# 2016 RESPONSE ACTION EFFECTIVENESS REPORT

**SWMU 17/BUILDING 1423 PLUME**
**SWMU 17/BUILDING 1429 PLUME**
**SWMU 18 PLUME**
**SWMU 21 PLUME**
**SWMUS 79/136 CENTRAL PLUME**
**SWMU 136 NORTH PLUME**
**SWMU 136 SOUTH PLUME**
**SWMU 85 PLUME**
**SWMU 86 PLUME**
**SWMU 108 PLUME**
**SWMU 138 PLUME**

**FORMER NAVAL AIR STATION**
**DALLAS, TEXAS**

**Revision: 0**

**Prepared for:**

**Department of the Navy**
**Naval Facilities Engineering Command Southeast**
**Building 135 N, P.O. Box 30**
**Jacksonville, Florida 32212-0030**

**January 2017**

# 2016 RESPONSE ACTION EFFECTIVENESS REPORT

**SWMU 17/BUILDING 1423 PLUME**
**SWMU 17/BUILDING 1429 PLUME**
**SWMU 18 PLUME**
**SWMU 21 PLUME**
**SWMUS 79/136 CENTRAL PLUME**
**SWMU 136 NORTH PLUME**
**SWMU 136 SOUTH PLUME**
**SWMU 85 PLUME**
**SWMU 86 PLUME**
**SWMU 108 PLUME**
**SWMU 138 PLUME**

**FORMER NAVAL AIR STATION**
**DALLAS, TEXAS**

**Revision: 0**

**Prepared for:**

**Department of the Navy**
**Naval Facilities Engineering Command Southeast**
**Building 135 N, P.O. Box 30**
**Jacksonville, Florida 32212-0030**

**Prepared by:**

**Resolution Consultants**
*A Joint Venture of AECOM & EnSafe*
**1500 Wells Fargo Building**
**440 Monticello Avenue**
**Norfolk, Virginia 23510**

**Contract Number: N62470-11-D-8013**

**CTO JM78**

**January 2017**

**Tom Wiberg**
**Contract Task Order Manager**

## Table of Contents

SWMU 17/BUILDING 1423 PLUME
SWMU 17/BUILDING 1429 PLUME
SWMU 18 PLUME
SWMU 21 PLUME
SWMUS 79/136 CENTRAL PLUME
SWMU 136 NORTH PLUME
SWMU 136 SOUTH PLUME
SWMU 85 PLUME
SWMU 86 PLUME
SWMU 108 PLUME
SWMU 138 PLUME

## Attachments

| | |
|---|---|
| Attachment 1A | Maps and Cross Sections<br>Affected Property Map<br>Isoconcentration Contour Maps<br>Potentiometric Surface Maps |
| Attachment 1B | Graphs |

## Appendices

| | |
|---|---|
| Appendix 1 | Reference List |
| Appendix 2 | Not Applicable |
| Appendix 3 | Not Applicable |
| Appendix 4 | Data Tables |
| Appendix 5 | Sampling Procedures |
| Appendix 6 | Laboratory Data Packages and Data Usability Summaries |
| Appendix 7 | Statistical Methodology |
| Appendix 8 | Waste Disposal Manifests |

# SWMU 17/BUILDING 1423 PLUME

# 2016 Response Action Effectiveness Report
# SWMU 17/Building 1423 Plume
# Former NAS Dallas, Texas

## Professional Signatures and Seals

**Professional Geoscientist**

| | | |
|---|---|---|
| *Thomas Wiberg* | *1619* | *30 November 2017* |
| Professional Geologist | Geologist License number | Expiration date |
| | *17 January 2017* | |
| Signature | Date | |
| *972-791-3222* | *972-791-0405* | *twiberg@ensafe.com* |
| Telephone number | FAX number | E-mail |

**Professional Engineer**

| | | |
|---|---|---|
| | | |
| Professional Engineer | P.E. License number | Expiration date |
| | | |
| Signature | Date | |
| | | |
| Telephone number | FAX number | E-mail |

**Registered Corrective Action Specialists (RCASs) and Corrective Action Project Managers (CAPMs)**
**For LPST sites only.**

| | | |
|---|---|---|
| | | |
| Registered Corrective Action Specialist | RCAS Registration number | Expiration date |
| | | |
| Signature | Date | |
| | | |
| Corrective Action Project Manager | CAPM Registration number | Expiration date |
| | | |
| Signature | Date | |
| | | |
| Telephone number | FAX number | E-mail |

**Seals, as applicable:**

# TEXAS COMMISSION ON ENVIRONMENTAL QUALITY
## Response Action Effectiveness Report

## Cover Page

**Regulatory ID number** (Solid waste registration number, VCP ID number, etc) *Solid Waste Code #65033*

check one: ___ Initial RAER submittal for this onsite property *X* Subsequent RAER submittal

Report date: *January 2017* TCEQ Region No.: *4*

**TCEQ Program** (check one)

*X* Corrective Action (Mail Code 127)

___ Voluntary Cleanup Program (Mail Code 221)

___ Petroleum Storage Tank Program (Mail Code 137)

___ Superfund PRP Lead (Mail Code 143)

___ Municipal Solid Waste Permits (Mail Code 124)

**Onsite Property Information**

Onsite Property Name: *Former Naval Air Station Dallas (NAS Dallas) — SWMU 17/Building 1423 Plume*

Street no. *8100* Pre dir: *West* Street name: *Jefferson* Street type *Blvd* Post dir: ___

City: *Dallas* County: *Dallas* County Code: *57* Zip: *75211*

Nearest street intersection or location description: ___

Latitude: Degrees, Minutes, Seconds OR Decimal Degrees (circle one) North *32°44'33.5"*

Longitude: Degrees, Minutes, Seconds OR Decimal Degrees (circle one) West *96°57'49.0"*

**Offsite Affected Property Information**

Offsite Affected Property Name: *Not Applicable (N/A)*

Street no. ___ Pre dir: ___ Street name: ___ Street type: ___ Post dir: ___

City: ___ County: ___ County Code: ___ Zip: ___

[X] Check if no offsite properties affected

**Contact Person Information and Acknowledgement**

Person (or company) Name: *Navy BRAC PMO EAST*

Contact Person: *Mr. David Barney* Title: *BRAC Environmental Coordinator*

Mailing Address: *4911 S. Broad Street, Building 679*

City: *Philadelphia* State: *PA* Zip: *19112* E-mail address **david.a.barney@navy.mil**

Phone: *617-753-4656* Fax: ___

By my signature below, I acknowledge the requirement of §350.2(a) that no person shall submit information to the executive director or to parties who are required to be provided information under this chapter which they know or reasonably should have known to be false or intentionally misleading, or fail to submit available information which is critical to the understanding of the matter at hand or to the basis of critical decisions which reasonably would have been influenced by that information. Violation of this rule may subject a person to the imposition of civil, criminal, or administrative penalties.

Signature of Person BARNEY.DAVID.A.1228582553 Digitally signed by BARNEY.DAVID.A.1228582553 DN: c=US, o=U.S. Government, ou=DoD, ou=PKI, ou=USN, cn=BARNEY.DAVID.A.1228582553 Date: 2017.01.18 06:38:32 -05'00' Name, print: *David Barney* Date: ___

Check the reports/forms previously submitted:

**Remedy Standard A**

____ Self-Implementation Notice Submittal date: _____

_X_ Response Action Plan — Approval date: *December 2006*

**Remedy Standard B**

____ Response Action Plan — Approval date: _____

List all media (surface soil, subsurface soil, groundwater, sediment, surface water, air) that contained or contains a PCLE zone and specify the response action that has been or will be taken for each media. Indicate the type of removal, decontamination, physical control, or institutional control action used in the response action.

| Media | COCs | Removal | Decontamination | Physical Control | Institutional Control | Modified Response Objective | | |
|---|---|---|---|---|---|---|---|---|
| | | | | | | PMZ | WCU | TI |
| Groundwater | Trichloroethene (TCE)<br>cis-1,2-Dichloroethene (cis-DCE)<br>Vinyl Chloride (VC) | N/A | MNA | N/A | N/A | N/A | N/A | N/A |

Current land use of the onsite affected property: ___ Residential _X_ Commercial/industrial

Projected future land use of the onsite property (if known): _X_ Residential ____ Commercial/industrial

Briefly describe the affected property and PCLE zones, the conclusions from the assessment activities, identify any affected or threatened receptors, and describe any other major site conditions. If any portion of the response action is necessitated due to an aesthetic or nuisance condition, identify the nature of that condition and identify that portion of the response action conducted to address it. If any media that contains a PCLE zone is not being addressed in this response action, provide justification.

**Affected Property: SWMU 17/Building 1423 Plume**

**In 1989, a Resource Conservation and Recovery Act (RCRA) Facility Assessment (RFA) was performed at NAS Dallas in accordance with the 1984 RCRA Hazardous and Solid Waste Amendments to evaluate potential releases at Solid Waste Management Units (SWMUs) and Areas of Concern (AOCs) and to make preliminary determinations regarding the need for further action. The RFA Report included data collected as part of a Preliminary Review, a Visual Site Inspection, and a Sampling Visit, as necessary, for 135 SWMUs and six AOCs at NAS Dallas (A.T. Kearney, 1989).**

**In 1993, NAS Dallas was identified for closure under the Base Realignment and Closure Act (BRAC). As part of the base closure activities, an Environmental Baseline Survey (EBS) was conducted at NAS Dallas to identify any potential environmental concerns related to historical operations at the base [EnSafe/Allen & Hoshall (E/A&H), 1994]. During this EBS, additional site concerns were identified at numerous buildings across the installation. In order to strategically investigate the permitted and non-permitted SWMUs, AOCs, and additional site concerns identified in the EBS, the facility was divided into six sections, called "categories", based on property use and ownership. In 1995, the Navy initiated RCRA Facility Investigation (RFI) activities at NAS Dallas at Categories A through F. Submittal of the Final RFI Reports (issued as a series of six reports — one report per category) occurred during the period from November 2000 to March 2001 [Tetra Tech NUS, Inc. (Tetra Tech), 2000a — 2001b]. The RFI was completed under the requirements of the Texas Risk Reduction Standards (RRS) [30 Texas Administrative Code (TAC) 335, Subchapter S], the regulatory framework in effect at the time, and closure recommendations in the RFI Reports were based upon Risk Reduction Standard 2 — Industrial (RRS2-IND) criteria. The RFI Reports identified those areas that required further action based on the chemical constituents detected in the soil and/or groundwater at the base.**

**The RFI Reports received conditional approval by the Texas Natural Resource Conservation Commission, now the Texas Commission on Environmental Quality (TCEQ). Final approval of the RFI Reports by TCEQ was dependent upon landowner concurrence of the RRS2-IND clean-up standard.**

**In September of 1999, the Texas Risk Reduction Program (TRRP) (30 TAC 350) was promulgated. One of the major changes resulting from TRRP was eliminating site background as a closure criterion. The most stringent closure standard under TRRP is the Residential Remedy Standard A (RES A), which consists of closure for residential use with no engineering or institutional controls.**

**In March 2001, the Navy submitted a Notice of Intention to Switch to TRRP (30 TAC 350) for five of the six categories. The one category (Category C) that was not switched to TRRP, but remained under the RRS2-IND standards, was subsequently transferred to the Department of the Army.**

**In October 2002, an Affected Property Assessment Report (APAR) was produced based on evaluation of RFI data as well as data from follow-up investigations (Tetra Tech, 2002). The data included in the APAR were compared to TRRP RES A criteria to select those sites that may be closed with no land use encumbrances and to determine which sites required corrective action. The results of this comparison indicated that 23 SWMUs (1, 2, 6, 17, 18, 21, 31, 35, 36, 60, 79, 81, 83, 84, 85, 86, 92, 102, 108, 124, 136, 138, and 139) required further action.**

**SWMU 17/Building 1423 Plume**

**Building 1423, the Aerospace Ground Equipment Shop, was constructed in 1978. The facility, a prefabricated metal structure with large bay doors and a concrete floor, was used to maintain and inspect aircraft and related equipment. In addition, part of the building stored oil, maintenance equipment, and waste petroleum products for the Aircraft Maintenance Squadron. The building also had a paint booth with an associated filter system.**

**Records indicate that former aviation support buildings associated with Hensley Field, the predecessor to NAS Dallas, were constructed in this location during the 1940s; specifically, Buildings 838 and 938 (baths and latrines) were located near this site from 1944 to 1983.**

**SWMU 17, a 250-gallon waste petroleum fiberglass underground storage tank (UST) (No. 1423-A), was installed in 1978 near the southwest corner of Building 1423. Vehicle crankcase, hydraulic waste fluids/oil, and some solvents were stored in this tank. The EBS reports two fiberglass 250-gallon waste oil USTs were associated with the facility, one of which is SWMU 17. The second UST was suspected to be associated with SWMU 42, but shown as UST No. 1423-B on historical documentation. Both SWMUs 17 and 42 were periodically pumped out and the sludge disposed of offsite. USTs 1423-A and 1423-B were removed by the Navy's Remedial Action Contractor (RAC) in early 1999, and the excavations were backfilled with imported clean fill material. A Response Action Completion Report (RACR) detailing the removal activities and results of closure confirmation sampling was prepared and submitted to the TCEQ for review and approval in 2001. Final regulatory approval of the RACR was received from the TCEQ in a letter dated 9 September 2004.**

**Soil**

**No soil exceedances were reported.**

**Groundwater**

**The results of the RFI for Category D issued in January 2001 indicate that groundwater at the site had been impacted by chlorinated volatile organic compounds (CVOC). As described in the APAR, the groundwater of this SWMU is located within a Class 2 groundwater resource area.**

**Historical site use coupled with the release of chemicals of concern (COC) into the highly heterogeneous shallow groundwater bearing unit (GWBU) ultimately lead to the identification of a discrete groundwater Protective Concentration Level Exceedance (PCLE) zone associated with the SWMU 17/Building 1423 Plume. The PCLE zone is the portion of the affected property that required a response action to reduce the concentration of COCs to levels less than the respective critical Protective Concentration Levels (PCL). Subsequent to the APAR, a Response Action Plan (RAP) was submitted to the TCEQ for the affected groundwater at the SWMU 17/Building 1423 Plume. The revised RAP (Revision 2), dated February 2006, received TCEQ approval in December 2006.**

**As indicated in the RAP, Monitored Natural Attenuation (MNA) was chosen as a decontamination remedy to address groundwater contamination identified in the PCLE zone for the SWMU 17/Building 1423 Plume (Tetra Tech, 2006). This remedy intends for concentrations of COCs in groundwater to attenuate to rates less than the critical PCLs by means of in-situ biological reductive dechlorination by the year 2017. The remedy involves sequential sampling events to determine changes in the plume over time and includes one year of confirmation groundwater sampling to confirm that PCLs have consistently been achieved and no rebound has occurred.**

**In October 2015, the Navy submitted a revised RAP (Revision 3) (Resolution Consultants, 2015) to TCEQ. The purpose of the revised RAP was to remove monitor wells with no history of COC detections, or with COC detections below the applicable GWPS, for at least the previous five consecutive years, from the current monitoring and sampling plans. In accordance with the RAP, Resolution Consultants conducted plugging and abandonment (P&A) of select groundwater monitoring wells in April 2016. P&A actions were conducted by a state of Texas licensed driller (Strata Core Services, SCI). Three wells (600D95MW, 613D130MW, and 613D45MW) were abandoned at SWMU 17/Bldg 1423.**

**Potential receptors are onsite residents, onsite employees, and onsite construction workers. Because the groundwater PCLE zone is not projected to migrate offsite based on groundwater modeling results and other lines of evidence, it is not anticipated that offsite receptors will be affected. The possible routes of exposure to groundwater are inhalation (onsite residents, onsite employees, and onsite construction workers) and dermal contact (onsite construction workers). Ingestion is not a concern because during the implementation of the response actions there is controlled access to the site, which limits potential exposures to contaminated groundwater (i.e., no potable or irrigation wells will be installed) through 2017. The potential for inhalation of vapor from groundwater through soil to outdoor air is insignificant because the maximum detected COC concentrations in groundwater are less than their respective inhalation of volatiles from groundwater ($^{Air}GW_{Inh\text{-}V}$) PCLs. Additionally, the indoor air sampling conducted in a sealed building at a similar plume at the base (Building 1406 within the SWMU 21 area) indicated that no CVOCs were detected in the indoor air (TtNUS, 2004b). The recent Vapor Intrusion Study at SWMU 21 (Resolution Consultants, 2015) also concluded that sub-slab TCE and cis-1,2-DCE concentrations were well below VISLs for sub-slab vapor as well as RSLs for indoor air. Furthermore, the analytical results indicated that neither TCE nor cis-1,2-DCE were detected in indoor air samples. Therefore, vapor intrusion is not a current concern at NAS Dallas.**

# CHRONOLOGY OF MAJOR EVENTS

| | |
|---|---|
| Sep. 1985 | Initial Assessment Study was prepared and submitted. |
| Jan. 1987 | Confirmation Study and Verification Step Report was prepared and submitted. |
| Mar. 1989 | RFA was prepared and submitted. |
| 1993 — 1994 | EBS was prepared and submitted. |
| Mar. 1994 | BRAC Cleanup Plan was prepared and submitted. |
| 1995 — 1996 | Basewide Round 1 groundwater sampling event (Directed Phase RFI). |
| 1996 — 1997 | Interim Draft RFI Reports were prepared and submitted for each category identified at the air station. |
| Mar. — June 1998 | Basewide Round 2 groundwater sampling event (Chase Phase RFI). |
| May — Oct. 1998 | Main Fuel Farm (MFF) USTs were removed by the Navy's Charleston Detachment, along with other tanks basewide. |
| June 1998 — Jan. 1999 | Release Determination Report was prepared and submitted covering the removal of the MFF tanks. |
| Aug. — Sep. 1998 | Basewide Round 3 groundwater sampling event. |
| Sep. 1998 | Most military operations on NAS Dallas ceased and the air station was placed into caretaker status. |
| Dec. 1998 — Jan. 2000 | Removal of oil/water separators (OWS) basewide. |
| Jan. — Oct. 1999 | Basewide removal of hot spot areas of contamination. |
| Feb. — Apr. 1999 | Basewide Round 4 groundwater sampling event. |
| Sep. — Oct. 1999 | Removal of the remaining USTs basewide. |
| Sep. — Nov. 1999 | Basewide Round 5 groundwater sampling event. |
| July 1999 — Feb. 2000 | Basewide pre-Corrective Measures Study monitoring well installation and sampling event. |
| June — July 2000 | Preliminary groundwater investigation at Advanced Science Incorporated Area-5 (ASA-5) site in the MFF/Main Fuel Farm Storm Sewer (MFF/MFFSS) area. |
| July — Aug. 2000 | Basewide Round 6 groundwater sampling event. |
| Aug. — Sep. 2000 | Aquifer tests were conducted at five sites across Former NAS Dallas to determine aquifer properties. |
| 2000 — 2001 | Final RFI Reports were prepared and submitted for each category. |
| June — July 2001 | Basewide Round 7 groundwater sampling event, including evaluation of alternate sampling methods [i.e., passive diffusion bag (PDB) and HydraSleeve]. |
| Sep. 2001 | Enhanced Monitored Natural Attenuation (EMNA) pilot test initiated at ASA-5 site (SWMUs 79/136) involving the injection of potassium permanganate ($KMnO_4$). |

| | |
|---|---|
| Feb. 2002 | MNA Groundwater Modeling Report for MFF/MFFSS was prepared and submitted. |
| Mar. 2002 | Technical Memorandum Groundwater Sampling Procedure Comparison for selected monitoring wells was prepared and submitted. |
| Oct. 2002 | APAR was prepared and submitted. |
| Dec. 2002 — Mar. 2003 | Basewide Round 8 groundwater sampling event. |
| Jan. 2003 | Monitoring Well Abandonment Plan was prepared and submitted. |
| Jan. 2003 | Draft MNA Groundwater Modeling Report for Category D Sites was prepared and submitted. |
| Jan. 2003 | Corrective action (excavation and disposal) initiated on the Rubble Landfill (SWMU 1). |
| Feb. 2003 | Draft RAP for MFF/MFFSS soils was prepared and submitted. |
| Apr. 2003 | Draft RAP for Category D Sites soils was prepared and submitted. |
| Apr. 2003 | Final Groundwater Report to satisfy Provision VIII.D.8 of the Former NAS Dallas RCRA Hazardous Waste Storage Permit (No. HW-50276) was prepared and submitted. |
| May 2003 | Self Implementation Notice (SIN) for TRRP RES A Soil Response Actions for SWMUs 2, 6, 18, 21, 31, 35, 36, 60, 79, 81, 83, 84, 85, 86, 102, 124, 138, and 139 was prepared and submitted. |
| June 2003 | Draft MNA Groundwater Modeling Report for Category B was prepared and submitted. |
| June 2003 | RCRA Permit renewal and Compliance Plan applications submitted to the TCEQ. |
| June 2003 | Corrective action (excavation, solidification, and disposal) initiated on the Texas Air National Guard (TANG) Ponds (SWMU 92). |
| July — Aug. 2003 | Basewide Round 9 groundwater sampling event. |
| Aug. 2003 | Corrective action (excavation, disposal, and backfill) initiated on the sites covered in the SIN submitted in May 2003. |
| Aug. 2003 | 2002 Annual Groundwater Monitoring Report was prepared and submitted. |
| Dec. 2003 — Jan. 2004 | Basewide Round 10 groundwater sampling event. |
| Jan. 2004 | Soil RACR was prepared and submitted for the Rubble Landfill (SWMU 1). |
| Jan. 2004 | Soil RACR was prepared and submitted for the TANG Ponds (SWMU 92). |
| Mar. 2004 | TCEQ produced and distributed the Draft RCRA Permit and Draft Compliance Plan. |
| Apr. 2004 | Final Addendum to MNA Groundwater Modeling Report for MFF/MFFSS was prepared and submitted. |
| May 2004 | 2003 Groundwater Response Action Effectiveness Reports (RAER) were prepared and submitted. |

| | |
|---|---|
| June 2004 | Indoor and Outdoor Air Sampling at Building 1406 Report was prepared and submitted. |
| July 2004 | Basewide Round 11 groundwater sampling event. |
| July 2004 | Final MNA Groundwater Modeling Report for Category D was prepared and submitted. |
| Sep. 2004 | Final MNA Groundwater Modeling Report for Category B was prepared and submitted. |
| Sep. 2004 | TCEQ approved final closure documentation for the Miscellaneous Sites Soil RACR. |
| Oct. 2004 | Basewide Round 12 groundwater sampling event. |
| Oct. 2004 | TCEQ approved Final MNA Groundwater Modeling Report for Category D Sites at Former NAS Dallas. |
| Oct. 2004 | TCEQ approved Final Addendum to the MNA Groundwater Modeling Report for MFF/MFFSS at Former NAS Dallas. |
| Oct. 2004 | TCEQ approved Final Groundwater Report for Former NAS Dallas. |
| Oct. 2004 | TCEQ approved the 2002 Annual Groundwater Monitoring Report. |
| Nov. 2004 | Final RAP (Basewide) for groundwater was prepared and submitted. |
| Dec. 2004 | 2004 Semi-annual Groundwater Monitoring Report was prepared and submitted. |
| Dec. 2004 | TCEQ issued comments on the 2003 Groundwater RAERs. |
| Jan. 2005 | 2004 Groundwater RAERs were prepared and submitted. |
| Mar. 2005 | Monitoring Well Installation and Abandonment Plan was prepared and submitted. |
| Mar. 2005 | Draft 84 Sites Soil RACR was prepared and submitted. |
| Apr. 2005 | 2004 Groundwater RAERs were prepared and submitted. |
| Apr. 2005 | Basewide Round 13 groundwater sampling event. |
| June 2005 | Corrective action for groundwater (excavation, disposal, and backfill) initiated at SWMU 85. |
| June 2005 | Corrective action for groundwater (excavation, disposal, and backfill) initiated at SWMU 18. |
| July 2005 | Basewide Round 13 groundwater sampling event. |
| Aug. 2005 | TCEQ issued comments on the Draft 84 Sites Soil RACR. |
| Aug. 2005 | 2005 Semi-annual Groundwater Monitoring Report was prepared and submitted. |
| Sep. 2005 | TCEQ issued comments on the 2004 Groundwater RAPs. |
| Oct. 2005 | TCEQ issued comments on the 2004 Groundwater RAERs. |
| Oct. 2005 | Basewide Round 14 groundwater sampling event. |
| Oct. — Dec. 2005 | City of Dallas issued comments on the Draft 84 Sites Soil RACR. |

| | |
|---|---|
| Dec. 2005 | TCEQ issued comments on the 2005 Semi-annual Groundwater Monitoring Report. |
| Jan. 2006 | 2005 Groundwater RAERs were prepared and submitted. |
| Jan. 2006 | Basewide Round 15 groundwater sampling event. |
| Feb. 2006 | Revised Groundwater RAPS (Revision 2) were prepared and submitted covering SWMUs 17/Building 1423, 17/Building 1429, 18, 35, 85, 86, 108, 136 North, 136 South, and 139. |
| Mar. 2006 | RACR for groundwater removed at SWMUs 18 and 85 were prepared and submitted. |
| May 2006 | Basewide Round 15B groundwater sampling event. |
| May 2006 | TCEQ issued comments on the 2005 Groundwater RAERs. |
| June 2006 | 85 Sites, Defense Reutilization and Marketing Office (DRMO), and Naval Weapons Industrial Reserve Plant (NWIRP) SWMU 18 Soil RACRs (Revision 1) were prepared and submitted. |
| July 2006 | TCEQ issued comments on the Groundwater RAPs (Revision 2). |
| July 2006 | EMNA Pilot Test initiated at SWMU 21 involving the injection of zero valent iron (ZVI). |
| Aug. 2006 | Basewide Round 16 groundwater sampling event. |
| Aug. 2006 | Responses to TCEQ comments on the Groundwater RAPs (Revision 2), including replacement pages, were prepared and submitted. |
| Nov. 2006 | Basewide Round 16B groundwater sampling event. |
| Dec. 2006 | RACR for groundwater PCL at SWMU 35 was prepared and submitted. |
| Dec. 2006 | TCEQ approves Groundwater RAP (Revision 2) covering SWMUs 17/Building 1423, 17/Building 1429, 18, 35, 85, 86, 108, 136 North, 136 South, and 139. |
| Jan. 2007 | 2006 Groundwater RAERs were prepared and submitted. |
| Apr. 2007 | Groundwater Sampling Work Plan Addendum, Slug Test Work Plan, and Monitoring Well Installation and Abandonment Work Plan were prepared and submitted. |
| Apr. — May 2007 | Basewide Round 17 groundwater sampling event. |
| Apr. — June 2007 | SWMU 18 OWS removal operations were conducted. |
| Apr. 2007 | Slug test operations conducted at SWMUs 18, 85, and 139. |
| Aug. — Sep. 2007 | Basewide Round 18 groundwater sampling event. |
| Nov. 2007 | Field Activities for SWMU 21 EMNA Pilot Study completed. |
| Jan. 2008 | Basewide Round 19 groundwater sampling event. |
| Jan. 2008 | 2007 Groundwater RAERs were prepared and submitted. |
| Feb. 2008 | TCEQ approves the Groundwater RACR for SWMU 35. |
| Apr. 2008 | Comments to the 85 Sites, DRMO, and NWIRP SWMU 18 Soil RACRs revisions were received from the TCEQ. |

| | |
|---|---|
| May 2008 | TCEQ issued comments on the 2007 Groundwater RAERs. |
| May 2008 | Response to the 85 Sites, DRMO, and NWIRP SWMU 18 Soil RACRs comments were submitted to the TCEQ. |
| July 2008 | Basewide Round 20 groundwater sampling event. |
| July 2008 | TCEQ grants final approval of the 85 Sites, DRMO, and NWIRP SWMU 18 Soil RACRs. |
| July 2008 | Response to TCEQ comments on 2007 Groundwater RAERs, replacement pages (Revision 1) to 2007 RAERs prepared and submitted. |
| Oct. 2008 | Technical Memorandum, ASA-5 East Site EMNA Pilot Study prepared and submitted. |
| Oct. 2008 | Technical Memorandum, Pilot Study at SWMU 21 prepared and submitted. |
| Oct. 2008 | SWMU 17/Building 1429 Pilot Test Work Plan prepared and submitted. |
| Dec. 2008 | SWMU 139 Groundwater RACR prepared and submitted. |
| Jan. 2009 | Basewide Round 21 groundwater sampling event. |
| Jan. 2009 | 2008 Groundwater RAERs prepared and submitted. |
| Jan. 2009 | Revised Groundwater RAPs for SWMU 21 (Revision 2) prepared and submitted. |
| Jan. 2009 | Revised Groundwater RAPs for SWMUs 79/136 Central (Revision 2) prepared and submitted. |
| Jan. 2009 | Revised Groundwater RAP for SWMU 136 South (Revision 4) prepared and submitted. |
| May 2009 | SWMU 21 Pilot Study additional groundwater sampling. |
| May 2009 | SWMU 79/136 Central non-compliant monitoring well groundwater sampling. |
| May 2009 | TCEQ grants conditional approval of the SWMU 139 Groundwater RACR. |
| June 2009 | ASA-5 Pilot Test injection points abandonment. |
| June 2009 | SWMU 35 monitoring well abandonment. |
| July 2009 | Basewide Round 22 groundwater sampling event. |
| Sep. 2009 | SWMU 21 Pilot Study monitoring wells abandonment. |
| Oct. 2009 | Revised Technical Memorandum, SWMU 21 Pilot Study prepared and submitted. |
| Oct. 2009 | SWMU 136 South non-compliant monitoring well groundwater sampling. |
| Nov. 2009 | Response to TCEQ comments on 2008 Groundwater RAERs prepared and submitted. |
| Jan. 2010 | Basewide Round 23 groundwater sampling event. |
| Jan. 2010 | 2009 Groundwater RAERs prepared and submitted. |
| July 2010 | Basewide Round 24 groundwater sampling event. |
| Aug. 2010 | Basewide monitoring well network inspection and five-year survey. |

| | |
|---|---|
| Nov. 2010 | Response to TCEQ comments on 2009 Groundwater RAERs prepared and submitted. |
| Dec. 2010 | Monitoring wells general maintenance and minor repairs completed. |
| Jan. 2011 | Basewide Round 25 groundwater sampling event. |
| Jan. 2011 | 2010 Groundwater RAERs prepared and submitted. |
| March 2011 | Monitoring well inspection at SWMU 21/SWMU 18 on monitoring wells within the 20-acre area leased to the Air National Guard. |
| May 2011 | Addendum to Monitoring Well Installation and Abandonment Plan prepared and submitted. |
| June 2011 | SWMU 139 monitoring wells plugged and abandoned. |
| June 2011 | SWMU 81 monitoring wells plugged and abandoned. |
| June 2011 | Repairs, abandonment and replacement of damaged monitoring wells at SWMU 21 and SWMU18. |
| July 2011 | Basewide Round 26 groundwater sampling event. |
| Dec. 2011 | Response to TCEQ comments on 2010 Groundwater RAERs prepared and submitted. |
| Jan. 2012 | Basewide Round 27 groundwater sampling event. |
| Mar. 2012 | 2011 Groundwater RAERs prepared and submitted. |
| July 2012 | Basewide Round 28 groundwater sampling event. |
| Aug. 2012 | U.S. EPA Comments to the 2011 Groundwater RAER. |
| Oct. 2012 | TCEQ comments to the 2011 Groundwater RAER. |
| Jan. 2013 | Basewide Round 29 groundwater sampling event. |
| Jan. 2013 | 2012 Groundwater RAERs prepared and submitted. |
| Feb. 2013 | TCEQ comments to the 2012 Groundwater RAER. |
| June 2013 | U.S. EPA comments to the 2012 Groundwater RAER. |
| July 2013 | Basewide Round 30 groundwater sampling event. |
| July 2013 | Response to TCEQ comments on 2012 Groundwater RAERs prepared and submitted. |
| Jan. 2014 | Basewide Round 31 groundwater sampling event. |
| Jan. 2014 | 2013 Groundwater RAERs prepared and submitted. |
| Feb. 2014 | TCEQ comments to the 2013 Groundwater RAER. |
| June 2014 | U.S. EPA comments to the 2013 Groundwater RAER. |
| July 2014 | Basewide Round 32 groundwater sampling event. |
| July 2014 | Response to TCEQ comments on 2013 Groundwater RAERs prepared and submitted. |
| Nov. 2014 | RCRA Permit renewal and Compliance Plan (Number 50276) applications submitted to the TCEQ. |
| Jan. 2015 | Basewide Round 33 groundwater sampling event. |
| Jan. 2015 | 2014 Groundwater RAERs prepared and submitted. |

| | |
|---|---|
| May 2015 | TCEQ Permit Renewal Application Technical Notice of Deficiency (NOD) Letter, dated May 26, 2015. |
| June 2015 | Meeting with TCEQ, U.S. EPA, and City of Dallas |
| June 2015 | TCEQ comments letter to the 2014 Groundwater RAER, dated June 10, 2015. |
| June 2015 | Submittal of Draft revised RAP for SWMU 17/Building 1423, received June 23, 2015. |
| June 2015 | Response to TCEQ comments to the Response to Permit Renewal Application Technical NOD Letter for Former Dallas Naval Air Station (NAS), Dallas, Texas, dated June 26, 2015. |
| July 2015 | Basewide Round 34 groundwater sampling event. |
| July 2015 | TCEQ Permit Renewal Application Second Technical Notice of Deficiency Letter, dated July 24, 2015. |
| July 2015 | Response to TCEQ Comments on the Technical Memorandum Pilot Study for SWMU 21, Rev. 1, July 2009 submitted to the TCEQ, dated July 24, 2015. |
| Oct. 2015 | Basewide submittal of Revised and Interim Response Action Plans. |
| Dec. 2015 | Draft Final Enhanced Monitored Natural Attenuation (EMNA) Spot Treatment Workplan for SWMU 18 prepared and submitted to TCEQ. |
| Dec. 2015 | Amendment to the Approved Class V Underground Injection Control (UIC) Permit (5X2600432) prepared and submitted to TCEQ. |
| Jan. 2016 | Basewide Round 35 groundwater sampling event. |
| Jan. 2016 | TCEQ, U.S EPA, and City of Dallas approve EMNA workplan. |
| Jan. 2016 | 2015 Groundwater RAERs prepared and submitted. |
| Jan. 2016 | EMNA Spot Treatment Design Verification Testing at SWMU 18 by Resolution Consultants and Regenesis Remediation Services. |
| March 2016 | Draft Tier II Sampling and Analysis Plan Addendum #1, Long-Term Monitoring Plan Enhanced Monitored Natural Attenuation Spot Treatment at SWMU 18 Former Naval Air Station Dallas, Dallas, Texas prepared and submitted to TCEQ. |
| March 2016 | Amendment to the Approved Class V UIC Permit (5X2600432) prepared and submitted to TCEQ. |
| Apr. 2016 | TCEQ approves UIC amendment request. |
| Apr. 2016 | Basewide monitor well plugging and abandonment and operation and maintenance actions, installation of monitor well 508F98MW in SWMU 79 |
| Apr. 2016 | EMNA Spot Treatment at SWMU 18 baseline groundwater sampling event. |
| May 2016 | EMNA Spot Treatment at SWMU 18 injections by Resolution Consultants and Regenesis Remediation Services. |
| Jul. 2016 | Basewide Round 36 groundwater sampling event. |

| | |
|---|---|
| Aug. 2016 | Deploy passive diffusion bags at EMNA Spot Treatment well 606D152MW. |
| Sep. 2016 | Basewide operations and maintenance activities completed. |
| Sep. 2016 | EMNA Spot Treatment at SWMU 18 first quarterly performance groundwater monitoring event. |
| Sep. 2016 | Draft Tier II Sampling and Analysis Plan Addendum #2, Long-Term Monitoring Plan, Enhanced Monitored Natural Attenuation, Perfluoroalkyl Substances Groundwater Investigation, Former Naval Air Station Dallas, Dallas, Texas prepared and submitted to TCEQ. |

# Checklist for Report Completeness

Use this checklist to determine the portions of the form that must be submitted for this report. Answer all questions by checking Yes or No. If the answer is Yes include that portion of the report. If the answer is No, do not complete or submit that portion of the report. All form contents that are marked "Required" must be submitted. Form contents marked with an asterisk (*) are not included in the blank form and are to be provided by the person.

| | | | Report Contents | |
|---|---|---|---|---|
| | | Required | **Cover Page** | ☒ |
| | | Required | **Executive Summary** | ☒ |
| | | Required | **Checklist for Report Completeness** | ☒ |
| | | Required | **Worksheet 1.0** Response Action Objectives | ☒ |
| | | Required | **Attachment 1A*** Maps and Cross Sections | ☒ |
| | | Required | **Attachment 1B*** Graphs | ☒ |
| | | Required | **Attachment 1C*** Response Action Diagrams | ☐ *N/A* |
| No ☒ | Is a plume management zone being used as part of the response action? | ☐ Yes | **Worksheet 2.0** Plume Management Zone | ☐ |
| | | | **Attachment 2A*** Map of Plume Management Zone | ☐ |
| No ☒ | Was an area of technical impracticability approved for use as part of the response action? | ☐ Yes | **Worksheet 3.0** Technical Impracticability | ☐ |
| | | | **Attachment 3A*** Map of Technical Impracticability | ☐ |
| No ☒ | Are institutional controls used or required as part of the response action? | ☐ Yes | **Worksheet 4.0** Institutional Controls | ☐ |
| | | Required | **Worksheet 5.0** Performance Measures and Problems | ☒ |
| No ☐ | Have any operation and maintenance activities been conducted? | ☒ Yes | **Worksheet 6.0** Operation and Maintenance | ☒ |
| No ☒ | Has there been any change to the plans for post-response action care from that submitted in the RAP? | ☐ Yes | **Worksheet 7.0** Post-Response Action Care | ☐ |
| No ☐ | Was any information for this report obtained from outside sources? | ☒ Yes | **Appendix 1*** References | ☒ |
| No ☒ | Is an ESA and/or Compensatory Restoration being used as part of the response action? | ☐ Yes | **Appendix 2*** ESA and Compensatory Restoration | ☐ |

| Checklist for Report Completeness | ID No. *SWR 65033* *SWMU 17/Building 1423 Plume* | Report Date: *01/17/2017* |
|---|---|---|

| | | | | |
|---|---|---|---|---|
| No ☒ | Are institutional controls or landowner concurrence required in the response action? | ☐ Yes → | **Appendix 3*** Institutional Controls and Landowner Concurrence | ☐ |
| No ☐ | Is there data or boring/monitor well information not previously submitted? | ☒ Yes | **Appendix 4*** Data Tables, Boring Logs, and Well Completions | ☒ |
| No ☒ | Did sampling procedures differ from those described in the RAP? | ☐ Yes → | **Appendix 5*** Sampling Procedures | ☐ |
| No ☐ | Has any sampling been conducted for which the analytical results were not previously submitted? | ☒ Yes → | **Appendix 6*** Laboratory Data Packages | ☒[1] |
| No ☐ | Were statistics or geostatistics used in the response action? | ☒ Yes → | **Appendix 7*** Statistical Methodology | ☒ |
| No ☐ | Were any wastes generated that were not reported through STEERS? | ☒ Yes → | **Appendix 8*** Waste Disposition | ☒ |

***Note:***
[1]Included with 2016 RAER in CD format.

Use this worksheet to describe the response action objectives in each media.

## Response Action Objectives — SWMU 17/Building 1423 Plume

What is the selected remedy standard for this affected property? *X* A ____ B

List the environmental media to which this applies *Groundwater*

Repeat this section for each medium that had a different response action objective.

Provide a detailed description of the response action. Describe the removal actions, decontamination actions, treatment system(s), and/or physical or institutional control actions that have been conducted in each media and indicate if there were any differences between the actions taken and the actions proposed in the SIN or RAP.

**The groundwater response action for the site consists of MNA as a decontamination remedy to reduce the concentration of COCs to less than their critical PCLs. MNA includes the following elements:**

- **Decontamination through the ongoing biological and chemical reductive dechlorination processes.**
- **A monitoring/confirmation sampling program to evaluate the progress of the decontamination.**

**The fate and transport modeling results (Tetra Tech, 2004) indicated that there would be no expansion of the PCLE zone or offsite migration of COCs at concentrations greater than the respective critical PCLs.**

Describe how the response action has, or is working towards, achievement of the property-specific response objectives for the PCLE zone in each medium in the context of the response objectives set forth in §350.32 or §350.33, as applicable. Explain how the response action is appropriate based on the hydrogeologic and COC characteristics. Describe any unprotective conditions that continued or resulted from the remedial actions and the actions taken to mitigate unprotective conditions.

**The response action for the contaminated groundwater in the PCLE zone will meet groundwater response objectives of §350.32 by the use of MNA as a decontamination remedy to reduce the concentration of COCs within the PCLE zone to less than their critical PCLs. The primary mechanisms for natural attenuation of COCs rely on the capacity of the groundwater system to reduce COC concentrations. The attenuation process can include biodegradation, dispersion, dilution, and adsorption of contaminates in site groundwater. Specifically, the response action relies on in-situ biological reductive dechlorination of dissolved chlorinated solvents in groundwater. The Navy considers this response action appropriate based on the ongoing evaluation process that has demonstrated that MNA is capable of reducing the concentrations of COCs in the PCLE zone within a reasonable timeframe, while controlling plume expansion.**

**During the implementation of the response action activities, there will be controlled access to the site and limited potential exposure to contaminated groundwater due to site restrictions on potable or irrigation well installation through 2017. Additionally, the fate and transport modeling results in the Final MNA Groundwater Monitoring Report for Category D (Tetra Tech, 2004) predicted that there would be no expansion of the PCLE zone or offsite migration of COCs at concentrations greater than the respective critical groundwater PCLs. Because this decontaminating remedy is based on an in-situ technology, the potential short-term exposures normally associated with the implementation of ex-situ technologies (i.e., dermal and inhalation exposures) are not a concern.**

If different from the information provided in the RAP, explain how the COCs have been handled, treated, disposed, or transferred to another medium and document that the response action has not resulted in any additional exposure conditions due to response action activities.

*N/A*

Explain whether the response action is achieving, or will achieve, the objectives within the reasonable time frame.

**Only one COC in one monitor well exceeded its PCL during the January 2016 sample event; TCE was detected at a concentration of 0.00954 mg/L, slightly above its PCL of 0.005 mg/L, in the sample collected from monitor well 61303MW during the January sampling event. No COCs exceeded PCLs during the July sampling event. The strongest evidence for natural attention is the reduction of COC concentrations observed in samples from monitoring wells over the period of record and the apparent stability of the plume. Specifically, natural attenuation has reduced concentrations of TCE, cis-1,2-DCE, and VC in monitoring wells located along the centerline of the plume (61303MW, 613D41MW, and 61301MW) to levels below respective critical groundwater PCLs.**

**COC concentration data indicate concentration versus (vs.) time attenuation rates ($K_{time}$) necessary to achieve clean-up goals show decreasing or downward trends in concentration levels. In addition, linear regression modeling of site data, which indicate the best estimate of the "true" line through the data, indicates that attenuation will be adequate to reach PCL goals; however, seasonal fluctuations in TCE concentrations appear to be occurring at monitoring well 61303MW. TCE concentrations at 61303MW tend to increase slightly above the PCL of 0.005 milligrams per liter (mg/L) during the January groundwater sample events and return to levels below the PCL during July sample events. Nevertheless, overall decreasing trends in COCs indicate that progress of the MNA response action is occurring.**

**The Navy considers this response action appropriate based on the ongoing evaluation process that has demonstrated that MNA is capable of reducing the concentrations of COCs in the PCLE zone within a reasonable time frame, while controlling plume expansion.**

**Maps in Attachment 1A, data tables in Appendix 4, and graphs in Attachment 1B show a smaller PCLE zone footprint than that presented in the RAP (Tetra Tech, 2006), thus providing additional indications that effective remediation of the plume through MNA is occurring within the expected time frame (i.e., on or before 2017).**

Are physical controls part of the response action? ____ Yes *X* No

If yes, describe the type and purpose of the physical control and discuss how the physical control has proven effective.

*N/A*

## Soil Response Action Objectives

When using removal and/or decontamination with controls or controls only, demonstrate that the physical control or combination of measures is reliably containing, and will continue to contain, COCs within and/or derived from the surface soil and subsurface soil PCLE zone materials over time.

*N/A*

Explain how the removal or decontamination action is reducing the concentration of COCs to the critical surface soil and subsurface soil PCL throughout the soil PCLE zone and preventing COC concentrations above the critical soil PCLs from migrating beyond the original boundary of the soil PCLE zone.

*N/A*

## Groundwater Response Action Objectives — SWMU 17/Building 1423 Plume

Name of groundwater-bearing unit to which this information applies *Upper Water Bearing Zone (Alluvial Overburden)*

Repeat this section for each groundwater-bearing unit for which a different response action is being conducted.

Groundwater classification ____ 1 _X_ 2 ___ 3

Is a modified groundwater response action being used for any part of the groundwater PCLE zone (§350.33(f)(2), (3), or (4))? ___ Yes _X_ No

If yes, complete the appropriate portions of this report.

Explain how the removal or decontamination actions are reducing the concentration of COCs to the critical groundwater PCL throughout the groundwater PCLE zone and preventing COC concentrations above the critical groundwater PCL from migrating beyond the original boundary of the groundwater PCLE zone. If COC concentrations above the critical groundwater PCL have ever migrated beyond the original boundary of the groundwater PCLE zone, explain the actions taken to address the increase in the PCLE zone.

**The response action has reduced concentrations of TCE, cis-1,2-DCE, and VC in monitoring wells located along the centerline of the plume (61303MW, 613D41MW, and 61301MW) to levels below respective groundwater PCLs. COC concentration data indicate concentration vs. time attenuation rates ($K_{time}$) necessary to achieve clean-up goals show decreasing or downward trends. In addition, linear regression modeling of site data, which indicate the best estimate of the "true" line through the data, indicates that attenuation will be adequate to reach PCL goals. Overall decreasing trends in COCs indicate that progress of the MNA response action is occurring. It should be noted that only one COC in one monitor well had a PCL exceedance during the January sampling event. No COCs exceeded PCLs during the July sampling event.**

**The Navy considers this response action appropriate based on the ongoing evaluation process that has demonstrated that MNA is capable of reducing the concentrations of COCs in the PCLE zone within a reasonable time frame, while controlling plume expansion.**

**Maps in Attachment 1A, data tables in Appendix 4, and graphs in Attachment 1B show a smaller PCLE zone footprint than that presented in the RAP (Tetra Tech, 2006), thus providing additional indications that effective remediation of the plume through MNA is occurring within the expected time frame (i.e., on or before 2017).**

Explain how the response actions are preventing COCs from migrating to air at concentrations above the PCLs for air if the groundwater-to-air PCLs ($^{Air}GW_{Inh\text{-}V}$) were exceeded.

**The maximum observed concentrations of the detected groundwater COCs in the PCLE zone are less than their respective $^{Air}GW_{Inh\text{-}V}$ PCLs.**

Explain how the response actions are preventing COCs from migrating to surface water at concentrations above the PCLs for groundwater discharges to surface water if surface water was a factor.

**As indicated in the RAP (Tetra Tech, 2006), surface water is not a factor. Additionally, the fate and transport modeling results (Tetra Tech, 2004) indicate that the PCLE zone will not migrate beyond the Former NAS Dallas property line; therefore, there will be no threat to offsite human or ecological receptors.**

Explain how the response actions are preventing human and ecological receptor exposure to the groundwater PCLE zone.

**The response action is based on an in-situ technology that will permanently degrade the COCs. During the implementation of the in-situ groundwater response action, access to the site will be controlled by not permitting any potable or irrigation wells in the PCLE zone during remedial activities. Additionally, the fate and transport modeling results (Tetra Tech, 2004) indicate that the PCLE zone will not migrate beyond the Former NAS Dallas property line; therefore, there will be no threat to offsite human or ecological receptors.**

## Waste Management

Describe the volume and final disposition or reuse location of waste or environmental media that has been removed from the affected property during the response action, if not previously reported under STEERS. Provide copies of all manifests, other documentation of disposition, and landowner consent for reuse of soil in Appendix 8.

**Excess groundwater recovered through the low-flow or PDB sampling methods is placed into properly labeled 55-gallon capacity drums and stored at the site. Upon classification, waste disposal arrangements are made with a licensed waste disposal facility. Appendix 8 contains copies of the waste disposal manifests for groundwater generated during the 2016 sampling activities at Former NAS Dallas.**

# ATTACHMENT 1A
# MAPS AND CROSS SECTIONS

# AFFECTED PROPERTY MAP

Affected Property Map
Former NAS Dallas, Texas

January 2014 Isocontour
Gross PCLE Zone Outline
Demolished Building
Existing Structure
Owned by City of Dallas
Transferred from Exelon Corporation to City of Dallas
Transferred from Navy to City of Dallas
Transferred from Navy to City of Grand Prairie
Transferred from Navy to U.S. Army Reserve
Owned by Exelon Corporation

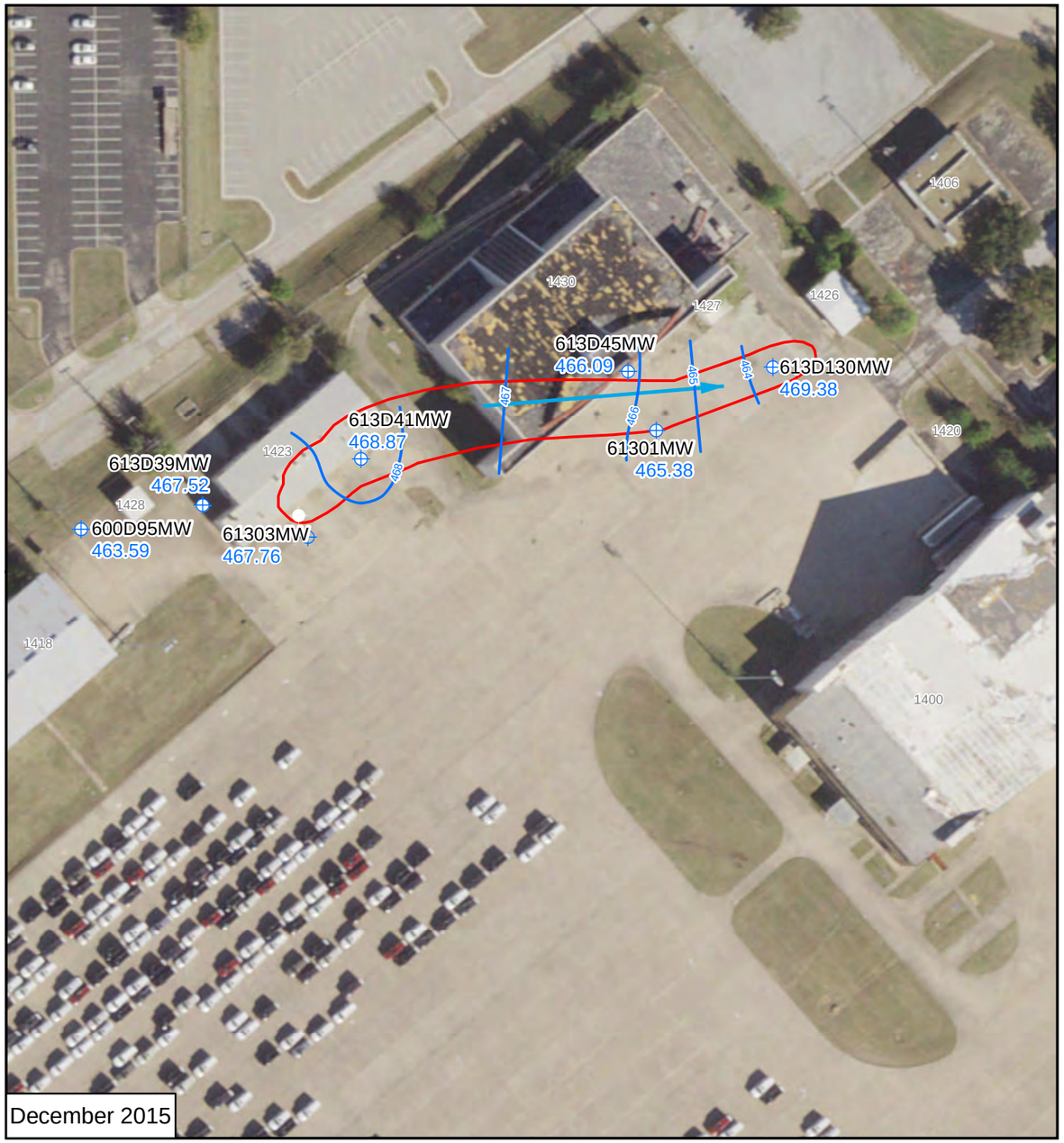
NAVFAC Naval Facilities Engineering Command

| | |
|---|---|
| REQUESTED BY: T. Wiberg | DATE: 9/21/2015 |
| DRAWN BY: A. Zimmerman | PROJECT NUMBER: 0888812796 |

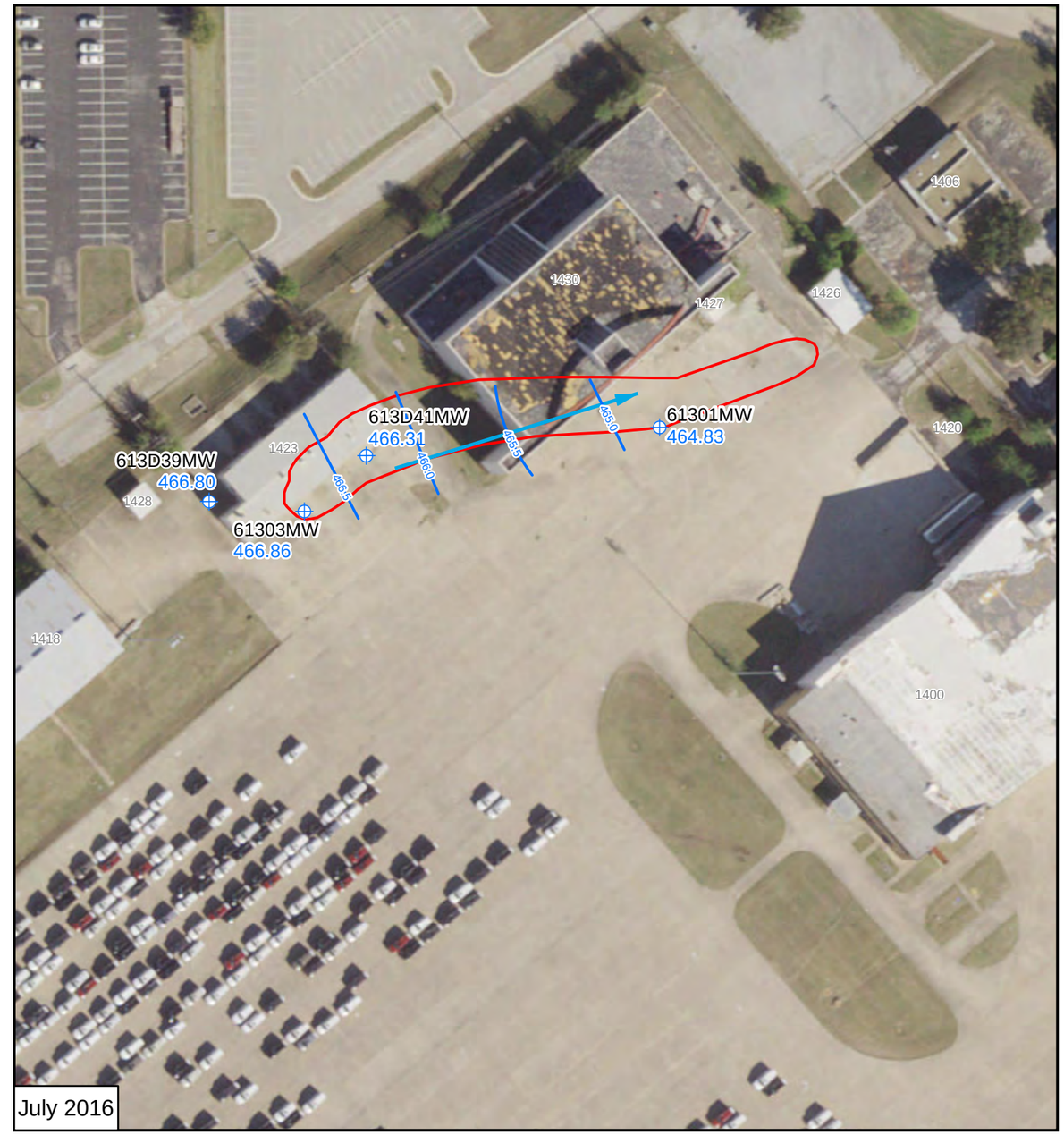
X:\Navy\NAS_Dallas\NAS_Dallas_Jan14_AffectedPropMap.mxd

Service Layer Credits: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community; State boundary is from the United States Census Bureau; Some data are from TetraTech.

# POTENTIOMETRIC SURFACE MAPS




December 2015




July 2016

N

Well Location

Potentiometric Surface Contour, Dashed Where Inferred

Groundwater Flow Direction

Gross PCLE Zone Outline

Demolished Building

Notes:
464.83 - Potentiometric Surface Contour (Feet above MSL)
* Anomalous water level not used to construct contours

0 50 100 150 200 Feet

Figure 1A-3
Potentiometric Surface Map
SWMU 17 / Building 1423 Plume
2016 RAER
Former NAS Dallas, Texas

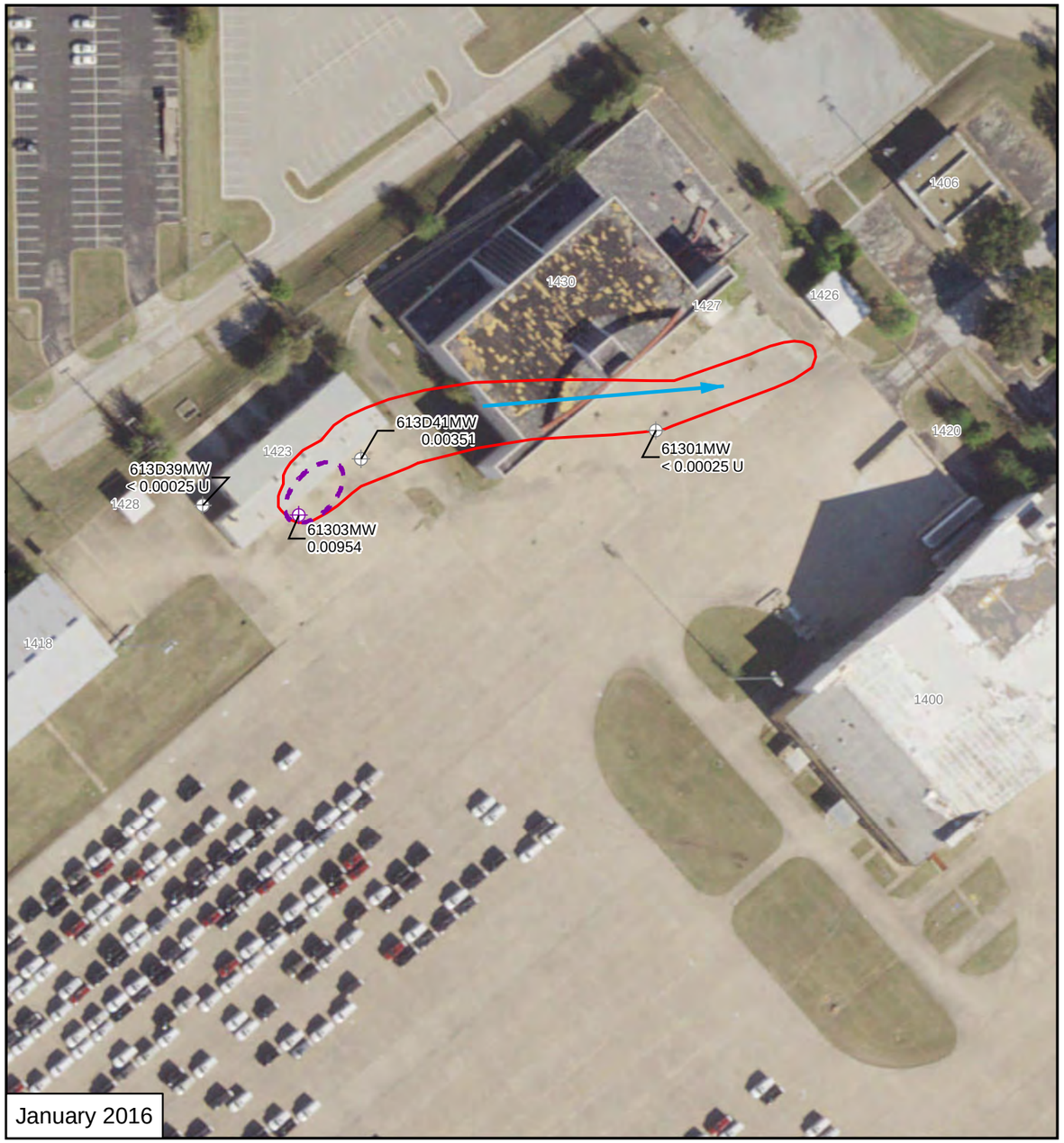
NAVFAC Naval Facilities Engineering Command

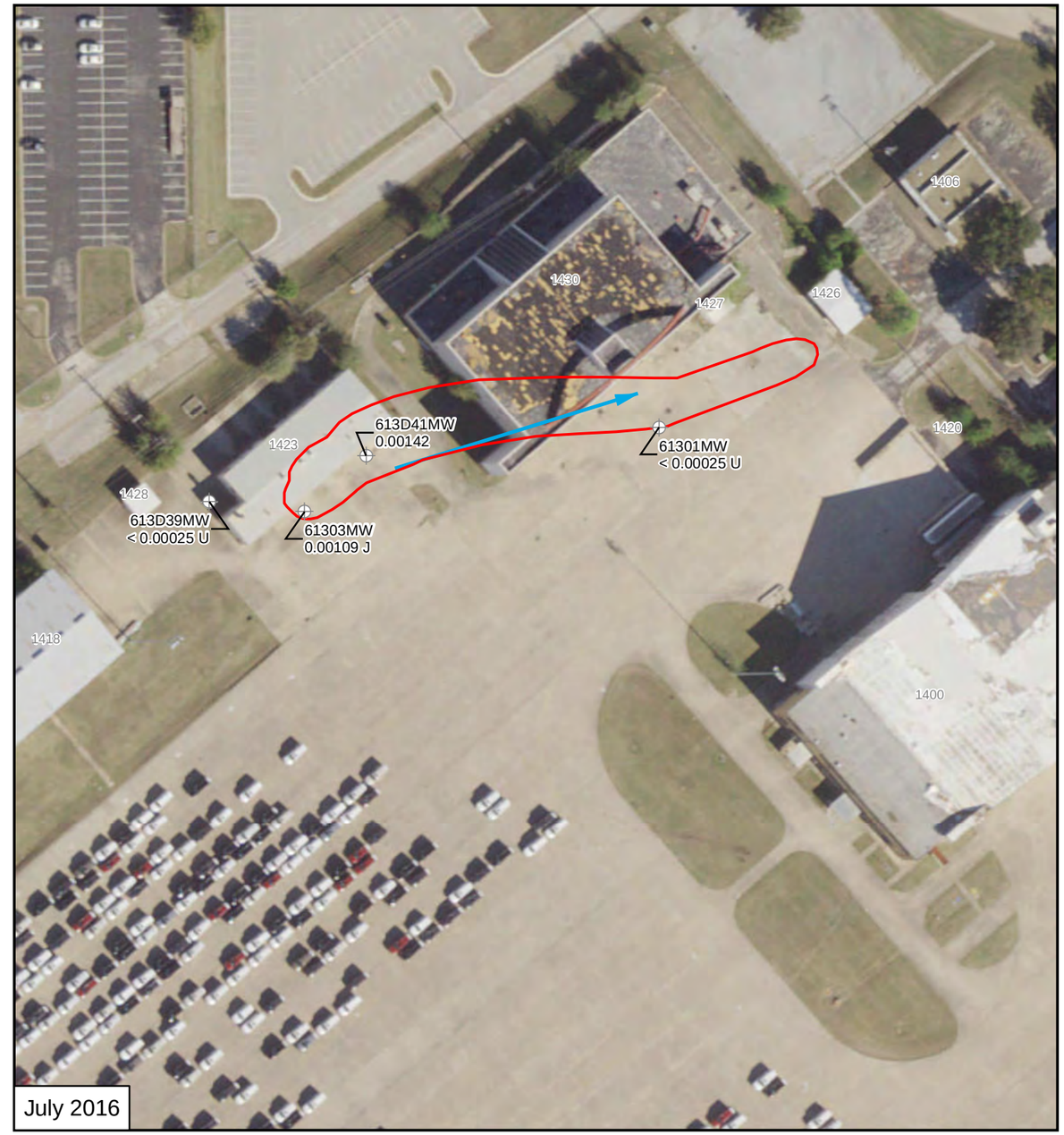
| | |
|---|---|
| REQUESTED BY: E. Brickman | DATE: 10/14/2016 |
| DRAWN BY: M. Senne | PROJECT NUMBER: 0888812796 |

X:\Navy\NAS_Dallas\2016_Jul_NAS_Dallas_Iso_POT_SWMU17_Building1423.mxd

Service Layer Credits: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community

# ISOCONCENTRATION CONTOUR MAPS




N

**TCE Concentration (mg/L)**

- ND - 0.005
- 0.005 - 0.05

**Isoconcentration Contour**

- 0.0005 mg/L

- Gross PCLE Zone Outline
- Groundwater Flow Direction
- Demolished Building

Note: The PCL for TCE = 0.005 mg/L

0 50 100 150 200 Feet

Figure 1A-2A
Trichloroethene Isoconcentration Contours
SWMU 17 / Building 1423 Plume
2016 RAER
Former NAS Dallas, Texas

NAVFAC Naval Facilities Engineering Command

| | |
|---|---|
| REQUESTED BY: E. Brickman | DATE: 11/16/2016 |
| DRAWN BY: M. Senne | PROJECT NUMBER: 0888812796 |

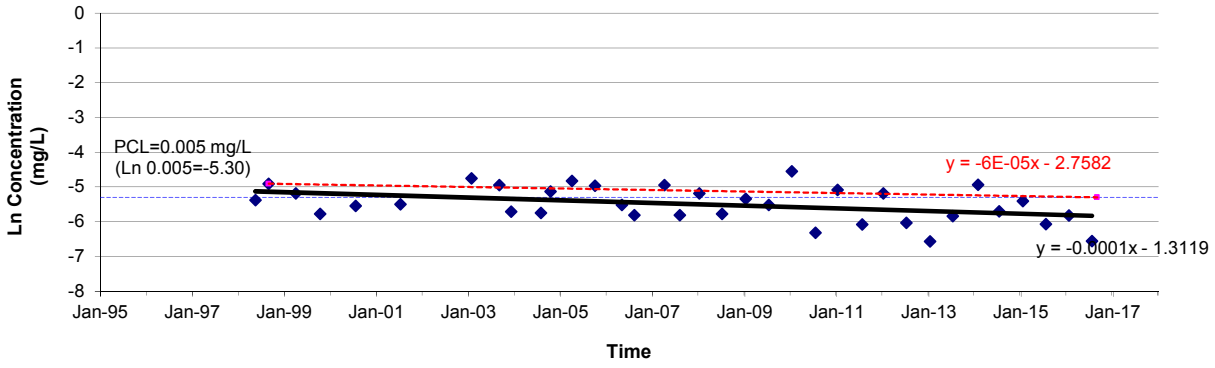
Source: Esri, DigitalGlobe, GeoEye, i-cubed, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community

X:\Navy\NAS_Dallas\project\2016_RAER\2016_Jul_NAS_Dallas_Iso_TCE_SWMU17_Building1423Plume.mxd

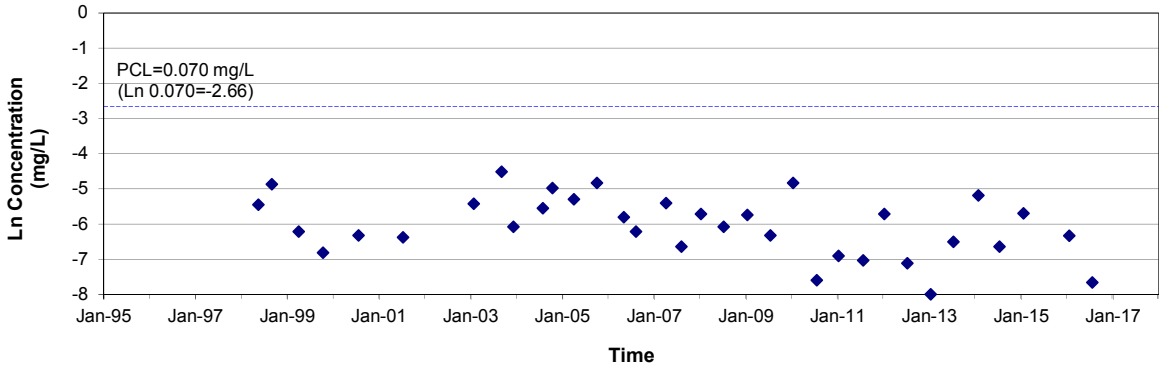
# ATTACHMENT 1B
# GRAPHS

**CONCENTRATION VS. TIME GRAPHS**
**WITH MINIMUM REQUIRED ATTENUATION RATES**
**SWMU 17/BUILDING 1423 PLUME**
**613D41MW**
**2016**
**FORMER NAS DALLAS, TEXAS**

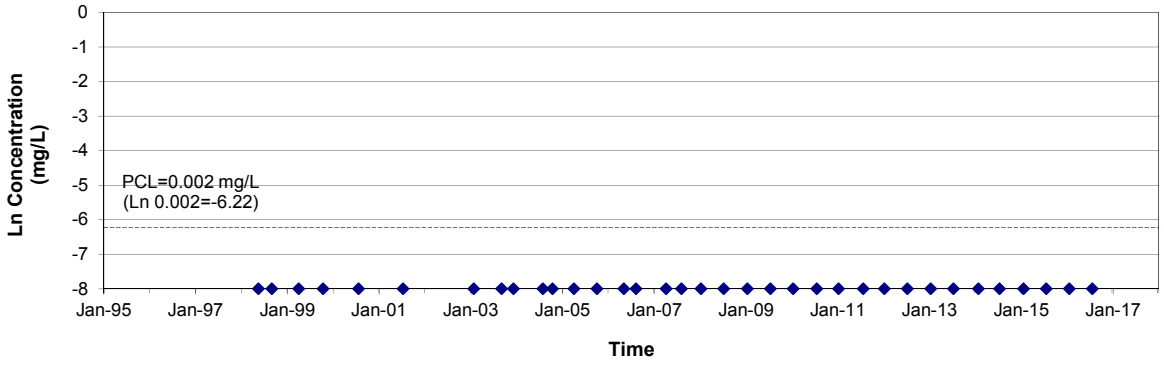
**TCE**




**cis-1,2-DCE**



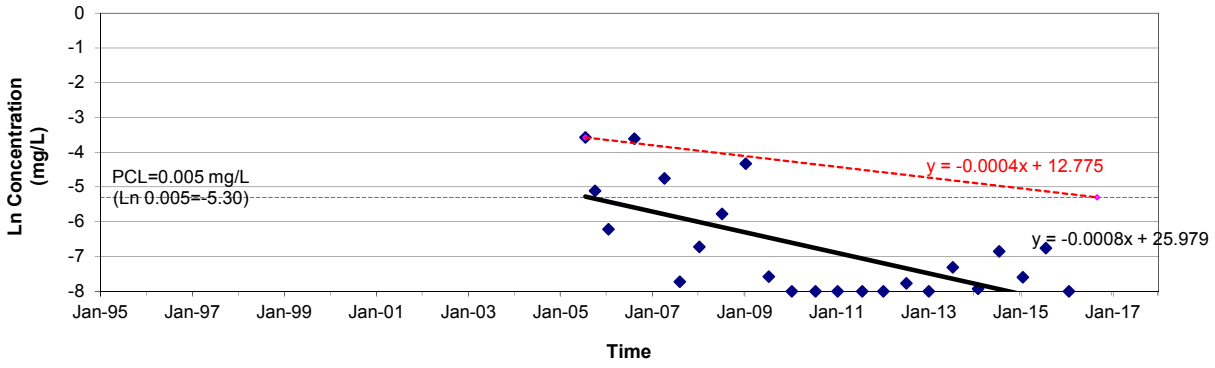

**Vinyl Chloride**



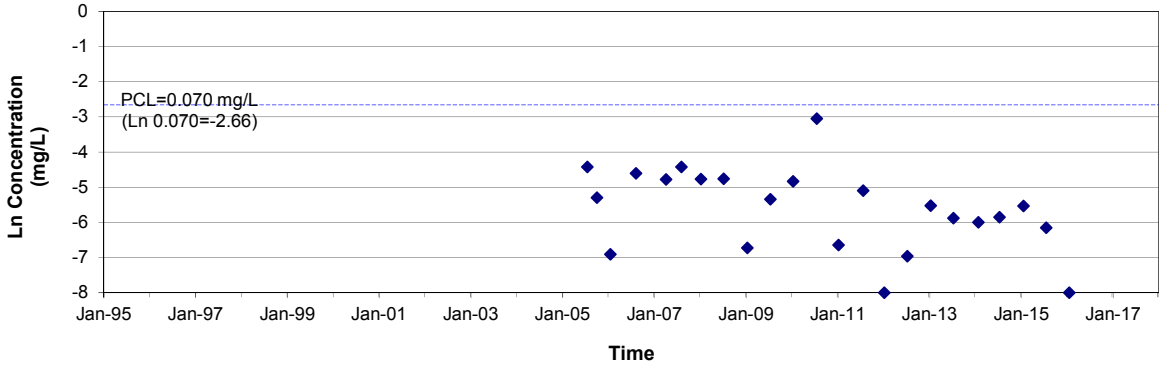

Notes: Red line and slope are based on minimum required attenuation rate ($k_{time}$) to meet PCL by 01 Sep 2016.
Black line and slope are based on linear regression of the raw data.
Sample events using permeable diffusion bag (PDB) samplers are listed on Tables 2-1A and 2-1B in Appendix 2.

**CONCENTRATION VS. TIME GRAPHS**
**WITH MINIMUM REQUIRED ATTENUATION RATES**
**SWMU 17/BUILDING 1423 PLUME**
**613D130MW**
**2016**
**FORMER NAS DALLAS, TEXAS**

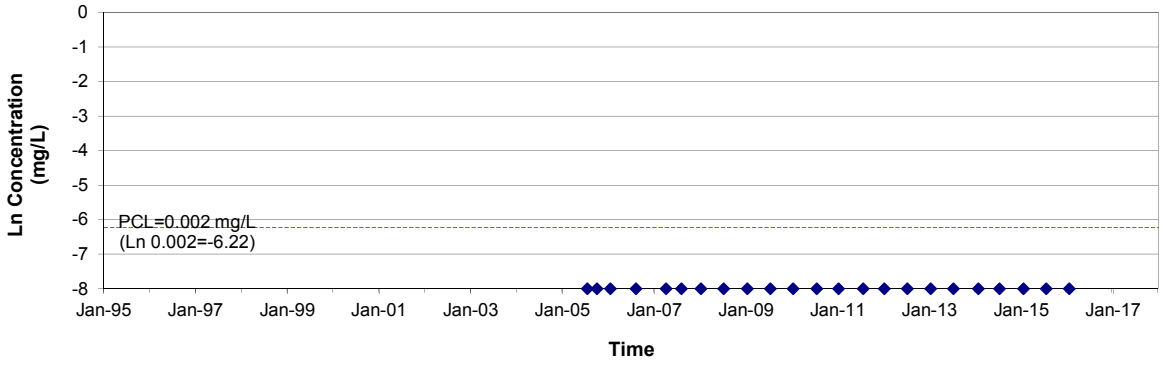
**TCE**




**cis-1,2-DCE**



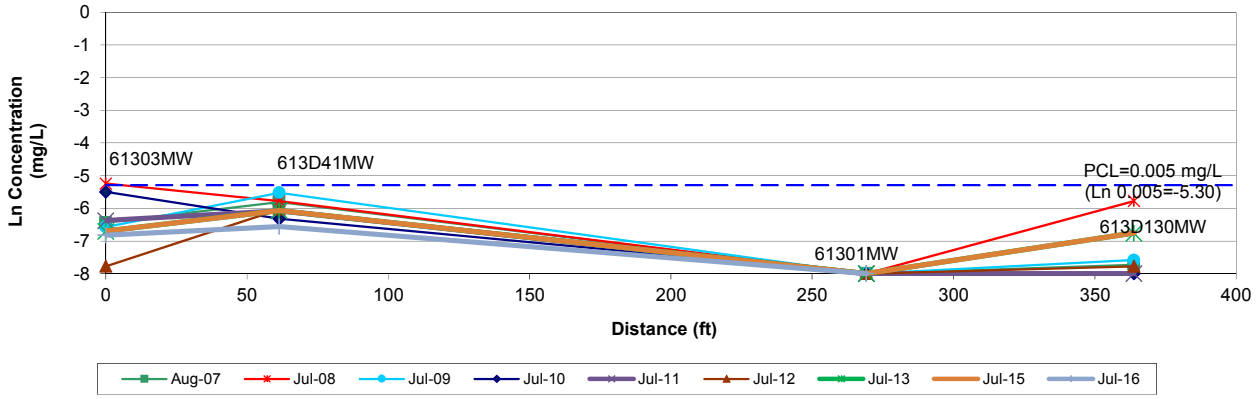

**Vinyl Chloride**



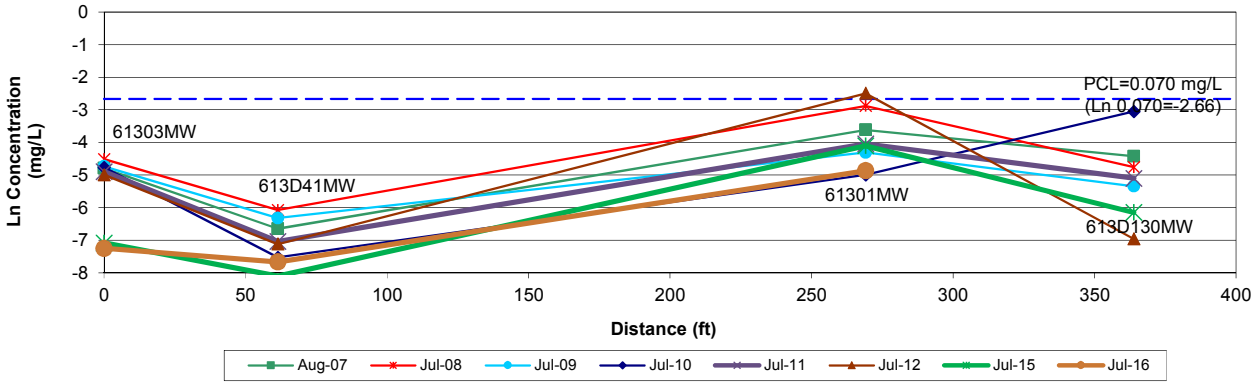

Notes: Red line and slope are based on minimum required attenuation rate ($k_{time}$) to meet PCL by 01 Sep 2016.
Black line and slope are based on linear regression of the raw data.
Sample events using permeable diffusion bag (PDB) samplers are listed on Tables 2-1A and 2-1B in Appendix 2.

# CONCENTRATION VS. DISTANCE GRAPHS
# SWMU 17/BUILDING 1423 PLUME
# 2016
# FORMER NAS DALLAS, TEXAS

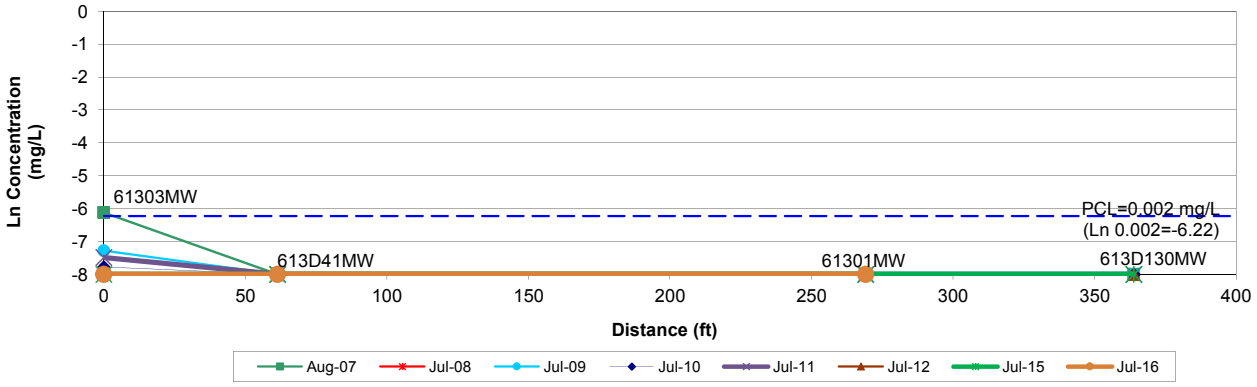
## TCE




## cis-1,2-DCE



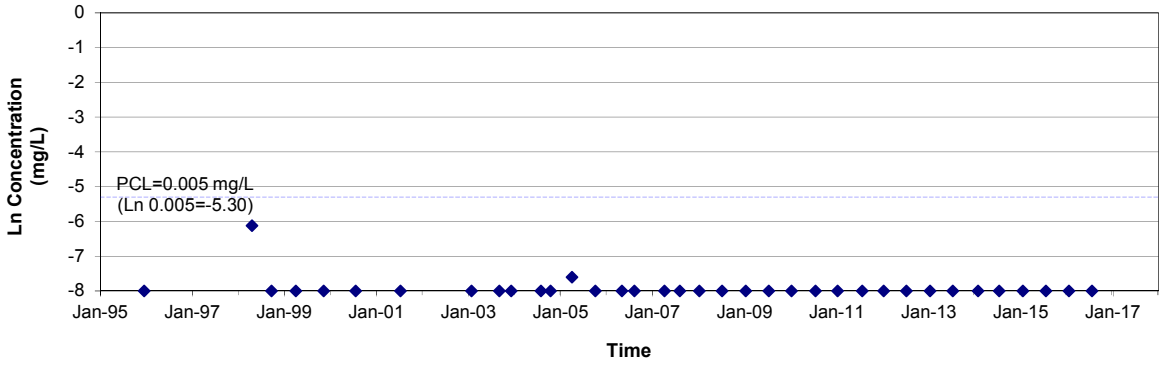

## Vinyl Chloride



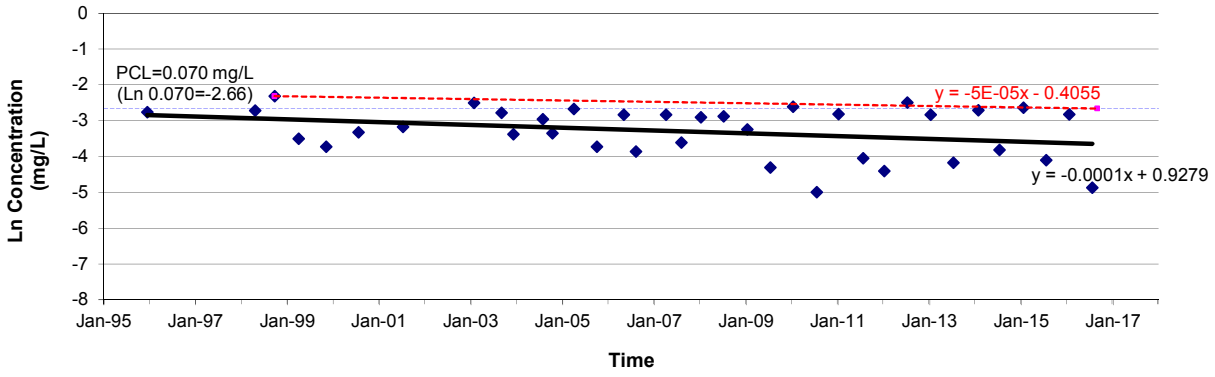

Notes: Graphed data points are taken from raw data.
Sample events using passive diffusion bag (PDB) samplers are listed on Tables 2-1A and 2-1B in Appendix 2.

**CONCENTRATION VS. TIME GRAPHS**
**WITH MINIMUM REQUIRED ATTENUATION RATES**
**SWMU 17/BUILDING 1423 PLUME**
**61301MW**
**2016**
**FORMER NAS DALLAS, TEXAS**

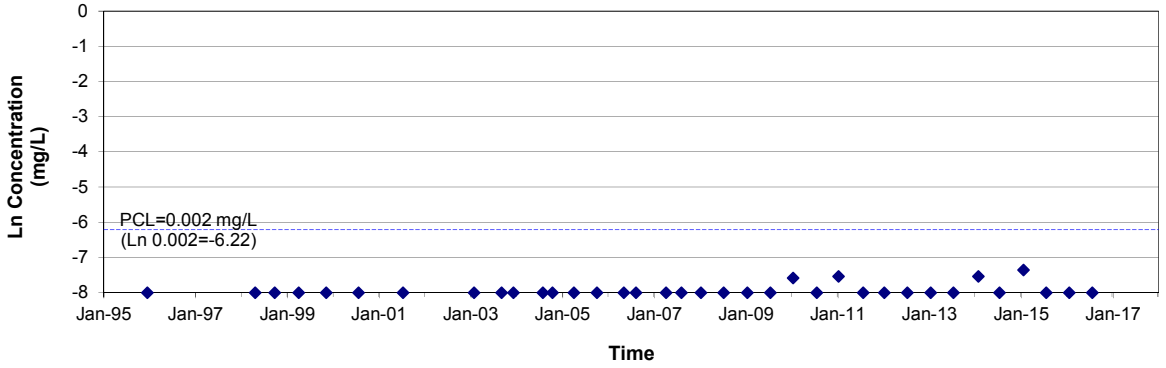
**TCE**




**cis-1,2-DCE**



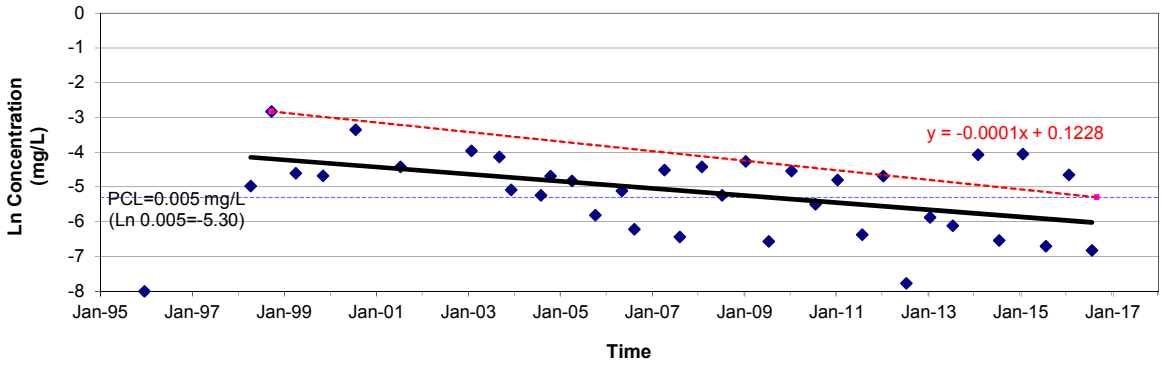

**Vinyl Chloride**



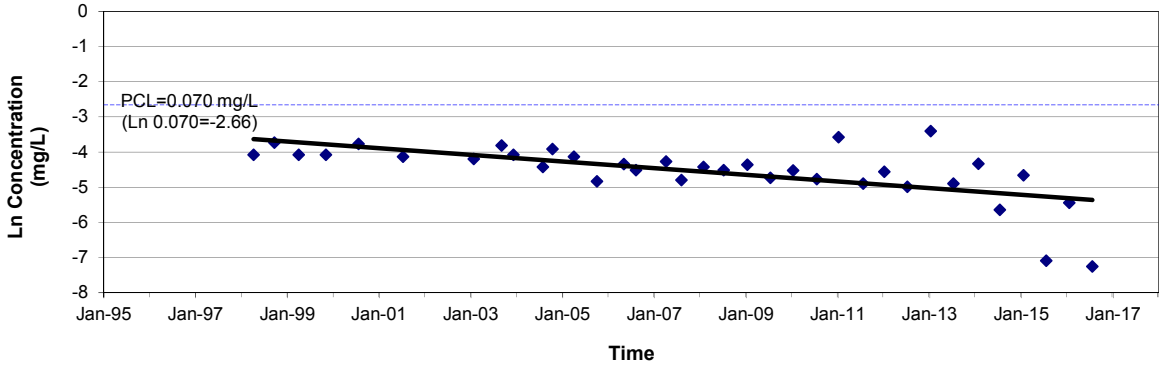

Notes: Red line and slope are based on minimum required attenuation rate ($k_{time}$) to meet PCL by 01 Sep 2016.
Black line and slope are based on linear regression of the raw data.
Sample events using permeable diffusion bag (PDB) samplers are listed on Tables 2-1A and 2-1B in Appendix 2.

**CONCENTRATION VS. TIME GRAPHS**
**WITH MINIMUM REQUIRED ATTENUATION RATES**
**SWMU 17/BUILDING 1423 PLUME**
**61303MW**
**2016**
**FORMER NAS DALLAS, TEXAS**

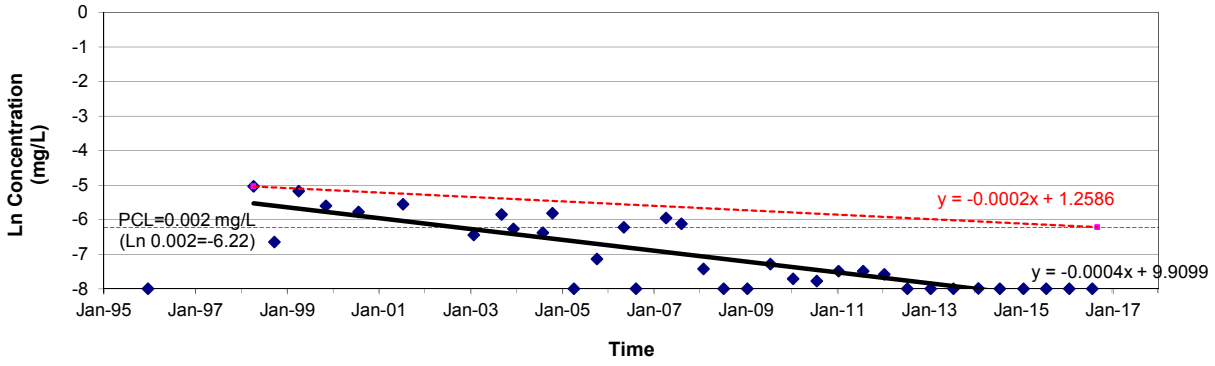
**TCE**




**cis-1,2-DCE**




**Vinyl Chloride**




Notes: Red line and slope are based on minimum required attenuation rate ($k_{time}$) to meet PCL by 01 Sep 2016.
Black line and slope are based on linear regression of the raw data.
Sample events using permeable diffusion bag (PDB) samplers are listed on Tables 2-1A and 2-1B in Appendix 2.

## Performance Measures

List and describe the performance measures for each environmental medium containing a PCLE zone that are being used to determine if reasonable progress is being made by the response action in a timely manner. Provide documentation that these performance measures are being met. Attach additional information if necessary.

**Performance Measures**

**The approach to determine if MNA is consistently achieving the clean-up goals by 2017 involves sequential sampling events to monitor the size and shape of the PCLE zone changes over time. To this effect, a tiered sampling program incorporating performance, detection, and ambient monitoring was implemented. This sampling program allows collection of analytical data on the COCs, groundwater flow, and geochemical parameters that may affect the progress of MNA and the likelihood of meeting site remediation goals. The design of the monitoring program allows a conclusion of success or failure to be drawn as early as possible during the response action implementation while providing reasonable confidence in the conclusion.**

**Performance monitoring encompasses the sampling of the point of exposure (POE) wells (61301MW, 61303MW, and 613D41MW) within the plume, and the background monitoring well (613D39MW) outside the PCLE zone. Data collected from these monitoring wells serve to check the plume shape and determine if it is shrinking or expanding, stable or migrating, thus triggering programmatic adjustments if necessary. COC analytical data collected from the monitoring wells located along the plume centerline were used to determine plume attenuation rates for individual chemical constituents ($k_{time}$) and for the plume as a whole ($k_{dist}$). Data collected from the background monitoring well served to monitor any changes in the ambient conditions that may impact the effectiveness of MNA in achieving the clean-up goal in a timely manner. The COC analytical results are summarized in Table 4-1.**

**POE well 613D130MW and the corrective action observation (CAO) wells 600D95MW and 613D45MW had either no history of COC detections or the COC detections have been below applicable GWPSs for at least the previous five consecutive years. These wells were P&A'd on April 8, 2016, in accordance with the RAP submitted to TCEQ in October 2015. Well plugging reports are located in Appendix 4, and historical COC analytical results for P&A wells are included in Table 4-1B.**

**Performance monitoring for 2016 also entailed sampling for MNA parameters (pH, ORP, dissolved oxygen, iron, nitrate, nitrite, phosphate, sulfate, total organic carbon, chloride, ethene, ethane, methane, alkalinity, carbon dioxide and hydrogen sulfide) during the July sampling event. MNA parameters are sampled on a biennial sampling schedule. The MNA parameters measured by field tests and laboratory analyses are presented in Table 4-2. MNA parameter data, as needed, serve as a secondary line of evidence to evaluate whether subsurface conditions continue to support natural attenuation.**

**The conceptual MNA site model for this plume is represented in the data tables in Appendix 4, the isoconcentration maps and potentiometric surface maps included in Attachment 1A, and the concentration vs. time and concentration vs. distance graphs in Attachment 1B.**

**After each semi-annual groundwater monitoring event, the COC concentration data collected were evaluated for both the entire plume and monitoring well by monitoring well basis in accordance with the RAP (Tetra Tech, 2006). The initial data analysis and interpretation focused on the detection of changes or trends in the data. Further evaluation focused on the assessment of the changes or trends and their impact on MNA in achieving the site-related goals.**

**It was expected that analytical data would indicate that attenuation rates were sufficient to effectively remediate the plume on or before the year 2017. Reasonable progress of the response action was evaluated considering the following criteria:**

- **The monitoring well's COC-specific $K_{time}$ attenuation rate based on the available sampling data is not more than the minimum attenuation rate necessary to meet clean-up by the year 2017.**

- **The monitoring well's COC-specific concentration is less than the remedial benchmark concentration (calculated concentration goal based on the initial maximum concentration and the minimum rate necessary to meet the remedial goals by 2017) for that sample date.**

- **The COC-specific $k_{dist}$ attenuation rate based on the available sampling data indicates an actual attenuation equal to or greater than the rate of COC migration from the suspected source area.**

**Response Action Progress**

**Table 4-3 summarizes the groundwater gauging data. The potentiometric maps for the December 2015 and July 2016 events, included in Figure 1A-3 (Attachment 1A), indicate that the direction of groundwater flow is to the north-northeast, consistent with previous sampling events.**

**The COC isoconcentration maps, prepared using the data collected during the January and July 2016 sampling events, are included in Figures 1A-2A and 1A-2B (Attachment 1A). A review of the 2016 data indicate:**

- **TCE is the only COC at SWMU 17/Building 1423 currently exceeding PCLs.**
- **TCE exceeded its PCL in only one of the four monitor wells (61303MW).**
- **TCE slightly exceeded its PCL of 0.005 mg/L at monitoring well 61303MW in during the January sampling event (0.00954 mg/L).**

- **There was no expansion of the PCLE zone or offsite migration of COCs at concentrations greater than PCLs in 2016.**

**Tables 4-4 and 4-5 (Appendix 4) summarize the concentration vs. time and concentration vs. distance attenuation rate constants for the plume centerline and provide an estimated time of cleanup for the plume obtained through linear regression. The graphs in Attachment 1B graphically depict the same attenuation rate constants summarized in Tables 4-4 and 4-5 and the minimum required attenuation rate to meet the remediation goals. Based on the data presented:**

- **COCs have met cleanup goals at all monitor wells for one sampling event several times but not two consecutive sampling events.**

**As discussed in the sections above and based on primary lines of evidence, MNA continues to be an appropriate remedial method to reduce the COCs to their critical PCLs in a reasonable time frame (i.e., on or before 2017). MNA will be continued at the SWMU 17/Building 1423 Plume for the upcoming year in accordance with the procedures and protocols described in the RAP (Tetra Tech, 2006).**

**If the January 2017 analytical data show that TCE concentrations are less than its critical PCL for two consecutive semi-annual sampling events, termination of performance monitoring and initiation of verification monitoring will be implemented. Verification monitoring will include three years of semi-annual groundwater sampling in order to satisfy the requirements of the Compliance Plan for NAS Dallas (TCEQ, 2004). If no additional COC exceedances are identified during this three year period of post response action verification monitoring, the monitoring system can be terminated, the monitoring wells will be abandoned, and the site will be removed from the permit.**

## Problems

Complete the table for the response action. When the response action consists of several components or multiple actions, complete one table for each major component or action.

Response Action Name/Designation: *Groundwater Response Action*

List the problems that have been encountered during the response action, describe the impact of each problem, and the response to the problem.

| Description of the Problem | Impact | Did this cause a response action failure? | | Corrective Response |
|---|---|---|---|---|
| | | Yes | No | |
| NONE | | | | |

Use this worksheet to describe the operation and maintenance (O&M) activities conducted for each response action.

Response Action Name/Designation: Well maintenance

List all portions of the response action to which this information applies. Repeat this worksheet for each major component or operation.

Describe the O&M and inspection activities that have been conducted to operate and maintain response action components.

**POE well 613D130MW and the CAO wells 600D95MW and 613D45MW had either no history of COC detections or the COC detections have been below applicable GWPSs for at least the previous five consecutive years. Per approval from TCEQ, these monitor wells were P&A'd on April 8, 2016, in accordance with the RAP submitted to TCEQ in October 2015. Well plugging reports are in Appendix 4, and historical analytical results for P&A wells are included in Table 4-1B.**

**In September 2016, Resolution Consultants conducted a detailed evaluation of maintenance needs for monitor wells at former NAS Dallas SWMUs. The surface completion at monitoring well 613D41MW was re-fitted by tapping the rim eyelets and replacing bolts and washers in order to secure the lid. Surface completions at wells 61301MW, 61303MW, and 613D39MW could not be re-fitted. Additional maintenance actions for these wells were completed on October 12 and 13, 2016, and included coring/removal of existing flush mount completions and re-installation of well skirts, rims, and lids.**

# APPENDIX 1
# REFERENCE LIST

# APPENDIX 1
# REFERENCES

A.T. Kearney, Inc. *RCRA Facility Assessment Preliminary Review/Visual Site Inspection. Chicago, Illinois.* 1989.

EnSafe/Allen & Hoshall. *Naval Air Station Dallas Environmental Baseline Survey, Dallas, Texas*. Memphis, Tennessee. 1994.

Tetra Tech NUS, Inc. *RCRA Facility Investigation Report for Category C*. Pittsburgh, Pennsylvania. 2000a.

— *RCRA Facility Investigation Report for Category E. Pittsburgh, Pennsylvania.* 2000b.

— *RCRA Facility Investigation Report for Category F. Pittsburgh, Pennsylvania.* 2000c.

— *RCRA Facility Investigation Report for Category D. Pittsburgh, Pennsylvania.* 2001a.

— *RCRA Facility Investigation Report for Category B. Pittsburgh, Pennsylvania.* 2001b.

— *Affected Property Assessment Report. Houston, Texas*. 2002.

— *Final MNA Groundwater Modeling Report for Category D. Pittsburgh, Pennsylvania.* 2004.

— *Response Action Plan, Revision 2. Pittsburgh, Pennsylvania.* 2004.

Resolution Consultants. *Draft Final Alternatives Evaluation Report, Former Naval Air Station, Dallas, Texas*. Norfolk, Virginia. August 2013.

— *Draft Vapor Intrusion Study Report, Buildings 1405, 1422, and 1424, Solid Waste Management Unit 21. Norfolk, Virginia. September 2015.*

— *Revised Groundwater Response Action Plan for SWMU 17//Building 1423 Plume (Revision 3). Norfolk, Virginia. October 2015.*

# APPENDIX 4
# DATA TABLES

**Table 4-1 Summary of Chemicals of Concern Detected in Groundwater**
**Table 4-2 Summary of Geochemical Parameters Measured in Groundwater**
**Table 4-3 Summary of Groundwater Gauging Data**
**Table 4-4 Summary of Concentration vs. Time Attenuation Rate Constants**
**Table 4-5 Summary of Concentration vs. Distance Attenuation Rate Constants**

# TABLE 4-1
# SUMMARY OF CHEMICALS OF CONCERN DETECTED IN GROUNDWATER

**Table 4-1A**

**Summary of Chemicals of Concern Detected in Groundwater**
**SWMU 17/Building 1423 Plume**
**2016 RAER**
**Former NAS Dallas, Texas**
**Page 1 of 4**

| Monitoring Well | Sampling Date | Sampling Round | SDG | Chemicals of Concern (mg/L) | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | 1,1-Dichloroethene | Carbon Tetrachloride | Chloroform | Chloromethane | cis-1,2-Dichloroethene | Methylene Chloride | Tetrachloroethene | trans-1,2-Dichloroethene | Trichloroethene | Vinyl Chloride |
| **Protective Concentration Levels (mg/L)** | | | | **0.00700** | **0.00500** | **0.24000** | **0.07000** | **0.07000** | **0.00500** | **0.00500** | **0.10000** | **0.00500** | **0.00200** |
| **Monitoring Wells Located Inside PCLE Zone** | | | | | | | | | | | | | |
| **61301MW** | 12/14/1995 | Round 1 | -- | 0.00500 U | 0.00500 U | 0.00500 U | 0.01000 U | 0.06310 | 0.01000 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.01000 U |
| | 4/20/1998 | Round 2 | DL152 | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.06600 | 0.00500 U | 0.00500 U | 0.00500 U | 0.00220 J | 0.00500 U |
| | 9/22/1998 | Round 3 | DL224 | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.09900 | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U |
| | 4/1/1999 | Round 4 | DL289 | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.03000 | 0.00050 J | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U |
| | 11/8/1999 | Round 5 | DL332 | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.02400 | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U |
| | 7/21/2000 | Round 6 | DL351 | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.03600 | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U |
| | 7/12/2001 | Round 7 | DL369 | 0.00500 U | 0.00500 U | 0.00500 U | 0.01000 U | 0.04200 | 0.00500 U | 0.00500 U | 0.00250 U | 0.00500 U | 0.01000 U |
| | 1/27/2003 | Round 8 (PDB) | 280195 | 0.00300 U | 0.00300 U | 0.00300 U | 0.00300 U | 0.08200 | 0.00600 U | 0.00300 U | 0.00058 J | 0.00300 U | 0.00300 U |
| | 9/3/2003 | Round 9 | A3I040190 | 0.00022 U | 0.00018 U | 0.00021 U | 0.00026 U | 0.04000 | 0.00028 U | 0.00012 U | 0.00024 U | 0.00022 U | 0.00026 U |
| | 9/3/2003 | Round 9 (PDB-HIGH) | A3I040190 | 0.00022 U | 0.00018 U | 0.00021 U | 0.00026 U | 0.03500 | 0.00028 U | 0.00012 U | 0.00024 U | 0.00022 U | 0.00026 U |
| | 9/3/2003 | Round 9 (PDB-LOW) | A3I040190 | 0.00044 U | 0.00036 U | 0.00042 U | 0.00052 U | 0.06200 | 0.00056 U | 0.00024 U | 0.00048 U | 0.00044 U | 0.00052 U |
| | 12/7/2003 | Round 10 | C3L090143 | 0.00033 U | 0.00039 U | 0.00049 U | 0.00049 U | 0.03400 | 0.00053 U | | 0.00041 U | 0.00036 U | 0.00098 U |
| | 7/29/2004 | Round 11 (PDB) | C4G300219 | 0.00070 U | 0.00049 U | 0.00020 U | 0.00035 U | 0.05200 | 0.00080 U | 0.00042 U | 0.00045 U | 0.00044 U | 0.00034 U |
| | 10/13/2004 | Round 12 (PDB) | C4J140392 | 0.00035 U | 0.00025 U | 0.00010 U | 0.00017 U | 0.03500 | 0.00040 U | 0.00021 U | 0.00023 U | 0.00022 U | 0.00017 U |
| | 4/3/2005 | Round 13 (PDB) | 2605 | 0.00040 U | 0.00030 U | 0.00040 U | 0.00030 U | 0.06900 | 0.00200 U | 0.00040 U | 0.00050 J | 0.00050 J | 0.00030 U |
| | 10/5/2005 | Round 14 | CTO260-16 | 0.00040 U | 0.00030 U | 0.00040 U | 0.00030 U | 0.02400 | 0.00200 U | 0.00040 U | 0.00030 U | 0.00030 U | 0.00030 U |
| | 5/4/2006 | Round 15 | CTO24-1 | 0.00060 U | 0.00050 U | 0.00040 U | 0.00060 U | 0.05900 | 0.00200 U | 0.00060 U | 0.00060 U | 0.00040 U | 0.00060 U |
| | 8/10/2006 | Round 16 | CTO24-12 | 0.00060 U | 0.00050 U | 0.00040 U | 0.00060 U | 0.02100 | 0.00200 UJ | 0.00060 U | 0.00060 U | 0.00040 U | 0.00060 U |
| | 5/8/2007 | Round 17 (PDB) | 0705111 | 0.00013 U | 0.00011 U | 0.00013 U | 0.00028 U | 0.05900 | 0.00023 U | 0.00100 U | 0.00015 U | 0.00023 U | 0.00020 U |
| | 8/21/2007 | Round 18 | DALLASW001 | 0.00042 U | 0.00014 U | 0.00010 U | 0.00040 U | 0.02700 | 0.00026 U | 0.00014 U | 0.00040 U | 0.00028 U | 0.00019 U |
| | 1/29/2008 | Round 19 (PDB) | CTO73-4 | 0.00039 U | 0.00044 U | 0.00036 U | 0.00060 U | 0.05500 | 0.00050 J | 0.00046 U | 0.00049 J | 0.00053 U | 0.00043 U |
| | 7/22/2008 | Round 20 (PDB) | F58957 | 0.00054 U | 0.00022 U | 0.00028 U | 0.00061 U | 0.05630 | 0.00100 U | 0.00022 U | 0.00045 U | 0.00032 U | 0.00030 U |
| | 1/12/2009 | Round 21 (PDB) | F62751 | 0.00054 U | 0.00022 U | 0.00028 U | 0.00061 U | 0.03910 | 0.00100 U | 0.00022 U | 0.00045 U | 0.00032 U | 0.00030 U |
| | 7/14/2009 | Round 22 | F66642 | 0.00054 U | 0.00022 U | 0.00028 U | 0.00061 U | 0.01350 | 0.00100 U | 0.00022 U | 0.00045 U | 0.00032 U | 0.00030 U |
| | 1/11/2010 | Round 23 (PDB) | F70740 | 0.00054 U | 0.00022 U | 0.00028 U | 0.00061 U | 0.07330 | 0.00100 U | 0.00037 J | 0.00072 J | 0.00032 U | 0.00051 J |
| | 7/13/2010 | Round 24 (PDB) | F75073 | 0.00029 U | 0.00034 U | 0.00025 U | 0.00050 U | 0.00680 | 0.00200 U | 0.00044 U | 0.00034 U | 0.00024 U | 0.00028 U |
| | 1/10/2011 | Round 25 (PDB) | F79278 | 0.00023 U | 0.00025 U | 0.00022 U | 0.00050 U | 0.05990 | 0.00200 U | 0.00025 U | 0.00055 J | 0.00026 U | 0.00053 J |
| | 7/25/2011 | Round 26 | F84572 | 0.00023 U | 0.00025 U | 0.00022 U | 0.00055 U | 0.01750 | 0.00200 U | 0.00025 U | 0.00035 U | 0.00026 U | 0.00022 U |
| | 1/9/2012 | Round 27 | F89332 | 0.00023 U | 0.00025 U | 0.00022 U | 0.00050 U | 0.0122 | 0.0020 U | 0.00025 U | 0.00035 U | 0.00026 U | 0.00022 U |
| | 7/10/2012 | Round 28 | F94786 | 0.00023 U | NS | NS | NS | 0.0825 | NS | NS | 0.0011 | 0.00026 U | 0.00022 J |
| | 1/7/2013 | Round 29 (PDB) | FA639 | 0.00020 U | 0.00031 U | 0.00026 U | 0.00050 U | 0.0591 | 0.0020 U | 0.00032 U | 0.00023 U | 0.00031 U | 0.00044 U |
| | 7/16/2013 | Round 30 | FA6470 | 0.00020 U | 0.00031 U | 0.00026 U | 0.00084 J | 0.0154 | 0.00200 U | 0.00032 U | 0.00023 U | 0.00031 U | 0.00044 U |
| | 1/28/2014 | Round 31 (PDB) | | 0.00025 U | 0.0004 U | 0.00031 U | 0.00053 U | 0.0670 | 0.002 U | 0.00026 U | 0.00063 J | 0.0003 U | 0.00053 J |
| | 7/15/2014 | Round 32 | 1407111 | 0.00025 U | 0.00025 U | 0.00025 U | 0.00025 U | 0.0221 | 0.0005 U | 0.00025 U | 0.00025 U | 0.00025 U | 0.00025 U |
| | 1/20/2015 | Round 33 (PDB) | 1501071 | 0.00025 U | NS | NS | NS | 0.0716 | NS | NS | 0.00101 | 0.00025 U | 0.00064 J |
| | 7/21/2015 | Round 34 | 1507171 | 0.00025 U | 0.00025 U | 0.00025 U | 0.00025 U | 0.0166 | 0.0005 U | 0.00025 U | 0.00025 U | 0.00025 U | 0.00025 U |
| | 1/20/2016 | Round 35 (PDB) | 1601140 | 0.00025 U | NS | NS | NS | 0.0595 | NS | NS | 0.00064 J | 0.00025 U | 0.00063 J |
| | 7/21/2016 | Round 36 | 1607165 | 0.00025 U | 0.00025 U | 0.00025 U | 0.00025 U | 0.00766 | 0.0005 U | 0.00025 U | 0.00025 U | 0.00025 U | 0.00025 U |

**Table 4-1A**

**Summary of Chemicals of Concern Detected in Groundwater**
**SWMU 17/Building 1423 Plume**
**2016 RAER**
**Former NAS Dallas, Texas**
**Page 2 of 4**

| Monitoring Well | Sampling Date | Sampling Round | SDG | Chemicals of Concern (mg/L) | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | 1,1-Dichloroethene | Carbon Tetrachloride | Chloroform | Chloromethane | cis-1,2-Dichloroethene | Methylene Chloride | Tetrachloroethene | trans-1,2-Dichloroethene | Trichloroethene | Vinyl Chloride |
| **Protective Concentration Levels (mg/L)** | | | | **0.00700** | **0.00500** | **0.24000** | **0.07000** | **0.07000** | **0.00500** | **0.00500** | **0.10000** | **0.00500** | **0.00200** |
| **61303MW** | 12/18/1995 | Round 1 | -- | 0.00500 U | 0.00500 U | 0.00500 U | 0.01000 U | NA | 0.00500 U | 0.00500 U | NA | 0.00500 U | 0.01000 U |
| | 4/8/1998 | Round 2 | DL139 | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.01700 | 0.00500 U | 0.00500 U | 0.00210 J | 0.00690 | 0.00650 |
| | 9/21/1998 | Round 3 | DL224 | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.02400 | 0.00500 U | 0.00500 U | 0.00210 J | 0.05900 | 0.00130 J |
| | 4/2/1999 | Round 4 | DL289 | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.01700 | 0.00500 U | 0.00500 U | 0.00270 J | 0.01000 | 0.00570 |
| | 11/4/1999 | Round 5 | DL332 | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.01700 | 0.00500 U | 0.00500 U | 0.00260 J | 0.00930 | 0.00370 J |
| | 7/21/2000 | Round 6 | DL351 | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.02300 | 0.00500 U | 0.00500 U | 0.00290 J | 0.03500 | 0.00310 J |
| | 7/11/2001 | Round 7 | DL369 | 0.00500 U | 0.00500 U | 0.00500 U | 0.01000 U | 0.01600 | 0.00500 U | 0.00500 U | 0.00280 | 0.01200 | 0.00390 J |
| | 1/26/2003 | Round 8 (PDB) | 280195 | 0.00100 U | 0.00100 U | 0.00100 U | 0.00100 U | 0.01500 | 0.00200 U | 0.00100 U | 0.00270 | 0.01900 | 0.00160 |
| | 9/3/2003 | Round 9 | A3I040190 | 0.00022 U | 0.00018 U | 0.00021 U | 0.00026 U | 0.01500 | 0.00028 U | 0.00012 U | 0.00380 | 0.00500 | 0.00290 |
| | 9/3/2003 | Round 9 (PDB-HIGH) | A3I040190 | 0.00022 U | 0.00018 U | 0.00021 U | 0.00026 U | 0.02100 | 0.00028 U | 0.00012 U | 0.00250 | 0.01300 | 0.00160 |
| | 9/3/2003 | Round 9 (PDB-LOW) | A3I040190 | 0.00022 U | 0.00018 U | 0.00021 U | 0.00026 U | 0.02200 | 0.00028 U | 0.00012 U | 0.00240 | 0.01600 | 0.00170 |
| | 12/7/2003 | Round 10 | C3L090143 | 0.00033 U | 0.00039 U | 0.00049 U | 0.00049 U | 0.01700 | 0.00053 U | 0.00038 U | 0.00360 | 0.00620 | 0.00190 J |
| | 7/29/2004 | Round 11 (PDB) | C4G300219 | 0.00035 U | 0.00025 U | 0.00010 U | 0.00017 U | 0.01200 | 0.00040 U | 0.00021 U | 0.00150 | 0.00530 | 0.00170 |
| | 10/14/2004 | Round 12 | C4J150380 | 0.00035 U | 0.00025 U | 0.00010 U | 0.00017 U | 0.01500 | 0.00040 U | 0.00021 U | 0.00290 | 0.00430 | 0.00300 |
| | 10/14/2004 | Round 12 (PDB) | C4J150380 | 0.00035 U | 0.00025 U | 0.00010 U | 0.00017 U | 0.02000 | 0.00040 U | 0.00021 U | 0.00190 | 0.00920 | 0.00190 |
| | 4/3/2005 | Round 13 (PDB) | 2605 | 0.00040 U | 0.00030 U | 0.00040 U | 0.00030 U | 0.01600 | 0.00200 U | 0.00040 U | 0.00300 | 0.00800 | 0.00200 |
| | 10/5/2005 | Round 14 | CTO260-16 | 0.00040 U | 0.00030 U | 0.00040 U | 0.00030 U | 0.00800 | 0.00200 U | 0.00040 U | 0.00200 | 0.00300 | 0.00080 J |
| | 5/4/2006 | Round 15 | CTO24-1 | 0.00060 U | 0.00050 U | 0.00040 U | 0.00060 U | 0.01300 | 0.00200 U | 0.00060 U | 0.00300 | 0.00600 | 0.00200 |
| | 8/10/2006 | Round 16 | CTO24-12 | 0.00060 U | 0.00050 U | 0.00040 U | 0.00060 U | 0.01100 | 0.00200 UJ | 0.00060 U | 0.00300 | 0.00200 | 0.00060 U |
| | 5/8/2007 | Round 17 (PDB) | 0705111 | 0.00028 U | 0.00020 U | 0.00023 U | 0.00017 U | 0.01400 | 0.00025 J | 0.00014 U | 0.00380 | 0.01100 | 0.00260 |
| | 8/21/2007 | Round 18 | DALLASW001 | 0.00042 U | 0.00014 U | 0.00010 U | 0.00040 U | 0.00830 | 0.00026 U | 0.00014 U | 0.00160 | 0.00160 | 0.00220 |
| | 1/29/2008 | Round 19 (PDB) | CTO73-4 | 0.00039 U | 0.00044 U | 0.00036 U | 0.00060 U | 0.01200 | 0.00040 U | 0.00046 U | 0.00200 | 0.01200 | 0.00060 J |
| | 7/22/2008 | Round 20 (PDB) | F58957 | 0.00054 U | 0.00022 U | 0.00028 U | 0.00061 U | 0.01100 | 0.00100 U | 0.00022 U | 0.00120 | 0.00530 | 0.00030 U |
| | 1/12/2009 | Round 21 (PDB) | F62751 | 0.00054 U | 0.00022 U | 0.00028 U | 0.00061 U | 0.01280 | 0.00100 U | 0.00022 U | 0.00220 | 0.01410 | 0.00030 U |
| | 7/14/2009 | Round 22 | F66643 | 0.00054 U | 0.00022 U | 0.00028 U | 0.00061 U | 0.00880 | 0.00100 U | 0.00022 U | 0.00220 | 0.00140 | 0.00069 J |
| | 1/11/2010 | Round 23 (PDB) | F70740 | 0.00054 U | 0.00022 U | 0.00028 U | 0.00061 U | 0.01090 | 0.00100 U | 0.00022 U | 0.00170 | 0.01070 | 0.00045 J |
| | 7/13/2010 | Round 24 (PDB) | F75073 | 0.00029 U | 0.00034 U | 0.00025 U | 0.00050 U | 0.00850 | 0.00200 U | 0.00044 U | 0.00092 J | 0.00410 | 0.00042 J |
| | 1/10/2011 | Round 25 (PDB) | F79278 | 0.00023 U | 0.00025 U | 0.00022 U | 0.00050 U | 0.02790 | 0.00200 U | 0.00025 U | 0.00350 | 0.00820 | 0.00056 J |
| | 7/25/2011 | Round 26 | F84572 | 0.00023 U | 0.00025 U | 0.00022 U | 0.00062 U | 0.00750 | 0.00200 U | 0.00025 U | 0.00190 | 0.00170 | 0.00056 J |
| | 1/9/2012 | Round 27 | F89332 | 0.00023 U | 0.00025 U | 0.00022 U | 0.00050 U | 0.0105 | 0.0020 U | 0.00025 U | 0.0017 | 0.0092 | 0.00051 U |
| | 7/10/2012 | Round 28 | F94786 | 0.00023 U | NS | NS | NS | 0.0068 | NS | NS | 0.0014 | 0.00042 | 0.00030 |
| | 1/7/2013 | Round 29 (PDB) | FA639 | 0.00020 U | 0.00031 U | 0.00026 U | 0.00050 U | 0.0333 | 0.0020 U | 0.00032 U | 0.0022 | 0.0028 | 0.00044 U |
| | 7/16/2013 | Round 30 | FA6470 | 0.00020 U | 0.00031 U | 0.00026 U | 0.00060 J | 0.0075 | 0.0020 U | 0.00032 U | 0.0021 | 0.0022 | 0.00049 J |
| | 1/28/2014 | Round 31 (PDB) | | 0.00025 U | 0.0004 U | 0.00031 U | 0.00053 U | 0.0123 | 0.0020 U | 0.00026 U | 0.0013 | 0.0171 | 0.00033 U |
| | 7/15/2014 | Round 32 | 1407125 | 0.00025 U | 0.00025 U | 0.00025 U | 0.00025 U | 0.00355 | 0.0005 U | 0.00025 U | 0.00091 J | 0.00145 | 0.00025 U |
| | 1/20/2015 | Round 33 (PDB) | 1501071 | 0.00025 U | NS | NS | NS | 0.00947 | NS | NS | 0.00112 | 0.0174 | 0.00025 U |
| | 7/21/2015 | Round 34 | 1507171 | 0.00025 U | 0.00025 U | 0.00025 U | 0.00025 U | 0.000839 | 0.0005 U | 0.00025 U | 0.00091 J | 0.00123 | 0.00025 U |
| | 1/20/2016 | Round 35 (PDB) | 1601140 | 0.00025 U | NS | NS | NS | 0.00434 | NS | NS | 0.00044 J | 0.00954 | 0.00025 U |
| | 7/21/2016 | Round 36 | 1607165 | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.00071 J | 0.001 U | 0.0005 U | 0.0005 U | 0.00109 J | 0.0005 U |

**Table 4-1A**

**Summary of Chemicals of Concern Detected in Groundwater**
**SWMU 17/Building 1423 Plume**
**2016 RAER**
**Former NAS Dallas, Texas**
**Page 3 of 4**

| Monitoring Well | Sampling Date | Sampling Round | SDG | Chemicals of Concern (mg/L) | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | 1,1-Dichloroethene | Carbon Tetrachloride | Chloroform | Chloromethane | cis-1,2-Dichloroethene | Methylene Chloride | Tetrachloroethene | trans-1,2-Dichloroethene | Trichloroethene | Vinyl Chloride |
| **Protective Concentration Levels (mg/L)** | | | | **0.00700** | **0.00500** | **0.24000** | **0.07000** | **0.07000** | **0.00500** | **0.00500** | **0.10000** | **0.00500** | **0.00200** |
| **613D41MW** | 4/7/1998 | | | Well Installed | | | | | | | | | |
| | 5/16/1998 | Round 2 | DL179 | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00430 J | 0.00500 U | 0.00500 U | 0.00500 U | 0.00460 J | 0.00500 U |
| | 10/12/1999 | Round 5 | DL327 | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00110 J | 0.00500 U | 0.00500 U | 0.00500 U | 0.00310 J | 0.00500 U |
| | 7/21/2000 | Round 6 | DL351 | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00180 J | 0.00500 U | 0.00500 U | 0.00500 U | 0.00390 J | 0.00500 U |
| | 7/11/2001 | Round 7 | DL369 | 0.00500 U | 0.00500 U | 0.00500 U | 0.01000 U | 0.00170 J | 0.00500 U | 0.00500 U | 0.00250 U | 0.00410 J | 0.01000 U |
| | 1/26/2003 | Round 8 (PDB) | 280195 | 0.00100 U | 0.00100 U | 0.00100 U | 0.00100 U | 0.00440 | 0.00200 U | 0.00100 U | 0.00079 J | 0.00860 | 0.00100 U |
| | 9/3/2003 | Round 9 | A3I040190 | 0.00022 U | 0.00018 U | 0.00021 U | 0.00026 U | 0.00210 | 0.00028 U | 0.00012 U | 0.00039 J | 0.00320 | 0.00026 U |
| | 9/3/2003 | Round 9 (PDB) | A3I040190 | 0.00022 U | 0.00018 U | 0.00021 U | 0.00026 U | 0.01100 | 0.00028 U | 0.00012 U | 0.00180 | 0.00710 | 0.00026 U |
| | 12/8/2003 | Round 10 | C3L090143 | 0.00044 U | 0.00039 U | 0.00049 U | 0.00049 U | 0.00230 | 0.00053 U | 0.00038 U | 0.00041 U | 0.00330 | 0.00098 U |
| | 7/29/2004 | Round 11 (PDB) | C4G300219 | 0.00035 U | 0.00025 U | 0.00010 U | 0.00017 U | 0.00390 | 0.00040 U | 0.00021 U | 0.00085 J | 0.00320 | 0.00017 U |
| | 10/13/2004 | Round 12 (PDB) | C4J140392 | 0.00035 U | 0.00025 U | 0.00010 U | 0.00017 U | 0.00690 | 0.00040 U | 0.00021 U | 0.00130 | 0.00590 | 0.00017 U |
| | 4/3/2005 | Round 13 (PDB) | 2606 | 0.00040 U | 0.00030 U | 0.00040 U | 0.00030 U | 0.00500 | 0.00200 U | 0.00040 U | 0.00100 | 0.00800 | 0.00030 U |
| | 10/17/2005 | Round 14 | CTO260-19 | 0.00040 U | 0.00030 U | 0.00040 U | 0.00030 U | 0.00200 | 0.00200 U | 0.00040 U | 0.00040 J | 0.00400 | 0.00030 U |
| | 10/17/2005 | Round 14 (PDB) | CTO260-19 | 0.00040 U | 0.00030 U | 0.00040 U | 0.00030 U | 0.00700 | 0.00200 U | 0.00040 U | 0.00200 | 0.00700 | 0.00030 U |
| | 5/4/2006 | Round 15 | CTO24-1 | 0.00060 U | 0.00050 U | 0.00040 U | 0.00060 U | 0.00300 | 0.00200 U | 0.00060 U | 0.00060 U | 0.00400 | 0.00060 U |
| | 8/10/2006 | Round 16 | CTO24-12 | 0.00060 U | 0.00050 U | 0.00040 U | 0.00060 U | 0.00200 | 0.00200 UJ | 0.00060 U | 0.00060 U | 0.00300 | 0.00060 U |
| | 5/9/2007 | Round 17 | 0705111 | 0.00028 U | 0.00020 U | 0.00023 U | 0.00017 U | 0.00450 | 0.00025 U | 0.00014 U | 0.00100 J | 0.00710 | 0.00012 U |
| | 5/9/2007 | Round 17 (PDB) | 0705111 | 0.00028 U | 0.00028 U | 0.00023 U | 0.00017 U | 0.00200 | 0.00025 U | 0.00014 U | 0.00063 J | 0.00380 | 0.00012 U |
| | 8/21/2007 | Round 18 | DALLASW001 | 0.00042 U | 0.00014 U | 0.00010 U | 0.00040 U | 0.00130 | 0.00026 U | 0.00014 U | 0.00040 U | 0.00300 | 0.00019 U |
| | 1/29/2008 | Round 19 | CTO73-5 | 0.00039 U | 0.00044 U | 0.00036 U | 0.00060 U | 0.00230 | 0.00040 U | 0.00046 U | 0.00048 J | 0.00380 | 0.00043 U |
| | 1/29/2008 | Round 19 (PDB) | CTO73-4 | 0.00039 U | 0.00044 U | 0.00036 U | 0.00060 U | 0.00330 | 0.00040 U | 0.00046 U | 0.00072 J | 0.00560 | 0.00043 U |
| | 7/22/2008 | Round 20 | F58957 | 0.00054 U | 0.00022 U | 0.00028 U | 0.00061 U | 0.00110 | 0.00100 U | 0.00022 U | 0.00045 | 0.00310 | 0.00030 U |
| | 7/22/2008 | Round 20 (PDB) | F58957 | 0.00054 U | 0.00022 U | 0.00028 U | 0.00061 U | 0.00230 | 0.00100 U | 0.00022 U | 0.00047 J | 0.00210 | 0.00030 U |
| | 1/12/2009 | Round 21 | F62751 | 0.00054 U | 0.00022 U | 0.00028 U | 0.00061 U | 0.00190 | 0.00100 U | 0.00079 J | 0.00050 J | 0.00300 | 0.00030 U |
| | 1/12/2009 | Round 21 (PDB) | F62751 | 0.00054 U | 0.00022 U | 0.00028 U | 0.00061 U | 0.00320 | 0.00100 U | 0.00022 U | 0.00077 J | 0.00480 | 0.00030 U |
| | 7/14/2009 | Round 22 | F66643 | 0.00054 U | 0.00022 U | 0.00028 U | 0.00061 U | 0.00180 | 0.00100 U | 0.00022 U | 0.00047 J | 0.00400 | 0.00030 U |
| | 1/11/2010 | Round 23 | F70740 | 0.00054 U | 0.00022 U | 0.00028 U | 0.00061 U | 0.00800 | 0.00100 U | 0.00022 U | 0.00170 | 0.01060 | 0.00030 U |
| | 7/13/2010 | Round 24 | F75073 | 0.00029 U | 0.00029 U | 0.00025 U | 0.00050 U | 0.00260 | 0.00200 U | 0.00044 U | 0.00062 J | 0.00180 | 0.00028 U |
| | 7/13/2010 | Round 24 (PDB) | F75073 | 0.00029 U | 0.00029 U | 0.00025 U | 0.00050 U | 0.00260 | 0.00200 U | 0.00044 U | 0.00062 J | 0.00170 | 0.00028 U |
| | 1/10/2011 | Round 25 (PDB) | F79278 | 0.00023 U | 0.00025 U | 0.00022 U | 0.00050 U | 0.00590 | 0.00200 U | 0.00025 U | 0.00130 | 0.00620 | 0.00022 U |
| | 1/10/2011 | Round 25 | F79278 | 0.00023 U | 0.00025 U | 0.00022 U | 0.00050 U | 0.00100 | 0.00200 U | 0.00025 U | 0.00035 U | 0.00180 | 0.00022 U |
| | 7/25/2011 | Round 26 | F84572 | 0.00023 U | 0.00025 U | 0.00022 U | 0.00054 U | 0.00088 JH | 0.00200 U | 0.00025 U | 0.00035 U | 0.00230 | 0.00022 U |
| | 1/9/2012 | Round 27 | F89332 | 0.00023 U | 0.00025 U | 0.00022 U | 0.00050 U | 0.0033 | 0.0020 U | 0.00025 U | 0.00061 | 0.0054 | 0.00022 U |
| | 7/10/2012 | Round 28 | F94786 | 0.00023 U | NS | NS | NS | 0.00081 J | NS | NS | 0.00035 U | 0.0024 | 0.00022 U |
| | 1/7/2013 | Round 29 (PDB) | FA639 | 0.00020 U | 0.00031 U | 0.00026 U | 0.00050 U | 0.0051 | 0.0020 U | 0.00032 U | 0.00023 U | 0.0049 | 0.00044 U |
| | 1/7/2013 | Round 29 | FA639 | 0.00020 U | 0.00031 U | 0.00026 U | 0.00050 U | 0.00024 U | 0.0020 U | 0.00032 U | 0.00023 U | 0.00140 | 0.00044 U |
| | 7/16/2013 | Round 30 | FA6470 | 0.00020 U | 0.00031 U | 0.00026 U | 0.00050 U | 0.0015 | 0.0020 U | 0.00032 U | 0.00026 J | 0.0029 | 0.00044 U |
| | 1/28/2014 | Round 31 (PDB) | FA12120 | 0.00025 U | 0.0004 U | 0.00031 U | 0.00053 U | 0.0056 | 0.0020 U | 0.00026 U | 0.0011 | 0.0072 | 0.00033 U |
| | 7/15/2014 | Round 32 | 1407111 | 0.00025 U | 0.00025 U | 0.00025 U | 0.00025 U | 0.0013 | 0.0005 U | 0.00025 U | 0.00029 J | 0.00334 | 0.00025 U |
| | 1/20/2015 | Round 33 (PDB) | 1501071 | 0.00025 U | NS | NS | NS | 0.00349 | NS | NS | 0.00062 J | 0.00447 | 0.00025 U |
| | 7/22/2015 | Round 34 | 1507178 | 0.00025 U | 0.00025 U | 0.00025 U | 0.00025 U | 0.000304 | 0.0005 U | 0.00025 U | 0.00029 J | 0.00232 | 0.00025 U |
| | 1/20/2016 | Round 35 (PDB) | 1601140 | 0.00025 U | NS | NS | NS | 0.00178 | NS | NS | 0.00033 J | 0.00296 | 0.00025 U |
| | 7/21/2016 | Round 36 | 1607165 | 0.00025 U | 0.00025 U | 0.00025 U | 0.00025 U | 0.00047 J | 0.0005 U | 0.00025 U | 0.00025 U | 0.00142 | 0.00025 U |

**Table 4-1A**

**Summary of Chemicals of Concern Detected in Groundwater**
**SWMU 17/Building 1423 Plume**
**2016 RAER**
**Former NAS Dallas, Texas**
**Page 4 of 4**

| Monitoring Well | Sampling Date | Sampling Round | SDG | Chemicals of Concern (mg/L) | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | 1,1-Dichloroethene | Carbon Tetrachloride | Chloroform | Chloromethane | cis-1,2-Dichloroethene | Methylene Chloride | Tetrachloroethene | trans-1,2-Dichloroethene | Trichloroethene | Vinyl Chloride |
| **Protective Concentration Levels (mg/L)** | | | | **0.00700** | **0.00500** | **0.24000** | **0.07000** | **0.07000** | **0.00500** | **0.00500** | **0.10000** | **0.00500** | **0.00200** |
| **Monitoring Wells Located Outside PCLE Zone** | | | | | | | | | | | | | |
| **613D39MW** | 4/7/1998 | | | Well Installed | | | | | | | | | |
| | 5/19/1998 | Round 2 | DL182 | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U |
| | 8/30/1998 | Round 3 | DL212 | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U |
| | 3/30/1999 | Round 4 | DL288 | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U |
| | 10/26/1999 | Round 5 | DL330 | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U |
| | 7/21/2000 | Round 6 | DL351 | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U |
| | 7/13/2001 | Round 7 | DL371 | 0.00500 U | 0.00500 U | 0.00500 U | 0.01000 U | 0.00250 U | 0.00500 U | 0.00500 U | 0.00250 U | 0.00500 U | 0.01000 U |
| | 1/26/2003 | Round 8 (PDB) | 280195 | 0.00100 U | 0.00100 U | 0.00100 U | 0.00100 U | 0.00100 U | 0.00200 U | 0.00100 U | 0.00100 U | 0.00100 U | 0.00100 U |
| | -- | Round 9 | -- | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS |
| | 12/8/2003 | Round 10 | C3L090143 | 0.00049 U | 0.00039 U | 0.00049 U | 0.00049 U | 0.00041 U | 0.00053 U | 0.00038 U | 0.00041 U | 0.00036 U | 0.00098 U |
| | -- | Round 11 | -- | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS |
| | 10/15/2004 | Round 12 (PDB) | C4J160168 | 0.00035 U | 0.00025 U | 0.00010 U | 0.00017 U | 0.00027 U | 0.00040 U | 0.00021 U | 0.00023 U | 0.00022 U | 0.00017 U |
| | -- | Round 13 | -- | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS |
| | 10/18/2005 | Round 14 (PDB) | CTO260-21 | 0.00040 U | 0.00030 U | 0.00040 U | 0.00030 U | 0.00030 U | 0.00200 U | 0.00040 U | 0.00030 U | 0.00030 U | 0.00030 U |
| | 5/4/2006 | Round 15 | CTO24-1 | 0.00060 U | 0.00050 U | 0.00040 U | 0.00060 U | 0.00050 U | 0.00200 U | 0.00060 U | 0.00060 U | 0.00040 U | 0.00060 U |
| | 8/10/2006 | Round 16 | CTO24-12 | 0.00060 U | 0.00050 U | 0.00040 U | 0.00060 UJ | 0.00050 U | 0.00200 UJ | 0.00060 U | 0.00060 U | 0.00040 U | 0.00060 U |
| | 5/8/2007 | Round 17 (PDB) | 0705111 | 0.00013 U | 0.00011 U | 0.00013 U | 0.00028 U | 0.00014 U | 0.00023 U | 0.00010 U | 0.00015 U | 0.00023 U | 0.00020 U |
| | 8/22/2007 | Round 18 | DALLASW001 | 0.00042 U | 0.00014 U | 0.00010 U | 0.00040 U | 0.00044 U | 0.00026 U | 0.00014 U | 0.00040 U | 0.00028 U | 0.00019 U |
| | 1/29/2008 | Round 19 (PDB) | CTO73-4 | 0.00039 U | 0.00044 U | 0.00036 U | 0.00060 U | 0.00032 U | 0.00040 U | 0.00046 U | 0.00048 U | 0.00053 U | 0.00043 U |
| | 7/22/2008 | Round 20 (PDB) | F58957 | 0.00054 U | 0.00022 U | 0.00028 U | 0.00061 U | 0.00020 U | 0.00100 U | 0.00022 U | 0.00045 U | 0.00032 U | 0.00030 U |
| | 1/12/2009 | Round 21 (PDB) | F62751 | 0.00054 U | 0.00022 U | 0.00028 U | 0.00061 U | 0.00020 U | 0.00100 U | 0.00022 U | 0.00045 U | 0.00032 U | 0.00030 U |
| | 7/14/2009 | Round 22 | F66643 | 0.00054 U | 0.00022 U | 0.00028 U | 0.00061 U | 0.00020 U | 0.00100 U | 0.00022 U | 0.00045 U | 0.00032 U | 0.00030 U |
| | 1/11/2010 | Round 23 (PDB) | F70740 | 0.00054 U | 0.00022 U | 0.00028 U | 0.00061 U | 0.00020 U | 0.00100 U | 0.00022 U | 0.00045 U | 0.00032 U | 0.00030 U |
| | 7/13/2010 | Round 24 (PDB) | F75073 | 0.00029 U | 0.00034 U | 0.00025 U | 0.00050 U | 0.00032 U | 0.00200 U | 0.00044 U | 0.00034 U | 0.00024 U | 0.00028 U |
| | 1/10/2011 | Round 25 (PDB) | F79278 | 0.00023 U | 0.00025 U | 0.00022 U | 0.00050 U | 0.00026 U | 0.00200 U | 0.00025 U | 0.00035 U | 0.00026 U | 0.00022 U |
| | 7/25/2011 | Round 26 | F84572 | 0.00023 U | 0.00025 U | 0.00022 U | 0.00059 U | 0.00026 U | 0.00200 U | 0.00025 U | 0.00035 U | 0.00026 U | 0.00022 U |
| | 1/9/2012 | Round 27 | F89332 | 0.00023 U | 0.00025 U | 0.00022 U | 0.00050 U | 0.00026 U | 0.0020 U | 0.00025 U | 0.00035 U | 0.00026 U | 0.00022 U |
| | 7/10/2012 | Round 28 | F94786 | 0.00023 U | NS | NS | NS | 0.00026 U | NS | NS | 0.00035 U | 0.00026 U | 0.00022 U |
| | 1/7/2013 | Round 29 (PDB) | FA639 | 0.00020 U | 0.00031 U | 0.00026 U | 0.00050 U | 0.00024 U | 0.0020 U | 0.00032 U | 0.00023 U | 0.00031 U | 0.00044 U |
| | 7/16/2013 | Round 30 | FA6470 | 0.00020 U | 0.00031 U | 0.00026 U | 0.00050 U | 0.00024 U | 0.0020 U | 0.00032 U | 0.00023 U | 0.00031 U | 0.00044 U |
| | 1/28/2014 | Round 31 (PDB) | FA12120 | 0.00025 U | 0.0004 U | 0.00031 U | 0.00053 U | 0.00033 U | 0.0020 U | 0.00026 U | 0.00034 U | 0.0003 U | 0.00033 U |
| | 7/16/2014 | Round 32 | 1407125 | 0.00025 U | 0.00025 U | 0.00025 U | 0.00025 U | 0.00025 U | 0.0005 U | 0.00025 U | 0.00025 U | 0.00025 U | 0.00025 U |
| | 1/20/2015 | Round 33 (PDB) | 1501071 | 0.00025 U | NS | NS | NS | 0.00025 U | NS | NS | 0.00025 U | 0.00025 U | 0.00025 U |
| | 7/21/2015 | Round 34 | 1507171 | 0.00025 U | 0.00025 U | 0.00025 U | 0.00025 U | 0.00025 U | 0.0005 U | 0.00025 U | 0.00025 U | 0.00025 U | 0.00025 U |
| | 1/20/2016 | Round 35 (PDB) | 1601140 | 0.00025 U | NS | NS | NS | 0.00025 U | NS | NS | 0.00025 U | 0.00025 U | 0.00025 U |
| | 7/21/2016 | Round 36 | 1607165 | 0.00025 U | 0.00025 U | 0.00025 U | 0.00025 U | 0.00025 U | 0.0005 U | 0.00025 U | 0.00025 U | 0.00025 U | 0.00025 U |

***Notes:***
mg/L — milligrams per liter
NA — Not Applicable
NS — Not Sampled
NS-D — Not Sampled during this round due to insufficient water in the monitoring well
PDB — Passive Diffusion Bag
SDG — Sample Delivery Group
PCLE — Protective Concentration Level Exceedance

Note:
Shaded areas indicate an exceedance.

Analytical Result Qualifiers:
J — Indicates that the chemical was detected. However, the associated numerical result may not be a precise representation of the amount that is actually present in the sample. The laboratory reported concentration is considered to be an estimate of the true concentration.
U — Indicates that the chemical was not detected at the numerical detection limit (sample-specific quantitation limit) noted. Nondetected results from the laboratory are reported in this manner. This qualifier is added to a positive result (reported by the laboratory) if the detected concentration is determined to be attributable to contamination introduced during field sampling or laboratory analysis.
UJ — Indicates that the chemical was not detected. However, the detection limit (sample-specific quantitation limit) is considered to be estimated based on problems encountered during laboratory analysis. The associated numerical detection limit is regarded as inaccurate or imprecise.

**Table 4-1B**

**Summary of Chemicals of Concern Detected in Groundwater**
**Historical Monitoring Wells — SWMU 17/Building 1423 Plume**
**2016 RAER**
**Former NAS Dallas, Texas**
**Page 1 of 3**

| Monitoring Well | Sampling Date | | SDG | Chemicals of Concern (mg/L) | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | 1,1-Dichloroethene | Carbon Tetrachloride | Chloroform | Chloromethane | cis-1,2-Dichloroethene | Methylene Chloride | Tetrachloroethene | trans-1,2-Dichloroethene | Trichloroethene | Vinyl Chloride |
| **Protective Concentration Levels (mg/L)** | | | | **0.00700** | **0.00500** | **0.24000** | **0.07000** | **0.07000** | **0.00500** | **0.00500** | **0.10000** | **0.00500** | **0.00200** |
| **Monitoring Wells Located Inside PCLE Zone** | | | | | | | | | | | | | |
| **613D130MW** | 3/29/2005 | | Well Installed | | | | | | | | | | |
| | 4/1/2005 | Round 13 | -- | NS-D | NS-D | NS-D | NS-D | NS-D | NS-D | NS-D | NS-D | NS-D | NS-D |
| | 8/2/2005 | Round 13B | CTO260-12 | 0.00040 U | 0.00030 U | 0.00040 U | 0.00040 J | 0.01200 | 0.00200 U | 0.00040 U | 0.00200 | 0.02800 | 0.00030 U |
| | 8/2/2005 | Round13B (PDB) | CTO260-12 | 0.00040 U | 0.00030 U | 0.00040 U | 0.00030 U | 0.00600 | 0.00200 U | 0.00040 U | 0.00080 J | 0.00600 | 0.00030 U |
| | 10/18/2005 | Round14 (PDB) | CTO260-21 | 0.00040 U | 0.00030 U | 0.00040 U | 0.00030 U | 0.00500 J | 0.00200 U | 0.00040 U | 0.00090 J | 0.00600 J | 0.00030 U |
| | 1/18/2006 | Round 15 | CTO260-28 | 0.00040 U | 0.00030 U | 0.00040 U | 0.00030 U | 0.00100 | 0.00200 U | 0.00040 U | 0.00030 J | 0.00200 | 0.00030 U |
| | 8/10/2006 | Round 16 | CTO24-12 | 0.00060 U | 0.00050 U | 0.00040 U | 0.00060 U | 0.01000 | 0.00200 UJ | 0.00060 U | 0.00200 | 0.02700 | 0.00060 U |
| | 5/8/2007 | Round 17 (PDB) | 0705111 | 0.00013 U | 0.00011 U | 0.00013 U | 0.00028 U | 0.00840 | 0.00023 U | 0.00010 U | 0.00150 | 0.00860 | 0.00020 U |
| | 8/22/2007 | Round 18 | DALLASW001 | 0.00042 U | 0.00014 U | 0.00010 U | 0.00040 U | 0.01200 | 0.00026 U | 0.00014 U | 0.00230 | 0.00044 J | 0.00019 U |
| | 1/29/2008 | Round 19 (PDB) | 1/29/2008 | 0.00039 U | 0.00044 U | 0.00036 U | 0.00060 U | 0.00850 | 0.00046 J | 0.00046 U | 0.00160 | 0.00120 | 0.00043 U |
| | 7/22/2008 | Round 20 (PDB) | F58957 | 0.00054 U | 0.00022 U | 0.00028 U | 0.00061 U | 0.00860 | 0.00100 U | 0.00022 U | 0.00096 J | 0.00310 | 0.00030 U |
| | 1/12/2009 | Round 21 (PDB) | F62751 | 0.00054 U | 0.00022 U | 0.00028 U | 0.00061 U | 0.00120 | 0.00100 U | 0.00022 J | 0.00045 U | 0.01320 | 0.00030 U |
| | 7/14/2009 | Round 22 | F66643 | 0.00054 U | 0.00022 U | 0.00028 U | 0.00061 U | 0.00480 | 0.00100 U | 0.00022 U | 0.00059 J | 0.00051 J | 0.00030 U |
| | 1/11/2010 | Round 23 (PDB) | F70740 | 0.00054 U | 0.00022 U | 0.00028 U | 0.00061 U | 0.00230 | 0.00100 U | 0.00022 U | 0.00047 J | 0.00032 U | 0.00030 U |
| | 7/13/2010 | Round 24 (PDB) | F75073 | 0.00029 U | 0.00034 U | 0.00025 U | 0.00050 U | 0.04750 | 0.00200 U | 0.00044 U | 0.00042 J | 0.00024 U | 0.00028 U |
| | 1/10/2011 | Round 25 (PDB) | F79278 | 0.00023 U | 0.00025 U | 0.00022 U | 0.00050 U | 0.00130 | 0.00200 U | 0.00025 U | 0.00035 U | 0.00026 U | 0.00022 U |
| | 7/25/2011 | Round 26 | F84572 | 0.00023 U | 0.00025 U | 0.00022 U | 0.00055 U | 0.00610 | 0.00200 U | 0.00025 U | 0.00082 J | 0.00026 U | 0.00022 U |
| | 1/9/2012 | Round 27 | F89332 | 0.00023 U | 0.00025 U | 0.00022 U | 0.00050 U | 0.00026 U | 0.0020 U | 0.00025 U | 0.00035 U | 0.00026 U | 0.00022 U |
| | 7/10/2012 | Round 28 | F4786 | 0.00023 U | NS | NS | NS | 0.00095 | NS | NS | 0.00038 | 0.00042 | 0.00022 U |
| | 1/7/2013 | Round 29 (PDB) | FA639 | 0.00020 U | 0.00031 U | 0.00026 U | 0.00050 U | 0.0040 | 0.0020 U | 0.00032 U | 0.00023 U | 0.00031 U | 0.00044 U |
| | 7/16/2013 | Round 30 | FA6470 | 0.00020 U | 0.00031 U | 0.00026 U | 0.00050 U | 0.0028 | 0.0020 U | 0.00032 U | 0.00047 J | 0.00067 J | 0.00044 U |
| | 1/28/2014 | Round 31 (PDB) | FA12120 | 0.00025 U | 0.0004 U | 0.00031 U | 0.00053 U | 0.0025 | 0.0020 U | 0.00026 U | 0.00069 J | 0.00036 J | 0.00033 U |
| | 7/15/2014 | Round 32 | 1407111 | 0.00025 U | 0.00025 U | 0.00025 U | 0.00025 U | 0.00289 | 0.0005 U | 0.00025 U | 0.00052 J | 0.00106 | 0.00025 U |
| | 1/20/2015 | Round 33 (PDB) | 1501071 | 0.00025 U | NS | NS | NS | 0.00394 | NS | NS | 0.00083 J | 0.0005 J | 0.00025 U |
| | 7/22/2015 | Round 34 | 1507178 | 0.00025 U | 0.00025 U | 0.00025 U | 0.00025 U | 0.00214 | 0.0005 U | 0.00025 U | 0.000312 | 0.00116 | 0.00025 U |
| | 1/20/2016 | Round 35 (PDB) | Well Abandoned | | | | | | | | | | |

**Table 4-1B**

**Summary of Chemicals of Concern Detected in Groundwater**
**Historical Monitoring Wells — SWMU 17/Building 1423 Plume**
**2016 RAER**
**Former NAS Dallas, Texas**
**Page 2 of 3**

| Monitoring Well | Sampling Date | | SDG | Chemicals of Concern (mg/L) | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | 1,1-Dichloroethene | Carbon Tetrachloride | Chloroform | Chloromethane | cis-1,2-Dichloroethene | Methylene Chloride | Tetrachloroethene | trans-1,2-Dichloroethene | Trichloroethene | Vinyl Chloride |
| **Protective Concentration Levels (mg/L)** | | | | **0.00700** | **0.00500** | **0.24000** | **0.07000** | **0.07000** | **0.00500** | **0.00500** | **0.10000** | **0.00500** | **0.00200** |
| **Monitoring Wells Located Outside PCLE Zone** | | | | | | | | | | | | | |
| **600D95MW** | 8/17/1999 | | Well Installed | | | | | | | | | | |
| | 8/17/1999 | Round 5 | DL318 | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U |
| | 7/12/2000 | Round 6 | DL349 | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U |
| | 7/10/2001 | Round 7 | DL368 | 0.00500 U | 0.00500 U | 0.00500 U | 0.01000 U | 0.00250 U | 0.00500 U | 0.00500 U | 0.00250 U | 0.00500 U | 0.01000 U |
| | 1/26/2003 | Round 8 (PDB) | 280195 | 0.00100 U | 0.00100 U | 0.00100 U | 0.00100 U | 0.00100 U | 0.00200 U | 0.00100 U | 0.00100 U | 0.00100 U | 0.00100 U |
| | -- | Round 9 | -- | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS |
| | 12/8/2003 | Round 10 | C3L090143 | 0.00033 U | 0.00039 U | 0.00049 U | 0.00049 U | 0.00041 U | 0.00053 U | 0.00038 U | 0.00041 U | 0.00036 U | 0.00098 U |
| | -- | Round 11 | -- | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS |
| | 10/15/2004 | Round 12 (PDB) | C4J160168 | 0.00035 U | 0.00025 U | 0.00010 U | 0.00017 U | 0.00027 U | 0.00040 U | 0.00021 U | 0.00023 U | 0.00022 U | 0.00017 U |
| | -- | Round 13 | -- | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS |
| | 10/8/2005 | Round 14 (PDB) | CTO260-21 | 0.00040 U | 0.00030 U | 0.00040 U | 0.00030 U | 0.00030 U | 0.00200 U | 0.00040 U | 0.00030 U | 0.00030 U | 0.00030 U |
| | 5/18/2006 | Round 15 | CTO24-4 | 0.00100 U | 0.00100 U | 0.00100 U | 0.00200 U | 0.00100 U | 0.00500 UJ | 0.00100 U | 0.00100 U | 0.00100 U | 0.00200 U |
| | 8/23/2006 | Round 16 | CTO24-19 | 0.00060 U | 0.00050 U | 0.00040 U | 0.00060 UJ | 0.00050 U | 0.00200 U | 0.00060 U | 0.00060 U | 0.00040 U | 0.00060 U |
| | 5/8/2007 | Round 17 (PDB) | 0705111 | 0.00013 U | 0.00011 U | 0.00013 U | 0.00028 U | 0.00014 U | 0.00023 U | 0.00010 U | 0.00015 U | 0.00023 U | 0.00020 U |
| | 8/23/2007 | Round 18 | DALLASW001 | 0.00042 U | 0.00014 U | 0.00010 U | 0.00040 U | 0.00044 U | 0.00026 U | 0.00014 U | 0.00040 U | 0.00028 U | 0.00019 U |
| | 1/31/2008 | Round 19 (PDB) | CTO73-7 | 0.00039 U | 0.00044 U | 0.00036 U | 0.00060 U | 0.00032 U | 0.00040 U | 0.00046 U | 0.00048 U | 0.00053 U | 0.00043 U |
| | 7/22/2008 | Round 20 (PDB) | F58958 | 0.00054 U | 0.00022 U | 0.00028 U | 0.00061 U | 0.00020 U | 0.00100 U | 0.00022 U | 0.00045 U | 0.00032 U | 0.00030 U |
| | 1/12/2009 | Round 21 (PDB) | F62752 | 0.00054 U | 0.00022 U | 0.00028 U | 0.00061 U | 0.00020 U | 0.00100 U | 0.00022 U | 0.00045 U | 0.00032 U | 0.00030 U |
| | 7/14/2009 | Round 22 | F66642 | 0.00054 U | 0.00022 U | 0.00028 U | 0.00061 U | 0.00020 U | 0.00100 U | 0.00022 U | 0.00045 U | 0.00032 U | 0.00030 U |
| | 1/11/2010 | Round 23 (PDB) | F70741 | 0.00054 U | 0.00022 U | 0.00028 U | 0.00061 U | 0.00020 U | 0.00100 U | 0.00022 U | 0.00045 U | 0.00032 U | 0.00030 U |
| | 7/13/2010 | Round 24 (PDB) | F75075 | 0.00029 U | 0.00034 U | 0.00025 U | 0.00050 U | 0.00032 U | 0.00200 U | 0.00044 U | 0.00034 U | 0.00024 U | 0.00028 U |
| | 1/11/2011 | Round 25 (PDB) | F79282 | 0.00023 U | 0.00025 U | 0.00022 U | 0.00050 U | 0.00026 U | 0.00200 U | 0.00025 U | 0.00035 U | 0.00026 U | 0.00022 U |
| | 7/27/2011 | Round 26 | F84666 | 0.00023 U | 0.00025 U | 0.00022 U | 0.00050 U | 0.00026 U | 0.00200 U | 0.00025 U | 0.00035 U | 0.00026 U | 0.00022 U |
| | 1/10/2012 | Round 27 (PDB) | F89336 | 0.00023 U | 0.00025 U | 0.00022 U | 0.00050 U | 0.00026 U | 0.00200 U | 0.00025 U | 0.00035 U | 0.00026 U | 0.00022 U |
| | 7/9/2012 | Round 28 | F94780 | 0.00023 U | NS | NS | NS | 0.00026 U | NS | NS | 0.00035 U | 0.00026 U | 0.00022 U |
| | 1/8/2013 | Round 29 (PDB) | FA637 | 0.00020 U | 0.00031 U | 0.00026 U | 0.00050 U | 0.00024 U | 0.0020 U | 0.00032 U | 0.00023 U | 0.00031 U | 0.00044 U |
| | 7/16/2013 | Round 30 | FA6474 | 0.00020 U | 0.00031 U | 0.00026 U | 0.00050 U | 0.00024 U | 0.0020 U | 0.00032 U | 0.00023 U | 0.00031 U | 0.00044 U |
| | 1/28/2014 | Round 31 (PDB) | FA12120 | 0.00025 U | 0.0004 U | 0.00031 U | 0.00053 U | 0.00033 U | 0.0020 U | 0.00026 U | 0.00034 U | 0.00030 U | 0.00033 U |
| | 7/16/2014 | Round 32 | 1407125 | 0.00025 U | 0.00025 U | 0.00025 U | 0.00025 U | 0.00025 U | 0.0005 U | 0.00025 U | 0.00025 U | 0.00025 U | 0.00025 U |
| | 1/20/2015 | Round 33 (PDB) | 1501071 | 0.00025 U | NS | NS | NS | 0.00025 U | NS | NS | 0.00025 U | 0.00025 U | 0.00025 U |
| | 7/21/2015 | Round 34 | 1507171 | 0.00025 U | 0.00025 U | 0.00025 U | 0.00025 U | 0.00025 U | 0.0005 U | 0.00025 U | 0.00025 U | 0.00025 U | 0.00025 U |
| | 1/20/2016 | Round 35 (PDB) | Well Abandoned | | | | | | | | | | |
| **61802MW** | 12/14/1995 | Round 1 | -- | 0.00500 U | 0.00500 U | 0.00500 U | 0.01000 U | 0.00500 U | 0.01000 U | 0.00500 U | 0.00500 U | 0.00958 U | 0.01000 U |
| | 4/19/1998 | Round 2 | DL152 | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U |
| | -- | Round 3 | -- | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS |
| | -- | Round 4 | -- | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS |
| | 11/9/1999 | Round 5 | DL333 | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00021 J | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U |
| | -- | Round 6 | -- | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS |
| | -- | Round 7 | -- | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS |
| | -- | Round 8 | -- | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS |
| | 2/6/2003 | | Well Abandoned | | | | | | | | | | |
| **613D70MW** | 4/4/1998 | | Well Installed | | | | | | | | | | |
| | 5/16/1998 | Roound 2 | DL179 | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U |
| | 8/30/1998 | Roound 3 | DL211 | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 UJ | 0.00500 U | 0.00500 U |
| | -- | Roound 4 | -- | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS |
| | 11/9/1999 | Roound 5 | DL333 | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U |
| | 7/24/2000 | Roound 6 | DL352 | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U |
| | 7/12/2001 | Roound 7 | DL370 | 0.00500 U | 0.00500 U | 0.00500 U | 0.01000 U | 0.00250 U | 0.00500 U | 0.00500 U | 0.00250 U | 0.00500 U | 0.01000 U |
| | 1/26/2003 | Roound 8 (PDB) | 280195 | 0.00100 U | 0.00100 U | 0.00100 U | 0.00100 U | 0.00100 U | 0.00200 U | 0.00100 U | 0.00100 U | 0.00100 U | 0.00100 U |
| | -- | Roound 9 | -- | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS |
| | 12/9/2003 | Roound 10 | C3L100326 | 0.00021 U | 0.00020 U | 0.00014 U | 0.00008 U | 0.00016 U | 0.00016 U | 0.00024 U | 0.00019 U | 0.00010 U | 0.00017 U |
| | -- | Roound 11 | -- | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS |
| | -- | Roound 12 | -- | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS |
| | 4/26/2005 | | Well Abandoned | | | | | | | | | | |

**Table 4-1B**

**Summary of Chemicals of Concern Detected in Groundwater**
**Historical Monitoring Wells — SWMU 17/Building 1423 Plume**
**2016 RAER**
**Former NAS Dallas, Texas**
**Page 3 of 3**

| Monitoring Well | Sampling Date | | SDG | Chemicals of Concern (mg/L) | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | 1,1-Dichloroethene | Carbon Tetrachloride | Chloroform | Chloromethane | cis-1,2-Dichloroethene | Methylene Chloride | Tetrachloroethene | trans-1,2-Dichloroethene | Trichloroethene | Vinyl Chloride |
| **Protective Concentration Levels (mg/L)** | | | | **0.00700** | **0.00500** | **0.24000** | **0.07000** | **0.07000** | **0.00500** | **0.00500** | **0.10000** | **0.00500** | **0.00200** |
| **613D45MW** | 4/13/1998 | | Well Installed | | | | | | | | | | |
| | 5/16/1998 | Round 2 | DL179 | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U |
| | 8/30/1998 | Round 3 | DL212 | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U |
| | -- | Round 4 | -- | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS |
| | 11/9/1999 | Round 5 | DL333 | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00590 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U |
| | 7/21/2000 | Round 6 | DL351 | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U |
| | 7/13/2001 | Round 7 | DL370 | 0.00500 U | 0.00500 U | 0.00500 U | 0.01000 U | 0.00250 U | 0.00500 U | 0.00500 U | 0.00250 U | 0.00500 U | 0.01000 U |
| | 1/27/2003 | Round 8 (PDB) | 280195 | 0.00100 U | 0.00100 U | 0.00100 U | 0.00100 U | 0.00100 U | 0.00200 U | 0.00100 U | 0.00100 U | 0.00100 U | 0.00040 J |
| | -- | Round 9 | -- | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS |
| | 12/7/2003 | Round 10 | C3L090143 | 0.00033 U | 0.00039 U | 0.00049 U | 0.00049 U | 0.00041 U | 0.00053 U | 0.00038 U | 0.00041 U | 0.00036 U | 0.00098 U |
| | -- | Round 11 | -- | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS |
| | 10/15/2004 | Round 12 (PDB) | C4J160168 | 0.00035 U | 0.00025 U | 0.00010 U | 0.00017 U | 0.00027 U | 0.00040 U | 0.00021 U | 0.00023 U | 0.00022 U | 0.00017 U |
| | -- | Round 13 | -- | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS |
| | 10/18/2005 | Round 14 (PDB) | CTO260-21 | 0.00040 U | 0.00030 U | 0.00040 U | 0.00030 U | 0.00030 U | 0.00200 U | 0.00040 U | 0.00030 U | 0.00030 U | 0.00030 U |
| | 5/3/2006 | Round 15 | CTO24-1 | 0.00060 U | 0.00050 U | 0.00040 U | 0.00060 U | 0.00050 U | 0.00200 U | 0.00060 U | 0.00060 U | 0.00040 U | 0.00060 U |
| | 8/10/2006 | Round 16 | CTO24-12 | 0.00060 U | 0.00050 U | 0.00040 U | 0.00060 U | 0.00050 U | 0.00200 UJ | 0.00060 U | 0.00060 U | 0.00040 U | 0.00060 U |
| | 5/8/2007 | Round 17 (PDB) | 0705111 | 0.00013 U | 0.00011 U | 0.00013 U | 0.00028 U | 0.00014 U | 0.00023 U | 0.00010 U | 0.00015 U | 0.00027 J | 0.00140 J |
| | 8/22/2007 | Round 18 | DALLASW001 | 0.00042 U | 0.00014 U | 0.00010 U | 0.00040 U | 0.00044 U | 0.00026 U | 0.00014 U | 0.00040 U | 0.00028 U | 0.00019 U |
| | 1/29/2008 | Round 19 (PDB) | CTO73-4 | 0.00039 U | 0.00044 U | 0.00036 U | 0.00060 U | 0.00032 U | 0.00040 U | 0.00046 U | 0.00048 U | 0.00053 U | 0.00043 U |
| | 7/22/2008 | Round 20 (PDB) | F58957 | 0.00054 U | 0.00022 U | 0.00028 U | 0.00061 U | 0.00020 U | 0.00100 U | 0.00022 U | 0.00045 U | 0.00032 U | 0.00030 U |
| | 1/12/2009 | Round 21 (PDB) | F62751 | 0.00054 U | 0.00022 U | 0.00028 U | 0.00061 U | 0.00020 U | 0.00100 U | 0.00022 U | 0.00077 J | 0.00032 U | 0.00030 U |
| | 7/14/2009 | Round 22 | F66643 | 0.00054 U | 0.00022 U | 0.00028 U | 0.00061 U | 0.00020 U | 0.00180 U | 0.00022 U | 0.00045 U | 0.00032 U | 0.00030 U |
| | 1/11/2010 | Round 23 (PDB) | F70740 | 0.00054 U | 0.00022 U | 0.00028 U | 0.00061 U | 0.00020 U | 0.00100 U | 0.00022 U | 0.00045 U | 0.00032 U | 0.00057 J |
| | 7/13/2010 | Round 24 (PDB) | F75073 | 0.00029 U | 0.00034 U | 0.00025 U | 0.00050 U | 0.00032 U | 0.00200 U | 0.00044 U | 0.00034 U | 0.00024 U | 0.00028 U |
| | 1/10/2011 | Round 25 (PDB) | F79278 | 0.00023 U | 0.00025 U | 0.00022 U | 0.00050 U | 0.00026 U | 0.00200 U | 0.00025 U | 0.00035 U | 0.00026 U | 0.00022 U |
| | 7/25/2011 | Round 26 | F84572 | 0.00023 U | 0.00025 U | 0.00022 U | 0.00060 U | 0.00026 U | 0.00200 U | 0.00025 U | 0.00035 U | 0.00026 U | 0.00022 U |
| | 1/9/2012 | Round 27 | F89332 | 0.00025 U | 0.00025 U | 0.00022 U | 0.00050 U | 0.00026 U | 0.0020 U | 0.00025 U | 0.00035 U | 0.00026 U | 0.00022 U |
| | 7/10/2012 | Round 28 | F94786 | 0.00023 U | NS | NS | NS | 0.00026 U | NS | NS | 0.00035 U | 0.00026 U | 0.00023 |
| | 1/7/2013 | Round 29 (PDB) | FA639 | 0.00020 U | 0.00031 U | 0.00026 U | 0.00050 U | 0.00024 U | 0.0020 U | 0.00032 U | 0.00023 U | 0.00031 U | 0.00044 U |
| | 7/16/2013 | Round 30 | FA6470 | 0.00020 U | 0.00031 U | 0.00026 U | 0.00050 U | 0.00024 U | 0.0020 U | 0.00032 U | 0.00023 U | 0.00031 U | 0.00044 U |
| | 1/28/2014 | Round 31 (PDB) | FA12120 | 0.00025 U | 0.0004 U | 0.00031 U | 0.00053 U | 0.00033 U | 0.0002 U | 0.00026 U | 0.00034 U | 0.0003 U | 0.00033 U |
| | 7/15/2014 | Round 32 | 1407111 | 0.00025 U | 0.00025 U | 0.00025 U | 0.00025 U | 0.00025 U | 0.0005 U | 0.00025 U | 0.00025 U | 0.00025 U | 0.00025 U |
| | 1/20/2015 | Round 33 (PDB) | 1501071 | 0.00025 U | NS | NS | NS | 0.00025 U | NS | NS | 0.00025 U | 0.00025 U | 0.00025 U |
| | 7/21/2015 | Round 34 | 1507171 | 0.00025 U | 0.00025 U | 0.00025 U | 0.00025 U | 0.00025 U | 0.0005 U | 0.00025 U | 0.00025 U | 0.00025 U | 0.00025 U |
| | 1/20/2016 | Round 35 (PDB) | Well Abandoned | | | | | | | | | | |

mg/L - milligrams per liter
NA - Not Applicable
NS - Not Sampled
NS-D - Not Sampled during this round due to insufficient water in the monitoring well
PDB - Passive Diffusion Bag
SDG - Sample Delivery Group
PCLE - Protective Concentration Level Exceedance

Note:
Shaded areas indicate an exceedance.

Analytical Result Qualifiers:
J - Indicates that the chemical was detected. However, the associated numerical result may not be a precise representation of the amount that is actually present in the sample. The laboratory reported concentration is considered to be an estimate of the true concentration.
U - Indicates that the chemical was not detected at the numerical detection limit (sample-specific quantitation limit) noted. Nondetected results from the laboratory are reported in this manner. This qualifier is added to a positive result (reported by the laboratory) if the detected concentration is determined to be attributable to contamination introduced during field sampling or laboratory analysis.
UJ - Indicates that the chemical was not detected. However, the detection limit (sample-specific quantitation limit) is considered to be estimated based on problems encountered during laboratory analysis. The associated numerical detection limit is regarded as inaccurate or imprecise.

# TABLE 4-2
# SUMMARY OF GEOCHEMICAL PARAMETERS MEASURED IN GROUNDWATER

**Table 4-2A**

**Summary of Geochemical Parameters Measured in Groundwater**
**SWMU 17/Building 1423 Plume**
**2016 RAER**
**Former NAS Dallas, Texas**
**Page 1 of 3**

| Monitoring Well | Sampling Date | Sampling Round | SDG | Oxidation-Reduction Conditions | | | | | | | | Degradation Products | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Dissolved Oxygen[2] | Ferrous Iron[2] | Nitrate[3] | Nitrite[3] | ORP[1] | Phosphate[3] | Sulfate[3] | TOC[3] | Alkalinity[2] | Carbon Dioxide[2] | Chloride[3] | Ethane[3] | Ethene[3] | Methane[3] | pH[1] | Sulfide[3] |
| | | | Units | mg/L | mg/L | mg/L | mg/L | mV | mg/L | mg/L | mg/L | mg/L | mg/L | mg/L | ng/L | ng/L | µg/L | S.U. | mg/L |
| **Monitoring Wells Located Inside PCLE Zone** | | | | | | | | | | | | | | | | | | | |
| **61301MW** | 11/8/1999 | Round 5 | DL332 | 0.80 | 0 | NA | NA | 294.5 | NA | 469 | NA | 442 | NA | 83.4 | NA | NA | NA | 7.07 | NA |
| | 7/21/2000 | Round 6 | DL351 | 3.0 | 0.2 | NA | NA | 173.2 | NA | 641 | NA | 450 | NA | 149 | NA | NA | NA | 6.88 | NA |
| | 12/7/2003 | Round 10 | C3L090143 | 3.5 | 0 | NA | NA | 76.00 | NA | 610 | NA | 250 | NA | 160 | NA | NA | NA | 6.94 | NA |
| | 10/5/2005 | Round 14 | CTO260-16, 17 | 4.0 | 0 | NA | NA | 21 | 0.038 J | 640 | 1.4 | 250 | NA | 140 | 760 U | 350 U | 3.8 U | 6.92 | 0.14 U |
| | 8/21/2007 | Round 18 | DALLASW001 | 2.5 | 0 | 0.05 U | 1 | 116 | 0.5 U | 562 | 1.1 | 400 | 40 | 144 | 330 U | 330 U | 1.8 U | 7.1 | 0.78 |
| | 7/14/2009 | Round 22 | F66643 | 3.0 | 0 | 0.13 | 0.1 UR | -3.2 | 0.026 J | 489 | 1.2 | 450 | 60 | 113 | 320 U | 430 U | 1 U | 7.38 | 0.6 U |
| | 7/25/2011 | Round 26 | F84572 | 1.0 | 0.1 | 0.96 JL | 0.05 U | -15.6 | 0.13 | 616 JL | 1.2 | 25 | 14 | 170 | 320 U | 430 U | 1.74 | 7.09 | 0.3 U |
| | 1/10/2012 | Round 27 | F88817 | NA | NA | NA | NA | 88.5 | NA | NA | NA | NA | NA | NA | NA | NA | NA | 7.12 | NA |
| | 7/10/2012 | Round 28 | F94831 | NA | NA | NA | NA | 50.3 | NA | NA | NA | NA | NA | NA | NA | NA | NA | 6.73 | NA |
| | 1/7/2013 | Round 29 | FA639 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| | 7/16/2013 | Round 30 | FA6470 | 1.0 | 0.3 | 0.50 U | 0.50 U | -12.3 | 0.046 J | 579 | 1.3 | 325 | 40 | 153 JL | 320 U | 430 U | 2.3 | 7.1 | 0.90 JH |
| | 2/25/2014 | Round 31 | FIELD | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| | 7/15/2014 | Round 32 | 1407111 | 0.9 | 0.41 | 0.033 U | 0.165 UJL | -15.7 | 0.01 U | 495 | 1.55 J | NA | 95 | 133 | 0.001 U | 0.001 U | 0.00171 J | 7.13 | 0.02 |
| | 1/20/2015 | Round 33 | 1501071 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| | 7/21/2015 | Round 34 | 1507171 | 0.99 | 0.74 | 0.033 U | 0.033 U | -3.3 | .0313 J | 784 | 1.25 U | 501 | 55 | 210 | 0.001 U | 0.001 U | 3.19 J | 6.92 | 0 |
| | 1/20/2016 | Round 35 | 1601140 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| | 7/21/2016 | Round 36 | 1607165 | 1.72 | 0.31 | 0.0703 | 0.033 U | 14 | 0.0209 | 314 | 1.25 U | 483 | 0 | 90.8 | 0.001 U | 0.001 U | 1.18 | 7.28 | NA |
| **61303MW** | 11/4/1999 | Round 5 | DL332, TTE14 | 0.60 | 0 | NA | NA | 297.5 | NA | 228 | NA | 366 | NA | 23.1 | 196 | 204 | 3.232 | 6.95 | NA |
| | 7/21/2000 | Round 6 | DL351 | 1.5 | 0.2 | NA | NA | 238.8 | NA | 244 | NA | 350 | NA | 30.8 | NA | NA | NA | 6.91 | NA |
| | 12/7/2003 | Round 10 | C3L090143 | 1.0 | 0 | NA | NA | 20.00 | NA | 185 | NA | 350 | NA | 14.8 | NA | NA | NA | 6.76 | NA |
| | 10/5/2005 | Round 14 | CTO260-16, 17 | 1.5 | 0.2 | NA | NA | -68 | NA | NA | NA | 225 | 35 | 21 | 760 U | 350 U | 2.9 U | 6.84 | 0.14 U |
| | 8/21/2007 | Round 18 | DALLASW001 | 2 | 0.6 | 0.05 U | 2.9 | -45 | 0.5 U | 146 | 0.83 | 200 | 35 | 18.1 | 330 U | 330 U | 3.2 U | 6.42 | 0..82 |
| | 7/14/2009 | Round 22 | F66643 | 1 | 0 | 0.05 U | 0.05 UR | 1.3 | 0.12 | 90.5 | 0.52 J | 50 | 30 | 9.8 | 320 U | 430 U | 0.95 U | 6.96 | 0.6 U |
| | 7/25/2011 | Round 26 | F84572 | 1 | 0.2 | 0.05 UJL | 0.05 U | -41.3 | 0.087 | 98.1 JL | 0.55 | 13 | 25 | 14.2 | 320 U | 430 U | 0.59 | 6.55 | 0.3 U |
| | 1/1/2012 | Round 27 | F88817 | NA | NA | NA | NA | -7.3 | NA | NA | NA | NA | NA | NA | NA | NA | NA | 7.09 | NA |
| | 7/10/2012 | Round 28 | F94831 | NA | NA | NA | NA | -65.7 | NA | NA | NA | NA | NA | NA | NA | NA | NA | 6.56 | NA |
| | 1/7/2013 | Round 29 | FA639 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| | 7/16/2013 | Roudn 30 | FA6470 | 0.4 | 0.4 | 0.050 U | 0.050 U | -46.8 | 0.095 J | 87.4 | 0.83 J U | 300 | 20 | 12.3 | 320 U | 430 U | 0.41 J | 7.13 | 1.6 JH |
| | 2/25/2014 | Round 31 | FIELD | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| | 7/16/2014 | Round 32 | 1407125 | 0.53 | 0.09 | 0.033 U | 0.033 U | -75.4 | 0.01 U | 68.3 | 1.25 U | NA | 40 | 22.7 | 0.001 UJ | 0.001 UJ | 0.001 U | 6.73 | 0 |
| | 1/20/2015 | Round 33 | 1501071 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| | 7/21/2015 | Round 34 | 1507171 | 0.2 | 0.12 | .042 J | 0.033 U | 13.3 | .023 J | 132 | 1.25 U | 311 | 40 | 18.2 | 0.001 U | 0.001 U | 1.19 J | 7.05 | 0.01 |
| | 1/20/2016 | Round 35 | 1601140 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| | 7/21/2016 | Round 36 | 1607165 | 0 | 0.16 | 0.137 | 0.033 U | -75 | 0.01 U | 143 | 1.25 U | 330 | 0 | 14.5 | 0.001 U | 0.001 U | 1.12 | 7.31 | NA |

**Table 4-2A**

**Summary of Geochemical Parameters Measured in Groundwater**
**SWMU 17/Building 1423 Plume**
**2016 RAER**
**Former NAS Dallas, Texas**
**Page 2 of 3**

| Monitoring Well | Sampling Date | Sampling Round | SDG | Oxidation-Reduction Conditions | | | | | | | | Degradation Products | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Dissolved Oxygen[2] | Ferrous Iron[2] | Nitrate[3] | Nitrite[3] | ORP[1] | Phosphate[3] | Sulfate[3] | TOC[3] | Alkalinity[2] | Carbon Dioxide[2] | Chloride[3] | Ethane[3] | Ethene[3] | Methane[3] | pH[1] | Sulfide[3] |
| | | | Units | mg/L | mg/L | mg/L | mg/L | mV | mg/L | mg/L | mg/L | mg/L | mg/L | mg/L | ng/L | ng/L | µg/L | S.U. | mg/L |
| 613D41MW | 4/7/1998 | Well Installed | | | | | | | | | | | | | | | | | |
| | 10/12/1999 | Round 5 | DL327, TTE12 | 0.40 | 0 | NA | NA | 537.5 | NA | 136 | NA | 396 | NA | 13.7 | NA | 13.0 | 0.1770 | 6.72 | NA |
| | 7/21/2000 | Round 6 | DL351 | 0.60 | 0.2 | NA | NA | 206.6 | NA | 149 | NA | 355 | NA | 16.8 | NA | NA | NA | 6.72 | NA |
| | 12/8/2003 | Round 10 | C3L090143 | 0.60 | 0 | NA | NA | 323.0 | NA | 151 | NA | 400 | NA | 8.50 | NA | NA | NA | 6.61 | NA |
| | 10/17/2005 | Round 14 | CTO260-16, 17 | 0.8 | 0 | 6.8 J | 0.0032 J | 137 | 0.00991 U | 120 | 0.84 J | 225 | 70 | 12 | 760 U | 350 U | 2.6 U | 6.79 | 0.15 J |
| | 8/21/2007 | Round 18 | DALLASW001 | 3 | 0 | 6.6 | 1 U | -27 | 0.5 U | 121 | 1.1 | 250 | 25 | 9 | 330 U | 330 U | 0.82 U | 6.8 | 0.83 U |
| | 7/14/2009 | Round 22 | F66643 | 2.5 | 0 | 5.6 J | 0.05 UR | 122.8 | 0.02 U | 100 | 0.51 J | 400 | 45 | 13.9 | 320 U | 430 U | 0.16 U | 6.86 | 0.6 U |
| | 1/11/2010 | Round 23 | F70740 | NA | NA | NA | NA | 82.5 | NA | NA | NA | NA | NA | NA | NA | NA | NA | 7.12 | NA |
| | 7/13/2010 | Round 24 | F75073 | NA | NA | NA | NA | -37.4 | NA | NA | NA | NA | NA | NA | NA | NA | NA | 6.91 | NA |
| | 1/10/2011 | Round 25 | FIELD | NA | NA | NA | NA | 14.2 | NA | NA | NA | NA | NA | NA | NA | NA | NA | 6.99 | NA |
| | 7/25/2011 | Round 26 | F84572 | 3 | 0 | 4.7 JL | 0.05 U | 13.4 | 0.11 | 77.7 JL | 0.71 | 60 | 15 | 8.2 | 320 U | 430 U | 0.16 U | 6.55 | 0.3 U |
| | 1/10/2012 | Round 27 | F88817 | NA | NA | NA | NA | 9.8 | NA | NA | NA | NA | NA | NA | NA | NA | NA | 6.61 | NA |
| | 7/10/2012 | Round 28 | F94831 | NA | NA | NA | NA | 19.8 | NA | NA | NA | NA | NA | NA | NA | NA | NA | 6.98 | NA |
| | 1/7/2013 | Round 29 | FA639 | NA | NA | NA | NA | 101.0 | NA | NA | NA | NA | NA | NA | NA | NA | NA | 7.01 | NA |
| | 7/16/2013 | Round 30 | FA6470 | 1 | 0 | 7.0 U | 0.13 J | 103.3 | 0.020 U | 73.1 | 0.66 J U | 250 | 40 | 14 | 320 U | 430 U | 0.16 U | 6.92 | 0.39 J |
| | 2/25/2014 | Round 31 | FIELD | 2.04 | NA | NA | NA | 89.6 | NA | NA | NA | NA | NA | NA | NA | NA | NA | 7.08 | NA |
| | 7/15/2014 | Round 32 | 1407111 | 2.13 | 1.01 | 8.31 | 0.033 U | -43.4 | 0.01 U | 98.2 | 1.25 U | NA | 100 | 13.5 | 0.001 U | 0.001 U | 0.001 U | 6.51 | 0.2 |
| | 1/20/2015 | Round 33 | 1501071 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| | 7/22/2015 | Round 34 | 1507178 | 2.36 | 0.12 | 6.42 | 0.033 U | 77.1 | 0.01 U | 131 | 1.25 U | 347 | 40 | 12.3 | 0.001 U | 0.001 U | 0.001 U | 6.93 | 0.02 |
| | 1/20/2016 | Round 35 | 1601140 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| | 7/21/2016 | Round 36 | 1607165 | 0.98 | 0.28 | 2.71 | 0.033 U | 142 | 0.0192 | 83.1 | 1.25 U | 348 | 0 | 6.79 | 0.001 U | 0.001 U | 0.001 U | 6.74 | NA |

**Table 4-2A**

**Summary of Geochemical Parameters Measured in Groundwater**
**SWMU 17/Building 1423 Plume**
**2016 RAER**
**Former NAS Dallas, Texas**


| Monitoring Well | Sampling Date | Sampling Round | SDG | Oxidation-Reduction Conditions | | | | | | | | Degradation Products | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Dissolved Oxygen[2] | Ferrous Iron[2] | Nitrate[3] | Nitrite[3] | ORP[1] | Phosphate[3] | Sulfate[3] | TOC[3] | Alkalinity[2] | Carbon Dioxide[2] | Chloride[3] | Ethane[3] | Ethene[3] | Methane[3] | pH[1] | Sulfide[3] |
| | | | Units | mg/L | mg/L | mg/L | mg/L | mV | mg/L | mg/L | mg/L | mg/L | mg/L | mg/L | ng/L | ng/L | µg/L | S.U. | mg/L |
| **Monitoring Wells Located Outside PCLE Zone** | | | | | | | | | | | | | | | | | | | |
| **613D39MW** | 4/7/1998 | Well Installed | | | | | | | | | | | | | | | | | |
| | 8/23/1999 | Round 5 | DL319, TTE09 | 0.70 | 0 | NA | NA | 193.2 | NA | 263 | NA | 386 | NA | 33.2 | 6 | 46.0 | 27.50 | 6.92 | NA |
| | 7/21/2000 | Round 6 | DL351 | 0.60 | 0.2 | NA | NA | 238.0 | NA | 288 | NA | 400 | NA | 37.0 | NA | NA | NA | 6.88 | NA |
| | 12/8/2003 | Round 10 | C3L090143 | 0.80 | 0 | NA | NA | 315.0 | NA | 253 | NA | 425 | NA | 34.3 | NA | NA | NA | 6.72 | NA |
| | 8/22/2007 | Round 18 | DALLASW001 | 1 | 0.7 | 0.27 | 1 U | 56 | 0.5 U | 245 | 0.77 | 50 | 50 | 31.1 | 330 U | 330 U | 1.8 U | 7.26 | 0.87 U |
| | 7/14/2009 | Round 22 | F66643 | 1 | 0 | 0.51 | 0.05 UR | 137 | 0.081 J | 182 | 0.76 J | 300 | 65 | 35.3 | 320 U | 430 U | 0.16 U | 6.83 | 0.6 U |
| | 7/25/2011 | Round 26 | F84572 | 0.6 | 0 | 0.74 JL | 0.25 U | 60.3 | 0.15 | 273 JL | 0.94 | 180 | 70 | 76 | 320 U | 430 U | 0.76 | 6.73 | 0.3 U |
| | 1/10/2012 | Round 27 | F88817 | NA | NA | NA | NA | 55.6 | NA | NA | NA | NA | NA | NA | NA | NA | NA | 6.92 | NA |
| | 7/10/2012 | Round 28 | F94831 | NA | NA | NA | NA | 49.3 | NA | NA | NA | NA | NA | NA | NA | NA | NA | 6.4 | NA |
| | 1/7/2013 | Round 29 | FA639 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| | 7/16/2013 | Round 30 | FA6470 | 0.4 | 0 | 0.32 J | 0.25 U | 79.9 | 0.048 J | 228 | 0.83 J U | 300 | 40 | 45.5 JL | 320 U | 430 U | 0.56 | 6.62 | 1.3 JH |
| | 2/25/2014 | Round 31 | FIELD | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| | 7/16/2014 | Round 32 | 1407125 | 0.47 | 0 | 0.085 J | 0.033 U | -64.6 | 0.01 U | 174 | 1.25 U | NA | 85 | 30.3 | 0.001 UJ | 0.001 UJ | 0.001 U | 6.59 | 0 |
| | 1/20/2015 | Round 33 | 1501071 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| | 7/21/2015 | Round 34 | 1507171 | 0.41 | 0.18 | 0.033 U | 0.033 U | 32.7 | .0196 J | 191 | 1.25 U | 386 | 90 | 33.3 | 0.001 U | 0.001 U | 1.46 J | 6.8 | 0 |
| | 1/20/2016 | Round 35 | 1601140 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| | 7/21/2016 | Round 36 | 1607165 | 0 | 0.02 | 0.033 U | 0.033 U | 79 | 0.01 U | 219 | 1.25 U | 406 | 0 | 38.1 | 0.001 U | 0.001 U | 2.81 | 7.06 | NA |

***Notes:***

mg/L — milligrams per liter
mV — millivolts
NA — Not Analyzed
ng/L — nanograms per liter
ORP — Oxidation/reduction potential
TOC — Total Organic Carbon
mg/L — micrograms per liter
S.U. — Standard Units
SDG — Sample Delivery Group
PCLE — Protective Concentration Level Exceedance

1. Field measurement, meter
2. Field measurement, test kit
3. Analytical laboratory result

Analytical Result Qualifiers:
J, K (or H) , L — Indicates that the chemical was detected; however, the associated numerical result may not be a precise representation of the amount that is actually present in the sample. The laboratory reported concentration is considered to be bias unknown (J), high (K or H), or low (L) estimate of the true concentration.
U — Indicates that the sample was not detected at the numerical detection limit (sample-specific quantitation limit) noted. Nondetected results from the laboratory are reported in this manner. This qualifier is added to a positive result (reported by the laboratory) if the detected concentration is determined to be attributable to contamination introduced during field sampling or laboratory analysis.
H — Indicates that the initial and continuing calibration during analysis was greater than the upper quality control limit.

**Table 4-2B**

**Summary of Geochemical Parameters Measured in Groundwater**
**Historical Monitoring Wells — SWMU 17/Building 1423 Plume**
**2016 RAER**

**Former NAS Dallas, Texas**


| Monitoring Well | Sampling Date | Sampling Round | SDG | Oxidation-Reduction Conditions | | | | | | | | Degradation Products | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Dissolved Oxygen[2] | Ferrous Iron[2] | Nitrate[3] | Nitrite[3] | ORP[1] | Phosphate[3] | Sulfate[3] | TOC[3] | Alkalinity[2] | Carbon Dioxide[2] | Chloride[3] | Ethane[3] | Ethene[3] | Methane[3] | pH[1] | Sulfide[3] |
| | | | Units | mg/L | mg/L | mg/L | mg/L | mV | mg/L | mg/L | mg/L | mg/L | mg/L | mg/L | mg/L | ng/L | mg/L | S.U. | mg/L |
| **Monitoring Wells Located Inside PCLE Zone** | | | | | | | | | | | | | | | | | | | |
| **613D70MW** | 8/24/1999 | Round 5 | DL319, TTE09 | 1.0 | 0 | NA | NA | 284.3 | NA | 3100 | NA | NA | NA | 1750 | NA | 0.00 | 0.0920 | 6.81 | NA |
| | 11/9/1999 | Round 5 | DL333 | 1.0 | 0 | NA | NA | 350.9 | NA | 2810 | NA | NA | NA | 1600 | NA | NA | NA | 7.07 | NA |
| | 7/24/2000 | Round 6 | DL352 | 2.0 | 0.2 | NA | NA | 277.3 | NA | 2920 J | NA | NA | NA | 1620 | NA | NA | NA | 6.70 | NA |
| | 12/9/2003 | Round 10 | C3L100326 | 0.60 | 0 | NA | NA | 279.0 | NA | 3090 | NA | NA | NA | 1680 | NA | NA | NA | 6.78 | NA |
| | 4/26/2005 | Well Abandoned | | | | | | | | | | | | | | | | | |
| **613D130MW** | 8/22/2007 | Round 18 | DALLASW001 | NA | NA | 0.05 U | 1 | -95 | 0.5 U | 1080 | 2.4 | NA | NA | 55 | 330 U | 1,200 | 22 | 7.06 | 0.73 U |
| | 7/14/2009 | Round 22 | F66643 | 2 | 0 | 0.05 U | 0.05 UR | -21.9 | 0.074 J | 867 | 2.5 | 400 | 45 | 44.9 | 320 U | 430 U | 9.86 | 7.69 | 0.6 U |
| | 7/25/2011 | Round 26 | F84572 | 0.8 | 0.6 | 0.05 UJL | 0.05 UJL | 45.7 | 0.1 | 869 JL | 2.1 | 300 | 35 | 38.5 | 320 U | 430 U | 7.63 | 7.05 | 0.3 U |
| | 1/10/2012 | Round 27 | F88817 | NA | NA | NA | NA | 69.6 | NA | NA | NA | NA | NA | NA | NA | NA | NA | 7.19 | NA |
| | 7/10/2012 | Round 28 | F94831 | NA | NA | NA | NA | 19.8 | NA | NA | NA | NA | NA | NA | NA | NA | NA | 7.03 | NA |
| | 1/7/2013 | Round 29 | FA639 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| | 7/16/2013 | Round 30 | FA6470 | 0.2 | 0.2 | 0.50 U | 0.50 U | 53.1 | 0.020 U | 638 | 2.0 | 400 | 40 | 31 | 320 U | 430 U | 0.42 J | 6.76 | 1.5 JH |
| | 2/25/2014 | Round 31 | FIELD | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| | 7/15/2014 | Round 32 | 1407111 | 0.16 | 0.3 | 0.033 U | 0.165 U | -53.3 | 0.01 U | 715 | 2.21 J | NA | 100 | 40.6 | 0.001 U | 0.001 U | 0.00119 J | 7.06 | 0.04 |
| | 1/20/2015 | Round 33 | 1501071 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| | 7/22/2015 | Round 34 | 1507178 | 0.25 | 0.14 | 0.033 U | 0.165 U | 63 | 0.01 U | 644 | 2.02 J | 357 | 65 | 32.4 | 0.001 U | 0.001 U | 1.72 J | 7.08 | 0.01 |
| | 4/4/2016 | Well Plugged and Abandoned | | | | | | | | | | | | | | | | | |

**Table 4-2B**

**Summary of Geochemical Parameters Measured in Groundwater**
**Historical Monitoring Wells — SWMU 17/Building 1423 Plume**
**2016 RAER**

**Former NAS Dallas, Texas**


| Monitoring Well | Sampling Date | Sampling Round | SDG | Oxidation-Reduction Conditions | | | | | | | | Degradation Products | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Dissolved Oxygen[2] | Ferrous Iron[2] | Nitrate[3] | Nitrite[3] | ORP[1] | Phosphate[3] | Sulfate[3] | TOC[3] | Alkalinity[2] | Carbon Dioxide[2] | Chloride[3] | Ethane[3] | Ethene[3] | Methane[3] | pH[1] | Sulfide[3] |
| | | | Units | mg/L | mg/L | mg/L | mg/L | mV | mg/L | mg/L | mg/L | mg/L | mg/L | mg/L | mg/L | ng/L | mg/L | S.U. | mg/L |
| **Monitoring Wells Located Outside PCLE Zone** | | | | | | | | | | | | | | | | | | | |
| **61802MW** | 10/25/1998 | Well Installed | | | | | | | | | | | | | | | | | |
| | 11/9/1999 | Round 5 | DL333 | 0.60 | 0.2 | NA | NA | 163.2 | NA | 505 | NA | NA | NA | 88.3 | NA | NA | NA | 6.89 | NA |
| | 2/6/2003 | Well Abandoned | | | | | | | | | | | | | | | | | |
| **613D45MW** | 4/13/1998 | Well Installed | | | | | | | | | | | | | | | | | |
| | 11/9/1999 | Round 5 | DL333 | 1.0 | 0 | NA | NA | 131.0 | NA | 198 | NA | 520 | NA | 37.2 | NA | NA | NA | 6.98 | NA |
| | 7/21/2000 | Round 6 | DL351 | 0.60 | 0.2 | NA | NA | 158.8 | NA | 182 | NA | 475 | NA | 29.6 | NA | NA | NA | 6.92 | NA |
| | 12/7/2003 | Round 10 | C3L090143 | 2.0 | 1 | NA | NA | -60.00 | NA | 151 | NA | 250 | NA | 20.6 | NA | NA | NA | 6.72 | NA |
| | 8/22/2007 | Round 18 | DALLASW001 | 1 | 0.8 | 0.18 | 2.8 H | 7 | 0.5 U | 147 | 1.5 | 40 | 50 | 28.7 | 330 U | 330 U | 140 | 7.2 | 1.3 U |
| | 7/14/2009 | Round 22 | F66643 | 0.2 | 0 | 0.05 U | 0.05 UR | -50 | 0.03 J | 135 | 1.2 | 325 | 70 | 30.4 | 320 U | 430 U | 41.3 | 6.82 | 0.6 U |
| | 7/25/2011 | Round 26 | F84572 | 1 | 2 | 0.25 UJL | 0.25 U | -168.3 | 0.098 | 131 JL | 1.3 | 0 | 0 | 25.2 | 320 U | 430 U | NA | 7.2 | 0.3 U |
| | 1/10/2012 | Round 27 | F88817 | NA | NA | NA | NA | -117.7 | NA | NA | NA | NA | NA | NA | NA | NA | NA | 6.96 | NA |
| | 7/10/2012 | Round 28 | F94831 | NA | NA | NA | NA | -33.8 | NA | NA | NA | NA | NA | NA | NA | NA | NA | 6.94 | NA |
| | 1/7/2013 | Round 29 | FA639 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| | 7/16/2013 | Round 30 | FA6470 | 0.2 | 0.6 | 0.25 U | 0.25 U | -42.9 | 0.020 U | 139 | 1.3 | 400 | 35 | 25.1 | 320 U | 430 U | 39.8 | 6.9 | 0.64 J |
| | 2/25/2014 | Round 31 | FIELD | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| | 7/15/2014 | Round 32 | 1407111 | 0.34 | 0.22 | 0.033 U | 0.033 U | -23.2 | 0.01 U | 136 | 1.55 J | NA | 92 | 26.2 | 0.001 U | 0.001 U | 0.001 U | 6.46 | 0.08 |
| | 1/20/2015 | Round 33 | 1501071 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| | 7/21/2015 | Round 34 | 1507171 | 0.72 | 0.08 | .196 J | 0.033 U | 135.3 | .0163 J | 117 | 1.67 J | 449 | 85 | 28.4 | 0.001 U | 0.001 U | 5.19 | 6.93 | 0.01 |
| | 4/4/2016 | Well Plugged and Abandoned | | | | | | | | | | | | | | | | | |
| **600D95MW** | 8/17/1999 | Well Installed | | | | | | | | | | | | | | | | | |
| | 8/17/1999 | Round 5 | DL318, TTE09 | 4.5 | 0 | NA | NA | 306.6 | NA | 4000 | NA | 452 | NA | 1980 | 16 | 536 | 1.317 | 6.84 | NA |
| | 7/12/2000 | Round 6 | DL349 | 2.0 | 0.2 | NA | NA | 237.2 | NA | 3330 | NA | 450 | NA | 1130 | NA | NA | NA | 6.88 | NA |
| | 12/8/2003 | Round 10 | C3L090143 | 1.5 | 0 | NA | NA | 386.0 | NA | 3330 | NA | 500 | NA | 1210 | NA | NA | NA | 6.71 | NA |
| | 8/23/2007 | Round 18 | DALLASW001 | NA | NA | 0.05 U | 1 U | NA | 0.5 U | 3280 | 3.9 | NA | NA | 1010 | 330 U | 330 U | 1.8 U | NA | 0.83 U |
| | 8/23/2007 | Round 18 | FIELD | 1 | 0 | NA | NA | 18 | NA | NA | NA | 60 | 50 | NA | NA | NA | NA | 6.6 | NA |
| | 7/14/2009 | Round 22 | F66642 | 1 | 0 | 0.14 JL | 2.5 UR | 68.2 | 0.02 UJL | 2950 JL | 3.9 | 25 | 85 | 1320 JL | 320 U | 430 U | 0.16 U | 6.55 | 0.6 U |
| | 1/11/2011 | Round 25 | F66643 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| | 7/27/2011 | Round 26 | F84666 | 0.3 | 0 | 0.5 R | 0.5 R | 18.5 | 0.02 U | 3330 JL | 3.3 | 350 | 80 | 1410 | 320 U | 430 U | 0.6 | 6.72 | 0.3 U |
| | 1/1/2012 | Round 27 | F88817 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| | 7/9/2012 | Round 28 | F94831 | NA | NA | NA | NA | 123.8 | NA | NA | NA | NA | NA | NA | NA | NA | NA | 6.69 | NA |
| | 1/8/2013 | Round 29 | FA637 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| | 7/16/2013 | Round 30 | FA6474 | 0.1 | 0 | 5.0 U | 5.0 U | 128 | 0.020 U | 3390 | 3.3 | 200 | 40 | 1150 | 320 U | 430 U | 0.16 | 6.80 | 0.23 U |
| | 2/25/2014 | Round 31 | FIELD | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| | 7/16/2014 | Round 32 | 1407125 | 0.45 | 0 | 0.033 U | 0.66 U | -60.9 | 0.01 U | NA | 3.41 | NA | NA | 26.2 | 0.001 U | 0.001 U | 0.001 U | 6.63 | 0.04 |
| | 1/20/2015 | Round 33 | 1501071 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| | 7/21/2015 | Round 34 | 1507171 | 0.42 | 0.36 | 0.033 U | 0.66 U | 23.4 | .0163 J | 806 | 1.33 J | 380 | 125 | 85.5 | 0.001 U | 0.001 U | 1.66 J | 6.7 | 0 |
| | 4/4/2016 | Well Plugged and Abandoned | | | | | | | | | | | | | | | | | |

mg/L - milligrams per liter
mV - millivolts
NA - Not Analyzed
ng/L - nanograms per liter
ORP - Oxidation/reduction potential

TOC - Total Organic Carbon
mg/L - micrograms per liter
S.U. - Standard Units
SDG - Sample Delivery Group
PCLE - Protective Concentration Level Exceedance

Notes:
1. Field measurement, meter
2. Field measurement, test kit
3. Analytical laboratory result

Analytical Result Qualifiers:
J, K, L - Indicates that the chemical was detected; however, the associated numerical result may not be a precise representation of the amount that is actually present in the sample. The laboratory reported concentration is considered to be bias unknown (J), high (K), or low (L) estimate of the true concentration.
U - Indicates that the sample was not detected at the numerical detection limit (sample-specific quantitation limit) noted. Nondetected results from the laboratory are reported in this manner. This qualifier is added to a positive result (reported by the laboratory) if the detected concentration is determined to be attributable to contamination introduced

# TABLE 4-3
# SUMMARY OF GROUNDWATER GAUGING DATA

**Table 4-3A**

**Summary of Groundwater Gauging Data**
**SWMU 17/Building 1423 Plume**
**2016 RAER**
**Former NAS Dallas, Texas**
**Page 1 of 4**

| Monitoring Well | Top of Casing [1] (ft msl) | Screened Interval (ft msl) | Date | Depth to Water [2] (ft bgs) | Groundwater Elevation (ft msl) | SCREENED INTERVAL (Feet/TOC) |
|---|---|---|---|---|---|---|
| **Monitoring Wells Located Inside PCLE Zone** | | | | | | |
| **61301MW** | 474.34 | 460.49 to 450.49 | 4/3/1998 | | | 13.85 to 23.85 |
| | | | 5/1/1998 | 9.14 | 465.20 | |
| | | | 8/1/1998 | 9.41 | 464.93 | |
| | | | 2/1/1999 | 10.07 | 464.27 | |
| | | | 9/1/1999 | 9.66 | 464.68 | |
| | | | 6/1/2000 | 9.89 | 464.45 | |
| | | | 6/1/2001 | 9.40 | 464.94 | |
| | | | 12/2/2002 | 9.01 | 465.33 | |
| | | | 8/1/2003 | 10.13 | 464.21 | |
| | | | 12/23/2003 | 9.98 | 464.36 | |
| | | | 7/4/2004 | 8.98 | 465.36 | |
| | | | 10/13/2004 | 9.30 | 465.04 | |
| | 474.18 | 460.33 to 450.33 | 4/17/2005 | 9.51 | 464.67 | |
| | | | 7/22/2005 | 9.82 | 464.36 | |
| | | | 10/4/2005 | 10.41 | 463.77 | |
| | | | 1/21/2006 | 11.41 | 462.77 | |
| | | | 5/1/2006 | 10.88 | 463.30 | |
| | | | 8/7/2006 | 11.76 | 462.42 | |
| | | | 4/23/2007 | 9.71 | 464.47 | |
| | | | 8/21/2007 | 9.54 | 464.64 | |
| | | | 1/14/2008 | 9.72 | 464.46 | |
| | | | 7/8/2008 | 10.40 | 463.78 | |
| | | | 12/15/2008 | 10.71 | 463.47 | |
| | | | 7/13/2009 | 10.37 | 463.81 | |
| | 474.18 | 460.33 to 450.33 | 12/15/2009 | 9.19 | 464.99 | |
| | | | 8/9/2010 | 9.10 | 465.08 | |
| | | | 12/17/2010 | 10.04 | 464.14 | |
| | | | 7/25/2011 | 9.16 | 465.02 | |
| | | | 12/14/2011 | 9.55 | 464.63 | |
| | | | 7/10/2012 | 9.40 | 464.78 | |
| | | | 12/19/2012 | 10.18 | 464.00 | |
| | | | 7/15/2013 | 9.54 | 464.64 | |
| | | | 12/17/2013 | 9.40 | 464.78 | |
| | | | 7/15/2014 | 9.75 | 464.43 | |
| | | | 12/17/2014 | 10.65 | 463.53 | |
| | | | 7/20/2015 | 9.20 | 464.98 | |
| | | | 12/14/2015 | 8.80 | 465.38 | |
| | | | 7/18/2016 | 9.35 | 464.83 | |

**Table 4-3A**

**Summary of Groundwater Gauging Data**
**SWMU 17/Building 1423 Plume**
**2016 RAER**
**Former NAS Dallas, Texas**
**Page 2 of 4**

| Monitoring Well | Top of Casing [1] (ft msl) | Screened Interval (ft msl) | Date | Depth to Water [2] (ft bgs) | Groundwater Elevation (ft msl) | SCREENED INTERVAL (Feet/TOC) |
|---|---|---|---|---|---|---|
| 61303MW | 476.14 | 467.29 to 457.29 | 11/6/1995 | | | 8.85 to 18.85 |
| | | | 2/1/1998 | 8.45 | 467.69 | |
| | | | 5/1/1998 | 8.76 | 467.38 | |
| | | | 8/1/1998 | 9.76 | 466.38 | |
| | | | 2/1/1999 | 9.05 | 467.09 | |
| | | | 9/1/1999 | 9.82 | 466.32 | |
| | | | 6/1/2000 | 8.68 | 467.46 | |
| | | | 6/1/2001 | 9.04 | 467.10 | |
| | | | 12/2/2002 | 8.66 | 467.48 | |
| | | | 8/1/2003 | 9.89 | 466.25 | |
| | | | 12/23/2003 | 9.64 | 466.50 | |
| | | | 7/4/2004 | 8.73 | 467.41 | |
| | | | 10/14/2004 | 9.61 | 466.53 | |
| | 475.98 | 467.13 to 457.13 | 4/17/2005 | 9.36 | 466.62 | |
| | | | 7/22/2005 | 9.59 | 466.39 | |
| | | | 10/4/2005 | 9.86 | 466.12 | |
| | | | 1/21/2006 | 10.81 | 465.17 | |
| | | | 5/1/2006 | 8.85 | 467.13 | |
| | | | 8/7/2006 | 10.22 | 465.76 | |
| | | | 4/23/2007 | 9.09 | 466.89 | |
| | | | 8/21/2007 | 8.99 | 466.99 | |
| | | | 1/14/2008 | 9.74 | 466.24 | |
| | | | 7/8/2008 | 9.56 | 466.42 | |
| | | | 12/15/2008 | 10.06 | 465.92 | |
| | | | 7/13/2009 | 9.60 | 466.38 | |
| | 475.98 | 467.13 to 457.13 | 12/15/2009 | 8.91 | 467.07 | |
| | | | 8/9/2010 | 9.13 | 466.85 | |
| | | | 12/17/2010 | 9.99 | 465.99 | |
| | | | 7/25/2011 | 8.10 | 467.88 | |
| | | | 12/14/2011 | 8.92 | 467.06 | |
| | | | 7/10/2012 | 9.54 | 466.44 | |
| | | | 12/19/2012 | 9.92 | 466.06 | |
| | | | 7/15/2013 | 8.26 | 467.72 | |
| | | | 12/17/2013 | 8.72 | 467.26 | |
| | | | 7/15/2014 | 8.91 | 467.07 | |
| | | | 12/17/2014 | 8.87 | 467.11 | |
| | | | 7/20/2015 | 8.84 | 467.14 | |
| | | | 12/14/2015 | 8.22 | 467.76 | |
| | | | 7/18/2016 | 9.12 | 466.86 | |

**Table 4-3A**

**Summary of Groundwater Gauging Data**
**SWMU 17/Building 1423 Plume**
**2016 RAER**
**Former NAS Dallas, Texas**
**Page 3 of 4**

| Monitoring Well | Top of Casing [1] (ft msl) | Screened Interval (ft msl) | Date | Depth to Water [2] (ft bgs) | Groundwater Elevation (ft msl) | SCREENED INTERVAL (Feet/TOC) |
|---|---|---|---|---|---|---|
| 613D41MW | 476.15 | 469.65 to 459.65 | 4/7/1998 | | | 6.50 to 16.50 |
| | | | 5/1/1998 | 8.68 | 467.47 | |
| | | | 8/1/1998 | 10.32 | 465.83 | |
| | | | 2/1/1999 | 8.91 | 467.24 | |
| | | | 9/1/1999 | 9.87 | 466.28 | |
| | | | 6/1/2000 | 9.17 | 466.98 | |
| | | | 6/1/2001 | 9.14 | 467.01 | |
| | | | 12/2/2002 | 8.51 | 467.64 | |
| | | | 8/1/2003 | 10.25 | 465.90 | |
| | | | 12/23/2003 | 8.51 | 467.64 | |
| | | | 7/4/2004 | 8.16 | 467.99 | |
| | | | 10/13/2004 | 10.08 | 466.07 | |
| | 475.92 | 469.42 to 459.42 | 4/17/2005 | 10.03 | 465.89 | |
| | | | 7/22/2005 | 10.21 | 465.71 | |
| | | | 10/3/2005 | 10.48 | 465.44 | |
| | | | 1/21/2006 | 11.32 | 464.60 | |
| | | | 5/1/2006 | 9.14 | 466.78 | |
| | | | 8/7/2006 | 10.76 | 465.16 | |
| | | | 4/23/2007 | 9.56 | 466.36 | |
| | | | 8/21/2007 | 9.52 | 466.40 | |
| | | | 1/14/2008 | 10.41 | 465.51 | |
| | | | 7/8/2008 | 10.20 | 465.72 | |
| | | | 12/15/2008 | 10.71 | 465.21 | |
| | | | 7/13/2009 | 10.20 | 465.72 | |
| | 475.92 | 469.42 to 459.42 | 12/15/2009 | 9.55 | 466.37 | |
| | | | 8/9/2010 | 9.76 | 466.16 | |
| | | | 12/17/2010 | 10.54 | 465.38 | |
| | | | 7/25/2011 | 7.61 | 468.31 | |
| | | | 12/14/2011 | 9.50 | 466.42 | |
| | | | 7/10/2012 | 10.43 | 465.49 | |
| | | | 12/19/2012 | 10.67 | 465.25 | |
| | | | 7/15/2013 | 8.92 | 467.00 | |
| | | | 12/17/2013 | 9.29 | 466.63 | |
| | | | 7/15/2014 | 9.78 | 466.14 | |
| | | | 12/17/2014 | 9.31 | 466.61 | |
| | | | 7/20/2015 | 9.5 | 466.42 | |
| | | | 12/14/2015 | 7.05 | 468.87 | |
| | | | 7/18/2016 | 9.61 | 466.31 | |

**Table 4-3A**

**Summary of Groundwater Gauging Data**
**SWMU 17/Building 1423 Plume**
**2016 RAER**
**Former NAS Dallas, Texas**
**Page 4 of 4**

| Monitoring Well | Top of Casing [1] (ft msl) | Screened Interval (ft msl) | Date | Depth to Water [2] (ft bgs) | Groundwater Elevation (ft msl) | SCREENED INTERVAL (Feet/TOC) |
|---|---|---|---|---|---|---|
| **Monitoring Wells Located Outside PCLE Zone** | | | | | | 10.00 to 20.00 |
| **613D39MW** | 475.93 | 465.93 to 455.93 | 4/3/1998 | | | 10.00 to 20.00 |
| | | | 5/1/1998 | 8.46 | 467.47 | |
| | | | 8/1/1998 | 9.63 | 466.30 | |
| | | | 2/1/1999 | 8.58 | 467.35 | |
| | | | 9/1/1999 | 9.49 | 466.44 | |
| | | | 6/1/2000 | 8.62 | 467.31 | |
| | | | 6/1/2001 | 9.55 | 466.38 | |
| | | | 12/2/2002 | 8.34 | 467.59 | |
| | | | 8/1/2003 | 9.84 | 466.09 | |
| | | | 12/23/2003 | 9.12 | 466.81 | |
| | | | 7/4/2004 | 8.79 | 467.14 | |
| | | | 10/15/2004 | 9.17 | 466.76 | |
| | 475.72 | 465.72 to 455.72 | 4/17/2005 | 9.12 | 466.60 | |
| | | | 7/22/2005 | 9.37 | 466.35 | |
| | | | 10/4/2005 | 9.71 | 466.01 | |
| | | | 1/21/2006 | 10.54 | 465.18 | |
| | | | 5/1/2006 | 10.01 | 465.71 | |
| | | | 8/7/2006 | 10.09 | 465.63 | |
| | | | 4/23/2007 | 8.75 | 466.97 | |
| | | | 8/21/2007 | 8.87 | 466.85 | |
| | | | 1/14/2008 | 9.62 | 466.10 | |
| | | | 7/8/2008 | 9.45 | 466.27 | |
| | | | 12/15/2008 | 9.78 | 465.94 | |
| | | | 7/13/2009 | 9.72 | 466.00 | |
| | 475.74 | 465.74 to 455.74 | 12/15/2009 | 8.58 | 467.16 | |
| | | | 8/9/2010 | 8.73 | 467.01 | |
| | | | 12/17/2010 | 9.72 | 466.02 | |
| | | | 7/25/2011 | 8.17 | 467.57 | |
| | | | 12/14/2011 | 8.86 | 466.88 | |
| | | | 7/10/2012 | 9.89 | 465.85 | |
| | | | 12/19/2012 | 9.76 | 465.98 | |
| | | | 7/15/2013 | 8.82 | 466.92 | |
| | | | 12/17/2013 | 8.40 | 467.34 | |
| | | | 7/15/2014 | 8.53 | 467.21 | |
| | | | 12/17/2014 | 8.85 | 466.89 | |
| | | | 7/20/2015 | 8.52 | 467.22 | |
| | | | 12/14/2015 | 8.22 | 467.52 | |
| | | | 7/18/2016 | 8.94 | 466.80 | |

***Notes:***
bgs — below ground surface
ft — feet
msl — mean sea level
NA — Not Available or Applicable (i.e., abandoned, not installed, not measured)
PCLE — Protective Concentration Level Exceedance
1 — All monitoring wells on-site were resurveyed in May 2005 and September 2010 in accordance with the Compliance Plan Requirements.
2 — Depth to water measurements taken from the top of the riser.

**Table 4-3B**

**Summary of Groundwater Gauging Data**
**Historical Monitoring Wells — SWMU 17/Building 1423 Plume**
**2016 RAER**

**Former NAS Dallas, Texas**
**Page 1 of 2**

| Monitoring Well | Top of Casing [1] (ft msl) | Screened Interval (ft msl) | Date | Depth to Water [2] (ft bgs) | Groundwater Elevation (ft msl) |
|---|---|---|---|---|---|
| **Monitoring Wells Located Inside PCLE Zone** | | | | | |
| **613D130MW** | 474.41 | 464.63 to 454.63 | 3/29/2005 | | |
| | | | 4/17/2005 | 18.18 | 456.23 |
| | | | 7/18/2005 | 15.10 | 459.31 |
| | | | 10/4/2005 | 14.78 | 459.63 |
| | | | 1/18/2006 | 13.26 | 461.15 |
| | | | 5/1/2006 | 13.74 | 460.67 |
| | | | 8/7/2006 | 13.39 | 461.02 |
| | | | 4/23/2007 | 13.13 | 461.28 |
| | | | 8/21/2007 | 12.50 | 461.91 |
| | | | 1/14/2008 | 11.22 | 463.19 |
| | | | 7/8/2008 | 10.93 | 463.48 |
| | | | 12/15/2008 | 10.72 | 463.69 |
| | | | 7/13/2009 | 10.64 | 463.77 |
| | 474.39 | 464.61 to 454.61 | 12/15/2009 | 12.20 | 462.19 |
| | | | 8/9/2010 | 10.66 | 463.73 |
| | | | 12/17/2010 | 10.32 | 464.07 |
| | | | 7/25/2011 | 10.73 | 463.66 |
| | | | 12/14/2011 | 8.90 | 465.49 |
| | | | 7/10/2012 | 12.30 | 462.09 |
| | | | 12/19/2012 | 12.25 | 462.14 |
| | | | 7/15/2013 | 9.18 | 465.21 |
| | | | 12/17/2013 | 11.25 | 463.14 |
| | | | 7/15/2014 | 11.28 | 463.11 |
| | | | 12/17/2014 | 12.26 | 462.13 |
| | | | 7/20/2015 | 8.83 | 465.56 |
| | | | 12/14/2015 | 10.80 | 463.59 |
| | | | 4/4/2016 | Well Plugged and Abandoned | |
| **Monitoring Wells Located Outside PCLE Zone** | | | | | |
| **600D95MW** | 476.58 | 466.58 to 456.58 | 8/17/1999 | Well Installed | |
| | | | 9/1/1999 | 8.21 | 468.37 |
| | | | 6/1/2000 | 7.37 | 469.21 |
| | | | 6/1/2001 | 7.70 | 468.88 |
| | | | 12/2/2002 | 7.42 | 469.16 |
| | | | 8/1/2003 | 7.71 | 468.87 |
| | | | 12/23/2003 | 7.20 | 469.38 |
| | | | 7/4/2004 | 6.57 | 470.01 |
| | | | 9/28/2004 | 7.29 | 469.29 |
| | 476.57 | 466.57 to 456.57 | 4/17/2005 | 7.32 | 469.25 |
| | | | 7/22/2005 | 7.80 | 468.77 |
| | | | 10/4/2005 | 8.58 | 467.99 |
| | | | 1/21/2006 | 9.69 | 466.88 |
| | | | 5/1/2006 | 7.19 | 469.38 |
| | | | 8/7/2006 | 8.09 | 468.48 |
| | | | 4/23/2007 | 6.98 | 469.59 |
| | | | 8/21/2007 | 6.91 | 469.66 |
| | | | 1/14/2008 | 7.73 | 468.84 |
| | | | 7/8/2008 | 7.48 | 469.09 |
| | | | 12/16/2008 | 8.31 | 468.26 |
| | | | 7/14/2009 | 7.31 | 469.26 |
| | 476.59 | 466.59 to 456.59 | 12/15/2009 | 7.00 | 469.59 |
| | | | 8/9/2010 | 7.04 | 469.55 |
| | | | 12/16/2010 | 7.64 | 468.95 |
| | | | 7/25/2011 | 7.45 | 469.14 |
| | | | 12/14/2011 | 6.70 | 469.89 |
| | | | 12/19/2012 | 8.59 | 468.00 |
| | | | 7/15/2013 | 7.55 | 469.04 |
| | | | 12/17/2013 | 6.67 | 469.92 |
| | | | 7/15/2014 | 7.52 | 469.07 |
| | | | 12/17/2014 | 8.19 | 468.40 |
| | | | 7/20/2015 | 7.21 | 469.38 |
| | | | 4/4/2016 | Well Plugged and Abandoned | |

**Table 4-3B**

**Summary of Groundwater Gauging Data**
**Historical Monitoring Wells — SWMU 17/Building 1423 Plume**
**2016 RAER**

**Former NAS Dallas, Texas**
**Page 2 of 2**

| Monitoring Well | Top of Casing [1] (ft msl) | Screened Interval (ft msl) | Date | Depth to Water [2] (ft bgs) | Groundwater Elevation (ft msl) |
|---|---|---|---|---|---|
| 613D45MW | 474.98 | 466.88 to 456.88 | 4/3/1998 | | |
| | | | 5/1/1998 | 10.21 | 464.77 |
| | | | 8/1/1998 | 10.93 | 464.05 |
| | | | 2/1/1999 | 10.36 | 464.62 |
| | | | 9/1/1999 | 9.66 | 465.32 |
| | | | 6/1/2000 | 9.54 | 465.44 |
| | | | 6/1/2001 | 9.84 | 465.14 |
| | | | 12/2/2002 | 9.91 | 465.07 |
| | | | 8/1/2003 | 10.63 | 464.35 |
| | | | 12/23/2003 | 10.77 | 464.21 |
| | | | 7/4/2004 | 9.36 | 465.62 |
| | | | 10/15/2004 | 10.51 | 464.47 |
| | 474.84 | 466.74 to 456.74 | 4/17/2005 | 10.25 | 464.59 |
| | | | 7/22/2005 | 10.61 | 464.23 |
| | | | 10/4/2005 | 11.16 | 463.68 |
| | | | 1/21/2006 | 12.24 | 462.60 |
| | | | 5/1/2006 | 10.79 | 464.05 |
| | | | 8/7/2006 | 11.21 | 463.63 |
| | | | 4/23/2007 | 10.24 | 464.60 |
| | | | 8/21/2007 | 9.81 | 465.03 |
| | | | 1/14/2008 | 11.02 | 463.82 |
| | | | 7/8/2008 | 10.57 | 464.27 |
| | | | 12/15/2008 | 11.45 | 463.39 |
| | | | 7/13/2009 | 10.30 | 464.54 |
| | 474.84 | 466.74 to 456.74 | 12/15/2009 | 9.67 | 465.17 |
| | | | 8/9/2010 | 9.86 | 464.98 |
| | | | 12/17/2010 | 10.76 | 464.08 |
| | | | 7/25/2011 | 9.79 | 465.05 |
| | | | 12/14/2011 | 10.11 | 464.73 |
| | | | 7/9/2012 | 10.05 | 464.79 |
| | | | 12/19/2012 | 11.48 | 463.36 |
| | | | 7/15/2013 | 10.16 | 464.68 |
| | | | 12/17/2013 | 10.16 | 464.68 |
| | | | 7/15/2014 | 10.17 | 464.67 |
| | | | 12/17/2014 | 10.94 | 463.90 |
| | | | 7/20/2015 | 9.47 | 465.37 |
| | | | 12/14/2015 | 8.75 | 466.09 |
| | | | 4/4/2016 | Well Plugged and Abandoned | |
| 613D70MW | 479.22 | 463.32 to 453.32 | 4/8/1998 | | |
| | | | 5/1/1998 | 10.40 | 468.82 |
| | | | 8/1/1998 | 10.89 | 468.33 |
| | | | 2/1/1999 | 7.69 | 471.53 |
| | | | 9/1/1999 | 11.15 | 468.07 |
| | | | 6/1/2000 | 8.97 | 470.25 |
| | | | 6/1/2001 | 7.34 | 471.88 |
| | | | 12/2/2002 | 6.25 | 472.97 |
| | | | 8/1/2003 | 10.30 | 468.92 |
| | | | 12/23/2003 | 10.81 | 468.41 |
| | | | 7/4/2004 | 5.48 | 473.74 |
| | | | 9/28/2004 | 8.31 | 470.91 |
| | | | 4/17/2005 | | |
| 61802MW | 475.96 | 462.46 to 452.46 | 10/25/1995 | | |
| | | | 5/1/1998 | 14.02 | 461.94 |
| | | | 8/1/1998 | 14.16 | 461.80 |
| | | | 2/1/1999 | 14.02 | 461.94 |
| | | | 9/1/1999 | 14.02 | 461.94 |
| | | | 2/6/2003 | | |

bgs - below ground surface
ft - feet
msl - mean sea level
PCLE - Protective Concentration Level Exceedance

Note:
1 - All monitoring wells on-site were resurveyed in May 2005 in accordance with the Compliance Plan Requirements.
Depth to water measurements taken from the top of the riser.

# TABLE 4-4
# SUMMARY OF CONCENTRATION VS. TIME ATTENUATION RATE CONSTANTS

**Table 4-4**

**Summry of Concentrations VS. Time Attenuation Rate Constants**
**SWMU 17/Building 1423 Plume**
**2016 RAER**
**Former NAS Dallas, Texas**
**Page 1 of 12**

| Monitoring Well | Sampling Date | Elapsed Time (Years) | Protective Concentration Level (mg/L) | Concentration Detected (mg/L) | Natural Log of Concentration (mg/L) | Degradation Rate from Natural Log ($K_{time}$) (mg/L per year) | Minimum Degradation Rate Required for Remedial Goals Natural Log ($K_{time}$) (mg/L per year) | Minimum Degradation Rate Met? (Yes/No) | Expected Remedial Goal Concentration (mg/L) | Expected Remedial Goal Concentration Met? (Yes/No) | Remedial Goals Being Met? (Yes/No) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Trichloroethene** | | | | | | | | | | | |
| 61301MW | Dec-95 | 0.0 | 0.00500 | 0.00500 U | -8.00 | -- | -- | -- | -- | -- | -- |
| | Apr-98 | 2.4 | 0.00500 | 0.00220 J | -6.12 | -- | -- | -- | -- | -- | -- |
| | Sep-98 | 2.8 | 0.00500 | 0.00500 U | -8.00 | -- | -- | -- | -- | -- | -- |
| | Apr-99 | 3.3 | 0.00500 | 0.00500 U | -8.00 | -- | NA | NA | NA | Less Than PCL | Less Than PCL |
| | Nov-99 | 3.9 | 0.00500 | 0.00500 U | -8.00 | -- | NA | NA | NA | Less Than PCL | Less Than PCL |
| | Jul-00 | 4.6 | 0.00500 | 0.00500 U | -8.00 | -- | NA | NA | NA | Less Than PCL | Less Than PCL |
| | Jul-01 | 5.6 | 0.00500 | 0.00500 U | -8.00 | -- | NA | NA | NA | Less Than PCL | Less Than PCL |
| | Jan-03 | 7.1 | 0.00500 | 0.00300 U | -8.00 | -- | NA | NA | NA | Less Than PCL | Less Than PCL |
| | Sep-03 | 7.7 | 0.00500 | 0.00044 U | -8.00 | -- | NA | NA | NA | Less Than PCL | Less Than PCL |
| | Dec-03 | 8.0 | 0.00500 | 0.00036 U | -8.00 | -- | NA | NA | NA | Less Than PCL | Less Than PCL |
| | Jul-04 | 8.6 | 0.00500 | 0.00044 U | -8.00 | -- | NA | NA | NA | Less Than PCL | Less Than PCL |
| | Oct-04 | 8.8 | 0.00500 | 0.00022 U | -8.00 | -- | NA | NA | NA | Less Than PCL | Less Than PCL |
| | Apr-05 | 9.3 | 0.00500 | 0.00050 J | -7.60 | -- | NA | NA | NA | Less Than PCL | Less Than PCL |
| | Oct-05 | 9.8 | 0.00500 | 0.00030 U | -8.00 | -- | NA | NA | NA | Less Than PCL | Less Than PCL |
| | May-06 | 10.4 | 0.00500 | 0.00040 U | -8.00 | -- | NA | NA | NA | Less Than PCL | Less Than PCL |
| | Aug-06 | 10.7 | 0.00500 | 0.00040 U | -8.00 | -- | NA | NA | NA | Less Than PCL | Less Than PCL |
| | Apr-07 | 11.3 | 0.00500 | 0.00023 U | -8.00 | -- | NA | NA | NA | Less Than PCL | Less Than PCL |
| | Aug-07 | 11.7 | 0.00500 | 0.00028 U | -8.00 | -- | NA | NA | NA | Less Than PCL | Less Than PCL |
| | Jan-08 | 12.1 | 0.00500 | 0.00053 U | -8.00 | -- | NA | NA | NA | Less Than PCL | Less Than PCL |
| | Jul-08 | 12.6 | 0.00500 | 0.00032 U | -8.00 | -- | NA | NA | NA | Less Than PCL | Less Than PCL |
| | Jan-09 | 13.1 | 0.00500 | 0.00032 U | -8.00 | -- | NA | NA | NA | Less Than PCL | Less Than PCL |
| | Jul-09 | 13.6 | 0.00500 | 0.00032 U | -8.00 | -- | NA | NA | NA | Less Than PCL | Less Than PCL |
| | Jan-10 | 14.1 | 0.00500 | 0.00032 U | -8.00 | -- | NA | NA | NA | Less Than PCL | Less Than PCL |
| | Jul-10 | 14.6 | 0.00500 | 0.00024 U | -8.00 | -- | NA | NA | NA | Less Than PCL | Less Than PCL |
| | Jan-11 | 15.1 | 0.00500 | 0.00026 U | -8.00 | -- | NA | NA | NA | Less Than PCL | Less Than PCL |
| | Jul-11 | 15.6 | 0.00500 | 0.00026 U | -8.00 | -- | NA | NA | NA | Less Than PCL | Less Than PCL |
| | Jan-12 | 16.1 | 0.00500 | 0.00026 U | -8.00 | -- | NA | NA | NA | Less Than PCL | Less Than PCL |
| | Jul-12 | 16.6 | 0.00500 | 0.00026 U | -8.00 | -- | NA | NA | NA | Less Than PCL | Less Than PCL |
| | Jan-13 | 17.1 | 0.00500 | 0.00031 U | -8.00 | -- | NA | NA | NA | Less Than PCL | Less Than PCL |
| | Jul-13 | 17.6 | 0.00500 | 0.00031 U | -8.00 | -- | NA | NA | NA | Less Than PCL | Less Than PCL |
| | Jan-14 | 18.1 | 0.00500 | 0.0003 U | -8.00 | -- | NA | NA | NA | Less Than PCL | Less Than PCL |
| | Jul-14 | 18.6 | 0.00500 | 0.00025 U | -8.00 | -- | NA | NA | NA | Less Than PCL | Less Than PCL |
| | Jan-15 | 19.1 | 0.00500 | 0.00025 U | -8.00 | -- | NA | NA | NA | Less Than PCL | Less Than PCL |
| | Jul-15 | 19.6 | 0.00500 | 0.00025 U | -8.00 | -- | NA | NA | NA | Less Than PCL | Less Than PCL |
| | Jan-16 | 20.1 | 0.00500 | 0.00025 U | -8.00 | -- | NA | NA | NA | Less Than PCL | Less Than PCL |
| | Jul-16 | 20.6 | 0.00500 | 0.00025 U | -8.00 | -- | NA | NA | NA | Less Than PCL | Less Than PCL |

**Table 4-4**

**Summry of Concentrations VS. Time Attenuation Rate Constants**
**SWMU 17/Building 1423 Plume**
**2016 RAER**
**Former NAS Dallas, Texas**
**Page 2 of 12**

| Monitoring Well | Sampling Date | Elapsed Time (Years) | Protective Concentration Level (mg/L) | Concentration Detected (mg/L) | Natural Log of Concentration (mg/L) | Degradation Rate from Natural Log ($K_{time}$) (mg/L per year) | Minimum Degradation Rate Required for Remedial Goals Natural Log ($K_{time}$) (mg/L per year) | Minimum Degradation Rate Met? (Yes/No) | Expected Remedial Goal Concentration (mg/L) | Expected Remedial Goal Concentration Met? (Yes/No) | Remedial Goals Being Met? (Yes/No) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 61303MW | Dec-95 | 0.0 | 0.00500 | 0.00500 U | -8.00 | -- | -- | -- | -- | -- | -- |
| | Apr-98 | 2.3 | 0.00500 | 0.00690 | -4.98 | -- | -- | -- | -- | -- | -- |
| | Sep-98 | 2.8 | 0.00500 | 0.05900 | -2.83 | -- | -- | -- | -- | -- | -- |
| | Apr-99 | 3.3 | 0.00500 | 0.01000 | -4.61 | -- | -- | -- | -- | -- | -- |
| | Nov-99 | 3.9 | 0.00500 | 0.00930 | -4.68 | -0.224 | -0.137 | Yes | 0.05058 | Yes | Yes |
| | Jul-00 | 4.6 | 0.00500 | 0.03500 | -3.35 | 0.251 | -0.137 | No | 0.04586 | Yes | Evaluate Further |
| | Jul-01 | 5.6 | 0.00500 | 0.01200 | -4.42 | 0.028 | -0.137 | No | 0.04012 | Yes | Evaluate Further |
| | Jan-03 | 7.1 | 0.00500 | 0.01900 | -3.96 | 0.043 | -0.137 | No | 0.03245 | Yes | Evaluate Further |
| | Sep-03 | 7.7 | 0.00500 | 0.01600 | -4.14 | 0.024 | -0.137 | No | 0.02987 | Yes | Evaluate Further |
| | Dec-03 | 8.0 | 0.00500 | 0.00620 | -5.08 | -0.058 | -0.137 | No | 0.02882 | Yes | Evaluate Further |
| | Jul-04 | 8.6 | 0.00500 | 0.00530 | -5.24 | -0.111 | -0.137 | No | 0.02638 | Yes | Evaluate Further |
| | Oct-04 | 8.8 | 0.00500 | 0.00920 | -4.69 | -0.109 | -0.137 | No | 0.02562 | Yes | Evaluate Further |
| | Apr-05 | 9.3 | 0.00500 | 0.00800 | -4.83 | -0.113 | -0.137 | No | 0.02403 | Yes | Evaluate Further |
| | Oct-05 | 9.8 | 0.00500 | 0.00300 | -5.81 | -0.153 | -0.137 | Yes | 0.02242 | Less Than PCL | Less Than PCL |
| | May-06 | 10.4 | 0.00500 | 0.00600 | -5.12 | -0.152 | -0.137 | Yes | 0.02070 | Yes | Yes |
| | Aug-06 | 10.7 | 0.00500 | 0.00200 | -6.21 | -0.186 | -0.137 | Yes | 0.01995 | Less Than PCL | Less Than PCL |
| | Apr-07 | 11.3 | 0.00500 | 0.01100 | -4.51 | -0.156 | -0.137 | Yes | 0.01822 | Yes | Yes |
| | Aug-07 | 11.6 | 0.00500 | 0.00160 | -6.44 | -0.186 | -0.137 | Yes | 0.01741 | Less Than PCL | Less Than PCL |
| | Jan-08 | 12.1 | 0.00500 | 0.01200 | -4.42 | -0.155 | -0.137 | Yes | 0.01630 | Yes | Yes |
| | Jul-08 | 12.6 | 0.00500 | 0.00530 | -5.24 | -0.149 | -0.137 | Yes | 0.01534 | Yes | Yes |
| | Jan-09 | 13.1 | 0.00500 | 0.01410 | -4.26 | -0.121 | -0.137 | No | 0.01429 | Yes | Evaluate Further |
| | Jul-09 | 13.6 | 0.00500 | 0.00140 | -6.57 | -0.145 | -0.137 | Yes | 0.01334 | Less Than PCL | Less Than PCL |
| | Jan-10 | 14.1 | 0.00500 | 0.01070 | -4.54 | -0.124 | -0.137 | No | 0.01246 | Yes | Evaluate Further |
| | Jul-10 | 14.6 | 0.00500 | 0.00410 | -5.50 | -0.123 | -0.137 | No | 0.01160 | Less Than PCL | Less Than PCL |
| | Jan-11 | 15.1 | 0.00500 | 0.00820 | -4.80 | -0.110 | -0.137 | No | 0.01086 | Yes | Evaluate Further |
| | Jul-11 | 15.6 | 0.00500 | 0.00170 | -6.38 | -0.123 | -0.137 | No | 0.01009 | Less Than PCL | Less Than PCL |
| | Jan-12 | 16.1 | 0.00500 | 0.00920 | -4.69 | -0.108 | -0.137 | No | 0.00947 | Yes | Evaluate Further |
| | Jul-12 | 16.6 | 0.00500 | 0.00042 J | -7.78 | -0.137 | -0.137 | No | 0.00884 | Less Than PCL | Less Than PCL |
| | Jan-13 | 17.1 | 0.00500 | 0.0028 | -5.88 | -0.136 | -0.137 | No | 0.00824 | Less Than PCL | Less Than PCL |
| | Jul-13 | 17.6 | 0.00500 | 0.0022 | -6.12 | -0.137 | -0.137 | No | 0.00770 | Less Than PCL | Less Than PCL |
| | Jan-14 | 18.1 | 0.00500 | 0.0171 | -4.07 | -0.113 | -0.137 | No | 0.00714 | No | No |
| | Jul-14 | 18.6 | 0.00500 | 0.00145 | -6.54 | -0.120 | -0.137 | No | 0.00670 | Less Than PCL | Less Than PCL |
| | Jan-15 | 19.1 | 0.00500 | 0.0174 | -4.05 | -0.099 | -0.137 | No | 0.00624 | No | No |
| | Jul-15 | 19.6 | 0.00500 | 0.00123 | -6.70 | -0.107 | -0.137 | No | 0.00583 | Less Than PCL | Less Than PCL |
| | Jan-16 | 20.1 | 0.00500 | 0.0095 | -6.70 | -0.113 | -0.137 | No | 0.00544 | No | No |
| | Jul-16 | 20.6 | 0.00500 | 0.00109 | -6.70 | -0.118 | -0.137 | No | 0.00508 | No | No |

**Table 4-4**

**Summry of Concentrations VS. Time Attenuation Rate Constants**
**SWMU 17/Building 1423 Plume**
**2016 RAER**
**Former NAS Dallas, Texas**
**Page 3 of 12**

| Monitoring Well | Sampling Date | Elapsed Time (Years) | Protective Concentration Level (mg/L) | Concentration Detected (mg/L) | Natural Log of Concentration (mg/L) | Degradation Rate from Natural Log ($K_{time}$) (mg/L per year) | Minimum Degradation Rate Required for Remedial Goals Natural Log ($K_{time}$) (mg/L per year) | Minimum Degradation Rate Met? (Yes/No) | Expected Remedial Goal Concentration (mg/L) | Expected Remedial Goal Concentration Met? (Yes/No) | Remedial Goals Being Met? (Yes/No) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 613D41MW | Apr-98 | 0.0 | 0.00500 | -- | -- | -- | -- | -- | -- | -- | -- |
| | May-98 | 0.1 | 0.00500 | 0.00460 J | -5.38 | -- | -- | -- | -- | -- | -- |
| | Aug-98 | 0.4 | 0.00500 | 0.00740 | -4.91 | -- | -- | -- | -- | -- | -- |
| | Apr-99 | 1.0 | 0.00500 | 0.00560 | -5.18 | -- | -- | -- | -- | -- | -- |
| | Oct-99 | 1.5 | 0.00500 | 0.00310 J | -5.78 | -0.360 | -0.022 | Yes | 0.00722 | Less Than PCL | Less Than PCL |
| | Jul-00 | 2.3 | 0.00500 | 0.00390 J | -5.55 | -0.232 | -0.022 | Yes | 0.00710 | Less Than PCL | Less Than PCL |
| | Jul-01 | 3.3 | 0.00500 | 0.00410 J | -5.50 | -0.136 | -0.022 | Yes | 0.00695 | Less Than PCL | Less Than PCL |
| | Jan-03 | 4.8 | 0.00500 | 0.00860 | -4.76 | 0.050 | -0.022 | No | 0.00672 | No | No |
| | Sep-03 | 5.4 | 0.00500 | 0.00710 | -4.95 | 0.069 | -0.022 | No | 0.00664 | No | No |
| | Dec-03 | 5.7 | 0.00500 | 0.00330 | -5.71 | 0.014 | -0.022 | No | 0.00660 | Less Than PCL | Less Than PCL |
| | Jul-04 | 6.3 | 0.00500 | 0.00320 | -5.74 | -0.018 | -0.022 | No | 0.00651 | Less Than PCL | Less Than PCL |
| | Oct-04 | 6.5 | 0.00500 | 0.00590 | -5.13 | -0.004 | -0.022 | No | 0.00648 | Yes | Evaluate Further |
| | Apr-05 | 7.0 | 0.00500 | 0.00800 | -4.83 | 0.020 | -0.022 | No | 0.00641 | No | No |
| | Oct-05 | 7.5 | 0.00500 | 0.00700 | -4.96 | 0.030 | -0.022 | No | 0.00634 | No | No |
| | May-06 | 8.1 | 0.00500 | 0.00400 | -5.52 | 0.015 | -0.022 | No | 0.00626 | Less Than PCL | Less Than PCL |
| | Aug-06 | 8.3 | 0.00500 | 0.00300 | -5.81 | -0.004 | -0.022 | No | 0.00622 | Less Than PCL | Less Than PCL |
| | Apr-07 | 9.0 | 0.00500 | 0.00710 | -4.95 | 0.008 | -0.022 | No | 0.00614 | No | No |
| | Aug-07 | 9.3 | 0.00500 | 0.00300 | -5.81 | -0.007 | -0.022 | No | 0.00609 | Less Than PCL | Less Than PCL |
| | Jan-08 | 9.8 | 0.00500 | 0.00560 | -5.18 | -0.003 | -0.022 | No | 0.00604 | Yes | Evaluate Further |
| | Jul-08 | 10.3 | 0.00500 | 0.00310 | -5.78 | -0.014 | -0.022 | No | 0.00597 | Less Than PCL | Less Than PCL |
| | Jan-09 | 10.8 | 0.00500 | 0.00480 | -5.34 | -0.012 | -0.022 | No | 0.00590 | Less Than PCL | Less Than PCL |
| | Jul-09 | 11.3 | 0.00500 | 0.00400 | -5.52 | -0.014 | -0.022 | No | 0.00584 | Less Than PCL | Less Than PCL |
| | Jan-10 | 11.8 | 0.00500 | 0.01060 | -4.55 | 0.002 | -0.022 | No | 0.00578 | No | No |
| | Jul-10 | 12.3 | 0.00500 | 0.00180 | -6.32 | -0.016 | -0.022 | No | 0.00571 | Less Than PCL | Less Than PCL |
| | Jan-11 | 12.8 | 0.00500 | 0.00620 | -5.08 | -0.010 | -0.022 | No | 0.00565 | No | No |
| | Jul-11 | 13.3 | 0.00500 | 0.00230 | -6.07 | -0.020 | -0.022 | No | 0.00559 | Less Than PCL | Less Than PCL |
| | Jan-12 | 13.8 | 0.00500 | 0.00560 | -5.18 | -0.016 | -0.022 | No | 0.00553 | No | No |
| | Jul-12 | 14.3 | 0.00500 | 0.00240 | -6.03 | -0.023 | -0.022 | Yes | 0.00547 | Less Than PCL | Less Than PCL |
| | Jan-13 | 14.8 | 0.00500 | 0.0014 | -6.57 | -0.037 | -0.022 | Yes | 0.00541 | Less Than PCL | Less Than PCL |
| | Jul-13 | 15.3 | 0.00500 | 0.0029 | -5.84 | -0.038 | -0.022 | Yes | 0.00535 | Less Than PCL | Less Than PCL |
| | Jan-14 | 15.8 | 0.00500 | 0.0072 | -4.93 | -0.029 | -0.022 | Yes | 0.00529 | No | Evaluate Further |
| | Jul-14 | 16.3 | 0.00500 | 0.00334 | -5.70 | -0.029 | -0.022 | Yes | 0.00524 | Less Than PCL | Less Than PCL |
| | Jan-15 | 16.8 | 0.00500 | 0.00447 | -5.41 | -0.027 | -0.022 | Yes | 0.00518 | Less Than PCL | Less Than PCL |
| | Jul-15 | 17.3 | 0.00500 | 0.00232 | -6.07 | -0.031 | -0.022 | Yes | 0.00512 | Less Than PCL | Less Than PCL |
| | Jan-16 | 17.8 | 0.00500 | 0.00296 | -5.82 | -0.032 | -0.022 | Yes | 0.00507 | Less Than PCL | Less Than PCL |
| | Jul-16 | 18.3 | 0.00500 | 0.00142 | -6.56 | -0.039 | -0.022 | Yes | 0.00501 | Less Than PCL | Less Than PCL |

**Table 4-4**

**Summry of Concentrations VS. Time Attenuation Rate Constants**
**SWMU 17/Building 1423 Plume**
**2016 RAER**
**Former NAS Dallas, Texas**
**Page 4 of 12**

| Monitoring Well | Sampling Date | Elapsed Time (Years) | Protective Concentration Level (mg/L) | Concentration Detected (mg/L) | Natural Log of Concentration (mg/L) | Degradation Rate from Natural Log ($K_{time}$) (mg/L per year) | Minimum Degradation Rate Required for Remedial Goals Natural Log ($K_{time}$) (mg/L per year) | Minimum Degradation Rate Met? (Yes/No) | Expected Remedial Goal Concentration (mg/L) | Expected Remedial Goal Concentration Met? (Yes/No) | Remedial Goals Being Met? (Yes/No) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 613D130MW | Jul-05 | 0.0 | 0.00500 | 0.02800 | -3.58 | -- | -- | -- | -- | -- | -- |
| | Oct-05 | 0.2 | 0.00500 | 0.00600 | -5.12 | -- | -- | -- | -- | -- | -- |
| | Jan-06 | 0.5 | 0.00500 | 0.00200 | -6.21 | -- | -- | -- | -- | -- | -- |
| | Aug-06 | 1.1 | 0.00500 | 0.02700 | -3.61 | 0.302 | -0.155 | No | 0.02376 | No | No |
| | Apr-07 | 1.7 | 0.00500 | 0.00860 | -4.76 | 0.032 | -0.155 | No | 0.02146 | Yes | Evaluate Further |
| | Aug-07 | 2.1 | 0.00500 | 0.00044 J | -7.73 | -0.983 | -0.155 | Yes | 0.02038 | Less Than PCL | Less Than PCL |
| | Jan-08 | 2.5 | 0.00500 | 0.00120 | -6.73 | -0.991 | -0.155 | Yes | 0.01909 | Less Than PCL | Less Than PCL |
| | Jul-08 | 3.0 | 0.00500 | 0.00310 | -5.78 | -0.721 | -0.155 | Yes | 0.01767 | Less Than PCL | Less Than PCL |
| | Jan-09 | 3.5 | 0.00500 | 0.01320 | -4.33 | -0.323 | -0.155 | Yes | 0.01632 | Yes | Yes |
| | Jul-09 | 4.0 | 0.00500 | 0.00051 J | -7.58 | -0.506 | -0.155 | Yes | 0.01510 | Less Than PCL | Less Than PCL |
| | Jan-10 | 4.5 | 0.00500 | 0.00032 U | -8.00 | -0.619 | -0.155 | Yes | 0.01398 | Less Than PCL | Less Than PCL |
| | Jul-10 | 5.0 | 0.00500 | 0.00024 U | -8.00 | -0.655 | -0.155 | Yes | 0.01291 | Less Than PCL | Less Than PCL |
| | Jan-11 | 5.5 | 0.00500 | 0.00026 U | -8.00 | -0.654 | -0.155 | Yes | 0.01198 | Less Than PCL | Less Than PCL |
| | Jul-11 | 6.0 | 0.00500 | 0.00026 U | -8.00 | -0.631 | -0.155 | Yes | 0.01103 | Less Than PCL | Less Than PCL |
| | Jan-12 | 6.5 | 0.00500 | 0.00026 U | -8.00 | -0.602 | -0.155 | Yes | 0.01027 | Less Than PCL | Less Than PCL |
| | Jul-12 | 7.0 | 0.00500 | 0.00042 J | -7.78 | -0.558 | -0.155 | Yes | 0.00950 | Less Than PCL | Less Than PCL |
| | Jan-13 | 7.5 | 0.00500 | 0.00031 U | -8.00 | -0.526 | -0.155 | Yes | 0.00882 | Less Than PCL | Less Than PCL |
| | Jul-13 | 8.0 | 0.00500 | 0.00067 J | -7.31 | -0.468 | -0.155 | Yes | 0.00813 | Less Than PCL | Less Than PCL |
| | Jan-14 | 8.5 | 0.00500 | 0.00036 J | -7.93 | -0.439 | -0.155 | Yes | 0.00747 | Less Than PCL | Less Than PCL |
| | Jul-14 | 9.0 | 0.00500 | 0.00106 | -6.85 | -0.381 | -0.155 | Yes | 0.00696 | Less Than PCL | Less Than PCL |
| | Jan-15 | 9.5 | 0.00500 | 0.0005 J | -7.60 | -0.352 | -0.155 | Yes | 0.00642 | Less Than PCL | Less Than PCL |
| | Jul-15 | 10.0 | 0.00500 | 0.00116 | -6.76 | -0.306 | -0.155 | Yes | 0.00594 | Less Than PCL | Less Than PCL |
| | Jan-16 | 10.5 | 0.00500 | 0.0005 J | -8.00 | -0.296 | -0.155 | Yes | 0.00550 | Less Than PCL | Less Than PCL |
| | Jul-16 | Well Abandoned | | | | | | | | | |

**Table 4-4**

**Summry of Concentrations VS. Time Attenuation Rate Constants**
**SWMU 17/Building 1423 Plume**
**2016 RAER**
**Former NAS Dallas, Texas**
**Page 5 of 12**

| Monitoring Well | Sampling Date | Elapsed Time (Years) | Protective Concentration Level (mg/L) | Concentration Detected (mg/L) | Natural Log of Concentration (mg/L) | Degradation Rate from Natural Log ($K_{time}$) (mg/L per year) | Minimum Degradation Rate Required for Remedial Goals Natural Log ($K_{time}$) (mg/L per year) | Minimum Degradation Rate Met? (Yes/No) | Expected Remedial Goal Concentration (mg/L) | Expected Remedial Goal Concentration Met? (Yes/No) | Remedial Goals Being Met? (Yes/No) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **cis-1,2-Dichloroethene** | | | | | | | | | | | |
| 61301MW | Dec-95 | 0.0 | 0.07000 | 0.06310 | -2.76 | -- | -- | -- | -- | -- | -- |
| | Apr-98 | 2.4 | 0.07000 | 0.06600 | -2.72 | -- | -- | -- | -- | -- | -- |
| | Sep-98 | 2.8 | 0.07000 | 0.09900 | -2.31 | -- | -- | -- | -- | -- | -- |
| | Apr-99 | 3.3 | 0.07000 | 0.03000 | -3.51 | -0.090 | -0.019 | Yes | 0.09800 | Less Than PCL | Less Than PCL |
| | Nov-99 | 3.9 | 0.07000 | 0.02400 | -3.73 | -0.210 | -0.019 | Yes | 0.09687 | Less Than PCL | Less Than PCL |
| | Jul-00 | 4.6 | 0.07000 | 0.03600 | -3.32 | -0.191 | -0.019 | Yes | 0.09556 | Less Than PCL | Less Than PCL |
| | Jul-01 | 5.6 | 0.07000 | 0.04200 | -3.17 | -0.140 | -0.019 | Yes | 0.09378 | Less Than PCL | Less Than PCL |
| | Jan-03 | 7.1 | 0.07000 | 0.08200 | -2.50 | -0.023 | -0.019 | Yes | 0.09103 | Yes | Yes |
| | Sep-03 | 7.7 | 0.07000 | 0.06200 | -2.78 | 0.001 | -0.019 | No | 0.08998 | Less Than PCL | Less Than PCL |
| | Dec-03 | 8.0 | 0.07000 | 0.03400 | -3.38 | -0.022 | -0.019 | Yes | 0.08953 | Less Than PCL | Less Than PCL |
| | Jul-04 | 8.6 | 0.07000 | 0.05200 | -2.96 | -0.015 | -0.019 | No | 0.08842 | Less Than PCL | Less Than PCL |
| | Oct-04 | 8.8 | 0.07000 | 0.03500 | -3.35 | -0.026 | -0.019 | Yes | 0.08807 | Less Than PCL | Less Than PCL |
| | Apr-05 | 9.3 | 0.07000 | 0.06900 | -2.67 | -0.009 | -0.019 | No | 0.08727 | Less Than PCL | Less Than PCL |
| | Oct-05 | 9.8 | 0.07000 | 0.02400 | -3.73 | -0.031 | -0.019 | Yes | 0.08643 | Less Than PCL | Less Than PCL |
| | May-06 | 10.4 | 0.07000 | 0.05900 | -2.83 | -0.020 | -0.019 | Yes | 0.08546 | Less Than PCL | Less Than PCL |
| | Aug-06 | 10.7 | 0.07000 | 0.02100 | -3.86 | -0.039 | -0.019 | Yes | 0.08502 | Less Than PCL | Less Than PCL |
| | Apr-07 | 11.3 | 0.07000 | 0.05900 | -2.83 | -0.027 | -0.019 | Yes | 0.08395 | Less Than PCL | Less Than PCL |
| | Aug-07 | 11.7 | 0.07000 | 0.02700 | -3.61 | -0.036 | -0.019 | Yes | 0.08341 | Less Than PCL | Less Than PCL |
| | Jan-08 | 12.1 | 0.07000 | 0.05500 | -2.90 | -0.028 | -0.019 | Yes | 0.08273 | Less Than PCL | Less Than PCL |
| | Jul-08 | 12.6 | 0.07000 | 0.05630 | -2.88 | -0.021 | -0.019 | Yes | 0.08194 | Less Than PCL | Less Than PCL |
| | Jan-09 | 13.1 | 0.07000 | 0.03910 | -3.24 | -0.021 | -0.019 | Yes | 0.08113 | Less Than PCL | Less Than PCL |
| | Jul-09 | 13.6 | 0.07000 | 0.01350 | -4.31 | -0.040 | -0.019 | Yes | 0.08034 | Less Than PCL | Less Than PCL |
| | Jan-10 | 14.1 | 0.07000 | 0.07330 | -2.61 | -0.027 | -0.019 | Yes | 0.07958 | Yes | Yes |
| | Jul-10 | 14.6 | 0.07000 | 0.00680 | -4.99 | -0.053 | -0.019 | Yes | 0.07879 | Less Than PCL | Less Than PCL |
| | Jan-11 | 15.1 | 0.07000 | 0.05990 | -2.82 | -0.043 | -0.019 | Yes | 0.07806 | Less Than PCL | Less Than PCL |
| | Jul-11 | 15.6 | 0.07000 | 0.01750 | -4.05 | -0.050 | -0.019 | Yes | 0.07726 | Less Than PCL | Less Than PCL |
| | Jan-12 | 16.1 | 0.07000 | 0.01220 | -4.41 | -0.061 | -0.019 | Yes | 0.07657 | Less Than PCL | Less Than PCL |
| | Jul-12 | 16.6 | 0.07000 | 0.08250 | -2.49 | -0.046 | -0.019 | Yes | 0.07584 | No | Evaluate Further |
| | Jan-13 | 17.1 | 0.07000 | 0.0591 | -2.83 | -0.038 | -0.019 | Yes | 0.07509 | Less Than PCL | Less Than PCL |
| | Jul-13 | 17.6 | 0.07000 | 0.0154 | -4.17 | -0.045 | -0.019 | Yes | 0.07437 | Less Than PCL | Less Than PCL |
| | Jan-14 | 18.1 | 0.07000 | 0.0670 | -2.70 | -0.035 | -0.019 | Yes | 0.07360 | Less Than PCL | Less Than PCL |
| | Jul-14 | 18.6 | 0.07000 | 0.0221 | -3.81 | -0.038 | -0.019 | Yes | 0.07294 | Less Than PCL | Less Than PCL |
| | Jan-15 | 19.1 | 0.07000 | 0.0716 | -2.64 | -0.029 | -0.019 | Yes | 0.07222 | Yes | Yes |
| | Jul-15 | 19.6 | 0.07000 | 0.0166 | -4.10 | -0.035 | -0.019 | Yes | 0.07153 | Less Than PCL | Less Than PCL |
| | Jan-16 | 20.1 | 0.07000 | 0.0595 | -2.82 | -0.028 | -0.019 | Yes | 0.07084 | Less Than PCL | Less Than PCL |
| | Jul-16 | 20.6 | 0.07000 | 0.00766 | -4.87 | -0.039 | -0.019 | Yes | 0.07016 | Less Than PCL | Less Than PCL |

**Table 4-4**

**Summry of Concentrations VS. Time Attenuation Rate Constants**
**SWMU 17/Building 1423 Plume**
**2016 RAER**
**Former NAS Dallas, Texas**
**Page 6 of 12**

| Monitoring Well | Sampling Date | Elapsed Time (Years) | Protective Concentration Level (mg/L) | Concentration Detected (mg/L) | Natural Log of Concentration (mg/L) | Degradation Rate from Natural Log ($K_{time}$) (mg/L per year) | Minimum Degradation Rate Required for Remedial Goals Natural Log ($K_{time}$) (mg/L per year) | Minimum Degradation Rate Met? (Yes/No) | Expected Remedial Goal Concentration (mg/L) | Expected Remedial Goal Concentration Met? (Yes/No) | Remedial Goals Being Met? (Yes/No) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 61303MW | Apr-98 | 0.0 | 0.07000 | 0.01700 | -4.07 | -- | -- | -- | -- | -- | -- |
| | Sep-98 | 0.5 | 0.07000 | 0.02400 | -3.73 | -- | -- | -- | -- | -- | -- |
| | Apr-99 | 1.0 | 0.07000 | 0.01700 | -4.07 | -- | -- | -- | -- | -- | -- |
| | Nov-99 | 1.6 | 0.07000 | 0.01700 | -4.07 | -- | NA | NA | NA | Less Than PCL | Less Than PCL |
| | Jul-00 | 2.3 | 0.07000 | 0.02300 | -3.77 | -- | NA | NA | NA | Less Than PCL | Less Than PCL |
| | Jul-01 | 3.3 | 0.07000 | 0.01600 | -4.14 | -- | NA | NA | NA | Less Than PCL | Less Than PCL |
| | Jan-03 | 4.8 | 0.07000 | 0.01500 | -4.20 | -- | NA | NA | NA | Less Than PCL | Less Than PCL |
| | Sep-03 | 5.4 | 0.07000 | 0.02200 | -3.82 | -- | NA | NA | NA | Less Than PCL | Less Than PCL |
| | Dec-03 | 5.7 | 0.07000 | 0.01700 | -4.07 | -- | NA | NA | NA | Less Than PCL | Less Than PCL |
| | Jul-04 | 6.3 | 0.07000 | 0.01200 | -4.42 | -- | NA | NA | NA | Less Than PCL | Less Than PCL |
| | Oct-04 | 6.5 | 0.07000 | 0.02000 | -3.91 | -- | NA | NA | NA | Less Than PCL | Less Than PCL |
| | Apr-05 | 7.0 | 0.07000 | 0.01600 | -4.14 | -- | NA | NA | NA | Less Than PCL | Less Than PCL |
| | Oct-05 | 7.5 | 0.07000 | 0.00800 | -4.83 | -- | NA | NA | NA | Less Than PCL | Less Than PCL |
| | May-06 | 8.1 | 0.07000 | 0.01300 | -4.34 | -- | NA | NA | NA | Less Than PCL | Less Than PCL |
| | Aug-06 | 8.3 | 0.07000 | 0.01100 | -4.51 | -- | NA | NA | NA | Less Than PCL | Less Than PCL |
| | Apr-07 | 9.0 | 0.07000 | 0.01400 | -4.27 | -- | NA | NA | NA | Less Than PCL | Less Than PCL |
| | Aug-07 | 9.3 | 0.07000 | 0.00830 | -4.79 | -- | NA | NA | NA | Less Than PCL | Less Than PCL |
| | Jan-08 | 9.8 | 0.07000 | 0.01200 | -4.42 | -- | NA | NA | NA | Less Than PCL | Less Than PCL |
| | Jul-08 | 10.3 | 0.07000 | 0.01100 | -4.51 | -- | NA | NA | NA | Less Than PCL | Less Than PCL |
| | Jan-09 | 10.8 | 0.07000 | 0.01280 | -4.36 | -- | NA | NA | NA | Less Than PCL | Less Than PCL |
| | Jul-09 | 11.3 | 0.07000 | 0.00880 | -4.73 | -- | NA | NA | NA | Less Than PCL | Less Than PCL |
| | Jan-10 | 11.8 | 0.07000 | 0.01090 | -4.52 | -- | NA | NA | NA | Less Than PCL | Less Than PCL |
| | Jul-10 | 12.3 | 0.07000 | 0.00850 | -4.77 | -- | NA | NA | NA | Less Than PCL | Less Than PCL |
| | Jan-11 | 12.8 | 0.07000 | 0.02790 | -3.58 | -- | NA | NA | NA | Less Than PCL | Less Than PCL |
| | Jul-11 | 13.3 | 0.07000 | 0.00750 | -4.89 | -- | NA | NA | NA | Less Than PCL | Less Than PCL |
| | Jan-12 | 13.8 | 0.07000 | 0.01050 | -4.56 | -- | NA | NA | NA | Less Than PCL | Less Than PCL |
| | Jul-12 | 14.3 | 0.07000 | 0.00680 | -4.99 | -- | NA | NA | NA | Less Than PCL | Less Than PCL |
| | Jan-13 | 14.8 | 0.07000 | 0.0333 | -3.40 | -- | NA | NA | NA | Less Than PCL | Less Than PCL |
| | Jul-13 | 15.3 | 0.07000 | 0.0075 | -4.89 | -- | NA | NA | NA | Less Than PCL | Less Than PCL |
| | Jan-14 | 15.8 | 0.07000 | 0.0131 | -4.34 | -- | NA | NA | NA | Less Than PCL | Less Than PCL |
| | Jul-14 | 16.3 | 0.07000 | 0.00355 | -5.64 | -- | NA | NA | NA | Less Than PCL | Less Than PCL |
| | Jan-15 | 16.8 | 0.07000 | 0.00947 | -4.66 | -- | NA | NA | NA | Less Than PCL | Less Than PCL |
| | Jul-15 | 17.3 | 0.07000 | 0.000839 | -7.08 | -- | NA | NA | NA | Less Than PCL | Less Than PCL |
| | Jan-16 | 17.8 | 0.07000 | 0.00434 | -5.44 | -- | NA | NA | NA | Less Than PCL | Less Than PCL |
| | Jul-16 | 18.3 | 0.07000 | 0.00071 | -7.25 | -- | NA | NA | NA | Less Than PCL | Less Than PCL |

**Table 4-4**

**Summry of Concentrations VS. Time Attenuation Rate Constants**
**SWMU 17/Building 1423 Plume**
**2016 RAER**
**Former NAS Dallas, Texas**
**Page 7 of 12**

| Monitoring Well | Sampling Date | Elapsed Time (Years) | Protective Concentration Level (mg/L) | Concentration Detected (mg/L) | Natural Log of Concentration (mg/L) | Degradation Rate from Natural Log ($K_{time}$) (mg/L per year) | Minimum Degradation Rate Required for Remedial Goals Natural Log ($K_{time}$) (mg/L per year) | Minimum Degradation Rate Met? (Yes/No) | Expected Remedial Goal Concentration (mg/L) | Expected Remedial Goal Concentration Met? (Yes/No) | Remedial Goals Being Met? (Yes/No) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 613D41MW | Dec-95 | 0.0 | 0.07000 | 0.00850 | -- | -- | -- | --- | -- | -- | -- |
| | May-98 | 2.4 | 0.07000 | 0.00430 J | -5.45 | -- | -- | --- | -- | -- | -- |
| | Aug-98 | 2.7 | 0.07000 | 0.00770 | -4.87 | -- | -- | --- | -- | -- | -- |
| | Apr-99 | 3.3 | 0.07000 | 0.00200 J | -6.21 | -- | -- | -- | -- | -- | -- |
| | Oct-99 | 3.8 | 0.07000 | 0.00110 J | -6.81 | -- | NA | NA | NA | Less Than PCL | Less Than PCL |
| | Jul-00 | 4.6 | 0.07000 | 0.00180 J | -6.32 | -- | NA | NA | NA | Less Than PCL | Less Than PCL |
| | Jul-01 | 5.6 | 0.07000 | 0.00170 J | -6.38 | -- | NA | NA | NA | Less Than PCL | Less Than PCL |
| | Jan-03 | 7.1 | 0.07000 | 0.00440 | -5.43 | -- | NA | NA | NA | Less Than PCL | Less Than PCL |
| | Sep-03 | 7.7 | 0.07000 | 0.01100 | -4.51 | -- | NA | NA | NA | Less Than PCL | Less Than PCL |
| | Dec-03 | 8.0 | 0.07000 | 0.00230 | -6.07 | -- | NA | NA | NA | Less Than PCL | Less Than PCL |
| | Jul-04 | 8.6 | 0.07000 | 0.00390 | -5.55 | -- | NA | NA | NA | Less Than PCL | Less Than PCL |
| | Oct-04 | 8.8 | 0.07000 | 0.00690 | -4.98 | -- | NA | NA | NA | Less Than PCL | Less Than PCL |
| | Apr-05 | 9.3 | 0.07000 | 0.00500 | -5.30 | -- | NA | NA | NA | Less Than PCL | Less Than PCL |
| | Oct-05 | 9.8 | 0.07000 | 0.00800 | -4.83 | -- | NA | NA | NA | Less Than PCL | Less Than PCL |
| | May-06 | 10.4 | 0.07000 | 0.00300 | -5.81 | -- | NA | NA | NA | Less Than PCL | Less Than PCL |
| | Aug-06 | 10.7 | 0.07000 | 0.00200 | -6.21 | -- | NA | NA | NA | Less Than PCL | Less Than PCL |
| | Apr-07 | 11.3 | 0.07000 | 0.00450 | -5.40 | -- | NA | NA | NA | Less Than PCL | Less Than PCL |
| | Aug-07 | 11.6 | 0.07000 | 0.00130 | -6.65 | -- | NA | NA | NA | Less Than PCL | Less Than PCL |
| | Jan-08 | 12.1 | 0.07000 | 0.00330 | -5.71 | -- | NA | NA | NA | Less Than PCL | Less Than PCL |
| | Jul-08 | 12.6 | 0.07000 | 0.00230 | -6.07 | -- | NA | NA | NA | Less Than PCL | Less Than PCL |
| | Jan-09 | 13.1 | 0.07000 | 0.00320 | -5.74 | -- | NA | NA | NA | Less Than PCL | Less Than PCL |
| | Jul-09 | 13.6 | 0.07000 | 0.00180 | -6.32 | -- | NA | NA | NA | Less Than PCL | Less Than PCL |
| | Jan-10 | 14.1 | 0.07000 | 0.00800 | -4.83 | -- | NA | NA | NA | Less Than PCL | Less Than PCL |
| | Jul-10 | 14.6 | 0.07000 | 0.00050 | -7.60 | -- | NA | NA | NA | Less Than PCL | Less Than PCL |
| | Jan-11 | 15.1 | 0.07000 | 0.00100 | -6.91 | -- | NA | NA | NA | Less Than PCL | Less Than PCL |
| | Jul-11 | 15.6 | 0.07000 | 0.00088 JH | -7.04 | -- | NA | NA | NA | Less Than PCL | Less Than PCL |
| | Jan-12 | 16.1 | 0.07000 | 0.00330 | -5.71 | -- | NA | NA | NA | Less Than PCL | Less Than PCL |
| | Jul-12 | 16.6 | 0.07000 | 0.00081 | -7.12 | -- | NA | NA | NA | Less Than PCL | Less Than PCL |
| | Jan-13 | 17.1 | 0.07000 | 0.00024 U | -8.00 | -- | NA | NA | NA | Less Than PCL | Less Than PCL |
| | Jul-13 | 17.6 | 0.07000 | 0.0015 | -6.50 | -- | NA | NA | NA | Less Than PCL | Less Than PCL |
| | Jan-14 | 18.1 | 0.07000 | 0.0056 | -5.18 | -- | NA | NA | NA | Less Than PCL | Less Than PCL |
| | Jul-14 | 18.6 | 0.07000 | 0.0013 | -6.65 | -- | NA | NA | NA | Less Than PCL | Less Than PCL |
| | Jan-15 | 19.1 | 0.07000 | 0.00336 | -5.70 | -- | NA | NA | NA | Less Than PCL | Less Than PCL |
| | Jul-15 | 19.6 | 0.07000 | 0.000304 | -8.10 | -- | NA | NA | NA | Less Than PCL | Less Than PCL |
| | Jan-16 | 20.1 | 0.07000 | 0.00178 | -6.33 | -- | NA | NA | NA | Less Than PCL | Less Than PCL |
| | Jul-16 | 20.6 | 0.07000 | 0.00047 | -7.66 | -- | NA | NA | NA | Less Than PCL | Less Than PCL |

**Table 4-4**

**Summry of Concentrations VS. Time Attenuation Rate Constants**
**SWMU 17/Building 1423 Plume**
**2016 RAER**
**Former NAS Dallas, Texas**
**Page 8 of 12**

| Monitoring Well | Sampling Date | Elapsed Time (Years) | Protective Concentration Level (mg/L) | Concentration Detected (mg/L) | Natural Log of Concentration (mg/L) | Degradation Rate from Natural Log ($K_{time}$) (mg/L per year) | Minimum Degradation Rate Required for Remedial Goals Natural Log ($K_{time}$) (mg/L per year) | Minimum Degradation Rate Met? (Yes/No) | Expected Remedial Goal Concentration (mg/L) | Expected Remedial Goal Concentration Met? (Yes/No) | Remedial Goals Being Met? (Yes/No) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 613D130MW | Jul-05 | 0.0 | 0.07000 | 0.01200 | -4.42 | --- | --- | --- | --- | --- | --- |
| | Oct-05 | 0.2 | 0.07000 | 0.00500 | -5.30 | --- | --- | --- | --- | --- | --- |
| | Jan-06 | 0.5 | 0.07000 | 0.00100 | -6.91 | --- | --- | --- | --- | --- | --- |
| | Aug-06 | 1.1 | 0.07000 | 0.01000 | -4.61 | -- | NA | NA | NA | Less Than PCL | Less Than PCL |
| | Apr-07 | 1.7 | 0.07000 | 0.00840 | -4.78 | -- | NA | NA | NA | Less Than PCL | Less Than PCL |
| | Aug-07 | 2.1 | 0.07000 | 0.01200 | -4.42 | -- | NA | NA | NA | Less Than PCL | Less Than PCL |
| | Jan-08 | 2.5 | 0.07000 | 0.00850 | -4.77 | -- | NA | NA | NA | Less Than PCL | Less Than PCL |
| | Jul-08 | 3.0 | 0.07000 | 0.00860 | -4.76 | -- | NA | NA | NA | Less Than PCL | Less Than PCL |
| | Jan-09 | 3.5 | 0.07000 | 0.00120 | -6.73 | -- | NA | NA | NA | Less Than PCL | Less Than PCL |
| | Jul-09 | 4.0 | 0.07000 | 0.00480 | -5.34 | -- | NA | NA | NA | Less Than PCL | Less Than PCL |
| | Jan-10 | 4.5 | 0.07000 | 0.00800 | -4.83 | -- | NA | NA | NA | Less Than PCL | Less Than PCL |
| | Jul-10 | 5.0 | 0.07000 | 0.04750 | -3.05 | -- | NA | NA | NA | Less Than PCL | Less Than PCL |
| | Jan-11 | 5.5 | 0.07000 | 0.00130 | -6.65 | -- | NA | NA | NA | Less Than PCL | Less Than PCL |
| | Jul-11 | 6.0 | 0.07000 | 0.00610 | -5.10 | -- | NA | NA | NA | Less Than PCL | Less Than PCL |
| | Jan-12 | 6.5 | 0.07000 | 0.00026 U | -8.00 | -- | NA | NA | NA | Less Than PCL | Less Than PCL |
| | Jul-12 | 7.0 | 0.07000 | 0.00095 J | -6.96 | -- | NA | NA | NA | Less Than PCL | Less Than PCL |
| | Jan-13 | 7.5 | 0.07000 | 0.0040 | -5.52 | -- | NA | NA | NA | Less Than PCL | Less Than PCL |
| | Jul-13 | 8.0 | 0.07000 | 0.0028 | -5.88 | -- | NA | NA | NA | Less Than PCL | Less Than PCL |
| | Jan-14 | 8.5 | 0.07000 | 0.0025 | -5.99 | -- | NA | NA | NA | Less Than PCL | Less Than PCL |
| | Jul-14 | 9.0 | 0.07000 | 0.00289 | -5.85 | -- | NA | NA | NA | Less Than PCL | Less Than PCL |
| | Jan-15 | 9.5 | 0.07000 | 0.00394 | -5.54 | -- | NA | NA | NA | Less Than PCL | Less Than PCL |
| | Jul-15 | 10.0 | 0.07000 | 0.00214 | -6.15 | -- | NA | NA | NA | Less Than PCL | Less Than PCL |
| | Jan-16 | 10.5 | 0.07000 | 0.00394 | -8.00 | -- | NA | NA | NA | Less Than PCL | Less Than PCL |
| | Jul-16 | Well Abandoned | | | | | | | | | |

**Table 4-4**

**Summry of Concentrations VS. Time Attenuation Rate Constants**
**SWMU 17/Building 1423 Plume**
**2016 RAER**
**Former NAS Dallas, Texas**
**Page 9 of 12**

| Monitoring Well | Sampling Date | Elapsed Time (Years) | Protective Concentration Level (mg/L) | Concentration Detected (mg/L) | Natural Log of Concentration (mg/L) | Degradation Rate from Natural Log ($K_{time}$) (mg/L per year) | Minimum Degradation Rate Required for Remedial Goals Natural Log ($K_{time}$) (mg/L per year) | Minimum Degradation Rate Met? (Yes/No) | Expected Remedial Goal Concentration (mg/L) | Expected Remedial Goal Concentration Met? (Yes/No) | Remedial Goals Being Met? (Yes/No) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Vinyl Chloride** | | | | | | | | | | | |
| 61301MW | Dec-95 | 0.0 | 0.00200 | 0.01000 U | -8.00 | -- | -- | -- | -- | -- | -- |
| | Apr-98 | 2.4 | 0.00200 | 0.00500 U | -8.00 | -- | -- | -- | -- | -- | -- |
| | Sep-98 | 2.8 | 0.00200 | 0.00500 U | -8.00 | -- | -- | -- | -- | -- | -- |
| | Apr-99 | 3.3 | 0.00200 | 0.00500 U | -8.00 | -- | NA | NA | NA | Less Than PCL | Less Than PCL |
| | Nov-99 | 3.9 | 0.00200 | 0.00500 U | -8.00 | -- | NA | NA | NA | Less Than PCL | Less Than PCL |
| | Jul-00 | 4.6 | 0.00200 | 0.00500 U | -8.00 | -- | NA | NA | NA | Less Than PCL | Less Than PCL |
| | Jul-01 | 5.6 | 0.00200 | 0.01000 U | -8.00 | -- | NA | NA | NA | Less Than PCL | Less Than PCL |
| | Jan-03 | 7.1 | 0.00200 | 0.00300 U | -8.00 | -- | NA | NA | NA | Less Than PCL | Less Than PCL |
| | Sep-03 | 7.7 | 0.00200 | 0.00052 U | -8.00 | -- | NA | NA | NA | Less Than PCL | Less Than PCL |
| | Dec-03 | 8.0 | 0.00200 | 0.00098 U | -8.00 | -- | NA | NA | NA | Less Than PCL | Less Than PCL |
| | Jul-04 | 8.6 | 0.00200 | 0.00034 U | -8.00 | -- | NA | NA | NA | Less Than PCL | Less Than PCL |
| | Oct-04 | 8.8 | 0.00200 | 0.00017 U | -8.00 | -- | NA | NA | NA | Less Than PCL | Less Than PCL |
| | Apr-05 | 9.3 | 0.00200 | 0.00030 U | -8.00 | -- | NA | NA | NA | Less Than PCL | Less Than PCL |
| | Oct-05 | 9.8 | 0.00200 | 0.00030 U | -8.00 | -- | NA | NA | NA | Less Than PCL | Less Than PCL |
| | May-06 | 10.4 | 0.00200 | 0.00060 U | -8.00 | -- | NA | NA | NA | Less Than PCL | Less Than PCL |
| | Aug-06 | 10.7 | 0.00200 | 0.00060 U | -8.00 | -- | NA | NA | NA | Less Than PCL | Less Than PCL |
| | Apr-07 | 11.3 | 0.00200 | 0.00020 U | -8.00 | -- | NA | NA | NA | Less Than PCL | Less Than PCL |
| | Aug-07 | 11.7 | 0.00200 | 0.00019 U | -8.00 | -- | NA | NA | NA | Less Than PCL | Less Than PCL |
| | Jan-08 | 12.1 | 0.00200 | 0.00043 U | -8.00 | -- | NA | NA | NA | Less Than PCL | Less Than PCL |
| | Jul-08 | 12.6 | 0.00200 | 0.00030 U | -8.00 | -- | NA | NA | NA | Less Than PCL | Less Than PCL |
| | Jan-09 | 13.1 | 0.00200 | 0.00030 U | -8.00 | -- | NA | NA | NA | Less Than PCL | Less Than PCL |
| | Jul-09 | 13.6 | 0.00200 | 0.0003 | -8.00 | -- | NA | NA | NA | Less Than PCL | Less Than PCL |
| | Jan-10 | 14.1 | 0.00200 | 0.00051 J | -7.58 | -- | NA | NA | NA | Less Than PCL | Less Than PCL |
| | Jul-10 | 14.6 | 0.00200 | 0.00028 U | -8.00 | -- | NA | NA | NA | Less Than PCL | Less Than PCL |
| | Jan-11 | 15.1 | 0.00200 | 0.00053 J | -7.54 | -- | NA | NA | NA | Less Than PCL | Less Than PCL |
| | Jul-11 | 15.6 | 0.00200 | 0.00022 U | -8.00 | -- | NA | NA | NA | Less Than PCL | Less Than PCL |
| | Jan-12 | 16.1 | 0.00200 | 0.00022 U | -8.00 | -- | NA | NA | NA | Less Than PCL | Less Than PCL |
| | Jul-12 | 16.6 | 0.00200 | 0.00022 | -8.00 | -- | NA | NA | NA | Less Than PCL | Less Than PCL |
| | Jan-13 | 17.1 | 0.00200 | 0.00044 U | -8.00 | -- | NA | NA | NA | Less Than PCL | Less Than PCL |
| | Jul-13 | 17.6 | 0.00200 | 0.00044 U | -8.00 | -- | NA | NA | NA | Less Than PCL | Less Than PCL |
| | Jan-14 | 18.1 | 0.00200 | .00053 J | -7.54 | -- | NA | NA | NA | Less Than PCL | Less Than PCL |
| | Jul-14 | 18.6 | 0.00200 | 0.00025 U | -8.00 | -- | NA | NA | NA | Less Than PCL | Less Than PCL |
| | Jan-15 | 19.1 | 0.00200 | 0.00064 J | -7.35 | -- | NA | NA | NA | Less Than PCL | Less Than PCL |
| | Jul-15 | 19.6 | 0.00200 | 0.00025 U | -8.00 | -- | NA | NA | NA | Less Than PCL | Less Than PCL |
| | Jan-16 | 20.1 | 0.00200 | 0.00063 J | -8.00 | -- | NA | NA | NA | Less Than PCL | Less Than PCL |
| | Jul-16 | 20.6 | 0.00200 | 0.00025 U | -8.00 | -- | NA | NA | NA | Less Than PCL | Less Than PCL |

**Table 4-4**

**Summry of Concentrations VS. Time Attenuation Rate Constants**
**SWMU 17/Building 1423 Plume**
**2016 RAER**
**Former NAS Dallas, Texas**
**Page 10 of 12**

| Monitoring Well | Sampling Date | Elapsed Time (Years) | Protective Concentration Level (mg/L) | Concentration Detected (mg/L) | Natural Log of Concentration (mg/L) | Degradation Rate from Natural Log ($K_{time}$) (mg/L per year) | Minimum Degradation Rate Required for Remedial Goals Natural Log ($K_{time}$) (mg/L per year) | Minimum Degradation Rate Met? (Yes/No) | Expected Remedial Goal Concentration (mg/L) | Expected Remedial Goal Concentration Met? (Yes/No) | Remedial Goals Being Met? (Yes/No) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 61303MW | Dec-95 | 0.0 | 0.00200 | 0.01000 U | -8.00 | -- | -- | -- | -- | -- | -- |
| | Apr-98 | 2.3 | 0.00200 | 0.00650 | -5.04 | -- | -- | -- | -- | -- | -- |
| | Sep-98 | 2.8 | 0.00200 | 0.00130 J | -6.65 | -- | -- | -- | -- | -- | -- |
| | Apr-99 | 3.3 | 0.00200 | 0.00570 | -5.17 | -0.055 | -0.064 | No | 0.00610 | Yes | Evaluate Further |
| | Nov-99 | 3.9 | 0.00200 | 0.00370 J | -5.60 | -0.009 | -0.064 | No | 0.00588 | Yes | Evaluate Further |
| | Jul-00 | 4.6 | 0.00200 | 0.00310 J | -5.78 | -0.066 | -0.064 | Yes | 0.00561 | Yes | Yes |
| | Jul-01 | 5.6 | 0.00200 | 0.00390 J | -5.55 | -0.005 | -0.064 | No | 0.00528 | Yes | Evaluate Further |
| | Jan-03 | 7.1 | 0.00200 | 0.00160 | -6.44 | -0.139 | -0.064 | Yes | 0.00478 | Less Than PCL | Less Than PCL |
| | Sep-03 | 7.7 | 0.00200 | 0.00290 | -5.84 | -0.096 | -0.064 | Yes | 0.00460 | Yes | Yes |
| | Dec-03 | 8.0 | 0.00200 | 0.00190 J | -6.27 | -0.111 | -0.064 | Yes | 0.00452 | Less Than PCL | Less Than PCL |
| | Jul-04 | 8.6 | 0.00200 | 0.00170 | -6.38 | -0.122 | -0.064 | Yes | 0.00434 | Less Than PCL | Less Than PCL |
| | Oct-04 | 8.8 | 0.00200 | 0.00300 | -5.81 | -0.097 | -0.064 | Yes | 0.00428 | Yes | Yes |
| | Apr-05 | 9.3 | 0.00200 | 0.00200 | -8.00 | -0.179 | -0.064 | Yes | 0.00415 | Less Than PCL | Less Than PCL |
| | Oct-05 | 9.8 | 0.00200 | 0.00080 J | -7.13 | -0.196 | -0.064 | Yes | 0.00402 | Less Than PCL | Less Than PCL |
| | May-06 | 10.4 | 0.00200 | 0.00200 | -6.21 | -0.169 | -0.064 | Yes | 0.00388 | Less Than PCL | Less Than PCL |
| | Aug-06 | 10.7 | 0.00200 | 0.00060 U | -8.00 | -0.207 | -0.064 | Yes | 0.00381 | Less Than PCL | Less Than PCL |
| | Apr-07 | 11.3 | 0.00200 | 0.00260 | -5.95 | -0.169 | -0.064 | Yes | 0.00365 | Yes | Yes |
| | Aug-07 | 11.6 | 0.00200 | 0.00220 | -6.12 | -0.145 | -0.064 | Yes | 0.00358 | Yes | Yes |
| | Jan-08 | 12.1 | 0.00200 | 0.00060 J | -7.42 | -0.158 | -0.064 | Yes | 0.00347 | Less Than PCL | Less Than PCL |
| | Jul-08 | 12.6 | 0.00200 | 0.00030 U | -8.00 | -0.180 | -0.064 | Yes | 0.00337 | Less Than PCL | Less Than PCL |
| | Jan-09 | 13.1 | 0.00200 | 0.00030 U | -8.00 | -0.195 | -0.064 | Yes | 0.00326 | Less Than PCL | Less Than PCL |
| | Jul-09 | 13.6 | 0.00200 | 0.00069 J | -7.28 | -0.190 | -0.064 | Yes | 0.00316 | Less Than PCL | Less Than PCL |
| | Jan-10 | 14.1 | 0.00200 | 0.00045 J | -7.71 | -0.192 | -0.064 | Yes | 0.00306 | Less Than PCL | Less Than PCL |
| | Jul-10 | 14.6 | 0.00200 | 0.00042 J | -7.78 | -0.194 | -0.064 | Yes | 0.00296 | Less Than PCL | Less Than PCL |
| | Jan-11 | 15.1 | 0.00200 | 0.00056 J | -7.49 | -0.188 | -0.064 | Yes | 0.00287 | Less Than PCL | Less Than PCL |
| | Jul-11 | 15.6 | 0.00200 | 0.00056 J | -7.49 | -0.183 | -0.064 | Yes | 0.00277 | Less Than PCL | Less Than PCL |
| | Jan-12 | 16.1 | 0.00200 | 0.00051 J | -7.58 | -0.178 | -0.064 | Yes | 0.00269 | Less Than PCL | Less Than PCL |
| | Jul-12 | 16.6 | 0.00200 | 0.00030 J | -8.00 | -0.179 | -0.064 | Yes | 0.00261 | Less Than PCL | Less Than PCL |
| | Jan-13 | 17.1 | 0.00200 | 0.00044 U | -8.00 | -0.178 | -0.064 | Yes | 0.00252 | Less Than PCL | Less Than PCL |
| | Jul-13 | 17.6 | 0.00200 | 0.00044 U | -8.00 | -0.177 | -0.064 | Yes | 0.00245 | Less Than PCL | Less Than PCL |
| | Jan-14 | 18.1 | 0.00200 | 0.00034 J | -7.99 | -0.174 | -0.064 | Yes | 0.00236 | Less Than PCL | Less Than PCL |
| | Jul-14 | 18.6 | 0.00200 | 0.00025 U | -8.00 | -0.172 | -0.064 | Yes | 0.00229 | Less Than PCL | Less Than PCL |
| | Jan-15 | 19.1 | 0.00200 | 0.00025 U | -8.00 | -0.168 | -0.064 | Yes | 0.00222 | Less Than PCL | Less Than PCL |
| | Jul-15 | 19.6 | 0.00200 | 0.00025 U | -8.00 | -0.165 | -0.064 | Yes | 0.00215 | Less Than PCL | Less Than PCL |
| | Jan-16 | 20.1 | 0.00200 | 0.00025 U | -8.00 | -0.161 | -0.064 | Yes | 0.00208 | Less Than PCL | Less Than PCL |
| | Jul-16 | 20.6 | 0.00200 | 0.0005 U | -8.00 | -0.157 | -0.064 | Yes | 0.00201 | Less Than PCL | Less Than PCL |

**Table 4-4**

**Summry of Concentrations VS. Time Attenuation Rate Constants**
**SWMU 17/Building 1423 Plume**
**2016 RAER**
**Former NAS Dallas, Texas**
**Page 11 of 12**

| Monitoring Well | Sampling Date | Elapsed Time (Years) | Protective Concentration Level (mg/L) | Concentration Detected (mg/L) | Natural Log of Concentration (mg/L) | Degradation Rate from Natural Log ($K_{time}$) (mg/L per year) | Minimum Degradation Rate Required for Remedial Goals Natural Log ($K_{time}$) (mg/L per year) | Minimum Degradation Rate Met? (Yes/No) | Expected Remedial Goal Concentration (mg/L) | Expected Remedial Goal Concentration Met? (Yes/No) | Remedial Goals Being Met? (Yes/No) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 613D41MW | May-98 | 0.0 | 0.00200 | 0.00500 U | -8.00 | -- | -- | -- | -- | -- | -- |
| | Aug-98 | 0.3 | 0.00200 | 0.00500 U | -8.00 | -- | -- | -- | -- | -- | -- |
| | Apr-99 | 0.9 | 0.00200 | 0.00500 U | -8.00 | -- | -- | -- | -- | -- | -- |
| | Oct-99 | 1.4 | 0.00200 | 0.00500 U | -8.00 | -- | NA | NA | NA | Less Than PCL | Less Than PCL |
| | Jul-00 | 2.2 | 0.00200 | 0.00500 U | -8.00 | -- | NA | NA | NA | Less Than PCL | Less Than PCL |
| | Jul-01 | 3.2 | 0.00200 | 0.01000 U | -8.00 | -- | NA | NA | NA | Less Than PCL | Less Than PCL |
| | Jan-03 | 4.7 | 0.00200 | 0.00100 U | -8.00 | -- | NA | NA | NA | Less Than PCL | Less Than PCL |
| | Sep-03 | 5.3 | 0.00200 | 0.00026 U | -8.00 | -- | NA | NA | NA | Less Than PCL | Less Than PCL |
| | Dec-03 | 5.6 | 0.00200 | 0.00098 U | -8.00 | -- | NA | NA | NA | Less Than PCL | Less Than PCL |
| | Jul-04 | 6.2 | 0.00200 | 0.00017 U | -8.00 | -- | NA | NA | NA | Less Than PCL | Less Than PCL |
| | Oct-04 | 6.4 | 0.00200 | 0.00017 U | -8.00 | -- | NA | NA | NA | Less Than PCL | Less Than PCL |
| | Apr-05 | 6.9 | 0.00200 | 0.00030 U | -8.00 | -- | NA | NA | NA | Less Than PCL | Less Than PCL |
| | Oct-05 | 7.4 | 0.00200 | 0.00030 U | -8.00 | -- | NA | NA | NA | Less Than PCL | Less Than PCL |
| | May-06 | 8.0 | 0.00200 | 0.00060 U | -8.00 | -- | NA | NA | NA | Less Than PCL | Less Than PCL |
| | Aug-06 | 8.2 | 0.00200 | 0.00060 U | -8.00 | -- | NA | NA | NA | Less Than PCL | Less Than PCL |
| | Apr-07 | 8.9 | 0.00200 | 0.00012 U | -8.00 | -- | NA | NA | NA | Less Than PCL | Less Than PCL |
| | Aug-07 | 9.2 | 0.00200 | 0.00019 U | -8.00 | -- | NA | NA | NA | Less Than PCL | Less Than PCL |
| | Jan-08 | 9.7 | 0.00200 | 0.00043 U | -8.00 | -- | NA | NA | NA | Less Than PCL | Less Than PCL |
| | Jul-08 | 10.2 | 0.00200 | 0.00030 U | -8.00 | -- | NA | NA | NA | Less Than PCL | Less Than PCL |
| | Jan-09 | 10.7 | 0.00200 | 0.00030 U | -8.00 | -- | NA | NA | NA | Less Than PCL | Less Than PCL |
| | Jul-09 | 11.2 | 0.00200 | 0.00030 U | -8.00 | -- | NA | NA | NA | Less Than PCL | Less Than PCL |
| | Jan-10 | 11.7 | 0.00200 | 0.00030 U | -8.00 | -- | NA | NA | NA | Less Than PCL | Less Than PCL |
| | Jul-10 | 12.2 | 0.00200 | 0.00028 U | -8.00 | -- | NA | NA | NA | Less Than PCL | Less Than PCL |
| | Jan-11 | 12.7 | 0.00200 | 0.00022 U | -8.00 | -- | NA | NA | NA | Less Than PCL | Less Than PCL |
| | Jul-11 | 13.2 | 0.00200 | 0.00022 U | -8.00 | -- | NA | NA | NA | Less Than PCL | Less Than PCL |
| | Jan-12 | 13.7 | 0.00200 | 0.00022 U | -8.00 | -- | NA | NA | NA | Less Than PCL | Less Than PCL |
| | Jul-12 | 14.2 | 0.00200 | 0.00022 U | -8.00 | -- | NA | NA | NA | Less Than PCL | Less Than PCL |
| | Jan-13 | 14.7 | 0.00200 | 0.00044 U | -8.00 | -- | NA | NA | NA | Less Than PCL | Less Than PCL |
| | Jul-13 | 15.2 | 0.00200 | 0.00044 U | -8.00 | -- | NA | NA | NA | Less Than PCL | Less Than PCL |
| | Jan-14 | 15.7 | 0.00200 | 0.00033 U | -8.00 | -- | NA | NA | NA | Less Than PCL | Less Than PCL |
| | Jul-14 | 16.2 | 0.00200 | 0.00025 U | -8.00 | -- | NA | NA | NA | Less Than PCL | Less Than PCL |
| | Jan-15 | 16.7 | 0.00200 | 0.00025 U | -8.00 | -- | NA | NA | NA | Less Than PCL | Less Than PCL |
| | Jul-15 | 17.2 | 0.00200 | 0.00025 U | -8.00 | -- | NA | NA | NA | Less Than PCL | Less Than PCL |
| | Jan-16 | 17.7 | 0.00200 | 0.00025 U | -8.00 | -- | NA | NA | NA | Less Than PCL | Less Than PCL |
| | Jul-16 | 18.2 | 0.00200 | 0.00025 U | -8.00 | -- | NA | NA | NA | Less Than PCL | Less Than PCL |

**Table 4-4**

**Summry of Concentrations VS. Time Attenuation Rate Constants**
**SWMU 17/Building 1423 Plume**
**2016 RAER**
**Former NAS Dallas, Texas**


| Monitoring Well | Sampling Date | Elapsed Time (Years) | Protective Concentration Level (mg/L) | Concentration Detected (mg/L) | Natural Log of Concentration (mg/L) | Degradation Rate from Natural Log ($K_{time}$) (mg/L per year) | Minimum Degradation Rate Required for Remedial Goals Natural Log ($K_{time}$) (mg/L per year) | Minimum Degradation Rate Met? (Yes/No) | Expected Remedial Goal Concentration (mg/L) | Expected Remedial Goal Concentration Met? (Yes/No) | Remedial Goals Being Met? (Yes/No) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 613D130MW | Jul-05 | 0.0 | 0.00200 | 0.00030 U | -8.00 | -- | -- | -- | -- | -- | -- |
| | Oct-05 | 0.2 | 0.00200 | 0.00030 U | -8.00 | -- | -- | -- | -- | -- | -- |
| | Jan-06 | 0.5 | 0.00200 | 0.00030 U | -8.00 | -- | -- | -- | -- | -- | -- |
| | Aug-06 | 1.1 | 0.00200 | 0.00060 U | -8.00 | -- | NA | NA | NA | Less Than PCL | Less Than PCL |
| | Apr-07 | 1.7 | 0.00200 | 0.00020 U | -8.00 | -- | NA | NA | NA | Less Than PCL | Less Than PCL |
| | Aug-07 | 2.1 | 0.00200 | 0.00019 U | -8.00 | -- | NA | NA | NA | Less Than PCL | Less Than PCL |
| | Jan-08 | 2.5 | 0.00200 | 0.00043 U | -8.00 | -- | NA | NA | NA | Less Than PCL | Less Than PCL |
| | Jul-08 | 3.0 | 0.00200 | 0.00030 U | -8.00 | -- | NA | NA | NA | Less Than PCL | Less Than PCL |
| | Jan-09 | 3.5 | 0.00200 | 0.00030 U | -8.00 | -- | NA | NA | NA | Less Than PCL | Less Than PCL |
| | Jul-09 | 4.0 | 0.00200 | 0.00030 U | -8.00 | -- | NA | NA | NA | Less Than PCL | Less Than PCL |
| | Jan-10 | 4.5 | 0.00200 | 0.00030 U | -8.00 | -- | NA | NA | NA | Less Than PCL | Less Than PCL |
| | Jul-10 | 5.0 | 0.00200 | 0.00028 U | -8.00 | -- | NA | NA | NA | Less Than PCL | Less Than PCL |
| | Jan-11 | 5.5 | 0.00200 | 0.00022 U | -8.00 | -- | NA | NA | NA | Less Than PCL | Less Than PCL |
| | Jul-11 | 6.0 | 0.00200 | 0.00022 U | -8.00 | -- | NA | NA | NA | Less Than PCL | Less Than PCL |
| | Jan-12 | 6.5 | 0.00200 | 0.0002 U | -8.00 | -- | NA | NA | NA | Less Than PCL | Less Than PCL |
| | Jul-12 | 7.0 | 0.00200 | 0.00022 U | -8.00 | -- | NA | NA | NA | Less Than PCL | Less Than PCL |
| | Jan-13 | 7.5 | 0.00200 | 0.00044 U | -8.00 | -- | NA | NA | NA | Less Than PCL | Less Than PCL |
| | Jul-13 | 8.0 | 0.00200 | 0.00044 U | -8.00 | -- | NA | NA | NA | Less Than PCL | Less Than PCL |
| | Jan-14 | 8.5 | 0.00200 | 0.00033 U | -8.00 | -- | NA | NA | NA | Less Than PCL | Less Than PCL |
| | Jul-14 | 9.0 | 0.00200 | 0.00025 U | -8.00 | -- | NA | NA | NA | Less Than PCL | Less Than PCL |
| | Jan-15 | 9.5 | 0.00200 | 0.00025 U | -8.00 | -- | NA | NA | NA | Less Than PCL | Less Than PCL |
| | Jul-15 | 10.0 | 0.00200 | 0.00025 U | -8.00 | -- | NA | NA | NA | Less Than PCL | Less Than PCL |
| | Jan-16 | 10.5 | 0.00200 | 0.00025 U | -8.00 | -- | NA | NA | NA | Less Than PCL | Less Than PCL |
| | Jul-16 | Well Abandoned | | | | | | | | | |

***Notes:***

mg/L — milligrams per liter

NA — Not Applicable

NS-D — Not Sampled due to Dry Well

Shaded areas indicate an exceedance.

For graphing purposes non-detect concentrations have been assigned a natural log value of -8.

Monitoring Well 613D130MW was plugged and abandoned in April 2016.

Analytical Result Qualifiers:

J — Indicates that the chemical was detected. However, the associated numerical result may not be a precise representation of the amount that is actually present in the sample. The laboratory reported concentration is considered to be an estimate of the true concentration.

U — Indicates that the chemical was not detected at the numerical detection limit (sample-specific quantitation limit) noted. Nondetected results from the laboratory are reported in this manner. This qualifier is added to a positive result (reported by the laboratory) if the detected concentration is determined to be attributable to contamination introduced during field sampling or laboratory analysis.

# TABLE 4-5
# SUMMARY OF CONCENTRATION VS. DISTANCE ATTENUATION RATE CONSTANTS

**Table 4-5**

**Summary of Concentration VS. Distance Attenuation Rate Constants**
**SWMU 17/Building 1423 PLUME**
**2016 RAER**
**Former NAS Dallas, Texas**
**Page 1 of 3**

| Sampling Date | Protective Concentration Level (mg/L) | Detected Concentration (mg/L) | | | | Natural Log of COC Concentration (mg/L) | | | | $K_{dist}$ (mg/L per ft) |
|---|---|---|---|---|---|---|---|---|---|---|
| **Centerline Monitoring Wells** | | **61303MW** | **613D41MW** | **61301MW** | **613D130MW** | **61303MW** | **613D41MW** | **61301MW** | **613D130MW** | |
| **Distance from source (ft)** | | **0** | **61** | **269** | **364** | **0** | **61** | **269** | **364** | |
| **Trichloroethene** | | | | | | | | | | |
| Dec-95 | 0.00500 | 0.00500 U | -- | 0.00500 U | -- | -8.00 | -- | -8.00 | -- | 0.000 |
| Aug-98 | 0.00500 | 0.00690 | 0.00460 J | 0.00220 J | -- | -4.98 | -5.38 | -6.12 | -- | -0.004 |
| Apr-99 | 0.00500 | 0.05900 | 0.00740 | 0.00500 U | -- | -2.83 | -4.91 | -8.00 | -- | -0.018 |
| Apr-99 | 0.00500 | 0.01000 | 0.00560 | 0.00500 U | -- | -4.61 | -5.18 | -8.00 | -- | -0.013 |
| Nov-99 | 0.00500 | 0.00930 | 0.00310 J | 0.00500 U | -- | -4.68 | -5.78 | -8.00 | -- | -0.012 |
| Jul-00 | 0.00500 | 0.03500 | 0.00390 J | 0.00500 U | -- | -3.35 | -5.55 | -8.00 | -- | -0.016 |
| Jul-01 | 0.00500 | 0.01200 | 0.00410 J | 0.00500 U | -- | -4.42 | -5.50 | -8.00 | -- | -0.013 |
| Jan-03 | 0.00500 | 0.01900 | 0.00860 | 0.00300 U | -- | -3.96 | -4.76 | -8.00 | -- | -0.015 |
| Sep-03 | 0.00500 | 0.01600 | 0.00710 | 0.00044 U | -- | -4.14 | -4.95 | -8.00 | -- | -0.014 |
| Dec-03 | 0.00500 | 0.00620 | 0.00330 | 0.00036 U | -- | -5.08 | -5.71 | -8.00 | -- | -0.011 |
| Jul-04 | 0.00500 | 0.00530 | 0.00320 | 0.00044 U | -- | -5.24 | -5.74 | -8.00 | -- | -0.010 |
| Oct-04 | 0.00500 | 0.00920 | 0.00590 | 0.00022 U | -- | -4.69 | -5.13 | -8.00 | -- | -0.013 |
| Apr-05 | 0.00500 | 0.00800 | 0.00800 | 0.00050 J | -- | -4.83 | -4.83 | -7.60 | -- | -0.011 |
| Oct-05 | 0.00500 | 0.00300 | 0.00700 | 0.00030 U | 0.00600 J | -5.81 | -4.96 | -8.00 | -5.12 | -0.002 |
| May-06 | 0.00500 | 0.00600 | 0.00400 | 0.00040 U | 0.00200 | -5.12 | -5.52 | -8.00 | -6.21 | -0.005 |
| Aug-06 | 0.00500 | 0.00200 | 0.00300 | 0.00040 U | 0.02700 | -6.21 | -5.81 | -8.00 | -3.61 | 0.003 |
| May-07 | 0.00500 | 0.01100 | 0.00710 | 0.00023 U | 0.00860 | -4.51 | -4.95 | -8.00 | -4.76 | -0.004 |
| Aug-07 | 0.00500 | 0.00160 | 0.00300 | 0.00028 U | 0.00044 J | -6.44 | -5.81 | -8.00 | -7.73 | -0.005 |
| Jan-08 | 0.00500 | 0.01200 | 0.00560 | 0.00053 U | 0.00120 | -4.42 | -5.18 | -8.00 | -6.73 | -0.008 |
| Jul-08 | 0.00500 | 0.00530 | 0.00310 | 0.00032 U | 0.00310 | -5.24 | -5.78 | -8.00 | -5.78 | -0.003 |
| Jan-09 | 0.00500 | 0.01410 | 0.00480 | 0.00032 U | 0.01320 | -4.26 | -5.34 | -8.00 | -4.33 | -0.003 |
| Jul-09 | 0.00500 | 0.00140 | 0.00400 | 0.00032 U | 0.00051 J | -6.57 | -5.52 | -8.00 | -7.58 | -0.005 |
| Jan-10 | 0.00500 | 0.01070 | 0.01060 | 0.00032 U | 0.00032 U | -4.54 | -4.55 | -8.00 | -8.00 | -0.011 |
| Jul-10 | 0.00500 | 0.00410 | 0.00180 | 0.00024 U | 0.00024 U | -5.50 | -6.32 | -8.00 | -8.00 | -0.007 |
| Jan-11 | 0.00500 | 0.00820 | 0.00620 | 0.00026 U | 0.00026 U | -4.80 | -5.08 | -8.00 | -8.00 | -0.010 |
| Jul-11 | 0.00500 | 0.00170 | 0.00230 | 0.00026 U | 0.00026 U | -6.38 | -6.07 | -8.00 | -8.00 | -0.006 |
| Jan-12 | 0.00500 | 0.00920 | 0.00540 | 0.00026 U | 0.00026 U | -4.69 | -5.22 | -8.00 | -8.00 | -0.010 |
| Jul-12 | 0.00500 | 0.00042 J | 0.00240 | 0.00026 U | 0.00042 J | -7.78 | -6.03 | -8.00 | -7.78 | -0.002 |
| Jan-13 | 0.00500 | 0.0028 | 0.0014 | 0.00031 U | 0.00031 U | -5.88 | -6.57 | -8.00 | -8.00 | -0.006 |
| Jul-13 | 0.00500 | 0.0022 | 0.0029 | 0.00031 U | 0.00067 J | -6.12 | -5.84 | -8.00 | -7.31 | -0.005 |
| Jan-14 | 0.00500 | 0.01710 | 0.00720 | 0.00030 U | 0.00036 J | -4.07 | -4.93 | -8.00 | -7.93 | -0.012 |
| Jul-14 | 0.00500 | 0.00145 | 0.00334 | 0.00025 U | 0.00106 | -6.54 | -5.70 | -8.00 | -6.85 | -0.003 |
| Jan-15 | 0.00500 | 0.0174 | 0.00447 | 0.00025 U | 0.0005 J | -4.05 | -5.41 | -8.00 | -8.00 | -0.011 |
| Jul-15 | 0.00500 | 0.00123 | 0.00232 | 0.00025 U | 0.00116 | -6.70 | -6.07 | -8.00 | -6.76 | -0.002 |
| Jan-16 | 0.00500 | 0.00954 | 0.00296 | 0.00025 U | -- | -4.05 | -5.41 | -8.00 | -8.00 | -0.011 |
| Jul-16 | 0.00500 | 0.00109 | 0.00142 | 0.00025 U | -- | -6.82 | -6.56 | -8.00 | -- | -0.005 |

**Table 4-5**

**Summary of Concentration VS. Distance Attenuation Rate Constants**
**SWMU 17/Building 1423 PLUME**
**2016 RAER**
**Former NAS Dallas, Texas**
**Page 2 of 3**

| Sampling Date | Protective Concentration Level (mg/L) | Detected Concentration (mg/L) | | | | Natural Log of COC Concentration (mg/L) | | | | $K_{dist}$ (mg/L per ft) |
|---|---|---|---|---|---|---|---|---|---|---|
| **Centerline Monitoring Wells** | | **61303MW** | **613D41MW** | **61301MW** | **613D130MW** | **61303MW** | **613D41MW** | **61301MW** | **613D130MW** | |
| **Distance from source (ft)** | | **0** | **61** | **269** | **364** | **0** | **61** | **269** | **364** | |
| **cis-1,2-Dichloroethene** | | | | | | | | | | |
| Dec-95 | 0.07000 | -- | -- | 0.06310 | -- | -- | -- | -2.76 | -- | -- |
| Apr-98 | 0.07000 | 0.01700 | 0.00430 J | 0.06600 | -- | -4.07 | -5.45 | -2.72 | -- | 0.007 |
| Sep-98 | 0.07000 | 0.02400 | 0.00770 | 0.09900 | -- | -3.73 | -4.87 | -2.31 | -- | 0.007 |
| Apr-99 | 0.07000 | 0.01700 | 0.00200 J | 0.03000 | -- | -4.07 | -6.21 | -3.51 | -- | 0.005 |
| Nov-99 | 0.07000 | 0.01700 | 0.00110 J | 0.02400 | -- | -4.07 | -6.81 | -3.73 | -- | 0.005 |
| Jul-00 | 0.07000 | 0.02300 | 0.00180 J | 0.03600 | -- | -3.77 | -6.32 | -3.32 | -- | 0.005 |
| Jul-01 | 0.07000 | 0.01600 | 0.00170 J | 0.04200 | -- | -4.14 | -6.38 | -3.17 | -- | 0.007 |
| Jan-03 | 0.07000 | 0.01500 | 0.00440 | 0.08200 | -- | -4.20 | -5.43 | -2.50 | -- | 0.008 |
| Sep-03 | 0.07000 | 0.02200 | 0.01100 | 0.06200 | -- | -3.82 | -4.51 | -2.78 | -- | 0.005 |
| Dec-03 | 0.07000 | 0.01700 | 0.00230 | 0.03400 | -- | -4.07 | -6.07 | -3.38 | -- | 0.005 |
| Jul-04 | 0.07000 | 0.01200 | 0.00390 | 0.05200 | -- | -4.42 | -5.55 | -2.96 | -- | 0.007 |
| Oct-04 | 0.07000 | 0.02000 | 0.00690 | 0.03500 | -- | -3.91 | -4.98 | -3.35 | -- | 0.004 |
| Apr-05 | 0.07000 | 0.01600 | 0.00500 | 0.06900 | -- | -4.14 | -5.30 | -2.67 | -- | 0.007 |
| Oct-05 | 0.07000 | 0.00800 | 0.00700 | 0.02400 | 0.00500 J | -4.83 | -4.96 | -3.73 | -5.30 | 0.000 |
| May-06 | 0.07000 | 0.01300 | 0.00300 | 0.05900 | 0.00100 | -4.34 | -5.81 | -2.83 | -6.91 | -0.002 |
| Aug-06 | 0.07000 | 0.01100 | 0.00200 | 0.02100 | 0.01000 | -4.51 | -6.21 | -3.86 | -4.61 | 0.003 |
| Apr-07 | 0.07000 | 0.01400 | 0.00450 | 0.05900 | 0.00840 | -4.27 | -5.40 | -2.83 | -4.78 | 0.002 |
| Aug-07 | 0.07000 | 0.00830 | 0.00130 | 0.02700 | 0.01200 | -4.79 | -6.65 | -3.61 | -4.42 | 0.004 |
| Jan-08 | 0.07000 | 0.01200 | 0.00330 | 0.05500 | 0.00850 | -4.42 | -5.71 | -2.90 | -4.77 | 0.003 |
| Jul-08 | 0.07000 | 0.01100 | 0.00230 | 0.05630 | 0.00860 | -4.51 | -6.07 | -2.88 | -4.76 | 0.003 |
| Jan-09 | 0.07000 | 0.01280 | 0.00320 | 0.03910 | 0.00120 | -4.36 | -5.74 | -3.24 | -6.73 | -0.002 |
| Jul-09 | 0.07000 | 0.00880 | 0.00180 | 0.01350 | 0.00480 | -4.73 | -6.32 | -4.31 | -5.34 | 0.001 |
| Jan-10 | 0.07000 | 0.01090 | 0.00800 | 0.07330 | 0.00800 | -4.52 | -4.83 | -2.61 | -4.83 | 0.002 |
| Jul-10 | 0.07000 | 0.00850 | 0.00054 | 0.00680 | 0.04750 | -4.77 | -7.52 | -4.99 | -3.05 | 0.007 |
| Jan-11 | 0.07000 | 0.02790 | 0.00100 | 0.05990 | 0.00130 | -3.58 | -6.91 | -2.82 | -6.65 | -0.002 |
| Jul-11 | 0.07000 | 0.00750 | 0.00088 JH | 0.01750 | 0.00610 | -4.89 | -7.04 | -4.05 | -5.10 | 0.003 |
| Jan-12 | 0.07000 | 0.01050 | 0.00330 | 0.01220 | 0.00026 U | -4.56 | -5.71 | -4.41 | -8.00 | -0.006 |
| Jul-12 | 0.07000 | 0.00680 | 0.00081 J | 0.08250 | 0.00095 J | -4.99 | -7.12 | -2.49 | -6.96 | 0.001 |
| Jan-13 | 0.07000 | 0.0333 | 0.00024 U | 0.0591 | 0.0040 | -3.40 | -8.00 | -2.83 | -5.52 | 0.002 |
| Jul-13 | 0.07000 | 0.0075 | 0.0015 | 0.01540 | 0.00280 | -4.89 | -6.50 | -4.17 | -5.88 | 0.001 |
| Jan-14 | 0.07000 | 0.0131 | 0.0056 | 0.06700 | 0.00250 | -4.34 | -5.18 | -2.70 | -5.99 | -0.001 |
| Jul-14 | 0.07000 | 0.00355 | 0.0013 | 0.0221 | 0.00289 | -5.64 | -6.65 | -3.81 | -5.85 | 0.003 |
| Jan-15 | 0.07000 | 0.00947 | 0.00332 | 0.0716 | 0.00394 | -4.66 | -5.71 | -2.64 | -5.54 | 0.002 |
| Jul-15 | 0.07000 | 0.000839 | 0.000304 | 0.0166 | 0.00214 | -7.08 | -8.10 | -4.10 | -6.15 | 0.007 |
| Jan-16 | 0.07000 | 0.00434 | 0.00178 | 0.0595 | -- | -4.66 | -5.71 | -2.64 | -5.54 | 0.002 |
| Jul-16 | 0.07000 | 0.00071 | 0.00047 | 0.00766 | -- | -7.25 | -7.66 | -4.87 | -- | 0.010 |

**Table 4-5**

**Summary of Concentration VS. Distance Attenuation Rate Constants**
**SWMU 17/Building 1423 PLUME**
**2016 RAER**
**Former NAS Dallas, Texas**
**Page 3 of 3**

| Sampling Date | Protective Concentration Level (mg/L) | Detected Concentration (mg/L) | | | | Natural Log of COC Concentration (mg/L) | | | | $K_{dist}$ (mg/L per ft) |
|---|---|---|---|---|---|---|---|---|---|---|
| **Centerline Monitoring Wells** | | **61303MW** | **613D41MW** | **61301MW** | **613D130MW** | **61303MW** | **613D41MW** | **61301MW** | **613D130MW** | |
| **Distance from source (ft)** | | **0** | **61** | **269** | **364** | **0** | **61** | **269** | **364** | |
| **Vinyl Chloride** | | | | | | | | | | |
| Dec-95 | 0.00200 | 0.01000 U | -- | 0.01000 U | -- | -8.00 | -- | -8.00 | -- | 0.000 |
| Apr-98 | 0.00200 | 0.00650 | 0.005 U | 0.00500 U | -- | -5.04 | -8.00 | -8.00 | -- | -0.008 |
| Sep-98 | 0.00200 | 0.00130 J | 0.005 U | 0.00500 U | -- | -6.65 | -8.00 | -8.00 | -- | -0.004 |
| Apr-99 | 0.00200 | 0.00570 | 0.005 U | 0.00500 U | -- | -5.17 | -8.00 | -8.00 | -- | -0.008 |
| Nov-99 | 0.00200 | 0.00370 J | 0.005 U | 0.00500 U | -- | -5.60 | -8.00 | -8.00 | -- | -0.007 |
| Jul-00 | 0.00200 | 0.00310 J | 0.005 U | 0.00500 U | -- | -5.78 | -8.00 | -8.00 | -- | -0.006 |
| Jul-01 | 0.00200 | 0.00390 J | 0.01 U | 0.01000 U | -- | -5.55 | -8.00 | -8.00 | -- | -0.007 |
| Jan-03 | 0.00200 | 0.00160 | 0.001 U | 0.00300 U | -- | -6.44 | -8.00 | -8.00 | -- | -0.004 |
| Sep-03 | 0.00200 | 0.00290 | 0.00026 U | 0.00052 U | -- | -5.84 | -8.00 | -8.00 | -- | -0.006 |
| Dec-03 | 0.00200 | 0.00190 J | 0.00098 U | 0.00098 U | -- | -6.27 | -8.00 | -8.00 | -- | -0.005 |
| Jul-04 | 0.00200 | 0.00170 | 0.00017 U | 0.00034 U | -- | -6.38 | -8.00 | -8.00 | -- | -0.004 |
| Oct-04 | 0.00200 | 0.00300 | 0.00017 U | 0.00017 U | -- | -5.81 | -8.00 | -8.00 | -- | -0.006 |
| Apr-05 | 0.00200 | 0.00200 | 0.00030 U | 0.00030 U | -- | -6.21 | -8.00 | -8.00 | -- | -0.005 |
| Oct-05 | 0.00200 | 0.00080 J | 0.00030 U | 0.00030 U | 0.00030 U | -7.13 | -8.00 | -8.00 | -8.00 | -0.002 |
| May-06 | 0.00200 | 0.00200 | 0.00060 U | 0.00060 U | 0.00030 U | -6.21 | -8.00 | -8.00 | -8.00 | -0.004 |
| Aug-06 | 0.00200 | 0.00060 U | 0.00060 U | 0.00060 U | 0.00060 U | -8.00 | -8.00 | -8.00 | -8.00 | 0.000 |
| Apr-07 | 0.00200 | 0.00260 | 0.00012 U | 0.00020 U | 0.00020 U | -5.95 | -8.00 | -8.00 | -8.00 | -0.004 |
| Aug-07 | 0.00200 | 0.00220 | 0.00019 U | 0.00019 U | 0.00019 U | -6.12 | -8.00 | -8.00 | -8.00 | -0.004 |
| Jan-08 | 0.00200 | 0.00060 J | 0.000430 U | 0.000430 U | 0.000430 U | -7.42 | -8.00 | -8.00 | -8.00 | -0.001 |
| Jul-08 | 0.00200 | 0.00030 U | 0.00030 U | 0.0003 U | 0.00030 U | -8.00 | -8.00 | -8.00 | -8.00 | 0.000 |
| Jan-09 | 0.00200 | 0.00030 U | 0.00030 U | 0.00030 U | 0.00030 U | -8.00 | -8.00 | -8.00 | -8.00 | 0.000 |
| Jul-09 | 0.00200 | 0.00069 J | 0.00030 U | 0.00030 U | 0.00030 U | -7.28 | -8.00 | -8.00 | -8.00 | -0.001 |
| Jan-10 | 0.00200 | 0.00045 J | 0.00030 U | 0.00051 J | 0.00030 U | -7.71 | -8.00 | -7.58 | -8.00 | 0.000 |
| Jul-10 | 0.00200 | 0.00042 J | 0.00028 U | 0.00028 U | 0.00028 U | -7.78 | -8.00 | -8.00 | -8.00 | 0.000 |
| Jan-11 | 0.00200 | 0.00056 J | 0.00022 U | 0.00053 J | 0.00022 U | -7.49 | -8.00 | -7.54 | -8.00 | -0.001 |
| Jul-11 | 0.00200 | 0.00056 J | 0.00022 U | 0.00022 U | 0.00022 U | -7.49 | -8.00 | -8.00 | -8.00 | -0.001 |
| Jan-12 | 0.00200 | 0.00051 J | 0.00022 U | 0.00022 U | 0.00022 U | -7.58 | -8.00 | -8.00 | -8.00 | -0.001 |
| Jul-12 | 0.00200 | 0.00030 J | 0.00022 U | 0.00022 J | 0.00022 U | -8.11 | -8.00 | -8.42 | -8.00 | 0.000 |
| Jan-13 | 0.00200 | 0.00044 U | 0.00044 U | 0.00044 U | 0.00044 U | -8.00 | -8.00 | -8.00 | -8.00 | 0.000 |
| Jul-13 | 0.00200 | 0.00044 U | 0.00044 U | 0.00044 U | 0.00044 U | -8.00 | -8.00 | -8.00 | -8.00 | 0.000 |
| Jan-14 | 0.00500 | 0.00034 J | 0.00033 U | .00053 J | 0.00033 U | -7.99 | -8.00 | -7.54 | -8.00 | 0.000 |
| Jul-14 | 0.00500 | 0.00025 U | 0.00025 U | 0.00025 U | 0.00025 U | -8.00 | -8.00 | -8.00 | -8.00 | 0.000 |
| Jan-15 | 0.00500 | 0.00025 U | 0.00025 U | 0.00064 J | 0.00025 U | -8.00 | -8.00 | -8.00 | -8.00 | 0.000 |
| Jul-15 | 0.00500 | 0.00025 U | 0.00025 U | 0.00064 J | 0.00025 U | -8.00 | -8.00 | -8.00 | -8.00 | 0.000 |
| Jan-16 | 0.00500 | 0.00025 U | 0.00025 U | 0.00063 J | -- | -8.00 | -8.00 | -8.00 | -8.00 | 0.000 |
| Jul-16 | 0.00500 | 0.0005 U | 0.00025 U | 0.00025 U | -- | -8.00 | -8.00 | -8.00 | -8.00 | 0.000 |

Notes:
ft - feet
mg/L - milligrams per liter
NA - Not Applicable
NS - Not Sampled
Shaded areas indicate an exceedance.
For graphing purposes non-detect concentrations and estimated concentrations below 0.0003 mg/L have been assigned a natural log value of -8.
Monitoring Well 613D130MW was plugged and abandoned in April 2016.

Analytical Result Qualifiers:
J - Indicates that the chemical was detected. However, the associated numerical result may not be a precise representation of the amount that is actually present in the sample. The laboratory reported concentration is considered to be an estimate of the true concentration.
U - Indicates that the chemical was not detected at the numerical detection limit (sample-specific quantitation limit) noted. Nondetected results from the laboratory are reported in this manner. This qualifier is added to a positive result (reported by the laboratory) if the detected concentration is determined to be attributable to contamination introduced during field sampling or laboratory analysis.

# Plug and Abandonment Documentation

# STATE OF TEXAS PLUGGING REPORT for Tracking #158482

| | | | |
|---|---|---|---|
| Owner: | **NAS Dallas** | Owner Well #: | **613D45MW** |
| Address: | **8100 West Jefferson<br>Grand Prairie, TX 75051** | Grid #: | **33-17-1** |
| Well Location: | **8100 West Jefferson<br>Grand Prairie, TX 75051** | Latitude: | **32° 44' 25.8" N** |
| | | Longitude: | **096° 57' 46.3" W** |
| Well County: | **Dallas** | Elevation: | **No Data** |
| Well Type: | **Monitor** | | |

*Drilling Information*

| | | | |
|---|---|---|---|
| Company: | **No Data** | Date Drilled: | **No Data** |
| Driller: | **No Data** | License Number: | **No Data** |

| | *Diameter (in.)* | *Top Depth (ft.)* | *Bottom Depth (ft.)* |
|---|---|---|---|
| Borehole: | | **0** | **18.1** |

*Plugging Information*

Date Plugged: **4/4/2016** Plugger:

Plug Method: **Pour in 3/8 bentonite chips when standing water in well is less than 100 feet depth, cement top 2 feet**

Casing Left in Well:

**No Data**

Plug(s) Placed in Well:

| *Top (ft.)* | *Bottom (ft.)* | *Description (number of sacks & material)* |
|---|---|---|
| **0** | **2** | **Cement 2 Bags/Sacks** |
| **2** | **18.1** | **Bentonite 2 Bags/Sacks** |

Certification Data: The driller certified that the driller plugged this well (or the well was plugged under the driller's direct supervision) and that each and all of the statements herein are true and correct. The driller understood that failure to complete the required items will result in the reports(s) being returned for completion and resubmittal.

Company Information: **Strata Core Services, LLC**

**112 S. Norwood Drive**
**Hurst, TX 76053**

Driller Name: **Brad Eskue** License Number: **58164**

Comments: **No Data**

# STATE OF TEXAS PLUGGING REPORT for Tracking #158481

| | | | |
|---|---|---|---|
| Owner: | **NAS Dallas** | Owner Well #: | **613D130MW** |
| Address: | **8100 West Jefferson<br>Grand Prairie, TX 75051** | Grid #: | **33-17-1** |
| Well Location: | **8100 West Jefferson<br>Grand Prairie, TX 75051** | Latitude: | **32° 44' 25.8" N** |
| | | Longitude: | **096° 57' 46.3" W** |
| Well County: | **Dallas** | Elevation: | **No Data** |
| Well Type: | **Monitor** | | |

*Drilling Information*

| | | | |
|---|---|---|---|
| Company: | **No Data** | Date Drilled: | **No Data** |
| Driller: | **No Data** | License Number: | **No Data** |

| | *Diameter (in.)* | *Top Depth (ft.)* | *Bottom Depth (ft.)* |
|---|---|---|---|
| Borehole: | | **0** | **19.8** |

*Plugging Information*

Date Plugged: **4/4/2016** Plugger:

Plug Method: **Pour in 3/8 bentonite chips when standing water in well is less than 100 feet depth, cement top 2 feet**

Casing Left in Well: **No Data**

Plug(s) Placed in Well:

| *Top (ft.)* | *Bottom (ft.)* | *Description (number of sacks & material)* |
|---|---|---|
| **0** | **2** | **Cement 2 Bags/Sacks** |
| **2** | **19.8** | **Bentonite 2 Bags/Sacks** |

Certification Data: The driller certified that the driller plugged this well (or the well was plugged under the driller's direct supervision) and that each and all of the statements herein are true and correct. The driller understood that failure to complete the required items will result in the reports(s) being returned for completion and resubmittal.

Company Information: **Strata Core Services, LLC**

**112 S. Norwood Drive**
**Hurst, TX 76053**

Driller Name: **Brad Eskue** License Number: **58164**

Comments: **No Data**

# STATE OF TEXAS PLUGGING REPORT for Tracking #158480

| | | | |
|---|---|---|---|
| Owner: | **NAS Dallas** | Owner Well #: | **600D95MW** |
| Address: | **8100 West Jefferson<br>Grand Prairie, TX 75051** | Grid #: | **33-17-1** |
| Well Location: | **8100 West Jefferson<br>Grand Prairie, TX 75051** | Latitude: | **32° 44' 25.8" N** |
| | | Longitude: | **096° 57' 46.3" W** |
| Well County: | **Dallas** | Elevation: | **No Data** |
| Well Type: | **Monitor** | | |

*Drilling Information*

| | | | |
|---|---|---|---|
| Company: | **No Data** | Date Drilled: | **No Data** |
| Driller: | **No Data** | License Number: | **No Data** |

| | *Diameter (in.)* | *Top Depth (ft.)* | *Bottom Depth (ft.)* |
|---|---|---|---|
| Borehole: | | **0** | **20** |

*Plugging Information*

Date Plugged: **4/4/2016** Plugger:

Plug Method: **Pour in 3/8 bentonite chips when standing water in well is less than 100 feet depth, cement top 2 feet**

Casing Left in Well:

**No Data**

Plug(s) Placed in Well:

| *Top (ft.)* | *Bottom (ft.)* | *Description (number of sacks & material)* |
|---|---|---|
| **0** | **2** | **Cement 2 Bags/Sacks** |
| **2** | **20** | **Bentonite 2 Bags/Sacks** |

Certification Data: The driller certified that the driller plugged this well (or the well was plugged under the driller's direct supervision) and that each and all of the statements herein are true and correct. The driller understood that failure to complete the required items will result in the reports(s) being returned for completion and resubmittal.

Company Information: **Strata Core Services, LLC**

**112 S. Norwood Drive**
**Hurst, TX 76053**

Driller Name: **Brad Eskue** License Number: **58164**

Comments: **No Data**

# APPENDIX 5
# SAMPLING PROCEDURES

Sampling collection and handling procedures were updated to follow Uniform Federal Policy (UFP) for Sample and Analysis Plans in the document titled, *Tier II Sampling and Analysis Plan, Long-Term Groundwater Monitoring Plan, Former Naval Air Station Dallas, Dallas, Texas*, dated December 2014

# APPENDIX 6
# LABORATORY DATA PACKAGES AND DATA USABILITY SUMMARIES

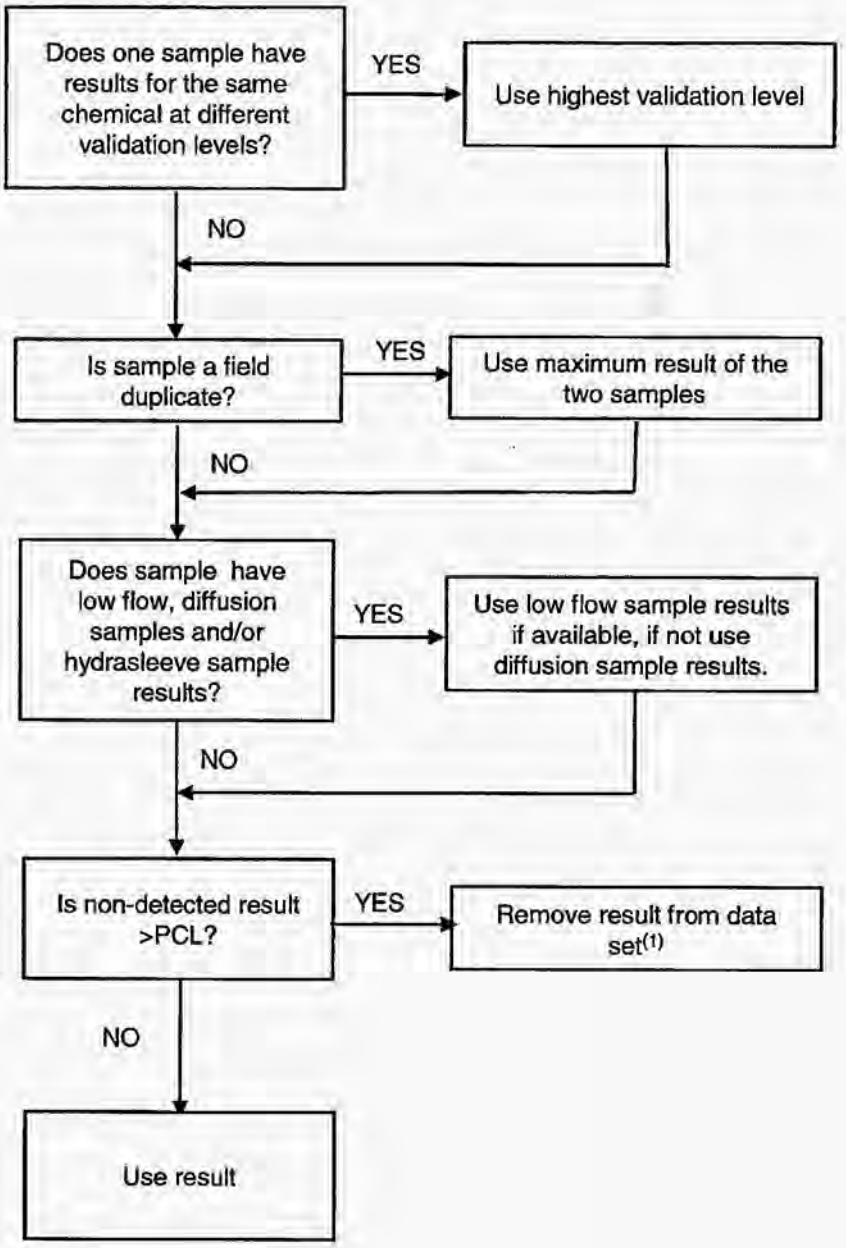
See the attached CD for the Laboratory Analytical Reports
(sorted by Sample Delivery Group Number)

# APPENDIX 7
# STATISTICAL METHODOLOGY

# PROCEDURES FOR CALCULATING VARIOUS STATISTICS AND EQUATIONS

GROUNDWATER DATABASE DEVELOPMENT FOR GRAPHING AND MANN KENDALL STATISTICAL EVALUATION

NAS DALLAS, TEXAS




NOTES:

(1) For 1,1,2,2-PCA and vinyl chloride the TRRP RES A limit < MDL of 5 U therefore only the non-detects > 5 U were removed from the data set.

# STDEV

See Also

Estimates standard deviation based on a sample. The standard deviation is a measure of how widely values are dispersed from the average value (the mean).

**Syntax**

**STDEV(number1**,number2,...)

Number1, number2, ... are 1 to 30 number arguments corresponding to a sample of a population. You can also use a single array or a reference to an array instead of arguments separated by commas.

**Remarks**

- STDEV assumes that its arguments are a sample of the population. If your data represents the entire population, then compute the standard deviation using STDEVP.
- The standard deviation is calculated using the "nonbiased" or "n-1" method.
- STDEV uses the following formula:
- $$\sqrt{\frac{n\sum x^2 - \left(\sum x\right)^2}{n(n-1)}}$$
  $$\sqrt{\frac{n\sum x^2 - \left(\sum x\right)^2}{n(n-1)}}$$
- Logical values such as TRUE and FALSE and text are ignored. If logical values and text must not be ignored, use the STDEVA worksheet function.

**Example**

Suppose 10 tools stamped from the same machine during a production run are collected as a random sample and measured for breaking strength.

The example may be easier to understand if you copy it to a blank worksheet.

How?

| | A |
|---|---|
| 1 | **Strength** |
| 2 | 1345 |
| 3 | 1301 |
| 4 | 1368 |
| 5 | 1322 |
| 6 | 1310 |
| 7 | 1370 |
| 8 | 1318 |
| 9 | 1350 |
| 10 | 1303 |
| 11 | 1299 |

| Formula | Description (Result) |
|---|---|
| =STDEV(A2:A11) | Standard deviation of breaking strength (27.46391572) |

# BEST-FIT LINE USING LINEAR REGRESSION

# LINEST

See Also

Calculates the statistics for a line by using the "least squares" method to calculate a straight line that best fits your data, and returns an array that describes the line. Because this function returns an array of values, it must be entered as an array formula.

The equation for the line is:

y = mx + b or

y = m1x1 + m2x2 + ... + b (if there are multiple ranges of x-values)

where the dependent y-value is a function of the independent x-values. The m-values are coefficients corresponding to each x-value, and b is a constant value. Note that y, x, and m can be vectors. The array that LINEST returns is {mn,mn-1,...,m1,b}. LINEST can also return additional regression statistics.

**Syntax**

**LINEST(known_y's**,known_x's,const,stats)

Known_y's is the set of y-values you already know in the relationship y = mx + b.

- If the array known_y's is in a single column, then each column of known_x's is interpreted as a separate variable.
- If the array known_y's is in a single row, then each row of known_x's is interpreted as a separate variable.

Known_x's is an optional set of x-values that you may already know in the relationship y = mx + b.

- The array known_x's can include one or more sets of variables. If only one variable is used, known_y's and known_x's can be ranges of any shape, as long as they have equal dimensions. If more than one variable is used, known_y's must be a vector (that is, a range with a height of one row or a width of one column).
- If known_x's is omitted, it is assumed to be the array {1,2,3,...} that is the same size as known_y's.

Const is a logical value specifying whether to force the constant b to equal 0.

- If const is TRUE or omitted, b is calculated normally.
- If const is FALSE, b is set equal to 0 and the m-values are adjusted to fit y = mx.

Stats is a logical value specifying whether to return additional regression statistics.

- If stats is TRUE, LINEST returns the additional regression statistics, so the returned array is {mn,mn-1,...,m1,b;sen,sen-1,...,se1,seb;r2,sey;F,df;ssreg,ssresid}.
- If stats is FALSE or omitted, LINEST returns only the m-coefficients and the constant b.

The additional regression statistics are as follows.

| Statistic | Description |
|---|---|
| se1,se2,...,sen | The standard error values for the coefficients m1,m2,...,mn. |
| Seb | The standard error value for the constant b (seb = #N/A when const is FALSE). |
| r2 | The coefficient of determination. Compares estimated and actual y-values, and ranges in value from 0 to 1. If it is 1, there is a perfect correlation in the sample — there is no difference between the estimated y-value and the actual y-value. At the other extreme, if the coefficient of determination is 0, the regression equation is not helpful in predicting a y-value. For information about how r2 is calculated, see "Remarks" later in this topic. |
| sey | The standard error for the y estimate. |
| F | The F statistic, or the F-observed value. Use the F statistic to determine whether the observed relationship between the dependent and independent variables occurs by chance. |
| df | The degrees of freedom. Use the degrees of freedom to help you find F-critical values in a statistical table. Compare the values you find in the table to the F statistic returned by LINEST to determine a confidence level for the model. |
| ssreg | The regression sum of squares. |
| ssresid | The residual sum of squares. |

The following illustration shows the order in which the additional regression statistics are returned.

| | A | B | C | D | E | F |
|---|---|---|---|---|---|---|
| 1 | $m_n$ | $m_{n-1}$ | ... | $m_2$ | $m_1$ | b |
| 2 | $se_n$ | $se_{n-1}$ | ... | $se_2$ | $se_1$ | $se_b$ |
| 3 | $r_2$ | $se_y$ | | | | |
| 4 | F | $d_f$ | | | | |
| 5 | $ss_{reg}$ | $ss_{resid}$ | | | | |

**Remarks**

- You can describe any straight line with the slope and the y-intercept:

  Slope (m):
  To find the slope of a line, often written as m, take two points on the line, (x1,y1) and (x2,y2); the slope is equal to (y2 - y1)/(x2 - x1).

  Y-intercept (b):
  The y-intercept of a line, often written as b, is the value of y at the point where the line crosses the y-axis.

  The equation of a straight line is y = mx + b. Once you know the values of m and b, you can calculate any point on the line by plugging the y- or x-value into that equation. You can also use the TREND function.

- When you have only one independent x-variable, you can obtain the slope and y-intercept values directly by using the following formulas:

  Slope:
  =INDEX(LINEST(known_y's,known_x's),1)

  Y-intercept:
  =INDEX(LINEST(known_y's,known_x's),2)

- The accuracy of the line calculated by LINEST depends on the degree of scatter in your data. The more linear the data, the more accurate the LINEST model. LINEST uses the method of least squares for determining the best fit for the data. When you have only one independent x-variable, the calculations for m and b are based on the following formulas:

$$m = \frac{n\left(\sum xy\right) - \left(\sum x\right)\left(\sum y\right)}{n\left(\sum\left(x^2\right)\right) - \left(\sum x\right)^2}$$

$$b = \frac{\left(\sum y\right)\left(\sum\left(x^2\right)\right) - \left(\sum x\right)\left(\sum xy\right)}{n\left(\sum\left(x^2\right)\right) - \left(\sum x\right)^2}$$

- The line- and curve-fitting functions LINEST and LOGEST can calculate the best straight line or exponential curve that fits your data. However, you have to decide which of the two results best fits your data. You can calculate TREND(known_y's,known_x's) for a straight line, or GROWTH(known_y's, known_x's) for an exponential curve. These functions, without the new_x's argument, return an array of y-values predicted along that line or curve at your actual data points. You can then compare the predicted values with the actual values. You may want to chart them both for a visual comparison.

- In regression analysis, Microsoft Excel calculates for each point the squared difference between the y-value estimated for that point and its actual y-value. The sum of these squared differences is called the residual sum of squares. Microsoft Excel then calculates the sum of the squared differences between the actual y-values and the average of the y-values, which is called the total sum of squares (regression sum of squares + residual sum of squares). The smaller the residual sum of squares is, compared with the total sum of squares, the larger the value of the coefficient of determination, r2, which is an indicator of how well the equation resulting from the regression analysis explains the relationship among the variables.

- Formulas that return arrays must be entered as array formulas.

- When entering an array constant such as known_x's as an argument, use commas to separate values in the same row and semicolons to separate rows. Separator characters may be different depending on your locale setting in **Regional Settings** or **Regional Options** in **Control Panel**.

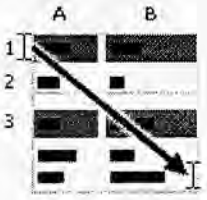
- Note that the y-values predicted by the regression equation may not be valid if they are outside the range of the y-values you used to determine the equation.

**Example 1 Slope and Y-Intercept**

The example may be easier to understand if you copy it to a blank worksheet.

How?

1. Create a blank workbook or worksheet.
2. Select the example in the Help topic. Do not select the row or column headers.




Selecting an example from Help

3. Press CTRL+C.
4. In the worksheet, select cell A1, and press CTRL+V.
5. To switch between viewing the results and viewing the formulas that return the results, press CTRL+` (grave accent), or on the **Tools** menu, point to **Formula Auditing**, and then click **Formula Auditing Mode**.

| | A | B |
|---|---|---|
| 1 | **Known y** | **Known x** |
| 2 | 1 | 0 |
| 3 | 9 | 4 |
| 4 | 5 | 2 |
| 5 | 7 | 3 |
| | **Formula** | **Formula** |
| | =LINEST(A2:A5,B2:B5,,FALSE) | |

**Note** The formula in the example must be entered as an array formula. After copying the example to a blank worksheet, select the range A7:B7 starting with the formula cell. Press F2, and then press CTRL+SHIFT+ENTER. If the formula is not entered as an array formula, the single result is 2.

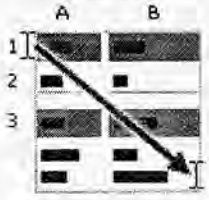
When entered as an array, the slope (2) and the y-intercept (1) are returned.

**Example 2 Simple Linear Regression**

The example may be easier to understand if you copy it to a blank worksheet.

How?

1. Create a blank workbook or worksheet.
2. Select the example in the Help topic. Do not select the row or column headers.




Selecting an example from Help

3. Press CTRL+C.
4. In the worksheet, select cell A1, and press CTRL+V.
5. To switch between viewing the results and viewing the formulas that return the results, press CTRL+` (grave accent), or on the **Tools** menu, point to **Formula Auditing**, and then click **Formula Auditing Mode**.

| | A | B |
|---|---|---|
| 1 | **Month** | **Sales** |
| 2 | 1 | 3100 |
| 3 | 2 | 4500 |
| 4 | 3 | 4400 |

| | | |
|---|---|---|
| **5** | 4 | 5400 |
| **6** | 5 | 7500 |
| **7** | 6 | 8100 |
| | **Formula** | **Description (Result)** |
| | =SUM(LINEST(B2:B7, A2:A7)*{9,1}) | Estimate sales for the ninth month (11000) |

In general, SUM({m,b}*{x,1}) equals mx + b, the estimated y-value for a given x-value. You can also use the TREND function.

**Example 3 Multiple Linear Regression**

Suppose a commercial developer is considering purchasing a group of small office buildings in an established business district.

The developer can use multiple linear regression analysis to estimate the value of an office building in a given area based on the following variables.

| Variable | Refers to the |
|---|---|
| y | Assessed value of the office building |
| x1 | Floor space in square feet |
| x2 | Number of offices |
| x3 | Number of entrances |
| x4 | Age of the office building in years |

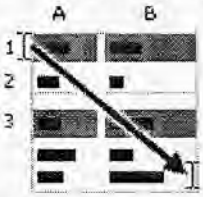
This example assumes that a straight-line relationship exists between each independent variable (x1, x2, x3, and x4) and the dependent variable (y), the value of office buildings in the area.

The developer randomly chooses a sample of 11 office buildings from a possible 1,500 office buildings and obtains the following data. "Half an entrance" means an entrance for deliveries only.

The example may be easier to understand if you copy it to a blank worksheet.

How?

1. Create a blank workbook or worksheet.
2. Select the example in the Help topic. Do not select the row or column headers.




Selecting an example from Help

3. Press CTRL+C.
4. In the worksheet, select cell A1, and press CTRL+V.
5. To switch between viewing the results and viewing the formulas that return the results, press CTRL+` (grave accent), or on the **Tools** menu, point to **Formula Auditing**, and then click **Formula Auditing Mode**.

| | A | B | C | D | E |
|---|---|---|---|---|---|
| **1** | **Floor space (x1)** | **Offices (x2)** | **Entrances (x3)** | **Age (x4)** | **Assessed value (y)** |
| **2** | 2310 | 2 | 2 | 20 | 142,000 |
| **3** | 2333 | 2 | 2 | 12 | 144,000 |
| **4** | 2356 | 3 | 1.5 | 33 | 151,000 |
| **5** | 2379 | 3 | 2 | 43 | 150,000 |

| | | | | | |
|---|---|---|---|---|---|
| **6** | 2402 | 2 | 3 | 53 | 139,000 |
| **7** | 2425 | 4 | 2 | 23 | 169,000 |
| **8** | 2448 | 2 | 1.5 | 99 | 126,000 |
| **9** | 2471 | 2 | 2 | 34 | 142,900 |
| **10** | 2494 | 3 | 3 | 23 | 163,000 |
| **11** | 2517 | 4 | 4 | 55 | 169,000 |
| **12** | 2540 | 2 | 3 | 22 | 149,000 |

**Formula**

=LINEST(E2:E12,A2:D12,TRUE,TRUE)

**Note** The formula in the example must be entered as an array formula. After copying the example to a blank worksheet, select the range A14:E18 starting with the formula cell. Press F2, and then press CTRL+SHIFT+ENTER. If the formula is not entered as an array formula, the single result is -234.2371645.

When entered as an array, the following regression statistics are returned. Use this key to identify the statistic you want.

| | A | B | C | D | E | F |
|---|---|---|---|---|---|---|
| 1 | $m_n$ | $m_{n-1}$ | ... | $m_2$ | $m_1$ | b |
| 2 | $se_n$ | $se_{n-1}$ | ... | $se_2$ | $se_1$ | $se_b$ |
| 3 | $r_2$ | $se_y$ | | | | |
| 4 | F | $d_f$ | | | | |
| 5 | $ss_{reg}$ | $ss_{resid}$ | | | | |

The multiple regression equation, y = m1*x1 + m2*x2 + m3*x3 + m4*x4 + b, can now be obtained using the values from row 14:

y = 27.64*x1 + 12,530*x2 + 2,553*x3+ 234.24*x4 + 52,318

The developer can now estimate the assessed value of an office building in the same area that has 2,500 square feet, three offices, and two entrances and is 25 years old, by using the following equation:

y = 27.64*2500 + 12530*3 + 2553*2 - 234.24*25 + 52318 = $158,261

Or you can copy the following table to cell A21 of the example workbook.

| Floor space (x1) | Offices (x2) | Entrances (x3) | Age (x4) | Assessed value (y) |
|---|---|---|---|---|
| 2500 | 3 | 2 | 25 | =D14*A22 + C14*B22 + B14*C22 + A14*D22 + E14 |

You can also use the TREND function to calculate this value.

**Example 4 Using The F And R2 Statistics**

In the previous example, the coefficient of determination, or r2, is 0.99675 (see cell A17 in the output for LINEST), which would indicate a strong relationship between the independent variables and the sale price. You can use the F statistic to determine whether these results, with such a high r2 value, occurred by chance.

Assume for the moment that in fact there is no relationship among the variables, but that you have drawn a rare sample of 11 office buildings that causes the statistical analysis to demonstrate a strong relationship. The term "Alpha" is used for the probability of erroneously concluding that there is a relationship.

There is a relationship among the variables if the F-observed statistic is greater than the F-critical value. The F-critical value can be obtained by referring to a table of F-critical values in many statistics textbooks. To read the table, assume a single-tailed test, use an Alpha value of 0.05, and for the degrees of freedom (abbreviated in most tables as v1 and v2), use v1 = k = 4 and v2 = n - (k + 1) = 11 - (4 + 1) = 6, where k is the number of variables in the regression analysis and n is the number of data points. The F-critical value is 4.53.

The F-observed value is 459.753674 (cell A18), which is substantially greater than the F-critical value of 4.53. Therefore, the regression equation is useful in predicting the assessed value of office buildings in this area.

**Example 5 Calculating The T-Statistics**

Another hypothesis test will determine whether each slope coefficient is useful in estimating the assessed value of an office building in example 3. For example, to test the age coefficient for statistical significance, divide -234.24 (age slope coefficient) by 13.268 (the estimated standard error of age coefficients in cell A15). The following is the t-observed value:

t = m4 ÷ se4 = -234.24 ÷ 13.268 = -17.7

If you consult a table in a statistics manual, you will find that t-critical, single tail, with 6 degrees of freedom and Alpha = 0.05 is 1.94. Because the absolute value of t, 17.7, is greater than 1.94, age is an important variable when estimating the assessed value of an office building. Each of

the other independent variables can be tested for statistical significance in a similar manner. The following are the t-observed values for each of the independent variables.

| Variable | t-observed value |
|---|---|
| Floor space | 5.1 |
| Number of offices | 31.3 |
| Number of entrances | 4.8 |
| Age | 17.7 |

These values all have an absolute value greater than 1.94; therefore, all the variables used in the regression equation are useful in predicting the assessed value of office buildings in this area.

## SLOPE OF BEST-FIT LINE

# SLOPE

See Also

Returns the slope of the linear regression line through data points in known_y's and known_x's. The slope is the vertical distance divided by the horizontal distance between any two points on the line, which is the rate of change along the regression line.

**Syntax**

**SLOPE(known_y's,known_x's)**

Known_y's is an array or cell range of numeric dependent data points.

Known_x's is the set of independent data points.

**Remarks**

- The arguments must be either numbers or names, arrays, or references that contain numbers.
- If an array or reference argument contains text, logical values, or empty cells, those values are ignored; however, cells with the value zero are included.
- If known_y's and known_x's are empty or have a different number of data points, SLOPE returns the #N/A error value.
- The equation for the slope of the regression line is:

$$b = \frac{n\sum xy - \left(\sum x\right)\left(\sum y\right)}{n\sum x^2 - \left(\sum x\right)^2}$$

**Example**

The example may be easier to understand if you copy it to a blank worksheet.

How?

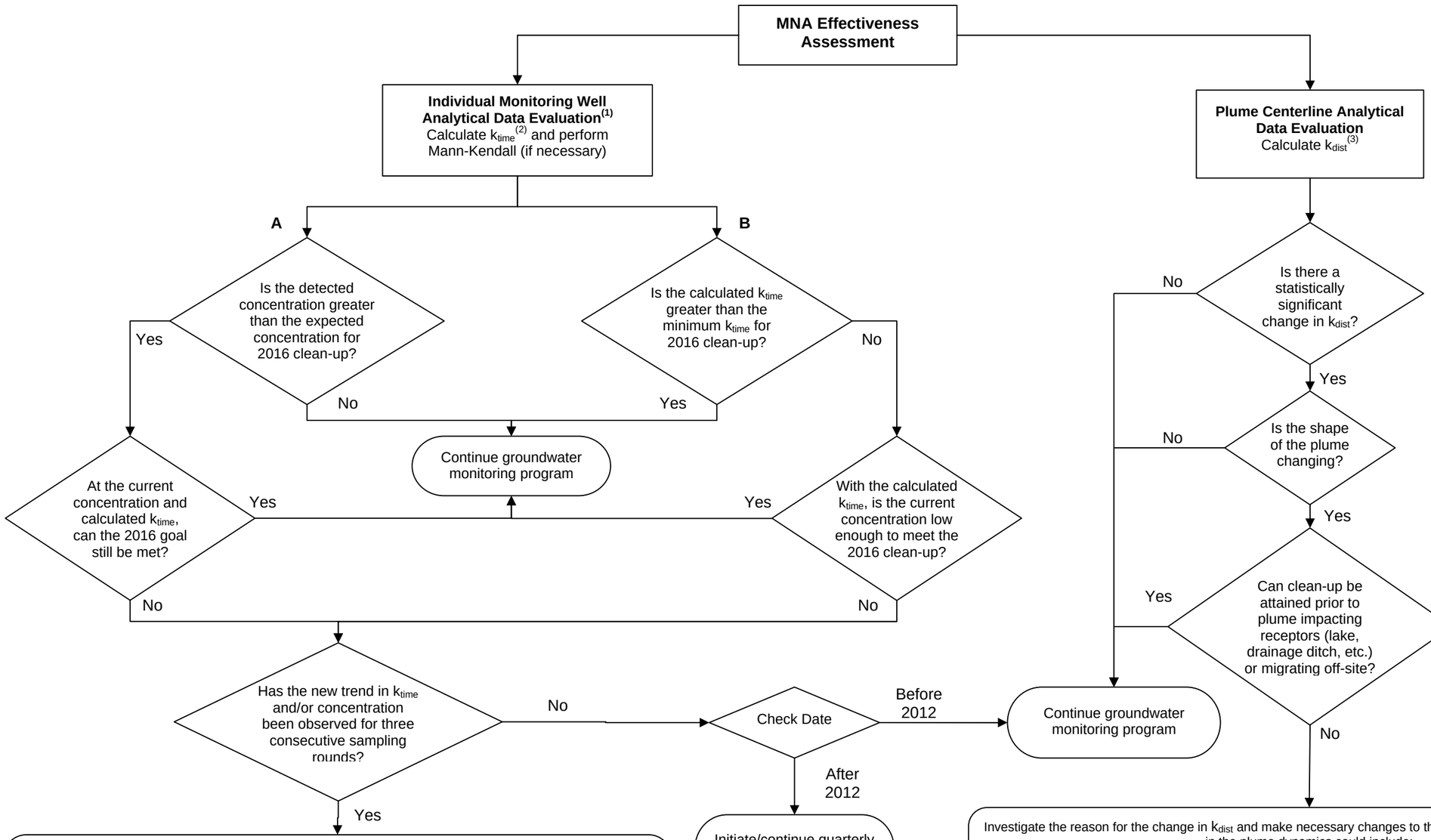
| | A | B |
|---|---|---|
| 1 | **Known y** | **Known x** |
| 2 | 2 | 6 |
| 3 | 3 | 5 |
| 4 | 9 | 11 |
| 5 | 1 | 7 |
| 6 | 8 | 5 |
| 7 | 7 | 4 |
| 8 | 5 | 4 |

| Formula | Description (Result) |
|---|---|
| =SLOPE(A2:A8,B2:B8) | Slope of the linear regression line through the data points above (0.305556) |

# MONITORED NATURAL ATTENUATION DATA EVALUATION

**DIAGRAM 3-1**
**MONITORED NATURAL ATTENUATION DATA EVALUATION**
**RESPONSE ACTION PLAN**

**NAS DALLAS, TEXAS**




Investigate the reason for the change in $k_{time}$ and make necessary changes to the remedial system. These changes in the plume dynamics could include:

| **Reason for $k_{time}$ Change** | **Recommended Changes in Remediation** |
|---|---|
| New source or new release | Identify new Responsible Party for continued remediation. |
| Geochemical change | Determine if chemical additives are necessary or technical impracticability of additional remediation. |
| Asymptotic degradation reached | Determine if active remediation or excavation are necessary or technical impracticability of additional remediation. |

Investigate the reason for the change in $k_{dist}$ and make necessary changes to the remedial system. These changes in the plume dynamics could include:

| **Reason for $K_{dist}$ Change** | **Recommended Changes in Remediation** |
|---|---|
| New source or new release | Identify new Responsible Party for continued remediation. |
| Migrating plume | Initiate abatement measures such as interceptor trench, slurry walls, pump recovery / capture system, etc. if receptors are threatened. |

Notes:
(1) Both pathways (A, B) must be evaluated for each of the chemicals of concern in each monitoring point along the plume's centerline.
(2) $k_{time}$ Concentration versus Time Attenuation Rate Constant
(3) $k_{dist}$ Concentration versus Distance Attenuation Rate Constant

# Assessment of MNA Performance Monitoring

## Introduction

The MNA monitoring well networks at the NAS Dallas groundwater plumes will provide the necessary analytical data to evaluate the dynamic behavior of the plumes over time, including contaminant and/or concentration reductions indicative of progress toward clean-up objectives, changes in plume boundaries, and changes in geochemistry. To this effect, these monitoring well networks include monitoring wells in areas hydraulically upgradient and sidegradient to the groundwater plume, in the historical source area, along the main body of the plume and immediately downgradient of the plume. The number and locations of monitoring points for each plume was selected based on the size of the plume, groundwater velocity, proximity to receptors (including cross-media transfer of COCs), and presence of preferential pathways for COC migration.

As required by the Compliance Plan for NAS Dallas (TCEQ, 2004), performance monitoring for MNA will be conducted in accordance with Response Action Plan (RAP) Worksheet 3.1 until all remedial action objectives have been met for the plume for at least two consecutive sampling events. Upon demonstration of the attainment of clean-up objectives, a three-year of post-remedial action monitoring will be implemented in accordance with the Compliance Plan for NAS Dallas (TCEQ, 2004) and as outlined on RAP Worksheet 4.1.

In addition to the COCs identified in the APAR (TtNUS, 2003) for each groundwater plume, daughter products that may be formed as a result of biotransformation or chemical processes will be monitored during the corrective action period at each plume. In order to ensure that there is a potential for continued transformation of the COCs within the groundwater plume, the geochemical environment will also be monitored (i.e., oxidation-reduction potential, dissolved oxygen, pH, etc.) every two years at a minimum. During the post-remedial action monitoring, the Compliance Plan requires that an expanded list of parameters be sampled including those COCs historically detected at the site. In order to minimize the chance of identifying constituent exceedances during the post-response action monitoring, the expanded list of parameters identified on RAP Worksheet 4.1 (Compliance Plan Table III) will be monitored every five years at a minimum.

Each new round of data will help develop a better understanding of the site and site processes and as a result, the conceptual site model for MNA will be continuously reevaluated from the standpoint of the observed plume shape, location, stability, and dynamics; attenuation rates; groundwater flow patterns; and geochemical regimes.

To evaluate progress towards achievement of clean-up objectives, data collected from the monitoring well network will be used to determine temporal and spatial trends in COC concentrations, comparisons of observed COC concentrations with benchmark concentrations, and, comparison of calculated attenuation rates with the rates required to meet remedial objectives within the required timeframe. Data will be interpreted with regard to variability so that attenuation-related changes and trends can be distinguished from other sources of variation in the data.

If a departure from a predicted trend is found, (i.e., exceeding benchmark concentration or unfavorable changes in attenuation rates), the deviation will be evaluated to determine how the changes may affect attainment of remedial goals for the individual monitoring wells, as well as, how the changes may affect the behavior of the entire plume (i.e., plume stability, reduction in COC concentrations, etc.). Departures from expected trends may not mean remedy failure, because there may be a range of attenuation rates that will achieve the desired remedial goals

in the allotted time; therefore their significance must be evaluated in the context of the site-related goals. If the potential impact on the remedy is negligible, revision of the conceptual site model may be the only outcome of such evaluation. However, if the potential for impact is significant, implementation of alternative remedies may be triggered or, at a minimum additional characterization to better define the factors limiting COC reduction and determine methods for mitigating the magnitude of their impact would be warranted. Other site-related data (i.e., geochemistry and potentiometric data) will continue to be evaluated to provide evidence of COC migration, fate, and attenuation processes. These data may be used to ascertain COC degradation and the continuation of appropriate conditions for attenuation at acceptable rates.

Following the individual monitoring well data analysis, plume behavior will be assessed to evaluate the continued effectiveness of the MNA remedy, as well as the adequacy of the monitoring program and conceptual site model for MNA. The ongoing monitoring program will provide the necessary data for continual refinement of the conceptual model and subsequently of the monitoring program itself. Upon completion of each sampling round, data analysis and determination of the effectiveness of the MNA remedy, plume-specific criteria will drive decisions affecting the continuity of the monitoring program.

At some plumes, source control and interim remedial activities have occurred between the original site characterization process and the implementation of performance monitoring. Because these activities are expected to change the site's characteristics and behavior, performance monitoring will require the continued refinement of the conceptual site model for MNA. This refinement of the conceptual site model may eventually be different from the original MNA conceptual site model based on the initial site characterization data. Development and implementation of the new conceptual site model for MNA will require the collection of additional data (i.e., quarterly monitoring for the first year after interim remedial activities and on a semi-annual basis thereafter) to establish baseline conditions, expediently depict new site characteristics and parameter variability, establish trends and estimate attenuation rates for COCs, determine if the plume characteristics have been altered, and assess the likelihood of meeting site remediation goals.

## Evaluation of New Data

Data interpretation will include the preliminary assessment of the COC concentration data collected for both the plume centerline (e.g., whole plume dynamics) as well as on individual COCs within each monitoring well. The interpretation will be conducted through graphs, tables, maps, statistics, and time-series plots. This will help in identifying patterns, relationships, and anomalies, such as possible "outliers" to the observed remedial trend of the plume. Scatter graphs (i.e., $k_{time}$ and $k_{dist}$ graphs) will show relationships between two variables that are not readily evident using purely numerical methods. Mapping the data in plan view and/or cross-section (i.e., isoconcentration maps, potentiometric maps, MNA parameter maps, etc.) will help understand patterns of COC distribution and migration, and relationships between geochemical zones and COC attenuation.

The initial data analysis and interpretation will focus on the detection of trends in the data for the COCs within individual monitoring wells and subsequently for the plume as a whole. First, the COC concentration data collected from each monitoring well will be used to determine the temporal trends that exist within the plume. The COC trends will also be evaluated at monitoring points located throughout the plume as a whole. In order to adequately interpret progress toward COC reduction goals for the plume, it is necessary to compare trends of individual monitoring wells to trends of other monitoring wells in the plume. Evaluating trends in data from all sampling locations in the plume will determine if the plume exhibits stability or reduction in COC concentrations. In addition, for each COC, spatial trends along the plume centerline [i.e., concentration vs. distance attenuation rate ($k_{dist}$)] will be evaluated. This analysis assists in evaluating the stability of the plume and its migration potential. Assessment of spatial plume behavior is necessary to ensure no unacceptable plume migration occurs.

Further evaluation will focus on the assessment of any departures from predicted trends and their impact on the potential for MNA to achieve plume-related goals. If the COC data points do not definitively indicate that the remedial goals are meeting the reasonable progress expectations, other data will be analyzed in order to properly interpret particular variances from the predicted performance (i.e., the site stratigraphy, groundwater chemistry, the groundwater flow field, the season of the year).

In addition, non-parametric statistical tests, such as the Mann-Kendall test, may be included in the data evaluation to establish the existence of a trend when the initial evaluation is inconclusive due to high data variability.

The process of MNA data evaluation is graphically depicted in Diagram 3-1.

### Individual Monitoring Well Analytical Data Evaluation

Evaluation of progress towards achievement of clean-up goals will focus primarily on temporal trends in COC concentration at individual attenuation monitoring point (AMP) wells within the plume. After each sampling event, temporal trends [i.e., concentration vs. time attenuation rate ($k_{time}$)], will be established for each AMP of the plume. Temporal trends ($k_{time}$) are particularly useful in evaluating if remedial goals can be met in the desired timeframe for the individual location. The analysis of temporal trends is useful for estimating the potential lifetime of the COC plume at the particular location.

The parameters to be evaluated in parallel to ensure reasonable progress is being made in the response action at the particular location are as follows:

- Direct comparison of detected concentrations to expected or benchmark concentration to meet remedial goals by the year 2016 for the monitoring wells along the centerline of the plume.

- Direct comparison of observed attenuation rate ($k_{time}$) from the chemical specific historical data available for the monitoring well versus the minimum attenuation rate ($k_{time}$) necessary to meet the 2016 clean-up date.

The following graph depicts the possible evaluation scenarios for the above parameters:

| | |
|---|---|
| **Measured COC Concentration < Expected COC Concentration**<br>**and**<br>**Observed $k_{time}$ > Minimum $k_{time}$**<br>Remedial goal is being met, continue performance monitoring | **Measured COC Concentration < Expected COC Concentration**<br>**and**<br>**Observed $k_{time}$ < Minimum $k_{time}$**<br>Evaluate further to ensure remedial goal is being met |
| **Measured COC Concentration > Expected COC Concentration**<br>**and**<br>**Observed $k_{time}$ > Minimum $k_{time}$**<br>Evaluate further to ensure remedial goal is being met | **Measured COC Concentration > Expected COC Concentration**<br>**and**<br>**Observed $k_{time}$ < Minimum $k_{time}$**<br>Remedial goal not being met, consider new response action |

1. Satisfactory progress is being made with the response action (top left quadrant) for an individual well location, if the detected concentration of the COC(s) is not greater than the 2016 clean-up curve expected concentration; and, the observed attenuation rate based on historical data available from the monitoring well is equal to or greater than the minimum attenuation rate necessary to meet clean-up by the year 2016 for the monitoring wells along the centerline of the plume.
2. Reasonable progress is not being made towards achieving the remedial goal (bottom right quadrant) if the detected concentration of the COC(s) exceeds the 2016 clean-up curve expected concentration; and the observed attenuation rate based on historical data available from the monitoring well is less than the minimum attenuation rate necessary to meet clean-up by the year 2016 for the monitoring wells along the centerline of the plume. A new response action may need to be implemented if this trend continues for at least three sampling rounds.
3. Further evaluation will be needed for the scenarios in the top right and bottom left quadrants before establishing if reasonable progress is being made towards achievement of the clean-up goals:
   - Reasonable progress is being made when the observed attenuation rate based on historical data is steep enough that clean-up can still be achieved by the year 2016, even though the detected concentration of a COC may be greater than the expected concentration during a particular sampling event (bottom left quadrant).
   - Reasonable progress is being made if the detected concentration of a COC in the sampling event is sufficiently below the expected concentration so that with an observed attenuation rate based on historical data greater than the calculated minimum attenuation rate necessary to meet PCLs by 2016, the remedial objectives can still be achieved by the year 2016 (top right quadrant).
   - Reasonable progress may not be made if either of the preceding two situations continues for at least three consecutive sampling rounds. At that point in the response action evaluation, a new response action may need to be implemented. In this case other statistical methods may be used to evaluate the data such as using non-parametric tests (i.e., Mann-Kendall) to determine if there has been a statistically significant change in degradation trends.

Plume Analytical Data Evaluation

Since a plume-wide trend implying progress toward restoration cannot be satisfactorily elucidated from monitoring only individual sampling locations, it will be necessary to compare trends among the AMP wells in the plume. Reduction in COC concentrations from all or most sampling locations within predicted ranges and/or at anticipated rates can be interpreted as a decrease in COC mass for the plume and will be indicative of effective remediation of the plume through MNA. Mixed trends in different portions of the plume may imply temporal changes in plume migration or may be simply attributed to the natural attenuation processes, and do not signify failure of MNA to achieve its goals in a timely manner. These variations will be evaluated in the context of the conceptual site model and sampling history before they are attributed to natural attenuation processes of other possible causes. To this effect, in cases of mixed trends it will be necessary to perform other comparisons in order to reach a conclusion of satisfactory progress. It will be particularly useful to evaluate trends in COC and daughter product concentrations (e.g., a decreasing trend in trichloroethene compared to an increasing trend in cis-1,2-dichloroethene in the same plume may indicate degradation of trichloroethene to cis-1,2-dichloroethene). Other trends of interest include changes in geochemistry that may indicate decrease in attenuation rates, such as changes in availability of electron donors and electron acceptors, changes in oxidation-reduction potential, or other primary geochemical indicators.

The complement to the evaluation of the behavior of the plume as a whole is the assessment of spatial trends. For each COC, spatial trends along the plume centerline [i.e., concentration vs. distance attenuation rate ($k_{dist}$)] will be evaluated. This analysis assists in evaluating the stability of the plume and its migration potential. $k_{dist}$ will be calculated for the monitoring wells along the plume centerline after each annual sampling round and will be depicted in centerline trend graphs ($k_{dist}$ graphs). Assessment of spatial plume behavior will be performed through visual interpretation of changes in plume shape over time as shown in the isoconcentration maps as well as centerline trend graphs.

**Assessment Conclusions and Recommendations**

As a result of the response action effectiveness evaluation, the MNA conceptual site model will be continuously refined/modified by incorporating any new data and data trends in COC and geochemistry values and changes in site hydrology. As new data is gathered there will be an ever-expanding database for the site that can be used for comparison with the changes in parameters noted between monitoring events as well as for comparison to predicted, acceptable trends. This continual evaluation of performance monitoring data will translate in better understanding of plume behavior and anticipated data variability and therefore assist in the proper interpretation of monitoring data.

Upon completion of each sampling round, data analysis and determination of the effectiveness of the MNA remedy, plume-specific criteria will drive decisions affecting the continuity of the monitoring program such as: the appropriateness of continuing the monitoring program without change, the need for modifications to the monitoring program (i.e., increased monitoring frequency, additional monitoring wells), need for additional characterization, implementation of a contingency or alternative remedy, or verification of attainment of remedial goals and termination of performance monitoring.

Site-related decisions regarding continuing, modifying, or terminating MNA performance monitoring will be made based on the analyses of spatial and temporal trends in COC concentration, as well as comparisons with predicted benchmarks and/or the specified concentration standard (i.e., COC PCLs). The following summarizes each potential decision

and why it may be chosen based on the perceived progress towards achievement of MNA remediation goals at the plume:

1. Continue Monitoring Program Without Change

   COC concentrations, including toxic transformation products and any mobilized by-products or secondary COCs must remain within the bounds of acceptable trends in order to continue the monitoring program without any change until all remedial action objectives have been met. Groundwater flow parameters must not have changed outside previously identified acceptable ranges. The geochemistry must not have changed in such a way as to indicate that the COC degradation or other natural attenuation processes would be significantly affected.

2. Modify the Monitoring Program

   Modification of the monitoring program may be needed to better reflect changing conditions or increased understanding of natural attenuation processes at the site. Changing conditions or the need to test key assumptions may require new sampling points or increases in monitoring parameters or frequency. Possible scenarios include:

   - Changes in groundwater flowrates or directions that indicate COCs may move farther downgradient, laterally or vertically into previously unimpacted areas, may warrant the need for additional monitoring wells.
   - Unfavorable changes in COC concentrations within the plume, or in the observed attenuation rate based on historic data, may warrant increased monitoring frequency. Sampling frequency may be increased if a sudden change in the trend of COC concentration reduction is noted in order to provide information to facilitate understanding of the change and provide earlier warning of further change. If the protectiveness of the remedy is in question (i.e., unfavorable observed attenuation rate change after 2012), a determination may be made to collect data on a more frequent schedule to properly interpret trends in time to implement contingency remedies, if necessary, to meet PCLs by 2016.
   - Detections of COCs outside the known plume, indicating potential plume expansion or plume migration, may warrant the need for additional monitoring wells.

3. Implement a Contingency or Alternative Remedy

   Alternative remedies can be considered for use in case MNA fails to perform at the desired effectiveness. Situations that may trigger the implementation of a contingency or other remedy modifications will depend on site conditions and include the following:

   - COC concentrations are not decreasing at the rate previously determined to be necessary to meet the remediation objectives by 2016. This assessment will involve the direct comparison of current analytical data with the expected plume clean-up benchmarks as well as evaluation of temporal trends (i.e., observed attenuation rates) in COC concentrations versus the minimum attenuation rates required to meet clean-up by the year 2016. If the protectiveness of the remedy is in question (i.e., more than three rounds of sampling fail to meet the criteria), implementation of a contingency or alternative remedy would generally be warranted.
   - COC concentrations at AMP wells exhibit an increasing trend not originally predicted during remedy selection. This situation would involve the identification and assessment of trends in COC concentration data, including transformation products, changes in geochemistry that may indicate decrease in attenuation rates explaining the lack of

progress toward clean-up objectives, and/or additional COC releases. For some locations in the plume, a detection of a significant change may not trigger immediate implementation of a contingency or alternative remedy. For instance, a low-level or otherwise limited COC concentration increase does not necessarily mean that remediation timeframes will be expanded, or that by the time the pulse moves downgradient to the boundary of the plume there will be a significant plume expansion. Or, in some cases, the detailed characterization and modeling of COC fate and migration may indicate that concentrations for certain COCs (i.e., daughter products) in some portions of the plume are expected to increase temporarily, yet MNA would still meet remedial objectives. If so, the temporary increase would not trigger the contingency or alternative remedy as long as the increase conformed to the predictions and MNA remained protective, allowing observation for several years to test model predictions, if time is available (i.e., before 2012). In situations where evaluation shows the observed COC concentration increases are expected to unacceptably increase the time for plume restoration beyond 2016, or cause unacceptable plume expansion, triggering the contingency or alternative remedy would generally be warranted.

- COCs are identified in monitoring wells located outside the original plume boundary indicating unacceptable plume expansion or migration. Detections of COCs outside of the predetermined plume boundaries may indicate unacceptable plume expansion. Implementation of an alternative or contingency remedy will depend on the locations of the new detections, and distance and possible COC migration rates between these monitoring points and receptors (i.e., surface water bodies, off-site property). Because the COC travel time from the location of the detections may be many years at some sites, there may be time for further monitoring and assessment before a contingency or alternative remedy would need to be implemented. In contrast, if the protectiveness of the remedy is in question (i.e., a significant trend of increasing COC concentration in downgradient wells was noted), there may be much less time available to assess the trend if there was only a short travel time to downgradient receptors. In this case, a contingency or alternative remedy may be triggered immediately.

4. Termination of Performance Monitoring

Once PCLs have been achieved at each of the AMP locations within a plume, showing that the MNA remedy goals have been met for two consecutive semi-annual sampling events for an individual PCLE zone, performance monitoring will be terminated and a period of verification monitoring will be initiated. Verification monitoring will include three years of semi-annual groundwater sampling in order to satisfy the requirements of the Compliance Plan for NAS Dallas (TCEQ, 2004). Sampling parameters for the verification of achieving the PCLs and locations will be in accordance with RAP Worksheet 4.0. This sampling will include all COCs that have been historically detected in the area of the former SWMU, not just the ones that were identified for remediation in the Response Action Plan. If no additional COC exceedances are identified during this three year period of post response action care monitoring, the monitoring system can be terminated, the monitoring wells will be abandoned, and the site will be removed from the permit.

### Effects of Data Variability on Data Interpretation

Data interpretation is affected by data variability. This variability is sometimes associated with natural causes or may be simply attributed to the natural attenuation processes. Due to the dynamic nature of natural attenuation processes, data typically exhibit fluctuations of various magnitudes. For example, there is an expected degree of natural variability within a plume that may include small-scale expansion and shrinkage in response to changes in groundwater flowrates and biological degradation rates throughout the year. COC concentrations in individual monitoring wells may fluctuate with changes in plume configuration caused by oscillations in groundwater flow. Also, changes in groundwater elevations can cause changes in COC concentrations measured in monitoring wells.

It is essential that each data point be interpreted in the context of its derivation in time and space. For instance, monitoring wells produce data that should be interpreted with respect to COC sources, site stratigraphy, the groundwater flow field, the plume, possible receptors, season of the year, and other relevant factors. Variations in sampling methodology should also be considered, due to possible differences in COC concentrations derived from different sampling techniques or devices. The analytical methodology may be evaluated in terms of accuracy, precision, and detection limits. This list of data considerations is not exhaustive, but merely emphasizes that a number (i.e., a data point) should be placed in context to be interpreted. The better the understanding on the derivation and context of the data, the more likely it is that the appropriate decision can be made based on the data.

Examination of historical and spatial patterns may provide information useful in assessing the source and significance of variability in the measured parameters. For instance, if there are multiple monitoring wells in the same plume that show a consistent trend for a number of monitoring variables across several monitoring events, then one may suspect a natural variation, such as recharge differences or geochemical changes in the system, and investigate a correlation of recharge, indicator parameters, or other external hydrologic factors with concentration as indicative of the likely cause of the change. If, on the other hand, a specific monitoring well shows an unusually large change in concentration between monitoring events, relative to nearby monitoring wells, then one may suspect a measurement factor or additional release source is involved and look at sampling techniques or other such factors that may influence the concentration change. Because plume variability should be taken into account when interpreting monitoring data, it is important to have a good estimate of natural variability derived from the site investigation and ongoing MNA performance monitoring.

# APPENDIX 8
# WASTE DISPOSAL MANIFESTS

Project #: 0-0

Order #: 140398

EFFECTIVE ENVIRONMENTAL

Please print or type. (Form designed for use on elite (12-pitch) typewriter.)

**NON-HAZARDOUS WASTE MANIFEST**

1. Generator ID Number: TX8170022786 / 65033
2. Page 1 of 1
3. Emergency Response Phone: 877-577-2669
4. Waste Tracking Number: NHM140398

5. Generator's Name and Mailing Address
Naval Air Station Dallas (NAS)
c/o EnSafe Inc., 4545 Fuller Dr., Suite 342
Irving, TX 75038
Generator's Phone: 972.792.3222 ATTN: Tom Wiberg

Generator's Site Address (if different than mailing address)
8100 West Jefferson
Dallas, TX 75211
RB TVW

6. Transporter 1 Company Name
Stericycle Specialty Waste Solutions Inc
Phd: 972 329 1200
State ID#: 98032 / H-4695
U.S. EPA ID Number: MNS000110924

7. Transporter 2 Company Name
U.S. EPA ID Number

8. Designated Facility Name and Site Address
Itasca Landfill TX, LP
2559 FM 66
Itasca, Texas 76055
State ID#: H0241C
U.S. EPA ID Number: n/a
Facility's Phone: 254 897 2511

| 9a. HM | 9b. U.S. DOT Description (including Proper Shipping Name, Hazard Class, ID Number, and Packing Group (if any)) | 10. Containers No. | Type | 11. Total Quantity | 12. Unit Wt./Vol. | |
|---|---|---|---|---|---|---|
| ☐ | 1 Non-regulated material (soil cuttings Class 2 solids) | 01 ~~02~~ | DM | 55 ~~110~~ | G | CESQ3012 Non-RCRA |
| ☐ | 2. Non-regulated material (purged ground and decon water) | 02 | DM | 110 ~~55~~ | G | CESQ1012 Non-RCRA |
| | 3. | | | | | |
| | 4. | | | | | |

13. Special Handling Instructions and Additional Information
01:IDW Soil cuttings NR (PF:5110167655) 55G
02:IDW purge and decon waters NR (PF:5110167656) 55G
RB TVW
11-1) 0.72 ton 11-2) 0.47 tons

14. **GENERATOR'S CERTIFICATION:** I certify the materials described above on this manifest are not subject to federal regulations for reporting proper disposal of Hazardous Waste.

Generator's/Offeror's Printed/Typed Name: X DAVID BARNEY
Signature: X
Month 5 Day 31 Year 16

15. International Shipments ☐ Import to U.S. ☐ Export from U.S. Port of entry/exit:
Transporter signature (for exports only): Date leaving U.S.:

16. Transporter Acknowledgment of Receipt of Materials

Transporter 1 Printed/Typed Name: Rafael Blaze
Signature:
Month 5 Day 31 Year 16

Transporter 2 Printed/Typed Name: Steven Vansickle
Signature:
Month 6 Day 9 Year 16

17. Discrepancy

17a. Discrepancy Indication Space ☐ Quantity ☐ Type ☐ Residue ☐ Partial Rejection ☐ Full Rejection

Manifest Reference Number:

17b. Alternate Facility (or Generator)
U.S. EPA ID Number
Facility's Phone

17c. Signature of Alternate Facility (or Generator)
Month Day Year

01: H132 02: H132

18. Designated Facility Owner or Operator: Certification of receipt of materials covered by the manifest except as noted in Item 17a

Printed/Typed Name: Jessica Anderson
Signature:
Month 6 Day 9 Year 16

GENERATOR

INT'L

TRANSPORTER

DESIGNATED FACILITY

6-NHM-C-C-11

2-DESIGNATED FACILITY TO GENERATOR

Project #: 0-0 Order #: 140398

EFFECTIVE ENVIRONMENTAL

Please print or type. (Form designed for use on elite (12-pitch) typewriter.)

**NON-HAZARDOUS WASTE MANIFEST**

1. Generator ID Number: TX8170022786 / 65033
2. Page 1 of 1
3. Emergency Response Phone: 877-577-2669
4. Waste Tracking Number: NHM140398

5. Generator's Name and Mailing Address
Naval Air Station Dallas (NAS)
c/o EnSafe Inc., 4545 Fuller Dr., Suite 342
Irving, TX 75038
Generator's Phone: 972-292-3222 ATTN: Tom Wiberg

Generator's Site Address (if different than mailing address)
8100 West Jefferson
Dallas, TX 75211

RJ TWW

6. Transporter 1 Company Name
Stericycle Specialty Waste Solutions Inc
Ph#: 972 329 1200
State ID#: S5627 / H-4565
U.S. EPA ID Number: MNS000110924

7. Transporter 2 Company Name
U.S. EPA ID Number:

8. Designated Facility Name and Site Address
Itasca Landfill TX, LP
2559 FM 56
Itasca, Texas 76055
State ID#: H0241C
U.S. EPA ID Number: n/a
Facility's Phone: 254 687 2511

| 9a. HM | 9b. U.S. DOT Description (including Proper Shipping Name, Hazard Class, ID Number, and Packing Group (if any)) | 10. Containers No. | Type | 11. Total Quantity | 12. Unit Wt./Vol. | |
|---|---|---|---|---|---|---|
| ☐ | 1. Non-regulated material (soil cuttings Class 2 solids) | 01 ~~02~~ | DM | 55 ~~110~~ | G | CESQ3012 Non-RCRA |
| ☐ | 2. Non-regulated material (purged ground and decon water) | 02 | DM | 110 ~~55~~ | G | CESQ1012 Non-RCRA |
| | 3. | | | | | |
| | 4. | | | | | |

13. Special Handling Instructions and Additional Information
01:IDW Soil cuttings NR (PF:5110167655) 55G
02:IDW purge and decon waters NR (PF:5110167656) 55G

RJ TWW

11-1) 0.72 ton 11-2) 0.47 ton

14. **GENERATOR'S CERTIFICATION:** I certify the materials described above on this manifest are not subject to federal regulations for reporting proper disposal of Hazardous Waste.

Generator's/Offeror's Printed/Typed Name: X DAVID BURNEY
Signature: X
Month 5 Day 31 Year 16

15. International Shipments ☐ Import to U.S. ☐ Export from U.S. Port of entry/exit:
Transporter signature (for exports only): Date leaving U.S.:

16. Transporter Acknowledgment of Receipt of Materials

Transporter 1 Printed/Typed Name: Rafael Blayze
Signature:
Month 5 Day 31 Year 16

Transporter 2 Printed/Typed Name: Steven Vansickle
Signature:
Month 6 Day 9 Year 16

17. Discrepancy

17a. Discrepancy Indication Space ☐ Quantity ☐ Type ☐ Residue ☐ Partial Rejection ☐ Full Rejection

Manifest Reference Number:

17b. Alternate Facility (or Generator) U.S. EPA ID Number
Facility's Phone:

17c. Signature of Alternate Facility (or Generator) Month Day Year

01: H132 02: H132

18. Designated Facility Owner or Operator: Certification of receipt of materials covered by the manifest except as noted in Item 17a

Printed/Typed Name: Jessica Anderson
Signature:
Month 6 Day 4 Year 16

GENERATOR

INT'L

TRANSPORTER

DESIGNATED FACILITY

6-NHM-C-C-11

3-DESIGNATED FACILITY TO GENERATOR

Project #: 0-0 Order #: 145925

E² EFFECTIVE ENVIRONMENTAL

Please print or type. (Form designed for use on elite (12-pitch) typewriter.)

**NON-HAZARDOUS WASTE MANIFEST**

1. Generator ID Number: TX8170022786 / 65033
2. Page 1 of 1
3. Emergency Response Phone: 877-577-2669
4. Waste Tracking Number: NHM-145925

5. Generator's Name and Mailing Address
Naval Air Station Dallas (NAS)
c/o EnSafe Inc., 4545 Fuller Dr., Suite 342
Irving, TX 75038
Generator's Phone: 972-792-3222 ATTN: Tom Wherg

Generator's Site Address (if different than mailing address)
8100 West Jefferson
Dallas, TX 75211

6. Transporter 1 Company Name
Stericycle Specialty Waste Solutions Inc
Ph#: 972 329 1200
State ID#: 88922 / H-1496
U.S. EPA ID Number: MNS000110924

7. Transporter 2 Company Name
U.S. EPA ID Number

8. Designated Facility Name and Site Address
Itasca Landfill TX. LP
2559 FM 66
Itasca, Texas 76055
State ID#: H0241C
U.S. EPA ID Number: n/a
Facility's Phone: 254 687 2511

| 9a. HM | 9b. U.S. DOT Description (including Proper Shipping Name, Hazard Class, ID Number, and Packing Group (if any)) | 10. Containers No. | 10. Containers Type | 11. Total Quantity | 12. Unit Wt./Vol. | |
|---|---|---|---|---|---|---|
| ☐ | 1. Non-regulated material (purged ground and decon water) | 04 | DM | 220 | G | CESQ1012 Non-RCRA |
| ☐ | 2. Non-regulated material (soil cuttings Class 2 solids) | 02 | DM | 110 | G | CESQ3012 Non-RCRA |
| | 3. | | | | | |
| | 4. | | | | | |

13. Special Handling Instructions and Additional Information
01:IDW purge and decon waters NR (PF:5110167856) 55G
02:IDW Soil cuttings NR (PF:5110167855) 55G

11.1) 0.94 tn
11.2) ~~0.29 tn~~ 0.35 tn

14. **GENERATOR'S CERTIFICATION:** I certify the materials described above on this manifest are not subject to federal regulations for reporting proper disposal of Hazardous Waste.

Generator's/Offeror's Printed/Typed Name: X DAVID BARNEY
Signature: X
Month 11 Day 8 Year 16

15. International Shipments ☐ Import to U.S. ☐ Export from U.S. Port of entry/exit:
Transporter signature (for exports only): Date leaving U.S.:

16. Transporter Acknowledgment of Receipt of Materials

Transporter 1 Printed/Typed Name: Jason L Boss
Signature:
Month 11 Day 8 Year 16

Transporter 2 Printed/Typed Name: Rafael Blanco
Signature:
Month 11 Day 14 Year 16

17. Discrepancy

17a. Discrepancy Indication Space ☐ Quantity ☐ Type ☐ Residue ☐ Partial Rejection ☐ Full Rejection

Manifest Reference Number:

17b. Alternate Facility (or Generator) U.S. EPA ID Number
Facility's Phone:

17c. Signature of Alternate Facility (or Generator) Month Day Year

01: H132 02: H132

18. Designated Facility Owner or Operator: Certification of receipt of materials covered by the manifest except as noted in Item 17a

Printed/Typed Name: Cindy Reed
Signature: Cindy Reed
Month 11 Day 14 Year 16

GENERATOR

INT'L

TRANSPORTER

DESIGNATED FACILITY

6-NHM-C-C-11

2-DESIGNATED FACILITY TO GENERATOR

# SWMU 17/BUILDING 1429 PLUME

# 2016 Response Action Effectiveness Report
## SWMU 17/Building 1429 Plume
## Former NAS Dallas, Texas

## Professional Signatures and Seals

**Professional Geoscientist**

| | | |
|---|---|---|
| *Thomas Wiberg* | *1619* | *30 November 2017* |
| Professional Geologist | Geologist License number | Expiration date |
| | *17 January 2017* | |
| Signature | Date | |
| *972-791-3222* | *972-791-0405* | *twiberg@ensafe.com* |
| Telephone number | FAX number | E-mail |

**Professional Engineer**

| | | |
|---|---|---|
| | | |
| Professional Engineer | P.E. License number | Expiration date |
| | | |
| Signature | Date | |
| | | |
| Telephone number | FAX number | E-mail |

**Registered Corrective Action Specialists (RCASs) and Corrective Action Project Managers (CAPMs)**
**For LPST sites only.**

| | | |
|---|---|---|
| | | |
| Registered Corrective Action Specialist | RCAS Registration number | Expiration date |
| | | |
| Signature | Date | |
| | | |
| Corrective Action Project Manager | CAPM Registration number | Expiration date |
| | | |
| Signature | Date | |
| | | |
| Telephone number | FAX number | E-mail |

**Seals, as applicable:**

# TEXAS COMMISSION ON ENVIRONMENTAL QUALITY
## Response Action Effectiveness Report

## Cover Page

**Regulatory ID number** (Solid waste registration number, VCP ID number, etc.) *Solid Waste Code #65033*
check one: ___ Initial RAER submittal for this onsite property X Subsequent RAER submittal
Report date: *January 2017* TCEQ Region No.: *4*

**TCEQ Program** (check one)
X Corrective Action (Mail Code 127)
___ Voluntary Cleanup Program (Mail Code 221)
___ Petroleum Storage Tank Program (Mail Code 137)
___ Superfund PRP Lead (Mail Code 143)
___ Municipal Solid Waste Permits (Mail Code 124)

**Onsite Property Information**
Onsite Property Name: *Former Naval Air Station Dallas (NAS Dallas) — SWMU 17/Building 1429 Plume*
Street no. *8100* Pre dir: *West* Street name: *Jefferson* Street type *Blvd* Post dir: ___
City: *Dallas* County: *Dallas* County Code: *57* Zip: *75211*
Nearest street intersection or location description: ___

Latitude: Degrees, Minutes, Seconds OR Decimal Degrees (circle one) North *32°44'30.0"*
Longitude: Degrees, Minutes, Seconds OR Decimal Degrees (circle one) West *96°57'55.5"*

**Offsite Affected Property Information**
Offsite Affected Property Name: *Not Applicable (N/A)*
Street no. ___ Pre dir: ___ Street name: ___ Street type: ___ Post dir: ___
City: ___ County: ___ County Code: ___ Zip: ___

[X] Check if no offsite properties affected

**Contact Person Information and Acknowledgement**
Person (or company) Name: *Navy BRAC PMO East*
Contact Person: *Mr. David Barney* Title: *BRAC Environmental Coordinator*
Mailing Address: *4911 S. Broad Street, Building 679*
City: *Philadelphia* State: *PA* Zip: *19112* E-mail address **david.a.barney@navy.mil**
Phone: *617-753-4656* Fax: ___

By my signature below, I acknowledge the requirement of §350.2(a) that no person shall submit information to the executive director or to parties who are required to be provided information under this chapter which they know or reasonably should have known to be false or intentionally misleading, or fail to submit available information which is critical to the understanding of the matter at hand or to the basis of critical decisions which reasonably would have been influenced by that information. Violation of this rule may subject a person to the imposition of civil, criminal, or administrative penalties.

Signature of Person BARNEY.DAVID.A.1228582553 Digitally signed by BARNEY.DAVID.A.1228582553 DN: c=US, o=U.S. Government, ou=DoD, ou=PKI, ou=USN, cn=BARNEY.DAVID.A.1228582553 Date: 2017.01.18 06:39:51 -05'00' Name, print: *David Barney* Date: ___

Check the reports/forms previously submitted:

**Remedy Standard A**

____ Self-Implementation Notice Submittal date: _____

*X* Response Action Plan — Approval date: *December 2006*

**Remedy Standard B**

____ Response Action Plan — Approval date: _____

List all media (surface soil, subsurface soil, groundwater, sediment, surface water, air) that contained or contains a PCLE zone and specify the response action that has been or will be taken for each media. Indicate the type of removal, decontamination, physical control, or institutional control action used in the response action.

| Media | COCs | Removal | Decontamination | Physical Control | Institutional Control | Modified Response Objective | | |
|---|---|---|---|---|---|---|---|---|
| | | | | | | PMZ | WCU | TI |
| *Groundwater* | *Trichloroethene (TCE)*<br>*cis-1,2-Dichloroethene (cis-DCE)*<br>*Vinyl Chloride (VC)* | *N/A* | *MNA* | *N/A* | *N/A* | *N/A* | *N/A* | *N/A* |

Current land use of the onsite affected property: ___ Residential *X* Commercial/industrial

Projected future land use of the onsite property (if known): *X* Residential _____ Commercial/industrial

Briefly describe the affected property and PCLE zones, the conclusions from the assessment activities, identify any affected or threatened receptors, and describe any other major site conditions. If any portion of the response action is necessitated due to an aesthetic or nuisance condition, identify the nature of that condition and identify that portion of the response action conducted to address it. If any media that contains a PCLE zone is not being addressed in this response action, provide justification.

**Affected Property: SWMU 17/Building 1429 Plume**

**In 1989, a Resource Conservation and Recovery Act (RCRA) Facility Assessment (RFA) was performed at Naval Air Station (NAS) Dallas in accordance with the 1984 RCRA Hazardous and Solid Waste Amendments to evaluate potential releases at Solid Waste Management Units (SWMUs) and Areas of Concern (AOCs) and to make preliminary determinations regarding the need for further action. The RFA Report included data collected as part of a Preliminary Review, a Visual Site Inspection, and a Sampling Visit, as necessary, for 135 SWMUs and six AOCs at NAS Dallas (A.T. Kearney, 1989).**

**In 1993, NAS Dallas was identified for closure under the Base Realignment and Closure Act (BRAC). As part of the base closure activities, an Environmental Baseline Survey (EBS) was conducted at NAS Dallas to identify any potential environmental concerns related to historical operations at the base [EnSafe/Allen & Hoshall (E/A&H), 1994]. During this EBS, additional site concerns were identified at numerous buildings across the installation. In order to strategically investigate the permitted and non-permitted SWMUs, AOCs, and additional site concerns identified in the EBS, the facility was divided into six sections, called "categories", based on property use and ownership. In 1995, the Navy initiated RCRA Facility Investigation (RFI) activities at NAS Dallas at Categories A through F. Submittal of the Final RFI Reports (issued as a series of six reports — one report per category) occurred during the period from November 2000 to March 2001 [Tetra Tech NUS, Inc. (Tetra Tech), 2000a — 2001b]. The RFI was completed under the requirements of the Texas Risk Reduction Standards (RRS) [30 Texas Administrative Code (TAC) 335, Subchapter S], the regulatory framework in effect at the time, and closure recommendations in the RFI Reports were based upon Risk Reduction Standard 2 — Industrial (RRS2-IND) criteria. The RFI Reports identified those areas that required further action based on the chemical constituents detected in the soil and/or groundwater at the base.**

**The RFI Reports received conditional approval by the Texas Natural Resource Conservation Commission now the Texas Commission on Environmental Quality (TCEQ). Final approval of the RFI Reports by TCEQ and U.S. EPA was dependent upon landowner concurrence of the RRS2-IND clean-up standard.**

**In September of 1999, the Texas Risk Reduction Program (TRRP) (30 TAC 350) was promulgated. One of the major changes resulting from TRRP was eliminating site background as a closure criterion. The most stringent closure standard under TRRP is the Residential Remedy Standard A (RES A), which consists of closure for residential use with no engineering or institutional controls.**

**In March 2001, the Navy submitted a Notice of Intention to Switch to TRRP (30 TAC 350) for five of the six categories. The one category (Category C) that was not switched to TRRP, but remained under the RRS2-IND standards, was subsequently transferred to the Department of the Army.**

**In October 2002, an Affected Property Assessment Report (APAR) was produced based on evaluation of RFI data as well as data from follow-up investigations (Tetra Tech, 2002). The data included in the APAR were compared to TRRP RES A criteria to select those sites that may be closed with no land use encumbrances and to determine which sites required corrective action. The results of this comparison indicated that 23 SWMUs (1, 2, 6, 17, 18, 21, 31, 35, 36, 60, 79, 81, 83, 84, 85, 86, 92, 102, 108, 124, 136, 138, and 139) required further action.**

**SWMU 17/Building 1429 Plume**

**Building 1429, the Aerial Port Training Facility, was constructed in 1982 and expanded to its current size in 1993. The area was part of the original Hensley Field, which contained various airfield developments (aircraft aprons, maintenance and operations structures, and vehicle parking areas). Historical aerial photographs from 1951 indicate several other buildings and a hangar were formerly located in this area. The hangar (former Building 604), the control tower (former Building 601), an operations building (former Building G), and a shed for fire engines (former Building H) were located northwest of the current building. Two airplane fueling pits were located west of Building 1429. An oil storage house (former Building 620) was at the same location as Building 1429 from 1942 until its removal sometime between 1964 and 1979. A utility shop (former Building 619), constructed in 1942 and demolished sometime between 1964 and 1979, was located in the parking area north of Building 1429. A 1979 aerial photograph indicated an apron covered part of the site until 1982, when Building 1429 was constructed.**

**Building 1429 was used to prepare and manage training activities involving aircraft parachute drops, flight assistance, and preparedness. Hazardous materials stored onsite included grease, paints, toner, lube oils, brake fluids, solvents, starter fluid, and dry cell batteries. A drum storage area (containing empty 55-gallon drums used as parachute attachments during drop-training exercises) and a flammable storage locker were located west of the building.**

**The source for the chemicals of concern (COC) in the subsurface at the plume southeast of Building 1429 has not been specifically identified; therefore, this plume has been administratively assigned to SWMU 17. These COCs could have originated from the historic operations in the area as described above, or may have been from unreported releases from a 600-gallon steel above-ground storage tank (AST), identified as SWMUs 33 and 34 in the RFI Report for Category D (Tetra Tech, 2001a). This tank was used to collect aircraft fuel, engine oil, hydraulic fluid, and spent solvents. The tank was initially placed at the SWMU 33 location, which was approximately 150 feet southeast of Building 1429. In 1988, it was moved to the SWMU 34 location, which was about 100 feet east of Building 1429. At some date after 1988, the AST was removed.**

**Soil**

**No soil exceedances were reported.**

**Groundwater**

**The results of the RFI for Category D issued in January 2001 indicate that groundwater at the site had been impacted by chlorinated volatile organic compounds (CVOC). As described in the APAR, the groundwater of this SWMU is located within a Class 2 groundwater resource area. The high degree of heterogeneity associated with the shallow groundwater bearing unit (GWBU) onsite has resulted in a discrete groundwater Protective Concentration Level Exceedance (PCLE) zone associated with the SWMU 17/Building 1429 Plume that required a response action to reduce the concentration of COCs to less than the respective critical PCLs. Subsequent to the APAR, a Response Action Plan (RAP) was submitted to the TCEQ for groundwater at the SWMU 17/Building 1429 Plume. The revised RAP (Revision 2), dated February 2006, received TCEQ approval in December 2006.**

**The Navy originally proposed to utilize monitored natural attenuation (MNA) as a decontamination remedy to address the PCLE zone identified at the SWMU 17/Building 1429 Plume (Tetra Tech NUS [TtNUS]), 2002) by the year 2017. A re-evaluation of plume dynamics was presented in an Alternatives Evaluation Report (AER) (Resolution Consultants, 2013), and a determination was made that MNA alone would not effectively reduce the concentrations of COCs in groundwater for the southern portion of the plume to achieve remedial goals (TRRP RES A) by the cleanup date of 2017.**

**In accordance with the approved Groundwater RAP (Revision 2) (TtNUS, 2006), and as recommended by TCEQ in a letter dated May 26, 2015, failure of the response action triggers the implementation of contingency measures, which may include the selection of an appropriate alternate remedial measure such as enhanced MNA (EMNA). The Navy has proposed to implement EMNA in a pilot study as an alternate remedy at SWMU 18 groundwater plume in an effort to reduce COCs to below PCLs. This study will allow the Navy to make a determination as to whether the technology is viable. Depending upon the results of the EMNA spot treatment at SWMU 18, alternative remedial measures may be proposed in a comprehensive RAP for SWMU 17/Building 1429 Plume. MNA will be continued at the SWMU 17/Building 1429 Plume for the upcoming year in accordance with the procedures and protocols described in the Groundwater RAP (Revision 2) (TtNUS, 2006).**

**In October 2015, the Navy submitted a revised RAP (Revision 3) (Resolution Consultants, 2015) to TCEQ. The purpose of the revised RAP was to remove monitor wells with no history of COC detections, or with COC detections below the applicable GWPS for at least the previous five consecutive years, from the current monitoring and sampling plan and confirmation sampling plan. In accordance with the RAPs, Resolution Consultants conducted plugging and abandonment (P&A) of select groundwater monitoring wells in April 2016. P&A actions were conducted by a state of Texas licensed driller (Strata Core Services, SCI). Four wells (600D86MW, 60201MW, 612D155MW, and 79920MW) were P&A'd at SWMU 17/Bldg 1429. In addition, four wells (IW-1 through IW-4) that were previously installed for a pilot test that was never performed were also P&A'd.**

**Remedy performance groundwater sampling through 2016 continues to indicate that MNA has been an appropriate remedial method to reduce COCs, specifically trichloroethene (TCE), cis-1,2-dichloroethene (cis-1,2-DCE), and vinyl chloride (VC), to below their critical PCLs for the northern portion of the SWMU 17/Building 1429 Plume. , However, concentrations of TCE within the southern portion of the plume are not decreasing at a rate sufficient to meet the established 2017 remedial cleanup goal, as concentrations of TCE in five southern groundwater monitoring wells remain above the PCL of 0.005 mg/L for TCE.**

**Potential receptors are onsite residents, onsite employees, and onsite construction workers. Since the groundwater PCLE zone is not projected to migrate offsite based on groundwater modeling results and other lines of evidence, it is not anticipated that offsite receptors will be affected. The possible routes of exposure to groundwater are inhalation (onsite residents, onsite employees, and onsite construction workers) and dermal contact (onsite construction workers). Ingestion is not a concern since during the implementation of the response actions there is controlled access to the site, which limits potential exposures to contaminated groundwater (i.e., no potable or irrigation wells will be installed) through 2017. The potential for inhalation of vapor from groundwater through soil to outdoor air is insignificant, because the maximum detected COC concentrations in groundwater are below their respective inhalation of volatiles from groundwater ($^{Air}GW_{Inh\text{-}V}$) PCLs. There is also limited potential for exposure via an indoor air exposure scenario because the foundation and floor of any future buildings further serve as barriers for the vapor intrusion from groundwater. Additionally, the indoor air sampling conducted in a sealed building at a similar plume at the Base (Building 1406 at the SWMU 21 area) indicated that no chlorinated VOCs were detected in the indoor air (TtNUS, 2004). The recent Vapor Intrusion Study at SWMU 21 (Resolution Consultants, 2015) also concluded that sub-slab TCE and cis-1,2-DCE concentrations were well below VISLs for sub-slab vapor as well as RSLs for indoor air. Furthermore, the analytical results indicated that neither TCE nor cis-1,2-DCE were detected in indoor air samples. Therefore, vapor intrusion is not a current concern at NAS Dallas.**

## CHRONOLOGY OF MAJOR EVENTS

| | |
|---|---|
| Sep. 1985 | Initial Assessment Study was prepared and submitted. |
| Jan. 1987 | Confirmation Study and Verification Step Report was prepared and submitted. |
| Mar. 1989 | RFA was prepared and submitted. |
| 1993 — 1994 | EBS was prepared and submitted. |
| Mar. 1994 | BRAC Cleanup Plan was prepared and submitted. |
| 1995 — 1996 | Basewide Round 1 groundwater sampling event (Directed Phase RFI). |
| 1996 — 1997 | Interim Draft RFI Reports were prepared and submitted for each category identified at the air station. |
| Mar. — June 1998 | Basewide Round 2 groundwater sampling event (Chase Phase RFI). |
| May — Oct. 1998 | Main Fuel Farm (MFF) USTs were removed by the Navy's Charleston Detachment, along with other tanks basewide. |
| June 1998 — Jan. 1999 | Release Determination Report was prepared and submitted covering the removal of the MFF tanks. |
| Aug. — Sep. 1998 | Basewide Round 3 groundwater sampling event. |
| Sep. 1998 | Most military operations on NAS Dallas ceased and the air station was placed into caretaker status. |
| Dec. 1998 — Jan. 2000 | Removal of oil/water separators (OWS) basewide. |
| Jan. — Oct. 1999 | Basewide removal of hot spot areas of contamination. |
| Feb. — Apr. 1999 | Basewide Round 4 groundwater sampling event. |
| Sep. — Oct. 1999 | Removal of the remaining USTs basewide. |
| Sep. — Nov. 1999 | Basewide Round 5 groundwater sampling event. |
| July 1999 — Feb. 2000 | Basewide pre-Corrective Measures Study monitoring well installation and sampling event. |
| June — July 2000 | Preliminary groundwater investigation at Advanced Science Incorporated Area-5 (ASA-5) site in the MFF/Main Fuel Farm Storm Sewer (MFF/MFFSS) area. |
| July — Aug. 2000 | Basewide Round 6 groundwater sampling event. |
| Aug. — Sep. 2000 | Aquifer tests were conducted at five sites across Former NAS Dallas to determine aquifer properties. |
| 2000 — 2001 | Final RFI Reports were prepared and submitted for each category. |
| June — July 2001 | Basewide Round 7 groundwater sampling event, including evaluation of alternate sampling methods [i.e., passive diffusion bag (PDB) and HydraSleeve™]. |
| Sep. 2001 | Enhanced Monitored Natural Attenuation (EMNA) pilot test initiated at ASA-5 site (SWMUs 79/136) involving the injection of potassium permanganate ($KMnO_4$). |

| | |
|---|---|
| Feb. 2002 | MNA Groundwater Modeling Report for MFF/MFFSS was prepared and submitted. |
| Mar. 2002 | Technical Memorandum Groundwater Sampling Procedure Comparison for selected monitoring wells was prepared and submitted. |
| Oct. 2002 | APAR was prepared and submitted. |
| Dec. 2002 — Mar. 2003 | Basewide Round 8 groundwater sampling event. |
| Jan. 2003 | Monitoring Well Abandonment Plan was prepared and submitted. |
| Jan. 2003 | Draft MNA Groundwater Modeling Report for Category D Sites was prepared and submitted. |
| Jan. 2003 | Corrective action (excavation and disposal) initiated on the Rubble Landfill (SWMU 1). |
| Feb. 2003 | Draft RAP for MFF/MFFSS soils was prepared and submitted. |
| Apr. 2003 | Draft RAP for Category D Sites soils was prepared and submitted. |
| Apr. 2003 | Final Groundwater Report to satisfy Provision VIII.D.8 of the Former NAS Dallas RCRA Hazardous Waste Storage Permit (No. HW-50276) was prepared and submitted. |
| May 2003 | Self Implementation Notice (SIN) for TRRP RES A Soil Response Actions for SWMUs 2, 6, 18, 21, 31, 35, 36, 60, 79, 81, 83, 84, 85, 86, 102, 124, 138, and 139 was prepared and submitted. |
| June 2003 | Draft MNA Groundwater Modeling Report for Category B was prepared and submitted. |
| June 2003 | RCRA Permit renewal and Compliance Plan applications submitted to the TCEQ. |
| June 2003 | Corrective action (excavation, solidification, and disposal) initiated on the Texas Air National Guard (TANG) Ponds (SWMU 92). |
| July — Aug. 2003 | Basewide Round 9 groundwater sampling event. |
| Aug. 2003 | Corrective action (excavation, disposal, and backfill) initiated on the sites covered in the SIN submitted in May 2003. |
| Aug. 2003 | 2002 Annual Groundwater Monitoring Report was prepared and submitted. |
| Dec. 2003 — Jan. 2004 | Basewide Round 10 groundwater sampling event. |
| Jan. 2004 | Soil RACR was prepared and submitted for the Rubble Landfill (SWMU 1). |
| Jan. 2004 | Soil RACR was prepared and submitted for the TANG Ponds (SWMU 92). |
| Mar. 2004 | TCEQ produced and distributed the Draft RCRA Permit and Draft Compliance Plan. |
| Apr. 2004 | Final Addendum to MNA Groundwater Modeling Report for MFF/MFFSS was prepared and submitted. |
| May 2004 | 2003 Groundwater Response Action Effectiveness Reports (RAER) were prepared and submitted. |

| | |
|---|---|
| June 2004 | Indoor and Outdoor Air Sampling at Building 1406 Report was prepared and submitted. |
| July 2004 | Basewide Round 11 groundwater sampling event. |
| July 2004 | Final MNA Groundwater Modeling Report for Category D was prepared and submitted. |
| Sep. 2004 | Final MNA Groundwater Modeling Report for Category B was prepared and submitted. |
| Sep. 2004 | TCEQ approved final closure documentation for the Miscellaneous Sites Soil RACR. |
| Oct. 2004 | Basewide Round 12 groundwater sampling event. |
| Oct. 2004 | TCEQ approved Final MNA Groundwater Modeling Report for Category D Sites at Former NAS Dallas. |
| Oct. 2004 | TCEQ approved Final Addendum to the MNA Groundwater Modeling Report for MFF/MFFSS at Former NAS Dallas. |
| Oct. 2004 | TCEQ approved Final Groundwater Report for Former NAS Dallas. |
| Oct. 2004 | TCEQ approved the 2002 Annual Groundwater Monitoring Report. |
| Nov. 2004 | Final RAP (Basewide) for groundwater was prepared and submitted. |
| Dec. 2004 | 2004 Semi-annual Groundwater Monitoring Report was prepared and submitted. |
| Dec. 2004 | TCEQ issued comments on the 2003 Groundwater RAERs. |
| Jan. 2005 | 2004 Groundwater RAERs were prepared and submitted. |
| Mar. 2005 | Monitoring Well Installation and Abandonment Plan was prepared and submitted. |
| Mar. 2005 | Draft 84 Sites Soil RACR was prepared and submitted. |
| Apr. 2005 | 2004 Groundwater RAERs were prepared and submitted. |
| Apr. 2005 | Basewide Round 13 groundwater sampling event. |
| June 2005 | Corrective action for groundwater (excavation, disposal, and backfill) initiated at SWMU 85. |
| June 2005 | Corrective action for groundwater (excavation, disposal, and backfill) initiated at SWMU 18. |
| July 2005 | Basewide Round 13 groundwater sampling event. |
| Aug. 2005 | TCEQ issued comments on the Draft 84 Sites Soil RACR. |
| Aug. 2005 | 2005 Semi-annual Groundwater Monitoring Report was prepared and submitted. |
| Sep. 2005 | TCEQ issued comments on the 2004 Groundwater RAPs. |
| Oct. 2005 | TCEQ issued comments on the 2004 Groundwater RAERs. |
| Oct. 2005 | Basewide Round 14 groundwater sampling event. |
| Oct. — Dec. 2005 | City of Dallas issued comments on the Draft 84 Sites Soil RACR. |

| | |
|---|---|
| Dec. 2005 | TCEQ issued comments on the 2005 Semi-annual Groundwater Monitoring Report. |
| Jan. 2006 | 2005 Groundwater RAERs were prepared and submitted. |
| Jan. 2006 | Basewide Round 15 groundwater sampling event. |
| Feb. 2006 | Revised Groundwater RAPS (Revision 2) were prepared and submitted covering SWMUs 17/Building 1423, 17/Building 1429, 18, 35, 85, 86, 108, 136 North, 136 South, and 139. |
| Mar. 2006 | RACR for groundwater removed at SWMUs 18 and 85 were prepared and submitted. |
| May 2006 | Basewide Round 15B groundwater sampling event. |
| May 2006 | TCEQ issued comments on the 2005 Groundwater RAERs. |
| June 2006 | 85 Sites, Defense Reutilization and Marketing Office (DRMO), and Naval Weapons Industrial Reserve Plant (NWIRP) SWMU 18 Soil RACRs (Revision 1) were prepared and submitted. |
| July 2006 | TCEQ issued comments on the Groundwater RAPs (Revision 2). |
| July 2006 | EMNA Pilot Test initiated at SWMU 21 involving the injection of zero valent iron (ZVI). |
| Aug. 2006 | Basewide Round 16 groundwater sampling event. |
| Aug. 2006 | Responses to TCEQ comments on the Groundwater RAPs (Revision 2), including replacement pages, were prepared and submitted. |
| Nov. 2006 | Basewide Round 16B groundwater sampling event. |
| Dec. 2006 | RACR for groundwater PCL at SWMU 35 was prepared and submitted. |
| Dec. 2006 | TCEQ approves Groundwater RAP (Revision 2) covering SWMUs 17/Building 1423, 17/Building 1429, 18, 35, 85, 86, 108, 136 North, 136 South, and 139. |
| Jan. 2007 | 2006 Groundwater RAERs were prepared and submitted. |
| Apr. 2007 | Groundwater Sampling Work Plan Addendum, Slug Test Work Plan, and Monitoring Well Installation and Abandonment Work Plan were prepared and submitted. |
| Apr. — May 2007 | Basewide Round 17 groundwater sampling event. |
| Apr. — June 2007 | SWMU 18 OWS removal operations were conducted. |
| Apr. 2007 | Slug test operations conducted at SWMUs 18, 85, and 139. |
| Aug. — Sep. 2007 | Basewide Round 18 groundwater sampling event. |
| Nov. 2007 | Field Activities for SWMU 21 EMNA Pilot Study completed. |
| Jan. 2008 | Basewide Round 19 groundwater sampling event. |
| Jan. 2008 | 2007 Groundwater RAERs were prepared and submitted. |
| Feb. 2008 | TCEQ approves the Groundwater RACR for SWMU 35. |
| Apr. 2008 | Comments to the 85 Sites, DRMO, and NWIRP SWMU 18 Soil RACRs revisions were received from the TCEQ. |

| | |
|---|---|
| May 2008 | TCEQ issued comments on the 2007 Groundwater RAERs. |
| May 2008 | Response to the 85 Sites, DRMO, and NWIRP SWMU 18 Soil RACRs comments were submitted to the TCEQ. |
| July 2008 | Basewide Round 20 groundwater sampling event. |
| July 2008 | TCEQ grants final approval of the 85 Sites, DRMO, and NWIRP SWMU 18 Soil RACRs. |
| July 2008 | Response to TCEQ comments on 2007 Groundwater RAERs, replacement pages (Revision 1) to 2007 RAERs prepared and submitted. |
| Oct. 2008 | Technical Memorandum, ASA-5 East Site EMNA Pilot Study prepared and submitted. |
| Oct. 2008 | Technical Memorandum, Pilot Study at SWMU 21 prepared and submitted. |
| Oct. 2008 | SWMU 17/Building 1429 Pilot Test Work Plan prepared and submitted. |
| Dec. 2008 | SWMU 139 Groundwater RACR prepared and submitted. |
| Jan. 2009 | Basewide Round 21 groundwater sampling event. |
| Jan. 2009 | 2008 Groundwater RAERs prepared and submitted. |
| Jan. 2009 | Revised Groundwater RAPs for SWMU 21 (Revision 2) prepared and submitted. |
| Jan. 2009 | Revised Groundwater RAPs for SWMUs 79/136 Central (Revision 2) prepared and submitted. |
| Jan. 2009 | Revised Groundwater RAP for SWMU 136 South (Revision 4) prepared and submitted. |
| May 2009 | SWMU 21 Pilot Study additional groundwater sampling. |
| May 2009 | SWMU 79/136 Central non-compliant monitoring well groundwater sampling. |
| May 2009 | TCEQ grants conditional approval of the SWMU 139 Groundwater RACR. |
| June 2009 | ASA-5 Pilot Test injection points abandonment. |
| June 2009 | SWMU 35 monitoring well abandonment. |
| July 2009 | Basewide Round 22 groundwater sampling event. |
| Sep. 2009 | SWMU 21 Pilot Study monitoring wells abandonment. |
| Oct. 2009 | Revised Technical Memorandum, SWMU 21 Pilot Study prepared and submitted. |
| Oct. 2009 | SWMU 136 South non-compliant monitoring well groundwater sampling. |
| Nov. 2009 | Response to TCEQ comments on 2008 Groundwater RAERs prepared and submitted. |
| Jan. 2010 | Basewide Round 23 groundwater sampling event. |
| Jan. 2010 | 2009 Groundwater RAERs prepared and submitted. |
| July 2010 | Basewide Round 24 groundwater sampling event. |
| Aug. 2010 | Basewide monitoring well network inspection and five-year survey. |

| | |
|---|---|
| Nov. 2010 | Response to TCEQ comments on 2009 Groundwater RAERs prepared and submitted. |
| Dec. 2010 | Monitoring wells general maintenance and minor repairs completed. |
| Jan. 2011 | Basewide Round 25 groundwater sampling event. |
| Jan. 2011 | 2010 Groundwater RAERs prepared and submitted. |
| March 2011 | Monitor well inspection at SWMU 21/SWMU 18 on monitoring wells within the 20-acre area leased to the Air National Guard. |
| May 2011 | Addendum to Monitoring Well Installation and Abandonment Plan prepared and submitted. |
| June 2011 | SWMU 139 monitoring wells plugged and abandoned. |
| June 2011 | SWMU 81 monitoring wells plugged and abandoned. |
| June 2011 | Repairs, abandonment and replacement of damaged monitoring wells at SWMU 21 and SWMU18. |
| July 2011 | Basewide Round 26 groundwater sampling event. |
| Dec. 2011 | Response to TCEQ comments on 2010 Groundwater RAERs prepared and submitted. |
| Jan. 2012 | Basewide Round 27 groundwater sampling event. |
| March 2013 | 2011 Groundwater RAERs prepared and submitted. |
| July 2012 | Basewide Round 28 groundwater sampling event. |
| Aug. 2012 | U.S. EPA comments to the 2011 Groundwater RAER. |
| Oct. 2012 | TCEQ comments to the 2011 Groundwater RAER. |
| Jan. 2013 | Basewide Round 29 groundwater sampling event. |
| Jan. 2013 | 2012 Groundwater RAERs prepared and submitted. |
| Feb. 2013 | TCEQ comments to the 2012 Groundwater RAER. |
| June 2013 | U.S. EPA comments to the 2012 Groundwater RAER. |
| July 2013 | Basewide Round 30 groundwater sampling event. |
| July 2013 | Response to TCEQ comments on 2012 Groundwater RAERs prepared and submitted. |
| Jan. 2014 | Basewide Round 31 groundwater sampling event. |
| Jan. 2014 | 2013 Groundwater RAERs prepared and submitted. |
| Feb. 2014 | TCEQ comments to the 2013 Groundwater RAER. |
| June 2014 | U.S. EPA comments to the 2013 Groundwater RAER. |
| July 2014 | Basewide Round 32 groundwater sampling event. |
| July 2014 | Response to TCEQ comments on 2013 Groundwater RAERs prepared and submitted. |
| Nov. 2014 | RCRA Permit renewal and Compliance Plan (Number 50276) applications submitted to the TCEQ. |
| Jan. 2015 | Basewide Round 33 groundwater sampling event. |
| Jan. 2015 | 2014 Groundwater RAERs prepared and submitted. |

| | |
|---|---|
| May 2015 | TCEQ Permit Renewal Application Technical Notice of Deficiency (NOD) Letter, dated May 26, 2015. |
| June 2015 | City of Dallas meeting |
| June 2015 | TCEQ comments letter to the 2014 Groundwater RAER, dated June 10, 2015. |
| June 2015 | Submittal of Draft revised RAP for SWMU 17/Building 1429, received June 23, 2015. |
| June 2015 | Response to TCEQ comments to the Response to Permit Renewal Application Technical NOD Letter for Former Dallas Naval Air Station (NAS), Dallas, Texas, dated June 26, 2015. |
| July 2015 | Base-wide Round 34 groundwater sampling event. |
| July 2015 | TCEQ Permit Renewal Application Second Technical Notice of Deficiency Letter, dated July 24, 2015. |
| July 2015 | Response to TCEQ Comments on the Technical Memorandum Pilot Study for SWMU 21, Rev. 1, July 2009 submitted to the TCEQ, dated July 24, 2015. |
| Oct. 2015 | Basewide submittal of Revised and Interim Response Action Plans. |
| Dec. 2015 | Draft Final Enhanced Monitored Natural Attenuation (EMNA) Spot Treatment Workplan for SWMU 18 prepared and submitted to TCEQ. |
| Dec. 2015 | Amendment to the Approved Class V Underground Injection Control (UIC) Permit (5X2600432) prepared and submitted to TCEQ. |
| Jan. 2016 | Basewide Round 35 groundwater sampling event. |
| Jan. 2016 | TCEQ, EPA, and City of Dallas approve EMNA workplan. |
| Jan. 2016 | 2015 Groundwater RAERs prepared and submitted. |
| Jan. 2016 | EMNA Spot Treatment Design Verification Testing at SWMU 18 by Resolution Consultants and Regenesis Remediation Services. |
| March 2016 | Draft Tier II Sampling and Analysis Plan Addendum #1, Long-Term Monitoring Plan Enhanced Monitored Natural Attenuation Spot Treatment at SWMU 18 Former Naval Air Station Dallas, Dallas, Texas prepared and submitted to TCEQ. |
| March 2016 | Amendment to the Approved Class V UIC Permit (5X2600432) prepared and submitted to TCEQ. |
| Apr. 2016 | TCEQ approves UIC amendment request. |
| Apr. 2016 | Basewide monitor well plugging and abandonment and operation and maintenance actions, installation of monitor well 508F98MW in SWMU 79 |
| Apr. 2016 | EMNA Spot Treatment at SWMU 18 baseline groundwater sampling event. |
| May 2016 | EMNA Spot Treatment at SWMU 18 injections by Resolution Consultants and Regenesis Remediation Services. |
| Jul. 2016 | Basewide Round 36 groundwater sampling event. |

| | |
|---|---|
| Aug. 2016 | Deploy passive diffusion bags at EMNA Spot Treatment well 606D152MW. |
| Sep. 2016 | Basewide operations and maintenance activities completed. |
| Sep. 2016 | EMNA Spot Treatment at SWMU 18 first quarterly performance groundwater monitoring event. |
| Sep. 2016 | Draft Tier II Sampling and Analysis Plan Addendum #2, Long-Term Monitoring Plan, Enhanced Monitored Natural Attenuation, Perfluoroalkyl Substances Groundwater Investigation, Former Naval Air Station Dallas, Dallas, Texas prepared and submitted to TCEQ. |

# Checklist for Report Completeness

Use this checklist to determine the portions of the form that must be submitted for this report. Answer all questions by checking Yes or No. If the answer is Yes include that portion of the report. If the answer is No, do not complete or submit that portion of the report. All form contents that are marked "Required" must be submitted. Form contents marked with an asterisk (*) are not included in the blank form and are to be provided by the person.

| | | | Report Contents | |
|---|---|---|---|---|
| | | Required | **Cover Page** | ☒ |
| | | Required | **Executive Summary** | ☒ |
| | | Required | **Checklist for Report Completeness** | ☒ |
| | | Required | **Worksheet 1.0** Response Action Objectives | ☒ |
| | | Required | **Attachment 1A*** Maps and Cross Sections | ☒ |
| | | Required | **Attachment 1B*** Graphs | ☒ |
| | | Required | **Attachment 1C*** Response Action Diagrams | ☐ *N/A* |
| No ☒ | Is a plume management zone being used as part of the response action? | ☐ Yes | **Worksheet 2.0** Plume Management Zone | ☐ |
| | | | **Attachment 2A*** Map of Plume Management Zone | ☐ |
| No ☒ | Was an area of technical impracticability approved for use as part of the response action? | ☐ Yes | **Worksheet 3.0** Technical Impracticability | ☐ |
| | | | **Attachment 3A*** Map of Technical Impracticability | ☐ |
| No ☒ | Are institutional controls used or required as part of the response action? | ☐ Yes | **Worksheet 4.0** Institutional Controls | ☐ |
| | | Required | **Worksheet 5.0** Performance Measures and Problems | ☒ |
| No ☐ | Have any operation and maintenance activities been conducted? | ☒ Yes | **Worksheet 6.0** Operation and Maintenance | ☒ |
| No ☒ | Has there been any change to the plans for post-response action care from that submitted in the RAP? | ☐ Yes | **Worksheet 7.0** Post-Response Action Care | ☐ |
| No ☐ | Was any information for this report obtained from outside sources? | ☒ Yes | **Appendix 1*** References | ☒ |
| No ☒ | Is an ESA and/or Compensatory Restoration being used as part of the response action? | ☐ Yes | **Appendix 2*** ESA and Compensatory Restoration | ☐ |

| Checklist for Report Completeness | ID No. *SWR 65033* *SWMU 17/Building 1429 Plume* | Report Date: *01/17/2017* |
|---|---|---|

| | | | | |
|---|---|---|---|---|
| No ☒ | Are institutional controls or landowner concurrence required in the response action? | ☐ Yes → | **Appendix 3*** Institutional Controls and Landowner Concurrence | ☐ |
| No ☐ | Is there data or boring/monitor well information not previously submitted? | ☒ Yes | **Appendix 4*** Data Tables, Boring Logs, and Well Completions | ☒ |
| No ☒ | Did sampling procedures differ from those described in the RAP? | ☐ Yes → | **Appendix 5*** Sampling Procedures | ☐ |
| No ☐ | Has any sampling been conducted for which the analytical results were not previously submitted? | ☒ Yes → | **Appendix 6*** Laboratory Data Packages | ☒[1] |
| No ☐ | Were statistics or geostatistics used in the response action? | ☒ Yes → | **Appendix 7*** Statistical Methodology | ☒[2] |
| No ☐ | Were any wastes generated that were not reported through STEERS? | ☒ Yes → | **Appendix 8*** Waste Disposition | ☒ |

***Notes:***

[1] Included with 2016 RAER in CD format.

[2] Included with 2016 RAER for SWMU 17/Building 1423.

Use this worksheet to describe the response action objectives in each media.

## Response Action Objectives — SWMU 17/Building 1429 Plume

What is the selected remedy standard for this affected property? *X* A ____ B

List the environmental media to which this applies *Groundwater*

Repeat this section for each medium that had a different response action objective.

Provide a detailed description of the response action. Describe the removal actions, decontamination actions, treatment system(s), and/or physical or institutional control actions that have been conducted in each media and indicate if there were any differences between the actions taken and the actions proposed in the SIN or RAP.

**The groundwater response action for the site consists of MNA as a decontamination remedy to reduce the concentration of COCs to less than their critical PCLs by the established 2017 remedial cleanup goal. MNA includes the following elements:**

- **Decontamination through the ongoing biological and chemical reductive dechlorination process.**
- **A monitoring/confirmation sampling program to evaluate the progress of the decontamination.**

**During the implementation of the response action activities, there has been and will continue to be controlled access to the site, which will limit potential exposures to contaminated groundwater (i.e., no potable or irrigation wells will be installed) through 2017. Additionally, the fate and transport modeling results in the Final MNA Groundwater Monitoring Report for Category D (Tetra Tech, 2004) predicted that there would be no expansion of the PCLE zone or offsite migration of COCs at concentrations greater than the respective critical groundwater PCLs. Because this decontaminating remedy is based on an in-situ technology, the potential short-term exposures normally associated with the implementation of ex-situ technologies (i.e., dermal and inhalation exposures) are not a concern.**

Describe how the response action has, or is working towards, achievement of the property-specific response objectives for the PCLE zone in each medium in the context of the response objectives set forth in §350.32 or §350.33, as applicable. Explain how the response action is appropriate based on the hydrogeologic and COC characteristics. Describe any unprotective conditions that continued or resulted from the remedial actions and the actions taken to mitigate unprotective conditions.

**The Navy originally proposed to utilize MNA as the response action for the contaminated groundwater in the PCLE zone to meet groundwater response objectives of §350.32, thereby reducing the concentration of COCs within the PCLE zone to less than their critical PCLs. The primary mechanisms for natural attenuation of CVOCs rely on the capacity of the groundwater system to reduce COC concentrations. The attenuation process can include biodegradation, dispersion, dilution, and adsorption of contaminates in site groundwater. A re-evaluation of plume dynamics was presented in an AER (Resolution Consultants, 2013), and a determination was made that MNA alone would not effectively reduce the concentrations of COCs in groundwater for the southern portion of the plume to achieve remedial goals by the year 2017.**

**Given that the remedy (MNA) selected in the 2006 Groundwater RAP (Revision 2) at SWMU 17/Building 1429 will not achieve the critical PCLs within the timeframe specified, a comprehensive RAP will be submitted based upon the outcome of the spot treatment/EMNA at SWMU 18.**

If different from the information provided in the RAP, explain how the COCs have been handled, treated, disposed, or transferred to another medium and document that the response action has not resulted in any additional exposure conditions due to response action activities.

*N/A*

Explain whether the response action is achieving, or will achieve, the objectives within the reasonable time frame.

**The strongest evidence for natural attention is the reduction of COC concentrations observed in samples from monitoring wells over the period of record and the apparent stability of the plume. Specifically, natural attenuation has reduced concentrations of TCE, cis-DCE, and VC in monitoring wells located in the northern portion of the plume (603D71MWand 61201MW, ) to levels below their respective critical groundwater PCLs. Data continues to provide indication that effective remediation through MNA is occurring in the northern portion of the plume.**

**Concentrations of COCs in the southern portion of the plume continue to show progress towards clean-up goals. However, TCE concentration versus (vs.) time attenuation rate ($K_{time}$) data (Table 4-4) for southern plume wells do not indicate that remedial clean-up goals will be achieved in the specified timeframe. In addition, linear regression modeling of site data, which display the best estimate of the "true" line through the data, indicate that attenuation of TCE in southern groundwater monitoring wells will not be adequate to reach PCL goals. It should be noted that overall decreasing trends in COCs indicate that progress of the MNA response action is occurring.**

**Maps in Attachment 1A, data tables in Appendix 4, and graphs in Attachment 1B show a considerably smaller PCLE zone footprint than that presented in the Groundwater RAP (Revision 2) (Tetra Tech, 2006).**

Are physical controls part of the response action? ____ Yes _X_ No

If yes, describe the type and purpose of the physical control and discuss how the physical control has proven effective.

*N/A*

## Soil Response Action Objectives

When using removal and/or decontamination with controls or controls only, demonstrate that the physical control or combination of measures is reliably containing, and will continue to contain, COCs within and/or derived from the surface soil and subsurface soil PCLE zone materials over time.

*N/A*

Explain how the removal or decontamination action is reducing the concentration of COCs to the critical surface soil and subsurface soil PCL throughout the soil PCLE zone and preventing COC concentrations above the critical soil PCLs from migrating beyond the original boundary of the soil PCLE zone.

*N/A*

## Groundwater Response Action Objectives — SWMU 17/Building 1429 Plume

Name of groundwater-bearing unit to which this information applies *Upper Water Bearing Zone (Alluvial Overburden)*

Repeat this section for each groundwater-bearing unit for which a different response action is being conducted.

Groundwater Classification ____ 1 _X_ 2 ____ 3

Is a modified groundwater response action being used for any part of the groundwater PCLE zone (§350.33(f)(2), (3), or (4))? ____ Yes _X_ No

If yes, complete the appropriate portions of this report.

Explain how the removal or decontamination actions are reducing the concentration of COCs to the critical groundwater PCL throughout the groundwater PCLE zone and preventing COC concentrations above the critical groundwater PCL from migrating beyond the original boundary of the groundwater PCLE zone. If COC concentrations above the critical groundwater PCL have ever migrated beyond the original boundary of the groundwater PCLE zone, explain the actions taken to address the increase in the PCLE zone.

**The strongest evidence for natural attention is the reduction of contaminant levels observed in samples from monitoring wells over the period of record, the apparent stability of the plume, and lack of migration of COCs beyond the boundary of the PCLE zone. Specifically, natural attenuation has reduced concentrations of TCE, cis-DCE, and VC in monitoring wells located in the northern portion of the plume (603D71MW, 61201MW, and 61201MW) to levels below respective critical groundwater PCLs. Data continues to provide indication that effective remediation through MNA is occurring in the northern portion of the plume.**

**Concentrations of COCs in the southern portion of the plume continue to show progress towards clean-up goals. However, TCE concentration vs. time attenuation rate ($K_{time}$) data (Table 4-4) for southern plume wells do not indicate that remedial clean-up goals will be achieved in the specified timeframe. In addition, linear regression modeling of site data, which display the best estimate of the "true" line through the data, indicate that attenuation of TCE in southern groundwater monitoring wells will not be adequate to reach PCL goals. It should be noted that overall decreasing trends in COCs indicate that progress of the MNA response action is occurring**

**Maps in Attachment 1A, data tables in Appendix 4, and graphs in Attachment 1B show a smaller PCLE zone footprint than that presented in the RAP (Tetra Tech, 2006).**

Explain how the response actions are preventing COCs from migrating to air at concentrations above the PCLs for air if the groundwater-to-air PCLs ($^{Air}GW_{Inh-V}$) were exceeded.

**The maximum observed concentrations of the detected groundwater COCs in the PCLE zone are less than their respective $^{Air}GW_{Inh-V}$ PCLs.**

Explain how the response actions are preventing COCs from migrating to surface water at concentrations above the PCLs for groundwater discharges to surface water if surface water was a factor.

**As shown in the Groundwater RAP (Revision 2) (Tetra Tech, 2006), surface water is not a factor. Additionally, the fate and transport modeling results (Tetra Tech, 2004) indicate that the PCLE zone will not migrate beyond the Former NAS Dallas property line; therefore, there will be no threat to offsite human or ecological receptors.**

Explain how the response actions are preventing human and ecological receptor exposure to the groundwater PCLE zone.

**The response action is based on an in-situ technology that will permanently degrade the COCs. During the implementation of the in-situ groundwater response action, access to the site will be controlled by not permitting any potable or irrigation wells in the PCLE zone during remedial activities. Additionally, the fate and transport modeling results (Tetra Tech, 2004) indicate that the PCLE zone will not migrate beyond the Former NAS Dallas property line; therefore, there will be no threat to offsite human or ecological receptors.**

## Waste Management

Describe the volume and final disposition or reuse location of waste or environmental media that has been removed from the affected property during the response action, if not previously reported under STEERS. Provide copies of all manifests, other documentation of disposition, and landowner consent for reuse of soil in Appendix 8.

| |
|---|
| **Excess groundwater recovered through the low-flow or PDB sampling methods is placed into properly labeled 55-gallon capacity drums and stored at the site. Upon classification, waste disposal arrangements are made with a licensed waste disposal facility. Appendix 8 contains copies of the waste disposal manifests for groundwater generated during the 2016 sampling activities at Former NAS Dallas.** |

# ATTACHMENT 1A
# MAPS AND CROSS SECTIONS

# AFFECTED PROPERTY MAP

Affected Property Map
Former NAS Dallas, Texas

January 2014 Isocontour
Gross PCLE Zone Outline
Demolished Building
Existing Structure
Owned by City of Dallas
Transferred from Exelon Corporation to City of Dallas
Transferred from Navy to City of Dallas
Transferred from Navy to City of Grand Prairie
Transferred from Navy to U.S. Army Reserve
Owned by Exelon Corporation

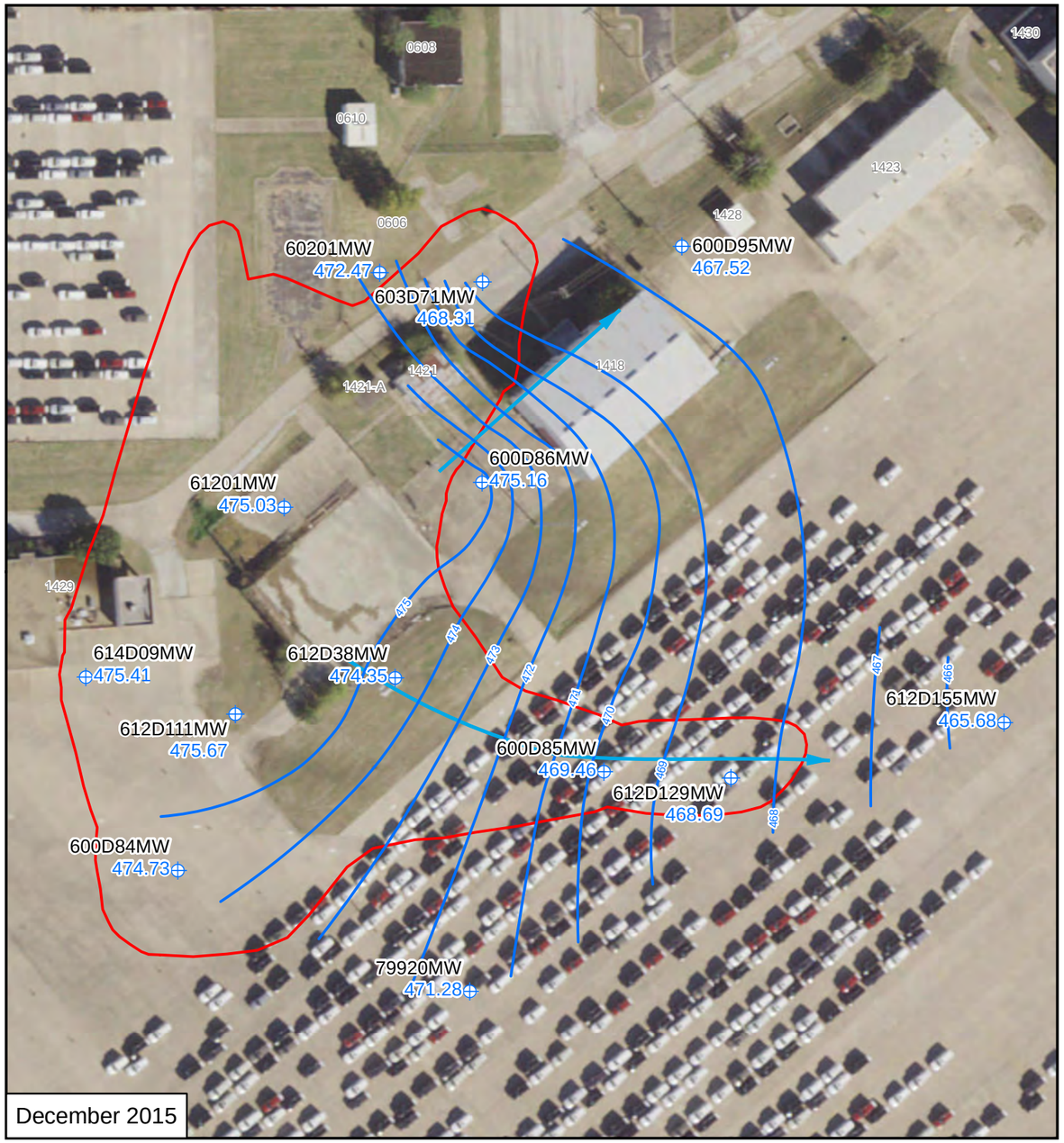
NAVFAC Naval Facilities Engineering Command

| | |
|---|---|
| REQUESTED BY: T. Wiberg | DATE: 9/21/2015 |
| DRAWN BY: A. Zimmerman | PROJECT NUMBER: 0888812796 |

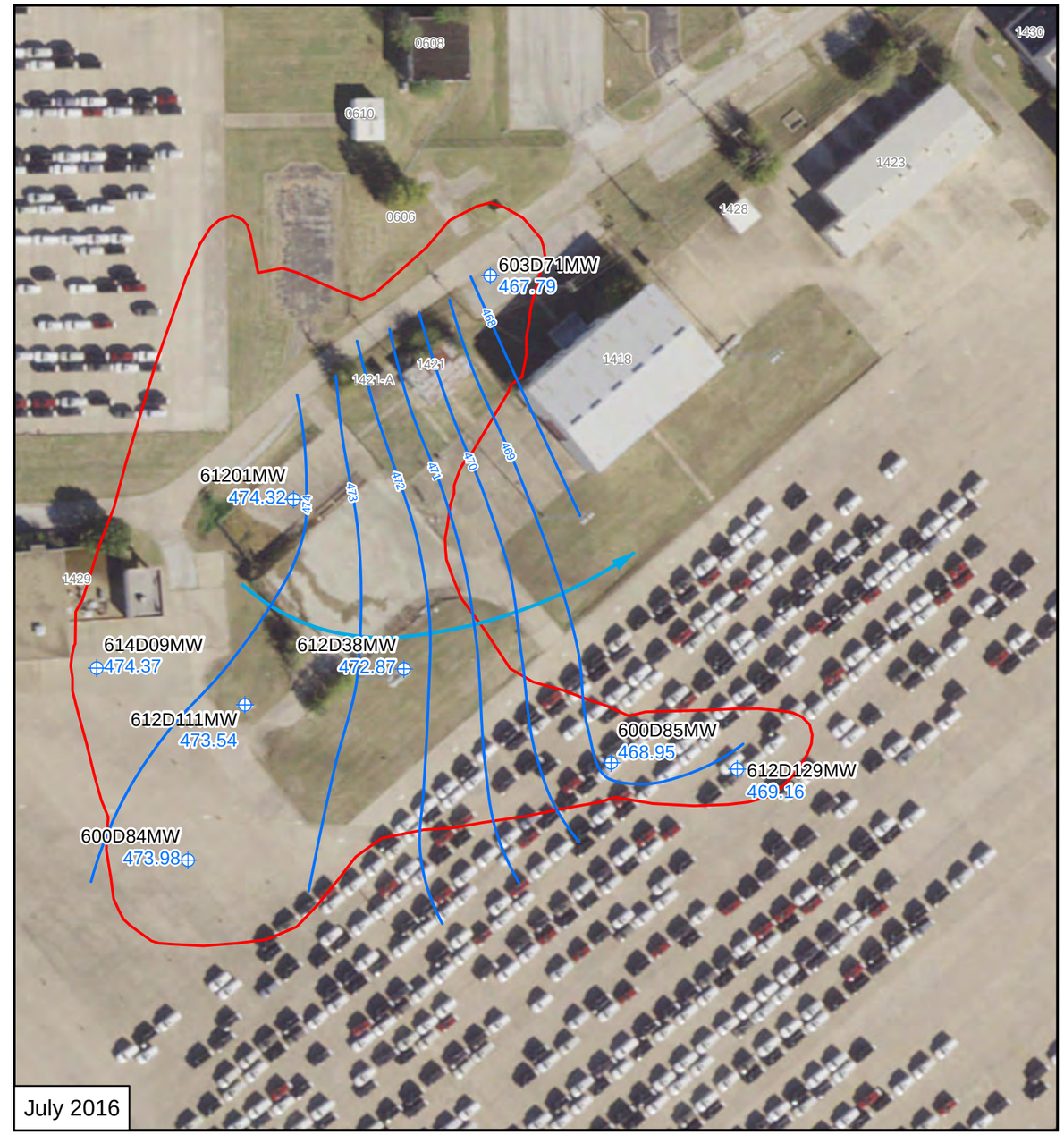
X:\Navy\NAS_Dallas\NAS_Dallas_Jan14_AffectedPropMap.mxd

Service Layer Credits: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community; State boundary is from the United States Census Bureau; Some data are from TetraTech.

# POTENTIOMETRIC SURFACE MAPS




December 2015




July 2016

N

Well Location

Potentiometric Surface Contour

Groundwater Flow Direction

Gross PCLE Zone Outline

Demolished Building

Notes:
473.98 - Potentiometric Surface Contour (Feet above MSL)
* Anomalous water level not used to construct contours

0 50 100 150 200 Feet

Figure 1A-3
Potentiometric Surface Map
SWMU 17 / Building 1429 Plume
2016 RAER
Former NAS Dallas, Texas

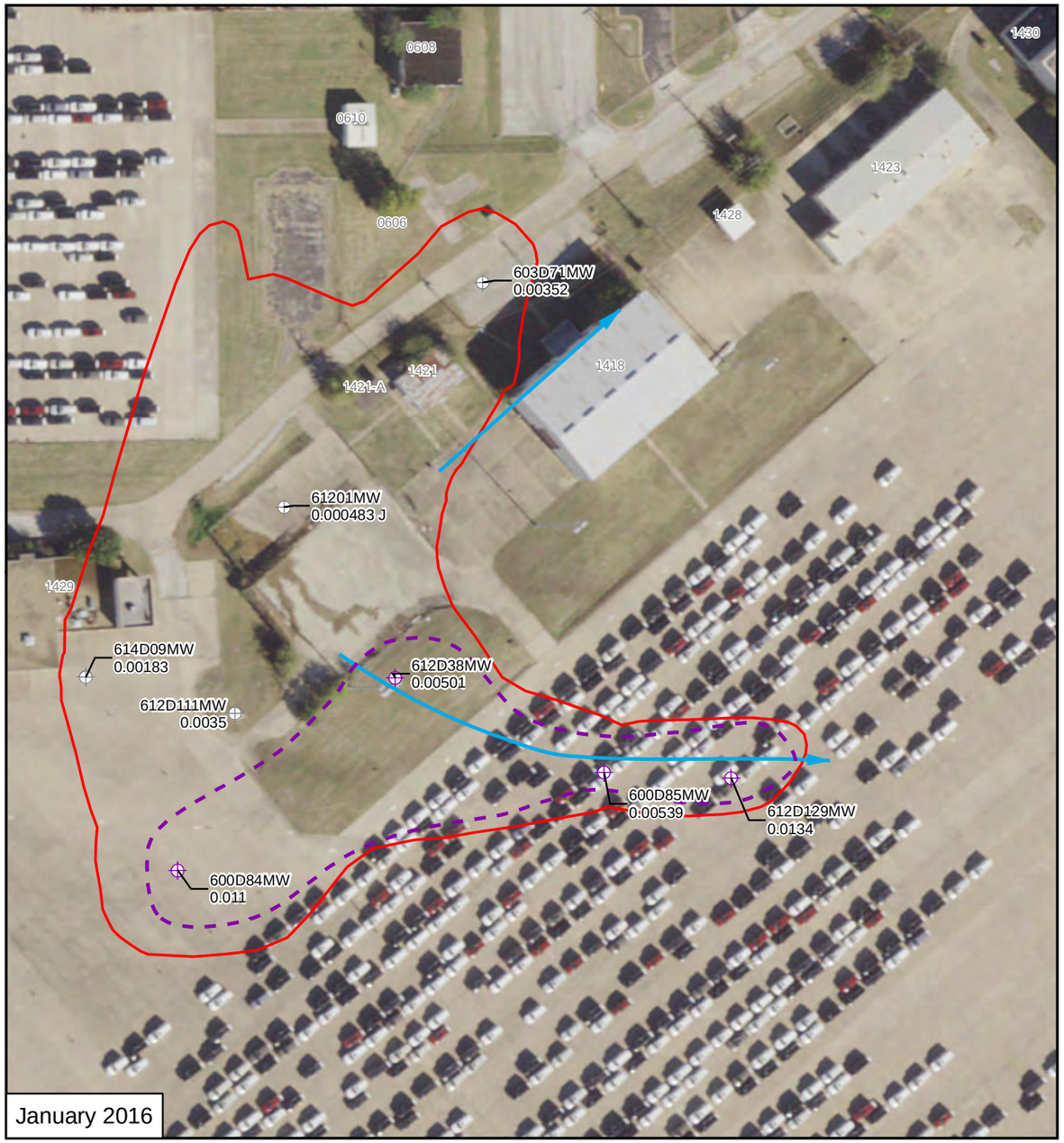
NAVFAC Naval Facilities Engineering Command

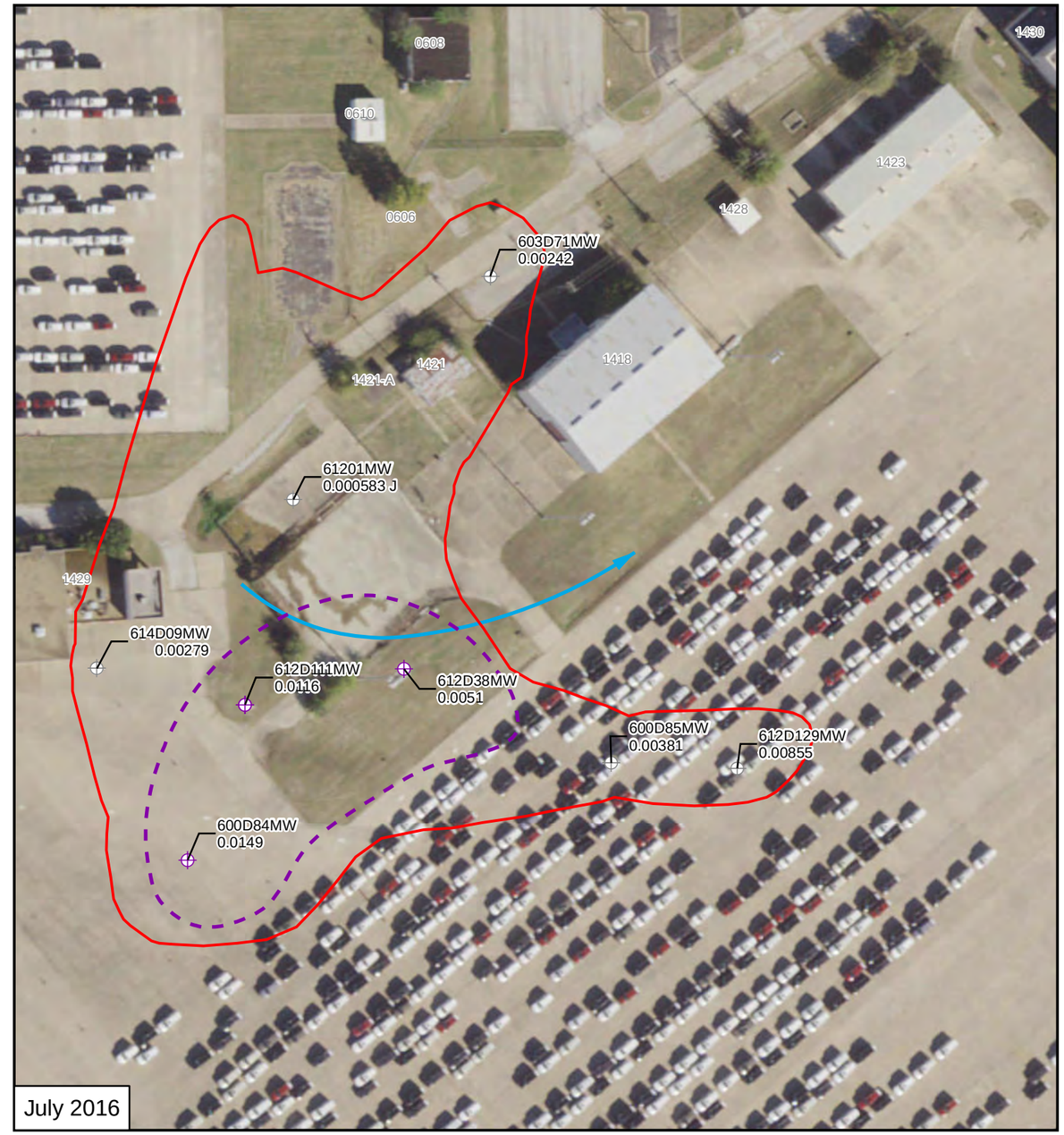
| | |
|---|---|
| REQUESTED BY: E. Brickman | DATE: 10/17/2016 |
| DRAWN BY: M. Senne | PROJECT NUMBER: 0888812796 |

X:\Navy\NAS_Dallas\2016_Jul_NAS_Dallas_Iso_POT_SWMU17_Building1429.mxd

Service Layer Credits: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community

# ISOCONCENTRATION CONTOUR MAPS




N

**TCE Concentration (mg/L)**

- ND - 0.005
- > 0.005 - 0.05
- > 0.05 - 0.5
- Gross PCLE Zone Outline
- Groundwater Flow Direction

**Isoconcentration Contours**

- 0.005 mg/L
- Demolished Building

Note: The PCL for TCE = 0.005 mg/L

0 50 100 150 200 Feet

Figure 1A-2A
Trichloroethene Isoconcentration Contours
SWMU 17 / Building 1429 Plume
2016 RAER
Former NAS Dallas, Texas

NAVFAC Naval Facilities Engineering Command

| | |
|---|---|
| REQUESTED BY: E. Brickman | DATE: 11/17/2016 |
| DRAWN BY: M. Senne | PROJECT NUMBER: 0888812796 |

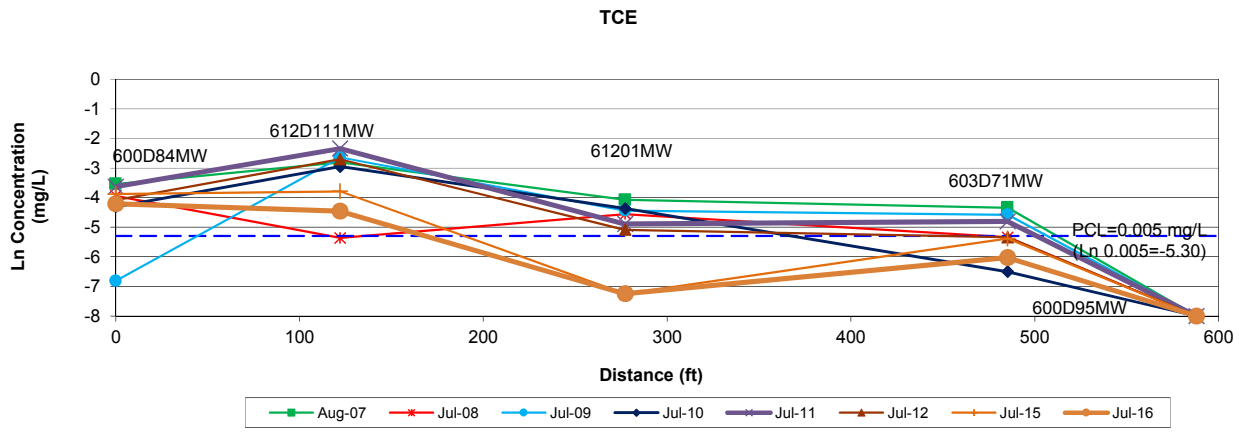
X:\Navy\NAS_Dallas\project\2016_RAER\2016_Jul_NAS_Dallas_Iso_TCE_SWMU17_Building1429Plume.mxd

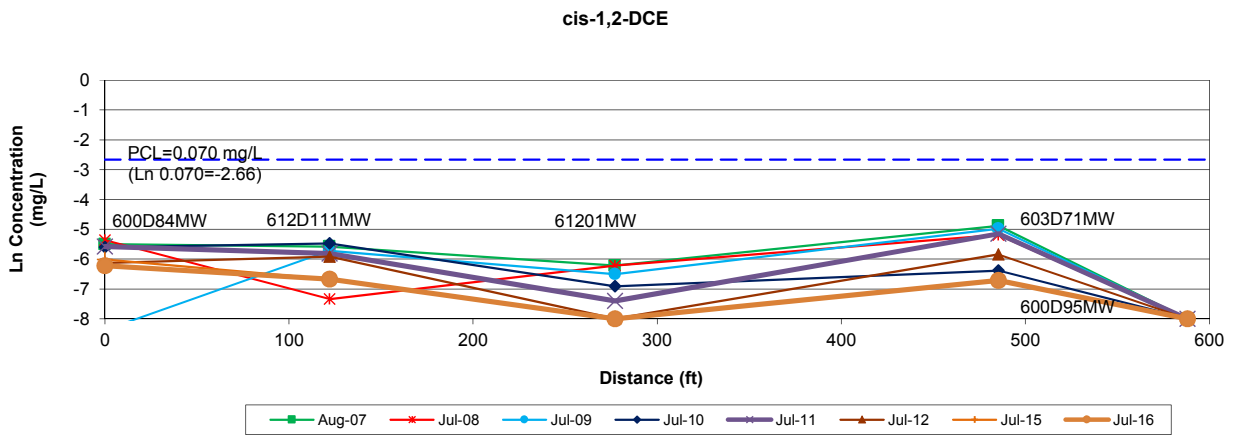
Service Layer Credits: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

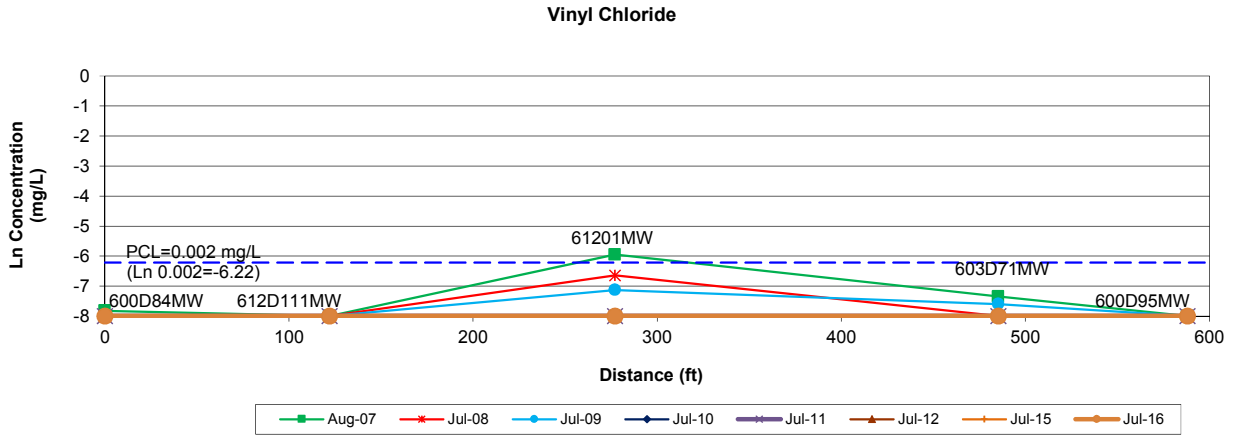
# ATTACHMENT 1B
# GRAPHS

# CONCENTRATION VS. DISTANCE GRAPHS
# SWMU 17/BUILDING 1429 PLUME
# NORTHEAST CENTERLINE
# 2016

## FORMER NAS DALLAS, TEXAS



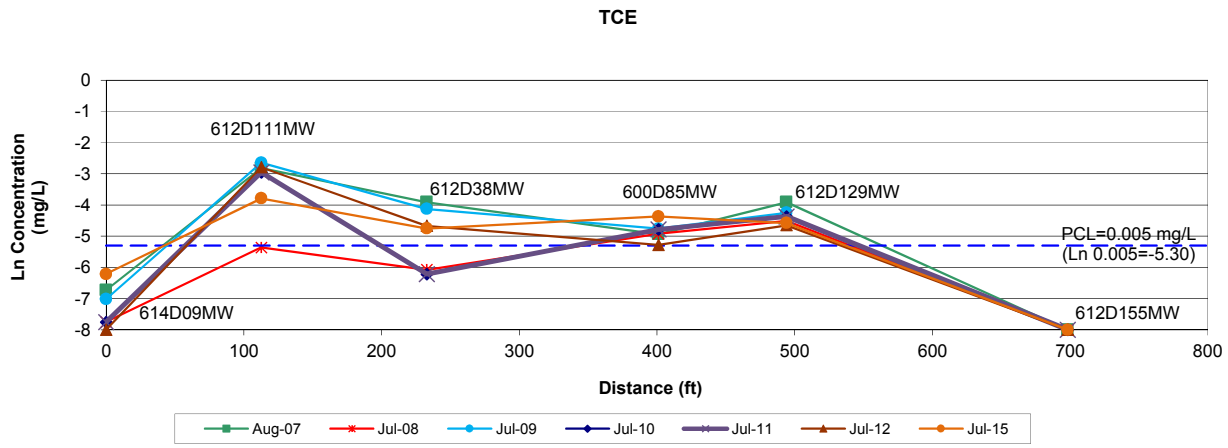



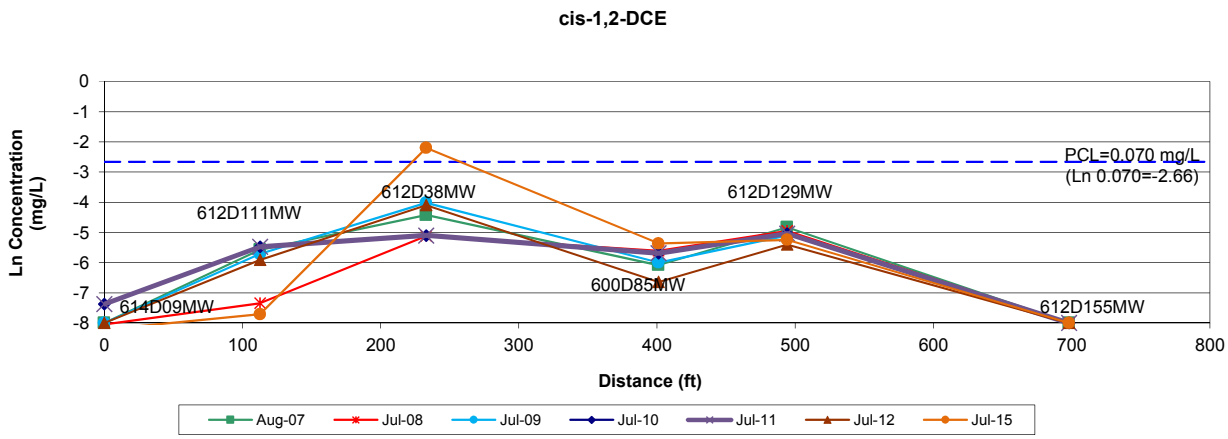



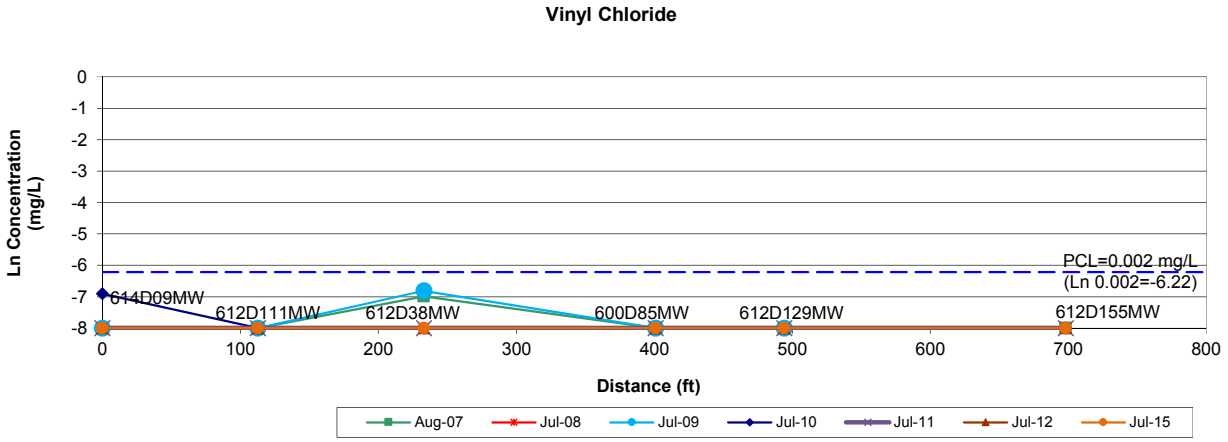

Notes: Graphed data points are taken from raw data.
Sample events using passive diffusion bag (PDB) samplers are listed on Tables 2-1A and 2-1B in Appendix 2.

# CONCENTRATION VS. DISTANCE GRAPHS
# SWMU 17/BUILDING 1429 PLUME
# SOUTHEAST CENTERLINE
# 2016

## FORMER NAS DALLAS, TEXAS



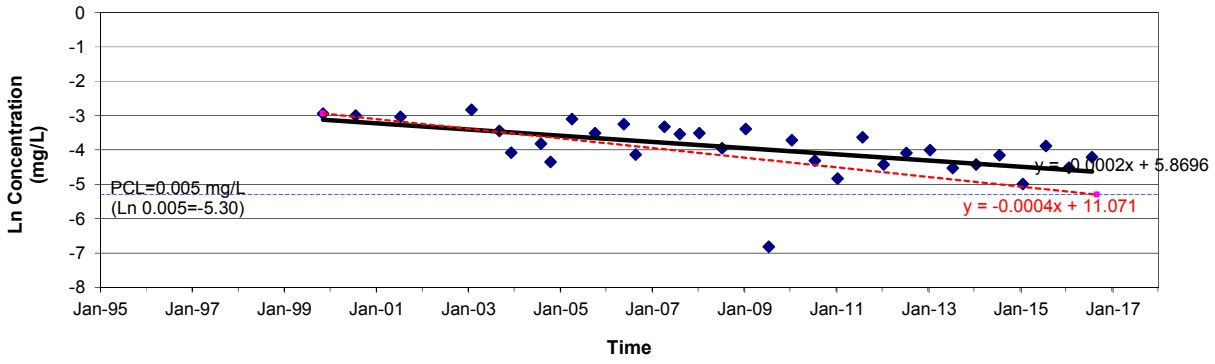




Notes: Graphed data points are taken from raw data.
Sample events using passive diffusion bag (PDB) samplers are listed on Tables 2-1A and 2-1B in Appendix 2.

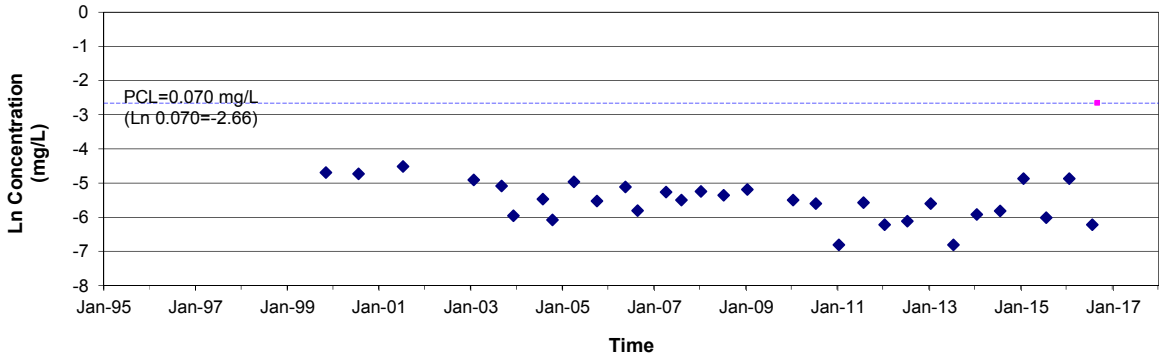
**CONCENTRATION VS. TIME GRAPHS**
**WITH MINIMUM REQUIRED ATTENUATION RATE**
**SWMU 17/BUILDING 1429 PLUME**
**600D84MW**
**2016**

**FORMER NAS DALLAS, TEXAS**

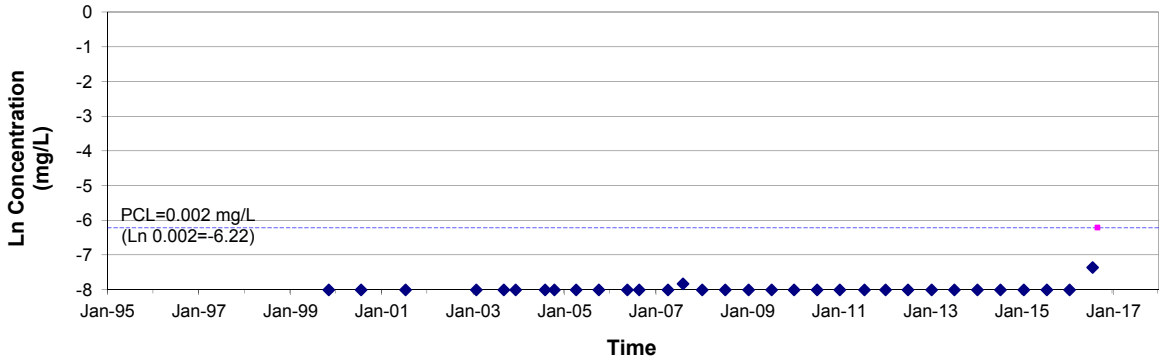
**TCE**




**cis-1,2-DCE**




**Vinyl Chloride**

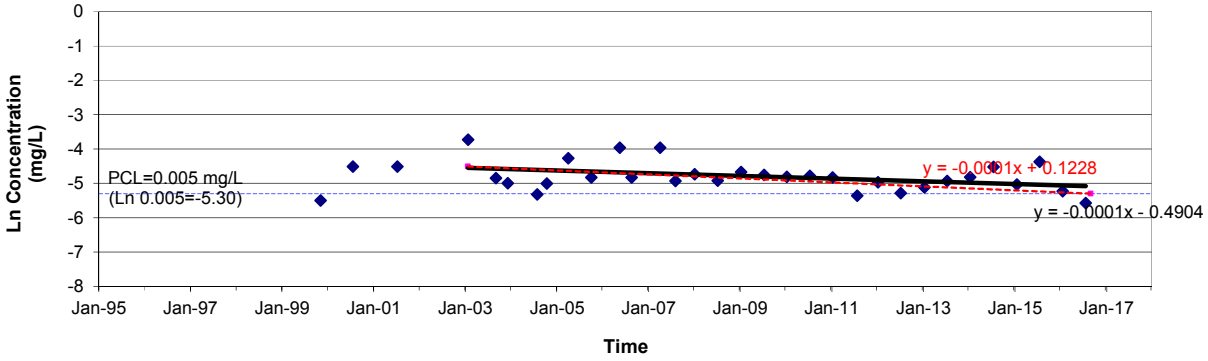



Notes: Red line and slope are based on minimum required attenuation rate ($k_{time}$) to meet PCL by 01 Sep 2016.
Black line and slope are based on linear regression of the raw data.
Sample events using permeable diffusion bag (PDB) samplers are listed on Tables 2-1A and 2-1B in Appendix 2.

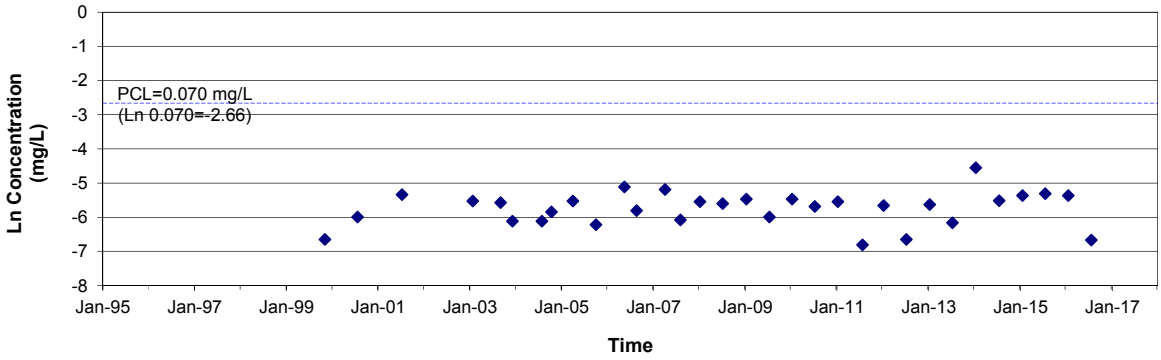
**CONCENTRATION VS. TIME GRAPHS**
**WITH MINIMUM REQUIRED ATTENUATION RATE**
**SWMU 17/BUILDING 1429 PLUME**
**600D85MW**
**2016**

**FORMER NAS DALLAS, TEXAS**

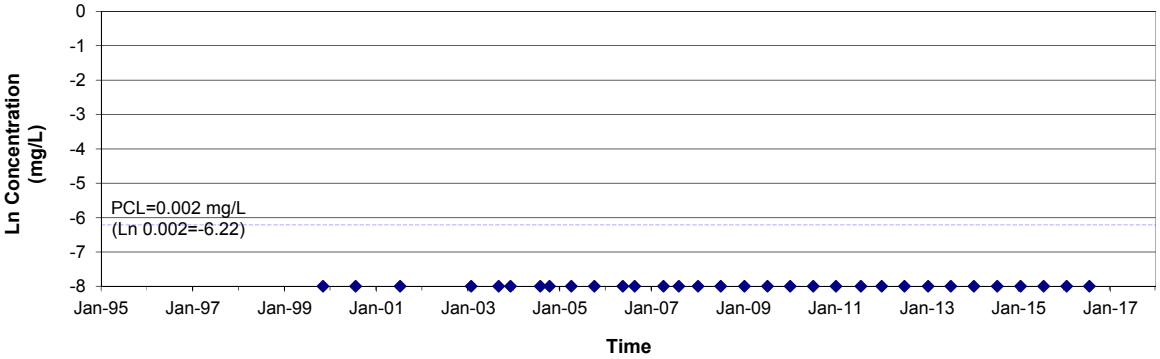
**TCE**




**cis-1,2-DCE**




**Vinyl Chloride**

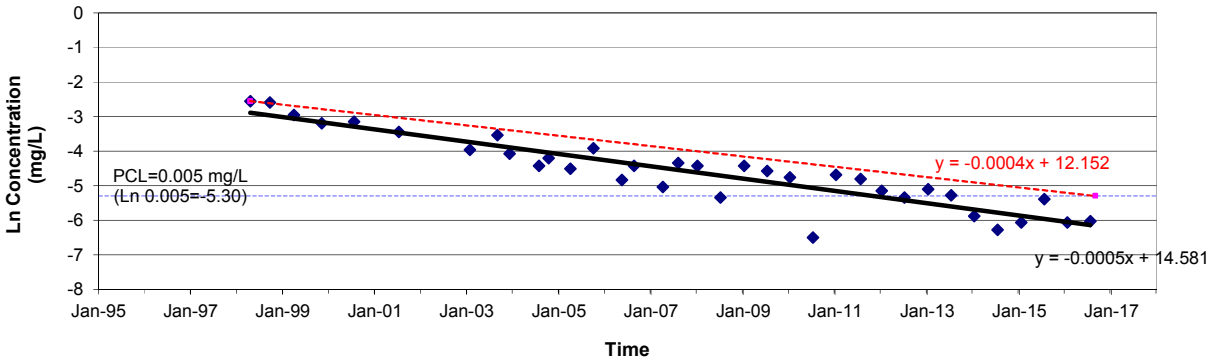



Notes: Red line and slope are based on minimum required attenuation rate ($k_{time}$) to meet PCL by 01 Sep 2016.
Black line and slope are based on linear regression of the raw data.
Sample events using permeable diffusion bag (PDB) samplers are listed on Tables 2-1A and 2-1B in Appendix 2.

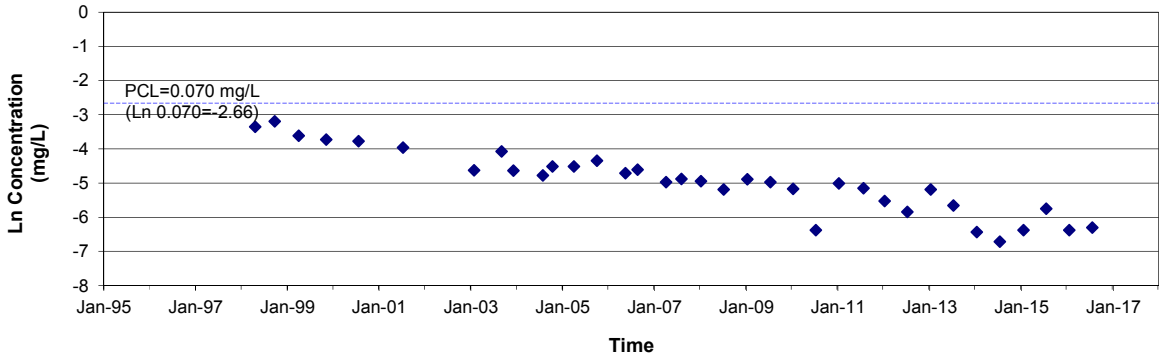
**CONCENTRATION VS. TIME GRAPHS**
**WITH MINIMUM REQUIRED ATTENUATION RATE**
**SWMU 17/BUILDING 1429 PLUME**
**603D71MW**
**2016**

**FORMER NAS DALLAS, TEXAS**

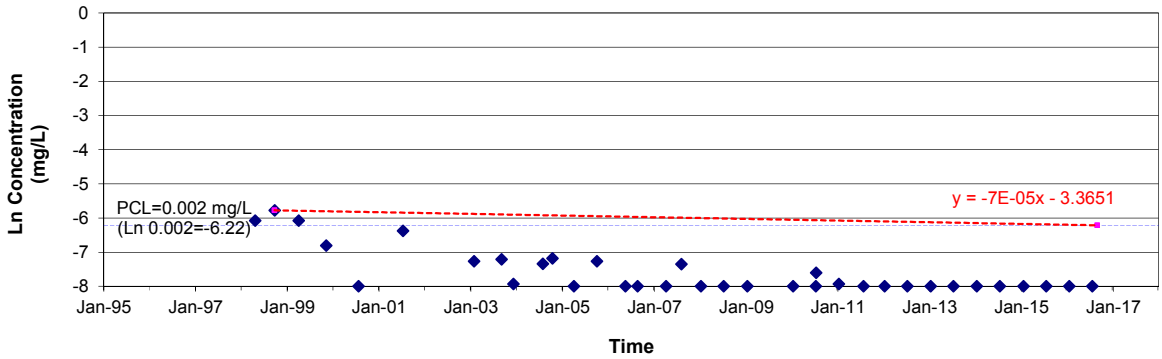
**TCE**




**cis-1,2-DCE**




**Vinyl Chloride**

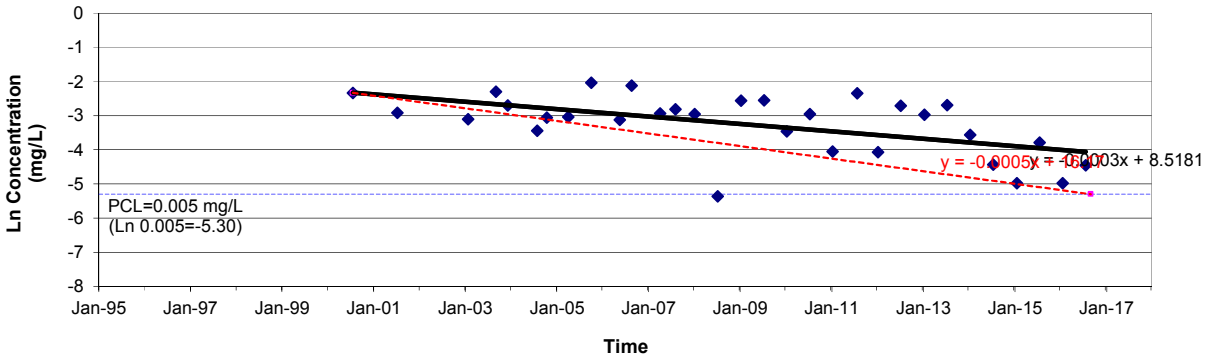



Notes: Red line and slope are based on minimum required attenuation rate ($k_{time}$) to meet PCL by 01 Sep 2016.
Black line and slope are based on linear regression of the raw data.
Sample events using permeable diffusion bag (PDB) samplers are listed on Tables 2-1A and 2-1B in Appendix 2.

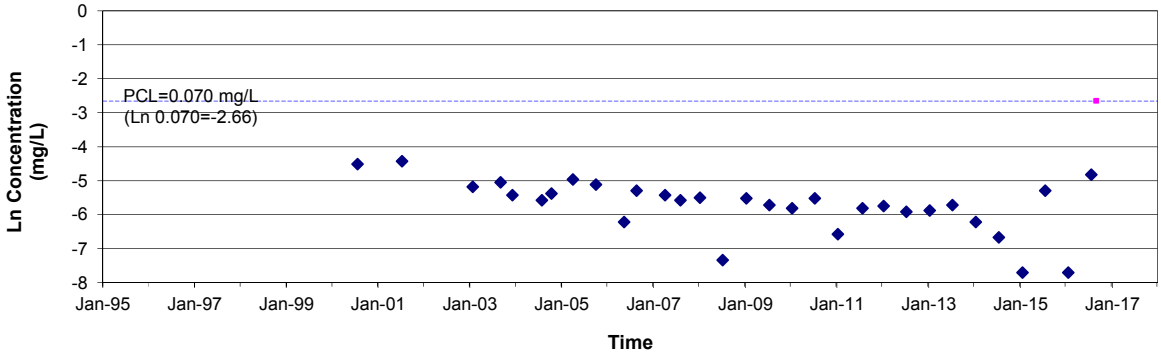
**CONCENTRATION VS. TIME GRAPHS**
**WITH MINIMUM REQUIRED ATTENUATION RATE**
**SWMU 17/BUILDING 1429 PLUME**
**612D111MW**
**2016**

**FORMER NAS DALLAS, TEXAS**

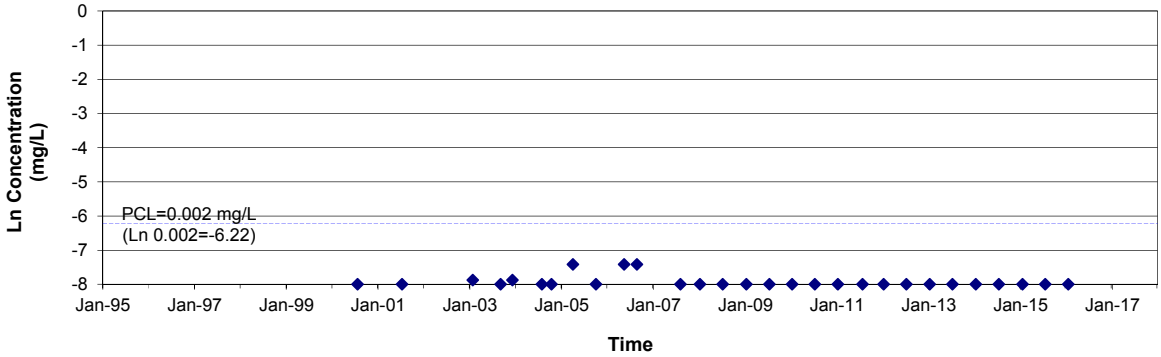
**TCE**




**cis-1,2-DCE**




**Vinyl Chloride**

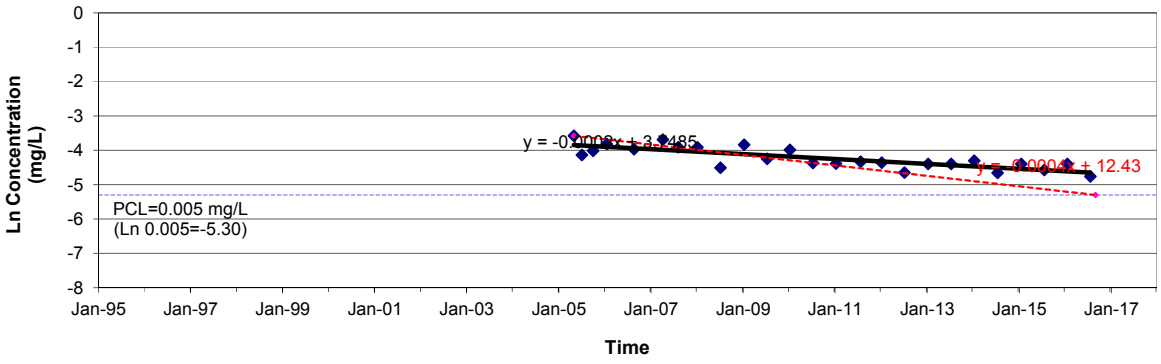



Notes: Red line and slope are based on minimum required attenuation rate ($k_{time}$) to meet PCL by 01 Sep 2016.
Black line and slope are based on linear regression of the raw data.
Sample events using permeable diffusion bag (PDB) samplers are listed on Tables 2-1A and 2-1B in Appendix 2.

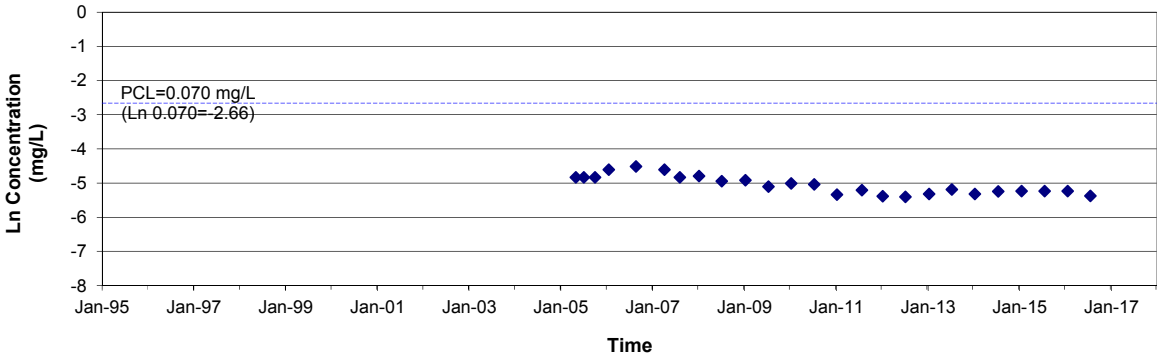
# CONCENTRATION VS. TIME GRAPHS
# WITH MINIMUM REQUIRED ATTENUATION RATE
# SWMU 17/BUILDING 1429 PLUME
# 612D129MW
# 2016

## FORMER NAS DALLAS, TEXAS

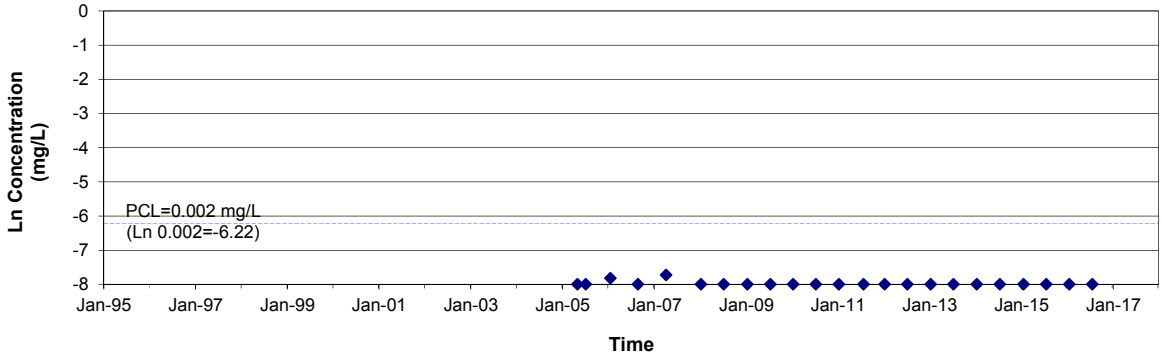
### TCE




### cis-1,2-DCE




### Vinyl Chloride

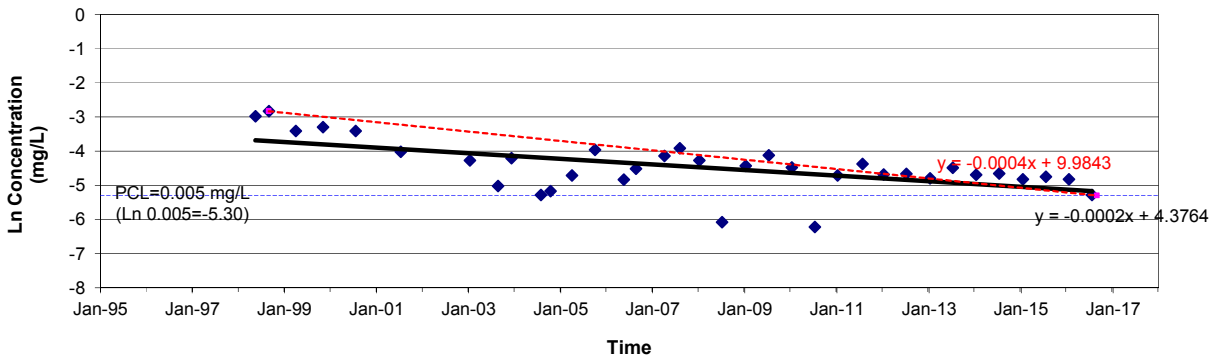



Notes: Red line and slope are based on minimum required attenuation rate ($k_{time}$) to meet PCL by 01 Sep 2016.
Black line and slope are based on linear regression of the raw data.
Sample events using permeable diffusion bag (PDB) samplers are listed on Tables 2-1A and 2-1B in Appendix 2.

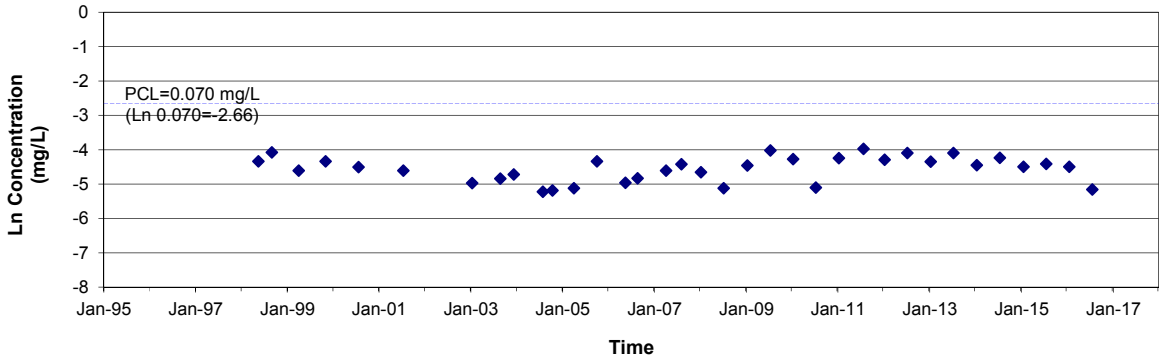
**CONCENTRATION VS. TIME GRAPHS**
**WITH MINIMUM REQUIRED ATTENUATION RATE**
**SWMU 17/BUILDING 1429 PLUME**
**612D38MW**
**2016**

**FORMER NAS DALLAS, TEXAS**

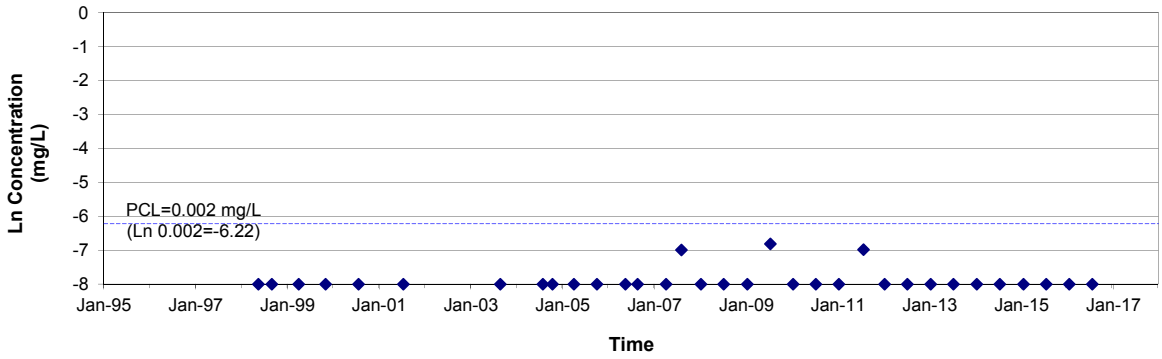
**TCE**




**cis-1,2-DCE**




**Vinyl Chloride**

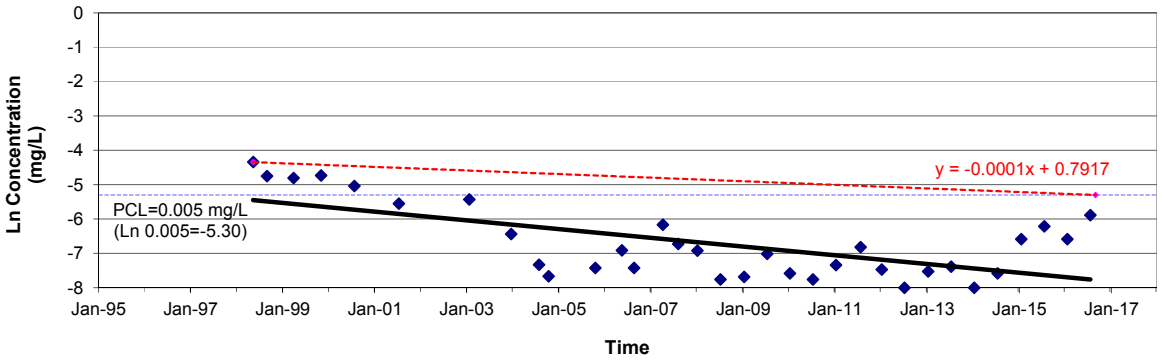



Notes: Red line and slope are based on minimum required attenuation rate ($k_{time}$) to meet PCL by 01 Sep 2016.
Black line and slope are based on linear regression of the raw data.
Sample events using permeable diffusion bag (PDB) samplers are listed on Tables 2-1A and 2-1B in Appendix 2.

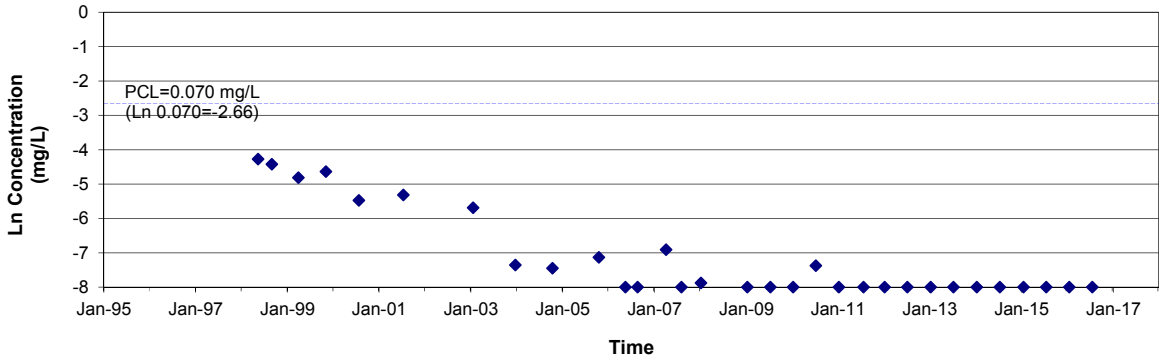
**CONCENTRATION VS. TIME GRAPHS**
**WITH MINIMUM REQUIRED ATTENUATION RATE**
**SWMU 17/BUILDING 1429 PLUME**
**614D09MW**
**2016**

**FORMER NAS DALLAS, TEXAS**

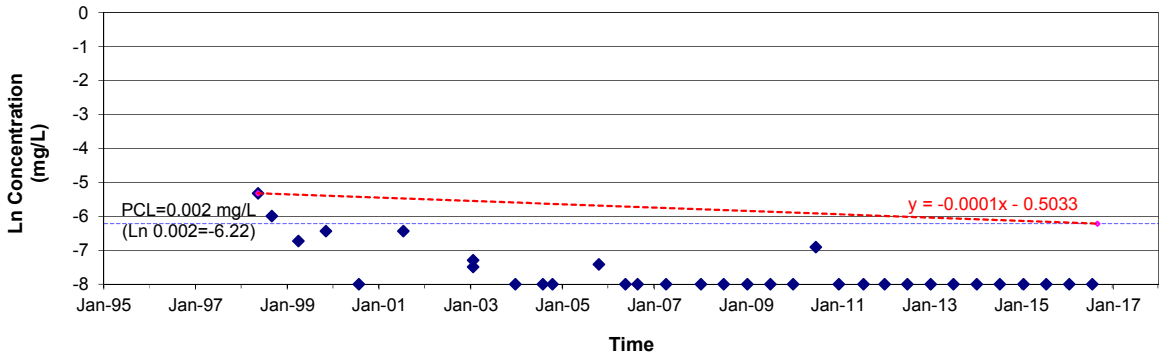
**TCE**




**cis-1,2-DCE**




**Vinyl Chloride**

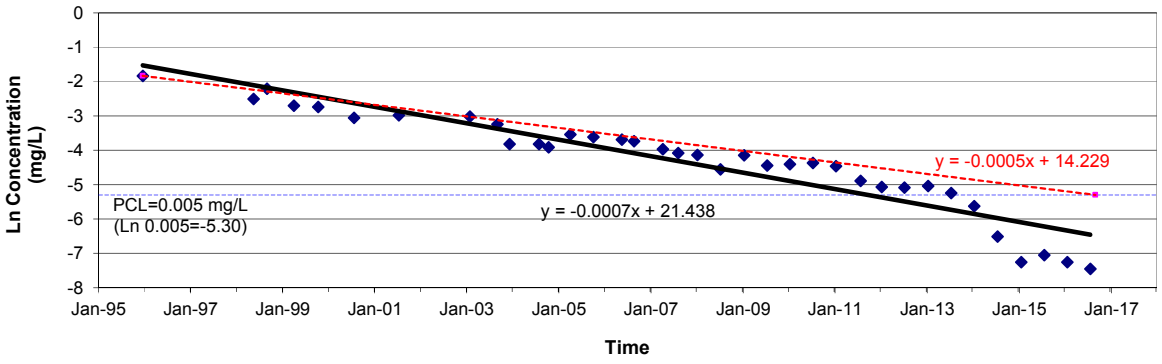



Notes: Red line and slope are based on minimum required attenuation rate ($k_{time}$) to meet PCL by 01 Sep 2016.
Black line and slope are based on linear regression of the raw data.
Sample events using permeable diffusion bag (PDB) samplers are listed on Tables 2-1A and 2-1B in Appendix 2.

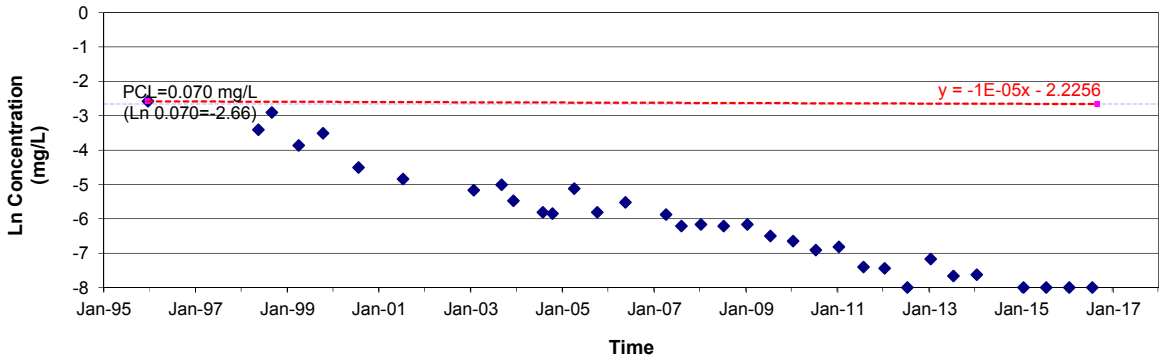
**CONCENTRATION VS. TIME GRAPHS**
**WITH MINIMUM REQUIRED ATTENUATION RATE**
**SWMU 17/BUILDING 1429 PLUME**
**61201MW**
**2016**

**FORMER NAS DALLAS, TEXAS**

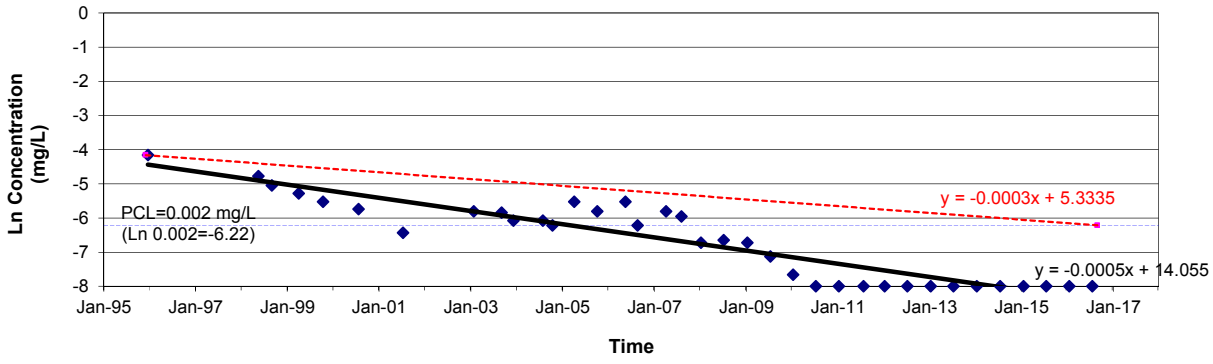
**TCE**




**cis-1,2-DCE**




**Vinyl Chloride**




Notes: Red line and slope are based on minimum required attenuation rate ($k_{time}$) to meet PCL by 01 Sep 2016.
Black line and slope are based on linear regression of the raw data.
Sample events using permeable diffusion bag (PDB) samplers are listed on Tables 2-1A and 2-1B in Appendix 2.

## Performance Measures

List and describe the performance measures for each environmental medium containing a PCLE zone that are being used to determine if reasonable progress is being made by the response action in a timely manner. Provide documentation that these performance measures are being met. Attach additional information if necessary.

**Performance Measures**

**The approach to determine if MNA is consistently achieving the clean-up goals by 2017 involves sequential sampling events to monitor the size and shape of the PCLE zone over time. To this effect, a tiered sampling program incorporating performance, detection, and ambient monitoring was implemented. This sampling program allows collection of analytical data on the COCs, groundwater flow, and geochemical parameters that may affect the progress of MNA and the likelihood of meeting site remediation goals. The design of the monitoring program allows a conclusion of success or failure to be drawn as early as possible during the response action implementation while providing reasonable confidence in the conclusion.**

**Performance monitoring encompasses the sampling of the point of exposure (POE) wells (603D71MW 608D84MW, 608D85MW, 61201MW, 612D38MW, 612D111MW, and 612D129MW) and the background monitoring well (614D09MW). Data collected from these monitoring wells serves to check the plume shape and determine if it is shrinking or expanding, stable or migrating, thus triggering programmatic adjustments if necessary. COC analytical data collected from the monitoring wells located within the plume were used to determine plume attenuation rates for individual chemical constituents ($k_{time}$). COC data collected from the monitoring wells along the plume centerline were used to determine plume attenuation rates and for the plume as a whole ($k_{dist}$). Data collected from the background monitoring well served to monitor any changes in the ambient conditions that may impact the effectiveness of MNA in achieving the clean-up goal in a timely manner. The COC analytical results are summarized in Table 4-1.**

**Corrective action observation (CAO) wells (600D86MW, 600D95MW, 60201MW, 612D155MW, and 79920MW) had either no history of COC detections or the COC detections have been below applicable GWPSs for at least the previous five consecutive years. These wells were abandoned on April 4 and 6, 2016, in accordance with the RAP submitted to TCEQ in October 2015. In addition, four wells (IW-1 through IW-4) that were previously installed for a pilot test that was never performed were also P&A'd. Plugging reports are located in Appendix 4, and historical COC analytical results for P&A'd wells are included in Table 4-1B.**

**Performance monitoring for 2016 also entailed sampling for MNA parameters (pH, oxidation-reduction potential [ORP], dissolved oxygen [DO], iron, nitrate, nitrite, phosphate, sulfate, total organic carbon, chloride, ethene, ethane, methane, alkalinity, carbon dioxide, and hydrogen sulfide) during the July 2016 sampling event. MNA parameters are sampled on a biennial sampling schedule. The MNA parameters measured by field tests and laboratory analyses are presented in Table 4-2. MNA parameter data, as needed, serve as a secondary line of evidence to evaluate whether subsurface conditions continue to support natural attenuation.**

**The conceptual MNA site model for this plume is represented in the data tables in Appendix 4, the isoconcentration maps and potentiometric surface maps included in Attachment 1A, and the concentration vs. time and concentration vs. distance graphs in Attachment 1B.**

**After each semi-annual groundwater monitoring event, the COC concentration data collected were evaluated for both the entire plume and monitoring well by monitoring well basis in accordance with the RAP (Tetra Tech, 2006). The initial data analysis and interpretation focused on the detection of changes or trends in the data. Further evaluation focused on the assessment of the changes or trends and their impact on MNA in achieving the site-related goals.**

**It was expected that analytical data would indicate that attenuation rates were sufficient to effectively remediate the plume on or before the year 2017. Reasonable progress of the response action was evaluated considering the following criteria:**

- **The monitoring well's COC specific $k_{time}$ attenuation rate based on the available sampling data is not more than the minimum attenuation rate necessary to achieve clean-up by the year 2017.**

- **The monitoring well's COC specific concentration is less than the remedial benchmark concentration (calculated concentration goal based on the initial maximum concentration and the minimum rate necessary to meet the remedial goals by 2017) for that sample date.**
- **The COC specific $k_{dist}$ attenuation rate based on the available sampling data indicates an actual attenuation equal to or greater than the rate of COC migration from the suspected source area.**

**Response Action Progress**

**Table 4-3 summarizes the groundwater gauging data. The potentiometric surface maps for the December 2015 and July 2016 groundwater gauging events, included in Figure 1A-3 (Attachment 1A), indicate that the shape of the groundwater elevation contours and direction of groundwater flow is to the east, consistent with previous sampling events.**

**The COC isoconcentration contour map, prepared using data collected during the January and July 2016 sampling events, is included in Figure 1A-2A (Attachment 1A). A review of the 2016 data indicate that:**

- **TCE is the only COC at SWMU 17/Building 1429 currently exceeding PCLs.**
- **TCE exceeded its PCL in five of the eight monitor wells (612D111MW, 612D38MW, 600D84MW, 600D85MW, and 612D129MW).**
- **TCE exceeded its PCL of 0.005 mg/L during both the January and July sampling events at monitoring wells 612D38MW (0.00501 and 0.0051), 600D84MW (0.011 and 0.0149 mg/L), and 612D129MW (0.0134 and 0.00855 mg/L). TCE exceeded its PCL during the January sampling event only at monitoring well 600D85MW (0.00539 mg/L) and during the July sampling event only at monitoring well 612D111MW (0.0116 mg/L).**
- **There continues to be no offsite migration of COCs at concentrations greater than the respective critical groundwater PCLs, and the plume has not migrated beyond the historical PCLE zone.**

**Tables 4-4 and 4-5 (Appendix 4) summarize the concentration vs. time and concentration vs. distance attenuation rate constants for the plume centerline. The graphs in Attachment 1B graphically depict the same attenuation rate constants summarized in Tables 4-4 and 4-5 and the minimum required attenuation rate to meet the remediation goals. Based on the data presented:**

- **The monitoring wells located on the northern portion of SWMU 17/Building 1429 Plume (monitoring wells 61201MW and 603D71MW) have met 2017 remedial goals, indicating that effective remediation of the northern plume through MNA has occurred.**
- **Although decreasing trends in TCE concentrations continue to occur for all monitor wells located in the southern portion of the plume, remedial goals will not be achieved for the southern portion of the plume (monitoring wells 612D38MW, 600D84MW, 612D111MW, 600D85MW, and 612D129MW) on or before the year 2017.**

**As discussed in the sections above, MNA has been an appropriate remedial method to reduce the COCs to below their critical PCLs for the northern portion of the SWMU 17/Building 1429 Plume. Monitoring wells located in the southern portion of the SWMU 17/Building 1429 Plume show a decreasing trend in COC concentrations but the remedial goals will not be achieved for this portion of the plume within the established time frame.**

**In accordance with the approved Groundwater RAP (Revision 2) (TtNUS, 2006), and as recommended by TCEQ in a letter dated May 26, 2015, failure of the response action triggers the implementation of contingency measures, which may include the selection of an appropriate alternate remedial measure. The Navy has proposed to implement EMNA as an alternate remedy at the affected area of SWMU 18 groundwater plume in an effort to reduce COCs to below PCLs. This will allow the Navy to make a determination as to whether the technology is viable. Depending upon the results of the EMNA spot treatment at SWMU 18, alternative remedial measures may be proposed in a comprehensive RAP for SWMU 17/Building 1429 Plume. MNA will be continued at the SWMU 17/Building 1429 Plume for the upcoming year in accordance with the procedures and protocols described in the Groundwater RAP (Revision 2) (Tetra Tech, 2006).**

## Problems

Complete the table for the response action. When the response action consists of several components or multiple actions, complete one table for each major component or action.

Response Action Name/Designation: *Groundwater Response Action*

List the problems that have been encountered during the response action, describe the impact of each problem, and the response to the problem.

| Description of the Problem | Impact | Did this cause a response action failure? | | Corrective Response |
|---|---|---|---|---|
| | | Yes | No | |
| *COC concentration data for monitoring wells 600D84MW, 612D111MW, 600D85MW, 612D38MW, and 612D129MW indicate MNA has slowed or ceased to the point that the remedial goals will not be achieved for the southern portion of the plume.* | *In accordance with the approved RAP (TtNUS, 2006), failure of the approved response action to meet critical PCLs triggers the implementation of contingency measures, which includes the selection of an appropriate alternate remedial measure.* | *X* | | *The Navy has proposed to implement EMNA as an alternate remedy at the affected area of SWMU 18 groundwater plume in an effort to reduce COCs to below PCLs. Depending upon the results of the EMNA spot treatment at SWMU 18, alternative remedial measures may be proposed in a comprehensive RAP for SWMU 17/Building 1429 Plume. MNA will be continued at the SWMU 17/Building 1429 Plume for the upcoming year in accordance with the procedures and protocols described in the Groundwater RAP (Revision 2) (Tetra Tech, 2006).* |

Use this worksheet to describe the operation and maintenance (O&M) activities conducted for each response action.

Response Action Name/Designation: Well maintenance

List all portions of the response action to which this information applies. Repeat this worksheet for each major component or operation.

Describe the O&M and inspection activities that have been conducted to operate and maintain response action components.

**Corrective action observation (CAO) wells (600D86MW, 600D95MW, 60201MW, 612D155MW, and 79920MW) had either no history of COC detections or the COC detections have been below applicable GWPSs for at least the previous five consecutive years. Per approval from TCEQ, these wells were abandoned on April 4 and 6, 2016, in accordance with the RAP submitted to TCEQ in October 2015. In addition, four wells (IW-1 through IW-4) that were previously installed for a pilot test that was never performed were also P&A'd. Well plugging reports are located in Appendix 4, and historical analytical results for P&A'd wells are included in Table 4-1B.**

**In September 2016, Resolution Consultants conducted a detailed evaluation of maintenance needs for monitor wells at former NAS Dallas. Monitor well 612D38MW (a stickup well) was checked for integrity and secure conditions; a broken lock was replaced. Surface completion wells 608D84MW, 608D85MW, 61201MW, 612D129MW, and 614D09MW were re-fitted by tapping the rim eyelets and replacing bolts and washers in order to secure the lid. Monitoring wells 603D71MW and 612D111MW could not be re-fitted. Additional maintenance actions for these wells were completed on October 12 and 13, 2016, and included coring and removal of existing flush mount completions, and re-installation of flush-mount well skirts, rims, and lids.**

# APPENDIX 1
# REFERENCE LIST

# APPENDIX 1
# REFERENCES

A.T. Kearney, Inc. *RCRA Facility Assessment Preliminary Review/Visual Site Inspection. Chicago, Illinois.* 1989.

EnSafe/Allen & Hoshall. *Naval Air Station Dallas Environmental Baseline Survey, Dallas, Texas*. Memphis, Tennessee. 1994.

Tetra Tech NUS, Inc. *RCRA Facility Investigation Report for Category C*. Pittsburgh, Pennsylvania. 2000a.

— *RCRA Facility Investigation Report for Category E. Pittsburgh, Pennsylvania.* 2000b.

— *RCRA Facility Investigation Report for Category F. Pittsburgh, Pennsylvania.* 2000c.

— *RCRA Facility Investigation Report for Category D. Pittsburgh, Pennsylvania.* 2001a.

— *RCRA Facility Investigation Report for Category B. Pittsburgh, Pennsylvania.* 2001b.

— *Affected Property Assessment Report. Houston, Texas*. 2002.

— *Final MNA Groundwater Modeling Report for Category D. Pittsburgh, Pennsylvania.* 2004.

— *Response Action Plan, Revision 2. Pittsburgh, Pennsylvania.* 2006.

Resolution Consultants. *Draft Final Alternatives Evaluation Report, Former Naval Air Station, Dallas, Texas*. Norfolk, Virginia. August 2013.

— *Draft Vapor Intrusion Study Report, Buildings 1405, 1422, and 1424, Solid Waste Management Unit 21*. Norfolk, Virginia. September 2015.

— *Interim Revised Groundwater Response Action Plan for SWMU 17/Building 1429 Plume (Revision 3).* Norfolk, Virginia. October 2015.

# APPENDIX 4
# DATA TABLES

**Table 4-1 Summary of Chemicals of Concern Detected in Groundwater**
**Table 4-2 Summary of Geochemical Parameters Measured in Groundwater**
**Table 4-3 Summary of Groundwater Gauging Data**
**Table 4-4 Summary of Concentration vs. Time Attenuation Rate Constants**
**Table 4-5 Summary of Concentration vs. Distance Attenuation Rate Constants**

# TABLE 4-1
# SUMMARY OF CHEMICALS OF CONCERN DETECTED IN GROUNDWATER

**Table 4-1A**

**Summary of Chemicals of Concern Detected IN GROUNDWATER**
**Long Term Monitoring Wells — SWMU 17/Biulding 1429 Plume**
**2016 RAER**

**Former NAS Dallas, Texas**


| Monitoring Well | Sampling Date | Sampling Round | Chemicals of Concern (mg/L) | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | 1,1-Dichloroethene | Carbon Tetrachloride | Chloroform | Chloromethane | cis-1,2-Dichloroethene | Methylene Chloride | Tetrachloroethene | trans-1,2-Dichloroethene | Trichloroethene | Vinyl Chloride |
| **Protective Concentration Levels (mg/L)** | | | **0.00700** | **0.00500** | **0.24000** | **0.07000** | **0.07000** | **0.00500** | **0.00500** | **0.10000** | **0.00500** | **0.00200** |
| **Monitoring Wells Located Inside PCLE Zone** | | | | | | | | | | | | |
| **600D84MW** | 8/9/1999 | | Well Installed | | | | | | | | | |
| | 8/9/1999 | Round 5 | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00920 | 0.00500 U | 0.00500 U | 0.00230 J | 0.05300 | 0.00500 U |
| | 7/12/2000 | Round 6 | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00880 | 0.00500 U | 0.00500 U | 0.00190 J | 0.05000 | 0.00500 U |
| | 7/12/2001 | Round 7 (PDB) | 0.00500 U | 0.00500 U | 0.00500 U | 0.01000 U | 0.01100 | 0.00500 U | 0.00500 U | 0.00260 | 0.04800 | 0.01000 U |
| | 1/26/2003 | Round 8 (PDB) | 0.00250 U | 0.00250 U | 0.00250 U | 0.00250 U | 0.00740 | 0.00500 U | 0.00250 U | 0.00120 J | 0.05900 | 0.00250 U |
| | 8/25/2003 | Round 9 (PDB) | 0.00031 U | 0.00026 U | 0.00030 U | 0.00037 U | 0.00620 | 0.00040 U | 0.00017 U | 0.00097 | 0.03200 | 0.00037 U |
| | 12/16/2003 | Round 10 | 0.00021 U | 0.00020 U | 0.00014 U | 0.00008 U | 0.00260 | 0.00016 U | 0.00024 U | 0.00041 J | 0.01700 | 0.00017 U |
| | 7/28/2004 | Round 11 (PDB) | 0.00035 U | 0.00025 U | 0.00010 U | 0.00017 U | 0.00420 | 0.00040 U | 0.00021 U | 0.00075 J | 0.02200 | 0.00017 U |
| | 10/14/2004 | Round 12 | 0.00035 U | 0.00025 U | 0.00010 U | 0.00017 U | 0.00230 | 0.00040 U | 0.00021 U | 0.00041 J | 0.01300 | 0.00017 U |
| | 10/14/2004 | Round 12 (PBD) | 0.00035 U | 0.00025 U | 0.00010 U | 0.00017 U | 0.00075 J | 0.00040 U | 0.00021 U | 0.00023 U | 0.00290 | 0.00017 U |
| | 4/3/2005 | Round 13 (PDB) | 0.00040 U | 0.00030 U | 0.00040 U | 0.00030 U | 0.00700 | 0.00200 U | 0.00040 U | 0.00100 | 0.04500 | 0.00030 U |
| | 10/5/2005 | Round 14 | 0.00040 U | 0.00030 U | 0.00040 U | 0.00030 U | 0.00400 | 0.00200 U | 0.00040 U | 0.00030 U | 0.03000 | 0.00030 U |
| | 5/18/2006 | Round 15B | 0.00060 U | 0.00050 U | 0.00040 U | 0.00060 U | 0.00600 | 0.00200 U | 0.00060 U | 0.00060 J | 0.03900 | 0.00060 U |
| | 8/22/2006 | Round 16 | 0.00060 U | 0.00050 U | 0.00040 U | 0.00060 UJ | 0.00300 | 0.00200 U | 0.00060 U | 0.00060 U | 0.01600 | 0.00060 U |
| | 5/8/2007 | Round 17 (PDB) | 0.00013 U | 0.00011 U | 0.00013 U | 0.00028 U | 0.00520 | 0.00023 U | 0.00010 U | 0.00071 J | 0.03600 | 0.00020 U |
| | 8/22/2007 | Round 18 | 0.00042 U | 0.00014 U | 0.00010 U | 0.00040 U | 0.00410 | 0.00026 U | 0.00014 U | 0.00084 J | 0.02900 | 0.00040 J |
| | 1/30/2008 | Round 19 (PDB) | 0.00039 U | 0.00044 U | 0.00036 U | 0.00060 U | 0.00530 | 0.00040 U | 0.00046 U | 0.00067 J | 0.03000 | 0.00043 U |
| | 7/22/2008 | Round 20 (PDB) | 0.00054 U | 0.00022 U | 0.00028 U | 0.00061 U | 0.00470 | 0.00100 U | 0.00022 U | 0.00068 J | 0.01940 | 0.00030 U |
| | 1/12/2009 | Round 21 (PDB) | 0.00054 U | 0.00022 U | 0.00028 U | 0.00061 U | 0.00560 | 0.00100 U | 0.00022 U | 0.00080 J | 0.03390 | 0.00030 U |
| | 7/14/2009 | Round 22 | 0.00054 U | 0.00022 U | 0.00028 U | 0.00061 U | 0.00023 J | 0.00100 U | 0.00022 U | 0.00045 U | 0.00110 | 0.00030 U |
| | 1/11/2010 | Round 23 (PDB) | 0.00054 U | 0.00022 U | 0.00028 U | 0.00061 U | 0.00410 | 0.00100 U | 0.00022 U | 0.00064 J | 0.02430 | 0.00030 U |
| | 7/13/2010 | Round 24 (PDB) | 0.00029 U | 0.00034 U | 0.00025 U | 0.00050 U | 0.00370 | 0.00200 U | 0.00044 U | 0.00046 J | 0.01350 | 0.00028 U |
| | 1/11/2011 | Round 25 (PDB) | 0.00023 U | 0.00025 U | 0.00022 U | 0.00050 U | 0.00110 | 0.00200 U | 0.00025 U | 0.00035 U | 0.00800 | 0.00022 U |
| | 7/27/2011 | Round 26 | 0.00023 U | 0.00025 U | 0.00022 U | 0.00050 U | 0.00380 | 0.00200 U | 0.00025 U | 0.00059 J | 0.02640 | 0.00022 U |
| | 1/10/2012 | Round 27 (PDB) | 0.00025 U | 0.00025 U | 0.00022 U | 0.00050 U | 0.0020 | 0.0020 U | 0.00025 U | 0.00035 U | 0.0120 | 0.00022 U |
| | 7/9/2012 | Round 28 | 0.00023 U | NS | NS | NS | 0.0022 | NS | NS | 0.00037 J | 0.0168 | 0.00022 U |
| | 1/8/2013 | Round 29 (PDB) | 0.00020 U | 0.00031 U | 0.00026 U | 0.00050 U | 0.0037 | 0.0020 U | 0.00032 U | 0.00039 J | 0.0182 | 0.00044 U |
| | 7/16/2013 | Round 30 | 0.00020 U | 0.00031 U | 0.00026 U | 0.00050 U | 0.0011 | 0.0020 U | 0.00032 U | 0.00023 U | 0.0108 | 0.00044 U |
| | 1/28/2014 | Round 31 (PDB) | 0.00025 U | 0.0004 U | 0.00031 U | 0.00053 U | 0.0027 | 0.0020 U | 0.00026 U | 0.00034 U | 0.0120 | 0.00033 U |
| | 7/15/2014 | Round 32 | 0.00025 U | 0.00025 U | 0.00025 U | 0.00025 U | 0.00298 | 0.0005 U | 0.00025 U | 0.00027 J | 0.0157 | 0.00025 U |
| | 1/21/2015 | Round 33 (PDB) | 0.00025 U | NS | NS | NS | 0.0077 | NS | NS | 0.00031 J | 0.0068 | 0.00025 U |
| | 7/23/2015 | Round 34 | 0.00025 U | NS | NS | NS | 0.0025 | NS | 0.00025 U | 0.00025 U | 0.0206 | 0.00025 U |
| | 1/21/2016 | Round 35 (PDB) | 0.00025 U | NS | NS | NS | 0.00469 | NS | NS | 0.00025 U | 0.011 | 0.00025 U |
| | 7/23/2016 | Round 36 | 0.00025 U | 0.00025 U | 0.00025 U | 0.00025 U | 0.00199 | 0.0005 U | 0.00025 U | 0.00025 U | 0.0149 | 0.00064 J |

**Table 4-1A**

**Summary of Chemicals of Concern Detected IN GROUNDWATER**
**Long Term Monitoring Wells — SWMU 17/Biulding 1429 Plume**
**2016 RAER**

**Former NAS Dallas, Texas**


| Monitoring Well | Sampling Date | Sampling Round | Chemicals of Concern (mg/L) | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | 1,1-Dichloroethene | Carbon Tetrachloride | Chloroform | Chloromethane | cis-1,2-Dichloroethene | Methylene Chloride | Tetrachloroethene | trans-1,2-Dichloroethene | Trichloroethene | Vinyl Chloride |
| **Protective Concentration Levels (mg/L)** | | | **0.00700** | **0.00500** | **0.24000** | **0.07000** | **0.07000** | **0.00500** | **0.00500** | **0.10000** | **0.00500** | **0.00200** |
| **600D85MW** | 8/10/1999 | | Well Installed | | | | | | | | | |
| | 8/10/1999 | Round 5 | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00130 J | 0.00130 U | 0.00500 U | 0.00500 U | 0.00410 J | 0.00500 U |
| | 7/12/2000 | Round 6 | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00250 J | 0.00500 U | 0.00500 U | 0.00500 U | 0.01100 | 0.00500 U |
| | 7/12/2001 | Round 7 (PDB) | 0.00500 U | 0.00500 U | 0.00500 U | 0.01000 U | 0.00480 | 0.00500 U | 0.00500 U | 0.00250 U | 0.01100 | 0.01000 U |
| | 1/26/2003 | Round 8 (PDB) | 0.00100 U | 0.00100 U | 0.00100 U | 0.00100 U | 0.00400 | 0.00200 U | 0.00100 U | 0.00100 U | 0.02400 | 0.00100 U |
| | 8/25/2003 | Round 9 (PDB) | 0.00022 U | 0.00018 U | 0.00021 U | 0.00026 U | 0.00380 | 0.00028 U | 0.00012 U | 0.00028 J | 0.00790 | 0.00026 U |
| | 12/9/2003 | Round 10 | 0.00021 U | 0.00020 U | 0.00014 U | 0.00038 J | 0.00220 | 0.00016 U | 0.00024 U | 0.00020 J | 0.00680 | 0.00017 U |
| | 7/28/2004 | Round 11 (PDB) | 0.00035 U | 0.00025 U | 0.00010 U | 0.00017 U | 0.00220 | 0.00040 U | 0.00021 U | 0.00023 U | 0.00490 | 0.00017 U |
| | 10/13/2004 | Round 12 (PBD) | 0.00035 U | 0.00025 U | 0.00010 U | 0.00017 U | 0.00290 | 0.00040 U | 0.00021 U | 0.00023 U | 0.00670 | 0.00017 U |
| | 4/3/2005 | Round 13 (PDB) | 0.00040 U | 0.00030 U | 0.00040 U | 0.00030 U | 0.00400 | 0.00200 U | 0.00040 U | 0.00030 J | 0.01400 | 0.00030 U |
| | 10/6/2005 | Round 14 | 0.00040 U | 0.00030 U | 0.00040 U | 0.00030 U | 0.00200 | 0.00200 U | 0.00040 U | 0.00030 U | 0.00800 | 0.00030 U |
| | 5/18/2006 | Round 15B | 0.00100 U | 0.00100 U | 0.00100 U | 0.00200 U | 0.00600 | 0.00500 U | 0.00100 U | 0.00100 U | 0.01900 | 0.00200 U |
| | 8/22/2006 | Round 16 | 0.00060 U | 0.00050 U | 0.00040 U | 0.00060 UJ | 0.00300 | 0.00200 U | 0.00060 U | 0.00060 U | 0.00800 | 0.00060 U |
| | 5/8/2007 | Round 17 (PDB) | 0.00043 J | 0.00020 U | 0.00023 U | 0.00017 U | 0.00560 | 0.00032 J | 0.00014 U | 0.00053 U | 0.01900 | 0.00012 U |
| | 8/22/2007 | Round 18 | 0.00042 U | 0.00014 U | 0.00010 U | 0.00040 U | 0.00230 | 0.00026 U | 0.00014 U | 0.00040 U | 0.00720 | 0.00019 U |
| | 1/30/2008 | Round 19 (PDB) | 0.00039 U | 0.00044 U | 0.00036 U | 0.00060 U | 0.00390 | 0.00040 J | 0.00046 U | 0.00048 U | 0.00880 | 0.00043 U |
| | 7/22/2008 | Round 20 (PDB) | 0.00054 U | 0.00022 U | 0.00028 U | 0.00061 U | 0.00370 | 0.00100 U | 0.00022 U | 0.00045 U | 0.00730 | 0.00030 U |
| | 1/12/2009 | Round 21 (PDB) | 0.00054 U | 0.00022 U | 0.00028 U | 0.00061 U | 0.00420 | 0.00100 U | 0.00022 U | 0.00045 U | 0.00940 | 0.00030 U |
| | 7/14/2009 | Round 22 | 0.00054 U | 0.00022 U | 0.00028 U | 0.00061 U | 0.00250 | 0.00100 U | 0.00022 U | 0.00045 U | 0.00860 | 0.00030 U |
| | 1/11/2010 | Round 23 (PDB) | 0.00054 U | 0.00022 U | 0.00028 U | 0.00061 U | 0.00420 | 0.00100 U | 0.00022 U | 0.00045 U | 0.00820 | 0.00030 U |
| | 7/13/2010 | Round 24 (PDB) | 0.00029 U | 0.00034 U | 0.00025 U | 0.00050 U | 0.00340 | 0.00200 U | 0.00044 U | 0.00034 U | 0.00840 | 0.00028 U |
| | 1/11/2011 | Round 25 (PDB) | 0.00023 U | 0.00025 U | 0.00022 U | 0.00050 U | 0.00390 | 0.00200 U | 0.00025 U | 0.00035 U | 0.00800 | 0.00022 U |
| | 7/27/2011 | Round 26 | 0.00023 U | 0.00025 U | 0.00022 U | 0.00050 U | 0.00110 | 0.00200 U | 0.00025 U | 0.00035 U | 0.00470 | 0.00022 U |
| | 1/11/2012 | Round 27 (PDB) | 0.00025 U | 0.00025 U | 0.00022 U | 0.00050 U | 0.0035 | 0.00200 U | 0.00025 U | 0.00035 U | 0.0070 | 0.00022 U |
| | 7/9/2012 | Round 28 | 0.00023 U | NS | NS | NS | 0.0013 | NS | NS | 0.00035 U | 0.0051 | 0.00022 U |
| | 1/8/2013 | Round 29 (PDB) | 0.00020 U | 0.00031 U | 0.00026 U | 0.00050 U | 0.0036 | 0.0020 U | 0.00032 U | 0.00023 U | 0.0060 | 0.00044 U |
| | 7/16/2013 | Round 30 | 0.00020 U | 0.00031 U | 0.00026 U | 0.00050 U | 0.0021 | 0.0020 U | 0.00032 U | 0.00023 U | 0.0072 | 0.00044 U |
| | 1/28/2014 | Round 31 (PDB) | 0.00025 U | 0.0004 U | 0.00031 U | 0.00053 U | 0.0106 | 0.00020 U | 0.00026 U | 0.00035 J | 0.0081 | 0.00033 U |
| | 7/15/2014 | Round 32 | 0.00025 U | 0.00025 U | 0.00025 U | 0.00025 U | 0.00404 | 0.0005 U | 0.00025 U | 0.00032 J | 0.0109 | 0.00025 U |
| | 1/21/2015 | Round 33 (PDB) | 0.00025 U | NS | NS | NS | 0.0047 | NS | NS | 0.00025 U | 0.0065 | 0.00025 U |
| | 7/23/2015 | Round 34 | 0.00025 U | NS | NS | NS | 0.0049 | NS | 0.00025 U | 0.00416 | 0.0127 | 0.00025 U |
| | 1/21/2016 | Round 35 (PDB) | 0.00025 U | NS | NS | NS | 0.00621 | NS | NS | 0.00025 U | 0.00539 | 0.00025 U |
| | 7/23/2016 | Round 36 | 0.00025 U | 0.00025 U | 0.00025 U | 0.00025 U | 0.00127 | 0.0005 U | 0.00025 U | 0.00025 U | 0.00381 | 0.00025 U |

**Table 4-1A**

**Summary of Chemicals of Concern Detected IN GROUNDWATER**
**Long Term Monitoring Wells — SWMU 17/Biulding 1429 Plume**
**2016 RAER**

**Former NAS Dallas, Texas**


| Monitoring Well | Sampling Date | Sampling Round | Chemicals of Concern (mg/L) | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | 1,1-Dichloroethene | Carbon Tetrachloride | Chloroform | Chloromethane | cis-1,2-Dichloroethene | Methylene Chloride | Tetrachloroethene | trans-1,2-Dichloroethene | Trichloroethene | Vinyl Chloride |
| **Protective Concentration Levels (mg/L)** | | | **0.00700** | **0.00500** | **0.24000** | **0.07000** | **0.07000** | **0.00500** | **0.00500** | **0.10000** | **0.00500** | **0.00200** |
| **603D71MW** | 4/4/1998 | Well Installed | | | | | | | | | | |
| | 5/18/1998 | Round 2 | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.03500 | 0.00500 U | 0.00500 U | 0.00500 U | 0.07800 | 0.00230 J |
| | 8/30/1998 | Round 3 | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.04100 | 0.00500 U | 0.00500 U | 0.00500 UJ | 0.07500 | 0.00310 J |
| | 4/1/1999 | Round 4 | 0.00069 J | 0.00500 U | 0.00500 U | 0.00500 U | 0.02700 | 0.00500 U | 0.00500 U | 0.00064 J | 0.05200 | 0.00230 J |
| | 11/6/1999 | Round 5 | 0.00830 U | 0.00830 U | 0.00830 U | 0.00830 U | 0.02400 | 0.00830 U | 0.00830 U | 0.00830 U | 0.04100 | 0.00110 J |
| | 7/20/2000 | Round 6 | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.02300 | 0.00500 U | 0.00500 U | 0.00500 U | 0.04300 | 0.00500 U |
| | 7/11/2001 | Round 7 | 0.00500 U | 0.00500 U | 0.00500 U | 0.01000 U | 0.01900 | 0.00500 U | 0.00500 U | 0.00120 J | 0.03200 | 0.00170 J |
| | 1/11/2003 | Round 8 | 0.00100 U | 0.00100 U | 0.00100 U | 0.00100 U | 0.00980 | 0.00200 U | 0.00100 U | 0.00044 J | 0.01900 | 0.00070 J |
| | 8/24/2003 | Round 9 | 0.00058 J | 0.00036 U | 0.00042 U | 0.00052 U | 0.01700 | 0.00056 U | 0.00024 U | 0.00076 J | 0.02900 | 0.00074 J |
| | 12/15/2003 | Round 10 | 0.00023 J | 0.00020 U | 0.00014 U | 0.00008 U | 0.00970 | 0.00016 U | 0.00024 U | 0.00026 J | 0.01700 | 0.00036 J |
| | 7/29/2004 | Round 11 (PDB) | 0.00035 U | 0.00025 U | 0.00010 U | 0.00017 U | 0.00840 | 0.00040 U | 0.00021 U | 0.00053 J | 0.01200 | 0.00065 J |
| | 10/12/2004 | Round 12 (PBD) | 0.00035 U | 0.00025 U | 0.00010 U | 0.00017 U | 0.01100 | 0.00040 U | 0.00021 U | 0.00058 J | 0.01500 | 0.00076 J |
| | 4/3/2005 | Round 13 (PDB) | 0.00040 U | 0.00030 U | 0.00040 U | 0.00030 U | 0.01100 | 0.00200 U | 0.00040 U | 0.00040 J | 0.01100 | 0.00030 U |
| | 10/6/2005 | Round 14 | 0.00050 J | 0.00030 U | 0.00040 U | 0.00030 U | 0.01300 | 0.00200 U | 0.00040 U | 0.00100 | 0.02000 | 0.00070 J |
| | 5/18/2006 | Round 15B | 0.00100 U | 0.00100 U | 0.00100 U | 0.00200 U | 0.00900 | 0.00500 UJ | 0.00100 U | 0.00100 U | 0.00800 | 0.00200 U |
| | 8/23/2006 | Round 16 | 0.00060 U | 0.00050 U | 0.00040 U | 0.00060 UJ | 0.01000 | 0.00200 U | 0.00060 U | 0.00060 U | 0.01200 | 0.00060 U |
| | 5/8/2007 | Round 17 (PDB) | 0.00025 J | 0.00011 U | 0.00013 U | 0.00028 U | 0.00690 | 0.00023 U | 0.00010 U | 0.00020 J | 0.00650 | 0.00020 U |
| | 8/23/2007 | Round 18 | 0.00042 U | 0.00014 U | 0.00010 U | 0.00040 U | 0.00760 | 0.00026 U | 0.00014 U | 0.00053 J | 0.01300 | 0.00064 J |
| | 1/30/2008 | Round 19 (PDB) | 0.00039 U | 0.00044 U | 0.00036 U | 0.00060 U | 0.00710 | 0.00040 U | 0.00046 U | 0.00048 U | 0.01200 | 0.00043 U |
| | 7/22/2008 | Round 20 (PDB) | 0.00054 U | 0.00022 U | 0.00028 U | 0.00061 U | 0.00560 | 0.00100 U | 0.00022 U | 0.00045 U | 0.00480 | 0.00030 U |
| | 1/12/2009 | Round 21 (PDB) | 0.00054 U | 0.00022 U | 0.00028 U | 0.00061 U | 0.00750 | 0.00100 U | 0.00022 U | 0.00059 J | 0.01200 | 0.00030 U |
| | 7/14/2009 | Round 22 | 0.00054 U | 0.00022 U | 0.00028 U | 0.00061 U | 0.00690 | 0.00100 U | 0.00022 U | 0.00059 J | 0.01030 | 0.00050 J |
| | 1/11/2010 | Round 23 (PDB) | 0.00054 U | 0.00022 U | 0.00028 U | 0.00061 U | 0.00570 | 0.00100 U | 0.00022 U | 0.00049 J | 0.00860 | 0.00030 U |
| | 7/13/2010 | Round 24 (PDB) | 0.00029 U | 0.00034 U | 0.00025 U | 0.00050 U | 0.00170 | 0.00200 U | 0.00044 U | 0.00034 U | 0.00150 | 0.00028 U |
| | 1/11/2011 | Round 25 (PDB) | 0.00023 U | 0.00025 U | 0.00022 U | 0.00050 U | 0.00670 | 0.00200 U | 0.00025 U | 0.00061 J | 0.00920 | 0.00036 J |
| | 7/27/2011 | Round 26 | 0.00023 U | 0.00025 U | 0.00022 U | 0.00050 U | 0.00580 | 0.00200 U | 0.00025 U | 0.00062 J | 0.00820 | 0.00022 U |
| | 1/11/2012 | Round 27 (PDB) | 0.00023 U | 0.00025 U | 0.00022 U | 0.00050 U | 0.0040 | 0.00200 U | 0.00025 U | 0.00038 J | 0.0058 | 0.00022 U |
| | 7/9/2012 | Round 28 | 0.00023 U | NS | NS | NS | 0.0029 | NS | NS | 0.00035 U | 0.0048 | 0.00022 U |
| | 1/8/2013 | Round 29 (PDB) | 0.00023 J | 0.00031 U | 0.00026 U | 0.00050 U | 0.0056 | 0.0020 U | 0.00032 U | 0.00050 J | 0.0061 | 0.00044 U |
| | 7/16/2013 | Round 30 | 0.00020 U | 0.00031 U | 0.00026 U | 0.00050 U | 0.0035 | 0.0020 U | 0.00032 U | 0.00030 J | 0.0051 | 0.00044 U |
| | 1/28/2014 | Round 31 (PDB) | 0.00025 U | 0.0004 U | 0.00031 U | 0.00053 U | 0.0016 | 0.0020 U | 0.00026 U | 0.00034 U | 0.0028 | 0.00033 U |
| | 7/15/2014 | Round 32 | 0.00025 U | 0.00025 U | 0.00025 U | 0.00025 U | 0.00121 | 0.0005 U | 0.00025 U | 0.00025 U | 0.00188 | 0.00025 U |
| | 1/21/2015 | Round 33 (PDB) | 0.00025 U | NS | NS | NS | 0.0017 | NS | NS | 0.00025 U | 0.00233 | 0.00025 U |
| | 7/22/2015 | Round 34 | 0.00025 U | NS | NS | NS | 0.0032 | NS | 0.00025 U | 0.000382 J | 0.00459 | 0.00025 U |
| | 1/21/2016 | Round 35 (PDB) | 0.00025 U | NS | NS | NS | 0.00244 | NS | NS | 0.00025 U | 0.00352 | 0.00025 U |
| | 7/23/2016 | Round 36 | 0.00025 U | 0.00025 U | 0.00025 U | 0.00025 U | 0.00183 | 0.0005 U | 0.00025 U | 0.00026 J | 0.00242 | 0.00025 U |

**Table 4-1A**

**Summary of Chemicals of Concern Detected IN GROUNDWATER**
**Long Term Monitoring Wells — SWMU 17/Biulding 1429 Plume**
**2016 RAER**

**Former NAS Dallas, Texas**


| Monitoring Well | Sampling Date | Sampling Round | Chemicals of Concern (mg/L) | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | 1,1-Dichloroethene | Carbon Tetrachloride | Chloroform | Chloromethane | cis-1,2-Dichloroethene | Methylene Chloride | Tetrachloroethene | trans-1,2-Dichloroethene | Trichloroethene | Vinyl Chloride |
| **Protective Concentration Levels (mg/L)** | | | **0.00700** | **0.00500** | **0.24000** | **0.07000** | **0.07000** | **0.00500** | **0.00500** | **0.10000** | **0.00500** | **0.00200** |
| **61201MW** | 12/14/1995 | Round 1 | 0.00500 U | 0.00500 U | 0.00500 U | 0.01000 U | 0.07560 | 0.01000 U | 0.00500 U | 0.00500 U | 0.16000 | 0.01560 |
| | 5/1/1998 | Round 2 | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.03300 | 0.00500 U | 0.00500 U | 0.00069 J | 0.08200 | 0.00840 |
| | 9/22/1998 | Round 3 | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.05500 | 0.00500 U | 0.00500 U | 0.00500 U | 0.11000 | 0.00640 |
| | 4/1/1999 | Round 4 | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.02100 | 0.00500 U | 0.00500 U | 0.00049 J | 0.06700 | 0.00510 |
| | 11/6/1999 | Round 5 | 0.01200 U | 0.01200 U | 0.01200 U | 0.01200 U | 0.03000 | 0.01200 U | 0.01200 U | 0.01200 U | 0.06500 | 0.00400 J |
| | 7/21/2000 | Round 6 | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.01100 | 0.00500 U | 0.00500 U | 0.00500 U | 0.04700 | 0.00320 J |
| | 7/13/2001 | Round 7 (PDB) | 0.00500 U | 0.00500 U | 0.00500 U | 0.01000 U | 0.00790 | 0.00500 U | 0.00500 U | 0.00250 U | 0.05100 | 0.00160 J |
| | 1/12/2003 | Round 8 | 0.00100 U | 0.00100 U | 0.00100 U | 0.00100 U | 0.00470 | 0.00200 U | 0.00100 U | 0.00100 U | 0.04900 | 0.00300 |
| | 1/12/2003 | Round 8 (PDB) | 0.00200 U | 0.00200 U | 0.00200 U | 0.00200 U | 0.00570 | 0.00400 U | 0.00200 U | 0.00200 U | 0.04900 | 0.00180 J |
| | 8/25/2003 | Round 9 (PDB) | 0.00037 U | 0.00030 U | 0.00035 U | 0.00043 U | 0.00670 | 0.00047 U | 0.00020 U | 0.00040 U | 0.03900 | 0.00290 |
| | 12/9/2003 | Round 10 | 0.00021 J | 0.00020 U | 0.00014 U | 0.00008 U | 0.00420 | 0.00016 U | 0.00024 U | 0.00019 U | 0.02200 | 0.00230 |
| | 7/29/2004 | Round 11 (PDB) | 0.00035 U | 0.00025 U | 0.00010 U | 0.00017 U | 0.00300 | 0.00040 U | 0.00021 U | 0.00023 U | 0.02200 | 0.00230 |
| | 10/13/2004 | Round 12 (PBD) | 0.00035 U | 0.00025 U | 0.00010 U | 0.00017 U | 0.00290 | 0.00040 U | 0.00021 U | 0.00023 U | 0.02000 | 0.00200 |
| | 4/4/2005 | Round 13 (PDB) | 0.00040 U | 0.00030 U | 0.00040 U | 0.00030 U | 0.00600 | 0.00200 U | 0.00040 U | 0.00030 U | 0.02900 | 0.00400 |
| | 10/6/2005 | Round 14 | 0.00040 U | 0.00030 U | 0.00040 U | 0.00030 U | 0.00300 | 0.00200 U | 0.00040 U | 0.00030 U | 0.02700 | 0.00300 |
| | 5/18/2006 | Round 15B | 0.00060 U | 0.00050 U | 0.00040 U | 0.00060 U | 0.00400 | 0.00200 U | 0.00060 U | 0.00060 U | 0.02500 | 0.00400 |
| | 8/25/2006 | Round 16 | 0.00060 U | 0.00050 U | 0.00040 U | 0.00060 UJ | 0.00200 | 0.00200 U | 0.00060 U | 0.00060 U | 0.02400 | 0.00200 |
| | 5/8/2007 | Round 17 (PDB) | 0.00028 U | 0.00020 U | 0.00023 U | 0.00017 U | 0.00280 | 0.00025 U | 0.00014 U | 0.00053 U | 0.01900 | 0.00300 |
| | 8/23/2007 | Round 18 | 0.00042 U | 0.00014 U | 0.00010 U | 0.00400 U | 0.00200 | 0.00026 U | 0.00014 U | 0.00040 U | 0.01700 | 0.00260 |
| | 1/31/2008 | Round 19 (PDB) | 0.00039 U | 0.00044 U | 0.00036 U | 0.00060 U | 0.00210 | 0.00040 U | 0.00046 U | 0.00048 U | 0.01600 | 0.00120 J |
| | 7/22/2008 | Round 20 (PDB) | 0.00054 U | 0.00022 U | 0.00028 U | 0.00061 U | 0.00200 | 0.00100 U | 0.00022 U | 0.00045 U | 0.01050 | 0.00130 |
| | 1/12/2009 | Round 21 (PDB) | 0.00054 U | 0.00022 U | 0.00028 U | 0.00061 U | 0.00210 | 0.00100 U | 0.00022 U | 0.00045 U | 0.01590 | 0.00120 |
| | 7/14/2009 | Round 22 | 0.00054 U | 0.00022 U | 0.00028 U | 0.00061 U | 0.00150 | 0.00100 U | 0.00022 U | 0.00045 U | 0.01180 | 0.00080 J |
| | 1/11/2010 | Round 23 (PDB) | 0.00054 U | 0.00022 U | 0.00028 U | 0.00061 U | 0.00130 | 0.00100 U | 0.00022 U | 0.00045 U | 0.01220 | 0.00047 J |
| | 7/13/2010 | Round 24 (PDB) | 0.00029 U | 0.00034 U | 0.00025 U | 0.00050 U | 0.00100 | 0.00200 U | 0.00044 U | 0.00034 U | 0.01270 | 0.00028 U |
| | 1/11/2011 | Round 25 (PDB) | 0.00023 U | 0.00025 U | 0.00022 U | 0.00050 U | 0.00110 | 0.00200 U | 0.00025 U | 0.00035 U | 0.01160 | 0.00022 U |
| | 7/27/2011 | Round 26 | 0.00023 U | 0.00025 U | 0.00038 J | 0.00050 U | 0.00061 J | 0.00200 U | 0.00025 U | 0.00035 U | 0.00750 | 0.00022 U |
| | 1/11/2012 | Round 27 (PDB) | 0.00023 U | 0.00025 U | 0.00073 J | 0.00050 U | 0.00059 J | 0.00200 U | 0.00025 U | 0.00035 U | 0.0063 | 0.00022 U |
| | 7/9/212 | Round 28 | 0.00023 U | NS | NS | NS | 0.00026 U | NS | NS | 0.00035 U | 0.0062 | 0.00022 U |
| | 1/8/2013 | Round 29 (PDB) | 0.00020 U | 0.00031 U | 0.00051 J | 0.00050 U | 0.00077 J | 0.0020 U | 0.00032 U | 0.00023 U | 0.0065 | 0.00044 U |
| | 7/16/2013 | Round 30 | 0.00020 U | 0.00031 U | 0.00052 J | 0.00050 U | 0.00047 J | 0.0020 U | 0.00032 U | 0.00023 U | 0.0053 | 0.00044 U |
| | 1/28/2014 | Round 31 (PDB) | 0.00025 U | 0.0004 U | 0.00031 U | 0.00053 U | 0.00049 J | 0.00020 U | 0.00026 U | 0.00034 U | 0.0036 | 0.00033 U |
| | 7/15/2014 | Round 32 | 0.00025 U | 0.00025 U | 0.00025 U | 0.00025 U | 0.00025 J | 0.0005 U | 0.00025 U | 0.00025 U | 0.00149 | 0.00025 U |
| | 1/21/2015 | Round 33 (PDB) | 0.00025 U | NS | NS | NS | 0.00025 U | NS | NS | 0.00025 U | 0.00071 J | 0.00025 U |
| | 7/22/2015 | Round 34 | 0.00025 U | NS | NS | NS | 0.00025 U | NS | 0.00025 U | 0.00025 U | 0.000868 J | 0.00025 U |
| | 1/21/2016 | Round 35 (PDB) | 0.00025 U | NS | NS | NS | 0.00025 U | NS | NS | 0.00025 U | 0.00048 J | 0.00025 U |
| | 7/23/2016 | Round 36 | 0.00025 U | 0.00025 U | 0.00025 U | 0.00025 U | 0.00025 U | 0.0005 U | 0.00025 U | 0.00025 U | 0.00058 J | 0.00025 U |

**Table 4-1A**

**Summary of Chemicals of Concern Detected IN GROUNDWATER**
**Long Term Monitoring Wells — SWMU 17/Biulding 1429 Plume**
**2016 RAER**

**Former NAS Dallas, Texas**


| Monitoring Well | Sampling Date | Sampling Round | Chemicals of Concern (mg/L) | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | 1,1-Dichloroethene | Carbon Tetrachloride | Chloroform | Chloromethane | cis-1,2-Dichloroethene | Methylene Chloride | Tetrachloroethene | trans-1,2-Dichloroethene | Trichloroethene | Vinyl Chloride |
| **Protective Concentration Levels (mg/L)** | | | **0.00700** | **0.00500** | **0.24000** | **0.07000** | **0.07000** | **0.00500** | **0.00500** | **0.10000** | **0.00500** | **0.00200** |
| **612D38MW** | 5/4/1998 | | Well Installed | | | | | | | | | |
| | 5/16/1998 | Round 2 | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.01300 | 0.00500 U | 0.00500 U | 0.01100 | 0.05100 | 0.00500 U |
| | 8/31/1998 | Round 3 | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.01700 | 0.00500 U | 0.00500 U | 0.01000 | 0.05900 | 0.00500 U |
| | 4/1/1999 | Round 4 | 0.00061 J | 0.00500 U | 0.00500 U | 0.00500 U | 0.01000 | 0.00500 U | 0.00500 U | 0.00570 | 0.03300 | 0.00500 U |
| | 11/3/1999 | Round 5 | 0.00077 J | 0.00500 U | 0.00500 U | 0.00500 U | 0.01300 | 0.00530 | 0.00500 U | 0.00790 | 0.03700 | 0.00500 U |
| | 7/21/2000 | Round 6 | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.01100 | 0.00500 U | 0.00500 U | 0.00660 | 0.03300 | 0.00500 U |
| | 7/13/2001 | Round 7 (PDB) | 0.00500 U | 0.00500 U | 0.00500 U | 0.01000 U | 0.01000 | 0.00500 U | 0.00500 U | 0.00680 | 0.01800 | 0.01000 U |
| | 1/12/2003 | Round 8 | 0.00100 U | 0.00100 U | 0.00100 U | 0.00100 U | 0.00670 | 0.00200 U | 0.00100 U | 0.00480 | 0.01400 | 0.00022 J |
| | 1/12/2003 | Round 8 (PDB) | 0.00100 U | 0.00100 U | 0.00100 U | 0.00100 U | 0.00690 | 0.00023 J | 0.00100 U | 0.00490 | 0.01400 | 0.00100 U |
| | 8/25/2003 | Round 9 (PDB) | 0.00030 J | 0.00018 U | 0.00021 U | 0.00026 U | 0.00790 | 0.00028 U | 0.00012 U | 0.00500 | 0.00660 | 0.00026 U |
| | 12/9/2003 | Round 10 | 0.00045 J | 0.00020 U | 0.00014 U | 0.00008 U | 0.00890 | 0.00016 U | 0.00024 U | 0.00540 | 0.01500 | 0.00028 J |
| | 7/29/2004 | Round 11 (PDB) | 0.00035 U | 0.00025 U | 0.00010 U | 0.00017 U | 0.00540 | 0.00040 U | 0.00021 U | 0.00410 | 0.00510 | 0.00017 U |
| | 10/13/2004 | Round 12 (PBD) | 0.00035 U | 0.00025 U | 0.00010 U | 0.00017 U | 0.00560 | 0.00040 U | 0.00021 U | 0.00360 | 0.00570 | 0.00017 U |
| | 4/3/2005 | Round 13 (PDB) | 0.00040 U | 0.00030 U | 0.00040 U | 0.00030 U | 0.00600 | 0.00200 U | 0.00040 U | 0.00600 | 0.00900 | 0.00030 U |
| | 10/17/2005 | Round 14 | 0.00060 J | 0.00030 U | 0.00040 U | 0.00030 U | 0.01300 | 0.00200 U | 0.00040 U | 0.01300 | 0.01900 | 0.00050 J |
| | 10/17/2005 | Round 14 (PDB) | 0.00040 U | 0.00030 U | 0.00040 U | 0.00030 U | 0.00700 | 0.00200 U | 0.00040 U | 0.00500 | 0.00700 | 0.00030 U |
| | 5/18/2006 | Round 15B | 0.00100 U | 0.00100 U | 0.00100 U | 0.00200 U | 0.00700 | 0.00500 UJ | 0.00100 U | 0.00500 | 0.00800 | 0.00200 U |
| | 8/23/2006 | Round 16 | 0.00060 U | 0.00050 U | 0.00040 U | 0.00060 UJ | 0.00800 | 0.00200 U | 0.00060 U | 0.00700 | 0.01100 | 0.00060 U |
| | 5/8/2007 | Round 17 (PDB) | 0.00041 J | 0.00011 U | 0.00013 U | 0.00028 U | 0.01000 | 0.00023 U | 0.00010 U | 0.00840 | 0.01600 | 0.00020 U |
| | 8/24/2007 | Round 18 | 0.00055 J | 0.00014 U | 0.00010 U | 0.00040 U | 0.01200 | 0.00026 U | 0.00014 U | 0.01100 | 0.02000 | 0.00092 J |
| | 1/31/2008 | Round 19 (PDB) | 0.00039 U | 0.00044 U | 0.00036 U | 0.00060 U | 0.00950 | 0.00040 U | 0.00046 U | 0.00730 | 0.01400 | 0.00043 U |
| | 7/22/2008 | Round 20 (PDB) | 0.00054 U | 0.00022 U | 0.00028 U | 0.00061 U | 0.00600 | 0.00100 U | 0.00022 U | 0.00390 | 0.00230 | 0.00030 U |
| | 1/12/2009 | Round 21 (PDB) | 0.00054 U | 0.00022 U | 0.00028 U | 0.00061 U | 0.01160 | 0.00100 U | 0.00022 U | 0.00760 | 0.01190 | 0.00030 U |
| | 7/14/2009 | Round 22 | 0.00062 J | 0.00022 U | 0.00028 U | 0.00061 U | 0.01800 | 0.00130 J | 0.00022 U | 0.01350 | 0.01620 | 0.00110 |
| | 1/11/2010 | Round 23 (PDB) | 0.00054 U | 0.00022 U | 0.00028 U | 0.00061 U | 0.01390 | 0.00100 U | 0.00022 U | 0.00930 | 0.01140 | 0.00030 U |
| | 7/13/2010 | Round 24 (PDB) | 0.00044 U | 0.00034 U | 0.00025 U | 0.00050 U | 0.00610 | 0.00200 U | 0.00044 U | 0.00380 | 0.00200 | 0.00028 U |
| | 1/11/2011 | Round 25 (PDB) | 0.00040 J | 0.00025 U | 0.00022 U | 0.00050 U | 0.01430 | 0.00200 U | 0.00025 U | 0.00970 | 0.00900 | 0.00022 U |
| | 7/27/2011 | Round 26 | 0.00054 J | 0.00025 U | 0.00022 U | 0.00050 U | 0.01880 | 0.00200 U | 0.00025 U | 0.01330 | 0.01260 | 0.00093 J |
| | 1/11/2012 | Round 27 (PDB) | 0.00045 J | 0.00025 U | 0.00022 U | 0.00050 U | 0.01370 | 0.00200 U | 0.00025 U | 0.00820 | 0.00930 | 0.00022 U |
| | 7/9/012 | Round 28 | 0.00023 U | NS | NS | NS | 0.0166 | NS | NS | 0.0117 | 0.0094 | 0.00022 U |
| | 1/8/2013 | Round 29 (PDB) | 0.00039 J | 0.00031 U | 0.00026 U | 0.00050 U | 0.0129 | 0.0020 U | 0.00032 U | 0.0088 | 0.0083 | 0.00044 U |
| | 7/16/2013 | Round 30 | 0.00020 U | 0.00031 U | 0.00026 U | 0.00050 U | 0.0167 | 0.0020 U | 0.00032 U | 0.0114 | 0.0113 | 0.00044 U |
| | 1/28/2014 | Round 31 (PDB) | 0.00025 U | 0.0004 U | 0.00031 U | 0.00053 U | 0.0117 | 0.00020 U | 0.00026 U | 0.0067 | 0.0092 | 0.00033 U |
| | 7/15/2014 | Round 32 | 0.00064 J | 0.00025 U | 0.00025 U | 0.00025 U | 0.0145 | 0.0005 U | 0.00025 U | 0.0088 | 0.0095 | 0.00025 U |
| | 1/21/2015 | Round 33 (PDB) | 0.00028 J | NS | NS | NS | 0.0111 | NS | NS | 0.0068 | 0.0081 | 0.00025 U |
| | 7/23/2015 | Round 34 | 0.000364 J | | | | 0.0121 | | 0.00025 U | 0.0088 | 0.0086 | 0.00025 U |
| | 1/21/2016 | Round 35 (PDB) | 0.00025 U | NS | NS | NS | 0.00649 | NS | NS | 0.004 | 0.00501 | 0.00025 U |
| | 7/23/2016 | Round 36 | 0.00025 U | 0.00025 U | 0.00025 U | 0.00025 U | 0.00577 | 0.0005 U | 0.00025 U | 0.00522 | 0.0051 | 0.00025 U |

**Table 4-1A**

**Summary of Chemicals of Concern Detected IN GROUNDWATER**
**Long Term Monitoring Wells — SWMU 17/Biulding 1429 Plume**
**2016 RAER**

**Former NAS Dallas, Texas**


| Monitoring Well | Sampling Date | Sampling Round | Chemicals of Concern (mg/L) | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | 1,1-Dichloroethene | Carbon Tetrachloride | Chloroform | Chloromethane | cis-1,2-Dichloroethene | Methylene Chloride | Tetrachloroethene | trans-1,2-Dichloroethene | Trichloroethene | Vinyl Chloride |
| **Protective Concentration Levels (mg/L)** | | | **0.00700** | **0.00500** | **0.24000** | **0.07000** | **0.07000** | **0.00500** | **0.00500** | **0.10000** | **0.00500** | **0.00200** |
| **612D111MW** | 8/3/2000 | | Well Installed | | | | | | | | | |
| | 8/18/2000 | Round 6 | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.01100 | 0.00500 U | 0.00500 U | 0.00500 U | 0.09700 | 0.00500 U |
| | 7/13/2001 | Round 7 | 0.00500 U | 0.00500 U | 0.00500 U | 0.01000 U | 0.01200 | 0.00500 U | 0.00500 U | 0.00250 U | 0.05400 | 0.01000 U |
| | 1/21/2003 | Round 8 | 0.00200 U | 0.00200 U | 0.00200 U | 0.00200 U | 0.00560 J | 0.00400 U | 0.00200 U | 0.00200 U | 0.04500 J | 0.00038 J |
| | 1/21/2003 | Round 8 (PDB) | 0.00100 U | 0.00100 U | 0.00100 U | 0.00100 U | 0.00420 | 0.00200 U | 0.00100 U | 0.00100 U | 0.03400 | 0.00042 J |
| | 8/25/2003 | Round 9 (PDB) | 0.00088 U | 0.00072 U | 0.00084 U | 0.00100 U | 0.00640 | 0.00110 U | 0.00048 U | 0.00096 U | 0.10000 | 0.00100 U |
| | 12/16/2003 | Round 10 | 0.00021 U | 0.00020 U | 0.00014 U | 0.00008 U | 0.00440 | 0.00016 U | 0.00024 U | 0.00019 U | 0.06700 | 0.00038 J |
| | 7/29/2004 | Round 11 (PDB) | 0.00035 U | 0.00025 U | 0.00010 U | 0.00017 U | 0.00380 | 0.00040 U | 0.00021 U | 0.00023 U | 0.03200 | 0.00017 U |
| | 10/14/2004 | Round 12 | 0.00088 U | 0.00062 U | 0.00025 U | 0.00044 U | 0.00380 | 0.00100 U | 0.00052 U | 0.00057 U | 0.04500 | 0.00042 U |
| | 10/14/2004 | Round 12 (PBD) | 0.00088 U | 0.00062 U | 0.00025 U | 0.00044 U | 0.00460 | 0.00100 U | 0.00052 U | 0.00057 U | 0.04700 | 0.00042 U |
| | 4/3/2005 | Round 13 (PDB) | 0.00040 U | 0.00030 U | 0.00040 U | 0.00030 U | 0.00700 | 0.00200 U | 0.00040 U | 0.00030 U | 0.04800 | 0.00060 J |
| | 10/6/2005 | Round 14 | 0.00040 U | 0.00030 U | 0.00040 U | 0.00030 U | 0.00600 | 0.00200 U | 0.00040 U | 0.00030 U | 0.13000 | 0.00030 U |
| | 5/16/2006 | Round 15B | 0.00060 U | 0.00050 U | 0.00040 U | 0.00060 U | 0.00200 | 0.00200 U | 0.00060 U | 0.00060 U | 0.04400 | 0.00060 U |
| | 5/16/2006 | Round 15 (PDB) | 0.00060 U | 0.00050 U | 0.00040 U | 0.00060 U | 0.00100 | 0.00200 U | 0.00060 U | 0.00060 U | 0.01400 | 0.00060 U |
| | 8/24/2006 | Round 16 | 0.00060 U | 0.00050 U | 0.00040 U | 0.00060 U | 0.00400 | 0.00200 U | 0.00060 U | 0.00060 U | 0.12000 | 0.00060 U |
| | 8/23/2006 | Round 16 (PDB) | 0.00060 U | 0.00050 U | 0.00040 U | 0.00060 U | 0.00500 | 0.00200 U | 0.00060 U | 0.00060 U | 0.12000 | 0.00060 U |
| | 5/9/2007 | Round 17 | 0.00028 U | 0.00020 U | 0.00023 U | 0.00017 U | 0.00440 | 0.00025 U | 0.00014 U | 0.00053 U | 0.05300 | 0.00022 J |
| | 5/9/2007 | Round 17 (PDB) | 0.00028 U | 0.00020 U | 0.00023 U | 0.00017 U | 0.00440 | 0.00025 U | 0.00014 U | 0.00053 U | 0.04000 | 0.00032 J |
| | 8/23/2007 | Round 18 | 0.00042 U | 0.00014 U | 0.00010 U | 0.00040 U | 0.00380 | 0.00026 U | 0.00014 U | 0.00040 U | 0.06000 | 0.00019 U |
| | 1/29/2008 | Round 19 | 0.00039 U | 0.00044 U | 0.00036 U | 0.00060 U | 0.00380 | 0.00040 U | 0.00046 U | 0.00048 U | 0.05200 | 0.00043 U |
| | 1/29/2008 | Round 19 (PDB) | 0.00039 U | 0.00044 U | 0.00036 U | 0.00060 U | 0.00410 | 0.00040 U | 0.00046 U | 0.00048 U | 0.04100 | 0.00043 U |
| | 7/22/2008 | Round 20 | 0.00054 U | 0.00022 U | 0.00028 U | 0.00061 U | 0.00065 J | 0.00100 U | 0.00022 U | 0.00045 U | 0.00470 | 0.00030 U |
| | 1/12/2009 | Round 21 | 0.00054 U | 0.00022 U | 0.00028 U | 0.00061 U | 0.00400 | 0.00100 U | 0.00044 J | 0.00045 U | 0.07710 | 0.00030 U |
| | 1/12/2009 | Round 21 (PDB) | 0.00054 U | 0.00022 U | 0.00028 U | 0.00061 U | 0.00450 | 0.00100 U | 0.00022 U | 0.00045 U | 0.09520 | 0.00030 U |
| | 7/14/2009 | Round 22 | 0.00054 U | 0.00022 U | 0.00028 U | 0.00061 U | 0.00330 | 0.00100 U | 0.00022 U | 0.00045 U | 0.07820 | 0.00030 U |
| | 1/11/2010 | Round 23 | 0.00054 U | 0.00022 U | 0.00028 U | 0.00061 U | 0.00300 | 0.00100 U | 0.00022 U | 0.00045 U | 0.03130 | 0.00030 U |
| | 1/11/2010 | Round 23 (PDB) | 0.00054 U | 0.00022 U | 0.00028 U | 0.00061 U | 0.00270 | 0.00100 U | 0.00022 U | 0.00045 U | 0.02530 | 0.00030 U |
| | 7/13/2010 | Round 24 | 0.00029 U | 0.00034 U | 0.00025 U | 0.00050 U | 0.00400 | 0.00200 U | 0.00044 U | 0.00034 U | 0.05230 JL | 0.00028 U |
| | 1/11/2011 | Round 25 (PDB) | 0.00023 U | 0.00025 U | 0.00022 U | 0.00050 U | 0.00140 | 0.00200 U | 0.00025 U | 0.00035 U | 0.01750 | 0.00022 U |
| | 7/27/2011 | Round 26 | 0.00023 U | 0.00025 U | 0.00022 U | 0.00050 U | 0.00300 | 0.00200 U | 0.00025 U | 0.00035 U | 0.09590 | 0.00022 U |
| | 1/10/2012 | Round 27 (PDB) | 0.00023 U | 0.00025 U | 0.00022 U | 0.00050 U | 0.0028 | 0.00200 U | 0.00025 U | 0.00035 U | 0.0171 | 0.00022 U |
| | 1/10/2012 | Round 27 | 0.00023 U | 0.00025 U | 0.00022 U | 0.00050 U | 0.0032 | 0.00200 U | 0.00025 U | 0.00035 U | 0.0128 | 0.00022 U |
| | 7/9/012 | Round 28 | 0.00023 U | NS | NS | NS | 0.0027 | NS | NS | 0.00035 U | 0.0614 | 0.00022 U |
| | 1/8/2013 | Round 29 (PDB) | 0.00020 U | 0.00031 U | 0.00026 U | 0.00050 U | 0.0027 | 0.0020 U | 0.00032 U | 0.00023 U | 0.0475 | 0.00044 U |
| | 1/8/2013 | Round 29 | 0.00020 U | 0.00031 U | 0.00026 U | 0.00050 U | 0.0028 | 0.0020 U | 0.00032 U | 0.00023 U | 0.0514 JH | 0.00044 U |
| | 7/16/2013 | Round 30 | 0.00020 U | 0.00031 U | 0.00026 U | 0.00050 U | 0.0033 | 0.0020 U | 0.00032 U | 0.00023 U | 0.0677 | 0.00044 U |
| | 1/28/2014 | Round 31 (PDB) | 0.00025 U | 0.0004 U | 0.00031 U | 0.00053 U | 0.0020 | 0.0020 U | 0.00026 U | 0.00034 U | 0.0271 | 0.00033 U |
| | 7/15/2014 | Round 32 | 0.00025 U | 0.00025 U | 0.00025 U | 0.00025 U | 0.00127 | 0.0005 U | 0.00025 U | 0.00025 U | 0.0119 J | 0.00025 U |
| | 1/21/2015 | Round 33 (PDB) | 0.00025 U | NS | NS | NS | 0.00045 J | NS | NS | 0.00025 U | 0.00171 | 0.00025 U |
| | 7/22/2015 | Round 34 | 0.00025 U | NS | NS | NS | 0.00502 | NS | 0.00025 U | 0.00025 U | 0.0226 | 0.00025 U |
| | 1/21/2016 | Round 35 (PDB) | 0.00025 U | NS | NS | NS | 0.00082 J | NS | NS | 0.00025 U | 0.00231 | 0.00025 U |
| | 7/23/2016 | Round 36 | 0.00025 U | 0.00025 U | 0.00025 U | 0.00025 U | 0.00806 | 0.0005 U | 0.00025 U | 0.00154 | 0.0116 | 0.00025 J |

**Table 4-1A**

**Summary of Chemicals of Concern Detected IN GROUNDWATER**
**Long Term Monitoring Wells — SWMU 17/Biulding 1429 Plume**
**2016 RAER**

**Former NAS Dallas, Texas**


| Monitoring Well | Sampling Date | Sampling Round | Chemicals of Concern (mg/L) | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | 1,1-Dichloroethene | Carbon Tetrachloride | Chloroform | Chloromethane | cis-1,2-Dichloroethene | Methylene Chloride | Tetrachloroethene | trans-1,2-Dichloroethene | Trichloroethene | Vinyl Chloride |
| **Protective Concentration Levels (mg/L)** | | | **0.00700** | **0.00500** | **0.24000** | **0.07000** | **0.07000** | **0.00500** | **0.00500** | **0.10000** | **0.00500** | **0.00200** |
| **612D129MW** | 3/29/2005 | | Well Installed | | | | | | | | | |
| | 5/1/2005 | Round 13 | 0.00040 U | 0.00030 U | 0.00040 U | 0.00030 U | 0.00800 | 0.00200 U | 0.00040 U | 0.00070 J | 0.02800 | 0.00030 U |
| | 5/1/2005 | Round 13 (PDB) | 0.00040 U | 0.00030 U | 0.00040 U | 0.00030 U | 0.00800 | 0.00200 U | 0.00040 U | 0.00070 J | 0.02300 | 0.00030 U |
| | 8/1/2005 | Round 13B | 0.00040 U | 0.00030 U | 0.00040 U | 0.00030 U | 0.00700 | 0.00200 U | 0.00040 U | 0.00060 J | 0.01600 | 0.00030 U |
| | 8/1/2005 | Round 13B (PDB) | 0.00040 U | 0.00030 U | 0.00040 U | 0.00030 U | 0.00800 | 0.00200 U | 0.00040 U | 0.00050 J | 0.01000 | 0.00030 U |
| | 10/6/2005 | Round 14 | 0.00040 U | 0.00030 U | 0.00040 U | 0.00030 U | 0.00800 | 0.00200 U | 0.00040 U | 0.00070 J | 0.01800 | 0.00030 J |
| | 1/18/2006 | Round 15B | 0.00040 J | 0.00030 U | 0.00040 U | 0.00030 U | 0.01000 | 0.00200 U | 0.00040 U | 0.00080 J | 0.02200 | 0.00040 J |
| | 8/24/2006 | Round 16 | 0.00060 U | 0.00050 U | 0.00040 U | 0.00060 U | 0.01100 | 0.00200 U | 0.00060 U | 0.00090 J | 0.01900 | 0.00060 U |
| | 5/9/2007 | Round 17 (PDB) | 0.00044 J | 0.00020 U | 0.00023 U | 0.00017 U | 0.01000 | 0.00025 J | 0.00014 U | 0.00098 J | 0.02500 | 0.00044 J |
| | 8/24/2007 | Round 18 | 0.00042 U | 0.00014 U | 0.00010 U | 0.00040 U | 0.00800 | 0.00026 U | 0.00014 U | 0.00059 J | 0.02000 | 0.00026 J |
| | 1/30/2008 | Round 19 (PDB) | 0.00039 U | 0.00044 U | 0.00036 U | 0.00060 U | 0.00830 | 0.00040 U | 0.00046 U | 0.00072 J | 0.02000 | 0.00043 U |
| | 7/22/2008 | Round 20 (PDB) | 0.00054 U | 0.00022 U | 0.00028 U | 0.00061 U | 0.00710 | 0.00100 U | 0.00022 U | 0.00071 J | 0.01100 | 0.00030 U |
| | 1/12/2009 | Round 21 (PDB) | 0.00054 U | 0.00022 U | 0.00028 U | 0.00061 U | 0.00730 | 0.00100 U | 0.00022 U | 0.00092 J | 0.02150 | 0.00030 U |
| | 7/14/2009 | Round 22 | 0.00054 U | 0.00022 U | 0.00028 U | 0.00061 U | 0.00610 | 0.00100 U | 0.00022 U | 0.00058 J | 0.01430 | 0.00030 U |
| | 1/11/2010 | Round 23 (PDB) | 0.00054 U | 0.00022 U | 0.00028 U | 0.00061 U | 0.00670 | 0.00100 U | 0.00022 U | 0.00079 J | 0.01860 | 0.00030 U |
| | 7/13/2010 | Round 24 (PDB) | 0.00029 U | 0.00034 U | 0.00025 U | 0.00050 U | 0.00650 | 0.00200 U | 0.00044 U | 0.00062 J | 0.01270 | 0.00028 U |
| | 1/11/2011 | Round 25 (PDB) | 0.00023 U | 0.00025 U | 0.00022 U | 0.00050 U | 0.00480 | 0.00200 U | 0.00025 U | 0.00037 J | 0.01250 | 0.00022 U |
| | 7/27/2011 | Round 26 | 0.00023 U | 0.00025 U | 0.00022 U | 0.00050 U | 0.00550 | 0.00200 U | 0.00025 U | 0.00046 J | 0.01320 | 0.00022 U |
| | 1/10/2012 | Round 27 (PDB) | 0.00023 U | 0.00025 U | 0.00022 U | 0.00050 U | 0.0046 | 0.00200 U | 0.00025 U | 0.00042 J | 0.0128 | 0.00022 U |
| | 7/9/012 | Round 28 | 0.00023 U | NS | NS | NS | 0.0045 | NS | NS | 0.00047 J | 0.0096 | 0.00022 U |
| | 1/8/2013 | Round 29 (PDB) | 0.00020 U | 0.00031 U | 0.00026 U | 0.00050 U | 0.0049 | 0.0020 U | 0.00032 U | 0.00042 J | 0.0123 | 0.00044 U |
| | 7/16/2013 | Round 30 | 0.00020 U | 0.00031 U | 0.00026 U | 0.00050 U | 0.0056 | 0.0020 U | 0.00032 U | 0.00046 J | 0.0123 | 0.00044 U |
| | 1/28/2014 | Round 31 (PDB) | 0.00025 U | 0.0004 U | 0.00031 U | 0.00053 U | 0.00490 | 0.0020 U | 0.00026 U | 0.0004 J | 0.01360 | 0.00033 U |
| | 7/15/2014 | Round 32 | 0.00025 U | 0.00025 U | 0.00025 U | 0.00025 U | 0.00527 | 0.0005 U | 0.00025 U | 0.00038 J | 0.00951 | 0.00025 U |
| | 1/21/2015 | Round 33 (PDB) | 0.00025 U | NS | NS | NS | 0.00531 | NS | NS | 0.00051 J | 0.01230 | 0.00025 U |
| | 7/23/2015 | Round 34 | 0.00025 U | NS | NS | NS | 0.00531 | NS | 0.00025 U | 0.000418 J | 0.01030 | 0.00025 U |
| | 1/21/2016 | Round 35 (PDB) | 0.00025 U | NS | NS | NS | 0.00548 | NS | NS | 0.00039 J | 0.0134 | 0.00025 U |
| | 7/23/2016 | Round 36 | 0.00025 U | 0.00025 U | 0.00025 U | 0.00025 U | 0.00461 | 0.0005 U | 0.00025 U | 0.00034 J | 0.00855 | 0.00025 U |

**Table 4-1A**

**Summary of Chemicals of Concern Detected IN GROUNDWATER**
**Long Term Monitoring Wells — SWMU 17/Biulding 1429 Plume**
**2016 RAER**

**Former NAS Dallas, Texas**
**Page 8 OF 8**

| Monitoring Well | Sampling Date | Sampling Round | Chemicals of Concern (mg/L) | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | 1,1-Dichloroethene | Carbon Tetrachloride | Chloroform | Chloromethane | cis-1,2-Dichloroethene | Methylene Chloride | Tetrachloroethene | trans-1,2-Dichloroethene | Trichloroethene | Vinyl Chloride |
| **Protective Concentration Levels (mg/L)** | | | **0.00700** | **0.00500** | **0.24000** | **0.07000** | **0.07000** | **0.00500** | **0.00500** | **0.10000** | **0.00500** | **0.00200** |
| **614D09MW** | 4/20/1998 | | Well Installed | | | | | | | | | |
| | 5/13/1998 | Round 2 | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.01400 | 0.00500 U | 0.00500 U | 0.00500 U | 0.01300 | 0.00490 J |
| | 8/30/1998 | Round 3 | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.01200 | 0.00500 U | 0.00500 U | 0.00500 U | 0.00870 | 0.00250 J |
| | 3/30/1999 | Round 4 | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00810 | 0.00500 U | 0.00500 U | 0.00500 U | 0.00820 | 0.00120 J |
| | 11/4/1999 | Round 5 | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00970 | 0.00500 U | 0.00500 U | 0.00500 U | 0.00880 | 0.00160 J |
| | 7/24/2000 | Round 6 | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00420 J | 0.00500 U | 0.00500 U | 0.00500 U | 0.00650 | 0.00500 U |
| | 7/13/2001 | Round 7 | 0.00500 U | 0.00500 U | 0.00500 U | 0.01000 U | 0.00490 | 0.00500 U | 0.00500 U | 0.00250 U | 0.00390 J | 0.00160 J |
| | 1/21/2003 | Round 8 | 0.00100 U | 0.00100 U | 0.00100 U | 0.00100 U | 0.00340 | 0.00200 U | 0.00100 U | 0.00100 U | 0.00390 | 0.00068 J |
| | 1/21/2003 | Round 8 (PDB) | 0.00100 U | 0.00100 U | 0.00100 U | 0.00100 U | 0.00340 | 0.00200 U | 0.00100 U | 0.00100 U | 0.00440 | 0.00056 J |
| | -- | Round 9 | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS |
| | 12/22/2003 | Round 10 | 0.00021 U | 0.00020 U | 0.00014 U | 0.00008 U | 0.00064 J | 0.00016 U | 0.00024 U | 0.00019 U | 0.00160 | 0.00017 U |
| | 7/29/2004 | Round 11 (PDB) | 0.00035 U | 0.00025 U | 0.00010 U | 0.00017 U | 0.00033 J | 0.00040 U | 0.00021 U | 0.00023 U | 0.00066 J | 0.00017 U |
| | 10/13/2004 | Round 12 (PDB) | 0.00035 U | 0.00025 U | 0.00010 U | 0.00017 U | 0.00058 J | 0.00040 U | 0.00021 U | 0.00023 U | 0.00047 J | 0.00017 U |
| | -- | Round 13 | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS |
| | 10/19/2005 | Round 14 | 0.00040 U | 0.00030 U | 0.00040 U | 0.00030 U | 0.00080 J | 0.00200 U | 0.00040 U | 0.00030 U | 0.00060 J | 0.00060 J |
| | 5/18/2006 | Round 15B | 0.00060 U | 0.00050 U | 0.00040 U | 0.00060 U | 0.00050 U | 0.00200 U | 0.00060 U | 0.00060 U | 0.00100 | 0.00060 U |
| | 8/23/2006 | Round 16 | 0.00060 U | 0.00050 U | 0.00040 U | 0.00060 UJ | 0.00050 U | 0.00200 U | 0.00060 U | 0.00060 U | 0.00060 J | 0.00060 U |
| | 5/8/2007 | Round 17 | 0.00013 U | 0.00011 U | 0.00013 U | 0.00028 U | 0.00100 | 0.00023 U | 0.00010 U | 0.00015 U | 0.00210 | 0.00020 U |
| | 8/24/2007 | Round 18 | 0.00042 U | 0.00014 U | 0.00010 U | 0.00040 U | 0.00044 U | 0.00026 U | 0.00014 U | 0.00040 U | 0.00120 | 0.00020 J |
| | 1/30/2008 | Round 19 (PDB) | 0.00039 U | 0.00044 U | 0.00036 U | 0.00060 U | 0.00038 J | 0.00040 U | 0.00046 U | 0.00048 U | 0.00099 J | 0.00043 U |
| | 7/22/2008 | Round 20 (PDB) | 0.00054 U | 0.00022 U | 0.00028 U | 0.00061 U | 0.00032 J | 0.00100 U | 0.00022 U | 0.00045 U | 0.00043 J | 0.00030 U |
| | 1/12/2009 | Round 21 (PDB) | 0.00054 U | 0.00022 U | 0.00028 U | 0.00061 U | 0.00020 U | 0.00100 U | 0.00022 U | 0.00045 U | 0.00046 J | 0.00030 U |
| | 7/14/2009 | Round 22 | 0.00054 U | 0.00022 U | 0.00028 U | 0.00061 U | 0.00020 U | 0.00100 U | 0.00022 U | 0.00045 U | 0.00090 J | 0.00030 U |
| | 1/11/2010 | Round 23 (PDB) | 0.00054 U | 0.00022 U | 0.00028 U | 0.00061 U | 0.00020 U | 0.00100 U | 0.00022 U | 0.00045 U | 0.00051 J | 0.00030 U |
| | 7/13/2010 | Round 24 (PDB) | 0.00029 U | 0.00034 U | 0.00025 U | 0.00050 U | 0.00063 J | 0.00200 U | 0.00044 U | 0.00034 U | 0.00043 J | 0.00100 |
| | 1/11/2011 | Round 25 (PDB) | 0.00023 U | 0.00025 U | 0.00022 U | 0.00050 U | 0.00026 U | 0.00200 U | 0.00025 U | 0.00035 U | 0.00065 J | 0.00022 U |
| | 7/27/2011 | Round 26 | 0.00023 U | 0.00025 U | 0.00022 U | 0.00050 U | 0.00026 U | 0.00200 U | 0.00025 U | 0.00035 U | 0.00110 | 0.00022 U |
| | 1/11/2012 | Round 27 (PDB) | 0.00023 U | 0.00025 U | 0.00022 U | 0.00050 U | 0.00026 U | 0.00200 U | 0.00025 U | 0.00035 U | 0.00051 J | 0.00022 U |
| | 7/9/012 | Round 28 | 0.00023 U | NS | NS | NS | 0.00026 U | NS | NS | 0.00035 U | 0.00026 U | 0.00022 U |
| | 1/8/2013 | Round 29 (PDB) | 0.00020 U | 0.00031 U | 0.00026 U | 0.00050 U | 0.00024 U | 0.0020 U | 0.00032 U | 0.00023 U | 0.00054 J | 0.00044 U |
| | 7/16/2013 | Round 30 | 0.00020 U | 0.00031 U | 0.00026 U | 0.00050 U | 0.00024 U | 0.0020 U | 0.00032 U | 0.00023 U | 0.00062 J | 0.00044 U |
| | 1/28/2014 | Round 31 (PDB) | 0.00025 U | 0.0004 U | 0.00031 U | 0.00053 U | 0.00033 U | 0.00020 U | 0.00026 U | 0.00034 U | 0.00030 U | 0.00033 U |
| | 7/15/2014 | Round 32 | 0.00025 U | 0.00025 U | 0.00025 U | 0.00025 U | 0.00025 U | 0.0005 U | 0.00025 U | 0.00025 U | 0.00051 J | 0.00025 U |
| | 1/21/2015 | Round 33 (PDB) | 0.00025 U | NS | NS | NS | 0.00027 J | NS | NS | 0.00025 U | 0.00139 | 0.00025 U |
| | 7/23/2015 | Round 34 | 0.00025 U | NS | NS | NS | 0.00025 U | NS | 0.00025 U | 0.00025 U | 0.00200 | 0.00025 U |
| | 1/21/2016 | Round 35 (PDB) | 0.00025 U | NS | NS | NS | 0.00025 U | NS | NS | 0.00025 U | 0.00191 | 0.00025 U |
| | 7/23/2016 | Round 36 | 0.00025 U | 0.00025 U | 0.00025 U | 0.00025 U | 0.00025 U | 0.0005 U | 0.00025 U | 0.00025 U | 0.00279 | 0.00025 U |

mg/L - milligrams per liter
NA - Not Applicable
NS - Not Sampled
PDB - Passive Diffusion Bag
SDG - Sample Delivery Group
PCLE - Protective Concentration Level Exceedance

Notes:
Shaded areas indicate an exceedance.

Analytical Result Qualifiers:
J - Indicates that the chemical was detected. However, the associated numerical result may not be a precise representation of the amount that is actually present in the sample. The laboratory reported concentration is considered to be an estimate of the true concentration.
U - Indicates that the chemical was not detected at the numerical detection limit (sample-specific quantitation limit) noted. Nondetected results from the laboratory are reported in this manner. This qualifier is added to a positive result (reported by the laboratory) if the detected concentration is determined to be attributable to contamination introduced during field sampling or laboratory analysis.
UJ - Indicates that the chemical was not detected. However, the detection limit (sample-specific quantitation limit) is considered to be estimated based on problems encountered during laboratory analysis. The associated numerical detection limit is regarded as inaccurate or imprecise.

**Table 4-1B**

**Summary of Chemicals of Concern Detected IN GROUNDWATER**
**Historical Monitoring Wells — SWMU 17/Buidling 1429 Plume**
**2016 RAER**

**Former NAS Dallas, Texas**


| Monitoring Well | Sampling Date | Sampling Round | Chemicals of Concern (mg/L) | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | 1,1-Dichloroethene | Carbon Tetrachloride | Chloroform | Chloromethane | cis-1,2-Dichloroethene | Methylene Chloride | Tetrachloroethene | trans-1,2-Dichloroethene | Trichloroethene | Vinyl Chloride |
| **Protective Concentration Levels (mg/L)** | | | **0.00700** | **0.00500** | **0.24000** | **0.07000** | **0.07000** | **0.00500** | **0.00500** | **0.10000** | **0.00500** | **0.00200** |
| **Monitoring Wells Located Inside PCLE Zone** | | | | | | | | | | | | |
| **60304MW** | 11/3/1995 | Round 1 | 0.00500 U | 0.00500 U | 0.00500 U | 0.01000 U | 0.00500 U | 0.01000 U | 0.00500 U | 0.00500 U | 0.00707 | 0.01000 U |
| | 4/29/1998 | Round 2 | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00100 J | 0.00500 U | 0.00500 U | 0.00500 U | 0.00400 J | 0.00500 U |
| | 9/21/1998 | Round 3 | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00680 | 0.00500 U |
| | 4/2/1999 | Round 4 | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00084 J | 0.00500 U | 0.00500 U | 0.00500 U | 0.00300 J | 0.00500 U |
| | 10/19/1999 | Round 5 | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00097 J | 0.00500 U | 0.00500 U | 0.00500 U | 0.00330 J | 0.00500 U |
| | 7/18/2000 | Round 6 | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00048 J | 0.00500 U | 0.00500 U | 0.00500 U | 0.00190 J | 0.00500 U |
| | 7/11/2001 | Round 7 | 0.00500 U | 0.00500 U | 0.00500 U | 0.01000 U | 0.00250 U | 0.00500 U | 0.00500 U | 0.00250 U | 0.00140 J | 0.01000 U |
| | 1/26/2003 | Round 8 (PDB) | 0.00100 U | 0.00100 U | 0.00100 U | 0.00100 U | 0.00063 J | 0.00200 U | 0.00100 U | 0.00100 U | 0.00270 | 0.00100 U |
| | -- | Round 9 | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS |
| | 12/15/2003 | Round 10 | 0.00021 U | 0.00020 U | 0.00014 U | 0.00008 U | 0.00028 J | 0.00016 U | 0.00024 U | 0.00019 U | 0.00120 | 0.00017 U |
| | 7/28/2004 | Round 11 (PDB) | 0.00035 U | 0.00025 U | 0.00010 U | 0.00017 U | 0.00030 J | 0.00040 U | 0.00021 U | 0.00023 U | 0.00096 J | 0.00017 U |
| | 10/12/2004 | Round 12 (PDB) | 0.00035 U | 0.00025 U | 0.00010 U | 0.00017 U | 0.00027 U | 0.00040 U | 0.00021 U | 0.00023 U | 0.00073 J | 0.00017 U |
| | 4/19/2005 | | Well Abandoned | | | | | | | | | |
| **612D109MW** | 8/7/2000 | | Well Installed | | | | | | | | | |
| | 8/19/2000 | Round 6 | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.01900 | 0.00500 U | 0.00500 U | 0.00500 U | 0.03300 | 0.00210 J |
| | 7/13/2001 | Round 7 | 0.00500 U | 0.00500 U | 0.00500 U | 0.01000 U | 0.02400 | 0.00500 U | 0.00500 U | 0.00170 J | 0.03100 | 0.00280 J |
| | 7/13/2001 | Round 7 (PDB) | 0.00500 U | 0.00500 U | 0.00500 U | 0.01000 U | 0.01700 | 0.00500 U | 0.00500 U | 0.00110 J | 0.02200 | 0.00160 J |
| | 1/21/2003 | Round 8 (PDB) | 0.00100 U | 0.00100 U | 0.00100 U | 0.00100 U | 0.01100 | 0.00200 U | 0.00100 U | 0.00120 | 0.01100 | 0.00041 J |
| | 8/26/2003 | Round 9 (PDB) | 0.00022 U | 0.00018 U | 0.00021 U | 0.00032 J | 0.01400 | 0.00028 U | 0.00012 U | 0.00180 | 0.00900 | 0.00110 |
| | 12/16/2003 | Round 10 | 0.00021 U | 0.00020 U | 0.00014 U | 0.00008 U | 0.00830 | 0.00016 U | 0.00024 U | 0.00150 | 0.02300 | 0.00081 J |
| | 7/29/2004 | Round 11 (PDB) | 0.00035 U | 0.00025 U | 0.00010 U | 0.00017 U | 0.00770 | 0.00040 U | 0.00021 U | 0.00180 | 0.00700 | 0.00078 J |
| | 10/13/2004 | Round 12 (PDB) | 0.00035 U | 0.00025 U | 0.00010 U | 0.00017 U | 0.00950 | 0.00040 U | 0.00021 U | 0.00110 | 0.00590 | 0.00093 J |
| | 4/19/2005 | | Well Abandoned | | | | | | | | | |
| **612D110MW** | 8/2/2000 | | Well Installed | | | | | | | | | |
| | 8/18/2000 | Round 6 | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.04300 | 0.00500 U | 0.00500 U | 0.00110 J | 0.06400 | 0.00560 |
| | 10/20/2000 | | Well Abandoned | | | | | | | | | |
| **612D112MW** | 8/5/2000 | | Well Installed | | | | | | | | | |
| | 8/19/2000 | Round 6 | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.03500 | 0.00500 U | 0.00500 U | 0.00390 J | 0.04400 | 0.00310 J |
| | 10/20/2000 | | Well Abandoned | | | | | | | | | |
| **612D113MW** | 8/5/2000 | | Well Installed | | | | | | | | | |
| | 8/18/2000 | Round 6 | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00840 | 0.00500 U | 0.00500 U | 0.00500 U | 0.15000 | 0.00500 U |
| | 7/13/2001 | Round 7 (PDB) | 0.01200 U | 0.01200 U | 0.01200 U | 0.02500 U | 0.02600 | 0.01200 U | 0.01200 U | 0.01200 | 0.01500 | 0.02500 U |
| | 1/21/2003 | Round 8 | 0.00100 U | 0.00100 U | 0.00100 U | 0.00100 U | 0.00440 | 0.00200 U | 0.00100 U | 0.00780 | 0.00076 J | 0.00100 U |
| | 1/21/2003 | Round 8 (PDB) | 0.00100 U | 0.00100 U | 0.00100 U | 0.00100 U | 0.00074 J | 0.00200 U | 0.00100 U | 0.00077 J | 0.00027 J | 0.00100 U |
| | -- | Round 9 | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS |
| | 12/16/2003 | Round 10 | 0.00021 U | 0.00020 U | 0.00014 U | 0.00008 U | 0.00560 | 0.00016 U | 0.00024 U | 0.00070 J | 0.01500 | 0.00041 J |
| | 7/29/2004 | Round 11 (PDB) | 0.00035 U | 0.00025 U | 0.00100 | 0.00017 U | 0.00027 U | 0.00040 U | 0.00021 U | 0.00023 U | 0.00033 J | 0.00017 U |
| | 10/13/2004 | Round 12 (PDB) | 0.00035 U | 0.00025 U | 0.00010 U | 0.00017 U | 0.00027 U | 0.00040 U | 0.00021 U | 0.00023 U | 0.00071 J | 0.00017 U |
| | 4/19/2005 | | Well Abandoned | | | | | | | | | |
| **612D114MW** | 8/5/2000 | | Well Installed | | | | | | | | | |
| | -- | Round 6 | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS |
| | 7/13/2001 | Round 7 (PDB) | 0.00500 U | 0.00500 U | 0.00500 U | 0.01000 U | 0.00250 U | 0.00500 U | 0.00500 U | 0.00250 U | 0.00500 U | 0.01000 U |
| | 1/21/2003 | Round 8 | 0.00100 U | 0.00100 U | 0.00100 U | 0.00100 U | 0.00053 J | 0.00200 U | 0.00100 U | 0.00100 U | 0.00028 J | 0.00100 U |
| | 1/21/2003 | Round 8 (PDB) | 0.00100 U | 0.00100 U | 0.00100 U | 0.00100 U | 0.00100 U | 0.00200 U | 0.00100 U | 0.00100 U | 0.00100 U | 0.00100 U |
| | -- | Round 9 | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS |
| | 12/21/2003 | Round 10 | 0.00021 U | 0.00020 U | 0.00014 U | 0.00008 U | 0.00016 U | 0.00016 U | 0.00024 U | 0.00019 U | 0.00010 U | 0.00017 U |
| | -- | Round 11 | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS |
| | 10/13/2004 | Round 12 (PDB) | 0.00035 U | 0.00025 U | 0.00010 U | 0.00017 U | 0.00027 U | 0.00040 U | 0.00021 U | 0.00023 U | 0.00022 U | 0.00017 U |
| | 4/19/2005 | | Well Abandoned | | | | | | | | | |

**Table 4-1B**

**Summary of Chemicals of Concern Detected IN GROUNDWATER**
**Historical Monitoring Wells — SWMU 17/Buidling 1429 Plume**
**2016 RAER**

**Former NAS Dallas, Texas**
**Page 2 OF 5**

| Monitoring Well | Sampling Date | Sampling Round | Chemicals of Concern (mg/L) | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | 1,1-Dichloroethene | Carbon Tetrachloride | Chloroform | Chloromethane | cis-1,2-Dichloroethene | Methylene Chloride | Tetrachloroethene | trans-1,2-Dichloroethene | Trichloroethene | Vinyl Chloride |
| **Protective Concentration Levels (mg/L)** | | | **0.00700** | **0.00500** | **0.24000** | **0.07000** | **0.07000** | **0.00500** | **0.00500** | **0.10000** | **0.00500** | **0.00200** |
| **Monitoring Wells Located Outside PCLE Zone** | | | | | | | | | | | | |
| **600D86MW** | 8/10/1999 | | Well Installed | | | | | | | | | |
| | 8/17/1999 | Round 5 | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U |
| | 7/12/2000 | Round 6 | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U |
| | 6/22/2001 | Round 7 | 0.00500 U | 0.00500 U | 0.00500 U | 0.01000 U | 0.00250 U | 0.00500 U | 0.00500 U | 0.00250 U | 0.00500 U | 0.01000 U |
| | 1/11/2003 | Round 8 | 0.00100 U | 0.00100 U | 0.00100 U | 0.00100 U | 0.00100 U | 0.00200 U | 0.00100 U | 0.00100 U | 0.00100 U | 0.00100 U |
| | -- | Round 9 | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS |
| | 12/9/2003 | Round 10 | 0.00021 U | 0.00020 U | 0.00014 U | 0.00008 U | 0.00016 U | 0.00016 U | 0.00024 U | 0.00019 U | 0.00010 U | 0.00017 U |
| | -- | Round 11 | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS |
| | 10/15/2004 | Round 12 (PDB) | 0.00035 U | 0.00025 U | 0.00010 U | 0.00017 U | 0.00027 U | 0.00040 U | 0.00021 U | 0.00023 U | 0.00022 U | 0.00017 U |
| | -- | Round 13 | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS |
| | 10/19/2005 | Round 14 | 0.00040 UJ | 0.00030 UJ | 0.00040 UJ | 0.00030 UJ | 0.00030 UJ | 0.00200 UJ | 0.00040 UJ | 0.00030 UJ | 0.00030 UJ | 0.00030 UJ |
| | 5/18/2006 | Round 15B | 0.00100 U | 0.00100 U | 0.00100 U | 0.00200 U | 0.00100 U | 0.00500 UJ | 0.00100 U | 0.00100 U | 0.00100 U | 0.00200 U |
| | 8/23/2006 | Round 16 (PDB) | 0.00060 U | 0.00050 U | 0.00040 U | 0.00060 UJ | 0.00050 U | 0.00200 U | 0.00060 U | 0.00060 U | 0.00040 U | 0.00060 U |
| | 5/8/2007 | Round 17 (PDB) | 0.00013 U | 0.00011 U | 0.00013 U | 0.00028 U | 0.00014 U | 0.00023 U | 0.00010 U | 0.00015 U | 0.00023 U | 0.00020 U |
| | 8/23/2007 | Round 18 | 0.00042 U | 0.00014 U | 0.00010 U | 0.00040 U | 0.00044 U | 0.00026 U | 0.00014 U | 0.00040 U | 0.00028 U | 0.00019 U |
| | 1/31/2008 | Round 19 (PDB) | 0.00039 U | 0.00044 U | 0.00036 U | 0.00060 U | 0.00032 U | 0.00040 U | 0.00046 U | 0.00048 U | 0.00053 U | 0.00043 U |
| | 7/22/2008 | Round 20 (PDB) | 0.00054 U | 0.00022 U | 0.00028 U | 0.00061 U | 0.00020 U | 0.00100 U | 0.00022 U | 0.00045 U | 0.00032 U | 0.00030 U |
| | 1/12/2009 | Round 21 (PDB) | 0.00054 U | 0.00022 U | 0.00028 U | 0.00061 U | 0.00020 U | 0.00100 U | 0.00022 U | 0.00045 U | 0.00032 U | 0.00030 U |
| | 7/14/2009 | Round 22 | 0.00054 U | 0.00022 U | 0.00028 U | 0.00061 U | 0.00020 U | 0.00100 U | 0.00022 U | 0.00045 U | 0.00032 U | 0.00030 U |
| | 1/11/2010 | Round 23 (PDB) | 0.00054 U | 0.00022 U | 0.00028 U | 0.00061 U | 0.00020 U | 0.00100 U | 0.00022 U | 0.00045 U | 0.00032 U | 0.00030 U |
| | 7/13/2010 | Round 24 (PDB) | 0.00029 U | 0.00034 U | 0.00025 U | 0.00050 U | 0.00032 U | 0.00200 U | 0.00044 U | 0.00034 U | 0.00024 U | 0.00028 U |
| | 1/11/2011 | Round 25 (PDB) | 0.00023 U | 0.00025 U | 0.00022 U | 0.00050 U | 0.00026 U | 0.00200 U | 0.00025 U | 0.00035 U | 0.00026 U | 0.00022 U |
| | 7/27/2011 | Round 26 | 0.00023 U | 0.00025 U | 0.00022 U | 0.00050 U | 0.00026 U | 0.00200 U | 0.00025 U | 0.00035 U | 0.00026 U | 0.00022 U |
| | 1/10/2112 | Round 27 (PDB) | 0.00023 U | 0.00025 U | 0.00022 U | 0.00050 U | 0.00026 U | 0.00200 U | 0.00025 U | 0.00035 U | 0.00026 U | 0.00022 U |
| | 7/9/2012 | Round 28 | 0.00023 U | NS | NS | NS | 0.00026 U | NS | NS | 0.00035 U | 0.00026 U | 0.00022 U |
| | 1/8/2013 | Round 29 (PDB) | 0.00020 U | 0.00031 U | 0.00026 U | 0.00050 U | 0.00024 U | 0.0020 U | 0.00032 U | 0.00023 U | 0.00031 U | 0.00044 U |
| | 7/16/2013 | Round 30 | 0.00020 U | 0.00031 U | 0.00026 U | 0.00050 U | 0.00024 U | 0.0020 U | 0.00032 U | 0.00023 U | 0.00031 U | 0.00044 U |
| | 1/28/2014 | Round 31 (PDB) | 0.00025 U | 0.0004 U | 0.00031 U | 0.00053 U | 0.00033 U | 0.00020 U | 0.00026 U | 0.00034 U | 0.00030 U | 0.00033 U |
| | 7/15/2014 | Round 32 | 0.00025 U | 0.00025 U | 0.00025 U | 0.00025 U | 0.00025 U | 0.0005 U | 0.00025 U | 0.00025 U | 0.00025 U | 0.00025 U |
| | 1/21/2015 | Round 33 (PDB) | 0.00025 U | NS | NS | NS | 0.00025 U | NS | NS | 0.00025 U | 0.00025 U | 0.00025 U |
| | 7/22/2015 | Round 34 | 0.00025 U | NS | NS | NS | 0.00025 U | NS | 0.00025 U | 0.00025 U | 0.00025 U | 0.00025 U |
| | 1/21/2016 | | Well Abandoned | | | | | | | | | |
| **603D15MW** | 4/4/1998 | | Well Installed | | | | | | | | | |
| | 5/13/1998 | Round 2 | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U |
| | 8/31/1998 | Round 3 | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U |
| | -- | Round 4 | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS |
| | 10/12/1999 | Round 5 | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U |
| | 7/18/2000 | Round 6 | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U |
| | -- | Round 7 | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS |
| | -- | Round 8 | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS |
| | -- | Round 9 | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS |
| | 12/16/2003 | Round 10 | 0.00021 U | 0.00020 U | 0.00014 U | 0.00008 U | 0.00016 U | 0.00016 U | 0.00024 U | 0.00019 U | 0.00010 U | 0.00017 U |
| | -- | Round 11 | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS |
| | -- | Round 12 | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS |
| | 4/19/2005 | | Well Abandoned | | | | | | | | | |
| **612D156MW** | 5/18/2006 | | Well Installed | | | | | | | | | |
| | 5/23/2006 | Round 15B | 0.00060 U | 0.00050 U | 0.00040 U | 0.00060 U | 0.00050 U | 0.00200 U | 0.00060 U | 0.00060 U | 0.00040 U | 0.00060 U |
| | 8/23/2006 | Round 16 (PDB) | 0.00060 U | 0.00050 U | 0.00040 U | 0.00060 UJ | 0.00050 U | 0.00200 U | 0.00060 U | 0.00060 U | 0.00040 U | 0.00060 U |
| | 11/6/2006 | Round 16B | 0.00060 U | 0.00050 U | 0.00040 U | 0.00060 U | 0.00050 U | 0.00200 U | 0.00060 U | 0.00060 U | 0.00040 U | 0.00060 U |
| | 5/8/2007 | Round 17 | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS |
| | 5/22/2007 | | Well Abandoned | | | | | | | | | |
| **613D70MW** | 4/4/1998 | | Well Installed | | | | | | | | | |
| | 5/16/1998 | Round 2 | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U |
| | 8/30/1998 | Round 3 | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 UJ | 0.00500 U | 0.00500 U |
| | -- | Round 4 | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS |
| | 11/9/1999 | Round 5 | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U |
| | 7/24/2000 | Round 6 | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U |
| | 7/12/2001 | Round 7 | 0.00500 U | 0.00500 U | 0.00500 U | 0.01000 U | 0.00250 U | 0.00500 U | 0.00500 U | 0.00250 U | 0.00500 U | 0.01000 U |
| | 1/26/2003 | Round 8 (PDB) | 0.00100 U | 0.00100 U | 0.00100 U | 0.00100 U | 0.00100 U | 0.00200 U | 0.00100 U | 0.00100 U | 0.00100 U | 0.00100 U |
| | -- | Round 9 | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS |
| | 12/9/2003 | Round 10 | 0.00021 U | 0.00020 U | 0.00014 U | 0.00008 U | 0.00016 U | 0.00016 U | 0.00024 U | 0.00019 U | 0.00010 U | 0.00017 U |
| | -- | Round 11 | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS |
| | -- | Round 12 | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS |
| | 4/26/2005 | | Well Abandoned | | | | | | | | | |

**Table 4-1B**

**Summary of Chemicals of Concern Detected IN GROUNDWATER**
**Historical Monitoring Wells — SWMU 17/Buidling 1429 Plume**
**2016 RAER**

**Former NAS Dallas, Texas**


| Monitoring Well | Sampling Date | Sampling Round | Chemicals of Concern (mg/L) | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | 1,1-Dichloroethene | Carbon Tetrachloride | Chloroform | Chloromethane | cis-1,2-Dichloroethene | Methylene Chloride | Tetrachloroethene | trans-1,2-Dichloroethene | Trichloroethene | Vinyl Chloride |
| **Protective Concentration Levels (mg/L)** | | | **0.00700** | **0.00500** | **0.24000** | **0.07000** | **0.07000** | **0.00500** | **0.00500** | **0.10000** | **0.00500** | **0.00200** |
| **61401MW** | 11/16/1995 | Round 1 | 0.00500 U | 0.00500 U | 0.00500 U | 0.01000 U | 0.00500 U | 0.01000 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.01000 U |
| | 4/21/1998 | Round 2 | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U |
| | -- | Round 3 | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS |
| | 3/30/1999 | Round 4 | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U |
| | 10/18/1999 | Round 5 | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U |
| | 7/24/2000 | Round 6 | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U |
| | 7/12/2001 | Round 7 | 0.00500 U | 0.00500 U | 0.00500 U | 0.01000 U | 0.00250 U | 0.00500 U | 0.00500 U | 0.00250 U | 0.00500 U | 0.01000 U |
| | 1/26/2003 | Round 8 (PDB) | 0.00100 U | 0.00100 U | 0.00100 U | 0.00100 U | 0.00100 U | 0.00200 U | 0.00100 U | 0.00100 U | 0.00025 J | 0.00100 U |
| | -- | Round 9 | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS |
| | 12/9/2003 | Round 10 | 0.00021 U | 0.00020 U | 0.00014 U | 0.00008 U | 0.00016 U | 0.00016 U | 0.00024 U | 0.00019 U | 0.00010 U | 0.00017 U |
| | -- | Round 11 | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS |
| | -- | Round 12 | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS |
| | 4/19/2005 | | Well Abandoned | | | | | | | | | |
| **61402MW** | 11/16/1995 | Round 1 | 0.00500 U | 0.00500 U | 0.00500 U | 0.01000 U | 0.00500 U | 0.01000 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.01000 U |
| | 4/22/1998 | Round 2 | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U |
| | -- | Round 3 | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS |
| | -- | Round 4 | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS |
| | 11/2/1999 | Round 5 | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00600 U | 0.00500 U | 0.00500 U | 0.00088 J | 0.00500 U |
| | 7/24/2000 | Round 6 | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U |
| | 7/15/2001 | Round 7 | 0.00500 U | 0.00500 U | 0.00500 U | 0.01000 U | 0.00250 U | 0.00500 U | 0.00500 U | 0.00250 U | 0.00500 U | 0.01000 U |
| | 1/26/2003 | Round 8 (PDB) | 0.00100 U | 0.00100 U | 0.00100 U | 0.00100 U | 0.00100 U | 0.00200 U | 0.00100 U | 0.00100 U | 0.00100 U | 0.00100 U |
| | -- | Round 9 | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS |
| | 12/9/2003 | Round 10 | 0.00021 U | 0.00020 U | 0.00014 U | 0.00008 U | 0.00016 U | 0.00016 U | 0.00024 U | 0.00019 U | 0.00057 J | 0.00017 U |
| | -- | Round 11 | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS |
| | -- | Round 12 | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS |
| | 4/19/2005 | | Well Abandoned | | | | | | | | | |
| **60201MW** | 10/26/1995 | Round 1 | 0.00500 U | 0.00500 U | 0.00500 U | 0.01000 U | NA | 0.00500 U | 0.00500 U | NA | 0.00500 U | 0.01000 U |
| | 4/8/1998 | Round 2 | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U |
| | 9/15/1998 | Round 3 | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U |
| | -- | Round 4 | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS |
| | 10/8/1999 | Round 5 | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00720 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U |
| | 7/18/2000 | Round 6 | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U |
| | 7/11/2001 | Round 7 | 0.00500 U | 0.00500 U | 0.00500 U | 0.01000 U | 0.00250 U | 0.00500 U | 0.00500 U | 0.00250 U | 0.00500 U | 0.01000 U |
| | 1/11/2003 | Round 8 | 0.00100 U | 0.00100 U | 0.00100 U | 0.00100 U | 0.00100 U | 0.00200 U | 0.00100 U | 0.00100 U | 0.00027 J | 0.00100 U |
| | -- | Round 9 | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS |
| | 12/16/2003 | Round 10 | 0.00021 U | 0.00020 U | 0.00014 U | 0.00008 U | 0.00016 U | 0.00016 U | 0.00024 U | 0.00019 U | 0.00034 J | 0.00017 U |
| | -- | Round 11 | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS |
| | 10/15/2004 | Round 12 (PDB) | 0.00035 U | 0.00025 U | 0.00010 U | 0.00017 U | 0.00027 U | 0.00040 U | 0.00021 U | 0.00023 U | 0.00022 U | 0.00017 U |
| | -- | Round 13 | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS |
| | 10/18/2005 | Round 14 (PDB) | 0.00040 U | 0.00030 U | 0.00040 U | 0.00030 U | 0.00030 U | 0.00200 U | 0.00040 U | 0.00030 U | 0.00030 U | 0.00030 U |
| | 5/18/2006 | Round 15B | 0.00100 U | 0.00100 U | 0.00100 U | 0.00200 U | 0.00100 U | 0.00500 UJ | 0.00100 U | 0.00100 U | 0.00100 U | 0.00200 U |
| | 8/23/2006 | Round 16 (PDB) | 0.00060 U | 0.00050 U | 0.00040 U | 0.00060 UJ | 0.00050 U | 0.00200 U | 0.00060 U | 0.00060 U | 0.00040 U | 0.00060 U |
| | 5/8/2007 | Round 17 (PDB) | 0.00013 U | 0.00011 U | 0.00013 U | 0.00028 U | 0.00014 U | 0.00023 U | 0.00010 U | 0.00015 U | 0.00023 U | 0.00020 U |
| | 8/23/2007 | Round 18 | 0.00042 U | 0.00014 U | 0.00010 U | 0.00040 U | 0.00044 U | 0.00026 U | 0.00014 U | 0.00040 U | 0.00032 J | 0.00019 U |
| | 1/30/2008 | Round 19 (PDB) | 0.00039 U | 0.00044 U | 0.00036 U | 0.00060 U | 0.00032 U | 0.00040 U | 0.00046 U | 0.00048 U | 0.00053 U | 0.00043 U |
| | 7/22/2008 | Round 20 (PDB) | 0.00054 U | 0.00022 U | 0.00028 U | 0.00061 U | 0.00020 U | 0.00100 U | 0.00022 U | 0.00045 U | 0.00032 U | 0.00030 U |
| | 1/12/2009 | Round 21 (PDB) | 0.00054 U | 0.00022 U | 0.00028 U | 0.00061 U | 0.00020 U | 0.00100 U | 0.00022 U | 0.00045 U | 0.00032 U | 0.00030 U |
| | 7/14/2009 | Round 22 | 0.00054 U | 0.00022 U | 0.00028 U | 0.00061 U | 0.00020 U | 0.00100 U | 0.00022 U | 0.00045 U | 0.00032 U | 0.00030 U |
| | 1/11/2010 | Round 23 (PDB) | 0.00054 U | 0.00022 U | 0.00028 U | 0.00061 U | 0.00020 U | 0.00100 U | 0.00022 U | 0.00045 U | 0.00032 U | 0.00030 U |
| | 7/13/2010 | Round 24 (PDB) | 0.00029 U | 0.00034 U | 0.00025 U | 0.00050 U | 0.00032 U | 0.00200 U | 0.00044 U | 0.00034 U | 0.00024 U | 0.00028 U |
| | 1/11/2011 | Round 25 (PDB) | 0.00023 U | 0.00025 U | 0.00022 U | 0.00050 U | 0.00026 U | 0.00200 U | 0.00025 U | 0.00035 U | 0.00026 U | 0.00023 J |
| | 7/27/2011 | Round 26 | 0.00023 U | 0.00025 U | 0.00022 U | 0.00050 U | 0.00026 U | 0.00200 U | 0.00025 U | 0.00035 U | 0.00049 J | 0.00022 U |
| | 1/10/2012 | Round 27 (PDB) | 0.00023 U | 0.00025 U | 0.00022 U | 0.00050 U | 0.00026 U | 0.00200 U | 0.00025 U | 0.00035 U | 0.00026 U | 0.00022 U |
| | 7/9/2012 | Round 28 | 0.00023 U | NS | NS | NS | 0.00026 U | NS | NS | 0.00035 U | 0.00026 U | 0.00022 U |
| | 1/8/2013 | Round 29 (PDB) | 0.00020 U | 0.00031 U | 0.00026 U | 0.00050 U | 0.00024 U | 0.0020 U | 0.00032 U | 0.00023 U | 0.00031 U | 0.00044 U |
| | 7/16/2013 | Round 30 | 0.00020 U | 0.00031 U | 0.00026 U | 0.00050 U | 0.00024 U | 0.0020 U | 0.00032 U | 0.00023 U | 0.00031 U | 0.00044 U |
| | 1/28/2014 | Round 31 (PDB) | 0.00025 U | 0.0004 U | 0.00031 U | 0.00053 U | 0.00033 U | 0.0020 U | 0.00026 U | 0.00034 U | 0.00030 U | 0.00033 U |
| | 7/15/2014 | Round 32 | 0.00025 U | 0.00025 U | 0.00025 U | 0.00025 U | 0.00025 U | 0.0005 U | 0.00025 U | 0.00025 U | 0.00025 U | 0.00025 U |
| | 1/21/2015 | Round 33 (PDB) | 0.00025 U | NS | NS | NS | 0.00025 U | NS | NS | 0.00025 U | 0.00025 U | 0.00025 U |
| | 7/22/2015 | Round 34 | 0.00025 U | NS | NS | NS | 0.00025 U | NS | 0.00025 U | 0.00025 U | 0.000437 J | 0.00025 U |
| | 1/21/2016 | | Well Abandonded | | | | | | | | | |

**Table 4-1B**

**Summary of Chemicals of Concern Detected IN GROUNDWATER**
**Historical Monitoring Wells — SWMU 17/Buidling 1429 Plume**
**2016 RAER**

**Former NAS Dallas, Texas**


| Monitoring Well | Sampling Date | Sampling Round | Chemicals of Concern (mg/L) | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | 1,1-Dichloroethene | Carbon Tetrachloride | Chloroform | Chloromethane | cis-1,2-Dichloroethene | Methylene Chloride | Tetrachloroethene | trans-1,2-Dichloroethene | Trichloroethene | Vinyl Chloride |
| **Protective Concentration Levels (mg/L)** | | | **0.00700** | **0.00500** | **0.24000** | **0.07000** | **0.07000** | **0.00500** | **0.00500** | **0.10000** | **0.00500** | **0.00200** |
| **79920MW** | 11/7/1996 | Round 1 | 0.00500 U | 0.00500 U | 0.00500 U | 0.01000 U | 0.00500 U | 0.03170 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.01000 U |
| | 5/4/1998 | Round 2 | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U |
| | -- | Round 3 | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS |
| | -- | Round 4 | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS |
| | 11/1/1999 | Round 5 | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U |
| | 7/24/2000 | Round 6 | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U |
| | 7/13/2001 | Round 7 | 0.00500 U | 0.00500 U | 0.00500 U | 0.01000 U | 0.00250 U | 0.00500 U | 0.00500 U | 0.00250 U | 0.00500 U | 0.01000 U |
| | 1/11/2003 | Round 8 | 0.00100 U | 0.00100 U | 0.00100 U | 0.00100 U | 0.00100 U | 0.00200 U | 0.00100 U | 0.00100 U | 0.00100 U | 0.00100 U |
| | -- | Round 9 | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS |
| | 12/22/2003 | Round 10 | 0.00021 U | 0.00020 U | 0.00014 U | 0.00008 U | 0.00016 U | 0.00016 U | 0.00024 U | 0.00019 U | 0.00010 U | 0.00017 U |
| | -- | Round 11 | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS |
| | 10/15/2004 | Round 12 (PDB) | 0.00035 U | 0.00025 U | 0.00010 U | 0.00017 U | 0.00027 U | 0.00040 U | 0.00021 U | 0.00023 U | 0.00022 U | 0.00017 U |
| | -- | Round 13 | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS |
| | 10/19/2005 | Round 14 | 0.00040 UJ | 0.00030 UJ | 0.00040 UJ | 0.00030 UJ | 0.00030 UJ | 0.00200 UJ | 0.00040 UJ | 0.00030 UJ | 0.00030 UJ | 0.00030 UJ |
| | 5/18/2006 | Round 15B | 0.00100 U | 0.00100 U | 0.00100 U | 0.00200 U | 0.00100 U | 0.00500 UJ | 0.00100 U | 0.00100 U | 0.00100 U | 0.00200 U |
| | 8/23/2006 | Round 16 (PDB) | 0.00060 U | 0.00050 U | 0.00040 U | 0.00060 UJ | 0.00050 U | 0.00200 U | 0.00060 U | 0.00060 U | 0.00040 U | 0.00060 U |
| | 5/8/2007 | Round 17 (PDB) | 0.00028 U | 0.00020 U | 0.00023 U | 0.00017 U | 0.00045 U | 0.00027 J | 0.00014 U | 0.00053 U | 0.00014 U | 0.00012 U |
| | 8/24/2007 | Round 18 | 0.00042 U | 0.00014 U | 0.00010 U | 0.00040 U | 0.00044 U | 0.00026 U | 0.00014 U | 0.00040 U | 0.00028 U | 0.00019 U |
| | 1/30/2008 | Round 19 (PDB) | 0.00039 U | 0.00044 U | 0.00036 U | 0.00060 U | 0.00032 U | 0.00040 U | 0.00046 U | 0.00048 U | 0.00053 U | 0.00043 U |
| | 7/22/2008 | Round 20 (PDB) | 0.00054 U | 0.00022 U | 0.00028 U | 0.00061 U | 0.00020 U | 0.00100 U | 0.00022 U | 0.00045 U | 0.00032 U | 0.00030 U |
| | 1/12/2009 | Round 21 (PDB) | 0.00054 U | 0.00022 U | 0.00028 U | 0.00061 U | 0.00020 U | 0.00100 U | 0.00022 U | 0.00045 U | 0.00032 U | 0.00030 U |
| | 7/14/2009 | Round 22 | 0.00054 U | 0.00022 U | 0.00028 U | 0.00061 U | 0.00020 U | 0.00100 U | 0.00022 U | 0.00045 U | 0.00032 U | 0.00030 U |
| | 1/11/2010 | Round 23 (PDB) | 0.00054 U | 0.00022 U | 0.00028 U | 0.00061 U | 0.00020 U | 0.00100 U | 0.00022 U | 0.00045 U | 0.00032 U | 0.00030 U |
| | 7/13/2010 | Round 24 (PDB) | 0.00029 U | 0.00034 U | 0.00025 U | 0.00050 U | 0.00032 U | 0.00200 U | 0.00044 U | 0.00034 U | 0.00024 U | 0.00028 U |
| | 1/11/2011 | Round 25 (PDB) | 0.00023 U | 0.00025 U | 0.00022 U | 0.00050 U | 0.00026 U | 0.00200 U | 0.00025 U | 0.00035 U | 0.00026 U | 0.00022 U |
| | 7/27/2011 | Round 26 | 0.00023 U | 0.00025 U | 0.00022 U | 0.00050 U | 0.00026 U | 0.00200 U | 0.00025 U | 0.00035 U | 0.00026 U | 0.00022 U |
| | 1/10/2012 | Round 27 (PDB) | 0.00023 U | 0.00025 U | 0.00022 U | 0.00050 U | 0.00026 U | 0.00200 U | 0.00025 U | 0.00035 U | 0.00026 U | 0.00022 U |
| | 7/9/2012 | Round 28 | 0.00023 U | NS | NS | NS | 0.00026 U | NS | NS | 0.00035 U | 0.00026 U | 0.00022 U |
| | 1/8/2013 | Round 29 (PDB) | 0.00020 U | 0.00031 U | 0.00026 U | 0.00050 U | 0.00024 U | 0.0020 U | 0.00032 U | 0.00023 U | 0.00031 U | 0.00044 U |
| | 7/16/2013 | Round 30 | 0.00020 U | 0.00031 U | 0.00026 U | 0.00050 U | 0.00024 U | 0.0020 U | 0.00032 U | 0.00023 U | 0.00031 U | 0.00044 U |
| | 1/28/2014 | Round 31 (PDB) | 0.00025 U | 0.0004 U | 0.00031 U | 0.00053 U | 0.00033 U | 0.0020 U | 0.00026 U | 0.00034 U | 0.00030 U | 0.00033 U |
| | 7/15/2014 | Round 32 | 0.00025 U | 0.00025 U | 0.00025 U | 0.00025 U | 0.00025 U | 0.0005 U | 0.00025 U | 0.00025 U | 0.00025 U | 0.00025 U |
| | 1/21/2015 | Round 33 (PDB) | 0.00025 U | NS | NS | NS | 0.00025 U | NS | NS | 0.00025 U | 0.00025 U | 0.00025 U |
| | 7/23/2015 | Round 34 | 0.00025 U | NS | NS | NS | 0.00025 U | NS | 0.00025 U | 0.00025 U | 0.00025 U | 0.00025 U |
| | 1/21/2016 | Well Abandonded | | | | | | | | | | |

**Table 4-1B**

**Summary of Chemicals of Concern Detected IN GROUNDWATER**
**Historical Monitoring Wells — SWMU 17/Buidling 1429 Plume**
**2016 RAER**

**Former NAS Dallas, Texas**


| Monitoring Well | Sampling Date | Sampling Round | Chemicals of Concern (mg/L) | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | 1,1-Dichloroethene | Carbon Tetrachloride | Chloroform | Chloromethane | cis-1,2-Dichloroethene | Methylene Chloride | Tetrachloroethene | trans-1,2-Dichloroethene | Trichloroethene | Vinyl Chloride |
| **Protective Concentration Levels (mg/L)** | | | **0.00700** | **0.00500** | **0.24000** | **0.07000** | **0.07000** | **0.00500** | **0.00500** | **0.10000** | **0.00500** | **0.00200** |
| **612D155MW** | 5/18/2006 | Well Installed | | | | | | | | | | |
| | 5/23/2006 | Round 15B | 0.00060 U | 0.00050 U | 0.00040 U | 0.00060 U | 0.00050 U | 0.00200 U | 0.00060 U | 0.00060 U | 0.00040 U | 0.00060 U |
| | 8/24/2006 | Round 16 (PDB) | 0.00060 U | 0.00050 U | 0.00040 U | 0.00060 UJ | 0.00050 U | 0.00200 U | 0.00060 U | 0.00060 U | 0.00040 U | 0.00060 U |
| | 11/7/2006 | Round 16B | 0.00060 U | 0.00050 U | 0.00040 U | 0.00060 U | 0.00050 U | 0.00200 U | 0.00060 U | 0.00060 U | 0.00040 U | 0.00060 U |
| | 5/9/2007 | Round 17 (PDB) | 0.00028 U | 0.00020 U | 0.00023 U | 0.00017 U | 0.00045 U | 0.00028 J | 0.00014 U | 0.00053 U | 0.00014 U | 0.00012 U |
| | 8/24/2007 | Round 18 | 0.00042 U | 0.00014 U | 0.00010 U | 0.00040 U | 0.00044 U | 0.00026 U | 0.00014 U | 0.00040 U | 0.00028 U | 0.00019 U |
| | 1/30/2008 | Round 19 (PDB) | 0.00039 U | 0.00044 U | 0.00036 U | 0.00060 U | 0.00032 U | 0.00040 U | 0.00046 U | 0.00048 U | 0.00053 U | 0.00043 U |
| | 7/22/2008 | Round 20 (PDB) | 0.00054 U | 0.00022 U | 0.00028 U | 0.00061 U | 0.00020 U | 0.00100 U | 0.00022 U | 0.00045 U | 0.00032 U | 0.00030 U |
| | 1/12/2009 | Round 21 (PDB) | 0.00054 U | 0.00022 U | 0.00028 U | 0.00061 U | 0.00020 U | 0.00100 U | 0.00022 U | 0.00045 U | 0.00032 U | 0.00030 U |
| | 7/14/2009 | Round 22 | 0.00054 U | 0.00022 U | 0.00028 U | 0.00061 U | 0.00020 U | 0.00100 U | 0.00022 U | 0.00045 U | 0.00032 U | 0.00030 U |
| | 1/11/2010 | Round 23 (PDB) | 0.00054 U | 0.00022 U | 0.00028 U | 0.00061 U | 0.00020 U | 0.00100 U | 0.00022 U | 0.00045 U | 0.00032 U | 0.00030 U |
| | 7/13/2010 | Round 24 (PDB) | 0.00029 U | 0.00034 U | 0.00025 U | 0.00050 U | 0.00032 U | 0.00200 U | 0.00044 U | 0.00034 U | 0.00024 U | 0.00028 U |
| | 1/11/2011 | Round 25 (PDB) | 0.00023 U | 0.00025 U | 0.00022 U | 0.00050 U | 0.00026 U | 0.00200 U | 0.00025 U | 0.00035 U | 0.00026 U | 0.00022 U |
| | 7/27/2011 | Round 26 | 0.00023 U | 0.00025 U | 0.00022 U | 0.00050 U | 0.00026 U | 0.00200 U | 0.00025 U | 0.00035 U | 0.00026 U | 0.00022 U |
| | 1/10/2012 | Round 27 (PDB) | 0.00023 U | 0.00025 U | 0.00022 U | 0.00050 U | 0.00026 U | 0.00200 U | 0.00025 U | 0.00035 U | 0.00026 U | 0.00022 U |
| | 7/9/2012 | Round 28 | 0.00023 U | NS | NS | NS | 0.00026 U | NS | NS | 0.00035 U | 0.00026 U | 0.00022 U |
| | 1/8/2013 | Round 29 (PDB) | 0.00020 U | 0.00031 U | 0.00026 U | 0.00050 U | 0.00024 U | 0.0020 U | 0.00032 U | 0.00023 U | 0.00031 U | 0.00044 U |
| | 7/16/2013 | Round 30 | 0.00020 U | 0.00031 U | 0.00026 U | 0.00050 U | 0.00024 U | 0.0020 U | 0.00032 U | 0.00023 U | 0.00031 U | 0.00044 U |
| | 1/28/2014 | Round 31 (PDB) | 0.00025 U | 0.0004 UJL | 0.00031 UJL | 0.00053 U | 0.00033 UJL | 0.0020 U | 0.00026 U | 0.00034 U | 0.00030 UJL | 0.00033 U |
| | 7/15/2014 | Round 32 | 0.00025 U | 0.00025 U | 0.00025 U | 0.00025 U | 0.00025 U | 0.0005 U | 0.00025 U | 0.00025 U | 0.00025 U | 0.00025 U |
| | 1/21/2015 | Round 33 (PDB) | 0.00025 U | NS | NS | NS | 0.00025 U | NS | NS | 0.00025 U | 0.00025 U | 0.00025 U |
| | 7/22/2015 | Round 34 | 0.00025 U | NS | NS | NS | 0.00025 U | NS | 0.00025 U | 0.00025 U | 0.00025 U | 0.00025 U |
| | 1/21/2016 | Well Abandonded | | | | | | | | | | |

***Notes:***
mg/L - milligrams per liter
NA - Not Applicable
NS - Not Sampled
PDB - Passive Diffusion Bag
SDG - Sample Delivery Group
PCLE - Protective Concentration Level Exceedance

Note:
Shaded areas indicate an exceedance.

Analytical Result Qualifiers:
J - Indicates that the chemical was detected. However, the associated numerical result may not be a precise representation of the amount that is actually present in the sample. The laboratory reported concentration is considered to be an estimate of the true concentration.
U - Indicates that the chemical was not detected at the numerical detection limit (sample-specific quantitation limit) noted. Nondetected results from the laboratory are reported in this manner. This qualifier is added to a positive result (reported by the laboratory) if the detected concentration is determined to be attributable to contamination introduced during field sampling or laboratory analysis.
UJ - Indicates that the chemical was not detected. However, the detection limit (sample-specific quantitation limit) is considered to be estimated based on problems encountered during laboratory analysis. The associated numerical detection limit is regarded as inaccurate or imprecise.

# TABLE 4-2
# SUMMARY OF GEOCHEMICAL PARAMETERS MEASURED IN GROUNDWATER

**Table 4-2A**

**Summary of Geochemical Parameters Measured in Groundwater**
**Long Term Monitoring Wells — SWMU 17/Buildings 1429 Plume**
**2016 RAER**

**Former NAS Dallas, Texas**


| Monitoring Well | Sampling Date | Sampling Round | SDG | Oxidation-Reduction Conditions | | | | | | | | Degradation Products | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Dissolved Oxygen[2] | Ferrous Iron[2] | Nitrate[3] | Nitrite[3] | ORP[1] | Phosphate[3] | Sulfate[3] | TOC[3] | Alkalinity[2] | Carbon Dioxide[2] | Chloride[3] | Ethane[3] | Ethene[3] | Methane[3] | pH[1] | Sulfide[3] |
| Units | | | | mg/L | mg/L | mg/L | mg/L | mV | mg/L | mg/L | mg/L | mg/L | mg/L | mg/L | ng/L | ng/L | µg/L | S.U. | mg/L |
| **Monitoring Wells Located Inside PCLE Zone** | | | | | | | | | | | | | | | | | | | |
| **600D84MW** | 8/9/1999 | Well Installed | | | | | | | | | | | | | | | | | |
| | 8/9/1999 | Round 5 | DL316, TTE7 | 0.70 | 0 | NA | NA | 253.1 | NA | 187 | NA | 358 | NA | 9.40 | 42 | 56.0 | 20.38 | 6.76 | NA |
| | 7/12/2000 | Round 6 | DL349 | 0.90 | 0.2 | NA | NA | 291.0 | NA | 183 | NA | 350 | NA | 9.20 | NA | NA | NA | 6.98 | NA |
| | 12/16/2003 | Round 10 | C3L170177 | 2.0 | 0 | NA | NA | 460.0 | NA | 114 | NA | 250 | NA | 7.60 | NA | NA | NA | 6.60 | NA |
| | 10/5/2005 | Round 14 | CTO260-16,17 | 1.0 | 0 | NA | NA | 112 | 0.00991 U | 85 | 0.75 J | 175 | 45 | 8 | 760 U | 350 U | 5.7 U | 6.77 | 0.14 U |
| | 8/22/2007 | Round 18 | DALLASW001 | NA | NA | 0.05 U | 1 U | NA | 0.5 U | 93.1 | 0.8 | NA | NA | 7.6 | 330 U | 330 U | 20 J | NA | 0.8 |
| | 8/22/2007 | Round 18 | FIELD | 1.0 | 0 | NA | NA | 173 | NA | NA | NA | 300 | 80 | NA | NA | NA | NA | 6.94 | NA |
| | 7/14/2009 | Round 22 | F66642 | 1 | 0 | 0.17 JL | 0.05 U | 112.3 | 0.02 UJL | 36.2 JL | 0.64 J | 300 | 35 | 5.7 JL | 320 U | 430 U | 0.54 | 7.00 | 0.6 U |
| | 7/27/2011 | Round 26 | F84666 | 0.5 | 0.1 | 0.25 JL | 0.05 R | -116.3 | 0.02 U | 82.6 JL | 0.49 | 180 | 12 | 6.4 | 320 U | 430 U | 4.4 | 6.96 | 0.3 U |
| | 1/1/2012 | Round 27 | F88817 | NA | NA | NA | NA | | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| | 7/9/2012 | Round 28 | F94831 | NA | NA | NA | NA | -60.6 | NA | NA | NA | NA | NA | NA | NA | NA | NA | 7.04 | NA |
| | 1/8/2013 | Round 29 | FA637 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| | 7/16/2013 | Round 30 | FA6474 | 1.0 | 0 | 0.16 | 0.050 U | 45.8 | 0.020 U | 63.8 | 0.74 J U | 300 | 25 | 24.5 | 320 U | 430 U | 0.98 | 7.02 | 0.67 JH |
| | 1/28/2014 | Round 31 | FIELD | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| | 7/18/2014 | Round 32 | 1407152 | 0.4 | 0 | 0.033 U | 0.033 UJL | -49.6 | 0.01 U | 81.2 | 2.14 J | NA | 50 | 14.7 | 0.001 U | 0.001 U | 0.00387 J | 6.59 | 0 |
| | 1/21/2015 | Round 33 | 1501079 | NA | NS | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| | 7/22/2015 | Round 34 | 1507178 | 0.8 | 0.03 | 0.033 U | 0.033 U | 60.6 | 0.01 U | 78.7 | 0.5 U | 361 | 60 | 23.5 | 0.001 U | 0.001 U | 2.62 J | 6.77 | 0 |
| | 1/20/2015 | Round 35 | 1601140 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| | 7/21/2016 | Round 36 | 1607157 | 0.0 | 0.23 | 0.0701 | 0.033 U | 10 | 0.0209 | 75.3 | 1.25 U | 358 | 0.0 | 17.2 | 0.001 U | 0.001 U | 2.96 | 6.8 | NA |
| **600D85MW** | 8/10/1999 | Well Installed | | | | | | | | | | | | | | | | | |
| | 8/10/1999 | Round 5 | DL317, TTE7 | 5.5 | 0 | NA | NA | 466.3 | NA | 111 | NA | 145 | NA | 49.0 | 23 | 447 | 0.3890 | 8.63 | NA |
| | 7/12/2000 | Round 6 | DL349 | 1.0 | 0.2 | NA | NA | 203.1 | NA | 106 | NA | 170 | NA | 34.9 | NA | NA | NA | 7.07 | NA |
| | 12/9/2003 | Round 10 | C3L100326 | 0.60 | 0 | NA | NA | 151.0 | NA | 91.7 | NA | 125 | NA | 15.8 | NA | NA | NA | 7.16 | NA |
| | 10/6/2005 | Round 14 | CTO260-16,17 | 1.5 | 0 | NA | NA | 100 | 0.00991 U | 86 | 0.76 J | 150 | 13 | 21 | 760 U | 350 U | 2.9 U | 7.13 | 0.14 U |
| | 8/22/2007 | Round 18 | DALLASW001 | NA | NA | 0.69 | 1 U | NA | 0.5 U | 81.3 | 0.86 | NA | NA | 19.8 | 330 U | 330 U | 1.1 U | NA | 0.85 U |
| | 8/22/2007 | Round 18 | FIELD | 2 | 0 | NA | NA | 55 | NA | NA | NA | 30 | 40 | NA | NA | NA | NA | 7.77 | NA |
| | 7/14/2009 | Round 22 | F66642 | 3 | 0 | 0.85 JL | 0.05 U | -13.4 | 0.02 UJL | 64.1 JL | 0.5 U | 130 | 20 | 11.8 JL | 320 U | 430 U | 0.16 U | 7.65 ** | 0.6 U |
| | 7/27/2011 | Round 26 | F84666 | 0.8 | 0 | 0.66 | 0.05 U | 14.3 | 0.043 | 102 JL | 0.4 | 150 | 10 | 23.6 | 320 U | 430 U | 160 U | 6.92 | 0.3 U |
| | 1/1/2012 | Round 27 | F88817 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| | 7/9/2012 | Round 28 | F94831 | NA | NA | NA | NA | 9.6 | NA | NA | NA | NA | NA | NA | NA | NA | NA | 7.44 | NA |
| | 1/8/2013 | Round 29 | FA637 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| | 7/16/2013 | Round 30 | FA6474 | 0.4 | 0 | 1.0 | 0.050 U | 81.8 | 0.12 | 71.8 | 0.70 J U | 100 | 150 | 9.6 | 320 U | 430 U | 0.16 U | 7.38 | 2.0 JH |
| | 1/28/2014 | Round 31 | FIELD | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| | 7/18/2014 | Round 32 | 1407152 | 0.7 | 0 | 0.671 | 0.033 U | -57.3 | 0.01 U | 93.8 | 1.25 U | NA | 40 | 12.7 | 0.001 U | 0.001 U | 0.001 U | 6.84 | 0 |
| | 1/21/2015 | Round 33 | 1501079 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| | 7/22/2015 | Round 34 | 1507178 | 0.7 | 0.1 | .388 J | .605 J | 105.7 | 0.01 U | 111.0 | 1.25 U | 229.0 | 45.0 | 16.5 | 0.001 U | 0.001 U | 0.001 U | 7.0 | 0.0 |
| | 1/20/2015 | Round 35 | 1601140 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| | 7/20/2016 | Round 36 | 1607157 | 0.87 | 0.0 | 0.613 | 0.033 U | 125.0 | 0.01 U | 100.0 | 1.25 U | 186.0 | 0.0 | 19.2 | 0.001 U | 0.001 U | 0.001 U | 7.58 | NA |

**Table 4-2A**

**Summary of Geochemical Parameters Measured in Groundwater**
**Long Term Monitoring Wells — SWMU 17/Buildings 1429 Plume**
**2016 RAER**

**Former NAS Dallas, Texas**


| Monitoring Well | Sampling Date | Sampling Round | SDG | Oxidation-Reduction Conditions | | | | | | | | Degradation Products | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Dissolved Oxygen[2] | Ferrous Iron[2] | Nitrate[3] | Nitrite[3] | ORP[1] | Phosphate[3] | Sulfate[3] | TOC[3] | Alkalinity[2] | Carbon Dioxide[2] | Chloride[3] | Ethane[3] | Ethene[3] | Methane[3] | pH[1] | Sulfide[3] |
| Units | | | | mg/L | mg/L | mg/L | mg/L | mV | mg/L | mg/L | mg/L | mg/L | mg/L | mg/L | ng/L | ng/L | µg/L | S.U. | mg/L |
| 603D71MW | 4/4/1998 | Well Installed | | | | | | | | | | | | | | | | | |
| | 8/20/1999 | Round 5 | DL318, TTE09 | 0.70 | 0 | NA | NA | 115.0 | NA | 654 | NA | 472 | NA | 86.8 | 427 | 342 | 57.60 | 6.98 | NA |
| | 7/20/2000 | Round 6 | DL351 | 1.0 | 0.2 | NA | NA | 126.1 | NA | 614 | NA | 435 | NA | 97.8 | NA | NA | NA | 6.93 | NA |
| | 12/15/2003 | Round 10 | C3L170177 | 3.0 | 0 | NA | NA | 423.0 | NA | 858 | NA | 300 | NA | 138 | NA | NA | NA | 6.61 | NA |
| | 10/6/2005 | Round 14 | CTO260-16,17 | 2.0 | 0 | NA | NA | -37 | 0.00991 U | 810 | 2.1 | 250 | 40 | 110 | 760 U | 350 U | 19 | 6.62 | 0.14 U |
| | 8/23/2007 | Round 18 | DALLASW001 | NA | NA | 0.05 U | 1 U | NA | 0.5 U | 945 | 1.8 | NA | NA | 147 | 330 U | 330 U | 18 | NA | 0.75 U |
| | 8/23/2007 | Round 18 | FIELD | 0.5 | 0 | NA | NA | 22 | NA | NA | NA | 400 | 90 | NA | NA | NA | NA | 6.73 | NA |
| | 7/14/2009 | Round 22 | F66642 | 2.5 | 0 | 0.05 UJL | 0.05 U | -26.7 | 0.02 UJL | 887 JL | 1.7 | 300 | 50 | 134 JL | 320 U | 430 U | 18.2 | 7.45 | 0.6 U |
| | 7/27/2011 | Round 26 | F84666 | 0.6 | 0.1 | 0.5 U | 0.5 U | 19.1 | 0.02 U | 850 JL | 1.7 | 12 | 13 | 130 | 320 U | 430 U | 5.45 | 6.78 | 0.3 U |
| | 1/1/2012 | Round 27 | F88817 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| | 7/9/2012 | Round 28 | F94831 | NA | NA | NA | NA | 45.1 | NA | NA | NA | NA | NA | NA | NA | NA | NA | 6.78 | NA |
| | 1/8/2013 | Round 29 | FA637 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| | 7/16/2013 | Round 30 | FA6474 | 1.0 | 0.2 | 0.50 U | 0.50 U | -12.8 | 0.020 U | 779 | 1.9 | 300 | 100 | 110 | 320 U | 430 U | 3.9 | 7.05 | 0.22 U |
| | 1/28/2014 | Round 31 | FIELD | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| | 7/17/2014 | Round 32 | 1407130 | 1.7 | 0.28 | 0.033 U | 0.33 U | 200.3 | 0.01 U | 1320 | 2.13 J | NA | 75 | 242 | 0.001 U | 0.001 U | 0.001 U | 7.31 | 0 |
| | 1/21/2015 | Round 33 | 1501079 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| | 7/22/2015 | Round 34 | 1507178 | 1.3 | 0.0 | 0.033 U | 0.33 U | 73.9 | 0.01 U | 896.0 | 1.63 J | 426.0 | 80.0 | 206.0 | 0.001 U | 0.001 U | 8.5 | 6.8 | 0.0 |
| | 1/20/2015 | Round 35 | 1601140 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| | 7/20/2016 | Round 36 | 1607157 | 0.24 | 0.02 | 0.123 | 0.033 U | 27.00 | 0.01 U | 482.00 | 1.66 | 426.00 | 0.0 | 116.00 | 0.001 U | 0.001 U | 5.82 | 7.56 | NA |
| 61201MW | 8/16/1999 | Round 5 | DL318, TTE09 | 0.40 | 0 | NA | NA | 246.3 | NA | 288 | NA | 436 | NA | 17.6 | 382 | 99.0 | 22.01 | 6.86 | NA |
| | 7/21/2000 | Round 6 | DL351 | 1.0 | 0.2 | NA | NA | 298.2 | NA | 311 | NA | 510 | NA | 20.2 | NA | NA | NA | 6.84 | NA |
| | 12/9/2003 | Round 10 | C3L100326 | 0.80 | 0 | NA | NA | 288.0 | NA | 247 | NA | 350 | NA | 14.1 | NA | NA | NA | 6.80 | NA |
| | 10/6/2005 | Round 14 | CTO260-16,17 | 1.5 | 0 | NA | NA | 56 | 0.028 J | 220 | 1.2 | 225 | 30 | 16 | 760 U | 350 U | 25 | 6.77 | 0.14 U |
| | 8/23/2007 | Round 18 | DALLASW001 | NA | NA | 0.05 U | 1 U | NA | 0.5 U | 211 | 0.99 | NA | NA | 11.5 | 330 U | 330 U | 24 | NA | 0.75 U |
| | 8/23/2007 | Round 18 | FIELD | 0.1 | 0 | NA | NA | 118 | NA | NA | NA | 350 | 65 | NA | NA | NA | NA | 6.86 | NA |
| | 7/14/2009 | Round 22 | F66642 | 0.8 | 0 | 0.05 UJL | 0.05 U | 22.2 | 0.035 JL | 157 JL | 0.73 J | 350 | 60 | 10.8 JL | 320 U | 430 U | 13.7 | 6.91 | 0.6 U |
| | 7/27/2011 | Round 26 | F84666 | 0.4 | 0.3 | 0.46 | 0.25 U | -11.4 | 0.12 | 118 JL | 0.55 | 700 | 0 | 10 | 320 U | 430 U | 0.64 U | 7.24 | 0.3 U |
| | 1/1/2012 | Round 27 | F88817 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| | 7/9/2012 | Round 28 | F94831 | NA | NA | NA | NA | 41.7 | NA | NA | NA | NA | NA | NA | NA | NA | NA | 6.95 | NA |
| | 1/8/2013 | Round 29 | FA637 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| | 7/16/2013 | Round 30 | FA6474 | 0.3 | 0.1 | 0.35 J | 0.25 U | 49.9 | 0.020 U | 148 | 0.86 J U | 350 | 40 | 15.0 | 320 U | 430 U | 3.8 | 7.06 | 0.48 JH |
| | 1/28/2014 | Round 31 | FIELD | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| | 7/16/2014 | Round 32 | 1407125 | 0.2 | 1.88 | 0.033 U | 0.033 U | 4.3 | 0.01 U | 142 | 1.36 J | NA | 100 | 44.5 | 0.001 UJ | 0.001 UJ | 0.0028 J | 6.89 | 0.27 |
| | 1/21/2015 | Round 33 | 1501079 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| | 7/22/2015 | Round 34 | 1507178 | 0.7 | 0.0 | 0.033 U | 0.033 U | 57.7 | 0.01 U | 175.0 | 1.25 U | 320.0 | 45.0 | 50.2 | 0.001 U | 0.001 U | 71.1 | 7.3 | 0.1 |
| | 1/20/2015 | Round 35 | 1601140 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| | 7/20/2016 | Round 36 | 1607157 | 0.0 | 0.15 | 0.033 U | 0.033 U | 7.0 | 0.01 U | 122.0 | 1.25 U | 296.0 | 0.0 | 24.2 | 0.001 U | 0.001 U | 40.8 | 7.89 | NA |

**Table 4-2A**

**Summary of Geochemical Parameters Measured in Groundwater**
**Long Term Monitoring Wells — SWMU 17/Buildings 1429 Plume**
**2016 RAER**

**Former NAS Dallas, Texas**


| Monitoring Well | Sampling Date | Sampling Round | SDG | Oxidation-Reduction Conditions | | | | | | | | Degradation Products | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Dissolved Oxygen[2] | Ferrous Iron[2] | Nitrate[3] | Nitrite[3] | ORP[1] | Phosphate[3] | Sulfate[3] | TOC[3] | Alkalinity[2] | Carbon Dioxide[2] | Chloride[3] | Ethane[3] | Ethene[3] | Methane[3] | pH[1] | Sulfide[3] |
| Units | | | | mg/L | mg/L | mg/L | mg/L | mV | mg/L | mg/L | mg/L | mg/L | mg/L | mg/L | ng/L | ng/L | µg/L | S.U. | mg/L |
| 612D111MW | 8/3/2000 | | | Well Installed | | | | | | | | | | | | | | | |
| | 8/18/2000 | Round 6 | DL356 | 0.40 | 0.2 | NA | NA | 329.2 | NA | 199 | NA | 300 | NA | 42.0 | NA | NA | NA | 6.66 | NA |
| | 12/16/2003 | Round 10 | C3L170177 | 2.5 | 0 | NA | NA | 546.0 | NA | 183 | NA | 400 | NA | 26.0 | NA | NA | NA | 6.59 | NA |
| | 10/6/2005 | Round 14 | CTO260-16,17 | 1.0 | 0 | NA | NA | 94 | 0.00991 U | 150 | 0.77 J | 250 | 40 | 24 | 760 U | 350 U | 3.2 U | 6.73 | 0.14 U |
| | 8/23/2007 | Round 18 | DALLASW001 | NA | NA | 0.19 | 1 U | NA | 0.5 U | 122 | 0.84 | NA | NA | 21.3 | 330 U | 330 U | 1.9 U | NA | 0.8 U |
| | 8/23/2007 | Round 18 | FIELD | 0.4 | 0 | NA | NA | 115 | NA | NA | NA | 350 | 55 | NA | NA | NA | NA | 6.83 | NA |
| | 7/14/2009 | Round 22 | F66642 | 0.7 | 0 | 0.4 JL | 0.05 U | 134.4 | 0.026 JL | 102 JL | 0.58 J | 350 | 25 | 15.6 JL | 320 U | 430 U | 0.95 | 6.93 | 0.6 U |
| | 1/11/2010 | Round 23 | F70741 | NA | NA | NA | NA | 38.7 | NA | NA | NA | NA | NA | NA | NA | NA | NA | 7.18 | NA |
| | 7/13/2010 | Round 24 | F75075 | NA | NA | NA | NA | -60.4 | NA | NA | NA | NA | NA | NA | NA | NA | NA | 6.94 | NA |
| | 1/11/2011 | Round 25 | FIELD | NA | NA | NA | NA | 93.2 | NA | NA | NA | NA | NA | NA | NA | NA | NA | 7.22 | NA |
| | 7/27/2011 | Round 26 | F84666 | 0.6 | 0 | 0.55 | 0.05 U | -5.4 | 0.02 U | 110 JL | 0.48 | 160 | 13 | 13.5 | 320 U | 430 U | 470 U | 6.94 | 0.3 U |
| | 1/1/2012 | Round 27 | F88817 | NA | NA | NA | NA | 28.2 | NA | NA | NA | NA | NA | NA | NA | NA | NA | 7.17 | NA |
| | 7/9/2012 | Round 28 | F94831 | NA | NA | NA | NA | -43.1 | NA | NA | NA | NA | NA | NA | NA | NA | NA | 6.88 | NA |
| | 1/8/2013 | Round 29 | FA637 | NA | NA | NA | NA | 114.1 | NA | NA | NA | NA | NA | NA | NA | NA | NA | 7.22 | NA |
| | 7/16/2013 | Round 30 | FA6474 | 0.3 | 0 | 0.30 | 0.10 U | 71.6 | 0.24 J | 96.6 | 0.89 J U | 300 | 40 | 21.2 | 320 U | 430 U | 0.53 | 7.03 | 0.57 JH |
| | 1/28/2014 | Round 31 | FIELD | 2.13 | NA | NA | NA | 77 | NA | NA | NA | NA | NA | NA | NA | NA | NA | 7.18 | NA |
| | 7/17/2014 | Round 32 | 1407130 | 0.3 | 0 | 0.033 U | 0.033 U | -58.5 | 0.01 U | 72.3 | 1.72 J | NA | 80 | 21.6 | 0.001 U | 0.001 U | 0.001 U | 6.66 | 0 |
| | 1/21/2015 | Round 33 | 1501079 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| | 7/22/2015 | Round 34 | 1507178 | 0.8 | 0.4 | 0.033 U | 0.033 U | -25.1 | 0.01 U | 164.0 | 1.25 U | 371.0 | 95.0 | 41.9 | 0.001 U | 0.001 U | 7.4 | 6.8 | 0.0 |
| | 1/20/2015 | Round 35 | 1601140 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| | 7/21/2016 | Round 36 | 1607165 | 0.0 | 1.47 | 0.033 U | 0.033 U | -151.0 | 0.01 U | 161.0 | 1.25 U | 432.0 | 0.0 | 23.5 | 0.001 U | 0.001 U | 3.7 | 7.0 | NA |
| 612D129MW | 10/6/2005 | Round 14 | CTO260-16,17 | 2.0 | 0 | NA | NA | 66 | 0.52 | 160 | 0.7 J | 175 | 30 | 31 | 760 U | 350 U | 3.9 U | 6.85 | 0.14 U |
| | 8/24/2007 | Round 18 | DALLASW001 | NA | NA | 0.53 | 1 U | NA | 0.5 U | 200 | 0.87 | NA | NA | 33.4 | 330 U | 330 UL | 1.1 U | NA | 0.78 U |
| | 8/24/2007 | Round 18 | FIELD | 0.4 | 0 | NA | NA | 160 | NA | NA | NA | 250 | 30 | NA | NA | NA | NA | 7.1 | NA |
| | 7/14/2009 | Round 22 | F66642 | 0.4 | 0 | 0.4 JL | 0.05 U | 14.5 | 0.035 JL | 158 JL | 0.5 U | 50 | 40 | 23.6 JL | 320 U | 430 U | 0.49 J | 6.92 | 0.6 U |
| | 7/27/2011 | Round 26 | F84666 | 0.8 | 0.1 | 0.53 | 0.1 U | 16.8 | 0.02 U | 164 JL | 0.42 | 30 | 15 | 25.9 | 320 U | 430 U | 0.22 J | 6.7 | 0.3 U |
| | 1/1/2012 | Round 27 | F88817 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| | 7/9/2012 | Round 28 | F94831 | NA | NA | NA | NA | 36.6 | NA | NA | NA | NA | NA | NA | NA | NA | NA | 7.22 | NA |
| | 1/8/2013 | Round 29 | FA637 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| | 7/16/2013 | Round 30 | FA6474 | 0.4 | 0 | 0.34 | 0.10 U | 103.6 | 0.075 J | 167 | 0.66 J U | 200 | 80 | 27.3 JH | 320 U | 430 U | 0.53 | 7.15 | 0.63 JH |
| | 1/28/2014 | Round 31 | FIELD | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| | 7/18/2014 | Round 32 | 1407152 | 0.5 | 0.09 | 0.311 | 0.033 U | 78.1 | 0.01 U | 165 | 1.25 U | NA | 35 | 19.7 | 0.001 U | 0.001 U | 0.001 U | 7.07 | 0 |
| | 1/21/2015 | Round 33 | 1501079 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| | 7/22/2015 | Round 34 | 1507178 | 0.9 | 0.0 | 0.033 U | 0.033 U | 92.2 | 0.01 U | 192.0 | 1.25 U | 309.0 | 40.0 | 23.6 | 0.001 U | 0.001 U | 0.001 U | 7.0 | 0.0 |
| | 1/20/2015 | Round 35 | 1601140 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| | 7/20/2016 | Round 36 | 1607157 | 0.0 | 0.0 | 0.393 | 0.033 U | 124.0 | 0.01 U | 166.0 | 1.25 U | 306.0 | 0.0 | 22.6 | 0.001 U | 0.001 U | 1.1 | 7.30 | NA |

**Table 4-2A**

**Summary of Geochemical Parameters Measured in Groundwater**
**Long Term Monitoring Wells — SWMU 17/Buildings 1429 Plume**
**2016 RAER**

**Former NAS Dallas, Texas**


| Monitoring Well | Sampling Date | Sampling Round | SDG | Oxidation-Reduction Conditions | | | | | | | | Degradation Products | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Dissolved Oxygen[2] | Ferrous Iron[2] | Nitrate[3] | Nitrite[3] | ORP[1] | Phosphate[3] | Sulfate[3] | TOC[3] | Alkalinity[2] | Carbon Dioxide[2] | Chloride[3] | Ethane[3] | Ethene[3] | Methane[3] | pH[1] | Sulfide[3] |
| Units | | | | mg/L | mg/L | mg/L | mg/L | mV | mg/L | mg/L | mg/L | mg/L | mg/L | mg/L | ng/L | ng/L | µg/L | S.U. | mg/L |
| 612D38MW | 5/4/1998 | Well Installed | | | | | | | | | | | | | | | | | |
| | 11/3/1999 | Round 5 | DL330, TTE14 | 0.50 | 0 | NA | NA | 206.4 | NA | 663 | NA | 510 | NA | 62.7 | 45 | 312 | 4.678 | 6.98 | NA |
| | 7/21/2000 | Round 6 | DL351 | 2.0 | 0.2 | NA | NA | 237.1 | NA | 660 | NA | 600 | NA | 70.6 | NA | NA | NA | 7.00 | NA |
| | 12/9/2003 | Round 10 | C3L100326 | 0.60 | 0 | NA | NA | 332.0 | NA | 604 | NA | 350 | NA | 55.0 | NA | NA | NA | 7.03 | NA |
| | 10/17/2005 | Round 14 | CTO260-19, 20 | 0.8 | 0 | 0.004 U | 0.003 U | 116 | 0.0991 U | 600 | 1.3 | 400 | 70 | 76 | 760 U | 350 U | 4.7 U | 6.88 | 0.15 J |
| | 8/24/2007 | Round 18 | DALLASW001 | NA | NA | 0.05 U | 1 U | NA | 0.5 U | 690 | 1.4 | NA | NA | 98.5 | 330 U | 330 UL | 1.7 U | NA | 0.83 U |
| | 8/24/2007 | Round 18 | FIELD | 1 | 1 | NA | NA | 40 | NA | NA | NA | 40 | 40 | NA | NA | NA | NA | 7.00 | NA |
| | 7/14/2009 | Round 22 | F66642 | 0.6 | 0 | 0.05 UJL | 0.05 U | 39.2 | 0.02 UJL | 547 JL | 1.1 | 85 | 55 | 88 JL | 320 U | 430 U | 3.68 | 6.86 | 0.6 U |
| | 7/27/2011 | Round 26 | F84666 | 0.4 | 0 | 0.66 | 0.5 U | -16.6 | 0.02 U | 634 JL | 1 | 500 | 50 | 83.1 | 320 U | 430 U | 7.45 | 6.89 | 0.3 U |
| | 1/1/2012 | Round 27 | F88817 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| | 7/9/2012 | Round 28 | F94831 | NA | NA | NA | NA | 58.1 | NA | NA | NA | NA | NA | NA | NA | NA | NA | 7.01 | NA |
| | 1/8/2013 | Round 29 | FA637 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| | 7/16/213 | Round 30 | FA6474 | 0.4 | 0 | 0.50 U | 0.50 U | 68.1 | 0.030 J | 621 | 1.3 | 500 | 50 | 70.2 JH | 320 U | 430 U | 2.1 | 7.06 | 0.65 JH |
| | 1/28/2014 | Round 31 | FIELD | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| | 7/16/2014 | Round 32 | 1407125 | 0.3 | 0.3 | 0.033 U | 0.165 U | 21.3 | 0.01 U | 566 | 1.51 J | NA | 100 | 56.3 | 0.001 UJ | 0.001 UJ | 0.00114 J | 6.94 | 0.02 |
| | 1/21/2015 | Round 33 | 1501079 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| | 7/22/2015 | Round 34 | 1507178 | 0.2 | 0.2 | 0.033 U | 0.165 U | 120.3 | 0.01 U | 715.0 | 1.33 J | 581.0 | 90.0 | 58.8 | 0.001 U | 0.001 U | 5.5 | 7.1 | 0.0 |
| | 1/20/2015 | Round 35 | 1601140 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| | 7/22/2016 | Round 36 | 1607175 | 0.0 | 0.0 | 0.0588 | 0.033 U | 82.0 | 0.0192 | 360.0 | 1.7 | 527.0 | 0.0 | 30.9 | 0.001 U | 0.001 U | 4.4 | 7.13 | NA |
| 614D09MW | 4/20/1998 | Well Installed | | | | | | | | | | | | | | | | | |
| | 11/4/1999 | Round 5 | DL332, TTE14 | 0.40 | 0 | NA | NA | 239.2 | NA | 90.0 | NA | 332 | NA | 7.00 | 87 | 454 | 3.011 | 6.99 | NA |
| | 7/24/2000 | Round 6 | DL352 | 3.0 | 0.2 | NA | NA | 123.0 | NA | 82.5 J | NA | 290 | NA | 6.70 | NA | NA | NA | 6.81 | NA |
| | 12/22/2003 | Round 10 | C3L230193 | 1.0 | 0 | NA | NA | 84.00 | NA | 56.8 | NA | 350 | NA | 5.30 J | NA | NA | NA | 6.92 | NA |
| | 8/24/2007 | Round 18 | DALLASW001 | NA | NA | 0.05 U | 1 U | NA | 0.5 U | 59.4 | 0.8 | NA | NA | 5.4 | 330 U | 330 UL | 11 | NA | 0.83 U |
| | 8/24/2007 | Round 18 | FIELD | 1 | 0 | NA | NA | -19 | NA | NA | NA | 50 | 30 | NA | NA | NA | NA | 6.86 | NA |
| | 7/14/2009 | Round 22 | F66642 | 3 | 0 | 0.2 JL | 0.05 U | -18.1 | 0.024 JL | 34.1 JL | 0.5 U | 275 | 70 | 5.6 JL | 320 U | 430 U | 0.79 | 6.8 | 0.6 U |
| | 7/27/2011 | Round 26 | F84666 | 0.9 | 0 | 0.46 | 0.05 U | -36.8 | 0.02 U | 34.6 JL | 0.51 | 170 | 14 | 6 | 320 U | 430 U | 0.16 U | 7.05 | 0.3 U |
| | 1/1/2012 | Round 27 | F88817 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| | 7/9/2012 | Round 28 | F94831 | NA | NA | NA | NA | 8.5 | NA | NA | NA | NA | NA | NA | NA | NA | NA | 6.95 | NA |
| | 1/8/2013 | Round 29 | FA637 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| | 7/16/2013 | Round 30 | FA6474 | 0.3 | 0 | 0.061 J | 0.050 U | 63.4 | 0.16 | 44 | 0.76 J U | 250 | 30 | 27.2 JH | 320 U | 430 U | 26.1 | 7.07 | 0.57 JH |
| | 1/28/2014 | Round 31 | FIELD | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| | 7/17/2014 | Round 32 | 1407130 | 0.3 | 0.03 | 0.033 U | 0.033 U | -56 | 0.01 U | 43.4 | 1.25 U | NA | 50 | 22.9 | 0.001 U | 0.001 U | 0.00101 J | 6.73 | 0.01 |
| | 1/21/2015 | Round 33 | 1501079 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| | 7/22/2015 | Round 34 | 1507178 | 0.3 | 0.4 | 0.033 U | 0.033 U | 118.2 | 0.01 U | 49.5 | 1.25 U | 327.0 | 50.0 | 22.3 | 0.001 U | 0.001 U | 1.34 J | 6.9 | 0.0 |
| | 1/20/2015 | Round 35 | 1601140 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| | 7/21/2016 | Round 36 | 1607165 | 0.0 | 0.05 | 0.177 | 0.033 U | 16.0 | 0.01 U | 49.4 | 1.25 U | 358.0 | 0.0 | 21.1 | 0.001 U | 0.001 U | 1.1 | 7.20 | NA |

mg/L - milligrams per liter
mV - millivolts
NA - Not Analyzed
ng/L - nanograms per liter
ORP - Oxidation/reduction potential

TOC - Total Organic Carbon
mg/L - micrograms per liter
S.U. - Standard Units
SDG - Sample Delivery Group
PCLE - Protective Concentration Level Exceedance

Notes:
1. Field measurement, Meter
2. Field measurement, Test Kit
3. Analytical laboratory result

Analytical Result Qualifiers:
J, K, H, L - Indicates that the chemical was detected; however, the associated numerical result may not be a precise representation of the amount that is actually present in the sample. The laboratory reported concentration is considered to be bias unknown (J), high (K or H), or low (L) estimate of the true concentration.
U - Indicates that the sample was not detected at the numerical detection limit (sample-specific quantitation limit) noted. Nondetected results from the laboratory are reported in this manner. This qualifier is added to a positive result (reported by the laboratory) if the detected concentration is determined to be attributable to contamination introduced during field sampling or laboratory analysis.

**Table 4-2B**

**Summary of Geochemical Parameters Measured in Groundwater**
**Historical Monitoring Wells — SWMU 17/Building 1429 Plume**
**2016 RAER**

**Former NAS Dallas, Texas**


| Monitoring Well | Sampling Date | Sampling Round | SDG | Oxidation-Reduction Conditions | | | | | | | | Degradation Products | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Dissolved Oxygen[2] | Ferrous Iron[2] | Nitrate[3] | Nitrite[3] | ORP[1] | Phosphate[3] | Sulfate[3] | TOC[3] | Alkalinity[2] | Carbon Dioxide[2] | Chloride[3] | Ethane[3] | Ethene[3] | Methane[3] | pH[1] | Sulfide[3] |
| | | Units | | mg/L | mg/L | mg/L | mg/L | mV | mg/L | mg/L | mg/L | mg/L | mg/L | mg/L | mg/L | ng/L | mg/L | S.U. | mg/L |
| **Monitoring Wells Located Inside PCLE Zone** | | | | | | | | | | | | | | | | | | | |
| **60304MW** | 10/19/1999 | Round 5 | | 0.40 | 0 | NA | NA | 358.6 | NA | 1730 | NA | 480 | NA | 117 | NA | NA | NA | 7.04 | NA |
| | 7/18/2000 | Round 6 | | 0.50 | 0.2 | NA | NA | 292.9 | NA | 1110 | NA | 330 | NA | 93.0 | NA | NA | NA | 7.10 | NA |
| | 12/15/2003 | Round 10 | | 1.0 | 0 | NA | NA | 96.00 | NA | 2210 | NA | 250 | NA | 78.4 | NA | NA | NA | 7.35 | NA |
| | 4/19/2005 | Well Abandoned | | | | | | | | | | | | | | | | | |
| **612D109MW** | 8/7/2000 | Well Installed | | | | | | | | | | | | | | | | | |
| | 8/19/2000 | Round 6 | | 0.30 | 0.2 | NA | NA | 329.0 | NA | NA | NA | 275 | NA | NA | NA | NA | NA | 6.69 | NA |
| | 12/16/2003 | Round 10 | | 2.0 | 0 | NA | NA | 160.0 | NA | 366 | NA | 225 | NA | 44.7 | NA | NA | NA | 6.65 | NA |
| | 4/19/2005 | Well Abandoned | | | | | | | | | | | | | | | | | |
| **612D110MW** | 8/2/2000 | Well Installed | | | | | | | | | | | | | | | | | |
| | 8/18/2000 | Round 6 | | 0.50 | 0.2 | NA | NA | 203.1 | NA | 514 | NA | 250 | NA | 56.7 | NA | NA | NA | 6.55 | NA |
| | 10/20/2000 | Well Abandoned | | | | | | | | | | | | | | | | | |
| **612D112MW** | 8/5/2000 | Well Installed | | | | | | | | | | | | | | | | | |
| | 8/19/2000 | Round 6 | | 2.0 | 0.2 | NA | NA | 331.1 | NA | NA | NA | 275 | NA | NA | NA | NA | NA | 6.57 | NA |
| | 10/20/2000 | Well Abandoned | | | | | | | | | | | | | | | | | |
| **612D113MW** | 8/5/2000 | Well Installed | | | | | | | | | | | | | | | | | |
| | 8/18/2000 | Round 6 | | 4.5 | 0.2 | NA | NA | 363.3 | NA | 226 | NA | 170 | NA | 35.7 | NA | NA | NA | 6.68 | NA |
| | 12/16/2003 | Round 10 | | 3.5 | 1 | NA | NA | 27.00 | NA | 386 | NA | 450 | NA | 24.9 | NA | NA | NA | 6.79 | NA |
| | 4/19/2005 | Well Abandoned | | | | | | | | | | | | | | | | | |
| **612D114MW** | 7/13/2001 | Well Installed | | | | | | | | | | | | | | | | | |
| | 12/21/2003 | Round 10 | | 5.0 | 0 | NA | NA | 424 | NA | 294 | NA | 275 | NA | 57.2 J | NA | NA | NA | 6.7 | NA |
| | 4/19/2005 | Well Abandoned | | | | | | | | | | | | | | | | | |

**Table 4-2B**

**Summary of Geochemical Parameters Measured in Groundwater**
**Historical Monitoring Wells — SWMU 17/Building 1429 Plume**
**2016 RAER**

**Former NAS Dallas, Texas**


| Monitoring Well | Sampling Date | Sampling Round | SDG | Oxidation-Reduction Conditions | | | | | | | | Degradation Products | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Dissolved Oxygen[2] | Ferrous Iron[2] | Nitrate[3] | Nitrite[3] | ORP[1] | Phosphate[3] | Sulfate[3] | TOC[3] | Alkalinity[2] | Carbon Dioxide[2] | Chloride[3] | Ethane[3] | Ethene[3] | Methane[3] | pH[1] | Sulfide[3] |
| | | Units | | mg/L | mg/L | mg/L | mg/L | mV | mg/L | mg/L | mg/L | mg/L | mg/L | mg/L | mg/L | ng/L | mg/L | S.U. | mg/L |
| **Monitoring Wells Located Outside PCLE Zone** | | | | | | | | | | | | | | | | | | | |
| **600D86MW** | -- | Well Installed | | | | | | | | | | | | | | | | | |
| | 8/17/1999 | Round 5 | DL318, TTE09 | 4.5 | 0 | NA | NA | 249.0 | NA | 1850 | NA | 376 | NA | 502 | 7 | 322 | 0.0950 | 7.22 | NA |
| | 7/12/2000 | Round 6 | DL349 | 2.0 | 2 | NA | NA | -52.70 | NA | 2740 | NA | 360 | NA | 828 | NA | NA | NA | 6.93 | NA |
| | 12/9/2003 | Round 10 | C3L100326 | 1.5 | 0.6 | NA | NA | 55.00 | NA | 2390 | NA | 375 | NA | 831 | NA | NA | NA | 6.90 | NA |
| | 8/23/2007 | Round 18 | DALLASW001 | NA | NA | 0.6 | 1 U | NA | 0.5 U | 2600 | 3.1 | NA | NA | 948 | 330 U | 330 U | 6.7 U | NA | 0.8 U |
| | 8/23/2007 | Round 18 | FIELD | 1 | 0 | NA | NA | -8 | NA | NA | NA | 50 | 40 | NA | NA | NA | NA | 6.7 | NA |
| | 7/14/2009 | Round 22 | F66642 | 3 | 0 | 0.05 UJL | 0.5 UR | 62.7 | 0.02 UJL | 1260 JL | 2.9 | 220 | 60 | 702 JL | 320 U | 430 U | 4.83 | 6.79 | 0.6 U |
| | 7/27/2011 | Round 26 | F84666 | 1 | 0.2 | 3.2 JL | 0.25 R | -51.2 | 0.036 | 2510 JL | 2.1 | 500 | 0 | 912 | 320 U | 430 U | 1.17 | 7.01 | 0.3 U |
| | 1/1/2012 | Round 27 | F88817 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| | 7/9/2012 | Round 28 | F94831 | NA | NA | NA | NA | 32.6 | NA | NA | NA | NA | NA | NA | NA | NA | NA | 6.9 | NA |
| | 1/8/2013 | Round 29 | FA637 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| | 7/16/2013 | Round 30 | FA6474 | 1.0 | 0.2 | 5.0 U | 5.0 U | -31.9 | 0.020 U | 3420 | 2.4 | 300 | 40 | 1170 | 320 U | 430 U | 2 | 6.89 | 0.22 U |
| | 1/28/2014 | Round 31 | FIELD | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| | 7/16/2014 | Round 32 | 1407125 | 0.3 | 0.43 | 0.069 J | 0.66 U | 28.5 | 0.01 U | 3470 | 2.53 J | NA | 100 | 1310 | 0.001 UJ | 0.001 UJ | 0.001 U | 6.71 | 0 |
| | 1/21/2015 | Round 33 | 1501079 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| | 7/22/2015 | Round 34 | 1507178 | 0.9 | 0.4 | 0.033 U | 0.033 U | 37.9 | .015 J | 3830.0 | 2.31 J | 436.0 | 95.0 | 1530.0 | 0.001 U | 0.001 U | 3.45 J | 6.8 | 0.0 |
| | 4/4/2016 | Well Plugged and Abandoned | | | | | | | | | | | | | | | | | |
| **60201MW** | 10/8/1999 | Round 5 | DL327, TTE12 | 0.40 | 0 | NA | NA | 371.0 | NA | 1070 | NA | 324 | NA | 86.3 | 54 | 10.0 | 0.2200 | 7.00 | NA |
| | 7/18/2000 | Round 6 | DL350 | 1.5 | 0.2 | NA | NA | 279.7 | NA | 1030 | NA | 365 | NA | 107 | NA | NA | NA | 7.35 | NA |
| | 12/16/2003 | Round 10 | C3L170177 | 0.90 | 0 | NA | NA | 421.0 | NA | 1030 | NA | 200 | NA | 108 | NA | NA | NA | 7.42 | NA |
| | 8/23/2007 | Round 18 | DALLASW001 | NA | NA | 0.0075 | 1 U | NA | 0.5 U | 919 | 0.79 | NA | NA | 103 | 330 U | 330 U | 0.83 U | NA | 0.85 U |
| | 8/23/2007 | Round 18 | FIELD | 0.5 | 0 | NA | NA | -1 | NA | NA | NA | 50 | 14 | NA | NA | NA | NA | 6.65 | NA |
| | 7/14/2009 | Round 22 | F66642 | 0.8 | 0 | 0.05 UJL | 0.05 U | 50.2 | 0.03 JL | 752 JL | 0.64 J | 300 | 50 | 102 JL | 320 U | 430 U | 0.16 U | 6.90 | 0.6 U |
| | 7/27/2011 | Round 26 | F84666 | 0.4 | 0.1 | 0.97 | 0.5 U | -9.9 | 0.02 U | 919 JL | 1.1 | 275 | 30 | 106 | 320 U | 430 U | 0.16 U | 6.71 | 0.3 U |
| | 1/1/2012 | Round 27 | F88817 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| | 7/9/2012 | Round 28 | F94831 | NA | NA | NA | NA | -34.2 | NA | NA | NA | NA | NA | NA | NA | NA | NA | 6 | NA |
| | 1/8/2013 | Round 29 | FA637 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| | 7/16/2013 | Round 30 | FA6474 | 0.4 | 0 | 0.50 U | 0.50 U | 80.6 | 0.21 | 831 | 0.89 J U | 304 | 50 | 103 | 320 U | 430 U | 0.16 U | 6.99 | 0.50 JH |
| | 1/28/2014 | Round 31 | FIELD | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| | 7/18/2014 | Round 32 | 1407152 | 0.7 | 0.05 | 0.033 U | 0.66 U | 7.7 | 0.01 U | 758 | 1.25 U | NA | 55 | 98.5 | 0.001 U | 0.001 U | 0.001 U | 6.19 | 0.04 |
| | 1/21/2015 | Round 33 | 1501079 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| | 7/22/2015 | Round 34 | 1507178 | 1.2 | 0.1 | 0.033 U | 0.66 U | 107.8 | 0.01 U | 896.0 | 1.25 U | 347.0 | 90.0 | 103.0 | 0.001 U | 0.001 U | 0.001 U | 6.9 | 0.0 |
| | 4/4/2016 | Well Plugged and Abandoned | | | | | | | | | | | | | | | | | |
| **612D155MW** | 8/24/2007 | Round 18 | DALLASW001 | NA | NA | 1.6 | 1 U | NA | 0.5 U | 276 | 0.74 | NA | NA | 36.6 | 330 U | 330 UL | 1.4 U | NA | 0.74 U |
| | 8/24/2007 | Round 18 | FIELD | 0.8 | 0 | NA | NA | 205 | NA | NA | NA | 300 | 27 | NA | NA | NA | NA | 7.22 | NA |
| | 7/14/2009 | Round 22 | F66642 | 3 | 0 | 1 JL | 0.05 U | -8.6 | 0.044 JL | 180 JL | 0.5 U | 300 | 35 | 24 JL | 320 U | 430 U | 1 | 7.57 | 0.6 U |
| | 7/27/2011 | Round 26 | F84666 | 0.4 | 0 | 1.1 | 0.1 U | 15.7 | 0.036 | 184 JL | 0.33 | 12 | 15 | 22.3 | 320 U | 430 U | 0.16 U | 6.8 | 0.3 U |
| | 1/1/2012 | Round 27 | F88817 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| | 7/9/2012 | Round 28 | F94831 | NA | NA | NA | NA | -10.9 | NA | NA | NA | NA | NA | NA | NA | NA | NA | 6.69 | NA |
| | 1/8/2013 | Round 29 | FA637 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| | 7/16/2013 | Round 30 | FA6474 | 0.4 | 0 | 1.2 | 0.25 U | 113.6 | 0.020 U | 224 | 0.57 J U | 100 | 25 | 30.1 JH | 320 U | 430 U | 0.16 U | 7.21 | 0.73 JH |
| | 1/28/2014 | Round 31 | FIELD | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| | 7/18/2014 | Round 32 | 1407152 | 0.9 | 0.13 | 1.36 | 0.033 U | -69.6 | 0.01 U | 72.5 | 1.25 U | NA | 40 | 10.7 | 0.001 U | 0.001 U | 0.001 U | 6.86 | 0.05 |
| | 1/21/2015 | Round 33 | 1501079 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| | 7/22/2015 | Round 34 | 1507178 | 0.7 | 0.1 | .794 J | 0.033 U | -20.9 | 0.01 U | 171.0 | 1.25 U | 311.0 | 60.0 | 19.0 | 0.001 U | 0.001 U | 1.07 J | 7.2 | 0.1 |
| | 4/4/2016 | Well Plugged and Abandoned | | | | | | | | | | | | | | | | | |

**Table 4-2B**

**Summary of Geochemical Parameters Measured in Groundwater**
**Historical Monitoring Wells — SWMU 17/Building 1429 Plume**
**2016 RAER**

**Former NAS Dallas, Texas**


| Monitoring Well | Sampling Date | Sampling Round | SDG | Oxidation-Reduction Conditions | | | | | | | | Degradation Products | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Dissolved Oxygen[2] | Ferrous Iron[2] | Nitrate[3] | Nitrite[3] | ORP[1] | Phosphate[3] | Sulfate[3] | TOC[3] | Alkalinity[2] | Carbon Dioxide[2] | Chloride[3] | Ethane[3] | Ethene[3] | Methane[3] | pH[1] | Sulfide[3] |
| | | Units | | mg/L | mg/L | mg/L | mg/L | mV | mg/L | mg/L | mg/L | mg/L | mg/L | mg/L | mg/L | ng/L | mg/L | S.U. | mg/L |
| 603D15MW | -- | | | Well Installed | | | | | | | | | | | | | | | |
| | 10/12/1999 | Round 5 | | 0.40 | 0 | NA | NA | 278.7 | NA | 151 | NA | 452 | NA | 26.4 | NA | NA | NA | 7.06 | NA |
| | 7/18/2000 | Round 6 | | 2.0 | 0.2 | NA | NA | 76.90 | NA | 152 | NA | 500 | NA | 26.1 | NA | NA | NA | 6.93 | NA |
| | 12/16/2003 | Round 10 | | 1.5 | 0 | NA | NA | 423.0 | NA | 110 | NA | 250 | NA | 26.7 | NA | NA | NA | 7.63 | NA |
| | 4/19/2005 | Well Abandoned | | | | | | | | | | | | | | | | | |
| 613D70MW | -- | | | Well Installed | | | | | | | | | | | | | | | |
| | 8/24/1999 | Round 5 | | 1.0 | 0 | NA | NA | 284.3 | NA | 3100 | NA | 350 | NA | 1750 | NA | 0.00 | 0.0920 | 6.81 | NA |
| | 11/9/1999 | Round 5 | | 1.0 | 0 | NA | NA | 350.9 | NA | 2810 | NA | 350 | NA | 1600 | NA | NA | NA | 7.07 | NA |
| | 7/24/2000 | Round 6 | | 2.0 | 0.2 | NA | NA | 277.3 | NA | 2920 J | NA | 400 | NA | 1620 | NA | NA | NA | 6.70 | NA |
| | 12/9/2003 | Round 10 | | 0.60 | 0 | NA | NA | 279.0 | NA | 3090 | NA | 425 | NA | 1680 | NA | NA | NA | 6.78 | NA |
| | 4/26/2005 | | | | | | | | | | | | | | | | | | |
| 61401MW | 10/18/1999 | Round 5 | | 0.40 | 0 | NA | NA | 212.0 | NA | 35.0 | NA | 380 | NA | 5.30 | NA | 23.0 | 0.9540 | 6.82 | NA |
| | 7/24/2000 | Round 6 | | 1.5 | 0.2 | NA | NA | 162.6 | NA | 35.7 J | NA | 400 | NA | 4.60 | NA | NA | NA | 6.63 | NA |
| | 12/9/2003 | Round 10 | | 0.60 | 0 | NA | NA | 121.0 | NA | 30.6 | NA | 400 | NA | 4.60 | NA | NA | NA | 7.60 | NA |
| | 4/19/2005 | Well Abandoned | | | | | | | | | | | | | | | | | |
| 61402MW | -- | | | Well Installed | | | | | | | | | | | | | | | |
| | 11/2/1999 | Round 5 | | 0.50 | 0 | NA | NA | 267.8 | NA | NA | NA | 292 | NA | 3.00 | NA | 15.0 | 1.826 | 6.79 | NA |
| | 7/24/2000 | Round 6 | | 0.60 | 0.2 | NA | NA | 228.9 | NA | NA | NA | 275 | NA | 2.60 | NA | NA | NA | 6.87 | NA |
| | 12/9/2003 | Round 10 | | 0.60 | 0 | NA | NA | 99.00 | NA | NA | NA | 250 | NA | 2.90 | NA | NA | NA | 7.74 | NA |
| | 4/19/2005 | Well Abandoned | | | | | | | | | | | | | | | | | |
| 79920MW | 11/1/1999 | Round 5 | DL330, TTE14 | 1.0 | 0 | NA | NA | 502.0 | NA | 75.8 | NA | 318 | NA | 5.70 | 0.0 | 12.0 | 0.0610 | 6.83 | NA |
| | 7/24/2000 | Round 6 | DL351 | 2.5 | 0.2 | NA | NA | 235.2 | NA | 85.8 | NA | 290 | NA | 6.40 | NA | NA | NA | 6.92 | NA |
| | 12/22/2003 | Round 10 | C3L230193 | 0.80 | 0 | NA | NA | 156.0 | NA | 96.4 | NA | 300 | NA | 7.50 J | NA | NA | NA | 6.60 | NA |
| | 8/24/2007 | Round 18 | DALLASW001 | NA | NA | 0.12 | 1 U | NA | 0.5 U | 91.4 | 0.5 | NA | NA | 8.6 | 330 U | 330 UL | 0.92 U | NA | 0.85 U |
| | 8/24/2007 | Round 18 | FIELD | 2 | 0 | NA | NA | -30 | NA | NA | NA | 150 | 50 | NA | NA | NA | NA | 6.8 | NA |
| | 7/14/2009 | Round 22 | F66642 | 1.5 | 0 | 0.19 JL | 0.05 U | 71.0 | 0.047 JL | 68.2 JL | 0.5 U | 300 | 30 | 8.4 JL | 320 U | 430 U | 0.16 U | 6.95 | 0.6 U |
| | 7/27/2011 | Round 26 | F84666 | 0.6 | 0.1 | 0.19 JL | 0.05 R | 18.7 | 0.02 U | 64.4 JL | 0.32 | 14 | 15 | 6.1 | 320 U | 430 U | 0.16 U | 6.61 | 0.3 U |
| | 1/1/2012 | Round 27 | F88817 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| | 7/9/2012 | Round 28 | F94831 | NA | NA | NA | NA | 3.9 | NA | NA | NA | NA | NA | NA | NA | NA | NA | 7.1 | NA |
| | 1/8/2013 | Round 29 | FA637 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| | 7/16/2013 | Round 30 | FA6474 | 0.8 | 0 | 0.21 | 0.050 U | 62.0 | 0.034 J | 67.9 | 0.61 J U | 250 | 100 | 7.1 JH | 320 U | 430 U | 0.16 U | 7.07 | 0.78 JH |
| | 1/28/2014 | Round 31 | FIELD | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| | 7/18/2014 | Round 32 | 1407152 | 0.7 | 0 | 0.072 J | 0.033 U | -76.9 | 0.01 U | 74.6 | 1.25 U | NA | 60 | 7.5 | 0.001 U | 0.001 U | 0.001 U | 6.69 | 0.01 |
| | 1/21/2015 | Round 33 | 1501079 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| | 7/22/2015 | Round 34 | 1507178 | 0.5 | 0.3 | 0.033 U | 0.66 U | 109.1 | 0.01 U | 78.5 | 1.25 U | 321.0 | 55.0 | 7.4 | 0.001 U | 0.001 U | 0.001 U | 7.1 | 0.0 |
| | 4/4/2016 | Well Plugged and Abandoned | | | | | | | | | | | | | | | | | |

mg/L - milligrams per liter
mV - millivolts
NA - Not Analyzed
ng/L - nanograms per liter
ORP - Oxidation/reduction potential

Notes:
1. Field measurement, Meter
2. Field measurement, Test Kit
3. Analytical Laboratory result

Analytical Result Qualifiers:
J, K, L - Indicates that the chemical was detected; however, the associated numerical result may not be a precise representation of the amount that is actually present in the sample. The laboratory reported concentration is considered to be bias unknown (J), high (K), or low (L) estimate of the true concentration.
U - Indicates that the sample was not detected at the numerical detection limit (sample-specific quantitation limit) noted. Nondetected results from the laboratory are reported in this manner. This qualifier is added to a positive result (reported by the laboratory) if the detected concentration is determined to be attributable to contamination introduced during field

# TABLE 4-3
# SUMMARY OF GROUNDWATER GAUGING DATA

# Table 4-3A

## Summary of Groundwater Gauging Data
## Long Term Monitoring Wells — SWMU 17/Building 1429 Plume
## 2016 RAER

## Former NAS Dallas, Texas


| Monitoring Well | Top of Casing [1] (ft msl) | Screened Interval (ft msl) | Date | Depth to Water [2] (ft bgs) | Groundwater Elevation (ft msl) |
|---|---|---|---|---|---|
| **Monitoring Wells Located Inside PCLE Zone** | | | | | |
| 600D84MW | 477.00 | 471.10 to 461.10 | 8/9/1999 | Well Installed | |
| | | | 9/1/1999 | 3.95 | 473.05 |
| | | | 6/1/2000 | 2.77 | 474.23 |
| | | | 6/1/2001 | 3.20 | 473.80 |
| | | | 12/2/2002 | 2.82 | 474.18 |
| | | | 8/1/2003 | 4.13 | 472.87 |
| | | | 12/23/2003 | 3.99 | 473.01 |
| | | | 7/4/2004 | 3.16 | 473.84 |
| | | | 9/28/2004 | 3.65 | 473.35 |
| | 476.99 | 471.09 to 461.09 | 4/17/2005 | 3.56 | 473.43 |
| | | | 7/21/2005 | 3.47 | 473.52 |
| | | | 10/4/2005 | 4.41 | 472.58 |
| | | | 1/21/2006 | 5.25 | 471.74 |
| | | | 5/1/2006 | 5.90 | 471.09 |
| | | | 8/7/2006 | 5.09 | 471.90 |
| | | | 4/23/2007 | 3.78 | 473.21 |
| | | | 8/22/2007 | 3.41 | 473.58 |
| | | | 1/14/2008 | 4.24 | 472.75 |
| | | | 7/8/2008 | 4.04 | 472.95 |
| | | | 12/16/2008 | 4.31 | 472.68 |
| | | | 7/14/2009 | 4.21 | 472.78 |
| | 476.99 | 471.09 to 461.09 | 12/15/2009 | 3.58 | 473.41 |
| | | | 8/9/2010 | 3.44 | 473.55 |
| | | | 12/16/2010 | 3.79 | 473.20 |
| | | | 7/25/2011 | 1.60 | 475.39 |
| | | | 12/14/2011 | 3.90 | 473.09 |
| | | | 7/9/2012 | 4.11 | 472.88 |
| | | | 12/19/2012 | 5.34 | 471.65 |
| | | | 7/15/2013 | 4.51 | 472.48 |
| | | | 12/17/2013 | 4.12 | 472.87 |
| | | | 7/15/2014 | 4.28 | 472.71 |
| | | | 12/15/2014 | 3.93 | 473.06 |
| | | | 7/20/2015 | 6.31 | 470.68 |
| | | | 12/14/2015 | 2.26 | 474.73 |
| | | | 7/18/2016 | 3.01 | 473.98 |

# Table 4-3A

## Summary of Groundwater Gauging Data
## Long Term Monitoring Wells — SWMU 17/Building 1429 Plume
## 2016 RAER

## Former NAS Dallas, Texas


| Monitoring Well | Top of Casing [1] (ft msl) | Screened Interval (ft msl) | Date | Depth to Water [2] (ft bgs) | Groundwater Elevation (ft msl) |
|---|---|---|---|---|---|
| 600D85MW | 475.24 | 465.14 to 455.14 | 8/10/1999 | Well Installed | |
| | | | 9/1/1999 | 7.07 | 468.17 |
| | | | 6/1/2000 | 5.08 | 470.16 |
| | | | 6/1/2001 | 5.05 | 470.19 |
| | | | 12/2/2002 | 3.99 | 471.25 |
| | | | 8/1/2003 | 6.34 | 468.90 |
| | | | 12/23/2003 | 5.95 | 469.29 |
| | | | 7/4/2004 | 5.82 | 469.42 |
| | | | 9/28/2004 | 5.50 | 469.74 |
| | 475.22 | 465.12 to 455.12 | 4/17/2005 | 5.82 | 469.40 |
| | | | 7/21/2005 | 5.70 | 469.52 |
| | | | 10/4/2005 | 6.31 | 468.91 |
| | | | 1/21/2006 | 6.55 | 468.67 |
| | | | 5/1/2006 | 6.47 | 468.75 |
| | | | 8/7/2006 | 6.58 | 468.64 |
| | | | 4/23/2007 | 5.88 | 469.34 |
| | | | 8/21/2007 | 8.65 | 466.57 |
| | | | 1/14/2008 | 5.38 | 469.84 |
| | | | 7/8/2008 | 6.25 | 468.97 |
| | | | 12/16/2008 | 5.32 | 469.90 |
| | | | 7/14/2009 | 6.55 | 468.67 |
| | 475.21 | 465.11 to 455.11 | 12/15/2009 | 6.26 | 468.95 |
| | | | 8/9/2010 | 5.32 | 469.89 |
| | | | 12/16/2010 | 6.59 | 468.62 |
| | | | 7/25/2011 | 5.40 | 469.81 |
| | | | 12/14/2011 | 6.26 | 468.95 |
| | | | 7/9/2012 | 5.89 | 469.32 |
| | | | 12/19/2012 | 6.91 | 468.30 |
| | | | 7/15/2013 | 5.88 | 469.33 |
| | | | 12/17/2013 | 6.31 | 468.90 |
| | | | 7/15/2014 | 5.79 | 469.42 |
| | | | 12/15/2014 | 6.16 | 469.05 |
| | | | 7/20/2015 | 5.20 | 470.01 |
| | | | 12/14/2015 | 5.75 | 469.46 |
| | | | 7/18/2016 | 6.26 | 468.95 |

# Table 4-3A

## Summary of Groundwater Gauging Data
## Long Term Monitoring Wells — SWMU 17/Building 1429 Plume
## 2016 RAER

## Former NAS Dallas, Texas


| Monitoring Well | Top of Casing [1] (ft msl) | Screened Interval (ft msl) | Date | Depth to Water [2] (ft bgs) | Groundwater Elevation (ft msl) |
|---|---|---|---|---|---|
| 603D71MW | 473.57 | 469.37 to 464.37 | 4/4/1998 | Well Installed | |
| | | | 5/1/1998 | 5.18 | 468.39 |
| | | | 8/1/1998 | 5.21 | 468.36 |
| | | | 2/1/1999 | 4.97 | 468.60 |
| | | | 9/1/1999 | 5.06 | 468.51 |
| | | | 6/1/2000 | 5.00 | 468.57 |
| | | | 6/1/2001 | 5.10 | 468.47 |
| | | | 12/2/2002 | 4.89 | 468.68 |
| | | | 8/1/2003 | 5.73 | 467.84 |
| | | | 12/23/2003 | 5.38 | 468.19 |
| | | | 7/4/2004 | 5.58 | 467.99 |
| | | | 9/27/2004 | 5.31 | 468.26 |
| | 473.41 | 469.21 to 464.21 | 4/17/2005 | 5.66 | 467.75 |
| | | | 7/21/2005 | 5.61 | 467.80 |
| | | | 10/4/2005 | 5.62 | 467.79 |
| | | | 1/21/2006 | 5.64 | 467.77 |
| | | | 5/1/2006 | 5.82 | 467.59 |
| | | | 8/7/2006 | 5.89 | 467.52 |
| | | | 4/23/2007 | 5.46 | 467.95 |
| | | | 8/22/2007 | 5.81 | 467.60 |
| | | | 1/14/2008 | 5.35 | 468.06 |
| | | | 7/8/2008 | 5.67 | 467.74 |
| | | | 12/16/2008 | 5.46 | 467.95 |
| | | | 7/14/2009 | 5.74 | 467.67 |
| | 473.42 | 469.22 to 464.22 | 12/15/2009 | 5.42 | 468.00 |
| | | | 8/9/2010 | 5.52 | 467.90 |
| | | | 12/16/2010 | 5.96 | 467.46 |
| | | | 7/25/2011 | 5.70 | 467.72 |
| | | | 12/14/2011 | 5.75 | 467.67 |
| | | | 7/9/2012 | 5.65 | 467.77 |
| | | | 12/19/2012 | 5.94 | 467.48 |
| | | | 7/15/2013 | 5.71 | 467.71 |
| | | | 12/17/2013 | 5.59 | 467.83 |
| | | | 7/15/2014 | 5.41 | 468.01 |
| | | | 12/15/2014 | 5.44 | 467.98 |
| | | | 7/20/2015 | 5.61 | 467.81 |
| | | | 12/14/2015 | 5.11 | 468.31 |
| | | | 7/18/2016 | 5.63 | 467.79 |

# Table 4-3A

## Summary of Groundwater Gauging Data
## Long Term Monitoring Wells — SWMU 17/Building 1429 Plume
## 2016 RAER

## Former NAS Dallas, Texas


| Monitoring Well | Top of Casing [1] (ft msl) | Screened Interval (ft msl) | Date | Depth to Water [2] (ft bgs) | Groundwater Elevation (ft msl) |
|---|---|---|---|---|---|
| 61201MW | 478.26 | 464.22 to 454.22 | 11/29/1996 | Well Installed | |
| | | | 2/1/1998 | 3.48 | 474.78 |
| | | | 5/1/1998 | 4.11 | 474.15 |
| | | | 8/1/1998 | 5.33 | 472.93 |
| | | | 2/1/1999 | 4.61 | 473.65 |
| | | | 9/1/1999 | 5.14 | 473.12 |
| | | | 6/1/2000 | 3.59 | 474.67 |
| | | | 6/1/2001 | 4.25 | 474.01 |
| | | | 12/2/2002 | 3.80 | 474.46 |
| | | | 8/1/2003 | 5.58 | 472.68 |
| | | | 12/23/2003 | 5.30 | 472.96 |
| | | | 7/4/2004 | 4.33 | 473.93 |
| | | | 9/28/2004 | 4.88 | 473.38 |
| | 478.02 | 463.98 to 453.98 | 4/17/2005 | NM | NM |
| | | | 7/21/2005 | 4.76 | 473.26 |
| | | | 10/4/2005 | 8.75 | 469.27 |
| | | | 1/21/2006 | 6.55 | 471.47 |
| | | | 5/1/2006 | 5.45 | 472.57 |
| | | | 8/7/2006 | 6.49 | 471.53 |
| | | | 4/23/2007 | 5.06 | 472.96 |
| | | | 8/22/2007 | 4.69 | 473.33 |
| | | | 1/14/2008 | 5.44 | 472.58 |
| | | | 7/8/2008 | 5.40 | 472.62 |
| | | | 12/16/2008 | 6.28 | 471.74 |
| | | | 7/14/2009 | 5.62 | 472.40 |
| | 478.03 | 463.99 to 453.99 | 12/15/2009 | 4.65 | 473.38 |
| | | | 8/9/2010 | 4.88 | 473.15 |
| | | | 12/16/2010 | 5.02 | 473.01 |
| | | | 7/25/2011 | 3.22 | 474.81 |
| | | | 12/14/2011 | 5.15 | 472.88 |
| | | | 7/9/2012 | 5.58 | 472.45 |
| | | | 12/19/2012 | 6.65 | 471.38 |
| | | | 7/15/2013 | 5.94 | 472.09 |
| | | | 12/17/2013 | 5.15 | 472.88 |
| | | | 7/15/2014 | 8.75 | 469.28 |
| | | | 12/15/2015 | 4.50 | 473.53 |
| | | | 7/20/2015 | 13.92 | 464.11 |
| | | | 12/14/2015 | 3.00 | 475.03 |
| | | | 7/18/2016 | 3.71 | 474.32 |

# Table 4-3A

## Summary of Groundwater Gauging Data
## Long Term Monitoring Wells — SWMU 17/Building 1429 Plume
## 2016 RAER

## Former NAS Dallas, Texas


| Monitoring Well | Top of Casing [1] (ft msl) | Screened Interval (ft msl) | Date | Depth to Water [2] (ft bgs) | Groundwater Elevation (ft msl) |
|---|---|---|---|---|---|
| 612D111MW | 477.85 | 469.38 to 465.38 | 8/3/2000 | Well Installed | |
| | | | 6/1/2001 | 3.85 | 474.00 |
| | | | 12/2/2002 | 3.38 | 474.47 |
| | | | 8/1/2003 | 5.02 | 472.83 |
| | | | 12/23/2003 | 4.82 | 473.03 |
| | | | 7/4/2004 | 3.65 | 474.20 |
| | | | 9/28/2004 | 4.55 | 473.30 |
| | 477.72 | 469.25 to 465.25 | 4/17/2005 | 4.32 | 473.40 |
| | | | 7/21/2005 | 4.27 | 473.45 |
| | | | 10/4/2005 | 5.29 | 472.43 |
| | | | 1/21/2006 | 5.91 | 471.81 |
| | | | 5/1/2006 | 4.89 | 472.83 |
| | | | 8/7/2006 | 6.07 | 471.65 |
| | | | 4/23/2007 | 4.51 | 473.21 |
| | | | 8/22/2007 | 4.28 | 473.44 |
| | | | 1/14/2008 | 4.78 | 472.94 |
| | | | 7/8/2008 | 4.90 | 472.82 |
| | | | 12/16/2008 | 6.05 | 471.67 |
| | | | 7/14/2009 | 5.10 | 472.62 |
| | 477.79 | 469.32 to 465.32 | 12/15/2009 | 3.51 | 474.28 |
| | | | 8/9/2010 | 4.54 | 473.25 |
| | | | 12/16/2010 | 4.72 | 473.07 |
| | | | 7/25/2011 | 2.78 | 475.01 |
| | | | 12/14/2011 | 4.97 | 472.82 |
| | | | 7/9/2012 | 5.31 | 472.48 |
| | | | 12/19/2012 | 6.47 | 471.32 |
| | | | 7/15/2013 | 5.73 | 472.06 |
| | | | 12/17/2013 | 5.13 | 472.66 |
| | | | 7/15/2014 | 5.28 | 472.51 |
| | | | 12/15/2015 | 4.83 | 472.96 |
| | | | 1/21/2015 | 4.30 | 473.49 |
| | | | 7/20/2015 | 4.88 | 472.91 |
| | | | 12/14/2015 | 2.12 | 475.67 |
| | | | 7/18/2016 | 4.25 | 473.54 |

# Table 4-3A

## Summary of Groundwater Gauging Data
## Long Term Monitoring Wells — SWMU 17/Building 1429 Plume
## 2016 RAER

## Former NAS Dallas, Texas


| Monitoring Well | Top of Casing [1] (ft msl) | Screened Interval (ft msl) | Date | Depth to Water [2] (ft bgs) | Groundwater Elevation (ft msl) |
|---|---|---|---|---|---|
| 612D129MW | 475.84 | 466.14 to 456.14 | 3/29/2005 | Well Installed | |
| | | | 4/17/2005 | 7.22 | 468.62 |
| | | | 7/18/2005 | 6.95 | 468.89 |
| | | | 10/4/2005 | 7.56 | 468.28 |
| | | | 1/18/2006 | 8.25 | 467.59 |
| | | | 5/1/2006 | 7.48 | 468.36 |
| | | | 8/7/2006 | 7.65 | 468.19 |
| | | | 4/23/2007 | 7.22 | 468.62 |
| | | | 8/21/2007 | 6.59 | 469.25 |
| | | | 1/14/2008 | 7.65 | 468.19 |
| | | | 7/8/2008 | 7.15 | 468.69 |
| | | | 12/16/2008 | 6.01 | 469.83 |
| | | | 7/14/2009 | 7.09 | 468.75 |
| | 475.84 | 466.14 to 456.14 | 12/15/2009 | 7.19 | 468.65 |
| | | | 8/9/2010 | 6.79 | 469.05 |
| | | | 12/16/2010 | 7.72 | 468.12 |
| | | | 7/25/2011 | 6.49 | 469.35 |
| | | | 12/14/2011 | 7.50 | 468.34 |
| | | | 7/9/2012 | 7.20 | 468.64 |
| | | | 12/19/2012 | 8.09 | 467.75 |
| | | | 7/15/2013 | 7.29 | 468.55 |
| | | | 12/17/2013 | 7.60 | 468.24 |
| | | | 7/15/2014 | 7.05 | 468.79 |
| | | | 1/21/2015 | 7.64 | 468.20 |
| | | | 7/20/2015 | 6.51 | 469.33 |
| | | | 12/14/2015 | 7.15 | 468.69 |
| | | | 7/18/2016 | 6.68 | 469.16 |

# Table 4-3A

## Summary of Groundwater Gauging Data
## Long Term Monitoring Wells — SWMU 17/Building 1429 Plume
## 2016 RAER

## Former NAS Dallas, Texas


| Monitoring Well | Top of Casing [1] (ft msl) | Screened Interval (ft msl) | Date | Depth to Water [2] (ft bgs) | Groundwater Elevation (ft msl) |
|---|---|---|---|---|---|
| 612D38MW | 478.26 | 467.86 to 457.86 | 5/4/1998 | Well Installed | |
| | | | 5/1/1998 | 7.13 | 471.13 |
| | | | 8/1/1998 | 8.90 | 469.36 |
| | | | 2/1/1999 | 7.19 | 471.07 |
| | | | 9/1/1999 | 8.24 | 470.02 |
| | | | 6/1/2000 | 5.99 | 472.27 |
| | | | 6/1/2001 | 6.83 | 471.43 |
| | | | 12/2/2002 | 6.35 | 471.91 |
| | | | 8/1/2003 | 8.15 | 470.11 |
| | | | 12/23/2003 | 7.70 | 470.56 |
| | | | 7/4/2004 | 6.71 | 471.55 |
| | | | 9/28/2004 | 7.52 | 470.74 |
| | 480.11 | 469.71 to 459.71 | 4/17/2005 | 7.25 | 472.86 |
| | | | 7/21/2005 | 7.53 | 472.58 |
| | | | 10/3/2005 | 8.51 | 471.60 |
| | | | 1/21/2006 | 8.91 | 471.20 |
| | | | 5/1/2006 | 7.61 | 472.50 |
| | | | 8/7/2006 | 9.19 | 470.92 |
| | | | 4/23/2007 | 7.34 | 472.77 |
| | | | 8/22/2007 | 7.12 | 472.99 |
| | | | 1/14/2008 | 7.85 | 472.26 |
| | | | 7/8/2008 | 8.10 | 472.01 |
| | | | 12/16/2008 | 8.74 | 471.37 |
| | | | 7/14/2009 | 8.19 | 471.92 |
| | 480.03 | 469.63 to 459.63 | 12/15/2009 | 7.22 | 472.81 |
| | | | 8/9/2010 | 7.39 | 472.64 |
| | | | 12/16/2010 | 7.59 | 472.44 |
| | | | 7/25/2011 | 6.21 | 473.82 |
| | | | 12/14/2011 | 7.56 | 472.47 |
| | | | 7/9/2012 | 8.05 | 471.98 |
| | | | 12/19/2012 | 8.92 | 471.11 |
| | | | 7/15/2013 | 8.51 | 471.52 |
| | | | 12/17/2013 | 7.66 | 472.37 |
| | | | 7/15/2014 | 8.20 | 471.83 |
| | | | 15/15/2014 | 7.69 | 472.34 |
| | | | 7/20/2015 | 7.94 | 472.09 |
| | | | 12/14/2015 | 5.68 | 474.35 |
| | | | 7/18/2016 | 7.16 | 472.87 |

# Table 4-3A

## Summary of Groundwater Gauging Data
## Long Term Monitoring Wells — SWMU 17/Building 1429 Plume
## 2016 RAER

## Former NAS Dallas, Texas


| Monitoring Well | Top of Casing [1] (ft msl) | Screened Interval (ft msl) | Date | Depth to Water [2] (ft bgs) | Groundwater Elevation (ft msl) |
|---|---|---|---|---|---|
| 614D09MW | 480.23 | 474.53 to 464.53 | 4/20/1998 | Well Installed | |
| | | | 5/1/1998 | 6.03 | 474.20 |
| | | | 8/1/1998 | 6.15 | 474.08 |
| | | | 2/1/1999 | 6.26 | 473.97 |
| | | | 9/1/1999 | 6.77 | 473.46 |
| | | | 6/1/2000 | 5.75 | 474.48 |
| | | | 6/1/2001 | 6.15 | 474.08 |
| | | | 12/2/2002 | 5.49 | 474.74 |
| | | | 8/1/2003 | 6.95 | 473.28 |
| | | | 12/23/2003 | 6.45 | 473.78 |
| | | | 7/4/2004 | 6.55 | 473.68 |
| | | | 9/28/2004 | 6.03 | 474.20 |
| | 480.06 | 474.36 to 464.36 | 4/17/2005 | 6.01 | 474.05 |
| | | | 7/21/2005 | 6.35 | 473.71 |
| | | | 10/4/2005 | 6.89 | 473.17 |
| | | | 1/21/2006 | 7.34 | 472.72 |
| | | | 5/1/2006 | 7.17 | 472.89 |
| | | | 8/7/2006 | 7.91 | 472.15 |
| | | | 4/23/2007 | 7.01 | 473.05 |
| | | | 8/22/2007 | 6.14 | 473.92 |
| | | | 1/14/2008 | 6.28 | 473.78 |
| | | | 7/8/2008 | 7.86 | 472.20 |
| | | | 12/16/2008 | 7.81 | 472.25 |
| | | | 7/14/2009 | 7.12 | 472.94 |
| | 480.06 | 474.36 to 464.36 | 12/15/2009 | 6.30 | 473.76 |
| | | | 8/9/2010 | 6.31 | 473.75 |
| | | | 12/16/2010 | 6.37 | 473.69 |
| | | | 7/25/2011 | 4.22 | 475.84 |
| | | | 12/14/2011 | 6.62 | 473.44 |
| | | | 7/9/2012 | 7.09 | 472.97 |
| | | | 12/19/2012 | 8.24 | 471.82 |
| | | | 7/15/2013 | 7.47 | 472.59 |
| | | | 12/17/2013 | 6.85 | 473.21 |
| | | | 7/15/2014 | 7.29 | 472.77 |
| | | | 12/15/2014 | 6.43 | 473.63 |
| | | | 7/20/2015 | 6.49 | 473.57 |
| | | | 12/14/2015 | 4.65 | 475.41 |
| | | | 7/18/2016 | 5.69 | 474.37 |

bgs - below ground surface
ft - feet
msl - mean sea level
NA - Not Available or Applicable (i.e., abandoned, not installed, not measured)
PCLE - Protective Concentration Level Exceedance

Notes:
1 - All monitoring wells on-site were resurveyed in May 2005 and September 2010 in accordance with the Compliance Plan Requirements.
2 - Depth to water measurements taken from the top of the riser.

# Table 4-3B

## Summary of Groundwater Gauging Data
## Historical Monitoring Wells — SWMU 17/Building 1429 Plume
## 2016 RAER

## Former NAS Dallas, Texas


| Monitoring Well | Top of Casing [1] (ft msl) | Screened Interval (ft msl) | Date | Depth to Water [2] (ft bgs) | Groundwater Elevation (ft msl) |
|---|---|---|---|---|---|
| **Monitoring Wells Located Inside PCLE Zone** | | | | | |
| **60304MW** | 483.90 | 475.21 to 465.21 | 10/17/1995 | Well Installed | |
| | | | 2/1/1998 | 8.98 | 474.92 |
| | | | 5/1/1998 | 10.36 | 473.54 |
| | | | 8/1/1998 | 11.06 | 472.84 |
| | | | 2/1/1999 | 10.09 | 473.81 |
| | | | 9/1/1999 | 10.92 | 472.98 |
| | | | 6/1/2000 | 9.72 | 474.18 |
| | | | 6/1/2001 | 10.20 | 473.70 |
| | | | 12/2/2002 | 10.24 | 473.66 |
| | | | 8/1/2003 | 11.58 | 472.32 |
| | | | 12/23/2003 | 11.28 | 472.62 |
| | | | 7/4/2004 | 10.25 | 473.65 |
| | | | 9/27/2004 | 10.94 | 472.96 |
| | | | 4/17/2005 | Well Plugged and Abandoned | |
| **612D109MW** | 478.16 | 473.97 to 463.97 | 8/5/2000 | Well Installed | |
| | | | 6/1/2000 | 0.00 | 478.16 |
| | | | 6/1/2001 | 4.20 | 473.96 |
| | | | 12/2/2002 | 4.00 | 474.16 |
| | | | 8/1/2003 | 5.38 | 472.78 |
| | | | 12/23/2003 | 5.16 | 473.00 |
| | | | 7/4/2004 | 3.95 | 474.21 |
| | | | 9/28/2004 | 4.85 | 473.31 |
| | | | 4/17/2005 | Well Plugged and Abandoned | |
| **612D110MW** | 478.51 | 472.51 to 462.51 | 6/1/2001 | NA | NA |
| | | | 12/1/2002 | Well Plugged and Abandoned | |
| **612D112MW** | 478.32 | 474.32 to 464.32 | 6/1/2001 | NA | NA |
| | | | 12/1/2002 | Well Plugged and Abandoned | |
| **612D113MW** | 477.51 | 466.61 to 456.61 | 8/5/2000 | 2-2B | |
| | | | 6/1/2000 | 0.00 | 477.51 |
| | | | 6/1/2001 | 3.77 | 473.74 |
| | | | 12/2/2002 | 3.61 | 473.90 |
| | | | 8/1/2003 | 4.92 | 472.59 |
| | | | 12/23/2003 | 4.71 | 472.80 |
| | | | 7/4/2004 | 1.21 | 476.30 |
| | | | 9/28/2004 | 4.39 | 473.12 |
| | | | 4/17/2005 | Well Plugged and Abandoned | |
| **612D114MW** | 477.72 | 475.72 to 471.72 | 8/5/2000 | Well Installed | |
| | | | 6/1/2000 | 0.00 | 477.72 |
| | | | 6/1/2001 | 2.83 | 474.89 |
| | | | 12/2/2002 | 2.93 | 474.79 |
| | | | 8/1/2003 | NM | NM |
| | | | 12/23/2003 | 4.01 | 473.71 |
| | | | 7/4/2004 | 2.05 | 475.67 |
| | | | 9/28/2004 | 4.65 | 473.07 |
| | | | 4/17/2005 | Well Plugged and Abandoned | |

# Table 4-3B

## Summary of Groundwater Gauging Data
## Historical Monitoring Wells — SWMU 17/Building 1429 Plume
## 2016 RAER

## Former NAS Dallas, Texas


| Monitoring Well | Top of Casing [1] (ft msl) | Screened Interval (ft msl) | Date | Depth to Water [2] (ft bgs) | Groundwater Elevation (ft msl) |
|---|---|---|---|---|---|
| **Monitoring Wells Located Outside PCLE Zone** | | | | | |
| **60201MW** | 480.69 | 463.40 to 453.40 | 4/27/1995 | Well Installed | |
| | | | 2/1/1998 | 6.48 | 474.21 |
| | | | 5/1/1998 | 6.98 | 473.71 |
| | | | 8/1/1998 | 8.23 | 472.46 |
| | | | 2/1/1999 | 7.32 | 473.37 |
| | | | 9/1/1999 | 8.21 | 472.48 |
| | | | 6/1/2000 | 6.57 | 474.12 |
| | | | 6/1/2001 | 7.18 | 473.51 |
| | | | 12/2/2002 | 7.15 | 473.54 |
| | | | 8/1/2003 | 8.65 | 472.04 |
| | | | 12/23/2003 | 7.02 | 473.67 |
| | | | 7/4/2004 | 7.13 | 473.56 |
| | | | 9/27/2004 | 7.92 | 472.77 |
| | 479.48 | 462.19 to 452.19 | 4/17/2005 | 7.88 | 471.60 |
| | | | 7/21/2005 | 8.31 | 471.17 |
| | | | 10/4/2005 | 9.91 | 469.57 |
| | | | 1/21/2006 | 9.71 | 469.77 |
| | | | 5/1/2006 | 8.03 | 471.45 |
| | | | 8/7/2006 | 9.35 | 470.13 |
| | | | 4/23/2007 | 7.71 | 471.77 |
| | | | 8/22/2007 | 7.60 | 471.88 |
| | | | 1/14/2008 | 8.32 | 471.16 |
| | | | 7/8/2008 | 8.38 | 471.10 |
| | | | 12/16/2008 | 9.08 | 470.40 |
| | | | 7/14/2009 | 8.40 | 471.08 |
| | 479.49 | 462.20 to 452.20 | 12/15/2009 | 7.71 | 471.78 |
| | | | 8/9/2010 | 7.74 | 471.75 |
| | | | 12/16/2010 | 8.28 | 471.21 |
| | | | 7/25/2011 | 8.07 | 471.42 |
| | | | 12/14/2011 | 7.70 | 471.79 |
| | | | 7/9/2012 | 8.27 | 471.22 |
| | | | 12/19/2012 | 9.31 | 470.18 |
| | | | 7/15/2013 | 5.58 | 473.91 |
| | | | 12/17/2013 | 7.95 | 471.54 |
| | | | 7/15/2014 | 5.16 | 474.33 |
| | | | 12/15/2015 | 9.02 | 470.47 |
| | | | 7/20/2015 | 7.92 | 471.57 |
| | | | 12/15/2015 | 7.02 | 472.47 |
| | | | 4/6/2016 | Well Plugged and Abandoned | |

# Table 4-3B

## Summary of Groundwater Gauging Data
## Historical Monitoring Wells — SWMU 17/Building 1429 Plume
## 2016 RAER

## Former NAS Dallas, Texas


| Monitoring Well | Top of Casing [1] (ft msl) | Screened Interval (ft msl) | Date | Depth to Water [2] (ft bgs) | Groundwater Elevation (ft msl) |
|---|---|---|---|---|---|
| 79920MW | 476.15 | 472.35 to 462.35 | 10/14/1996 | Well Installed | |
| | | | 2/1/1998 | 4.35 | 471.80 |
| | | | 5/1/1998 | 4.41 | 471.74 |
| | | | 8/1/1998 | 4.98 | 471.17 |
| | | | 2/1/1999 | 4.86 | 471.29 |
| | | | 9/1/1999 | 4.81 | 471.34 |
| | | | 6/1/2000 | 4.16 | 471.99 |
| | | | 6/1/2001 | 4.32 | 471.83 |
| | | | 12/2/2002 | 4.81 | 471.34 |
| | | | 8/1/2003 | 4.85 | 471.30 |
| | | | 12/23/2003 | 5.22 | 470.93 |
| | | | 7/4/2004 | 4.17 | 471.98 |
| | | | 9/28/2004 | 4.68 | 471.47 |
| | 475.97 | 472.17 to 462.17 | 4/17/2005 | 4.71 | 471.26 |
| | | | 7/21/2005 | 4.50 | 471.47 |
| | | | 10/4/2005 | 5.31 | 470.66 |
| | | | 1/18/2006 | 6.31 | 469.66 |
| | | | 5/1/2006 | 4.96 | 471.01 |
| | | | 8/7/2006 | 5.35 | 470.62 |
| | | | 4/23/2007 | 4.61 | 471.36 |
| | | | 8/21/2007 | 4.20 | 471.77 |
| | | | 1/14/2008 | 5.37 | 470.60 |
| | | | 7/8/2008 | 4.65 | 471.32 |
| | | | 12/16/2008 | 5.91 | 470.06 |
| | 475.96 | 472.16 to 462.16 | 12/15/2009 | 4.71 | 471.25 |
| | | | 8/9/2010 | 4.33 | 471.63 |
| | | | 12/16/2010 | 5.43 | 470.53 |
| | | | 7/25/2011 | 4.03 | 471.93 |
| | | | 12/14/2011 | 5.17 | 470.79 |
| | | | 12/19/2012 | 6.21 | 469.75 |
| | | | 7/15/2013 | 4.84 | 471.12 |
| | | | 12/17/2013 | 5.13 | 470.83 |
| | | | 7/15/2014 | 4.59 | 471.37 |
| | | | 12/15/2015 | 5.46 | 470.50 |
| | | | 7/20/2015 | 5.25 | 470.71 |
| | | | 12/14/2015 | 4.68 | 471.28 |
| | | | 4/4/2016 | Well Plugged and Abandoned | |

# Table 4-3B

## Summary of Groundwater Gauging Data
## Historical Monitoring Wells — SWMU 17/Building 1429 Plume
## 2016 RAER

## Former NAS Dallas, Texas


| Monitoring Well | Top of Casing [1] (ft msl) | Screened Interval (ft msl) | Date | Depth to Water [2] (ft bgs) | Groundwater Elevation (ft msl) |
|---|---|---|---|---|---|
| 600D86MW | 477.71 | 467.70 to 457.70 | 7/26/1999 | Well Installed | |
| | | | 9/1/1999 | 7.07 | 470.64 |
| | | | 6/1/2000 | 5.08 | 472.63 |
| | | | 6/1/2001 | 5.05 | 472.66 |
| | | | 12/2/2002 | 3.99 | 473.72 |
| | | | 8/1/2003 | 6.11 | 471.60 |
| | | | 12/23/2003 | 4.82 | 472.89 |
| | | | 7/4/2004 | 4.86 | 472.85 |
| | | | 9/28/2004 | 4.94 | 472.77 |
| | 477.69 | 467.68 to 457.68 | 4/17/2005 | NA | NA |
| | | | 7/21/2005 | 5.24 | 472.45 |
| | | | 10/4/2005 | 5.93 | 471.76 |
| | | | 1/21/2006 | 6.44 | 471.25 |
| | | | 5/1/2006 | 5.43 | 472.26 |
| | | | 8/7/2006 | 5.01 | 472.68 |
| | | | 4/23/2007 | 4.78 | 472.91 |
| | | | 8/22/2007 | 4.41 | 473.28 |
| | | | 1/14/2008 | 4.39 | 473.30 |
| | | | 7/8/2008 | 5.12 | 472.57 |
| | | | 12/16/2008 | 5.11 | 472.58 |
| | | | 7/14/2009 | 5.23 | 472.46 |
| | 477.71 | 467.70 to 457.70 | 12/15/2009 | 5.15 | 472.56 |
| | | | 8/9/2010 | 4.19 | 473.52 |
| | | | 12/16/2010 | 5.01 | 472.70 |
| | | | 7/25/2011 | 4.7 | 473.01 |
| | | | 12/14/2011 | 3.86 | 473.85 |
| | | | 7/9/2012 | 4.75 | 472.96 |
| | | | 12/19/2012 | 5.97 | 471.74 |
| | | | 7/15/2013 | 4.86 | 472.85 |
| | | | 12/17/2013 | 3.65 | 474.06 |
| | | | 7/15/2014 | 4.63 | 473.08 |
| | | | 12/15/2015 | 5.15 | 472.56 |
| | | | 7/20/2015 | 4.62 | 473.09 |
| | | | 12/14/2015 | 2.55 | 475.16 |
| | | | 4/4/2016 | Well Plugged and Abandoned | |

# Table 4-3B

## Summary of Groundwater Gauging Data
## Historical Monitoring Wells — SWMU 17/Building 1429 Plume
## 2016 RAER

## Former NAS Dallas, Texas


| Monitoring Well | Top of Casing [1] (ft msl) | Screened Interval (ft msl) | Date | Depth to Water [2] (ft bgs) | Groundwater Elevation (ft msl) |
|---|---|---|---|---|---|
| 612D155MW | 476.68 | 467.08 to 457.08 | 5/18/2006 | Well Installed | |
| | | | 5/23/2006 | 11.25 | 465.43 |
| | | | 8/7/2006 | 11.11 | 465.57 |
| | | | 11/7/2006 | 11.18 | 465.50 |
| | | | 4/23/2007 | 10.99 | 465.69 |
| | | | 8/21/2007 | 10.61 | 466.07 |
| | | | 1/14/2008 | 10.92 | 465.76 |
| | | | 7/8/2008 | 11.02 | 465.66 |
| | | | 12/16/2008 | 11.36 | 465.32 |
| | | | 7/14/2009 | 10.90 | 465.78 |
| | 476.68 | 467.08 to 457.08 | 12/15/2009 | 11.09 | 465.59 |
| | | | 8/9/2010 | 10.80 | 465.88 |
| | | | 12/16/2010 | 11.12 | 465.56 |
| | | | 7/25/2011 | 10.62 | 466.06 |
| | | | 12/14/2011 | 11.10 | 465.58 |
| | | | 7/9/2012 | 11.50 | 465.18 |
| | | | 12/19/2012 | 11.34 | 465.34 |
| | | | 7/15/2013 | 10.95 | 465.73 |
| | | | 12/17/2013 | 11.08 | 465.60 |
| | | | 7/15/2014 | 11.06 | 465.62 |
| | | | 12/15/2014 | 11.39 | 465.29 |
| | | | 7/20/2015 | 10.45 | 466.23 |
| | | | 12/14/2015 | 11.00 | 465.68 |
| | | | 4/4/2016 | Well Plugged and Abandoned | |
| 612D156MW | 476.50 | 469.20 to 459.20 | 5/18/2006 | Well Installed | |
| | | | 5/23/2006 | 11.3 | 465.20 |
| | | | 8/7/2006 | 8.61 | 467.89 |
| | | | 11/6/2006 | 6.51 | 469.99 |
| | | | 4/23/2007 | 7.21 | 469.29 |
| | | | 5/22/2007 | Well Abandoned | |
| 61401MW | 481.76 | 477.71 to 467.71 | 2/1/1998 | 6.60 | 475.16 |
| | | | 5/1/1998 | 7.12 | 474.64 |
| | | | 8/1/1998 | 8.27 | 473.49 |
| | | | 2/1/1999 | 7.61 | 474.15 |
| | | | 9/1/1999 | 8.26 | 473.50 |
| | | | 6/1/2000 | 6.80 | 474.96 |
| | | | 6/1/2001 | 7.32 | 474.44 |
| | | | 12/2/2002 | 6.49 | 475.27 |
| | | | 8/1/2003 | 8.30 | 473.46 |
| | | | 12/23/2003 | 7.99 | 473.77 |
| | | | 7/4/2004 | 7.26 | 474.50 |
| | | | 9/28/2004 | 7.78 | 473.98 |
| | | | 4/17/2005 | Well Plugged and Abandoned | |
| 61402MW | 480.94 | 476.80 to 466.80 | 11/8/1995 | Well Installed | |
| | | | 2/1/1998 | 5.63 | 475.31 |
| | | | 5/1/1998 | 6.18 | 474.76 |
| | | | 8/1/1998 | 7.48 | 473.46 |
| | | | 2/1/1999 | 6.75 | 474.19 |
| | | | 9/1/1999 | 7.37 | 473.57 |
| | | | 6/1/2000 | 5.84 | 475.10 |
| | | | 6/1/2001 | 6.50 | 474.44 |
| | | | 12/2/2002 | 5.80 | 475.14 |
| | | | 8/1/2003 | 7.55 | 473.39 |
| | | | 12/23/2003 | 7.30 | 473.64 |
| | | | 7/4/2004 | 6.37 | 474.57 |
| | | | 9/28/2004 | 7.02 | 473.92 |
| | | | 4/17/2005 | Well Plugged and Abandoned | |

# Table 4-3B

## Summary of Groundwater Gauging Data
## Historical Monitoring Wells — SWMU 17/Building 1429 Plume
## 2016 RAER

## Former NAS Dallas, Texas


| Monitoring Well | Top of Casing [1] (ft msl) | Screened Interval (ft msl) | Date | Depth to Water [2] (ft bgs) | Groundwater Elevation (ft msl) |
|---|---|---|---|---|---|
| 603D15MW | 484.37 | 478.67 to 468.67 | 4/15/1998 | Well Installed | |
| | | | 5/1/1998 | 10.34 | 474.03 |
| | | | 8/1/1998 | 11.13 | 473.24 |
| | | | 2/1/1999 | 10.44 | 473.93 |
| | | | 9/1/1999 | 10.89 | 473.48 |
| | | | 6/1/2000 | 10.17 | 474.20 |
| | | | 6/1/2001 | 10.27 | 474.10 |
| | | | 12/2/2002 | 10.07 | 474.30 |
| | | | 8/1/2003 | 11.08 | 473.29 |
| | | | 12/23/2003 | 10.66 | 473.71 |
| | | | 7/4/2004 | 10.59 | 473.78 |
| | | | 9/27/2004 | 10.75 | 473.62 |
| | | | 4/17/2005 | Well Plugged and Abandoned | |
| 613D70MW | 479.22 | 463.32 to 453.32 | 4/8/1998 | Well Installed | |
| | | | 5/1/1998 | 10.40 | 468.82 |
| | | | 8/1/1998 | 10.89 | 468.33 |
| | | | 2/1/1999 | 7.69 | 471.53 |
| | | | 9/1/1999 | 11.15 | 468.07 |
| | | | 6/1/2000 | 8.97 | 470.25 |
| | | | 6/1/2001 | 7.34 | 471.88 |
| | | | 12/2/2002 | 6.25 | 472.97 |
| | | | 8/1/2003 | 10.30 | 468.92 |
| | | | 12/23/2003 | 10.81 | 468.41 |
| | | | 7/4/2004 | 5.48 | 473.74 |
| | | | 9/28/2004 | 8.31 | 470.91 |
| | | | 4/17/2005 | Well Plugged and Abandoned | |

bgs - below ground surface
NA - Not Available or Applicable (i.e., abandoned, not installed, not measured)
ft - feet
msl - mean sea level
PCLE - Protective Concentration Level Exceedance

Note:
1 - All existing monitoring wells on-site were resurveyed in May 2005 in accordance with the Compliance Plan Requirements.
Depth to water measurements taken from the top of the riser.

# TABLE 4-4
# SUMMARY OF CONCENTRATION vs. TIME ATTENUATION RATE CONSTANTS

**Table 4-4**
**Summary of Concentration vs. Time Attenuation Rate Constants**
**SWMU 17/Building 1429 Plume**
**2016 RAER**
**Former NAS Dallas, Texas**
**Page 1 of 13**

| Monitoring Well | Sampling Date | Protective Concentration Level (mg/L) | Concentration Detected (mg/L) | Natural Log of Concentration (mg/L) | Degradation Rate from Natural Log ($K_{time}$) (mg/L per year) | Minimum Degradation Rate Required for Remedial Goals Natural Log ($K_{time}$) (mg/L per year) | Minimum Degradation Rate Met? (Yes/No) | Expected Remedial Goal Concentration (mg/L) | Expected Remedial Goal Concentration Met? (Yes/No) | Remedial Goals Being Met? (Yes/No) |
|---|---|---|---|---|---|---|---|---|---|---|
| **Trichloroethene** | | | | | | | | | | |
| 600D84MW | Nov-99 | 0.00500 | 0.05300 | -2.94 | -- | -- | -- | -- | -- | -- |
| | Jul-00 | 0.00500 | 0.05000 | -3.00 | -- | -- | -- | -- | -- | -- |
| | Jul-01 | 0.00500 | 0.04800 | -3.04 | -- | -- | -- | -- | -- | -- |
| | Jan-03 | 0.00500 | 0.05900 | -2.83 | 0.036 | -0.140 | No | 0.03370 | No | No |
| | Sep-03 | 0.00500 | 0.03200 | -3.44 | -0.071 | -0.140 | No | 0.03097 | No | No |
| | Dec-03 | 0.00500 | 0.01700 | -4.07 | -0.180 | -0.140 | Yes | 0.02986 | Yes | Yes |
| | Jul-04 | 0.00500 | 0.02200 | -3.82 | -0.196 | -0.140 | Yes | 0.02728 | Yes | Yes |
| | Oct-04 | 0.00500 | 0.01300 | -4.34 | -0.244 | -0.140 | Yes | 0.02649 | Yes | Yes |
| | Apr-05 | 0.00500 | 0.04500 | -3.10 | -0.174 | -0.140 | Yes | 0.02480 | No | Evaluate Further |
| | Oct-05 | 0.00500 | 0.03000 | -3.51 | -0.150 | -0.140 | Yes | 0.02312 | No | Evaluate Further |
| | May-06 | 0.00500 | 0.03900 | -3.24 | -0.111 | -0.140 | No | 0.02119 | No | No |
| | Aug-06 | 0.00500 | 0.01600 | -4.14 | -0.132 | -0.140 | No | 0.02042 | Yes | Evaluate Further |
| | Apr-07 | 0.00500 | 0.03600 | -3.32 | -0.104 | -0.140 | No | 0.01871 | No | No |
| | Aug-07 | 0.00500 | 0.02900 | -3.54 | -0.092 | -0.140 | No | 0.01785 | No | No |
| | Jan-08 | 0.00500 | 0.03000 | -3.51 | -0.081 | -0.140 | No | 0.01683 | No | No |
| | Jul-08 | 0.00500 | 0.01940 | -3.94 | -0.087 | -0.140 | No | 0.01569 | No | No |
| | Jan-09 | 0.00500 | 0.03390 | -3.38 | -0.072 | -0.140 | No | 0.01460 | No | No |
| | Jul-09 | 0.00500 | 0.00110 | -6.81 | -0.163 | -0.140 | Less Than PCL | 0.01361 | Less Than PCL | Less Than PCL |
| | Jan-10 | 0.00500 | 0.02430 | -3.72 | -0.143 | -0.140 | Yes | 0.01269 | No | Evaluate Further |
| | Jul-10 | 0.00500 | 0.01350 | -4.31 | -0.141 | -0.140 | Yes | 0.01183 | No | Evaluate Further |
| | Jan-11 | 0.00500 | 0.00800 | -4.83 | -0.151 | -0.140 | Yes | 0.01103 | Yes | Yes |
| | Jul-11 | 0.00500 | 0.02640 | -3.63 | -0.130 | -0.140 | No | 0.01023 | No | No |
| | Jan-12 | 0.00500 | 0.01200 | -4.42 | -0.128 | -0.140 | No | 0.00959 | No | No |
| | Jul-12 | 0.00500 | 0.01680 | -4.09 | -0.120 | -0.140 | No | 0.00895 | No | No |
| | Jan-13 | 0.00500 | 0.01820 | -4.01 | -0.111 | -0.140 | No | 0.00832 | No | No |
| | Jul-13 | 0.00500 | 0.01080 | -4.53 | -0.111 | -0.140 | No | 0.00777 | No | No |
| | Jan-14 | 0.00500 | 0.01200 | -4.42 | -0.108 | -0.140 | No | 0.00723 | No | No |
| | Jul-14 | 0.00500 | 0.01570 | -4.15 | -0.102 | -0.152 | No | 0.00674 | No | No |
| | Jan-15 | 0.00500 | 0.00683 | -4.99 | -0.107 | -0.152 | No | 0.00627 | No | No |
| | Jul-15 | 0.00500 | 0.02060 | -3.88 | -0.097 | -0.152 | No | 0.00585 | No | No |
| | Jan-16 | 0.00500 | 0.01100 | -4.51 | -0.096 | -0.140 | No | 0.00545 | No | No |
| | Jul-16 | 0.00500 | 0.01490 | -4.21 | -0.091 | -0.140 | No | 0.00508 | No | No |
| 600D85MW | Nov-99 | 0.00500 | 0.00410 J | -5.50 | -- | -- | -- | -- | -- | -- |
| | Jul-00 | 0.00500 | 0.01100 | -4.51 | -- | -- | -- | -- | -- | -- |
| | Jul-01 | 0.00500 | 0.01100 | -4.51 | -- | -- | -- | -- | -- | -- |
| | Jan-03 | 0.00500 | 0.02400 | -3.73 | 0.479 | -0.058 | No | 0.01100 | No | No |
| | Sep-03 | 0.00500 | 0.00790 | -4.84 | 0.215 | -0.058 | No | 0.01062 | Yes | Evaluate Further |
| | Dec-03 | 0.00500 | 0.00680 | -4.99 | 0.108 | -0.058 | No | 0.01046 | Yes | Evaluate Further |
| | Jul-04 | 0.00500 | 0.00490 | -5.32 | 0.011 | -0.058 | Less Than PCL | 0.01008 | Less Than PCL | Less Than PCL |
| | Oct-04 | 0.00500 | 0.00670 | -5.01 | -0.010 | -0.058 | No | 0.00996 | Yes | Evaluate Further |
| | Apr-05 | 0.00500 | 0.01400 | -4.27 | 0.031 | -0.058 | No | 0.00969 | No | No |
| | Oct-05 | 0.00500 | 0.00800 | -4.83 | 0.019 | -0.058 | No | 0.00941 | Yes | Evaluate Further |
| | May-06 | 0.00500 | 0.01900 | -3.96 | 0.064 | -0.058 | No | 0.00908 | No | No |
| | Aug-06 | 0.00500 | 0.00800 | -4.83 | 0.046 | -0.058 | No | 0.00894 | Yes | Evaluate Further |
| | Apr-07 | 0.00500 | 0.01900 | -3.96 | 0.074 | -0.058 | No | 0.00863 | No | No |
| | Aug-07 | 0.00500 | 0.00720 | -4.93 | 0.050 | -0.058 | No | 0.00846 | Yes | Evaluate Further |
| | Jan-08 | 0.00500 | 0.00880 | -4.73 | 0.040 | -0.058 | No | 0.00826 | No | No |
| | Jul-08 | 0.00500 | 0.00730 | -4.92 | 0.025 | -0.058 | No | 0.00802 | Yes | Evaluate Further |
| | Jan-09 | 0.00500 | 0.00940 | -4.67 | 0.022 | -0.058 | No | 0.00778 | No | No |
| | Jul-09 | 0.00500 | 0.00860 | -4.76 | 0.017 | -0.058 | No | 0.00756 | No | No |
| | Jan-10 | 0.00500 | 0.00820 | -4.80 | 0.011 | -0.058 | No | 0.00735 | No | No |
| | Jul-10 | 0.00500 | 0.00840 | -4.78 | 0.007 | -0.058 | No | 0.00714 | No | No |
| | Jan-11 | 0.00500 | 0.00800 | -4.83 | 0.003 | -0.058 | No | 0.00693 | No | No |
| | Jul-11 | 0.00500 | 0.00470 | -5.36 | -0.012 | -0.058 | Less Than PCL | 0.00672 | Less Than PCL | Less Than PCL |
| | Jan-12 | 0.00500 | 0.00700 | -4.96 | -0.015 | -0.058 | No | 0.00654 | No | No |
| | Jul-12 | 0.00500 | 0.00510 | -5.28 | -0.024 | -0.058 | No | 0.00636 | Yes | Evaluate Further |
| | Jan-13 | 0.00500 | 0.00600 | -5.12 | -0.027 | -0.058 | No | 0.00617 | Yes | Evaluate Further |
| | Jul-13 | 0.00500 | 0.00720 | -4.93 | -0.027 | -0.058 | No | 0.00600 | No | No |
| | Jan-14 | 0.00500 | 0.00810 | -4.82 | -0.025 | -0.058 | No | 0.00582 | No | No |
| | Jul-14 | 0.00500 | 0.01090 | -4.52 | -0.018 | -0.152 | No | 0.00674 | No | No |
| | Jan-15 | 0.00500 | 0.00653 | -5.03 | -0.020 | -0.152 | Yes | 0.00627 | No | Evaluate Further |
| | Jul-15 | 0.00500 | 0.01270 | -4.37 | -0.013 | -0.152 | No | 0.00585 | No | No |
| | Jan-16 | 0.00500 | 0.00539 | -5.22 | -0.017 | -0.058 | No | 0.00518 | No | No |
| | Jul-16 | 0.00500 | 0.00381 | -5.57 | -0.024 | -0.058 | Less Than PCL | 0.00503 | Less Than PCL | Less Than PCL |

**Table 4-4**
**Summary of Concentration vs. Time Attenuation Rate Constants**
**SWMU 17/Building 1429 Plume**
**2016 RAER**
**Former NAS Dallas, Texas**
**Page 2 of 13**

| Monitoring Well | Sampling Date | Protective Concentration Level (mg/L) | Concentration Detected (mg/L) | Natural Log of Concentration (mg/L) | Degradation Rate from Natural Log ($K_{time}$) (mg/L per year) | Minimum Degradation Rate Required for Remedial Goals Natural Log ($K_{time}$) (mg/L per year) | Minimum Degradation Rate Met? (Yes/No) | Expected Remedial Goal Concentration (mg/L) | Expected Remedial Goal Concentration Met? (Yes/No) | Remedial Goals Being Met? (Yes/No) |
|---|---|---|---|---|---|---|---|---|---|---|
| 603D71MW | Apr-98 | 0.00500 | 0.07800 | -2.55 | -- | -- | -- | -- | -- | -- |
| | Sep-98 | 0.00500 | 0.07500 | -2.59 | -- | -- | -- | -- | -- | -- |
| | Apr-99 | 0.00500 | 0.05200 | -2.96 | -- | -- | -- | -- | -- | -- |
| | Nov-99 | 0.00500 | 0.04100 | -3.19 | -0.447 | -0.149 | Yes | 0.05292 | Yes | Yes |
| | Jul-00 | 0.00500 | 0.04300 | -3.15 | -0.311 | -0.149 | Yes | 0.04796 | Yes | Yes |
| | Jul-01 | 0.00500 | 0.03200 | -3.44 | -0.279 | -0.149 | Yes | 0.04183 | Yes | Yes |
| | Jan-03 | 0.00500 | 0.01900 | -3.96 | -0.286 | -0.149 | Yes | 0.03368 | Yes | Yes |
| | Sep-03 | 0.00500 | 0.02900 | -3.54 | -0.222 | -0.149 | Yes | 0.03097 | Yes | Yes |
| | Dec-03 | 0.00500 | 0.01700 | -4.07 | -0.235 | -0.149 | Yes | 0.02986 | Yes | Yes |
| | Jul-04 | 0.00500 | 0.01200 | -4.42 | -0.255 | -0.149 | Yes | 0.02728 | Yes | Yes |
| | Oct-04 | 0.00500 | 0.01500 | -4.20 | -0.252 | -0.149 | Yes | 0.02649 | Yes | Yes |
| | Apr-05 | 0.00500 | 0.01100 | -4.51 | -0.258 | -0.149 | Yes | 0.02480 | Yes | Yes |
| | Oct-05 | 0.00500 | 0.02000 | -3.91 | -0.233 | -0.149 | Yes | 0.02312 | Yes | Yes |
| | May-06 | 0.00500 | 0.00800 | -4.83 | -0.244 | -0.149 | Yes | 0.02119 | Yes | Yes |
| | Aug-06 | 0.00500 | 0.01200 | -4.42 | -0.236 | -0.149 | Yes | 0.02041 | Yes | Yes |
| | Apr-07 | 0.00500 | 0.00650 | -5.04 | -0.244 | -0.149 | Yes | 0.01871 | Yes | Yes |
| | Aug-07 | 0.00500 | 0.01300 | -4.34 | -0.229 | -0.149 | Yes | 0.01785 | Yes | Yes |
| | Jan-08 | 0.00500 | 0.01200 | -4.42 | -0.217 | -0.149 | Yes | 0.01683 | Yes | Yes |
| | Jul-08 | 0.00500 | 0.00480 | -5.34 | -0.227 | -0.149 | Less Than PCL | 0.01569 | Less Than PCL | Less Than PCL |
| | Jan-09 | 0.00500 | 0.01200 | -4.42 | -0.211 | -0.149 | Yes | 0.01460 | Yes | Yes |
| | Jul-09 | 0.00500 | 0.01030 | -4.58 | -0.200 | -0.149 | Yes | 0.01361 | Yes | Yes |
| | Jan-10 | 0.00500 | 0.00860 | -4.76 | -0.193 | -0.149 | Yes | 0.01269 | Yes | Yes |
| | Jul-10 | 0.00500 | 0.00150 | -6.50 | -0.217 | -0.149 | Less Than PCL | 0.01183 | Less Than PCL | Less Than PCL |
| | Jan-11 | 0.00500 | 0.00920 | -4.69 | -0.204 | -0.149 | Yes | 0.01103 | Yes | Yes |
| | Jul-11 | 0.00500 | 0.00820 | -4.80 | -0.194 | -0.149 | Yes | 0.01023 | Yes | Yes |
| | Jan-12 | 0.00500 | 0.00580 | -5.15 | -0.189 | -0.149 | Yes | 0.00959 | Yes | Yes |
| | Jul-12 | 0.00500 | 0.00480 | -5.34 | -0.187 | -0.149 | Less Than PCL | 0.00895 | Less Than PCL | Less Than PCL |
| | Jan-13 | 0.00500 | 0.00610 | -5.10 | -0.180 | -0.149 | Yes | 0.00832 | Yes | Yes |
| | Jul-13 | 0.00500 | 0.00510 | -5.28 | -0.176 | -0.149 | Yes | 0.00777 | Yes | Yes |
| | Jan-14 | 0.00500 | 0.00280 | -5.88 | -0.178 | -0.149 | Less Than PCL | 0.00723 | Less Than PCL | Less Than PCL |
| | Jul-14 | 0.00500 | 0.00188 | -6.28 | -0.165 | -0.152 | Less Than PCL | 0.00674 | Less Than PCL | Less Than PCL |
| | Jan-15 | 0.00500 | 0.00233 | -6.06 | -0.151 | -0.152 | Less Than PCL | 0.00627 | Less Than PCL | Less Than PCL |
| | Jul-15 | 0.00500 | 0.00459 | -5.38 | -0.161 | -0.152 | Less Than PCL | 0.00585 | Less Than PCL | Less Than PCL |
| | Jan-16 | 0.00500 | 0.00352 | -6.06 | -0.151 | -0.152 | Less Than PCL | 0.00627 | Less Than PCL | Less Than PCL |
| | Jul-16 | 0.00500 | 0.00242 | -6.02 | -0.158 | -0.152 | Less Than PCL | 0.00508 | Less Than PCL | Less Than PCL |
| 61201MW | Dec-95 | 0.00500 | 0.16000 | -1.83 | -- | -- | -- | -- | -- | -- |
| | May-98 | 0.00500 | 0.08200 | -2.50 | -- | -- | -- | -- | -- | -- |
| | Aug-98 | 0.00500 | 0.11000 | -2.21 | -- | -- | -- | -- | -- | -- |
| | Apr-99 | 0.00500 | 0.06700 | -2.70 | -0.234 | -0.167 | Yes | 0.05761 | No | Evaluate Further |
| | Oct-99 | 0.00500 | 0.06500 | -2.73 | -0.237 | -0.167 | Yes | 0.05347 | No | Evaluate Further |
| | Jul-00 | 0.00500 | 0.04700 | -3.06 | -0.259 | -0.167 | Yes | 0.04796 | Yes | Yes |
| | Jul-01 | 0.00500 | 0.05100 | -2.98 | -0.228 | -0.167 | Yes | 0.04185 | No | Evaluate Further |
| | Jan-03 | 0.00500 | 0.04900 | -3.02 | -0.181 | -0.167 | Yes | 0.03370 | No | Evaluate Further |
| | Sep-03 | 0.00500 | 0.03900 | -3.24 | -0.172 | -0.167 | Yes | 0.03097 | No | Evaluate Further |
| | Dec-03 | 0.00500 | 0.02200 | -3.82 | -0.198 | -0.167 | Yes | 0.02985 | Yes | Yes |
| | Jul-04 | 0.00500 | 0.02200 | -3.82 | -0.208 | -0.167 | Yes | 0.02728 | Yes | Yes |
| | Oct-04 | 0.00500 | 0.02000 | -3.91 | -0.216 | -0.167 | Yes | 0.02649 | Yes | Yes |
| | Apr-05 | 0.00500 | 0.02900 | -3.54 | -0.204 | -0.167 | Yes | 0.02479 | No | Evaluate Further |
| | Oct-05 | 0.00500 | 0.02700 | -3.61 | -0.195 | -0.167 | Yes | 0.02311 | No | Evaluate Further |
| | May-06 | 0.00500 | 0.02500 | -3.69 | -0.187 | -0.167 | Yes | 0.02119 | No | Evaluate Further |
| | Aug-06 | 0.00500 | 0.02400 | -3.73 | -0.181 | -0.167 | Yes | 0.02041 | No | Evaluate Further |
| | Apr-07 | 0.00500 | 0.01900 | -3.96 | -0.179 | -0.167 | Yes | 0.01871 | No | Evaluate Further |
| | Aug-07 | 0.00500 | 0.01700 | -4.07 | -0.179 | -0.167 | Yes | 0.01785 | Yes | Yes |
| | Jan-08 | 0.00500 | 0.01600 | -4.14 | -0.178 | -0.167 | Yes | 0.01683 | Yes | Yes |
| | Jul-08 | 0.00500 | 0.01050 | -4.56 | -0.185 | -0.167 | Yes | 0.01569 | Yes | Yes |
| | Jan-09 | 0.00500 | 0.01590 | -4.14 | -0.180 | -0.167 | Yes | 0.01460 | No | Evaluate Further |
| | Jul-09 | 0.00500 | 0.01180 | -4.44 | -0.180 | -0.167 | Yes | 0.01361 | Yes | Yes |
| | Jan-10 | 0.00500 | 0.01220 | -4.41 | -0.178 | -0.167 | Yes | 0.01269 | Yes | Yes |
| | Jul-10 | 0.00500 | 0.01270 | -4.37 | -0.175 | -0.167 | Yes | 0.01183 | No | Evaluate Further |
| | Jan-11 | 0.00500 | 0.01160 | -4.46 | -0.172 | -0.167 | Yes | 0.01103 | No | Evaluate Further |
| | Jul-11 | 0.00500 | 0.00750 | -4.89 | -0.174 | -0.167 | Yes | 0.01023 | Yes | Yes |
| | Jan-12 | 0.00500 | 0.00630 | -5.07 | -0.177 | -0.167 | Yes | 0.00959 | Yes | Yes |
| | Jul-12 | 0.00500 | 0.00620 | -5.08 | -0.179 | -0.167 | Yes | 0.00895 | Yes | Yes |
| | Jan-13 | 0.00500 | 0.00650 | -5.04 | -0.179 | -0.167 | Yes | 0.00832 | Yes | Yes |
| | Jul-13 | 0.00500 | 0.00530 | -5.24 | -0.180 | -0.167 | Yes | 0.00777 | Yes | Yes |
| | Jan-14 | 0.00500 | 0.00360 | -5.63 | -0.184 | -0.167 | Less Than PCL | 0.00723 | Less Than PCL | Less Than PCL |
| | Jul-14 | 0.00500 | 0.00149 | -6.51 | -0.150 | -0.152 | Less Than PCL | 0.00674 | Less Than PCL | Less Than PCL |
| | Jan-15 | 0.00500 | 0.00071 J | -7.25 | -0.118 | -0.152 | Less Than PCL | 0.00627 | Less Than PCL | Less Than PCL |
| | Jul-15 | 0.00500 | 0.000868 J | -7.05 | -0.136 | -0.152 | Less Than PCL | 0.00585 | Less Than PCL | Less Than PCL |
| | Jan-16 | 0.00500 | 0.00048 J | -7.25 | -0.118 | -0.152 | Less Than PCL | 0.00627 | Less Than PCL | Less Than PCL |
| | Jul-16 | 0.00500 | 0.00058 J | -7.45 | -0.116 | -0.152 | Less Than PCL | 0.00508 | Less Than PCL | Less Than PCL |

**Table 4-4**
**Summary of Concentration vs. Time Attenuation Rate Constants**
**SWMU 17/Building 1429 Plume**
**2016 RAER**
**Former NAS Dallas, Texas**
**Page 3 of 13**

| Monitoring Well | Sampling Date | Protective Concentration Level (mg/L) | Concentration Detected (mg/L) | Natural Log of Concentration (mg/L) | Degradation Rate from Natural Log ($K_{time}$) (mg/L per year) | Minimum Degradation Rate Required for Remedial Goals Natural Log ($K_{time}$) (mg/L per year) | Minimum Degradation Rate Met? (Yes/No) | Expected Remedial Goal Concentration (mg/L) | Expected Remedial Goal Concentration Met? (Yes/No) | Remedial Goals Being Met? (Yes/No) |
|---|---|---|---|---|---|---|---|---|---|---|
| 612D38MW | May-98 | 0.00500 | 0.05100 | -2.98 | -- | -- | -- | -- | -- | -- |
| | Aug-98 | 0.00500 | 0.05900 | -2.83 | -- | -- | -- | -- | -- | -- |
| | Apr-99 | 0.00500 | 0.03300 | -3.41 | -- | -- | -- | -- | -- | -- |
| | Nov-99 | 0.00500 | 0.03700 | -3.30 | -0.321 | -0.137 | Yes | 0.05302 | Yes | Yes |
| | Jul-00 | 0.00500 | 0.03300 | -3.41 | -0.240 | -0.137 | Yes | 0.04796 | Yes | Yes |
| | Jul-01 | 0.00500 | 0.01800 | -4.02 | -0.318 | -0.137 | Yes | 0.04182 | Yes | Yes |
| | Jan-03 | 0.00500 | 0.01400 | -4.27 | -0.298 | -0.137 | Yes | 0.03388 | Yes | Yes |
| | Aug-03 | 0.00500 | 0.00660 | -5.02 | -0.357 | -0.137 | Yes | 0.03107 | Yes | Yes |
| | Dec-03 | 0.00500 | 0.01500 | -4.20 | -0.306 | -0.137 | Yes | 0.02983 | Yes | Yes |
| | Jul-04 | 0.00500 | 0.00510 | -5.28 | -0.337 | -0.137 | Yes | 0.02728 | Yes | Yes |
| | Oct-04 | 0.00500 | 0.00570 | -5.17 | -0.344 | -0.137 | Yes | 0.02649 | Yes | Yes |
| | Apr-05 | 0.00500 | 0.00900 | -4.71 | -0.320 | -0.137 | Yes | 0.02480 | Yes | Yes |
| | Oct-05 | 0.00500 | 0.01900 | -3.96 | -0.266 | -0.137 | Yes | 0.02312 | Yes | Yes |
| | May-06 | 0.00500 | 0.00800 | -4.83 | -0.254 | -0.137 | Yes | 0.02119 | Yes | Yes |
| | Aug-06 | 0.00500 | 0.01100 | -4.51 | -0.233 | -0.137 | Yes | 0.02041 | Yes | Yes |
| | Apr-07 | 0.00500 | 0.01600 | -4.14 | -0.201 | -0.137 | Yes | 0.01871 | Yes | Yes |
| | Aug-07 | 0.00500 | 0.02000 | -3.91 | -0.170 | -0.137 | Yes | 0.01785 | No | Evaluate Further |
| | Jan-08 | 0.00500 | 0.01400 | -4.27 | -0.154 | -0.137 | Yes | 0.01683 | Yes | Yes |
| | Jul-08 | 0.00500 | 0.00230 | -6.07 | -0.182 | -0.137 | Less Than PCL | 0.01569 | Less Than PCL | Less Than PCL |
| | Jan-09 | 0.00500 | 0.01190 | -4.43 | -0.166 | -0.137 | Yes | 0.01460 | Yes | Yes |
| | Jul-09 | 0.00500 | 0.01620 | -4.12 | -0.145 | -0.137 | Yes | 0.01361 | No | Evaluate Further |
| | Jan-10 | 0.00500 | 0.01140 | -4.47 | -0.134 | -0.137 | No | 0.01269 | Yes | Evaluate Further |
| | Jul-10 | 0.00500 | 0.00200 | -6.21 | -0.156 | -0.137 | Less Than PCL | 0.01183 | Less Than PCL | Less Than PCL |
| | Jan-11 | 0.00500 | 0.00900 | -4.71 | -0.146 | -0.137 | Yes | 0.01103 | Yes | Yes |
| | Jul-11 | 0.00500 | 0.01260 | -4.37 | -0.132 | -0.137 | No | 0.01023 | No | No |
| | Jan-12 | 0.00500 | 0.00930 | -4.68 | -0.124 | -0.137 | No | 0.00959 | Yes | Evaluate Further |
| | Jul-12 | 0.00500 | 0.00940 | -4.67 | -0.116 | -0.137 | No | 0.00895 | No | No |
| | Jan-13 | 0.00500 | 0.00830 | -4.79 | -0.111 | -0.137 | No | 0.00832 | Yes | Evaluate Further |
| | Jul-13 | 0.00500 | 0.01130 | -4.48 | -0.102 | -0.137 | No | 0.00777 | No | No |
| | Jan-14 | 0.00500 | 0.00920 | -4.69 | -0.097 | -0.137 | No | 0.00723 | No | No |
| | Jul-14 | 0.00500 | 0.00952 | -4.65 | -0.123 | -0.152 | No | 0.00674 | No | No |
| | Jan-15 | 0.00500 | 0.00806 | -4.82 | -0.098 | -0.152 | No | 0.00627 | No | No |
| | Jul-15 | 0.00500 | 0.00864 | -4.75 | -0.116 | -0.152 | No | 0.00585 | No | No |
| | Jan-16 | 0.00500 | 0.00501 | -4.82 | -0.098 | -0.152 | No | 0.00627 | No | No |
| | Jul-16 | 0.00500 | 0.00510 | -5.28 | -0.106 | -0.152 | No | 0.00508 | No | No |
| 612D111MW | Jul-00 | 0.00500 | 0.09700 | -2.33 | -- | -- | -- | -- | -- | -- |
| | Jul-01 | 0.00500 | 0.05400 | -2.92 | -- | -- | -- | -- | -- | -- |
| | Jan-03 | 0.00500 | 0.04500 J | -3.10 | -- | -- | -- | -- | -- | -- |
| | Sep-03 | 0.00500 | 0.10000 | -2.30 | -0.036 | -0.184 | No | 0.03097 | No | No |
| | Dec-03 | 0.00500 | 0.06700 | -2.70 | -0.032 | -0.184 | No | 0.02986 | No | No |
| | Jul-04 | 0.00500 | 0.03200 | -3.44 | -0.132 | -0.184 | No | 0.02728 | No | No |
| | Oct-04 | 0.00500 | 0.04700 | -3.06 | -0.133 | -0.184 | No | 0.02649 | No | No |
| | Apr-05 | 0.00500 | 0.04800 | -3.04 | -0.125 | -0.184 | No | 0.02480 | No | No |
| | Oct-05 | 0.00500 | 0.13000 | -2.04 | -0.028 | -0.184 | No | 0.02312 | No | No |
| | May-06 | 0.00500 | 0.04400 | -3.12 | -0.050 | -0.184 | No | 0.02119 | No | No |
| | Aug-06 | 0.00500 | 0.12000 | -2.12 | 0.005 | -0.184 | No | 0.02041 | No | No |
| | Apr-07 | 0.00500 | 0.05300 | -2.94 | -0.008 | -0.184 | No | 0.01871 | No | No |
| | Aug-07 | 0.00500 | 0.06000 | -2.81 | -0.010 | -0.184 | No | 0.01785 | No | No |
| | Jan-08 | 0.00500 | 0.05200 | -2.96 | -0.017 | -0.184 | No | 0.01683 | No | No |
| | Jul-08 | 0.00500 | 0.00470 | -5.36 | -0.127 | -0.184 | Less Than PCL | 0.01569 | Less Than PCL | Less Than PCL |
| | Jan-09 | 0.00500 | 0.07710 | -2.56 | -0.092 | -0.184 | No | 0.01460 | No | No |
| | Jul-09 | 0.00500 | 0.07820 | -2.55 | -0.065 | -0.184 | No | 0.01361 | No | No |
| | Jan-10 | 0.00500 | 0.03130 | -3.46 | -0.074 | -0.184 | No | 0.01269 | No | No |
| | Jul-10 | 0.00500 | 0.05230 JL | -2.95 | -0.064 | -0.184 | No | 0.01183 | No | No |
| | Jan-11 | 0.00500 | 0.01750 | -4.05 | -0.086 | -0.184 | No | 0.01103 | No | No |
| | Jul-11 | 0.00500 | 0.09590 | -2.34 | -0.058 | -0.184 | No | 0.01023 | No | No |
| | Jan-12 | 0.00500 | 0.01710 | -4.07 | -0.077 | -0.184 | No | 0.00959 | No | No |
| | Jul-12 | 0.00500 | 0.06680 | -2.71 | -0.061 | -0.184 | No | 0.00895 | No | No |
| | Jan-13 | 0.00500 | 0.0514 JH | -2.97 | -0.053 | -0.184 | No | 0.00832 | No | No |
| | Jul-13 | 0.00500 | 0.06770 | -2.69 | -0.042 | -0.184 | No | 0.00777 | No | No |
| | Jan-14 | 0.00500 | 0.02830 | -3.56 | -0.047 | -0.184 | No | 0.00723 | No | No |
| | Jul-14 | 0.00500 | 0.0119 J | -4.43 | -0.061 | -0.152 | No | 0.00674 | No | No |
| | Jan-15 | 0.00500 | 0.00689 | -4.98 | -0.097 | -0.152 | No | 0.00627 | No | No |
| | Jul-15 | 0.00500 | 0.02260 | -3.79 | -0.053 | -0.152 | No | 0.00585 | No | No |
| | Jan-16 | 0.00500 | 0.00231 | -4.98 | -0.097 | -0.152 | No | 0.00627 | No | No |
| | Jul-16 | 0.00500 | 0.01160 | -4.46 | -0.055 | -0.152 | No | 0.00508 | No | No |

**Table 4-4**
**Summary of Concentration vs. Time Attenuation Rate Constants**
**SWMU 17/Building 1429 Plume**
**2016 RAER**
**Former NAS Dallas, Texas**
**Page 4 of 13**

| Monitoring Well | Sampling Date | Protective Concentration Level (mg/L) | Concentration Detected (mg/L) | Natural Log of Concentration (mg/L) | Degradation Rate from Natural Log ($K_{time}$) (mg/L per year) | Minimum Degradation Rate Required for Remedial Goals Natural Log ($K_{time}$) (mg/L per year) | Minimum Degradation Rate Met? (Yes/No) | Expected Remedial Goal Concentration (mg/L) | Expected Remedial Goal Concentration Met? (Yes/No) | Remedial Goals Being Met? (Yes/No) |
|---|---|---|---|---|---|---|---|---|---|---|
| 612D129MW | Dec-95 | 0.00500 | -- | -- | -- | -- | -- | -- | -- | -- |
| | Apr-98 | 0.00500 | -- | -- | -- | -- | -- | -- | -- | -- |
| | Sep-98 | 0.00500 | -- | -- | -- | -- | -- | -- | -- | -- |
| | Apr-99 | 0.00500 | -- | -- | -- | -- | -- | -- | -- | -- |
| | Nov-99 | 0.00500 | -- | -- | -- | -- | -- | -- | -- | -- |
| | Jul-00 | 0.00500 | -- | -- | -- | -- | -- | -- | -- | -- |
| | Jul-01 | 0.00500 | -- | -- | -- | -- | -- | -- | -- | -- |
| | Jan-03 | 0.00500 | -- | -- | -- | -- | -- | -- | -- | -- |
| | Sep-03 | 0.00500 | -- | -- | -- | -- | -- | -- | -- | -- |
| | Dec-03 | 0.00500 | -- | -- | -- | -- | -- | -- | -- | -- |
| | Jul-04 | 0.00500 | -- | -- | -- | -- | -- | -- | -- | -- |
| | Oct-04 | 0.00500 | -- | -- | -- | -- | -- | -- | -- | -- |
| 612D129MW | May-05 | 0.00500 | 0.02800 | -3.58 | -- | -- | -- | -- | -- | -- |
| | Jul-05 | 0.00500 | 0.01600 | -4.14 | -- | -- | -- | -- | -- | -- |
| | Oct-05 | 0.00500 | 0.01800 | -4.02 | -- | -- | -- | -- | -- | -- |
| | Jan-06 | 0.00500 | 0.02200 | -3.82 | -0.170 | -0.152 | Yes | 0.02219 | Yes | Yes |
| | Aug-06 | 0.00500 | 0.01900 | -3.96 | -0.103 | -0.152 | No | 0.02041 | Yes | Evaluate Further |
| | Apr-07 | 0.00500 | 0.02500 | -3.69 | 0.051 | -0.152 | No | 0.01871 | No | No |
| | Aug-07 | 0.00500 | 0.02000 | -3.91 | 0.017 | -0.152 | No | 0.01785 | No | No |
| | Jan-08 | 0.00500 | 0.02000 | -3.91 | 0.003 | -0.152 | No | 0.01683 | No | No |
| | Jul-08 | 0.00500 | 0.01100 | -4.51 | -0.102 | -0.152 | No | 0.01569 | Yes | Evaluate Further |
| | Jan-09 | 0.00500 | 0.02150 | -3.84 | -0.057 | -0.152 | No | 0.01460 | No | No |
| | Jul-09 | 0.00500 | 0.01430 | -4.25 | -0.075 | -0.152 | No | 0.01361 | No | No |
| | Jan-10 | 0.00500 | 0.01860 | -3.98 | -0.057 | -0.152 | No | 0.01269 | No | No |
| | Jul-10 | 0.00500 | 0.01270 | -4.37 | -0.074 | -0.152 | No | 0.01183 | No | No |
| | Jan-11 | 0.00500 | 0.01250 | -4.38 | -0.083 | -0.152 | No | 0.01103 | No | No |
| | Jul-11 | 0.00500 | 0.01320 | -4.33 | -0.083 | -0.152 | No | 0.01023 | No | No |
| | Jan-12 | 0.00500 | 0.01280 | -4.36 | -0.083 | -0.152 | No | 0.00959 | No | No |
| | Jul-12 | 0.00500 | 0.00960 | -4.65 | -0.093 | -0.152 | No | 0.00895 | No | No |
| | Jan-13 | 0.00500 | 0.01230 | -4.40 | -0.089 | -0.152 | No | 0.00832 | No | No |
| | Jul-13 | 0.00500 | 0.01230 | -4.40 | -0.084 | -0.152 | No | 0.00777 | No | No |
| | Jan-14 | 0.00500 | 0.01360 | -4.30 | -0.077 | -0.152 | No | 0.00723 | No | No |
| | Jul-14 | 0.00500 | 0.00951 | -4.66 | -0.080 | -0.152 | No | 0.00674 | No | No |
| | Jan-15 | 0.00500 | 0.01230 | -4.40 | -0.075 | -0.152 | No | 0.00627 | No | No |
| | Jul-15 | 0.00500 | 0.01030 | -4.58 | -0.074 | -0.152 | No | 0.00585 | No | No |
| | Jan-16 | 0.00500 | 0.01340 | -4.40 | -0.075 | -0.152 | No | 0.00627 | No | No |
| | Jul-16 | 0.00500 | 0.00855 | -4.76 | -0.074 | -0.152 | No | 0.00508 | No | No |
| 614D09MW | May-98 | 0.00500 | 0.01300 | -4.34 | -- | -- | -- | -- | -- | -- |
| | Aug-98 | 0.00500 | 0.00870 | -4.74 | -- | -- | -- | -- | -- | -- |
| | Mar-99 | 0.00500 | 0.00820 | -4.80 | -- | -- | -- | -- | -- | -- |
| | Nov-99 | 0.00500 | 0.00880 | -4.73 | -0.210 | -0.052 | Yes | 0.05300 | Yes | Yes |
| | Jul-00 | 0.00500 | 0.00650 | -5.04 | -0.232 | -0.052 | Yes | 0.04791 | Yes | Yes |
| | Jul-01 | 0.00500 | 0.00390 J | -5.55 | -0.310 | -0.052 | Less Than PCL | 0.04182 | Less Than PCL | Less Than PCL |
| | Jan-03 | 0.00500 | 0.00440 | -5.43 | -0.228 | -0.052 | Less Than PCL | 0.03376 | Less Than PCL | Less Than PCL |
| | Dec-03 | 0.00500 | 0.00160 | -6.44 | -0.298 | -0.052 | Less Than PCL | 0.02969 | Less Than PCL | Less Than PCL |
| | Jul-04 | 0.00500 | 0.00066 J | -7.32 | -0.381 | -0.052 | Less Than PCL | 0.02728 | Less Than PCL | Less Than PCL |
| | Oct-04 | 0.00500 | 0.00047 J | -7.66 | -0.433 | -0.052 | Less Than PCL | 0.02649 | Less Than PCL | Less Than PCL |
| | Oct-05 | 0.00500 | 0.00060 J | -7.42 | -0.430 | -0.052 | Less Than PCL | 0.02298 | Less Than PCL | Less Than PCL |
| | May-06 | 0.00500 | 0.00100 | -6.91 | -0.393 | -0.052 | Less Than PCL | 0.02119 | Less Than PCL | Less Than PCL |
| | Aug-06 | 0.00500 | 0.00060 J | -7.42 | -0.386 | -0.052 | Less Than PCL | 0.02041 | Less Than PCL | Less Than PCL |
| | Apr-07 | 0.00500 | 0.00210 | -6.17 | -0.331 | -0.052 | Less Than PCL | 0.01871 | Less Than PCL | Less Than PCL |
| | Aug-07 | 0.00500 | 0.00120 | -6.73 | -0.307 | -0.052 | Less Than PCL | 0.01785 | Less Than PCL | Less Than PCL |
| | Jan-08 | 0.00500 | 0.00099 J | -6.92 | -0.291 | -0.052 | Less Than PCL | 0.01683 | Less Than PCL | Less Than PCL |
| | Jul-08 | 0.00500 | 0.00043 J | -7.75 | -0.296 | -0.052 | Less Than PCL | 0.01569 | Less Than PCL | Less Than PCL |
| | Jan-09 | 0.00500 | 0.00046 J | -7.68 | -0.295 | -0.052 | Less Than PCL | 0.01460 | Less Than PCL | Less Than PCL |
| | Jul-09 | 0.00500 | 0.00090 J | -7.01 | -0.277 | -0.052 | Less Than PCL | 0.01361 | Less Than PCL | Less Than PCL |
| | Jan-10 | 0.00500 | 0.00051 J | -7.58 | -0.271 | -0.052 | Less Than PCL | 0.01269 | Less Than PCL | Less Than PCL |
| | Jul-10 | 0.00500 | 0.00043 J | -7.75 | -0.267 | -0.052 | Less Than PCL | 0.01183 | Less Than PCL | Less Than PCL |
| | Jan-11 | 0.00500 | 0.00065 J | -7.34 | -0.255 | -0.052 | Less Than PCL | 0.01103 | Less Than PCL | Less Than PCL |
| | Jul-11 | 0.00500 | 0.00110 | -6.81 | -0.235 | -0.052 | Less Than PCL | 0.01023 | Less Than PCL | Less Than PCL |
| | Jan-12 | 0.00500 | 0.00057 J | -7.47 | -0.226 | -0.052 | Less Than PCL | 0.00959 | Less Than PCL | Less Than PCL |
| | Jul-12 | 0.00500 | 0.00026 U | -8.00 | -0.225 | -0.052 | Less Than PCL | 0.00895 | Less Than PCL | Less Than PCL |
| | Jan-13 | 0.00500 | 0.00054 J | -7.52 | -0.217 | -0.052 | Less Than PCL | 0.00832 | Less Than PCL | Less Than PCL |
| | Jul-13 | 0.00500 | 0.00062 J | -7.39 | -0.207 | -0.052 | Less Than PCL | 0.00777 | Less Than PCL | Less Than PCL |
| | Jan-14 | 0.00500 | 0.0003 U | -8.00 | -0.204 | -0.052 | Less Than PCL | 0.00723 | Less Than PCL | Less Than PCL |
| | Jul-14 | 0.00500 | 0.00051 J | -7.58 | -0.197 | -0.052 | Less Than PCL | 0.00674 | Less Than PCL | Less Than PCL |
| | Jan-15 | 0.00500 | 0.00139 | -6.58 | -0.179 | -0.052 | Less Than PCL | 0.00627 | Less Than PCL | Less Than PCL |
| | Jul-15 | 0.00500 | 0.00200 | -6.21 | -0.159 | -0.052 | Less Than PCL | 0.00585 | Less Than PCL | Less Than PCL |
| | Jan-16 | 0.00500 | 0.00191 | -6.58 | -0.179 | -0.052 | Less Than PCL | 0.00627 | Less Than PCL | Less Than PCL |
| | Jul-16 | 0.00500 | 0.00279 | -5.88 | -0.129 | -0.052 | Less Than PCL | 0.00508 | Less Than PCL | Less Than PCL |

**Table 4-4**
**Summary of Concentration vs. Time Attenuation Rate Constants**
**SWMU 17/Building 1429 Plume**
**2016 RAER**
**Former NAS Dallas, Texas**
**Page 5 of 13**

| Monitoring Well | Sampling Date | Protective Concentration Level (mg/L) | Concentration Detected (mg/L) | Natural Log of Concentration (mg/L) | Degradation Rate from Natural Log ($K_{time}$) (mg/L per year) | Minimum Degradation Rate Required for Remedial Goals Natural Log ($K_{time}$) (mg/L per year) | Minimum Degradation Rate Met? (Yes/No) | Expected Remedial Goal Concentration (mg/L) | Expected Remedial Goal Concentration Met? (Yes/No) | Remedial Goals Being Met? (Yes/No) |
|---|---|---|---|---|---|---|---|---|---|---|
| **cis-1,2-Dichloroethene** | | | | | | | | | | |
| 600D84MW | Nov-99 | 0.07000 | 0.00920 | -4.69 | -- | -- | -- | -- | -- | -- |
| | Jul-00 | 0.07000 | 0.00880 | -4.73 | -- | -- | -- | -- | -- | -- |
| | Jul-01 | 0.07000 | 0.01100 | -4.51 | -- | -- | -- | -- | -- | -- |
| | Jan-03 | 0.07000 | 0.00740 | -4.91 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Sep-03 | 0.07000 | 0.00620 | -5.08 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Dec-03 | 0.07000 | 0.00260 | -5.95 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-04 | 0.07000 | 0.00420 | -5.47 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Oct-04 | 0.07000 | 0.00230 | -6.07 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Apr-05 | 0.07000 | 0.00700 | -4.96 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Oct-05 | 0.07000 | 0.00400 | -5.52 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | May-06 | 0.07000 | 0.00600 | -5.12 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Aug-06 | 0.07000 | 0.00300 | -5.81 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Apr-07 | 0.07000 | 0.00520 | -5.26 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Aug-07 | 0.07000 | 0.00410 | -5.50 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-08 | 0.07000 | 0.00530 | -5.24 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-08 | 0.07000 | 0.00470 | -5.36 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-09 | 0.07000 | 0.00560 J | -5.18 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-09 | 0.07000 | 0.00023 J | -8.38 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-10 | 0.07000 | 0.00410 | -5.50 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-10 | 0.07000 | 0.00370 | -5.60 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-11 | 0.07000 | 0.00110 | -6.81 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-11 | 0.07000 | 0.00380 | -5.57 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-12 | 0.07000 | 0.00200 | -6.21 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-12 | 0.07000 | 0.00220 | -6.12 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-13 | 0.07000 | 0.00370 | -5.60 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-13 | 0.07000 | 0.00110 | -6.81 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-14 | 0.07000 | 0.00270 | -5.91 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-14 | 0.07000 | 0.00298 | -5.82 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-15 | 0.07000 | 0.00768 | -4.87 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-15 | 0.07000 | 0.00245 | -6.01 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-16 | 0.07000 | 0.00469 | -4.87 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-16 | 0.07000 | 0.00199 | -6.22 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| 600D85MW | Nov-99 | 0.07000 | 0.00130 | -6.65 | -- | -- | -- | -- | -- | -- |
| | Jul-00 | 0.07000 | 0.00250 J | -5.99 | -- | -- | -- | -- | -- | -- |
| | Jul-01 | 0.07000 | 0.00480 | -5.34 | -- | -- | -- | -- | -- | -- |
| | Jan-03 | 0.07000 | 0.00400 | -5.52 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Sep-03 | 0.07000 | 0.00380 | -5.57 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Dec-03 | 0.07000 | 0.00220 | -6.12 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-04 | 0.07000 | 0.00220 | -6.12 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Oct-04 | 0.07000 | 0.00290 | -5.84 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Apr-05 | 0.07000 | 0.00400 | -5.52 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Oct-05 | 0.07000 | 0.00200 | -6.21 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | May-06 | 0.07000 | 0.00600 | -5.12 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Aug-06 | 0.07000 | 0.00300 | -5.81 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Apr-07 | 0.07000 | 0.00560 | -5.18 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Aug-07 | 0.07000 | 0.00230 | -6.07 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-08 | 0.07000 | 0.00390 | -5.55 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-08 | 0.07000 | 0.00370 | -5.60 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-09 | 0.07000 | 0.00420 | -5.47 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-09 | 0.07000 | 0.00250 | -5.99 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-10 | 0.07000 | 0.00420 | -5.47 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-10 | 0.07000 | 0.00340 | -5.68 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-11 | 0.07000 | 0.00390 | -5.55 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-11 | 0.07000 | 0.00110 | -6.81 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-12 | 0.07000 | 0.00350 | -5.65 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-12 | 0.07000 | 0.00130 | -6.65 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-13 | 0.07000 | 0.00360 | -5.63 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-13 | 0.07000 | 0.00210 | -6.17 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-14 | 0.07000 | 0.01060 | -4.55 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-14 | 0.07000 | 0.00404 | -5.51 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-15 | 0.07000 | 0.00468 | -5.36 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-15 | 0.07000 | 0.00494 | -5.31 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-16 | 0.07000 | 0.00621 | -5.36 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-16 | 0.07000 | 0.00127 | -6.67 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |

**Table 4-4**
**Summary of Concentration vs. Time Attenuation Rate Constants**
**SWMU 17/Building 1429 Plume**
**2016 RAER**
**Former NAS Dallas, Texas**
**Page 6 of 13**

| Monitoring Well | Sampling Date | Protective Concentration Level (mg/L) | Concentration Detected (mg/L) | Natural Log of Concentration (mg/L) | Degradation Rate from Natural Log ($K_{time}$) (mg/L per year) | Minimum Degradation Rate Required for Remedial Goals Natural Log ($K_{time}$) (mg/L per year) | Minimum Degradation Rate Met? (Yes/No) | Expected Remedial Goal Concentration (mg/L) | Expected Remedial Goal Concentration Met? (Yes/No) | Remedial Goals Being Met? (Yes/No) |
|---|---|---|---|---|---|---|---|---|---|---|
| 603D71MW | Apr-98 | 0.07000 | 0.03500 | -3.35 | -- | -- | -- | -- | -- | -- |
| | Sep-98 | 0.07000 | 0.04100 | -3.19 | -- | -- | -- | -- | -- | -- |
| | Apr-99 | 0.07000 | 0.02700 | -3.61 | -- | -- | -- | -- | -- | -- |
| | Nov-99 | 0.07000 | 0.02400 | -3.73 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-00 | 0.07000 | 0.02300 | -3.77 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-01 | 0.07000 | 0.01900 | -3.96 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-03 | 0.07000 | 0.00980 | -4.63 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Sep-03 | 0.07000 | 0.01700 | -4.07 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Dec-03 | 0.07000 | 0.00970 | -4.64 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-04 | 0.07000 | 0.00840 | -4.78 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Oct-04 | 0.07000 | 0.01100 | -4.51 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Apr-05 | 0.07000 | 0.01100 | -4.51 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Oct-05 | 0.07000 | 0.01300 | -4.34 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | May-06 | 0.07000 | 0.00900 | -4.71 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Aug-06 | 0.07000 | 0.01000 | -4.61 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Apr-07 | 0.07000 | 0.00690 | -4.98 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Aug-07 | 0.07000 | 0.00760 | -4.88 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-08 | 0.07000 | 0.00710 | -4.95 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-08 | 0.07000 | 0.00560 | -5.18 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-09 | 0.07000 | 0.00750 | -4.89 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-09 | 0.07000 | 0.00690 | -4.98 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-10 | 0.07000 | 0.00570 | -5.17 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-10 | 0.07000 | 0.00170 | -6.38 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-11 | 0.07000 | 0.00670 | -5.01 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-11 | 0.07000 | 0.00580 | -5.15 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-12 | 0.07000 | 0.00400 | -5.52 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-12 | 0.07000 | 0.00290 | -5.84 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-13 | 0.07000 | 0.00560 | -5.18 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-13 | 0.07000 | 0.00350 | -5.65 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-14 | 0.07000 | 0.00160 | -6.44 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-14 | 0.07000 | 0.00121 | -6.72 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-15 | 0.07000 | 0.0017 | -6.38 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-15 | 0.07000 | 0.00317 | -5.75 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-16 | 0.07000 | 0.00244 | -6.38 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-16 | 0.07000 | 0.00183 | -6.30 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| 61201MW | Dec-95 | 0.07000 | 0.07560 | -2.58 | -- | -- | -- | -- | -- | -- |
| | May-98 | 0.07000 | 0.03300 | -3.41 | -- | -- | -- | -- | -- | -- |
| | Aug-98 | 0.07000 | 0.05500 | -2.90 | -- | -- | -- | -- | -- | -- |
| | Apr-99 | 0.07000 | 0.02100 | -3.86 | -0.314 | -0.004 | Less Than PCL | 0.05761 | Less Than PCL | Less Than PCL |
| | Oct-99 | 0.07000 | 0.03000 | -3.51 | -0.278 | -0.004 | Less Than PCL | 0.05347 | Less Than PCL | Less Than PCL |
| | Jul-00 | 0.07000 | 0.01100 | -4.51 | -0.373 | -0.004 | Less Than PCL | 0.04796 | Less Than PCL | Less Than PCL |
| | Jul-01 | 0.07000 | 0.00790 | -4.84 | -0.416 | -0.004 | Less Than PCL | 0.04185 | Less Than PCL | Less Than PCL |
| | Jan-03 | 0.07000 | 0.00570 | -5.17 | -0.403 | -0.004 | Less Than PCL | 0.03370 | Less Than PCL | Less Than PCL |
| | Sep-03 | 0.07000 | 0.00670 | -5.01 | -0.368 | -0.004 | Less Than PCL | 0.03097 | Less Than PCL | Less Than PCL |
| | Dec-03 | 0.07000 | 0.00420 | -5.47 | -0.372 | -0.004 | Less Than PCL | 0.02985 | Less Than PCL | Less Than PCL |
| | Jul-04 | 0.07000 | 0.00300 | -5.81 | -0.380 | -0.004 | Less Than PCL | 0.02728 | Less Than PCL | Less Than PCL |
| | Oct-04 | 0.07000 | 0.00290 | -5.84 | -0.383 | -0.004 | Less Than PCL | 0.02649 | Less Than PCL | Less Than PCL |
| | Apr-05 | 0.07000 | 0.00600 | -5.12 | -0.352 | -0.004 | Less Than PCL | 0.02479 | Less Than PCL | Less Than PCL |
| | Oct-05 | 0.07000 | 0.00300 | -5.81 | -0.347 | -0.004 | Less Than PCL | 0.02311 | Less Than PCL | Less Than PCL |
| | May-06 | 0.07000 | 0.00400 | -5.52 | -0.328 | -0.004 | Less Than PCL | 0.02119 | Less Than PCL | Less Than PCL |
| | Aug-26 | 0.07000 | 0.00200 | -6.21 | -0.117 | -0.004 | Less Than PCL | 0.00123 | Less Than PCL | Less Than PCL |
| | Apr-07 | 0.07000 | 0.00280 | -5.88 | -0.121 | -0.004 | Less Than PCL | 0.01871 | Less Than PCL | Less Than PCL |
| | Aug-07 | 0.07000 | 0.00200 | -6.21 | -0.126 | -0.004 | Less Than PCL | 0.01785 | Less Than PCL | Less Than PCL |
| | Jan-08 | 0.07000 | 0.00210 | -6.17 | -0.130 | -0.004 | Less Than PCL | 0.01683 | Less Than PCL | Less Than PCL |
| | Jul-08 | 0.07000 | 0.00200 | -6.21 | -0.133 | -0.004 | Less Than PCL | 0.01569 | Less Than PCL | Less Than PCL |
| | Jan-09 | 0.07000 | 0.00210 | -6.17 | -0.137 | -0.004 | Less Than PCL | 0.01460 | Less Than PCL | Less Than PCL |
| | Jul-09 | 0.07000 | 0.00150 | -6.50 | -0.141 | -0.004 | Less Than PCL | 0.01361 | Less Than PCL | Less Than PCL |
| | Jan-10 | 0.07000 | 0.00130 | -6.65 | -0.146 | -0.004 | Less Than PCL | 0.01269 | Less Than PCL | Less Than PCL |
| | Jul-10 | 0.07000 | 0.00100 | -6.91 | -0.151 | -0.004 | Less Than PCL | 0.01183 | Less Than PCL | Less Than PCL |
| | Jan-11 | 0.07000 | 0.00110 | -6.81 | -0.156 | -0.004 | Less Than PCL | 0.01103 | Less Than PCL | Less Than PCL |
| | Jul-11 | 0.07000 | 0.00061 J | -7.40 | -0.163 | -0.004 | Less Than PCL | 0.01023 | Less Than PCL | Less Than PCL |
| | Jan-12 | 0.07000 | 0.00059 J | -7.44 | -0.169 | -0.004 | Less Than PCL | 0.00959 | Less Than PCL | Less Than PCL |
| | Jul-12 | 0.07000 | 0.00026 U | -8.00 | -0.178 | -0.004 | Less Than PCL | 0.00895 | Less Than PCL | Less Than PCL |
| | Jan-13 | 0.07000 | 0.00077 J | -7.17 | -0.180 | -0.004 | Less Than PCL | 0.00832 | Less Than PCL | Less Than PCL |
| | Jul-13 | 0.07000 | 0.00047 J | -7.66 | -0.185 | -0.004 | Less Than PCL | 0.00777 | Less Than PCL | Less Than PCL |
| | Jan-14 | 0.07000 | 0.00049 J | -7.62 | -0.189 | -0.004 | Less Than PCL | 0.00723 | Less Than PCL | Less Than PCL |
| | Jul-14 | 0.07000 | 0.00025 J | -8.29 | -0.196 | -0.004 | Less Than PCL | 0.00674 | Less Than PCL | Less Than PCL |
| | Jan-15 | 0.07000 | 0.00025 U | -8.00 | -0.200 | -0.004 | Less Than PCL | 0.00627 | Less Than PCL | Less Than PCL |
| | Jul-15 | 0.07000 | 0.00025 U | -8.00 | -0.203 | -0.004 | Less Than PCL | 0.00585 | Less Than PCL | Less Than PCL |
| | Jan-16 | 0.07000 | 0.00025 U | -8.00 | -0.200 | -0.004 | Less Than PCL | 0.00627 | Less Than PCL | Less Than PCL |
| | Jul-16 | 0.07000 | 0.00025 U | -8.29 | -0.211 | -0.004 | Less Than PCL | 0.00508 | Less Than PCL | Less Than PCL |

**Table 4-4**
**Summary of Concentration vs. Time Attenuation Rate Constants**
**SWMU 17/Building 1429 Plume**
**2016 RAER**
**Former NAS Dallas, Texas**
**Page 7 of 13**

| Monitoring Well | Sampling Date | Protective Concentration Level (mg/L) | Concentration Detected (mg/L) | Natural Log of Concentration (mg/L) | Degradation Rate from Natural Log ($K_{time}$) (mg/L per year) | Minimum Degradation Rate Required for Remedial Goals Natural Log ($K_{time}$) (mg/L per year) | Minimum Degradation Rate Met? (Yes/No) | Expected Remedial Goal Concentration (mg/L) | Expected Remedial Goal Concentration Met? (Yes/No) | Remedial Goals Being Met? (Yes/No) |
|---|---|---|---|---|---|---|---|---|---|---|
| 612D38MW | May-98 | 0.07000 | 0.01300 | -4.34 | -- | -- | -- | -- | -- | -- |
| | Aug-98 | 0.07000 | 0.01700 | -4.07 | -- | -- | -- | -- | -- | -- |
| | Apr-99 | 0.07000 | 0.01000 | -4.61 | -- | -- | -- | -- | -- | -- |
| | Nov-99 | 0.07000 | 0.01300 | -4.34 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-00 | 0.07000 | 0.01100 | -4.51 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-01 | 0.07000 | 0.01000 | -4.61 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-03 | 0.07000 | 0.00690 | -4.98 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Aug-03 | 0.07000 | 0.00790 | -4.84 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Dec-03 | 0.07000 | 0.00890 | -4.72 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-04 | 0.07000 | 0.00540 | -5.22 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Oct-04 | 0.07000 | 0.00560 | -5.18 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Apr-05 | 0.07000 | 0.00600 | -5.12 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Oct-05 | 0.07000 | 0.01300 | -4.34 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | May-06 | 0.07000 | 0.00700 | -4.96 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Aug-06 | 0.07000 | 0.00800 | -4.83 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Apr-07 | 0.07000 | 0.01000 | -4.61 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Aug-07 | 0.07000 | 0.01200 | -4.42 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-08 | 0.07000 | 0.00950 | -4.66 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-08 | 0.07000 | 0.00600 | -5.12 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-09 | 0.07000 | 0.01160 | -4.46 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-09 | 0.07000 | 0.01800 | -4.02 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-10 | 0.07000 | 0.01390 | -4.28 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-10 | 0.07000 | 0.00610 | -5.10 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-11 | 0.07000 | 0.01430 | -4.25 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-11 | 0.07000 | 0.01880 | -3.97 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-12 | 0.07000 | 0.01370 | -4.29 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-12 | 0.07000 | 0.01660 | -4.10 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-13 | 0.07000 | 0.01290 | -4.35 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-13 | 0.07000 | 0.01670 | -4.09 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-14 | 0.07000 | 0.01170 | -4.45 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-14 | 0.07000 | 0.0145 | -4.23 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-15 | 0.07000 | 0.0111 | -4.50 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-15 | 0.07000 | 0.0121 | -4.41 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-16 | 0.07000 | 0.00649 | -4.50 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-16 | 0.07000 | 0.00577 | -5.16 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| 612D111MW | Jul-00 | 0.07000 | 0.01100 | -4.51 | -- | -- | -- | -- | -- | -- |
| | Jul-01 | 0.07000 | 0.01200 | -4.42 | -- | -- | -- | -- | -- | -- |
| | Jan-03 | 0.07000 | 0.00560 J | -5.18 | -- | -- | -- | -- | -- | -- |
| | Sep-03 | 0.07000 | 0.00640 | -5.05 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Dec-03 | 0.07000 | 0.00440 | -5.43 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-04 | 0.07000 | 0.00380 | -5.57 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Oct-04 | 0.07000 | 0.00460 | -5.38 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Apr-05 | 0.07000 | 0.00700 | -4.96 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Oct-05 | 0.07000 | 0.00600 | -5.12 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | May-06 | 0.07000 | 0.00200 | -6.21 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Aug-06 | 0.07000 | 0.00500 | -5.30 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Apr-07 | 0.07000 | 0.00440 | -5.43 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Aug-07 | 0.07000 | 0.00380 | -5.57 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-08 | 0.07000 | 0.00410 | -5.50 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-08 | 0.07000 | 0.00065 J | -7.34 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-09 | 0.07000 | 0.00400 | -5.52 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-09 | 0.07000 | 0.00330 | -5.71 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-10 | 0.07000 | 0.00300 | -5.81 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-10 | 0.07000 | 0.00400 | -5.52 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-11 | 0.07000 | 0.00140 | -6.57 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-11 | 0.07000 | 0.00300 | -5.81 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-12 | 0.07000 | 0.00320 | -5.74 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-12 | 0.07000 | 0.00270 | -5.91 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-13 | 0.07000 | 0.00280 | -5.88 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-13 | 0.07000 | 0.00290 | -5.71 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-14 | 0.07000 | 0.00200 | -6.21 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-14 | 0.07000 | 0.00127 | -6.67 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-15 | 0.07000 | 0.00045 J | -7.71 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-15 | 0.07000 | 0.00502 | -5.29 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-16 | 0.07000 | 0.00082 J | -7.71 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-16 | 0.07000 | 0.00806 | -4.82 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |

**Table 4-4**
**Summary of Concentration vs. Time Attenuation Rate Constants**
**SWMU 17/Building 1429 Plume**
**2016 RAER**
**Former NAS Dallas, Texas**
**Page 8 of 13**

| Monitoring Well | Sampling Date | Protective Concentration Level (mg/L) | Concentration Detected (mg/L) | Natural Log of Concentration (mg/L) | Degradation Rate from Natural Log ($K_{time}$) (mg/L per year) | Minimum Degradation Rate Required for Remedial Goals Natural Log ($K_{time}$) (mg/L per year) | Minimum Degradation Rate Met? (Yes/No) | Expected Remedial Goal Concentration (mg/L) | Expected Remedial Goal Concentration Met? (Yes/No) | Remedial Goals Being Met? (Yes/No) |
|---|---|---|---|---|---|---|---|---|---|---|
| 612D129MW | Dec-95 | 0.07000 | -- | -- | -- | -- | -- | -- | -- | -- |
| | Apr-98 | 0.07000 | -- | -- | -- | -- | -- | -- | -- | -- |
| | Sep-98 | 0.07000 | -- | -- | -- | -- | -- | -- | -- | -- |
| | Apr-99 | 0.07000 | -- | -- | -- | -- | -- | -- | -- | -- |
| | Nov-99 | 0.07000 | -- | -- | -- | -- | -- | -- | -- | -- |
| | Jul-00 | 0.07000 | -- | -- | -- | -- | -- | -- | -- | -- |
| | Jul-01 | 0.07000 | -- | -- | -- | -- | -- | -- | -- | -- |
| | Jan-03 | 0.07000 | -- | -- | -- | -- | -- | -- | -- | -- |
| | Sep-03 | 0.07000 | -- | -- | -- | -- | -- | -- | -- | -- |
| | Dec-03 | 0.07000 | -- | -- | -- | -- | -- | -- | -- | -- |
| | Jul-04 | 0.07000 | -- | -- | -- | -- | -- | -- | -- | -- |
| | Oct-04 | 0.07000 | -- | -- | -- | -- | -- | -- | -- | -- |
| 612D129MW | May-05 | 0.07000 | 0.00800 | -4.83 | -- | -- | -- | -- | -- | -- |
| | Jul-05 | 0.07000 | 0.00800 | -4.83 | -- | -- | -- | -- | -- | -- |
| | Oct-05 | 0.07000 | 0.00800 | -4.83 | -- | -- | -- | -- | -- | -- |
| | Jan-06 | 0.07000 | 0.01000 | -4.61 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Aug-06 | 0.07000 | 0.01100 | -4.51 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Apr-07 | 0.07000 | 0.01000 | -4.61 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Aug-07 | 0.07000 | 0.00800 | -4.83 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-08 | 0.07000 | 0.00830 | -4.79 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-08 | 0.07000 | 0.00710 | -4.95 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-09 | 0.07000 | 0.00730 | -4.92 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-09 | 0.07000 | 0.00610 | -5.10 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-10 | 0.07000 | 0.00670 | -5.01 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-10 | 0.07000 | 0.00650 | -5.04 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-11 | 0.07000 | 0.00480 | -5.34 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-11 | 0.07000 | 0.00550 | -5.20 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-12 | 0.07000 | 0.00460 | -5.38 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-12 | 0.07000 | 0.00450 | -5.40 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-13 | 0.07000 | 0.00490 | -5.32 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-13 | 0.07000 | 0.00560 | -5.18 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-14 | 0.07000 | 0.00490 | -5.32 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-14 | 0.07000 | 0.00527 | -5.25 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-15 | 0.07000 | 0.00531 | -5.24 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-15 | 0.07000 | 0.00531 | -5.24 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-16 | 0.07000 | 0.00548 | -5.24 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-16 | 0.07000 | 0.00461 | -5.38 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| 614D09MW | May-98 | 0.07000 | 0.01400 | -4.27 | -- | -- | -- | -- | -- | -- |
| | Aug-98 | 0.07000 | 0.01200 | -4.42 | -- | -- | -- | -- | -- | -- |
| | Mar-99 | 0.07000 | 0.00810 | -4.82 | -- | -- | -- | -- | -- | -- |
| | Nov-99 | 0.07000 | 0.00970 | -4.64 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-00 | 0.07000 | 0.00420 J | -5.47 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-01 | 0.07000 | 0.00490 | -5.32 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-03 | 0.07000 | 0.00340 | -5.68 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Dec-03 | 0.07000 | 0.00064 J | -7.35 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-04 | 0.07000 | 0.00033 J | -8.02 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Oct-04 | 0.07000 | 0.00058 J | -7.45 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Oct-05 | 0.07000 | 0.00080 J | -7.13 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | May-06 | 0.07000 | 0.00050 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Aug-06 | 0.07000 | 0.00050 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Apr-07 | 0.07000 | 0.00100 | -6.91 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Aug-07 | 0.07000 | 0.00044 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-08 | 0.07000 | 0.00038 J | -7.88 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-08 | 0.07000 | 0.00032 J | -8.05 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-09 | 0.07000 | 0.00020 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-09 | 0.07000 | 0.00020 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-10 | 0.07000 | 0.00020 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-10 | 0.07000 | 0.00063 J | -7.37 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-11 | 0.07000 | 0.00026 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-11 | 0.07000 | 0.00026 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-12 | 0.07000 | 0.00026 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-12 | 0.07000 | 0.00026 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-13 | 0.07000 | 0.00024 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-13 | 0.07000 | 0.00024 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-14 | 0.07000 | 0.00033 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-14 | 0.07000 | 0.00025 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-15 | 0.07000 | 0.00025 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-15 | 0.07000 | 0.00025 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-16 | 0.07000 | 0.00025 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-16 | 0.07000 | 0.00025 U | -8.29 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |

**Table 4-4**
**Summary of Concentration vs. Time Attenuation Rate Constants**
**SWMU 17/Building 1429 Plume**
**2016 RAER**
**Former NAS Dallas, Texas**
**Page 9 of 13**

| Monitoring Well | Sampling Date | Protective Concentration Level (mg/L) | Concentration Detected (mg/L) | Natural Log of Concentration (mg/L) | Degradation Rate from Natural Log ($K_{time}$) (mg/L per year) | Minimum Degradation Rate Required for Remedial Goals Natural Log ($K_{time}$) (mg/L per year) | Minimum Degradation Rate Met? (Yes/No) | Expected Remedial Goal Concentration (mg/L) | Expected Remedial Goal Concentration Met? (Yes/No) | Remedial Goals Being Met? (Yes/No) |
|---|---|---|---|---|---|---|---|---|---|---|
| **Vinyl Chloride** | | | | | | | | | | |
| 600D84MW | Nov-99 | 0.00200 | 0.00500 U | -8.00 | -- | -- | -- | -- | -- | -- |
| | Jul-00 | 0.00200 | 0.00500 U | -8.00 | -- | -- | -- | -- | -- | -- |
| | Jul-01 | 0.00200 | 0.01000 U | -8.00 | -- | -- | -- | -- | -- | -- |
| | Jan-03 | 0.00200 | 0.00250 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Sep-03 | 0.00200 | 0.00037 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Dec-03 | 0.00200 | 0.00017 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-04 | 0.00200 | 0.00017 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Oct-04 | 0.00200 | 0.00017 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Apr-05 | 0.00200 | 0.00030 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Oct-05 | 0.00200 | 0.00030 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | May-06 | 0.00200 | 0.00060 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Aug-06 | 0.00200 | 0.00060 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Apr-07 | 0.00200 | 0.00020 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Aug-07 | 0.00200 | 0.00040 J | -7.82 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-08 | 0.00200 | 0.00043 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-08 | 0.00200 | 0.00030 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-09 | 0.00200 | 0.00030 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-09 | 0.00200 | 0.00030 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-10 | 0.00200 | 0.00030 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-10 | 0.00200 | 0.00028 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-11 | 0.00200 | 0.00022 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-11 | 0.00200 | 0.00022 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-12 | 0.00200 | 0.00022 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-12 | 0.00200 | 0.00022 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-13 | 0.00200 | 0.00044 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-13 | 0.00220 | 0.0044 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-14 | 0.00220 | 0.00033 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-14 | 0.00200 | 0.00025 U | -8.00 | -0.035 | -0.049 | Less Than PCL | 0.00674 | Less Than PCL | Less Than PCL |
| | Jan-15 | 0.00200 | 0.00025 U | -8.00 | -0.032 | -0.049 | Less Than PCL | 0.00627 | Less Than PCL | Less Than PCL |
| | Jul-15 | 0.00200 | 0.00025 U | -8.00 | -0.034 | -0.049 | Less Than PCL | 0.00585 | Less Than PCL | Less Than PCL |
| | Jan-16 | 0.00200 | 0.00025 U | -8.00 | -0.032 | -0.049 | Less Than PCL | 0.00627 | Less Than PCL | Less Than PCL |
| | Jul-16 | 0.00200 | 0.00064 J | -7.35 | -0.034 | -0.049 | Less Than PCL | 0.00508 | Less Than PCL | Less Than PCL |
| 600D85MW | Nov-99 | 0.00200 | 0.00500 U | -8.00 | -- | -- | -- | -- | -- | -- |
| | Jul-00 | 0.00200 | 0.00500 U | -8.00 | -- | -- | -- | -- | -- | -- |
| | Jul-01 | 0.00200 | 0.01000 U | -8.00 | -- | -- | -- | -- | -- | -- |
| | Jan-03 | 0.00200 | 0.00100 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Sep-03 | 0.00200 | 0.00026 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Dec-03 | 0.00200 | 0.00017 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-04 | 0.00200 | 0.00017 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Oct-04 | 0.00200 | 0.00017 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Apr-05 | 0.00200 | 0.00030 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Oct-05 | 0.00200 | 0.00030 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | May-06 | 0.00200 | 0.00200 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Aug-06 | 0.00200 | 0.00060 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Apr-07 | 0.00200 | 0.00012 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Aug-07 | 0.00200 | 0.00019 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-08 | 0.00200 | 0.00043 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-08 | 0.00200 | 0.00030 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-09 | 0.00200 | 0.00030 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-09 | 0.00200 | 0.00030 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-10 | 0.00200 | 0.00030 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-10 | 0.00200 | 0.00028 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-11 | 0.00200 | 0.00022 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-11 | 0.00200 | 0.00022 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-12 | 0.00200 | 0.00022 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-12 | 0.00200 | 0.00022 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-13 | 0.00200 | 0.00044 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-13 | 0.00200 | 0.00044 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-14 | 0.00200 | 0.00033 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-14 | 0.00200 | 0.00025 U | -8.00 | -0.040 | -0.049 | Less Than PCL | 0.00674 | Less Than PCL | Less Than PCL |
| | Jan-15 | 0.00200 | 0.00025 U | -8.00 | -0.036 | -0.049 | Less Than PCL | 0.00627 | Less Than PCL | Less Than PCL |
| | Jul-15 | 0.00200 | 0.00025 U | -8.00 | -0.040 | -0.049 | Less Than PCL | 0.00585 | Less Than PCL | Less Than PCL |
| | Jan-16 | 0.00200 | 0.00025 U | -8.00 | -0.036 | -0.049 | Less Than PCL | 0.00627 | Less Than PCL | Less Than PCL |
| | Jul-16 | 0.00200 | 0.00025 U | -8.29 | -0.040 | -0.049 | Less Than PCL | 0.00508 | Less Than PCL | Less Than PCL |

**Table 4-4**
**Summary of Concentration vs. Time Attenuation Rate Constants**
**SWMU 17/Building 1429 Plume**
**2016 RAER**
**Former NAS Dallas, Texas**
**Page 10 of 13**

| Monitoring Well | Sampling Date | Protective Concentration Level (mg/L) | Concentration Detected (mg/L) | Natural Log of Concentration (mg/L) | Degradation Rate from Natural Log ($K_{time}$) (mg/L per year) | Minimum Degradation Rate Required for Remedial Goals Natural Log ($K_{time}$) (mg/L per year) | Minimum Degradation Rate Met? (Yes/No) | Expected Remedial Goal Concentration (mg/L) | Expected Remedial Goal Concentration Met? (Yes/No) | Remedial Goals Being Met? (Yes/No) |
|---|---|---|---|---|---|---|---|---|---|---|
| 603D71MW | Apr-98 | 0.00200 | 0.00230 J | -6.07 | -- | -- | -- | -- | -- | -- |
| | Sep-98 | 0.00200 | 0.00310 | -5.78 | -- | -- | -- | -- | -- | -- |
| | Apr-99 | 0.00200 | 0.00230 J | -6.07 | -- | -- | -- | -- | -- | -- |
| | Nov-99 | 0.00200 | 0.00110 J | -6.81 | -0.516 | -0.024 | Less Than PCL | 0.05292 | Less Than PCL | Less Than PCL |
| | Jul-00 | 0.00200 | 0.00500 U | -8.00 | -0.907 | -0.024 | Less Than PCL | 0.04796 | Less Than PCL | Less Than PCL |
| | Jul-01 | 0.00200 | 0.00170 J | -6.38 | -0.360 | -0.024 | Less Than PCL | 0.04183 | Less Than PCL | Less Than PCL |
| | Jan-03 | 0.00200 | 0.00070 J | -7.26 | -0.280 | -0.024 | Less Than PCL | 0.03368 | Less Than PCL | Less Than PCL |
| | Sep-03 | 0.00200 | 0.00074 J | -7.21 | -0.236 | -0.024 | Less Than PCL | 0.03097 | Less Than PCL | Less Than PCL |
| | Dec-03 | 0.00200 | 0.00036 J | -7.93 | -0.272 | -0.024 | Less Than PCL | 0.02986 | Less Than PCL | Less Than PCL |
| | Jul-04 | 0.00200 | 0.00065 J | -7.34 | -0.240 | -0.024 | Less Than PCL | 0.02728 | Less Than PCL | Less Than PCL |
| | Oct-04 | 0.00200 | 0.00076 J | -7.18 | -0.213 | -0.024 | Less Than PCL | 0.02649 | Less Than PCL | Less Than PCL |
| | Apr-05 | 0.00200 | 0.00030 U | -8.00 | -0.228 | -0.024 | Less Than PCL | 0.02480 | Less Than PCL | Less Than PCL |
| | Oct-05 | 0.00200 | 0.00070 J | -7.26 | -0.203 | -0.024 | Less Than PCL | 0.02312 | Less Than PCL | Less Than PCL |
| | May-06 | 0.00200 | 0.00200 U | -8.00 | -0.208 | -0.024 | Less Than PCL | 0.02119 | Less Than PCL | Less Than PCL |
| | Aug-06 | 0.00200 | 0.00060 U | -8.00 | -0.210 | -0.024 | Less Than PCL | 0.02041 | Less Than PCL | Less Than PCL |
| | Apr-07 | 0.00200 | 0.00020 U | -8.00 | -0.207 | -0.024 | Less Than PCL | 0.01871 | Less Than PCL | Less Than PCL |
| | Aug-07 | 0.00200 | 0.00064 J | -7.35 | -0.185 | -0.024 | Less Than PCL | 0.01785 | Less Than PCL | Less Than PCL |
| | Jan-08 | 0.00200 | 0.00043 U | -8.00 | -0.183 | -0.024 | Less Than PCL | 0.01683 | Less Than PCL | Less Than PCL |
| | Jul-08 | 0.00200 | 0.00030 U | -8.00 | -0.180 | -0.024 | Less Than PCL | 0.01569 | Less Than PCL | Less Than PCL |
| | Jan-09 | 0.00200 | 0.00030 U | -8.00 | -0.175 | -0.024 | Less Than PCL | 0.01460 | Less Than PCL | Less Than PCL |
| | Jul-10 | 0.00200 | 0.00050 J | -7.60 | -0.155 | -0.024 | Less Than PCL | 0.01183 | Less Than PCL | Less Than PCL |
| | Jan-10 | 0.00200 | 0.00030 U | -8.00 | -0.151 | -0.024 | Less Than PCL | 0.01269 | Less Than PCL | Less Than PCL |
| | Jul-10 | 0.00200 | 0.00028 U | -8.00 | -0.147 | -0.024 | Less Than PCL | 0.01183 | Less Than PCL | Less Than PCL |
| | Jan-11 | 0.00200 | 0.00036 J | -7.93 | -0.141 | -0.024 | Less Than PCL | 0.01103 | Less Than PCL | Less Than PCL |
| | Jul-11 | 0.00200 | 0.00022 U | -8.00 | -0.136 | -0.024 | Less Than PCL | 0.01023 | Less Than PCL | Less Than PCL |
| | Jan-12 | 0.00200 | 0.00022 U | -8.00 | -0.131 | -0.024 | Less Than PCL | 0.00959 | Less Than PCL | Less Than PCL |
| | Jul-12 | 0.00200 | 0.00022 U | -8.00 | -0.126 | -0.024 | Less Than PCL | 0.00895 | Less Than PCL | Less Than PCL |
| | Jan-13 | 0.00200 | 0.00044 U | -8.00 | -0.121 | -0.024 | Less Than PCL | 0.00832 | Less Than PCL | Less Than PCL |
| | Jul-13 | 0.00200 | 0.00044 U | -8.00 | -0.116 | -0.024 | Less Than PCL | 0.00777 | Less Than PCL | Less Than PCL |
| | Jan-14 | 0.00200 | 0.00033 U | -8.00 | -0.112 | -0.024 | Less Than PCL | 0.00723 | Less Than PCL | Less Than PCL |
| | Jul-14 | 0.00200 | 0.00025 U | -8.00 | -0.027 | -0.049 | Less Than PCL | 0.00674 | Less Than PCL | Less Than PCL |
| | Jan-15 | 0.00200 | 0.00025 U | -8.00 | -0.021 | -0.049 | Less Than PCL | 0.00627 | Less Than PCL | Less Than PCL |
| | Jul-15 | 0.00200 | 0.00025 U | -8.00 | -0.026 | -0.049 | Less Than PCL | 0.00585 | Less Than PCL | Less Than PCL |
| | Jan-16 | 0.00200 | 0.00025 U | -8.00 | -0.021 | -0.049 | Less Than PCL | 0.00627 | Less Than PCL | Less Than PCL |
| | Jul-16 | 0.00200 | 0.00025 U | -8.29 | -0.026 | -0.049 | Less Than PCL | 0.00508 | Less Than PCL | Less Than PCL |
| 61201MW | Dec-95 | 0.00200 | 0.01560 | -4.16 | -- | -- | -- | -- | -- | -- |
| | May-98 | 0.00200 | 0.00840 | -4.78 | -- | -- | -- | -- | -- | -- |
| | Aug-98 | 0.00200 | 0.00640 | -5.05 | -- | -- | -- | -- | -- | -- |
| | Apr-99 | 0.00200 | 0.00510 | -5.28 | -0.327 | -0.099 | Yes | 0.05761 | Yes | Yes |
| | Oct-99 | 0.00200 | 0.00400 J | -5.52 | -0.350 | -0.099 | Yes | 0.05347 | Yes | Yes |
| | Jul-00 | 0.00200 | 0.00320 J | -5.74 | -0.355 | -0.099 | Yes | 0.04796 | Yes | Yes |
| | Jul-01 | 0.00200 | 0.00160 J | -6.44 | -0.400 | -0.099 | Less Than PCL | 0.04185 | Less Than PCL | Less Than PCL |
| | Jan-03 | 0.00200 | 0.00300 | -5.81 | -0.291 | -0.099 | Yes | 0.03370 | Yes | Yes |
| | Sep-03 | 0.00200 | 0.00290 | -5.84 | -0.239 | -0.099 | Yes | 0.03097 | Yes | Yes |
| | Dec-03 | 0.00200 | 0.00230 | -6.07 | -0.225 | -0.099 | Yes | 0.02985 | Yes | Yes |
| | Jul-04 | 0.00200 | 0.00230 | -6.07 | -0.209 | -0.099 | Yes | 0.02728 | Yes | Yes |
| | Oct-04 | 0.00200 | 0.00200 | -6.21 | -0.204 | -0.099 | Less Than PCL | 0.02649 | Less Than PCL | Less Than PCL |
| | Apr-05 | 0.00200 | 0.00400 | -5.52 | -0.172 | -0.099 | Yes | 0.02479 | Yes | Yes |
| | Oct-05 | 0.00200 | 0.00300 | -5.81 | -0.155 | -0.099 | Yes | 0.02311 | Yes | Yes |
| | May-06 | 0.00200 | 0.00400 | -5.52 | -0.132 | -0.099 | Yes | 0.02119 | Yes | Yes |
| | Aug-06 | 0.00200 | 0.00200 | -6.21 | -0.132 | -0.099 | Less Than PCL | 0.02041 | Less Than PCL | Less Than PCL |
| | Apr-07 | 0.00200 | 0.00300 | -5.81 | -0.121 | -0.099 | Yes | 0.01871 | Yes | Yes |
| | Aug-07 | 0.00200 | 0.00260 | -5.95 | -0.114 | -0.099 | Yes | 0.01785 | Yes | Yes |
| | Jan-08 | 0.00200 | 0.00120 J | -6.73 | -0.125 | -0.099 | Less Than PCL | 0.01683 | Less Than PCL | Less Than PCL |
| | Jul-08 | 0.00200 | 0.00130 | -6.65 | -0.130 | -0.099 | Less Than PCL | 0.01569 | Less Than PCL | Less Than PCL |
| | Jan-09 | 0.00200 | 0.00120 | -6.73 | -0.134 | -0.099 | Less Than PCL | 0.01460 | Less Than PCL | Less Than PCL |
| | Jul-09 | 0.00200 | 0.00080 J | -7.13 | -0.144 | -0.099 | Less Than PCL | 0.01361 | Less Than PCL | Less Than PCL |
| | Jan-10 | 0.00200 | 0.00047 J | -7.66 | -0.159 | -0.099 | Less Than PCL | 0.01269 | Less Than PCL | Less Than PCL |
| | Jul-10 | 0.00200 | 0.00028 U | -8.00 | -0.175 | -0.099 | Less Than PCL | 0.01183 | Less Than PCL | Less Than PCL |
| | Jan-11 | 0.00200 | 0.00022 U | -8.00 | -0.187 | -0.099 | Less Than PCL | 0.01103 | Less Than PCL | Less Than PCL |
| | Jul-11 | 0.00200 | 0.00022 U | -8.00 | -0.196 | -0.099 | Less Than PCL | 0.01023 | Less Than PCL | Less Than PCL |
| | Jan-12 | 0.00200 | 0.00022 U | -8.00 | -0.202 | -0.099 | Less Than PCL | 0.00959 | Less Than PCL | Less Than PCL |
| | Jul-12 | 0.00200 | 0.00022 U | -8.00 | -0.205 | -0.099 | Less Than PCL | 0.00895 | Less Than PCL | Less Than PCL |
| | Jan-13 | 0.00200 | 0.00044 U | -8.00 | -0.207 | -0.099 | Less Than PCL | 0.00832 | Less Than PCL | Less Than PCL |
| | Jul-13 | 0.00200 | 0.00044 U | -8.00 | -0.207 | -0.099 | Less Than PCL | 0.00777 | Less Than PCL | Less Than PCL |
| | Jan-14 | 0.00200 | 0.00033 U | -8.00 | -0.207 | -0.099 | Less Than PCL | 0.00723 | Less Than PCL | Less Than PCL |
| | Jul-14 | 0.00200 | 0.00025 U | -8.00 | -0.007 | -0.049 | Less Than PCL | 0.00674 | Less Than PCL | Less Than PCL |
| | Jan-15 | 0.00200 | 0.00025 U | -8.00 | -0.005 | -0.049 | Less Than PCL | 0.00627 | Less Than PCL | Less Than PCL |
| | Jul-15 | 0.00200 | 0.00025 U | -8.00 | -0.008 | -0.049 | Less Than PCL | 0.00585 | Less Than PCL | Less Than PCL |
| | Jan-16 | 0.00200 | 0.00025 U | -8.00 | -0.005 | -0.049 | Less Than PCL | 0.00627 | Less Than PCL | Less Than PCL |
| | Jul-16 | 0.00200 | 0.00025 U | -8.29 | -0.008 | -0.049 | Less Than PCL | 0.00508 | Less Than PCL | Less Than PCL |

**Table 4-4**
**Summary of Concentration vs. Time Attenuation Rate Constants**
**SWMU 17/Building 1429 Plume**
**2016 RAER**
**Former NAS Dallas, Texas**


| Monitoring Well | Sampling Date | Protective Concentration Level (mg/L) | Concentration Detected (mg/L) | Natural Log of Concentration (mg/L) | Degradation Rate from Natural Log ($K_{time}$) (mg/L per year) | Minimum Degradation Rate Required for Remedial Goals Natural Log ($K_{time}$) (mg/L per year) | Minimum Degradation Rate Met? (Yes/No) | Expected Remedial Goal Concentration (mg/L) | Expected Remedial Goal Concentration Met? (Yes/No) | Remedial Goals Being Met? (Yes/No) |
|---|---|---|---|---|---|---|---|---|---|---|
| 612D38MW | May-98 | 0.00200 | 0.00500 U | -8.00 | -- | -- | -- | -- | -- | -- |
| | Aug-98 | 0.00200 | 0.00500 U | -8.00 | -- | -- | -- | -- | -- | -- |
| | Apr-99 | 0.00200 | 0.00500 U | -8.00 | -- | -- | -- | -- | -- | -- |
| | Nov-99 | 0.00200 | 0.00500 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-00 | 0.00200 | 0.00500 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-01 | 0.00200 | 0.01000 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-03 | 0.00200 | 0.00022 J | -8.42 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Aug-03 | 0.00200 | 0.00026 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Dec-03 | 0.00200 | 0.00028 J | -8.18 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-04 | 0.00200 | 0.00017 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Oct-04 | 0.00200 | 0.00017 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Apr-05 | 0.00200 | 0.00030 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Oct-05 | 0.00200 | 0.00030 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | May-06 | 0.00200 | 0.00200 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Aug-06 | 0.00200 | 0.00060 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Apr-07 | 0.00200 | 0.00020 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Aug-07 | 0.00200 | 0.00092 J | -6.99 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-08 | 0.00200 | 0.00043 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-08 | 0.00200 | 0.00030 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-09 | 0.00200 | 0.00030 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-09 | 0.00200 | 0.00110 | -6.81 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-10 | 0.00200 | 0.00030 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-10 | 0.00200 | 0.00028 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-11 | 0.00200 | 0.00022 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-11 | 0.00200 | 0.00093 J | -6.98 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-12 | 0.00200 | 0.00022 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-12 | 0.00200 | 0.00022 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-13 | 0.00200 | 0.00044 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-13 | 0.00200 | 0.00044 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-14 | 0.00200 | 0.00033 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-14 | 0.00200 | 0.00025 U | -8.00 | -0.017 | -0.049 | Less Than PCL | 0.00674 | Less Than PCL | Less Than PCL |
| | Jan-15 | 0.00200 | 0.00025 U | -8.00 | -0.018 | -0.049 | Less Than PCL | 0.00627 | Less Than PCL | Less Than PCL |
| | Jul-15 | 0.00200 | 0.00025 U | -8.00 | -0.018 | -0.049 | Less Than PCL | 0.00585 | Less Than PCL | Less Than PCL |
| | Jan-16 | 0.00200 | 0.00025 U | -8.00 | -0.018 | -0.049 | Less Than PCL | 0.00627 | Less Than PCL | Less Than PCL |
| | Jul-16 | 0.00200 | 0.00025 U | -8.00 | -0.020 | -0.049 | Less Than PCL | 0.00508 | Less Than PCL | Less Than PCL |
| 612D111MW | Jul-00 | 0.00200 | 0.00500 U | -8.00 | -- | -- | -- | -- | -- | -- |
| | Jul-01 | 0.00200 | 0.01000 U | -8.00 | -- | -- | -- | -- | -- | -- |
| | Jan-03 | 0.00200 | 0.00038 J | -7.88 | -- | -- | -- | -- | -- | -- |
| | Sep-03 | 0.00200 | 0.00100 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Dec-03 | 0.00200 | 0.00038 J | -7.88 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-04 | 0.00200 | 0.00017 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Oct-04 | 0.00200 | 0.00042 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Apr-05 | 0.00200 | 0.00060 J | -7.42 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Oct-05 | 0.00200 | 0.00030 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | May-06 | 0.00200 | 0.00060 U | -7.42 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Aug-06 | 0.00200 | 0.00060 U | -7.42 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Apr-07 | 0.00200 | 0.00032 J | -8.05 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Aug-07 | 0.00200 | 0.00019 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-08 | 0.00200 | 0.00043 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-08 | 0.00200 | 0.00030 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-09 | 0.00200 | 0.00030 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-09 | 0.00200 | 0.00030 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-10 | 0.00200 | 0.00030 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-10 | 0.00200 | 0.00028 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-11 | 0.00200 | 0.00022 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-11 | 0.00200 | 0.00022 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-12 | 0.00200 | 0.00022 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-12 | 0.00200 | 0.00022 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-13 | 0.00200 | 0.00044 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-13 | 0.00200 | 0.00044 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-14 | 0.00200 | 0.00033 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-14 | 0.00200 | 0.00025 U | -8.00 | -0.027 | -0.049 | Less Than PCL | 0.00674 | Less Than PCL | Less Than PCL |
| | Jan-15 | 0.00200 | 0.00025 U | -8.00 | -0.033 | -0.049 | Less Than PCL | 0.00627 | Less Than PCL | Less Than PCL |
| | Jul-15 | 0.00200 | 0.00025 U | -8.00 | -0.032 | -0.049 | Less Than PCL | 0.00585 | Less Than PCL | Less Than PCL |
| | Jan-16 | 0.00200 | 0.00025 U | -8.00 | -0.033 | -0.049 | Less Than PCL | 0.00627 | Less Than PCL | Less Than PCL |
| | Jul-16 | 0.00200 | 0.00025 J | -8.29 | -0.040 | -0.049 | Less Than PCL | 0.00508 | Less Than PCL | Less Than PCL |

**Table 4-4**
**Summary of Concentration vs. Time Attenuation Rate Constants**
**SWMU 17/Building 1429 Plume**
**2016 RAER**
**Former NAS Dallas, Texas**
**Page 12 of 13**

| Monitoring Well | Sampling Date | Protective Concentration Level (mg/L) | Concentration Detected (mg/L) | Natural Log of Concentration (mg/L) | Degradation Rate from Natural Log ($K_{time}$) (mg/L per year) | Minimum Degradation Rate Required for Remedial Goals Natural Log ($K_{time}$) (mg/L per year) | Minimum Degradation Rate Met? (Yes/No) | Expected Remedial Goal Concentration (mg/L) | Expected Remedial Goal Concentration Met? (Yes/No) | Remedial Goals Being Met? (Yes/No) |
|---|---|---|---|---|---|---|---|---|---|---|
| 612D129MW | Dec-95 | 0.00200 | -- | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Apr-98 | 0.00200 | -- | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Sep-98 | 0.00200 | -- | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Apr-99 | 0.00200 | -- | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Nov-99 | 0.00200 | -- | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-00 | 0.00200 | -- | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-01 | 0.00200 | -- | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-03 | 0.00200 | -- | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Sep-03 | 0.00200 | -- | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Dec-03 | 0.00200 | -- | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-04 | 0.00200 | -- | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Oct-04 | 0.00200 | -- | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| 612D129MW | May-05 | 0.00200 | 0.00030 U | -8.00 | -- | -- | -- | -- | -- | -- |
| | Jul-05 | 0.00200 | 0.00030 U | -8.00 | -- | -- | -- | -- | -- | -- |
| | Oct-05 | 0.00200 | 0.00030 J | -8.11 | -- | -- | -- | -- | -- | -- |
| | Jan-06 | 0.00200 | 0.00040 J | -7.82 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Aug-06 | 0.00200 | 0.00060 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Apr-07 | 0.00200 | 0.00044 J | -7.73 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Aug-07 | 0.00200 | 0.00026 J | -8.25 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-08 | 0.00200 | 0.00043 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-08 | 0.00200 | 0.00030 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-09 | 0.00200 | 0.00030 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-09 | 0.00200 | 0.00030 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-10 | 0.00200 | 0.00030 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-10 | 0.00200 | 0.00028 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-11 | 0.00200 | 0.00022 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-11 | 0.00200 | 0.00022 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-12 | 0.00200 | 0.00022 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-12 | 0.00200 | 0.00022 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-13 | 0.00200 | 0.00044 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-13 | 0.00200 | 0.00044 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-14 | 0.00200 | 0.00033 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-14 | 0.00200 | 0.00025 U | -8.00 | -0.297 | -0.049 | Less Than PCL | 0.00674 | Less Than PCL | Less Than PCL |
| | Jan-15 | 0.00200 | 0.00025 U | -8.00 | -0.291 | -0.049 | Less Than PCL | 0.00627 | Less Than PCL | Less Than PCL |
| | Jul-15 | 0.00200 | 0.00025 U | -8.00 | -0.302 | -0.049 | Less Than PCL | 0.00585 | Less Than PCL | Less Than PCL |
| | Jan-16 | 0.00200 | 0.00025 U | -8.00 | -0.291 | -0.049 | Less Than PCL | 0.00627 | Less Than PCL | Less Than PCL |
| | Jul-16 | 0.00200 | 0.00025 U | -8.29 | -0.323 | -0.049 | Less Than PCL | 0.00508 | Less Than PCL | Less Than PCL |

**Table 4-4**
**Summary of Concentration vs. Time Attenuation Rate Constants**
**SWMU 17/Building 1429 Plume**
**2016 RAER**
**Former NAS Dallas, Texas**
**Page 13 of 13**

| Monitoring Well | Sampling Date | Protective Concentration Level (mg/L) | Concentration Detected (mg/L) | Natural Log of Concentration (mg/L) | Degradation Rate from Natural Log ($K_{time}$) (mg/L per year) | Minimum Degradation Rate Required for Remedial Goals Natural Log ($K_{time}$) (mg/L per year) | Minimum Degradation Rate Met? (Yes/No) | Expected Remedial Goal Concentration (mg/L) | Expected Remedial Goal Concentration Met? (Yes/No) | Remedial Goals Being Met? (Yes/No) |
|---|---|---|---|---|---|---|---|---|---|---|
| 614D09MW | May-98 | 0.00200 | 0.00490 J | -5.32 | -- | -- | -- | -- | -- | -- |
| | Aug-98 | 0.00200 | 0.00250 J | -5.99 | -- | -- | -- | -- | -- | -- |
| | Mar-99 | 0.00200 | 0.00120 J | -6.73 | -- | -- | -- | -- | -- | -- |
| | Nov-99 | 0.00200 | 0.00160 J | -6.44 | -0.753 | -0.049 | Less Than PCL | 0.05300 | Less Than PCL | Less Than PCL |
| | Jul-00 | 0.00200 | 0.00500 U | -8.00 | -1.034 | -0.049 | Less Than PCL | 0.04791 | Less Than PCL | Less Than PCL |
| | Jul-01 | 0.00200 | 0.00160 J | -6.44 | -0.441 | -0.049 | Less Than PCL | 0.04182 | Less Than PCL | Less Than PCL |
| | Jan-03 | 0.00200 | 0.00068 J | -7.29 | -0.326 | -0.049 | Less Than PCL | 0.03376 | Less Than PCL | Less Than PCL |
| | Jan-03 | 0.00200 | 0.00056 J | -7.49 | -0.321 | -0.049 | Less Than PCL | 0.03376 | Less Than PCL | Less Than PCL |
| | Dec-03 | 0.00200 | 0.00017 U | -8.00 | -0.337 | -0.049 | Less Than PCL | 0.02969 | Less Than PCL | Less Than PCL |
| | Jul-04 | 0.00200 | 0.00017 U | -8.00 | -0.331 | -0.049 | Less Than PCL | 0.02728 | Less Than PCL | Less Than PCL |
| | Oct-04 | 0.00200 | 0.00017 U | -8.00 | -0.324 | -0.049 | Less Than PCL | 0.02649 | Less Than PCL | Less Than PCL |
| | Oct-05 | 0.00200 | 0.00060 J | -7.42 | -0.272 | -0.049 | Less Than PCL | 0.02298 | Less Than PCL | Less Than PCL |
| | May-06 | 0.00200 | 0.00060 U | -8.00 | -0.259 | -0.049 | Less Than PCL | 0.02119 | Less Than PCL | Less Than PCL |
| | Aug-06 | 0.00200 | 0.00060 U | -8.00 | -0.248 | -0.049 | Less Than PCL | 0.02041 | Less Than PCL | Less Than PCL |
| | Apr-07 | 0.00200 | 0.00020 U | -8.00 | -0.235 | -0.049 | Less Than PCL | 0.01871 | Less Than PCL | Less Than PCL |
| | Aug-07 | 0.00200 | 0.00020 J | -8.52 | -0.239 | -0.049 | Less Than PCL | 0.01785 | Less Than PCL | Less Than PCL |
| | Jan-08 | 0.00200 | 0.00043 U | -8.00 | -0.226 | -0.049 | Less Than PCL | 0.01683 | Less Than PCL | Less Than PCL |
| | Jul-08 | 0.00200 | 0.00030 U | -8.00 | -0.213 | -0.049 | Less Than PCL | 0.01569 | Less Than PCL | Less Than PCL |
| | Jan-09 | 0.00200 | 0.00030 U | -8.00 | -0.201 | -0.049 | Less Than PCL | 0.01460 | Less Than PCL | Less Than PCL |
| | Jul-09 | 0.00200 | 0.00030 U | -8.00 | -0.190 | -0.049 | Less Than PCL | 0.01361 | Less Than PCL | Less Than PCL |
| | Jan-10 | 0.00200 | 0.00030 U | -8.00 | -0.179 | -0.049 | Less Than PCL | 0.01269 | Less Than PCL | Less Than PCL |
| | Jul-10 | 0.00200 | 0.00100 | -6.91 | -0.149 | -0.049 | Less Than PCL | 0.01183 | Less Than PCL | Less Than PCL |
| | Jan-11 | 0.00200 | 0.00022 U | -8.00 | -0.142 | -0.049 | Less Than PCL | 0.01103 | Less Than PCL | Less Than PCL |
| | Jul-11 | 0.00200 | 0.00022 U | -8.00 | -0.136 | -0.049 | Less Than PCL | 0.01023 | Less Than PCL | Less Than PCL |
| | Jan-12 | 0.00200 | 0.00022 U | -8.00 | -0.129 | -0.049 | Less Than PCL | 0.00959 | Less Than PCL | Less Than PCL |
| | Jul-12 | 0.00200 | 0.00022 U | -8.00 | -0.124 | -0.049 | Less Than PCL | 0.00895 | Less Than PCL | Less Than PCL |
| | Jan-13 | 0.00200 | 0.00044 U | -8.00 | -0.118 | -0.049 | Less Than PCL | 0.00832 | Less Than PCL | Less Than PCL |
| | Jul-13 | 0.00200 | 0.00044 U | -8.00 | -0.112 | -0.049 | Less Than PCL | 0.00777 | Less Than PCL | Less Than PCL |
| | Jan-14 | 0.00200 | 0.00033 U | -8.00 | -0.107 | -0.049 | Less Than PCL | 0.00723 | Less Than PCL | Less Than PCL |
| | Jul-14 | 0.00200 | 0.00025 U | -8.00 | -0.103 | -0.049 | Less Than PCL | 0.00674 | Less Than PCL | Less Than PCL |
| | Jan-15 | 0.00200 | 0.00025 U | -8.00 | -0.099 | -0.049 | Less Than PCL | 0.00627 | Less Than PCL | Less Than PCL |
| | Jul-15 | 0.00200 | 0.00025 U | -8.00 | -0.096 | -0.049 | Less Than PCL | 0.00585 | Less Than PCL | Less Than PCL |
| | Jan-16 | 0.00200 | 0.00025 U | -8.00 | -0.099 | -0.049 | Less Than PCL | 0.00627 | Less Than PCL | Less Than PCL |
| | Jul-16 | 0.00200 | 0.00025 U | -8.29 | -0.093 | -0.049 | Less Than PCL | 0.00508 | Less Than PCL | Less Than PCL |

Notes:
mg/L - milligrams per liter
NA - Not Applicable
NS - Not Sampled
Shaded areas indicate an exceedance.
For graphing purposes non-detect concentrations have been assigned a natural log value of -8.

Analytical Result Qualifiers:
J, H, L - Indicates that the chemical was detected; however, the associated numerical result may not be a precise representation of the amount that is actually present in the sample. The laboratory reported concentration is considered to be bias unknown (J), high ( H), or low (L) estimate of the true concentration.

U - Indicates that the chemical was not detected at the numerical detection limit (sample-specific quantitation limit) noted. Nondetected results from the laboratory are reported in this manner. This qualifier is added to a positive result (reported by the laboratory) if the detected concentration is determined to be attributable to contamination introduced during field sampling or laboratory analysis.

# TABLE 4-5
# SUMMARY OF CONCENTRATION vs. DISTANCE ATTENUATION RATE CONSTANTS

**Table 4-5A**

**Summary of Concentration vs. Distance Attenuation Rate Constants**
**SWMU 17/Building 1429 Plume**
**Northeast Centerline**
**2016 RAER**
**Former NAS Dallas, Texas**
**Page 1 of 4**

| Sampling Date | Protective Concentration Level (mg/L) | Detected Concentration (mg/L) | | | | | Natural Log of COC Concentration (mg/L) | | | | | $k_{dist}$ (mg/L per ft) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Centerline Monitoring Wells** | | **600D84MW** | **612D111MW** | **61201MW** | **603D71MW** | **600D95MW** | **600D84MW** | **612D111MW** | **61201MW** | **603D71MW** | **600D95MW** | |
| **Distance from source (ft)** | | **0** | **122** | **277** | **485** | **588** | 0 | 122 | 277 | 485 | 588 | |
| **Trichloroethene** | | | | | | | | | | | | |
| Dec-95 | **0.00500** | -- | -- | 0.16000 | -- | -- | -- | -- | -1.83 | -- | -- | -- |
| Apr-98 | **0.00500** | -- | -- | 0.08200 | 0.07800 | -- | -- | -- | -2.50 | -2.55 | -- | -0.0002 |
| Sep-98 | **0.00500** | -- | -- | 0.11000 | 0.07500 | -- | -- | -- | -2.21 | -2.59 | -- | -0.0018 |
| Apr-99 | **0.00500** | -- | -- | 0.06700 | 0.05200 | -- | -- | -- | -2.70 | -2.96 | -- | -0.0012 |
| Nov-99 | **0.00500** | 0.05300 | -- | 0.06500 | 0.04100 | 0.00500 U | -2.94 | -- | -2.73 | -3.19 | -8.00 | -0.0148 |
| Jul-00 | **0.00500** | 0.05000 | 0.09700 | 0.04700 | 0.04300 | 0.00500 U | -3.00 | -2.33 | -3.06 | -3.15 | -8.00 | -0.0097 |
| Jul-01 | **0.00500** | 0.04800 | 0.05400 | 0.05100 | 0.03200 | 0.00500 U | -3.04 | -2.92 | -2.98 | -3.44 | -8.00 | -0.0090 |
| Jan-03 | **0.00500** | 0.05900 | 0.04500 J | 0.04900 | 0.01900 | 0.00100 U | -2.83 | -3.10 | -3.02 | -3.96 | -8.00 | -0.0091 |
| Sep-03 | **0.00500** | 0.03200 | 0.10000 | 0.03900 | 0.02900 | NS | -3.44 | -2.30 | -3.24 | -3.54 | -- | -0.0033 |
| Dec-03 | **0.00500** | 0.01700 | 0.06700 | 0.02200 | 0.01700 | 0.00010 U | -4.07 | -2.70 | -3.82 | -4.07 | -8.00 | -0.0094 |
| Jul-04 | **0.00500** | 0.02200 | 0.03200 | 0.02200 | 0.01200 | NS | -3.82 | -3.44 | -3.82 | -4.42 | -- | -0.0027 |
| Oct-04 | **0.00500** | 0.01300 | 0.04700 | 0.02000 | 0.01500 | 0.00022 U | -4.34 | -3.06 | -3.91 | -4.20 | -8.00 | -0.0087 |
| Apr-05 | **0.00500** | 0.04500 | 0.04800 | 0.02900 | 0.01100 | NS | -3.10 | -3.04 | -3.54 | -4.51 | -- | -0.0041 |
| Oct-05 | **0.00500** | 0.03000 | 0.13000 | 0.02700 | 0.02000 | 0.00030 U | -3.51 | -2.04 | -3.61 | -3.91 | -8.00 | -0.0106 |
| May-06 | **0.00500** | 0.03900 | 0.04400 | 0.02500 | 0.00800 | 0.00100 U | -3.24 | -3.12 | -3.69 | -4.83 | -8.00 | -0.0093 |
| Aug-06 | **0.00500** | 0.01600 | 0.12000 | 0.02400 | 0.01200 | 0.00040 U | -4.14 | -2.12 | -3.73 | -4.42 | -8.00 | -0.0108 |
| Apr-07 | **0.00500** | 0.03600 | 0.05300 | 0.01900 | 0.00650 | 0.00023 U | -3.32 | -2.94 | -3.96 | -5.04 | -8.00 | -0.0097 |
| Aug-07 | **0.00500** | 0.02900 | 0.06000 | 0.01700 | 0.01300 | 0.00028 U | -3.54 | -2.81 | -4.07 | -4.34 | -8.00 | -0.0092 |
| Jan-08 | **0.00500** | 0.03000 | 0.05200 | 0.01600 | 0.01200 | 0.00053 U | -3.51 | -2.96 | -4.14 | -4.42 | -8.00 | -0.0090 |
| Jul-08 | **0.00500** | 0.01940 | 0.00470 | 0.01050 | 0.00480 | 0.00032 U | -3.94 | -5.36 | -4.56 | -5.34 | -8.00 | -0.0050 |
| Jan-09 | **0.00500** | 0.03390 | 0.09520 | 0.01590 | 0.01200 | 0.00032 U | -3.38 | -2.35 | -4.14 | -4.42 | -8.00 | -0.0101 |
| Jul-09 | **0.00500** | 0.00110 | 0.0712 J | 0.01180 | 0.01030 | 0.00032 U | -6.81 | -2.64 | -4.44 | -4.58 | -8.00 | -0.0095 |
| Jan-10 | **0.00500** | 0.02430 | 0.03130 | 0.01220 | 0.00860 | 0.00032 U | -3.72 | -3.46 | -4.41 | -4.76 | -8.00 | -0.0081 |
| Jul-10 | **0.00500** | 0.01350 | 0.05230 | 0.01270 | 0.00150 | 0.00032 U | -4.31 | -2.95 | -4.37 | -6.50 | -8.00 | -0.0107 |
| Jan-11 | **0.00500** | 0.00800 | 0.01750 | 0.01160 | 0.00920 | 0.00026 U | -4.83 | -4.05 | -4.46 | -4.69 | -8.00 | -0.0069 |
| Jul-11 | **0.00500** | 0.02640 | 0.09590 | 0.00750 | 0.00820 | 0.00026 U | -3.63 | -2.34 | -4.89 | -4.80 | -8.00 | -0.0099 |
| Jan-12 | **0.00500** | 0.01200 | 0.01710 | 0.00630 | 0.00580 | 0.00026 U | -4.42 | -4.07 | -5.07 | -5.15 | -8.00 | -0.0069 |
| Jul-12 | **0.00500** | 0.01680 | 0.06680 | 0.00620 | 0.00480 | 0.00026 U | -4.09 | -2.71 | -5.08 | -5.34 | -8.00 | -0.0096 |
| Jan-13 | **0.00500** | 0.01820 | 0.0514 JH | 0.00650 | 0.00610 | 0.00031 U | -4.01 | -2.97 | -5.04 | -5.10 | -8.00 | -0.0089 |
| Jul-13 | **0.00500** | 0.01080 | 0.06770 | 0.00530 | 0.00510 | 0.00031 U | -4.53 | -2.69 | -5.24 | -5.28 | -8.00 | -0.0095 |
| Jan-14 | **0.00500** | 0.01200 | 0.02830 | 0.00360 | 0.00280 | 0.00030 U | -4.42 | -3.56 | -5.63 | -5.88 | -8.00 | -0.0081 |
| Jul-14 | **0.00500** | 0.01570 | 0.0119 J | 0.00149 | 0.00188 | 0.00025 U | -4.15 | -4.43 | -6.51 | -6.28 | -8.00 | -0.0062 |
| Jan-15 | **0.00500** | 0.00683 | 0.00171 | 0.00071 J | 0.00233 | 0.00025 U | -4.99 | -6.37 | -7.25 | -6.06 | -8.00 | -0.0018 |
| Jul-15 | **0.00500** | 0.02060 | 0.02260 | 0.000868 J | 0.00459 | 0.00025 U | -3.88 | -3.79 | -7.25 | -5.38 | -8.00 | -0.0061 |
| Jan-16 | **0.00500** | 0.011 | 0.00231 | 0.00048 J | 0.00352 | 0.00025 U | -4.99 | -6.37 | -7.25 | -6.06 | -8.00 | -0.0018 |
| Jul-16 | **0.00500** | 0.0149 | 0.0116 | 0.00058 | 0.00242 | 0.0005 U | -4.21 | -4.46 | -7.25 | -6.02 | -8.00 | -0.0054 |

**Table 4-5A**

**Summary of Concentration vs. Distance Attenuation Rate Constants**
**SWMU 17/Building 1429 Plume**
**Northeast Centerline**
**2016 RAER**
**Former NAS Dallas, Texas**
**Page 2 of 4**

| Sampling Date | Protective Concentration Level (mg/L) | Detected Concentration (mg/L) | | | | | Natural Log of COC Concentration (mg/L) | | | | | $k_{dist}$ (mg/L per ft) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Centerline Monitoring Wells** | | **600D84MW** | **612D111MW** | **61201MW** | **603D71MW** | **600D95MW** | **600D84MW** | **612D111MW** | **61201MW** | **603D71MW** | **600D95MW** | |
| **Distance from source (ft)** | | **0** | **122** | **277** | **485** | **588** | 0 | 122 | 277 | 485 | 588 | |
| **cis-1,2-Dichloroethene** | | | | | | | | | | | | |
| Dec-95 | **0.07000** | -- | -- | 0.07560 | -- | -- | -- | -- | -2.58 | -- | -- | -- |
| Apr-98 | **0.07000** | -- | -- | 0.03300 | 0.03500 | -- | -- | -- | -3.41 | -3.35 | -- | 0.0003 |
| Sep-98 | **0.07000** | -- | -- | 0.05500 | 0.04100 | -- | -- | -- | -2.90 | -3.19 | -- | -0.0014 |
| Apr-99 | **0.07000** | -- | -- | 0.02100 | 0.02700 | -- | -- | -- | -3.86 | -3.61 | -- | 0.0012 |
| Nov-99 | **0.07000** | 0.00920 | -- | 0.03000 | 0.02400 | 0.00500 U | -4.69 | -- | -3.51 | -3.73 | -8.00 | -0.0125 |
| Jul-00 | **0.07000** | 0.00880 | 0.01100 | 0.01100 | 0.02300 | 0.00500 U | -4.73 | -4.51 | -4.51 | -3.77 | -8.00 | -0.0052 |
| Jul-01 | **0.07000** | 0.01100 | 0.01200 | 0.00790 | 0.01900 | 0.00250 U | -4.51 | -4.42 | -4.84 | -3.96 | -8.00 | -0.0053 |
| Jan-03 | **0.07000** | 0.00740 | 0.00560 J | 0.00570 | 0.00980 | 0.00100 U | -4.91 | -5.18 | -5.17 | -4.63 | -8.00 | -0.0042 |
| Sep-03 | **0.07000** | 0.00620 | 0.00640 | 0.00670 | 0.01700 | NS | -5.08 | -5.05 | -5.01 | -4.07 | -- | 0.0028 |
| Dec-03 | **0.07000** | 0.00260 | 0.00440 | 0.00420 | 0.00970 | 0.00041 U | -5.95 | -5.43 | -5.47 | -4.64 | -8.00 | -0.0036 |
| Jul-04 | **0.07000** | 0.00420 | 0.00380 | 0.00300 | 0.00840 | NS | -5.47 | -5.57 | -5.81 | -4.78 | -- | 0.0023 |
| Oct-04 | **0.07000** | 0.00230 | 0.00460 | 0.00290 | 0.01100 | 0.00027 U | -6.07 | -5.38 | -5.84 | -4.51 | -8.00 | -0.0033 |
| Apr-05 | **0.07000** | 0.00700 | 0.00700 | 0.00600 | 0.01100 | NS | -4.96 | -4.96 | -5.12 | -4.51 | -- | 0.0013 |
| Oct-05 | **0.07000** | 0.00400 | 0.00600 | 0.00300 | 0.01300 | 0.0003 U | -5.52 | -5.12 | -5.81 | -4.34 | -8.00 | -0.0037 |
| May-06 | **0.07000** | 0.00600 | 0.00200 | 0.00400 | 0.00900 | 0.00100 U | -5.12 | -6.21 | -5.52 | -4.71 | -8.00 | -0.0021 |
| Aug-06 | **0.07000** | 0.00300 | 0.00500 | 0.00200 | 0.01000 | 0.00050 U | -5.81 | -5.30 | -6.21 | -4.61 | -8.00 | -0.0033 |
| Apr-07 | **0.07000** | 0.00520 | 0.00440 | 0.00280 | 0.00690 | 0.00014 U | -5.26 | -5.43 | -5.88 | -4.98 | -8.00 | -0.0036 |
| Aug-07 | **0.07000** | 0.00410 | 0.00380 | 0.00200 | 0.00760 | 0.00044 U | -5.50 | -5.57 | -6.21 | -4.88 | -8.00 | -0.0030 |
| Jan-08 | **0.07000** | 0.00530 | 0.00410 | 0.00210 | 0.00710 | 0.00032 U | -5.24 | -5.50 | -6.17 | -4.95 | -8.00 | -0.0032 |
| Jul-08 | **0.07000** | 0.00470 | 0.00065 J | 0.00200 | 0.00560 | 0.00020 U | -5.36 | -7.34 | -6.21 | -5.18 | -8.00 | 0.0000 |
| Jan-09 | **0.07000** | 0.00560 | 0.00450 | 0.00210 | 0.00750 | 0.00020 U | -5.18 | -5.40 | -6.17 | -4.89 | -8.00 | -0.0034 |
| Jul-09 | **0.07000** | 0.00023 J | 0.00330 | 0.00150 | 0.00690 | 0.00020 U | -8.38 | -5.71 | -6.50 | -4.98 | -8.00 | -0.0026 |
| Jan-10 | **0.07000** | 0.00410 | 0.00300 | 0.00130 | 0.00570 | 0.00020 U | -5.50 | -5.81 | -6.65 | -5.17 | -8.00 | -0.0025 |
| Jul-10 | **0.07000** | 0.00370 | 0.00420 | 0.00100 | 0.00170 | 0.00020 U | -5.60 | -5.47 | -6.91 | -6.38 | -8.00 | -0.0041 |
| Jan-11 | **0.07000** | 0.00110 | 0.00140 | 0.00110 | 0.00670 | 0.00026 U | -6.81 | -6.57 | -6.81 | -5.01 | -8.00 | -0.0008 |
| Jul-11 | **0.07000** | 0.00380 | 0.00300 | 0.00061 J | 0.00580 | 0.00026 U | -5.57 | -5.81 | -7.40 | -5.15 | -8.00 | -0.0020 |
| Jan-12 | **0.07000** | 0.00200 | 0.00320 | 0.00050 J | 0.00400 | 0.00026 U | -6.21 | -5.74 | -7.60 | -5.52 | -8.00 | -0.0023 |
| Jul-12 | **0.07000** | 0.00220 | 0.00270 | 0.00026 U | 0.00290 | 0.00026 U | -6.12 | -5.91 | -8.00 | -5.84 | -8.00 | -0.0020 |
| Jan-13 | **0.07000** | 0.00370 | 0.00280 | 0.00077 J | 0.00560 | 0.00024 U | -5.60 | -5.88 | -7.17 | -5.18 | -8.00 | -0.0020 |
| Jul-13 | **0.07000** | 0.00110 | 0.00330 | 0.00047 J | 0.00350 | 0.00024 U | -6.81 | -5.71 | -7.66 | -5.65 | -8.00 | -0.0024 |
| Jan-14 | **0.00500** | 0.00270 | 0.00200 | 0.00049 J | 0.00160 | 0.00033 U | -5.91 | -6.21 | -7.62 | -6.44 | -8.00 | -0.0022 |
| Jul-14 | **0.00500** | 0.00298 | 0.00127 | 0.00025 J | 0.00121 | 0.00025 U | -5.82 | -6.67 | -8.29 | -6.72 | -8.29 | -0.0016 |
| Jan-15 | **0.00500** | 0.00768 | 0.00045 J | 0.00025 U | 0.0017 | 0.00025 U | -4.87 | -6.67 | -8.29 | -6.72 | -8.29 | -0.0016 |
| Jul-15 | **0.00500** | 0.00245 | 0.00502 | 0.00025 U | 0.00317 | 0.00025 U | -6.01 | -6.67 | -8.29 | -6.72 | -8.29 | -0.0016 |
| Jan-16 | **0.00500** | 0.00469 | 0.00082 J | 0.00025 U | 0.00244 | 0.00025 U | -4.87 | -6.67 | -8.29 | -6.72 | -8.29 | -0.0016 |
| Jul-16 | **0.00500** | 0.00199 | 0.00806 | 0.00025 | 0.00183 | 0.0005 U | -6.22 | -6.67 | -8.29 | -6.72 | -8.29 | -0.0016 |

**Table 4-5A**

**Summary of Concentration vs. Distance Attenuation Rate Constants**
**SWMU 17/Building 1429 Plume**
**Northeast Centerline**
**2016 RAER**
**Former NAS Dallas, Texas**


| Sampling Date | Protective Concentration Level (mg/L) | Detected Concentration (mg/L) | | | | | Natural Log of COC Concentration (mg/L) | | | | | $k_{dist}$ (mg/L per ft) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Centerline Monitoring Wells** | | **600D84MW** | **612D111MW** | **61201MW** | **603D71MW** | **600D95MW** | **600D84MW** | **612D111MW** | **61201MW** | **603D71MW** | **600D95MW** | |
| **Distance from source (ft)** | | **0** | **122** | **277** | **485** | **588** | 0 | 122 | 277 | 485 | 588 | |
| **Vinyl Chloride** | | | | | | | | | | | | |
| Dec-95 | **0.00200** | -- | -- | 0.01560 | -- | -- | -- | -- | -4.16 | -- | -- | -- |
| Apr-98 | **0.00200** | -- | -- | 0.00840 | 0.00230 J | -- | -- | -- | -4.78 | -6.07 | -- | -0.0062 |
| Sep-98 | **0.00200** | -- | -- | 0.00640 | 0.00310 | -- | -- | -- | -5.05 | -5.78 | -- | -0.0035 |
| Apr-99 | **0.00200** | -- | -- | 0.00510 | 0.00230 J | -- | -- | -- | -5.28 | -6.07 | -- | -0.0038 |
| Nov-99 | **0.00200** | 0.00500 U | -- | 0.00400 J | 0.00110 J | 0.00500 U | -8.00 | -- | -5.52 | -6.81 | -8.00 | -0.0077 |
| Jul-00 | **0.00200** | 0.00500 U | 0.00500 U | 0.00320 J | 0.00500 U | 0.00500 U | -8.00 | -8.00 | -5.74 | -8.00 | -8.00 | -0.0016 |
| Jul-01 | **0.00200** | 0.01000 U | 0.01000 U | 0.00160 J | 0.00170 J | 0.01000 U | -8.00 | -8.00 | -6.44 | -6.38 | -8.00 | 0.0004 |
| Jan-03 | **0.00200** | 0.00250 U | 0.00042 J | 0.00300 | 0.00070 J | 0.00100 U | -8.00 | -7.78 | -5.81 | -7.26 | -8.00 | -0.0013 |
| Sep-03 | **0.00200** | 0.00037 U | 0.00100 U | 0.00290 | 0.00074 J | NS | -8.00 | -8.00 | -5.84 | -7.21 | -- | 0.0017 |
| Dec-03 | **0.00200** | 0.00017 U | 0.00038 J | 0.00230 | 0.00036 J | 0.00098 U | -8.00 | -7.88 | -6.07 | -7.93 | -8.00 | -0.0015 |
| Jul-04 | **0.00200** | 0.00017 U | 0.00017 U | 0.00230 | 0.00065 J | NS | -8.00 | -8.00 | -6.07 | -7.34 | -- | 0.0014 |
| Oct-04 | **0.00200** | 0.00017 U | 0.00420 U | 0.00200 | 0.00076 J | 0.00017 U | -8.00 | -8.00 | -6.21 | -7.18 | -8.00 | -0.0005 |
| Apr-05 | **0.00200** | 0.00030 U | 0.00060 J | 0.00400 | 0.00030 U | NS | -8.00 | -7.42 | -5.52 | -8.00 | -- | -0.0022 |
| Oct-05 | **0.00200** | 0.00030 U | 0.00030 U | 0.00300 | 0.00070 J | 0.00030 U | -8.00 | -8.00 | -5.81 | -7.26 | -8.00 | -0.0009 |
| May-06 | **0.00200** | 0.00060 U | 0.00060 U | 0.00400 | 0.00200 U | 0.00200 U | -8.00 | -8.00 | -5.52 | -8.00 | -8.00 | -0.0017 |
| Aug-06 | **0.00200** | 0.00060 U | 0.00060 U | 0.00200 | 0.00060 U | 0.00060 U | -8.00 | -8.00 | -6.21 | -8.00 | -8.00 | -0.0012 |
| Apr-07 | **0.00200** | 0.00020 U | 0.00032 J | 0.00300 | 0.00020 U | 0.00020 U | -8.00 | -8.05 | -5.81 | -8.00 | -8.00 | -0.0014 |
| Aug-07 | **0.00200** | 0.00040 J | 0.00019 U | 0.00260 | 0.00064 J | 0.00019 U | -7.82 | -8.00 | -5.95 | -7.35 | -8.00 | -0.0008 |
| Jan-08 | **0.00200** | 0.00043 U | 0.00043 U | 0.0012 J | 0.00043 U | 0.00043 U | -8.00 | -8.00 | -6.73 | -8.00 | -8.00 | -0.0009 |
| Jul-08 | **0.00200** | 0.00030 U | 0.00030 U | 0.00130 | 0.00030 U | 0.00030 U | -8.00 | -8.00 | -6.65 | -8.00 | -8.00 | -0.0009 |
| Jan-09 | **0.00200** | 0.00030 U | 0.00030 U | 0.00120 | 0.00030 U | 0.00030 U | -8.00 | -8.00 | -6.73 | -8.00 | -8.00 | -0.0009 |
| Jul-09 | **0.00200** | 0.00030 U | 0.00030 U | 0.00080 J | 0.00050 J | 0.00030 U | -8.00 | -8.00 | -7.13 | -7.60 | -8.00 | -0.0002 |
| Jan-10 | **0.00200** | 0.00030 U | 0.00030 U | 0.00047 J | 0.00030 U | 0.00030 U | -8.00 | -8.00 | -7.66 | -8.00 | -8.00 | -0.0002 |
| Jul-10 | **0.00200** | 0.00028 U | 0.00028 U | 0.00028 U | 0.00028 U | 0.00030 U | -8.00 | -8.00 | -8.00 | -8.00 | -8.00 | 0.0000 |
| Jan-11 | **0.00200** | 0.00022 U | 0.00022 U | 0.00022 U | 0.00036 J | 0.00022 U | -8.00 | -8.00 | -8.00 | -7.93 | -8.00 | 0.0001 |
| Jul-11 | **0.00200** | 0.00022 U | 0.00022 U | 0.00022 U | 0.00022 U | 0.00022 U | -8.00 | -8.00 | -8.00 | -8.00 | -8.00 | 0.0000 |
| Jan-12 | **0.00200** | 0.00022 U | 0.00022 U | 0.00022 U | 0.00022 U | 0.00022 U | -8.00 | -8.00 | -8.00 | -8.00 | -8.00 | 0.0000 |
| Jul-12 | **0.00200** | 0.00022 U | 0.00022 U | 0.00022 U | 0.00022 U | 0.00022 U | -8.00 | -8.00 | -8.00 | -8.00 | -8.00 | 0.0000 |
| Jan-13 | **0.00200** | 0.00044 U | 0.00044 U | 0.00044 U | 0.00044 U | 0.00044 U | -8.00 | -8.00 | -8.00 | -8.00 | -8.00 | 0.0000 |
| Jul-13 | **0.00200** | 0.00044 U | 0.00044 U | 0.00044 U | 0.00044 U | 0.00044 U | -8.00 | -8.00 | -8.00 | -8.00 | -8.00 | 0.0000 |
| Jan-14 | **0.00500** | 0.00033 U | 0.00033 U | 0.00033 U | 0.00033 U | 0.00033 U | -8.00 | -8.00 | -8.00 | -8.00 | -8.00 | 0.0000 |
| Jul-14 | **0.00500** | 0.00025 U | 0.00025 U | 0.00025 U | 0.00025 U | 0.00025 U | -8.00 | -8.00 | -8.00 | -8.00 | -8.00 | 0.0000 |
| Jan-15 | **0.00500** | 0.00025 U | 0.00025 U | 0.00025 U | 0.00025 U | 0.00025 U | -8.00 | -8.00 | -8.00 | -8.00 | -8.00 | 0.0000 |
| Jul-15 | **0.00500** | 0.00025 U | 0.00025 U | 0.00025 U | 0.00025 U | 0.00025 U | -8.00 | -8.00 | -8.00 | -8.00 | -8.00 | 0.0000 |
| Jan-16 | **0.00500** | 0.00025 U | 0.00025 U | 0.00025 U | 0.00025 U | 0.00025 U | -8.00 | -8.00 | -8.00 | -8.00 | -8.00 | 0.0000 |
| Jul-16 | **0.00500** | 0.00064 | 0.00025 | 0.00025 | 0.00025 | 0.0005 U | -8.00 | -8.00 | -8.00 | -8.00 | -8.00 | 0.0000 |

**Table 4-5A**

**Summary of Concentration vs. Distance Attenuation Rate Constants**
**SWMU 17/Building 1429 Plume**
**Northeast Centerline**
**2016 RAER**
**Former NAS Dallas, Texas**


| Sampling Date | Protective Concentration Level (mg/L) | Detected Concentration (mg/L) | | | | | Natural Log of COC Concentration (mg/L) | | | | | $k_{dist}$ (mg/L per ft) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Centerline Monitoring Wells** | | **600D84MW** | **612D111MW** | **61201MW** | **603D71MW** | **600D95MW** | **600D84MW** | **612D111MW** | **61201MW** | **603D71MW** | **600D95MW** | |
| **Distance from source (ft)** | | **0** | **122** | **277** | **485** | **588** | 0 | 122 | 277 | 485 | 588 | |

ft - feet
mg/L - milligrams per liter
NA - Not Applicable
NS - Not Sampled

Notes:
Shaded areas indicate an exceedance.
For graphing purposes non-detect concentrations and estimated concentrations below 0.0003 mg/L have been assigned a natural log value of -8.

Analytical Result Qualifiers:
J - Indicates that the chemical was detected. However, the associated numerical result may not be a precise representation of the amount that is actually present in the sample. The laboratory reported concentration is considered to be an estimate of the true concentration.
U - Indicates that the chemical was not detected at the numerical detection limit (sample-specific quantitation limit) noted. Nondetected results from the laboratory are reported in this manner. This qualifier is added to a positive result (reported by the laboratory) if the detected concentration is determined to be attributable to contamination introduced during field sampling or laboratory analysis.

**Table 4-5B**

**Summary of Concentration vs. Distance Attenuation Rate Constants**
**SWMU 17/Building 1429 Plume**
**Southeast Centerline**
**2016 RAER**
**Former NAS Dallas, Texas**
**Page 1 of 4**

| Sampling Date | Protective Concentration Level (mg/L) | Detected Concentration (mg/L) | | | | | | Natural Log of COC Concentration (mg/L) | | | | | | $k_{dist}$ (mg/L per ft) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Centerline Monitoring Wells** | | **614D09MW** | **612D111MW** | **612D38MW** | **600D85MW** | **612D129MW** | **612D155MW** | **614D09MW** | **612D111MW** | **612D38MW** | **600D85MW** | **612D129MW** | **612D155MW** | |
| **Distance from source (ft)** | | **0** | **113** | **233** | **401** | **494** | **698** | **0** | **113** | **233** | **401** | **494** | **698** | |
| **Trichloroethene** | | | | | | | | | | | | | | |
| Dec-95 | **0.00500** | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| Apr-98 | **0.00500** | 0.01300 | -- | 0.05100 | -- | -- | -- | -4.34281 | -- | -2.98 | -- | -- | -- | -- |
| Sep-98 | **0.00500** | 0.00870 | -- | 0.05900 | -- | -- | -- | -4.74443 | -- | -2.83 | -- | -- | -- | -- |
| Apr-99 | **0.00500** | 0.00820 | -- | 0.03300 | -- | -- | -- | -4.80362 | -- | -3.41 | -- | -- | -- | -- |
| Nov-99 | **0.00500** | 0.00880 | -- | 0.03700 | 0.00410 J | -- | -- | -4.73300 | -- | -3.30 | -5.50 | -- | -- | -0.0131 |
| Jul-00 | **0.00500** | 0.00650 | 0.09700 | 0.03300 | 0.01100 | -- | -- | -5.04 | -2.33 | -3.41 | -4.51 | -- | -- | -0.0075 |
| Jul-01 | **0.00500** | 0.00390 J | 0.05400 | 0.01800 | 0.01100 | -- | -- | -5.55 | -2.92 | -4.02 | -4.51 | -- | -- | -0.0054 |
| Jan-03 | **0.00500** | 0.00440 | 0.04500 J | 0.01400 | 0.02400 | -- | -- | -5.43 | -3.10 | -4.27 | -3.73 | -- | -- | -0.0018 |
| Sep-03 | **0.00500** | NS | 0.10000 | 0.00660 | 0.00790 | -- | -- | -- | -2.30 | -5.02 | -4.84 | -- | -- | -0.0082 |
| Dec-03 | **0.00500** | 0.00160 | 0.06700 | 0.01500 | 0.00680 | -- | -- | -6.44 | -2.70 | -4.20 | -4.99 | -- | -- | -0.0077 |
| Jul-04 | **0.00500** | 0.00066 J | 0.03200 | 0.00510 | 0.00490 | -- | -- | -7.32 | -3.44 | -5.28 | -5.32 | -- | -- | -0.0061 |
| Oct-04 | **0.00500** | 0.00047 J | 0.04700 | 0.00570 | 0.00670 | -- | -- | -7.66 | -3.06 | -5.17 | -5.01 | -- | -- | -0.0063 |
| Apr-05 | **0.00500** | NS | 0.04800 | 0.00900 | 0.01400 | 0.02800 | -- | -- | -3.04 | -4.71 | -4.27 | -3.58 | -- | -0.0009 |
| Oct-05 | **0.00500** | 0.00060 J | 0.13000 | 0.01900 | 0.00800 | 0.01800 | -- | -7.42 | -2.04 | -3.96 | -4.83 | -4.02 | -- | -0.0054 |
| May-06 | **0.00500** | 0.00100 | 0.04400 | 0.00800 | 0.19000 | 0.02200 | 0.00040 U | -6.91 | -3.12 | -4.83 | -1.66 | -3.82 | -8.00 | -0.0063 |
| Aug-06 | **0.00500** | 0.00060 J | 0.12000 | 0.01100 | 0.00800 | 0.01900 | 0.00040 U | -7.42 | -2.12 | -4.51 | -4.83 | -3.96 | -8.00 | -0.0081 |
| Apr-07 | **0.00500** | 0.00210 | 0.05300 | 0.01600 | 0.01900 | 0.02500 | 0.00014 U | -6.17 | -2.94 | -4.14 | -3.96 | -3.69 | -8.00 | -0.0071 |
| Aug-07 | **0.00500** | 0.00120 | 0.06000 | 0.02000 | 0.00720 | 0.02000 | 0.00028 U | -6.73 | -2.81 | -3.91 | -4.93 | -3.91 | -8.00 | -0.0076 |
| Jan-08 | **0.00500** | 0.00099 J | 0.05200 | 0.01400 | 0.00880 | 0.02000 | 0.00053 U | -6.92 | -2.96 | -4.27 | -4.73 | -3.91 | -8.00 | -0.0072 |
| Jul-08 | **0.00500** | 0.00043 J | 0.00470 | 0.00230 | 0.00730 | 0.01100 | 0.00032 U | -7.75 | -5.36 | -6.07 | -4.92 | -4.51 | -8.00 | -0.0030 |
| Jan-09 | **0.00500** | 0.00046 J | 0.09520 | 0.01190 | 0.00940 | 0.02150 | 0.00032 U | -7.68 | -2.35 | -4.43 | -4.67 | -3.84 | -8.00 | -0.0078 |
| Jul-09 | **0.00500** | 0.00090 J | 0.07120 J | 0.01620 | 0.00860 | 0.01430 | 0.00032 U | -7.01 | -2.64 | -4.12 | -4.76 | -4.25 | -8.00 | -0.0079 |
| Jan-10 | **0.00500** | 0.00051 J | 0.03130 | 0.01140 | 0.00820 | 0.01860 | 0.00032 U | -7.58 | -3.46 | -4.47 | -4.80 | -3.98 | -8.00 | -0.0064 |
| Jul-10 | **0.00500** | 0.00043 J | 0.05230 | 0.00200 | 0.00840 | 0.01270 | 0.00024 U | -7.75 | -2.95 | -6.21 | -4.78 | -4.37 | -8.00 | -0.0060 |
| Jan-11 | **0.00500** | 0.00065 J | 0.01750 | 0.00900 | 0.00800 | 0.01250 | 0.00026 U | -7.34 | -4.05 | -4.71 | -4.83 | -4.38 | -8.00 | -0.0056 |
| Jul-11 | **0.00500** | 0.00110 | 0.09590 | 0.01260 | 0.00470 | 0.01320 | 0.00026 U | -7.75 | -2.95 | -6.21 | -4.78 | -4.37 | -8.00 | -0.0060 |
| Jan-12 | **0.00500** | 0.00051 J | 0.01280 | 0.00930 | 0.00700 | 0.01280 | 0.00026 U | -7.58 | -4.36 | -4.68 | -4.96 | -4.36 | -8.00 | -0.0052 |
| Jul-12 | **0.00500** | 0.00026 U | 0.06140 | 0.00940 | 0.00510 | 0.00960 | 0.00026 U | -8.00 | -2.79 | -4.67 | -5.28 | -4.65 | -8.00 | -0.0075 |
| Jan-13 | **0.00500** | 0.00054 J | 0.0514 JH | 0.00830 | 0.00600 | 0.01230 | 0.00031 U | -7.52 | -2.97 | -4.79 | -5.12 | -4.40 | -8.00 | -0.0070 |
| Jul-13 | **0.00500** | 0.00062 J | 0.06770 | 0.01130 | 0.00720 | 0.01230 | 0.00031 U | -7.39 | -2.69 | -4.48 | -4.93 | -4.40 | -8.00 | -0.0076 |
| Jan-14 | **0.00500** | 0.0003 U | 0.02830 | 0.00920 | 0.00810 | 0.01360 | 0.00030 UJL | -8.00 | -3.56 | -4.69 | -4.82 | -4.30 | -8.00 | -0.0063 |
| Jul-14 | **0.00500** | 0.00051 J | 0.0119 J | 0.00952 | 0.01090 | 0.00951 | 0.00025 U | -7.58 | -4.43 | -4.65 | -4.52 | -4.66 | -8.00 | -0.0053 |
| Jan-15 | **0.00500** | 0.00139 | 0.00171 | 0.00806 | 0.00653 | 0.01230 | 0.00025 U | -6.58 | -6.37 | -4.82 | -5.03 | -4.40 | -8.00 | -0.0025 |
| Jul-15 | **0.00500** | 0.00200 | 0.02260 | 0.00864 | 0.01270 | 0.01030 | 0.00025 U | -6.21 | -3.79 | -4.75 | -4.37 | -4.58 | -8.00 | -0.0060 |
| Jan-15 | **0.00500** | 0.00191 | 0.00231 | 0.00501 | 0.00539 | 0.0134 | 0.00025 U | -6.58 | -6.37 | -4.82 | -5.03 | -4.40 | -8.00 | -0.0025 |
| Jul-15 | **0.00500** | 0.00279 | 0.0116 | 0.0051 | 0.00381 | 0.00855 | -- | -5.88 | -4.46 | -5.28 | -5.57 | -4.76 | -- | -0.0011 |

**Table 4-5B**

**Summary of Concentration vs. Distance Attenuation Rate Constants**
**SWMU 17/Building 1429 Plume**
**Southeast Centerline**
**2016 RAER**
**Former NAS Dallas, Texas**


| Sampling Date | Protective Concentration Level (mg/L) | Detected Concentration (mg/L) | | | | | | Natural Log of COC Concentration (mg/L) | | | | | | $k_{dist}$ (mg/L per ft) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Centerline Monitoring Wells** | | **614D09MW** | **612D111MW** | **612D38MW** | **600D85MW** | **612D129MW** | **612D155MW** | **614D09MW** | **612D111MW** | **612D38MW** | **600D85MW** | **612D129MW** | **612D155MW** | |
| **Distance from source (ft)** | | **0** | **113** | **233** | **401** | **494** | **698** | **0** | **113** | **233** | **401** | **494** | **698** | |
| **cis-1,2-Dichloroethene** | | | | | | | | | | | | | | |
| Dec-95 | **0.07000** | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| Apr-98 | **0.07000** | 0.01400 | -- | 0.01300 | -- | -- | -- | -4.26870 | -- | -4.34 | -- | -- | -- | -- |
| Sep-98 | **0.07000** | 0.01200 | -- | 0.01700 | -- | -- | -- | -4.42285 | -- | -4.07 | -- | -- | -- | -- |
| Apr-99 | **0.07000** | 0.00810 | -- | 0.01000 | -- | -- | -- | -4.81589 | -- | -4.61 | -- | -- | -- | -- |
| Nov-99 | **0.07000** | 0.00970 | -- | 0.01300 | 0.00130 J | -- | -- | -4.63563 | -- | -4.34 | -6.65 | -- | -- | -0.0137 |
| Jul-00 | **0.07000** | 0.00420 J | 0.01100 | 0.01100 | 0.00250 J | -- | -- | -5.47 | -4.51 | -4.51 | -5.99 | -- | -- | -0.0054 |
| Jul-01 | **0.07000** | 0.00490 | 0.01200 | 0.01000 | 0.00480 | -- | -- | -5.32 | -4.42 | -4.61 | -5.34 | -- | -- | -0.0033 |
| Jan-03 | **0.07000** | 0.00340 | 0.00560 J | 0.00690 | 0.00400 | -- | -- | -5.68 | -5.18 | -4.98 | -5.52 | -- | -- | -0.0013 |
| Sep-03 | **0.07000** | NS | 0.00640 | 0.00790 | 0.00380 | -- | -- | -- | -5.05 | -4.84 | -5.57 | -- | -- | -0.0020 |
| Dec-03 | **0.07000** | 0.00064 J | 0.00440 | 0.00890 | 0.00220 | -- | -- | -7.35 | -5.43 | -4.72 | -6.12 | -- | -- | -0.0028 |
| Jul-04 | **0.07000** | 0.00033 J | 0.00380 | 0.00540 | 0.00220 | -- | -- | -8.02 | -5.57 | -5.22 | -6.12 | -- | -- | -0.0021 |
| Oct-04 | **0.07000** | 0.00058 J | 0.00460 | 0.00560 | 0.00290 | -- | -- | -7.45 | -5.38 | -5.18 | -5.84 | -- | -- | -0.0017 |
| Apr-05 | **0.07000** | NS | 0.00700 | 0.00600 | 0.00400 | 0.00800 | -- | -- | -4.96 | -5.12 | -5.52 | -4.83 | -- | -0.0002 |
| Oct-05 | **0.07000** | 0.00080 J | 0.00600 | 0.01300 | 0.00200 | 0.00800 | -- | -7.13 | -5.12 | -4.34 | -6.21 | -4.83 | -- | -0.0012 |
| May-06 | **0.07000** | 0.00050 U | 0.00200 | 0.00700 | 0.00600 | 0.01000 | 0.00050 U | -8.00 | -6.21 | -4.96 | -5.12 | -4.61 | -8.00 | -0.0027 |
| Aug-06 | **0.07000** | 0.00050 U | 0.00500 | 0.00800 | 0.00300 | 0.01100 | 0.00050 U | -8.00 | -5.30 | -4.83 | -5.81 | -4.51 | -8.00 | -0.0040 |
| Apr-07 | **0.07000** | 0.00100 | 0.00440 | 0.01000 | 0.00560 | 0.01000 | 0.00045 U | -6.91 | -5.43 | -4.61 | -5.18 | -4.61 | -8.00 | -0.0040 |
| Aug-07 | **0.07000** | 0.00044 U | 0.00380 | 0.01200 | 0.00230 | 0.00800 | 0.00044 U | -8.00 | -5.57 | -4.42 | -6.07 | -4.83 | -8.00 | -0.0041 |
| Jan-08 | **0.07000** | 0.00038 J | 0.00410 | 0.00950 | 0.00390 | 0.00830 | 0.00032 U | -7.88 | -5.50 | -4.66 | -5.55 | -4.79 | -8.00 | -0.0040 |
| Jul-08 | **0.07000** | 0.00032 J | 0.00065 J | 0.00600 | 0.00370 | 0.00710 | 0.00020 U | -8.05 | -7.34 | -5.12 | -5.60 | -4.95 | -8.00 | -0.0013 |
| Jan-09 | **0.07000** | 0.00020 U | 0.00450 | 0.01160 | 0.00420 | 0.00730 | 0.00020 U | -8.00 | -5.40 | -4.46 | -5.47 | -4.92 | -8.00 | -0.0043 |
| Jul-09 | **0.07000** | 0.00020 U | 0.00330 | 0.01800 | 0.00250 | 0.00610 | 0.00020 U | -8.00 | -5.71 | -4.02 | -5.99 | -5.10 | -8.00 | -0.0044 |
| Jan-10 | **0.07000** | 0.00020 U | 0.00300 | 0.01390 | 0.00420 | 0.00670 | 0.00020 U | -8.00 | -5.81 | -4.28 | -5.47 | -5.01 | -8.00 | -0.0040 |
| Jul-10 | **0.07000** | 0.00063 J | 0.00420 | 0.00610 | 0.00340 | 0.00650 | 0.00032 U | -7.37 | -5.47 | -5.10 | -5.68 | -5.04 | -8.00 | -0.0038 |
| Jan-11 | **0.07000** | 0.00026 U | 0.00140 | 0.01430 | 0.00390 | 0.00480 | 0.00026 U | -8.00 | -6.57 | -4.25 | -5.55 | -5.34 | -8.00 | -0.0032 |
| Jul-11 | **0.07000** | 0.00026 U | 0.00300 | 0.01880 | 0.00110 | 0.00550 | 0.00026 U | -7.37 | -5.47 | -5.10 | -5.68 | -5.04 | -8.00 | -0.0038 |
| Jan-12 | **0.07000** | 0.00026 U | 0.00320 | 0.01370 | 0.00350 | 0.00460 | 0.00026 U | -8.00 | -5.74 | -4.29 | -5.65 | -5.38 | -8.00 | -0.0043 |
| Jul-12 | **0.07000** | 0.00026 U | 0.00270 | 0.01660 | 0.00130 | 0.00450 | 0.00026 U | -8.00 | -5.91 | -4.10 | -6.65 | -5.40 | -8.00 | -0.0043 |
| Jan-13 | **0.07000** | 0.00024 U | 0.00280 | 0.01290 | 0.00360 | 0.00490 | 0.00024 U | -8.00 | -5.88 | -4.35 | -5.63 | -5.32 | -8.00 | -0.0040 |
| Jul-13 | **0.07000** | 0.00024 U | 0.00330 | 0.01670 | 0.00210 | 0.00560 | 0.00024 U | -8.00 | -5.71 | -4.09 | -6.17 | -5.18 | -8.00 | -0.0044 |
| Jan-14 | **0.07000** | 0.00033 U | 0.00200 | 0.01170 | 0.01060 | 0.00490 | 0.00033 UJL | -8.00 | -6.21 | -4.45 | -4.55 | -5.32 | -8.00 | -0.0034 |
| Jul-14 | **0.07000** | 0.00025 U | 0.00127 | 0.0145 | 0.00404 | 0.00527 | 0.00025 U | -8.00 | -6.67 | -4.23 | -5.51 | -5.25 | -8.00 | -0.0030 |
| Jan-15 | **0.07000** | 0.00027 J | 0.00045 J | 0.0111 | 0.00468 | 0.00531 | 0.00025 U | -8.22 | -7.71 | -2.20 | -5.36 | -5.24 | -8.00 | -0.0031 |
| Jul-15 | **0.07000** | 0.00025 U | 0.00502 | 0.0121 | 0.00494 | 0.00531 | 0.00025 U | -8.22 | -7.71 | -2.20 | -5.36 | -5.24 | -8.00 | -0.0031 |
| Jan-15 | **0.07000** | 0.00025 U | 0.00082 J | 0.00649 | 0.00621 | 0.00548 | 0.00025 U | -8.22 | -7.71 | -2.20 | -5.36 | -5.24 | -8.00 | -0.0031 |
| Jul-15 | **0.07000** | 0.00025 | 0.00806 | 0.00577 | 0.00127 | 0.00461 | -- | -8.22 | -7.71 | -2.20 | -5.36 | -5.24 | -- | 0.0028 |

**Table 4-5B**

**Summary of Concentration vs. Distance Attenuation Rate Constants**
**SWMU 17/Building 1429 Plume**
**Southeast Centerline**
**2016 RAER**
**Former NAS Dallas, Texas**


| Sampling Date | Protective Concentration Level (mg/L) | Detected Concentration (mg/L) | | | | | | Natural Log of COC Concentration (mg/L) | | | | | | $k_{dist}$ (mg/L per ft) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Centerline Monitoring Wells** | | **614D09MW** | **612D111MW** | **612D38MW** | **600D85MW** | **612D129MW** | **612D155MW** | **614D09MW** | **612D111MW** | **612D38MW** | **600D85MW** | **612D129MW** | **612D155MW** | |
| **Distance from source (ft)** | | **0** | **113** | **233** | **401** | **494** | **698** | **0** | **113** | **233** | **401** | **494** | **698** | |
| **Vinyl Chloride** | | | | | | | | | | | | | | |
| Dec-95 | **0.00200** | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| Apr-98 | **0.00200** | 0.00490 J | -- | 0.00500 U | -- | -- | -- | -5.31852 | -- | -8.00 | -- | -- | -- | -- |
| Sep-98 | **0.00200** | 0.00250 J | -- | 0.00500 U | -- | -- | -- | -5.99146 | -- | -8.00 | -- | -- | -- | -- |
| Apr-99 | **0.00200** | 0.00120 J | -- | 0.00500 U | -- | -- | -- | -6.72543 | -- | -8.00 | -- | -- | -- | -- |
| Nov-99 | **0.00200** | 0.00160 J | -- | 0.00500 U | 0.00500 U | -- | -- | -6.43775 | -- | -8.00 | -8.00 | -- | -- | 0.0000 |
| Jul-00 | **0.00200** | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | -- | -- | -8.00 | -8.00 | -8.00 | -8.00 | -- | -- | 0.0000 |
| Jul-01 | **0.00200** | 0.00160 J | 0.01000 U | 0.01000 U | 0.01000 U | -- | -- | -6.44 | -8.00 | -8.00 | -8.00 | -- | -- | 0.0000 |
| Jan-03 | **0.00200** | 0.00068 J | 0.00042 J | 0.00022 J | 0.00100 U | -- | -- | -7.29 | -7.78 | -8.42 | -8.00 | -- | -- | -0.0006 |
| Sep-03 | **0.00200** | NS | 0.00100 U | 0.00026 U | 0.00026 U | -- | -- | -- | -8.00 | -8.00 | -8.00 | -- | -- | 0.0000 |
| Dec-03 | **0.00200** | 0.00017 U | 0.00038 J | 0.00028 J | 0.00017 U | -- | -- | -8.00 | -7.88 | -8.18 | -8.00 | -- | -- | -0.0003 |
| Jul-04 | **0.00200** | 0.00017 U | 0.00017 U | 0.00017 U | 0.00017 U | -- | -- | -8.00 | -8.00 | -8.00 | -8.00 | -- | -- | 0.0000 |
| Oct-04 | **0.00200** | 0.00017 U | 0.00042 U | 0.00017 U | 0.00017 U | -- | -- | -8.00 | -8.00 | -8.00 | -8.00 | -- | -- | 0.0000 |
| Apr-05 | **0.00200** | NS | 0.00060 J | 0.00030 U | 0.00030 U | 0.00030 U | -- | -- | -7.42 | -8.00 | -8.00 | -8.00 | -- | -0.0013 |
| Oct-05 | **0.00200** | 0.00060 J | 0.00030 U | 0.00050 J | 0.00030 U | 0.00030 J | -- | -7.42 | -8.00 | -7.60 | -8.00 | -8.11 | -- | -0.0006 |
| May-06 | **0.00200** | 0.00060 U | 0.00060 U | 0.00200 U | 0.00200 U | 0.00040 J | 0.00060 U | -8.00 | -8.00 | -8.00 | -8.00 | -7.82 | -8.00 | 0.0001 |
| Aug-06 | **0.00200** | 0.00060 U | 0.00060 U | 0.00060 U | 0.00060 U | 0.00060 U | 0.00060 U | -8.00 | -8.00 | -8.00 | -8.00 | -8.00 | -8.00 | 0.0000 |
| Apr-07 | **0.00200** | 0.00020 U | 0.00032 J | 0.00020 U | 0.00012 U | 0.00044 J | 0.00012 U | -8.00 | -8.05 | -8.00 | -8.00 | -7.73 | -8.00 | 0.0002 |
| Aug-07 | **0.00200** | 0.00020 J | 0.00019 U | 0.00092 J | 0.00019 U | 0.00026 J | 0.00019 U | -8.52 | -8.00 | -6.99 | -8.00 | -8.25 | -8.00 | -0.0009 |
| Jan-08 | **0.00200** | 0.00043 U | 0.00043 U | 0.00043 U | 0.00043 U | 0.00043 U | 0.00043 U | -8.00 | -8.00 | -8.00 | -8.00 | -8.00 | -8.00 | 0.0000 |
| Jul-08 | **0.00200** | 0.00030 U | 0.00030 U | 0.00030 U | 0.00030 U | 0.00030 U | 0.00030 U | -8.00 | -8.00 | -8.00 | -8.00 | -8.00 | -8.00 | 0.0000 |
| Jan-09 | **0.00200** | 0.00030 U | 0.00030 U | 0.00030 U | 0.00030 U | 0.00030 U | 0.00030 U | -8.00 | -8.00 | -8.00 | -8.00 | -8.00 | -8.00 | 0.0000 |
| Jul-09 | **0.00200** | 0.00030 U | 0.00030 U | 0.00110 | 0.00030 U | 0.00030 U | 0.00030 U | -8.00 | -8.00 | -6.81 | -8.00 | -8.00 | -8.00 | -0.0009 |
| Jan-10 | **0.00200** | 0.00030 U | 0.00030 U | 0.00030 U | 0.00030 U | 0.00030 U | 0.00030 U | -8.00 | -8.00 | -8.00 | -8.00 | -8.00 | -8.00 | 0.0000 |
| Jul-10 | **0.00200** | 0.00100 | 0.00028 U | 0.00028 U | 0.00028 U | 0.00028 U | 0.00028 U | -6.91 | -8.00 | -8.00 | -8.00 | -8.00 | -8.00 | 0.0000 |
| Jan-11 | **0.00200** | 0.00022 U | 0.00022 U | 0.00022 U | 0.00022 U | 0.00022 U | 0.00022 U | -8.00 | -8.00 | -8.00 | -8.00 | -8.00 | -8.00 | 0.0000 |
| Jul-11 | **0.00200** | 0.00022 U | 0.00022 U | 0.00093 J | 0.00022 U | 0.00022 U | 0.00022 U | -8.00 | -8.00 | -8.00 | -8.00 | -8.00 | -8.00 | 0.0000 |
| Jan-12 | **0.00200** | 0.00022 U | 0.00022 U | 0.00022 U | 0.00022 U | 0.00022 U | 0.00022 U | -8.00 | -8.00 | -8.00 | -8.00 | -8.00 | -8.00 | 0.0000 |
| Jul-12 | **0.00200** | 0.00022 U | 0.00022 U | 0.00022 U | 0.00022 U | 0.00022 U | 0.00022 U | -8.00 | -8.00 | -8.00 | -8.00 | -8.00 | -8.00 | 0.0000 |
| Jan-13 | **0.00200** | 0.00044 U | 0.00044 U | 0.00044 U | 0.00044 U | 0.00044 U | 0.00044 U | -8.00 | -8.00 | -8.00 | -8.00 | -8.00 | -8.00 | 0.0000 |
| Jul-13 | **0.00200** | 0.00044 U | 0.00044 U | 0.00044 U | 0.00044 U | 0.00044 U | 0.00044 U | -8.00 | -8.00 | -8.00 | -8.00 | -8.00 | -8.00 | 0.0000 |
| Jan-14 | **0.00200** | 0.00033 U | 0.00033 U | 0.00033 U | 0.00033 U | 0.00033 U | 0.00033 U | -8.00 | -8.00 | -8.00 | -8.00 | -8.00 | -8.00 | 0.0000 |
| Jul-14 | **0.00200** | 0.00025 U | 0.00025 U | 0.00025 U | 0.00025 U | 0.00025 U | 0.00025 U | -8.00 | -8.00 | -8.00 | -8.00 | -8.00 | -8.00 | 0.0000 |
| Jan-15 | **0.00200** | 0.00025 U | 0.00025 U | 0.00025 U | 0.00025 U | 0.00025 U | 0.00025 U | -8.00 | -8.00 | -8.00 | -8.00 | -8.00 | -8.00 | 0.0000 |
| Jul-15 | **0.00200** | 0.00025 U | 0.00025 U | 0.00025 U | 0.00025 U | 0.00025 U | 0.00025 U | -8.00 | -8.00 | -8.00 | -8.00 | -8.00 | -8.00 | 0.0000 |
| Jan-15 | **0.00200** | 0.00025 U | 0.00025 U | 0.00025 U | 0.00025 U | 0.00025 U | 0.00025 U | -8.00 | -8.00 | -8.00 | -8.00 | -8.00 | -8.00 | 0.0000 |
| Jul-15 | **0.00200** | 0.00025 | 0.00025 | 0.00025 U | 0.00025 | 0.00025 | -- | -8.00 | -8.00 | -8.00 | -8.00 | -8.00 | -8.00 | 0.0000 |

**Table 4-5B**

**Summary of Concentration vs. Distance Attenuation Rate Constants**
**SWMU 17/Building 1429 Plume**
**Southeast Centerline**
**2016 RAER**
**Former NAS Dallas, Texas**


| Sampling Date | Protective Concentration Level (mg/L) | Detected Concentration (mg/L) | | | | | | Natural Log of COC Concentration (mg/L) | | | | | | $k_{dist}$ (mg/L per ft) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Centerline Monitoring Wells** | | **614D09MW** | **612D111MW** | **612D38MW** | **600D85MW** | **612D129MW** | **612D155MW** | **614D09MW** | **612D111MW** | **612D38MW** | **600D85MW** | **612D129MW** | **612D155MW** | |
| **Distance from source (ft)** | | **0** | **113** | **233** | **401** | **494** | **698** | **0** | **113** | **233** | **401** | **494** | **698** | |

ft - feet
mg/L - milligrams per liter
NA - Not Applicable
-- - Not Sampled

Notes:
Shaded areas indicate an exceedance.
For graphing purposes non-detect concentratio-- and estimated concentratio-- below 0.0003 mg/L have been assigned a natural log value of -8.

Analytical Result Qualifiers:
J - Indicates that the chemical was detected. However, the associated numerical result may not be a precise representation of the amount that is actually present in the sample. The laboratory reported concentration is co--idered to be an estimate of the true concentration.

U - Indicates that the chemical was not detected at the numerical detection limit (sample-specific quantitation limit) noted. Nondetected results from the laboratory are reported in this manner. This qualifier is added to a positive result (reported by the laboratory) if the detected concentration is determined to be attributable to contamination introduced during field sampling or laboratory analysis.

# Plug and Abandonment Documentation

# STATE OF TEXAS PLUGGING REPORT for Tracking #158505

| | | | |
|---|---|---|---|
| Owner: | NAS Dallas | Owner Well #: | IW-1 |
| Address: | 8100 West Jefferson<br>Grand Prairie, TX 75051 | Grid #: | 33-17-1 |
| Well Location: | 8100 West Jefferson<br>Grand Prairie, TX 75051 | Latitude: | 32° 44' 25.8" N |
| | | Longitude: | 096° 57' 46.3" W |
| Well County: | Dallas | Elevation: | No Data |
| Well Type: | Monitor | | |

*Drilling Information*

| | | | |
|---|---|---|---|
| Company: | No Data | Date Drilled: | No Data |
| Driller: | No Data | License Number: | No Data |

| | *Diameter (in.)* | *Top Depth (ft.)* | *Bottom Depth (ft.)* |
|---|---|---|---|
| Borehole: | | 0 | 15 |

*Plugging Information*

Date Plugged: **4/5/2016** Plugger:

Plug Method: **Pour in 3/8 bentonite chips when standing water in well is less than 100 feet depth, cement top 2 feet**

Casing Left in Well: **No Data**

Plug(s) Placed in Well:

| *Top (ft.)* | *Bottom (ft.)* | *Description (number of sacks & material)* |
|---|---|---|
| 0 | 2 | Cement 2 Bags/Sacks |
| 2 | 15 | Bentonite 2 Bags/Sacks |

Certification Data: The driller certified that the driller plugged this well (or the well was plugged under the driller's direct supervision) and that each and all of the statements herein are true and correct. The driller understood that failure to complete the required items will result in the reports(s) being returned for completion and resubmittal.

Company Information: **Strata Core Services, LLC**
**112 S. Norwood Drive**
**Hurst, TX 76053**

Driller Name: **Brad Eskue** License Number: **58164**

Comments: **No Data**

# STATE OF TEXAS PLUGGING REPORT for Tracking #158506

| | | | |
|---|---|---|---|
| Owner: | **NAS Dallas** | Owner Well #: | **IW-2** |
| Address: | **8100 West Jefferson<br>Grand Prairie, TX 75051** | Grid #: | **33-17-1** |
| Well Location: | **8100 West Jefferson<br>Grand Prairie, TX 75051** | Latitude: | **32° 44' 25.8" N** |
| | | Longitude: | **096° 57' 46.3" W** |
| Well County: | **Dallas** | Elevation: | **No Data** |
| Well Type: | **Monitor** | | |

*Drilling Information*

| | | | |
|---|---|---|---|
| Company: | **No Data** | Date Drilled: | **No Data** |
| Driller: | **No Data** | License Number: | **No Data** |

| | *Diameter (in.)* | *Top Depth (ft.)* | *Bottom Depth (ft.)* |
|---|---|---|---|
| Borehole: | | **0** | **15** |

*Plugging Information*

Date Plugged: **4/5/2016** Plugger:

Plug Method: **Pour in 3/8 bentonite chips when standing water in well is less than 100 feet depth, cement top 2 feet**

Casing Left in Well:

**No Data**

Plug(s) Placed in Well:

| *Top (ft.)* | *Bottom (ft.)* | *Description (number of sacks & material)* |
|---|---|---|
| **0** | **2** | **Cement 2 Bags/Sacks** |
| **2** | **15** | **Bentonite 2 Bags/Sacks** |

Certification Data: The driller certified that the driller plugged this well (or the well was plugged under the driller's direct supervision) and that each and all of the statements herein are true and correct. The driller understood that failure to complete the required items will result in the reports(s) being returned for completion and resubmittal.

Company Information: **Strata Core Services, LLC**

**112 S. Norwood Drive**
**Hurst, TX 76053**

Driller Name: **Brad Eskue** License Number: **58164**

Comments: **No Data**

# STATE OF TEXAS PLUGGING REPORT for Tracking #158507

| | | | |
|---|---|---|---|
| Owner: | **NAS Dallas** | Owner Well #: | **IW-3** |
| Address: | **8100 West Jefferson<br>Grand Prairie, TX 75051** | Grid #: | **33-17-1** |
| Well Location: | **8100 West Jefferson<br>Grand Prairie, TX 75051** | Latitude: | **32° 44' 25.8" N** |
| | | Longitude: | **096° 57' 46.3" W** |
| Well County: | **Dallas** | Elevation: | **No Data** |
| Well Type: | **Monitor** | | |

*Drilling Information*

| | | | |
|---|---|---|---|
| Company: | **No Data** | Date Drilled: | **No Data** |
| Driller: | **No Data** | License Number: | **No Data** |

| | *Diameter (in.)* | *Top Depth (ft.)* | *Bottom Depth (ft.)* |
|---|---|---|---|
| Borehole: | | **0** | **15** |

*Plugging Information*

Date Plugged: **4/6/2016** Plugger:

Plug Method: **Pour in 3/8 bentonite chips when standing water in well is less than 100 feet depth, cement top 2 feet**

Casing Left in Well:

**No Data**

Plug(s) Placed in Well:

| *Top (ft.)* | *Bottom (ft.)* | *Description (number of sacks & material)* |
|---|---|---|
| **0** | **2** | **Cement 2 Bags/Sacks** |
| **2** | **15** | **Bentonite 2 Bags/Sacks** |

Certification Data: The driller certified that the driller plugged this well (or the well was plugged under the driller's direct supervision) and that each and all of the statements herein are true and correct. The driller understood that failure to complete the required items will result in the reports(s) being returned for completion and resubmittal.

Company Information: **Strata Core Services, LLC**

**112 S. Norwood Drive**
**Hurst, TX 76053**

Driller Name: **Brad Eskue** License Number: **58164**

Comments: **No Data**

# STATE OF TEXAS PLUGGING REPORT for Tracking #158508

| | | | |
|---|---|---|---|
| Owner: | **NAS Dallas** | Owner Well #: | **IW-4** |
| Address: | **8100 West Jefferson<br>Grand Prairie, TX 75051** | Grid #: | **33-17-1** |
| Well Location: | **8100 West Jefferson<br>Grand Prairie, TX 75051** | Latitude: | **32° 44' 25.8" N** |
| | | Longitude: | **096° 57' 46.3" W** |
| Well County: | **Dallas** | Elevation: | **No Data** |
| Well Type: | **Monitor** | | |

*Drilling Information*

| | | | |
|---|---|---|---|
| Company: | **No Data** | Date Drilled: | **No Data** |
| Driller: | **No Data** | License Number: | **No Data** |

| | *Diameter (in.)* | *Top Depth (ft.)* | *Bottom Depth (ft.)* |
|---|---|---|---|
| Borehole: | | **0** | **15** |

*Plugging Information*

Date Plugged: **4/6/2016** Plugger:

Plug Method: **Pour in 3/8 bentonite chips when standing water in well is less than 100 feet depth, cement top 2 feet**

Casing Left in Well:

**No Data**

Plug(s) Placed in Well:

| *Top (ft.)* | *Bottom (ft.)* | *Description (number of sacks & material)* |
|---|---|---|
| **0** | **2** | **Cement 2 Bags/Sacks** |
| **2** | **15** | **Bentonite 2 Bags/Sacks** |

Certification Data: The driller certified that the driller plugged this well (or the well was plugged under the driller's direct supervision) and that each and all of the statements herein are true and correct. The driller understood that failure to complete the required items will result in the reports(s) being returned for completion and resubmittal.

Company Information: **Strata Core Services, LLC**

**112 S. Norwood Drive**
**Hurst, TX 76053**

Driller Name: **Brad Eskue** License Number: **58164**

Comments: **No Data**

# STATE OF TEXAS PLUGGING REPORT for Tracking #158486

| | | | |
|---|---|---|---|
| Owner: | **NAS Dallas** | Owner Well #: | **612D155MW** |
| Address: | **8100 West Jefferson<br>Grand Praire, TX 75051** | Grid #: | **33-17-1** |
| Well Location: | **8100 West Jefferson<br>Grand Praire, TX 75051** | Latitude: | **32° 44' 25.8" N** |
| | | Longitude: | **096° 57' 46.3" W** |
| Well County: | **Dallas** | Elevation: | **No Data** |
| Well Type: | **Monitor** | | |

*Drilling Information*

| | | | |
|---|---|---|---|
| Company: | **No Data** | Date Drilled: | **No Data** |
| Driller: | **No Data** | License Number: | **No Data** |

| | *Diameter (in.)* | *Top Depth (ft.)* | *Bottom Depth (ft.)* |
|---|---|---|---|
| Borehole: | | **0** | **19.6** |

*Plugging Information*

Date Plugged: **4/4/2016** Plugger:

Plug Method: **Pour in 3/8 bentonite chips when standing water in well is less than 100 feet depth, cement top 2 feet**

Casing Left in Well:

**No Data**

Plug(s) Placed in Well:

| *Top (ft.)* | *Bottom (ft.)* | *Description (number of sacks & material)* |
|---|---|---|
| **0** | **2** | **Cement 2 Bags/Sacks** |
| **2** | **19.6** | **Bentonite 2 Bags/Sacks** |

Certification Data: The driller certified that the driller plugged this well (or the well was plugged under the driller's direct supervision) and that each and all of the statements herein are true and correct. The driller understood that failure to complete the required items will result in the reports(s) being returned for completion and resubmittal.

Company Information: **Strata Core Services, LLC**

**112 S. Norwood Drive**
**Hurst, TX 76053**

Driller Name: **Brad Eskue** License Number: **58164**

Comments: **No Data**

# STATE OF TEXAS PLUGGING REPORT for Tracking #158485

| | | | |
|---|---|---|---|
| Owner: | NAS Dallas | Owner Well #: | 60201MW |
| Address: | 8100 West Jefferson<br>Grand Prairie, TX 75051 | Grid #: | 33-17-1 |
| Well Location: | 8100 West Jefferson<br>Grand Prairie, TX 75051 | Latitude: | 32° 44' 25.8" N |
| | | Longitude: | 096° 57' 46.3" W |
| Well County: | Dallas | Elevation: | No Data |
| Well Type: | Monitor | | |

*Drilling Information*

| | | | |
|---|---|---|---|
| Company: | No Data | Date Drilled: | No Data |
| Driller: | No Data | License Number: | No Data |

| | Diameter (in.) | Top Depth (ft.) | Bottom Depth (ft.) |
|---|---|---|---|
| Borehole: | | 0 | 27.3 |

*Plugging Information*

Date Plugged: **4/6/2016** Plugger:

Plug Method: **Pour in 3/8 bentonite chips when standing water in well is less than 100 feet depth, cement top 2 feet**

Casing Left in Well: **No Data**

Plug(s) Placed in Well:

| Top (ft.) | Bottom (ft.) | Description (number of sacks & material) |
|---|---|---|
| 0 | 2 | Cement 2 Bags/Sacks |
| 2 | 27.3 | Bentonite 3 Bags/Sacks |

Certification Data: The driller certified that the driller plugged this well (or the well was plugged under the driller's direct supervision) and that each and all of the statements herein are true and correct. The driller understood that failure to complete the required items will result in the reports(s) being returned for completion and resubmittal.

Company Information: **Strata Core Services, LLC**
**112 S. Norwood Drive**
**Hurst, TX 76053**

Driller Name: **Brad Eskue** License Number: **58164**

Comments: **No Data**

# STATE OF TEXAS PLUGGING REPORT for Tracking #158483

| | | | |
|---|---|---|---|
| Owner: | NAS Dallas | Owner Well #: | 600D86MW |
| Address: | 8100 West Jefferson<br>Grand Prairie, TX 75051 | Grid #: | 33-17-1 |
| Well Location: | 8100 West Jefferson<br>Grand Prairie, TX 75051 | Latitude: | 32° 44' 25.8" N |
| | | Longitude: | 096° 57' 46.3" W |
| Well County: | Dallas | Elevation: | No Data |
| Well Type: | Monitor | | |

*Drilling Information*

| | | | |
|---|---|---|---|
| Company: | No Data | Date Drilled: | No Data |
| Driller: | No Data | License Number: | No Data |

| | Diameter (in.) | Top Depth (ft.) | Bottom Depth (ft.) |
|---|---|---|---|
| Borehole: | | 0 | 20 |

*Plugging Information*

Date Plugged: 4/4/2016 Plugger:

Plug Method: Pour in 3/8 bentonite chips when standing water in well is less than 100 feet depth, cement top 2 feet

Casing Left in Well: No Data

Plug(s) Placed in Well:

| Top (ft.) | Bottom (ft.) | Description (number of sacks & material) |
|---|---|---|
| 0 | 2 | Cement 2 Bags/Sacks |
| 2 | 20 | Bentonite 2 Bags/Sacks |

Certification Data: The driller certified that the driller plugged this well (or the well was plugged under the driller's direct supervision) and that each and all of the statements herein are true and correct. The driller understood that failure to complete the required items will result in the reports(s) being returned for completion and resubmittal.

Company Information: Strata Core Services, LLC
112 S. Norwood Drive
Hurst, TX 76053

Driller Name: Brad Eskue License Number: 58164

Comments: No Data

# STATE OF TEXAS PLUGGING REPORT for Tracking #158487

| | | | |
|---|---|---|---|
| Owner: | NAS Dallas | Owner Well #: | 79920MW |
| Address: | 8100 West Jefferson<br>Grand Prairie, TX 75051 | Grid #: | 33-17-1 |
| Well Location: | 8100 West Jefferson<br>Grand Prairie, TX 75051 | Latitude: | 32° 44' 25.8" N |
| | | Longitude: | 096° 57' 46.3" W |
| Well County: | Dallas | Elevation: | No Data |
| Well Type: | Monitor | | |

*Drilling Information*

| | | | |
|---|---|---|---|
| Company: | No Data | Date Drilled: | No Data |
| Driller: | No Data | License Number: | No Data |

| | Diameter (in.) | Top Depth (ft.) | Bottom Depth (ft.) |
|---|---|---|---|
| Borehole: | | 0 | 13.8 |

*Plugging Information*

Date Plugged: **4/4/2016** Plugger:

Plug Method: **Pour in 3/8 bentonite chips when standing water in well is less than 100 feet depth, cement top 2 feet**

Casing Left in Well: **No Data**

Plug(s) Placed in Well:

| Top (ft.) | Bottom (ft.) | Description (number of sacks & material) |
|---|---|---|
| 0 | 2 | Cement 2 Bags/Sacks |
| 2 | 13.8 | Bentonite 2 Bags/Sacks |

Certification Data: The driller certified that the driller plugged this well (or the well was plugged under the driller's direct supervision) and that each and all of the statements herein are true and correct. The driller understood that failure to complete the required items will result in the reports(s) being returned for completion and resubmittal.

Company Information: **Strata Core Services, LLC**
**112 S. Norwood Drive**
**Hurst, TX 76053**

Driller Name: **Brad Eskue** License Number: **58164**

Comments: **No Data**

# APPENDIX 5
# SAMPLING PROCEDURES

Sampling collection and handling procedures were updated to follow Uniform Federal Policy (UFP) for Sample and Analysis Plans in the document titled, Tier II Sampling and Analysis Plan, Long Term Groundwater Monitoring Plan, Former Naval Air Station Dallas, Dallas, Texas, dated December 2014

# APPENDIX 6
# LABORATORY DATA PACKAGES AND DATA USABILITY SUMMARIES

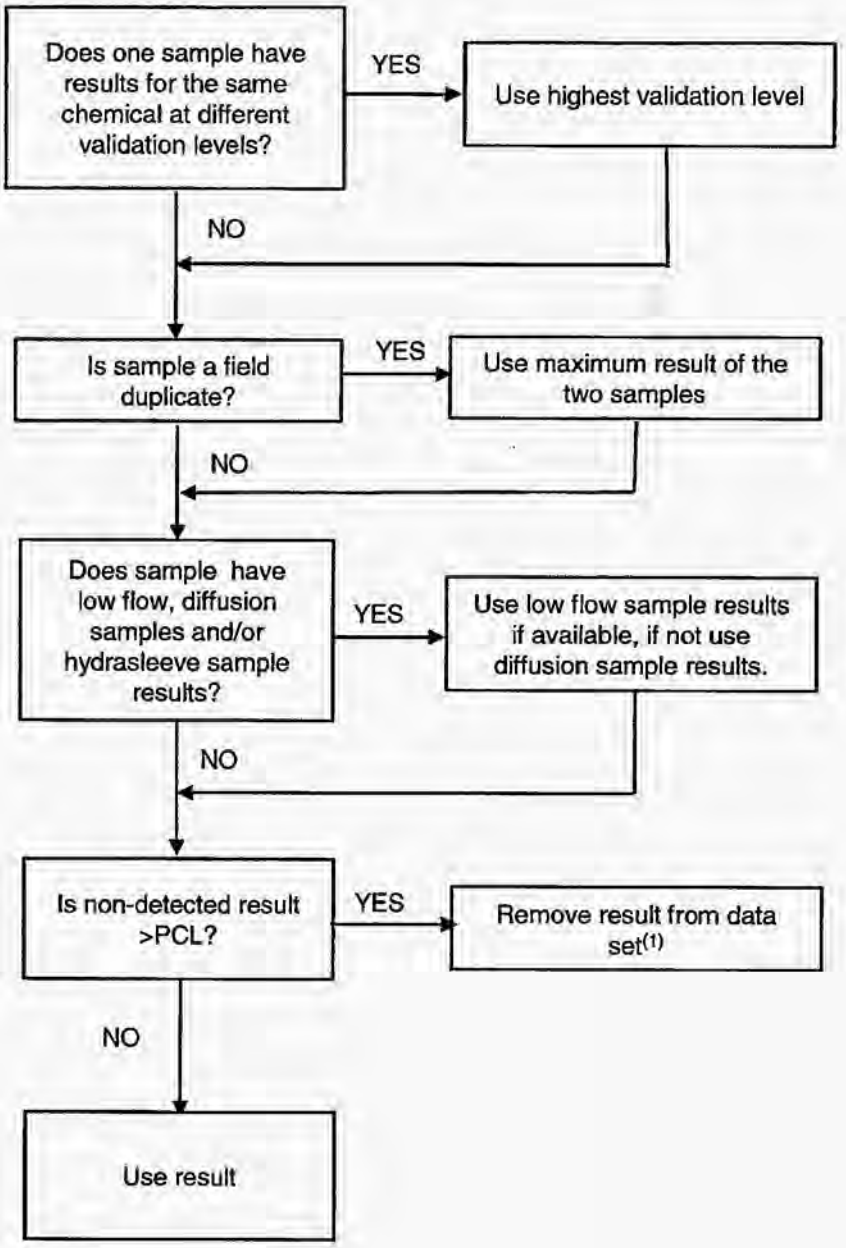
See the attached CD for the Laboratory Analytical Reports —
Submitted with the 2016 RAER for SWMU 17/Building 1423
(sorted by Sample Delivery Group Number)

# APPENDIX 7
# STATISTICAL METHODOLOGY

Statistical Methodology has been submitted with the 2016 RAER for SWMU 17/Building 1423

GROUNDWATER DATABASE DEVELOPMENT FOR GRAPHING AND MANN KENDALL STATISTICAL EVALUATION

NAS DALLAS, TEXAS




NOTES:

(1) For 1,1,2,2-PCA and vinyl chloride the TRRP RES A limit < MDL of 5 U therefore only the non-detects > 5 U were removed from the data set.

# STDEV

See Also

Estimates standard deviation based on a sample. The standard deviation is a measure of how widely values are dispersed from the average value (the mean).

**Syntax**

**STDEV(number1**,number2,...)

Number1, number2, ... are 1 to 30 number arguments corresponding to a sample of a population. You can also use a single array or a reference to an array instead of arguments separated by commas.

**Remarks**

- STDEV assumes that its arguments are a sample of the population. If your data represents the entire population, then compute the standard deviation using STDEVP.
- The standard deviation is calculated using the "nonbiased" or "n-1" method.
- STDEV uses the following formula:
- $$\sqrt{\frac{n\sum x^2 - \left(\sum x\right)^2}{n(n-1)}}$$
  $$\sqrt{\frac{n\sum x^2 - \left(\sum x\right)^2}{n(n-1)}}$$
- Logical values such as TRUE and FALSE and text are ignored. If logical values and text must not be ignored, use the STDEVA worksheet function.

**Example**

Suppose 10 tools stamped from the same machine during a production run are collected as a random sample and measured for breaking strength.

The example may be easier to understand if you copy it to a blank worksheet.

How?

| | A |
|---|---|
| 1 | **Strength** |
| 2 | 1345 |
| 3 | 1301 |
| 4 | 1368 |
| 5 | 1322 |
| 6 | 1310 |
| 7 | 1370 |
| 8 | 1318 |
| 9 | 1350 |
| 10 | 1303 |
| 11 | 1299 |

| Formula | Description (Result) |
|---|---|
| =STDEV(A2:A11) | Standard deviation of breaking strength (27.46391572) |

# BEST-FIT LINE USING LINEAR REGRESSION

# LINEST

See Also

Calculates the statistics for a line by using the "least squares" method to calculate a straight line that best fits your data, and returns an array that describes the line. Because this function returns an array of values, it must be entered as an array formula.

The equation for the line is:

y = mx + b or

y = m1x1 + m2x2 + ... + b (if there are multiple ranges of x-values)

where the dependent y-value is a function of the independent x-values. The m-values are coefficients corresponding to each x-value, and b is a constant value. Note that y, x, and m can be vectors. The array that LINEST returns is {mn,mn-1,...,m1,b}. LINEST can also return additional regression statistics.

**Syntax**

**LINEST(known_y's**,known_x's,const,stats)

Known_y's is the set of y-values you already know in the relationship y = mx + b.

- If the array known_y's is in a single column, then each column of known_x's is interpreted as a separate variable.
- If the array known_y's is in a single row, then each row of known_x's is interpreted as a separate variable.

Known_x's is an optional set of x-values that you may already know in the relationship y = mx + b.

- The array known_x's can include one or more sets of variables. If only one variable is used, known_y's and known_x's can be ranges of any shape, as long as they have equal dimensions. If more than one variable is used, known_y's must be a vector (that is, a range with a height of one row or a width of one column).
- If known_x's is omitted, it is assumed to be the array {1,2,3,...} that is the same size as known_y's.

Const is a logical value specifying whether to force the constant b to equal 0.

- If const is TRUE or omitted, b is calculated normally.
- If const is FALSE, b is set equal to 0 and the m-values are adjusted to fit y = mx.

Stats is a logical value specifying whether to return additional regression statistics.

- If stats is TRUE, LINEST returns the additional regression statistics, so the returned array is {mn,mn-1,...,m1,b;sen,sen-1,...,se1,seb;r2,sey;F,df;ssreg,ssresid}.
- If stats is FALSE or omitted, LINEST returns only the m-coefficients and the constant b.

The additional regression statistics are as follows.

| Statistic | Description |
|---|---|
| se1,se2,...,sen | The standard error values for the coefficients m1,m2,...,mn. |
| Seb | The standard error value for the constant b (seb = #N/A when const is FALSE). |
| r2 | The coefficient of determination. Compares estimated and actual y-values, and ranges in value from 0 to 1. If it is 1, there is a perfect correlation in the sample — there is no difference between the estimated y-value and the actual y-value. At the other extreme, if the coefficient of determination is 0, the regression equation is not helpful in predicting a y-value. For information about how r2 is calculated, see "Remarks" later in this topic. |
| sey | The standard error for the y estimate. |
| F | The F statistic, or the F-observed value. Use the F statistic to determine whether the observed relationship between the dependent and independent variables occurs by chance. |
| df | The degrees of freedom. Use the degrees of freedom to help you find F-critical values in a statistical table. Compare the values you find in the table to the F statistic returned by LINEST to determine a confidence level for the model. |
| ssreg | The regression sum of squares. |
| ssresid | The residual sum of squares. |

The following illustration shows the order in which the additional regression statistics are returned.

| | A | B | C | D | E | F |
|---|---|---|---|---|---|---|
| 1 | $m_n$ | $m_{n-1}$ | ... | $m_2$ | $m_1$ | b |
| 2 | $se_n$ | $se_{n-1}$ | ... | $se_2$ | $se_1$ | $se_b$ |
| 3 | $r_2$ | $se_y$ | | | | |
| 4 | F | $d_f$ | | | | |
| 5 | $ss_{reg}$ | $ss_{resid}$ | | | | |

**Remarks**

- You can describe any straight line with the slope and the y-intercept:

  Slope (m):
  To find the slope of a line, often written as m, take two points on the line, (x1,y1) and (x2,y2); the slope is equal to (y2 - y1)/(x2 - x1).

  Y-intercept (b):
  The y-intercept of a line, often written as b, is the value of y at the point where the line crosses the y-axis.

  The equation of a straight line is y = mx + b. Once you know the values of m and b, you can calculate any point on the line by plugging the y- or x-value into that equation. You can also use the TREND function.

- When you have only one independent x-variable, you can obtain the slope and y-intercept values directly by using the following formulas:

  Slope:
  =INDEX(LINEST(known_y's,known_x's),1)

  Y-intercept:
  =INDEX(LINEST(known_y's,known_x's),2)

- The accuracy of the line calculated by LINEST depends on the degree of scatter in your data. The more linear the data, the more accurate the LINEST model. LINEST uses the method of least squares for determining the best fit for the data. When you have only one independent x-variable, the calculations for m and b are based on the following formulas:

$$m = \frac{n\left(\sum xy\right) - \left(\sum x\right)\left(\sum y\right)}{n\left(\sum\left(x^2\right)\right) - \left(\sum x\right)^2}$$

$$b = \frac{\left(\sum y\right)\left(\sum\left(x^2\right)\right) - \left(\sum x\right)\left(\sum xy\right)}{n\left(\sum\left(x^2\right)\right) - \left(\sum x\right)^2}$$

- The line- and curve-fitting functions LINEST and LOGEST can calculate the best straight line or exponential curve that fits your data. However, you have to decide which of the two results best fits your data. You can calculate TREND(known_y's,known_x's) for a straight line, or GROWTH(known_y's, known_x's) for an exponential curve. These functions, without the new_x's argument, return an array of y-values predicted along that line or curve at your actual data points. You can then compare the predicted values with the actual values. You may want to chart them both for a visual comparison.

- In regression analysis, Microsoft Excel calculates for each point the squared difference between the y-value estimated for that point and its actual y-value. The sum of these squared differences is called the residual sum of squares. Microsoft Excel then calculates the sum of the squared differences between the actual y-values and the average of the y-values, which is called the total sum of squares (regression sum of squares + residual sum of squares). The smaller the residual sum of squares is, compared with the total sum of squares, the larger the value of the coefficient of determination, r2, which is an indicator of how well the equation resulting from the regression analysis explains the relationship among the variables.

- Formulas that return arrays must be entered as array formulas.

- When entering an array constant such as known_x's as an argument, use commas to separate values in the same row and semicolons to separate rows. Separator characters may be different depending on your locale setting in **Regional Settings** or **Regional Options** in **Control Panel**.

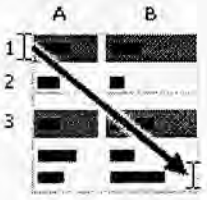
- Note that the y-values predicted by the regression equation may not be valid if they are outside the range of the y-values you used to determine the equation.

**Example 1 Slope and Y-Intercept**

The example may be easier to understand if you copy it to a blank worksheet.

How?

1. Create a blank workbook or worksheet.
2. Select the example in the Help topic. Do not select the row or column headers.




Selecting an example from Help

3. Press CTRL+C.
4. In the worksheet, select cell A1, and press CTRL+V.
5. To switch between viewing the results and viewing the formulas that return the results, press CTRL+` (grave accent), or on the **Tools** menu, point to **Formula Auditing**, and then click **Formula Auditing Mode**.

| | A | B |
|---|---|---|
| 1 | **Known y** | **Known x** |
| 2 | 1 | 0 |
| 3 | 9 | 4 |
| 4 | 5 | 2 |
| 5 | 7 | 3 |
| | **Formula** | **Formula** |
| | =LINEST(A2:A5,B2:B5,,FALSE) | |

**Note** The formula in the example must be entered as an array formula. After copying the example to a blank worksheet, select the range A7:B7 starting with the formula cell. Press F2, and then press CTRL+SHIFT+ENTER. If the formula is not entered as an array formula, the single result is 2.

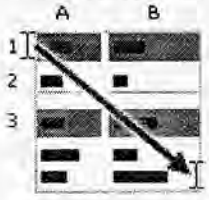
When entered as an array, the slope (2) and the y-intercept (1) are returned.

**Example 2 Simple Linear Regression**

The example may be easier to understand if you copy it to a blank worksheet.

How?

1. Create a blank workbook or worksheet.
2. Select the example in the Help topic. Do not select the row or column headers.




Selecting an example from Help

3. Press CTRL+C.
4. In the worksheet, select cell A1, and press CTRL+V.
5. To switch between viewing the results and viewing the formulas that return the results, press CTRL+` (grave accent), or on the **Tools** menu, point to **Formula Auditing**, and then click **Formula Auditing Mode**.

| | A | B |
|---|---|---|
| 1 | **Month** | **Sales** |
| 2 | 1 | 3100 |
| 3 | 2 | 4500 |
| 4 | 3 | 4400 |

| | | |
|---|---|---|
| **5** | 4 | 5400 |
| **6** | 5 | 7500 |
| **7** | 6 | 8100 |
| | **Formula** | **Description (Result)** |
| | =SUM(LINEST(B2:B7, A2:A7)*{9,1}) | Estimate sales for the ninth month (11000) |

In general, SUM({m,b}*{x,1}) equals mx + b, the estimated y-value for a given x-value. You can also use the TREND function.

**Example 3 Multiple Linear Regression**

Suppose a commercial developer is considering purchasing a group of small office buildings in an established business district.

The developer can use multiple linear regression analysis to estimate the value of an office building in a given area based on the following variables.

| Variable | Refers to the |
|---|---|
| y | Assessed value of the office building |
| x1 | Floor space in square feet |
| x2 | Number of offices |
| x3 | Number of entrances |
| x4 | Age of the office building in years |

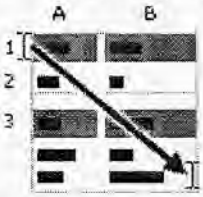
This example assumes that a straight-line relationship exists between each independent variable (x1, x2, x3, and x4) and the dependent variable (y), the value of office buildings in the area.

The developer randomly chooses a sample of 11 office buildings from a possible 1,500 office buildings and obtains the following data. "Half an entrance" means an entrance for deliveries only.

The example may be easier to understand if you copy it to a blank worksheet.

How?

1. Create a blank workbook or worksheet.
2. Select the example in the Help topic. Do not select the row or column headers.




Selecting an example from Help

3. Press CTRL+C.
4. In the worksheet, select cell A1, and press CTRL+V.
5. To switch between viewing the results and viewing the formulas that return the results, press CTRL+` (grave accent), or on the **Tools** menu, point to **Formula Auditing**, and then click **Formula Auditing Mode**.

| | A | B | C | D | E |
|---|---|---|---|---|---|
| **1** | **Floor space (x1)** | **Offices (x2)** | **Entrances (x3)** | **Age (x4)** | **Assessed value (y)** |
| **2** | 2310 | 2 | 2 | 20 | 142,000 |
| **3** | 2333 | 2 | 2 | 12 | 144,000 |
| **4** | 2356 | 3 | 1.5 | 33 | 151,000 |
| **5** | 2379 | 3 | 2 | 43 | 150,000 |

| | | | | | |
|---|---|---|---|---|---|
| **6** | 2402 | 2 | 3 | 53 | 139,000 |
| **7** | 2425 | 4 | 2 | 23 | 169,000 |
| **8** | 2448 | 2 | 1.5 | 99 | 126,000 |
| **9** | 2471 | 2 | 2 | 34 | 142,900 |
| **10** | 2494 | 3 | 3 | 23 | 163,000 |
| **11** | 2517 | 4 | 4 | 55 | 169,000 |
| **12** | 2540 | 2 | 3 | 22 | 149,000 |

**Formula**

=LINEST(E2:E12,A2:D12,TRUE,TRUE)

**Note** The formula in the example must be entered as an array formula. After copying the example to a blank worksheet, select the range A14:E18 starting with the formula cell. Press F2, and then press CTRL+SHIFT+ENTER. If the formula is not entered as an array formula, the single result is -234.2371645.

When entered as an array, the following regression statistics are returned. Use this key to identify the statistic you want.

| | A | B | C | D | E | F |
|---|---|---|---|---|---|---|
| 1 | $m_n$ | $m_{n-1}$ | ... | $m_2$ | $m_1$ | b |
| 2 | $se_n$ | $se_{n-1}$ | ... | $se_2$ | $se_1$ | $se_b$ |
| 3 | $r_2$ | $se_y$ | | | | |
| 4 | F | $d_f$ | | | | |
| 5 | $ss_{reg}$ | $ss_{resid}$ | | | | |

The multiple regression equation, y = m1*x1 + m2*x2 + m3*x3 + m4*x4 + b, can now be obtained using the values from row 14:

y = 27.64*x1 + 12,530*x2 + 2,553*x3+ 234.24*x4 + 52,318

The developer can now estimate the assessed value of an office building in the same area that has 2,500 square feet, three offices, and two entrances and is 25 years old, by using the following equation:

y = 27.64*2500 + 12530*3 + 2553*2 - 234.24*25 + 52318 = $158,261

Or you can copy the following table to cell A21 of the example workbook.

| Floor space (x1) | Offices (x2) | Entrances (x3) | Age (x4) | Assessed value (y) |
|---|---|---|---|---|
| 2500 | 3 | 2 | 25 | =D14*A22 + C14*B22 + B14*C22 + A14*D22 + E14 |

You can also use the TREND function to calculate this value.

**Example 4 Using The F And R2 Statistics**

In the previous example, the coefficient of determination, or r2, is 0.99675 (see cell A17 in the output for LINEST), which would indicate a strong relationship between the independent variables and the sale price. You can use the F statistic to determine whether these results, with such a high r2 value, occurred by chance.

Assume for the moment that in fact there is no relationship among the variables, but that you have drawn a rare sample of 11 office buildings that causes the statistical analysis to demonstrate a strong relationship. The term "Alpha" is used for the probability of erroneously concluding that there is a relationship.

There is a relationship among the variables if the F-observed statistic is greater than the F-critical value. The F-critical value can be obtained by referring to a table of F-critical values in many statistics textbooks. To read the table, assume a single-tailed test, use an Alpha value of 0.05, and for the degrees of freedom (abbreviated in most tables as v1 and v2), use v1 = k = 4 and v2 = n - (k + 1) = 11 - (4 + 1) = 6, where k is the number of variables in the regression analysis and n is the number of data points. The F-critical value is 4.53.

The F-observed value is 459.753674 (cell A18), which is substantially greater than the F-critical value of 4.53. Therefore, the regression equation is useful in predicting the assessed value of office buildings in this area.

**Example 5 Calculating The T-Statistics**

Another hypothesis test will determine whether each slope coefficient is useful in estimating the assessed value of an office building in example 3. For example, to test the age coefficient for statistical significance, divide -234.24 (age slope coefficient) by 13.268 (the estimated standard error of age coefficients in cell A15). The following is the t-observed value:

t = m4 ÷ se4 = -234.24 ÷ 13.268 = -17.7

If you consult a table in a statistics manual, you will find that t-critical, single tail, with 6 degrees of freedom and Alpha = 0.05 is 1.94. Because the absolute value of t, 17.7, is greater than 1.94, age is an important variable when estimating the assessed value of an office building. Each of

the other independent variables can be tested for statistical significance in a similar manner. The following are the t-observed values for each of the independent variables.

| Variable | t-observed value |
|---|---|
| Floor space | 5.1 |
| Number of offices | 31.3 |
| Number of entrances | 4.8 |
| Age | 17.7 |

These values all have an absolute value greater than 1.94; therefore, all the variables used in the regression equation are useful in predicting the assessed value of office buildings in this area.

## SLOPE OF BEST-FIT LINE

# SLOPE

See Also

Returns the slope of the linear regression line through data points in known_y's and known_x's. The slope is the vertical distance divided by the horizontal distance between any two points on the line, which is the rate of change along the regression line.

**Syntax**

**SLOPE(known_y's,known_x's)**

Known_y's is an array or cell range of numeric dependent data points.

Known_x's is the set of independent data points.

**Remarks**

- The arguments must be either numbers or names, arrays, or references that contain numbers.
- If an array or reference argument contains text, logical values, or empty cells, those values are ignored; however, cells with the value zero are included.
- If known_y's and known_x's are empty or have a different number of data points, SLOPE returns the #N/A error value.
- The equation for the slope of the regression line is:

$$b = \frac{n\sum xy - \left(\sum x\right)\left(\sum y\right)}{n\sum x^2 - \left(\sum x\right)^2}$$

**Example**

The example may be easier to understand if you copy it to a blank worksheet.

How?

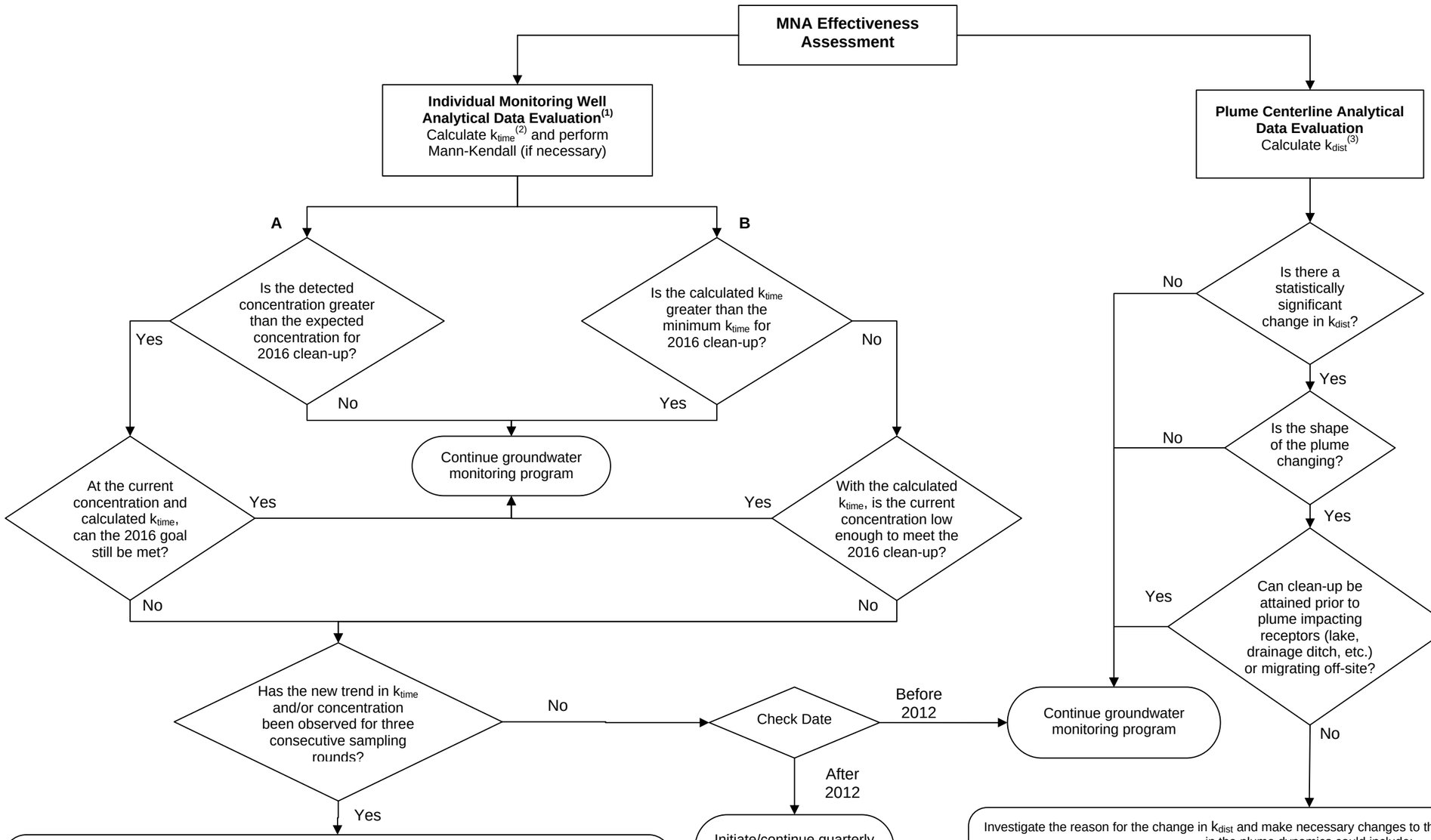
| | A | B |
|---|---|---|
| 1 | **Known y** | **Known x** |
| 2 | 2 | 6 |
| 3 | 3 | 5 |
| 4 | 9 | 11 |
| 5 | 1 | 7 |
| 6 | 8 | 5 |
| 7 | 7 | 4 |
| 8 | 5 | 4 |

| Formula | Description (Result) |
|---|---|
| =SLOPE(A2:A8,B2:B8) | Slope of the linear regression line through the data points above (0.305556) |

# MONITORED NATURAL ATTENUATION DATA EVALUATION

**DIAGRAM 3-1**
**MONITORED NATURAL ATTENUATION DATA EVALUATION**
**RESPONSE ACTION PLAN**

**NAS DALLAS, TEXAS**




Investigate the reason for the change in $k_{time}$ and make necessary changes to the remedial system. These changes in the plume dynamics could include:

| **Reason for $k_{time}$ Change** | **Recommended Changes in Remediation** |
|---|---|
| New source or new release | Identify new Responsible Party for continued remediation. |
| Geochemical change | Determine if chemical additives are necessary or technical impracticability of additional remediation. |
| Asymptotic degradation reached | Determine if active remediation or excavation are necessary or technical impracticability of additional remediation. |

Investigate the reason for the change in $k_{dist}$ and make necessary changes to the remedial system. These changes in the plume dynamics could include:

| **Reason for $K_{dist}$ Change** | **Recommended Changes in Remediation** |
|---|---|
| New source or new release | Identify new Responsible Party for continued remediation. |
| Migrating plume | Initiate abatement measures such as interceptor trench, slurry walls, pump recovery / capture system, etc. if receptors are threatened. |

Notes:
(1) Both pathways (A, B) must be evaluated for each of the chemicals of concern in each monitoring point along the plume's centerline.
(2) $k_{time}$ Concentration versus Time Attenuation Rate Constant
(3) $k_{dist}$ Concentration versus Distance Attenuation Rate Constant

# Assessment of MNA Performance Monitoring

## Introduction

The MNA monitoring well networks at the NAS Dallas groundwater plumes will provide the necessary analytical data to evaluate the dynamic behavior of the plumes over time, including contaminant and/or concentration reductions indicative of progress toward clean-up objectives, changes in plume boundaries, and changes in geochemistry. To this effect, these monitoring well networks include monitoring wells in areas hydraulically upgradient and sidegradient to the groundwater plume, in the historical source area, along the main body of the plume and immediately downgradient of the plume. The number and locations of monitoring points for each plume was selected based on the size of the plume, groundwater velocity, proximity to receptors (including cross-media transfer of COCs), and presence of preferential pathways for COC migration.

As required by the Compliance Plan for NAS Dallas (TCEQ, 2004), performance monitoring for MNA will be conducted in accordance with Response Action Plan (RAP) Worksheet 3.1 until all remedial action objectives have been met for the plume for at least two consecutive sampling events. Upon demonstration of the attainment of clean-up objectives, a three-year of post-remedial action monitoring will be implemented in accordance with the Compliance Plan for NAS Dallas (TCEQ, 2004) and as outlined on RAP Worksheet 4.1.

In addition to the COCs identified in the APAR (TtNUS, 2003) for each groundwater plume, daughter products that may be formed as a result of biotransformation or chemical processes will be monitored during the corrective action period at each plume. In order to ensure that there is a potential for continued transformation of the COCs within the groundwater plume, the geochemical environment will also be monitored (i.e., oxidation-reduction potential, dissolved oxygen, pH, etc.) every two years at a minimum. During the post-remedial action monitoring, the Compliance Plan requires that an expanded list of parameters be sampled including those COCs historically detected at the site. In order to minimize the chance of identifying constituent exceedances during the post-response action monitoring, the expanded list of parameters identified on RAP Worksheet 4.1 (Compliance Plan Table III) will be monitored every five years at a minimum.

Each new round of data will help develop a better understanding of the site and site processes and as a result, the conceptual site model for MNA will be continuously reevaluated from the standpoint of the observed plume shape, location, stability, and dynamics; attenuation rates; groundwater flow patterns; and geochemical regimes.

To evaluate progress towards achievement of clean-up objectives, data collected from the monitoring well network will be used to determine temporal and spatial trends in COC concentrations, comparisons of observed COC concentrations with benchmark concentrations, and, comparison of calculated attenuation rates with the rates required to meet remedial objectives within the required timeframe. Data will be interpreted with regard to variability so that attenuation-related changes and trends can be distinguished from other sources of variation in the data.

If a departure from a predicted trend is found, (i.e., exceeding benchmark concentration or unfavorable changes in attenuation rates), the deviation will be evaluated to determine how the changes may affect attainment of remedial goals for the individual monitoring wells, as well as, how the changes may affect the behavior of the entire plume (i.e., plume stability, reduction in COC concentrations, etc.). Departures from expected trends may not mean remedy failure, because there may be a range of attenuation rates that will achieve the desired remedial goals

in the allotted time; therefore their significance must be evaluated in the context of the site-related goals. If the potential impact on the remedy is negligible, revision of the conceptual site model may be the only outcome of such evaluation. However, if the potential for impact is significant, implementation of alternative remedies may be triggered or, at a minimum additional characterization to better define the factors limiting COC reduction and determine methods for mitigating the magnitude of their impact would be warranted. Other site-related data (i.e., geochemistry and potentiometric data) will continue to be evaluated to provide evidence of COC migration, fate, and attenuation processes. These data may be used to ascertain COC degradation and the continuation of appropriate conditions for attenuation at acceptable rates.

Following the individual monitoring well data analysis, plume behavior will be assessed to evaluate the continued effectiveness of the MNA remedy, as well as the adequacy of the monitoring program and conceptual site model for MNA. The ongoing monitoring program will provide the necessary data for continual refinement of the conceptual model and subsequently of the monitoring program itself. Upon completion of each sampling round, data analysis and determination of the effectiveness of the MNA remedy, plume-specific criteria will drive decisions affecting the continuity of the monitoring program.

At some plumes, source control and interim remedial activities have occurred between the original site characterization process and the implementation of performance monitoring. Because these activities are expected to change the site's characteristics and behavior, performance monitoring will require the continued refinement of the conceptual site model for MNA. This refinement of the conceptual site model may eventually be different from the original MNA conceptual site model based on the initial site characterization data. Development and implementation of the new conceptual site model for MNA will require the collection of additional data (i.e., quarterly monitoring for the first year after interim remedial activities and on a semi-annual basis thereafter) to establish baseline conditions, expediently depict new site characteristics and parameter variability, establish trends and estimate attenuation rates for COCs, determine if the plume characteristics have been altered, and assess the likelihood of meeting site remediation goals.

## Evaluation of New Data

Data interpretation will include the preliminary assessment of the COC concentration data collected for both the plume centerline (e.g., whole plume dynamics) as well as on individual COCs within each monitoring well. The interpretation will be conducted through graphs, tables, maps, statistics, and time-series plots. This will help in identifying patterns, relationships, and anomalies, such as possible "outliers" to the observed remedial trend of the plume. Scatter graphs (i.e., $k_{time}$ and $k_{dist}$ graphs) will show relationships between two variables that are not readily evident using purely numerical methods. Mapping the data in plan view and/or cross-section (i.e., isoconcentration maps, potentiometric maps, MNA parameter maps, etc.) will help understand patterns of COC distribution and migration, and relationships between geochemical zones and COC attenuation.

The initial data analysis and interpretation will focus on the detection of trends in the data for the COCs within individual monitoring wells and subsequently for the plume as a whole. First, the COC concentration data collected from each monitoring well will be used to determine the temporal trends that exist within the plume. The COC trends will also be evaluated at monitoring points located throughout the plume as a whole. In order to adequately interpret progress toward COC reduction goals for the plume, it is necessary to compare trends of individual monitoring wells to trends of other monitoring wells in the plume. Evaluating trends in data from all sampling locations in the plume will determine if the plume exhibits stability or reduction in COC concentrations. In addition, for each COC, spatial trends along the plume centerline [i.e., concentration vs. distance attenuation rate ($k_{dist}$)] will be evaluated. This analysis assists in evaluating the stability of the plume and its migration potential. Assessment of spatial plume behavior is necessary to ensure no unacceptable plume migration occurs.

Further evaluation will focus on the assessment of any departures from predicted trends and their impact on the potential for MNA to achieve plume-related goals. If the COC data points do not definitively indicate that the remedial goals are meeting the reasonable progress expectations, other data will be analyzed in order to properly interpret particular variances from the predicted performance (i.e., the site stratigraphy, groundwater chemistry, the groundwater flow field, the season of the year).

In addition, non-parametric statistical tests, such as the Mann-Kendall test, may be included in the data evaluation to establish the existence of a trend when the initial evaluation is inconclusive due to high data variability.

The process of MNA data evaluation is graphically depicted in Diagram 3-1.

### Individual Monitoring Well Analytical Data Evaluation

Evaluation of progress towards achievement of clean-up goals will focus primarily on temporal trends in COC concentration at individual attenuation monitoring point (AMP) wells within the plume. After each sampling event, temporal trends [i.e., concentration vs. time attenuation rate ($k_{time}$)], will be established for each AMP of the plume. Temporal trends ($k_{time}$) are particularly useful in evaluating if remedial goals can be met in the desired timeframe for the individual location. The analysis of temporal trends is useful for estimating the potential lifetime of the COC plume at the particular location.

The parameters to be evaluated in parallel to ensure reasonable progress is being made in the response action at the particular location are as follows:

- Direct comparison of detected concentrations to expected or benchmark concentration to meet remedial goals by the year 2016 for the monitoring wells along the centerline of the plume.

- Direct comparison of observed attenuation rate ($k_{time}$) from the chemical specific historical data available for the monitoring well versus the minimum attenuation rate ($k_{time}$) necessary to meet the 2016 clean-up date.

The following graph depicts the possible evaluation scenarios for the above parameters:

| | |
|---|---|
| **Measured COC Concentration < Expected COC Concentration**<br>**and**<br>**Observed $k_{time}$ > Minimum $k_{time}$**<br>Remedial goal is being met, continue performance monitoring | **Measured COC Concentration < Expected COC Concentration**<br>**and**<br>**Observed $k_{time}$ < Minimum $k_{time}$**<br>Evaluate further to ensure remedial goal is being met |
| **Measured COC Concentration > Expected COC Concentration**<br>**and**<br>**Observed $k_{time}$ > Minimum $k_{time}$**<br>Evaluate further to ensure remedial goal is being met | **Measured COC Concentration > Expected COC Concentration**<br>**and**<br>**Observed $k_{time}$ < Minimum $k_{time}$**<br>Remedial goal not being met, consider new response action |

1. Satisfactory progress is being made with the response action (top left quadrant) for an individual well location, if the detected concentration of the COC(s) is not greater than the 2016 clean-up curve expected concentration; and, the observed attenuation rate based on historical data available from the monitoring well is equal to or greater than the minimum attenuation rate necessary to meet clean-up by the year 2016 for the monitoring wells along the centerline of the plume.
2. Reasonable progress is not being made towards achieving the remedial goal (bottom right quadrant) if the detected concentration of the COC(s) exceeds the 2016 clean-up curve expected concentration; and the observed attenuation rate based on historical data available from the monitoring well is less than the minimum attenuation rate necessary to meet clean-up by the year 2016 for the monitoring wells along the centerline of the plume. A new response action may need to be implemented if this trend continues for at least three sampling rounds.
3. Further evaluation will be needed for the scenarios in the top right and bottom left quadrants before establishing if reasonable progress is being made towards achievement of the clean-up goals:
   - Reasonable progress is being made when the observed attenuation rate based on historical data is steep enough that clean-up can still be achieved by the year 2016, even though the detected concentration of a COC may be greater than the expected concentration during a particular sampling event (bottom left quadrant).
   - Reasonable progress is being made if the detected concentration of a COC in the sampling event is sufficiently below the expected concentration so that with an observed attenuation rate based on historical data greater than the calculated minimum attenuation rate necessary to meet PCLs by 2016, the remedial objectives can still be achieved by the year 2016 (top right quadrant).
   - Reasonable progress may not be made if either of the preceding two situations continues for at least three consecutive sampling rounds. At that point in the response action evaluation, a new response action may need to be implemented. In this case other statistical methods may be used to evaluate the data such as using non-parametric tests (i.e., Mann-Kendall) to determine if there has been a statistically significant change in degradation trends.

Plume Analytical Data Evaluation

Since a plume-wide trend implying progress toward restoration cannot be satisfactorily elucidated from monitoring only individual sampling locations, it will be necessary to compare trends among the AMP wells in the plume. Reduction in COC concentrations from all or most sampling locations within predicted ranges and/or at anticipated rates can be interpreted as a decrease in COC mass for the plume and will be indicative of effective remediation of the plume through MNA. Mixed trends in different portions of the plume may imply temporal changes in plume migration or may be simply attributed to the natural attenuation processes, and do not signify failure of MNA to achieve its goals in a timely manner. These variations will be evaluated in the context of the conceptual site model and sampling history before they are attributed to natural attenuation processes of other possible causes. To this effect, in cases of mixed trends it will be necessary to perform other comparisons in order to reach a conclusion of satisfactory progress. It will be particularly useful to evaluate trends in COC and daughter product concentrations (e.g., a decreasing trend in trichloroethene compared to an increasing trend in cis-1,2-dichloroethene in the same plume may indicate degradation of trichloroethene to cis-1,2-dichloroethene). Other trends of interest include changes in geochemistry that may indicate decrease in attenuation rates, such as changes in availability of electron donors and electron acceptors, changes in oxidation-reduction potential, or other primary geochemical indicators.

The complement to the evaluation of the behavior of the plume as a whole is the assessment of spatial trends. For each COC, spatial trends along the plume centerline [i.e., concentration vs. distance attenuation rate ($k_{dist}$)] will be evaluated. This analysis assists in evaluating the stability of the plume and its migration potential. $k_{dist}$ will be calculated for the monitoring wells along the plume centerline after each annual sampling round and will be depicted in centerline trend graphs ($k_{dist}$ graphs). Assessment of spatial plume behavior will be performed through visual interpretation of changes in plume shape over time as shown in the isoconcentration maps as well as centerline trend graphs.

**Assessment Conclusions and Recommendations**

As a result of the response action effectiveness evaluation, the MNA conceptual site model will be continuously refined/modified by incorporating any new data and data trends in COC and geochemistry values and changes in site hydrology. As new data is gathered there will be an ever-expanding database for the site that can be used for comparison with the changes in parameters noted between monitoring events as well as for comparison to predicted, acceptable trends. This continual evaluation of performance monitoring data will translate in better understanding of plume behavior and anticipated data variability and therefore assist in the proper interpretation of monitoring data.

Upon completion of each sampling round, data analysis and determination of the effectiveness of the MNA remedy, plume-specific criteria will drive decisions affecting the continuity of the monitoring program such as: the appropriateness of continuing the monitoring program without change, the need for modifications to the monitoring program (i.e., increased monitoring frequency, additional monitoring wells), need for additional characterization, implementation of a contingency or alternative remedy, or verification of attainment of remedial goals and termination of performance monitoring.

Site-related decisions regarding continuing, modifying, or terminating MNA performance monitoring will be made based on the analyses of spatial and temporal trends in COC concentration, as well as comparisons with predicted benchmarks and/or the specified concentration standard (i.e., COC PCLs). The following summarizes each potential decision

and why it may be chosen based on the perceived progress towards achievement of MNA remediation goals at the plume:

1. Continue Monitoring Program Without Change

   COC concentrations, including toxic transformation products and any mobilized by-products or secondary COCs must remain within the bounds of acceptable trends in order to continue the monitoring program without any change until all remedial action objectives have been met. Groundwater flow parameters must not have changed outside previously identified acceptable ranges. The geochemistry must not have changed in such a way as to indicate that the COC degradation or other natural attenuation processes would be significantly affected.

2. Modify the Monitoring Program

   Modification of the monitoring program may be needed to better reflect changing conditions or increased understanding of natural attenuation processes at the site. Changing conditions or the need to test key assumptions may require new sampling points or increases in monitoring parameters or frequency. Possible scenarios include:

   - Changes in groundwater flowrates or directions that indicate COCs may move farther downgradient, laterally or vertically into previously unimpacted areas, may warrant the need for additional monitoring wells.
   - Unfavorable changes in COC concentrations within the plume, or in the observed attenuation rate based on historic data, may warrant increased monitoring frequency. Sampling frequency may be increased if a sudden change in the trend of COC concentration reduction is noted in order to provide information to facilitate understanding of the change and provide earlier warning of further change. If the protectiveness of the remedy is in question (i.e., unfavorable observed attenuation rate change after 2012), a determination may be made to collect data on a more frequent schedule to properly interpret trends in time to implement contingency remedies, if necessary, to meet PCLs by 2016.
   - Detections of COCs outside the known plume, indicating potential plume expansion or plume migration, may warrant the need for additional monitoring wells.

3. Implement a Contingency or Alternative Remedy

   Alternative remedies can be considered for use in case MNA fails to perform at the desired effectiveness. Situations that may trigger the implementation of a contingency or other remedy modifications will depend on site conditions and include the following:

   - COC concentrations are not decreasing at the rate previously determined to be necessary to meet the remediation objectives by 2016. This assessment will involve the direct comparison of current analytical data with the expected plume clean-up benchmarks as well as evaluation of temporal trends (i.e., observed attenuation rates) in COC concentrations versus the minimum attenuation rates required to meet clean-up by the year 2016. If the protectiveness of the remedy is in question (i.e., more than three rounds of sampling fail to meet the criteria), implementation of a contingency or alternative remedy would generally be warranted.
   - COC concentrations at AMP wells exhibit an increasing trend not originally predicted during remedy selection. This situation would involve the identification and assessment of trends in COC concentration data, including transformation products, changes in geochemistry that may indicate decrease in attenuation rates explaining the lack of

progress toward clean-up objectives, and/or additional COC releases. For some locations in the plume, a detection of a significant change may not trigger immediate implementation of a contingency or alternative remedy. For instance, a low-level or otherwise limited COC concentration increase does not necessarily mean that remediation timeframes will be expanded, or that by the time the pulse moves downgradient to the boundary of the plume there will be a significant plume expansion. Or, in some cases, the detailed characterization and modeling of COC fate and migration may indicate that concentrations for certain COCs (i.e., daughter products) in some portions of the plume are expected to increase temporarily, yet MNA would still meet remedial objectives. If so, the temporary increase would not trigger the contingency or alternative remedy as long as the increase conformed to the predictions and MNA remained protective, allowing observation for several years to test model predictions, if time is available (i.e., before 2012). In situations where evaluation shows the observed COC concentration increases are expected to unacceptably increase the time for plume restoration beyond 2016, or cause unacceptable plume expansion, triggering the contingency or alternative remedy would generally be warranted.

- COCs are identified in monitoring wells located outside the original plume boundary indicating unacceptable plume expansion or migration. Detections of COCs outside of the predetermined plume boundaries may indicate unacceptable plume expansion. Implementation of an alternative or contingency remedy will depend on the locations of the new detections, and distance and possible COC migration rates between these monitoring points and receptors (i.e., surface water bodies, off-site property). Because the COC travel time from the location of the detections may be many years at some sites, there may be time for further monitoring and assessment before a contingency or alternative remedy would need to be implemented. In contrast, if the protectiveness of the remedy is in question (i.e., a significant trend of increasing COC concentration in downgradient wells was noted), there may be much less time available to assess the trend if there was only a short travel time to downgradient receptors. In this case, a contingency or alternative remedy may be triggered immediately.

4. Termination of Performance Monitoring

Once PCLs have been achieved at each of the AMP locations within a plume, showing that the MNA remedy goals have been met for two consecutive semi-annual sampling events for an individual PCLE zone, performance monitoring will be terminated and a period of verification monitoring will be initiated. Verification monitoring will include three years of semi-annual groundwater sampling in order to satisfy the requirements of the Compliance Plan for NAS Dallas (TCEQ, 2004). Sampling parameters for the verification of achieving the PCLs and locations will be in accordance with RAP Worksheet 4.0. This sampling will include all COCs that have been historically detected in the area of the former SWMU, not just the ones that were identified for remediation in the Response Action Plan. If no additional COC exceedances are identified during this three year period of post response action care monitoring, the monitoring system can be terminated, the monitoring wells will be abandoned, and the site will be removed from the permit.

### Effects of Data Variability on Data Interpretation

Data interpretation is affected by data variability. This variability is sometimes associated with natural causes or may be simply attributed to the natural attenuation processes. Due to the dynamic nature of natural attenuation processes, data typically exhibit fluctuations of various magnitudes. For example, there is an expected degree of natural variability within a plume that may include small-scale expansion and shrinkage in response to changes in groundwater flowrates and biological degradation rates throughout the year. COC concentrations in individual monitoring wells may fluctuate with changes in plume configuration caused by oscillations in groundwater flow. Also, changes in groundwater elevations can cause changes in COC concentrations measured in monitoring wells.

It is essential that each data point be interpreted in the context of its derivation in time and space. For instance, monitoring wells produce data that should be interpreted with respect to COC sources, site stratigraphy, the groundwater flow field, the plume, possible receptors, season of the year, and other relevant factors. Variations in sampling methodology should also be considered, due to possible differences in COC concentrations derived from different sampling techniques or devices. The analytical methodology may be evaluated in terms of accuracy, precision, and detection limits. This list of data considerations is not exhaustive, but merely emphasizes that a number (i.e., a data point) should be placed in context to be interpreted. The better the understanding on the derivation and context of the data, the more likely it is that the appropriate decision can be made based on the data.

Examination of historical and spatial patterns may provide information useful in assessing the source and significance of variability in the measured parameters. For instance, if there are multiple monitoring wells in the same plume that show a consistent trend for a number of monitoring variables across several monitoring events, then one may suspect a natural variation, such as recharge differences or geochemical changes in the system, and investigate a correlation of recharge, indicator parameters, or other external hydrologic factors with concentration as indicative of the likely cause of the change. If, on the other hand, a specific monitoring well shows an unusually large change in concentration between monitoring events, relative to nearby monitoring wells, then one may suspect a measurement factor or additional release source is involved and look at sampling techniques or other such factors that may influence the concentration change. Because plume variability should be taken into account when interpreting monitoring data, it is important to have a good estimate of natural variability derived from the site investigation and ongoing MNA performance monitoring.

# APPENDIX 8
# WASTE DISPOSAL MANIFESTS

Project #: 0-0

Order #: 140398

EFFECTIVE ENVIRONMENTAL

Please print or type. (Form designed for use on elite (12-pitch) typewriter.)

**NON-HAZARDOUS WASTE MANIFEST**

1. Generator ID Number: TX8170022786 / 65033
2. Page 1 of 1
3. Emergency Response Phone: 877-577-2669
4. Waste Tracking Number: NHM140398

5. Generator's Name and Mailing Address
Naval Air Station Dallas (NAS)
c/o EnSafe Inc., 4545 Fuller Dr., Suite 342
Irving, TX 75038
Generator's Phone: 972.792.3222 ATTN: Tom Wiberg

Generator's Site Address (if different than mailing address)
8100 West Jefferson
Dallas, TX 75211
RB TVW

6. Transporter 1 Company Name
Stericycle Specialty Waste Solutions Inc
Phd: 972 329 1200
State ID#: 98032 / H-4695
U.S. EPA ID Number: MNS000110924

7. Transporter 2 Company Name
U.S. EPA ID Number

8. Designated Facility Name and Site Address
Itasca Landfill TX, LP
2559 FM 66
Itasca, Texas 76055
State ID#: H0241C
U.S. EPA ID Number: n/a
Facility's Phone: 254 897 2511

| 9a. HM | 9b. U.S. DOT Description (including Proper Shipping Name, Hazard Class, ID Number, and Packing Group (if any)) | 10. Containers No. | Type | 11. Total Quantity | 12. Unit Wt./Vol. | |
|---|---|---|---|---|---|---|
| ☐ | 1 Non-regulated material (soil cuttings Class 2 solids) | 01 ~~02~~ | DM | 55 ~~110~~ | G | CESQ3012 Non-RCRA |
| ☐ | 2. Non-regulated material (purged ground and decon water) | 02 | DM | 110 ~~55~~ | G | CESQ1012 Non-RCRA |
| | 3. | | | | | |
| | 4. | | | | | |

13. Special Handling Instructions and Additional Information
01:IDW Soil cuttings NR (PF:5110167655) 55G
02:IDW purge and decon waters NR (PF:5110167656) 55G
RB TVW
11-1) 0.72 ton 11-2) 0.47 tons

14. **GENERATOR'S CERTIFICATION:** I certify the materials described above on this manifest are not subject to federal regulations for reporting proper disposal of Hazardous Waste.

Generator's/Offeror's Printed/Typed Name: X DAVID BARNEY
Signature: X
Month 5 Day 31 Year 16

15. International Shipments ☐ Import to U.S. ☐ Export from U.S. Port of entry/exit:
Transporter signature (for exports only): Date leaving U.S.:

16. Transporter Acknowledgment of Receipt of Materials

Transporter 1 Printed/Typed Name: Rafael Blaze
Signature:
Month 5 Day 31 Year 16

Transporter 2 Printed/Typed Name: Steven Vansickle
Signature:
Month 6 Day 9 Year 16

17. Discrepancy

17a. Discrepancy Indication Space ☐ Quantity ☐ Type ☐ Residue ☐ Partial Rejection ☐ Full Rejection

Manifest Reference Number:

17b. Alternate Facility (or Generator)
U.S. EPA ID Number
Facility's Phone

17c. Signature of Alternate Facility (or Generator)
Month Day Year

01: H132 02: H132

18. Designated Facility Owner or Operator: Certification of receipt of materials covered by the manifest except as noted in Item 17a

Printed/Typed Name: Jessica Anderson
Signature:
Month 6 Day 9 Year 16

GENERATOR

INT'L

TRANSPORTER

DESIGNATED FACILITY

6-NHM-C-C-11

2-DESIGNATED FACILITY TO GENERATOR

Project #: 0-0 Order #: 140398

EFFECTIVE ENVIRONMENTAL

Please print or type. (Form designed for use on elite (12-pitch) typewriter.)

**NON-HAZARDOUS WASTE MANIFEST**

1. Generator ID Number: TX8170022786 / 65033
2. Page 1 of 1
3. Emergency Response Phone: 877-577-2669
4. Waste Tracking Number: NHM140398

5. Generator's Name and Mailing Address
Naval Air Station Dallas (NAS)
c/o EnSafe Inc., 4545 Fuller Dr., Suite 342
Irving, TX 75038
Generator's Phone: 972-292-3222 ATTN: Tom Wiberg

Generator's Site Address (if different than mailing address)
8100 West Jefferson
Dallas, TX 75211

RJ TWW

6. Transporter 1 Company Name
Stericycle Specialty Waste Solutions Inc
Ph#: 972 329 1200
State ID#: S5627 / H-4565
U.S. EPA ID Number: MNS000110924

7. Transporter 2 Company Name
U.S. EPA ID Number:

8. Designated Facility Name and Site Address
Itasca Landfill TX, LP
2559 FM 56
Itasca, Texas 76055
State ID#: H0241C
U.S. EPA ID Number: n/a
Facility's Phone: 254 687 2511

| 9a. HM | 9b. U.S. DOT Description (including Proper Shipping Name, Hazard Class, ID Number, and Packing Group (if any)) | 10. Containers No. | Type | 11. Total Quantity | 12. Unit Wt./Vol. | |
|---|---|---|---|---|---|---|
| ☐ | 1. Non-regulated material (soil cuttings Class 2 solids) | 01 ~~02~~ | DM | 55 ~~110~~ | G | CESQ3012 Non-RCRA |
| ☐ | 2. Non-regulated material (purged ground and decon water) | 02 | DM | 110 ~~55~~ | G | CESQ1012 Non-RCRA |
| | 3. | | | | | |
| | 4. | | | | | |

13. Special Handling Instructions and Additional Information
01:IDW Soil cuttings NR (PF:5110167655) 55G
02:IDW purge and decon waters NR (PF:5110167656) 55G

RJ TWW

11-1) 0.72 ton 11-2) 0.47 ton

14. **GENERATOR'S CERTIFICATION:** I certify the materials described above on this manifest are not subject to federal regulations for reporting proper disposal of Hazardous Waste.

Generator's/Offeror's Printed/Typed Name: X DAVID BURNEY
Signature: X
Month 5 Day 31 Year 16

15. International Shipments ☐ Import to U.S. ☐ Export from U.S. Port of entry/exit:
Transporter signature (for exports only): Date leaving U.S.:

16. Transporter Acknowledgment of Receipt of Materials

Transporter 1 Printed/Typed Name: Rafael Blayze
Signature:
Month 5 Day 31 Year 16

Transporter 2 Printed/Typed Name: Steven Vansickle
Signature:
Month 6 Day 9 Year 16

17. Discrepancy

17a. Discrepancy Indication Space ☐ Quantity ☐ Type ☐ Residue ☐ Partial Rejection ☐ Full Rejection

Manifest Reference Number:

17b. Alternate Facility (or Generator) U.S. EPA ID Number
Facility's Phone:

17c. Signature of Alternate Facility (or Generator) Month Day Year

01: H132 02: H132

18. Designated Facility Owner or Operator: Certification of receipt of materials covered by the manifest except as noted in Item 17a

Printed/Typed Name: Jessica Anderson
Signature:
Month 6 Day 4 Year 16

GENERATOR

INT'L

TRANSPORTER

DESIGNATED FACILITY

6-NHM-C-C-11

3-DESIGNATED FACILITY TO GENERATOR

Project #: 0-0 Order #: 145925

E² EFFECTIVE ENVIRONMENTAL

Please print or type. (Form designed for use on elite (12-pitch) typewriter.)

**NON-HAZARDOUS WASTE MANIFEST**

1. Generator ID Number: TX8170022786 / 65033
2. Page 1 of 1
3. Emergency Response Phone: 877-577-2669
4. Waste Tracking Number: NHM-145925

5. Generator's Name and Mailing Address
Naval Air Station Dallas (NAS)
c/o EnSafe Inc., 4545 Fuller Dr., Suite 342
Irving, TX 75038
Generator's Phone: 972-792-3222 ATTN: Tom Wherg

Generator's Site Address (if different than mailing address)
8100 West Jefferson
Dallas, TX 75211

6. Transporter 1 Company Name
Stericycle Specialty Waste Solutions Inc
Ph#: 972 329 1200
State ID#: 88922 / H-1496
U.S. EPA ID Number: MNS000110924

7. Transporter 2 Company Name
U.S. EPA ID Number

8. Designated Facility Name and Site Address
Itasca Landfill TX. LP
2559 FM 66
Itasca, Texas 76055
State ID#: H0241C
U.S. EPA ID Number: n/a
Facility's Phone: 254 687 2511

| 9a. HM | 9b. U.S. DOT Description (including Proper Shipping Name, Hazard Class, ID Number, and Packing Group (if any)) | 10. Containers No. | 10. Containers Type | 11. Total Quantity | 12. Unit Wt./Vol. | |
|---|---|---|---|---|---|---|
| ☐ | 1. Non-regulated material (purged ground and decon water) | 04 | DM | 220 | G | CESQ1012 Non-RCRA |
| ☐ | 2. Non-regulated material (soil cuttings Class 2 solids) | 02 | DM | 110 | G | CESQ3012 Non-RCRA |
| | 3. | | | | | |
| | 4. | | | | | |

13. Special Handling Instructions and Additional Information
01:IDW purge and decon waters NR (PF:5110167856) 55G
02:IDW Soil cuttings NR (PF:5110167855) 55G

11.1) 0.94 tn
11.2) ~~0.29 tn~~ 0.35 tn

14. **GENERATOR'S CERTIFICATION:** I certify the materials described above on this manifest are not subject to federal regulations for reporting proper disposal of Hazardous Waste.

Generator's/Offeror's Printed/Typed Name: X DAVID BARNEY
Signature: X
Month 11 Day 8 Year 16

15. International Shipments ☐ Import to U.S. ☐ Export from U.S. Port of entry/exit:
Transporter signature (for exports only): Date leaving U.S.:

16. Transporter Acknowledgment of Receipt of Materials

Transporter 1 Printed/Typed Name: Jason L Boss
Signature:
Month 11 Day 8 Year 16

Transporter 2 Printed/Typed Name: Rafael Blanco
Signature:
Month 11 Day 14 Year 16

17. Discrepancy

17a. Discrepancy Indication Space ☐ Quantity ☐ Type ☐ Residue ☐ Partial Rejection ☐ Full Rejection

Manifest Reference Number:

17b. Alternate Facility (or Generator) U.S. EPA ID Number
Facility's Phone:

17c. Signature of Alternate Facility (or Generator) Month Day Year

01: H132 02: H132

18. Designated Facility Owner or Operator: Certification of receipt of materials covered by the manifest except as noted in Item 17a

Printed/Typed Name: Cindy Reed
Signature: Cindy Reed
Month 11 Day 14 Year 16

GENERATOR

INT'L

TRANSPORTER

DESIGNATED FACILITY

6-NHM-C-C-11

2-DESIGNATED FACILITY TO GENERATOR

# SWMU 18 PLUME

**2016 Response Action Effectiveness Report**
**SWMU 18 Plume**
**Former NAS Dallas, Texas**

**Professional Signatures and Seals**

**Professional Geoscientist**

| | | |
|---|---|---|
| ***Thomas Wiberg*** | ***1619*** | ***30 November 2017*** |
| Professional Geologist | Geologist License number | Expiration date |
| | ***17 Jan 2017*** | |
| Signature | Date | |
| ***972-791-3222*** | ***972-791-0405*** | ***twiberg@ensafe.com*** |
| Telephone number | FAX number | E-mail |

**Professional Engineer**

| | | |
|---|---|---|
| Professional Engineer | P.E. License number | Expiration date |
| Signature | Date | |
| Telephone number | FAX number | E-mail |

**Registered Corrective Action Specialists (RCASs) and Corrective Action Project Managers (CAPMs)**
**For LPST sites only.**

| | | |
|---|---|---|
| Registered Corrective Action Specialist | RCAS Registration number | Expiration date |
| Signature | Date | |
| Corrective Action Project Manager | CAPM Registration number | Expiration date |
| Signature | Date | |
| Telephone number | FAX number | E-mail |

**Seals, as applicable:**

# TEXAS COMMISSION ON ENVIRONMENTAL QUALITY
## Response Action Effectiveness Report

## Cover Page

**Regulatory ID number** (Solid waste registration number, VCP ID number, etc.) *Solid Waste Code #65033*

check one: ___ Initial RAER submittal for this onsite property X Subsequent RAER submittal

Report date: *January 2017* TCEQ Region No.: *4*

**TCEQ Program** (check one)

X Corrective Action (Mail Code 127)

___ Voluntary Cleanup Program (Mail Code 221)

___ Petroleum Storage Tank Program (Mail Code 137)

___ Superfund PRP Lead (Mail Code 143)

___ Municipal Solid Waste Permits (Mail Code 124)

**Onsite Property Information**

Onsite Property Name: *Former Naval Air Station Dallas (NAS Dallas) — SWMU 18 Plume*

Street no. *8100* Pre dir: *West* Street name: *Jefferson* Street type *Blvd* Post dir: ___

City: *Dallas* County: *Dallas* County Code: *57* Zip: *75211*

Nearest street intersection or location description: ___

Latitude: Degrees, Minutes, Seconds OR Decimal Degrees (circle one) North *32°44'43.5"*

Longitude: Degrees, Minutes, Seconds OR Decimal Degrees (circle one) West *96°57'38.0"*

**Offsite Affected Property Information**

Offsite Affected Property Name: *Not Applicable (N/A)*

Street no. ___ Pre dir: ___ Street name: ___ Street type: ___ Post dir: ___

City: ___ County: ___ County Code: ___ Zip: ___

[X] Check if no offsite properties affected

**Contact Person Information and Acknowledgement**

Person (or company) Name: *Navy BRAC PMO East*

Contact Person: *Mr. David Barney* Title: *BRAC Environmental Coordinator*

Mailing Address: *4911 S. Broad Street, Building 679*

City: *Philadelphia* State: *PA* Zip: *19112* E-mail address *david.a.barney@navy.mil*

Phone: *617-753-4656* Fax: ___

By my signature below, I acknowledge the requirement of §350.2(a) that no person shall submit information to the executive director or to parties who are required to be provided information under this chapter which they know or reasonably should have known to be false or intentionally misleading, or fail to submit available information which is critical to the understanding of the matter at hand or to the basis of critical decisions which reasonably would have been influenced by that information. Violation of this rule may subject a person to the imposition of civil, criminal, or administrative penalties.

Signature of Person BARNEY.DAVID.A.1228582553 Digitally signed by BARNEY.DAVID.A.1228582553 DN: c=US, o=U.S. Government, ou=DoD, ou=PKI, ou=USN, cn=BARNEY.DAVID.A.1228582553 Date: 2017.01.18 09:40:56 -05'00' Name, print: *David Barney* Date: ___

Check the reports/forms previously submitted:

**Remedy Standard A**

____ Self-Implementation Notice Submittal date: _____

*X* Response Action Plan — Approval date: ***December 2006***

**Remedy Standard B**

____ Response Action Plan — Approval date: _____

List all media (surface soil, subsurface soil, groundwater, sediment, surface water, air) that contained or contains a PCLE zone and specify the response action that has been or will be taken for each media. Indicate the type of removal, decontamination, physical control, or institutional control action used in the response action.

| Media | COCs | Removal | Decontamination | Physical Control | Institutional Control | Modified Response Objective | | |
|---|---|---|---|---|---|---|---|---|
| | | | | | | PMZ | WCU | TI |
| Soil | Benzo(a)anthracene<br>Benzo(b)fluoranthene<br>Benzo(a)pyrene<br>Carbazole<br>Dibenzo(a,h)anthracene<br>Indeno(1,2,3-cd)pyrene<br>Arsenic<br>Lead | Excavation and offsite disposal soil (completed in 2003) | N/A | N/A | N/A | N/A | N/A | N/A |
| Groundwater | Trichloroethene (TCE)<br>cis-1,2-Dichloroethene (cis-DCE)<br>Vinyl Chloride(VC) | Excavation and offsite disposal of groundwater (completed in 2005) | MNA (after excavation) | N/A | N/A | N/A | N/A | N/A |

Current land use of the onsite affected property: ___ Residential *X* Commercial/industrial

Projected future land use of the onsite property (if known): *X* Residential ____ Commercial/industrial

Briefly describe the affected property and PCLE zones, the conclusions from the assessment activities, identify any affected or threatened receptors, and describe any other major site conditions. If any portion of the response action is necessitated due to an aesthetic or nuisance condition, identify the nature of that condition and identify that portion of the response action conducted to address it. If any media that contains a PCLE zone is not being addressed in this response action, provide justification.

**Affected Property: SWMU 18 Plume**

**In 1989, a Resource Conservation and Recovery Act (RCRA) Facility Assessment (RFA) was performed at Naval Air Station (NAS) Dallas in accordance with the 1984 RCRA Hazardous and Solid Waste Amendments. The RFA was conducted to evaluate potential releases at Solid Waste Management Units (SWMUs) and Areas of Concern (AOCs) and to make preliminary determinations regarding the need for further action. The RFA Report included data collected as part of a Preliminary Review, a Visual Site Inspection, and a Sampling Visit, as necessary, for 135 SWMUs and six AOCs at NAS Dallas (A.T. Kearney, 1989).**

**In 1993, NAS Dallas was identified for closure under the Base Realignment and Closure Act (BRAC). As part of the base closure activities, an Environmental Baseline Survey (EBS) was conducted at NAS Dallas to identify any potential environmental concerns related to historical operations at the base [EnSafe/Allen & Hoshall (E/A&H), 1994]. During this EBS, additional site concerns were identified at numerous buildings across the installation. To strategically investigate the permitted and non-permitted SWMUs, AOCs, and additional site concerns identified in the EBS, the facility was divided into six sections, called "categories", based on property use and ownership. In 1995, the Navy initiated RCRA Facility Investigation (RFI) activities at NAS Dallas at Categories A through F. Submittal of the Final RFI Reports (issued as a series of six reports — one report per category) occurred during the period from November 2000 to March 2001 [Tetra Tech NUS, Inc. (Tetra Tech), 2000a — 2001b]. The RFI was**

completed under the requirements of the Texas Risk Reduction Standards (RRS) [30 Texas Administrative Code (TAC) 335, Subchapter S], the regulatory framework in effect at the time, and closure recommendations in the RFI Reports were based upon Risk Reduction Standard 2 — Industrial (RRS2-IND) criteria. The RFI Reports identified those areas that required further action based on the chemical constituents detected in the soil and/or groundwater at the base.

The RFI Reports received conditional approval by the Texas Natural Resource Conservation Commission now the Texas Commission on Environmental Quality (TCEQ). Final approval of the RFI Reports by TCEQ was dependent upon landowner concurrence of the RRS2-IND clean-up standard.

In September of 1999, the Texas Risk Reduction Program (TRRP) (30 TAC 350) was promulgated. One of the major changes resulting from TRRP was eliminating site background as a closure criterion. The most stringent closure standard under TRRP is the Residential Remedy Standard A (RES A), which consists of closure for residential use with no engineering or institutional controls.

In March 2001, the Navy submitted a Notice of Intention to Switch to TRRP (30 TAC 350) for five of the six categories. The one category (Category C) that was not switched to TRRP, but remained under the RRS2-IND standards, was subsequently transferred to the Department of the Army.

In October 2002, an Affected Property Assessment Report (APAR) was produced based on evaluation of RFI data as well as data from follow-up investigations (Tetra Tech, 2002). The data included in the APAR were compared to TRRP RES A criteria to select those sites that may be closed with no land use encumbrances and to determine which sites required corrective action. The results of this comparison indicated that 23 SWMUs (1, 2, 6, 17, 18, 21, 31, 35, 36, 60, 79, 81, 83, 84, 85, 86, 92, 102, 108, 124, 136, 138, and 139) required further action.

**SWMU 18 Plume**

Building 1424, the Automotive Shop (136th Airlift Wing), functioned as an auto maintenance and repair facility since its construction in 1978. An associated gasoline pump island, former Building 1414, was located west of Building 1424 until its removal in 1993. Since 1943, the area surrounding Building 1424 was reportedly the location of several automotive service facilities. Records indicate that former support buildings associated with Hensley Field were constructed in this area prior to 1964 and demolished before 1980. These former buildings included Buildings 1305/RR (ammunition storage building), 1308 [Aerospace Ground Equipment (AGE) Texas Air National Guard (TANG)] automotive office), 1309 (TANG automotive shop), 1310 (grease rack), 1312 (auto paint booth), 1321 (unknown), 1330 (storage building), 1413 (unknown), 1414 (gasoline pump island and underground storage tanks (USTs), and E (kennels).

Several SWMUs, USTs, and other environmental concerns associated with Building 1424 were reported in the EBS. One of these, SWMU 18, a 480-gallon waste oil steel UST (No. 1424-C) installed in 1983, was located on the north side of Building 1424. To address the shallow soil exceedances of volatile organic compounds (VOCs) and inorganic compounds around SWMU 18, an Interim Corrective Action (ICA) was conducted by the Navy's Remedial Action Contractor (RAC) in late 1999. The UST and impacted shallow soil at SWMU 18 was excavated and disposed offsite at a licensed landfill and the excavation backfilled with imported clean fill material. Upon completion of the ICA, the existing monitoring wells remained in place to continue groundwater monitoring at this location. A Response Action Completion Report (RACR) detailing the removal activities and results of closure confirmation sampling was prepared and submitted to TCEQ for review and approval in 2001. Final regulatory approval of the ICA RACR was received from the TCEQ in a letter dated September 9, 2004.

**Soil**

Based upon the data obtained during the RFI and subsequently evaluated in the APAR, further action was recommended at SWMU 18 due to exceedances of semivolatile organic compounds (SVOC) and inorganics in the soil. Consequently, excavation of impacted soil was recommended by the Navy and carried out by the Navy's RAC in 2003. The RACR for the soil removal activities was prepared and submitted to the TCEQ in March 2005. The RACR has undergone several review cycles by the City of Dallas, EPA, and TCEQ,

**and the final replacement pages for the RACR were submitted to the TCEQ in May 2008 (CH2M Hill, 2008). The TCEQ granted final approval of the RACR in July 2008.**

**Groundwater**

**The results of the RFI for Category D, issued in January 2001, indicate that groundwater at the site has been impacted by chlorinated VOCs (CVOCs). As described in the APAR, the groundwater of this SWMU is located within a Class 2 groundwater resource area. The high degree of heterogeneity associated with the shallow groundwater bearing unit (GWBU) onsite has resulted in a discrete groundwater Protective Concentration Level Exceedance (PCLE) zone associated with the SWMU 18 Plume that required a response action to reduce the concentration of chemicals of concern (COC) to less than the respective critical Protective Concentration Levels (PCL). Subsequent to the APAR, a Response Action Plan (RAP) was submitted to the TCEQ for groundwater at the SWMU 18 Plume.**

**In April 2005, all groundwater monitoring wells associated with SWMU 18 were plugged and abandoned in preparation for the groundwater excavation activity, which was initiated in May 2005 by the Navy's Environmental Multiple Award Contractor (EMAC). The groundwater remaining within the excavated plume area was sampled, and the analytical results confirmed that the COC concentrations remaining in the plume area were reduced to less than the TRRP RES A criteria. A revised RAP (Revision 2), dated February 2006, received TCEQ approval in December 2006.**

**A RACR detailing the groundwater excavation activities was prepared and submitted to the TCEQ in March 2006 (Arcadis, 2006). After completion of the groundwater excavation and backfilling, six monitoring wells were installed within and around the former PCLE zone at SWMU 18 to confirm that TRRP RES A criteria had been consistently achieved. In June 2011, as a result of a monitoring well inspection at SWMU 18 conducted on monitoring wells within the 20-acre area leased to the Air National Guard, the Navy abandoned monitoring well 606D154MW and installed replacement monitoring well 606D154RMW. A residual TCE plume was detected, thus a period of MNA was implemented in accordance with the RAP (Tetra Tech, 2006) to ensure that MNA is successfully remediating the groundwater to less than critical groundwater PCLs.**

**The Navy originally proposed to utilize excavation and monitored natural attenuation (MNA) as a decontaminating remedy to address the PCLE zone identified at the SWMU 18 Plume (Tetra Tech NUS [TtNUS], 2002) by the year 2017. A re-evaluation of plume dynamics was presented in an Alternatives Evaluation Report (AER) (Resolution Consultants, 2013), and a determination was made that MNA alone would not effectively reduce the concentrations of COCs in groundwater in the outlier well 606D152MW to achieve remedial goals (TRRP RES A) by the cleanup date of 2017.**

**In accordance with the approved Groundwater RAP (Revision 2) (TtNUS, 2006), and as recommended by TCEQ in a letter dated May 26, 2015, failure of the response action triggers the implementation of contingency measures, which may include the selection of an appropriate alternate remedial measure. The Navy proposed enhanced MNA (EMNA) as an alternate remedy at the affected area of SWMU 18 groundwater plume in an effort to reduce COCs to below PCLs in the Draft Final Enhanced Monitored Natural Attenuation Spot Treatment Work Plan (Resolution Consultants December 2015). Protocols for evaluating groundwater conditions in support of the EMNA Spot Treatment were detailed in the Tier II Sampling and Analysis Plan (SAP) Addendum #1, Long-Term Monitoring Plan Enhanced Monitored Natural Attenuation Spot Treatment At SWMU 18 (Resolutions Consultants March 2016).**

**A summary of the EMNA Spot Treatment actions completed to date is provided in Worksheet 1.0 of this report and includes descriptions of the Design Verification Testing (DVT), Baseline Groundwater Sampling Event, Spot Treatment Injection application, and Performance Monitoring Events. Depending upon the results of the EMNA spot treatment at SWMU 18, alternative remedial measures may be proposed in a comprehensive RAP for SWMU 18 Plume, to follow. MNA will be continued at the SWMU 18 Plume in accordance with the procedures and protocols described in the Groundwater RAP (Revision 2) (Tetra Tech, 2006).**

**In October 2015, the Navy submitted a revised RAP (Revision 3) (Resolution Consultants, 2015) to TCEQ. The purpose of the revised RAP was to remove monitor wells with no history of COC detections, or with COC detections below the applicable GWPS for at least the previous five consecutive years, from the current monitoring and sampling plan and confirmation sampling plan. In accordance with the RAPs,**

**Resolution Consultants conducted plugging and abandonment (P&A) of select groundwater monitoring wells in April 2016. P&A actions were conducted by a state of Texas licensed driller (Strata Core Services, SCI). One well (606D151MW) was P&A'd at SWMU 18.**

**Potential receptors are onsite residents, onsite employees, and onsite construction workers. Since the groundwater PCLE zone is not projected to migrate offsite based on groundwater modeling results and other lines of evidence, it is not anticipated that offsite receptors will be affected. The possible routes of exposure to groundwater are inhalation (onsite residents, onsite employees, and onsite construction workers) and dermal contact (onsite construction workers). Ingestion is not a concern because during the implementation of the response actions there is controlled access to the site, which limits potential exposures to contaminated groundwater (i.e., no potable or irrigation wells will be installed) through 2017. The potential for inhalation of vapor from groundwater through soil to outdoor air is insignificant because the maximum detected COC concentrations in groundwater before remediation occurred are less than their respective inhalation of volatiles from groundwater ($^{Air}GW_{Inh\text{-}V}$) PCLs. Additionally, the indoor air sampling conducted in a sealed building at a similar plume at the base (Building 1406 within the SWMU 21 area) indicated that no CVOCs were detected in the indoor air (TtNUS, 2004b). The recent Vapor Intrusion Study at SWMU 21 (Resolution Consultants 2015) also concluded that sub-slab TCE and cis-1,2-DCE concentrations were well below VISLs for sub-slab vapor as well as RSLs for indoor air. Furthermore, the analytical results indicated that neither TCE nor cis-1,2-DCE were detected in indoor air samples. Therefore, vapor intrusion is not a current concern at NAS Dallas.**

## CHRONOLOGY OF MAJOR EVENTS

| | |
|---|---|
| Sep. 1985 | Initial Assessment Study was prepared and submitted. |
| Jan. 1987 | Confirmation Study and Verification Step Report was prepared and submitted. |
| Mar. 1989 | RFA was prepared and submitted. |
| 1993 — 1994 | EBS was prepared and submitted. |
| Mar. 1994 | BRAC Cleanup Plan was prepared and submitted. |
| 1995 — 1996 | Basewide Round 1 groundwater sampling event (Directed Phase RFI). |
| 1996 — 1997 | Interim Draft RFI Reports were prepared and submitted for each category identified at the air station. |
| Mar. — June 1998 | Basewide Round 2 groundwater sampling event (Chase Phase RFI). |
| May — Oct. 1998 | Main Fuel Farm (MFF) USTs were removed by the Navy's Charleston Detachment, along with other tanks basewide. |
| June 1998 — Jan. 1999 | Release Determination Report was prepared and submitted covering the removal of the MFF tanks. |
| Aug. — Sep. 1998 | Basewide Round 3 groundwater sampling event. |
| Sep. 1998 | Most military operations on NAS Dallas ceased and the air station was placed into caretaker status. |
| Dec. 1998 — Jan. 2000 | Removal of oil/water separators (OWS) basewide. |
| Jan. — Oct. 1999 | Basewide removal of hot spot areas of contamination. |
| Feb. — Apr. 1999 | Basewide Round 4 groundwater sampling event. |
| Sep. — Oct. 1999 | Removal of the remaining USTs basewide. |
| Sep. — Nov. 1999 | Basewide Round 5 groundwater sampling event. |
| July 1999 — Feb. 2000 | Basewide pre-Corrective Measures Study monitoring well installation and sampling event. |
| June — July 2000 | Preliminary groundwater investigation at Advanced Science Incorporated Area -5 (ASA-5) site in the MFF/Main Fuel Farm Storm Sewer (MFF/MFFSS) area. |
| July — Aug. 2000 | Basewide Round 6 groundwater sampling event. |
| Aug. — Sep. 2000 | Aquifer tests were conducted at five sites across Former NAS Dallas to determine aquifer properties. |
| 2000 — 2001 | Final RFI Reports were prepared and submitted for each category. |
| June — July 2001 | Basewide Round 7 groundwater sampling event, including evaluation of alternate sampling methods [i.e., passive diffusion bag (PDB) and HydraSleeve™]. |
| Sep. 2001 | Enhanced Monitored Natural Attenuation (EMNA) pilot test initiated at ASA-5 site (SWMUs 79/136) involving the injection of potassium permanganate ($KMnO_4$). |

| | |
|---|---|
| Feb. 2002 | MNA Groundwater Modeling Report for MFF/MFFSS was prepared and submitted. |
| Mar. 2002 | Technical Memorandum Groundwater Sampling Procedure Comparison for selected monitoring wells was prepared and submitted. |
| Oct. 2002 | APAR was prepared and submitted. |
| Dec. 2002 — Mar. 2003 | Basewide Round 8 groundwater sampling event. |
| Jan. 2003 | Monitoring Well Abandonment Plan was prepared and submitted. |
| Jan. 2003 | Draft MNA Groundwater Modeling Report for Category D Sites was prepared and submitted. |
| Jan. 2003 | Corrective action (excavation and disposal) initiated on the Rubble Landfill (SWMU 1). |
| Feb. 2003 | Draft RAP for MFF/MFFSS soils was prepared and submitted. |
| Apr. 2003 | Draft RAP for Category D Sites soils was prepared and submitted. |
| Apr. 2003 | Final Groundwater Report to satisfy Provision VIII.D.8 of the Former NAS Dallas RCRA Hazardous Waste Storage Permit (No. HW-50276) was prepared and submitted. |
| May 2003 | Self Implementation Notice (SIN) for TRRP RES A Soil Response Actions for SWMUs 2, 6, 18, 21, 31, 35, 36, 60, 79, 81, 83, 84, 85, 86, 102, 124, 138, and 139 was prepared and submitted. |
| June 2003 | Draft MNA Groundwater Modeling Report for Category B was prepared and submitted. |
| June 2003 | RCRA Permit renewal and Compliance Plan applications submitted to the TCEQ. |
| June 2003 | Corrective action (excavation, solidification, and disposal) initiated on the TANG Ponds (SWMU 92). |
| July — Aug. 2003 | Basewide Round 9 groundwater sampling event. |
| Aug. 2003 | Corrective action (excavation, disposal, and backfill) initiated on the sites covered in the SIN submitted in May 2003. |
| Aug. 2003 | 2002 Annual Groundwater Monitoring Report was prepared and submitted. |
| Dec. 2003 — Jan. 2004 | Basewide Round 10 groundwater sampling event. |
| Jan. 2004 | Soil RACR was prepared and submitted for the Rubble Landfill (SWMU 1). |
| Jan. 2004 | Soil RACR was prepared and submitted for the TANG Ponds (SWMU 92). |
| Mar. 2004 | TCEQ produced and distributed the Draft RCRA Permit and Draft Compliance Plan. |
| Apr. 2004 | Final Addendum to MNA Groundwater Modeling Report for MFF/MFFSS was prepared and submitted. |
| May 2004 | 2003 Groundwater Response Action Effectiveness Reports (RAER) were prepared and submitted. |

| | |
|---|---|
| June 2004 | Indoor and Outdoor Air Sampling at Building 1406 Report was prepared and submitted. |
| July 2004 | Basewide Round 11 groundwater sampling event. |
| July 2004 | Final MNA Groundwater Modeling Report for Category D was prepared and submitted. |
| Sep. 2004 | Final MNA Groundwater Modeling Report for Category B was prepared and submitted. |
| Sep. 2004 | TCEQ approved final closure documentation for the Miscellaneous Sites Soil RACR. |
| Oct. 2004 | Basewide Round 12 groundwater sampling event. |
| Oct. 2004 | TCEQ approved Final MNA Groundwater Modeling Report for Category D Sites at Former NAS Dallas. |
| Oct. 2004 | TCEQ approved Final Addendum to the MNA Groundwater Modeling Report for MFF/MFFSS at Former NAS Dallas. |
| Oct. 2004 | TCEQ approved Final Groundwater Report for Former NAS Dallas. |
| Oct. 2004 | TCEQ approved the 2002 Annual Groundwater Monitoring Report. |
| Nov. 2004 | Final RAP (Basewide) for groundwater was prepared and submitted. |
| Dec. 2004 | 2004 Semi-annual Groundwater Monitoring Report was prepared and submitted. |
| Dec. 2004 | TCEQ issued comments on the 2003 Groundwater RAERs. |
| Jan. 2005 | 2004 Groundwater RAERs were prepared and submitted. |
| Mar. 2005 | Monitoring Well Installation and Abandonment Plan was prepared and submitted. |
| Mar. 2005 | Draft 84 Sites Soil RACR was prepared and submitted. |
| Apr. 2005 | 2004 Groundwater RAERs were prepared and submitted. |
| Apr. 2005 | Basewide Round 13 groundwater sampling event. |
| June 2005 | Corrective action for groundwater (excavation, disposal, and backfill) initiated at SWMU 85. |
| June 2005 | Corrective action for groundwater (excavation, disposal, and backfill) initiated at SWMU 18. |
| July 2005 | Basewide Round 13 groundwater sampling event. |
| Aug. 2005 | TCEQ issued comments on the Draft 84 Sites Soil RACR. |
| Aug. 2005 | 2005 Semi-annual Groundwater Monitoring Report was prepared and submitted. |
| Sep. 2005 | TCEQ issued comments on the 2004 Groundwater RAPs. |
| Oct. 2005 | TCEQ issued comments on the 2004 Groundwater RAERs. |
| Oct. 2005 | Basewide Round 14 groundwater sampling event. |
| Oct. — Dec. 2005 | City of Dallas issued comments on the Draft 84 Sites Soil RACR. |

| | |
|---|---|
| Dec. 2005 | TCEQ issued comments on the 2005 Semi-annual Groundwater Monitoring Report. |
| Jan. 2006 | 2005 Groundwater RAERs were prepared and submitted. |
| Jan. 2006 | Basewide Round 15 groundwater sampling event. |
| Feb. 2006 | Revised Groundwater RAPS (Revision 2) were prepared and submitted covering SWMUs 17/Building 1423, 17/Building 1429, 18, 35, 85, 86, 108, 136 North, 136 South, and 139. |
| Mar. 2006 | RACR for groundwater removed at SWMUs 18 and 85 were prepared and submitted. |
| May 2006 | Basewide Round 15B groundwater sampling event. |
| May 2006 | TCEQ issued comments on the 2005 Groundwater RAERs. |
| June 2006 | 85 Sites, Defense Reutilization and Marketing Office (DRMO), and Naval Weapons Industrial Reserve Plant (NWIRP) SWMU 18 Soil RACRs (Revision 1) were prepared and submitted. |
| July 2006 | TCEQ issued comments on the Groundwater RAPs (Revision 2). |
| July 2006 | EMNA Pilot Test initiated at SWMU 21 involving the injection of zero valent iron (ZVI). |
| Aug. 2006 | Basewide Round 16 groundwater sampling event. |
| Aug. 2006 | Responses to TCEQ comments on the Groundwater RAPs (Revision 2), including replacement pages, were prepared and submitted. |
| Nov. 2006 | Basewide Round 16B groundwater sampling event. |
| Dec. 2006 | RACR for groundwater PCL at SWMU 35 was prepared and submitted. |
| Dec. 2006 | TCEQ approves Groundwater RAP (Revision 2) covering SWMUs 17/Building 1423, 17/Building 1429, 18, 35, 85, 86, 108, 136 North, 136 South, and 139. |
| Jan. 2007 | 2006 Groundwater RAERs were prepared and submitted. |
| Apr. 2007 | Groundwater Sampling Work Plan Addendum, Slug Test Work Plan, and Monitoring Well Installation and Abandonment Work Plan were prepared and submitted. |
| Apr. — May 2007 | Basewide Round 17 groundwater sampling event. |
| Apr. — June 2007 | SWMU 18 OWS removal operations were conducted. |
| Apr. 2007 | Slug test operations conducted at SWMUs 18, 85, and 139. |
| Aug. — Sep. 2007 | Basewide Round 18 groundwater sampling event. |
| Nov. 2007 | Field Activities for SWMU 21 EMNA Pilot Study completed. |
| Jan. 2008 | Basewide Round 19 groundwater sampling event. |
| Jan. 2008 | 2007 Groundwater RAERs were prepared and submitted. |
| Feb. 2008 | TCEQ approves the Groundwater RACR for SWMU 35. |
| Apr. 2008 | Comments to the 85 Sites, DRMO, and NWIRP SWMU 18 Soil RACRs revisions were received from the TCEQ. |

| | |
|---|---|
| May 2008 | TCEQ issued comments on the 2007 Groundwater RAERs. |
| May 2008 | Response to the 85 Sites, DRMO, and NWIRP SWMU 18 Soil RACRs comments were submitted to the TCEQ. |
| July 2008 | Basewide Round 20 groundwater sampling event. |
| July 2008 | TCEQ grants final approval of the 85 Sites, DRMO, and NWIRP SWMU 18 Soil RACRs. |
| July 2008 | Response to TCEQ comments on 2007 Groundwater RAERs, replacement pages (Revision 1) to 2007 RAERs prepared and submitted. |
| Oct. 2008 | Technical Memorandum, ASA-5 East Site EMNA Pilot Study prepared and submitted. |
| Oct. 2008 | Technical Memorandum, Pilot Study at SWMU 21 prepared and submitted. |
| Oct. 2008 | SWMU 17/1429 Pilot Test Work Plan prepared and submitted. |
| Dec. 2008 | SWMU 139 Groundwater RACR prepared and submitted. |
| Jan. 2009 | Basewide Round 21 groundwater sampling event. |
| Jan. 2009 | 2008 Groundwater RAERs were prepared and submitted. |
| Jan. 2009 | Revised Groundwater RAPs for SWMU 21 (Revision 2) prepared and submitted. |
| Jan. 2009 | Revised Groundwater RAPs for SWMUs 79/136 Central (Revision 2) prepared and submitted. |
| Jan. 2009 | Revised Groundwater RAP for SWMU 136 South (Revision 4) prepared and submitted. |
| May 2009 | SWMU 21 Pilot Study additional groundwater sampling |
| May 2009 | SWMU 79/136 Central non-compliant monitoring well groundwater sampling. |
| May 2009 | TCEQ grants conditional approval of the SWMU 139 Groundwater RACR. |
| June 2009 | ASA-5 Pilot Test injection points abandonment. |
| June 2009 | SWMU 35 monitoring well abandonment. |
| July 2009 | Basewide Round 22 groundwater sampling event. |
| Sep. 2009 | SWMU 21 Pilot Study monitoring wells abandonment. |
| Oct. 2009 | Revised Technical Memorandum, SWMU 21 Pilot Study prepared and submitted. |
| Oct. 2009 | SWMU 136 South non-compliant monitoring well groundwater sampling. |
| Nov. 2009 | Response to TCEQ comments on 2008 Groundwater RAERs prepared and submitted. |
| Jan. 2010 | Basewide Round 23 groundwater sampling event. |
| Jan. 2010 | 2009 Groundwater RAERs prepared and submitted. |
| July 2010 | Basewide Round 24 groundwater sampling event. |
| Aug. 2010 | Basewide monitoring well network inspection and five-year survey. |

| | |
|---|---|
| Nov. 2010 | Response to TCEQ comments on 2009 Groundwater RAERs prepared and submitted. |
| Dec. 2010 | Monitoring wells general maintenance and minor repairs completed. |
| Jan. 2011 | Basewide Round 25 groundwater sampling event. |
| Jan. 2011 | 2010 Groundwater RAERs prepared and submitted. |
| March 2011 | Monitor well inspection at SWMU 21/SWMU 18 on monitoring wells within the 20-acre area leased to the Air National Guard. |
| May 2011 | Addendum to Monitoring Well Installation and Abandonment Plan prepared and submitted. |
| June 2011 | SWMU 139 monitoring wells plugged and abandoned. |
| June 2011 | SWMU 81 monitoring wells plugged and abandoned. |
| June 2011 | Repairs, abandonment and replacement of damaged monitoring wells at SWMU 21 and SWMU18. |
| July. 2011 | Basewide Round 26 groundwater sampling event. |
| Dec. 2011 | Response to TCEQ comments on 2010 Groundwater RAERs prepared and submitted. |
| Jan. 2012 | Basewide Round 27 groundwater sampling event. |
| March 2012 | 2011 Groundwater RAERs prepared and submitted. |
| July 2012 | Basewide Round 28 groundwater sampling event. |
| Aug. 2012 | EPA comments to the 2011 Groundwater RAER. |
| Oct. 2012 | TCEQ comments to the 2011 Groundwater RAER. |
| Jan. 2013 | Basewide Round 29 groundwater sampling event. |
| Jan. 2013 | 2012 Groundwater RAERs prepared and submitted |
| Feb. 2013 | TCEQ comments to the 2012 Groundwater RAER. |
| June 2013 | EPA comments to the 2012 Groundwater RAER. |
| July 2013 | Basewide Round 30 groundwater sampling event. |
| July 2013 | Response to TCEQ comments on 2012 Groundwater RAERs prepared and submitted |
| Jan. 2014 | Basewide Round 31 groundwater sampling event. |
| Jan. 2014 | 2013 Groundwater RAERs prepared and submitted |
| Feb. 2014 | TCEQ comments to the 2013 Groundwater RAER. |
| June 2014 | EPA comments to the 2013 Groundwater RAER. |
| July 2014 | Basewide Round 32 groundwater sampling event. |
| July 2014 | Response to TCEQ comments on 2013 Groundwater RAERs prepared and submitted |
| Nov. 2014 | RCRA Permit renewal and Compliance Plan (Number 50276) applications submitted to the TCEQ. |
| Jan. 2015 | Basewide Round 33 groundwater sampling event. |
| Jan. 2015 | 2014 Groundwater RAERs prepared and submitted. |

| | |
|---|---|
| May 2015 | TCEQ Permit Renewal Application Technical Notice of Deficiency (NOD) Letter, dated 26 May 26, 2015. |
| June 2015 | Meeting with TCEQ, EPA, and City of Dallas |
| June 2015 | TCEQ comments letter to the 2014 Groundwater RAER, dated 10 June 2015. |
| June 2015 | Submittal of Draft revised RAP for SWMU 18, received 23 June 2015. |
| June 2015 | Response to TCEQ comments to the Response to Permit Renewal Application Technical NOD Letter for Former Dallas Naval Air Station (NAS), Dallas, Texas, dated 26 June 2015. |
| July 2015 | Basewide Round 34 groundwater sampling event. |
| July 2015 | TCEQ Permit Renewal Application Second Technical Notice of Deficiency Letter, dated 24 July 2015. |
| July 2015 | Response to TCEQ Comments on the Technical Memorandum Pilot Study for SWMU 21, Rev. 1, July 2009 submitted to the TCEQ, dated 24 July 2015. |
| Oct. 2015 | Basewide submittal of Revised and Interim Response Action Plans. |
| Dec. 2015 | Draft Final Enhanced Monitored Natural Attenuation (EMNA) Spot Treatment Workplan for SWMU 18 prepared and submitted to TCEQ. |
| Dec. 2015 | Amendment to the Approved Class V Underground Injection Control (UIC) Permit (5X2600432) prepared and submitted to TCEQ. |
| Jan. 2016 | Basewide Round 35 groundwater sampling event. |
| Jan. 2016 | TCEQ, EPA, and City of Dallas approve EMNA workplan. |
| Jan. 2016 | 2015 Groundwater RAERs prepared and submitted. |
| Jan. 2016 | EMNA Spot Treatment Design Verification Testing at SWMU 18 by Resolution Consultants and Regenesis Remediation Services. |
| March 2016 | Draft Tier II Sampling and Analysis Plan Addendum #1, Long-Term Monitoring Plan Enhanced Monitored Natural Attenuation Spot Treatment at SWMU 18 Former Naval Air Station Dallas, Dallas, Texas prepared and submitted to TCEQ. |
| March 2016 | Amendment to the Approved Class V UIC Permit (5X2600432) prepared and submitted to TCEQ. |
| Apr. 2016 | TCEQ approves UIC amendment request. |
| Apr. 2016 | Basewide monitor well plugging and abandonment and operation and maintenance actions, installation of monitor well 508F98MW in SWMU 79 |
| Apr. 2016 | EMNA Spot Treatment at SWMU 18 baseline groundwater sampling event. |
| May 2016 | EMNA Spot Treatment at SWMU 18 injections by Resolution Consultants and Regenesis Remediation Services. |
| Jul. 2016 | Basewide Round 36 groundwater sampling event. |

| | |
|---|---|
| Aug. 2016 | Deploy passive diffusion bags at EMNA Spot Treatment well 606D152MW. |
| Sep. 2016 | Basewide operations and maintenance activities completed. |
| Sep. 2016 | EMNA Spot Treatment at SWMU 18 first quarterly performance groundwater monitoring event. |
| Sep. 2016 | Draft Tier II Sampling and Analysis Plan Addendum #2, Long-Term Monitoring Plan, Enhanced Monitored Natural Attenuation, Perfluoroalkyl Substances Groundwater Investigation, Former Naval Air Station Dallas, Dallas, Texas prepared and submitted to TCEQ. |

## Checklist for Report Completeness

Use this checklist to determine the portions of the form that must be submitted for this report. Answer all questions by checking Yes or No. If the answer is Yes include that portion of the report. If the answer is No, do not complete or submit that portion of the report. All form contents that are marked "Required" must be submitted. Form contents marked with an asterisk (*) are not included in the blank form and are to be provided by the person.

| | | | | Report Contents |
|---|---|---|---|---|
| | | Required | **Cover Page** | ☒ |
| | | Required | **Executive Summary** | ☒ |
| | | Required | **Checklist for Report Completeness** | ☒ |
| | | Required | **Worksheet 1.0** Response Action Objectives | ☒ |
| | | Required | **Attachment 1A*** Maps and Cross Sections | ☒ |
| | | Required | **Attachment 1B*** Graphs | ☒ |
| | | Required | **Attachment 1C*** Response Action Diagrams | ☐ *N/A* |
| No ☒ | Is a plume management zone being used as part of the response action? | ☐ Yes | **Worksheet 2.0** Plume Management Zone | ☐ |
| | | | **Attachment 2A*** Map of Plume Management Zone | ☐ |
| No ☒ | Was an area of technical impracticability approved for use as part of the response action? | ☐ Yes | **Worksheet 3.0** Technical Impracticability | ☐ |
| | | | **Attachment 3A*** Map of Technical Impracticability | ☐ |
| No ☒ | Are institutional controls used or required as part of the response action? | ☐ Yes | **Worksheet 4.0** Institutional Controls | ☐ |
| | | Required | **Worksheet 5.0** Performance Measures and Problems | ☒ |
| No ☐ | Have any operation and maintenance activities been conducted? | ☒ Yes | **Worksheet 6.0** Operation and Maintenance | ☒ |
| No ☒ | Has there been any change to the plans for post-response action care from that submitted in the RAP? | ☐ Yes | **Worksheet 7.0** Post-Response Action Care | ☐ |
| No ☐ | Was any information for this report obtained from outside sources? | ☒ Yes | **Appendix 1*** References | ☒ |
| No ☒ | Is an ESA and/or Compensatory Restoration being used as part of the response action? | ☐ Yes | **Appendix 2*** ESA and Compensatory Restoration | ☐ |

| Checklist for Report Completeness | ID No. ***SWR 65033 SWMU 18 Plume*** | Report Date: ***01/17/2017*** |
|---|---|---|

| | | | | |
|---|---|---|---|---|
| No ☒ | Are institutional controls or landowner concurrence required in the response action? | ☐ Yes | **Appendix 3*** Institutional Controls and Landowner Concurrence | ☐ |
| No ☐ | Is there data or boring/monitor well information not previously submitted? | ☒ Yes | **Appendix 4*** Data Tables, Boring Logs, and Well Completions | ☒ |
| No ☒ | Did sampling procedures differ from those described in the RAP? | ☐ Yes → | **Appendix 5*** Sampling Procedures | ☐ |
| No ☐ | Has any sampling been conducted for which the analytical results were not previously submitted? | ☒ Yes → | **Appendix 6*** Laboratory Data Packages | ☒[1] |
| No ☐ | Were statistics or geostatistics used in the response action? | ☒ Yes → | **Appendix 7*** Statistical Methodology | ☒[2] |
| No ☐ | Were any wastes generated that were not reported through STEERS? | ☒ Yes → | **Appendix 8*** Waste Disposition | ☒ |

***Notes:***

[1] Included with 2016 RAER in CD format.

[2] Included with 2016 RAER for SWMU 17/Building 1423.

Use this worksheet to describe the response action objectives in each media.

## Response Action Objectives — SWMU 18 Plume

What is the selected remedy standard for this affected property? ***X*** A ____ B

List the environmental media to which this applies ***Soil***

Repeat this section for each medium that had a different response action objective.

Provide a detailed description of the response action. Describe the removal actions, decontamination actions, treatment system(s), and/or physical or institutional control actions that have been conducted in each media and indicate if there were any differences between the actions taken and the actions proposed in the SIN or RAP.

**Based upon the data obtained during the RFI and subsequently evaluated in the APAR, further action was recommended at SWMU 18 due to exceedances of SVOCs and inorganics in the soil. Consequently, excavation of impacted soil was recommended by the Navy and carried out by the Navy's RAC in 2003. The RACR for the soil removal activities was prepared and submitted to the TCEQ in March 2005. The RACR has undergone several review cycles by the City of Dallas, EPA, and TCEQ, and the final replacement pages for the RACR were submitted to the TCEQ in May 2008 (CH2M Hill, 2008). The TCEQ granted final approval of the RACR in July 2008.**

List the environmental media to which this applies ***Groundwater***

Repeat this section for each medium that had a different response action objective.

Provide a detailed description of the response action. Describe the removal actions, decontamination actions, treatment system(s), and/or physical or institutional control actions that have been conducted in each media and indicate if there were any differences between the actions taken and the actions proposed in the SIN or RAP.

**The groundwater response action for this site has consisted of groundwater excavation followed by MNA, as a removal and decontamination remedy to reduce the concentration of COCs to less than their critical PCLs (Tetra Tech, 2006). Consequently, excavation of impacted groundwater was carried out by the Navy's EMAC in 2005. The RACR for the groundwater removal activities was prepared and submitted to the TCEQ in March 2006.**

**Six monitoring wells were installed in May 2006 within and around the former PCLE zone. The results of the continued groundwater sampling and analysis from these monitoring wells is discussed on Worksheet 5.0 and presented in the maps and graphs in Attachment 1 and in the tables Appendix 4.**

**MNA was required after completion of the excavation activities, and the following elements were identified as the basis for determining the successful implementation of the MNA remedy:**

- **Decontamination through the ongoing biological and chemical reductive dechlorination processes.**
- **A monitoring/confirmation sampling program to evaluate the progress of the decontamination.**

**During the implementation of the response action activities, there was controlled access to the site and limited potential exposures to contaminated groundwater due to site restrictions on potable or irrigation well installation through 2017. Additionally, the fate and transport modeling results in the Final MNA Groundwater Modeling Report for Category D (Tetra Tech, 2004) predicted that there would be no expansion of the PCLE zone or offsite migration of COCs at concentrations greater than the respective critical groundwater PCLs. Because this decontaminating remedy is based on an in-situ technology, the potential short-term exposure normally associated with the implementation of ex-situ technologies (i.e., dermal and inhalation exposures) were not a concern.**

Describe how the response action has, or is working towards, achievement of the property-specific response objectives for the PCLE zone in each medium in the context of the response objectives set forth in §350.32 or §350.33, as applicable. Explain how the response action is appropriate based on the hydrogeologic and COC characteristics. Describe any unprotective conditions that continued or resulted from the remedial actions and the actions taken to mitigate unprotective conditions.

**The response action objectives for the contaminated groundwater in the PCLE zone were expected to meet groundwater response objectives of §350.32 through groundwater excavation as a removal remedy followed by MNA as a decontamination remedy to reduce the concentrations of COCs within the PCLE zones below their critical PCLs.**

**Even though the groundwater and monitoring evaluation process at this plume predicted that, in time, MNA alone was capable of reducing the concentrations of COCs in the PCLE zone, while controlling plume expansion, the Navy considered groundwater excavation as an appropriate response action based on the COC concentrations present in the groundwater, the size of the groundwater plume, and the projected achievement of the remedial goals by the year 2017.**

**After completion of the groundwater excavation, backfilling, and grading of the area, six monitor wells were installed within and around the former PCLE zone to confirm that the response action objectives had been achieved in accordance with the Compliance Plan No. 50276 for NAS Dallas. The newly installed monitoring wells were sampled on a semi-annual basis as required by the Compliance Plan to confirm that the response action objectives had been consistently achieved.**

**Because there were remaining COC exceedances in the groundwater after completion of the excavation, a period of MNA decontamination followed until COC concentrations were reduced to below PCLs in accordance with the Compliance Plan. The following elements were determined to be the basis for determining successful implementation of the MNA remedy:**

- **Decontamination through either biological or chemical reductive dechlorination processes.**
- **A monitoring/confirmation sampling program to evaluate the progress of the decontamination.**

**A re-evaluation of plume dynamics was presented in the AER (Resolution Consultants, 2013), and a determination was made that MNA alone would not effectively reduce the concentrations of COCs in groundwater for the southern portion of the plume to achieve remedial goals by the year 2017. Remedy performance sampling indicates that the PCLE zone for the SWMU 18 plume is stable and not increasing in concentration or expanding. In general, MNA has been an appropriate remedial method to reduce COCs to below their critical PCLs at the majority of the SWMU 18 plume. However, it appears that COC concentrations in one outlier monitor well (606D152MW) will not reach critical PCLs by the 2017 deadline.**

**In accordance with the approved RAP (Tetra Tech NUS [TtNUS] 2006), and as recommended by TCEQ in a letter dated May 26, 2015, failure of the response action triggers the implementation of contingency measures which may include a re-evaluation of plume dynamics and the selection of an appropriate alternate remedial measure.**

**To fulfill these requirements, the Navy proposed EMNA as an alternate remedy at the affected area of SWMU 18 to meet the groundwater response objectives of §350.32. Beginning in January 2016, the Navy began implementation of the EMNA Spot Treatment following the approved EMNA Spot Treatment Work Plan (Resolution Consultants December 2015) and the SAP Addendum #1 (Resolutions Consultants March 2016). Specific tasks completed to date are summarized below and include Design Verification Testing (DVT), Baseline Groundwater Sampling Event, Spot Treatment Injection application, and Performance Monitoring Events. A complete summary of investigation activities will be presented in Progress and Spot Treatment Reports, to follow.**

**Design Verification Testing**
**Resolution Consultants and Regenesis Remediation Services carried out activities of the DVT on January 26-27, 2016, including three geotechnical soil borings, soil sampling, and four clear water injections. Results indicated site geology consisting of permeable clay and silt fill material to a depth of 12 feet below ground surface (bgs) underlain by low permeability native clays, silts, and**

**shale bedrock at approximately 20 ft bgs. Results of soil sampling indicate low level VOC concentrations which may indicate that back diffusion of VOC from the lower shale unit is acting as a primary source of VOCs observed in groundwater. Observations of injections indicated that permeability of the native materials below 12 ft bgs is low, and injections within this unit could potentially require increased pressure or targeting of a discontinuous permeable zone at the clay/shale interface. Results of this investigation were utilized to refine the conceptual model for the advancement and injection of bioremediation amendments.**

**Baseline Groundwater Sampling Event**
**Baseline groundwater sampling occurred on April 26-28, 2016, and included collection of groundwater samples from monitor wells 606D149MW, 606D150MW, 606D152MW, 606D153MW, and 606D154MWR in order to establish the baseline groundwater conditions prior to Spot Treatment. Samples were analyzed for CVOCs of concern and microbial and EMNA indicator parameters.**

**Spot Treatment Injections**
**Resolution Consultants and Regenesis Remediation Services performed direct-push injections on May 2-6, 2016, and May 25, 2016, in the Spot Treatment Area associated with monitoring well 606D152MW. Spot Treatment consisted of 14 co-located injection points of PlumeStop Liquid Activated Carbon (PlumeStop) and Bio-Dechlor Inoculum Plus (BDI), spaced 8 feet apart on 3 east west oriented rows located near 606D152MW. Hydrogen Release Compound (HRC) injections consisted of 11 injection points spaced 8 feet apart nested within the PlumeStop/BDI injection rows. Injections utilized Geoprobe drive rods using bottom-up application techniques from 8 to 23 ft bgs with a slotted 2-ft retractable screen-tip.**

**PlumeStop was mixed in solution with potable water to achieve target concentrations, with approximately 3,400 gallons of solution injected into 14 injection points. Application flow rates were maintained between 1.0 and 4.0 gpm, and injection line pressures were observed between 0 and 100 psi, with some injection locations reaching higher pressures. Where flow was induced readily, BDI was co-applied as 0.25 liter (L) additions to the PlumeStop solution, totaling 18 L of BDI injected.**

**Moderate to high back pressures and day-lighting or surfacing of PlumeStop was observed throughout the injection process. Additional measures were taken to reduce the occurrence of surfacing. Specifically, the solution of PlumeStop was increased in concentration and decreased in total volume injected at each point. Additionally, injection rods were allowed to remain in place until the down-hole back pressure had decreased. Once back pressures subsided, injection rods were pulled and boreholes were plugged.**

**Injections at the 11 HRC points included 98 gallons of HRC and HRC Primer solution. Pressurized injections of the HRC solution induced significant back pressure and surfacing which limited completion of HRC injections. On May 26, 2016, the remainder of HRC injections were completed via flight auger borings and gravity feed release.**

**Performance Groundwater Monitoring Sampling Event**
**Groundwater monitoring at select SWMU 18 monitoring wells is being conducted to evaluate the effectiveness of the Spot Treatment. Sampling includes select CVOCs and microbial and EMNA indicator parameters. Upon completion of the Spot Treatment injection event, the first of three monthly performance monitoring events for monitor well 606D152MW was conducted on June 10, 2016. PlumeStop in solution created heavy black staining of the groundwater sample which interfered with the laboratory equipment during analysis. Staining of water persisted and samples were not collected or analyzed for the remaining July and August monthly events; however, this well was developed and a passive diffusion bag (PDB) was deployed on August 30, 2016. The PDB membrane allows groundwater/analytes across the sampler membrane; however, the colloidal (1-2 µm) particles of PlumeStop are unable to diffuse through the medium.**

**PDB sampling techniques were utilized to conduct the first quarterly sample event at 606D152MW in September 2016. Monitoring well 606D152MW will continue to be sampled quarterly for a two year period, and will be supplemented with semi-annual performance monitoring data collected**

**from other SWMU 18 wells (606D149MW, 606D150MW, 606D153MW, 606D154RMW). Results will be presented in Progress and Spot Treatment Reports, to follow.**

**Given that the remedy (MNA) for the 2006 Groundwater RAP (Revision 2) at SWMU 18 will not achieve the critical PCLs within the timeframe specified in the 2006 RAP, a comprehensive RAP will be submitted based upon the outcome of the spot treatment/EMNA at SWMU 18. MNA will be continued at the SWMU 18 Plume for the upcoming year in accordance with the procedures and protocols described in the Groundwater RAP (Revision 2) (Tetra Tech, 2006).**

If different from the information provided in the RAP, explain how the COCs have been handled, treated, disposed, or transferred to another medium and document that the response action has not resulted in any additional exposure conditions due to response action activities.

***N/A***

Explain whether the response action is achieving, or will achieve, the objectives within the reasonable time frame.

**The strongest evidence for MNA is the reduction of contaminant levels observed in samples from monitoring wells over the period of record and the apparent stability of the plume. Specifically, MNA combined with soil removal actions have reduced concentrations of TCE and cis-1,2-DCE in monitoring wells606D149MW, 606D150MW, and 606D154RMW to levels below their respective critical groundwater PCLs. TCE has been reduced to below its PCL in monitoring well 606D153, cis-1,2-DCE remains above its PCL.**

**Maps in Attachment 1A, data tables in Appendix 4, and graphs in Attachment 1B show a considerably smaller PCLE zone footprint than the historical PCLE zone presented in the RAP (Tetra Tech, 2006). Data continues to provide indication that effective remediation through MNA is occurring in some portions of the plume. However, it is unlikely that remedial goals for TCE and cis-1,2-DCE will be achieved at monitoring well 606D152MW.**

**TCE and cis-1,2-DCE concentration versus (vs.) time attenuation rate ($K_{time}$) data (Table 4-4) for 606D152MW do not indicate that remedial clean-up goals will be achieved in the specified timeframe. In addition linear regression modeling of site data, which display the best estimate of the "true" line through the data, indicate that attenuation will not be adequate to reach PCL goals. As previously stated, the Navy has selected to implement additional remedial measures. Therefore, the Navy will implement EMNA as an alternate remedy to meet the groundwater response objectives of §350.32. Given that the remedy (MNA) for the 2006 Groundwater RAP (Revision 2) at SWMU 18 will not achieve the critical PCLs within the timeframe specified in the 2006 RAP, a comprehensive RAP will be submitted based upon the outcome of the spot treatment/EMNA at SWMU 18.**

Are physical controls part of the response action? ____ Yes ***X*** No

If yes, describe the type and purpose of the physical control and discuss how the physical control has proven effective.

***N/A***

## Soil Response Action Objectives

When using removal and/or decontamination with controls or controls only, demonstrate that the physical control or combination of measures is reliably containing, and will continue to contain, COCs within and/or derived from the surface soil and subsurface soil PCLE zone materials over time.

***N/A***

Explain how the removal or decontamination action is reducing the concentration of COCs to the critical surface soil and subsurface soil PCL throughout the soil PCLE zone and preventing COC concentrations above the critical soil PCLs from migrating beyond the original boundary of the soil PCLE zone.

**The soils containing COC concentrations in excess of TRRP RES A were excavated by the Navy's RAC in 2003. Since no soils remain at the site in excess of TRRP RES A concentrations, there is no danger of COCs migrating beyond the original boundary of the PCLE zone. The RACR for the soil removal activities was prepared and submitted to the TCEQ in March 2005. The RACR has undergone several review cycles by the City of Dallas, EPA, and TCEQ and the final replacement pages for the RACR were submitted to the TCEQ in May 2008 (CH2M Hill, 2008). The TCEQ granted final approval of the RACR in July 2008.**

## Groundwater Response Action Objectives — SWMU 18 Plume

Name of groundwater-bearing unit to which this information applies ***Upper Water Bearing Zone (Alluvial Overburden)***

Repeat this section for each groundwater-bearing unit for which a different response action is being conducted.

Groundwater Classification ___ 1 ***X*** 2 ___ 3

Is a modified groundwater response action being used for any part of the groundwater PCLE zone (§350.33(f)(2), (3), or (4))? ___ Yes ***X*** No

If yes, complete the appropriate portions of this report.

Explain how the removal or decontamination actions are reducing the concentration of COCs to the critical groundwater PCL throughout the groundwater PCLE zone and preventing COC concentrations above the critical groundwater PCL from migrating beyond the original boundary of the groundwater PCLE zone. If COC concentrations above the critical groundwater PCL have ever migrated beyond the original boundary of the groundwater PCLE zone, explain the actions taken to address the increase in the PCLE zone.

**The soils containing COC concentrations in excess of TRRP RES A were excavated by the Navy's Response Action Contractor in 2003, thus reducing a possible source for COCs in groundwater and the possible migration of COCs beyond the original boundary of the PCLE zone. In addition, COC concentrations observed in samples from monitoring wells over the period of record have decreased, and the plume is stable. Specifically, MNA combined with soil removal actions have reduced concentrations of TCE and cis-1,2-DCE in monitoring wells 606D149MW, 606D150MW, and 606D154RMW to levels below their respective critical groundwater PCLs. Cis-1,2-DCE remains above its PCL in monitoring well 606D153MW.**

**Maps in Attachment 1A, data tables in Appendix 4, and graphs in Attachment 1B show a considerably smaller PCLE zone footprint than the historical PCLE zone presented in the RAP (Tetra Tech, 2006). Data continues to provide indication that effective remediation through MNA is occurring in some portions of the plume. However, it is unlikely that remedial goals for TCE and cis-1,2-DCE will be achieved at monitoring well 606D152MW.**

Explain how the response actions are preventing COCs from migrating to air at concentrations above the PCLs for air if the groundwater-to-air PCLs ($^{Air}GW_{Inh\text{-}V}$) were exceeded.

**The maximum observed concentrations of the detected groundwater COCs in the PCLE zone are less than their respective $^{Air}GW_{Inh\text{-}V}$ PCLs.**

Explain how the response actions are preventing COCs from migrating to surface water at concentrations above the PCLs for groundwater discharges to surface water if surface water was a factor.

**As shown in the Groundwater RAP (Revision 2) (Tetra Tech, 2006), surface water is not a factor. Additionally, the fate and transport modeling results (Tetra Tech, 2004) indicate that the PCLE zone will not migrate beyond the Former NAS Dallas property line; therefore, there will be no threat to offsite human or ecological receptors.**

Explain how the response actions are preventing human and ecological receptor exposure to the groundwater PCLE zone.

**The response action is based on an in-situ technology that will permanently degrade the COCs. During the implementation of the in-situ groundwater response action, access to the site will be controlled by not permitting any potable or irrigation wells in the PCLE zone during remedial activities. Additionally, the fate and transport modeling results (Tetra Tech, 2004) indicate that the PCLE zone will not migrate beyond the Former NAS Dallas property line; therefore, there will be no threat to offsite human or ecological receptors.**

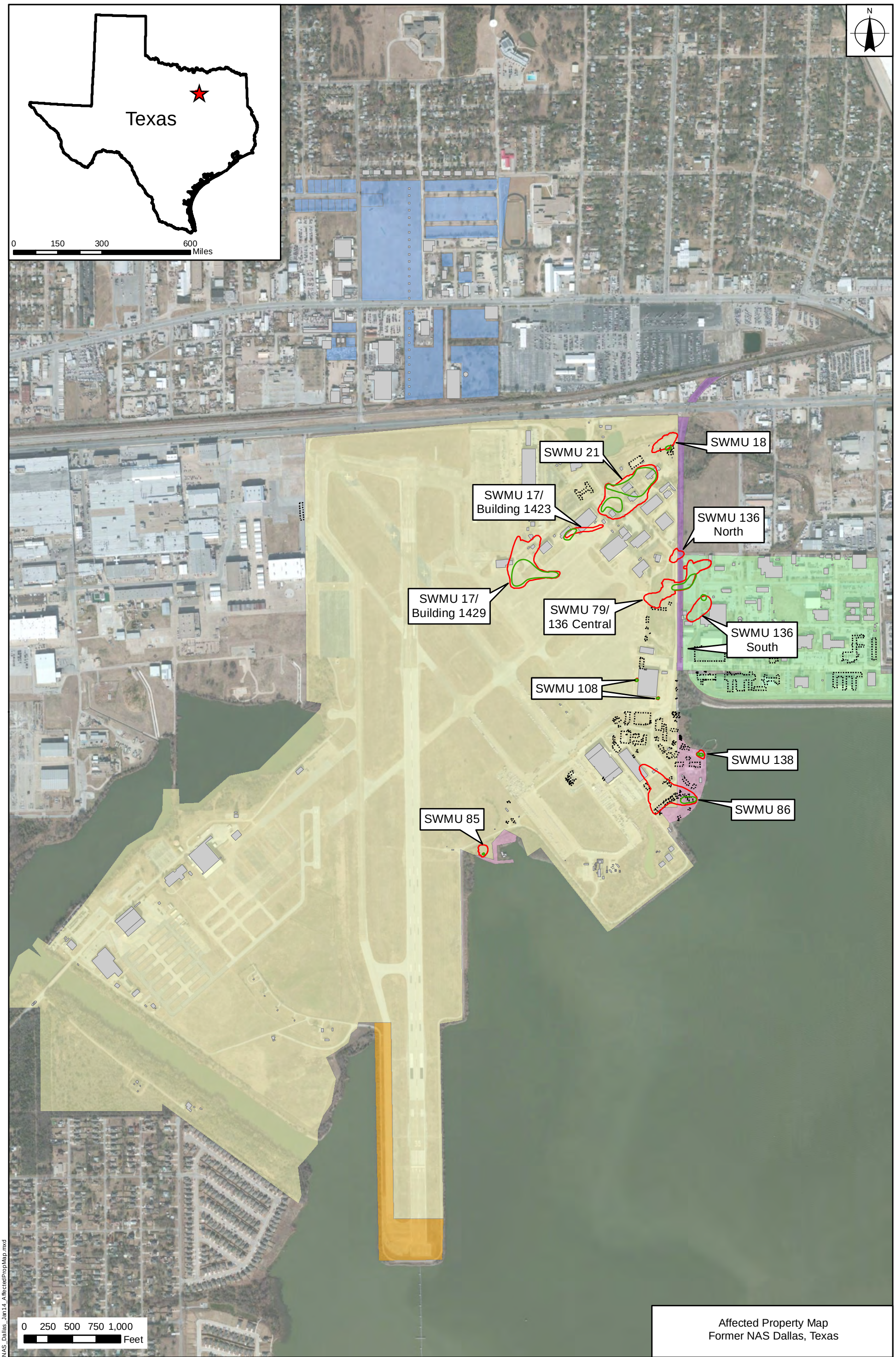
## Waste Management

Describe the volume and final disposition or reuse location of waste or environmental media that has been removed from the affected property during the response action, if not previously reported under STEERS. Provide copies of all manifests, other documentation of disposition, and landowner consent for reuse of soil in Appendix 8.

**Excess groundwater recovered through the low-flow or PDB sampling methods is placed into properly labeled 55-gallon capacity drums and stored at the site. Upon classification, waste disposal arrangements are made with a licensed waste disposal facility. Appendix 8 contains copies of the waste disposal manifests for groundwater generated during the 2016 sampling activities at Former NAS Dallas.**

# ATTACHMENT 1A
# MAPS AND CROSS SECTIONS

# AFFECTED PROPERTY MAP




Affected Property Map
Former NAS Dallas, Texas

January 2014 Isocontour
Gross PCLE Zone Outline
Demolished Building
Existing Structure
Owned by City of Dallas
Transferred from Exelon Corporation to City of Dallas
Transferred from Navy to City of Dallas
Transferred from Navy to City of Grand Prairie
Transferred from Navy to U.S. Army Reserve
Owned by Exelon Corporation

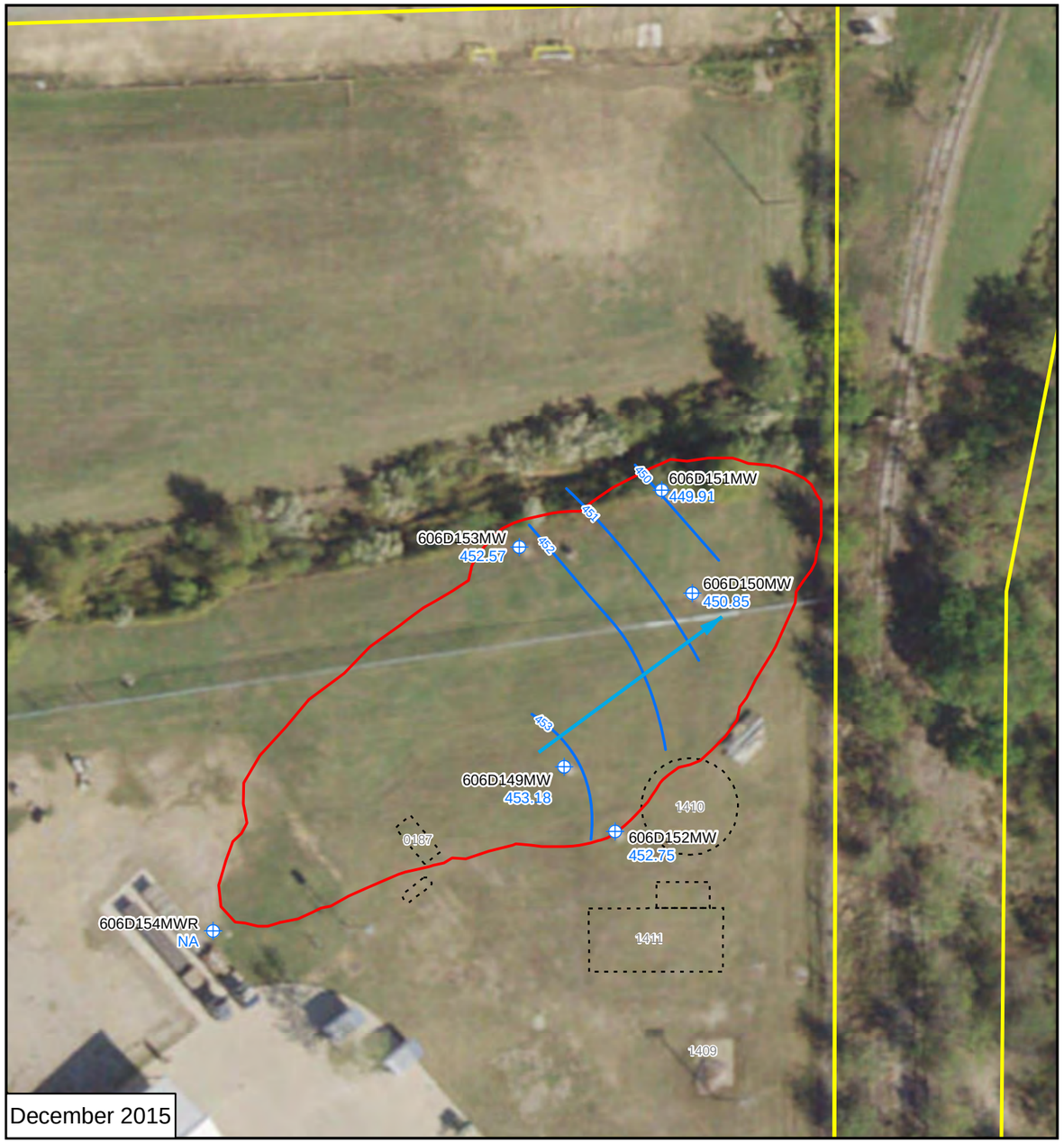
NAVFAC Naval Facilities Engineering Command

| | |
|---|---|
| REQUESTED BY: T. Wiberg | DATE: 8/5/2014 |
| DRAWN BY: A. Zimmerman | PROJECT NUMBER: 0888812796 |

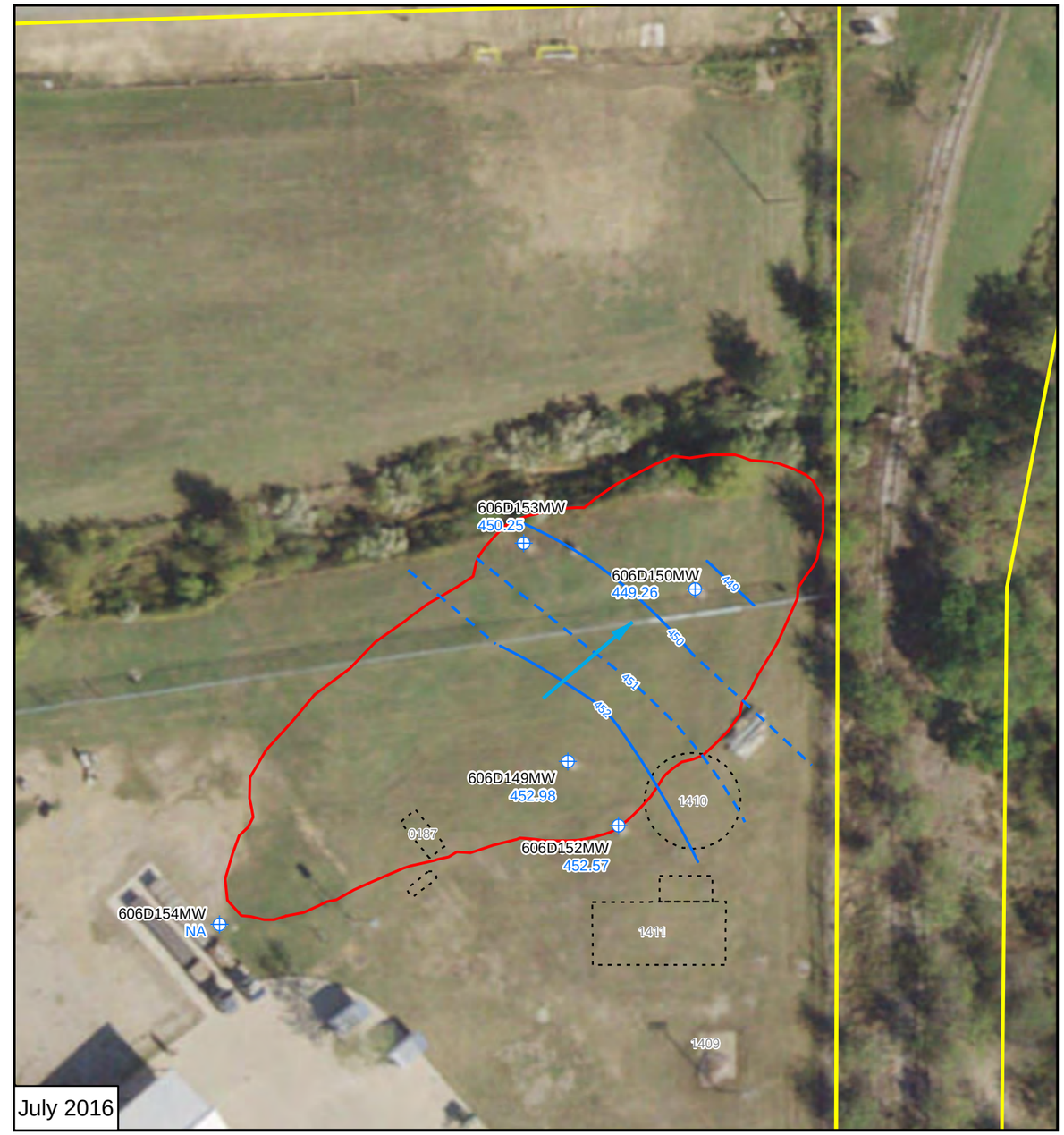
X:\Navy\NAS_Dallas\NAS_Dallas_Jan14_AffectedPropMap.mxd

Service Layer Credits: Source: Esri, DigitalGlobe, GeoEye, i-cubed, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community; State boundary is from the United States Census Bureau; Some data are from TetraTech.

# POTENTIOMETRIC SURFACE MAPS




December 2015




July 2016

N

- Monitoring Well
- Potentiometric Surface Contour
- Groundwater Flow Direction
- Gross PCLE Zone Outline
- Property Boundary 2014
- Demolished Building

Notes:
452.98 - Potentiometric Surface Contour (Feet above MSL)
NA = Elevation not measured at location

0 30 60 90 120 Feet

Figure 1A-3
Potentiometric Surface Map
SWMU 18
2016 RAER
Former NAS Dallas, Texas

NAVFAC Naval Facilities Engineering Command

| | |
|---|---|
| REQUESTED BY: E. Brickman | DATE: 10/17/2016 |
| DRAWN BY: M. Senne | PROJECT NUMBER: 0888812796 |

X:\Navy\NAS_Dallas\2016_Jul_NAS_Dallas_Iso_POT_SWMU18.mxd

Service Layer Credits: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community

# ISOCONCENTRATION CONTOUR MAPS

N

**TCE (mg/L)**

- ND - 0.005
- > 0.005 - 0.05
- Gross PCLE Zone Outline
- Property Boundary 2014
- Groundwater Flow Direction

**Isoconcentration Contours**

- 0.005 mg/L
- Demolished Building

Note: The PCL for TCE = 0.005 mg/L
J = Estimated value
L = Bais low
U = Non-detect

0 30 60 90 120 Feet

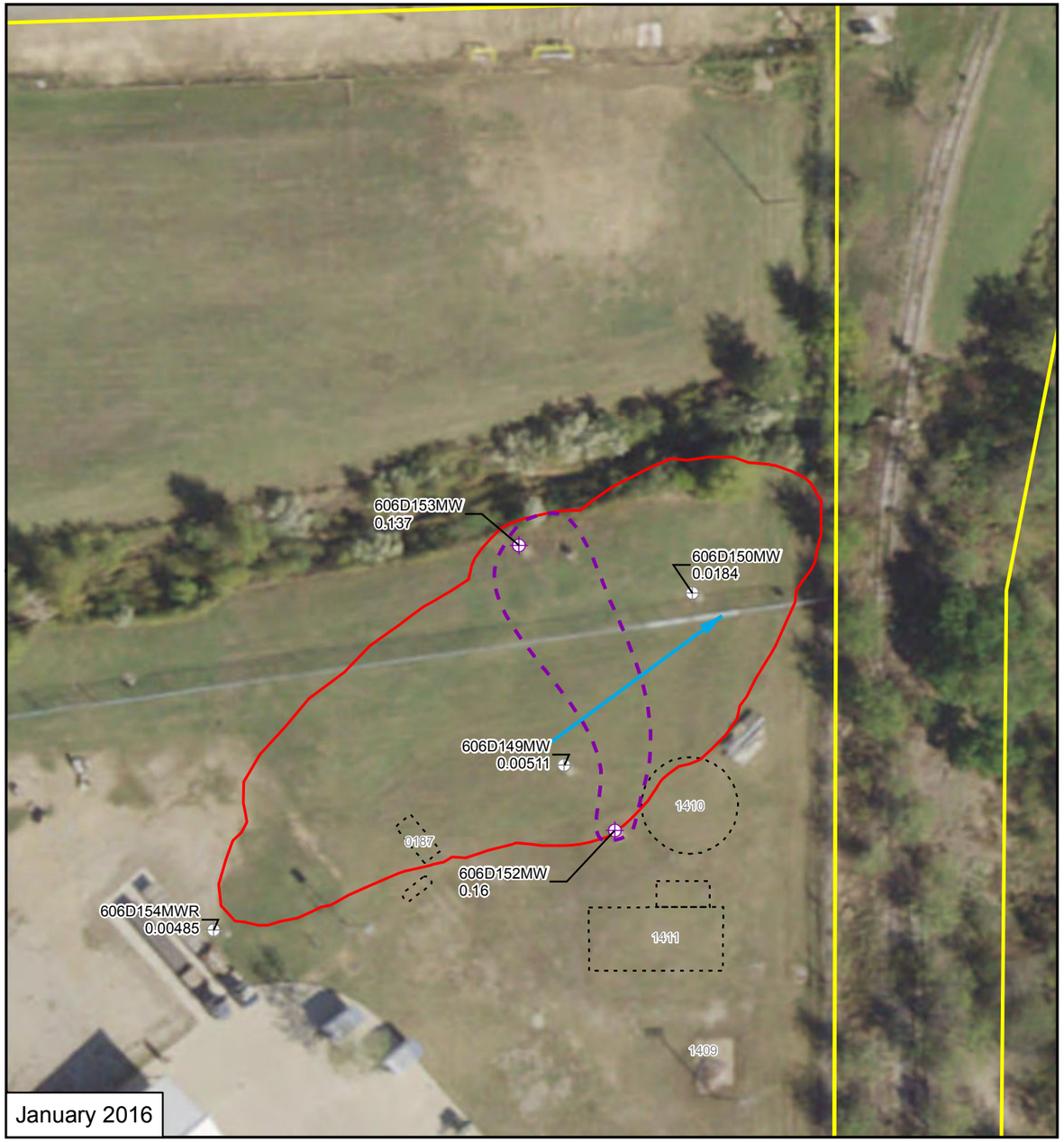
Figure 1A-2A
Trichloroethene Isoconcentration Contours
SWMU 18
2016 RAER
Former NAS Dallas, Texas

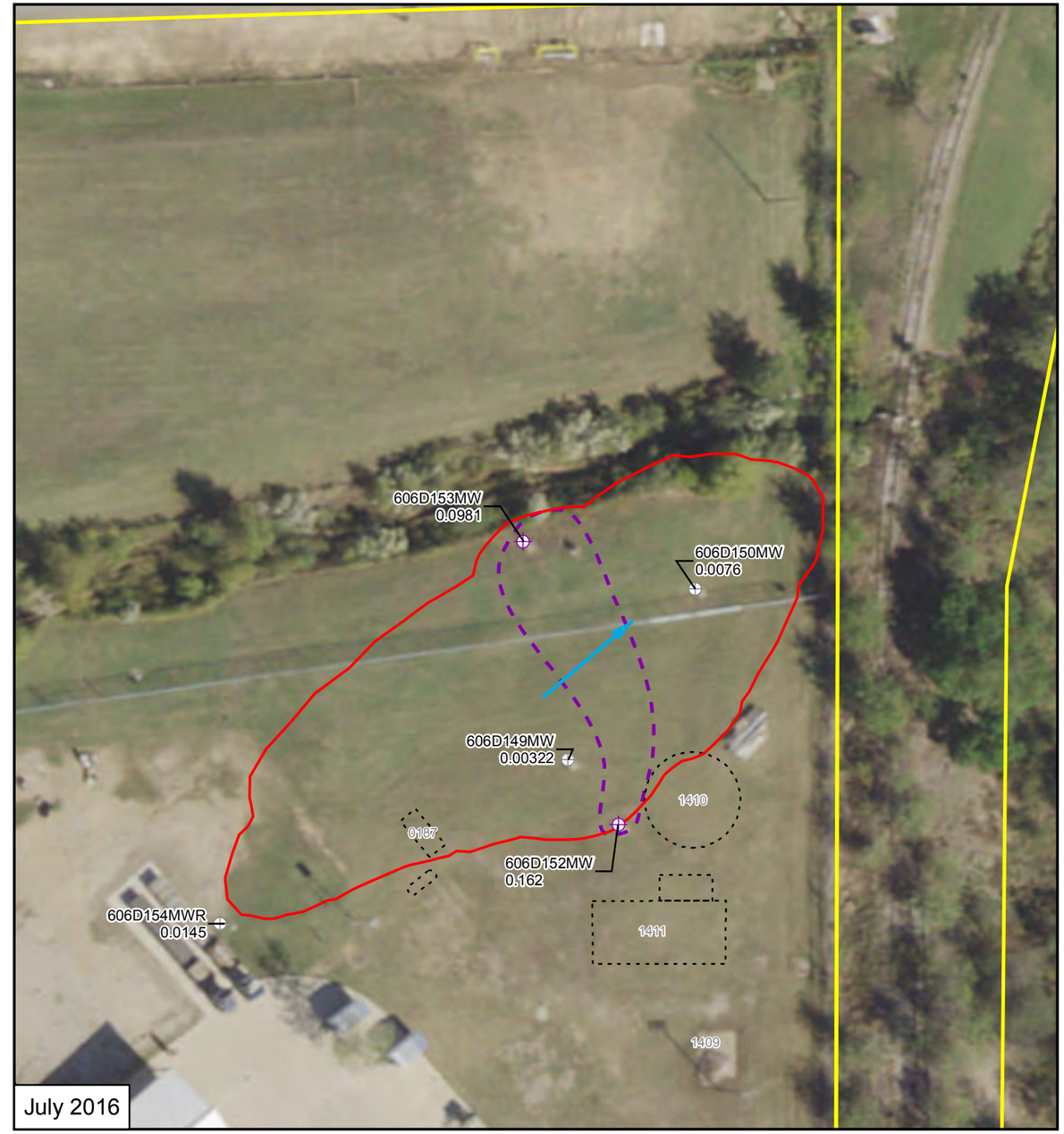
NAVFAC Naval Facilities Engineering Command

| | |
|---|---|
| REQUESTED BY: E. Brickman | DATE: 11/18/2016 |
| DRAWN BY: M. Senne | PROJECT NUMBER: 0888812796 |

X:\Navy\NAS_Dallas\project\2016_RAER\2016_Jul_NAS_Dallas_Iso_TCE_SWMU18.mxd

Service Layer Credits: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community




N

**cis-1,2-DCE Concentration (mg/L)**

- ND - 0.07
- > 0.07 - 0.7
- Gross PCLE Zone Outline
- Property Boundary 2014
- Groundwater Flow Direction

**Isoconcentration Contours**

- 0.07 mg/L
- Demolished Building

Note: The PCL for cis-1,2-DCE = 0.07 mg/L
J = Estimated value
L = Bais low
U = Non-detect

0 30 60 90 120 Feet

Figure 1A-2A
cis-1,2-Dichloroethene Isoconcentration Contours
SWMU 18
2016 RAER
Former NAS Dallas, Texas

NAVFAC Naval Facilities Engineering Command

| | |
|---|---|
| REQUESTED BY: E. Brickman | DATE: 11/22/2016 |
| DRAWN BY: M. Senne | PROJECT NUMBER: 0888812796 |

X:\Navy\NAS_Dallas\project\2016_RAER\2016_Jul_NAS_Dallas_Iso_cis12DCE_SWMU18.mxd

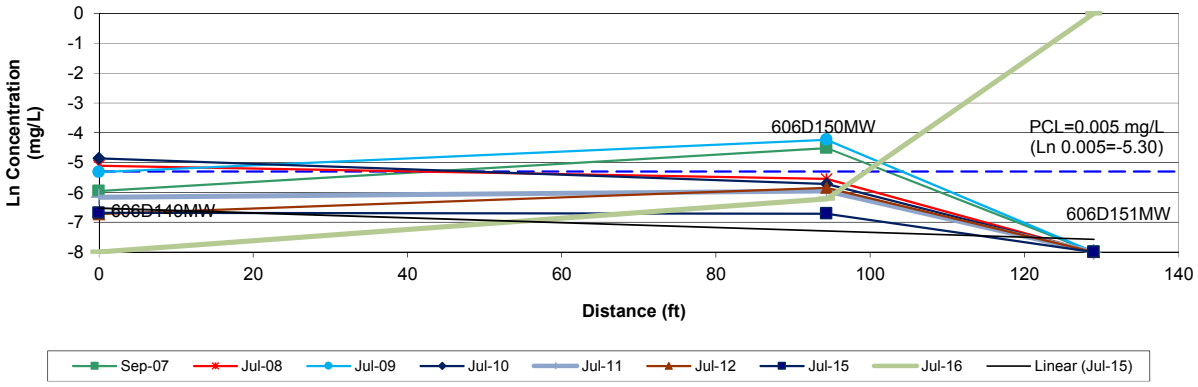
Service Layer Credits: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

# ATTACHMENT 1B
# GRAPHS

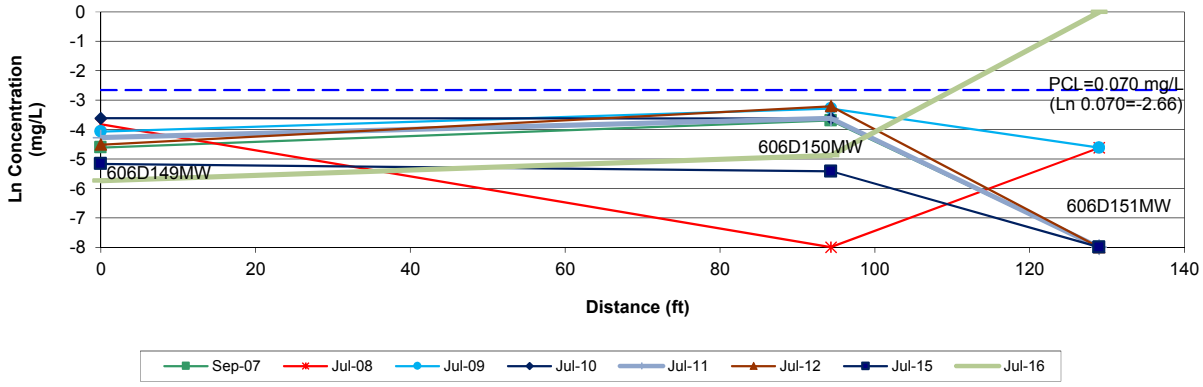
# CONCENTRATION VS. DISTANCE GRAPHS
# SWMU 18 PLUME
# 2016 RAER

## FORMER NAS DALLAS, TEXAS

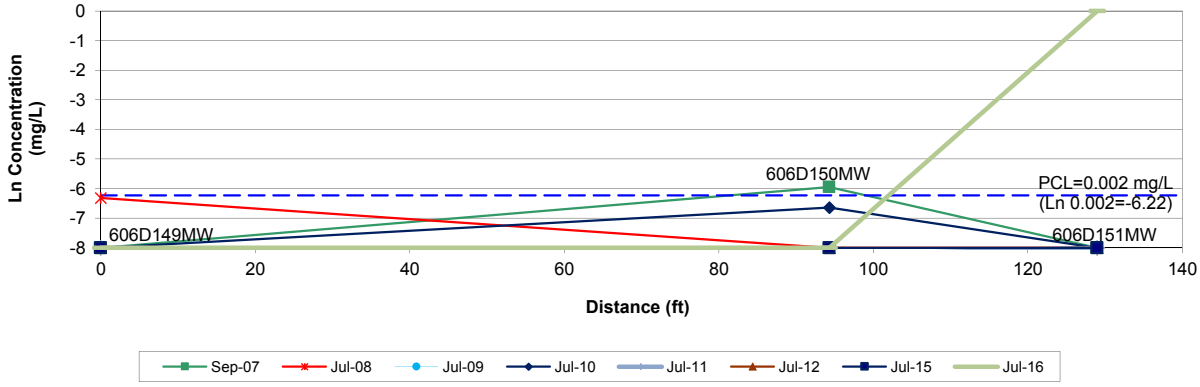
### TCE




### cis-1,2-DCE




### Vinyl Chloride

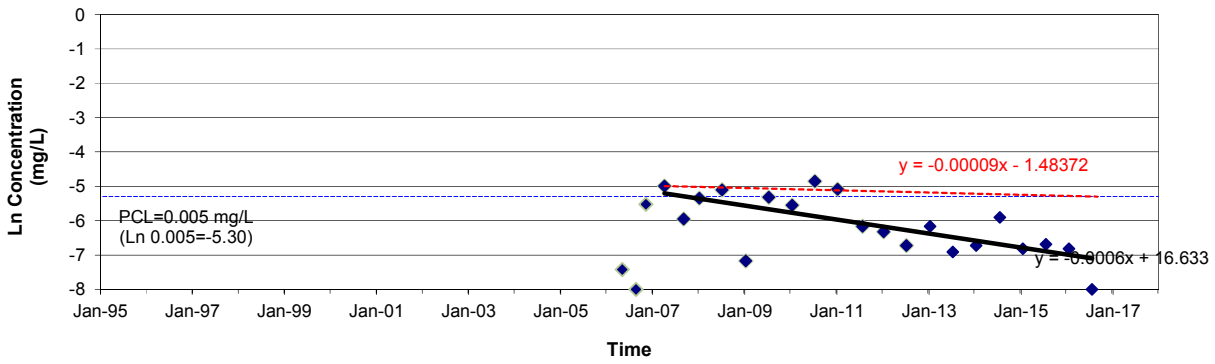



Notes: Graphed data points are taken from raw data.
Sample events using passive diffusion bag (PDB) samplers are listed on Tables 4-1A and 4-1B in Appendix 4.

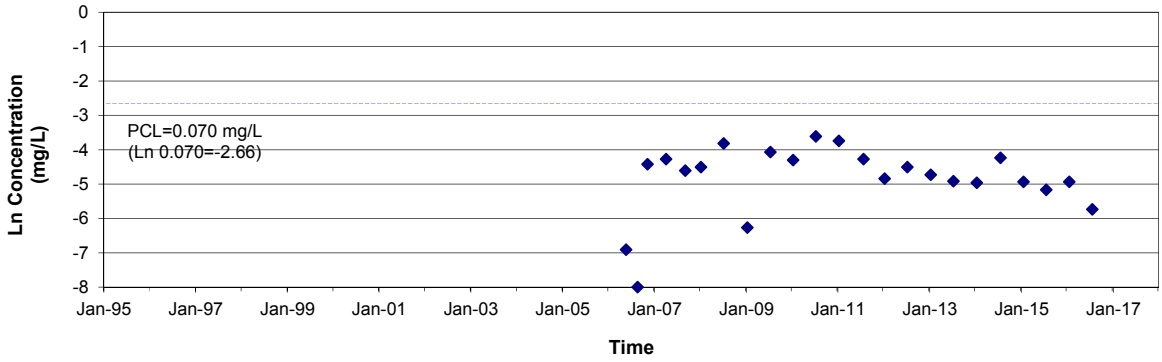
# CONCENTRATION VS. TIME GRAPHS
# WITH MINIMUM REQUIRED ATTENUATION RATE
# SWMU 18 PLUME
# 606D149MW
# 2016 RAER

## FORMER NAS DALLAS, TEXAS

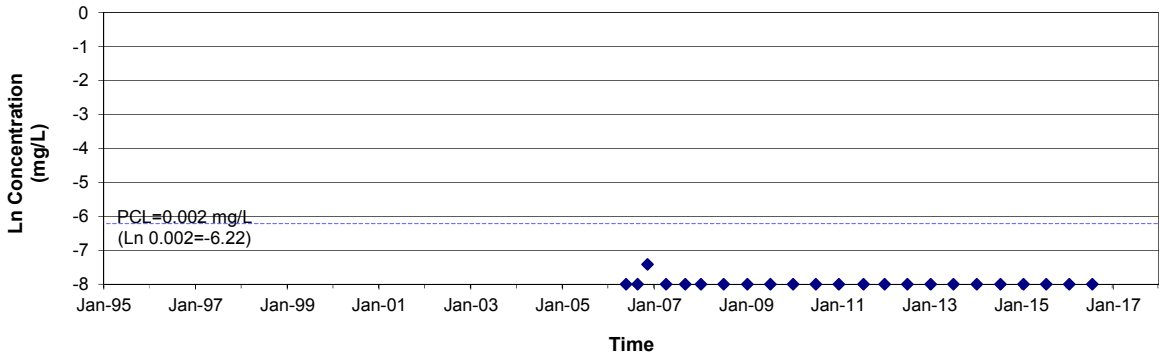
### TCE




### cis-1,2-DCE




### Vinyl Chloride

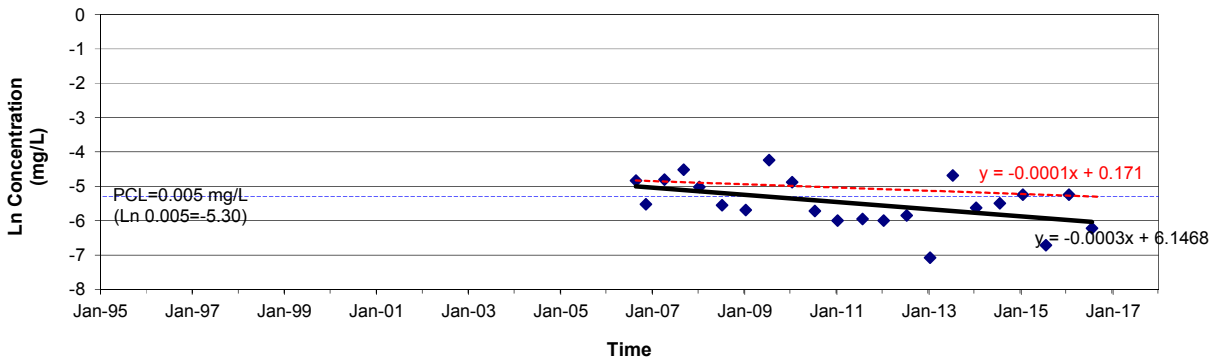



Notes: Red line and slope are based on minimum required attenuation rate ($k_{time}$) to meet PCL by 01 Sep 2016.
Black line and slope are based on linear regression of the raw data.
Sample events using permeable diffusion bag (PDB) samplers are listed on Tables 4-1A and 4-1B in Appendix 4.

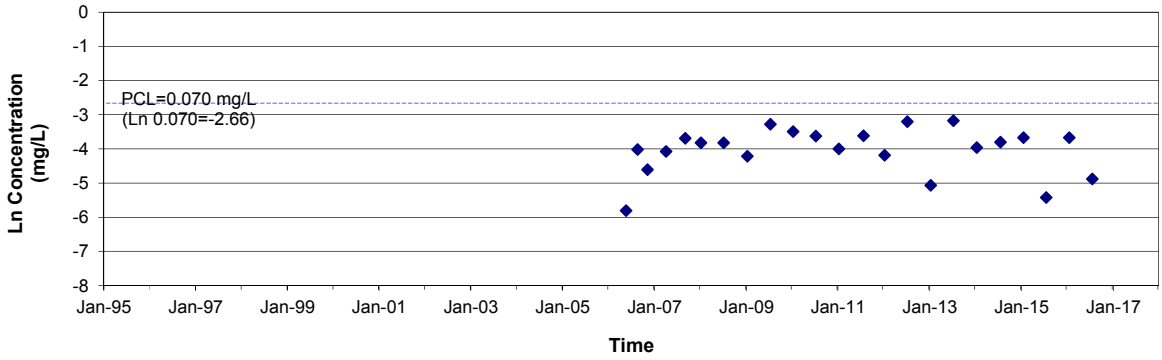
# CONCENTRATION VS. TIME GRAPHS
# WITH MINIMUM REQUIRED ATTENUATION RATE
# SWMU 18 PLUME
# 606D150MW
# 2016 RAER

## FORMER NAS DALLAS, TEXAS

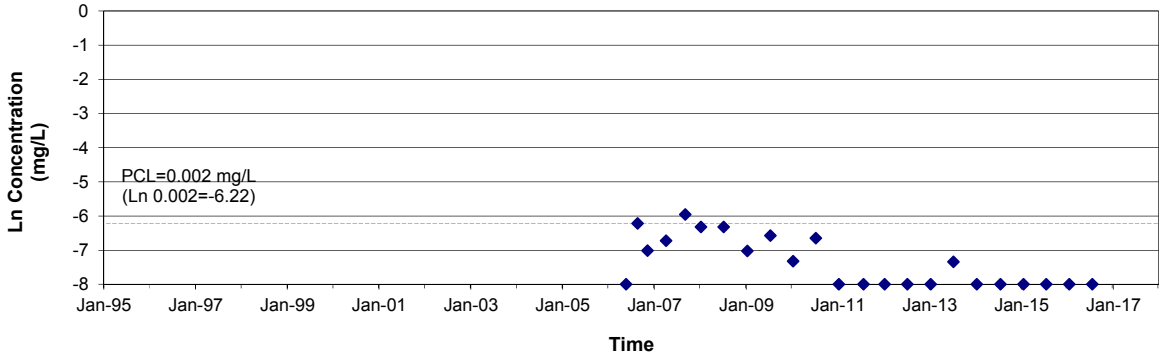
### TCE




### cis-1,2-DCE




### Vinyl Chloride

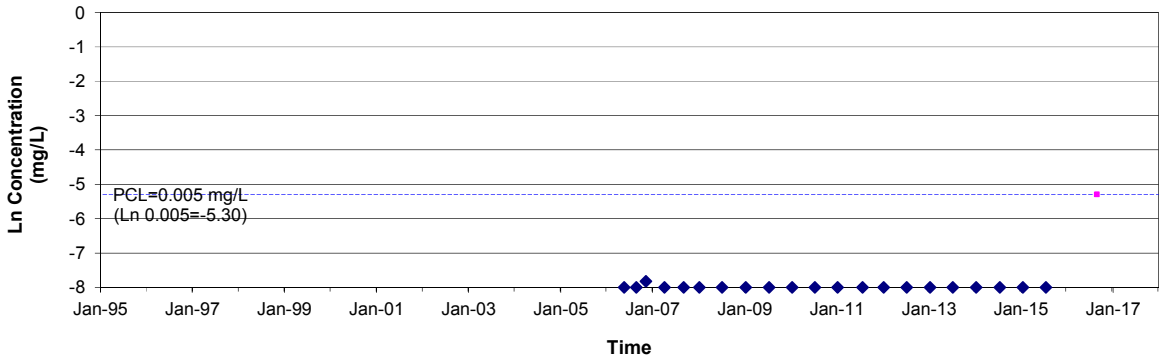



Notes: Red line and slope are based on minimum required attenuation rate ($k_{time}$) to meet PCL by 01 Sep 2016.
Black line and slope are based on linear regression of the raw data.
Sample events using permeable diffusion bag (PDB) samplers are listed on Tables 4-1A and 4-1B in Appendix 4.

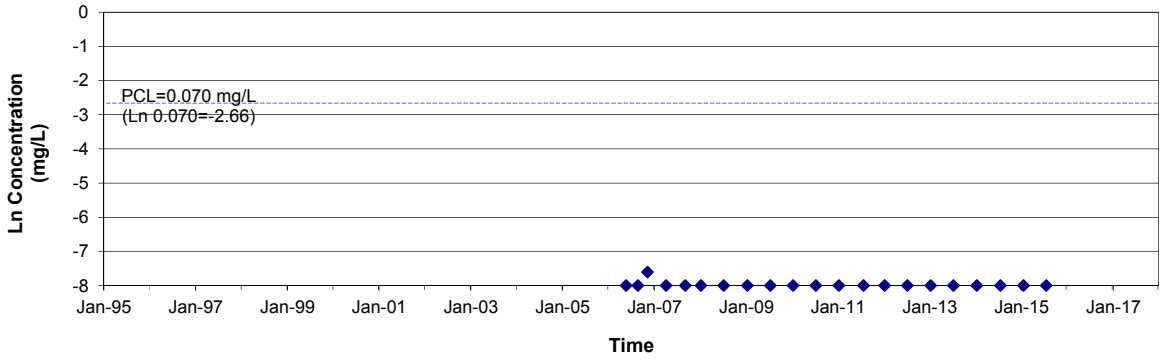
# CONCENTRATION VS. TIME GRAPHS
# WITH MINIMUM REQUIRED ATTENUATION RATE
# SWMU 18 PLUME
# 606D151MW
# 2016 RAER

## FORMER NAS DALLAS, TEXAS

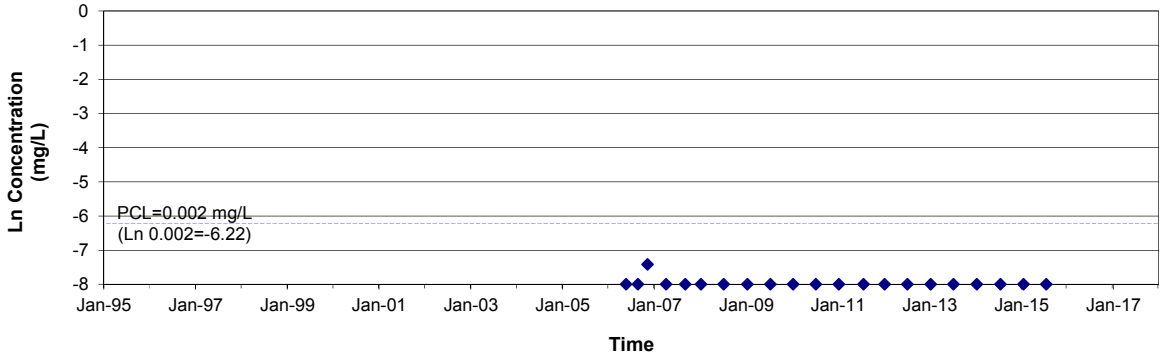
### TCE




### cis-1,2-DCE




### Vinyl Chloride

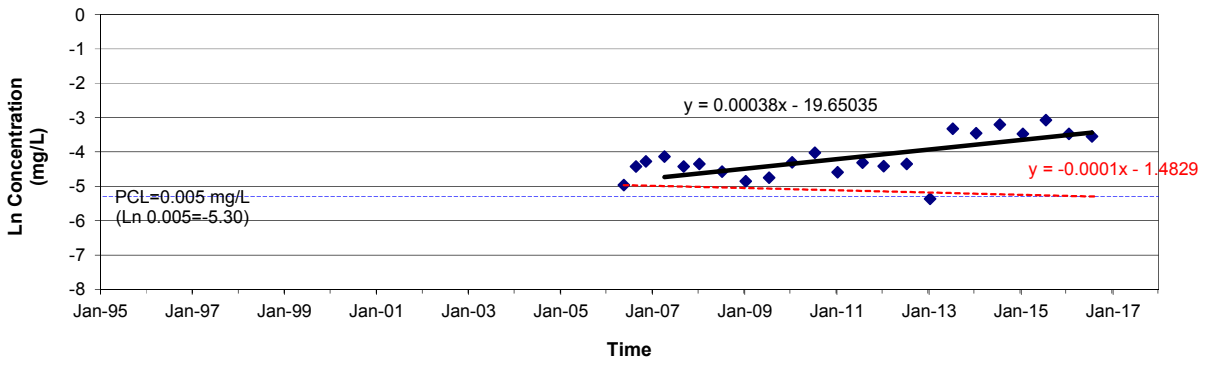



Notes: Red line and slope are based on minimum required attenuation rate ($k_{time}$) to meet PCL by 01 Sep 2016.
Black line and slope are based on linear regression of the raw data.
Sample events using permeable diffusion bag (PDB) samplers are listed on Tables 4-1A and 4-1B in Appendix 4.

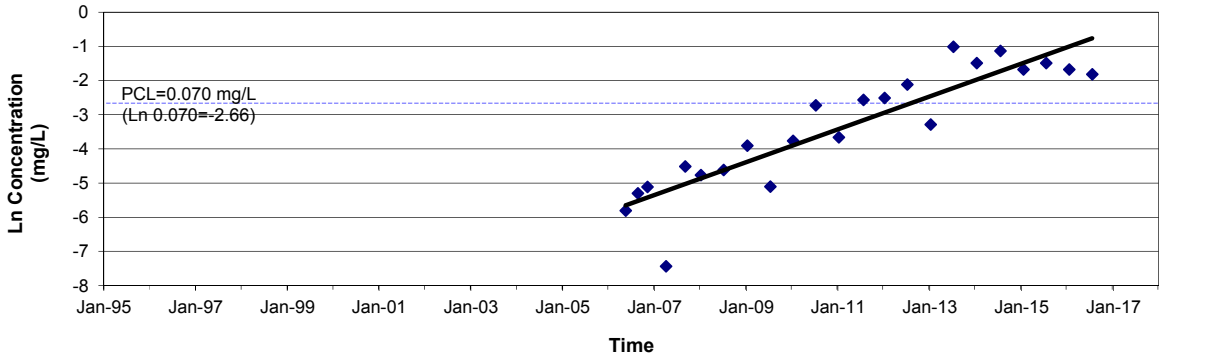
# CONCENTRATION VS. TIME GRAPHS
# WITH MINIMUM REQUIRED ATTENUATION RATE
# SWMU 18 PLUME
# 606D152MW
# 2016 RAER

## FORMER NAS DALLAS, TEXAS

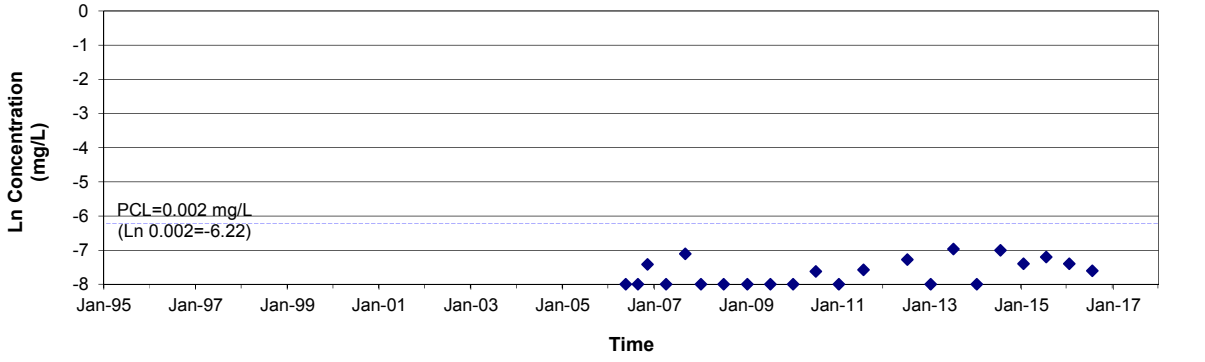
### TCE




### cis-1,2-DCE




### Vinyl Chloride

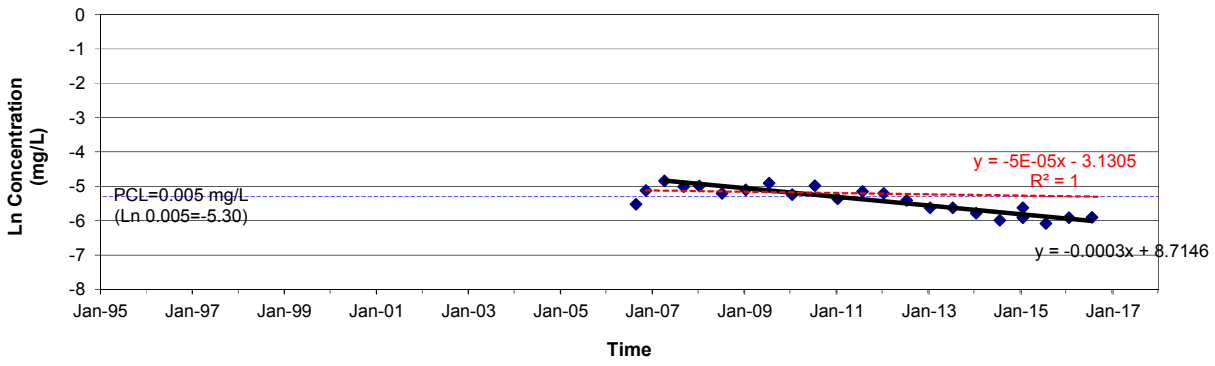



Notes: Red line and slope are based on minimum required attenuation rate ($k_{time}$) to meet PCL by 01 Sep 2016.
Black line and slope are based on linear regression of the raw data.
Sample events using permeable diffusion bag (PDB) samplers are listed on Tables 4-1A and 4-1B in Appendix 4.

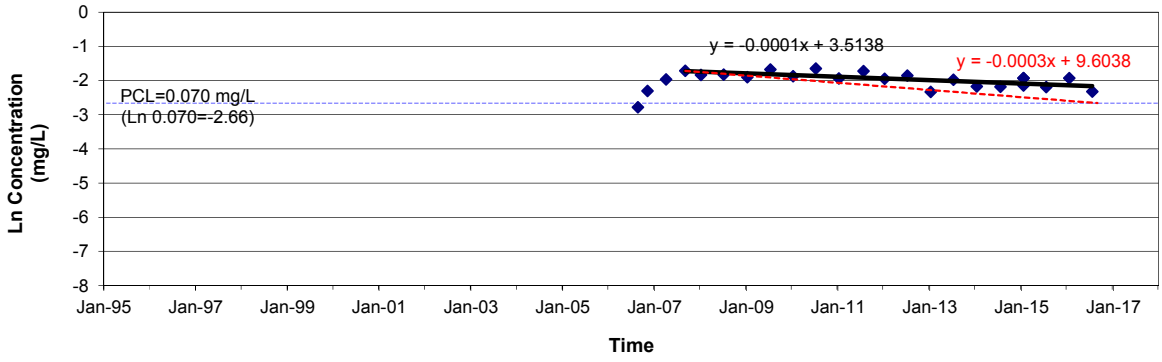
# CONCENTRATION VS. TIME GRAPHS
# WITH MINIMUM REQUIRED ATTENUATION RATE
# SWMU 18 PLUME
# 606D153MW
# 2016 RAER

## FORMER NAS DALLAS, TEXAS

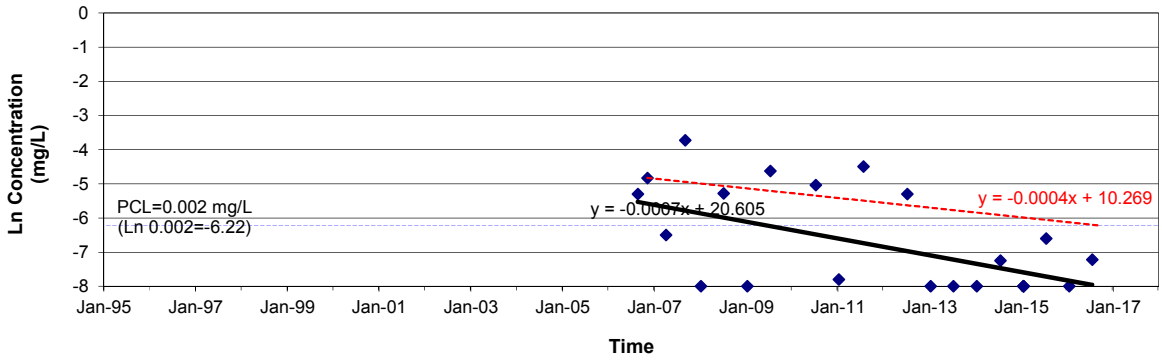
### TCE




### cis-1,2-DCE




### Vinyl Chloride

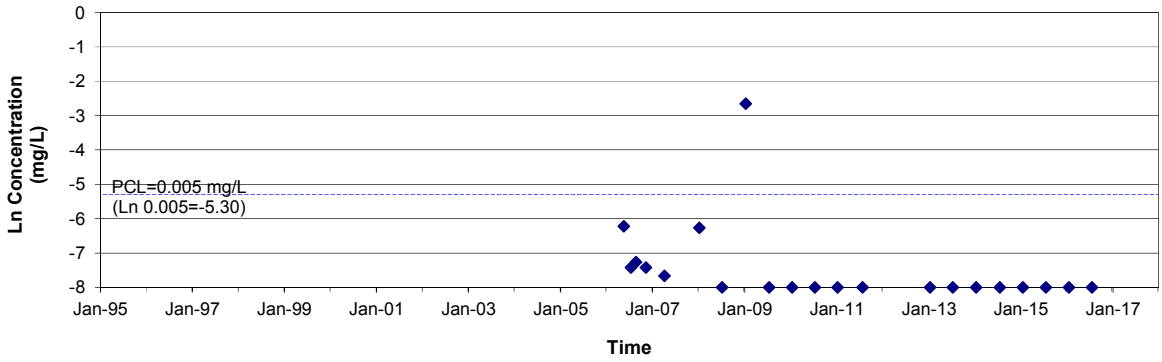



Notes: Red line and slope are based on minimum required attenuation rate ($k_{time}$) to meet PCL by 01 Sep 2016.
Black line and slope are based on linear regression of the raw data.
Sample events using permeable diffusion bag (PDB) samplers are listed on Tables 4-1A and 4-1B in Appendix 4.

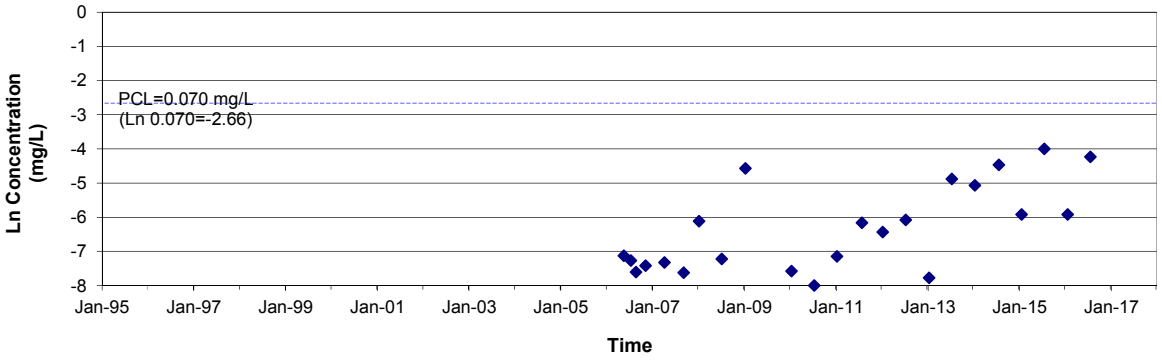
# CONCENTRATION VS. TIME GRAPHS
# WITH MINIMUM REQUIRED ATTENUATION RATE
# SWMU 18 PLUME
# 606D154MW
# 2016 RAER

## FORMER NAS DALLAS, TEXAS

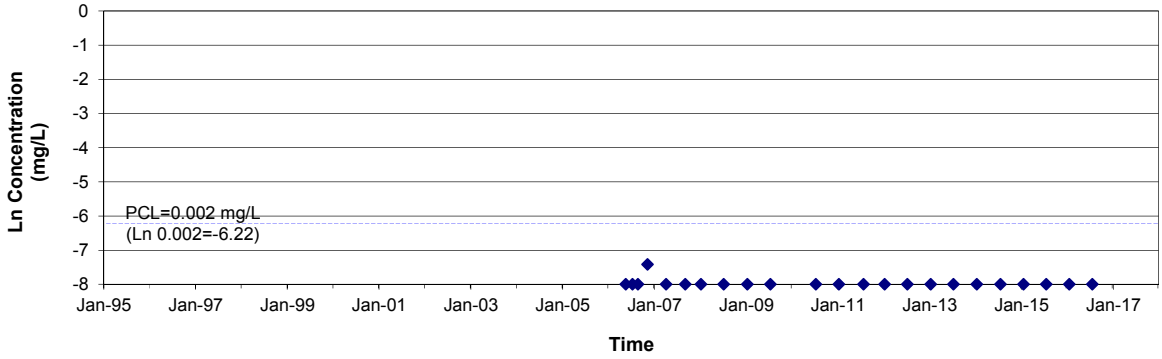
### TCE




### cis-1,2-DCE




### Vinyl Chloride




Notes: Red line and slope are based on minimum required attenuation rate ($k_{time}$) to meet PCL by 01 Sep 2016.
Black line and slope are based on linear regression of the raw data.
Sample events using permeable diffusion bag (PDB) samplers are listed on Tables 4-1A and 4-1B in Appendix 4.

## Performance Measures

List and describe the performance measures for each environmental medium containing a PCLE zone that are being used to determine if reasonable progress is being made by the response action in a timely manner. Provide documentation that these performance measures are being met. Attach additional information if necessary.

**Performance Measures for Groundwater Excavation**

**The approach used to determine if the response action was successful after the excavation of the PCLE zone to expose and remove the impacted groundwater involved confirmation sampling of the groundwater that entered into the open excavation. Based on the previous groundwater excavation activities at other plumes at Former NAS Dallas and guidance from the TCEQ, two consecutive analytical results from the groundwater sampled within the excavation indicating concentrations less than TRRP RES A were necessary to verify that the remedial objectives had been achieved. If the analytical results indicated that COCs were still present in the groundwater at concentrations greater than TRRP RES A, additional soil excavation and/or groundwater removal would be performed and the groundwater would be sampled again. Once two consecutive analytical results indicated that the COC concentrations were less than TRRP RES A, the excavation area was backfilled, graded, and the site was restored to pre-excavation conditions.**

**After completion of the groundwater excavation activities and backfilling and grading of the area, six monitoring wells (606D149MW, 606D150MW, 606D151MW, 606D152MW, 606D153MW, and 606D154MW) were installed within and around the former PCLE zone to confirm that TRRP RES A criteria had been consistently achieved. In June 2011, as a result of a monitoring well inspection at SWMU 18 conducted on monitoring wells within the 20-acre area leased to the Air National Guard, the Navy abandoned monitoring well 606D154MW and installed replacement monitoring well 606D154RMW. These monitoring wells are sampled on a semi-annual basis as required by the Compliance Plan (No. 50276) for Former NAS Dallas.**

**Post Response Action Monitoring Data Assessment**

**The removal of source areas (contaminated soils and groundwater) was completed in 2005. Two consecutive confirmation samples were obtained from the groundwater within the open excavation that indicated the groundwater PCLE zone had been removed.**

**Six replacement monitoring wells were installed in and around the historic PCLE zone as stated above. It was expected that no residual concentrations would be detected in the replacement monitoring wells during the post-response action period. However, post-excavation and backfilling sampling rounds detected residual concentrations of TCE in the replacement wells. Therefore, as proposed in the RAP (Tetra Tech, 2006), MNA was implemented for the decontamination of any remaining COC exceedances until the remedial goals have been met.**

**Performance Measures for MNA**

**The approach to determine if MNA is consistently achieving the clean-up goals by 2017 involves sequential sampling events to determine how the size and shape of the PCLE zones are changing over time. To this effect, a tiered sampling program incorporating performance, detection, and ambient monitoring is implemented. This sampling program allows the collection of data on the COCs, groundwater flow, and geochemical parameters that may affect the progress of MNA and the likelihood of meeting site remediation goals. The design of the monitoring program allows a conclusion of success or failure to be drawn as early as possible during the response action while providing reasonable confidence in the conclusion.**

**Performance monitoring encompasses the sampling of the point of exposure (POE) wells (606D149MW, 606D150MW, 606D152MW, and 606D153MW) within the plume and the background monitoring well (606D154RMW) outside the PCLE zone. Data collected from these monitoring wells serves to check the plume shape and determine if it is shrinking or expanding, stable or migrating, thus triggering programmatic adjustments if necessary. COC analytical data collected from the monitoring wells located along the plume centerline are used to determine plume attenuation rates for individual COCs ($k_{time}$) and**

for the plume as a whole ($k_{dist}$). Data collected from the background monitoring wells serves to monitor any changes in the ambient conditions are changing that may impact the effectiveness of MNA in achieving the clean-up goals in a timely manner. The COC analytical results are summarized in Table 4-1.

POE well 606D151MW had no history of COC detections. The well was abandoned on April 7, 2016, in accordance with the RAP submitted to TCEQ in October 2015. Plugging Reports are located in Appendix 4, and historical COC analytical results for P&A'd wells are included in Table 4-1B.

Performance monitoring for 2016 also entailed sampling for MNA parameters (pH, oxidation-reduction potential [ORP], dissolved oxygen [DO], ferrous iron, alkalinity, hydrogen sulfide, carbon dioxide, nitrate, nitrite, orthophosphate, sulfate, sulfide, total organic carbon, chloride, ethene, ethane, and methane) during the July 2016 sampling event. MNA parameters are sampled on a biennial sampling schedule. The MNA parameters measured by field tests and laboratory analyses are presented in Table 4-2. MNA parameter data, as needed, serve as a secondary line of evidence to evaluate whether subsurface conditions continue to support natural attenuation.

The conceptual MNA site model for this plume is represented in the isoconcentration maps and potentiometric surface maps included in Attachment 1A, the concentration vs. time and concentration vs. distance graphs in Attachment 1B, and the linear regressions for estimation of COC attenuation rates included in Tables 4-4 and 4-5 in Appendix 4.

After each semi-annual groundwater monitoring event, the COC concentration data collected were evaluated for both the entire plume as well as on a monitoring well by monitoring well basis in accordance with the RAP (Tetra Tech, 2006). The initial data analysis and interpretation focused on the detection of trend changes in the data. Further evaluation focused on the impact the trend changes may have on the potential for MNA to achieve the remedial goals.

It was expected that the analytical data would indicate the attenuation rates are sufficient to effectively remediate the plume on or before the year 2017. Reasonable progress of the response action is evaluated considering the following criteria:

- The monitoring well and COC specific $k_{time}$ attenuation rate based on the available sampling data is not more than the minimum attenuation rate necessary to meet the remedial goals by the year 2017.
- The monitoring well and COC specific concentration is less than the remedial benchmark concentration (calculated concentration goal based on the initial maximum concentration and the minimum rate necessary to achieve the remedial goals by 2017) for that sample date.
- The COC specific $k_{dist}$ attenuation rate based on the available sampling data indicates attenuation equal to or faster than the rate of COC migration from the suspected source area.

<u>Response Action Progress</u>

The removal of source areas (impacted soils and groundwater) was completed in 2005. Two consecutive confirmation samples were obtained from the groundwater within the open excavation that indicated the groundwater PCLE zone had been removed. However, TCE and cis-1,2-DCE concentrations were detected in the replacement monitoring wells. Therefore, MNA has been implemented for the decontamination of any remaining COC exceedances until the remedial goals have been met.

Table 4-3 summarizes the groundwater gauging data. The potentiometric surface maps for the December 2015 and July 2016 gauging events, included in Figure 1A-3 (Attachment 1A), indicate that the direction of groundwater flow is to the north, consistent with previous sampling events.

The COC isoconcentration contour maps, prepared using the data collected during the January and July 2016 sampling events, are included in Figures 1A-2A through 1A-2B (Attachment 1A). A review of the 2016 data indicate that:

- TCE and cis-1,2-DCE are the only COCs at SWMU 18 currently exceeding PCLs.
- TCE exceeded its PCL in one of the five monitor wells (606D152MW), and cis-1,2-DCE exceeded its PCL in two of the five monitor wells (606D152MW and 606D153MW).

- **TCE exceeded its PCL of 0.005 mg/L during both the January and July sampling event at 606D152MW (0.0108 and 0.0288 mg/L).**

- **Cis-1,2-DCE exceeded its PCL of 0.07 mg/L during both the January and July sampling events at monitoring wells 606D152MW (0.16 and 0.162 mg/L) and 606D153MW (0.137 and 0.0981 mg/L).**

**Tables 4-4 and 4-5 (Appendix 4) summarize the concentration vs. time and concentration vs. distance attenuation rate constants for the plume centerline. The graphs in Attachment 1B graphically depict the same attenuation rate constants summarized in Tables 4-4 and 4-5 and the minimum required attenuation rate to meet the remediation goals. Based on the data presented:**

- **The monitoring wells located on the perimeter of SWMU 18 Plume (monitoring wells 606D149MW, 606D150MW, and 606D154RMW) have met 2017 remedial goals, indicating that effective remediation of portions of the plume through soil remediation and MNA has occurred.**

- **Monitoring well 606D152MW displays stable to increasing trends for concentrations of TCE and cis-1,2,DCE, indicating that remedial goals will not be achieved by the year 2017.**

- **Monitoring well 606D153MW displays a generally stable trend for cis-1,2-DCE, indicating remedial goals will not be achieved by the year 2017.**

**Monitoring wells 606D152MW and 606D153MW indicate a lack of progress toward clean-up, indicating that MNA has slowed or ceased to the point that the remedial goals will not be achieved at these locations. In accordance with the approved Groundwater RAP (Revision 2) (TtNUS, 2006), and as recommended by TCEQ in a letter dated May 26 2015, failure of the response action triggers the implementation of contingency measures, which may include the selection of an appropriate alternate remedial measure. In May 2016, the Navy implemented EMNA as an alternate remedy at the affected area of SWMU 18 groundwater plume in an effort to reduce COCs to below PCLs. This will allow the Navy to make a determination as to whether the technology is viable. MNA will be continued at the SWMU 18 for the upcoming year in accordance with the procedures and protocols described in the Groundwater RAP (Revision 2) (Tetra Tech, 2006).**

## Problems

Complete the table for the response action. When the response action consists of several components or multiple actions, complete one table for each major component or action.

Response Action Name/Designation: ***Groundwater Response Action***

List the problems that have been encountered during the response action, describe the impact of each problem, and the response to the problem.

| Description of the Problem | Impact | Did this cause a response action failure? Yes | No | Corrective Response |
|---|---|---|---|---|
| ***Excavation of the impacted soil and groundwater reduced COC concentrations to the respective PCLs in most but not all of the monitoring wells located throughout the historical PLCE zone.*** | ***None*** | | ***X*** | ***Continue the use of MNA at this plume until COC concentrations in groundwater decrease to less than the TRRP RES A PCLs.*** |
| ***Monitoring Well 606D154MW damaged during construction activities in 2011.*** | ***None*** | | ***X*** | ***Monitoring Well 606D154MW plugged and abandoned, and replaced with monitoring well 606D154RMW.*** |

| Description of the Problem | Impact | Did this cause a response action failure? Yes | No | Corrective Response |
|---|---|---|---|---|
| ***COC concentration data for monitoring wells 606D152MW and 606D153MW indicate MNA has slowed or ceased to the point that the remedial goals will not be achieved at these wells.*** | ***In accordance with the approved RAP (TtNUS, 2006), failure of the approved response action to meet critical PCLs triggers the implementation of contingency measures, which includes the selection of an appropriate alternate remedial measure.*** | ***X*** | | ***As part of the Interim Revised RAP (Revision 3) submitted by the Navy in October 2015, the Navy has proposed to implement EMNA as an alternate remedy at the affected area of SWMU 18 groundwater plume in an effort to reduce COCs to below PCLs. In addition, the Interim RAP (Revision 3) proposed to remove monitor wells from the current monitoring and sampling plan and confirmation sampling plan. MNA will be continued at the SWMU 18 Plume for the upcoming year in accordance with the procedures and protocols described in the Groundwater RAP (Revision 2) (Tetra Tech, 2006).*** |

Use this worksheet to describe the operation and maintenance (O&M) activities conducted for each response action.

Response Action Name/Designation: Well maintenance

List all portions of the response action to which this information applies. Repeat this worksheet for each major component or operation.

Describe the O&M and inspection activities that have been conducted to operate and maintain response action components.

**In October 2015, the Navy submitted a revised RAP (Revision 3) (Resolution Consultants, 2015) to TCEQ. The purpose of the revised RAP was to remove monitor wells from the current monitoring and sampling plan and confirmation sampling plan. CAO well 606D152MW had no history of COC detections. Per approval from TCEQ, and in accordance with the RAP submitted to TCEQ in October 2015, Resolution Consultants conducted plugging and abandonment (P&A) of 606D152MW in April 2016. P&A actions were conducted by a state of Texas licensed driller (Strata Core Services, SCI). Well plugging reports are located in Appendix 4, and historical COC analytical results for P&A'd wells are included in Table 4-1B.**

**In September 2016, Resolution Consultants conducted a detailed evaluation of maintenance needs for monitor wells at former NAS Dallas. Monitor wells 606D149MW, 606D150MW, 606D152MW, and 606D153MW (all stickup wells) were in good condition, all pads and bollards were stable, and the wells were locked. The surface completion at monitoring well 606D154MW was re-fitted by tapping the rim eyelets and replacing bolts and washers in order to secure the lid.**

# APPENDIX 1
# REFERENCE LIST

# APPENDIX 1
# REFERENCES

A.T. Kearney, Inc. *RCRA Facility Assessment Preliminary Review/Visual Site Inspection. Chicago, Illinois.* 1989.

CH2M Hill, *85 Sites, Defense Reutilization and Marketing Office, and Naval Weapons Industrial Reserve Plant SWMU 18 Response Action Completion Report, Revision 3, Naval Air Station Dallas, Dallas, Texas.* Atlanta, Georgia. May, 2008. 2008.

EnSafe/Allen & Hoshall. *Naval Air Station Dallas Environmental Baseline Survey, Dallas, Texas*. Memphis, Tennessee. 1994.

Tetra Tech NUS, Inc. *RCRA Facility Investigation Report for Category C*. Pittsburgh, Pennsylvania. 2000a.

— *RCRA Facility Investigation Report for Category E. Pittsburgh, Pennsylvania.* 2000b.

— *RCRA Facility Investigation Report for Category F. Pittsburgh, Pennsylvania.* 2000c.

— *RCRA Facility Investigation Report for Category D. Pittsburgh, Pennsylvania.* 2001a.

— *RCRA Facility Investigation Report for Category B. Pittsburgh, Pennsylvania.* 2001b.

— *Affected Property Assessment Report. Houston, Texas*. 2002.

— *Final Monitoring Natural Attenuation Groundwater Modeling Report for Category D. Pittsburgh, Pennsylvania.* 2004.

— *Response Action Plan, Revision 2. Pittsburgh, Pennsylvania.* 2006.

Resolution Consultants. *Draft Final Alternatives Evaluation Report, Former Naval Air Station, Dallas, Texas*. Norfolk, Virginia. August 2013.

— *Draft Vapor Intrusion Study Report, Buildings 1405, 1422, and 1424, Solid Waste Management Unit 21*. Norfolk, Virginia. September 2015.

— *Interim Revised Groundwater Response Action Plan for SWMU 18 Plume (Revision 3).* Norfolk, Virginia. October 2015.

# APPENDIX 4
# DATA TABLES

**Table 4-1 Summary of Chemicals of Concern Detected in Groundwater**
**Table 4-2 Summary of Geochemical Parameters Measured in Groundwater**
**Table 4-3 Summary of Groundwater Gauging Data**
**Table 4-4 Summary of Concentration vs. Time Attenuation Rate Constants**
**Table 4-5 Summary of Concentration vs. Distance Attenuation Rate Constants**

# TABLE 4-1
# SUMMARY OF CHEMICALS OF CONCERN DETECTED IN GROUNDWATER

**Table 4-1A**

**Summary of Chemicals of Concern Detected in Groundwater**
**Long Term Monitoring Wells — SWMU 18 Plume**
**2016 RAER**
**Former NAS Dallas, Texas**
**Page 1 of 3**

| Monitoring Well | Sampling Date | Sampling Round | Chemicals of Concern (mg/L) | | | | |
|---|---|---|---|---|---|---|---|
| | | | 1,1-Dichloroethene | cis-1,2-Dichloroethene | trans-1,2-Dichloroethene | Trichloroethene | Vinyl Chloride |
| **Protective Concentration Levels (mg/L)** | | | **0.00700** | **0.07000** | **0.10000** | **0.00500** | **0.00200** |
| **Monitoring Wells Located Inside PCLE Zone** | | | | | | | |
| **606D149MW** | 5/15/2006 | Wells Installed | | | | | |
| | 5/23/2006 | Round 15 | 0.00060 U | 0.00100 | 0.00060 U | 0.00060 J | 0.00060 U |
| | 8/23/2006 | Round 16 | 0.00060 U | 0.00050 U | 0.00060 U | 0.00040 U | 0.00060 U |
| | 11/9/2006 | Round 16B | 0.00060 U | 0.01200 | 0.00080 J | 0.00400 | * 0.00060 U |
| | 5/10/2007 | Round 17 (PDB) | 0.00028 U | 0.01400 | 0.00150 | 0.00680 | 0.00012 U |
| | 9/14/2007 | Round 18 | 0.00013 U | 0.01000 | 0.00130 | 0.00260 | 0.00020 U |
| | 1/29/2008 | Round 19 (PDB) | 0.00039 U | 0.01100 | 0.00065 J | 0.00480 | 0.00043 U |
| | 7/23/2008 | Round 20 (PDB) | 0.00054 U | 0.02190 | 0.00260 | 0.00610 | 0.00030 U |
| | 1/12/2009 | Round 21 (PDB) | 0.00054 U | 0.00190 | 0.00045 U | 0.00077 J | 0.00030 U |
| | 7/15/2009 | Round 22 | 0.00054 U | 0.01710 | 0.00360 | 0.00490 | 0.00030 U |
| | 1/13/2010 | Round 23 (PDB) | 0.00029 U | 0.01360 | 0.00093 J | 0.00390 | 0.00028 U |
| | 7/13/2010 | Round 24 (PDB) | 0.00029 U | 0.02700 | 0.00330 | 0.00780 | 0.00028 U |
| | 1/11/2011 | Round 25 (PDB) | 0.00023 U | 0.02380 | 0.00310 | 0.00620 | 0.00022 U |
| | 7/27/2011 | Round 26 | 0.00023 U | 0.01390 | 0.00190 | 0.00210 | 0.00022 U |
| | 1/10/2012 | Round 27 (PDB) | 0.00023 U | 0.00790 | 0.00059 J | 0.00180 | 0.00022 U |
| | 7/11/2012 | Round 28 | NS | 0.01100 | 0.00140 | 0.00120 | 0.00022 U |
| | 1/8/2013 | Round 29 (PDB) | 0.00020 U | 0.0088 | 0.00097 J | 0.0021 | 0.00044 U |
| | 7/17/2013 | Round 30 | 0.00020 U | 0.0073 | 0.00086 J | 0.0010 | 0.00044 U |
| | 2/25/2014 | Round 31 (PDB) | 0.00025 U | 0.0070 | 0.00034 U | 0.0012 | 0.00033 U |
| | 7/22/2014 | Round 32 | 0.0005 U | 0.0145 | 0.00158 J | 0.00273 | 0.0005 U |
| | 1/21/2015 | Round 33 (PDB) | NS | 0.00717 | 0.00036 J | 0.0011 | 0.00025 U |
| | 7/21/2015 | Round 44 | 0.00025 U | 0.00571 | 0.000657 J | 0.00125 | 0.00025 U |
| | 1/21/2016 | Round 35 (PDB) | NS | 0.00511 | 0.00069 J | 0.0008 J | 0.00025 U |
| | 7/21/2016 | Round 36 | 0.0005 U | 0.00322 | 0.0005 U | 0.0005 U | 0.0005 U |
| **606D150MW** | 5/15/2006 | Wells Installed | | | | | |
| | 5/23/2006 | Round 15 | 0.00060 U | 0.00300 | 0.00060 U | 0.00100 | 0.00060 U |
| | 8/23/2006 | Round 16 | 0.00060 U | 0.01800 | 0.00070 J | 0.00800 | 0.00200 J |
| | 11/8/2006 | Round 16B | 0.00060 U | 0.01000 | 0.00060 U | 0.00400 | * 0.00090 J |
| | 5/10/2007 | Round 17 (PDB) | 0.00028 U | 0.01700 | 0.00079 J | 0.00820 | 0.00120 J |
| | 9/14/2007 | Round 18 | 0.00021 J | 0.02500 | 0.00084 J | 0.01100 | 0.00260 |
| | 1/29/2008 | Round 19 (PDB) | 0.00039 U | 0.02200 | 0.00052 J | 0.00660 | 0.00180 J |
| | 7/23/2008 | Round 20 (PDB) | 0.00054 U | 0.02200 | 0.00056 J | 0.00390 | 0.00180 |
| | 1/12/2009 | Round 21 (PDB) | 0.00054 U | 0.01480 | 0.00050 J | 0.00340 | 0.00089 J |
| | 7/15/2009 | Round 22 | 0.00054 U | 0.03760 | 0.00160 | 0.01450 | 0.00140 |
| | 1/13/2010 | Round 23 (PDB) | 0.00029 U | 0.03050 | 0.00210 | 0.00760 | 0.00066 J |
| | 7/13/2010 | Round 24 (PDB) | 0.00029 U | 0.02680 | 0.00150 | 0.00330 | 0.00130 |
| | 1/11/2011 | Round 25 (PDB) | 0.00023 U | 0.01830 | 0.00093 J | 0.00250 | 0.00022 U |
| | 7/27/2011 | Round 26 | 0.00023 U | 0.02690 | 0.00310 | 0.00260 | 0.00026 J |
| | 1/10/2012 | Round 27 (PDB) | 0.00023 U | 0.01520 | 0.00020 U | 0.00250 | 0.00022 U |
| | 7/11/2012 | Round 28 | NS | 0.04050 | 0.00450 | 0.00290 | 0.00022 U |
| | 1/8/2013 | Round 29 (PDB) | 0.00020 U | 0.0063 | 0.00046 J | 0.00085 J | 0.00044 U |
| | 7/17/2013 | Round 30 | 0.00023 J | 0.0420 | 0.00230 | 0.00930 | 0.00065 J |
| | 2/25/2014 | Round 31 (PDB) | 0.00025 U | 0.0190 | 0.58000 J | 0.00360 | 0.00033 U |
| | 7/22/2014 | Round 32 | 0.0005 U | 0.0223 | 0.00075 J | 0.00412 | 0.0005 U |
| | 1/21/2015 | Round 33 (PDB) | NS | 0.0255 | 0.00079 J | 0.00529 | 0.00025 U |
| | 7/21/2015 | Round 34 | 0.00025 U | 0.00443 | 0.00025 U | 0.00122 | 0.00025 U |
| | 1/21/2016 | Round 35 (PDB) | NS | 0.0184 | 0.00061 J | 0.0024 | 0.00025 U |
| | 7/21/2016 | Round 36 | 0.00025 U | 0.0076 | 0.00028 J | 0.002 | 0.00025 U |

**Table 4-1A**

**Summary of Chemicals of Concern Detected in Groundwater**
**Long Term Monitoring Wells — SWMU 18 Plume**
**2016 RAER**
**Former NAS Dallas, Texas**
**Page 2 of 3**

| Monitoring Well | Sampling Date | Sampling Round | Chemicals of Concern (mg/L) | | | | |
|---|---|---|---|---|---|---|---|
| | | | 1,1-Dichloroethene | cis-1,2-Dichloroethene | trans-1,2-Dichloroethene | Trichloroethene | Vinyl Chloride |
| **Protective Concentration Levels (mg/L)** | | | **0.00700** | **0.07000** | **0.10000** | **0.00500** | **0.00200** |
| **606D152MW** | 5/15/2006 | Wells Installed | | | | | |
| | 5/19/2006 | Round 15 | 0.00060 U | 0.00300 | 0.00060 U | 0.00700 | 0.00060 U |
| | 8/24/2006 | Round 16 | 0.00060 U | 0.00500 | 0.00060 UJ | 0.01200 | 0.00060 U |
| | 11/9/2006 | Round 16B | 0.00060 U | 0.00600 | 0.00060 U | 0.01400 | 0.00060 U |
| | 5/15/2007 | Round 17 | 0.00028 U | 0.00990 | 0.00053 U | 0.01000 | 0.00036 J |
| | 5/15/2007 | Round 17 (PDB) | 0.00028 U | 0.00590 | 0.00053 U | 0.01600 | 0.00012 U |
| | 9/14/2007 | Round 18 | 0.00016 J | 0.01100 | 0.00030 J | 0.01200 | 0.00082 J |
| | 1/29/2008 | Round 19 (PDB) | 0.00039 U | 0.00850 | 0.00048 U | 0.01300 | 0.00043 U |
| | 7/23/2008 | Round 20 (PDB) | 0.00054 U | 0.00990 | 0.00045 U | 0.01040 | 0.00030 U |
| | 1/12/2009 | Round 21 (PDB) | 0.00054 U | 0.02020 | 0.00140 | 0.00780 | 0.00030 U |
| | 7/15/2009 | Round 22 | 0.00054 U | 0.00610 | 0.00052 J | 0.00870 | 0.00030 U |
| | 1/13/2010 | Round 23 (PDB) | 0.00029 U | 0.02310 | 0.00034 U | 0.01360 | 0.00028 U |
| | 7/13/2010 | Round 24 (PDB) | 0.00029 U | 0.06540 | 0.00073 J | 0.01800 | 0.00049 J |
| | 1/11/2011 | Round 25 (PDB) | 0.00023 J | 0.02560 | 0.00038 J | 0.01020 | 0.00022 U |
| | 7/27/2011 | Round 26 | 0.00023 U | 0.07680 | 0.00073 J | 0.01340 | 0.00051 J |
| | 1/10/2012 | Round 27 (PDB) | 0.00023 U | 0.08120 | 0.00068 J | 0.01210 | 0.00022 J |
| | 7/11/2012 | Round 28 | NS | 0.12100 | 0.00130 | 0.01360 | 0.00069 J |
| | 1/8/2013 | Round 29 (PDB) | 0.00020 U | 0.03720 | 0.00037 J | 0.00470 | 0.00044 U |
| | 7/17/2013 | Round 30 | 0.00038 J | 0.36300 | 0.00270 | 0.03610 | 0.00094 J |
| | 2/25/2014 | Round 31 (PDB) | 0.000025 U | 0.22600 | 0.00170 | 0.03150 | 0.00033 U |
| | 7/22/2014 | Round 32 | 0.0005 U | 0.32200 | 0.00262 | 0.04070 | 0.00091 J |
| | 1/21/2015 | Round 33 (PDB) | NS | 0.18700 | 0.00248 | 0.03100 | 0.00061 J |
| | 7/21/2015 | Round 34 | 0.0005 U | 0.22600 | 0.00162 J | 0.04630 | 0.000747 J |
| | 1/21/2016 | Round 35 (PDB) | NS | 0.16 | 0.0143 | 0.0108 | 0.00051 J |
| | 7/21/2016 | Round 36 | 0.0005 UJL | 0.162 JL | 0.00141 JL | 0.0288 JL | 0.0005 UJL |
| **606D153MW** | 5/16/2006 | Wells Installed | | | | | |
| | 5/19/2006 | Round 15 | NS-D | NS-D | NS-D | NS-D | NS-D |
| | 8/24/2006 | Round 16 | 0.00060 U | 0.06200 | 0.00300 | 0.00400 | 0.00500 |
| | 11/9/2006 | Round16B | 0.00060 U | 0.10000 | 0.00400 | 0.00600 | 0.00800 |
| | 5/14/2007 | Round 17 (PDB) | 0.00072 J | 0.14000 | 0.00670 | 0.00790 | 0.00150 J |
| | 9/17/2007 | Round 18 | 0.00046 J | 0.18000 | 0.00570 | 0.00670 | 0.02400 |
| | 1/29/2008 | Round 19 | 0.00039 U | 0.14000 | 0.00460 | 0.00620 | 0.00043 U |
| | 1/29/2008 | Round 19 (PDB) | 0.00039 U | 0.16000 | 0.00520 | 0.00680 | 0.00043 U |
| | 7/23/2008 | Round 20 | 0.00110 U | 0.13900 | 0.00480 | 0.00680 | 0.00250 |
| | 7/23/2008 | Round 20 (PDB) | 0.00110 U | 0.16100 | 0.00660 | 0.00550 | 0.00510 |
| | 1/12/2009 | Round 21 | 0.00110 U | 0.13500 | 0.00550 JH | 0.00580 | 0.00060 U |
| | 1/12/2009 | Round 21 (PDB) | 0.00110 U | 0.14900 | 0.00640 | 0.00610 | 0.00060 U |
| | 7/14/2009 | Round 22 | 0.00110 U | 0.18700 | 0.00750 | 0.00740 | 0.00980 |
| | 1/13/2010 | Round 23 | 0.0003 J | 0.13700 | 0.00550 | 0.00530 | 0.00028 J |
| | 1/13/2010 | Round 23 (PDB) | 0.00029 U | 0.15400 | 0.00570 | 0.00570 | 0.00028 U |
| | 7/13/2010 | Round 24 | 0.00035 J | 0.16600 | 0.00590 | 0.00560 | 0.00330 |
| | 7/13/2010 | Round 24 (PDB) | 0.00044 J | 0.19300 | 0.00790 | 0.00690 | 0.00650 |
| | 1/11/2011 | Round 25 (PDB) | 0.00029 J | 0.16600 | 0.00550 | 0.00520 | 0.00045 J |
| | 1/11/2011 | Round 25 | 0.00027 J | 0.14400 | 0.00500 | 0.00470 | 0.00041 J |
| | 7/27/2011 | Round 26 | 0.00034 J | 0.17800 | 0.00680 | 0.00580 | 0.01120 |
| | 1/10/2012 | Round 27 (PDB) | 0.00023 U | 0.14300 | 0.00510 | 0.00480 | 0.00025 J |
| | 1/10/2012 | Round 27 | 0.00025 J | 0.13100 | 0.00510 | 0.00480 | 0.00025 J |
| | 7/11/2012 | Round 28 | NS | 0.15600 | 0.00560 | 0.00410 | 0.00500 |
| | 1/8/2013 | Round 29 (PDB) | 0.00040 U | 0.106 | 0.0045 | 0.0034 | 0.00088 U |
| | 1/8/2013 | Round 29 | 0.00020 U | 0.0969 | 0.0049 | 0.0034 | 0.00044 U |
| | 7/17/2013 | Round 30 | 0.00020 U | 0.139 | 0.0055 | 0.0036 | 0.00044 U |
| | 2/25/2014 | Round 31 (PDB) | 0.00025 U | 0.1140 | 0.0050 | 0.0031 | 0.00033 U |
| | 7/22/2014 | Round 32 | 0.0005 U | 0.113 | 0.00433 | 0.00251 | 0.00071 J |
| | 1/21/2015 | Round 33 (PDB) | NS | 0.1460 | 0.00514 | 0.00361 | 0.00025 U |
| | 1/21/2015 | Round 33 | NS | 0.1170 | 0.00419 | 0.00277 | 0.0005 U |
| | 1/21/2015 | Round 33 | NS | 0.1190 | 0.00406 | 0.00271 | 0.0005 U |
| | 7/21/2015 | Round 34 | 0.0005 U | 0.1120 | 0.00378 | 0.00229 | 0.00136 |
| | 1/21/2016 | Round 35 (PDB) | NS | 0.137 | 0.00477 | 0.00268 | 0.00025 U |
| | 7/21/2016 | Round 36 | 0.0005 U | 0.0981 | 0.00342 | 0.00274 | 0.00073 J |

**Table 4-1A**

**Summary of Chemicals of Concern Detected in Groundwater**
**Long Term Monitoring Wells — SWMU 18 Plume**
**2016 RAER**
**Former NAS Dallas, Texas**
**Page 3 of 3**

| Monitoring Well | Sampling Date | Sampling Round | Chemicals of Concern (mg/L) | | | | |
|---|---|---|---|---|---|---|---|
| | | | 1,1-Dichloroethene | cis-1,2-Dichloroethene | trans-1,2-Dichloroethene | Trichloroethene | Vinyl Chloride |
| **Protective Concentration Levels (mg/L)** | | | **0.00700** | **0.07000** | **0.10000** | **0.00500** | **0.00200** |
| **Monitoring Wells Located Outside PCLE Zone** | | | | | | | |
| **606D154MW** | 5/15/2006 | Wells Installed | | | | | |
| | 5/19/2006 | Round 15 | 0.00060 U | 0.00080 J | 0.00060 U | 0.00200 | 0.00060 U |
| | 7/13/2006 | Round 15B | 0.00060 U | 0.00070 J | 0.00060 U | 0.00090 J | 0.00060 U |
| | 8/24/2006 | Round 16 | 0.00060 U | 0.00050 J | 0.00060 U | 0.00070 J | 0.00060 U |
| | 11/9/2006 | Round 17 | 0.00060 U | 0.00060 J | 0.00060 U | 0.00060 J | 0.00060 U |
| | 5/10/2007 | Round 17 (PDB) | 0.00028 U | 0.00066 J | 0.00053 U | 0.00047 J | 0.00012 U |
| | 9/17/2007 | Round 18 | 0.00013 U | 0.00049 J | 0.00015 U | 0.00025 J | 0.00020 U |
| | 1/29/2008 | Round 19 (PDB) | 0.00039 U | 0.00220 | 0.00048 U | 0.00190 | 0.00043 U |
| | 7/23/2008 | Round 20 (PDB) | 0.00054 U | 0.00073 J | 0.00045 U | 0.00032 U | 0.00030 U |
| | 1/12/2009 | Round 21 (PDB) | 0.00066 J | 0.01040 | 0.00045 U | 0.07030 | 0.00030 U |
| | 7/14/2009 | Round 22 | 0.00054 U | 0.00024 J | 0.00045 U | 0.00032 U | 0.00030 U |
| | 1/13/2010 | Round 23 (PDB) | 0.00029 U | 0.00051 J | 0.00034 U | 0.00024 U | 0.00028 U |
| | 7/13/2010 | Round 24 (PDB) | 0.00029 U | 0.00032 U | 0.00034 U | 0.00024 U | 0.00028 U |
| | 1/11/2011 | Round 25 | 0.00023 U | 0.00079 J | 0.00035 U | 0.00026 U | 0.00022 U |
| | 6/15/2011 | Well Abandoned | | | | | |
| **606D154MWR** | 6/16/2011 | Well Installed | | | | | |
| | 7/27/2011 | Round 26 | 0.00023 U | 0.00210 | 0.00035 U | 0.00026 U | 0.00022 U |
| | 1/10/2012 | Round 27 (PDB) | 0.00023 U | 0.00160 | 0.00035 U | 0.00026 U | 0.00022 U |
| | 7/11/2012 | Round 28 | NS | 0.00230 | 0.00035 U | 0.00026 U | 0.00022 U |
| | 1/8/2013 | Round 29 (PDB) | 0.00020 U | 0.00042 J | 0.00023 U | 0.00031 U | 0.00044 U |
| | 7/17/2013 | Round 30 | 0.00020 U | 0.00760 | 0.00023 U | 0.00031 U | 0.00044 U |
| | 2/25/2014 | Round 31 (PDB) | 0.00025 U | 0.00630 | 0.00034 U | 0.00030 U | 0.00033 U |
| | 7/22/2014 | Round 32 | 0.00025 U | 0.0115 | 0.00028 J | 0.00025 U | 0.00025 U |
| | 1/21/2015 | Round 33 (PDB) | NS | 0.0027 | 0.00025 U | 0.00025 U | 0.00025 U |
| | 7/21/2015 | Round 34 | 0.00025 U | 0.0184 | 0.00025 U | 0.00025 U | 0.00025 U |
| | 1/21/2016 | Round 35 (PDB) | NS | 0.00485 | 0.00025 U | 0.00025 U | 0.00025 U |
| | 7/21/2016 | Round 36 | 0.0005 U | 0.0145 | 0.0005 U | 0.0005 U | 0.0005 U |

***Notes:***
mg/L - milligrams per liter
NA - Not Analyzed
NS - Not Sampled
NS-D - Not Sampled during this round due to insufficient water in the monitoring well
PDB - Passive Diffusion Bag
SDG - Sample Delivery Group
PCLE - Protective Concentration Level Exceedance

***Note:***
Shaded areas indicate an exceedance.

Analytical Result Qualifiers:

J - Indicates that the chemical was detected. However, the associated numerical result may not be a precise representation of the amount that is actually present in the sample. The laboratory reported concentration is considered to be an estimate of the true concentration.

U - Indicates that the chemical was not detected at the numerical detection limit (sample-specific quantitation limit) noted. Nondetected results from the laboratory are reported in this manner. This qualifier is added to a positive result (reported by the laboratory) if the detected concentration is determined to be attributable to contamination introduced during field sampling or laboratory analysis.

UJ - Indicates that the chemical was not detected. However, the detection limit (sample-specific quantitation limit) is considered to be estimated based on problems encountered during laboratory analysis. The associated numerical detection limit is regarded as in accurate or imprecise.

**Table 4-1B**

**Summary of Chemicals of Concern Detected in Groundwater**
**Historical Monitoring Wells — SWMU 18 Plume**
**2016 RAER**
**Former NAS Dallas, Texas**
**Page 1 of 4**

| Monitoring Well | Sampling Date | Sampling Round | Chemicals of Concern (mg/L) | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | 1,1-Dichloroethene | cis-1,2-Dichloroethene | Tetrachloroethene | trans-1,2-Dichloroethene | Trichloroethene | Vinyl Chloride |
| Protective Concentration Levels (mg/L) | | | 0.00700 | 0.07000 | 0.00500 | 0.10000 | 0.00500 | 0.00200 |
| Monitoring Wells Located Inside PCLE Zone | | | | | | | | |
| 60603MW | -- | Round 1 | NS | NS | NS | NS | NS | NS |
| | 4/21/1998 | Round 2 | 0.01700 U | 0.36000 | 0.01700 U | 0.00310 J | 0.01300 J | 0.09400 |
| | 9/15/1998 | Round 3 | 0.17000 U | 0.88000 | 0.17000 U | 0.17000 U | 0.17000 U | 0.14000 J |
| | 1/11/1999 | Round 4 | 0.01000 U | 0.21000 | 0.01000 U | 0.00130 J | 0.00650 J | 0.04900 |
| | 4/3/1999 | Well Abandoned | | | | | | |
| 606D20MW | 5/5/1998 | Well Installed | | | | | | |
| | 5/29/1998 | Round 2 | 0.00500 U | 0.08300 | 0.00500 U | 0.00500 U | 0.03800 | 0.00420 J |
| | 9/1/1998 | Round 3 | 0.01000 U | 0.29000 | 0.01000 U | 0.01000 U | 0.16000 | 0.00680 J |
| | 3/29/1999 | Round 4 | 0.00710 U | 0.23000 | 0.00710 U | 0.00170 J | 0.08600 | 0.00710 U |
| | 11/4/1999 | Round 5 | 0.00620 U | 0.18000 | 0.00620 U | 0.00210 J | 0.06900 | 0.00620 U |
| | 7/19/2000 | Round 6 | 0.00840 U | 0.25000 | 0.00840 U | 0.00210 J | 0.09100 | 0.00840 U |
| | 6/25/2001 | Round 7 | 0.01700 U | 0.45000 | 0.01700 U | 0.00450 J | 0.06900 | 0.00540 J |
| | -- | Round 8 | NS | NS | NS | NS | NS | NS |
| | 2/8/2003 | Well Abandoned | | | | | | |
| 606D115TW | -- | Well Installed | | | | | | |
| | -- | Round 9 | NS | NS | NS | NS | NS | NS |
| | 9/22/2003 | Round 10 | 0.00022 U | 0.00025 U | 0.00012 U | 0.00024 U | 0.00022 U | 0.00026 U |
| | 7/19/2004 | Round 11 | 0.00035 U | 0.00027 U | 0.00021 U | 0.00023 U | 0.00022 U | 0.00017 U |
| | 10/15/2004 | Round 12 | 0.00035 U | 0.00027 U | 0.00021 U | 0.00023 U | 0.00022 U | 0.00017 U |
| | 4/17/2005 | Well Abandoned | | | | | | |
| 606D117TW | -- | Well Installed | | | | | | |
| | 6/1/2003 | Round 9 | 0.00100 U | 0.02100 | 0.00100 U | 0.00050 U | 0.00100 U | 0.00520 |
| | -- | Round 10 | NS | NS | NS | NS | NS | NS |
| | 7/16/2004 | Round 11 | 0.00140 U | 0.08400 | 0.00083 U | 0.00230 J | 0.00400 | 0.00190 J |
| | 10/11/2004 | Round 12 | 0.00350 U | 0.13000 | 0.00210 U | 0.00680 J | 0.00350 J | 0.00350 J |
| | 4/17/2005 | Well Abandoned | | | | | | |
| 606D118TW | -- | Well Installed | | | | | | |
| | 6/1/2003 | Round 9 | 0.01700 U | 0.59000 | 0.01700 U | 0.00990 | 0.15000 J | 0.02100 |
| | -- | Round 10 | NS | NS | NS | NS | NS | NS |
| | 7/16/2004 | Round 11 | 0.01800 U | 0.62000 J | 0.01000 U | 0.01100 U | 0.14000 | 0.03700 J |
| | 10/11/2004 | Round 12 | 0.00350 U | 0.23000 | 0.00210 U | 0.01600 | 0.03700 | 0.01200 |
| | 4/17/2005 | Well Abandoned | | | | | | |
| 606D119TW | -- | Well Installed | | | | | | |
| | -- | Round 9 | NS | NS | NS | NS | NS | NS |
| | 9/22/2003 | Round 10 | 0.00044 U | 0.04400 | 0.00024 U | 0.00150 | 0.00180 J | 0.00200 |
| | 7/16/2004 | Round 11 | 0.00070 U | 0.05200 | 0.00042 U | 0.00160 J | 0.00160 J | 0.00160 J |
| | 10/13/2004 | Round 12 | 0.00070 U | 0.05500 J | 0.00042 U | 0.00140 J | 0.00200 | 0.00240 |
| | 4/17/2005 | Well Abandoned | | | | | | |
| 606D120TW | -- | Well Installed | | | | | | |
| | 6/1/2003 | Round 9 | 0.01300 U | 0.42000 | 0.01300 U | 0.00540 J | 0.24000 J | 0.02200 |
| | -- | Round 10 | NS | NS | NS | NS | NS | NS |
| | 7/16/2004 | Round 11 | 0.01100 U | 0.88000 | 0.00620 U | 0.00680 U | 0.30000 | 0.03000 |
| | 10/13/2004 | Round 12 | 0.01800 U | 0.98000 | 0.01000 U | 0.01100 U | 0.28000 | 0.03700 J |
| | 4/17/2005 | Well Abandoned | | | | | | |
| 606D121TW | -- | Well Installed | | | | | | |
| | 6/1/2003 | Round 9 | 0.00100 U | 0.00690 | 0.00100 U | 0.00050 U | 0.00100 U | 0.00100 U |
| | -- | Round 10 | NS | NS | NS | NS | NS | NS |
| | -- | Round 11 | NS | NS | NS | NS | NS | NS |
| | 10/12/2004 | Round 12 | 0.00035 U | 0.01300 | 0.00021 U | 0.00023 U | 0.00022 U | 0.00027 J |
| | 4/17/2005 | Well Abandoned | | | | | | |
| 606D122TW | -- | Well Installed | | | | | | |
| | 5/16/2003 | Round 9 | 0.00870 U | 0.23000 | 0.00870 U | 0.00440 U | 0.18000 | 0.01400 |
| | -- | Round 10 | NS | NS | NS | NS | NS | NS |
| | 7/16/2004 | Round 11 | 0.00350 U | 0.39000 | 0.00210 U | 0.00450 U | 0.36000 | 0.02700 |
| | 10/12/2004 | Round 12 | 0.00530 U | 0.38000 | 0.00310 U | 0.00340 U | 0.24000 | 0.02500 |
| | 4/17/2005 | Well Abandoned | | | | | | |

**Table 4-1B**

**Summary of Chemicals of Concern Detected in Groundwater**
**Historical Monitoring Wells — SWMU 18 Plume**
**2016 RAER**
**Former NAS Dallas, Texas**
**Page 2 of 4**

| Monitoring Well | Sampling Date | Sampling Round | Chemicals of Concern (mg/L) | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | 1,1-Dichloroethene | cis-1,2-Dichloroethene | Tetrachloroethene | trans-1,2-Dichloroethene | Trichloroethene | Vinyl Chloride |
| **Protective Concentration Levels (mg/L)** | | | **0.00700** | **0.07000** | **0.00500** | **0.10000** | **0.00500** | **0.00200** |
| **606D123TW** | -- | Well Installed | | | | | | |
| | 9/22/2003 | Round 10 | 0.01100 U | 1.40000 | 0.00600 U | 0.01200 U | 0.66000 | 0.09000 |
| | 7/29/2004 | Round 11 (PDB) | 0.01800 U | 1.70000 | 0.01000 U | 0.01100 U | 0.54000 | 0.08500 |
| | 10/12/2004 | Round 12 | 0.02600 U | 1.60000 | 0.01600 U | 0.01700 U | 0.68000 | 0.09800 |
| | 10/12/2004 | Round 12 (PDB) | 0.00880 U | 1.30000 | 0.00520 U | 0.00570 U | 0.53000 | 0.08200 |
| | 4/17/2005 | Well Abandoned | | | | | | |
| **606D124TW** | -- | Well Installed | | | | | | |
| | 10/6/2003 | Round 10 | 0.00022 U | 0.02900 | 0.00012 U | 0.00024 J | 0.02700 | 0.00093 J |
| | 7/29/2004 | Round 11 (PDB) | 0.00180 U | 0.08900 | 0.00100 U | 0.00110 U | 0.04300 | 0.00490 J |
| | 10/14/2004 | Round 12 (PDB) | 0.00180 U | 0.17000 | 0.00100 U | 0.00110 U | 0.16000 | 0.00760 |
| | 4/17/2005 | Well Abandoned | | | | | | |
| **606D125TW** | -- | Well Installed | | | | | | |
| | 9/22/2003 | Round 10 | 0.00730 U | 0.95000 | 0.00400 U | 0.00800 U | 0.55000 | 0.07000 |
| | 7/29/2004 | Round 11 (PDB) | 0.01800 U | 1.20000 | 0.01000 U | 0.01100 U | 0.53000 | 0.06700 |
| | 10/13/2004 | Round 12 (PDB) | 0.01800 U | 1.30000 | 0.01000 U | 0.01100 U | 0.74000 | 0.10000 |
| | 4/17/2005 | Well Abandoned | | | | | | |
| **606D126TW** | -- | Well Installed | | | | | | |
| | 10/5/2003 | Round 10 | 0.00031 U | 0.03600 | 0.00017 U | 0.00046 J | 0.02200 | 0.00170 |
| | 7/29/2004 | Round 11 (PDB) | 0.00350 U | 0.24000 | 0.00210 U | 0.00230 U | 0.13000 | 0.01000 |
| | 10/13/2004 | Round 12 (PDB) | 0.00280 | 0.26000 | 0.00021 U | 0.00350 | 0.14000 | 0.01700 |
| | 4/17/2005 | Well Abandoned | | | | | | |
| **606D127TW** | -- | Well Installed | | | | | | |
| | 10/6/2003 | Round 10 | 0.00022 U | 0.00025 U | 0.00012 U | 0.00024 U | 0.00022 U | 0.00026 U |
| | 7/29/2004 | Round 11 (PDB) | 0.00035 U | 0.00027 U | 0.00021 U | 0.00023 U | 0.00022 U | 0.00017 U |
| | 10/13/2004 | Round 12 (PDB) | 0.00035 U | 0.00027 U | 0.00021 U | 0.00023 U | 0.00022 U | 0.00017 U |
| | 4/17/2005 | Well Abandoned | | | | | | |
| **606D151MW** | 5/16/2006 | Wells Installed | | | | | | |
| | 5/22/2006 | Round 15 | 0.00060 U | 0.00050 U | NS | 0.00060 U | 0.00040 U | 0.00060 U |
| | 8/25/2006 | Round 16 | 0.00060 U | 0.00050 U | NS | 0.00060 U | 0.00040 U | 0.00060 U |
| | 11/9/2006 | Round 16B | 0.00060 U | 0.00050 U | NS | 0.00060 U | 0.00040 U | * 0.00060 U |
| | 5/14/2007 | Round 17 (PDB) | 0.00028 U | 0.00045 U | NS | 0.00053 U | 0.00014 U | 0.00012 U |
| | 9/17/2007 | Round 18 | 0.00013 U | 0.00014 U | NS | 0.00015 U | 0.00023 U | 0.00020 U |
| | 1/29/2008 | Round 19 (PDB) | 0.00039 U | 0.00032 U | NS | 0.00048 U | 0.00053 U | 0.00043 U |
| | 7/23/2008 | Round 20 (PDB) | 0.00054 U | 0.00020 U | NS | 0.00045 U | 0.00032 U | 0.00030 U |
| | 1/12/2009 | Round 21 (PDB) | 0.00054 U | 0.00020 U | NS | 0.00045 U | 0.00032 U | 0.00030 U |
| | 7/15/2009 | Round 22 | 0.00054 U | 0.00020 U | NS | 0.00045 U | 0.00032 U | 0.00030 U |
| | 1/13/2010 | Round 23 (PDB) | 0.00029 U | 0.00032 U | NS | 0.00034 U | 0.00024 U | 0.00028 U |
| | 7/13/2010 | Round 24 (PDB) | 0.00029 U | 0.00032 U | NS | 0.00034 U | 0.00024 U | 0.00028 U |
| | 1/11/2011 | Round 25 (PDB) | 0.00023 U | 0.00026 U | NS | 0.00035 U | 0.00026 U | 0.00022 U |
| | 7/27/2011 | Round 26 | 0.00023 U | 0.00026 U | NS | 0.00035 U | 0.00026 U | 0.00022 U |
| | 1/10/2012 | Round 27 (PDB) | 0.00023 U | 0.00026 U | NS | 0.00035 U | 0.00026 U | 0.00022 U |
| | 7/11/2012 | Round 28 | NS | 0.00026 U | NS | 0.00035 U | 0.00026 U | 0.00022 U |
| | 1/8/2013 | Round 29 (PDB) | 0.00020 U | 0.00024 U | NS | 0.00023 U | 0.00031 U | 0.00044 U |
| | 7/17/2013 | Round 30 | 0.00020 U | 0.00024 U | NS | 0.00023 U | 0.00031 U | 0.00044 U |
| | 2/25/2014 | Round 31 (PDB) | 0.00025 U | 0.00033 U | NS | 0.00034 U | 0.00030 U | 0.00033 U |
| | 7/22/2014 | Round 32 | 0.0005 U | 0.0005 U | NS | 0.0005 U | 0.0005 U | 0.0005 U |
| | 1/21/2015 | Round 33 (PDB) | NS | 0.00025 U | NS | 0.00025 U | 0.00025 U | 0.00025 U |
| | 7/21/2015 | Round 44 | 0.00025 U | 0.00025 U | NS | 0.00025 U | 0.00025 U | 0.00025 U |
| | 1/21/2016 | Well Abandoned | | | | | | |

**Table 4-1B**

**Summary of Chemicals of Concern Detected in Groundwater**
**Historical Monitoring Wells — SWMU 18 Plume**
**2016 RAER**
**Former NAS Dallas, Texas**
**Page 3 of 4**

| Monitoring Well | Sampling Date | Sampling Round | Chemicals of Concern (mg/L) | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | 1,1-Dichloroethene | cis-1,2-Dichloroethene | Tetrachloroethene | trans-1,2-Dichloroethene | Trichloroethene | Vinyl Chloride |
| **Protective Concentration Levels (mg/L)** | | | **0.00700** | **0.07000** | **0.00500** | **0.10000** | **0.00500** | **0.00200** |
| **Monitoring Wells Located Outside PCLE Zone** | | | | | | | | |
| **600D90MW** | 8/3/2000 | Well Installed | | | | | | |
| | 8/3/2000 | Round 6 | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U |
| | 6/22/2001 | Round 7 | 0.00500 U | 0.00250 U | 0.00500 U | 0.00250 U | 0.00500 U | 0.01000 U |
| | 1/21/2003 | Round 8 (PDB) | 0.00100 U | 0.00100 U | 0.00100 U | 0.00100 U | 0.00100 U | 0.00100 U |
| | -- | Round 9 | NS | NS | NS | NS | NS | NS |
| | 12/9/2003 | Round 10 | 0.00021 U | 0.00016 U | 0.00024 U | 0.00019 U | 0.00010 U | 0.00017 U |
| | -- | Round 11 | NS | NS | NS | NS | NS | NS |
| | -- | Round 12 | NS | NS | NS | NS | NS | NS |
| | 4/18/2005 | Well Abandoned | | | | | | |
| **600D91MW** | -- | Well Installed | | | | | | |
| | 6/26/2001 | Round 7 | 0.00500 U | 0.00250 U | 0.00500 U | 0.00250 U | 0.00500 U | 0.01000 U |
| | 1/21/2003 | Round 8 | 0.00100 U | 0.00100 U | 0.00100 U | 0.00100 U | 0.00100 U | 0.00100 U |
| | -- | Round 9 | NS | NS | NS | NS | NS | NS |
| | 12/8/2003 | Round 10 | 0.00033 U | 0.00041 U | 0.00038 U | 0.00041 U | 0.00036 U | 0.00098 U |
| | -- | Round 11 | NS | NS | NS | NS | NS | NS |
| | -- | Round 12 | NS | NS | NS | NS | NS | NS |
| | 4/18/2005 | Well Abandoned | | | | | | |
| **60602MW** | 10/27/1995 | Pre--Round 1 | 0.00563 U | 0.00563 U | 0.00563 U | 0.00563 U | 0.00563 U | 0.01130 U |
| | 10/27/1995 | Pre--Round 1 | 0.00554 U | 0.00554 U | 0.00554 U | 0.00554 U | 0.00554 U | 0.01110 U |
| | 10/27/1995 | Pre--Round 1 | 0.00625 U | 0.00625 U | 0.00625 U | 0.00625 U | 0.00625 U | 0.01250 U |
| | 11/15/1995 | Round 1 | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.01000 U |
| | 4/20/1998 | Round 2 | 0.00500 U | 0.00330 J | 0.00500 U | 0.00500 U | 0.00210 J | 0.00500 U |
| | 9/21/1998 | Round 3 | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U |
| | -- | Round 4 | NS | NS | NS | NS | NS | NS |
| | 10/19/1999 | Round 5 | 0.00500 U | 0.01600 | 0.00500 U | 0.00500 U | 0.00490 J | 0.00500 U |
| | 7/18/2000 | Round 6 | 0.00500 U | 0.00290 J | 0.00500 U | 0.00500 U | 0.00250 J | 0.00500 U |
| | 6/20/2001 | Round 7 | 0.00500 U | 0.00270 | 0.00500 U | 0.00250 U | 0.00500 U | 0.01000 U |
| | 1/10/2003 | Round 8 | 0.00100 U | 0.00100 | 0.00100 U | 0.00100 U | 0.00100 U | 0.00100 U |
| | -- | Round 9 | NS | NS | NS | NS | NS | NS |
| | 12/7/2003 | Round 10 | 0.00044 U | 0.00170 | 0.00038 U | 0.00041 U | 0.00036 U | 0.00098 U |
| | -- | Round 11 | NS | NS | NS | NS | NS | NS |
| | 10/14/2004 | Round 12 (PDB) | 0.00035 U | 0.00094 J | 0.00021 U | 0.00023 U | 0.00066 J | 0.00017 U |
| | 4/17/2005 | Well Abandoned | | | | | | |

**Table 4-1B**

**Summary of Chemicals of Concern Detected in Groundwater**
**Historical Monitoring Wells — SWMU 18 Plume**
**2016 RAER**
**Former NAS Dallas, Texas**
**Page 4 of 4**

| Monitoring Well | Sampling Date | Sampling Round | Chemicals of Concern (mg/L) | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | 1,1-Dichloroethene | cis-1,2-Dichloroethene | Tetrachloroethene | trans-1,2-Dichloroethene | Trichloroethene | Vinyl Chloride |
| **Protective Concentration Levels (mg/L)** | | | **0.00700** | **0.07000** | **0.00500** | **0.10000** | **0.00500** | **0.00200** |
| **606D116TW** | -- | | | | | | | |
| | 5/28/2003 | - | 0.00540 U | 0.00270 U | 0.00540 U | 0.00270 U | 0.00540 U | 0.00540 U |
| | 6/1/2003 | Round 9 | 0.00100 U | 0.00050 U | 0.00100 U | 0.00050 U | 0.00100 U | 0.00100 U |
| | -- | Round 10 | NS | NS | NS | NS | NS | NS |
| | -- | Round 11 | NS | NS | NS | NS | NS | NS |
| | 10/15/2004 | Round 12 | 0.00035 U | 0.00027 U | 0.00021 U | 0.00023 U | 0.00022 U | 0.00017 U |
| | 4/17/2005 | | Well Abandoned | | | | | |
| **606D128TW** | -- | | | | | | | |
| | 10/15/2003 | - | 0.00150 U | 0.00072 U | 0.00052 U | 0.00066 U | 0.00052 U | 0.00092 U |
| | 10/15/2003 | - | 0.00150 U | 0.00072 U | 0.00052 U | 0.00067 U | 0.00052 U | 0.00093 U |
| | 10/15/2003 | - | 0.00150 U | 0.00076 U | 0.00055 U | 0.00070 U | 0.00067 J | 0.00098 U |
| | 10/18/2003 | Round 10 | 0.00022 U | 0.00025 U | 0.00012 U | 0.00024 U | 0.00022 U | 0.00026 U |
| | -- | Round 11 | NS | NS | NS | NS | NS | NS |
| | 10/14/2004 | Round 12 (PDB) | 0.00035 U | 0.00027 U | 0.00021 U | 0.00023 U | 0.00022 U | 0.00017 U |
| | 4/17/2005 | | Well Abandoned | | | | | |
| **60604MW** | 10/31/1995 | Pre--Round 1 | 0.00650 U | 0.00650 U | 0.00650 U | 0.00650 U | 0.00650 U | 0.01300 U |
| | 10/31/1995 | Pre--Round 1 | 0.00649 U | 0.00649 U | 0.00649 U | 0.00649 U | 0.00649 U | 0.01300 U |
| | 10/31/1995 | Pre--Round 1 | 0.00575 U | 0.00575 U | 0.00575 U | 0.00575 U | 0.00575 U | 0.01150 U |
| | 11/15/1995 | Round 1 | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.01000 U |
| | -- | Round 2 | NS | NS | NS | NS | NS | NS |
| | -- | Round 3 | NS | NS | NS | NS | NS | NS |
| | -- | Round 4 | NS | NS | NS | NS | NS | NS |
| | 10/19/1999 | Round 5 | 0.00500 U | 0.01100 | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U |
| | 7/18/2000 | Round 6 | 0.00500 U | 0.00900 | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U |
| | 6/20/2001 | Round 7 | 0.00500 U | 0.00620 | 0.00500 U | 0.00250 U | 0.00500 U | 0.01000 U |
| | 1/10/2003 | Round 8 | 0.00100 U | 0.00460 | 0.00100 U | 0.00100 U | 0.00100 U | 0.00100 U |
| | -- | Round 9 | NS | NS | NS | NS | NS | NS |
| | 12/8/2003 | Round 10 | 0.00047 U | 0.00730 | 0.00038 U | 0.00041 U | 0.00036 U | 0.00098 U |
| | 7/28/2004 | Round 11 (PDB) | 0.00035 U | 0.00370 | 0.00021 U | 0.00023 U | 0.00022 U | 0.00017 U |
| | 10/13/2004 | Round 12 (PDB) | 0.00035 U | 0.00620 | 0.00021 U | 0.00023 U | 0.00022 U | 0.00017 U |
| | 4/17/2005 | | Well Abandoned | | | | | |

***Notes:***
mg/L - milligrams per liter
NA - Not Applicable
NS - Not Sampled
PDB - Passive Diffusion Bag
SDG - Sample Delivery Group
PCLE - Protective Concentration Level Exceedance

***Note:***
Shaded areas indicate an exceedance.

Analytical Result Qualifiers:
of the true concentration.
the laboratory) if the detected concentration is determined to be attributable to contamination introduced during field sampling or laboratory analysis.
regarded as in accurate or imprecise.

# TABLE 4-2
# SUMMARY OF GEOCHEMICAL PARAMETERS MEASURED IN GROUNDWATER

**Table 4-2A**

**Summary of Groundwater Gauging Data**
**Long Term Monitoring Wells — SWMU 18 Plume**
**2016 RAER**
**Former NAS Dallas, Texas**
**Page 1 of 3**

| Monitoring Well | Top of Casing [1] (ft msl) | Screened Interval (ft msl) | Date | Depth to Water [2] (ft bgs) | Groundwater Elevation (ft msl) |
|---|---|---|---|---|---|
| **Monitoring Wells Located Inside PCLE Zone** | | | | | |
| **606D149MW** | 460.37 | 447.16 to 437.16 | 5/15/2006 | | |
| | | | 5/23/2006 | 7.11 | 453.26 |
| | | | 8/7/2006 | 7.09 | 453.28 |
| | | | 11/9/2006 | 5.98 | 454.39 |
| | | | 4/24/2007 | 8.54 | 451.83 |
| | | | 8/20/2007 | 7.03 | 453.34 |
| | | | 1/14/2008 | 7.09 | 453.28 |
| | | | 7/9/2008 | 8.25 | 452.12 |
| | | | 12/16/2008 | 7.42 | 452.95 |
| | | | 7/13/2009 | 8.70 | 451.67 |
| | 460.35 | 447.14 to 437.14 | 12/15/2009 | 7.28 | 453.07 |
| | | | 8/10/2010 | 7.53 | 452.82 |
| | | | 12/16/2010 | 6.54 | 453.81 |
| | | | 7/25/2011 | 8.06 | 452.29 |
| | | | 12/14/2011 | 7.25 | 453.10 |
| | | | 7/11/2012 | 8.62 | 451.73 |
| | | | 12/19/2012 | 7.40 | 452.95 |
| | | | 7/15/2013 | 9.06 | 451.29 |
| | | | 12/17/2013 | 7.75 | 452.60 |
| | | | 7/15/2014 | 9.80 | 450.55 |
| | | | 12/15/2015 | 8.33 | 452.02 |
| | | | 7/20/2015 | 8.07 | 452.28 |
| | | | 12/15/2015 | 7.17 | 453.18 |
| | | | 7/19/2016 | 7.37 | 452.98 |
| **606D150MW** | 459.63 | 446.78 to 436.78 | 5/15/2006 | | |
| | | | 5/23/2006 | 16.30 | 443.33 |
| | | | 8/7/2006 | 8.99 | 450.64 |
| | | | 11/8/2006 | 7.25 | 452.38 |
| | | | 4/24/2007 | 9.33 | 450.30 |
| | | | 8/20/2007 | 9.07 | 450.56 |
| | | | 1/14/2008 | 7.51 | 452.12 |
| | | | 7/9/2008 | 7.72 | 451.91 |
| | | | 12/16/2008 | 8.69 | 450.94 |
| | | | 7/13/2009 | 9.94 | 449.69 |
| | 459.52 | 446.67 to 436.67 | 12/15/2009 | 8.45 | 451.07 |
| | | | 8/10/2010 | 9.57 | 449.95 |
| | | | 12/16/2010 | 8.46 | 451.06 |
| | | | 7/25/2011 | 9.75 | 449.77 |
| | | | 12/14/2011 | 8.95 | 450.57 |
| | | | 7/11/2012 | 10.33 | 449.19 |
| | | | 12/19/2012 | 9.57 | 449.95 |
| | | | 7/15/2013 | 10.81 | 448.71 |
| | | | 12/17/2013 | 9.63 | 449.89 |
| | | | 7/15/2014 | 11.27 | 448.25 |
| | | | 12/15/2015 | 10.17 | 449.35 |
| | | | 7/20/2015 | 9.17 | 450.35 |
| | | | 12/15/2015 | 8.67 | 450.85 |
| | | | 7/19/2016 | 10.26 | 449.26 |

**Table 4-2A**

**Summary of Groundwater Gauging Data**
**Long Term Monitoring Wells — SWMU 18 Plume**
**2016 RAER**
**Former NAS Dallas, Texas**
**Page 2 of 3**

| Monitoring Well | Top of Casing [1] (ft msl) | Screened Interval (ft msl) | Date | Depth to Water [2] (ft bgs) | Groundwater Elevation (ft msl) |
|---|---|---|---|---|---|
| 606D152MW | 460.72 | 448.02 to 438.02 | 5/15/2006 | | |
| | | | 5/19/2006 | 7.70 | 453.02 |
| | | | 8/7/2006 | 8.38 | 452.34 |
| | | | 11/8/2006 | 7.38 | 453.34 |
| | | | 4/24/2007 | 7.35 | 453.37 |
| | | | 8/20/2007 | 6.89 | 453.83 |
| | | | 1/14/2008 | 7.97 | 452.75 |
| | | | 7/9/2008 | 7.86 | 452.86 |
| | | | 12/16/2008 | 8.68 | 452.04 |
| | | | 7/13/2009 | 8.23 | 452.49 |
| | 460.55 | 447.85 to 437.85 | 12/15/2009 | 7.52 | 453.03 |
| | | | 8/10/2010 | 7.84 | 452.71 |
| | | | 12/16/2010 | 7.93 | 452.62 |
| | | | 7/25/2011 | 8.05 | 452.50 |
| | | | 12/14/2011 | 8.20 | 452.35 |
| | | | 7/11/2012 | 8.28 | 452.27 |
| | | | 12/19/2012 | 8.39 | 452.16 |
| | | | 7/15/2013 | 8.34 | 452.21 |
| | | | 12/17/2013 | 8.13 | 452.42 |
| | | | 7/15/2014 | 8.17 | 452.38 |
| | | | 12/15/2015 | 8.73 | 451.82 |
| | | | 7/20/2015 | 8.17 | 452.38 |
| | | | 12/15/2015 | 7.80 | 452.75 |
| | | | 7/19/2016 | 7.98 | 452.57 |
| 606D153MW | 460.26 | 447.86 to 437.86 | 5/16/2006 | | |
| | | | 5/23/2006 | dry | -- |
| | | | 8/7/2006 | 16.49 | 443.77 |
| | | | 11/9/2006 | 12.16 | 448.10 |
| | | | 4/24/2007 | 9.95 | 450.31 |
| | | | 8/20/2007 | 9.35 | 450.91 |
| | | | 1/14/2008 | 5.78 | 454.48 |
| | | | 7/9/2008 | 10.30 | 449.96 |
| | | | 12/16/2008 | 9.96 | 450.30 |
| | | | 7/13/2009 | 10.15 | 450.11 |
| | 460.24 | 447.84 to 437.84 | 12/15/2009 | 8.28 | 451.96 |
| | | | 8/10/2010 | 10.86 | 449.38 |
| | | | 12/16/2010 | 9.05 | 451.19 |
| | | | 7/25/2011 | 9.75 | 450.49 |
| | | | 12/14/2011 | 9.96 | 450.28 |
| | | | 7/11/2012 | 10.31 | 449.93 |
| | | | 12/19/2012 | 10.68 | 449.56 |
| | | | 7/15/2013 | 10.81 | 449.43 |
| | | | 12/17/2013 | 10.74 | 449.50 |
| | | | 7/15/2014 | 11.53 | 448.71 |
| | | | 12/15/2014 | 10.83 | 449.41 |
| | | | 1/21/2015 | 10.85 | 449.39 |
| | | | 7/20/2015 | 10.52 | 449.72 |
| | | | 12/15/2015 | 7.67 | 452.57 |
| | | | 7/19/2016 | 9.99 | 450.25 |

**Table 4-2A**

**Summary of Groundwater Gauging Data**
**Long Term Monitoring Wells — SWMU 18 Plume**
**2016 RAER**
**Former NAS Dallas, Texas**
**Page 3 of 3**

| Monitoring Well | Top of Casing [1] (ft msl) | Screened Interval (ft msl) | Date | Depth to Water [2] (ft bgs) | Groundwater Elevation (ft msl) |
|---|---|---|---|---|---|
| **Monitoring Wells Located Outside PCLE Zone** | | | | | |
| **606D154MW/ 606D154RMW** | 457.72 | 449.22 to 439.22 | 5/15/2006 | | |
| | | | 5/19/2006 | 4.08 | 453.64 |
| | | | 8/7/2006 | 4.61 | 453.11 |
| | | | 11/9/2006 | 3.70 | 454.02 |
| | | | 4/24/2007 | 3.78 | 453.94 |
| | | | 8/20/2007 | 3.79 | 453.93 |
| | | | 1/14/2008 | 4.39 | 453.33 |
| | | | 7/9/2008 | 4.23 | 453.49 |
| | | | 12/16/2008 | 11.15 | 446.57 |
| | | | 7/13/2009 | 4.49 | 453.23 |
| | 457.73 | 449.23 to 439.23 | 12/15/2009 | 4.08 | 453.65 |
| | | | 8/10/2010 | 4.18 | 453.55 |
| | | | 12/16/2010 | NA[3] | NA[3] |
| | | | 7/25/2011 | 3.67 | NA[4] |
| | | | 12/14/2011 | 3.50 | NA[3] |
| | | | 7/11/2012 | 3.85 | NA[4] |
| | | | 12/19/2012 | 4.02 | NA[4] |
| | | | 7/15/2013 | 3.79 | NA[6] |
| | | | 12/17/2013 | 3.47 | NA[6] |
| | | | 7/15/2014 | 4.85 | NA[6] |
| | | | 12/15/2014 | 3.90 | NA[6] |
| | | | 1/21/2015 | 4.85 | NA[6] |
| | | | 7/20/2015 | 3.53 | NA[6] |
| | | | 12/15/2015 | 2.85 | NA[6] |
| | | | 7/19/2016 | 3.55 | NA[6] |

bgs - below ground surface
ft - feet
msl - mean sea level
NA - Not Available or Applicable (i.e., abandoned, not installed, not measured)
PCLE - Protective Concentration Level Exceedance

Notes:
1 - All monitoring wells on-site were resurveyed in September 2010 in accordance with the Compliance Plan Requirements.
2 - Depth to water measurements taken from the top of the riser.
3 - Inaccessible 4, 5 and 6 - Pending Survey

**Table 4-2B**

**Summary of Groundwater Gauging Data**
**Historical Monitoring Wells — SWMU 18 Plume**
**2016 RAER**
**Former NAS Dallas, Texas**
**Page 1 of 3**

| Monitoring Well | Top of Casing [1] (ft msl) | Screened Interval (ft msl) | Date | Depth to Water [2] (ft bgs) | Groundwater Elevation (ft msl) |
|---|---|---|---|---|---|
| **Monitoring Wells Located Inside PCLE Zone** | | | | | |
| **60603MW** | 457.81 | 453.81 to 443.81 | 10/27/1995 | | |
| | | | 5/1/1998 | 3.79 | 454.02 |
| | | | 8/1/1998 | 4.85 | 452.96 |
| | | | 2/9/2003 | | |
| **606D20MW** | 460.99 | 450.59 to 440.59 | 5/5/1998 | | |
| | | | 5/1/1998 | 19.21 | 441.78 |
| | | | 8/1/1998 | 14.14 | 446.85 |
| | | | 2/1/1999 | 8.72 | 452.27 |
| | | | 9/1/1999 | 14.64 | 446.35 |
| | | | 6/1/2000 | 9.73 | 451.26 |
| | | | 6/1/2001 | 9.67 | 451.32 |
| | | | 12/2/2002 | 0.00 | 460.99 |
| | | | 2/8/2003 | | |
| **606D115TW** | 454.74 | 464.74 to 438.74 | 5/29/2003 | | |
| | | | 8/1/2003 | 6.69 | 448.05 |
| | | | 12/23/2003 | 5.40 | 449.34 |
| | | | 7/4/2004 | 4.25 | 450.49 |
| | | | 9/28/2004 | 6.35 | 448.39 |
| | | | 4/17/2005 | | |
| **606D117TW** | 455.34 | 449.34 to 439.34 | 5/29/2003 | | |
| | | | 8/1/2003 | 5.85 | 449.49 |
| | | | 12/23/2003 | 4.36 | 450.98 |
| | | | 7/4/2004 | 4.76 | 450.58 |
| | | | 9/28/2004 | 5.44 | 449.90 |
| | | | 4/17/2005 | | |
| **606D118TW** | 457.06 | 451.06 to 441.06 | 5/29/2003 | | |
| | | | 8/1/2003 | 7.85 | 449.21 |
| | | | 12/23/2003 | 7.10 | 449.96 |
| | | | 7/4/2004 | 6.28 | 450.78 |
| | | | 9/28/2004 | 7.09 | 449.97 |
| | | | 4/17/2005 | | |
| **606D119TW** | 458.38 | 452.38 to 442.38 | 5/29/2003 | | |
| | | | 8/1/2003 | 8.35 | 450.03 |
| | | | 12/23/2003 | 8.00 | 450.38 |
| | | | 7/4/2004 | 6.12 | 452.26 |
| | | | 9/28/2004 | 7.21 | 451.17 |
| | | | 4/17/2005 | | |
| **606D120TW** | 457.63 | 451.63 to 441.63 | 5/29/2003 | | |
| | | | 8/1/2003 | 9.95 | 447.68 |
| | | | 12/23/2003 | 4.76 | 452.87 |
| | | | 7/4/2004 | 3.53 | 454.10 |
| | | | 9/28/2004 | 3.77 | 453.86 |
| | | | 4/17/2005 | | |
| **606D121TW** | 457.30 | 451.30 to 441.30 | 9/17/2003 | | |
| | | | 12/23/2003 | 6.18 | 451.12 |
| | | | 7/4/2004 | 4.29 | 453.01 |
| | | | 9/28/2004 | 6.03 | 451.27 |
| | | | 4/17/2005 | | |
| **606D122TW** | 457.60 | 452.60 to 442.60 | 5/29/2003 | | |
| | | | 8/1/2003 | 4.53 | 453.07 |
| | | | 12/23/2003 | 3.75 | 453.85 |
| | | | 7/4/2004 | 3.29 | 454.31 |
| | | | 9/28/2004 | 3.81 | 453.79 |
| | | | 4/17/2005 | | |

**Table 4-2B**

**Summary of Groundwater Gauging Data**
**Historical Monitoring Wells — SWMU 18 Plume**
**2016 RAER**
**Former NAS Dallas, Texas**
**Page 2 of 3**

| Monitoring Well | Top of Casing [1] (ft msl) | Screened Interval (ft msl) | Date | Depth to Water [2] (ft bgs) | Groundwater Elevation (ft msl) |
|---|---|---|---|---|---|
| **606D123TW** | 458.60 | 450.10 to 440.10 | 4/5/1998 | | |
| | | | 12/23/2003 | 5.13 | 453.47 |
| | | | 7/4/2004 | 4.42 | 454.18 |
| | | | 9/28/2004 | 5.11 | 453.49 |
| | | | 4/17/2005 | | |
| **606D124TW** | 457.26 | 448.76 to 438.76 | 9/17/2003 | | |
| | | | 12/23/2003 | 4.47 | 452.79 |
| | | | 7/4/2004 | 3.99 | 453.27 |
| | | | 9/28/2004 | 3.99 | 453.27 |
| | | | 4/17/2005 | | |
| **606D125TW** | 458.51 | 450.01 to 440.01 | 9/17/2003 | | |
| | | | 12/23/2003 | 4.58 | 453.93 |
| | | | 7/4/2004 | 4.44 | 454.07 |
| | | | 9/28/2004 | 4.77 | 453.74 |
| | | | 4/17/2005 | | |
| **606D126TW** | 458.40 | 449.90 to 439.90 | 9/17/2003 | | |
| | | | 12/23/2003 | 7.60 | 450.80 |
| | | | 7/4/2004 | 7.22 | 451.18 |
| | | | 9/28/2004 | 5.03 | 453.37 |
| | | | 4/17/2005 | | |
| **606D127TW** | 457.94 | 449.44 to 439.44 | 9/17/2003 | | |
| | | | 12/23/2003 | 12.87 | 445.07 |
| | | | 7/4/2004 | 7.47 | 450.47 |
| | | | 9/28/2004 | 6.91 | 451.03 |
| | | | 4/17/2005 | | |
| **606D151MW** | 457.82 | 457.82 to 457.82 | 5/16/2006 | | |
| | | | 8/7/2006 | 7.70 | 450.12 |
| | | | 8/7/2006 | 7.41 | 450.41 |
| | | | 11/9/2006 | 6.94 | 450.88 |
| | | | 4/24/2007 | 7.30 | 450.52 |
| | | | 8/20/2007 | 7.35 | 450.47 |
| | | | 1/14/2008 | 7.67 | 450.15 |
| | | | 7/9/2008 | 8.63 | 449.19 |
| | | | 12/16/2008 | 7.51 | 450.31 |
| | | | 7/13/2009 | 8.77 | 449.05 |
| | 457.81 | 457.81 to 457.81 | 12/15/2009 | 8.20 | 449.61 |
| | | | 8/10/2010 | 7.72 | 450.09 |
| | | | 12/16/2010 | 8.02 | 449.79 |
| | | | 7/25/2011 | 9.2 | 448.61 |
| | | | 12/14/2011 | 8.21 | 449.60 |
| | | | 7/11/2012 | 10.33 | 447.48 |
| | | | 12/19/2012 | 8.48 | 449.33 |
| | | | 7/15/2013 | 9.20 | 448.61 |
| | | | 12/17/2013 | 8.29 | 449.52 |
| | | | 7/15/2014 | 9.78 | 448.03 |
| | | | 12/15/2015 | 8.61 | 449.20 |
| | | | 7/20/2015 | 9.35 | 448.46 |
| | | | 12/15/2015 | 7.90 | 449.91 |
| | | | 4/7/2016 | Well Plugged and Abandoned | |

**Table 4-2B**

**Summary of Groundwater Gauging Data**
**Historical Monitoring Wells — SWMU 18 Plume**
**2016 RAER**
**Former NAS Dallas, Texas**
**Page 3 of 3**

| Monitoring Well | Top of Casing [1] (ft msl) | Screened Interval (ft msl) | Date | Depth to Water [2] (ft bgs) | Groundwater Elevation (ft msl) |
|---|---|---|---|---|---|
| **Monitoring Wells Located Outside PCLE Zone** | | | | | |
| **60602MW** | 458.24 | 453.98 to 443.98 | 10/27/1995 | | |
| | | | 2/1/1998 | 4.61 | 453.63 |
| | | | 5/1/1998 | 5.16 | 453.08 |
| | | | 8/1/1998 | 6.68 | 451.56 |
| | | | 2/1/1999 | 6.63 | 451.61 |
| | | | 9/1/1999 | 7.11 | 451.13 |
| | | | 6/1/2000 | 4.68 | 453.56 |
| | | | 6/1/2001 | 4.98 | 453.26 |
| | | | 12/2/2002 | 4.75 | 453.49 |
| | | | 8/1/2003 | 6.14 | 452.10 |
| | | | 12/23/2003 | 5.77 | 452.47 |
| | | | 7/4/2004 | 5.12 | 453.12 |
| | | | 9/28/2004 | 5.62 | 452.62 |
| | | | 4/17/2005 | | |
| **60604MW** | 457.85 | 453.89 to 443.89 | 11/17/1995 | | |
| | | | 2/1/1998 | 4.82 | 453.03 |
| | | | 5/1/1998 | 6.11 | 451.74 |
| | | | 8/1/1998 | 6.23 | 451.62 |
| | | | 2/1/1999 | 4.49 | 453.36 |
| | | | 9/1/1999 | 5.33 | 452.52 |
| | | | 6/1/2000 | 6.64 | 451.21 |
| | | | 6/1/2001 | 6.94 | 450.91 |
| | | | 12/2/2002 | 3.74 | 454.11 |
| | | | 8/1/2003 | 4.88 | 452.97 |
| | | | 12/23/2003 | 4.33 | 453.52 |
| | | | 7/4/2004 | 6.19 | 451.66 |
| | | | 9/28/2004 | 4.28 | 453.57 |
| | | | 4/17/2005 | | |
| **600D90MW** | 460.77 | 457.54 to 447.54 | 8/3/2000 | Well Installed | |
| | | | 9/1/1999 | 13.02 | 447.75 |
| | | | 6/1/2000 | 10.70 | 450.07 |
| | | | 6/1/2001 | 8.46 | 452.31 |
| | | | 12/2/2002 | 5.24 | 455.53 |
| | | | 8/1/2003 | 11.25 | 449.52 |
| | | | 12/23/2003 | 12.32 | 448.45 |
| **606D116TW** | 455.74 | 449.74 to 439.74 | 7/4/2004 | 4.39 | 451.35 |
| | | | 9/28/2004 | 5.98 | 449.76 |
| | | | 4/17/2005 | | |
| **606D128TW** | 457.73 | 449.23 to 439.23 | 9/17/2003 | | |
| | | | 12/23/2003 | 4.16 | 453.57 |
| | | | 7/4/2004 | 3.55 | 454.18 |
| | | | 9/28/2004 | 4.05 | 453.68 |
| | | | 4/17/2005 | | |

bgs - below ground surface
ft - feet
msl - mean sea level
PCLE - Protective Concentration Level Exceedance

Note:
1 - All monitoring wells on-site were resurveyed in May 2005 in accordance with the Compliance Plan Requirements
Depth to water measurements taken from the top of the riser.

# TABLE 4-3
# SUMMARY OF GROUNDWATER GAUGING DATA

**Table 4-3A**

**Summary of Geochemical Parameters Measured in Groundwater**
**Long Term Monitoring Wells — SWMU 18 Plume**
**2016 RAER**
**Former NAS Dallas, Texas**
**Page 1 of 2**

| Monitoring Well | Sampling Date | Sampling Round | SDG | Oxidation-Reduction Conditions | | | | | | Degradation Products | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Dissolved Oxygen[1] | ORP[1] | Hydrogen[2] | Methane[2] | Ferrous Iron[1] | Sulfate[2] | Ethene[2] | pH[1] | Alkalinity[1] | Chloride[2] |
| | | | Units | mg/L | mV | nM | µg/L | mg/L | mg/L | ng/L | S.U. | mg/L | mg/L |
| **Monitoring Wells Located Inside the PCLE Zone** | | | | | | | | | | | | | |
| **606D149MW** | 9/14/2007 | Round 18 | DALLASW006 | NA | NA | NA | 39.00 | NA | 2610 | 330 U | NA | NA | 390 |
| | 9/14/2007 | Round 18 | FIELD | 0.9 | -420.0 | NA | NA | NA | NA | NA | 6.44 | 700 | NA |
| | 7/15/2009 | Round 22 | F66683 | 1.0 | 95.8 | NA | 32.60 | 0 | 2580 | 430 U | 6.24 | 800 | 513 |
| | 7/27/2011 | Round 26 | F84667 | 0.6 | -26.4 | NA | 23.8 | 0.6 | 3210 JL | 430 U | 6.36 | 700 | 509 |
| | 7/11/2012 | Round 28 | F94831 | NA | 1.0 | NA | NA | NA | NA | NA | 6.54 | NA | NA |
| | 1/8/2013 | Round 29 | FA608 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| | 7/17/2013 | Round 30 | FA6522 | 0 | 0.0 | NA | 121 | 0 | 2680 | 430 U | 6.62 | 200 | 325 |
| | 2/25/2014 | Round 31 | F79280 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| | 7/22/2014 | Round 32 | 1407174 | 0.21 | -70.8 | NA | NA | 1.3 | 3210 | 0.001 U | 6.32 | NA | 438 |
| | 1/21/2015 | Round 33 | 1501079 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| | 7/21/2015 | Round 34 | 1507171 | 0.48 | 15.0 | NA | 55.6 | 0.39 | 2090 | 0.001 U | 6.54 | 558 | 127 |
| | 1/20/2016 | Round 35 | 1601126 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| | 7/22/2016 | Round 36 | 160175 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| **606D150MW** | 9/14/2007 | Round 18 | DALLASW006 | NA | NA | NA | 26.00 | NA | 2600 | 550 J | NA | NA | 587 |
| | 9/14/2007 | Round 18 | FIELD | 1.0 | -48.0 | NA | NA | NA | NA | NA | 6.45 | 350 | NA |
| | 7/15/2009 | Round 22 | F66683 | 1.0 | 84.2 | NA | 1.44 | 0 | 2200 | 430 U | 6.64 | 700 | 643 |
| | 7/27/2011 | Round 26 | F84667 | 0.4 | -50.1 | NA | 19.9 | 4 | 2610 JL | 430 U | 6.76 | 700 | 677 |
| | 7/11/2012 | Round 28 | F94831 | NA | 9.7 | NA | NA | NA | NA | NA | 6.7 | NA | NA |
| | 1/8/2013 | Round 29 | FA608 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| | 7/16/2013 | Round 30 | FA6522 | 0.4 | 1.8 | NA | 6.1 | 0.3 | 2940 | 430 U | 6.76 | 500 | 713 |
| | 2/25/2014 | Round 31 | F79280 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| | 7/22/2014 | Round 32 | 1407174 | 0.45 | 315.3 | NA | NA | 0.1 | 2920 | 0.001 U | 6.44 | NA | 697 |
| | 1/21/2015 | Round 33 | 1501079 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| | 7/21/2015 | Round 44 | 1507171 | 0.82 | -38.7 | NA | 15.3 | 0.06 | 376 | 0.001 U | 6.83 | 544 | 88.7 |
| | 1/20/2016 | Round 35 | 1601126 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| | 7/22/2016 | Round 36 | 160175 | 0 | 26.00 | NA | 45.4 | 0.07 | 471 | 0.001 U | 6.85 | 718 | 151 |
| **606D152MW** | 9/14/2007 | Round 18 | DALLASW006 | NA | NA | NA | 60.00 | NA | 983 | 330 U | NA | NA | 191 |
| | 9/14/2007 | Round 18 | FIELD | 0.8 | -45.0 | NA | NA | NA | NA | NA | 7.08 | 700 | NA |
| | 7/15/2009 | Round 22 | F66683 | 0.8 | 173.8 | NA | 46.80 | 0 | 1130 | 430 U | 7.02 | 400 | 219 |
| | 7/27/2011 | Round 26 | F84667 | 1 | ` | NA | 13.3 | 0 | 1630 | 430 U | 6.92 | 400 | 285 |
| | 7/11/2012 | Round 28 | F94831 | NA | 19.4 | NA | NA | NA | NA | NA | 6.9 | NA | NA |
| | 1/8/2013 | Round 29 | FA608 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| | 7/17/2013 | Round 30 | FA6522 | 0.8 | 34.6 | NA | 48.5 | 1.0 | 1670 | 430 U | 6.93 | 100 | 235 |
| | 2/25/2014 | Round 31 | F79280 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| | 7/22/2014 | Round 32 | 1407174 | 0.45 | 19.4 | NA | NA | 0.0 | 1400 | 0.001 U | 6.74 | NA | 211 |
| | 1/21/2015 | Round 33 | 1501079 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| | 7/21/2015 | Round 44 | 1507171 | 0.99 | 24.3 | NA | 21.6 | 0 | 1360 | 0.001 U | 6.84 | 614 | 234 |
| | 1/20/2016 | Round 35 | 1601126 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| | 7/22/2016 | Round 36 | 160175 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| **606D153MW** | 9/17/2007 | Round 18 | DALLASW006 | NA | NA | NA | 11.00 U | NA | 6180 | 330 U | NA | NA | 1,420 |
| | 9/17/2007 | Round 18 | FIELD | 0.9 | -380.0 | NA | NA | NA | NA | NA | 6.65 | 400 | NA |
| | 7/15/2009 | Round 22 | F66640 | 1.0 | 62.9 | NA | 3.17 | 0 | 4980 | 430 U | 6.72 | 525 | 1,470 |
| | 1/13/2010 | Round 23 | F70769 | NA | 169.0 | NA | NA | NA | NA | NA | 6.60 | NA | NA |
| | 7/13/2010 | Round 24 | F75074 | NA | -35.2 | NA | NA | NA | NA | NA | 6.47 | NA | NA |
| | 1/11/2011 | Round 25 | FIELD | NA | 146.9 | NA | NA | NA | NA | NA | 6.89 | NA | NA |
| | 7/27/2011 | Round 26 | F84667 | 0.4 | -67.8 | NA | 3.18 J | 0.2 | 5410 | 430 U | 6.82 | 500 | 1450 |
| | 1/1/2012 | Round 27 | F88817 | NA | 34 | NA | NA | NA | NA | NA | 6.98 | NA | NA |
| | 7/11/2012 | Round 28 | F94831 | NA | 42.6 | NA | NA | NA | NA | NA | 6.88 | NA | NA |
| | 1/8/2013 | Round 29 | FA608 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| | 7/17/2013 | Round 30 | FA6522 | 0.8 | 17.7 | NA | 0.18 | 0 | 5690 | 430 U | 6.7 | 500 | 1410 |
| | 2/25/2014 | Round 31 | F79280 | 1.73 | 105.6 | NA | NA | NA | NA | NA | 6.86 | NA | NA |
| | 7/22/2014 | Round 32 | 1407174 | 0.55 | -84.0 | NA | NA | 0.11 | 5170 J | 0.001 U | 6.62 | NA | 1420 |
| | 1/21/2015 | Round 33 | 1501079 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| | 7/21/2015 | Round 44 | 1507171 | 0.76 | 82.9 | NA | 2.63 J | 0 | 4630 | 0.001 U | 6.73 | 606 | 928 |
| | 1/20/2016 | Round 35 | 1601126 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| | 7/22/2016 | Round 36 | 160175 | 5.26 | 194.0 | NA | 1.68 | 0.02 | 3940 | 0.001 U | 6.29 | 715 | 752 |

**Table 4-3A**

**Summary of Geochemical Parameters Measured in Groundwater**
**Long Term Monitoring Wells — SWMU 18 Plume**
**2016 RAER**
**Former NAS Dallas, Texas**
**Page 2 of 2**

| Monitoring Well | Sampling Date | Sampling Round | SDG | Oxidation-Reduction Conditions | | | | | | Degradation Products | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Dissolved Oxygen[1] | ORP[1] | Hydrogen[2] | Methane[2] | Ferrous Iron[1] | Sulfate[2] | Ethene[2] | pH[1] | Alkalinity[1] | Chloride[2] |
| | | | Units | mg/L | mV | nM | µg/L | mg/L | mg/L | ng/L | S.U. | mg/L | mg/L |
| **Monitoring Wells Located Outside the PCLE Zone** | | | | | | | | | | | | | |
| **606D154MW** | 9/17/2007 | Round 18 | DALLASW006 | NA | NA | NA | 21.00 | NA | 1240 | 330 U | NA | NA | 227 |
| | 9/17/2007 | Round 18 | FIELD | 400.0 | -326.0 | NA | NA | NA | NA | NA | 6.69 | 400 | NA |
| | 7/14/2009 | Round 22 | F66640 | 1.0 | -48.4 | NA | 11.50 | 1 | 1300 | 430 U | 6.83 | 500 | 208 |
| | 1/11/2011 | Round 25 | FIELD | NA | 91.2 | NA | NA | NA | NA | NA | 6.98 | NA | NA |
| | 7/27/2011 | Round 26 | F84667 | 0.3 | -56.4 | NA | 10.2 | 0.1 | 1310 | 430 U | 7.16 | 350 | 174 |
| | 7/11/2012 | Round 28 | F94831 | NA | 6.1 | NA | NA | NA | NA | NA | 6.94 | NA | NA |
| | 1/8/2013 | Round 29 | FA608 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| | 7/17/2013 | Round 30 | FA6522 | 1 | -20.9 | NA | 10.4 | 0.2 | 1280 | 430 U | 7.01 | 100 | 203 |
| | 2/25/2014 | Round 31 | F79280 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| | 7/22/2014 | Round 32 | 1407174 | 0.26 | -24.5 | NA | NA | 0.38 | 1220 | 0.001 U | 6.78 | NA | 183 |
| | 1/21/2015 | Round 33 | 1501079 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| | 7/21/2015 | Round 44 | 1507171 | 0.58 | -60.4 | NA | 19.6 | 0.45 | 1440 | 0.001 U | 6.79 | 505 | 181 |
| | 1/20/2016 | Round 35 | 1601126 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| | 7/22/2016 | Round 36 | 160175 | 0 | -155.0 | NA | 14.5 | 0.93 | 1300 | 0.001 U | 7.11 | 398 | 166 |

mg/L - milligrams per liter
mV - millivolts
NA - Not Analyzed
ng/L - nanograms per liter
nM - nanomoles per liter
mg/L - micrograms per liter
S.U. - Standard Units
SDG - Sample Delivery Group

Notes:
1. Field measurement
2. Analytical laboratory result

Analytical Result Qualifiers:

J, K, L - Indicates that the chemical was detected; however, the associated numerical result may not be a precise representation of the amount that is actually present in the sample. The laboratory reported concentration is considered to be bias unknown (J), high (K), or low (L) estimate of the true concentration.

U - Indicates that the chemical was not detected at the numerical detection limit (sample-specific quantitation limit) noted. Nondetected results from the laboratory are reported in this manner. This qualifier is added to a positive result (reported by the laboratory) if the detected concentration is determined to be attributable to contamination introduced during field sampling or laboratory analysis.

Monitoring wells 606D149MW and 606D152MW were not sampled during the July 2016 event due to high concentrations of injection materials.

**Table 4-3A**

**Summary of Geochemical Parameters Measured in Groundwater**
**Long Term Monitoring Wells — SWMU 18 Plume**
**2016 RAER**
**Former NAS Dallas, Texas**
**Page 1 of 1**

| Monitoring Well | Sampling Date | Sampling Round | Oxidation-Reduction Conditions | | | | | | Degradation Products | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Dissolved Oxygen[1] | ORP[1] | Hydrogen[2] | Methane[2] | Ferrous Iron[1] | Sulfate[2] | Ethene[2] | pH[1] | Alkalinity[1] | Chloride[2] |
| | | Units | mg/L | mV | nM | µg/L | mg/L | mg/L | ng/L | S.U. | mg/L | mg/L |
| **Monitoring Wells Located Inside the PCLE Zone** | | | | | | | | | | | | |
| **606D151MW** | 9/17/2007 | Round 18 | NA | NA | NA | 1.40 U | NA | 762 | 330 U | NA | NA | 187 |
| | 9/17/2007 | Round 18 | 0.8 | -110.0 | NA | NA | NA | NA | NA | 7.05 | 450 | NA |
| | 7/15/2009 | Round 22 | 3.0 | 15.8 | NA | 15.10 | 0 | 1850 | 430 U | 6.9 | 500 | 337 |
| | 7/27/2011 | Round 26 | 0.5 | -71.7 | NA | 31.6 | 0.8 | 3440 | 430 U | 7.13 | 500 | 688 |
| | 7/11/2012 | Round 28 | NA | 11.4 | NA | NA | NA | NA | NA | 6.85 | NA | NA |
| | 1/8/2013 | Round 29 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| | 7/17/2103 | Round 30 | 1.0 | 30.7 | NA | 420 | 0 | 1110 | 430 U | 6.84 | 100 | 205 |
| | 2/25/2014 | Round 31 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| | 7/22/2014 | Round 32 | 0.4 | 15.2 | NA | NA | 0 | 2890 | 0.001 U | 6.6 | NA | 545 |
| | 1/21/2015 | Round 33 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| | 7/21/2015 | Round 44 | 1.21 | -24.9 | NA | 1.02 J | 0.07 | 2370 | 0.001 U | 6.7 | 564 | 458 |
| | 4/7/2016 | Well Plugged and Abandoned | | | | | | | | | | |

mg/L - milligrams per liter
mV - millivolts
NA - Not Analyzed
ng/L - nanograms per liter
nM - nanomoles per
mg/L - micrograms
S.U. - Standard Unit
SDG - Sample Delivery Group

Notes:
1. Field measurement
2. Analytical laboratory result

Analytical Result Qualifiers:

J, K, L - Indicates that the chemical was detected; however, the associated numerical result may not be a precise representation of the amount that is actually present in the sample. The laboratory reported concentration is considered to be bias unknown (J), high (K), or low (L) estimate of the true concentration.
U - Indicates that the chemical was not detected at the numerical detection limit (sample-specific quantitation limit) noted. Nondetected results from the laboratory are reported in this manner. This qualifier is added to a positive result (reported by the

# TABLE 4-4
# SUMMARY OF CONCENTRATION VS. TIME ATTENUATION RATE CONSTANTS

**Table 4-4A**

**Summary of Concentration vs. Time Attenuation Rate Constants**
**SWMU 18 Plume**
**2016 RAER**
**Former NAS Dallas, Texas**
**Page 1 of 15**

| Monitoring Well | Sampling Date | Elapsed Time (years) | Protective Concentration Level (mg/L) | Concentration Detected (mg/L) | Natural Log of Concentration (mg/L) | Degradation Rate from Natural Log ($K_{time}$) (mg/L per year) | Minimum Degradation Rate Required for Remedial Goals Natural Log ($K_{time}$) (mg/L per year) | Minimum Degradation Rate Met? (Yes/No) | Expected Remedial Goal Concentration (mg/L) | Expected Remedial Goal Concentration Met? (Yes/No) | Remedial Goals Being Met? (Yes/No) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | **Trichloroethene** | | | | | | | | | | |
| **606D149MW** | May-06 | 0.0 | 0.00500 | 0.00060 J | -7.42 | -- | -- | -- | -- | -- | -- |
| | Aug-06 | 0.3 | 0.00500 | 0.00040 U | -8.00 | -- | -- | -- | -- | -- | -- |
| | Nov-06 | 0.5 | 0.00500 | 0.00400 | -5.52 | -- | -- | -- | -- | -- | -- |
| | Apr-07 | 0.9 | 0.00500 | 0.00680 | -4.99 | -- | -- | -- | -- | -- | -- |
| | Sep-07 | 1.3 | 0.00500 | 0.00260 | -5.95 | -- | -- | -- | -- | -- | -- |
| | Jan-08 | 1.7 | 0.00500 | 0.00480 | -5.34 | -- | -- | -- | -- | -- | -- |
| | Jul-08 | 2.2 | 0.00500 | 0.00610 | -5.10 | -- | -- | -- | -- | -- | -- |
| | Jan-09 | 2.7 | 0.00500 | 0.00077 J | -7.17 | -0.850 | -0.033 | Less Than PCL | 0.00642 | Less Than PCL | Less Than PCL |
| | Jul-09 | 3.2 | 0.00500 | 0.00490 | -5.32 | -0.322 | -0.033 | Less Than PCL | 0.00631 | Less Than PCL | Less Than PCL |
| | Jan-10 | 3.7 | 0.00500 | 0.00390 | -5.55 | -0.169 | -0.033 | Less Than PCL | 0.00621 | Less Than PCL | Less Than PCL |
| | Jul-10 | 4.2 | 0.00500 | 0.00780 | -4.85 | 0.032 | -0.033 | No | 0.00611 | No | No |
| | Jan-11 | 4.7 | 0.00500 | 0.00620 | -5.08 | 0.086 | -0.033 | No | 0.00601 | No | No |
| | Jul-11 | 5.2 | 0.00500 | 0.00210 | -6.17 | -0.018 | -0.033 | Less Than PCL | 0.00591 | Less Than PCL | Less Than PCL |
| | Jan-12 | 5.7 | 0.00500 | 0.00180 | -6.32 | -0.086 | -0.033 | Less Than PCL | 0.00582 | Less Than PCL | Less Than PCL |
| | Jul-12 | 6.2 | 0.00500 | 0.00120 | -6.73 | -0.154 | -0.033 | Less Than PCL | 0.00573 | Less Than PCL | Less Than PCL |
| | Jan-13 | 6.7 | 0.00500 | 0.00210 | -6.17 | -0.151 | -0.033 | Less Than PCL | 0.00563 | Less Than PCL | Less Than PCL |
| | Jul-13 | 7.2 | 0.00500 | 0.00100 | -6.91 | -0.188 | -0.033 | Less Than PCL | 0.00554 | Less Than PCL | Less Than PCL |
| | Jan-14 | 7.7 | 0.00500 | 0.00120 | -6.73 | -0.198 | -0.033 | Less Than PCL | 0.00545 | Less Than PCL | Less Than PCL |
| | Jul-14 | 8.2 | 0.00500 | 0.00273 | -5.90 | -0.163 | -0.033 | Less Than PCL | 0.00536 | Less Than PCL | Less Than PCL |
| | Jan-15 | 8.7 | 0.00500 | 0.0011 | -6.81 | -0.172 | -0.033 | Less Than PCL | 0.00527 | Less Than PCL | Less Than PCL |
| | Jul-15 | 9.2 | 0.00500 | 0.00125 | -6.68 | -0.171 | -0.033 | Less Than PCL | 0.00519 | Less Than PCL | Less Than PCL |
| | Jan-16 | 9.7 | 0.00500 | 0.0008 J | -6.81 | -0.172 | -0.033 | Less Than PCL | 0.00527 | Less Than PCL | Less Than PCL |
| | Jul-16 | 10.2 | 0.00500 | 0.0005 U | -8.00 | -0.203 | -0.033 | Less Than PCL | 0.00502 | Less Than PCL | Less Than PCL |

**Table 4-4A**

**Summary of Concentration vs. Time Attenuation Rate Constants**
**SWMU 18 Plume**
**2016 RAER**
**Former NAS Dallas, Texas**
**Page 2 of 15**

| Monitoring Well | Sampling Date | Elapsed Time (years) | Protective Concentration Level (mg/L) | Concentration Detected (mg/L) | Natural Log of Concentration (mg/L) | Degradation Rate from Natural Log ($K_{time}$) (mg/L per year) | Minimum Degradation Rate Required for Remedial Goals Natural Log ($K_{time}$) (mg/L per year) | Minimum Degradation Rate Met? (Yes/No) | Expected Remedial Goal Concentration (mg/L) | Expected Remedial Goal Concentration Met? (Yes/No) | Remedial Goals Being Met? (Yes/No) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 606D150MW | May-06 | 0.0 | 0.00500 | 0.00100 | -6.91 | - | -- | -- | -- | -- | -- |
| | Aug-06 | 0.3 | 0.00500 | 0.00800 | -4.83 | -- | -- | -- | -- | -- | -- |
| | Nov-06 | 0.5 | 0.00500 | 0.00400 | -5.52 | -- | -- | -- | -- | -- | -- |
| | Apr-07 | 0.9 | 0.00500 | 0.00820 | -4.80 | -- | -- | -- | -- | -- | -- |
| | Sep-07 | 1.3 | 0.00500 | 0.01100 | -4.51 | -- | -- | -- | -- | -- | -- |
| | Jan-08 | 1.6 | 0.00500 | 0.00660 | -5.02 | 0.221 | -0.047 | No | 0.00750 | Yes | Evaluate Further |
| | Jul-08 | 2.1 | 0.00500 | 0.00390 | -5.55 | -0.132 | -0.047 | Less Than PCL | 0.00733 | Less Than PCL | Less Than PCL |
| | Jan-09 | 2.6 | 0.00500 | 0.00340 | -5.68 | -0.259 | -0.047 | Less Than PCL | 0.00715 | Less Than PCL | Less Than PCL |
| | Jul-09 | 3.2 | 0.00500 | 0.01450 | -4.23 | 0.033 | -0.047 | No | 0.00698 | No | No |
| | Jan-10 | 3.6 | 0.00500 | 0.00760 | -4.88 | 0.044 | -0.047 | No | 0.00682 | No | No |
| | Jul-10 | 4.1 | 0.00500 | 0.00330 | -5.71 | -0.061 | -0.047 | Less Than PCL | 0.00667 | Less Than PCL | Less Than PCL |
| | Jan-11 | 4.6 | 0.00500 | 0.00250 | -5.99 | -0.141 | -0.047 | Less Than PCL | 0.00651 | Less Than PCL | Less Than PCL |
| | Jul-11 | 5.2 | 0.00500 | 0.00260 | -5.95 | -0.175 | -0.047 | Less Than PCL | 0.00635 | Less Than PCL | Less Than PCL |
| | Jan-12 | 5.6 | 0.00500 | 0.00250 | -5.99 | -0.191 | -0.047 | Less Than PCL | 0.00622 | Less Than PCL | Less Than PCL |
| | Jul-12 | 6.1 | 0.00500 | 0.00290 | -5.84 | -0.185 | -0.047 | Less Than PCL | 0.00607 | Less Than PCL | Less Than PCL |
| | Jan-13 | 6.6 | 0.00500 | 0.00085 | -7.07 | -0.244 | -0.047 | Less Than PCL | 0.00593 | Less Than PCL | Less Than PCL |
| | Jul-13 | 7.1 | 0.00500 | 0.00930 | -4.68 | -0.162 | -0.047 | Yes | 0.00579 | No | Evaluate Further |
| | Jan-14 | 7.7 | 0.00500 | 0.00360 | -5.63 | -0.143 | -0.047 | Less Than PCL | 0.00566 | Less Than PCL | Less Than PCL |
| | Jul-14 | 8.2 | 0.00500 | 0.00412 | -5.49 | -0.123 | -0.047 | Less Than PCL | 0.00552 | Less Than PCL | Less Than PCL |
| | Jan-15 | 8.7 | 0.00500 | 0.00529 | -5.24 | -0.098 | -0.047 | Yes | 0.00539 | No | No |
| | Jul-15 | 9.2 | 0.00500 | 0.00122 | -6.71 | -0.123 | -0.047 | Less Than PCL | 0.00527 | Less Than PCL | Less Than PCL |
| | Jan-16 | 9.7 | 0.00500 | 0.0024 | -5.24 | -0.099 | -0.047 | Less Than PCL | 0.00515 | No | No |
| | Jul-16 | 10.2 | 0.00500 | 0.002 | -6.21 | -0.104 | -0.047 | Less Than PCL | 0.00503 | Less Than PCL | Less Than PCL |
| 606D151MW | May-06 | 0.0 | 0.00500 | 0.00040 U | -8.00 | -- | -- | -- | -- | -- | -- |
| | Aug-06 | 0.3 | 0.00500 | 0.00040 U | -8.00 | -- | -- | -- | -- | -- | -- |
| | Nov-06 | 0.5 | 0.00500 | 0.00040 U | -7.82 | -- | -- | -- | -- | -- | -- |
| | Apr-07 | 0.9 | 0.00500 | 0.00014 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Sep-07 | 1.3 | 0.00500 | 0.00023 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-08 | 1.6 | 0.00500 | 0.00053 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-08 | 2.1 | 0.00500 | 0.00032 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-09 | 2.6 | 0.00500 | 0.00032 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-09 | 3.2 | 0.00500 | 0.00032 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-10 | 3.6 | 0.00500 | 0.00024 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-10 | 4.1 | 0.00500 | 0.00024 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-11 | 4.6 | 0.00500 | 0.00026 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-11 | 5.2 | 0.00500 | 0.00026 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-12 | 5.6 | 0.00500 | 0.00026 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-12 | 6.1 | 0.00500 | 0.00026 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-13 | 6.7 | 0.00500 | 0.00031 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-13 | 7.1 | 0.00500 | 0.00031 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-14 | 7.7 | 0.00500 | 0.00033 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-14 | 8.2 | 0.00500 | 0.0005 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-15 | 8.7 | 0.00500 | 0.00025 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-15 | 9.2 | 0.00500 | 0.00025 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-16 | Well Abandoned | | | | | | | | | |

**Table 4-4A**

**Summary of Concentration vs. Time Attenuation Rate Constants**
**SWMU 18 Plume**
**2016 RAER**
**Former NAS Dallas, Texas**
**Page 3 of 15**

| Monitoring Well | Sampling Date | Elapsed Time (years) | Protective Concentration Level (mg/L) | Concentration Detected (mg/L) | Natural Log of Concentration (mg/L) | Degradation Rate from Natural Log ($K_{time}$) (mg/L per year) | Minimum Degradation Rate Required for Remedial Goals Natural Log ($K_{time}$) (mg/L per year) | Minimum Degradation Rate Met? (Yes/No) | Expected Remedial Goal Concentration (mg/L) | Expected Remedial Goal Concentration Met? (Yes/No) | Remedial Goals Being Met? (Yes/No) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 606D152MW | May-06 | 0.0 | 0.00500 | 0.00700 | -4.96 | -- | -- | -- | -- | -- | -- |
| | Aug-06 | 0.3 | 0.00500 | 0.01200 | -4.42 | -- | -- | -- | -- | -- | -- |
| | Nov-06 | 0.5 | 0.00500 | 0.01400 | -4.27 | -- | -- | -- | -- | -- | -- |
| | Apr-07 | 0.9 | 0.00500 | 0.01600 | -4.14 | -- | -- | -- | -- | -- | -- |
| | Sep-07 | 1.3 | 0.00500 | 0.01200 | -4.42 | 0.362 | -0.033 | No | 0.00671 | No | No |
| | Jan-08 | 1.6 | 0.00500 | 0.01300 | -4.34 | 0.237 | -0.033 | No | 0.00663 | No | No |
| | Jul-08 | 2.1 | 0.00500 | 0.01040 | -4.57 | 0.085 | -0.033 | No | 0.00653 | No | No |
| | Jan-09 | 2.7 | 0.00500 | 0.00780 | -4.85 | -0.049 | -0.033 | Yes | 0.00642 | No | Evaluate Further |
| | Jul-09 | 3.2 | 0.00500 | 0.00870 | -4.74 | -0.076 | -0.033 | Yes | 0.00631 | No | Evaluate Further |
| | Jan-10 | 3.7 | 0.00500 | 0.01360 | -4.30 | -0.019 | -0.033 | No | 0.00621 | No | No |
| | Jul-10 | 4.2 | 0.00500 | 0.01800 | -4.02 | 0.042 | -0.033 | No | 0.00611 | No | No |
| | Jan-11 | 4.7 | 0.00500 | 0.01020 | -4.59 | 0.019 | -0.033 | No | 0.00601 | No | No |
| | Jul-11 | 5.2 | 0.00500 | 0.01340 | -4.31 | 0.026 | -0.033 | No | 0.00591 | No | No |
| | Jan-12 | 5.6 | 0.00500 | 0.01210 | -4.41 | 0.023 | -0.033 | No | 0.00582 | No | No |
| | Jul-12 | 6.2 | 0.00500 | 0.01300 | -4.34 | 0.025 | -0.033 | No | 0.00573 | No | No |
| | Jan-13 | 6.7 | 0.00500 | 0.00470 | -5.36 | -0.026 | -0.033 | Less Than PCL | 0.00563 | Less Than PCL | Less Than PCL |
| | Jul-13 | 7.2 | 0.00500 | 0.03610 | -3.32 | 0.031 | -0.033 | No | 0.00554 | No | No |
| | Jan-14 | 7.7 | 0.00500 | 0.03150 | -3.46 | 0.063 | -0.033 | No | 0.00545 | No | No |
| | Jul-14 | 8.2 | 0.00500 | 0.04070 | -3.20 | 0.094 | -0.033 | No | 0.00536 | No | No |
| | Jan-15 | 8.7 | 0.00500 | 0.03100 | -3.47 | 0.106 | -0.124 | No | 0.00610 | No | No |
| | Jul-15 | 9.2 | 0.00500 | 0.04630 | -3.07 | 0.124 | -0.033 | No | 0.00519 | No | No |
| | Jan-16 | 9.7 | 0.00500 | 0.0108 | -3.47 | 0.106 | -0.124 | No | 0.00610 | No | No |
| | Jul-16 | 10.2 | 0.00500 | 0.0288 JL | -3.55 | 0.124 | -0.033 | No | 0.00502 | No | No |

**Table 4-4A**

**Summary of Concentration vs. Time Attenuation Rate Constants**
**SWMU 18 Plume**
**2016 RAER**
**Former NAS Dallas, Texas**
**Page 4 of 15**

| Monitoring Well | Sampling Date | Elapsed Time (years) | Protective Concentration Level (mg/L) | Concentration Detected (mg/L) | Natural Log of Concentration (mg/L) | Degradation Rate from Natural Log ($K_{time}$) (mg/L per year) | Minimum Degradation Rate Required for Remedial Goals Natural Log ($K_{time}$) (mg/L per year) | Minimum Degradation Rate Met? (Yes/No) | Expected Remedial Goal Concentration (mg/L) | Expected Remedial Goal Concentration Met? (Yes/No) | Remedial Goals Being Met? (Yes/No) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 606D153MW | Aug-06 | 0.0 | 0.00500 | 0.00400 | -5.52 | -- | -- | -- | -- | -- | -- |
| | Nov-06 | 0.2 | 0.00500 | 0.00600 | -5.12 | -- | -- | -- | -- | -- | -- |
| | Apr-07 | 0.6 | 0.00500 | 0.00790 | -4.84 | -- | -- | -- | -- | -- | -- |
| | Sep-07 | 1.0 | 0.00500 | 0.00670 | -5.01 | -- | -- | -- | -- | -- | -- |
| | Jan-08 | 1.4 | 0.00500 | 0.00680 | -4.99 | 0.056 | -0.019 | No | 0.00587 | No | No |
| | Jul-08 | 1.9 | 0.00500 | 0.00550 | -5.20 | -0.084 | -0.019 | Yes | 0.00582 | Yes | Yes |
| | Jan-09 | 2.4 | 0.00500 | 0.00610 | -5.10 | -0.067 | -0.019 | Yes | 0.00576 | No | Evaluate Further |
| | Jul-09 | 2.9 | 0.00500 | 0.00740 | -4.91 | -0.005 | -0.019 | No | 0.00571 | No | No |
| | Jan-10 | 3.4 | 0.00500 | 0.00530 | -5.24 | -0.044 | -0.019 | Yes | 0.00566 | Yes | Yes |
| | Jul-10 | 3.9 | 0.00500 | 0.00690 | -4.98 | -0.019 | -0.019 | Yes | 0.00560 | No | Evaluate Further |
| | Jan-11 | 4.4 | 0.00500 | 0.00470 | -5.36 | -0.052 | -0.019 | Less Than PCL | 0.00555 | Less Than PCL | Less Than PCL |
| | Jul-11 | 4.9 | 0.00500 | 0.00580 | -5.15 | -0.045 | -0.019 | Yes | 0.00550 | No | Evaluate Further |
| | Jan-12 | 5.4 | 0.00500 | 0.00550 | -5.20 | -0.044 | -0.019 | Yes | 0.00545 | No | Evaluate Further |
| | Jul-12 | 5.9 | 0.00500 | 0.00450 | -5.40 | -0.056 | -0.019 | Less Than PCL | 0.00540 | Less Than PCL | Less Than PCL |
| | Jan-13 | 6.4 | 0.00500 | 0.00360 | -5.63 | -0.075 | -0.019 | Less Than PCL | 0.00535 | Less Than PCL | Less Than PCL |
| | Jul-13 | 6.9 | 0.00500 | 0.00360 | -5.63 | -0.086 | -0.019 | Less Than PCL | 0.00530 | Less Than PCL | Less Than PCL |
| | Jan-14 | 7.4 | 0.00500 | 0.00310 | -5.78 | -0.097 | -0.019 | Less Than PCL | 0.00525 | Less Than PCL | Less Than PCL |
| | Jul-14 | 7.9 | 0.00500 | 0.00251 | -5.99 | -0.112 | -0.019 | Less Than PCL | 0.00520 | Less Than PCL | Less Than PCL |
| | Jan-15 | 8.4 | 0.00500 | 0.00361 | -5.62 | -0.107 | -0.019 | Less Than PCL | 0.00515 | Less Than PCL | Less Than PCL |
| | Jan-15 | 8.4 | 0.00500 | 0.00277 | -5.89 | -0.111 | -0.019 | Less Than PCL | 0.00515 | Less Than PCL | Less Than PCL |
| | Jan-15 | 8.4 | 0.00500 | 0.00271 | -5.91 | -0.115 | -0.049 | Less Than PCL | 0.00541 | Less Than PCL | Less Than PCL |
| | Jul-15 | 8.9 | 0.00500 | 0.00229 | -6.08 | -0.121 | -0.019 | Less Than PCL | 0.00510 | Less Than PCL | Less Than PCL |
| | Jan-16 | 9.7 | 0.00500 | 0.00268 | -5.91 | -0.119 | -0.049 | Less Than PCL | 0.00541 | Less Than PCL | Less Than PCL |
| | Jul-16 | 9.9 | 0.00500 | 0.00274 | -5.90 | -0.117 | -0.019 | Less Than PCL | 0.00501 | Less Than PCL | Less Than PCL |

**Table 4-4A**

**Summary of Concentration vs. Time Attenuation Rate Constants**
**SWMU 18 Plume**
**2016 RAER**
**Former NAS Dallas, Texas**
**Page 5 of 15**

| Monitoring Well | Sampling Date | Elapsed Time (years) | Protective Concentration Level (mg/L) | Concentration Detected (mg/L) | Natural Log of Concentration (mg/L) | Degradation Rate from Natural Log ($K_{time}$) (mg/L per year) | Minimum Degradation Rate Required for Remedial Goals Natural Log ($K_{time}$) (mg/L per year) | Minimum Degradation Rate Met? (Yes/No) | Expected Remedial Goal Concentration (mg/L) | Expected Remedial Goal Concentration Met? (Yes/No) | Remedial Goals Being Met? (Yes/No) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 606D154MW/606D154RMW | May-06 | 0.0 | 0.00500 | 0.00200 | -6.21 | -- | -- | -- | -- | -- | -- |
| | Jul-06 | 0.2 | 0.00500 | 0.00060 J | -7.42 | -- | -- | -- | -- | -- | -- |
| | Aug-06 | 0.3 | 0.00500 | 0.00070 J | -7.26 | -- | -- | -- | -- | -- | -- |
| | Nov-06 | 0.5 | 0.00500 | 0.00060 J | -7.42 | -- | -- | -- | -- | -- | -- |
| | Apr-07 | 0.9 | 0.00500 | 0.00047 J | -7.66 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Sep-07 | 1.3 | 0.00500 | 0.00025 J | -8.29 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-08 | 1.6 | 0.00500 | 0.00190 | -6.27 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-08 | 2.1 | 0.00500 | 0.00032 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-09 | 2.7 | 0.00500 | 0.07030 | -2.65 | -- | NA | NA | NA | NA | Evaluate Further |
| | Jul-09 | 3.2 | 0.00500 | 0.00032 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-10 | 3.7 | 0.00500 | 0.00024 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-10 | 4.2 | 0.00500 | 0.00024 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-11 | 4.7 | 0.00500 | 0.00026 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-11 | 5.2 | 0.00500 | 0.00026 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-12 | 5.6 | 0.00500 | 0.00026 U | -8.25 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-12 | 6.2 | 0.00500 | 0.00026 U | -8.25 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-13 | 6.7 | 0.00500 | 0.00031 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-13 | 7.2 | 0.00500 | 0.00031 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-14 | 7.7 | 0.00500 | 0.0003 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-14 | 8.2 | 0.00500 | 0.00025 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-15 | 8.7 | 0.00500 | 0.00025 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-15 | 9.2 | 0.00500 | 0.00025 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-16 | 9.7 | 0.00500 | 0.00025 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-16 | 10.2 | 0.00500 | 0.0005 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |

**Table 4-4A**

**Summary of Concentration vs. Time Attenuation Rate Constants**
**SWMU 18 Plume**
**2016 RAER**
**Former NAS Dallas, Texas**
**Page 6 of 15**

| Monitoring Well | Sampling Date | Elapsed Time (years) | Protective Concentration Level (mg/L) | Concentration Detected (mg/L) | Natural Log of Concentration (mg/L) | Degradation Rate from Natural Log ($K_{time}$) (mg/L per year) | Minimum Degradation Rate Required for Remedial Goals Natural Log ($K_{time}$) (mg/L per year) | Minimum Degradation Rate Met? (Yes/No) | Expected Remedial Goal Concentration (mg/L) | Expected Remedial Goal Concentration Met? (Yes/No) | Remedial Goals Being Met? (Yes/No) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **cis-1,2-Dichloroethene** | | | | | | | | | | | |
| **606D149MW** | May-06 | 0.0 | 0.07000 | 0.00100 | -6.91 | -- | -- | -- | -- | -- | -- |
| | Aug-06 | 0.3 | 0.07000 | 0.00050 U | -8.00 | -- | -- | -- | -- | -- | -- |
| | Nov-06 | 0.5 | 0.07000 | 0.01200 | -4.42 | -- | -- | -- | -- | -- | -- |
| | Apr-07 | 0.9 | 0.07000 | 0.01400 | -4.27 | -- | -- | -- | -- | -- | -- |
| | Sep-07 | 1.3 | 0.07000 | 0.01000 | -4.61 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-08 | 1.6 | 0.07000 | 0.01100 | -4.51 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-08 | 2.1 | 0.07000 | 0.02190 | -3.82 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-09 | 2.6 | 0.07000 | 0.00190 | -6.27 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-09 | 3.2 | 0.07000 | 0.01710 | -4.07 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-10 | 3.6 | 0.07000 | 0.01360 | -4.30 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-10 | 4.1 | 0.07000 | 0.02700 | -3.61 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-11 | 4.6 | 0.07000 | 0.02380 | -3.74 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-11 | 5.2 | 0.07000 | 0.01390 | -4.28 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-12 | 5.6 | 0.07000 | 0.00790 | -4.84 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-12 | 6.1 | 0.07000 | 0.01100 | -4.51 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-13 | 6.6 | 0.07000 | 0.00880 | -4.73 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-13 | 7.1 | 0.07000 | 0.00730 | -4.92 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-14 | 7.7 | 0.07000 | 0.00700 | -4.96 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-14 | 8.2 | 0.07000 | 0.0145 | -4.23 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-15 | 8.7 | 0.07000 | 0.00717 | -4.94 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-15 | 9.2 | 0.07000 | 0.00571 | -5.17 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-16 | 9.7 | 0.07000 | 0.00511 | -4.94 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-16 | 10.2 | 0.07000 | 0.00322 | -5.74 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |

**Table 4-4A**

**Summary of Concentration vs. Time Attenuation Rate Constants**
**SWMU 18 Plume**
**2016 RAER**
**Former NAS Dallas, Texas**


| Monitoring Well | Sampling Date | Elapsed Time (years) | Protective Concentration Level (mg/L) | Concentration Detected (mg/L) | Natural Log of Concentration (mg/L) | Degradation Rate from Natural Log ($K_{time}$) (mg/L per year) | Minimum Degradation Rate Required for Remedial Goals Natural Log ($K_{time}$) (mg/L per year) | Minimum Degradation Rate Met? (Yes/No) | Expected Remedial Goal Concentration (mg/L) | Expected Remedial Goal Concentration Met? (Yes/No) | Remedial Goals Being Met? (Yes/No) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 606D150MW | May-06 | 0.0 | 0.07000 | 0.00300 | -5.81 | -- | -- | -- | -- | -- | -- |
| | Aug-06 | 0.3 | 0.07000 | 0.01800 | -4.02 | -- | -- | -- | -- | -- | -- |
| | Nov-06 | 0.5 | 0.07000 | 0.01000 | -4.61 | -- | -- | -- | -- | -- | -- |
| | Apr-07 | 0.9 | 0.07000 | 0.01700 | -4.07 | -- | -- | -- | -- | -- | -- |
| | Sep-07 | 1.3 | 0.07000 | 0.02500 | -3.69 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-08 | 1.6 | 0.07000 | 0.02200 | -3.82 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-08 | 2.1 | 0.07000 | 0.02200 | -3.82 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-09 | 2.6 | 0.07000 | 0.01480 | -4.21 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-09 | 3.2 | 0.07000 | 0.03760 | -3.28 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-10 | 3.6 | 0.07000 | 0.03050 | -3.49 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-10 | 4.1 | 0.07000 | 0.02680 | -3.62 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-11 | 4.6 | 0.07000 | 0.01830 | -4.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-11 | 5.2 | 0.07000 | 0.02690 | -3.62 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-12 | 5.6 | 0.07000 | 0.01520 | -4.19 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-12 | 6.1 | 0.07000 | 0.04050 | -3.21 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-13 | 6.6 | 0.07000 | 0.00630 | -5.07 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-13 | 7.1 | 0.07000 | 0.04200 | -3.17 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-14 | 7.7 | 0.07000 | 0.01910 | -3.96 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-14 | 8.2 | 0.07000 | 0.0223 | -3.80 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-15 | 8.7 | 0.07000 | 0.0255 | -3.67 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-15 | 9.2 | 0.07000 | 0.00443 | -5.42 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-16 | 9.7 | 0.07000 | 0.0184 | -3.67 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-16 | 10.2 | 0.07000 | 0.0076 | -4.88 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |

**Table 4-4A**

**Summary of Concentration vs. Time Attenuation Rate Constants**
**SWMU 18 Plume**
**2016 RAER**
**Former NAS Dallas, Texas**
**Page 8 of 15**

| Monitoring Well | Sampling Date | Elapsed Time (years) | Protective Concentration Level (mg/L) | Concentration Detected (mg/L) | Natural Log of Concentration (mg/L) | Degradation Rate from Natural Log ($K_{time}$) (mg/L per year) | Minimum Degradation Rate Required for Remedial Goals Natural Log ($K_{time}$) (mg/L per year) | Minimum Degradation Rate Met? (Yes/No) | Expected Remedial Goal Concentration (mg/L) | Expected Remedial Goal Concentration Met? (Yes/No) | Remedial Goals Being Met? (Yes/No) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 606D151MW | May-06 | 0.0 | 0.07000 | 0.00050 U | -8.00 | -- | -- | -- | -- | -- | -- |
| | Aug-06 | 0.3 | 0.07000 | 0.00050 U | -8.00 | -- | -- | -- | -- | -- | -- |
| | Nov-06 | 0.5 | 0.07000 | 0.00050 U | -7.60 | -- | -- | -- | -- | -- | -- |
| | Apr-07 | 0.9 | 0.07000 | 0.00014 U | -8.00 | -- | -- | -- | -- | -- | -- |
| | Sep-07 | 1.3 | 0.07000 | 0.00014 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-08 | 1.6 | 0.07000 | 0.00032 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-08 | 2.1 | 0.07000 | 0.00020 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-09 | 2.6 | 0.07000 | 0.00020 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-09 | 3.2 | 0.07000 | 0.00020 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-10 | 3.6 | 0.07000 | 0.00032 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-10 | 4.1 | 0.07000 | 0.00032 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-11 | 4.6 | 0.07000 | 0.00026 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-11 | 5.2 | 0.07000 | 0.00026 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-12 | 5.6 | 0.07000 | 0.00026 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-12 | 6.1 | 0.07000 | 0.00026 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-13 | 6.7 | 0.07000 | 0.00024 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-13 | 7.1 | 0.07000 | 0.00024 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-14 | 7.7 | 0.07000 | 0.00033 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-14 | 8.2 | 0.07000 | 0.0005 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-15 | 8.7 | 0.07000 | 0.00025 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-15 | 9.2 | 0.07000 | 0.00025 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-16 | Well Abandoned | | | | | | | | | |
| 606D152MW | May-06 | 0.0 | 0.07000 | 0.00300 | -5.81 | -- | -- | -- | -- | -- | -- |
| | Aug-06 | 0.3 | 0.07000 | 0.00500 | -5.30 | -- | -- | -- | -- | -- | -- |
| | Nov-06 | 0.5 | 0.07000 | 0.00600 | -5.12 | -- | -- | -- | -- | -- | -- |
| | Apr-07 | 0.9 | 0.07000 | 0.00059 | -7.44 | -1.913 | 0.486 | Less Than PCL | 0.00072 | Less Than PCL | Less Than PCL |
| | Sep-07 | 1.3 | 0.07000 | 0.01100 | -4.51 | 0.195 | 0.486 | Less Than PCL | 0.00088 | Less Than PCL | Less Than PCL |
| | Jan-08 | 1.6 | 0.07000 | 0.00850 | -4.77 | 0.487 | 0.486 | Less Than PCL | 0.00104 | Less Than PCL | Less Than PCL |
| | Jul-08 | 2.1 | 0.07000 | 0.00990 | -4.62 | 0.553 | 0.486 | Less Than PCL | 0.00132 | Less Than PCL | Less Than PCL |
| | Jan-09 | 2.7 | 0.07000 | 0.02020 | -3.90 | 0.680 | 0.486 | Less Than PCL | 0.00170 | Less Than PCL | Less Than PCL |
| | Jul-09 | 3.2 | 0.07000 | 0.00610 | -5.10 | 0.447 | 0.486 | Less Than PCL | 0.00218 | Less Than PCL | Less Than PCL |
| | Jan-10 | 3.7 | 0.07000 | 0.02310 | -3.77 | 0.503 | 0.486 | Less Than PCL | 0.00277 | Less Than PCL | Less Than PCL |
| | Jul-10 | 4.2 | 0.07000 | 0.06540 | -2.73 | 0.621 | 0.486 | Less Than PCL | 0.00353 | Less Than PCL | Less Than PCL |
| | Jan-11 | 4.7 | 0.07000 | 0.02560 | -3.67 | 0.566 | 0.486 | Less Than PCL | 0.00450 | Less Than PCL | Less Than PCL |
| | Jul-11 | 5.2 | 0.07000 | 0.07680 | -2.57 | 0.598 | 0.486 | No | 0.00585 | No | No |
| | Jan-12 | 5.6 | 0.07000 | 0.08120 | -2.51 | 0.602 | 0.486 | No | 0.00730 | No | No |
| | Jul-12 | 6.2 | 0.07000 | 0.12100 | -2.11 | 0.610 | 0.486 | No | 0.00932 | No | No |
| | Jan-13 | 6.7 | 0.07000 | 0.03720 | -3.29 | 0.541 | 0.486 | Less Than PCL | 0.01194 | Less Than PCL | Less Than PCL |
| | Jul-13 | 7.2 | 0.07000 | 0.36300 | -1.01 | 0.583 | 0.486 | No | 0.01520 | No | No |
| | Jan-14 | 7.7 | 0.07000 | 0.22600 | -1.49 | 0.582 | 0.486 | No | 0.01945 | No | No |
| | Jul-14 | 8.2 | 0.07000 | 0.32200 | -1.13 | 0.583 | 0.486 | No | 0.02502 | No | No |
| | Jan-15 | 8.7 | 0.07000 | 0.18700 | -1.68 | 0.558 | 0.486 | No | 0.03193 | No | No |
| | Jul-15 | 9.2 | 0.07000 | 0.22600 | -1.49 | 0.537 | 0.486 | No | 0.04064 | No | No |
| | Jan-16 | 9.7 | 0.07000 | 0.16 | -1.68 | 0.558 | 0.486 | No | 0.03193 | No | No |
| | Jul-16 | 10.2 | 0.07000 | 0.162 JL | -1.82 | 0.480 | 0.486 | Yes | 0.06619 | No | Evaluate Further |

**Table 4-4A**

**Summary of Concentration vs. Time Attenuation Rate Constants**
**SWMU 18 Plume**
**2016 RAER**
**Former NAS Dallas, Texas**
**Page 9 of 15**

| Monitoring Well | Sampling Date | Elapsed Time (years) | Protective Concentration Level (mg/L) | Concentration Detected (mg/L) | Natural Log of Concentration (mg/L) | Degradation Rate from Natural Log ($K_{time}$) (mg/L per year) | Minimum Degradation Rate Required for Remedial Goals Natural Log ($K_{time}$) (mg/L per year) | Minimum Degradation Rate Met? (Yes/No) | Expected Remedial Goal Concentration (mg/L) | Expected Remedial Goal Concentration Met? (Yes/No) | Remedial Goals Being Met? (Yes/No) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 606D153MW | Aug-06 | 0.0 | 0.07000 | 0.06200 | -2.78 | -- | -- | -- | -- | -- | -- |
| | Nov-06 | 0.2 | 0.07000 | 0.10000 | -2.30 | -- | -- | -- | -- | -- | -- |
| | Apr-07 | 0.6 | 0.07000 | 0.14000 | -1.97 | -- | -- | -- | -- | -- | -- |
| | Sep-07 | 1.0 | 0.07000 | 0.18000 | -1.71 | 0.964 | -0.105 | No | 0.18000 | Yes | Evaluate Further |
| | Jan-08 | 1.4 | 0.07000 | 0.16000 | -1.83 | 0.673 | -0.105 | No | 0.17374 | Yes | Evaluate Further |
| | Jul-08 | 1.9 | 0.07000 | 0.16100 | -1.83 | 0.460 | -0.105 | No | 0.16487 | Yes | Evaluate Further |
| | Jan-09 | 2.4 | 0.07000 | 0.14900 | -1.90 | 0.304 | -0.105 | No | 0.15619 | Yes | Evaluate Further |
| | Jul-09 | 2.9 | 0.07000 | 0.18700 | -1.68 | 0.265 | -0.105 | No | 0.14814 | No | No |
| | Jan-10 | 3.4 | 0.07000 | 0.15400 | -1.87 | 0.195 | -0.105 | No | 0.14058 | No | No |
| | Jul-10 | 3.9 | 0.07000 | 0.19300 | -1.65 | 0.180 | -0.105 | No | 0.13344 | No | No |
| | Jan-11 | 4.4 | 0.07000 | 0.14400 | -1.94 | 0.132 | -0.105 | No | 0.12663 | No | No |
| | Jul-11 | 4.9 | 0.07000 | 0.17800 | -1.73 | 0.118 | -0.105 | No | 0.11965 | No | No |
| | Jan-12 | 5.4 | 0.07000 | 0.14300 | -1.94 | 0.090 | -0.105 | No | 0.11404 | No | No |
| | Jul-12 | 5.9 | 0.07000 | 0.15600 | -1.86 | 0.075 | -0.105 | No | 0.10822 | No | No |
| | Jan-13 | 6.4 | 0.07000 | 0.09690 | -2.33 | 0.038 | -0.105 | No | 0.10255 | Yes | Evaluate Further |
| | Jul-13 | 6.9 | 0.07000 | 0.13900 | -1.97 | 0.030 | -0.105 | No | 0.09735 | No | No |
| | Jan-14 | 7.4 | 0.07000 | 0.11400 | -2.17 | 0.016 | -0.105 | No | 0.09230 | No | No |
| | Jul-14 | 7.9 | 0.07000 | 0.11300 | -2.18 | 0.005 | -0.105 | No | 0.08741 | No | No |
| | Jan-15 | 8.4 | 0.07000 | 0.14600 | -1.92 | 0.006 | -0.105 | No | 0.08293 | No | No |
| | Jan-15 | 8.4 | 0.07000 | 0.11700 | -2.15 | 0.001 | -0.105 | No | 0.08293 | No | No |
| | Jan-15 | 8.4 | 0.07000 | 0.14600 | -1.92 | 0.002 | -0.105 | No | 0.08293 | No | No |
| | Jul-15 | 8.9 | 0.07000 | 0.11200 | -2.19 | -0.003 | -0.105 | No | 0.07872 | No | No |
| | Jan-16 | 9.7 | 0.07000 | 0.137 | -1.92 | 0.002 | -0.105 | No | 0.08293 | No | No |
| | Jul-16 | 9.9 | 0.07000 | 0.0981 | -2.32 | -0.008 | -0.105 | No | 0.07085 | No | No |

**Table 4-4A**

**Summary of Concentration vs. Time Attenuation Rate Constants**
**SWMU 18 Plume**
**2016 RAER**
**Former NAS Dallas, Texas**


| Monitoring Well | Sampling Date | Elapsed Time (years) | Protective Concentration Level (mg/L) | Concentration Detected (mg/L) | Natural Log of Concentration (mg/L) | Degradation Rate from Natural Log ($K_{time}$) (mg/L per year) | Minimum Degradation Rate Required for Remedial Goals Natural Log ($K_{time}$) (mg/L per year) | Minimum Degradation Rate Met? (Yes/No) | Expected Remedial Goal Concentration (mg/L) | Expected Remedial Goal Concentration Met? (Yes/No) | Remedial Goals Being Met? (Yes/No) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 606D154MW/606D154RMW | May-06 | 0.0 | 0.07000 | 0.00080 J | -7.13 | -- | -- | -- | -- | -- | -- |
| | Jul-06 | 0.2 | 0.07000 | 0.00070 J | -7.26 | -- | -- | -- | -- | -- | -- |
| | Aug-06 | 0.3 | 0.07000 | 0.00050 J | -7.60 | -- | -- | -- | -- | -- | -- |
| | Nov-06 | 0.5 | 0.07000 | 0.00060 | -7.42 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Apr-07 | 0.9 | 0.07000 | 0.00066 J | -7.32 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Sep-07 | 1.3 | 0.07000 | 0.00049 J | -7.62 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-08 | 1.6 | 0.07000 | 0.00220 | -6.12 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-08 | 2.1 | 0.07000 | 0.00073 J | -7.22 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-09 | 2.7 | 0.07000 | 0.01040 | -4.57 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-09 | 3.2 | 0.07000 | 0.00024 J | -8.33 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-10 | 3.7 | 0.07000 | 0.00051 J | -7.58 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-10 | 4.2 | 0.07000 | 0.00032 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-11 | 4.7 | 0.07000 | 0.00079 J | -7.14 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-11 | 5.2 | 0.07000 | 0.00210 | -6.17 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-12 | 5.6 | 0.07000 | 0.00160 | -6.44 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-12 | 6.2 | 0.07000 | 0.00230 | -6.07 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-13 | 6.7 | 0.07000 | 0.00042 J | -7.78 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-13 | 7.2 | 0.07000 | 0.00760 | -4.88 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-14 | 7.7 | 0.07000 | 0.00630 | -5.07 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-14 | 8.2 | 0.07000 | 0.0115 | -4.47 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-15 | 8.7 | 0.07000 | 0.0027 | -5.91 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-15 | 9.2 | 0.07000 | 0.0184 | -4.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-16 | 9.7 | 0.07000 | 0.00485 | -5.91 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-16 | 10.2 | 0.07000 | 0.0145 | -4.23 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |

**Table 4-4A**

**Summary of Concentration vs. Time Attenuation Rate Constants**
**SWMU 18 Plume**
**2016 RAER**
**Former NAS Dallas, Texas**


| Monitoring Well | Sampling Date | Elapsed Time (years) | Protective Concentration Level (mg/L) | Concentration Detected (mg/L) | Natural Log of Concentration (mg/L) | Degradation Rate from Natural Log ($K_{time}$) (mg/L per year) | Minimum Degradation Rate Required for Remedial Goals Natural Log ($K_{time}$) (mg/L per year) | Minimum Degradation Rate Met? (Yes/No) | Expected Remedial Goal Concentration (mg/L) | Expected Remedial Goal Concentration Met? (Yes/No) | Remedial Goals Being Met? (Yes/No) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Vinyl Chloride** | | | | | | | | | | | |
| **606D149MW** | May-06 | 0.0 | 0.00200 | 0.00060 U | -8.00 | -- | -- | -- | -- | -- | -- |
| | Aug-06 | 0.3 | 0.00200 | 0.00060 U | -8.00 | -- | -- | -- | -- | -- | -- |
| | Nov-06 | 0.5 | 0.00200 | 0.00060 U | -7.42 | -- | -- | -- | -- | -- | -- |
| | Apr-07 | 0.9 | 0.00200 | 0.00012 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Sep-07 | 1.3 | 0.00200 | 0.00020 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-08 | 1.6 | 0.00200 | 0.00043 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-08 | 2.1 | 0.00200 | 0.00030 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-09 | 2.6 | 0.00200 | 0.00030 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-09 | 3.2 | 0.00200 | 0.00030 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-10 | 3.6 | 0.00200 | 0.00028 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-10 | 4.1 | 0.00200 | 0.00028 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-11 | 4.6 | 0.00200 | 0.00022 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-11 | 5.2 | 0.00200 | 0.00022 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-12 | 5.6 | 0.00200 | 0.00022 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-12 | 6.1 | 0.00200 | 0.00022 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-13 | 6.6 | 0.00200 | 0.00044 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-13 | 7.1 | 0.00200 | 0.00044 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-14 | 7.7 | 0.00200 | 0.00033 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-14 | 8.2 | 0.00200 | 0.0005 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-15 | 8.7 | 0.00200 | 0.00025 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-15 | 9.2 | 0.00200 | 0.00025 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-16 | 9.7 | 0.00200 | 0.00025 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-16 | 10.2 | 0.00200 | 0.0005 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |

**Table 4-4A**

**Summary of Concentration vs. Time Attenuation Rate Constants**
**SWMU 18 Plume**
**2016 RAER**
**Former NAS Dallas, Texas**


| Monitoring Well | Sampling Date | Elapsed Time (years) | Protective Concentration Level (mg/L) | Concentration Detected (mg/L) | Natural Log of Concentration (mg/L) | Degradation Rate from Natural Log ($K_{time}$) (mg/L per year) | Minimum Degradation Rate Required for Remedial Goals Natural Log ($K_{time}$) (mg/L per year) | Minimum Degradation Rate Met? (Yes/No) | Expected Remedial Goal Concentration (mg/L) | Expected Remedial Goal Concentration Met? (Yes/No) | Remedial Goals Being Met? (Yes/No) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 606D150MW | May-06 | 0.0 | 0.00200 | 0.00060 U | -8.00 | -- | -- | -- | -- | -- | -- |
| | Aug-06 | 0.3 | 0.00200 | 0.00200 J | -6.21 | -- | -- | -- | -- | -- | -- |
| | Nov-06 | 0.5 | 0.00200 | 0.00090 J | -7.01 | -- | -- | -- | -- | -- | -- |
| | Apr-07 | 0.9 | 0.00200 | 0.00120 J | -6.73 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Sep-07 | 1.3 | 0.00200 | 0.00260 | -5.95 | -- | NA | NA | NA | NA | Evaluate Further |
| | Jan-08 | 1.6 | 0.00200 | 0.00180 J | -6.32 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-08 | 2.1 | 0.00200 | 0.00180 | -6.32 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-09 | 2.6 | 0.00200 | 0.00089 J | -7.02 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-09 | 3.2 | 0.00200 | 0.00140 | -6.57 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-10 | 3.6 | 0.00200 | 0.00066 J | -7.32 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-10 | 4.1 | 0.00200 | 0.00130 | -6.65 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-11 | 4.6 | 0.00200 | 0.00022 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-11 | 5.2 | 0.00200 | 0.00026 J | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-12 | 5.6 | 0.00200 | 0.00022 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-12 | 6.1 | 0.00200 | 0.00022 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-13 | 6.6 | 0.00200 | 0.00044 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-13 | 7.1 | 0.00200 | 0.00065 J | -7.34 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-14 | 7.7 | 0.00200 | 0.00033 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-14 | 8.2 | 0.00200 | 0.0005 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-15 | 8.7 | 0.00200 | 0.00025 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-15 | 9.2 | 0.00200 | 0.00025 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-16 | 9.7 | 0.00200 | 0.00025 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-16 | 10.2 | 0.00200 | 0.00025 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |

**Table 4-4A**

**Summary of Concentration vs. Time Attenuation Rate Constants**
**SWMU 18 Plume**
**2016 RAER**
**Former NAS Dallas, Texas**


| Monitoring Well | Sampling Date | Elapsed Time (years) | Protective Concentration Level (mg/L) | Concentration Detected (mg/L) | Natural Log of Concentration (mg/L) | Degradation Rate from Natural Log ($K_{time}$) (mg/L per year) | Minimum Degradation Rate Required for Remedial Goals Natural Log ($K_{time}$) (mg/L per year) | Minimum Degradation Rate Met? (Yes/No) | Expected Remedial Goal Concentration (mg/L) | Expected Remedial Goal Concentration Met? (Yes/No) | Remedial Goals Being Met? (Yes/No) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 606D151MW | May-06 | 0.0 | 0.00200 | 0.00060 U | -8.00 | -- | -- | -- | -- | -- | -- |
| | Aug-06 | 0.3 | 0.00200 | 0.00060 U | -8.00 | -- | -- | -- | -- | -- | -- |
| | Nov-06 | 0.5 | 0.00200 | 0.00060 U | -7.42 | -- | -- | -- | -- | -- | -- |
| | Apr-07 | 0.9 | 0.00200 | 0.00012 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Sep-07 | 1.3 | 0.00200 | 0.00020 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-08 | 1.6 | 0.00200 | 0.00043 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-08 | 2.1 | 0.00200 | 0.00030 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-09 | 2.6 | 0.00200 | 0.00030 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-09 | 3.2 | 0.00200 | 0.00030 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-10 | 3.6 | 0.00200 | 0.00028 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-10 | 4.1 | 0.00200 | 0.00028 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-11 | 4.6 | 0.00200 | 0.00022 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-11 | 5.2 | 0.00200 | 0.00022 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-12 | 5.6 | 0.00200 | 0.00022 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-12 | 6.1 | 0.00200 | 0.00022 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-13 | 6.7 | 0.00200 | 0.00044 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-13 | 7.1 | 0.00200 | 0.00044 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-14 | 7.7 | 0.00200 | 0.00033 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-14 | 8.2 | 0.00200 | 0.0005 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-15 | 8.7 | 0.00200 | 0.00025 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-15 | 9.2 | 0.00200 | 0.00025 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-16 | Well Abandoned | | | | | | | | | |
| 606D152MW | May-06 | 0.0 | 0.00200 | 0.00060 U | -8.00 | -- | -- | -- | -- | -- | -- |
| | Aug-06 | 0.3 | 0.00200 | 0.00060 U | -8.00 | -- | -- | -- | -- | -- | -- |
| | Nov-06 | 0.5 | 0.00200 | 0.00060 U | -7.42 | -- | -- | -- | -- | -- | -- |
| | Apr-07 | 0.9 | 0.00200 | 0.00012 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Sep-07 | 1.3 | 0.00200 | 0.00082 J | -7.11 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-08 | 1.6 | 0.00200 | 0.00043 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-08 | 2.1 | 0.00200 | 0.00030 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-09 | 2.7 | 0.00200 | 0.00030 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-09 | 3.2 | 0.00200 | 0.00030 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-10 | 3.7 | 0.00200 | 0.00028 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-10 | 4.2 | 0.00200 | 0.00049 J | -7.62 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-11 | 4.7 | 0.00200 | 0.00022 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-11 | 5.2 | 0.00200 | 0.00051 J | -7.58 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-12 | 5.6 | 0.00200 | 0.00022 J | -8.42 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-12 | 6.2 | 0.00200 | 0.00069 J | -7.28 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-13 | 6.7 | 0.00200 | 0.00044 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-13 | 7.2 | 0.00200 | 0.00094 J | -6.97 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-14 | 7.7 | 0.00200 | 0.00033 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-14 | 8.2 | 0.00200 | 0.00091 J | -7.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-15 | 8.7 | 0.00200 | 0.00061 J | -7.40 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-15 | 9.2 | 0.00200 | 0.000747 J | -7.20 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-16 | 9.7 | 0.00200 | 0.00051 J | -7.40 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-16 | 10.2 | 0.00200 | 0.0005 UJL | -7.60 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |

**Table 4-4A**

**Summary of Concentration vs. Time Attenuation Rate Constants**
**SWMU 18 Plume**
**2016 RAER**
**Former NAS Dallas, Texas**


| Monitoring Well | Sampling Date | Elapsed Time (years) | Protective Concentration Level (mg/L) | Concentration Detected (mg/L) | Natural Log of Concentration (mg/L) | Degradation Rate from Natural Log ($K_{time}$) (mg/L per year) | Minimum Degradation Rate Required for Remedial Goals Natural Log ($K_{time}$) (mg/L per year) | Minimum Degradation Rate Met? (Yes/No) | Expected Remedial Goal Concentration (mg/L) | Expected Remedial Goal Concentration Met? (Yes/No) | Remedial Goals Being Met? (Yes/No) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 606D153MW | Aug-06 | 0.0 | 0.00200 | 0.00500 | -5.30 | -- | -- | -- | -- | -- | -- |
| | Nov-06 | 0.2 | 0.00200 | 0.00800 | -4.83 | -- | -- | -- | -- | -- | -- |
| | Apr-07 | 0.6 | 0.00200 | 0.00150 J | -6.50 | -- | -- | -- | -- | -- | -- |
| | Sep-07 | 1.0 | 0.00200 | 0.02400 | -3.73 | 0.936 | -0.141 | No | 0.00712 | No | No |
| | Jan-08 | 1.4 | 0.00200 | 0.00043 U | -8.00 | -1.177 | -0.141 | Less Than PCL | 0.00679 | Less Than PCL | Less Than PCL |
| | Jul-08 | 1.9 | 0.00200 | 0.00510 | -5.28 | -0.440 | -0.141 | Yes | 0.00633 | Yes | Yes |
| | Jan-09 | 2.4 | 0.00200 | 0.00060 U | -8.00 | -0.936 | -0.141 | Less Than PCL | 0.00588 | Less Than PCL | Less Than PCL |
| | Jul-09 | 2.9 | 0.00200 | 0.00980 | -4.63 | -0.290 | -0.141 | Yes | 0.00548 | No | Evaluate Further |
| | Jan-10 | 3.4 | 0.00200 | 0.00028 J | -8.18 | -0.583 | -0.141 | Less Than PCL | 0.00511 | Less Than PCL | Less Than PCL |
| | Jul-10 | 3.9 | 0.00200 | 0.00650 | -5.04 | -0.274 | -0.141 | Yes | 0.00476 | No | Evaluate Further |
| | Jan-11 | 4.4 | 0.00200 | 0.00041 J | -7.80 | -0.393 | -0.141 | Less Than PCL | 0.00444 | Less Than PCL | Less Than PCL |
| | Jul-11 | 4.9 | 0.00200 | 0.01120 | -4.49 | -0.149 | -0.141 | Yes | 0.00411 | No | Evaluate Further |
| | Jan-12 | 5.4 | 0.00200 | 0.00032 J | -8.05 | -0.266 | -0.141 | Less Than PCL | 0.00385 | Less Than PCL | Less Than PCL |
| | Jul-12 | 5.9 | 0.00200 | 0.00500 | -5.30 | -0.157 | -0.141 | Yes | 0.00359 | No | Evaluate Further |
| | Jan-13 | 6.4 | 0.00200 | 0.00044 U | -8.00 | -0.230 | -0.141 | Less Than PCL | 0.00334 | Less Than PCL | Less Than PCL |
| | Jul-13 | 6.9 | 0.00200 | 0.00044 U | -8.00 | -0.273 | -0.141 | Less Than PCL | 0.00312 | Less Than PCL | Less Than PCL |
| | Jan-14 | 7.4 | 0.00200 | 0.00033 U | -8.00 | -0.295 | -0.141 | Less Than PCL | 0.00290 | Less Than PCL | Less Than PCL |
| | Jul-14 | 7.9 | 0.00200 | 0.00071 J | -7.25 | -0.277 | -0.141 | Less Than PCL | 0.00270 | Less Than PCL | Less Than PCL |
| | Jan-15 | 8.4 | 0.00200 | 0.00025 U | -8.00 | -0.285 | -0.141 | Less Than PCL | 0.00251 | Less Than PCL | Less Than PCL |
| | Jan-15 | 8.4 | 0.00200 | 0.0005 U | -8.00 | -0.290 | -0.141 | Less Than PCL | 0.00251 | Less Than PCL | Less Than PCL |
| | Jan-15 | 8.4 | 0.00200 | 0.00025 U | -8.00 | -0.294 | -0.141 | Less Than PCL | 0.00251 | Less Than PCL | Less Than PCL |
| | Jul-15 | 8.9 | 0.00200 | 0.00136 | -6.60 | -0.261 | -0.141 | Less Than PCL | 0.00234 | Less Than PCL | Less Than PCL |
| | Jan-16 | 9.7 | 0.00200 | 0.00025 U | -8.00 | -0.294 | -0.141 | Less Than PCL | 0.00251 | Less Than PCL | Less Than PCL |
| | Jul-16 | 9.9 | 0.00200 | 0.00073 J | -7.22 | -0.244 | -0.141 | Less Than PCL | 0.00203 | Less Than PCL | Less Than PCL |

**Table 4-4A**

**Summary of Concentration vs. Time Attenuation Rate Constants**
**SWMU 18 Plume**
**2016 RAER**
**Former NAS Dallas, Texas**


| Monitoring Well | Sampling Date | Elapsed Time (years) | Protective Concentration Level (mg/L) | Concentration Detected (mg/L) | Natural Log of Concentration (mg/L) | Degradation Rate from Natural Log ($K_{time}$) (mg/L per year) | Minimum Degradation Rate Required for Remedial Goals Natural Log ($K_{time}$) (mg/L per year) | Minimum Degradation Rate Met? (Yes/No) | Expected Remedial Goal Concentration (mg/L) | Expected Remedial Goal Concentration Met? (Yes/No) | Remedial Goals Being Met? (Yes/No) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 606D154MW/606D154RMW | May-06 | 0.0 | 0.00200 | 0.00060 U | -8.00 | -- | -- | -- | -- | -- | -- |
| | Jul-06 | 0.2 | 0.00200 | 0.00060 U | -8.00 | -- | -- | -- | -- | -- | -- |
| | Aug-06 | 0.3 | 0.00200 | 0.00060 U | -8.00 | -- | -- | -- | -- | -- | -- |
| | Nov-06 | 0.5 | 0.00200 | 0.00060 U | -7.42 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Apr-07 | 0.9 | 0.00200 | 0.00012 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Sep-07 | 1.3 | 0.00200 | 0.00020 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-08 | 1.6 | 0.00200 | 0.00043 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-08 | 2.1 | 0.00200 | 0.00030 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-09 | 2.7 | 0.00200 | 0.00030 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-09 | 3.2 | 0.00200 | 0.00030 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-10 | 3.7 | 0.00200 | 0.00028 J | -8.18 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-10 | 4.2 | 0.00200 | 0.00028 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-11 | 4.7 | 0.00200 | 0.00022 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-11 | 5.2 | 0.00200 | 0.00022 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-12 | 5.6 | 0.00200 | 0.00022 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-12 | 6.2 | 0.00200 | 0.00022 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-13 | 6.7 | 0.00200 | 0.00044 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-13 | 7.2 | 0.00200 | 0.00044 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-14 | 7.7 | 0.00200 | 0.00033 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-14 | 8.2 | 0.00200 | 0.00025 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-15 | 8.7 | 0.00200 | 0.00025 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-15 | 9.2 | 0.00200 | 0.00025 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-16 | 9.7 | 0.00200 | 0.00025 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-16 | 10.2 | 0.00200 | 0.0005 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |

mg/L - milligrams per liter
NA - Not Applicable
NS - Not Sampled
NS-D - Not Sampled due to Dry Well

Notes:
Shaded areas indicate an exceedance.
For graphing purposes non-detect concentrations have been assigned a natural log value of -8.
Monitoring Well 606D151MW was plugged and abandoned in April 2016.

Analytical Result Qualifiers:
J - Indicates that the chemical was detected. However, the associated numerical result may not be a precise representation of the amount that is actually present in the sample. The laboratory reported concentration is considered to be an estimate of the true concentration.

U - Indicates that the chemical was not detected at the numerical detection limit (sample-specific quantitation limit) noted. Nondetected results from the laboratory are reported in this manner. This qualifier is added to a positive result (reported by the laboratory) if the detected concentration is determined to be attributable to contamination introduced during field sampling or laboratory analysis.

# TABLE 4-5
# SUMMARY OF CONCENTRATION VS. DISTANCE ATTENUATION RATE CONSTANTS

**Table 4-5A**

**Summary of Concentration vs. Distance Attenuation Rate Contants**
**SWMU 18 Plume**
**2016 RAER**
**Former NAS Dallas, Texas**

| Sampling Date | Protective Concentration Level (mg/L) | Detected Concentration (mg/L) | | | Natural Log of COC Concentration (mg/L) | | | $K_{dist}$ (mg/L per ft) |
|---|---|---|---|---|---|---|---|---|
| Centerline Monitoring Wells | | 606D149MW | 606D150MW | 606D151MW | 606D149MW | 606D150MW | 606D151MW | |
| Distance from source (ft) | | 0 | 94 | 129 | 0 | 94 | 129 | |
| **Trichloroethene** | | | | | | | | |
| May-06 | | | | | | | | |
| May-06 | 0.00500 | 0.00060 J | 0.00100 | 0.00040 U | -7.42 | -6.91 | -8.00 | -0.002 |
| Aug-06 | 0.00500 | 0.00040 U | 0.00800 | 0.00040 U | -8.00 | -4.83 | -8.00 | 0.007 |
| Nov-06 | 0.00500 | 0.00400 | 0.00400 | 0.00040 U | -7.82 | -5.52 | -8.00 | 0.004 |
| Apr-07 | 0.00500 | 0.00680 | 0.00820 | 0.00014 U | -4.99 | -4.80 | -8.00 | -0.018 |
| Sep-07 | 0.00500 | 0.00260 | 0.01100 | 0.00023 U | -5.95 | -4.51 | -8.00 | -0.009 |
| Jan-08 | 0.00500 | 0.00480 | 0.00660 | 0.000530 U | -5.34 | -5.02 | -8.00 | -0.016 |
| Jul-08 | 0.00500 | 0.00610 | 0.00390 | 0.00032 U | -5.10 | -5.55 | -8.00 | -0.019 |
| Jan-09 | 0.00500 | 0.00077 J | 0.00340 | 0.00032 U | -7.17 | -5.68 | -8.00 | -0.002 |
| Jul-09 | 0.00500 | 0.00490 | 0.01450 | 0.00032 U | -5.32 | -4.23 | -8.00 | -0.014 |
| Jan-10 | 0.00500 | 0.00390 | 0.0076 | 0.00024 U | -5.55 | -4.88 | -8.00 | -0.014 |
| Jul-10 | 0.00500 | 0.00780 | 0.00330 | 0.00024 U | -4.85 | -5.71 | -8.00 | -0.021 |
| Jan-11 | 0.00500 | 0.00620 | 0.00250 | 0.00026 U | -5.08 | -5.99 | -8.00 | -0.020 |
| Jul-11 | 0.00500 | 0.00210 | 0.00260 | 0.00026 U | -6.17 | -5.95 | -8.00 | -0.011 |
| Jan-12 | 0.00500 | 0.00180 | 0.00250 | 0.00026 U | -6.32 | -5.99 | -8.00 | -0.010 |
| Jul-12 | 0.00500 | 0.00120 | 0.00290 | 0.00026 U | -6.73 | -5.84 | -8.00 | -0.006 |
| Jan-13 | 0.00500 | 0.00210 | 0.00085 | 0.00031 U | -6.17 | -7.07 | -8.00 | -0.013 |
| Jul-13 | 0.00500 | 0.00100 | 0.00930 | 0.00031 U | -6.91 | -4.68 | -8.00 | -0.002 |
| Jan-14 | 0.00500 | 0.00120 | 0.00360 | 0.00033 U | -6.73 | -5.63 | -8.00 | -0.005 |
| Jul-14 | 0.00500 | 0.00273 | 0.00412 | 0.0005 U | -5.90 | -5.49 | -8.00 | -0.012 |
| Jan-15 | 0.00500 | 0.0011 | 0.00529 | 0.00025 U | -6.81 | -5.24 | -8.00 | -0.004 |
| Jul-15 | 0.00500 | 0.00125 | 0.00122 | 0.00025 U | -6.68 | -6.71 | -8.00 | -0.008 |
| Jan-16 | 0.00500 | 0.0008 J | 0.0024 | -- | -6.81 | -5.24 | -8.00 | -0.004 |
| Jul-16 | 0.00500 | 0.0005 U | 0.002 | -- | -8.00 | -6.21 | -- | 0.019 |

**Table 4-5A**

**Summary of Concentration vs. Distance Attenuation Rate Contants**
**SWMU 18 Plume**
**2016 RAER**
**Former NAS Dallas, Texas**

| Sampling Date | Protective Concentration Level (mg/L) | Detected Concentration (mg/L) | | | Natural Log of COC Concentration (mg/L) | | | $K_{dist}$ (mg/L per ft) |
|---|---|---|---|---|---|---|---|---|
| **Centerline Monitoring Wells** | | **606D149MW** | **606D150MW** | **606D151MW** | **606D149MW** | **606D150MW** | **606D151MW** | |
| **Distance from source (ft)** | | **0** | **94** | **129** | **0** | **94** | **129** | |
| **cis-1,2-Dichloroethene** | | | | | | | | |
| May-06 | | | | | | | | |
| May-06 | 0.07000 | 0.00100 | 0.00300 | 0.00050 U | -6.91 | -5.81 | -8.00 | -0.004 |
| Aug-06 | 0.07000 | 0.00050 U | 0.01800 | 0.00050 U | -8.00 | -4.02 | -8.00 | 0.009 |
| Nov-06 | 0.07000 | 0.01200 | 0.01000 | 0.00050 U | -4.42 | -4.61 | -8.00 | -0.022 |
| Apr-07 | 0.07000 | 0.01400 | 0.01700 | 0.00045 U | -4.27 | -4.07 | -8.00 | -0.022 |
| Sep-07 | 0.07000 | 0.01000 | 0.02500 | 0.00014 U | -4.61 | -3.69 | -8.00 | -0.019 |
| Jan-08 | 0.07000 | 0.01100 | 0.02200 | 0.000320 U | -4.51 | -3.82 | -8.00 | -0.020 |
| Jul-08 | 0.07000 | 0.02200 | 0.0002 U | 0.00990 | -3.82 | -8.00 | -4.62 | -0.014 |
| Jan-09 | 0.07000 | 0.00190 | 0.01480 | 0.0002 U | -6.27 | -4.21 | -4.62 | 0.015 |
| Jul-09 | 0.07000 | 0.01710 | 0.03760 | 0.0002 U | -4.07 | -3.28 | -4.62 | -0.002 |
| Jan-10 | 0.07000 | 0.01360 | 0.03050 | 0.00032 U | -4.30 | -3.49 | -8.00 | -0.021 |
| Jul-10 | 0.07000 | 0.02700 | 0.02680 | 0.00032 U | -3.61 | -3.62 | -8.00 | -0.027 |
| Jan-11 | 0.07000 | 0.02380 | 0.01830 | 0.00026 U | -3.74 | -4.00 | -8.00 | -0.027 |
| Jul-11 | 0.07000 | 0.01390 | 0.02690 | 0.00026 U | -4.28 | -3.62 | -8.00 | -0.021 |
| Jan-12 | 0.07000 | 0.00790 | 0.01520 | 0.00026 U | -4.84 | -4.19 | -8.00 | -0.018 |
| Jul-12 | 0.07000 | 0.01100 | 0.04050 | 0.00026 U | -4.51 | -3.21 | -8.00 | -0.018 |
| Jan-13 | 0.07000 | 0.00880 | 0.00630 | 0.00024 U | -4.73 | -5.07 | -8.00 | -0.021 |
| Jul-13 | 0.07000 | 0.00730 | 0.04200 | 0.00024 U | -4.92 | -3.17 | -8.00 | -0.015 |
| Jan-14 | 0.07000 | 0.00700 | 0.01910 | 0.00033 U | -4.96 | -3.96 | -8.00 | -0.016 |
| Jul-14 | 0.07000 | 0.0145 | 0.0223 | 0.0005 U | -4.23 | -3.80 | -8.00 | -0.022 |
| Jan-15 | 0.07000 | 0.00717 | 0.0255 | 0.00025 U | -4.94 | -3.67 | -8.00 | -0.016 |
| Jul-15 | 0.07000 | 0.00571 | 0.00443 | 0.00025 U | -5.17 | -5.42 | -8.00 | -0.018 |
| Jan-16 | 0.07000 | 0.00511 | 0.0184 | -- | -4.94 | -3.67 | -8.00 | -0.016 |
| Jul-16 | 0.07000 | 0.00322 | 0.0076 | -- | -5.74 | -4.88 | -- | 0.009 |

**Table 4-5A**

**Summary of Concentration vs. Distance Attenuation Rate Contants**
**SWMU 18 Plume**
**2016 RAER**
**Former NAS Dallas, Texas**

| Sampling Date | Protective Concentration Level (mg/L) | Detected Concentration (mg/L) | | | Natural Log of COC Concentration (mg/L) | | | $K_{dist}$ (mg/L per ft) |
|---|---|---|---|---|---|---|---|---|
| **Centerline Monitoring Wells** | | **606D149MW** | **606D150MW** | **606D151MW** | **606D149MW** | **606D150MW** | **606D151MW** | |
| **Distance from source (ft)** | | **0** | **94** | **129** | **0** | **94** | **129** | |
| **Vinyl Chloride** | | | | | | | | |
| May-06 | | | | | | | | |
| May-06 | 0.00200 | 0.00060 U | 0.00060 U | 0.00060 U | -8.00 | -8.00 | -8.00 | 0.000 |
| Aug-06 | 0.00200 | 0.00060 U | 0.00200 J | 0.00060 U | -8.00 | -6.21 | -8.00 | 0.004 |
| Nov-06 | 0.00200 | 0.00060 U | 0.00090 J | 0.00060 U | -8.00 | -7.01 | -8.00 | 0.002 |
| Apr-07 | 0.00200 | 0.00012 U | 0.0012 J | 0.00012 U | -8.00 | -6.73 | -8.00 | 0.003 |
| Sep-07 | 0.00200 | 0.00020 U | 0.00260 | 0.00020 U | -8.00 | -5.95 | -8.00 | 0.005 |
| Jan-08 | 0.00200 | 0.000430 U | 0.0018 J | 0.000430 U | -8.00 | -6.32 | -8.00 | 0.004 |
| Jul-08 | 0.00200 | 0.00180 | 0.0003 U | 0.0003 U | -6.32 | -8.00 | -8.00 | -0.014 |
| Jan-09 | 0.00200 | 0.00030 U | 0.00089 J | 0.0003 U | -8.00 | -7.02 | -8.00 | 0.002 |
| Jul-09 | 0.00200 | 0.00030 U | 0.00014 | 0.0003 U | -8.00 | -8.87 | -8.00 | -0.002 |
| Jan-10 | 0.00200 | 0.00028 U | 0.00066 J | 0.00028 U | -8.00 | -7.32 | -8.00 | 0.002 |
| Jul-10 | 0.00200 | 0.00028 U | 0.00130 | 0.00028 U | -8.00 | -6.65 | -8.00 | 0.003 |
| Jan-11 | 0.00200 | 0.00022 U | 0.00022 U | 0.00022 U | -8.00 | -8.00 | -8.00 | 0.000 |
| Jul-11 | 0.00200 | 0.00022 U | 0.00026 J | 0.00022 U | -8.00 | -8.25 | -8.00 | -0.001 |
| Jan-12 | 0.00200 | 0.00022 U | 0.00022 U | 0.00022 U | -8.00 | -8.00 | -8.00 | 0.000 |
| Jul-12 | 0.00200 | 0.00022 U | 0.00022 U | 0.00022 U | -8.00 | -8.00 | -8.00 | 0.000 |
| Jan-13 | 0.00200 | 0.00044 U | 0.00044 U | 0.00044 U | -8.00 | -8.00 | -8.00 | 0.000 |
| Jul-13 | 0.00200 | 0.00044 U | 0.00065 J | 0.00044 U | -8.00 | -7.34 | -8.00 | 0.001 |
| Jan-14 | 0.00200 | 0.00033 U | 0.00033 U | 0.00033 U | -8.00 | -8.00 | -8.00 | 0.000 |
| Jul-14 | 0.00200 | 0.0005 U | 0.0005 U | 0.0005 U | -8.00 | -8.00 | -8.00 | 0.000 |
| Jan-15 | 0.00200 | 0.00025 U | 0.00025 U | 0.00025 U | -8.00 | -8.00 | -8.00 | 0.000 |
| Jul-15 | 0.00200 | 0.00025 U | 0.00025 U | 0.00025 U | -8.00 | -8.00 | -8.00 | 0.000 |
| Jan-16 | 0.00200 | 0.00025 U | 0.00025 U | -- | -8.00 | -8.00 | -8.00 | 0.000 |
| Jul-16 | 0.00200 | 0.0005 U | 0.00025 | -- | -8.00 | -8.00 | -- | 0.000 |

ft - feet
mg/L - milligrams per liter
NA - Not Applicable
NS - Not Sampled

Notes:
Shaded areas indicate an exceedance.
For graphing purposes non-detect concentrations and estimated concentrations below 0.0003 mg/L have been assigned a natural log value of -8.
Monitoring Well 606D151MW was plugged and abandoned in April 2016.
Analytical Result Qualifiers:
J - Indicates that the chemical was detected. However, the associated numerical result may not be a precise representation of the amount that is actually present in the sample. The laboratory reported concentration is considered to be an estimate of the true concentration.
U - Indicates that the chemical was not detected at the numerical detection limit (sample-specific quantitation limit) noted. Nondetected results from the laboratory are reported in this manner. This qualifier is added to a positive result (reported by the laboratory) if the detected concentration is determined to be attributable to contamination introduced during field sampling or laboratory analysis.

# Plug and Abandonment Documentation

# STATE OF TEXAS PLUGGING REPORT for Tracking #158488

| | | | |
|---|---|---|---|
| Owner: | **NAS Dallas** | Owner Well #: | **606D151MW** |
| Address: | **8100 West Jefferson<br>Grand Prairie, TX 75051** | Grid #: | **33-17-1** |
| Well Location: | **8100 West Jefferson<br>Grand Prairie, TX 75051** | Latitude: | **32° 44' 25.8" N** |
| | | Longitude: | **096° 57' 46.3" W** |
| Well County: | **Dallas** | Elevation: | **No Data** |
| Well Type: | **Monitor** | | |

*Drilling Information*

| | | | |
|---|---|---|---|
| Company: | **No Data** | Date Drilled: | **No Data** |
| Driller: | **No Data** | License Number: | **No Data** |

| | *Diameter (in.)* | *Top Depth (ft.)* | *Bottom Depth (ft.)* |
|---|---|---|---|
| Borehole: | | **0** | **22.8** |

*Plugging Information*

Date Plugged: **4/7/2016** Plugger:

Plug Method: **Pour in 3/8 bentonite chips when standing water in well is less than 100 feet depth, cement top 2 feet**

Casing Left in Well:

**No Data**

Plug(s) Placed in Well:

| *Top (ft.)* | *Bottom (ft.)* | *Description (number of sacks & material)* |
|---|---|---|
| **0** | **2** | **Cement 2 Bags/Sacks** |
| **2** | **22.8** | **Bentonite 2 Bags/Sacks** |

Certification Data: The driller certified that the driller plugged this well (or the well was plugged under the driller's direct supervision) and that each and all of the statements herein are true and correct. The driller understood that failure to complete the required items will result in the reports(s) being returned for completion and resubmittal.

Company Information: **Strata Core Services, LLC**

**112 S. Norwood Drive**
**Hurst, TX 76053**

Driller Name: **Brad Eskue** License Number: **58164**

Comments: **No Data**

# APPENDIX 5
# SAMPLING PROCEDURES

Sampling collection and handling procedures were updated to follow Uniform Federal Policy (UFP) for Sample and Analysis Plans in the document titled, Tier II Sampling and Analysis Plan, Long Term Groundwater Monitoring Plan, Former Naval Air Station Dallas, Dallas, Texas, dated December 2014

# APPENDIX 6
# LABORATORY DATA PACKAGES AND DATA USABILITY SUMMARIES

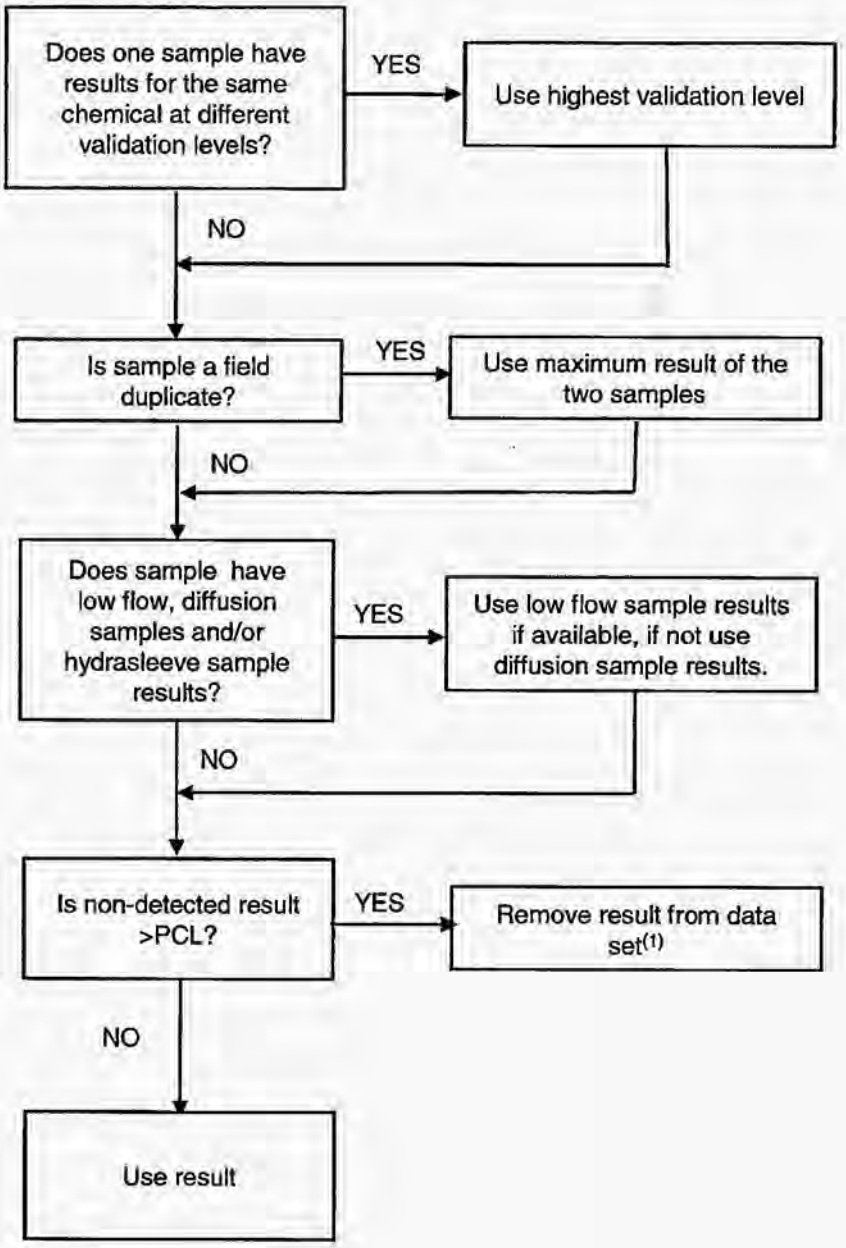
See the attached CD for the Laboratory Analytical Reports —
submitted with the 2016 RAER for SWMU 17/Building 1423
(sorted by Sample Delivery Group Number)

# APPENDIX 7
# STATISTICAL METHODOLOGY

Statistical Methodology has been submitted with the 2016 RAER for SWMU 17/Building 1423

GROUNDWATER DATABASE DEVELOPMENT FOR GRAPHING AND MANN KENDALL STATISTICAL EVALUATION

NAS DALLAS, TEXAS




NOTES:

(1) For 1,1,2,2-PCA and vinyl chloride the TRRP RES A limit < MDL of 5 U therefore only the non-detects > 5 U were removed from the data set.

# STDEV

See Also

Estimates standard deviation based on a sample. The standard deviation is a measure of how widely values are dispersed from the average value (the mean).

**Syntax**

**STDEV(number1**,number2,...)

Number1, number2, ... are 1 to 30 number arguments corresponding to a sample of a population. You can also use a single array or a reference to an array instead of arguments separated by commas.

**Remarks**

- STDEV assumes that its arguments are a sample of the population. If your data represents the entire population, then compute the standard deviation using STDEVP.
- The standard deviation is calculated using the "nonbiased" or "n-1" method.
- STDEV uses the following formula:
- $$\sqrt{\frac{n\sum x^2 - \left(\sum x\right)^2}{n(n-1)}}$$
  $$\sqrt{\frac{n\sum x^2 - \left(\sum x\right)^2}{n(n-1)}}$$
- Logical values such as TRUE and FALSE and text are ignored. If logical values and text must not be ignored, use the STDEVA worksheet function.

**Example**

Suppose 10 tools stamped from the same machine during a production run are collected as a random sample and measured for breaking strength.

The example may be easier to understand if you copy it to a blank worksheet.

How?

| | A |
|---|---|
| 1 | **Strength** |
| 2 | 1345 |
| 3 | 1301 |
| 4 | 1368 |
| 5 | 1322 |
| 6 | 1310 |
| 7 | 1370 |
| 8 | 1318 |
| 9 | 1350 |
| 10 | 1303 |
| 11 | 1299 |

| Formula | Description (Result) |
|---|---|
| =STDEV(A2:A11) | Standard deviation of breaking strength (27.46391572) |

# BEST-FIT LINE USING LINEAR REGRESSION

# LINEST

See Also

Calculates the statistics for a line by using the "least squares" method to calculate a straight line that best fits your data, and returns an array that describes the line. Because this function returns an array of values, it must be entered as an array formula.

The equation for the line is:

y = mx + b or

y = m1x1 + m2x2 + ... + b (if there are multiple ranges of x-values)

where the dependent y-value is a function of the independent x-values. The m-values are coefficients corresponding to each x-value, and b is a constant value. Note that y, x, and m can be vectors. The array that LINEST returns is {mn,mn-1,...,m1,b}. LINEST can also return additional regression statistics.

**Syntax**

**LINEST(known_y's**,known_x's,const,stats)

Known_y's is the set of y-values you already know in the relationship y = mx + b.

- If the array known_y's is in a single column, then each column of known_x's is interpreted as a separate variable.
- If the array known_y's is in a single row, then each row of known_x's is interpreted as a separate variable.

Known_x's is an optional set of x-values that you may already know in the relationship y = mx + b.

- The array known_x's can include one or more sets of variables. If only one variable is used, known_y's and known_x's can be ranges of any shape, as long as they have equal dimensions. If more than one variable is used, known_y's must be a vector (that is, a range with a height of one row or a width of one column).
- If known_x's is omitted, it is assumed to be the array {1,2,3,...} that is the same size as known_y's.

Const is a logical value specifying whether to force the constant b to equal 0.

- If const is TRUE or omitted, b is calculated normally.
- If const is FALSE, b is set equal to 0 and the m-values are adjusted to fit y = mx.

Stats is a logical value specifying whether to return additional regression statistics.

- If stats is TRUE, LINEST returns the additional regression statistics, so the returned array is {mn,mn-1,...,m1,b;sen,sen-1,...,se1,seb;r2,sey;F,df;ssreg,ssresid}.
- If stats is FALSE or omitted, LINEST returns only the m-coefficients and the constant b.

The additional regression statistics are as follows.

| Statistic | Description |
|---|---|
| se1,se2,...,sen | The standard error values for the coefficients m1,m2,...,mn. |
| Seb | The standard error value for the constant b (seb = #N/A when const is FALSE). |
| r2 | The coefficient of determination. Compares estimated and actual y-values, and ranges in value from 0 to 1. If it is 1, there is a perfect correlation in the sample — there is no difference between the estimated y-value and the actual y-value. At the other extreme, if the coefficient of determination is 0, the regression equation is not helpful in predicting a y-value. For information about how r2 is calculated, see "Remarks" later in this topic. |
| sey | The standard error for the y estimate. |
| F | The F statistic, or the F-observed value. Use the F statistic to determine whether the observed relationship between the dependent and independent variables occurs by chance. |
| df | The degrees of freedom. Use the degrees of freedom to help you find F-critical values in a statistical table. Compare the values you find in the table to the F statistic returned by LINEST to determine a confidence level for the model. |
| ssreg | The regression sum of squares. |
| ssresid | The residual sum of squares. |

The following illustration shows the order in which the additional regression statistics are returned.

| | A | B | C | D | E | F |
|---|---|---|---|---|---|---|
| 1 | $m_n$ | $m_{n-1}$ | ... | $m_2$ | $m_1$ | b |
| 2 | $se_n$ | $se_{n-1}$ | ... | $se_2$ | $se_1$ | $se_b$ |
| 3 | $r_2$ | $se_y$ | | | | |
| 4 | F | $d_f$ | | | | |
| 5 | $ss_{reg}$ | $ss_{resid}$ | | | | |

**Remarks**

- You can describe any straight line with the slope and the y-intercept:

  Slope (m):
  To find the slope of a line, often written as m, take two points on the line, (x1,y1) and (x2,y2); the slope is equal to (y2 - y1)/(x2 - x1).

  Y-intercept (b):
  The y-intercept of a line, often written as b, is the value of y at the point where the line crosses the y-axis.

  The equation of a straight line is y = mx + b. Once you know the values of m and b, you can calculate any point on the line by plugging the y- or x-value into that equation. You can also use the TREND function.

- When you have only one independent x-variable, you can obtain the slope and y-intercept values directly by using the following formulas:

  Slope:
  =INDEX(LINEST(known_y's,known_x's),1)

  Y-intercept:
  =INDEX(LINEST(known_y's,known_x's),2)

- The accuracy of the line calculated by LINEST depends on the degree of scatter in your data. The more linear the data, the more accurate the LINEST model. LINEST uses the method of least squares for determining the best fit for the data. When you have only one independent x-variable, the calculations for m and b are based on the following formulas:

$$m = \frac{n\left(\sum xy\right) - \left(\sum x\right)\left(\sum y\right)}{n\left(\sum\left(x^2\right)\right) - \left(\sum x\right)^2}$$

$$b = \frac{\left(\sum y\right)\left(\sum\left(x^2\right)\right) - \left(\sum x\right)\left(\sum xy\right)}{n\left(\sum\left(x^2\right)\right) - \left(\sum x\right)^2}$$

- The line- and curve-fitting functions LINEST and LOGEST can calculate the best straight line or exponential curve that fits your data. However, you have to decide which of the two results best fits your data. You can calculate TREND(known_y's,known_x's) for a straight line, or GROWTH(known_y's, known_x's) for an exponential curve. These functions, without the new_x's argument, return an array of y-values predicted along that line or curve at your actual data points. You can then compare the predicted values with the actual values. You may want to chart them both for a visual comparison.

- In regression analysis, Microsoft Excel calculates for each point the squared difference between the y-value estimated for that point and its actual y-value. The sum of these squared differences is called the residual sum of squares. Microsoft Excel then calculates the sum of the squared differences between the actual y-values and the average of the y-values, which is called the total sum of squares (regression sum of squares + residual sum of squares). The smaller the residual sum of squares is, compared with the total sum of squares, the larger the value of the coefficient of determination, r2, which is an indicator of how well the equation resulting from the regression analysis explains the relationship among the variables.

- Formulas that return arrays must be entered as array formulas.

- When entering an array constant such as known_x's as an argument, use commas to separate values in the same row and semicolons to separate rows. Separator characters may be different depending on your locale setting in **Regional Settings** or **Regional Options** in **Control Panel**.

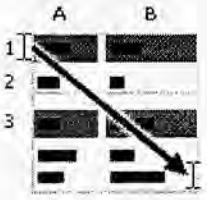
- Note that the y-values predicted by the regression equation may not be valid if they are outside the range of the y-values you used to determine the equation.

**Example 1 Slope and Y-Intercept**

The example may be easier to understand if you copy it to a blank worksheet.

How?

1. Create a blank workbook or worksheet.
2. Select the example in the Help topic. Do not select the row or column headers.




Selecting an example from Help

3. Press CTRL+C.
4. In the worksheet, select cell A1, and press CTRL+V.
5. To switch between viewing the results and viewing the formulas that return the results, press CTRL+` (grave accent), or on the **Tools** menu, point to **Formula Auditing**, and then click **Formula Auditing Mode**.

| | A | B |
|---|---|---|
| 1 | **Known y** | **Known x** |
| 2 | 1 | 0 |
| 3 | 9 | 4 |
| 4 | 5 | 2 |
| 5 | 7 | 3 |
| | **Formula** | **Formula** |
| | =LINEST(A2:A5,B2:B5,,FALSE) | |

**Note** The formula in the example must be entered as an array formula. After copying the example to a blank worksheet, select the range A7:B7 starting with the formula cell. Press F2, and then press CTRL+SHIFT+ENTER. If the formula is not entered as an array formula, the single result is 2.

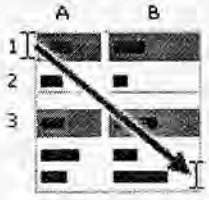
When entered as an array, the slope (2) and the y-intercept (1) are returned.

**Example 2 Simple Linear Regression**

The example may be easier to understand if you copy it to a blank worksheet.

How?

1. Create a blank workbook or worksheet.
2. Select the example in the Help topic. Do not select the row or column headers.




Selecting an example from Help

3. Press CTRL+C.
4. In the worksheet, select cell A1, and press CTRL+V.
5. To switch between viewing the results and viewing the formulas that return the results, press CTRL+` (grave accent), or on the **Tools** menu, point to **Formula Auditing**, and then click **Formula Auditing Mode**.

| | A | B |
|---|---|---|
| 1 | **Month** | **Sales** |
| 2 | 1 | 3100 |
| 3 | 2 | 4500 |
| 4 | 3 | 4400 |

| | | |
|---|---|---|
| **5** | 4 | 5400 |
| **6** | 5 | 7500 |
| **7** | 6 | 8100 |
| | **Formula** | **Description (Result)** |
| | =SUM(LINEST(B2:B7, A2:A7)*{9,1}) | Estimate sales for the ninth month (11000) |

In general, SUM({m,b}*{x,1}) equals mx + b, the estimated y-value for a given x-value. You can also use the TREND function.

**Example 3 Multiple Linear Regression**

Suppose a commercial developer is considering purchasing a group of small office buildings in an established business district.

The developer can use multiple linear regression analysis to estimate the value of an office building in a given area based on the following variables.

| Variable | Refers to the |
|---|---|
| y | Assessed value of the office building |
| x1 | Floor space in square feet |
| x2 | Number of offices |
| x3 | Number of entrances |
| x4 | Age of the office building in years |

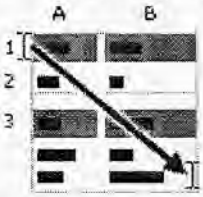
This example assumes that a straight-line relationship exists between each independent variable (x1, x2, x3, and x4) and the dependent variable (y), the value of office buildings in the area.

The developer randomly chooses a sample of 11 office buildings from a possible 1,500 office buildings and obtains the following data. "Half an entrance" means an entrance for deliveries only.

The example may be easier to understand if you copy it to a blank worksheet.

How?

1. Create a blank workbook or worksheet.
2. Select the example in the Help topic. Do not select the row or column headers.




Selecting an example from Help

3. Press CTRL+C.
4. In the worksheet, select cell A1, and press CTRL+V.
5. To switch between viewing the results and viewing the formulas that return the results, press CTRL+` (grave accent), or on the **Tools** menu, point to **Formula Auditing**, and then click **Formula Auditing Mode**.

| | A | B | C | D | E |
|---|---|---|---|---|---|
| **1** | **Floor space (x1)** | **Offices (x2)** | **Entrances (x3)** | **Age (x4)** | **Assessed value (y)** |
| **2** | 2310 | 2 | 2 | 20 | 142,000 |
| **3** | 2333 | 2 | 2 | 12 | 144,000 |
| **4** | 2356 | 3 | 1.5 | 33 | 151,000 |
| **5** | 2379 | 3 | 2 | 43 | 150,000 |

| | | | | | |
|---|---|---|---|---|---|
| **6** | 2402 | 2 | 3 | 53 | 139,000 |
| **7** | 2425 | 4 | 2 | 23 | 169,000 |
| **8** | 2448 | 2 | 1.5 | 99 | 126,000 |
| **9** | 2471 | 2 | 2 | 34 | 142,900 |
| **10** | 2494 | 3 | 3 | 23 | 163,000 |
| **11** | 2517 | 4 | 4 | 55 | 169,000 |
| **12** | 2540 | 2 | 3 | 22 | 149,000 |

**Formula**

=LINEST(E2:E12,A2:D12,TRUE,TRUE)

**Note** The formula in the example must be entered as an array formula. After copying the example to a blank worksheet, select the range A14:E18 starting with the formula cell. Press F2, and then press CTRL+SHIFT+ENTER. If the formula is not entered as an array formula, the single result is -234.2371645.

When entered as an array, the following regression statistics are returned. Use this key to identify the statistic you want.

| | A | B | C | D | E | F |
|---|---|---|---|---|---|---|
| 1 | $m_n$ | $m_{n-1}$ | ... | $m_2$ | $m_1$ | b |
| 2 | $se_n$ | $se_{n-1}$ | ... | $se_2$ | $se_1$ | $se_b$ |
| 3 | $r_2$ | $se_y$ | | | | |
| 4 | F | $d_f$ | | | | |
| 5 | $ss_{reg}$ | $ss_{resid}$ | | | | |

The multiple regression equation, y = m1*x1 + m2*x2 + m3*x3 + m4*x4 + b, can now be obtained using the values from row 14:

y = 27.64*x1 + 12,530*x2 + 2,553*x3+ 234.24*x4 + 52,318

The developer can now estimate the assessed value of an office building in the same area that has 2,500 square feet, three offices, and two entrances and is 25 years old, by using the following equation:

y = 27.64*2500 + 12530*3 + 2553*2 - 234.24*25 + 52318 = $158,261

Or you can copy the following table to cell A21 of the example workbook.

| Floor space (x1) | Offices (x2) | Entrances (x3) | Age (x4) | Assessed value (y) |
|---|---|---|---|---|
| 2500 | 3 | 2 | 25 | =D14*A22 + C14*B22 + B14*C22 + A14*D22 + E14 |

You can also use the TREND function to calculate this value.

**Example 4 Using The F And R2 Statistics**

In the previous example, the coefficient of determination, or r2, is 0.99675 (see cell A17 in the output for LINEST), which would indicate a strong relationship between the independent variables and the sale price. You can use the F statistic to determine whether these results, with such a high r2 value, occurred by chance.

Assume for the moment that in fact there is no relationship among the variables, but that you have drawn a rare sample of 11 office buildings that causes the statistical analysis to demonstrate a strong relationship. The term "Alpha" is used for the probability of erroneously concluding that there is a relationship.

There is a relationship among the variables if the F-observed statistic is greater than the F-critical value. The F-critical value can be obtained by referring to a table of F-critical values in many statistics textbooks. To read the table, assume a single-tailed test, use an Alpha value of 0.05, and for the degrees of freedom (abbreviated in most tables as v1 and v2), use v1 = k = 4 and v2 = n - (k + 1) = 11 - (4 + 1) = 6, where k is the number of variables in the regression analysis and n is the number of data points. The F-critical value is 4.53.

The F-observed value is 459.753674 (cell A18), which is substantially greater than the F-critical value of 4.53. Therefore, the regression equation is useful in predicting the assessed value of office buildings in this area.

**Example 5 Calculating The T-Statistics**

Another hypothesis test will determine whether each slope coefficient is useful in estimating the assessed value of an office building in example 3. For example, to test the age coefficient for statistical significance, divide -234.24 (age slope coefficient) by 13.268 (the estimated standard error of age coefficients in cell A15). The following is the t-observed value:

t = m4 ÷ se4 = -234.24 ÷ 13.268 = -17.7

If you consult a table in a statistics manual, you will find that t-critical, single tail, with 6 degrees of freedom and Alpha = 0.05 is 1.94. Because the absolute value of t, 17.7, is greater than 1.94, age is an important variable when estimating the assessed value of an office building. Each of

the other independent variables can be tested for statistical significance in a similar manner. The following are the t-observed values for each of the independent variables.

| Variable | t-observed value |
|---|---|
| Floor space | 5.1 |
| Number of offices | 31.3 |
| Number of entrances | 4.8 |
| Age | 17.7 |

These values all have an absolute value greater than 1.94; therefore, all the variables used in the regression equation are useful in predicting the assessed value of office buildings in this area.

## SLOPE OF BEST-FIT LINE

# SLOPE

See Also

Returns the slope of the linear regression line through data points in known_y's and known_x's. The slope is the vertical distance divided by the horizontal distance between any two points on the line, which is the rate of change along the regression line.

**Syntax**

**SLOPE(known_y's,known_x's)**

Known_y's is an array or cell range of numeric dependent data points.

Known_x's is the set of independent data points.

**Remarks**

- The arguments must be either numbers or names, arrays, or references that contain numbers.
- If an array or reference argument contains text, logical values, or empty cells, those values are ignored; however, cells with the value zero are included.
- If known_y's and known_x's are empty or have a different number of data points, SLOPE returns the #N/A error value.
- The equation for the slope of the regression line is:

$$b = \frac{n\sum xy - \left(\sum x\right)\left(\sum y\right)}{n\sum x^2 - \left(\sum x\right)^2}$$

**Example**

The example may be easier to understand if you copy it to a blank worksheet.

How?

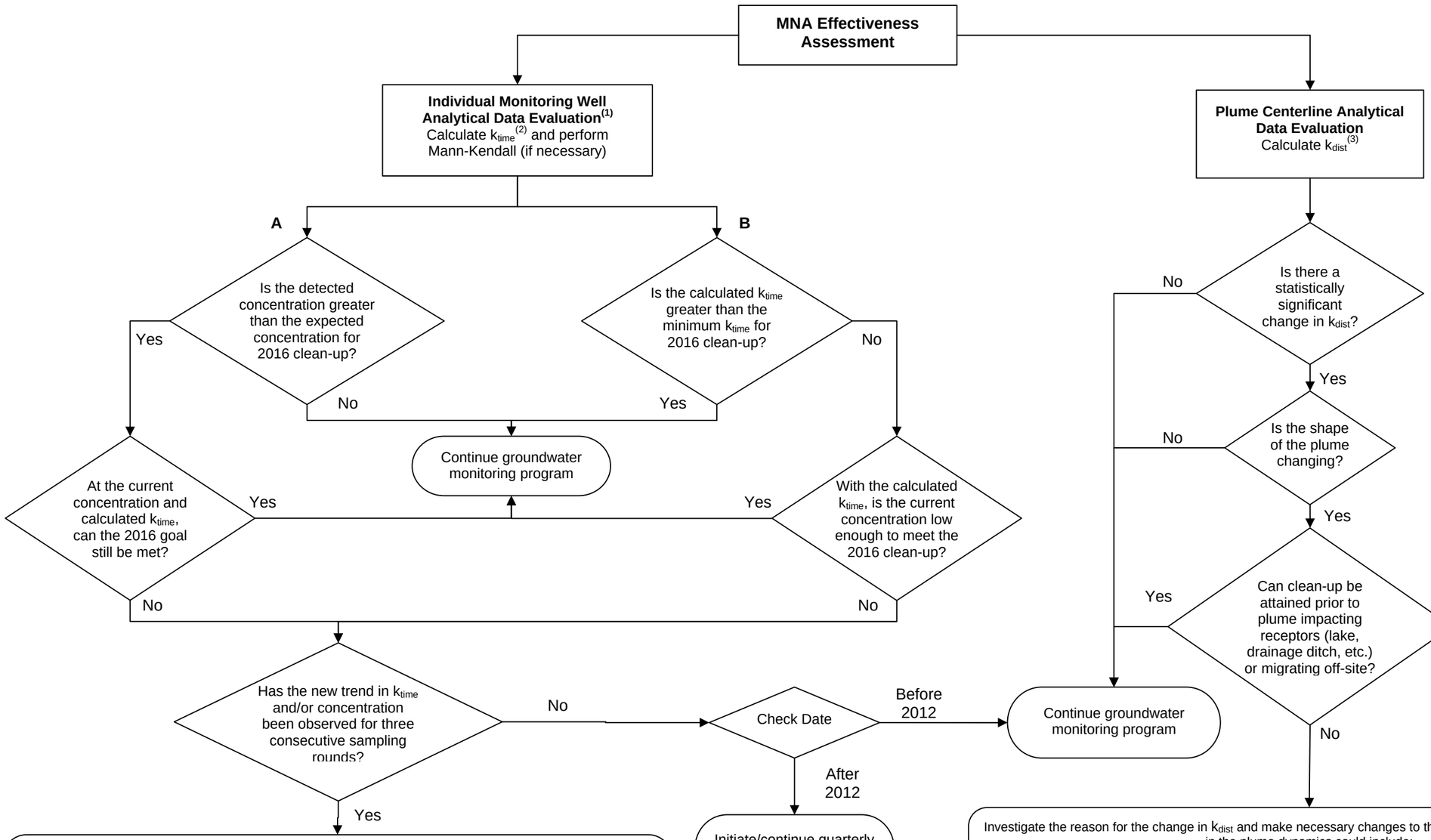
| | A | B |
|---|---|---|
| 1 | **Known y** | **Known x** |
| 2 | 2 | 6 |
| 3 | 3 | 5 |
| 4 | 9 | 11 |
| 5 | 1 | 7 |
| 6 | 8 | 5 |
| 7 | 7 | 4 |
| 8 | 5 | 4 |

| Formula | Description (Result) |
|---|---|
| =SLOPE(A2:A8,B2:B8) | Slope of the linear regression line through the data points above (0.305556) |

# MONITORED NATURAL ATTENUATION DATA EVALUATION

**DIAGRAM 3-1**
**MONITORED NATURAL ATTENUATION DATA EVALUATION**
**RESPONSE ACTION PLAN**

**NAS DALLAS, TEXAS**




Investigate the reason for the change in $k_{time}$ and make necessary changes to the remedial system. These changes in the plume dynamics could include:

| **Reason for $k_{time}$ Change** | **Recommended Changes in Remediation** |
|---|---|
| New source or new release | Identify new Responsible Party for continued remediation. |
| Geochemical change | Determine if chemical additives are necessary or technical impracticability of additional remediation. |
| Asymptotic degradation reached | Determine if active remediation or excavation are necessary or technical impracticability of additional remediation. |

Investigate the reason for the change in $k_{dist}$ and make necessary changes to the remedial system. These changes in the plume dynamics could include:

| **Reason for $K_{dist}$ Change** | **Recommended Changes in Remediation** |
|---|---|
| New source or new release | Identify new Responsible Party for continued remediation. |
| Migrating plume | Initiate abatement measures such as interceptor trench, slurry walls, pump recovery / capture system, etc. if receptors are threatened. |

Notes:
(1) Both pathways (A, B) must be evaluated for each of the chemicals of concern in each monitoring point along the plume's centerline.
(2) $k_{time}$ Concentration versus Time Attenuation Rate Constant
(3) $k_{dist}$ Concentration versus Distance Attenuation Rate Constant

# Assessment of MNA Performance Monitoring

## Introduction

The MNA monitoring well networks at the NAS Dallas groundwater plumes will provide the necessary analytical data to evaluate the dynamic behavior of the plumes over time, including contaminant and/or concentration reductions indicative of progress toward clean-up objectives, changes in plume boundaries, and changes in geochemistry. To this effect, these monitoring well networks include monitoring wells in areas hydraulically upgradient and sidegradient to the groundwater plume, in the historical source area, along the main body of the plume and immediately downgradient of the plume. The number and locations of monitoring points for each plume was selected based on the size of the plume, groundwater velocity, proximity to receptors (including cross-media transfer of COCs), and presence of preferential pathways for COC migration.

As required by the Compliance Plan for NAS Dallas (TCEQ, 2004), performance monitoring for MNA will be conducted in accordance with Response Action Plan (RAP) Worksheet 3.1 until all remedial action objectives have been met for the plume for at least two consecutive sampling events. Upon demonstration of the attainment of clean-up objectives, a three-year of post-remedial action monitoring will be implemented in accordance with the Compliance Plan for NAS Dallas (TCEQ, 2004) and as outlined on RAP Worksheet 4.1.

In addition to the COCs identified in the APAR (TtNUS, 2003) for each groundwater plume, daughter products that may be formed as a result of biotransformation or chemical processes will be monitored during the corrective action period at each plume. In order to ensure that there is a potential for continued transformation of the COCs within the groundwater plume, the geochemical environment will also be monitored (i.e., oxidation-reduction potential, dissolved oxygen, pH, etc.) every two years at a minimum. During the post-remedial action monitoring, the Compliance Plan requires that an expanded list of parameters be sampled including those COCs historically detected at the site. In order to minimize the chance of identifying constituent exceedances during the post-response action monitoring, the expanded list of parameters identified on RAP Worksheet 4.1 (Compliance Plan Table III) will be monitored every five years at a minimum.

Each new round of data will help develop a better understanding of the site and site processes and as a result, the conceptual site model for MNA will be continuously reevaluated from the standpoint of the observed plume shape, location, stability, and dynamics; attenuation rates; groundwater flow patterns; and geochemical regimes.

To evaluate progress towards achievement of clean-up objectives, data collected from the monitoring well network will be used to determine temporal and spatial trends in COC concentrations, comparisons of observed COC concentrations with benchmark concentrations, and, comparison of calculated attenuation rates with the rates required to meet remedial objectives within the required timeframe. Data will be interpreted with regard to variability so that attenuation-related changes and trends can be distinguished from other sources of variation in the data.

If a departure from a predicted trend is found, (i.e., exceeding benchmark concentration or unfavorable changes in attenuation rates), the deviation will be evaluated to determine how the changes may affect attainment of remedial goals for the individual monitoring wells, as well as, how the changes may affect the behavior of the entire plume (i.e., plume stability, reduction in COC concentrations, etc.). Departures from expected trends may not mean remedy failure, because there may be a range of attenuation rates that will achieve the desired remedial goals

in the allotted time; therefore their significance must be evaluated in the context of the site-related goals. If the potential impact on the remedy is negligible, revision of the conceptual site model may be the only outcome of such evaluation. However, if the potential for impact is significant, implementation of alternative remedies may be triggered or, at a minimum additional characterization to better define the factors limiting COC reduction and determine methods for mitigating the magnitude of their impact would be warranted. Other site-related data (i.e., geochemistry and potentiometric data) will continue to be evaluated to provide evidence of COC migration, fate, and attenuation processes. These data may be used to ascertain COC degradation and the continuation of appropriate conditions for attenuation at acceptable rates.

Following the individual monitoring well data analysis, plume behavior will be assessed to evaluate the continued effectiveness of the MNA remedy, as well as the adequacy of the monitoring program and conceptual site model for MNA. The ongoing monitoring program will provide the necessary data for continual refinement of the conceptual model and subsequently of the monitoring program itself. Upon completion of each sampling round, data analysis and determination of the effectiveness of the MNA remedy, plume-specific criteria will drive decisions affecting the continuity of the monitoring program.

At some plumes, source control and interim remedial activities have occurred between the original site characterization process and the implementation of performance monitoring. Because these activities are expected to change the site's characteristics and behavior, performance monitoring will require the continued refinement of the conceptual site model for MNA. This refinement of the conceptual site model may eventually be different from the original MNA conceptual site model based on the initial site characterization data. Development and implementation of the new conceptual site model for MNA will require the collection of additional data (i.e., quarterly monitoring for the first year after interim remedial activities and on a semi-annual basis thereafter) to establish baseline conditions, expediently depict new site characteristics and parameter variability, establish trends and estimate attenuation rates for COCs, determine if the plume characteristics have been altered, and assess the likelihood of meeting site remediation goals.

## Evaluation of New Data

Data interpretation will include the preliminary assessment of the COC concentration data collected for both the plume centerline (e.g., whole plume dynamics) as well as on individual COCs within each monitoring well. The interpretation will be conducted through graphs, tables, maps, statistics, and time-series plots. This will help in identifying patterns, relationships, and anomalies, such as possible "outliers" to the observed remedial trend of the plume. Scatter graphs (i.e., $k_{time}$ and $k_{dist}$ graphs) will show relationships between two variables that are not readily evident using purely numerical methods. Mapping the data in plan view and/or cross-section (i.e., isoconcentration maps, potentiometric maps, MNA parameter maps, etc.) will help understand patterns of COC distribution and migration, and relationships between geochemical zones and COC attenuation.

The initial data analysis and interpretation will focus on the detection of trends in the data for the COCs within individual monitoring wells and subsequently for the plume as a whole. First, the COC concentration data collected from each monitoring well will be used to determine the temporal trends that exist within the plume. The COC trends will also be evaluated at monitoring points located throughout the plume as a whole. In order to adequately interpret progress toward COC reduction goals for the plume, it is necessary to compare trends of individual monitoring wells to trends of other monitoring wells in the plume. Evaluating trends in data from all sampling locations in the plume will determine if the plume exhibits stability or reduction in COC concentrations. In addition, for each COC, spatial trends along the plume centerline [i.e., concentration vs. distance attenuation rate ($k_{dist}$)] will be evaluated. This analysis assists in evaluating the stability of the plume and its migration potential. Assessment of spatial plume behavior is necessary to ensure no unacceptable plume migration occurs.

Further evaluation will focus on the assessment of any departures from predicted trends and their impact on the potential for MNA to achieve plume-related goals. If the COC data points do not definitively indicate that the remedial goals are meeting the reasonable progress expectations, other data will be analyzed in order to properly interpret particular variances from the predicted performance (i.e., the site stratigraphy, groundwater chemistry, the groundwater flow field, the season of the year).

In addition, non-parametric statistical tests, such as the Mann-Kendall test, may be included in the data evaluation to establish the existence of a trend when the initial evaluation is inconclusive due to high data variability.

The process of MNA data evaluation is graphically depicted in Diagram 3-1.

### Individual Monitoring Well Analytical Data Evaluation

Evaluation of progress towards achievement of clean-up goals will focus primarily on temporal trends in COC concentration at individual attenuation monitoring point (AMP) wells within the plume. After each sampling event, temporal trends [i.e., concentration vs. time attenuation rate ($k_{time}$)], will be established for each AMP of the plume. Temporal trends ($k_{time}$) are particularly useful in evaluating if remedial goals can be met in the desired timeframe for the individual location. The analysis of temporal trends is useful for estimating the potential lifetime of the COC plume at the particular location.

The parameters to be evaluated in parallel to ensure reasonable progress is being made in the response action at the particular location are as follows:

- Direct comparison of detected concentrations to expected or benchmark concentration to meet remedial goals by the year 2016 for the monitoring wells along the centerline of the plume.

- Direct comparison of observed attenuation rate ($k_{time}$) from the chemical specific historical data available for the monitoring well versus the minimum attenuation rate ($k_{time}$) necessary to meet the 2016 clean-up date.

The following graph depicts the possible evaluation scenarios for the above parameters:

| | |
|---|---|
| **Measured COC Concentration < Expected COC Concentration**<br>**and**<br>**Observed $k_{time}$ > Minimum $k_{time}$**<br>Remedial goal is being met, continue performance monitoring | **Measured COC Concentration < Expected COC Concentration**<br>**and**<br>**Observed $k_{time}$ < Minimum $k_{time}$**<br>Evaluate further to ensure remedial goal is being met |
| **Measured COC Concentration > Expected COC Concentration**<br>**and**<br>**Observed $k_{time}$ > Minimum $k_{time}$**<br>Evaluate further to ensure remedial goal is being met | **Measured COC Concentration > Expected COC Concentration**<br>**and**<br>**Observed $k_{time}$ < Minimum $k_{time}$**<br>Remedial goal not being met, consider new response action |

1. Satisfactory progress is being made with the response action (top left quadrant) for an individual well location, if the detected concentration of the COC(s) is not greater than the 2016 clean-up curve expected concentration; and, the observed attenuation rate based on historical data available from the monitoring well is equal to or greater than the minimum attenuation rate necessary to meet clean-up by the year 2016 for the monitoring wells along the centerline of the plume.
2. Reasonable progress is not being made towards achieving the remedial goal (bottom right quadrant) if the detected concentration of the COC(s) exceeds the 2016 clean-up curve expected concentration; and the observed attenuation rate based on historical data available from the monitoring well is less than the minimum attenuation rate necessary to meet clean-up by the year 2016 for the monitoring wells along the centerline of the plume. A new response action may need to be implemented if this trend continues for at least three sampling rounds.
3. Further evaluation will be needed for the scenarios in the top right and bottom left quadrants before establishing if reasonable progress is being made towards achievement of the clean-up goals:
   - Reasonable progress is being made when the observed attenuation rate based on historical data is steep enough that clean-up can still be achieved by the year 2016, even though the detected concentration of a COC may be greater than the expected concentration during a particular sampling event (bottom left quadrant).
   - Reasonable progress is being made if the detected concentration of a COC in the sampling event is sufficiently below the expected concentration so that with an observed attenuation rate based on historical data greater than the calculated minimum attenuation rate necessary to meet PCLs by 2016, the remedial objectives can still be achieved by the year 2016 (top right quadrant).
   - Reasonable progress may not be made if either of the preceding two situations continues for at least three consecutive sampling rounds. At that point in the response action evaluation, a new response action may need to be implemented. In this case other statistical methods may be used to evaluate the data such as using non-parametric tests (i.e., Mann-Kendall) to determine if there has been a statistically significant change in degradation trends.

Plume Analytical Data Evaluation

Since a plume-wide trend implying progress toward restoration cannot be satisfactorily elucidated from monitoring only individual sampling locations, it will be necessary to compare trends among the AMP wells in the plume. Reduction in COC concentrations from all or most sampling locations within predicted ranges and/or at anticipated rates can be interpreted as a decrease in COC mass for the plume and will be indicative of effective remediation of the plume through MNA. Mixed trends in different portions of the plume may imply temporal changes in plume migration or may be simply attributed to the natural attenuation processes, and do not signify failure of MNA to achieve its goals in a timely manner. These variations will be evaluated in the context of the conceptual site model and sampling history before they are attributed to natural attenuation processes of other possible causes. To this effect, in cases of mixed trends it will be necessary to perform other comparisons in order to reach a conclusion of satisfactory progress. It will be particularly useful to evaluate trends in COC and daughter product concentrations (e.g., a decreasing trend in trichloroethene compared to an increasing trend in cis-1,2-dichloroethene in the same plume may indicate degradation of trichloroethene to cis-1,2-dichloroethene). Other trends of interest include changes in geochemistry that may indicate decrease in attenuation rates, such as changes in availability of electron donors and electron acceptors, changes in oxidation-reduction potential, or other primary geochemical indicators.

The complement to the evaluation of the behavior of the plume as a whole is the assessment of spatial trends. For each COC, spatial trends along the plume centerline [i.e., concentration vs. distance attenuation rate ($k_{dist}$)] will be evaluated. This analysis assists in evaluating the stability of the plume and its migration potential. $k_{dist}$ will be calculated for the monitoring wells along the plume centerline after each annual sampling round and will be depicted in centerline trend graphs ($k_{dist}$ graphs). Assessment of spatial plume behavior will be performed through visual interpretation of changes in plume shape over time as shown in the isoconcentration maps as well as centerline trend graphs.

**Assessment Conclusions and Recommendations**

As a result of the response action effectiveness evaluation, the MNA conceptual site model will be continuously refined/modified by incorporating any new data and data trends in COC and geochemistry values and changes in site hydrology. As new data is gathered there will be an ever-expanding database for the site that can be used for comparison with the changes in parameters noted between monitoring events as well as for comparison to predicted, acceptable trends. This continual evaluation of performance monitoring data will translate in better understanding of plume behavior and anticipated data variability and therefore assist in the proper interpretation of monitoring data.

Upon completion of each sampling round, data analysis and determination of the effectiveness of the MNA remedy, plume-specific criteria will drive decisions affecting the continuity of the monitoring program such as: the appropriateness of continuing the monitoring program without change, the need for modifications to the monitoring program (i.e., increased monitoring frequency, additional monitoring wells), need for additional characterization, implementation of a contingency or alternative remedy, or verification of attainment of remedial goals and termination of performance monitoring.

Site-related decisions regarding continuing, modifying, or terminating MNA performance monitoring will be made based on the analyses of spatial and temporal trends in COC concentration, as well as comparisons with predicted benchmarks and/or the specified concentration standard (i.e., COC PCLs). The following summarizes each potential decision

and why it may be chosen based on the perceived progress towards achievement of MNA remediation goals at the plume:

1. Continue Monitoring Program Without Change

   COC concentrations, including toxic transformation products and any mobilized by-products or secondary COCs must remain within the bounds of acceptable trends in order to continue the monitoring program without any change until all remedial action objectives have been met. Groundwater flow parameters must not have changed outside previously identified acceptable ranges. The geochemistry must not have changed in such a way as to indicate that the COC degradation or other natural attenuation processes would be significantly affected.

2. Modify the Monitoring Program

   Modification of the monitoring program may be needed to better reflect changing conditions or increased understanding of natural attenuation processes at the site. Changing conditions or the need to test key assumptions may require new sampling points or increases in monitoring parameters or frequency. Possible scenarios include:

   - Changes in groundwater flowrates or directions that indicate COCs may move farther downgradient, laterally or vertically into previously unimpacted areas, may warrant the need for additional monitoring wells.
   - Unfavorable changes in COC concentrations within the plume, or in the observed attenuation rate based on historic data, may warrant increased monitoring frequency. Sampling frequency may be increased if a sudden change in the trend of COC concentration reduction is noted in order to provide information to facilitate understanding of the change and provide earlier warning of further change. If the protectiveness of the remedy is in question (i.e., unfavorable observed attenuation rate change after 2012), a determination may be made to collect data on a more frequent schedule to properly interpret trends in time to implement contingency remedies, if necessary, to meet PCLs by 2016.
   - Detections of COCs outside the known plume, indicating potential plume expansion or plume migration, may warrant the need for additional monitoring wells.

3. Implement a Contingency or Alternative Remedy

   Alternative remedies can be considered for use in case MNA fails to perform at the desired effectiveness. Situations that may trigger the implementation of a contingency or other remedy modifications will depend on site conditions and include the following:

   - COC concentrations are not decreasing at the rate previously determined to be necessary to meet the remediation objectives by 2016. This assessment will involve the direct comparison of current analytical data with the expected plume clean-up benchmarks as well as evaluation of temporal trends (i.e., observed attenuation rates) in COC concentrations versus the minimum attenuation rates required to meet clean-up by the year 2016. If the protectiveness of the remedy is in question (i.e., more than three rounds of sampling fail to meet the criteria), implementation of a contingency or alternative remedy would generally be warranted.
   - COC concentrations at AMP wells exhibit an increasing trend not originally predicted during remedy selection. This situation would involve the identification and assessment of trends in COC concentration data, including transformation products, changes in geochemistry that may indicate decrease in attenuation rates explaining the lack of

progress toward clean-up objectives, and/or additional COC releases. For some locations in the plume, a detection of a significant change may not trigger immediate implementation of a contingency or alternative remedy. For instance, a low-level or otherwise limited COC concentration increase does not necessarily mean that remediation timeframes will be expanded, or that by the time the pulse moves downgradient to the boundary of the plume there will be a significant plume expansion. Or, in some cases, the detailed characterization and modeling of COC fate and migration may indicate that concentrations for certain COCs (i.e., daughter products) in some portions of the plume are expected to increase temporarily, yet MNA would still meet remedial objectives. If so, the temporary increase would not trigger the contingency or alternative remedy as long as the increase conformed to the predictions and MNA remained protective, allowing observation for several years to test model predictions, if time is available (i.e., before 2012). In situations where evaluation shows the observed COC concentration increases are expected to unacceptably increase the time for plume restoration beyond 2016, or cause unacceptable plume expansion, triggering the contingency or alternative remedy would generally be warranted.

- COCs are identified in monitoring wells located outside the original plume boundary indicating unacceptable plume expansion or migration. Detections of COCs outside of the predetermined plume boundaries may indicate unacceptable plume expansion. Implementation of an alternative or contingency remedy will depend on the locations of the new detections, and distance and possible COC migration rates between these monitoring points and receptors (i.e., surface water bodies, off-site property). Because the COC travel time from the location of the detections may be many years at some sites, there may be time for further monitoring and assessment before a contingency or alternative remedy would need to be implemented. In contrast, if the protectiveness of the remedy is in question (i.e., a significant trend of increasing COC concentration in downgradient wells was noted), there may be much less time available to assess the trend if there was only a short travel time to downgradient receptors. In this case, a contingency or alternative remedy may be triggered immediately.

4. Termination of Performance Monitoring

Once PCLs have been achieved at each of the AMP locations within a plume, showing that the MNA remedy goals have been met for two consecutive semi-annual sampling events for an individual PCLE zone, performance monitoring will be terminated and a period of verification monitoring will be initiated. Verification monitoring will include three years of semi-annual groundwater sampling in order to satisfy the requirements of the Compliance Plan for NAS Dallas (TCEQ, 2004). Sampling parameters for the verification of achieving the PCLs and locations will be in accordance with RAP Worksheet 4.0. This sampling will include all COCs that have been historically detected in the area of the former SWMU, not just the ones that were identified for remediation in the Response Action Plan. If no additional COC exceedances are identified during this three year period of post response action care monitoring, the monitoring system can be terminated, the monitoring wells will be abandoned, and the site will be removed from the permit.

### Effects of Data Variability on Data Interpretation

Data interpretation is affected by data variability. This variability is sometimes associated with natural causes or may be simply attributed to the natural attenuation processes. Due to the dynamic nature of natural attenuation processes, data typically exhibit fluctuations of various magnitudes. For example, there is an expected degree of natural variability within a plume that may include small-scale expansion and shrinkage in response to changes in groundwater flowrates and biological degradation rates throughout the year. COC concentrations in individual monitoring wells may fluctuate with changes in plume configuration caused by oscillations in groundwater flow. Also, changes in groundwater elevations can cause changes in COC concentrations measured in monitoring wells.

It is essential that each data point be interpreted in the context of its derivation in time and space. For instance, monitoring wells produce data that should be interpreted with respect to COC sources, site stratigraphy, the groundwater flow field, the plume, possible receptors, season of the year, and other relevant factors. Variations in sampling methodology should also be considered, due to possible differences in COC concentrations derived from different sampling techniques or devices. The analytical methodology may be evaluated in terms of accuracy, precision, and detection limits. This list of data considerations is not exhaustive, but merely emphasizes that a number (i.e., a data point) should be placed in context to be interpreted. The better the understanding on the derivation and context of the data, the more likely it is that the appropriate decision can be made based on the data.

Examination of historical and spatial patterns may provide information useful in assessing the source and significance of variability in the measured parameters. For instance, if there are multiple monitoring wells in the same plume that show a consistent trend for a number of monitoring variables across several monitoring events, then one may suspect a natural variation, such as recharge differences or geochemical changes in the system, and investigate a correlation of recharge, indicator parameters, or other external hydrologic factors with concentration as indicative of the likely cause of the change. If, on the other hand, a specific monitoring well shows an unusually large change in concentration between monitoring events, relative to nearby monitoring wells, then one may suspect a measurement factor or additional release source is involved and look at sampling techniques or other such factors that may influence the concentration change. Because plume variability should be taken into account when interpreting monitoring data, it is important to have a good estimate of natural variability derived from the site investigation and ongoing MNA performance monitoring.

# APPENDIX 8
# WASTE DISPOSAL MANIFESTS

Project #: 0-0

Order #: 140398

EFFECTIVE ENVIRONMENTAL

Please print or type. (Form designed for use on elite (12-pitch) typewriter.)

**NON-HAZARDOUS WASTE MANIFEST**

1. Generator ID Number: TX8170022786 / 65033
2. Page 1 of 1
3. Emergency Response Phone: 877-577-2669
4. Waste Tracking Number: NHM140398

5. Generator's Name and Mailing Address
Naval Air Station Dallas (NAS)
c/o EnSafe Inc., 4545 Fuller Dr., Suite 342
Irving, TX 75038
Generator's Phone: 972.792.3222 ATTN: Tom Wiberg

Generator's Site Address (if different than mailing address)
8100 West Jefferson
Dallas, TX 75211
RB TVW

6. Transporter 1 Company Name
Stericycle Specialty Waste Solutions Inc
Phd: 972 329 1200
State ID#: 98032 / H-4695
U.S. EPA ID Number: MNS000110924

7. Transporter 2 Company Name
U.S. EPA ID Number

8. Designated Facility Name and Site Address
Itasca Landfill TX, LP
2559 FM 66
Itasca, Texas 76055
State ID#: H0241C
U.S. EPA ID Number: n/a
Facility's Phone: 254 897 2511

| 9a. HM | 9b. U.S. DOT Description (including Proper Shipping Name, Hazard Class, ID Number, and Packing Group (if any)) | 10. Containers No. | Type | 11. Total Quantity | 12. Unit Wt./Vol. | |
|---|---|---|---|---|---|---|
| ☐ | 1 Non-regulated material (soil cuttings Class 2 solids) | 01 ~~02~~ | DM | 55 ~~110~~ | G | CESQ3012 Non-RCRA |
| ☐ | 2. Non-regulated material (purged ground and decon water) | 02 | DM | 110 ~~55~~ | G | CESQ1012 Non-RCRA |
| | 3. | | | | | |
| | 4. | | | | | |

13. Special Handling Instructions and Additional Information
01:IDW Soil cuttings NR (PF:5110167655) 55G
02:IDW purge and decon waters NR (PF:5110167656) 55G
RB TVW
11-1) 0.72 ton 11-2) 0.47 tons

14. **GENERATOR'S CERTIFICATION:** I certify the materials described above on this manifest are not subject to federal regulations for reporting proper disposal of Hazardous Waste.

Generator's/Offeror's Printed/Typed Name: X DAVID BARNEY
Signature: X
Month 5 Day 31 Year 16

15. International Shipments ☐ Import to U.S. ☐ Export from U.S. Port of entry/exit:
Transporter signature (for exports only): Date leaving U.S.:

16. Transporter Acknowledgment of Receipt of Materials

Transporter 1 Printed/Typed Name: Rafael Blaze
Signature:
Month 5 Day 31 Year 16

Transporter 2 Printed/Typed Name: Steven Vansickle
Signature:
Month 6 Day 9 Year 16

17. Discrepancy

17a. Discrepancy Indication Space ☐ Quantity ☐ Type ☐ Residue ☐ Partial Rejection ☐ Full Rejection

Manifest Reference Number:

17b. Alternate Facility (or Generator)
U.S. EPA ID Number
Facility's Phone

17c. Signature of Alternate Facility (or Generator)
Month Day Year

01: H132 02: H132

18. Designated Facility Owner or Operator: Certification of receipt of materials covered by the manifest except as noted in Item 17a

Printed/Typed Name: Jessica Anderson
Signature:
Month 6 Day 9 Year 16

GENERATOR

INT'L

TRANSPORTER

DESIGNATED FACILITY

6-NHM-C-C-11

2-DESIGNATED FACILITY TO GENERATOR

Project #: 0-0 Order #: 140398

EFFECTIVE ENVIRONMENTAL

Please print or type. (Form designed for use on elite (12-pitch) typewriter.)

**NON-HAZARDOUS WASTE MANIFEST**

1. Generator ID Number: TX8170022786 / 65033
2. Page 1 of 1
3. Emergency Response Phone: 877-577-2669
4. Waste Tracking Number: NHM140398

5. Generator's Name and Mailing Address
Naval Air Station Dallas (NAS)
c/o EnSafe Inc., 4545 Fuller Dr., Suite 342
Irving, TX 75038
Generator's Phone: 972-292-3222 ATTN: Tom Wiberg

Generator's Site Address (if different than mailing address)
8100 West Jefferson
Dallas, TX 75211

RJ TWW

6. Transporter 1 Company Name
Stericycle Specialty Waste Solutions Inc
Ph#: 972 329 1200
State ID#: S5627 / H-4565
U.S. EPA ID Number: MNS000110924

7. Transporter 2 Company Name
U.S. EPA ID Number:

8. Designated Facility Name and Site Address
Itasca Landfill TX, LP
2559 FM 56
Itasca, Texas 76055
State ID#: H0241C
U.S. EPA ID Number: n/a
Facility's Phone: 254 687 2511

| 9a. HM | 9b. U.S. DOT Description (including Proper Shipping Name, Hazard Class, ID Number, and Packing Group (if any)) | 10. Containers No. | Type | 11. Total Quantity | 12. Unit Wt./Vol. | |
|---|---|---|---|---|---|---|
| ☐ | 1. Non-regulated material (soil cuttings Class 2 solids) | 01 ~~02~~ | DM | 55 ~~110~~ | G | CESQ3012 Non-RCRA |
| ☐ | 2. Non-regulated material (purged ground and decon water) | 02 | DM | 110 ~~55~~ | G | CESQ1012 Non-RCRA |
| | 3. | | | | | |
| | 4. | | | | | |

13. Special Handling Instructions and Additional Information
01:IDW Soil cuttings NR (PF:5110167655) 55G
02:IDW purge and decon waters NR (PF:5110167656) 55G

RJ TWW

11-1) 0.72 ton 11-2) 0.47 ton

14. **GENERATOR'S CERTIFICATION:** I certify the materials described above on this manifest are not subject to federal regulations for reporting proper disposal of Hazardous Waste.

Generator's/Offeror's Printed/Typed Name: X DAVID BURNEY
Signature: X
Month 5 Day 31 Year 16

15. International Shipments ☐ Import to U.S. ☐ Export from U.S. Port of entry/exit:
Transporter signature (for exports only): Date leaving U.S.:

16. Transporter Acknowledgment of Receipt of Materials

Transporter 1 Printed/Typed Name: Rafael Blayze
Signature:
Month 5 Day 31 Year 16

Transporter 2 Printed/Typed Name: Steven Vansickle
Signature:
Month 6 Day 9 Year 16

17. Discrepancy

17a. Discrepancy Indication Space ☐ Quantity ☐ Type ☐ Residue ☐ Partial Rejection ☐ Full Rejection

Manifest Reference Number:

17b. Alternate Facility (or Generator) U.S. EPA ID Number
Facility's Phone:

17c. Signature of Alternate Facility (or Generator) Month Day Year

01: H132 02: H132

18. Designated Facility Owner or Operator: Certification of receipt of materials covered by the manifest except as noted in Item 17a

Printed/Typed Name: Jessica Anderson
Signature:
Month 6 Day 4 Year 16

GENERATOR

INT'L

TRANSPORTER

DESIGNATED FACILITY

6-NHM-C-C-11

3-DESIGNATED FACILITY TO GENERATOR

Project #: 0-0 Order #: 145925

E² EFFECTIVE ENVIRONMENTAL

Please print or type. (Form designed for use on elite (12-pitch) typewriter.)

**NON-HAZARDOUS WASTE MANIFEST**

1. Generator ID Number: TX8170022786 / 65033
2. Page 1 of 1
3. Emergency Response Phone: 877-577-2669
4. Waste Tracking Number: NHM-145925

5. Generator's Name and Mailing Address
Naval Air Station Dallas (NAS)
c/o EnSafe Inc., 4545 Fuller Dr., Suite 342
Irving, TX 75038
Generator's Phone: 972-792-3222 ATTN: Tom Wherg

Generator's Site Address (if different than mailing address)
8100 West Jefferson
Dallas, TX 75211

6. Transporter 1 Company Name
Stericycle Specialty Waste Solutions Inc
Ph#: 972 329 1200
State ID#: 88922 / H-1496
U.S. EPA ID Number: MNS000110924

7. Transporter 2 Company Name
U.S. EPA ID Number

8. Designated Facility Name and Site Address
Itasca Landfill TX. LP
2559 FM 66
Itasca, Texas 76055
State ID#: H0241C
U.S. EPA ID Number: n/a
Facility's Phone: 254 687 2511

| 9a. HM | 9b. U.S. DOT Description (including Proper Shipping Name, Hazard Class, ID Number, and Packing Group (if any)) | 10. Containers No. | 10. Containers Type | 11. Total Quantity | 12. Unit Wt./Vol. | |
|---|---|---|---|---|---|---|
| ☐ | 1. Non-regulated material (purged ground and decon water) | 04 | DM | 220 | G | CESQ1012 Non-RCRA |
| ☐ | 2. Non-regulated material (soil cuttings Class 2 solids) | 02 | DM | 110 | G | CESQ3012 Non-RCRA |
| | 3. | | | | | |
| | 4. | | | | | |

13. Special Handling Instructions and Additional Information
01:IDW purge and decon waters NR (PF:5110167856) 55G
02:IDW Soil cuttings NR (PF:5110167855) 55G

11.1) 0.94 tn
11.2) ~~0.29 tn~~ 0.35 tn

14. **GENERATOR'S CERTIFICATION:** I certify the materials described above on this manifest are not subject to federal regulations for reporting proper disposal of Hazardous Waste.

Generator's/Offeror's Printed/Typed Name: X DAVID BARNEY
Signature: X
Month 11 Day 8 Year 16

15. International Shipments ☐ Import to U.S. ☐ Export from U.S. Port of entry/exit:
Transporter signature (for exports only): Date leaving U.S.:

16. Transporter Acknowledgment of Receipt of Materials

Transporter 1 Printed/Typed Name: Jason L Boss
Signature:
Month 11 Day 8 Year 16

Transporter 2 Printed/Typed Name: Rafael Blanco
Signature:
Month 11 Day 14 Year 16

17. Discrepancy

17a. Discrepancy Indication Space ☐ Quantity ☐ Type ☐ Residue ☐ Partial Rejection ☐ Full Rejection

Manifest Reference Number:

17b. Alternate Facility (or Generator) U.S. EPA ID Number
Facility's Phone:

17c. Signature of Alternate Facility (or Generator) Month Day Year

01: H132 02: H132

18. Designated Facility Owner or Operator: Certification of receipt of materials covered by the manifest except as noted in Item 17a

Printed/Typed Name: Cindy Reed
Signature: Cindy Reed
Month 11 Day 14 Year 16

GENERATOR

INT'L

TRANSPORTER

DESIGNATED FACILITY

6-NHM-C-C-11

2-DESIGNATED FACILITY TO GENERATOR

# SWMU 21 PLUME

# 2016 Response Action Effectiveness Report
## SWMU 21 Plume
## Former NAS Dallas, Texas

## Professional Signatures and Seals

**Professional Geoscientist**

| | | |
|---|---|---|
| *Thomas Wiberg* | *1619* | *30 November 2017* |
| Professional Geologist | Geologist License number | Expiration date |
| | *17 January 2017* | |
| Signature | Date | |
| *972-791-3222* | *972-791-0405* | *twiberg@ensafe.com* |
| Telephone number | FAX number | E-mail |

**Professional Engineer**

| | | |
|---|---|---|
| | | |
| Professional Engineer | P.E. License number | Expiration date |
| | | |
| Signature | Date | |
| | | |
| Telephone number | FAX number | E-mail |

**Registered Corrective Action Specialists (RCASs) and Corrective Action Project Managers (CAPMs)**
**For LPST sites only.**

| | | |
|---|---|---|
| | | |
| Registered Corrective Action Specialist | RCAS Registration number | Expiration date |
| | | |
| Signature | Date | |
| | | |
| Corrective Action Project Manager | CAPM Registration number | Expiration date |
| | | |
| Signature | Date | |
| | | |
| Telephone number | FAX number | E-mail |

**Seals, as applicable:**

| Executive Summary | ID No. SWR 65033 SWMU 21 Plume | Report Date: 01/17/2017 |
|---|---|---|

# TEXAS COMMISSION ON ENVIRONMENTAL QUALITY
## Response Action Effectiveness Report

## Cover Page

**Regulatory ID number** (Solid waste registration number, VCP ID number, etc.) *Solid Waste Code #65033*

check one: ___ Initial RAER submittal for this onsite property  X Subsequent RAER submittal

Report date: *January 2017* TCEQ Region No.: *4*

**TCEQ Program** (check one)

X Corrective Action (Mail Code 127)

___ Voluntary Cleanup Program (Mail Code 221)

___ Petroleum Storage Tank Program (Mail Code 137)

___ Superfund PRP Lead (Mail Code 143)

___ Municipal Solid Waste Permits (Mail Code 124)

**Onsite Property Information**

Onsite Property Name: *Former Naval Air Station Dallas (NAS Dallas) -- SWMU 21 Plume*

Street no. *8100* Pre dir: *West* Street name: *Jefferson* Street type *Blvd* Post dir: ___

City: *Dallas* County: *Dallas* County Code: *57* Zip: *75211*

Nearest street intersection or location description: ___

Latitude: Degrees, Minutes, Seconds OR Decimal Degrees (circle one) North *32°44'36.5"*

Longitude: Degrees, Minutes, Seconds OR Decimal Degrees (circle one) West *96°57'44.0"*

**Offsite Affected Property Information**

Offsite Affected Property Name: *Not Applicable (N/A)*

Street no. ___ Pre dir: ___ Street name: ___ Street type: ___ Post dir: ___

City: ___ County: ___ County Code: ___ Zip: ___

[X] Check if no offsite properties affected

**Contact Person Information and Acknowledgement**

Person (or company) Name: *Navy BRAC PMO East*

Contact Person: *Mr. David Barney* Title: *BRAC Environmental Coordinator*

Mailing Address: *4911 S. Broad Street, Building 679*

City: *Philadelphia* State: *PA* Zip: *19112* E-mail address **david.a.barney@navy.mil**

Phone: *617-753-4656* Fax: ___

By my signature below, I acknowledge the requirement of §350.2(a) that no person shall submit information to the executive director or to parties who are required to be provided information under this chapter which they know or reasonably should have known to be false or intentionally misleading, or fail to submit available information which is critical to the understanding of the matter at hand or to the basis of critical decisions which reasonably would have been influenced by that information. Violation of this rule may subject a person to the imposition of civil, criminal, or administrative penalties.

Signature of Person BARNEY.DAVID.A.1228582553 Digitally signed by BARNEY.DAVID.A.1228582553 DN: c=US, o=U.S. Government, ou=DoD, ou=PKI, ou=USN, cn=BARNEY.DAVID.A.1228582553 Date: 2017.01.18 06:44:53 -05'00' Name, print: *David Barney* Date: ___

Check the reports/forms previously submitted:

**Remedy Standard A**

___ Self-Implementation Notice Submittal date: _____

*X* Response Action Plan — Approval date: *Draft Groundwater RAP submitted Nov. 2004*

**Remedy Standard B**

___ Response Action Plan — Approval date: _____

List all media (surface soil, subsurface soil, groundwater, sediment, surface water, air) that contained or contains a PCLE zone and specify the response action that has been or will be taken for each media. Indicate the type of removal, decontamination, physical control, or institutional control action used in the response action.

| Media | COCs[1] | Removal | Decontamination | Physical Control | Institutional Control | Modified Response Objective[2] | | |
|---|---|---|---|---|---|---|---|---|
| | | | | | | PMZ | WCU | TI |
| *Soil* | *Benzo(a)pyrene Lead* | *Excavation and offsite disposal of soil (completed in 2003)* | *N/A* | *N/A* | *N/A* | *N/A* | *N/A* | *N/A* |
| *Groundwater* | *Trichloroethene (TCE)* | *N/A* | *MNA* | *N/A* | *N/A* | *N/A* | *N/A* | *N/A* |

Current land use of the onsite affected property: ___ Residential **X** Commercial/industrial

Projected future land use of the onsite property (if known): *X* Residential ___ Commercial/industrial

Briefly describe the affected property and PCLE zones, the conclusions from the assessment activities, identify any affected or threatened receptors, and describe any other major site conditions. If any portion of the response action is necessitated due to an aesthetic or nuisance condition, identify the nature of that condition and identify that portion of the response action conducted to address it. If any media that contains a PCLE zone is not being addressed in this response action, provide justification.

[1] Specify either a specific COC or, if the response action is the same for all COCs in one type, specify the type of COC (for example, VOCs, SVOCs, metals).

[2] If a modified groundwater response objective is being used, check the type(s) of modifications.

**Affected Property: SWMU 21 Plume**

**In 1989, a Resource Conservation and Recovery Act (RCRA) Facility Assessment (RFA) was performed at Naval Air Station (NAS) Dallas in accordance with the 1984 RCRA Hazardous and Solid Waste Amendments to evaluate potential releases at Solid Waste Management Units (SWMUs) and Areas of Concern (AOCs) and to make preliminary determinations regarding the need for further action. The RFA Report included data collected as part of a Preliminary Review, a Visual Site Inspection, and a Sampling Visit, as necessary, for 135 SWMUs and six AOCs at NAS Dallas (A. T. Kearney, 1989).**

**In 1993, NAS Dallas was identified for closure under the Base Realignment and Closure Act (BRAC). As part of the base closure activities, an Environmental Baseline Survey (EBS) was conducted at NAS Dallas to identify any potential environmental concerns related to historical operations at the base [EnSafe/Allen & Hoshall (E/A&H), 1994]. During this EBS, additional site concerns were identified at numerous buildings across the installation. In order to strategically investigate the permitted and non-permitted SWMUs, AOCs, and additional site concerns identified in the EBS, the facility was divided into six sections, called "categories", based on property use and ownership. In 1995, the Navy initiated RCRA Facility Investigation (RFI) activities at NAS Dallas at Categories A through F. Submittal of the Final RFI Reports (issued as a series of six reports — one report per category) occurred during the period from November 2000 to March 2001 (Tetra Tech NUS, Inc. [Tetra Tech], 2000a to 2001b). The RFI was completed under the requirements of the Texas Risk Reduction Standards (RRS) (30 Texas Administrative Code [TAC] 335, Subchapter S), the regulatory framework in effect at the time, and closure recommendations in the RFI Reports were based upon Risk Reduction Standard 2 — Industrial (RRS2-IND) criteria. The RFI Reports identified those areas that required further action based on the chemical constituents detected in the soil and/or groundwater at the base.**

**The RFI Reports received conditional approval by the Texas Natural Resource Conservation Commission, now the Texas Commission on Environmental Quality (TCEQ). Final approval of the RFI Reports by TCEQ was dependent upon landowner concurrence of the RRS2-IND clean-up standard.**

**In September of 1999, the Texas Risk Reduction Program (TRRP) (30 TAC 350) was promulgated. One of the major changes resulting from TRRP was eliminating site background as a closure criterion. The most stringent closure standard under TRRP is the Residential Remedy Standard A (RES A), which consists of closure for residential use with no engineering or institutional controls.**

**In March 2001, the Navy submitted a Notice of Intention to Switch to TRRP (30 TAC 350) for five of the six categories. The one category (Category C) that was not switched to TRRP, but remained under the RRS2-IND standards, was subsequently transferred to the Department of the Army.**

**In October 2002, an Affected Property Assessment Report (APAR) was produced based on evaluation of RFI data as well as data from follow-up investigations (Tetra Tech, 2002). The data included in the APAR was compared to TRRP RES A criteria to select those sites that may be closed with no land use encumbrances and to determine which sites required corrective action. The results of this comparison indicate that 23 SWMUs (1, 2, 6, 17, 18, 21, 31, 35, 36, 60, 79, 81, 83, 84, 85, 86, 92, 102, 108, 124, 136, 138, and 139) required further actions.**

**SWMU 21 Plume**

**Building 1406, the Non-destructive Investigation (NDI) Laboratory, was constructed in 1960 on a former parking lot. From 1960 until 1971, the building served as a rocket storage facility for Texas Air National Guard (TANG) aircraft. Ammunition storage began in 1971. The building was used later for NDI Laboratory activities and ammunition storage (i.e., grenades and handgun/rifle ammunition). Hazardous materials historically stored and handled around the building included petroleum, oil, and lubricants (POL), penetrant flux solution and developer, various solvents, disodium phosphate, freon, and sodium nitrate. Three vats associated with NDI activities held penetrant, emulsifier, and developer liquids. Waste associated with the vats and the NDI processes were drummed for offsite disposal.**

**Within SWMU 21, a former 500-gallon concrete underground storage tank (UST) (No. 1406-1) was installed in 1972 at the base of the hill adjacent to Building 1406's northwest side. The EBS reported that the UST stored liquid wastes from the building's NDI dye penetrant vats. The UST was taken out of service and removed in 1988/1989 after releases of hazardous materials were reported. However, the piping from the building to the UST remains.**

**Based upon the data obtained during the RFI, further action was recommended at SWMU 21 Plume due to exceedances of SVOCs and inorganics in soil, and chlorinated VOCs in groundwater. Consequently, excavation**

of impacted soil and associated groundwater was recommended and carried out by the Navy's Remedial Action Contractor (RAC) in late 2003.

**Soil**

Based upon the data obtained during the RFI, further action was recommended at SWMU 21 due to exceedances of VOCs in the soil and groundwater. Consequently, excavation of impacted soil was recommended and carried out by the Navy's Remedial Action Contractor (RAC) in late 2003. The RAC report (RACR) for these activities was submitted to the TCEQ in March 2005 and granted final approval by the TCEQ in July 2008.

**Groundwater**

The results of the RFI for Category D (Tetra Tech, 2001a) indicate that groundwater at the site has been impacted by chlorinated volatile organic compounds (CVOC). As described in the APAR, the groundwater of this SWMU is located within a Class 2 groundwater resource area. The high degree of heterogeneity associated with the shallow groundwater bearing unit (GWBU) onsite has resulted in a discrete groundwater Protective Concentration Level Exceedance (PCLE) zone associated with the SWMU 21 Plume that required a response action to reduce the concentration of chemicals of concern (COC) to less than the respective critical Protective Concentration Levels (PCL).

Subsequent to the APAR, a draft Response Action Plan (RAP) was submitted for groundwater at the SWMU 21 Plume (Tetra Tech, 2004c). As proposed in the draft RAP, enhanced passive dechlorination followed by monitored natural attenuation (MNA) was chosen as a decontamination remedy to address the PCLE zone at SWMU 21 (Tetra Tech, 2004c). TCEQ requested that the RAP be amended to include alternate remedial actions after the completion of a pilot test that was conducted on a portion of the plume.

An enhanced monitored natural attenuation (EMNA) zero valent iron (ZVI) pilot study was proposed to determine whether in-situ abiotic degradation via ZVI could adequately reduce COC concentrations in groundwater to levels that would allow MNA to remediate the residual COC concentrations and meet the remedial goals for the plume by 2017. The 2006 ZVI pilot study consisted of pneumatic fracturing of the stiff, impermeable geomaterial as a means of artificially enhancing permeability by creating a transmissive zone into which dry, microscale zero valent iron was injected. Once injected, groundwater flowed through the higher permeability fractures and wetted the ZVI, allowing for chemical reduction of COCs.

Concentrations of COCs in groundwater were significantly reduced initially, indicating that groundwater transport to ZVI and dechlorination of chlorinated VOCs occurred. Approximately three years after implementation of the pilot study, groundwater sampling results for COCs had rebounded to pre-pilot study concentrations. The results of the pilot study were presented in a final revised pilot study report (Tetra Tech, 2009b), which concluded that ZVI injection was limited in its treatment capacity due to the inherent nature of the site geology, adsorbed-phase COCs, and rebound due to back-diffusion of COCs. Therefore, ZVI enhanced MNA was not recommended for site-wide remediation of VOCs. TCEQ concurred with the findings in a letter dated July 31, 2009. The Navy believes that the results of the pilot study suggest that remediation of the groundwater plume at SWMU is technically impracticable.

A revised RAP was submitted in January 2009 (Tetra Tech, 2009a), proposing to change the remediation approach from Remedy Standard A to Remedy Standard B with the establishment of a plume management zone (PMZ) with MNA as a control remedy until the concentrations of COCs within the groundwater PCLE zone are less than their critical PCLs. The revised RAP and proposed PMZ program has not been approved by the TCEQ. As such, the response action has consisted of groundwater monitoring for evaluation of MNA of contaminated groundwater. This effort has consisted of semi-annual groundwater monitoring conducted at site specific groundwater monitoring wells. Annual Response Action Effectiveness Reports (RAERs) for the SWMU 21 Plume Protective Concentration Level Exceedance (PCLE) zone have been submitted to the TCEQ which document the progress of MNA and the stability of the plume.

A re-evaluation of plume dynamics was presented in an Alternatives Evaluation Report (AER) (Resolution Consultants, 2013), and a determination was made that MNA alone would not effectively reduce the concentrations of COCs in groundwater at SWMU 21 to achieve remedial goals by the year 2017.

Given that MNA of contaminants in groundwater at SWMU 21 is not likely to achieve the critical PCLs by the year 2017, in accordance with the approved Groundwater RAP (Tetra Tech, 2004c), and as recommended by TCEQ in a letter dated May 26, 2015, failure of the response action triggers the implementation of contingency measures, which may include the selection of an appropriate alternate remedial measure. The Navy has proposed to implement EMNA as an alternate remedy at the affected area of SWMU 18 groundwater plume in

**an effort to reduce COCs to below PCLs. This will allow the Navy to make a determination as to whether the technology is viable. Depending upon the results of the EMNA spot treatment at SWMU 18, alternative remedial measures may be proposed in a comprehensive RAP for SWMU 21 Plume. MNA will be continued for the upcoming year in accordance with the procedures and protocols described in the Groundwater RAP, dated November 2004.**

**In October 2015, the Navy submitted a revised RAP (Revision 3) (Resolution Consultants, 2015) to TCEQ. The purpose of the revised RAP was to remove monitor wells with no history of COC detections, or with COC detections below the applicable GWPS for at least the previous five consecutive years, from the current monitoring and sampling plan and confirmation sampling plan. In accordance with the RAPs, Resolution Consultants conducted plugging and abandonment (P&A) of select groundwater monitoring wells in April 2016. P&A actions were conducted by a state of Texas licensed driller (Strata Core Services, SCI). Three wells (608D131MW, 608D147MW, and 608D34MW) were P&A'd at SWMU 21.**

**Potential receptors are onsite residents, onsite employees, and onsite construction workers. Because the groundwater PCLE zone is not projected to migrate offsite based on groundwater modeling results and other lines of evidence, it is not anticipated that offsite receptors will be affected. The possible routes of exposure to groundwater are inhalation (onsite residents, onsite employees, and onsite construction workers) and dermal contact (onsite construction workers). Ingestion is not a concern since during the implementation of the response actions as there is controlled access to the site, which limits potential exposures to contaminated groundwater (i.e., no potable or irrigation wells will be installed) through 2017. The potential for inhalation of vapor from groundwater through soil to outdoor air is insignificant, because the maximum detected COC concentrations in groundwater are less than their respective inhalation of volatiles from groundwater ($^{Air}GW_{Inh\text{-}v}$) PCLs. Additionally, the indoor air sampling conducted in a sealed building at a similar plume at the base (Building 1406 within the SWMU 21 area) indicated that no CVOCs were detected in the indoor air (TtNUS, 2004b). The recent Vapor Intrusion Study at SWMU 21 (Resolution Consultants, 2015) also concluded that sub-slab TCE and cis-1,2-DCE concentrations were well below VISLs for sub-slab vapor as well as RSLs for indoor air. Furthermore, the analytical results indicated that neither TCE nor cis-1,2-DCE were detected in indoor air samples. Therefore, vapor intrusion is not a current concern at NAS Dallas.**

## CHRONOLOGY OF MAJOR EVENTS

| | |
|---|---|
| Sep. 1985 | Initial Assessment Study was prepared and submitted. |
| Jan. 1987 | Confirmation Study and Verification Step Report was prepared and submitted. |
| Mar. 1989 | RFA was prepared and submitted. |
| 1993 — 1994 | EBS was prepared and submitted. |
| Mar. 1994 | BRAC Cleanup Plan was prepared and submitted. |
| 1995 — 1996 | Basewide Round 1 groundwater sampling event (Directed Phase RFI). |
| 1996 — 1997 | Interim Draft RFI Reports were prepared and submitted for each category identified at the air station. |
| Mar. — June 1998 | Basewide Round 2 groundwater sampling event (Chase Phase RFI). |
| May — Oct. 1998 | Main Fuel Farm (MFF) USTs were removed by the Navy's Charleston Detachment, along with other tanks basewide. |
| June 1998 — Jan. 1999 | Release Determination Report was prepared and submitted covering the removal of the MFF tanks. |
| Aug. — Sep. 1998 | Basewide Round 3 groundwater sampling event. |
| Sep. 1998 | Most military operations on NAS Dallas ceased and the air station was placed into caretaker status. |
| Dec. 1998 — Jan. 2000 | Removal of oil/water separators (OWS) basewide. |
| Jan. — Oct. 1999 | Basewide removal of hot spot areas of contamination. |
| Feb. — Apr. 1999 | Basewide Round 4 groundwater sampling event. |
| Sep. — Oct. 1999 | Removal of the remaining USTs basewide. |
| Sep. — Nov. 1999 | Basewide Round 5 groundwater sampling event. |
| July 1999 — Feb. 2000 | Basewide pre-Corrective Measures Study monitoring well installation and sampling event. |
| June — July 2000 | Preliminary groundwater investigation at Advanced Science Incorporated Area-5 (ASA-5) site in the MFF/Main Fuel Farm Storm Sewer (MFF/MFFSS) area. |
| July — Aug. 2000 | Basewide Round 6 groundwater sampling event. |
| Aug. — Sep. 2000 | Aquifer tests were conducted at five sites across Former NAS Dallas to determine aquifer properties. |
| 2000 — 2001 | Final RFI Reports were prepared and submitted for each category. |
| June — July 2001 | Basewide Round 7 groundwater sampling event, including evaluation of alternate sampling methods [i.e., passive diffusion bag (PDB) and HydraSleeve™]. |
| Sep. 2001 | Enhanced Monitored Natural Attenuation (EMNA) pilot test initiated at ASA-5 site (SWMUs 79/136) involving the injection of potassium permanganate ($KMnO_4$). |

| | |
|---|---|
| Feb. 2002 | MNA Groundwater Modeling Report for MFF/MFFSS was prepared and submitted. |
| Mar. 2002 | Technical Memorandum Groundwater Sampling Procedure Comparison for selected monitoring wells was prepared and submitted. |
| Oct. 2002 | APAR was prepared and submitted. |
| Dec. 2002 — Mar. 2003 | Basewide Round 8 groundwater sampling event. |
| Jan. 2003 | Monitoring Well Abandonment Plan was prepared and submitted. |
| Jan. 2003 | Draft MNA Groundwater Modeling Report for Category D Sites was prepared and submitted. |
| Jan. 2003 | Corrective action (excavation and disposal) initiated on the Rubble Landfill (SWMU 1). |
| Feb. 2003 | Draft RAP for MFF/MFFSS soils was prepared and submitted. |
| Apr. 2003 | Draft RAP for Category D Sites soils was prepared and submitted. |
| Apr. 2003 | Final Groundwater Report to satisfy Provision VIII.D.8 of the Former NAS Dallas RCRA Hazardous Waste Storage Permit (No. HW-50276) was prepared and submitted. |
| May 2003 | Self Implementation Notice (SIN) for TRRP RES A Soil Response Actions for SWMUs 2, 6, 18, 21, 31, 35, 36, 60, 79, 81, 83, 84, 85, 86, 102, 124, 138, and 139 was prepared and submitted. |
| June 2003 | Draft MNA Groundwater Modeling Report for Category B was prepared and submitted. |
| June 2003 | RCRA Permit renewal and Compliance Plan applications submitted to the TCEQ. |
| June 2003 | Corrective action (excavation, solidification, and disposal) initiated on the TANG Ponds (SWMU 92). |
| July — Aug. 2003 | Basewide Round 9 groundwater sampling event. |
| Aug. 2003 | Corrective action (excavation, disposal, and backfill) initiated on the sites covered in the SIN submitted in May 2003. |
| Aug. 2003 | 2002 Annual Groundwater Monitoring Report was prepared and submitted. |
| Dec. 2003 — Jan. 2004 | Basewide Round 10 groundwater sampling event. |
| Jan. 2004 | Soil RACR was prepared and submitted for the Rubble Landfill (SWMU 1). |
| Jan. 2004 | Soil RACR was prepared and submitted for the TANG Ponds (SWMU 92). |
| Mar. 2004 | TCEQ produced and distributed the Draft RCRA Permit and Draft Compliance Plan. |
| Apr. 2004 | Final Addendum to MNA Groundwater Modeling Report for MFF/MFFSS was prepared and submitted. |
| May 2004 | 2003 Groundwater Response Action Effectiveness Reports (RAER) were prepared and submitted. |

| | |
|---|---|
| June 2004 | Indoor and Outdoor Air Sampling at Building 1406 Report was prepared and submitted. |
| July 2004 | Basewide Round 11 groundwater sampling event. |
| July 2004 | Final MNA Groundwater Modeling Report for Category D was prepared and submitted. |
| Sep. 2004 | Final MNA Groundwater Modeling Report for Category B was prepared and submitted. |
| Sep. 2004 | TCEQ approved final closure documentation for the Miscellaneous Sites Soil RACR. |
| Oct. 2004 | Basewide Round 12 groundwater sampling event. |
| Oct. 2004 | TCEQ approved Final MNA Groundwater Modeling Report for Category D Sites at Former NAS Dallas. |
| Oct. 2004 | TCEQ approved Final Addendum to the MNA Groundwater Modeling Report for MFF/MFFSS at Former NAS Dallas. |
| Oct. 2004 | TCEQ approved Final Groundwater Report for Former NAS Dallas. |
| Oct. 2004 | TCEQ approved the 2002 Annual Groundwater Monitoring Report. |
| Nov. 2004 | Final RAP (Basewide) for groundwater was prepared and submitted. |
| Dec. 2004 | 2004 Semi-annual Groundwater Monitoring Report was prepared and submitted. |
| Dec. 2004 | TCEQ issued comments on the 2003 Groundwater RAERs. |
| Jan. 2005 | 2004 Groundwater RAERs were prepared and submitted. |
| Mar. 2005 | Monitoring Well Installation and Abandonment Plan was prepared and submitted. |
| Mar. 2005 | Draft 84 Sites Soil RACR was prepared and submitted. |
| Apr. 2005 | 2004 Groundwater RAERs were prepared and submitted. |
| Apr. 2005 | Basewide Round 13 groundwater sampling event. |
| June 2005 | Corrective action for groundwater (excavation, disposal, and backfill) initiated at SWMU 85. |
| June 2005 | Corrective action for groundwater (excavation, disposal, and backfill) initiated at SWMU 18. |
| July 2005 | Basewide Round 13 groundwater sampling event. |
| Aug. 2005 | TCEQ issued comments on the Draft 84 Sites Soil RACR. |
| Aug. 2005 | 2005 Semi-annual Groundwater Monitoring Report was prepared and submitted. |
| Sep. 2005 | TCEQ issued comments on the 2004 Groundwater RAPs. |
| Oct. 2005 | TCEQ issued comments on the 2004 Groundwater RAERs. |
| Oct. 2005 | Basewide Round 14 groundwater sampling event. |
| Oct. — Dec. 2005 | City of Dallas issued comments on the Draft 84 Sites Soil RACR. |

| | |
|---|---|
| Dec. 2005 | TCEQ issued comments on the 2005 Semi-annual Groundwater Monitoring Report. |
| Jan. 2006 | 2005 Groundwater RAERs were prepared and submitted. |
| Jan. 2006 | Basewide Round 15 groundwater sampling event. |
| Feb. 2006 | Revised Groundwater RAPS (Revision 2) were prepared and submitted covering SWMUs 17/Building 1423, 17/Building 1429, 18, 35, 85, 86, 108, 136 North, 136 South, and 139. |
| Mar. 2006 | RACR for groundwater removed at SWMUs 18 and 85 were prepared and submitted. |
| May 2006 | Basewide Round 15B groundwater sampling event. |
| May 2006 | TCEQ issued comments on the 2005 Groundwater RAERs. |
| June 2006 | Eighty-five Sites, Defense Reutilization and Marketing Office (DRMO), and Naval Weapons Industrial Reserve Plant (NWIRP) SWMU 18 Soil RACRs (Revision 1) were prepared and submitted. |
| July 2006 | TCEQ issued comments on the Groundwater RAPs (Revision 2). |
| July 2006 | EMNA Pilot Test initiated at SWMU 21 involving the injection of zero valent iron (ZVI). |
| Aug. 2006 | Basewide Round 16 groundwater sampling event. |
| Aug. 2006 | Responses to TCEQ comments on the Groundwater RAPs (Revision 2), including replacement pages, were prepared and submitted. |
| Nov. 2006 | Basewide Round 16B groundwater sampling event. |
| Dec. 2006 | RACR for groundwater PCL at SWMU 35 was prepared and submitted. |
| Dec. 2006 | TCEQ approves Groundwater RAP (Revision 2) covering SWMUs 17/Building 1423, 17/Building 1429, 18, 35, 85, 86, 108, 136 North, 136 South, and 139. |
| Jan. 2007 | 2006 Groundwater RAERs were prepared and submitted. |
| Apr. 2007 | Groundwater Sampling Work Plan Addendum, Slug Test Work Plan, and Monitoring Well Installation and Abandonment Work Plan were prepared and submitted. |
| Apr. — May 2007 | Basewide Round 17 groundwater sampling event. |
| Apr. — June 2007 | SWMU 18 OWS removal operations were conducted. |
| Apr. 2007 | Slug test operations conducted at SWMUs 18, 85, and 139. |
| Aug. — Sep. 2007 | Basewide Round 18 groundwater sampling event. |
| Nov. 2007 | Field Activities for SWMU 21 EMNA Pilot Study completed. |
| Jan. 2008 | Basewide Round 19 groundwater sampling event. |
| Jan. 2008 | 2007 Groundwater RAERs were prepared and submitted. |
| Feb. 2008 | TCEQ approves the Groundwater RACR for SWMU 35. |
| Apr. 2008 | Comments to the 85 Sites, DRMO, and NWIRP SWMU 18 Soil RACRs revisions were received from the TCEQ. |

| | |
|---|---|
| May 2008 | TCEQ issued comments on the 2007 Groundwater RAERs. |
| May 2008 | Response to the 85 Sites, DRMO, and NWIRP SWMU 18 Soil RACRs comments were submitted to the TCEQ. |
| July 2008 | Basewide Round 20 groundwater sampling event. |
| July 2008 | TCEQ grants final approval of the 85 Sites, DRMO, and NWIRP SWMU 18 Soil RACRs. |
| July 2008 | Response to TCEQ comments on 2007 Groundwater RAERs, replacement pages (Revision 1) to 2007 RAERs prepared and submitted. |
| Oct. 2008 | Technical Memorandum, ASA-5 East Site EMNA Pilot Study prepared and submitted. |
| Oct. 2008 | Technical Memorandum, Pilot Study at SWMU 21 prepared and submitted. |
| Oct. 2008 | SWMU 17/1429 Pilot Test Work Plan prepared and submitted. |
| Dec. 2008 | SWMU 139 Groundwater RACR prepared and submitted. |
| Jan. 2009 | Basewide Round 21 groundwater sampling event. |
| Jan. 2009 | 2008 Groundwater RAERs were prepared and submitted. |
| Jan. 2009 | Revised Groundwater RAPs for SWMU 21 (Revision 2) prepared and submitted. |
| Jan. 2009 | Revised Groundwater RAPs for SWMUs 79/136 Central (Revision 2) prepared and submitted. |
| Jan. 2009 | Revised Groundwater RAP for SWMU 136 South (Revision 4) prepared and submitted. |
| May 2009 | SWMU 21 Pilot Study additional groundwater sampling |
| May 2009 | SWMU 79/136 Central non-compliant monitoring well groundwater sampling. |
| May 2009 | TCEQ grants conditional approval of the SWMU 139 Groundwater RACR. |
| June 2009 | ASA-5 Pilot Test injection points abandonment. |
| June 2009 | SWMU 35 monitoring well abandonment. |
| July 2009 | Basewide Round 22 groundwater sampling event. |
| Sep. 2009 | SWMU 21 Pilot Study monitoring wells abandonment. |
| Oct. 2009 | Revised Technical Memorandum, SWMU 21 Pilot Study prepared and submitted. |
| Oct. 2009 | SWMU 136 South non-compliant monitoring well groundwater sampling. |
| Nov. 2009 | Response to TCEQ comments on 2008 Groundwater RAERs prepared and submitted. |
| Jan. 2010 | Basewide Round 23 groundwater sampling event. |
| Jan. 2010 | 2009 Groundwater RAERs prepared and submitted. |
| July 2010 | Basewide Round 24 groundwater sampling event. |
| Aug. 2010 | Basewide monitoring well network inspection and five-year survey. |

| | |
|---|---|
| Nov. 2010 | Response to TCEQ comments on 2009 Groundwater RAERs prepared and submitted. |
| Dec. 2010 | Monitoring wells general maintenance and minor repairs completed. |
| Jan. 2011 | Basewide Round 25 groundwater sampling event. |
| Jan. 2011 | 2010 Groundwater RAERs prepared and submitted. |
| March 2011 | Monitor well inspection at SWMU 21/SWMU 18 on monitoring wells within the 20-acre area leased to the Air National Guard. |
| May 2011 | Addendum to Monitoring Well Installation and Abandonment Plan prepared and submitted. |
| June 2011 | SWMU 139 monitoring wells plugged and abandoned. |
| June 2011 | SWMU 81 monitoring wells plugged and abandoned. |
| June 2011 | Repairs, abandonment and replacement of damaged monitoring wells at SWMU 21 and SWMU18. |
| July 2011 | Basewide Round 26 groundwater sampling event. |
| Dec. 2011 | Response to TCEQ comments on 2010 Groundwater RAERs prepared and submitted. |
| Jan. 2012 | Basewide Round 27 groundwater sampling event. |
| March 2012 | 2011 Groundwater RAERs prepared and submitted. |
| July 2012 | Basewide Round 28 groundwater sampling event. |
| Aug. 2012 | EPA comments to the 2011 Groundwater RAER. |
| Oct. 2012 | TCEQ comments to the 2011 Groundwater RAER. |
| Jan. 2013 | Basewide Round 29 groundwater sampling event. |
| Jan. 2013 | 2012 Groundwater RAERs prepared and submitted. |
| Feb. 2013 | TCEQ comments to the 2012 Groundwater RAER. |
| June 2013 | EPA comments to the 2012 Groundwater RAER. |
| July 2013 | Basewide Round 30 groundwater sampling event. |
| July 2013 | Response to TCEQ comments on 2012 Groundwater RAERs prepared and submitted. |
| Jan. 2014 | Basewide Round 31 groundwater sampling event. |
| Jan. 2014 | 2013 Groundwater RAERs prepared and submitted. |
| Feb. 2014 | TCEQ comments to the 2013 Groundwater RAER. |
| June 2014 | EPA comments to the 2013 Groundwater RAER. |
| July 2014 | Basewide Round 32 groundwater sampling event. |
| July 2014 | Response to TCEQ comments on 2013 Groundwater RAERs prepared and submitted. |
| Nov. 2014 | RCRA Permit renewal and Compliance Plan (Number 50276) applications submitted to the TCEQ. |
| Jan. 2015 | Basewide Round 33 groundwater sampling event. |
| Jan. 2015 | 2014 Groundwater RAERs prepared and submitted. |

| | |
|---|---|
| May 2015 | TCEQ Permit Renewal Application Technical Notice of Deficiency (NOD) Letter, dated May 26, 2015. |
| June 2015 | City of Dallas meeting |
| June 2015 | TCEQ comments letter to the 2014 Groundwater RAER, dated June 10, 2015. |
| June 2015 | Submittal of Draft revised RAP for SWMU 17/Building 1429, received June 23, 2015. |
| June 2015 | Response to TCEQ comments to the Response to Permit Renewal Application Technical NOD Letter for Former Dallas Naval Air Station (NAS), Dallas, Texas, dated June 26, 2015. |
| July 2015 | Basewide Round 34 groundwater sampling event. |
| July 2015 | TCEQ Permit Renewal Application Second Technical Notice of Deficiency Letter, dated July 24, 2015. |
| July 2015 | Response to TCEQ Comments on the Technical Memorandum Pilot Study for SWMU 21, Rev. 1, July 2009 submitted to the TCEQ, dated July 24, 2015. |
| Oct. 2015 | Basewide submittal of Revised and Interim Response Action Plans. |
| Dec. 2015 | Draft Final Enhanced Monitored Natural Attenuation (EMNA) Spot Treatment Workplan for SWMU 18 prepared and submitted to TCEQ. |
| Dec. 2015 | Amendment to the Approved Class V Underground Injection Control (UIC) Permit (5X2600432) prepared and submitted to TCEQ. |
| Jan. 2016 | Basewide Round 35 groundwater sampling event. |
| Jan. 2016 | TCEQ, U.S. EPA, and City of Dallas approve EMNA workplan. |
| Jan. 2016 | 2015 Groundwater RAERs prepared and submitted. |
| Jan. 2016 | EMNA Spot Treatment Design Verification Testing at SWMU 18 by Resolution Consultants and Regenesis Remediation Services. |
| March 2016 | Draft Tier II Sampling and Analysis Plan Addendum #1, Long-Term Monitoring Plan Enhanced Monitored Natural Attenuation Spot Treatment at SWMU 18 Former Naval Air Station Dallas, Dallas, Texas prepared and submitted to TCEQ. |
| March 2016 | Amendment to the Approved Class V UIC Permit (5X2600432) prepared and submitted to TCEQ. |
| Apr. 2016 | TCEQ approves UIC amendment request. |
| Apr. 2016 | Basewide monitor well plugging and abandonment and operation and maintenance actions, installation of monitor well 508F98MW in SWMU 79 |
| Apr. 2016 | EMNA Spot Treatment at SWMU 18 baseline groundwater sampling event. |
| May 2016 | EMNA Spot Treatment at SWMU 18 injections by Resolution Consultants and Regenesis Remediation Services. |
| Jul. 2016 | Basewide Round 36 groundwater sampling event. |

| | |
|---|---|
| Aug. 2016 | Deploy passive diffusion bags at EMNA Spot Treatment well 606D152MW. |
| Sep. 2016 | Basewide operations and maintenance activities completed. |
| Sep. 2016 | EMNA Spot Treatment at SWMU 18 first quarterly performance groundwater monitoring event. |
| Sep. 2016 | Draft Tier II Sampling and Analysis Plan Addendum #2, Long-Term Monitoring Plan, Enhanced Monitored Natural Attenuation, Perfluoroalkyl Substances Groundwater Investigation, Former Naval Air Station Dallas, Dallas, Texas prepared and submitted to TCEQ. |

# Checklist for Report Completeness

Use this checklist to determine the portions of the form that must be submitted for this report. Answer all questions by checking Yes or No. If the answer is Yes include that portion of the report. If the answer is No, do not complete or submit that portion of the report. All form contents that are marked "Required" must be submitted. Form contents marked with an asterisk (*) are not included in the blank form and are to be provided by the person.

| | | | | Report Contents |
|---|---|---|---|---|
| | | Required | **Cover Page** | ☒ |
| | | Required | **Executive Summary** | ☒ |
| | | Required | **Checklist for Report Completeness** | ☒ |
| | | Required | **Worksheet 1.0** Response Action Objectives | ☒ |
| | | Required | **Attachment 1A*** Maps and Cross Sections | ☒ |
| | | Required | **Attachment 1B*** Graphs | ☒ |
| | | Required | **Attachment 1C*** Response Action Diagrams | ☐ *N/A* |
| No ☒ | Is a plume management zone being used as part of the response action? | ☐ Yes | **Worksheet 2.0** Plume Management Zone | ☐ |
| | | | **Attachment 2A*** Map of Plume Management Zone | ☐ |
| No ☒ | Was an area of technical impracticability approved for use as part of the response action? | ☐ Yes | **Worksheet 3.0** Technical Impracticability | ☐ |
| | | | **Attachment 3A*** Map of Technical Impracticability | ☐ |
| No ☒ | Are institutional controls used or required as part of the response action? | ☐ Yes | **Worksheet 4.0** Institutional Controls | ☐ |
| | | Required | **Worksheet 5.0** Performance Measures and Problems | ☐ |
| No ☐ | Have any operation and maintenance activities been conducted? | ☒ Yes | **Worksheet 6.0** Operation and Maintenance | ☒ |
| No ☒ | Has there been any change to the plans for post-response action care from that submitted in the RAP? | ☐ Yes | **Worksheet 7.0** Post-Response Action Care | ☐ |
| No ☐ | Was any information for this report obtained from outside sources? | ☒ Yes | **Appendix 1*** References | ☒ |
| No ☒ | Is an ESA and/or Compensatory Restoration being used as part of the response action? | ☐ Yes | **Appendix 2*** ESA and Compensatory Restoration | ☐ |

| Checklist for Report Completeness | ID No. *SWR 65033 SWMU 21 Plume* | Report Date: *01/17/2016* |
|---|---|---|

| | | | | |
|---|---|---|---|---|
| No ☒ | Are institutional controls or landowner concurrence required in the response action? | ☐ Yes | **Appendix 3*** Institutional Controls and Landowner Concurrence | ☐ |
| No ☐ | Is there data or boring/monitor well information not previously submitted? | ☒ Yes | **Appendix 4*** Data Tables, Boring Logs, and Well Completions | ☒ |
| No ☒ | Did sampling procedures differ from those described in the RAP? | ☐ Yes → | **Appendix 5*** Sampling Procedures | ☐ |
| No ☐ | Has any sampling been conducted for which the analytical results were not previously submitted? | ☒ Yes → | **Appendix 6*** Laboratory Data Packages | ☒[1] |
| No ☐ | Were statistics or geostatistics used in the response action? | ☒ Yes | **Appendix 7*** Statistical Methodology | ☒[2] |
| No ☐ | Were any wastes generated that were not reported through STEERS? | ☒ Yes → | **Appendix 8*** Waste Disposition | ☒ |

***Notes:***

[1] Included with 2016 RAER in CD format.

[2] Included with 2016 RAER for SWMU 17/Building 1423.

Use this worksheet to describe the response action objectives in each media.

## Response Action Objectives — SWMU 21 Plume

What is the selected remedy standard for this affected property? *X* A ____ B

List the environmental media to which this applies *Soil*

Repeat this section for each medium that had a different response action objective.

Provide a detailed description of the response action. Describe the removal actions, decontamination actions, treatment system(s), and/or physical or institutional control actions that have been conducted in each media and indicate if there were any differences between the actions taken and the actions proposed in the SIN or RAP.

**Based upon the data obtained during the RFI and subsequently evaluated in the APAR, further action was recommended at SWMU 21 due to exceedances of SVOCs in the soil. Consequently, excavation of impacted soil was recommended by the Navy and carried out by the Navy's RAC in 2003. The RACR for the soil removal activities was prepared and submitted to the TCEQ in March 2005. The RACR has undergone several review cycles by the city of Dallas, U.S. EPA, and TCEQ and the final replacement pages for the RACR were submitted to the TCEQ in May 2008 (CH2M Hill, 2008). The TCEQ granted final approval of the RACR in July 2008.**

List the environmental media to which this applies *Groundwater*

Repeat this section for each medium that had a different response action objective.

Provide a detailed description of the response action. Describe the removal actions, decontamination actions, treatment system(s), and/or physical or institutional control actions that have been conducted in each media and indicate if there were any differences between the actions taken and the actions proposed in the SIN or RAP.

**The proposed groundwater response action for the site historically consisted of enhanced dechlorination followed by MNA as the decontamination remedy to reduce the concentration of COCs to less than their critical PCLs. Enhanced dechlorination was recommended because the fate and transport modeling results (Tetra Tech, 2004b) indicated that within the range of sensitivity runs for the calibrated model used to simulate the natural biological reductive dechlorination process, MNA alone would not reduce the chlorinated VOC concentrations to less than their respective PCLs in the required time period (i.e., 2017). Therefore, an in-situ enhanced passive dechlorination remedy was proposed to reduce the chlorinated VOC concentrations to levels that would allow MNA reach the remedial goals by 2017. The addition of ZVI via pneumatic fracturing was considered the most effective technology to satisfy the remedial goals of the enhanced dechlorination response action.**

**A pilot study was conducted in the more contaminated portion of the aquifer (where TCE concentrations are greater than 0.050 mg/L). The treatment zone covered approximately 50 feet by 50 feet horizontally and 25 feet vertically. The pilot study consisted of the injection of ZVI via pneumatic fracturing in the subsurface. The primary goal of the pilot study was to determine whether in-situ abiotic degradation via ZVI could adequately reduce COC concentrations in the groundwater to levels that would allow MNA to remediate the residual COC concentrations and meet the remedial goals for the plume by 2017. MNA would rely on the continuation of abiotic degradation and natural biodegradation along with the other natural attenuation processes such as dilution, dispersion, and advection to achieve the remedial goals in a reasonable timeframe.**

**The ZVI pilot study report concluded that ZVI injection was not recommended for site-wide remediation of VOCs, but it may be applicable as a source area treatment (Tetra Tech, 2008). ZVI injection via pneumatic fracturing was found to be limited in its treatment capacity due to the lithology (i.e., stiff, silty clay) present at the site. The report also noted that the reduced concentrations achieved in the pilot test area could rebound as back-diffusion of adsorbed-phase contaminants takes place, thus reducing the**

**effectiveness of the technology in reaching and maintaining COC concentrations less than critical PCLs. Per the TCEQ's request, an additional round of groundwater sampling was conducted in May 2009 to evaluate long-term effects of the ZVI injection at SWMU 21. A final revised pilot study report (Tetra Tech NUS, 2009) that supported the initial findings (Tetra Tech NUS, 2008), was submitted to the TCEQ in July 2009. The TCEQ concurred with the findings of the final pilot test report in a letter dated 31 July 2009 which stated "TCEQ has reviewed the analytical results and agrees with the Navy response that for several wells the chemical concentrations have returned to, or near, pre-treatment test conditions with very little to no change in the daughter products of TCE.**

**In a letter dated August 22, 2011, the TCEQ provided a comprehensive technical review to evaluate aspects of the design and performance of the ZVI injection pilot study for SWMU 21. A summary of TCEQ concerns include the following:**
**"H.3 A summary of the results state that "...ZVI injection via pneumatic fracturing is limited in its treatment capacity..." (Sec 7.0, Subject Report). The TCEQ concurs with this assessment for the following reasons:**

- **Pneumatic fracturing of the subsurface is only effective for stiff, impermeable geomaterial;**
- **When pneumatic fracturing was attempted on suitable geomaterial, the radii of fracturing were small and the size of the fracture apertures was small compared to the ZVI grain size and the fracturing occurred in isolated non-transmissive zones to which the rate of groundwater transport is negligible;**
- **The effectiveness of ZVI is dependent upon the ability of groundwater to transport TCE to ZVI sorption sites;**
- **Most of the ZVI was injected into small fracture zones in stiff, impermeable sediments that were isolated from transmissive groundwater zones to which groundwater transport of TCE to the ZVI sorption sites is ineffective; and**
- **In lieu of effective groundwater transport of TCE to ZVI sorption sites, the effectiveness of the response action should not be expected to be successful.**

**The Navy provided a response to TCEQ comments on the Technical Memorandum Pilot Study in a letter dated 26 June 2015.**

**Further sampling will continue at this plume area in accordance with the RAP (Tetra Tech, 2004c). In addition, since it is unlikely that the remedial goals will be achieved in the plume before the established time frame, alternate options are being considered by the Navy.**

Describe how the response action has, or is working towards, achievement of the property-specific response objectives for the PCLE zone in each medium in the context of the response objectives set forth in §350.32 or §350.33, as applicable. Explain how the response action is appropriate based on the hydrogeologic and COC characteristics. Describe any unprotective conditions that continued or resulted from the remedial actions and the actions taken to mitigate unprotective conditions.

**The results of the pilot test conducted at the SWMU 21 plume indicate that the originally proposed response action of MNA and enhanced passive dechlorination will most likely not meet the groundwater response objectives of §350.32 for the contaminated groundwater in the PCLE zones. The combined use of enhanced passive dechlorination and MNA as a decontamination remedy will most likely not reduce the concentration of COCs to less than their critical PCLs by the year 2017.**

**Based on primary lines of evidence, neither MNA alone nor enhanced abiotic degradation coupled with MNA appears to be an appropriate remedy to reduce the COCs to less than their critical PCLs on or before the year 2017 at the SWMU 21 groundwater plume. Therefore, in accordance with the Groundwater RAP (Tetra Tech, 2004c), and as recommended by TCEQ in a letter dated 26 May 2015, failure of the response action triggers the implementation of contingency measures, which may include the selection of an appropriate alternate remedial measure. The Navy has proposed to implement EMNA as an alternate remedy at the affected area of SWMU 18 groundwater plume in an effort to reduce COCs to below PCLs.**

**This will allow the Navy to make a determination as to whether the technology is viable. Depending upon the results of the EMNA spot treatment at SWMU 18, alternative remedial measures may be proposed in a comprehensive RAP for SWMU 21 Plume, to follow. MNA will be continued for the upcoming year in accordance with the procedures and protocols described in the Groundwater RAP (Revision 1), dated November 2004.**

**The current COC concentrations detected in the groundwater at this site are less than the TCEQ default onsite employee or construction worker exposure criteria (i.e., dermal and inhalation exposures); therefore, these exposure pathways will not be a concern. The only PCL exceeded at this site is through groundwater ingestion ($^{GW}GW_{Ing}$). Ingestion is not a concern since during the implementation of the response actions, there is controlled access to the site, which limits potential exposures to contaminated groundwater (i.e., no installation of potable or irrigation wells) through 2017. Additionally, the fate and transport modeling results (Tetra Tech, 2004b) predict that there will be no expansion of the PCLE zones or offsite migration of COCs at concentrations greater than the respective critical groundwater PCLs.**

If different from the information provided in the RAP, explain how the COCs have been handled, treated, disposed, or transferred to another medium and document that the response action has not resulted in any additional exposure conditions due to response action activities.

*N/A*

Explain whether the response action is achieving, or will achieve, the objectives within the reasonable time frame.

**Maps in Attachment 1A, graphs in Attachment 1B, data tables in Appendix 4, and graphs in Attachment 1B show mostly stable to slight increasing trends for TCE with only 608D141MW showing an increasing trend. Very few locations display increasing trends for cis-DCE. Consequently, no appreciable changes have occurred in the PCLE zone footprint when compared to the historical PCLE zone presented in the RAP (Tetra Tech, 2009a). In addition, the fate and transport modeling results (Tetra Tech, 2004b) indicated the existing groundwater PCLE zone is stable and not increasing in concentration or expanding down gradient. The results also indicate that there will be no expansion of the PCLE zone or offsite migration of COCs at concentrations greater than the respective critical groundwater PCLs.**

**As previously stated, neither MNA alone nor enhanced abiotic degradation coupled with MNA appears to be an appropriate remedy to reduce the COCs to less than their critical PCLs on or before the year 2017 at the SWMU 21 groundwater plume. Failure of the response action triggers the implementation of contingency measures, which may include the selection of an appropriate alternate remedial measure.**

**Further sampling will continue at this plume area in accordance with the RAP (Tetra Tech, 2004c).**

Are physical controls part of the response action? ____ Yes *X* No

If yes, describe the type and purpose of the physical control and discuss how the physical control has proven effective.

*N/A*

## Soil Response Action Objectives

When using removal and/or decontamination with controls or controls only, demonstrate that the physical control or combination of measures is reliably containing, and will continue to contain, COCs within and/or derived from the surface soil and subsurface soil PCLE zone materials over time.

*N/A*

Explain how the removal or decontamination action is reducing the concentration of COCs to the critical surface soil and subsurface soil PCL throughout the soil PCLE zone and preventing COC concentrations above the critical soil PCLs from migrating beyond the original boundary of the soil PCLE zone.

**The soils containing COC concentrations in excess of TRRP RES A were excavated by the Navy's RAC in 2003. Since no soils remain at the site in excess of TRRP RES A concentrations, there is no danger of COCs migrating beyond the original boundary of the PCLE zone. The RACR for the soil removal activities was prepared and submitted to the TCEQ in March 2005. The RACR has undergone several review cycles by the city of Dallas, EPA, and TCEQ and the final replacement pages for the RACR were submitted to the TCEQ in May 2008 (CH2M Hill, 2008). The TCEQ granted final approval of the RACR in July 2008.**

## Groundwater Response Action Objectives — SWMU 21 Plume

Name of groundwater-bearing unit to which this information applies *Upper Water Bearing Zone (Alluvial Overburden)*

Repeat this section for each groundwater-bearing unit for which a different response action is being conducted.

Groundwater Classification ___ 1 _X_ 2 ___ 3

Is a modified groundwater response action being used for any part of the groundwater PCLE zone (§350.33(f)(2), (3), or (4))? ___ Yes _X_ No

If yes, complete the appropriate portions of this report.

Explain how the removal or decontamination actions are reducing the concentration of COCs to the critical groundwater PCL throughout the groundwater PCLE zone and preventing COC concentrations above the critical groundwater PCL from migrating beyond the original boundary of the groundwater PCLE zone. If COC concentrations above the critical groundwater PCL have ever migrated beyond the original boundary of the groundwater PCLE zone, explain the actions taken to address the increase in the PCLE zone.

**While the fate and transport modeling results (Tetra Tech, 2004b) indicate that the ongoing biological reductive dechlorination process will not reduce the COC concentrations within the existing groundwater PCLE zones to levels less than their respective critical PCLs by the year 2017, the results did indicate that the PCLE zones will not expand nor will the COCs migrate offsite at concentrations greater than the respective critical groundwater PCLs. This conclusion has been substantiated through the groundwater analytical results obtained from monitoring wells located downgradient of the SWMU 21 Plume and through the concentration versus (vs.) distance graphs included in Attachment 1B.**

**In June 2011, the Navy abandoned monitoring well 600D89MW, located along the northwestern boundary of the plume, and installed replacement monitoring well 608D161MW further to the northwest and out of the entrance road to the 20-acre area leased to the Air National Guard to avoid damage to the monitoring well due to the passing of heavy equipment. Groundwater samples collected from monitoring well 608D161MW had elevated TCE concentrations during the June 2011 sampling event although historical groundwater data from monitoring well 600D89MW collected since 1999 had not exhibited any COC groundwater exceedances. Because replacement well 608D161MW is now located in the vicinity of the utility corridors in the area, the Navy believes the utility corridors may have offered a preferential pathway for plume migration. The Navy installed two additional monitoring wells downgradient of 608D161MW to assess the extent of this migration. The monitoring wells were installed prior to the January 2014 sampling event. One of the additional monitoring wells (608D162MW) was located north of 608D161MW, and the second monitoring well (608D163MW) was located downgradient of 608D161MW in the direction of groundwater flow.**

Explain how the response actions are preventing COCs from migrating to air at concentrations above the PCLs for air if the groundwater-to-air PCLs ($^{Air}GW_{Inh-V}$) were exceeded.

**The indoor air sampling conducted in the sealed Building 1406 at the SWMU 21 Plume area indicated that no chlorinated VOCs were detected in the indoor air (Tetra Tech, 2004a). Additionally, the maximum observed concentrations of the detected groundwater COCs in the PCLE zones are less than their respective $^{Air}GW_{Inh-V}$ PCLs. The recent Vapor Intrusion Study at SWMU 21 (Resolution Consultants, 2015) also concluded that sub-slab TCE and cis-1,2-DCE concentrations were well below VISLs for sub-slab vapor as well as RSLs for indoor air. Furthermore, the analytical results indicated that neither TCE nor cis-1,2-DCE were detected in indoor air samples. Therefore, vapor intrusion is not a current concern at NAS Dallas.**

Explain how the response actions are preventing COCs from migrating to surface water at concentrations above the PCLs for groundwater discharges to surface water if surface water was a factor.

**As shown in the RAP (Tetra Tech, 2009a), surface water is not a factor. Additionally, the fate and transport modeling results (Tetra Tech, 2004b) indicate that the PCLE zones will not migrate beyond the Former NAS Dallas property line; therefore, there will be no threat to offsite human or ecological receptors.**

Explain how the response actions are preventing human and ecological receptor exposure to the groundwater PCLE zone.

**The current COC concentrations detected in the groundwater at this site are less than the TCEQ default onsite employee or construction worker exposure criteria (i.e., dermal and inhalation exposures); therefore, these exposure pathways will not be a concern. The only PCL exceeded at this site is through groundwater ingestion ($^{GW}GW_{Ing}$). Ingestion is not a concern since during the implementation of the response actions there is controlled access to the site, which limits potential exposures to contaminated groundwater (i.e. no potable or irrigation wells will be installed) through 2017. Additionally, the fate and transport modeling results (Tetra Tech, 2004b) predict that there will be no expansion of the PCLE zones or offsite migration of COCs at concentrations greater than the respective critical groundwater PCLs. This conclusion has been substantiated through the groundwater analytical results obtained from monitoring wells located downgradient of the SWMU 21 Plume and through the concentration vs. distance graphs included in Attachment 1B.**

## Waste Management

Describe the volume and final disposition or reuse location of waste or environmental media that has been removed from the affected property during the response action, if not previously reported under STEERS. Provide copies of all manifests, other documentation of disposition, and landowner consent for reuse of soil in Appendix 8.

**Excess groundwater recovered through the low-flow or PDB sampling method was placed into properly labeled 55-gallon capacity drums and stored at the site. Upon classification, waste disposal arrangements were made with a licensed waste disposal facility. Appendix 8 contains copies of the waste disposal manifests for groundwater generated during the 2016 sampling activities at Former NAS Dallas.**

# ATTACHMENT 1A
# MAPS AND CROSS SECTIONS

# AFFECTED PROPERTY MAP

Affected Property Map
Former NAS Dallas, Texas

January 2014 Isocontour
Gross PCLE Zone Outline
Demolished Building
Existing Structure
Owned by City of Dallas
Transferred from Exelon Corporation to City of Dallas
Transferred from Navy to City of Dallas
Transferred from Navy to City of Grand Prairie
Transferred from Navy to U.S. Army Reserve
Owned by Exelon Corporation

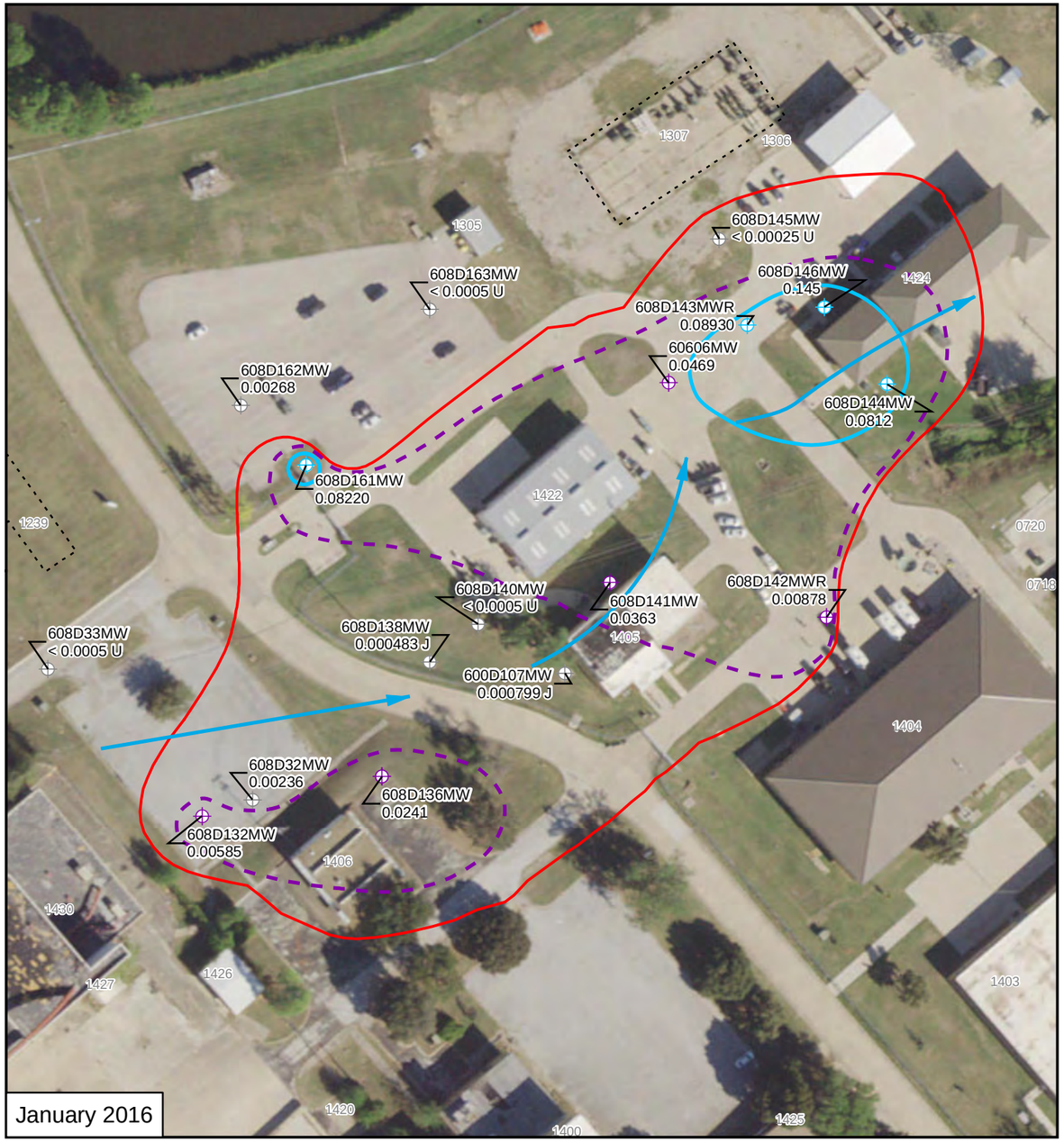
NAVFAC Naval Facilities Engineering Command

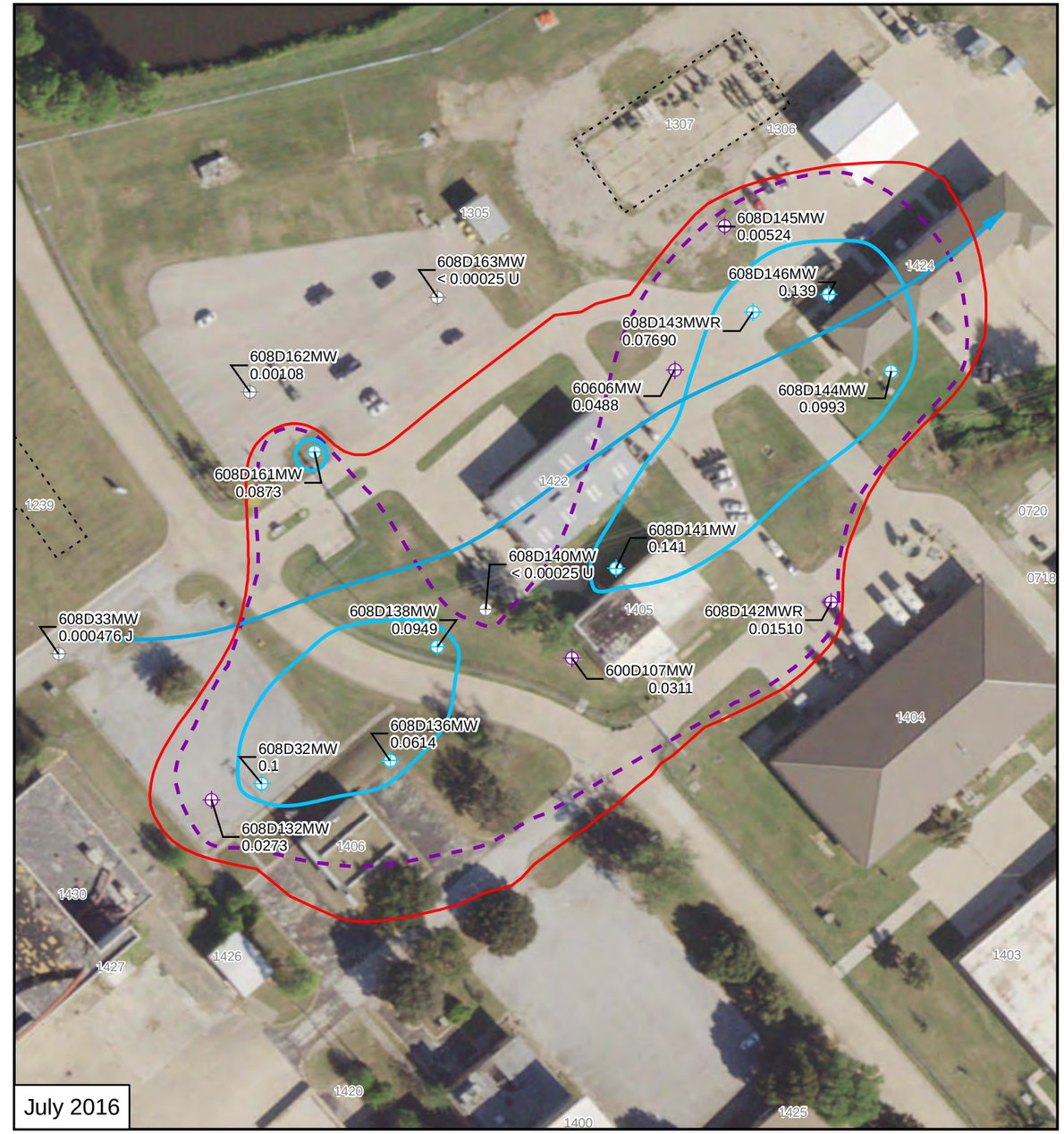
| | |
|---|---|
| REQUESTED BY: T. Wiberg | DATE: 9/21/2015 |
| DRAWN BY: A. Zimmerman | PROJECT NUMBER: 0888812796 |

X:\Navy\NAS_Dallas\NAS_Dallas_Jan14_AffectedPropMap.mxd

Service Layer Credits: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community; State boundary is from the United States Census Bureau; Some data are from TetraTech.

# ISOCONCENTRATION CONTOUR MAPS




N

**TCE Concentration (mg/L)**

- Not Sampled
- ND - 0.005
- > 0.005 - 0.05
- > 0.05 - 0.5

Gross PCLE Zone Outline

Groundwater Flow Direction

**Isoconcentration Contours**

- 0.005 mg/L
- 0.05 mg/ L

Demolished Building

Note: The PCL for TCE = 0.005 mg/L

0 50 100 150 200 Feet

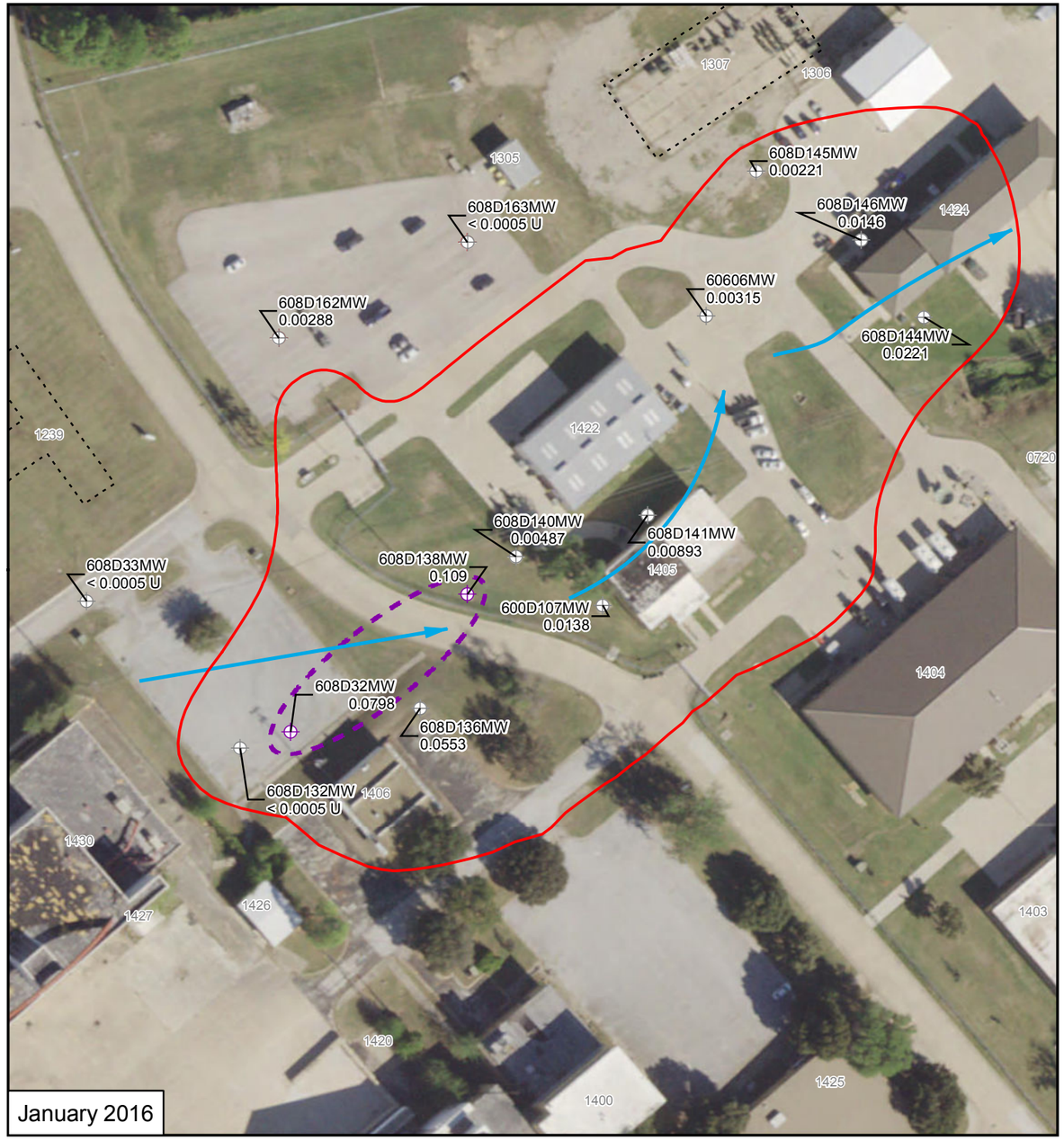
Figure 1A-2A
Trichloroethene Isoconcentration Contours
SWMU 21
2016 RAER
Former NAS Dallas, Texas

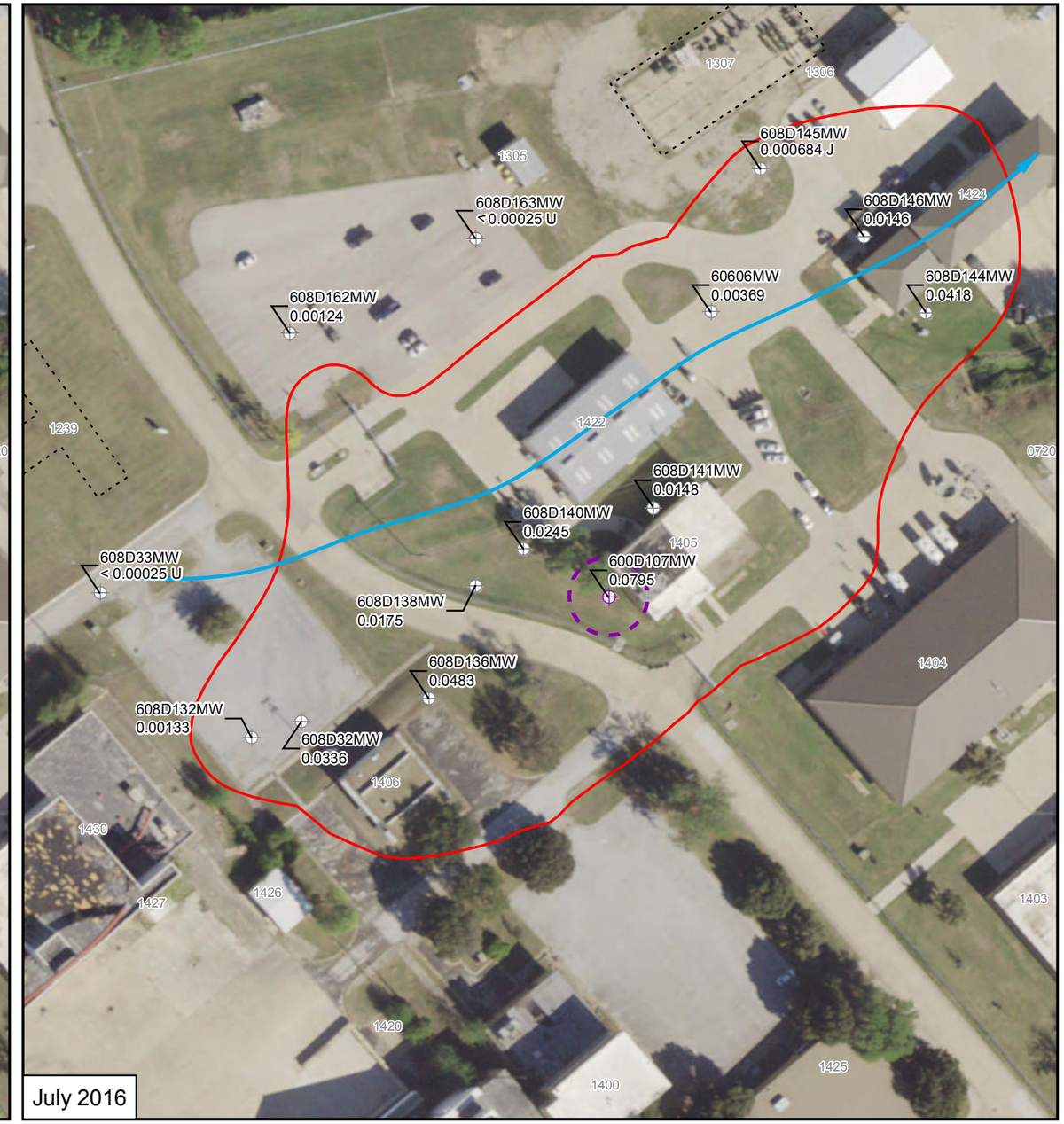
NAVFAC Naval Facilities Engineering Command

| | |
|---|---|
| REQUESTED BY: E. Brickman | DATE: 11/22/2016 |
| DRAWN BY: M. Senne | PROJECT NUMBER: 0888812796 |

X:\Navy\NAS_Dallas\project\2016_RAER\2016_Jul_NAS_Dallas_Iso_TCE_SWMU21.mxd

Service Layer Credits: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community




N

**cis-1,2-DCE Concentration (mg/L)**

- ND - 0.07
- > 0.07 - 0.7

**Isoconcentration Contours**

- 0.07 mg/L

- Gross PCLE Zone Outline
- Groundwater Flow Direction
- Demolished Building

Note: The PCL for cis-1,2-DCE = 0.07 mg/L
U = Non-detect
J = Estimated value

0 50 100 150 200 Feet

Figure 1A-2B
cis-1,2-Dichloroethene Isoconcentration Contours
SWMU 21
2106 RAER
Former NAS Dallas, Texas

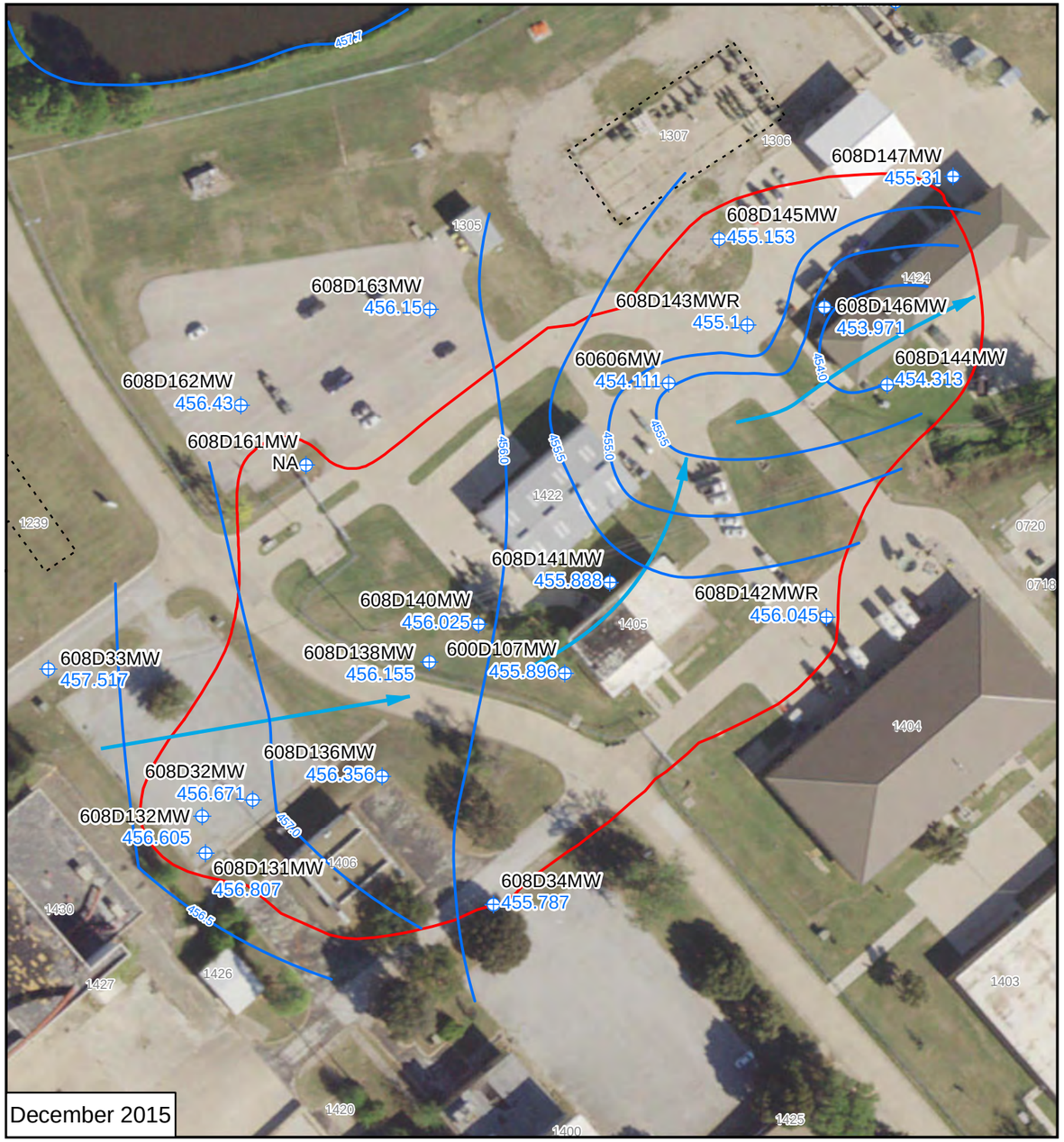
NAVFAC Naval Facilities Engineering Command

| | |
|---|---|
| REQUESTED BY: W. Ward | DATE: 12/9/2016 |
| DRAWN BY: M. Senne | PROJECT NUMBER: 0888812796 |

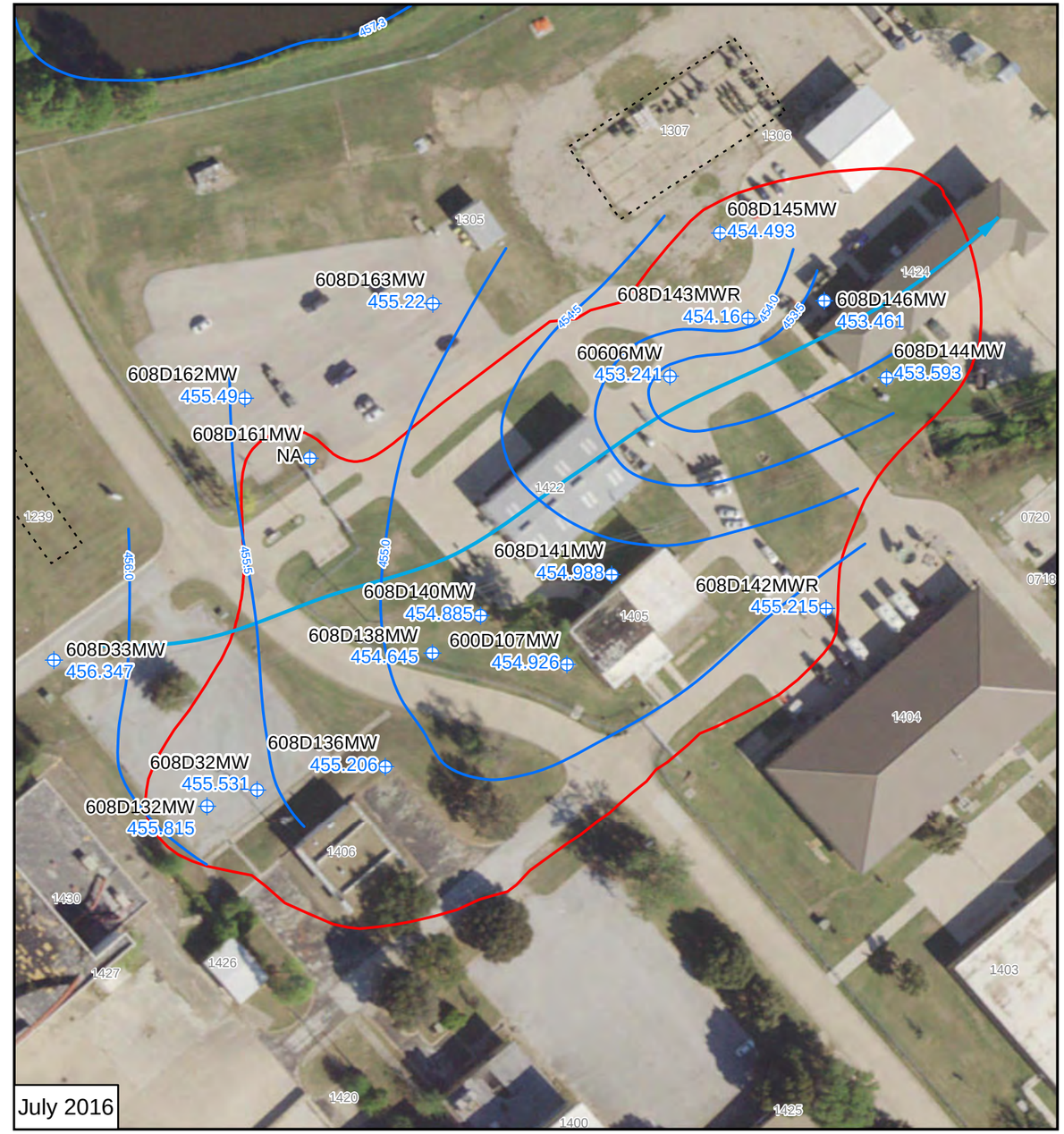
X:\Navy\NAS_Dallas\project\2016_RAER\2016_Jul_NAS_Dallas_Iso_cis12DCE_SWMU21.mxd

Source: Esri, DigitalGlobe, GeoEye, i-cubed, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community

# POTENTIOMETRIC SURFACE MAPS




December 2015




July 2016

N

Well Location
Potentiometric Surface Contour
Groundwater Flow Direction
Gross PCLE Zone Outline
Demolished Building

Notes:
454.926 - Potentiometric Surface Contour (Feet above MSL)
NA = Elevation not measured at location

0 50 100 150 200 Feet

Figure 1A-3
Potentiometric Surface Map
SWMU 21
2016 RAER
Former NAS Dallas, Texas

NAVFAC Naval Facilities Engineering Command

| | |
|---|---|
| REQUESTED BY: E. Brickman | DATE: 11/1/2016 |
| DRAWN BY: M. Senne | PROJECT NUMBER: 0888812796 |

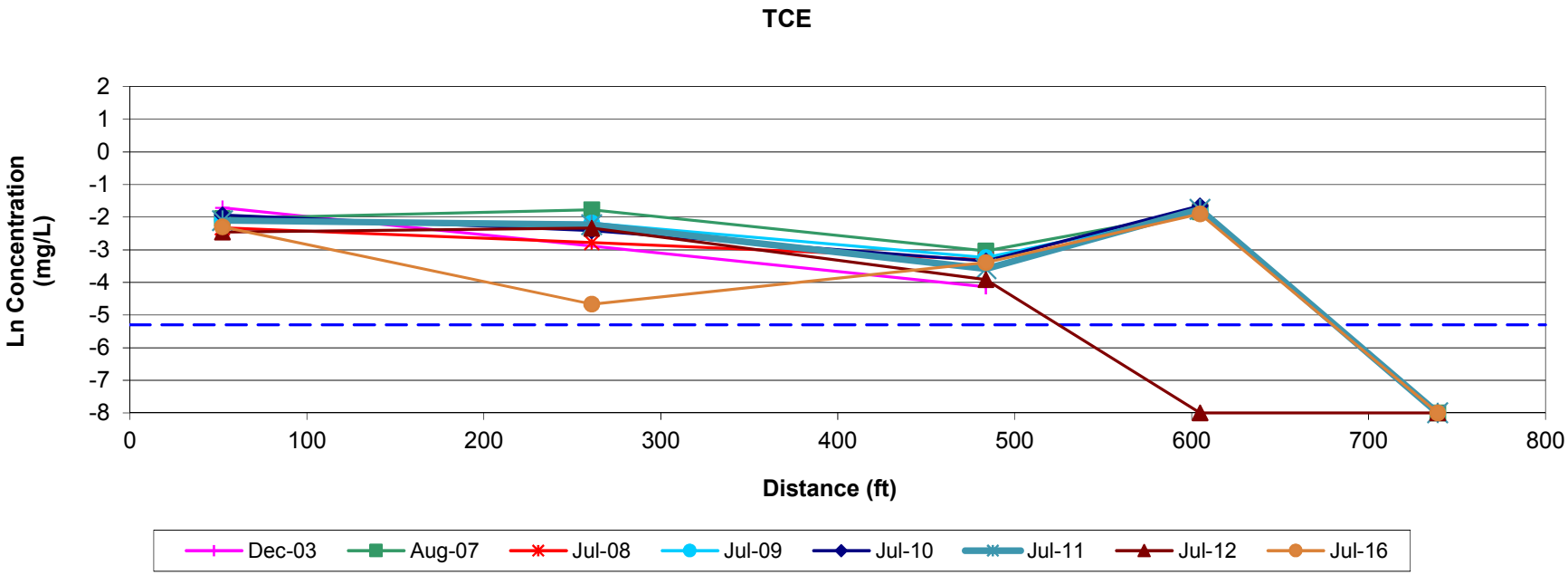
X:\Navy\NAS_Dallas\project\2016_RAER\2016_Jul_NAS_Dallas_Iso_POT_SWMU21.mxd

Service Layer Credits: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

# ATTACHMENT 1B
# GRAPHS

Table 4-5

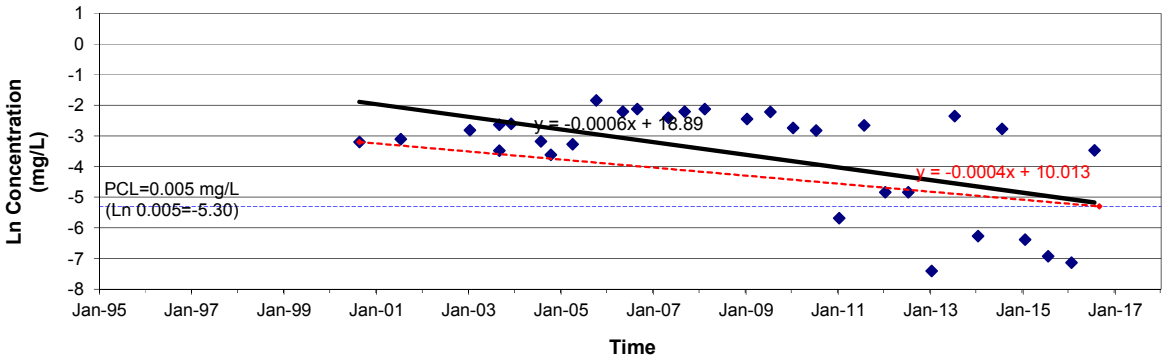
**Summary of Concentration vs. Distance Attenuation Rate Constants**
**SWMU 21 Plume**
**2014 RAER**
**Former NAS Dallas, Texas**
**Page 1 of 1**



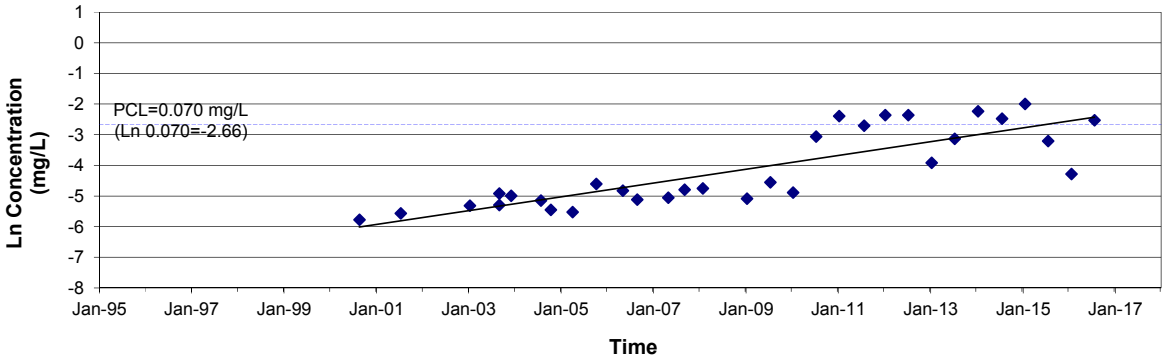
# CONCENTRATION VS. TIME GRAPHS
# WITH MINIMUM REQUIRED ATTENUATION RATES
# SWMU 21 PLUME
# 600D107MW
# 2016 RAER

## FORMER NAS DALLAS, TEXAS

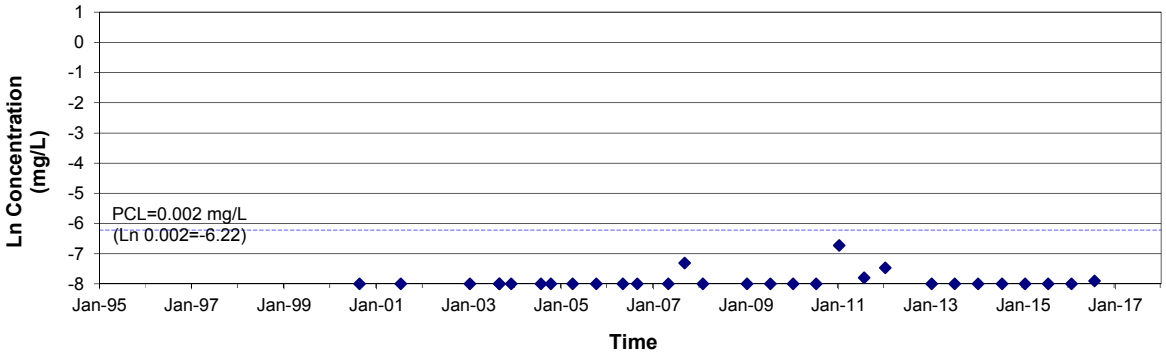
### TCE




### cis-1,2-DCE




### Vinyl Chloride

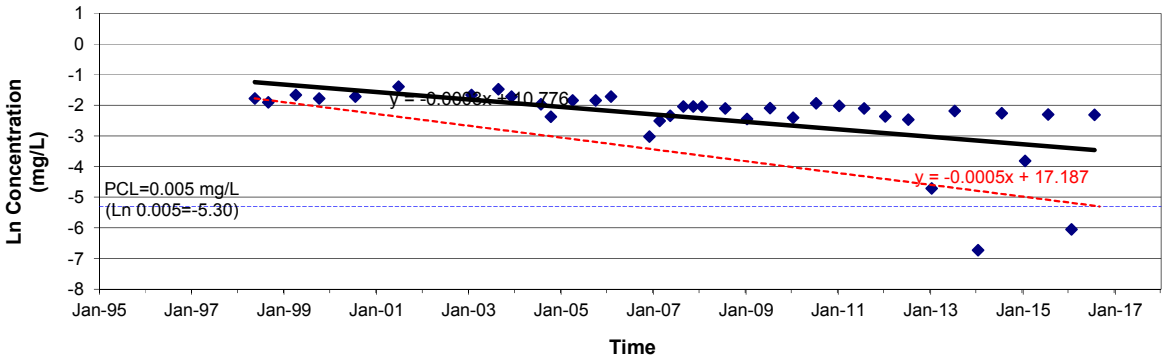



Notes: Red line and slope are based on minimum required attenuation rate ($k_{time}$) to meet PCL by 01 Sep 2016.
Black line and slope are based on linear regression of the raw data.
Sample events using permeable diffusion bag (PDB) samplers are listed on Tables 4-1A and 4-1B in Appendix 4.

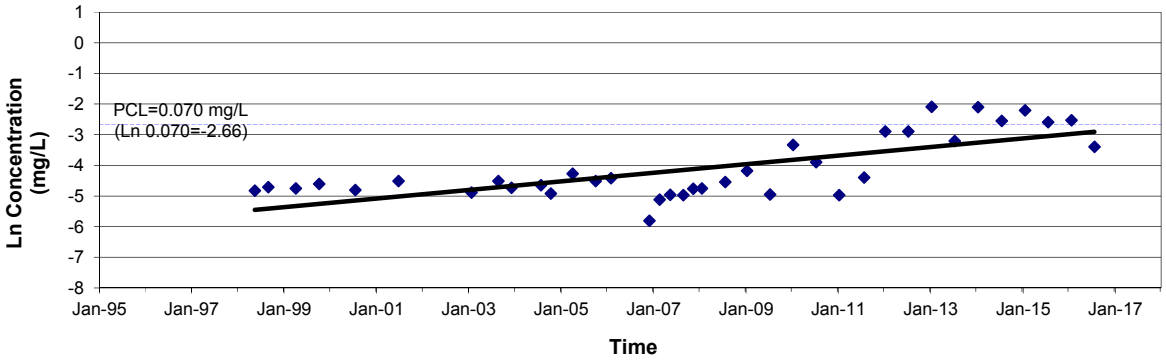
# CONCENTRATION VS. TIME GRAPHS
# WITH MINIMUM REQUIRED ATTENUATION RATES
# SWMU 21 PLUME
# 608D32MW
# 2016 RAER

## FORMER NAS DALLAS, TEXAS

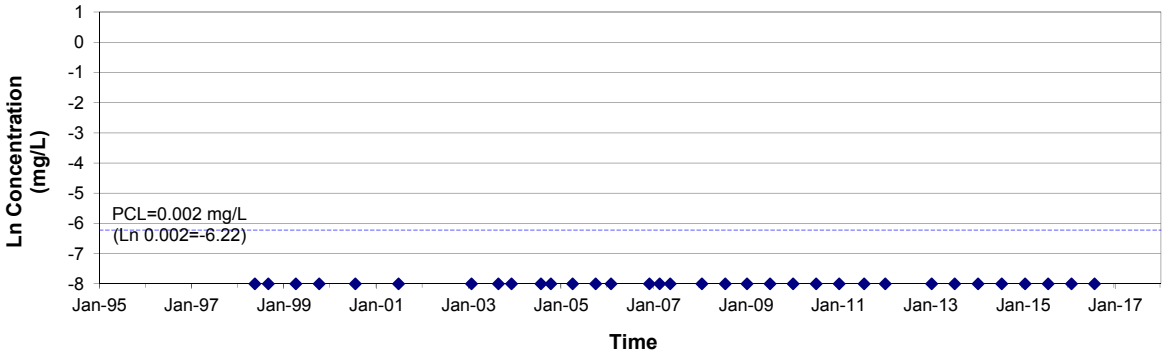
### TCE




### cis-1,2-DCE




### Vinyl Chloride

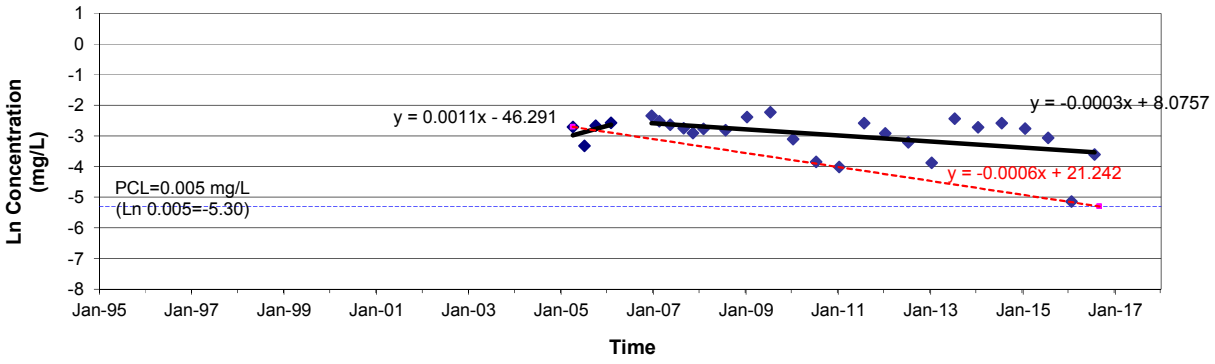



Notes: Red line and slope are based on minimum required attenuation rate ($k_{time}$) to meet PCL by 01 Sep 2016.
Black line and slope are based on linear regression of the raw data.
Sample events using permeable diffusion bag (PDB) samplers are listed on Tables 4-1A and 4-1B in Appendix 4.

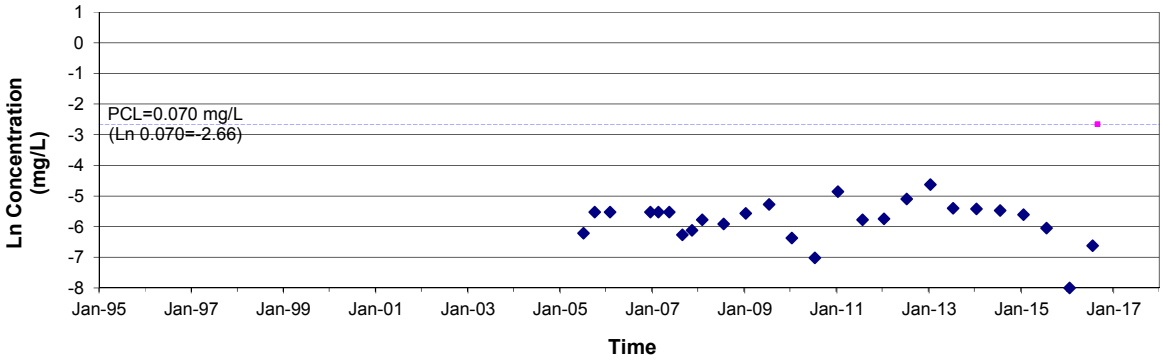
# CONCENTRATION VS. TIME GRAPHS
# WITH MINIMUM REQUIRED ATTENUATION RATES
# SWMU 21 PLUME
# 608D132MW
# 2016 RAER

## FORMER NAS DALLAS, TEXAS

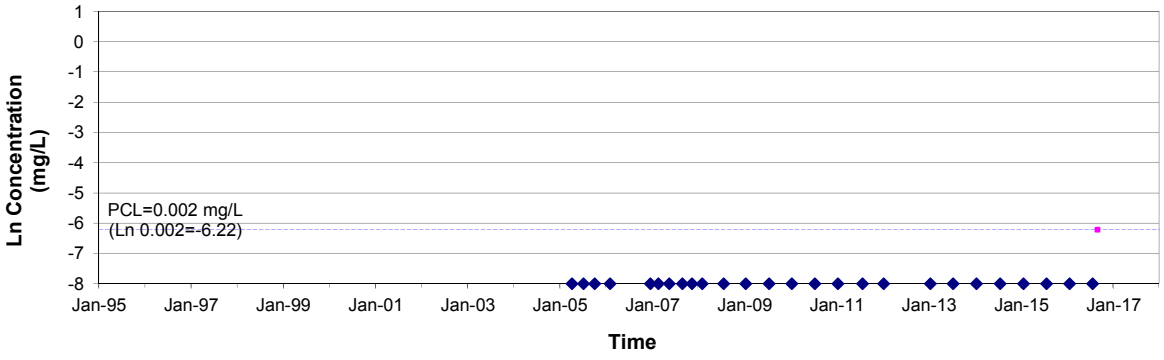
### TCE




### cis-1,2-DCE




### Vinyl Chloride

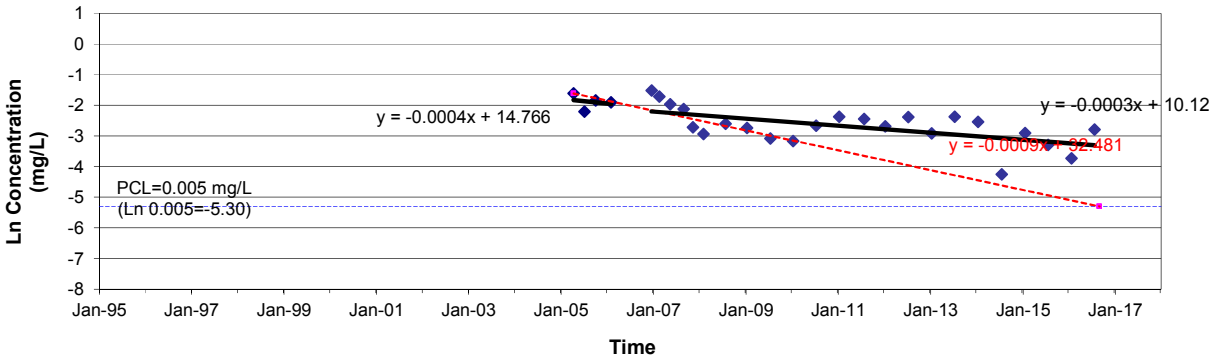



Notes: Red line and slope are based on minimum required attenuation rate ($k_{time}$) to meet PCL by 01 Sep 2016.
Black line and slope are based on linear regression of the raw data.
Sample events using permeable diffusion bag (PDB) samplers are listed on Tables 4-1A and 4-1B in Appendix 4.

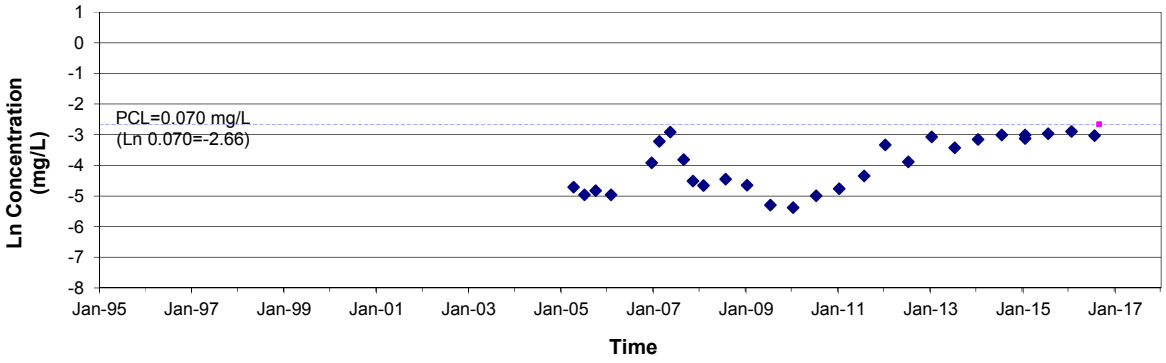
# CONCENTRATION VS. TIME GRAPHS
# WITH MINIMUM REQUIRED ATTENUATION RATES
# SWMU 21 PLUME
# 608D136MW
# 2016 RAER

## FORMER NAS DALLAS, TEXAS

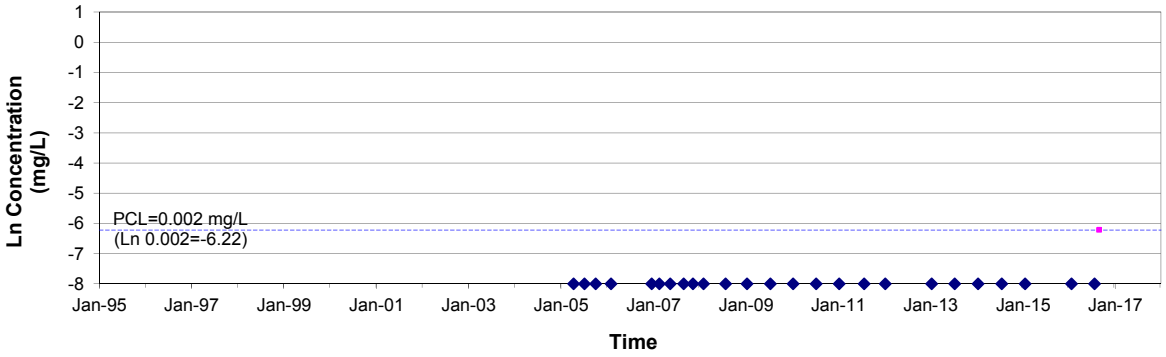
### TCE




### cis-1,2-DCE




### Vinyl Chloride

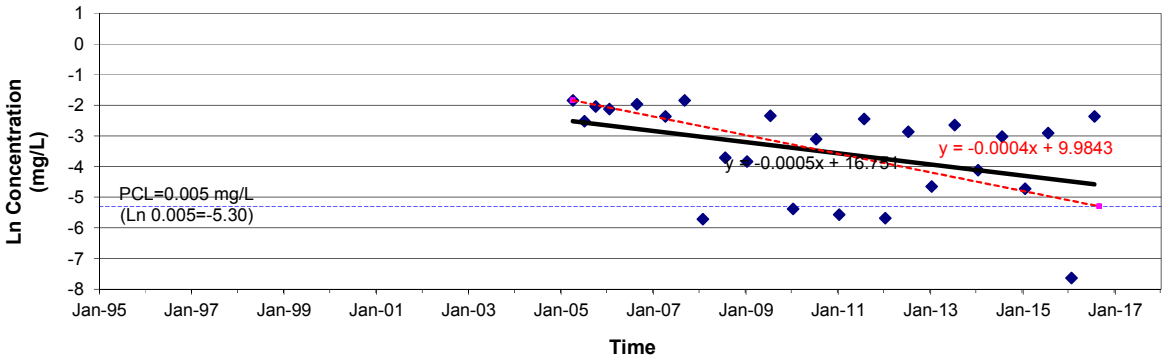



Notes: Red line and slope are based on minimum required attenuation rate ($k_{time}$) to meet PCL by 01 Sep 2016.
Black line and slope are based on linear regression of the raw data.
Sample events using permeable diffusion bag (PDB) samplers are listed on Tables 4-1A and 4-1B in Appendix 4.

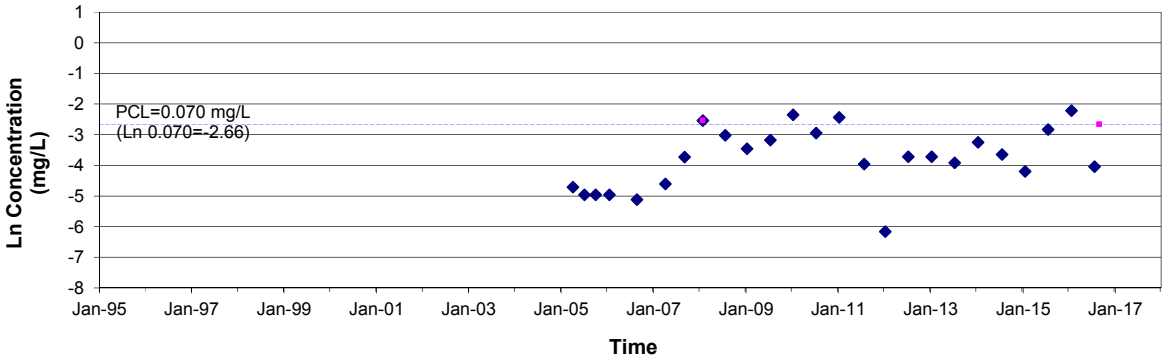
# CONCENTRATION VS. TIME GRAPHS
# WITH MINIMUM REQUIRED ATTENUATION RATES
# SWMU 21 PLUME
# 608D138MW
# 2016 RAER

## FORMER NAS DALLAS, TEXAS

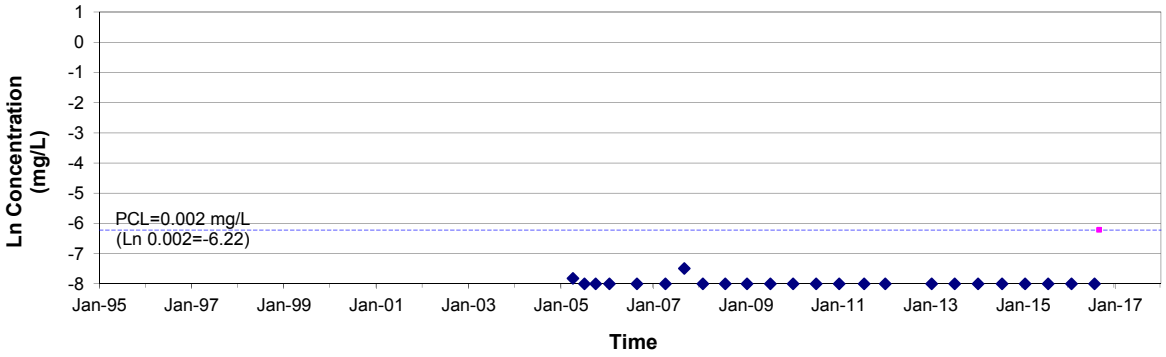
### TCE




### cis-1,2-DCE




### Vinyl Chloride

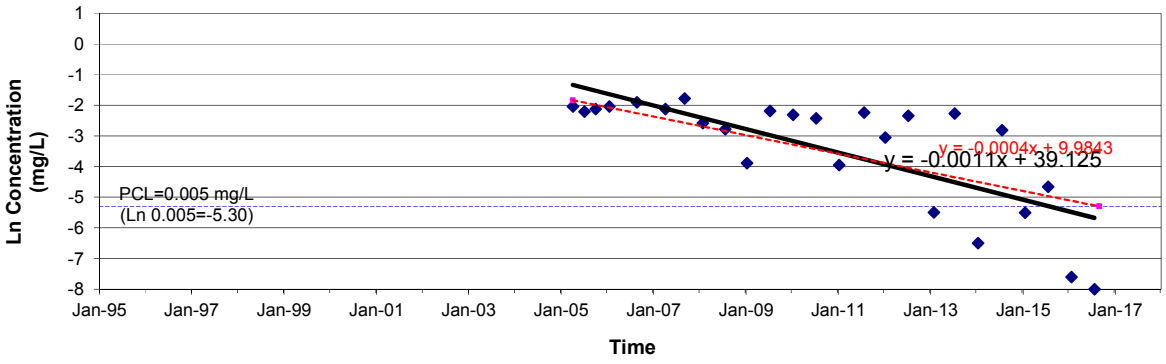



Notes: Red line and slope are based on minimum required attenuation rate ($k_{time}$) to meet PCL by 01 Sep 2016.
Black line and slope are based on linear regression of the raw data.
Sample events using permeable diffusion bag (PDB) samplers are listed on Tables 4-1A and 4-1B in Appendix 4.

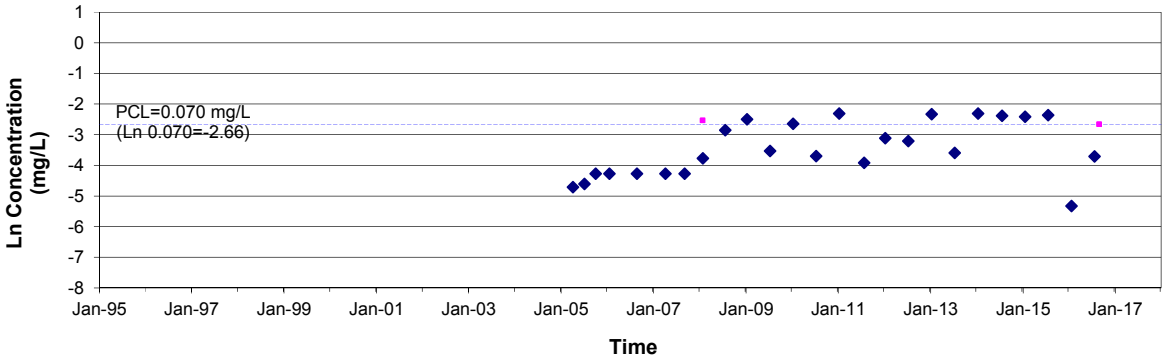
# CONCENTRATION VS. TIME GRAPHS
# WITH MINIMUM REQUIRED ATTENUATION RATES
# SWMU 21 PLUME
# 608D140MW
# 2016 RAER

## FORMER NAS DALLAS, TEXAS

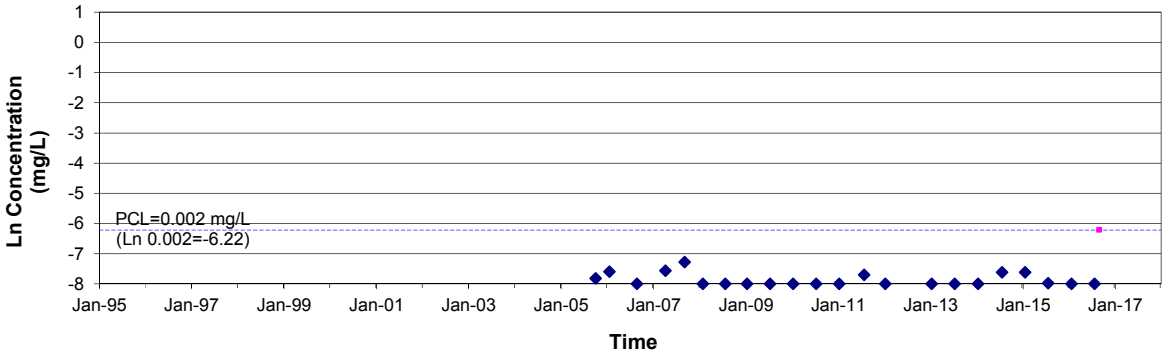
### TCE




### cis-1,2-DCE




### Vinyl Chloride

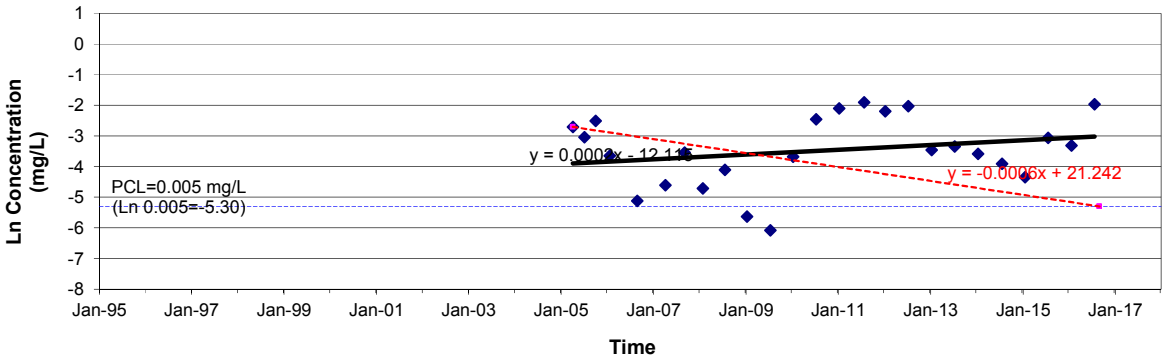



Notes: Red line and slope are based on minimum required attenuation rate ($k_{time}$) to meet PCL by 01 Sep 2016.
Black line and slope are based on linear regression of the raw data.
Sample events using permeable diffusion bag (PDB) samplers are listed on Tables 4-1A and 4-1B in Appendix 4.

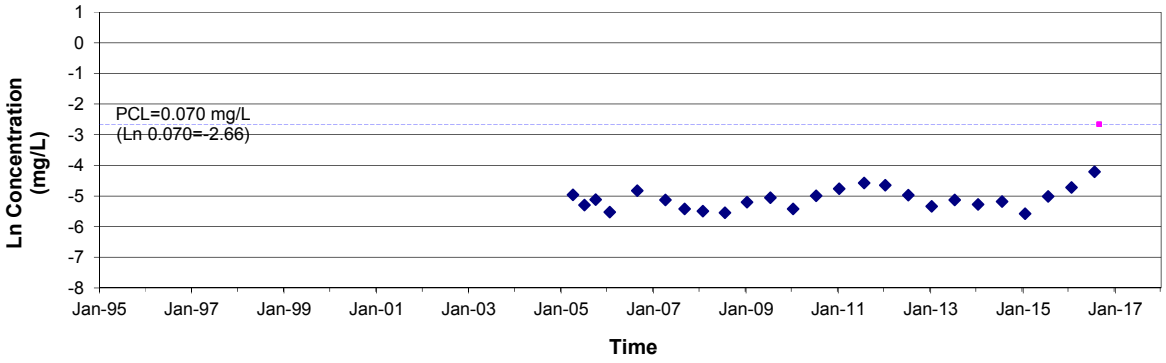
# CONCENTRATION VS. TIME GRAPHS
# WITH MINIMUM REQUIRED ATTENUATION RATES
# SWMU 21 PLUME
# 608D141MW
# 2016 RAER

## FORMER NAS DALLAS, TEXAS

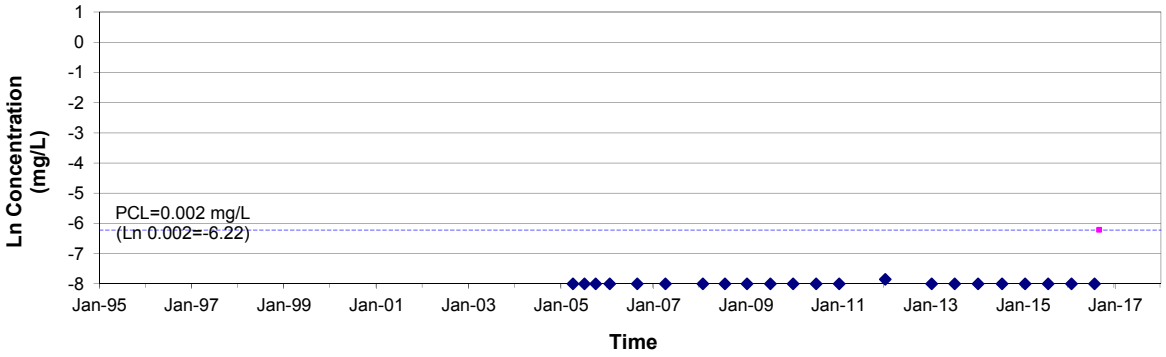
### TCE




### cis-1,2-DCE




### Vinyl Chloride

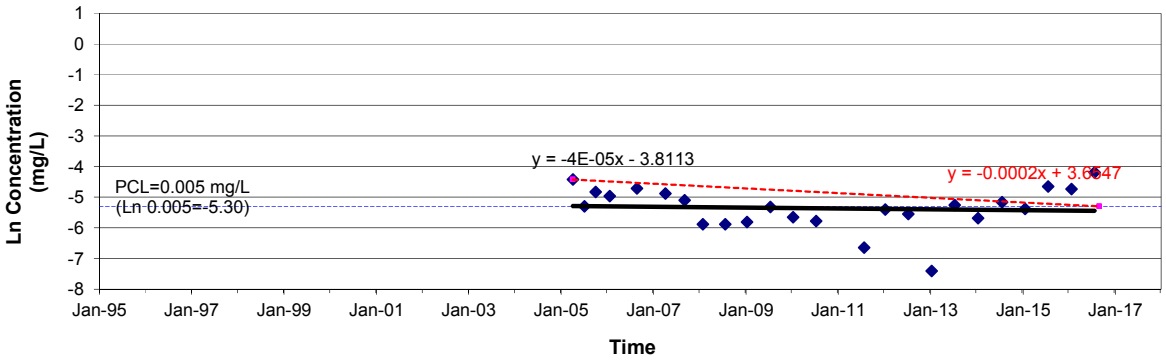



Notes: Red line and slope are based on minimum required attenuation rate ($k_{time}$) to meet PCL by 01 Sep 2016.
Black line and slope are based on linear regression of the raw data.
Sample events using permeable diffusion bag (PDB) samplers are listed on Tables 4-1A and 4-1B in Appendix 4.

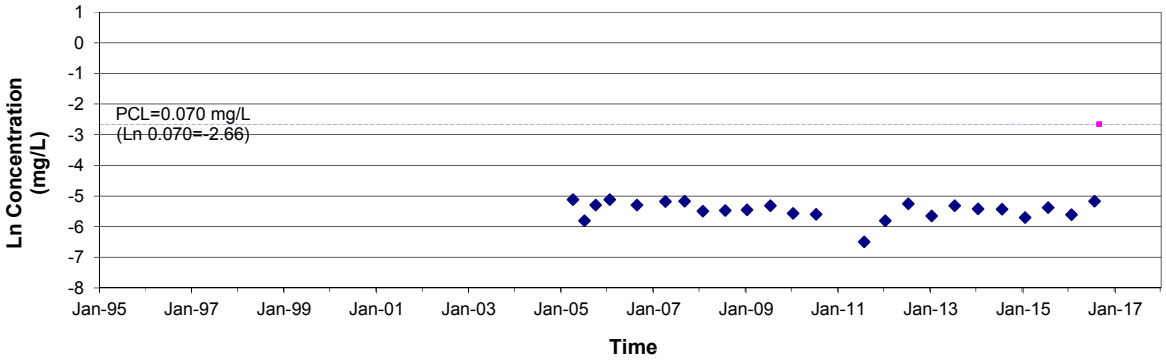
# CONCENTRATION VS. TIME GRAPHS
# WITH MINIMUM REQUIRED ATTENUATION RATES
# SWMU 21 PLUME
# 608D142MW
# 2016 RAER

## FORMER NAS DALLAS, TEXAS

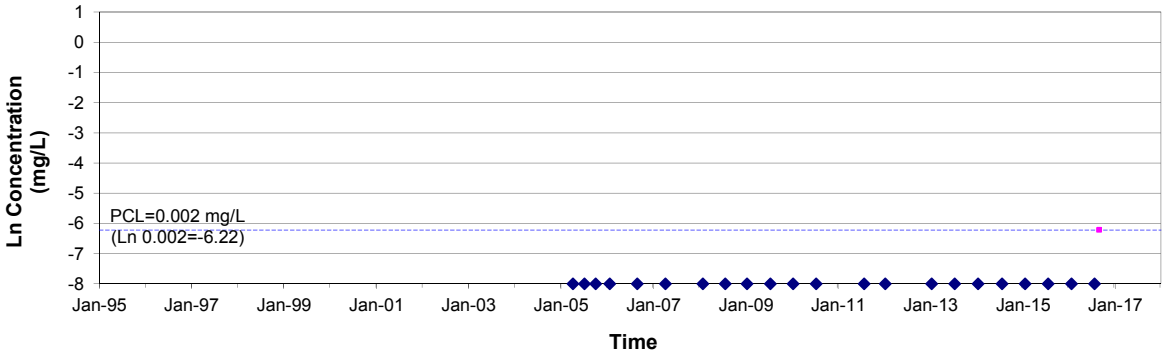
### TCE




### cis-1,2-DCE




### Vinyl Chloride

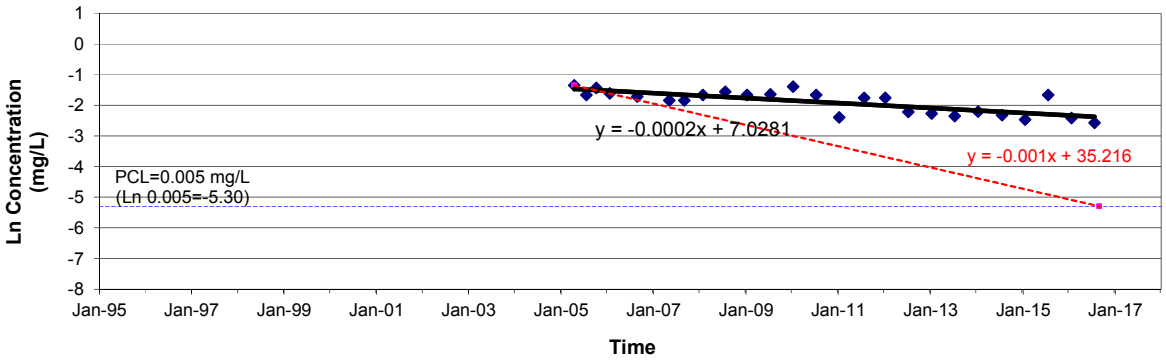



Notes: Red line and slope are based on minimum required attenuation rate ($k_{time}$) to meet PCL by 01 Sep 2016.
Black line and slope are based on linear regression of the raw data.
Sample events using permeable diffusion bag (PDB) samplers are listed on Tables 4-1A and 4-1B in Appendix 4.

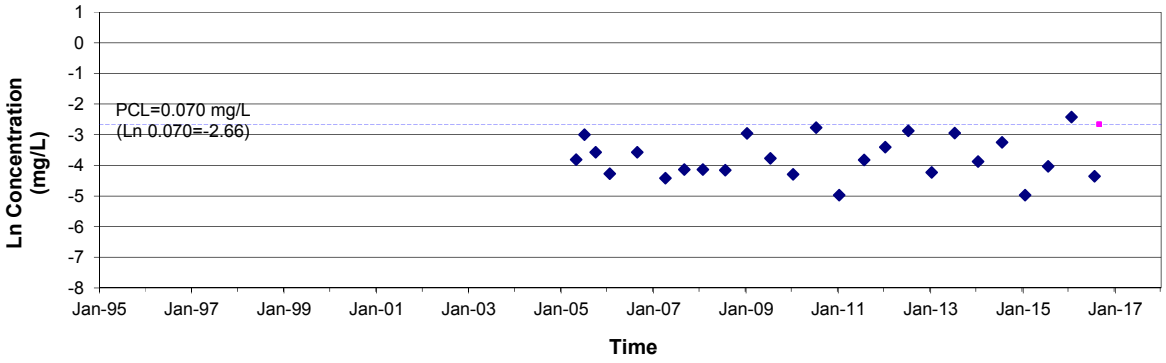
# CONCENTRATION VS. TIME GRAPHS
# WITH MINIMUM REQUIRED ATTENUATION RATES
# SWMU 21 PLUME
# 608D143MW
# 2016 RAER

## FORMER NAS DALLAS, TEXAS

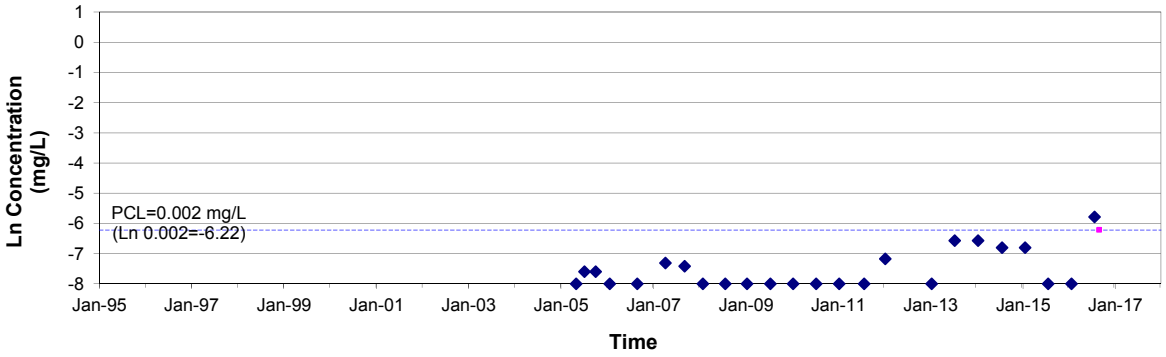
### TCE




### cis-1,2-DCE




### Vinyl Chloride

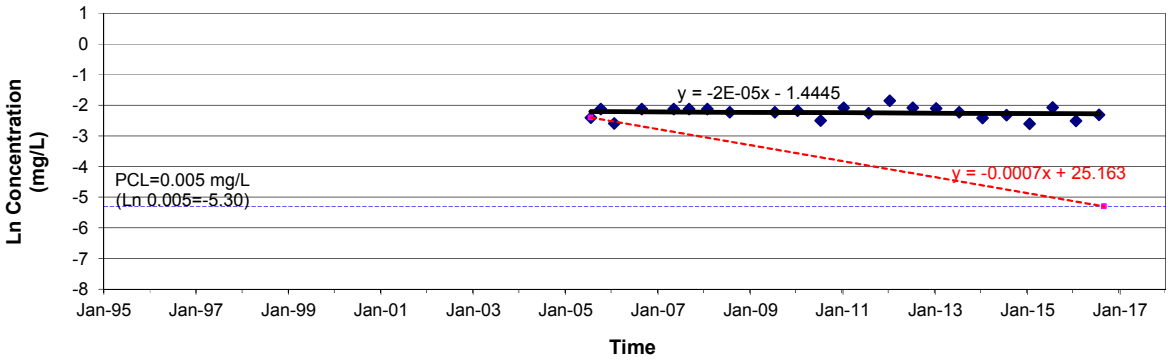



Notes: Red line and slope are based on minimum required attenuation rate ($k_{time}$) to meet PCL by 01 Sep 2016.
Black line and slope are based on linear regression of the raw data.
Sample events using permeable diffusion bag (PDB) samplers are listed on Tables 4-1A and 4-1B in Appendix 4.

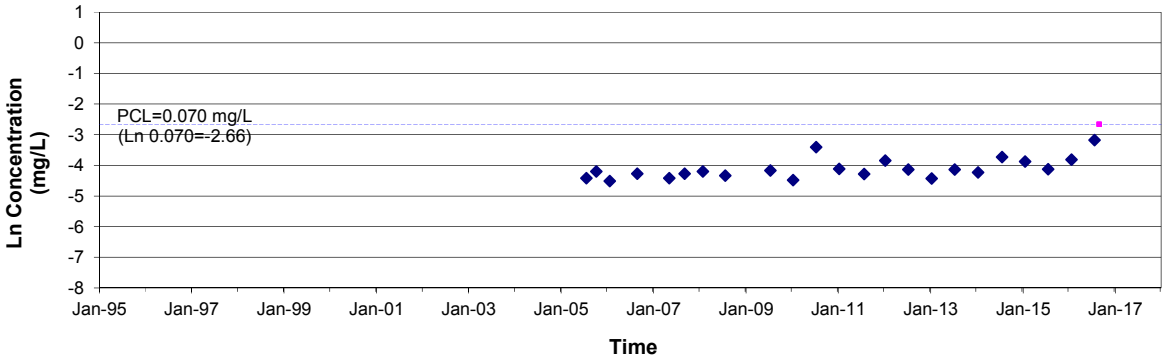
# CONCENTRATION VS. TIME GRAPHS
# WITH MINIMUM REQUIRED ATTENUATION RATES
# SWMU 21 PLUME
# 608D144MW
# 2016 RAER

## FORMER NAS DALLAS, TEXAS

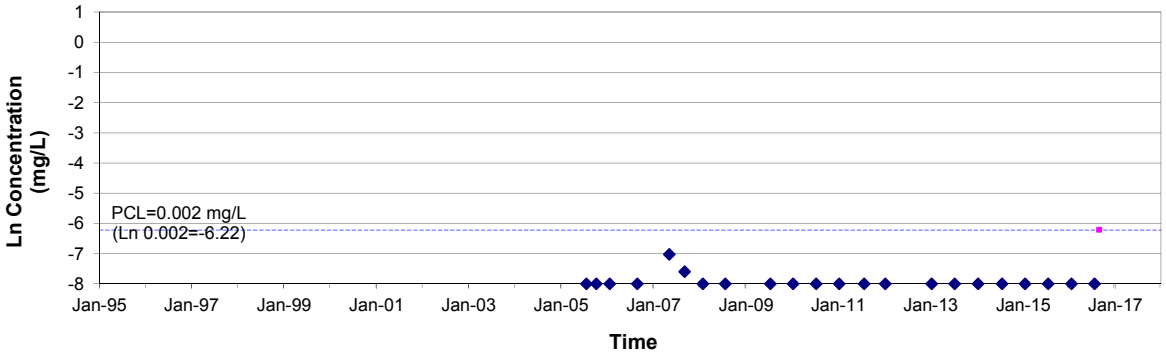
### TCE




### cis-1,2-DCE




### Vinyl Chloride

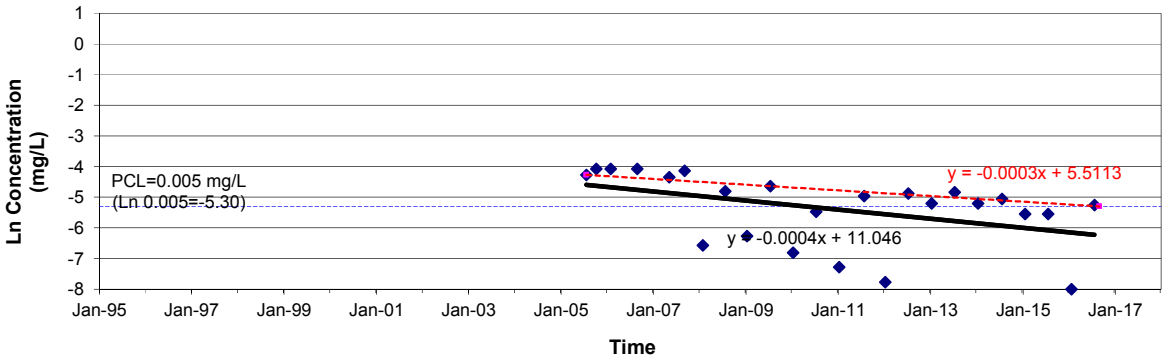



Notes: Red line and slope are based on minimum required attenuation rate ($k_{time}$) to meet PCL by 01 Sep 2016.
Black line and slope are based on linear regression of the raw data.
Sample events using permeable diffusion bag (PDB) samplers are listed on Tables 4-1A and 4-1B in Appendix 4.

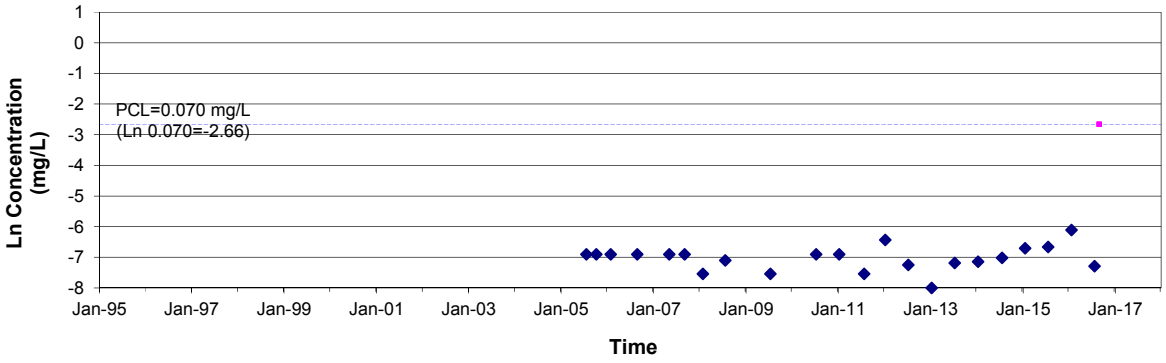
# CONCENTRATION VS. TIME GRAPHS
# WITH MINIMUM REQUIRED ATTENUATION RATES
# SWMU 21 PLUME
# 608D145MW
# 2016 RAER

## FORMER NAS DALLAS, TEXAS

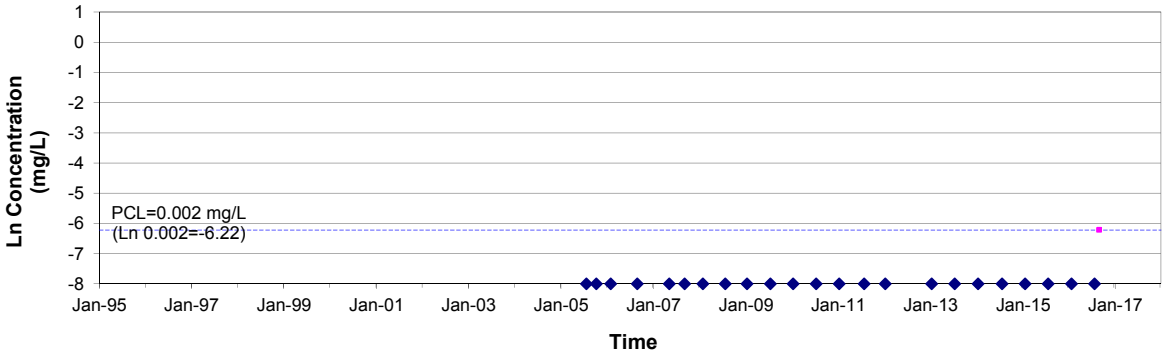
### TCE




### cis-1,2-DCE




### Vinyl Chloride

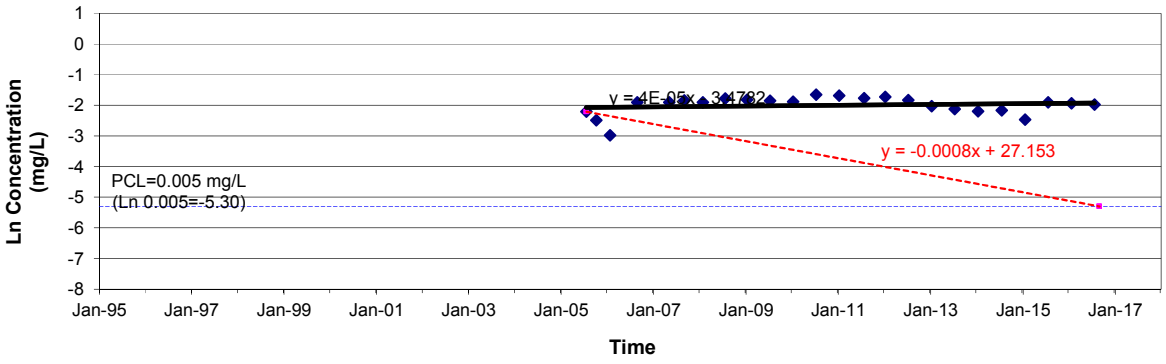



Notes: Red line and slope are based on minimum required attenuation rate ($k_{time}$) to meet PCL by 01 Sep 2016.
Black line and slope are based on linear regression of the raw data.
Sample events using permeable diffusion bag (PDB) samplers are listed on Tables 4-1A and 4-1B in Appendix 4.

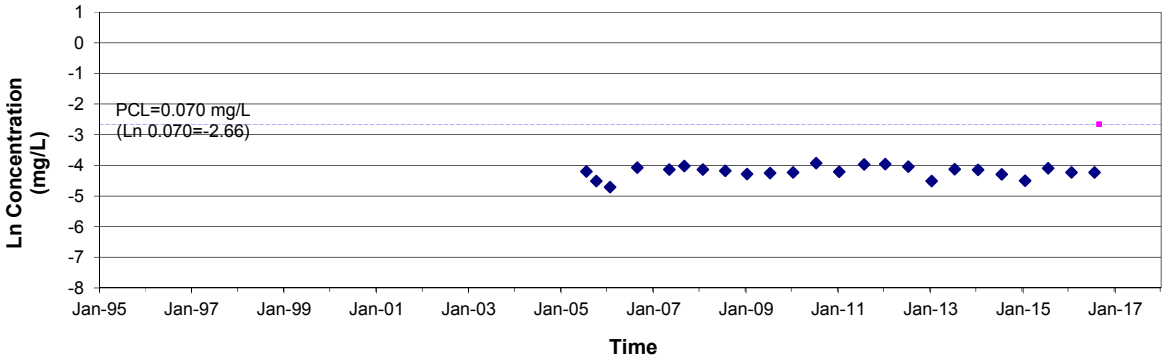
# CONCENTRATION VS. TIME GRAPHS
# WITH MINIMUM REQUIRED ATTENUATION RATES
# SWMU 21 PLUME
# 608D146MW
# 2016 RAER

## FORMER NAS DALLAS, TEXAS

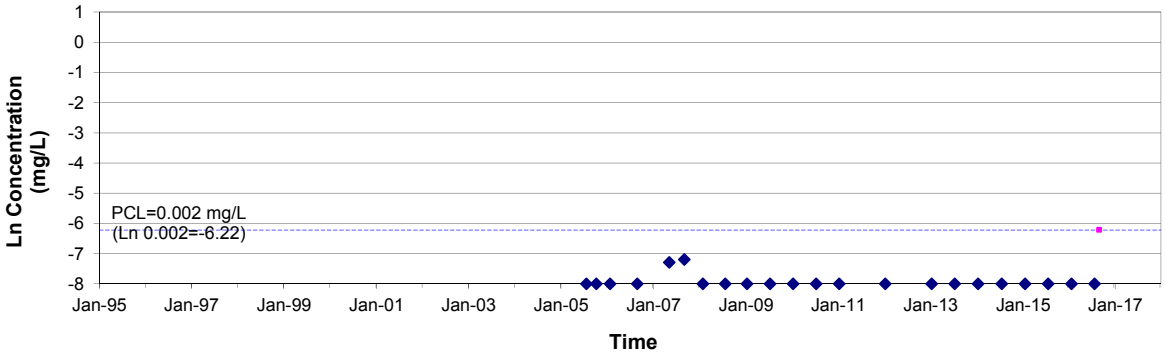
### TCE




### cis-1,2-DCE




### Vinyl Chloride

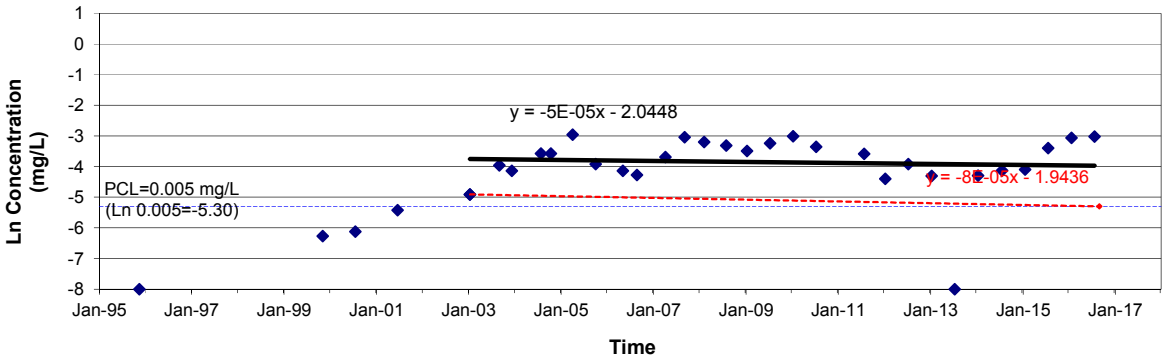



Notes: Red line and slope are based on minimum required attenuation rate ($k_{time}$) to meet PCL by 01 Sep 2016.
Black line and slope are based on linear regression of the raw data.
Sample events using permeable diffusion bag (PDB) samplers are listed on Tables 4-1A and 4-1B in Appendix 4.

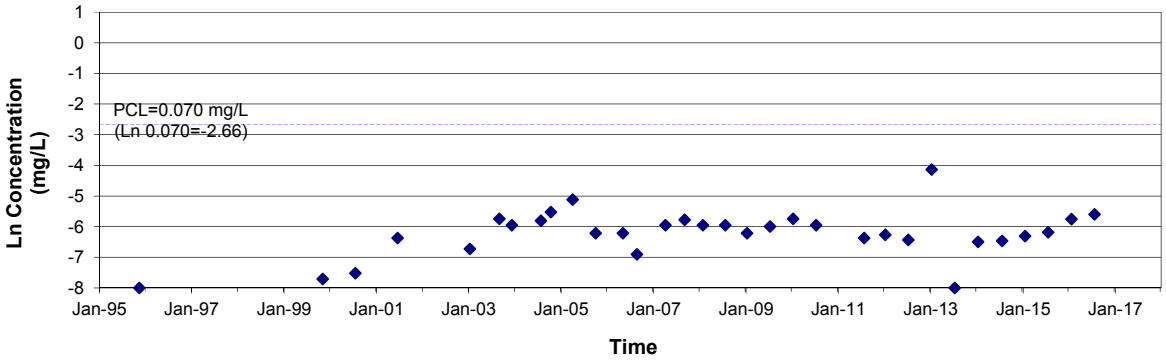
# CONCENTRATION VS. TIME GRAPHS
# WITH MINIMUM REQUIRED ATTENUATION RATES
# SWMU 21 PLUME
# 60606MW
# 2016 RAER

## FORMER NAS DALLAS, TEXAS

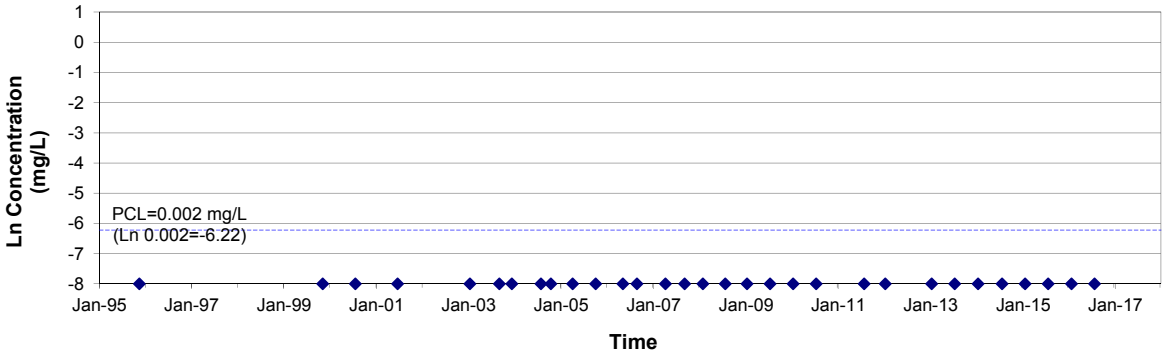
### TCE




### cis-1,2-DCE




### Vinyl Chloride




Notes: Red line and slope are based on minimum required attenuation rate ($k_{time}$) to meet PCL by 01 Sep 2016.
Black line and slope are based on linear regression of the raw data.
Sample events using permeable diffusion bag (PDB) samplers are listed on Tables 4-1A and 4-1B in Appendix 4.

## Performance Measures

List and describe the performance measures for each environmental medium containing a PCLE zone that are being used to determine if reasonable progress is being made by the response action in a timely manner. Provide documentation that these performance measures are being met. Attach additional information if necessary.

**Enhanced Passive Dechlorination Performance Measures**

**The approach to determining if enhanced passive dechlorination was making reasonable progress in achieving the interim clean-up goals involved performing process and performance monitoring during the initial pilot study and expanded implementation. The process and performance monitoring results provided the information necessary to optimize system operation and performance and the results necessary to determine if the remedial objective would be reached.**

**The process and performance monitoring conducted during the pilot study included monitoring the primary COC (TCE) and its daughter products (cis-1,2-DCE, VC, ethene, and ethane) in addition to the geochemical indicator parameters [oxidation/reduction potential (ORP), dissolved oxygen (DO), pH, methane, ferrous iron, total organic carbon (TOC), etc.] and other process monitoring parameters [hydrogen and Volatile Fatty Acids (VFAs)]. These were measured in monitoring wells within the pilot test area between and downgradient of the injection points to provide basic information on the efficacy of substrate delivery and the prevailing reduction-oxidation (redox) potential conditions created in the treatment zone [see 2004 RAP, Table 2A-2 (Tetra Tech, 2004c)]. Significant changes in these parameters when compared to baseline conditions or monitoring wells outside the pilot test area indicated the success of the ZVI in influencing the subsurface.**

**The process and performance monitoring throughout the pilot test occurred on a more frequent basis than the semi-annual COC sampling identified for the remainder of the monitoring wells associated with the SWMU 21 Plume. COC analytical data collected from these monitoring wells was used to determine TCE attenuation rates and the rate of daughter product generation and attenuation. This data provided the primary evidence that reductive dechlorination was occurring and the rate at which it was occurring. The secondary evidence was determined from geochemical parameters collected from a selected number of monitoring wells. These data provided the information necessary to determine if the in-situ conditions were favorable for EMNA through reductive dechlorination by the injection of ZVI.**

**Reasonable progress of the response action was evaluated considering the following criteria:**

- **TCE is being degraded and the attenuation rate is sufficient to reach the interim cleanup goal (i.e., 85 percent mass and concentration reduction) by the year 2017.**
- **TCE daughter products are being sequentially generated and attenuated.**
- **Geochemical data indicate that reducing conditions have been achieved in the treatment zone.**

**Pilot Test Data Assessment**

**The pilot test was initiated in July 2006 with the mobilization of the field crews and subcontractors to the site. Due to equipment failures associated with the unusually hot weather, the pilot test operations were delayed until October through November 2006. The pneumatic fracturing subcontractor injected approximately 5,000 pounds of ZVI into injection points IP-1 and IP-2. The Work Plan recommended three injection points; however, the tight soil formation would not allow the completion of the third injection point, and the pilot test was evaluated based on the iron injected into the first two locations. The performance monitoring at this pilot test site continued through November 2007.**

**The ZVI pilot study report concluded that ZVI injection via pneumatic fracturing was not recommended for site-wide remediation of VOCs, but it may be applicable as a source area treatment (Tetra Tech, 2008). ZVI injection via pneumatic fracturing was found to be limited in its treatment capacity due to the lithology (i.e., stiff silty clay) present at the site. The report also noted that the reduced concentrations achieved in the pilot test area could rebound as back-diffusion of adsorbed-phase contaminants takes place, thus reducing the effectiveness of the technology in reaching and maintaining COC concentrations less than critical PCLs.**

**At the TCEQ's request, an additional round of groundwater sampling was conducted in May 2009 to evaluate long-term effects of the ZVI injection at SWMU 21. A final revised pilot study report (Tetra Tech, 2009b) supporting the initial findings (Tetra Tech, 2008) was issued to the TCEQ in July 2009. The TCEQ concurred with the findings of the final pilot test report in a letter dated July 31, 2009 which stated "TCEQ has reviewed the analytical results and agrees with the Navy response that for several wells the chemical concentrations have returned to, or near, pre-treatment test conditions with very little to no change in the daughter products of TCE.**

**In a letter dated August 22, 2011, the TCEQ provided a comprehensive technical review to evaluate aspects of the design and performance of the ZVI injection pilot study for SWMU 21. A summary of TCEQ concerns include the following:**
**"H.3 A summary of the results state that "...ZVI injection via pneumatic fracturing is limited in its treatment capacity..."(Sec 7.0, Subject Report). The TCEQ concurs with this assessment for the following reasons:**

- **Pneumatic fracturing of the subsurface is only effective for stiff, impermeable geomaterial;**
- **When pneumatic fracturing was attempted on suitable geomaterial, the radii of fracturing were small and the size of the fracture apertures was small compared to the ZVI grain size and the fracturing occurred in isolated non-transmissive zones to which the rate of groundwater transport is negligible;**
- **The effectiveness of ZVI is dependent upon the ability of groundwater to transport TCE to ZVI sorption sites;**
- **Most of the ZVI was injected into small fracture zones in stiff, impermeable sediments that were isolated from transmissive groundwater zones to which groundwater transport of TCE to the ZVI sorption sites is ineffective; and**
- **In lieu of effective groundwater transport of TCE to ZVI sorption sites, the effectiveness of the response action should not be expected to be successful.**

**<u>MNA Performance Measures</u>**

**After the completion of the enhanced passive dechlorination remedial response action at the SWMU 21 Plume, MNA was expected to address the remaining areas of PCLE exceedances. The approach to determine if MNA is consistently achieving the clean-up goals by 2017 involves sequential sampling events to determine how the size and shape of the PCLE zones are changing over time. To this effect, a tiered sampling program incorporating performance, detection, and ambient monitoring was implemented. This sampling program allows collection of analytical data on the COCs, groundwater flow, and geochemical parameters that may affect the progress of MNA and the likelihood of meeting site remediation goals. The design of the monitoring program allows a conclusion of success or failure to be drawn as early as possible during the response action while providing reasonable confidence in the conclusion.**

**Performance monitoring encompasses the sampling of the point of exposure (POE) wells (600D107MW, 60606MW, 608D32MW, 608D132MW, 608D136MW, 608D138MW, 608D140MW, 608D141MW, 608D142MW, 608D143MW, 608D144MW, 608D145MW, and 608D146MW) within the plume, the background monitoring well (608D33MW) outside the PCLE zone, and the corrective action observation (CAO) well (608D161MW). In June 2011, as a result of a monitoring well inspection at SWMU 21 on monitoring wells within the 20-acre area leased to the Air National Guard, the Navy abandoned monitoring wells 600D89MW, 608D142MW, and 608D143MW, and installed replacement monitoring wells 608D161MW, 606D142RMW and 608D143RMW, respectively. Data collected from these monitoring wells serve to check the plume shape and determine if it is shrinking or expanding, stable or migrating, thus triggering programmatic adjustments if necessary. In January 2014, to further verify the plume boundary for SWMU 21, the Navy installed monitoring wells 608D162MW and 608D163MW. COC analytical data collected from the monitoring wells located along the plume centerline is used to determine plume attenuation rates for individual chemical constituents ($k_{time}$) and for the plume as a whole ($k_{dist}$). Data collected from the background monitoring wells serves to determine if ambient conditions are changing that may affect the effectiveness of MNA in achieving the clean-up goal in a timely manner. COC analytical results are summarized in Table 4-1.**

**POE well 608D131MW and the CAO wells 608D147MW and 608D34MW had either no history of COC detections, or the COC detections have been below applicable GWPSs for at least the previous five consecutive years. These monitor wells were abandoned on April 4 and 5, 2016, in accordance with the RAP submitted to TCEQ in October 2015. Well plugging reports are located in Appendix 4 and historical COC analytical results for P&A'd wells are included in Table 4-1B.**

**Performance monitoring for 2016 also entailed sampling for MNA parameters (pH, ORP, dissolved oxygen, ferrous iron, alkalinity, hydrogen sulfide, carbon dioxide, nitrate, nitrite, orthophosphate, sulfate, sulfide, total organic carbon, chloride, ethene, ethane, and methane) during the July 2016 sampling event. MNA parameters are sampled on a biennial sampling schedule. The MNA parameters measured by field tests and laboratory analyses are presented in Table 4-2. MNA parameter data, as needed, serve as a secondary line of evidence to evaluate whether subsurface conditions continue to support natural attenuation.**

**The conceptual MNA site model for this plume is represented in the data tables in Appendix 4, the isoconcentration maps and potentiometric surface maps included in Attachment 1A, and the concentration vs. time and concentration vs. distance graphs in Attachment 1B.**

**After each semi-annual groundwater monitoring event, the COC concentration data collected were evaluated for both the entire plume as well as on a monitoring well by monitoring well basis in accordance with the RAP (Tetra Tech, 2004c). The initial data analysis and interpretation focused on the detection of changes or trends in the data. Further evaluation focused on the assessment of the changes or trends and their impact on MNA to achieve site-related goals.**

**It was expected that upon completion of the pilot test the analytical data would indicate that the attenuation rates were sufficient to effectively remediate the plume on or before the year 2016. Reasonable progress of the response action was evaluated considering the following criteria:**

- **The monitoring well and COC specific $K_{time}$ attenuation rate based on the available historical sampling events is not more than the minimum attenuation rate necessary to meet clean-up goals by the year 2016.**
- **The monitoring well and COC specific concentration is less than the remedial benchmark concentration (calculated concentration goal based on the initial maximum concentration and the minimum rate necessary to achieve the remedial goals by 2016) for that sample date.**
- **The COC specific $k_{dist}$ attenuation rate based on the available historical sampling events indicates attenuation equal to or greater than the rate of COC migration from the suspected source area.**

**<u>Data Assessment</u>**

**Table 4-3 summarizes the groundwater gauging data. The potentiometric surface maps for the December 2015 and July 2016 gauging events, included in Figure 1A-3 (Attachment 1A), indicate that the shape of the groundwater elevation contours and direction of groundwater flow remain consistent with previous sampling events.**

**The COC isoconcentration maps, prepared using the analytical data collected during the January and July 2016 sampling events, are included in Figures 1A-2A and 1A-2B (Attachment 1A). A review of the 2016 data indicate:**

- **TCE and cis-1,2-DCE are the only COCs at SWMU 21 currently exceeding PCLs.**
- **TCE exceeded its PCL in 14 of the 17 monitor wells.**
- **TCE exceeded its critical PCL during the January and July sampling events in monitoring wells 60606MW (0.0469 and 0.0488 mg/L), 608D132MW (0.00585 and 0.0273 mg/L), 608D136MW (0.0241 and 0.0614 mg/L), 608D141MW (0.0363 and 0.141 mg/L), 608D142MWR (0.00878 and 0.0151 mg/L), 608D143MWR (0.0893 and 0.0769 mg/L), 608D144MW (0.0812 and 0.0993 mg/L), 608D146MW (0.145 and 0.139 mg/L), and 608D161MW (0.0822 and 0.0873 mg/L), and during the July sampling event only in monitoring wells 600D107MW (0.0311 mg/L), 608D32MW (0.1 mg/L), 608D138MW (0.0949 mg/L), and 608D145MW (0.00524 mg/L).**

- **Cis-1,2-DCE exceeded its PCL in 4 of the 17 monitor wells (61303MW).**

- **Cis-1,2-DCE exceeded its critical PCL during the January sampling event only in monitoring wells 608D32MW (0.0798 mg/L), 608D138MW (0.109 mg/L), and 608D143MWR (0.0885 mg/L), and during the July sampling event only in monitoring well 600D107MW (0.0795 mg/L).**

**Tables 4-4 and 4-5 (Appendix 4) summarize the concentration vs. time and concentration vs. distance attenuation rate constants for the plume centerline and the minimum required attenuation rate to meet the remediation goals. The graphs in Attachment 1B graphically depict the same attenuation rate constants summarized in Tables 4-4 and 4-5. Based on the data presented:**

- **TCE concentrations show flat to slightly increasing trends in the majority of monitoring wells within the PCLE zone.**

- **The presence of TCE daughter product cis-1,2-DCE at monitoring wells 600D107MW, 608D138MW, 608D143MWR, and 608D32MW indicates reductive dechlorination is occurring within the central area of the plume. However, the lack of a decrease in TCE concentrations along with the general lack of daughter product generation indicates that MNA alone will not reduce TCE throughout the plume to less than its critical PCL by year 2017.**

**As discussed in the sections above, and based on primary lines of evidence, MNA alone does not appear to be an appropriate remedial method to reduce TCE to its critical PCL in a reasonable time frame (i.e., on or before 2017). In addition, the ZVI injection pilot test conducted at SWMU 21 was found to be limited in its treatment capacity due to the lithology (i.e., stiff silty clay) present at the site. Based on primary lines of evidence, neither MNA alone nor enhanced abiotic degradation coupled with MNA appears to be an appropriate remedy to reduce the COCs to less than their critical PCLs on or before the year 2017 at the SWMU 21 groundwater plume. Therefore, in accordance with the Groundwater RAP (Tetra Tech, 2004c), and as recommended by TCEQ in a letter dated May 26, 2015, failure of the response action triggers the implementation of contingency measures, which may include the selection of an appropriate alternate remedial measure. The Navy has proposed to implement EMNA as a final pilot test of an alternate remedy at the affected area of SWMU 18 groundwater plume in an effort to reduce COCs to below PCLs. This will allow the Navy to make a determination as to whether the technology is viable. Depending upon the results of the EMNA spot treatment at SWMU 18, alternative remedial measures may be proposed in a comprehensive RAP for SWMU 21 Plume. MNA will be continued for the upcoming year in accordance with the procedures and protocols described in the 2004 Groundwater RAP (Tetra Tech, 2004c).**

## Problems

Complete the table for the response action. When the response action consists of several components or multiple actions, complete one table for each major component or action.

Response Action Name/Designation: *Groundwater Response Action*

List the problems that have been encountered during the response action, describe the impact of each problem, and the response to the problem.

| Description of the Problem | Impact | Did this cause a response action failure? | | Corrective Response |
|---|---|---|---|---|
| | | Yes | No | |

| | | | | |
|---|---|---|---|---|
| **Enhanced passive dechlorination followed by MNA was chosen as a decontamination remedy for SWMU 21. ZVI injection via pneumatic fracturing failed to result as an effective site wide remedy. No other alternate remedial actions were completed.** | **Concentrations of some COCs in groundwater are not expected to achieve 2017 cleanup goals.** | | **X** | **The Navy submitted a revised RAP (January 2009) proposing to change the remediation approach from Remedy Standard A to Remedy Standard B with the establishment of a PMZ until the concentrations of COCs within the PCLE zone were less than their critical PCLs. The RAP was not approved by TCEQ.** |
| **Monitoring Wells 608D142MW, 608D143MW, and 600D89MW damaged during construction activities.** | **None** | | **X** | **Monitoring Wells 608D142MW and 608D143MW plugged and abandoned, and replaced with monitoring wells 608D142RMW and 608D143RMW. Monitoring Well 600D89MW plugged and abandoned, and replaced with monitoring well 608D161MW.** |
| **COC concentrations were detected at the replacement POE (608D161MW) in excess of the critical PCLs during the January and July 2011 and 2012 sampling events.** | **COC concentrations have migrated beyond the boundary of the historical PCLE zone.** | | **X** | **The Navy installed two additional monitoring wells (608D162MW and 608D163MW) downgradient of 608D161MW before the January 2014 sampling event to assess the extent of plume migration.** |
| **The current remedy, enhanced passive dechlorination followed by MNA, does not appear to be capable of reducing concentrations of COCs by the cleanup goal of 2017.** | **In accordance with the approved RAP (TtNUS 2006), failure of the approved response action to meet critical PCLs triggers the implementation of contingency measures, which includes the selection of an appropriate alternate remedial measure.** | **X** | | **The Navy has proposed to implement EMNA as an alternate remedy at the affected area of SWMU 18 groundwater plume in an effort to reduce COCs to below PCLs. Depending on the results of the EMNA spot treatment at SWMU 18, alternative remedial measures may be proposed in a comprehensive RAP for SWMU 21 Plume. MNA will be continued at the SWMU 21 Plume for the upcoming year in accordance with the procedures and protocols described in the Groundwater RAP, dated November 2004.** |

Use this worksheet to describe the operation and maintenance (O&M) activities conducted for each response action.

Response Action Name/Designation: Well maintenance

List all portions of the response action to which this information applies. Repeat this worksheet for each major component or operation.

Describe the O&M and inspection activities that have been conducted to operate and maintain response action components.

**POE well 608D131MW and the CAO wells 608D147MW and 608D34MW had either no history of COC detections, or the COC detections have been below applicable GWPSs for at least the previous five consecutive years. These wells were abandoned on April 4 and 5, 2016, in accordance with the RAP submitted to TCEQ in October 2015. Well plugging reports are located in Appendix 4, and historical COC analytical results for P&A'd wells are included in Table 4-1B.**

**In September 2016, Resolution Consultants conducted a detailed evaluation of well maintenance needs for NAS Dallas SWMUs. The surface completions at monitoring wells 600D107MW, 60606MW, 608D132MW, 608D136MW, 608D138MW, 608D140MW, 608D141MW, 608D142MWR, 608D143MWR, 608D144MW, 608D145MW, 608D146MW, 608D161MW, 608D162MW, 608D163MW, 608D32MW, and 608D33MW were re-fitted by tapping the rim eyelets, and replacing bolts and washers in order to secure the lids.**

# APPENDIX 1
# REFERENCE LIST

# APPENDIX 1
## REFERENCES

A.T. Kearney, Inc. *RCRA Facility Assessment Preliminary Review/Visual Site Inspection. Chicago, Illinois.* 1989.

CH2M Hill, *85 Sites, Defense Reutilization and Marketing Office, and Naval Weapons Industrial Reserve Plant SWMU 18 Response Action Completion Report, Revision 3, Naval Air Station Dallas, Dallas, Texas.* Atlanta, Georgia. May, 2008. 2008.

EnSafe/Allen & Hoshall. *Naval Air Station Dallas Environmental Baseline Survey, Dallas, Texas*. Memphis, Tennessee. 1994.

Tetra Tech NUS, Inc. *RCRA Facility Investigation Report for Category C*. Pittsburgh, Pennsylvania. 2000a.

— *RCRA Facility Investigation Report for Category E. Pittsburgh, Pennsylvania.* 2000b.

— *RCRA Facility Investigation Report for Category F. Pittsburgh, Pennsylvania.* 2000c.

— *RCRA Facility Investigation Report for Category D. Pittsburgh, Pennsylvania.* 2001a.

— *RCRA Facility Investigation Report for Category B. Pittsburgh, Pennsylvania.* 2001b.

— *Affected Property Assessment Report. Houston, Texas.* 2002.

— *Indoor and Outdoor Air Sampling at Building 1406. Tetra Tech NUS, Houston, Texas.* 2004a.

— *Final MNA Groundwater Modeling Report for Category D. Pittsburgh, Pennsylvania.* 2004b.

— *Response Action Plan. Pittsburgh, Pennsylvania.* 2004c.

— *SWMU 21 Final Pilot Study Technical Memorandum. Pittsburgh, Pennsylvania.* 2008.

— *SWMU 21 Response Action Plan. Pittsburgh, Pennsylvania.* 2009a.

— *SWMU 21 Pilot Study Technical Memorandum Revision 1. Pittsburgh, Pennsylvania.* 2009b.

Resolution Consultants. *Draft Final Alternatives Evaluation Report, Former Naval Air Station, Dallas, Texas*. Norfolk, Virginia. August 2013.

— *Draft Vapor Intrusion Study Report, Buildings 1405, 1422, and 1424, Solid Waste Management Unit 21*. Norfolk, Virginia. September 2015.

— *Interim Revised Groundwater Response Action Plan for SWMU 21 Plume (Revision 1).* Norfolk, Virginia. October 2015.

# APPENDIX 4
# DATA TABLES

**Table 4-1 Summary of Chemicals of Concern Detected in Groundwater**
**Table 4-2 Summary of Geochemical Parameters Measured in Groundwater**
**Table 4-3 Summary of Groundwater Gauging Data**
**Table 4-4 Summary of Concentration vs. Time with Attenuation Action Levels**
**Table 4-5 Summary of Concentration vs. Distance Attenuation Rate Constants**

# TABLE 4-1
# SUMMARY OF CHEMICALS OF CONCERN DETECTED IN GROUNDWATER

**Table 4-1A**

**Summary of Chemicals of Concern Detected in Groundwater**
**Long Term Monitoring Wells — SWMU 21 Plume**
**2016 RAER**

**Former NAS Dallas, Texas**


| Monitoring Well | Sampling Date | Sampling Round | Chemicals of Concern (mg/L) | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | 1,1-Dichloroethene | Carbon Tetrachloride | Chloroform | Chloromethane | cis-1,2-Dichloroethene | Methylene Chloride | Tetrachloroethene | trans-1,2-Dichloroethene | Trichloroethene | Vinyl Chloride |
| **Protective Concentration Levels (mg/L)** | | | **0.00700** | **0.00500** | **0.24000** | **0.07000** | **0.07000** | **0.00500** | **0.00500** | **0.10000** | **0.00500** | **0.00200** |
| **Corrective Action Observation Monitoring Wells** | | | | | | | | | | | | |
| **600D107MW** | 8/8/2000 | | Well Installed | | | | | | | | | |
| | 8/20/2000 | Round 6 | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00310 J | 0.00500 U | 0.00500 U | 0.00500 U | 0.04100 | 0.00500 U |
| | 7/15/2001 | Round 7 | 0.00500 U | 0.00500 U | 0.00500 U | 0.01000 U | 0.00380 | 0.00500 U | 0.00500 U | 0.00250 U | 0.04500 | 0.01000 U |
| | 1/11/2003 | Round 8 | 0.00200 U | 0.00200 U | 0.00200 U | 0.00200 U | 0.00490 | 0.00400 U | 0.00200 U | 0.00200 U | 0.06000 | 0.00200 U |
| | 9/2/2003 | Round 9 | 0.00067 J | 0.00036 U | 0.00042 U | 0.00052 U | 0.00730 | 0.00056 U | 0.00024 U | 0.00048 U | 0.07200 | 0.00052 U |
| | 9/2/2003 | Round 9 (PDB) | 0.00022 U | 0.00018 U | 0.00021 U | 0.00026 U | 0.00500 | 0.00028 U | 0.00012 U | 0.00035 J | 0.03100 | 0.00026 U |
| | 12/5/2003 | Round 10 | 0.00056 U | 0.00039 U | 0.00049 U | 0.00049 U | 0.00680 | 0.00053 U | 0.00038 U | 0.00048 J | 0.07400 | 0.00098 U |
| | 7/28/2004 | Round 11 (PDB) | 0.00035 U | 0.00025 U | 0.00010 U | 0.00017 U | 0.00580 J | 0.00040 U | 0.00021 U | 0.00023 U | 0.04200 J | 0.00017 U |
| | 10/13/2004 | Round 12 (PDB) | 0.00035 U | 0.00025 U | 0.00010 U | 0.00017 U | 0.00430 | 0.00040 U | 0.00021 U | 0.00023 U | 0.02700 | 0.00017 U |
| | 4/3/2005 | Round 13 (PDB) | 0.00040 U | 0.00030 U | 0.00040 U | 0.00030 U | 0.00400 | 0.00200 U | 0.00040 U | 0.00040 J | 0.03800 | 0.00030 U |
| | 10/8/2005 | Round 14 | 0.00100 J | 0.00030 U | 0.00040 U | 0.00030 U | 0.01000 J | 0.00200 U | 0.00040 U | 0.00090 J | 0.16000 J | 0.00030 U |
| | 5/5/2006 | Round 15 | 0.00090 J | 0.00050 U | 0.00040 U | 0.00060 U | 0.00800 | 0.00200 U | 0.00060 U | 0.00070 J | 0.11000 | 0.00060 U |
| | 8/29/2006 | Round 16 | 0.00090 J | 0.00050 U | 0.00040 U | 0.00060 U | 0.00600 | 0.00200 U | 0.00060 U | 0.00060 U | 0.12000 | 0.00060 U |
| | 4/30/2007 | Round 17 | 0.00011 U | 0.00011 U | 0.00013 U | 0.00028 U | 0.00640 | 0.00023 U | 0.00036 J | 0.00039 J | 0.09100 | 0.00020 U |
| | 9/6/2007 | Round 18 | 0.00086 J | 0.00011 U | 0.00013 U | 0.00028 U | 0.00830 | 0.00023 U | 0.00042 J | 0.00074 J | 0.11000 | 0.00067 J |
| | 1/29/2008 | Round 19 | 0.00110 | 0.00044 U | 0.00036 U | 0.00060 U | 0.00860 | 0.00040 U | 0.00046 U | 0.00077 J | 0.12000 | 0.00043 U |
| | 1/29/2008 | Round 19 (PDB) | 0.00087 J | 0.00044 U | 0.00036 U | 0.00060 U | 0.00900 | 0.00040 U | 0.00046 U | 0.00066 J | 0.07000 | 0.00043 U |
| | 7/22/2008 | Round 20 | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS |
| | 1/12/2009 | Round 21 (PDB) | 0.00054 U | 0.00022 U | 0.00028 U | 0.00061 U | 0.00620 | 0.00100 U | 0.00028 J | 0.00047 J | 0.08680 | 0.0003 U |
| | 7/15/2009 | Round 22 | 0.00097 J | 0.00022 U | 0.00028 U | 0.00061 U | 0.01050 | 0.00100 U | 0.00050 J | 0.00071 J | 0.10900 | 0.00030 U |
| | 1/12/2010 | Round 23 (PDB) | 0.00058 J | 0.00034 U | 0.00025 U | 0.00050 U | 0.00750 | 0.00200 U | 0.00044 U | 0.00056 J | 0.06470 | 0.00028 U |
| | 7/14/2010 | Round 24 (PDB) | 0.00065 J | 0.00034 U | 0.00025 U | 0.00050 U | 0.04700 | 0.00200 U | 0.00044 U | 0.00066 J | 0.05950 | 0.00028 U |
| | 1/12/2011 | Round 25 (PDB) | 0.00100 | 0.00025 U | 0.00022 U | 0.00050 U | 0.09170 | 0.00200 U | 0.00025 U | 0.00140 | 0.00340 | 0.00120 |
| | 7/27/2011 | Round 26 | 0.00086 J | 0.00025 U | 0.00022 U | 0.00050 U | 0.06690 | 0.00200 U | 0.00025 U | 0.00110 | 0.07060 | 0.00041 J |
| | 1/11/2012 | Round 27 (PDB) | 0.00082 J | 0.00025 U | 0.00022 U | 0.00050 U | 0.100 | 0.0020 U | 0.00025 U | 0.0012 | 0.0018 | 0.00057 J |
| | 7/11/2012 | Round 28 | 0.00095 J | NS | NS | NS | 0.0941 | NS | 0.00025 U | 0.0013 | 0.0079 | NS |
| | 1/9/2013 | Round 29 (PDB) | 0.00020 U | 0.00031 U | 0.00026 U | 0.00050 U | 0.020 | 0.0020 U | 0.00032 U | 0.00023 U | 0.00061 J | 0.00044 U |
| | 7/17/2013 | Round 30 | 0.00097 J | 0.00031 U | 0.00026 U | 0.00050 U | 0.0438 | 0.0020 U | 0.00032 U | 0.00090 J | 0.0957 | 0.00044 U |
| | 2/25/2014 | Round 31 (PDB) | 0.00110 J | 0.00079 U | 0.00062 U | 0.0011 U | 0.10700 | 0.0040 U | 0.00051 U | 0.0100 J | 0.00190 J | 0.00065 U |
| | 7/23/2014 | Round 32 | 0.00089 J | 0.00025 U | 0.00025 U | 0.00025 U | 0.08440 | 0.0005 U | 0.00025 U | 0.00127 | 0.06310 | 0.00025 U |
| | 1/21/2015 | Round 33 (PDB) | 0.00136 | 0.0005 U | 0.0005 U | 0.0005 U | 0.13600 | 0.001 U | NS | 0.000989 | 0.00169 | 0.0005 U |
| | 7/22/2015 | Round 34 | 0.000314 J | 0.0005 U | 0.0005 U | 0.0005 U | 0.04030 | 0.001 U | NS | 0.000538 J | 0.000978 J | 0.0005 U |
| | 1/21/2016 | Round 35 (PDB) | 0.0005 U | NS | NS | NS | 0.0138 | NS | 0.0005 U | 0.0005 U | 0.0008 J | NS |
| | 7/22/2016 | Round 36 | 0.00059 J | 0.00025 U | 0.00025 U | 0.00025 U | 0.07950 | 0.0005 U | 0.00025 U | 0.00107 | 0.03110 | 0.00037 J |

**Table 4-1A**

**Summary of Chemicals of Concern Detected in Groundwater**
**Long Term Monitoring Wells — SWMU 21 Plume**
**2016 RAER**

**Former NAS Dallas, Texas**


| Monitoring Well | Sampling Date | Sampling Round | Chemicals of Concern (mg/L) | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | 1,1-Dichloroethene | Carbon Tetrachloride | Chloroform | Chloromethane | cis-1,2-Dichloroethene | Methylene Chloride | Tetrachloroethene | trans-1,2-Dichloroethene | Trichloroethene | Vinyl Chloride |
| **Protective Concentration Levels (mg/L)** | | | **0.00700** | **0.00500** | **0.24000** | **0.07000** | **0.07000** | **0.00500** | **0.00500** | **0.10000** | **0.00500** | **0.00200** |
| **60606MW** | 11/15/1995 | Round 1 | 0.00500 U | 0.00500 U | 0.00500 U | 0.01000 U | 0.00500 U | 0.01000 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.01000 U |
| | 11/5/1999 | Round 5 | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00045 J | 0.00500 U | 0.00500 U | 0.00500 U | 0.00190 J | 0.00500 U |
| | 7/19/2000 | Round 6 | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00054 J | 0.00500 U | 0.00500 U | 0.00500 U | 0.00220 J | 0.00500 U |
| | 6/19/2001 | Round 7 | 0.00500 U | 0.00500 U | 0.00500 U | 0.01000 U | 0.00170 J | 0.00500 U | 0.00500 U | 0.00250 U | 0.00440 J | 0.01000 U |
| | 1/13/2003 | Round 8 | 0.00100 U | 0.00100 U | 0.00100 U | 0.00100 U | 0.00120 | 0.00200 U | 0.00100 U | 0.00100 U | 0.00740 | 0.00100 U |
| | 9/2/2003 | Round 9 | 0.00022 U | 0.00018 U | 0.00021 U | 0.00026 U | 0.00310 | 0.00028 U | 0.00012 U | 0.00024 U | 0.01900 | 0.00026 U |
| | 9/2/2003 | Round 9 (PDB) | 0.00022 U | 0.00018 U | 0.00021 U | 0.00026 U | 0.00320 | 0.00028 U | 0.00012 U | 0.00024 U | 0.01800 | 0.00026 U |
| | 12/9/2003 | Round 10 | 0.00021 U | 0.00020 U | 0.00014 U | 0.00008 U | 0.00260 | 0.00016 U | 0.00024 U | 0.00019 U | 0.01600 | 0.00017 U |
| | 7/28/2004 | Round 11 | 0.00035 U | 0.00025 U | 0.00010 U | 0.00017 U | 0.00300 | 0.00040 U | 0.00021 U | 0.00023 U | 0.02800 | 0.00017 U |
| | 7/28/2004 | Round 11 (PDB) | 0.00035 U | 0.00025 U | 0.00010 U | 0.00017 U | 0.00300 | 0.00040 U | 0.00021 U | 0.00023 U | 0.02600 | 0.00017 U |
| | 10/13/2004 | Round 12 (PDB) | 0.00035 U | 0.00025 U | 0.00010 U | 0.00017 U | 0.00400 | 0.00040 U | 0.00021 U | 0.00023 U | 0.02800 | 0.00017 U |
| | 4/3/2005 | Round 13 (PDB) | 0.00040 U | 0.00030 U | 0.00040 U | 0.00030 U | 0.00600 | 0.00200 U | 0.00040 U | 0.00030 U | 0.05200 | 0.00030 U |
| | 10/7/2005 | Round 14 | 0.00040 U | 0.00030 U | 0.00040 U | 0.00030 U | 0.00200 | 0.00200 U | 0.00040 U | 0.00030 U | 0.02000 | 0.00030 U |
| | 5/5/2006 | Round 15 | 0.00060 U | 0.00050 U | 0.00040 U | 0.00060 U | 0.00200 | 0.00200 U | 0.00060 U | 0.00060 U | 0.01600 | 0.00060 U |
| | 8/25/2006 | Round 16 | 0.00060 U | 0.00100 UJ | 0.00040 U | 0.00060 U | 0.00100 | 0.00200 U | 0.00060 U | 0.00060 U | 0.01400 | 0.00060 U |
| | 4/30/2007 | Round 17 | 0.00013 U | 0.00011 U | 0.00013 U | 0.00028 U | 0.00260 | 0.00023 U | 0.00010 U | 0.00015 U | 0.02500 | 0.00020 U |
| | 9/7/2007 | Round 18 | 0.00042 U | 0.00014 U | 0.00010 U | 0.00040 U | 0.00310 | 0.00026 U | 0.00014 U | 0.00040 U | 0.04800 | 0.00019 U |
| | 1/29/2008 | Round 19 (PDB) | 0.00039 U | 0.00044 U | 0.00036 U | 0.00060 U | 0.00260 | 0.00040 U | 0.00046 U | 0.00048 U | 0.04100 | 0.00043 U |
| | 7/23/2008 | Round 20 (PDB) | 0.00054 U | 0.00022 U | 0.00028 U | 0.00061 U | 0.00260 | 0.00100 U | 0.00022 U | 0.00045 U | 0.03660 | 0.00030 U |
| | 1/12/2009 | Round 21 (PDB) | 0.00054 U | 0.00022 U | 0.00028 U | 0.00061 U | 0.00200 | 0.00100 U | 0.00022 U | 0.00045 U | 0.03050 | 0.00030 U |
| | 7/15/2009 | Round 22 | 0.00054 U | 0.00022 U | 0.00028 U | 0.00061 U | 0.00250 | 0.00100 U | 0.00022 U | 0.00045 U | 0.03910 | 0.00030 U |
| | 1/12/2010 | Round 23 (PDB) | 0.00029 U | 0.00034 U | 0.00025 U | 0.00050 U | 0.00320 | 0.00200 U | 0.00044 U | 0.00034 U | 0.04920 | 0.00028 U |
| | 7/14/2010 | Round 24 (PDB) | 0.00029 U | 0.00034 U | 0.00025 U | 0.00050 U | 0.00260 | 0.00200 U | 0.00044 U | 0.00034 U | 0.03510 | 0.00028 U |
| | 7/27/2011 | Round 26 | 0.00023 U | 0.00025 U | 0.00022 U | 0.00050 U | 0.00170 | 0.00200 U | 0.00025 U | 0.00035 U | 0.02780 | 0.00022 U |
| | 1/11/2012 | Round 27 (PDB) | 0.00023 U | 0.00025 U | 0.00022 U | 0.00050 U | 0.0019 | 0.0020 U | 0.00025 U | 0.00035 U | 0.0213 | 0.00022 U |
| | 7/11/2012 | Round 28 | 0.00023 U | NS | NS | NS | 0.0016 | NS | 0.00025 U | 0.00035 U | 0.0199 | NS |
| | 1/9/2013 | Round 29 (PDB) | 0.00020 U | 0.00031 U | 0.00026 U | 0.00050 U | 0.0015 | 0.0020 U | 0.00032 U | 0.00023 U | 0.0135 | 0.00044 U |
| | 7/17/2013 | Round 30 | 0.00020 U | 0.00031 U | 0.00026 U | 0.00050 U | 0.00024 U | 0.0020 U | 0.00032 U | 0.00023 U | 0.00031 U | 0.00044 U |
| | 2/25/2014 | Round 31 (PDB) | 0.00025 U | 0.0004 U | 0.00031 U | 0.00053 U | 0.00150 | 0.002 U | 0.00026 U | 0.00034 U | 0.0136 | 0.00033 U |
| | 7/23/2014 | Round 32 | 0.00025 U | 0.00025 U | 0.00025 U | 0.00025 U | 0.00155 | 0.0005 U | 0.00025 U | 0.00025 U | 0.01620 | 0.00025 U |
| | 1/21/2015 | Round 33 (PDB) | 0.00025 U | NS | NS | NS | 0.00181 | NS | NS | 0.00025 U | 0.0167 | 0.00025 U |
| | 7/23/2015 | Round 34 | 0.00025 U | 0.00025 U | 0.00025 U | 0.00025 U | 0.00207 | .000799 J | 0.00025 U | 0.00025 U | 0.0336 | 0.00025 U |
| | 1/21/2016 | Round 35 (PDB) | 0.00025 U | NS | NS | NS | 0.00315 | NS | 0.00025 U | 0.00025 U | 0.0469 | NS |
| | 7/22/2016 | Round 36 | 0.00025 U | 0.00025 U | 0.00025 U | 0.00025 U | 0.00369 | 0.0005 U | 0.00025 U | 0.00025 U | 0.0488 | 0.00025 U |

**Table 4-1A**

**Summary of Chemicals of Concern Detected in Groundwater**
**Long Term Monitoring Wells — SWMU 21 Plume**
**2016 RAER**

**Former NAS Dallas, Texas**


| Monitoring Well | Sampling Date | Sampling Round | Chemicals of Concern (mg/L) | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | 1,1-Dichloroethene | Carbon Tetrachloride | Chloroform | Chloromethane | cis-1,2-Dichloroethene | Methylene Chloride | Tetrachloroethene | trans-1,2-Dichloroethene | Trichloroethene | Vinyl Chloride |
| Protective Concentration Levels (mg/L) | | | 0.00700 | 0.00500 | 0.24000 | 0.07000 | 0.07000 | 0.00500 | 0.00500 | 0.10000 | 0.00500 | 0.00200 |
| 608D32MW | 5/11/1998 | | Well Installed | | | | | | | | | |
| | 5/16/1998 | Round 2 | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00800 | 0.00500 U | 0.00500 U | 0.00500 U | 0.17000 | 0.00500 U |
| | 8/30/1998 | Round 3 | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00900 | 0.00500 U | 0.00500 U | 0.00500 UJ | 0.15000 | 0.00500 U |
| | 4/5/1999 | Round 4 | 0.00120 J | 0.00500 U | 0.00500 U | 0.00500 U | 0.00860 | 0.00500 U | 0.00500 U | 0.00056 J | 0.19000 | 0.00500 U |
| | 10/8/1999 | Round 5 | 0.00150 J | 0.00720 U | 0.00720 U | 0.00720 U | 0.01000 | 0.00990 U | 0.00720 U | 0.00720 U | 0.17000 | 0.00720 U |
| | 7/20/2000 | Round 6 | 0.00830 U | 0.00830 U | 0.00830 U | 0.00830 U | 0.00820 J | 0.00830 U | 0.00830 U | 0.00830 U | 0.18000 | 0.00830 U |
| | 6/25/2001 | Round 7 | 0.01000 U | 0.01000 U | 0.01000 U | 0.02000 U | 0.01100 | 0.01000 U | 0.01000 U | 0.00500 U | 0.25000 | 0.02000 U |
| | 1/24/2003 | Round 8 | 0.01000 U | 0.01000 U | 0.01000 U | 0.01000 U | 0.00750 J | 0.02000 U | 0.01000 U | 0.01000 U | 0.19000 | 0.01000 U |
| | 8/26/2003 | Round 9 (PDB) | 0.00220 U | 0.00180 U | 0.00210 U | 0.00260 U | 0.01100 | 0.00280 U | 0.00120 U | 0.00240 U | 0.23000 | 0.00260 U |
| | 12/7/2003 | Round 10 | 0.00120 U | 0.00039 U | 0.00049 U | 0.00049 U | 0.00880 | 0.00053 U | 0.00038 U | 0.00062 J | 0.18000 J | 0.00098 U |
| | 7/28/2004 | Round 11 | 0.00350 U | 0.00250 U | 0.00100 U | 0.00170 U | 0.00730 J | 0.00400 U | 0.00210 U | 0.00230 U | 0.14000 | 0.00170 U |
| | 7/28/2004 | Round 11 (PDB) | 0.00180 U | 0.00120 U | 0.00050 U | 0.00087 U | 0.00960 | 0.00200 U | 0.00100 U | 0.00200 J | 0.14000 | 0.00084 U |
| | 10/13/2004 | Round 12 | 0.00180 U | 0.00120 U | 0.00050 U | 0.00087 U | 0.00730 | 0.00200 U | 0.00100 U | 0.00110 U | 0.12000 | 0.00084 U |
| | 10/13/2004 | Round 12 (PDB) | 0.00180 U | 0.00120 U | 0.00050 U | 0.00087 U | 0.00550 | 0.00200 U | 0.00100 U | 0.00110 U | 0.09300 | 0.00084 U |
| | 4/3/2005 | Round 13 (PDB) | 0.00100 | 0.00030 U | 0.00040 U | 0.00030 U | 0.01400 | 0.00200 U | 0.00040 U | 0.00200 | 0.16000 | 0.00030 U |
| | 10/8/2005 | Round 14 | 0.00200 J | 0.00030 U | 0.00040 U | 0.00030 U | 0.01100 J | 0.00200 U | 0.00040 U | 0.00201 | 0.16000 | 0.00030 U |
| | 10/8/2005 | Round 14 (PDB) | 0.00200 | 0.00030 U | 0.00040 U | 0.00030 U | 0.01000 | 0.00200 U | 0.00040 U | 0.00202 | 0.15000 | 0.00030 U |
| | 2/1/2006 | Round 15 | 0.00100 | 0.00030 U | 0.00040 U | 0.00030 U | 0.01200 | 0.00200 U | NA | 0.00200 | 0.18000 | 0.00030 U |
| | 8/25/2006 | Round 16 | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS |
| | 12/20/2006 | -- | 0.00100 U | 0.00100 U | 0.00100 U | 0.00200 U | 0.00300 | 0.00500 U | 0.00100 U | 0.00100 U | 0.04900 | 0.00200 U |
| | 2/21/2007 | -- | 0.00070 J | 0.00050 U | 0.00040 U | 0.00060 U | 0.00600 | 0.00200 U | 0.00060 U | 0.00060 U | 0.08200 | 0.00060 U |
| | 5/17/2007 | Round 17 | 0.00060 U | 0.00050 U | 0.00040 U | 0.00060 U | 0.00700 | 0.00200 U | 0.00060 U | 0.00070 J | 0.09600 | 0.00060 U |
| | 8/28/2007 | -- | 0.00060 J | 0.00014 U | 0.00010 U | 0.00057 J | 0.00690 | 0.00026 U | 0.00014 U | 0.00051 J | 0.13000 | 0.00023 J |
| | 11/15/2007 | -- | 0.00110 | 0.00014 U | 0.00010 U | 0.00040 U | 0.00850 | 0.00026 U | 0.00014 U | 0.00078 J | 0.13000 | 0.00022 J |
| | 1/21/2008 | Round 19 | 0.00100 | 0.00044 U | 0.00036 U | 0.00060 U | 0.00860 | 0.00040 U | 0.00046 U | 0.00068 J | 0.13000 | 0.00043 U |
| | 7/23/2008 | Round 20 | 0.00110 | 0.00044 U | 0.00056 U | 0.00120 U | 0.00860 | 0.00200 U | 0.00044 U | 0.00090 U | 0.12300 | 0.00060 U |
| | 7/23/2008 | Round 20 | 0.00110 | 0.00044 U | 0.00056 U | 0.00120 U | 0.01060 | 0.00200 U | 0.00044 U | 0.00095 J | 0.09690 | 0.00060 U |
| | 1/12/2009 | Round 21 | 0.00110 U | 0.00044 U | 0.00056 U | 0.00120 U | 0.01080 | 0.00300 J | 0.00044 U | 0.00090 U | 0.10600 | 0.00060 U |
| | 1/12/2009 | Round 21 | 0.00140 | 0.00022 U | 0.00028 U | 0.00061 U | 0.01540 | 0.00100 U | 0.00022 U | 0.00100 | 0.08730 | 0.00030 U |
| | 5/19/2009 | -- | 0.00056 J | 0.00036 U | 0.00022 U | 0.00026 U | 0.00500 | 0.00030 U | 0.00040 U | 0.00036 J | 0.07000 | 0.00026 U |
| | 7/15/2009 | Round 22 | 0.00110 U | 0.00022 U | 0.00028 U | 0.00120 U | 0.00710 | 0.00510 J* | 0.00044 U | 0.00090 U | 0.12400 | 0.00060 U |
| | 1/12/2010 | Round 23 | 0.00130 | 0.00034 U | 0.00025 U | 0.00050 U | 0.03580 | 0.00200 U | 0.00044 U | 0.00064 J | 0.09090 | 0.00028 U |
| | 1/12/2010 | Round 23 (PDB) | 0.00130 | 0.00034 U | 0.00025 U | 0.00050 U | 0.03800 | 0.00200 U | 0.00044 U | 0.00061 J | 0.07240 | 0.00028 U |
| | 7/14/2010 | Round 24 | 0.00120 | 0.00034 U | 0.00025 U | 0.00050 U | 0.01410 | 0.00200 U | 0.00044 U | 0.00077 J | 0.14400 | 0.00028 U |
| | 7/14/2010 | Round 24 (PDB) | 0.00150 | 0.00034 U | 0.00025 U | 0.00050 U | 0.02030 | 0.00200 U | 0.00044 U | 0.00094 J | 0.14500 | 0.00028 U |
| | 1/12/2011 | Round 25 (PDB) | 0.00078 J | 0.00025 U | 0.00022 U | 0.00050 U | 0.01300 | 0.00200 U | 0.00025 U | 0.00061 J | 0.07330 | 0.00022 U |
| | 1/12/2011 | Round 25 | 0.00046 U | 0.00050 U | 0.00044 U | 0.00100 U | 0.00690 | 0.01470 | 0.00050 U | 0.00070 U | 0.13300 | 0.00044 U |
| | 7/26/2011 | Round 26 | 0.00120 | 0.00025 U | 0.00022 U | 0.00050 U | 0.01230 | 0.00200 U | 0.00025 U | 0.00080 J | 0.12200 | 0.00022 U |
| | 1/11/2012 | Round 27 (PDB) | 0.0014 | 0.00025 U | 0.00022 U | 0.00050 U | 0.0552 | 0.0020 U | 0.00025 U | 0.00099 J | 0.0944 | 0.00022 U |
| | 7/11/2012 | Round 28 | 0.0014 | NS | NS | NS | 0.0556 | NS | 0.00025 U | 0.00084 J | 0.0852 | NS |
| | 1/9/2013 | Round 29 (PDB) | 0.00040 U | 0.0063 U | 0.00053 U | 0.0010 U | 0.124 | 0.0040 U | 0.00064 U | 0.00046 U | 0.0090 | 0.00088 U |
| | 7/17/2013 | Round 30 | 0.0012 J | 0.0063 U | 0.00053 U | 0.0010 U | 0.0404 | 0.0040 U | 0.00064 U | 0.00064 J | 0.1130 | 0.00088 U |
| | 2/25/2014 | Round 31 (PDB) | 0.0014 J | 0.00079 U | 0.00062 U | 0.0011 U | 0.12200 | 0.0040 U | 0.00051 U | 0.0012 J | 0.0012 J | 0.00065 U |
| | 7/21/2014 | Round 32 | 0.00166 | 0.00025 U | 0.00025 U | 0.00025 U | 0.07840 | 0.0005 U | 0.00025 U | 0.00123 | 0.1050 | 0.00025 U |
| | 1/21/2015 | Round 33 (PDB) | 0.00155 J | NS | NS | NS | 0.11100 | NS | 0.0005 U | 0.00124 J | 0.0220 | NS |
| | 7/22/2015 | Round 34 | 0.00132 J | 0.00025 U | 0.00025 U | 0.00025 U | 0.07480 | 0.0005 U | 0.0005 U | 0.00102 J | 0.1010 | 0.00025 U |
| | 1/21/2016 | Round 35 (PDB) | 0.00095 J | NS | NS | NS | 0.0798 | NS | 0.0005 U | 0.00082 J | 0.00236 | NS |
| | 7/22/2016 | Round 36 | 0.00093 J | 0.0005 U | 0.0005 U | 0.0005 U | 0.0336 | 0.00121 J | 0.0005 U | 0.00059 J | 0.1 | 0.0005 U |

**Table 4-1A**

**Summary of Chemicals of Concern Detected in Groundwater**
**Long Term Monitoring Wells — SWMU 21 Plume**
**2016 RAER**

**Former NAS Dallas, Texas**


| Monitoring Well | Sampling Date | Sampling Round | Chemicals of Concern (mg/L) | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | 1,1-Dichloroethene | Carbon Tetrachloride | Chloroform | Chloromethane | cis-1,2-Dichloroethene | Methylene Chloride | Tetrachloroethene | trans-1,2-Dichloroethene | Trichloroethene | Vinyl Chloride |
| Protective Concentration Levels (mg/L) | | | 0.00700 | 0.00500 | 0.24000 | 0.07000 | 0.07000 | 0.00500 | 0.00500 | 0.10000 | 0.00500 | 0.00200 |
| 608D132MW | 3/29/2005 | | Well Installed | | | | | | | | | |
| | 4/5/2005 | Round 13 | 0.00050 J | 0.00030 U | 0.00040 U | 0.00030 U | 0.00300 | 0.00200 U | 0.00040 U | 0.00030 U | 0.06700 | 0.00030 U |
| | 8/4/2005 | Round 13 (PDB) | 0.00040 U | 0.00030 U | 0.00040 U | 0.00030 U | 0.00200 | 0.00200 U | 0.00040 U | 0.00030 U | 0.03600 | 0.00030 U |
| | 10/8/2005 | Round 14 | 0.00080 J | 0.00030 U | 0.00040 U | 0.00030 U | 0.00400 | 0.00200 U | 0.00040 U | 0.00030 U | 0.07000 | 0.00030 U |
| | 2/2/2006 | Round 15 | 0.00040 U | 0.00030 U | 0.00040 U | 0.00030 U | 0.00400 | 0.00200 U | | 0.00040 J | 0.07700 | 0.00030 U |
| | 8/29/2006 | Round 16 | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS |
| | 12/19/2006 | -- | 0.00080 J | 0.00100 U | 0.00100 U | 0.00200 U | 0.00400 | 0.00500 U | 0.00100 U | 0.00100 U | 0.09600 | 0.00200 U |
| | 2/19/2007 | -- | 0.00080 J | 0.00050 U | 0.00040 U | 0.00060 U | 0.00400 | 0.00200 U | 0.00060 U | 0.00060 U | 0.08100 | 0.00060 U |
| | 5/16/2007 | Round 17 | 0.00060 U | 0.00050 U | 0.00040 U | 0.00060 U | 0.00400 | 0.00200 U | 0.00060 U | 0.00060 U | 0.07200 | 0.00060 U |
| | 8/29/2007 | -- | 0.00042 U | 0.00014 U | 0.00010 U | 0.00080 J | 0.00190 | 0.00026 U | 0.00014 U | 0.00040 U | 0.06400 | 0.00019 U |
| | 11/12/2007 | -- | 0.00047 J | 0.00011 U | 0.00013 U | 0.00028 U | 0.00220 | 0.00023 U | 0.00010 U | 0.00022 J | 0.05500 | 0.00020 U |
| | 1/22/2008 | Round 19 | 0.00057 J | 0.00044 U | 0.00036 U | 0.00060 U | 0.00310 | 0.00040 U | 0.00046 U | 0.00048 U | 0.06300 | 0.00043 U |
| | 7/22/2008 | Round 20 | 0.00054 U | 0.00022 U | 0.00028 U | 0.00061 U | 0.00280 | 0.00100 U | 0.00022 | 0.00045 U | 0.06050 | 0.00030 U |
| | 1/12/2009 | Round 21 | 0.00091 J | 0.00022 U | 0.00028 U | 0.00061 U | 0.00380 | 0.00100 U | 0.00022 U | 0.00092 JH | 0.09270 | 0.00030 U |
| | 5/19/2009 | -- | 0.00100 | 0.00036 U | 0.00022 U | 0.00026 U | 0.00500 | 0.00030 U | 0.00040 U | 0.00051 J | 0.10000 | 0.00026 U |
| | 7/15/2009 | Round 22 | 0.00110 | 0.00022 U | 0.00028 U | 0.00061 U | 0.00510 | 0.00100 U | 0.00022 U | 0.00048 J | 0.10800 | 0.00030 U |
| | 1/12/2010 | Round 23 | 0.00048 J | 0.00034 U | 0.00025 U | 0.00050 U | 0.00170 | 0.00200 U | 0.00044 U | 0.00045 J | 0.04500 JL | 0.00028 U |
| | 7/14/2010 | Round 24 | 0.00029 U | 0.00034 U | 0.00025 U | 0.00050 U | 0.00089 J | 0.00200 U | 0.00044 U | 0.00034 U | 0.02150 | 0.00028 U |
| | 1/12/2011 | Round 25 (PDB) | 0.00049 J | 0.00025 U | 0.00022 U | 0.00080 J | 0.00780 | 0.00200 U | 0.00025 U | 0.01850 | 0.01810 | 0.00022 U |
| | 7/26/2011 | Round 26 | 0.00065 J | 0.00025 U | 0.00022 U | 0.00050 U | 0.00310 | 0.00200 U | 0.00025 U | 0.00059 J | 0.07590 | 0.00022 U |
| | 1/11/2012 | Round 27 (PDB) | 0.00057 J | 0.00025 U | 0.00022 U | 0.00063 J | 0.0032 | 0.0020 U | 0.00025 U | 0.0018 | 0.0535 | 0.00022 U |
| | 7/11/2012 | Round 28 | 0.00053 J | NS | NS | NS | 0.0061 | NS | 0.00025 U | 0.0136 | 0.0386 | NS |
| | 1/9/2013 | Round 29 (PDB) | 0.00053 J | 0.00031 U | 0.00026 U | 0.00050 U | 0.0098 | 0.0020 U | 0.00032 U | 0.0245 | 0.0208 | 0.00044 U |
| | 7/17/2013 | Round 30 | 0.00071 J | 0.00031 U | 0.00026 U | 0.00050 U | 0.0045 | 0.0020 U | 0.00032 U | 0.0021 | 0.0881 | 0.00044 U |
| | 2/25/2014 | Round 31 (PDB) | 0.00042 J | 0.0004 U | 0.00031 U | 0.00053 U | 0.00440 | 0.0020 U | 0.00026 U | 0.0023 | 0.0664 | 0.00033 U |
| | 7/21/2014 | Round 32 | 0.00058 J | 0.00025 U | 0.00025 U | 0.00025 U | 0.00419 | 0.0005 U | 0.00025 U | 0.00115 | 0.07580 | 0.00025 U |
| | 1/21/2015 | Round 33 (PDB) | 0.000614 | NS | NS | NS | 0.00365 | NS | 0.00050 U | 0.00122 | 0.06330 | NS |
| | 7/23/2015 | Round 34 | 0.000353 J | 0.00025 U | 0.00025 U | 0.00025 U | 0.00237 | 0.0005 U | 0.00050 U | 0.000998 J | 0.0469 | 0.00025 U |
| | 1/21/2016 | Round 35 (PDB) | 0.0005 U | NS | NS | NS | 0.0005 U | NS | 0.0005 U | 0.0005 U | 0.00585 | NS |
| | 7/22/2016 | Round 36 | 0.00025 UJ | 0.00025 U | 0.00025 U | 0.00025 U | 0.00133 | 0.0005 U | 0.00025 U | 0.00026 J | 0.0273 | 0.00025 U |

**Table 4-1A**

**Summary of Chemicals of Concern Detected in Groundwater**
**Long Term Monitoring Wells — SWMU 21 Plume**
**2016 RAER**

**Former NAS Dallas, Texas**


| Monitoring Well | Sampling Date | Sampling Round | Chemicals of Concern (mg/L) | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | 1,1-Dichloroethene | Carbon Tetrachloride | Chloroform | Chloromethane | cis-1,2-Dichloroethene | Methylene Chloride | Tetrachloroethene | trans-1,2-Dichloroethene | Trichloroethene | Vinyl Chloride |
| Protective Concentration Levels (mg/L) | | | 0.00700 | 0.00500 | 0.24000 | 0.07000 | 0.07000 | 0.00500 | 0.00500 | 0.10000 | 0.00500 | 0.00200 |
| 608D136MW | 3/30/2005 | | Well Installed | | | | | | | | | |
| | 4/11/2005 | Round 13 | 0.00100 | 0.00030 U | 0.00040 U | 0.00030 U | 0.00900 | 0.00200 U | 0.00040 U | 0.00070 J | 0.20000 | 0.00030 U |
| | 8/4/2005 | Round 13B (PDB) | 0.00080 J | 0.00030 U | 0.00040 U | 0.00030 U | 0.00700 | 0.00200 U | 0.00040 U | 0.00050 J | 0.11000 | 0.00030 U |
| | 10/9/2005 | Round 14 | 0.00100 | 0.00030 U | 0.00040 U | 0.00030 U | 0.00800 | 0.00200 U | 0.00090 U | 0.00060 J | 0.16000 | 0.00030 U |
| | 2/2/2006 | Round 15 | 0.00100 | 0.00030 U | 0.00040 U | 0.00030 U | 0.00700 | 0.00200 U | | 0.00070 J | 0.15000 | 0.00030 U |
| | 8/29/2006 | Round 16 | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS |
| | 12/19/2006 | -- | 0.00200 | 0.00100 U | 0.00100 U | 0.00200 U | 0.02000 | 0.00500 U | 0.00100 U | 0.00100 | 0.22000 | 0.00200 U |
| | 2/19/2007 | -- | 0.00100 | 0.00050 U | 0.00040 U | 0.00060 U | 0.04000 | 0.00200 U | 0.00060 U | 0.00090 J | 0.18000 | 0.00060 U |
| | 5/16/2007 | Round 17 | 0.00100 | 0.00050 U | 0.00040 U | 0.00060 U | 0.05400 | 0.00200 U | 0.00060 U | 0.00090 J | 0.14000 | 0.00060 U |
| | 8/29/2007 | -- | 0.00054 J | 0.00014 U | 0.00010 U | 0.00040 U | 0.02200 | 0.00026 U | 0.00014 U | 0.00040 U | 0.12000 | 0.00019 U |
| | 11/12/2007 | -- | 0.00013 U | 0.00011 U | 0.00013 U | 0.00028 U | 0.01100 | 0.00023 U | 0.00010 U | 0.00015 U | 0.06600 | 0.00020 U |
| | 1/22/2008 | Round 19 | 0.00039 U | 0.00044 U | 0.00036 U | 0.00060 U | 0.00950 | 0.00040 U | 0.00046 U | 0.00048 U | 0.05300 | 0.00043 U |
| | 7/22/2008 | Round 20 | 0.00054 U | 0.00022 U | 0.00028 U | 0.00061 U | 0.01170 | 0.00100 U | 0.00022 U | 0.00045 U | 0.07430 | 0.00030 U |
| | 1/12/2009 | Round 21 | 0.00054 U | 0.00022 U | 0.00028 U | 0.00061 U | 0.00960 | 0.00100 U | 0.00022 U | 0.00045 U | 0.06480 | 0.00030 U |
| | 5/19/2009 | -- | 0.00026 U | 0.00036 U | 0.00022 U | 0.00026 U | 0.00500 | 0.00030 U | 0.00040 U | 0.00035 U | 0.04000 | 0.00026 U |
| | 7/15/2009 | Round 22 | 0.00054 U | 0.00022 U | 0.00028 U | 0.00061 U | 0.00500 | 0.00100 U | 0.00022 U | 0.00045 U | 0.04580 | 0.00030 U |
| | 1/12/2010 | Round 23 | 0.00047 J | 0.00034 U | 0.00025 U | 0.00050 U | 0.00460 | 0.00200 U | 0.00044 U | 0.00034 U | 0.04210 | 0.00028 U |
| | 7/14/2010 | Round 24 | 0.00059 J | 0.00034 U | 0.00025 U | 0.00050 U | 0.00680 | 0.00200 U | 0.00044 U | 0.00034 U | 0.07000 | 0.00028 U |
| | 1/12/2011 | Round 25 | 0.00075 J | 0.00025 U | 0.00022 U | 0.00050 U | 0.00850 | 0.00200 U | 0.00025 U | 0.00051 J | 0.09380 | 0.00022 U |
| | 7/26/2011 | Round 26 | 0.00078 J | 0.00025 U | 0.00022 U | 0.00050 U | 0.01300 | 0.00200 U | 0.00025 U | 0.00051 J | 0.08700 | 0.00022 U |
| | 1/11/2012 | Round 27 | 0.00061 J | 0.00025 U | 0.00022 U | 0.0020 | 0.0357 | 0.0020 U | 0.00025 U | 0.00054 J | 0.0619 | 0.00022 U |
| | 7/11/2012 | Round 28 | 0.00096 J | NS | NS | NS | 0.0206 | NS | 0.00025 U | 0.00069 J | 0.0887 | NS |
| | 1/9/2013 | Round 29 | 0.00020 U | 0.00031 U | 0.00026 U | 0.00050 U | 0.0463 JH | 0.0020 U | 0.00032 U | 0.00023 U | 0.0545 | 0.00044 U |
| | 7/17/2013 | Round 30 | 0.0011 | 0.00031 U | 0.00026 U | 0.00050 U | 0.0324 | 0.0020 U | 0.00032 U | 0.00073 J | 0.0938 | 0.00044 U |
| | 2/25/2014 | Round 31 (PDB) | 0.0011 | 0.0004 U | 0.00031 U | 0.00053 U | 0.0425 | 0.002 U | 0.00026 U | 0.00085 J | 0.0790 | 0.00033 U |
| | 7/21/2014 | Round 32 | 0.00065 J | 0.00025 U | 0.00025 U | 0.00025 U | 0.0492 | 0.0005 U | 0.00025 U | 0.00067 J | 0.0143 | 0.00025 U |
| | 1/21/2015 | Round 33 | 0.000935 J | NS | NS | NS | 0.0494 | NS | 0.00025 U | 0.000854 J | 0.0436 | NS |
| | 1/21/2015 | Round 33 | 0.00115 | NS | NS | NS | 0.0442 | NS | 0.00025 U | 0.000911 J | 0.055 | NS |
| | 7/23/2015 | Round 34 | 0.0006662 J | 0.00025 U | 0.00025 U | 0.00025 U | 0.0517 | 0.0005 U | 0.00025 U | 0.000723 J | 0.0371 | .000301 J |
| | 1/21/2016 | Round 35 (PDB) | 0.00077 J | NS | NS | NS | 0.0553 | NS | 0.0005 U | 0.00069 J | 0.0241 | NS |
| | 7/22/2016 | Round 36 | 0.00083 J | 0.0005 U | 0.0005 U | 0.0005 U | 0.0483 | 0.00123 J | 0.0005 U | 0.00064 J | 0.0614 | 0.0005 U |
| 608D138MW | 3/29/2005 | | Well Installed | | | | | | | | | |
| | 4/5/2005 | Round 13 | 0.00200 | 0.00030 U | 0.00040 U | 0.00030 U | 0.00900 | 0.00200 U | 0.00040 U | 0.00100 | 0.16000 | 0.00040 J |
| | 8/4/2005 | Round 13B (PDB) | 0.00090 J | 0.00030 U | 0.00040 U | 0.00030 U | 0.00700 | 0.00200 U | 0.00040 U | 0.00060 J | 0.08100 | 0.00030 U |
| | 10/7/2005 | Round 14 | 0.00100 | 0.00030 U | 0.00040 U | 0.00030 U | 0.00700 | 0.00200 U | 0.00040 U | 0.00070 J | 0.13000 | 0.00030 U |
| | 1/20/2006 | Round 15 | 0.00100 | 0.00030 U | 0.00040 U | 0.00030 U | 0.00700 | 0.00200 U | 0.00040 U | 0.00060 J | 0.12000 | 0.00030 U |
| | 8/25/2006 | Round 16 | 0.00200 | 0.00100 UJ | 0.00040 U | 0.00060 U | 0.00600 | 0.00200 U | 0.00060 U | 0.00060 J | 0.14000 | 0.00060 U |
| | 4/30/2007 | Round 17 | 0.00011 U | 0.00011 U | 0.00013 U | 0.00028 U | 0.01000 | 0.00023 U | 0.00010 U | 0.00052 J | 0.09400 | 0.00033 J |
| | 9/5/2007 | Round 18 | 0.00190 | 0.00011 U | 0.00013 U | 0.00028 U | 0.02400 | 0.00023 U | 0.00010 U | 0.00110 | 0.16000 | 0.00056 J |
| | 1/29/2008 | Round 19 (PDB) | 0.00130 | 0.00044 U | 0.00036 U | 0.00060 U | 0.07900 | 0.00040 U | 0.00046 U | 0.00088 J | 0.00330 | 0.00043 U |
| | 7/23/2008 | Round 20 (PDB) | 0.00120 | 0.00022 U | 0.00028 U | 0.00061 U | 0.04870 | 0.00100 U | 0.00022 U | 0.00120 | 0.02460 | 0.00030 U |
| | 1/12/2009 | Round 21 (PDB) | 0.00098 J | 0.00022 U | 0.00028 U | 0.00061 U | 0.03150 | 0.00100 U | 0.00022 U | 0.00110 | 0.02170 | 0.00030 U |
| | 7/15/2009 | Round 22 | 0.00200 | 0.00022 U | 0.00028 U | 0.00061 U | 0.04160 | 0.00100 U | 0.00022 U | 0.00110 | 0.09690 | 0.00030 U |
| | 1/12/2010 | Round 23 (PDB) | 0.00160 | 0.00034 U | 0.00025 U | 0.00050 U | 0.09550 | 0.00200 U | 0.00044 U | 0.00100 | 0.00460 | 0.00028 U |
| | 7/14/2010 | Round 24 (PDB) | 0.00100 | 0.00034 U | 0.00025 U | 0.00050 U | 0.05250 | 0.00200 U | 0.00044 U | 0.00089 J | 0.04510 | 0.00028 U |
| | 1/12/2011 | Round 25 (PDB) | 0.00110 | 0.00025 U | 0.00022 U | 0.00050 U | 0.08750 | 0.00200 U | 0.00025 U | 0.00098 J | 0.00380 | 0.00022 U |
| | 7/27/2011 | Round 26 | 0.00110 | 0.00025 U | 0.00022 U | 0.00050 U | 0.01910 | 0.00200 U | 0.00025 U | 0.00057 J | 0.08690 | 0.00022 U |
| | 1/11/2012 | Round 27 (PDB) | 0.00023 U | 0.00025 U | 0.00022 U | 0.00050 U | 0.0021 | 0.0020 U | 0.00025 U | 0.00035 U | 0.0034 | 0.00022 U |
| | 7/11/2012 | Round 28 | 0.0010 | NS | NS | NS | 0.0242 | NS | 0.00025 U | 0.00061 J | 0.0572 | NS |
| | 1/9/2013 | Round 29 (PDB) | 0.00020 U | 0.00031 U | 0.00026 U | 0.00050 U | 0.0242 | 0.0020 U | 0.00032 U | 0.00023 U | 0.0096 | 0.00044 U |
| | 7/17/2013 | Round 30 | 0.0012 | 0.00031 U | 0.00026 U | 0.00050 U | 0.0199 | 0.0020 U | 0.00032 U | 0.00057 J | 0.0714 | 0.00044 U |
| | 2/25/2014 | Round 31 (PDB) | 0.00066 J | 0.0004 U | 0.00031 U | 0.00053 U | 0.0387 | 0.002 U | 0.00026 U | 0.0006 J | 0.0163 | 0.00033 U |
| | 7/23/2014 | Round 32 | 0.00097 J | 0.00025 U | 0.00025 U | 0.00025 U | 0.0261 | 0.0005 U | 0.00025 U | 0.00071 J | 0.0491 | 0.00025 U |
| | 1/21/2015 | Round 33 (PDB) | 0.000382 | NS | NS | NS | 0.0150 | NS | 0.00025 U | 0.000546 J | 0.0089 | NS |
| | 7/22/2015 | Round 34 | 0.00173 | 0.00025 U | 0.00025 U | 0.00025 U | 0.0592 | 0.0005 U | 0.00025 U | 0.00105 | 0.0547 | 0.00025 U |
| | 1/21/2016 | Round 35 (PDB) | 0.00158 | NS | NS | NS | 0.109 | NS | 0.00025 U | 0.00127 | 0.00048 J | NS |
| | 7/22/2016 | Round 36 | 0.00106 J | 0.0005 U | 0.0005 U | 0.0005 U | 0.0175 | 0.001 U | 0.0005 U | 0.00067 J | 0.0949 | 0.0005 U |

**Table 4-1A**

**Summary of Chemicals of Concern Detected in Groundwater**
**Long Term Monitoring Wells — SWMU 21 Plume**
**2016 RAER**

**Former NAS Dallas, Texas**


| Monitoring Well | Sampling Date | Sampling Round | Chemicals of Concern (mg/L) | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | 1,1-Dichloroethene | Carbon Tetrachloride | Chloroform | Chloromethane | cis-1,2-Dichloroethene | Methylene Chloride | Tetrachloroethene | trans-1,2-Dichloroethene | Trichloroethene | Vinyl Chloride |
| Protective Concentration Levels (mg/L) | | | 0.00700 | 0.00500 | 0.24000 | 0.07000 | 0.07000 | 0.00500 | 0.00500 | 0.10000 | 0.00500 | 0.00200 |
| 608D140MW | 3/31/2005 | | Well Installed | | | | | | | | | |
| | 5/1/2005 | Round 13 | 0.00100 | 0.00030 U | 0.00040 U | 0.00030 U | 0.00900 | 0.00200 U | 0.00040 U | 0.00080 J | 0.13000 | 0.00030 U |
| | 5/1/2005 | Round 13 (PDB) | 0.00100 | 0.00030 U | 0.00040 U | 0.00030 U | 0.00900 | 0.00200 U | 0.00040 U | 0.00070 J | 0.11000 | 0.00030 U |
| | 8/2/2005 | Round 13B | 0.00100 | 0.00030 U | 0.00040 U | 0.00030 U | 0.01000 | 0.00200 U | 0.00040 U | 0.00100 | 0.11000 | 0.00050 J |
| | 8/2/2005 | Round 13B (PDB) | 0.00200 | 0.00030 U | 0.00040 U | 0.00030 U | 0.01000 | 0.00200 U | 0.00040 U | 0.00080 J | 0.08800 | 0.00040 J |
| | 10/17/2005 | Round 14 | 0.00100 | 0.00030 U | 0.00040 U | 0.00030 U | 0.01100 | 0.00200 U | 0.00040 U | 0.00090 J | 0.12000 | 0.00040 J |
| | 10/17/2005 | Round 14 (PDB) | 0.00100 | 0.00030 U | 0.00040 U | 0.00030 U | 0.01400 | 0.00200 U | 0.00040 U | 0.00090 J | 0.08400 | 0.00040 J |
| | 1/20/2006 | Round 15 | 0.00100 | 0.00030 U | 0.00040 U | 0.00030 U | 0.01400 | 0.00200 U | 0.00040 U | 0.00100 J | 0.13000 | 0.00050 J |
| | 8/25/2006 | Round 16 | 0.00200 | 0.00100 UJ | 0.00040 U | 0.00060 U | 0.01400 | 0.00200 U | 0.00060 U | 0.00100 | 0.15000 | 0.00060 U |
| | 4/30/2007 | Round 17 | 0.00011 U | 0.00011 U | 0.00013 U | 0.00028 U | 0.01400 | 0.00023 U | 0.00010 U | 0.00045 J | 0.12000 | 0.00052 J |
| | 9/5/2007 | Round 18 | 0.00160 | 0.00011 U | 0.00013 U | 0.00028 U | 0.01400 | 0.00023 U | 0.00010 U | 0.00088 J | 0.17000 | 0.00069 J |
| | 1/29/2008 | Round 19 (PDB) | 0.00098 J | 0.00044 U | 0.00036 U | 0.00060 U | 0.02300 | 0.00040 U | 0.00046 U | 0.00057 J | 0.07600 | 0.00043 U |
| | 7/23/2008 | Round 20 (PDB) | 0.00180 | 0.00022 U | 0.00028 U | 0.00061 U | 0.05800 | 0.00100 U | 0.00022 U | 0.00096 J | 0.06230 | 0.00030 U |
| | 1/12/2009 | Round 21 (PDB) | 0.00190 | 0.00022 U | 0.00028 U | 0.00061 U | 0.08280 | 0.00100 U | 0.00022 U | 0.00100 | 0.02050 | 0.00030 U |
| | 7/15/2009 | Round 22 | 0.00150 | 0.00022 U | 0.00028 U | 0.00061 U | 0.02920 | 0.00100 U | 0.00022 U | 0.00090 J | 0.11300 | 0.00030 U |
| | 1/12/2010 | Round 23 (PDB) | 0.00190 | 0.00034 U | 0.00025 U | 0.00050 U | 0.07110 | 0.00200 U | 0.00044 U | 0.00120 | 0.09970 | 0.00028 U |
| | 7/14/2010 | Round 24 (PDB) | 0.00120 | 0.00034 U | 0.00025 U | 0.00050 U | 0.02480 | 0.00200 U | 0.00044 U | 0.00070 J | 0.08910 | 0.00028 U |
| | 1/12/2011 | Round 25 (PDB) | 0.00150 | 0.00025 U | 0.00022 U | 0.00050 U | 0.09920 | 0.002 U | 0.00025 U | 0.00140 | 0.01920 | 0.00022 U |
| | 7/27/2011 | Round 26 | 0.00140 | 0.00025 U | 0.00022 U | 0.00050 U | 0.01990 | 0.002 U | 0.00025 U | 0.00081 J | 0.10700 | 0.00045 J |
| | 1/11/2012 | Round 27 (PDB) | 0.0011 | 0.00025 U | 0.00022 U | 0.00050 U | 0.0445 | 0.0020 U | 0.00025 U | 0.00066 J | 0.0474 | 0.00022 U |
| | 7/11/2012 | Round 28 | 0.0017 | NS | NS | NS | 0.0406 | NS | 0.00025 U | 0.0011 | 0.0968 | NS |
| | 1/9/2013 | Round 29 (PDB) | 0.00020 U | 0.00031 U | 0.00026 U | 0.00050 U | 0.0975 | 0.0020 U | 0.00032 U | 0.00023 U | 0.0041 | 0.00044 U |
| | 7/17/2013 | Round 30 | 0.0011 J | 0.00063 U | 0.00053 U | 0.0010 U | 0.0276 | 0.0040 U | 0.00064 U | 0.00064 J | 0.1040 | 0.00088 U |
| | 2/25/2014 | Round 31 (PDB) | 0.0013 | 0.0004 U | 0.00031 U | 0.00053 U | 0.0991 | 0.0020 U | 0.00026 U | 0.00120 | 0.0015 | 0.00033 U |
| | 7/23/2014 | Round 32 | 0.00136 | 0.00025 U | 0.00025 U | 0.00025 U | 0.0929 | 0.0005 U | 0.00025 U | 0.00126 | 0.0600 | 0.00049 J |
| | 1/21/2015 | Round 33 (PDB) | 0.000999 J | NS | NS | NS | 0.0894 | NS | 0.00050 U | 0.00115 J | 0.0041 | NS |
| | 7/23/2015 | Round 34 | 0.000845 J | 0.00025 U | 0.00025 U | 0.00025 U | 0.0949 | 0.0005 U | 0.00050 U | 0.000869 J | 0.0094 | .000342 J |
| | 1/21/2016 | Round 35 (PDB) | 0.0005 U | NS | NS | NS | 0.00487 | NS | 0.0005 U | 0.0005 U | 0.0005 U | NS |
| | 7/22/2016 | Round 36 | 0.00025 U | 0.00025 U | 0.00025 U | 0.00025 U | 0.0245 | 0.0005 U | 0.00025 U | 0.00025 U | 0.00025 U | 0.00025 U |
| 608D141MW | 3/31/2005 | | Well Installed | | | | | | | | | |
| | 4/14/2005 | Round 13 | 0.00060 J | 0.00030 U | 0.00040 U | 0.00030 U | 0.00700 | 0.00200 U | 0.00040 U | 0.00050 J | 0.06700 | 0.00030 U |
| | 8/4/2005 | Round 13B (PDB) | 0.00050 J | 0.00030 U | 0.00040 U | 0.00030 U | 0.00500 | 0.00200 U | 0.00040 U | 0.00040 J | 0.04800 | 0.00030 U |
| | 10/7/2005 | Round 14 | 0.00070 J | 0.00030 U | 0.00040 U | 0.00030 U | 0.00600 | 0.00200 U | 0.00040 U | 0.00050 J | 0.08200 | 0.00030 U |
| | 1/21/2006 | Round 15 | 0.00040 U | 0.00030 U | 0.00040 U | 0.00030 U | 0.00400 | 0.00200 U | 0.00040 U | 0.00030 U | 0.02600 | 0.00030 U |
| | 8/28/2006 | Round 16 | 0.00060 U | 0.00050 U | 0.00040 U | 0.00060 U | 0.00800 | 0.00200 U | 0.00060 U | 0.00060 U | 0.00600 | 0.00060 U |
| | 4/30/2007 | Round 17 | 0.00013 U | 0.00011 U | 0.00013 U | 0.00028 U | 0.00590 | 0.00023 U | 0.00010 U | 0.00015 U | 0.01000 | 0.00020 U |
| | 9/6/2007 | Round 18 | 0.00017 J | 0.00011 U | 0.00013 U | 0.00070 U | 0.00440 | 0.00023 U | 0.00010 U | 0.00020 J | 0.02900 | 0.00023 J |
| | 1/29/2008 | Round 19 (PDB) | 0.00039 U | 0.00044 U | 0.00036 U | 0.00060 U | 0.00410 | 0.00040 U | 0.00046 U | 0.00048 U | 0.00900 | 0.00043 U |
| | 7/22/2008 | Round 20 | 0.00054 U | 0.00022 U | 0.00028 U | 0.00061 U | 0.00390 | 0.00100 U | 0.00022 U | 0.00045 U | 0.01650 | 0.00030 U |
| | 1/12/2009 | Round 21 (PDB) | 0.00054 U | 0.00022 U | 0.00028 U | 0.00061 U | 0.00550 | 0.00100 U | 0.00022 U | 0.00045 U | 0.00360 | 0.00030 U |
| | 7/15/2009 | Round 22 | 0.00054 U | 0.00022 U | 0.00028 U | 0.00061 U | 0.00640 | 0.00100 U | 0.00022 U | 0.00045 U | 0.00230 | 0.00030 U |
| | 1/12/2010 | Round 23 (PDB) | 0.00029 U | 0.00034 U | 0.00025 U | 0.00050 U | 0.00440 | 0.00200 U | 0.00044 U | 0.00034 U | 0.02520 | 0.00028 U |
| | 7/14/2010 | Round 24 (PDB) | 0.00029 U | 0.00034 U | 0.00025 U | 0.00050 U | 0.00680 | 0.00200 U | 0.00044 U | 0.00034 U | 0.08590 | 0.00028 U |
| | 1/12/2011 | Round 25 | 0.00095 J | 0.00025 U | 0.00022 U | 0.00050 U | 0.00850 | 0.00200 U | 0.00025 U | 0.00059 J | 0.12200 | 0.00022 U |
| | 7/27/2011 | Round 26 | 0.00110 | 0.00025 U | 0.00022 U | 0.00050 U | 0.01030 | 0.00200 U | 0.00025 U | 0.00065 J | 0.15000 | 0.00031 J |
| | 1/11/2012 | Round 27 (PDB) | 0.00097 J | 0.00025 U | 0.00022 U | 0.00050 U | 0.0096 | 0.0020 U | 0.00025 U | 0.00066 J | 0.112 | 0.00039 J |
| | 7/11/2012 | Round 28 | 0.00063 J | NS | NS | NS | 0.0069 | NS | 0.00050 U | 0.00070 U | 0.132 | NS |
| | 1/9/2013 | Round 29 (PDB) | 0.00020 U | 0.00031 U | 0.00026 U | 0.00050 U | 0.0048 | 0.0020 U | 0.00032 U | 0.00023 U | 0.0315 | 0.00044 U |
| | 7/17/2013 | Round 30 | 0.00020 U | 0.00031 U | 0.00026 U | 0.00050 U | 0.0059 | 0.0020 U | 0.00032 U | 0.00023 U | 0.0355 | 0.00044 U |
| | 2/25/2014 | Round 31 (PDB) | 0.00025 U | 0.00040 U | 0.00031 U | 0.00053 U | 0.0051 | 0.0020 U | 0.00026 U | 0.00034 U | 0.0279 | 0.00033 U |
| | 7/23/2014 | Round 32 | 0.00025 U | 0.00025 U | 0.00025 U | 0.00025 U | 0.00564 | 0.0005 U | 0.00025 U | 0.00025 U | 0.0201 | 0.00025 U |
| | 1/21/2015 | Round 33 (PDB) | 0.00025 U | NS | NS | NS | 0.0038 | NS | 0.00025 U | 0.00025 U | 0.0130 | NS |
| | 7/23/2015 | Round 34 | 0.000264 J | 0.00025 U | 0.00025 U | 0.00025 U | 0.00662 | 0.0005 U | 0.00025 U | 0.00025 U | 0.0468 | 0.00025 U |
| | 1/21/2016 | Round 35 (PDB) | 0.00028 J | NS | NS | NS | 0.00893 | NS | 0.00025 U | 0.0003 J | 0.0363 | NS |
| | 7/22/2016 | Round 36 | 0.00072 J | 0.0005 U | 0.0005 U | 0.0005 U | 0.0148 | 0.001 U | 0.0005 U | 0.00059 J | 0.141 | 0.0005 U |

**Table 4-1A**

**Summary of Chemicals of Concern Detected in Groundwater**
**Long Term Monitoring Wells — SWMU 21 Plume**
**2016 RAER**

**Former NAS Dallas, Texas**


| Monitoring Well | Sampling Date | Sampling Round | Chemicals of Concern (mg/L) | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | 1,1-Dichloroethene | Carbon Tetrachloride | Chloroform | Chloromethane | cis-1,2-Dichloroethene | Methylene Chloride | Tetrachloroethene | trans-1,2-Dichloroethene | Trichloroethene | Vinyl Chloride |
| Protective Concentration Levels (mg/L) | | | 0.00700 | 0.00500 | 0.24000 | 0.07000 | 0.07000 | 0.00500 | 0.00500 | 0.10000 | 0.00500 | 0.00200 |
| 608D142MW | 3/31/2005 | Well Installed | | | | | | | | | | |
| | 4/5/2005 | Round 13 | 0.00040 U | 0.00030 U | 0.00040 U | 0.00030 U | 0.00600 | 0.00200 U | 0.00040 U | 0.00030 U | 0.01200 | 0.00030 U |
| | 8/4/2005 | Round 13B (PDB) | 0.00040 U | 0.00030 U | 0.00040 U | 0.00030 U | 0.00300 | 0.00200 U | 0.00040 U | 0.00030 U | 0.00500 | 0.00030 U |
| | 10/8/2005 | Round 14 | 0.00040 U | 0.00030 U | 0.00040 U | 0.00030 U | 0.00500 | 0.00200 U | 0.00040 U | 0.00030 U | 0.00800 | 0.00030 U |
| | 1/21/2006 | Round 15 | 0.00040 U | 0.00030 U | 0.00040 U | 0.00030 U | 0.00600 | 0.00200 U | 0.00040 U | 0.00030 J | 0.00700 | 0.00030 U |
| | 8/25/2006 | Round 16 | 0.00060 U | 0.00100 UJ | 0.00040 U | 0.00060 U | 0.00500 | 0.00200 U | 0.00060 U | 0.00060 U | 0.00900 | 0.00060 U |
| | 5/8/2007 | Round 17 | 0.00013 U | 0.00011 U | 0.00013 U | 0.00028 U | 0.00560 | 0.00023 U | 0.00010 U | 0.00015 U | 0.00760 | 0.00020 U |
| | 9/5/2007 | Round 18 | 0.00013 U | 0.00011 U | 0.00013 U | 0.00028 U | 0.00570 | 0.00023 U | 0.00010 U | 0.00015 U | 0.00610 | 0.00022 J |
| | 1/29/2008 | Round 19 (PDB) | 0.00039 U | 0.00044 U | 0.00036 U | 0.00060 U | 0.00410 | 0.00040 U | 0.00046 U | 0.00048 U | 0.00280 | 0.00043 U |
| | 7/23/2008 | Round 20 (PDB) | 0.00054 U | 0.00022 U | 0.00028 U | 0.00061 U | 0.00420 | 0.00100 U | 0.00022 U | 0.00045 U | 0.00280 | 0.00030 U |
| | 1/12/2009 | Round 21 (PDB) | 0.00054 U | 0.00022 U | 0.00028 U | 0.00061 U | 0.00430 | 0.00100 U | 0.00022 U | 0.00045 U | 0.00300 | 0.00030 U |
| | 7/15/2009 | Round 22 | 0.00054 U | 0.00022 U | 0.00028 U | 0.00061 U | 0.00490 | 0.00100 U | 0.00022 U | 0.00045 U | 0.00490 | 0.00030 U |
| | 1/12/2010 | Round 23 (PDB) | 0.00029 U | 0.00034 U | 0.00025 U | 0.00050 U | 0.00380 | 0.00200 U | 0.00044 U | 0.00034 U | 0.00350 | 0.00028 U |
| | 7/14/2010 | Round 24 (PDB) | 0.00029 U | 0.00034 U | 0.00025 U | 0.00050 U | 0.00370 | 0.00200 U | 0.00044 U | 0.00034 U | 0.00310 | 0.00028 U |
| | 1/12/2011 | Round 25 | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS |
| | 6/15/2011 | Well Abandoned | | | | | | | | | | |
| 608D142MWR | 6/16/2011 | Replacement Well Installed | | | | | | | | | | |
| | 7/27/2011 | Round 26 | 0.00023 U | 0.00025 U | 0.00022 U | 0.00050 U | 0.00150 | 0.00200 U | 0.00025 U | 0.00035 U | 0.00130 | 0.00022 U |
| | 1/11/2012 | Round 27 (PDB) | 0.00023 U | 0.00025 U | 0.00022 U | 0.00050 U | 0.0030 | 0.0020 U | 0.00025 U | 0.00035 U | 0.0045 | 0.00022 U |
| | 7/11/2012 | Round 28 | 0.00023 U | NS | NS | NS | 0.0052 | NS | 0.00025 U | 0.00035 U | 0.0039 | NS |
| | 1/9/2013 | Round 29 (PDB) | 0.00020 U | 0.00031 U | 0.00026 U | 0.00050 U | 0.0035 | 0.0020 U | 0.00032 U | 0.00023 U | 0.00061 J | 0.00044 U |
| | 7/17/2013 | Round 30 | 0.00020 U | 0.00031 U | 0.00026 U | 0.00050 U | 0.0049 | 0.0020 U | 0.00032 U | 0.00023 U | 0.0052 | 0.00044 U |
| | 2/25/2014 | Round 31 (PDB) | 0.00025 U | 0.0004 U | 0.00031 U | 0.00053 U | 0.0044 | 0.0020 U | 0.00026 U | 0.00034 U | 0.00340 | 0.00033 U |
| | 7/23/2014 | Round 32 | 0.00025 U | 0.00025 U | 0.00025 U | 0.00025 U | 0.00436 | 0.0005 U | 0.00025 U | 0.00026 J | 0.0058 | 0.00025 U |
| | 1/21/2015 | Round 33 (PDB) | 0.00025 U | NS | NS | NS | 0.0034 | NS | 0.00025 U | 0.00025 U | 0.0046 | NS |
| | 7/22/2015 | Round 34 | 0.00025 U | 0.00025 U | 0.00025 U | 0.00025 U | 0.00462 | 0.0005 U | 0.00025 U | 0.00025 U | 0.0096 | 0.00025 U |
| | 1/21/2016 | Round 35 (PDB) | 0.0005 U | NS | NS | NS | 0.00365 | NS | 0.0005 U | 0.0005 U | 0.00878 | NS |
| | 7/22/2016 | Round 36 | 0.00025 U | 0.00025 U | 0.00025 U | 0.00025 U | 0.00566 | 0.0005 U | 0.00025 U | 0.00029 J | 0.0151 | 0.00025 U |
| 608D143MW | 4/14/2005 | Well Installed | | | | | | | | | | |
| | 4/16/2005 | Round 13 | 0.00060 J | 0.00030 U | 0.00040 U | 0.00030 U | 0.02200 | 0.00200 U | 0.00040 U | 0.00060 J | 0.26000 | 0.00030 U |
| | 7/22/2005 | Round 13B | 0.00060 J | 0.00030 U | 0.00040 U | 0.00030 U | 0.05000 | 0.00200 U | 0.00040 U | 0.00050 J | 0.19000 | 0.00050 J |
| | 10/9/2005 | Round 14 | 0.00060 J | 0.00030 U | 0.00040 U | 0.00030 U | 0.02800 | 0.00200 U | 0.00040 U | 0.00050 J | 0.24000 J | 0.00050 J |
| | 1/21/2006 | Round 15 | 0.00040 U | 0.00030 U | 0.00040 U | 0.00030 U | 0.01400 | 0.00200 U | 0.00040 U | 0.00040 J | 0.20000 | 0.00030 U |
| | 8/28/2006 | Round 16 | 0.00100 UL | 0.00100 UL | 0.00100 UL | 0.00200 UL | 0.02800 L | 0.00500 UL | 0.00100 UL | 0.00100 UL | 0.18000 L | 0.00200 UL |
| | 5/8/2007 | Round 17 | 0.00040 J | 0.00011 U | 0.00013 U | 0.00028 U | 0.01200 | 0.00023 U | 0.00010 U | 0.00034 J | 0.16000 | 0.00067 J |
| | 9/5/2007 | Round 18 | 0.00052 J | 0.00011 U | 0.00013 U | 0.00028 U | 0.01600 | 0.00023 U | 0.00010 U | 0.00034 J | 0.16000 | 0.00060 J |
| | 1/29/2008 | Round 19 (PDB) | 0.00052 J | 0.00044 U | 0.00036 U | 0.00060 U | 0.01600 | 0.00040 U | 0.00046 U | 0.00048 U | 0.19000 | 0.00043 U |
| | 7/23/2008 | Round 20 (PDB) | 0.00110 U | 0.00044 U | 0.00056 U | 0.00120 U | 0.01570 | 0.00200 U | 0.00044 U | 0.00090 U | 0.21100 | 0.00060 U |
| | 1/12/2009 | Round 21 (PDB) | 0.00270 U | 0.00110 U | 0.00140 U | 0.00310 U | 0.05190 | 0.00650 J | 0.00110 U | 0.00230 U | 0.19000 | 0.00150 U |
| | 7/15/2009 | Round 22 | 0.00110 U | 0.00044 U | 0.00056 U | 0.00120 U | 0.02300 | 0.00410 J | 0.00044 U | 0.00090 U | 0.19400 | 0.00060 U |
| | 1/12/2010 | Round 23 (PDB) | 0.00058 U | 0.00068 U | 0.00050 U | 0.00100 U | 0.01360 | 0.00750 J | 0.00088 U | 0.00068 U | 0.25000 | 0.00056 U |
| | 7/14/2010 | Round 24 (PDB) | 0.00058 U | 0.00068 U | 0.00050 U | | 0.06310 | 0.00750 J | 0.00088 U | 0.00068 U | 0.19100 | 0.00056 U |
| | 1/12/2011 | Round 25 (PDB) | 0.00023 U | 0.00025 U | 0.00022 U | 0.0005 U | 0.00690 | 0.00200 U | 0.00025 U | 0.00035 U | 0.09150 | 0.00022 U |
| | 6/15/2011 | Well Abandoned | | | | | | | | | | |
| 608D143MWR | 6/16/2011 | Replacement Well Installed | | | | | | | | | | |
| | 7/27/2011 | Round 26 | 0.00055 J | 0.00025 U | 0.00022 U | 0.0005 U | 0.02190 | 0.00200 U | 0.00025 U | 0.00035 U | 0.17300 | 0.00022 U |
| | 1/11/2012 | Round 27 (PDB) | 0.00059 J | 0.00025 U | 0.00022 U | 0.00050 U | 0.0333 | 0.0020 U | 0.00025 U | 0.00041 J | 0.1730 | 0.00077 J |
| | 7/11/2012 | Round 28 | 0.00049 J | NS | NS | NS | 0.0563 | NS | 0.00050 U | 0.00070 U | 0.1090 | NS |
| | 1/9/2013 | Round 29 (PDB) | 0.00040 U | 0.00063 U | 0.00053 U | 0.0010 U | 0.0145 | 0.0040 U | 0.00064 U | 0.00046 U | 0.1040 | 0.00088 U |
| | 7/17/2013 | Round 30 | 0.00071 J | 0.00031 U | 0.00026 U | 0.00050 U | 0.0528 | 0.0020 U | 0.00032 U | 0.00048 J | 0.0956 | 0.0014 |
| | 2/25/2014 | Round 31 (PDB) | 0.00044 J | 0.0004 U | 0.00031 U | 0.00053 U | 0.0208 | 0.0020 U | 0.00026 U | 0.00035 J | 0.1100 | 0.00140 |
| | 7/23/2014 | Round 32 | 0.00046 J | 0.00025 U | 0.00025 U | 0.00025 U | 0.039 | 0.0005 U | 0.00025 U | 0.00041 J | 0.0988 | 0.00111 |
| | 1/21/2015 | Round 33 (PDB) | 0.00025 U | NS | NS | NS | 0.0141 | NS | 0.0005 U | 0.0005 U | 0.0849 | NS |
| | 7/22/2015 | Round 34 | 0.000562 J | 0.00025 U | 0.00025 U | 0.00025 U | 0.0178 | 0.0005 U | 0.0005 U | 0.000445 J | 0.191 | 0.00088 U |
| | 1/21/2016 | Round 35 (PDB) | 0.00066 J | NS | NS | NS | 0.0885 | NS | 0.0005 U | 0.00067 J | 0.0893 | NS |
| | 7/22/2016 | Round 36 | 0.00025 U | 0.00025 U | 0.00025 U | 0.00025 U | 0.0129 | 0.0005 U | 0.00025 U | 0.00025 U | 0.0769 | 0.00308 |

**Table 4-1A**

**Summary of Chemicals of Concern Detected in Groundwater**
**Long Term Monitoring Wells — SWMU 21 Plume**
**2016 RAER**

**Former NAS Dallas, Texas**


| Monitoring Well | Sampling Date | Sampling Round | Chemicals of Concern (mg/L) | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | 1,1-Dichloroethene | Carbon Tetrachloride | Chloroform | Chloromethane | cis-1,2-Dichloroethene | Methylene Chloride | Tetrachloroethene | trans-1,2-Dichloroethene | Trichloroethene | Vinyl Chloride |
| Protective Concentration Levels (mg/L) | | | 0.00700 | 0.00500 | 0.24000 | 0.07000 | 0.07000 | 0.00500 | 0.00500 | 0.10000 | 0.00500 | 0.00200 |
| 608D144MW | 7/20/2005 | Well Installed | | | | | | | | | | |
| | 7/22/2005 | Round 13 | 0.00050 J | 0.00030 U | 0.00040 U | 0.00030 U | 0.01200 | 0.00200 U | 0.00040 U | 0.00030 J | 0.09100 | 0.00030 U |
| | 10/8/2005 | Round 14 | 0.00050 J | 0.00030 U | 0.00040 U | 0.00030 U | 0.01500 | 0.00200 U | 0.00040 U | 0.00040 J | 0.12000 | 0.00030 U |
| | 1/21/2006 | Round 15 | 0.00040 J | 0.00030 U | 0.00040 U | 0.00030 U | 0.01100 | 0.00200 U | 0.00040 U | 0.00040 J | 0.07500 | 0.00030 U |
| | 8/28/2006 | Round 16 | 0.00060 U | 0.00050 U | 0.00040 U | 0.00060 U | 0.01400 | 0.00200 U | 0.00060 U | 0.00060 U | 0.12000 | 0.00060 U |
| | 5/8/2007 | Round 17 | 0.00038 J | 0.00011 U | 0.00013 U | 0.00028 U | 0.01200 | 0.00023 U | 0.00010 U | 0.00036 J | 0.12000 | 0.00089 J |
| | 9/6/2007 | Round 18 | 0.00046 J | 0.00011 U | 0.00013 U | 0.00049 U | 0.01400 | 0.00023 U | 0.00010 U | 0.00037 J | 0.12000 | 0.00050 J |
| | 1/29/2008 | Round 19 (PDB) | 0.00064 J | 0.00044 U | 0.00036 U | 0.00060 U | 0.01500 | 0.00040 U | 0.00046 U | 0.00048 U | 0.12000 | 0.00043 U |
| | 7/23/2008 | Round 20 (PDB) | 0.00110 U | 0.00044 U | 0.00056 U | 0.00120 U | 0.01310 | 0.00200 U | 0.00044 U | 0.00090 U | 0.10800 | 0.00060 U |
| | 1/12/2009 | Round 21 | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS |
| | 7/15/2009 | Round 22 | 0.00054 U | 0.00022 U | 0.00028 U | 0.00061 U | 0.01550 | 0.00100 U | 0.00022 U | 0.00046 J | 0.10800 | 0.00030 U |
| | 1/12/2010 | Round 23 (PDB) | 0.00058 U | 0.00068 U | 0.00050 U | 0.00100 U | 0.01130 | 0.00830 J | 0.00088 U | 0.00068 U | 0.11400 | 0.00056 U |
| | 7/14/2010 | Round 24 (PDB) | 0.00050 J | 0.00068 U | 0.00050 U | 0.00100 U | 0.03330 | 0.00830 J | 0.00088 U | 0.00068 U | 0.08280 | 0.00028 U |
| | 1/12/2011 | Round 25 (PDB) | 0.00056 J | 0.00025 U | 0.00022 U | 0.00050 U | 0.01630 | 0.00200 U | 0.00025 U | 0.00043 J | 0.12500 | 0.00022 U |
| | 7/27/2011 | Round 26 | 0.00049 J | 0.00025 U | 0.00022 U | 0.00050 U | 0.01380 | 0.00200 U | 0.00025 U | 0.00035 U | 0.10500 | 0.00022 U |
| | 1/11/2012 | Round 27 (PDB) | 0.00071 J | 0.00025 U | 0.00022 U | 0.00050 U | 0.0214 | 0.0020 U | 0.00025 U | 0.00045 J | 0.1580 | 0.00022 U |
| | 7/11/2012 | Round 28 | 0.00046 U | NS | NS | NS | 0.0160 | NS | 0.00050 U | 0.00070 U | 0.1250 | NS |
| | 1/9/2013 | Round 29 (PDB) | 0.00040 U | 0.00063 U | 0.00053 U | 0.0010 U | 0.0119 | 0.0040 U | 0.00064 U | 0.00046 U | 0.1230 | 0.00088 U |
| | 7/17/2013 | Round 30 | 0.00040 U | 0.00063 U | 0.00053 U | 0.0010 U | 0.0159 | 0.0040 U | 0.00064 U | 0.00046 U | 0.1080 | 0.00088 U |
| | 2/25/2014 | Round 31 (PDB) | 0.00065 J | 0.00040 U | 0.00031 U | 0.00053 U | 0.0145 | 0.0020 U | 0.00026 U | 0.00038 J | 0.0904 | 0.00033 U |
| | 7/23/2014 | Round 32 | 0.00055 J | 0.00025 U | 0.00025 U | 0.00025 U | 0.0241 | 0.0005 U | 0.00025 U | 0.00037 J | 0.0986 | 0.00025 U |
| | 1/21/2015 | Round 33 (PDB) | 0.0005 U | NS | NS | NS | 0.0207 | NS | 0.0005 U | 0.0005 U | 0.0746 | NS |
| | 7/22/2015 | Round 34 | 0.000641 J | 0.00025 U | 0.00025 U | 0.00025 U | 0.0161 | 0.0005 U | 0.0005 U | 0.000366 J | 0.1270 | 0.00025 U |
| | 1/21/2016 | Round 35 (PDB) | 0.0005 U | NS | NS | NS | 0.0221 | NS | 0.0005 U | 0.0005 U | 0.0812 | NS |
| | 7/22/2016 | Round 36 | 0.00054 J | 0.00025 U | 0.00025 U | 0.00025 U | 0.0418 | 0.0005 U | 0.00025 U | 0.00057 J | 0.0993 | 0.00025 U |
| 608D145MW | 7/20/2005 | Well Installed | | | | | | | | | | |
| | 7/22/2005 | Round 13 | 0.00040 U | 0.00030 U | 0.00040 U | 0.00030 U | 0.00100 | 0.00200 U | 0.00040 U | 0.00030 U | 0.01400 | 0.00030 U |
| | 10/8/2005 | Round 14 | 0.00040 U | 0.00030 U | 0.00040 U | 0.0003 U | 0.00100 | 0.00200 U | 0.00040 U | 0.00030 U | 0.01700 | 0.00030 U |
| | 1/30/2006 | Round 15 | 0.00040 U | 0.00030 U | 0.00040 U | 0.00030 U | 0.00100 | 0.00200 U | 0.00040 U | 0.00030 U | 0.01700 | 0.00030 U |
| | 8/28/2006 | Round 16 | 0.00060 U | 0.00050 U | 0.00040 U | 0.00060 U | 0.00100 | 0.00200 U | 0.00060 U | 0.00060 U | 0.01700 | 0.00060 U |
| | 5/8/2007 | Round 17 | 0.00013 U | 0.00011 U | 0.00013 U | 0.00028 U | 0.00100 J | 0.00023 U | 0.00010 U | 0.00015 U | 0.01300 | 0.00020 U |
| | 9/6/2007 | Round 18 | 0.00015 J | 0.00011 U | 0.00013 U | 0.00028 U | 0.00100 | 0.00023 U | 0.00010 U | 0.00015 U | 0.01600 | 0.00020 U |
| | 1/29/2008 | Round 19 (PDB) | 0.00039 U | 0.00044 U | 0.00036 U | 0.00060 U | 0.00053 J | 0.00040 U | 0.00046 U | 0.00048 U | 0.00140 | 0.00043 U |
| | 7/23/2008 | Round 20 (PDB) | 0.00054 U | 0.00022 U | 0.00028 U | 0.00061 U | 0.00082 J | 0.00100 U | 0.00022 U | 0.00045 U | 0.00820 | 0.00030 U |
| | 1/12/2009 | Round 21 (PDB) | 0.00054 U | 0.00022 U | 0.00028 U | 0.00061 U | 0.00020 U | 0.00100 U | 0.00022 U | 0.00045 U | 0.00190 | 0.00030 U |
| | 7/15/2009 | Round 22 | 0.00054 U | 0.00022 U | 0.00028 U | 0.00061 U | 0.00053 J | 0.00100 U | 0.00022 U | 0.00045 U | 0.00970 | 0.00030 U |
| | 1/12/2010 | Round 23 (PDB) | 0.00029 U | 0.00034 U | 0.00025 U | 0.00050 U | 0.00032 U | 0.00200 U | 0.00044 U | 0.00034 U | 0.00110 | 0.00028 U |
| | 7/14/2010 | Round 24 (PDB) | 0.00029 U | 0.00034 U | 0.00025 U | 0.00050 U | 0.00370 | 0.00200 U | 0.00044 U | 0.00034 U | 0.00420 | 0.00028 U |
| | 1/12/2011 | Round 25 (PDB) | 0.00023 U | 0.00025 U | 0.00022 U | 0.00050 U | 0.00110 | 0.00200 U | 0.00025 U | 0.00050 J | 0.00069 J | 0.00022 U |
| | 7/27/2011 | Round 26 | 0.00023 U | 0.00025 U | 0.00022 U | 0.00050 U | 0.00053 J | 0.00200 U | 0.00025 U | 0.00035 U | 0.00700 | 0.00022 U |
| | 1/11/2012 | Round 27 (PDB) | 0.00023 U | 0.00025 U | 0.00022 U | 0.00050 U | 0.0016 | 0.0020 U | 0.00025 U | 0.00035 U | 0.00042 J | 0.00022 U |
| | 7/11/2012 | Round 28 | 0.00023 U | NS | NS | NS | 0.00071 J | NS | 0.00025 U | 0.00035 U | 0.0076 | NS |
| | 1/9/2013 | Round 29 (PDB) | 0.00020 U | 0.00031 U | 0.00026 U | 0.00050 U | 0.00024 U | 0.0020 U | 0.00032 U | 0.00023 U | 0.0055 | 0.00044 U |
| | 7/17/2013 | Round 30 | 0.00020 U | 0.00031 U | 0.00026 U | 0.00050 U | 0.00076 J | 0.0020 U | 0.00032 U | 0.00023 U | 0.0079 | 0.00044 U |
| | 2/25/2014 | Round 31 (PDB) | 0.00025 U | 0.0004 U | 0.00031 U | 0.00053 U | 0.00079 J | 0.0020 U | 0.00026 U | 0.00034 U | 0.0055 | 0.00033 U |
| | 7/23/2014 | Round 32 | 0.00025 U | 0.00025 U | 0.00025 U | 0.00025 U | 0.00089 J | 0.0005 U | 0.00025 U | 0.00025 U | 0.0064 | 0.00025 U |
| | 1/21/2015 | Round 33 (PDB) | 0.00025 U | NS | NS | NS | 0.00122 | NS | 0.00025 U | 0.00025 U | 0.0039 | NS |
| | 7/22/2015 | Round 34 | 0.00025 U | 0.00025 U | 0.00025 U | 0.00025 U | 0.00128 | 0.0005 U | 0.00025 U | 0.00025 U | 0.0039 | 0.00025 U |
| | 1/21/2016 | Round 35 (PDB) | 0.00025 U | NS | NS | NS | 0.00221 | NS | 0.00025 U | 0.00025 U | 0.00025 U | NS |
| | 7/22/2016 | Round 36 | 0.00025 U | 0.00025 U | 0.00025 U | 0.00025 U | 0.00068 J | 0.0005 U | 0.00025 U | 0.00025 U | 0.00524 | 0.00025 U |

**Table 4-1A**

**Summary of Chemicals of Concern Detected in Groundwater**
**Long Term Monitoring Wells — SWMU 21 Plume**
**2016 RAER**

**Former NAS Dallas, Texas**


| Monitoring Well | Sampling Date | Sampling Round | Chemicals of Concern (mg/L) | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | 1,1-Dichloroethene | Carbon Tetrachloride | Chloroform | Chloromethane | cis-1,2-Dichloroethene | Methylene Chloride | Tetrachloroethene | trans-1,2-Dichloroethene | Trichloroethene | Vinyl Chloride |
| Protective Concentration Levels (mg/L) | | | 0.00700 | 0.00500 | 0.24000 | 0.07000 | 0.07000 | 0.00500 | 0.00500 | 0.10000 | 0.00500 | 0.00200 |
| 608D146MW | 7/20/2005 | | Well Installed | | | | | | | | | |
| | 7/22/2005 | Round 13 | 0.00040 J | 0.00030 U | 0.00040 U | 0.00030 U | 0.01500 | 0.00200 U | 0.00040 U | 0.00030 J | 0.11000 | 0.00030 U |
| | 10/7/2005 | Round 14 | 0.00040 J | 0.00030 U | 0.00040 U | 0.00030 U | 0.01100 | 0.00200 U | 0.00040 U | 0.00030 J | 0.08300 | 0.00030 U |
| | 1/25/2006 | Round 15 | 0.00040 U | 0.00030 U | 0.00040 U | 0.00030 U | 0.00900 | 0.00200 U | 0.00040 U | 0.00040 J | 0.05100 | 0.00030 U |
| | 8/28/2006 | Round 16 | 0.00060 U | 0.00100 U | 0.00040 U | 0.00200 UJ | 0.01700 J | 0.00500 UJ | 0.00060 U | 0.00060 U | 0.15000 | 0.00060 U |
| | 5/8/2007 | Round 17 | 0.00029 J | 0.00011 U | 0.00013 U | 0.00028 U | 0.01600 | 0.00023 U | 0.00010 U | 0.00047 J | 0.15000 | 0.00068 J |
| | 9/5/2007 | Round 18 | 0.00053 J | 0.00011 U | 0.00013 U | 0.00028 U | 0.01800 | 0.00023 U | 0.00010 U | 0.00049 J | 0.16000 | 0.00075 J |
| | 1/29/2008 | Round 19 (PDB) | 0.00059 J | 0.00044 U | 0.00036 U | 0.00060 U | 0.01600 | 0.00040 U | 0.00046 U | 0.00048 U | 0.15000 | 0.00043 U |
| | 7/23/2008 | Round 20 (PDB) | 0.00110 U | 0.00044 U | 0.00056 U | 0.00120 U | 0.01540 | 0.00200 U | 0.00044 U | 0.00090 U | 0.17000 | 0.00060 U |
| | 1/12/2009 | Round 21 (PDB) | 0.00110 U | 0.00044 U | 0.00056 U | 0.00120 U | 0.01380 | 0.00300 J | 0.00044 U | 0.00090 U | 0.16200 | 0.00060 U |
| | 7/15/2009 | Round 22 | 0.00110 U | 0.00022 U | 0.00056 U | 0.00120 U | 0.01430 | 0.00490 J | 0.00044 U | 0.00090 U | 0.15700 | 0.00060 U |
| | 1/12/2010 | Round 23 (PDB) | 0.00058 U | 0.00068 U | 0.00050 U | 0.00100 U | 0.01450 | 0.00770 J | 0.00088 U | 0.00068 U | 0.15300 | 0.00056 U |
| | 7/14/2010 | Round 24 (PDB) | 0.00058 U | 0.00034 U | 0.00025 U | 0.00050 U | 0.01980 | 0.00400 U | 0.00088 U | 0.00068 U | 0.19200 | 0.00056 U |
| | 1/12/2011 | Round 25 (PDB) | 0.00046 U | 0.00050 U | 0.00044 U | 0.00100 U | 0.0148 | 0.01270 | 0.00050 U | 0.00070 U | 0.18600 | 0.00044 U |
| | 7/27/2011 | Round 26 | 0.00060 J | 0.00025 U | 0.00022 U | 0.00050 U | 0.0188 | 0.00200 U | 0.00025 U | 0.00043 J | 0.17200 | 0.00027 J |
| | 1/11/2012 | Round 27 (PDB) | 0.00067 J | 0.00025 U | 0.00022 U | 0.00050 U | 0.0190 | 0.0020 U | 0.00025 U | 0.00035 U | 0.1790 | 0.00022 U |
| | 7/11/2012 | Round 28 | 0.00046 U | NS | NS | NS | 0.0175 | NS | 0.00050 U | 0.00070 U | 0.1610 | NS |
| | 1/9/2013 | Round 29 (PDB) | 0.00040 U | 0.00063 U | 0.00053 U | 0.0010 U | 0.0110 | 0.0040 U | 0.00064 U | 0.00046 U | 0.1320 | 0.00088 U |
| | 7/17/2013 | Round 30 | 0.00040 U | 0.00063 U | 0.00053 U | 0.0010 U | 0.0161 | 0.0040 U | 0.00064 U | 0.00046 U | 0.1200 | 0.00088 U |
| | 2/25/2014 | Round 31 (PDB) | 0.00053 U | 0.0004 U | 0.00031 U | 0.00053 U | 0.0158 | 0.0020 U | 0.00026 U | 0.00037 J | 0.1120 | 0.00033 U |
| | 7/22/2014 | Round 32 | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0137 | 0.001 U | 0.0005 U | 0.0005 U | 0.1150 | 0.0005 U |
| | 1/21/2015 | Round 33 (PDB) | 0.0005 U | NS | NS | NS | 0.0111 | NS | 0.0005 U | 0.0005 U | 0.0848 | NS |
| | 7/22/2015 | Round 34 | 0.000481 J | 0.0005 U | 0.0005 U | 0.0005 U | 0.0167 | 0.001 U | 0.0005 U | 0.000454 J | 0.1500 | 0.0005 U |
| | 1/21/2016 | Round 35 (PDB) | 0.0005 U | NS | NS | NS | 0.0146 | NS | 0.0005 U | 0.0005 U | 0.1450 | NS |
| | 7/22/2016 | Round 36 | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0146 | 0.001 U | 0.0005 U | 0.0005 U | 0.1390 | 0.0005 U |

**Table 4-1A**

**Summary of Chemicals of Concern Detected in Groundwater**
**Long Term Monitoring Wells — SWMU 21 Plume**
**2016 RAER**

**Former NAS Dallas, Texas**


| Monitoring Well | Sampling Date | Sampling Round | Chemicals of Concern (mg/L) | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | 1,1-Dichloroethene | Carbon Tetrachloride | Chloroform | Chloromethane | cis-1,2-Dichloroethene | Methylene Chloride | Tetrachloroethene | trans-1,2-Dichloroethene | Trichloroethene | Vinyl Chloride |
| Protective Concentration Levels (mg/L) | | | 0.00700 | 0.00500 | 0.24000 | 0.07000 | 0.07000 | 0.00500 | 0.00500 | 0.10000 | 0.00500 | 0.00200 |
| Point of Exposure and Background Monitoring Wells | | | | | | | | | | | | |
| 600D89MW | 8/18/1999 | Well Installed | | | | | | | | | | |
| | 8/18/1999 | Round 5 | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00150 J | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U |
| | 7/12/2000 | Round 6 | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U |
| | 7/9/2001 | Round 7 | 0.00500 U | 0.00500 U | 0.00500 U | 0.01000 U | 0.00250 U | 0.00500 U | 0.00500 U | 0.00250 U | 0.00500 U | 0.01000 U |
| | 1/20/2003 | Round 8 | 0.00100 U | 0.00100 U | 0.00100 U | 0.00100 U | 0.00100 U | 0.00200 U | 0.00100 U | 0.00100 U | 0.00100 U | 0.00100 U |
| | -- | Round 9 | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS |
| | 12/5/2003 | Round 10 | 0.00043 U | 0.00039 U | 0.00049 U | 0.00049 U | 0.00041 U | 0.00053 U | 0.00038 U | 0.00041 U | 0.00036 U | 0.00098 U |
| | -- | Round 11 | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS |
| | 10/14/2004 | Round 12 (PDB) | 0.00035 U | 0.00025 U | 0.00010 U | 0.00017 U | 0.00027 U | 0.00040 U | 0.00021 U | 0.00023 U | 0.00022 U | 0.00017 U |
| | 4/3/2005 | Round 13 (PDB) | 0.00040 U | 0.00030 U | 0.00040 U | 0.00030 U | 0.00030 U | 0.00200 U | 0.00040 U | 0.00030 U | 0.00030 U | 0.00030 U |
| | 10/8/2005 | Round 14 | 0.00040 U | 0.00030 U | 0.00040 U | 0.00030 U | 0.00030 U | 0.00200 U | 0.00040 U | 0.00030 U | 0.00030 U | 0.00030 U |
| | 5/5/2006 | Round 15 | 0.00060 U | 0.00050 U | 0.00040 U | 0.00060 U | 0.00050 U | 0.00200 U | 0.00060 U | 0.00060 U | 0.00090 J | 0.00060 U |
| | 8/28/2006 | Round 16 | 0.00060 U | 0.00050 U | 0.00040 U | 0.00060 U | 0.00050 U | 0.00200 U | 0.00060 U | 0.00060 U | 0.00040 U | 0.00060 U |
| | 5/8/2007 | Round 17 | 0.00028 U | 0.00020 U | 0.00023 U | 0.00017 U | 0.00045 U | 0.00025 U | 0.00014 U | 0.00053 U | 0.00076 J | 0.00012 U |
| | 9/6/2007 | Round 18 | 0.00013 U | 0.00011 U | 0.00013 U | 0.00028 U | 0.00030 J | 0.00023 U | 0.00010 U | 0.00015 U | 0.00060 J | 0.00020 U |
| | 1/29/2008 | Round 19 (PDB) | 0.00039 U | 0.00044 U | 0.00036 U | 0.00060 U | 0.00032 U | 0.00040 U | 0.00046 U | 0.00048 U | 0.00053 U | 0.00043 U |
| | 7/23/2008 | Round 20 (PDB) | 0.00054 U | 0.00022 U | 0.00028 U | 0.00061 U | 0.00020 U | 0.00100 U | 0.00022 U | 0.00045 U | 0.00032 U | 0.00030 U |
| | 1/12/2009 | Round 21 (PDB) | 0.00054 U | 0.00022 U | 0.00028 U | 0.00061 U | 0.00020 U | 0.00100 U | 0.00022 U | 0.00045 U | 0.00032 U | 0.00030 U |
| | 7/15/2009 | Round 22 | 0.00054 U | 0.00022 U | 0.00028 U | 0.00061 U | 0.00020 U | 0.00100 U | 0.00022 U | 0.00045 U | 0.00046 J | 0.00030 U |
| | 1/12/2010 | Round 23 (PDB) | 0.00029 U | 0.00034 U | 0.00025 U | 0.00050 U | 0.00032 U | 0.00200 U | 0.00044 U | 0.00034 U | 0.00024 U | 0.00028 U |
| | 7/14/2010 | Round 24 (PDB) | 0.00029 U | 0.00034 U | 0.00025 U | 0.00050 U | 0.00032 U | 0.00200 U | 0.00044 U | 0.00034 U | 0.00024 U | 0.00028 U |
| | 1/12/2011 | Round 25 (PDB) | 0.00023 U | 0.00025 U | 0.00022 U | 0.00050 U | 0.00026 U | 0.00200 U | 0.00025 U | 0.00035 U | 0.00026 U | 0.00022 U |
| | 6/15/2011 | Well Abandoned and Relocated as Monitoring Well 608D161MW | | | | | | | | | | |
| 608D161MW | 6/17/2011 | Well Installed | | | | | | | | | | |
| | 7/27/2011 | Round 26 | 0.0006 J | 0.00025 U | 0.00022 U | 0.00200 | 0.00580 | 0.00200 U | 0.00025 U | 0.00035 U | 0.09670 | 0.00028 J |
| | 1/11/2012 | Round 27 | 0.00057 J | 0.00025 U | 0.00022 U | 0.00050 U | 0.0063 | 0.0020 U | 0.00025 U | 0.00035 U | 0.0967 | 0.00027 J |
| | 1/11/2012 | Round 27 (PDB) | 0.00067 J | 0.00025 U | 0.00022 U | 0.00050 U | 0.0075 | 0.0020 U | 0.00025 U | 0.00035 U | 0.111 | 0.00027 J |
| | 1/11/2012 | Round 27 | 0.00057 J | 0.00025 U | 0.00022 U | 0.00050 U | 0.0063 | 0.0020 U | 0.00025 U | 0.00035 U | 0.0967 | 0.00027 J |
| | 7/11/2012 | Round 28 | 0.00069 J | NS | NS | NS | 0.0065 | NS | 0.00025 U | 0.00035 U | 0.101 | NS |
| | 1/9/2013 | Round 29 | 0.00075 J | 0.00031 U | 0.00026 U | 0.00050 U | 0.0076 | 0.0020 U | 0.00032 U | 0.00050 J | 0.0982 | 0.00044 U |
| | 1/9/2013 | Round 29 (PDB) | 0.00040 U | 0.00063 U | 0.00053 U | 0.0010 U | 0.0064 | 0.0040 U | 0.00064 U | 0.00046 U | 0.1050 | 0.00088 U |
| | 7/17/2013 | Round 30 | 0.00073 J | 0.00063 U | 0.00026 U | 0.0010 U | 0.0085 | 0.0040 U | 0.00064 U | 0.00040 J | 0.1060 | 0.00088 U |
| | 2/25/2014 | Round 31 (PDB) | 0.00051 U | 0.00079 U | 0.00062 U | 0.0011 U | 0.0078 | 0.0040 U | 0.00051 | 0.00069 U | 0.1150 | 0.00065 U |
| | 7/23/2014 | Round 32 | 0.00075 J | 0.00025 U | 0.00025 U | 0.00025 U | 0.0081 | 0.0005 U | 0.00025 U | 0.00051 J | 0.0995 | 0.00025 U |
| | 1/21/2015 | Round 33 (PDB) | 0.000701 J | NS | NS | NS | 0.00774 | NS | 0.0005 U | 0.000517 J | 0.0834 | NS |
| | 7/22/2015 | Round 34 | 0.000557 J | 0.00025 U | 0.00025 U | 0.00025 U | 0.00941 | 0.0005 U | 0.0005 U | 0.000448 J | 0.0979 | 0.00025 U |
| | 1/21/2016 | Round 35 (PDB) | 0.0005 U | NS | NS | NS | 0.00813 | NS | 0.0005 U | 0.0005 U | 0.0822 | NS |
| | 7/22/2016 | Round 36 | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.00968 | 0.001 U | 0.0005 U | 0.0005 U | 0.0873 | 0.0005 U |

**Table 4-1A**

**Summary of Chemicals of Concern Detected in Groundwater**
**Long Term Monitoring Wells — SWMU 21 Plume**
**2016 RAER**

**Former NAS Dallas, Texas**


| Monitoring Well | Sampling Date | Sampling Round | Chemicals of Concern (mg/L) | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | 1,1-Dichloroethene | Carbon Tetrachloride | Chloroform | Chloromethane | cis-1,2-Dichloroethene | Methylene Chloride | Tetrachloroethene | trans-1,2-Dichloroethene | Trichloroethene | Vinyl Chloride |
| Protective Concentration Levels (mg/L) | | | 0.00700 | 0.00500 | 0.24000 | 0.07000 | 0.07000 | 0.00500 | 0.00500 | 0.10000 | 0.00500 | 0.00200 |
| 608D33MW | 4/2/1998 | Well Installed | | | | | | | | | | |
| | 5/14/1998 | Round 2 | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U |
| | 8/31/1998 | Round 3 | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U |
| | -- | Round 4 | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS |
| | 11/8/1999 | Round 5 | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U |
| | 7/20/2000 | Round 6 | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U |
| | 7/9/2001 | Round 7 | 0.00500 U | 0.00500 U | 0.00500 U | 0.01000 U | 0.00250 U | 0.00500 U | 0.00500 U | 0.00250 U | 0.00500 U | 0.01000 U |
| | 1/13/2003 | Round 8 | 0.00100 U | 0.00100 U | 0.00100 U | 0.00100 U | 0.00100 U | 0.00200 U | 0.00100 U | 0.00100 U | 0.00070 J | 0.00100 U |
| | -- | Round 9 | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS |
| | 12/8/2003 | Round 10 | 0.00033 U | 0.00039 U | 0.00049 U | 0.00049 U | 0.00041 U | 0.00053 U | 0.00038 U | 0.00041 U | 0.00036 U | 0.00098 U |
| | -- | Round 11 | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS |
| | 10/14/2004 | Round 12 (PDB) | 0.00035 U | 0.00025 U | 0.00010 U | 0.00017 U | 0.00027 U | 0.00040 U | 0.00021 U | 0.00023 U | 0.00022 U | 0.00017 U |
| | -- | Round 13 | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS |
| | 10/8/2005 | Round 14 | 0.00040 U | 0.00030 U | 0.00040 U | 0.00030 U | 0.00030 U | 0.00200 U | 0.00040 U | 0.00030 U | 0.00080 J | 0.00030 U |
| | 5/4/2006 | Round 15 | 0.00060 U | 0.00050 U | 0.00040 U | 0.00060 U | 0.00050 U | 0.00200 U | 0.00060 U | 0.00060 U | 0.00040 J | 0.00060 U |
| | 8/29/2006 | Round 16 | 0.00060 U | 0.00050 U | 0.00040 U | 0.00060 U | 0.00050 U | 0.00200 U | 0.00060 U | 0.00060 U | 0.00040 J | 0.00060 U |
| | 5/7/2007 | Round 17 | 0.00013 U | 0.00011 U | 0.00013 U | 0.00028 U | 0.00047 J | 0.00023 U | 0.00010 U | 0.00015 U | 0.00110 | 0.00020 U |
| | 9/7/2007 | Round 18 | 0.00042 U | 0.00014 U | 0.00010 U | 0.00040 U | 0.00044 U | 0.00026 U | 0.00014 U | 0.00040 U | 0.00028 U | 0.00019 U |
| | 1/29/2008 | Round 19 (PDB) | 0.00039 U | 0.00044 U | 0.00036 U | 0.00060 U | 0.00069 J | 0.00040 U | 0.00046 U | 0.00048 U | 0.00250 | 0.00043 U |
| | 7/23/2008 | Round 20 (PDB) | 0.00054 U | 0.00022 U | 0.00028 U | 0.00061 U | 0.00059 J | 0.00100 U | 0.00022 U | 0.00045 U | 0.00055 J | 0.00030 U |
| | 1/12/2009 | Round 21 (PDB) | 0.00054 U | 0.00022 U | 0.00028 U | 0.00061 U | 0.00071 J | 0.00100 U | 0.00022 U | 0.00045 U | 0.00130 | 0.00030 U |
| | 7/15/2009 | Round 22 | 0.00054 U | 0.00022 U | 0.00028 U | 0.00061 U | 0.00023 J | 0.00100 U | 0.00022 U | 0.00045 U | 0.00098 J | 0.00030 U |
| | 1/12/2010 | Round 23 (PDB) | 0.00029 U | 0.00034 U | 0.00025 U | 0.00050 U | 0.00032 U | 0.00200 U | 0.00044 U | 0.00034 U | 0.00055 J | 0.00028 U |
| | 7/14/2010 | Round 24 (PDB) | 0.00029 U | 0.00034 U | 0.00025 U | 0.00050 U | 0.00032 U | 0.00200 U | 0.00044 U | 0.00034 U | 0.00055 J | 0.00028 U |
| | 1/12/2011 | Round 25 | 0.00023 U | 0.00025 U | 0.00022 U | 0.00050 U | 0.00055 J | 0.00200 U | 0.00025 U | 0.00035 U | 0.00120 | 0.00022 U |
| | 7/26/2011 | Round 26 | 0.00023 U | 0.00025 U | 0.00022 U | 0.00050 U | 0.00075 J | 0.00200 U | 0.00025 U | 0.00035 U | 0.00095 J | 0.00022 U |
| | 1/11/2012 | Round 27 | 0.00023 U | 0.00025 U | 0.00022 U | 0.00050 U | 0.000073 J | 0.0020 U | 0.00025 U | 0.00035 U | 0.00095 J | 0.00022 U |
| | 7/11/2012 | Round 28 | 0.00023 U | NS | NS | NS | 0.0011 J | NS | 0.00025 U | 0.000035 U | 0.0012 | NS |
| | 1/9/2013 | Round 29 | 0.00020 U | 0.00031 U | 0.00026 U | 0.00050 U | 0.00024 U | 0.0020 U | 0.00032 U | 0.00023 U | 0.00092 J | 0.00044 U |
| | 7/17/2013 | Round 30 | 0.00020 U | 0.00031 U | 0.00026 U | 0.00050 U | 0.00110 | 0.0020 U | 0.00032 U | 0.00023 U | 0.00180 | 0.00044 U |
| | 2/25/2014 | Round 31 (PDB) | 0.00025 U | 0.0004 U | 0.00031 U | 0.00053 U | 0.00120 | 0.0020 U | 0.00026 U | 0.00034 U | 0.00130 U | 0.00033 U |
| | 7/21/2014 | Round 32 | 0.00025 U | 0.00025 U | 0.00025 U | 0.00029 J | 0.00055 J | 0.0005 U | 0.00025 U | 0.00025 U | 0.00102 JH | 0.00025 U |
| | 1/21/2015 | Round 33 | 0.00025 U | NS | NS | NS | 0.00045 J | NS | 0.00025 U | 0.00025 U | 0.00061 JH | NS |
| | 7/23/2015 | Round 34 | 0.00025 U | 0.00025 U | 0.00025 U | 0.00025 U | 0.000263 J | 0.0005 U | 0.00025 U | 0.00025 U | 0.000393 J | 0.00025 U |
| | 1/21/2016 | Round 35 (PDB) | 0.0005 U | NS | NS | NS | 0.0005 U | NS | 0.0005 U | 0.0005 U | 0.0005 U | NS |
| | 7/22/2016 | Round 36 | 0.00025 UJ | 0.00025 U | 0.00025 U | 0.00025 U | 0.00025 U | 0.0005 U | 0.00025 U | 0.00025 U | 0.00048 J | 0.00025 U |
| 608D162MW | 1/29/2014 | Well Installed | | | | | | | | | | |
| | 1/29/2014 | Round 31 (PDB) | 0.00025 U | 0.0004 U | 0.00031 U | 0.00053 U | 0.00079 J | 0.0020 U | 0.00026 U | 0.00034 U | 0.00390 | 0.00033 U |
| | 7/23/2014 | Round 32 | 0.00025 U | 0.00025 U | 0.00025 U | 0.00025 U | 0.00053 J | 0.0005 U | 0.00025 U | 0.00025 U | 0.00258 | 0.00025 U |
| | 1/21/2015 | Round 33 (PDB) | 0.00025 U | NS | NS | NS | 0.000263 J | NS | 0.00025 U | 0.00025 U | 0.00091 J | NS |
| | 7/22/2015 | Round 34 | 0.00025 U | 0.00025 U | 0.00025 U | 0.00025 U | 0.00609 | 0.0005 U | 0.00025 U | 0.00263 | 0.0216 | 0.00025 U |
| | 1/21/2016 | Round 35 (PDB) | 0.00025 U | NS | NS | NS | 0.00288 | NS | 0.00025 U | 0.00105 | 0.00268 | NS |
| | 7/22/2016 | Round 36 | 0.00025 U | 0.00025 U | 0.00025 U | 0.00025 U | 0.00124 | 0.0005 U | 0.00025 U | 0.00036 J | 0.00108 | 0.00025 U |
| 608D163MW | 1/29/2014 | Well Installed | | | | | | | | | | |
| | 1/29/2014 | Round 31 (PDB) | 0.00025 U | 0.0004 U | 0.00031 U | 0.00053 U | 0.00033 U | 0.0020 U | 0.00026 U | 0.00034 U | 0.00030 U | 0.00033 U |
| | 7/23/2014 | Round 32 | 0.00025 U | 0.00025 U | 0.00025 U | 0.00025 U | 0.00025 U | 0.0005 U | 0.00025 U | 0.00025 U | 0.00025 U | 0.00025 U |
| | 1/21/2015 | Round 33 (PDB) | 0.00025 U | NS | NS | NS | 0.00025 U | NS | 0.00025 U | 0.00025 U | 0.00025 U | NS |
| | 7/22/2015 | Round 34 | 0.00025 U | 0.00025 U | 0.00025 U | 0.00025 U | 0.00025 U | 0.0005 U | 0.00025 U | 0.00025 U | 0.00025 U | 0.00025 U |
| | 1/21/2016 | Round 35 (PDB) | 0.0005 U | NS | NS | NS | 0.0005 U | NS | 0.0005 U | 0.0005 U | 0.0005 U | NS |
| | 7/22/2016 | Round 36 | 0.00025 U | 0.00025 U | 0.00025 U | 0.00025 U | 0.00025 U | 0.0005 U | 0.00025 U | 0.00025 U | 0.00025 U | 0.00025 U |

mg/L - milligrams per liter
NA - Not Applicable
NS - Not Sampled
NS-D - Not Sampled during this Round due to insufficient water in the monitoring well
LF - Low Flow
PDB - Passive Diffusion Bag
SDG - Sample Delivery Group
PCLE - Protective Concentration Level Exceedance

Note:
Shaded areas indicate an exceedance.
* Methylene Chloride is a common lab contaminant.

Analytical Result Qualifiers:
J - Indicates that the chemical was detected. However, the associated numerical result may not be a precise representation of the amount that is actually present in the sample. The laboratory reported concentration is considered to be an estimate of the true concentration.
U - Indicates that the chemical was not detected at the numerical detection limit (sample-specific quantitation limit) noted. Nondetected results from the laboratory are reported in this manner. This qualifier is added to a positive result (reported by the laboratory) if the detected concentration is determined to be attributable to contamination introduced during field sampling or laboratory analysis.
UJ - Indicates that the chemical was not detected. However, the detection limit (sample-specific quantitation limit) is considered to be estimated based on problems encountered during laboratory analysis. The associated numerical detection limit is regarded as inaccurate or imprecise.

**Table 4-1B**

**Summary of Chemicals of Concern Detected in Groundwater**
**Historical Monitoring Wells — SWMU 21 Plume**
**2016 RAER**

**Former NAS Dallas, Texas**


| Monitoring Well | Sampling Date | Sampling Round | Chemicals of Concern (mg/L) | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | 1,1-Dichloroethene | Carbon Tetrachloride | Chloroform | Chloromethane | cis-1,2-Dichloroethene | Methylene Chloride | Tetrachloroethene | trans-1,2-Dichloroethene | Trichloroethene | Vinyl Chloride |
| **Protective Concentration Levels (mg/L)** | | | **0.00700** | **0.00500** | **0.24000** | **0.07000** | **0.07000** | **0.00500** | **0.00500** | **0.10000** | **0.00500** | **0.00200** |
| **Monitoring Wells Located Inside PCLE Zone** | | | | | | | | | | | | |
| **600D88MW** | 8/19/1999 | Well Installed | | | | | | | | | | |
| | 8/19/1999 | Round 5 | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00380 J | 0.00500 U | 0.00500 U | 0.00500 U | 0.00940 | 0.00500 U |
| | 7/12/2000 | Round 6 | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00610 | 0.00500 U | 0.00500 U | 0.00500 U | 0.00970 | 0.00500 U |
| | 6/25/2001 | Round 7 | 0.00500 U | 0.00500 U | 0.00500 U | 0.01000 U | 0.00720 | 0.00500 U | 0.00500 U | 0.00250 U | 0.00820 | 0.01000 U |
| | -- | Well Destroyed | | | | | | | | | | |
| **600D103MW** | 8/9/2000 | Well Installed | | | | | | | | | | |
| | 8/21/2000 | Round 6 | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00370 J | 0.00500 U | 0.00500 U | 0.00500 U | 0.04500 | 0.00500 U |
| | 6/25/2001 | Round 7 | 0.00500 U | 0.00500 U | 0.00500 U | 0.01000 U | 0.00450 | 0.00500 U | 0.00500 U | 0.00250 U | 0.04300 | 0.01000 U |
| | 1/28/2003 | Round 8 | 0.00200 U | 0.00200 U | 0.00200 U | 0.00200 U | 0.00450 | 0.00400 U | 0.00200 U | 0.00200 U | 0.04800 | 0.00200 U |
| | 8/26/2003 | Round 9 (PDB) | 0.00044 U | 0.00036 U | 0.00042 U | 0.00052 U | 0.00670 | 0.00056 U | 0.00024 U | 0.00048 U | 0.03700 | 0.00052 U |
| | 12/5/2003 | Round 10 | 0.00070 U | 0.00039 U | 0.00049 U | 0.00049 U | 0.00830 | 0.00053 U | 0.00038 U | 0.00055 J | 0.09100 | 0.00098 U |
| | 7/28/2004 | Round 11 (PDB) | 0.00035 U | 0.00025 U | 0.00010 U | 0.00017 U | 0.00180 | 0.00040 U | 0.00021 U | 0.00023 U | 0.01500 | 0.00017 U |
| | 10/13/2004 | Round 12 (PDB) | 0.00088 U | 0.00062 U | 0.00025 U | 0.00044 U | 0.02400 | 0.00100 U | 0.00052 U | 0.00057 U | 0.05000 | 0.00042 U |
| | 4/18/2005 | Well Abandoned | | | | | | | | | | |
| **600D104MW** | 8/1/2000 | Well Installed | | | | | | | | | | |
| | 8/21/2000 | Round 6 | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00400 J | 0.00500 U | 0.00500 U | 0.00500 U | 0.04300 | 0.00500 U |
| | 10/20/2000 | Well Abandoned | | | | | | | | | | |
| **600D105MW** | 8/7/2000 | Well Installed | | | | | | | | | | |
| | 8/21/2000 | Round 6 | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00270 J | 0.00500 U | 0.00500 U | 0.00500 U | 0.03800 | 0.00500 U |
| | 10/20/2000 | Well Abandoned | | | | | | | | | | |
| **600D106MW** | 8/8/2000 | Well Installed | | | | | | | | | | |
| | 8/20/2000 | Round 6 | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00260 J | 0.00500 U |
| | 7/12/2001 | Round 7 | 0.00500 U | 0.00500 U | 0.00500 U | 0.01000 U | 0.00250 U | 0.00500 U | 0.00500 U | 0.00250 U | 0.00210 J | 0.01000 U |
| | 1/27/2003 | Round 8 | 0.00100 U | 0.00100 U | 0.00100 U | 0.00100 U | 0.00100 U | 0.00200 U | 0.00100 U | 0.00100 U | 0.00055 J | 0.00100 U |
| | 12/5/2003 | Round 10 | 0.00033 U | 0.00039 U | 0.00049 U | 0.00049 U | 0.00041 U | 0.00053 U | 0.00038 U | 0.00041 U | 0.00074 J | 0.00098 U |
| | 10/14/2004 | Round 12 (PDB) | 0.00035 U | 0.00025 U | 0.00010 U | 0.00017 U | 0.00027 U | 0.00040 U | 0.00021 U | 0.00023 U | 0.00034 J | 0.00017 U |
| | 4/18/2005 | Well Abandoned | | | | | | | | | | |
| **600D108MW** | 8/20/2000 | Well Installed | | | | | | | | | | |
| | 8/20/2000 | Round 6 | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00340 J | 0.00500 U | 0.00500 U | 0.00500 U | 0.01400 | 0.00500 U |
| | 7/13/2001 | Round 7 | 0.00500 U | 0.00500 U | 0.00500 U | 0.01000 U | 0.00390 | 0.00500 U | 0.00500 U | 0.00250 U | 0.00610 | 0.01000 U |
| | 1/13/2003 | Round 8 | 0.00100 U | 0.00100 U | 0.00100 U | 0.00100 U | 0.00100 U | 0.00200 U | 0.00100 U | 0.00100 U | 0.00028 J | 0.00100 U |
| | 8/26/2003 | Round 9 (PDB) | 0.00022 U | 0.00018 U | 0.00021 U | 0.00026 U | 0.00200 | 0.00028 U | 0.00044 U | 0.00024 U | 0.00089 J | 0.00026 U |
| | 12/5/2003 | Round 10 | 0.00033 U | 0.00039 U | 0.00049 U | 0.00049 U | 0.00270 | 0.00053 U | 0.00038 U | 0.00041 U | 0.00600 | 0.00098 U |
| | 7/28/2004 | Round 11 (PDB) | 0.00055 J | 0.00025 U | 0.00010 U | 0.00017 U | 0.01400 J | 0.00040 UJ | 0.00021 U | 0.00052 J | 0.07300 J | 0.00017 U |
| | 10/13/2004 | Round 12 (PDB) | 0.00035 U | 0.00025 U | 0.00010 U | 0.00017 U | 0.00120 | 0.00040 U | 0.00021 U | 0.00023 U | 0.00110 | 0.00017 U |
| | 4/18/2005 | Well Abandoned | | | | | | | | | | |
| **606D24MW** | 5/3/1998 | Well Installed | | | | | | | | | | |
| | 5/14/1998 | Round 2 | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.01100 | 0.00500 U | 0.00500 U | 0.00500 U | 0.02800 | 0.00500 U |
| | 8/31/1998 | Round 3 | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.01200 | 0.00500 U | 0.00500 U | 0.00500 U | 0.02500 | 0.00500 U |
| | 3/28/1999 | Round 4 | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.01300 | 0.00500 U | 0.00500 U | 0.00051 J | 0.03000 | 0.00500 U |
| | 9/27/1999 | Well Destroyed | | | | | | | | | | |
| **60801MW** | 11/17/1995 | Round 1 | 0.00500 U | 0.00500 U | 0.00500 U | 0.01000 U | NA | 0.00220 J | 0.00680 | NA | 0.04900 | 0.01000 U |
| | 4/20/1998 | Round 2 | 0.00110 J | 0.00500 U | 0.00500 U | 0.00500 U | 0.00430 J | 0.00500 U | 0.00500 U | 0.00500 U | 0.06700 | 0.00500 U |
| | 9/21/1998 | Round 3 | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00670 | 0.00500 U | 0.00500 U | 0.00500 U | 0.09600 | 0.00500 U |
| | 3/31/1999 | Round 4 | 0.00130 J | 0.00500 U | 0.00500 U | 0.00500 U | 0.00690 | 0.00500 U | 0.00500 U | 0.00500 U | 0.11000 | 0.00500 U |
| | 11/4/1999 | Round 5 | 0.02500 U | 0.02500 U | 0.02500 U | 0.02500 U | 0.00690 J | 0.02500 U | 0.02500 U | 0.02500 U | 0.12000 | 0.02500 U |
| | 7/20/2000 | Round 6 | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00770 | 0.00500 U | 0.00500 U | 0.00500 U | 0.13000 | 0.00500 U |
| | 6/25/2001 | Round 7 | 0.00160 J | 0.00500 U | 0.00500 U | 0.01000 U | 0.00740 | 0.00500 U | 0.00500 U | 0.00250 U | 0.13000 | 0.01000 U |
| | -- | Well Abandoned | | | | | | | | | | |

**Table 4-1B**

**Summary of Chemicals of Concern Detected in Groundwater**
**Historical Monitoring Wells — SWMU 21 Plume**
**2016 RAER**

**Former NAS Dallas, Texas**


| Monitoring Well | Sampling Date | Sampling Round | Chemicals of Concern (mg/L) | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | 1,1-Dichloroethene | Carbon Tetrachloride | Chloroform | Chloromethane | cis-1,2-Dichloroethene | Methylene Chloride | Tetrachloroethene | trans-1,2-Dichloroethene | Trichloroethene | Vinyl Chloride |
| **Protective Concentration Levels (mg/L)** | | | **0.00700** | **0.00500** | **0.24000** | **0.07000** | **0.07000** | **0.00500** | **0.00500** | **0.10000** | **0.00500** | **0.00200** |
| **Monitoring Wells Located Outside PCLE Zone** | | | | | | | | | | | | |
| **60605MW** | 11/16/1995 | Round 1 | 0.00500 U | 0.00500 U | 0.00500 U | 0.01000 U | 0.00500 U | 0.01000 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.01000 U |
| | 11/5/1999 | Round 5 | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00097 J | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U |
| | 7/19/2000 | Round 6 | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U |
| | 6/20/2001 | Round 7 | 0.00500 U | 0.00500 U | 0.00500 U | 0.01000 U | 0.00250 U | 0.00500 U | 0.00500 U | 0.00250 U | 0.00500 U | 0.01000 U |
| | 1/10/2003 | Round 8 | 0.00100 U | 0.00100 U | 0.00100 U | 0.00100 U | 0.00038 J | 0.00200 U | 0.00100 U | 0.00100 U | 0.00100 U | 0.00100 U |
| | -- | Well Destroyed | | | | | | | | | | |
| **606D17MW** | -- | Well Installed | | | | | | | | | | |
| | 5/18/1998 | Round 2 | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U |
| | 8/30/1998 | Round 3 | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 UJ | 0.00500 U | 0.00500 U |
| | 11/3/1999 | Round 5 | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00038 J | 0.00610 | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U |
| | 7/19/2000 | Round 6 | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U |
| | 6/21/2001 | Round 7 | 0.00500 U | 0.00500 U | 0.00500 U | 0.01000 U | 0.00250 U | 0.00500 U | 0.00500 U | 0.00250 U | 0.00500 U | 0.01000 U |
| | -- | Well Abandoned | | | | | | | | | | |
| **606D18MW** | 4/6/1998 | Well Installed | | | | | | | | | | |
| | 5/14/1998 | Round 2 | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U |
| | 9/1/1998 | Round 3 | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U |
| | 10/19/1999 | Round 5 | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U |
| | 7/19/2000 | Round 6 | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U |
| | 6/20/2001 | Round 7 | 0.00500 U | 0.00500 U | 0.00500 U | 0.01000 U | 0.00250 U | 0.00500 U | 0.00500 U | 0.00250 U | 0.00500 U | 0.01000 U |
| | 1/10/2003 | Round 8 | 0.00100 U | 0.00100 U | 0.00100 U | 0.00100 U | 0.00100 U | 0.00200 U | 0.00100 U | 0.00100 U | 0.00100 U | 0.00100 U |
| | 12/9/2003 | Round 10 | 0.00021 U | 0.00020 U | 0.00014 U | 0.00008 U | 0.00016 U | 0.00016 U | 0.00024 U | 0.00019 U | 0.00010 U | 0.00017 U |
| | 4/17/2005 | Well Abandoned | | | | | | | | | | |
| **606D23MW** | 5/3/1998 | Well Installed | | | | | | | | | | |
| | 5/19/1998 | Round 2 | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U |
| | 9/1/1998 | Round 3 | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U |
| | 11/15/1999 | Round 5 | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U |
| | 7/20/2000 | Round 6 | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U |
| | 6/20/2001 | Round 7 | 0.00500 U | 0.00500 U | 0.00500 U | 0.01000 U | 0.00250 U | 0.00500 U | 0.00500 U | 0.00250 U | 0.00500 U | 0.01000 U |
| | 1/13/2003 | Round 8 | 0.00100 U | 0.00100 U | 0.00100 U | 0.00100 U | 0.00100 U | 0.00200 U | 0.00100 U | 0.00100 U | 0.00100 U | 0.00100 U |
| | 6/3/2003 | Well Abandoned | | | | | | | | | | |
| **606D25MW** | 4/5/1998 | Well Installed | | | | | | | | | | |
| | 5/20/1998 | Round 2 | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U |
| | 9/1/1998 | Round 3 | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U |
| | 11/5/1999 | Round 5 | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U |
| | 7/20/2000 | Round 6 | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U |
| | 6/21/2001 | Round 7 | 0.00500 U | 0.00500 U | 0.00500 U | 0.01000 U | 0.00250 U | 0.00500 U | 0.00500 U | 0.00250 U | 0.00500 U | 0.01000 U |
| | 1/10/2003 | Round 8 | 0.00100 U | 0.00100 U | 0.00100 U | 0.00100 U | 0.00100 U | 0.00200 U | 0.00100 U | 0.00100 U | 0.00100 U | 0.00100 U |
| | 12/9/2003 | Round 10 | 0.00021 U | 0.00020 U | 0.00014 U | 0.00008 U | 0.00016 U | 0.00016 U | 0.00024 U | 0.00019 U | 0.00010 U | 0.00017 U |
| | 4/17/2005 | Well Abandoned | | | | | | | | | | |
| **60701MW** | 10/27/1995 | Round 1 | 0.00500 U | 0.00500 U | 0.00500 U | 0.01000 U | 0.00500 U | 0.01190 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.01000 U |
| | 8/19/1999 | Round 5 | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00150 J | 0.00500 U | 0.00500 U | 0.00500 U | 0.00160 J | 0.00500 U |
| | 7/20/2000 | Round 6 | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00120 J | 0.00500 U | 0.00500 U | 0.00500 U | 0.00110 J | 0.00500 U |
| | 7/9/2001 | Round 7 | 0.00500 U | 0.00500 U | 0.00500 U | 0.01000 U | 0.00089 J | 0.00500 U | 0.00500 U | 0.00250 U | 0.00097 J | 0.01000 U |
| | -- | Well Destroyed | | | | | | | | | | |

**Table 4-1B**

**Summary of Chemicals of Concern Detected in Groundwater**
**Historical Monitoring Wells — SWMU 21 Plume**
**2016 RAER**

**Former NAS Dallas, Texas**


| Monitoring Well | Sampling Date | Sampling Round | Chemicals of Concern (mg/L) | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | 1,1-Dichloroethene | Carbon Tetrachloride | Chloroform | Chloromethane | cis-1,2-Dichloroethene | Methylene Chloride | Tetrachloroethene | trans-1,2-Dichloroethene | Trichloroethene | Vinyl Chloride |
| **Protective Concentration Levels (mg/L)** | | | **0.00700** | **0.00500** | **0.24000** | **0.07000** | **0.07000** | **0.00500** | **0.00500** | **0.10000** | **0.00500** | **0.00200** |
| **608D34MW** | 5/14/1998 | | Well Installed | | | | | | | | | |
| | 5/14/1998 | Round 2 | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00420 J | 0.00500 U | 0.00500 U | 0.00500 U | 0.01100 | 0.00500 U |
| | 8/29/1998 | Round 3 | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00720 | 0.00500 U |
| | 3/31/1999 | Round 4 | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00220 J | 0.00500 U | 0.00500 U | 0.00500 U | 0.00540 J | 0.00500 U |
| | 11/8/1999 | Round 5 | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00150 J | 0.00500 U | 0.00500 U | 0.00500 U | 0.00360 J | 0.00500 U |
| | 7/21/2000 | Round 6 | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00110 J | 0.00500 U | 0.00500 U | 0.00500 U | 0.00220 J | 0.00500 U |
| | 6/26/2001 | Round 7 | 0.00500 U | 0.00500 U | 0.00500 U | 0.01000 U | 0.00120 J | 0.00500 U | 0.00500 U | 0.00250 U | 0.00250 J | 0.01000 U |
| | 1/13/2003 | Round 8 | 0.00100 U | 0.00100 U | 0.00100 U | 0.00100 U | 0.00100 U | 0.00200 U | 0.00100 U | 0.00100 U | 0.00071 J | 0.00100 U |
| | -- | Round 9 | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS |
| | 12/7/2003 | Round 10 | 0.00055 U | 0.00039 U | 0.00049 U | 0.00049 U | 0.00066 J | 0.00053 U | 0.00038 U | 0.00041 U | 0.00120 | 0.00098 U |
| | 7/19/2004 | Round 11 | 0.00035 U | 0.00025 U | 0.00010 U | 0.00017 U | 0.00034 J | 0.00040 U | 0.00021 U | 0.00023 U | 0.00062 J | 0.00017 U |
| | 10/2/2004 | Round 12 | 0.00035 U | 0.00025 U | 0.00010 U | 0.00017 U | 0.00035 J | 0.00040 U | 0.00021 U | 0.00023 U | 0.00082 J | 0.00017 U |
| | 4/5/2005 | Round 13 | 0.00040 U | 0.00030 U | 0.00040 U | 0.00030 U | 0.00050 J | 0.00200 U | 0.00040 U | 0.00030 U | 0.00100 | 0.00030 U |
| | 10/8/2005 | Round 14 | 0.00040 U | 0.00030 U | 0.00040 U | 0.00030 U | 0.00090 J | 0.00200 U | 0.00040 U | 0.00030 U | 0.00200 | 0.00030 U |
| | 10/8/2005 | Round 14 (PDB) | 0.00040 U | 0.00030 U | 0.00040 U | 0.00030 U | 0.00100 J | 0.00200 U | 0.00040 U | 0.00030 U | 0.00200 | 0.00030 U |
| | 5/4/2006 | Round 15 | 0.00060 U | 0.00050 U | 0.00040 U | 0.00060 U | 0.00050 U | 0.00200 U | 0.00060 U | 0.00060 U | 0.00100 | 0.00060 U |
| | 8/29/2006 | Round 16 | 0.00060 U | 0.00050 U | 0.00040 U | 0.00060 U | 0.00050 U | 0.00200 U | 0.00060 U | 0.00060 U | 0.00060 J | 0.00060 U |
| | 5/7/2007 | Round 17 | 0.00013 U | 0.00011 U | 0.00013 U | 0.00028 U | 0.00039 J | 0.00023 U | 0.00010 U | 0.00015 U | 0.00076 J | 0.00020 U |
| | 9/7/2007 | Round 18 | 0.00042 U | 0.00014 U | 0.00010 U | 0.00043 J | 0.00044 U | 0.00026 U | 0.00014 U | 0.00040 U | 0.00090 J | 0.00019 U |
| | 1/21/2008 | Round 19 | 0.00039 U | 0.00044 U | 0.00036 U | 0.00060 U | 0.00058 J | 0.00040 U | 0.00046 U | 0.00048 U | 0.00160 | 0.00043 U |
| | 7/22/2008 | Round 20 | 0.00054 U | 0.00022 U | 0.00028 U | 0.00061 U | 0.00020 U | 0.00100 U | 0.00022 U | 0.00045 U | 0.00032 U | 0.00030 U |
| | 1/12/2009 | Round 21 | 0.00054 U | 0.00022 U | 0.00028 U | 0.00061 U | 0.00020 U | 0.00100 U | 0.00022 U | 0.00045 U | 0.00055 J | 0.00030 U |
| | 7/15/2009 | Round 22 | 0.00054 U | 0.00022 U | 0.00028 U | 0.00061 U | 0.00029 | 0.00100 U | 0.00022 U | 0.00045 U | 0.00079 J | 0.00030 U |
| | 1/12/2010 | Round 23 (PDB) | 0.00029 U | 0.00034 U | 0.00025 U | 0.00050 U | 0.00032 U | 0.00200 U | 0.00044 U | 0.00034 U | 0.00055 J | 0.00028 U |
| | 7/14/2010 | Round 24 | 0.00029 U | 0.00034 U | 0.00025 U | 0.00050 U | 0.00032 U | 0.00200 U | 0.00044 U | 0.00034 U | 0.00040 J | 0.00028 U |
| | 1/12/2011 | Round 25 | 0.00023 U | 0.00025 U | 0.00022 U | 0.00050 U | 0.00026 U | 0.00200 U | 0.00025 U | 0.00035 U | 0.00075 J | 0.00022 U |
| | 7/26/2011 | Round 26 | 0.00023 U | 0.00025 U | 0.00022 U | 0.00050 U | 0.00026 U | 0.00200 U | 0.00025 U | 0.00035 U | 0.00026 U | 0.00022 U |
| | 1/11/2012 | Round 27 | 0.00023 U | 0.00025 U | 0.00022 U | 0.00050 U | 0.00026 U | 0.0020 U | 0.00025 U | 0.00035 U | 0.00038 J | 0.00022 U |
| | 7/11/2012 | Round 28 | 0.00023 U | NS | NS | NS | 0.00026 U | NS | 0.00025 U | 0.00035 U | 0.00026 U | NS |
| | 1/9/2013 | Round 29 | 0.00020 U | 0.00031 U | 0.00026 U | 0.00050 U | 0.00024 U | 0.0020 U | 0.00032 U | 0.00023 U | 0.00031 U | 0.00044 U |
| | 7/17/2013 | Round 30 | 0.00020 U | 0.00031 U | 0.00026 U | 0.00050 U | 0.00024 U | 0.0020 U | 0.00032 U | 0.00023 U | 0.00031 U | 0.00044 U |
| | 2/25/2014 | Round 31 (PDB) | 0.00025 U | 0.0004 U | 0.00031 U | 0.00053 U | 0.00033 U | 0.0020 U | 0.00026 U | 0.00034 U | 0.0003 U | 0.00033 U |
| | 7/21/2014 | Round 32 | 0.00025 U | 0.00025 U | 0.00025 U | 0.00025 U | 0.00043 J | 0.0005 U | 0.00025 U | 0.00025 U | 0.00052 J | 0.00025 U |
| | 1/21/2015 | Round 33 (PDB) | 0.00025 U | NS | NS | NS | 0.00025 U | NS | 0.00025 U | 0.00025 U | 0.00025 U | NS |
| | 7/23/2015 | Round 34 | 0.00025 U | 0.00025 U | 0.00025 U | 0.00025 U | 0.00025 U | 0.0005 U | 0.00025 U | 0.00025 U | 0.00025 U | 0.00025 U |
| | 7/23/2015 | | Well Abandoned | | | | | | | | | |
| **608D131MW** | 3/29/2005 | | | | | | | | | | | |
| | 4/5/2005 | Round 13 | 0.00040 U | 0.00030 U | 0.00040 U | 0.00030 U | 0.00030 U | 0.00200 U | 0.00040 U | 0.00030 U | 0.01100 | 0.00030 U |
| | 8/4/2005 | Round 13(PDB) | 0.00040 U | 0.00030 U | 0.00040 U | 0.00030 U | 0.00030 U | 0.00200 U | 0.00040 U | 0.00030 U | 0.00500 | 0.00030 U |
| | 10/7/2005 | Round 14 | 0.00040 U | 0.00030 U | 0.00040 U | 0.00030 U | 0.00030 U | 0.00200 U | 0.00040 U | 0.00030 U | 0.00200 | 0.00030 U |
| | 1/30/2006 | Round 15 | 0.00040 U | 0.00030 U | 0.00040 U | 0.00030 U | 0.00030 U | 0.00200 U | 0.00040 U | 0.00030 U | 0.00090 J | 0.00030 U |
| | 8/29/2006 | Round 16 | 0.00060 U | 0.00050 U | 0.00040 U | 0.00060 U | 0.00050 U | 0.00200 U | 0.00060 U | 0.00060 U | 0.00040 U | 0.00060 U |
| | 4/30/2007 | Round 17 | 0.00013 U | 0.00011 U | 0.00013 U | 0.00028 U | 0.00014 U | 0.00023 U | 0.00010 U | 0.00015 U | 0.00023 U | 0.00020 U |
| | 9/7/2007 | Round 18 | 0.00042 U | 0.00014 U | 0.00010 U | 0.00040 U | 0.00044 U | 0.00026 U | 0.00014 U | 0.00040 U | 0.00028 U | 0.00019 U |
| | 1/29/2008 | Round 19 (PDB) | 0.00039 U | 0.00044 U | 0.00036 U | 0.00060 U | 0.00032 U | 0.00040 U | 0.00046 U | 0.00048 U | 0.00053 U | 0.00043 U |
| | 7/23/2008 | Round 20 (PDB) | 0.00054 U | 0.00022 U | 0.00028 U | 0.00061 U | 0.00020 U | 0.00100 U | 0.00022 U | 0.00045 U | 0.00032 U | 0.00030 U |
| | 1/12/2009 | Round 21 (PDB) | 0.00054 U | 0.00022 U | 0.00028 U | 0.00061 U | 0.00020 U | 0.00100 U | 0.00022 U | 0.00045 U | 0.00032 U | 0.00030 U |
| | 7/15/2009 | Round 22 | 0.00054 U | 0.00022 U | 0.00028 U | 0.00061 U | 0.00020 U | 0.00100 U | 0.00022 U | 0.00045 U | 0.00032 U | 0.00030 U |
| | 1/12/2010 | Round 23 (PDB) | 0.00029 U | 0.00034 U | 0.00025 U | 0.00050 U | 0.00032 U | 0.00200 U | 0.00044 U | 0.00034 U | 0.00024 U | 0.00028 U |
| | 7/14/2010 | Round 24 (PDB) | 0.00029 U | 0.00034 U | 0.00025 U | 0.00050 U | 0.00032 U | 0.00200 U | 0.00044 U | 0.00034 U | 0.00024 U | 0.00028 U |
| | 1/12/2011 | Round 25 | 0.00023 U | 0.00025 U | 0.00022 U | 0.00050 U | 0.00026 U | 0.00200 U | 0.00025 U | 0.00035 U | 0.00026 U | 0.00022 U |
| | 7/26/2011 | Round 26 | 0.00023 U | 0.00025 U | 0.00022 U | 0.00050 U | 0.00026 U | 0.00200 U | 0.00025 U | 0.00035 U | 0.00026 U | 0.00022 U |
| | 1/11/2012 | Round 27 (PDB) | 0.00023 U | 0.00025 U | 0.00022 U | 0.00050 U | 0.00026 U | 0.0020 U | 0.00025 U | 0.00035 U | 0.00026 U | 0.00022 U |
| | 7/11/2012 | Round 28 | 0.00023 U | NS | NS | NS | 0.00026 U | NS | 0.00025 U | 0.00035 U | 0.00026 U | NS |
| | 1/9/2013 | Round 29 (PDB) | 0.00020 U | 0.00031 U | 0.00026 U | 0.00050 U | 0.00024 U | 0.0020 U | 0.00032 U | 0.00023 U | 0.00031 U | 0.00044 U |
| | 7/17/2013 | Round 30 | 0.00020 U | 0.00031 U | 0.00026 U | 0.00050 U | 0.00024 U | 0.0020 U | 0.00032 U | 0.00023 U | 0.00031 U | 0.00044 U |
| | 2/25/2014 | Round 31 (PDB) | 0.00025 U | 0.0004 U | 0.00031 U | 0.00053 U | 0.00033 U | 0.0020 U | 0.00026 U | 0.00034 U | 0.00030 U | 0.00033 U |
| | 7/21/2014 | Round 32 | 0.00025 U | 0.00025 U | 0.00025 U | 0.00025 U | 0.00025 U | 0.0005 U | 0.00025 U | 0.00025 U | 0.00025 U | 0.00025 U |
| | 1/21/2015 | Round 33 (PDB) | NS | NS | 0.00025 U | NS | 0.00025 U | NS | NS | 0.00025 U | 0.00025 U | 0.00025 U |
| | 7/23/2015 | Round 34 | 0.00025 U | 0.00025 U | 0.00025 U | 0.00025 U | 0.00025 U | 0.0005 U | 0.00025 U | 0.00025 U | 0.00025 U | 0.00025 U |
| | 7/23/2015 | | Well Abandoned | | | | | | | | | |

**Table 4-1B**

**Summary of Chemicals of Concern Detected in Groundwater**
**Historical Monitoring Wells — SWMU 21 Plume**
**2016 RAER**

**Former NAS Dallas, Texas**


| Monitoring Well | Sampling Date | Sampling Round | Chemicals of Concern (mg/L) | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | 1,1-Dichloroethene | Carbon Tetrachloride | Chloroform | Chloromethane | cis-1,2-Dichloroethene | Methylene Chloride | Tetrachloroethene | trans-1,2-Dichloroethene | Trichloroethene | Vinyl Chloride |
| **Protective Concentration Levels (mg/L)** | | | **0.00700** | **0.00500** | **0.24000** | **0.07000** | **0.07000** | **0.00500** | **0.00500** | **0.10000** | **0.00500** | **0.00200** |
| **608D147MW** | 7/20/2005 | | | | | | | | | | | |
| | 7/22/2005 | Round 13 | 0.00040 U | 0.00030 U | 0.00040 U | 0.00030 U | 0.00030 U | 0.00200 U | 0.00040 U | 0.00030 U | 0.00030 U | 0.00030 U |
| | 8/4/2005 | Round 13(PDB) | 0.00040 U | 0.00030 U | 0.00040 U | 0.00030 U | 0.00030 U | 0.00200 U | 0.00040 U | 0.00030 U | 0.00030 U | 0.00030 U |
| | 10/9/2005 | Round 14 | 0.00040 U | 0.00030 U | 0.00040 U | 0.00030 U | 0.00030 U | 0.00200 U | 0.00040 U | 0.00030 U | 0.00030 U | 0.00030 U |
| | 1/23/2006 | Round 15 | 0.00040 U | 0.00030 U | 0.00040 U | 0.00030 U | 0.00030 U | 0.00200 U | 0.00040 U | 0.00030 U | 0.00030 U | 0.00030 U |
| | 8/28/2006 | Round 16 | 0.00060 U | 0.00050 U | 0.00040 U | 0.00060 U | 0.00050 U | 0.00200 U | 0.00060 U | 0.00060 U | 0.00040 U | 0.00060 U |
| | 5/8/2007 | Round 17 | 0.00013 J | 0.00011 U | 0.00013 U | 0.00028 U | 0.00014 U | 0.00023 U | 0.00010 U | 0.00015 U | 0.00023 U | 0.00020 U |
| | 9/6/2007 | Round 18 | 0.00013 U | 0.00011 U | 0.00013 U | 0.00028 U | 0.00014 U | 0.00023 U | 0.00010 U | 0.00015 U | 0.00023 U | 0.00020 U |
| | 1/29/2008 | Round 19 (PDB) | 0.00039 U | 0.00044 U | 0.00036 U | 0.00060 U | 0.00032 U | 0.00040 U | 0.00046 U | 0.00048 U | 0.00053 U | 0.00043 U |
| | 7/23/2008 | Round 20 (PDB) | 0.00054 U | 0.00022 U | 0.00028 U | 0.00061 U | 0.00020 U | 0.00100 U | 0.00022 U | 0.00045 U | 0.00032 U | 0.00030 U |
| | 1/12/2009 | Round 21 (PDB) | 0.00054 U | 0.00022 U | 0.00028 U | 0.00061 U | 0.00020 U | 0.00100 U | 0.00022 U | 0.00045 U | 0.00032 U | 0.00030 U |
| | 7/15/2009 | Round 22 | 0.00054 U | 0.00022 U | 0.00028 U | 0.00061 U | 0.00020 U | 0.00100 U | 0.00022 U | 0.00045 U | 0.00032 U | 0.00030 U |
| | 1/12/2010 | Round 23 (PDB) | 0.00029 U | 0.00034 U | 0.00025 U | 0.00050 U | 0.00032 U | 0.00200 U | 0.00044 U | 0.00034 U | 0.00024 U | 0.00028 U |
| | 7/14/2010 | Round 24 (PDB) | 0.00029 U | 0.00034 U | 0.00025 U | 0.00050 U | 0.00032 U | 0.00200 U | 0.00044 U | 0.00034 U | 0.00024 U | 0.00028 U |
| | 1/12/2011 | Round 25 | 0.00023 U | 0.00025 U | 0.00022 U | 0.00050 U | 0.00026 U | 0.00200 U | 0.00025 U | 0.00035 U | 0.00026 U | 0.00022 U |
| | 7/27/2011 | Round 26 | 0.00023 U | 0.00025 U | 0.00022 U | 0.00050 U | 0.00026 U | 0.00200 U | 0.00025 U | 0.00035 U | 0.00026 U | 0.00022 U |
| | 1/11/2012 | Round 27 (PDB) | 0.00023 U | 0.00025 U | 0.00022 U | 0.00050 U | 0.00026 U | 0.0020 U | 0.00025 U | 0.00035 U | 0.00026 U | 0.00022 U |
| | 7/11/2012 | Round 28 | 0.00023 U | NS | NS | NS | 0.00026 U | NS | 0.00025 U | 0.00035 U | 0.00026 U | NS |
| | 1/9/2013 | Round 29 (PDB) | 0.00020 U | 0.00031 U | 0.00026 U | 0.00050 U | 0.00024 U | 0.0020 U | 0.00032 U | 0.00023 U | 0.00031 U | 0.00044 U |
| | 7/17/2013 | Round 30 | 0.00020 U | 0.00031 U | 0.00026 U | 0.00050 U | 0.00024 U | 0.0020 U | 0.00032 U | 0.00023 U | 0.00031 U | 0.00044 U |
| | 2/25/2014 | Round 31 (PDB) | 0.00025 U | 0.00040 U | 0.00031 U | 0.00053 U | 0.00033 U | 0.0020 U | 0.00026 U | 0.00034 U | 0.00030 U | 0.00033 U |
| | 7/22/2014 | Round 32 | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.001 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U |
| | 1/21/2015 | Round 33 (PDB) | 0.00025 U | NS | NS | NS | 0.00025 U | NS | 0.00025 U | 0.00025 U | 0.00025 U | NS |
| | 7/22/2015 | Round 34 | 0.00025 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.00025 U | 0.001 U | 0.00025 U | 0.00025 U | 0.00025 U | 0.0005 U |
| | 7/22/2015 | Well Abandoned | | | | | | | | | | |

mg/L - milligrams per liter
NA - Not Applicable
NS - Not Sampled
NS-D - Not Sampled during this Round due to insufficient water in the monitoring well
PDB - Passive Diffusion Bag
SDG - Sample Delivery Group
PCLE - Protective Concentration Level Exceedance

Note:
Shaded areas indicate an exceedance.

Analytical Result Qualifiers:
J - Indicates that the chemical was detected. However, the associated numerical result may not be a precise representation of the amount that is actually present in the sample. The laboratory reported concentration is considered to be an estimate of the true concentration.
U - Indicates that the chemical was not detected at the numerical detection limit (sample-specific quantitation limit) noted. Nondetected results from the laboratory are reported in this manner. This qualifier is added to a positive result (reported by the laboratory) if the detected concentration is determined to be attributable to contamination introduced during field sampling or laboratory analysis.
UJ - Indicates that the chemical was not detected. However, the detection limit (sample-specific quantitation limit) is considered to be estimated based on problems encountered during laboratory analysis. The associated numerical detection limit is regarded as inaccurate or imprecise.

# TABLE 4-2
# SUMMARY OF GEOCHEMICAL PARAMETERS MEASURED IN GROUNDWATER

**Table 4-2A**
**Summary of Groundwater Gauging Data**
**Long Term MonitoringWells — SWMU 21**
**2016 RAER**
**Former NAS Dallas, Texas**
**Page 1 of 9**

| Monitoring Well | Top of Casing [1] (ft msl) | Screened Interval (ft msl) | Date | Depth to Water [2] (ft bgs) | Groundwater Elevation (ft msl) |
|---|---|---|---|---|---|
| **Corrective Action Observation Monitoring Wells** | | | | | |
| 600D107MW | 464.45 | 444.28 to 439.28 | 8/8/2000 | | |
| | | | 6/1/2001 | 8.43 | 456.02 |
| | | | 12/2/2002 | 8.17 | 456.28 |
| | | | 8/1/2003 | 9.88 | 454.57 |
| | | | 12/23/2003 | 9.18 | 455.27 |
| | | | 7/4/2004 | 8.50 | 455.95 |
| | | | 9/28/2004 | 9.29 | 455.16 |
| | 464.52 | 444.35 to 439.35 | 4/17/2005 | 9.16 | 455.36 |
| | | | 7/21/2005 | 9.52 | 455.00 |
| | | | 10/6/2005 | 9.82 | 454.70 |
| | | | 1/21/2006 | 10.21 | 454.31 |
| | | | 5/3/2006 | 9.15 | 455.37 |
| | | | 8/9/2006 | 9.86 | 454.66 |
| | | | 4/25/2007 | 8.90 | 455.62 |
| | | | 8/20/2007 | 8.95 | 455.57 |
| | | | 1/14/2008 | 9.54 | 454.98 |
| | | | 7/9/2008 | NA | NA |
| | | | 12/15/2008 | 9.94 | 454.58 |
| | | | 7/14/2009 | 9.71 | 454.81 |
| | 464.50 | 444.33 to 439.33 | 12/15/2009 | 8.98 | 455.52 |
| | | | 8/10/2010 | 9.22 | 455.28 |
| | | | 12/16/2010 | 9.44 | 455.06 |
| | | | 7/25/2011 | 9.30 | 455.20 |
| | | | 12/14/2011 | 9.06 | 455.44 |
| | | | 7/11/2012 | 9.58 | 454.92 |
| | | | 12/19/2012 | 10.00 | 454.50 |
| | | | 7/15/2013 | 9.67 | 454.83 |
| | | | 12/17/2013 | 4.35 | 460.15 |
| | | | 7/15/2014 | 9.85 | 454.65 |
| | | | 12/15/2014 | 9.82 | 454.68 |
| | | | 7/20/2015 | 10.24 | 454.26 |
| | | | 12/15/2015 | 8.60 | 455.90 |
| | | | 7/19/2016 | 9.57 | 454.93 |
| 60606MW | 457.56 | 448.56 to 438.56 | 11/17/1995 | | |
| | | | 2/1/1998 | 1.31 | 456.25 |
| | | | 5/1/1998 | 2.01 | 455.55 |
| | | | 8/1/1998 | 2.59 | 454.97 |
| | | | 2/1/1999 | 1.77 | 455.79 |
| | | | 9/1/1999 | 2.20 | 455.36 |
| | | | 6/1/2000 | 1.00 | 456.56 |
| | | | 6/1/2001 | 1.47 | 456.09 |
| | | | 12/2/2002 | 1.23 | 456.33 |
| | | | 8/1/2003 | 2.92 | 454.64 |
| | | | 12/23/2003 | 2.37 | 455.19 |
| | | | 7/4/2004 | 1.79 | 455.77 |
| | | | 9/28/2004 | 2.40 | 455.16 |
| | 457.29 | 448.29 to 438.29 | 4/17/2005 | 2.28 | 455.01 |
| | | | 7/21/2005 | 2.76 | 454.53 |
| | | | 10/6/2005 | 3.07 | 454.22 |
| | | | 1/21/2006 | 3.30 | 453.99 |
| | | | 5/3/2006 | 2.32 | 454.97 |
| | | | 8/9/2006 | 2.96 | 454.33 |
| | | | 4/25/2007 | 2.02 | 455.27 |
| | | | 8/20/2007 | 2.08 | 455.21 |
| | | | 1/15/2008 | 2.53 | 454.76 |
| | | | 7/9/2008 | 2.48 | 454.81 |
| | | | 12/15/2008 | 2.98 | 454.31 |
| | | | 7/14/2009 | 2.80 | 454.49 |
| | 457.31 | 448.31 to 438.31 | 12/15/2009 | 2.11 | 455.20 |
| | | | 8/10/2010 | 2.35 | 454.96 |
| | | | 12/16/2010 | 2.54 | 454.77 |
| | | | 7/25/2011 | 3.99 | NA[4] |
| | | | 12/14/2011 | 3.68 | 453.63 |
| | | | 7/11/2012 | 6.59 | 450.72 |
| | | | 12/19/2012 | 4.49 | 452.82 |
| | | | 7/15/2013 | 4.17 | 453.14 |
| | | | 12/17/2013 | 3.89 | 453.42 |
| | | | 7/15/2014 | 4.37 | 452.94 |
| | | | 12/15/2014 | 4.39 | 452.92 |
| | | | 7/20/2015 | 4.72 | 452.59 |
| | | | 12/15/2015 | 3.20 | 454.11 |
| | | | 7/19/2016 | 4.07 | 453.24 |

**Table 4-2A**
**Summary of Groundwater Gauging Data**
**Long Term MonitoringWells — SWMU 21**
**2016 RAER**
**Former NAS Dallas, Texas**
**Page 2 of 9**

| Monitoring Well | Top of Casing [1] (ft msl) | Screened Interval (ft msl) | Date | Depth to Water [2] (ft bgs) | Groundwater Elevation (ft msl) |
|---|---|---|---|---|---|
| 608D32MW | 465.97 | 456.27 to 446.27 | 5/11/1998 | | |
| | | | 5/1/1998 | 9.45 | 456.52 |
| | | | 8/1/1998 | 10.52 | 455.45 |
| | | | 2/1/1999 | 9.22 | 456.75 |
| | | | 9/1/1999 | 9.98 | 455.99 |
| | | | 6/1/2000 | 8.61 | 457.36 |
| | | | 6/1/2001 | 9.30 | 456.67 |
| | | | 12/2/2002 | 9.00 | 456.97 |
| | | | 8/1/2003 | 10.72 | 455.25 |
| | | | 12/23/2003 | 10.00 | 455.97 |
| | | | 7/4/2004 | 9.01 | 456.96 |
| | | | 9/27/2004 | 10.00 | 455.97 |
| | 465.77 | 456.07 to 446.07 | 4/17/2005 | 9.72 | 456.05 |
| | | | 7/21/2005 | 10.25 | 455.52 |
| | | | 10/6/2005 | 10.75 | 455.02 |
| | | | 1/21/2006 | 11.21 | 454.56 |
| | | | 5/3/2006 | 10.00 | 455.77 |
| | | | 8/9/2006 | 10.78 | 454.99 |
| | | | 4/25/2007 | 10.03 | 455.74 |
| | | | 8/20/2007 | 9.41 | 456.36 |
| | | | 1/14/2008 | 11.18 | 454.59 |
| | | | 7/9/2008 | 10.10 | 455.67 |
| | | | 12/15/2008 | 8.88 | 456.89 |
| | | | 7/14/2009 | 10.42 | 455.35 |
| | 465.78 | 456.08 to 446.08 | 12/15/2009 | 9.58 | 456.20 |
| | | | 8/10/2010 | 9.87 | 455.91 |
| | | | 12/16/2010 | 10.08 | 455.70 |
| | | | 7/25/2011 | 10.18 | 455.60 |
| | | | 12/14/2011 | 9.85 | 455.93 |
| | | | 7/11/2012 | 10.39 | 455.39 |
| | | | 12/19/2012 | 10.88 | 454.90 |
| | | | 7/15/2013 | 10.73 | 455.05 |
| | | | 12/17/2013 | 10.22 | 455.56 |
| | | | 7/15/2014 | 10.71 | 455.07 |
| | | | 12/15/2014 | 10.91 | 454.87 |
| | | | 7/20/2015 | 10.36 | 455.42 |
| | | | 12/14/2015 | 9.11 | 456.67 |
| | | | 7/18/2016 | 10.25 | 455.53 |
| 608D132MW | 466.06 | 456.40 to 446.40 | 3/29/2005 | | |
| | | | 4/17/2005 | 9.95 | 456.11 |
| | | | 7/21/2005 | 10.30 | 455.76 |
| | | | 10/6/2005 | 10.81 | 455.25 |
| | | | 1/21/2006 | 11.34 | 454.72 |
| | | | 5/3/2006 | 10.22 | 455.84 |
| | | | 8/9/2006 | 10.89 | 455.17 |
| | | | 4/25/2007 | 9.66 | 456.40 |
| | | | 8/20/2007 | 9.62 | 456.44 |
| | | | 1/14/2008 | 10.00 | 456.06 |
| | | | 7/9/2008 | 10.26 | 455.80 |
| | | | 12/15/2008 | 10.69 | 455.37 |
| | | | 7/14/2009 | 10.21 | 455.85 |
| | | | 12/15/2008 | 10.69 | 455.37 |
| | | | 7/14/2009 | 10.21 | 455.85 |
| | 466.07 | 456.41 to 446.41 | 12/15/2009 | 9.45 | 456.62 |
| | | | 8/10/2010 | 9.96 | 456.11 |
| | | | 12/16/2010 | 10.21 | 455.86 |
| | | | 7/25/2011 | 10.08 | 455.99 |
| | | | 12/14/2011 | 10.28 | 455.79 |
| | | | 7/11/2012 | 10.50 | 455.57 |
| | | | 12/19/2012 | 10.88 | 455.19 |
| | | | 7/15/2013 | 10.65 | 455.42 |
| | | | 12/17/2013 | 10.29 | 455.78 |
| | | | 7/15/2014 | 10.88 | 455.19 |
| | | | 12/15/2014 | 11.23 | 454.84 |
| | | | 7/20/2015 | 10.38 | 455.69 |
| | | | 12/14/2015 | 9.46 | 456.61 |
| | | | 7/18/2016 | 10.25 | 455.82 |

**Table 4-2A**
**Summary of Groundwater Gauging Data**
**Long Term MonitoringWells — SWMU 21**
**2016 RAER**
**Former NAS Dallas, Texas**
**Page 3 of 9**

| Monitoring Well | Top of Casing [1] (ft msl) | Screened Interval (ft msl) | Date | Depth to Water [2] (ft bgs) | Groundwater Elevation (ft msl) |
|---|---|---|---|---|---|
| 608D136MW | 470.50 | 452.62 to 442.62 | 3/30/2005 | | |
| | | | 4/17/2005 | 14.77 | 455.73 |
| | | | 7/21/2005 | 16.25 | 454.25 |
| | | | 10/6/2005 | 15.72 | 454.78 |
| | | | 1/21/2006 | 15.85 | 454.65 |
| | | | 5/3/2006 | 15.58 | 454.92 |
| | | | 8/9/2006 | 15.76 | 454.74 |
| | | | 4/25/2007 | 14.91 | 455.59 |
| | | | 8/20/2007 | 14.99 | 455.51 |
| | | | 1/14/2008 | 15.12 | 455.38 |
| | | | 7/22/2008 | 15.15 | 455.35 |
| | | | 12/15/2008 | 15.34 | 455.16 |
| | | | 7/14/2009 | 15.53 | 454.97 |
| | 470.51 | 452.63 to 442.63 | 12/15/2009 | 14.54 | 455.97 |
| | | | 8/10/2010 | 14.92 | 455.59 |
| | | | 12/16/2010 | 15.11 | 455.40 |
| | | | 7/25/2011 | 15.10 | 455.41 |
| | | | 12/14/2011 | 14.83 | 455.68 |
| | | | 7/11/2012 | 15.46 | 455.05 |
| | | | 12/19/2012 | 15.77 | 454.74 |
| | | | 7/15/2013 | 15.85 | 454.66 |
| | | | 12/17/2013 | 15.16 | 455.35 |
| | | | 7/15/2014 | 15.57 | 454.94 |
| | | | 12/15/2015 | 15.83 | 454.68 |
| | | | 1/21/2015 | 15.43 | 455.08 |
| | | | 7/20/2015 | 15.17 | 455.34 |
| | | | 12/14/2015 | 14.15 | 456.36 |
| | | | 7/19/2016 | 15.30 | 455.21 |
| 608D138MW | 464.11 | 448.88 to 438.88 | 3/29/2005 | | |
| | | | 4/17/2005 | 8.53 | 455.58 |
| | | | 7/21/2005 | 8.96 | 455.15 |
| | | | 10/6/2005 | 9.36 | 454.75 |
| | | | 1/20/2006 | 9.71 | 454.40 |
| | | | 5/3/2006 | 8.64 | 455.47 |
| | | | 8/9/2006 | 9.51 | 454.60 |
| | | | 4/25/2007 | 8.42 | 455.69 |
| | | | 8/20/2007 | 8.41 | 455.70 |
| | | | 1/14/2008 | 9.03 | 455.08 |
| | | | 7/9/2008 | 8.95 | 455.16 |
| | | | 12/15/2008 | 6.84 | 457.27 |
| | | | 7/14/2009 | 9.16 | 454.95 |
| | 464.12 | 448.89 to 438.89 | 12/15/2009 | 8.65 | 455.47 |
| | | | 8/10/2010 | 8.69 | 455.43 |
| | | | 12/16/2010 | 8.88 | 455.24 |
| | | | 7/25/2011 | 8.81 | 455.31 |
| | | | 12/14/2011 | 8.58 | 455.54 |
| | | | 7/11/2012 | 9.11 | 455.01 |
| | | | 12/19/2012 | 9.55 | 454.57 |
| | | | 7/15/2013 | 9.21 | 454.91 |
| | | | 12/17/2013 | 8.86 | 455.26 |
| | | | 7/15/2014 | 9.72 | 454.40 |
| | | | 12/15/2014 | 9.78 | 454.34 |
| | | | 7/20/2015 | 8.93 | 455.19 |
| | | | 12/15/2015 | 7.96 | 456.16 |
| | | | 7/19/2016 | 9.47 | 454.65 |

**Table 4-2A**
**Summary of Groundwater Gauging Data**
**Long Term MonitoringWells — SWMU 21**
**2016 RAER**
**Former NAS Dallas, Texas**
**Page 4 of 9**

| Monitoring Well | Top of Casing [1] (ft msl) | Screened Interval (ft msl) | Date | Depth to Water [2] (ft bgs) | Groundwater Elevation (ft msl) |
|---|---|---|---|---|---|
| 608D140MW | 461.43 | 446.13 to 436.13 | 3/31/2005 | | |
| | | | 4/17/2005 | 5.95 | 455.48 |
| | | | 7/18/2005 | 6.16 | 455.27 |
| | | | 10/3/2005 | 6.67 | 454.76 |
| | | | 1/20/2006 | 7.03 | 454.40 |
| | | | 5/3/2006 | 5.85 | 455.58 |
| | | | 8/9/2006 | 6.44 | 454.99 |
| | | | 4/25/2007 | 5.90 | 455.53 |
| | | | 8/20/2007 | 5.52 | 455.91 |
| | | | 1/14/2008 | 6.30 | 455.13 |
| | | | 7/9/2008 | 6.26 | 455.17 |
| | | | 12/15/2008 | 5.84 | 455.59 |
| | | | 7/14/2009 | 6.81 | 454.62 |
| | 461.43 | 446.13 to 436.13 | 12/15/2009 | 5.62 | 455.81 |
| | | | 8/10/2010 | 6.07 | 455.36 |
| | | | 12/16/2010 | 6.26 | 455.17 |
| | | | 7/25/2011 | 6.38 | 455.05 |
| | | | 12/14/2011 | 5.98 | 455.45 |
| | | | 7/11/2012 | 6.47 | 454.96 |
| | | | 12/19/2012 | 6.87 | 454.56 |
| | | | 7/15/2013 | 6.59 | 454.84 |
| | | | 12/17/2013 | 6.25 | 455.18 |
| | | | 7/15/2014 | 6.82 | 454.61 |
| | | | 12/15/2014 | 7.08 | 454.35 |
| | | | 7/20/2015 | 6.34 | 455.09 |
| | | | 12/15/2015 | 5.40 | 456.03 |
| | | | 7/19/2016 | 6.54 | 454.89 |
| 608D141MW | 464.09 | 449.38 to 439.38 | 3/31/2005 | | |
| | | | 4/17/2005 | 8.75 | 455.34 |
| | | | 7/21/2005 | 9.15 | 454.94 |
| | | | 10/6/2005 | 9.55 | 454.54 |
| | | | 1/21/2006 | 9.80 | 454.29 |
| | | | 5/3/2006 | 8.79 | 455.30 |
| | | | 8/9/2006 | 9.49 | 454.60 |
| | | | 4/25/2007 | 8.49 | 455.60 |
| | | | 8/20/2007 | 5.61 | 458.48 |
| | | | 1/14/2008 | 9.00 | 455.09 |
| | | | 7/22/2008 | 8.99 | 455.10 |
| | | | 12/15/2008 | 9.56 | 454.53 |
| | | | 7/14/2009 | 9.36 | 454.73 |
| | 464.09 | 449.38 to 439.38 | 12/15/2009 | 7.60 | 456.49 |
| | | | 8/10/2010 | 8.83 | 455.26 |
| | | | 12/16/2010 | NA[3] | NA[3] |
| | | | 7/25/2011 | 9.00 | 455.09 |
| | | | 12/14/2011 | 8.74 | 455.35 |
| | | | 7/11/2012 | 9.30 | 454.79 |
| | | | 12/19/2012 | 9.60 | 454.49 |
| | | | 7/15/2013 | 9.29 | 454.80 |
| | | | 12/17/2013 | NA | NA |
| | | | 7/15/2014 | 9.45 | 454.64 |
| | | | 12/15/2014 | 9.38 | 454.71 |
| | | | 7/20/2015 | 9.14 | 454.95 |
| | | | 12/15/2015 | 8.20 | 455.89 |
| | | | 7/19/2016 | 9.10 | 454.99 |

**Table 4-2A**
**Summary of Groundwater Gauging Data**
**Long Term MonitoringWells — SWMU 21**
**2016 RAER**
**Former NAS Dallas, Texas**
**Page 5 of 9**

| Monitoring Well | Top of Casing [1] (ft msl) | Screened Interval (ft msl) | Date | Depth to Water [2] (ft bgs) | Groundwater Elevation (ft msl) |
|---|---|---|---|---|---|
| 608D142MW/ 608D142RMW | 465.10 | 452.13 to 442.13 | 3/31/2005 | | |
| | | | 4/17/2005 | 9.80 | 455.30 |
| | | | 7/21/2005 | 10.42 | 454.68 |
| | | | 10/6/2005 | 10.79 | 454.31 |
| | | | 1/21/2006 | 11.04 | 454.06 |
| | | | 5/3/2006 | 10.91 | 454.19 |
| | | | 8/9/2006 | 11.02 | 454.08 |
| | | | 4/25/2007 | 9.61 | 455.49 |
| | | | 8/20/2007 | 9.41 | 455.69 |
| | | | 1/14/2008 | 10.24 | 454.86 |
| | | | 7/9/2008 | 10.30 | 454.80 |
| | | | 12/15/2008 | 10.82 | 454.28 |
| | | | 7/14/2009 | 10.84 | 454.26 |
| | 465.10 | 452.13 to 442.13 | 12/15/2009 | 9.99 | 455.11 |
| | | | 8/10/2010 | 9.92 | 455.18 |
| | | | 12/16/2010 | 10.10 | 455.00 |
| | | | 7/25/2011 | 9.55 | NA[4] |
| | | | 12/14/2011 | 9.31 | 455.79 |
| | | | 7/11/2012 | 9.91 | 455.19 |
| | | | 12/19/2012 | 10.19 | 454.91 |
| | | | 7/15/2013 | 10.05 | 455.05 |
| | | | 12/17/2013 | 9.68 | 455.42 |
| | | | 7/15/2014 | 10.18 | 454.92 |
| | | | 12/15/2014 | 10.63 | 454.47 |
| | | | 7/20/2015 | 9.77 | 455.33 |
| | | | 12/15/2015 | 9.05 | 456.05 |
| | | | 7/19/2016 | 9.88 | 455.22 |
| 608D143MW/ 608D143RMW | 457.54 | 444.92 to 434.92 | 4/14/2005 | | |
| | | | 4/17/2005 | 3.27 | 454.27 |
| | | | 7/21/2005 | 4.36 | 453.18 |
| | | | 10/6/2005 | 4.57 | 452.97 |
| | | | 1/21/2006 | 4.50 | 453.04 |
| | | | 5/3/2006 | 3.11 | 454.43 |
| | | | 8/9/2006 | 3.82 | 453.72 |
| | | | 4/25/2007 | 2.96 | 454.58 |
| | | | 8/20/2007 | 3.01 | 454.53 |
| | | | 1/15/2008 | 3.49 | 454.05 |
| | | | 7/9/2008 | 3.07 | 454.47 |
| | | | 12/15/2008 | 3.71 | 453.83 |
| | | | 7/14/2009 | 3.68 | 453.86 |
| | 457.55 | 444.93 to 434.93 | 12/15/2009 | 3.17 | 454.38 |
| | | | 8/10/2010 | 3.34 | 454.21 |
| | | | 12/16/2010 | 3.51 | 454.04 |
| | | | 7/25/2011 | 3.26 | 454.29 |
| | | | 12/14/2011 | 3.00 | 454.55 |
| | | | 12/19/2012 | 3.62 | 453.93 |
| | | | 7/15/2013 | 3.28 | 454.27 |
| | | | 12/17/2013 | 3.01 | 454.54 |
| | | | 7/15/2014 | 3.50 | 454.05 |
| | | | 12/15/2014 | 3.49 | 454.06 |
| | | | 7/20/2015 | 3.19 | 454.36 |
| | | | 12/15/2015 | 2.45 | 455.10 |
| | | | 7/19/2016 | 3.39 | 454.16 |

**Table 4-2A**
**Summary of Groundwater Gauging Data**
**Long Term MonitoringWells — SWMU 21**
**2016 RAER**
**Former NAS Dallas, Texas**
**Page 6 of 9**

| Monitoring Well | Top of Casing [1] (ft msl) | Screened Interval (ft msl) | Date | Depth to Water [2] (ft bgs) | Groundwater Elevation (ft msl) |
|---|---|---|---|---|---|
| 608D144MW | 456.99 | 446.99 to 436.99 | 3/31/2005 | | |
| | | | 4/17/2005 | NA | NA |
| | | | 7/21/2005 | 4.58 | 452.41 |
| | | | 10/6/2005 | 4.84 | 452.15 |
| | | | 1/21/2006 | 4.49 | 452.50 |
| | | | 5/3/2006 | 3.28 | 453.71 |
| | | | 8/9/2006 | 3.82 | 453.17 |
| | | | 4/25/2007 | 3.25 | 453.74 |
| | | | 8/20/2007 | 3.28 | 453.71 |
| | | | 1/15/2008 | 3.52 | 453.47 |
| | | | 7/9/2008 | 3.07 | 453.92 |
| | | | 12/15/2008 | NA | NA |
| | | | 7/14/2009 | 3.70 | 453.29 |
| | 456.91 | 446.91 to 436.91 | 12/15/2009 | 3.41 | 453.50 |
| | | | 8/10/2010 | 3.56 | 453.35 |
| | | | 12/16/2010 | 3.56 | 453.35 |
| | | | 7/25/2011 | 4.45 | 452.46 |
| | | | 12/14/2011 | 3.20 | 453.71 |
| | | | 9/11/2012 | 3.59 | 453.32 |
| | | | 12/19/2012 | 3.52 | 453.39 |
| | | | 7/15/2013 | 3.39 | 453.52 |
| | | | 12/17/2013 | 3.09 | 453.82 |
| | | | 7/15/2014 | 3.80 | 453.11 |
| | | | 12/15/2014 | 3.44 | 453.47 |
| | | | 7/20/2015 | 3.26 | 453.65 |
| | | | 12/15/2015 | 2.60 | 454.31 |
| | | | 7/19/2016 | 3.32 | 453.59 |
| 608D145MW | 458.94 | 443.94 to 433.94 | 3/31/2005 | | |
| | | | 4/17/2005 | NA | NA |
| | | | 7/21/2005 | 5.28 | 453.66 |
| | | | 10/6/2005 | 5.48 | 453.46 |
| | | | 1/21/2006 | 5.71 | 453.23 |
| | | | 5/3/2006 | 4.35 | 454.59 |
| | | | 8/9/2006 | 4.82 | 454.12 |
| | | | 4/25/2007 | 4.14 | 454.80 |
| | | | 8/20/2007 | 4.16 | 454.78 |
| | | | 1/15/2008 | 4.30 | 454.64 |
| | | | 7/9/2008 | 4.30 | 454.64 |
| | | | 12/15/2008 | 4.86 | 454.08 |
| | | | 7/14/2009 | 4.68 | 454.26 |
| | 458.90 | 443.90 to 433.90 | 12/15/2009 | 4.15 | 454.75 |
| | | | 8/10/2010 | 4.19 | 454.71 |
| | | | 12/16/2010 | 4.54 | 454.36 |
| | | | 7/25/2011 | 4.36 | 454.54 |
| | | | 12/14/2011 | 4.16 | 454.74 |
| | | | 7/11/2012 | 4.99 | 453.91 |
| | | | 12/19/2012 | 4.91 | 453.99 |
| | | | 7/15/2013 | 4.56 | 454.34 |
| | | | 12/17/2013 | 4.29 | 454.61 |
| | | | 7/15/2014 | 4.95 | 453.95 |
| | | | 12/15/2014 | 4.84 | 454.06 |
| | | | 7/20/2015 | 3.84 | 455.06 |
| | | | 12/15/2015 | 3.75 | 455.15 |
| | | | 7/19/2016 | 4.41 | 454.49 |

**Table 4-2A**
**Summary of Groundwater Gauging Data**
**Long Term MonitoringWells — SWMU 21**
**2016 RAER**
**Former NAS Dallas, Texas**
**Page 7 of 9**

| Monitoring Well | Top of Casing [1] (ft msl) | Screened Interval (ft msl) | Date | Depth to Water [2] (ft bgs) | Groundwater Elevation (ft msl) |
|---|---|---|---|---|---|
| 608D146MW | 457.81 | 447.81 to 437.81 | 3/31/2005 | | |
| | | | 4/17/2005 | NA | NA |
| | | | 7/21/2005 | 5.04 | 452.77 |
| | | | 10/6/2005 | 5.39 | 452.42 |
| | | | 1/21/2006 | 5.01 | 452.80 |
| | | | 5/3/2006 | 3.89 | 453.92 |
| | | | 8/9/2006 | 4.31 | 453.50 |
| | | | 4/25/2007 | 3.58 | 454.23 |
| | | | 8/20/2007 | 3.61 | 454.20 |
| | | | 1/15/2008 | 3.99 | 453.82 |
| | | | 7/9/2008 | 3.64 | 454.17 |
| | | | 12/15/2008 | 4.37 | 453.44 |
| | | | 7/14/2009 | 4.19 | 453.62 |
| | 457.76 | 447.76 to 437.76 | 12/15/2009 | 3.75 | 454.01 |
| | | | 8/10/2010 | 3.91 | 453.85 |
| | | | 12/16/2010 | 4.03 | 453.73 |
| | | | 7/25/2011 | 4.38 | 453.38 |
| | | | 12/14/2011 | 4.14 | 453.62 |
| | | | 7/11/2012 | 4.57 | 453.19 |
| | | | 12/19/2012 | 4.65 | 453.11 |
| | | | 7/15/2013 | 4.38 | 453.38 |
| | | | 12/17/2013 | 4.10 | 453.66 |
| | | | 7/15/2014 | 4.56 | 453.20 |
| | | | 12/15/2014 | 4.53 | 453.23 |
| | | | 7/20/2015 | 4.28 | 453.48 |
| | | | 12/15/2015 | 3.79 | 453.97 |
| | | | 7/19/2016 | 4.30 | 453.46 |

**Table 4-2A**
**Summary of Groundwater Gauging Data**
**Long Term MonitoringWells — SWMU 21**
**2016 RAER**
**Former NAS Dallas, Texas**
**Page 8 of 9**

| Monitoring Well | Top of Casing [1] (ft msl) | Screened Interval (ft msl) | Date | Depth to Water [2] (ft bgs) | Groundwater Elevation (ft msl) |
|---|---|---|---|---|---|
| **Point of Exposure and Background Monitoring Wells** | | | | | |
| **600D89MW** | 460.59 | 443.18 to 433.18 | 2/1/1999 | | |
| | | | 9/1/1999 | 4.92 | 455.67 |
| | | | 6/1/2000 | 4.17 | 456.42 |
| | | | 6/1/2001 | 4.11 | 456.48 |
| | | | 12/2/2002 | 4.00 | 456.59 |
| | | | 8/1/2003 | 5.84 | 454.75 |
| | | | 12/23/2003 | 5.01 | 455.58 |
| | | | 7/4/2004 | 4.32 | 456.27 |
| | | | 9/28/2004 | 4.65 | 455.94 |
| | 460.58 | 443.17 to 433.17 | 4/17/2005 | 4.97 | 455.61 |
| | | | 7/21/2005 | 5.34 | 455.24 |
| | | | 10/6/2005 | 5.58 | 455.00 |
| | | | 1/21/2006 | 5.85 | 454.73 |
| | | | 5/3/2006 | 5.73 | 454.85 |
| | | | 8/9/2006 | 5.26 | 455.32 |
| | | | 4/25/2007 | 5.31 | 455.27 |
| | | | 8/20/2007 | 4.72 | 455.86 |
| | | | 1/15/2008 | 4.95 | 455.63 |
| | | | 7/9/2008 | 7.95 | 452.63 |
| | | | 12/15/2008 | 5.31 | 455.27 |
| | | | 7/14/2009 | 5.70 | 454.88 |
| | 460.57 | 443.16 to 433.16 | 12/15/2009 | 5.37 | 455.20 |
| | | | 8/10/2010 | 5.03 | 455.54 |
| | | | 12/16/2010 | 5.19 | 455.38 |
| | | | 6/15/2011 | NA | |
| **608D161MW** | NA | NA | 6/17/2011 | | |
| | | | 7/25/2011 | 5.56 | NA[4] |
| | | | 12/14/2011 | 5.3 | NA[4] |
| | | | 7/11/2012 | 6.10 | NA[4] |
| | | | 12/19/2012 | 6.27 | NA[4] |
| | | | 7/15/2013 | 5.84 | NA[4] |
| | | | 12/17/2013 | 5.55 | NA[4] |
| | | | 7/15/2014 | 6.00 | NA[4] |
| | | | 12/15/2014 | 6.15 | NA[4] |
| | | | 1/21/2015 | 5.90 | NA[4] |
| | | | 7/20/2015 | 5.64 | NA[4] |
| | | | 12/15/2015 | 4.66 | NA[4] |
| | | | 7/19/2016 | 5.78 | NA[4] |

**Table 4-2A**
**Summary of Groundwater Gauging Data**
**Long Term MonitoringWells — SWMU 21**
**2016 RAER**
**Former NAS Dallas, Texas**
**Page 9 of 9**

| Monitoring Well | Top of Casing [1] (ft msl) | Screened Interval (ft msl) | Date | Depth to Water [2] (ft bgs) | Groundwater Elevation (ft msl) |
|---|---|---|---|---|---|
| 608D33MW | 464.03 | 454.43 to 444.43 | 4/2/1998 | | |
| | | | 5/1/1998 | 6.71 | 457.32 |
| | | | 8/1/1998 | 7.86 | 456.17 |
| | | | 2/1/1999 | 6.59 | 457.44 |
| | | | 9/1/1999 | 7.26 | 456.77 |
| | | | 6/1/2000 | 5.71 | 458.32 |
| | | | 6/1/2001 | 6.59 | 457.44 |
| | | | 12/2/2002 | 5.94 | 458.09 |
| | | | 8/1/2003 | 7.72 | 456.31 |
| | | | 12/23/2003 | 7.30 | 456.73 |
| | | | 7/4/2004 | 6.83 | 457.20 |
| | | | 9/27/2004 | 7.03 | 457.00 |
| | 463.80 | 454.20 to 444.20 | 4/17/2005 | 7.12 | 456.68 |
| | | | 7/21/2005 | 7.59 | 456.21 |
| | | | 10/6/2005 | 8.10 | 455.70 |
| | | | 1/21/2006 | 8.56 | 455.24 |
| | | | 5/3/2006 | 7.62 | 456.18 |
| | | | 8/9/2006 | 8.26 | 455.54 |
| | | | 4/25/2007 | 6.51 | 457.29 |
| | | | 8/20/2007 | 6.63 | 457.17 |
| | | | 1/14/2008 | 7.44 | 456.36 |
| | | | 7/9/2008 | 7.47 | 456.33 |
| | | | 12/15/2008 | 8.09 | 455.71 |
| | | | 7/14/2009 | 7.67 | 456.13 |
| | 463.82 | 454.22 to 444.22 | 12/15/2009 | 7.02 | 456.80 |
| | | | 8/10/2010 | 6.98 | 456.84 |
| | | | 12/16/2010 | 7.43 | 456.39 |
| | | | 7/25/2011 | 7.38 | 456.44 |
| | | | 12/14/2011 | 7.06 | 456.76 |
| | | | 7/11/2012 | 8.60 | 455.22 |
| | | | 12/19/2012 | 8.16 | 455.66 |
| | | | 7/15/2013 | 7.74 | 456.08 |
| | | | 12/17/2013 | 7.45 | 456.37 |
| | | | 7/15/2014 | 8.13 | 455.69 |
| | | | 12/15/2014 | 8.12 | 455.70 |
| | | | 1/21/2015 | 7.90 | 455.92 |
| | | | 7/20/2015 | 7.21 | 456.61 |
| | | | 12/14/2015 | 6.30 | 457.52 |
| | | | 7/18/2016 | 7.47 | 456.35 |
| 608D162MW | 461.91 | 444.91 to 434.91 | 12/17/2013 | 6.41 | 455.50 |
| | | | 7/22/2014 | 6.84 | 455.07 |
| | | | 12/15/2014 | 6.81 | 455.10 |
| | | | 7/20/2015 | 6.50 | 455.41 |
| | | | 12/15/2015 | 5.48 | 456.43 |
| | | | 7/19/2016 | 6.42 | 455.49 |
| 608D163MW | 460.00 | 443.00 to 433.00 | 12/17/2013 | 4.68 | 455.32 |
| | | | 7/22/2014 | 5.14 | 454.86 |
| | | | 12/15/2014 | 5.13 | 454.87 |
| | | | 7/20/2015 | 4.82 | 455.18 |
| | | | 12/15/2015 | 3.85 | 456.15 |
| | | | 7/19/2016 | 4.78 | 455.22 |

bgs - below ground surface
ft - feet
msl - mean sea level
NA - Not Available or Applicable (i.e., abandoned, not installed, not measured)
PCLE - Protective Concentration Level Exceedance

Notes:
1 - All monitoring wells on-site were resurveyed in May 2005 and September 2010 in accordance with the Compliance Plan Requirements.
2 - Depth to water measurements taken from the top of the riser.
3 - Inaccessible
4 - Pending Survey

**Table 4-2B**

**Summary of Groundwater Gauging Data**
**Historical Monitoring Wells — SWMU 21**
**2016 RAER**
**Former NAS Dallas, Texas**
**Page 1 of 4**

| Monitoring Well | Top of Casing [1] (ft msl) | Screened Interval (ft msl) | Date | Depth to Water [2] (ft bgs) | Groundwater Elevation (ft msl) |
|---|---|---|---|---|---|
| **Monitoring Wells Located Inside PCLE Zone** | | | | | |
| **600D88MW** | 464.71 | 453.89 to 443.89 | 9/1/1999 | 9.47 | 455.24 |
| | | | 6/1/2000 | 8.17 | 456.54 |
| | | | 6/1/2001 | 8.72 | 455.99 |
| | | | NA | | |
| **600D103MW** | 464.81 | 448.41 to 438.41 | 8/5/2000 | | |
| | | | 6/1/2001 | 8.53 | 456.28 |
| | | | 12/2/2002 | 8.38 | 456.43 |
| | | | 8/1/2003 | 10.03 | 454.78 |
| | | | 12/23/2003 | 9.36 | 455.45 |
| | | | 7/4/2004 | 8.73 | 456.08 |
| | | | 9/28/2004 | 9.51 | 455.30 |
| | | | 4/18/2005 | | |
| **600D104MW** | 465.05 | 449.86 to 439.86 | 8/1/2000 | | |
| | | | 6/1/2000 | 11.21 | 453.84 |
| | | | 10/20/2000 | | |
| **600D105MW** | 465.21 | 447.03 to 437.03 | 8/7/2000 | | |
| | | | 6/1/2000 | 9.97 | 455.24 |
| | | | 10/20/2000 | | |
| **600D106MW** | 464.85 | 438.63 to 428.63 | 8/8/2000 | | |
| | | | 6/1/2001 | 7.51 | 457.34 |
| | | | 12/2/2002 | 7.76 | 457.09 |
| | | | 8/1/2003 | 8.02 | 456.83 |
| | | | 12/23/2003 | 10.18 | 454.67 |
| | | | 7/4/2004 | 11.55 | 453.30 |
| | | | 9/28/2004 | 8.45 | 456.40 |
| | | | 4/18/2005 | | |
| **600D108MW** | 464.17 | 456.15 to 446.15 | 8/8/2000 | | |
| | | | 6/1/2001 | 8.28 | 455.89 |
| | | | 12/2/2002 | 7.40 | 456.77 |
| | | | 8/1/2003 | 9.81 | 454.36 |
| | | | 12/23/2003 | 9.05 | 455.12 |
| | | | 7/4/2004 | 8.44 | 455.73 |
| | | | 9/28/2004 | 9.18 | 454.99 |
| | | | 4/18/2005 | | |
| **60605MW** | 459.27 | 450.57 to 440.57 | 10/30/1995 | | |
| | | | 2/1/1998 | 2.59 | 456.68 |
| | | | 5/1/1998 | 3.07 | 456.20 |
| | | | 8/1/1998 | 4.06 | 455.21 |
| | | | 2/1/1999 | 3.15 | 456.12 |
| | | | 9/1/1999 | 3.48 | 455.79 |
| | | | 6/1/2000 | 2.33 | 456.94 |
| | | | 6/1/2001 | 2.75 | 456.52 |
| | | | 12/14/2002 | 2.52 | 456.75 |
| | | | 8/1/2003 | 4.35 | 454.92 |
| | | | NA | | |
| **606D24MW** | 458.37 | 452.37 to 442.37 | 2/1/1998 | | |
| | | | 5/1/1998 | 4.18 | 454.19 |
| | | | 8/1/1998 | 5.10 | 453.27 |
| | | | 2/1/1999 | 4.58 | 453.79 |
| | | | 9/1/1999 | 6.61 | 451.76 |
| | | | 6/20/2000 | NA | NA |
| | | | 6/6/2001 | NA | NA |
| | | | 9/27/2001 | | |
| **60801MW** | 464.51 | 464.51 to 464.51 | 10/31/1995 | | |
| | | | 2/1/1998 | 7.68 | 456.83 |
| | | | 5/1/1998 | 8.31 | 456.20 |
| | | | 8/1/1998 | 9.22 | 455.29 |
| | | | 2/1/1999 | 8.23 | 456.28 |
| | | | 9/1/1999 | 8.76 | 455.75 |
| | | | 6/1/2000 | 7.35 | 457.16 |
| | | | 6/1/2001 | 7.87 | 456.64 |
| | | | NA | | |

**Table 4-2B**

**Summary of Groundwater Gauging Data**
**Historical Monitoring Wells — SWMU 21**
**2016 RAER**
**Former NAS Dallas, Texas**
**Page 2 of 4**

| Monitoring Well | Top of Casing [1] (ft msl) | Screened Interval (ft msl) | Date | Depth to Water [2] (ft bgs) | Groundwater Elevation (ft msl) |
|---|---|---|---|---|---|
| 608D34MW | 469.04 | 469.04 to 469.04 | 5/14/1998 | | |
| | | | 5/1/1998 | 12.93 | 456.11 |
| | | | 8/1/1998 | 13.86 | 455.18 |
| | | | 2/1/1999 | 12.77 | 456.27 |
| | | | 9/1/1999 | 13.40 | 455.64 |
| | | | 6/1/2000 | 12.03 | 457.01 |
| | | | 6/1/2001 | 12.50 | 456.54 |
| | | | 12/2/2002 | 12.41 | 456.63 |
| | | | 8/1/2003 | 14.00 | 455.04 |
| | | | 12/23/2003 | 13.35 | 455.69 |
| | | | 7/4/2004 | 12.45 | 456.59 |
| | | | 9/27/2004 | 13.41 | 455.63 |
| | 468.89 | 468.89 to 468.89 | 4/17/2005 | 13.22 | 455.67 |
| | | | 7/21/2005 | 13.61 | 455.28 |
| | | | 10/6/2005 | 14.01 | 454.88 |
| | | | 1/21/2006 | 14.51 | 454.38 |
| | | | 5/3/2006 | 13.34 | 455.55 |
| | | | 8/9/2006 | 14.16 | 454.73 |
| | | | 4/25/2007 | 13.03 | 455.86 |
| | | | 8/20/2007 | 13.04 | 455.85 |
| | | | 1/14/2008 | 13.75 | 455.14 |
| | | | 7/9/2008 | 13.51 | 455.38 |
| | | | 12/15/2008 | 14.27 | 454.62 |
| | | | 7/14/2009 | 13.96 | 454.93 |
| | 468.87 | 468.87 to 468.87 | 12/15/2009 | 8.78 | 460.09 |
| | | | 8/10/2010 | 13.33 | 455.54 |
| | | | 12/16/2010 | 13.51 | 455.36 |
| | | | 7/25/2011 | 13.49 | 455.38 |
| | | | 12/14/2011 | 13.21 | 455.66 |
| | | | 7/11/2012 | 13.79 | 455.08 |
| | | | 12/19/2012 | 14.25 | 454.62 |
| | | | 7/15/2013 | 14.18 | 454.69 |
| | | | 12/17/2013 | 13.63 | 455.24 |
| | | | 7/15/2014 | 14.57 | 454.30 |
| | | | 12/15/2014 | 14.31 | 454.56 |
| | | | 7/20/2015 | 13.70 | 455.17 |
| | | | 12/14/2015 | 13.08 | 455.79 |
| | | | 4/4/2016 | Well Plugged and Abandoned | |
| 608D131MW | 467.11 | 453.38 to 443.38 | 3/29/2005 | | |
| | | | 4/17/2005 | 12.25 | 454.86 |
| | | | 7/21/2005 | 11.79 | 455.32 |
| | | | 10/6/2005 | 11.96 | 455.15 |
| | | | 1/21/2006 | 11.98 | 455.13 |
| | | | 5/3/2006 | 12.15 | 454.96 |
| | | | 8/9/2006 | 12.09 | 455.02 |
| | | | 8/20/2007 | 10.77 | 456.34 |
| | | | 1/14/2008 | 11.53 | 455.58 |
| | | | 7/9/2008 | 11.20 | 455.91 |
| | | | 12/15/2008 | 12.19 | 454.92 |
| | | | 7/14/2009 | 11.71 | 455.40 |
| | 467.12 | 453.39 to 443.39 | 12/15/2009 | 10.70 | 456.42 |
| | | | 12/16/2010 | 11.37 | 455.75 |
| | | | 7/25/2011 | 11.39 | 455.73 |
| | | | 12/14/2011 | 11.07 | 456.05 |
| | | | 7/11/2012 | 11.63 | 455.49 |
| | | | 12/19/2012 | 12.13 | 454.99 |
| | | | 7/15/2013 | 11.89 | 455.23 |
| | | | 12/17/2013 | 11.41 | 455.71 |
| | | | 7/15/2014 | 12.06 | 455.06 |
| | | | 12/15/2014 | 12.22 | 454.90 |
| | | | 7/20/2015 | 11.63 | 455.49 |
| | | | 12/14/2015 | 10.31 | 456.81 |
| | | | 4/4/2016 | Well Plugged and Abandoned | |

**Table 4-2B**

**Summary of Groundwater Gauging Data**
**Historical Monitoring Wells — SWMU 21**
**2016 RAER**
**Former NAS Dallas, Texas**
**Page 3 of 4**

| Monitoring Well | Top of Casing [1] (ft msl) | Screened Interval (ft msl) | Date | Depth to Water [2] (ft bgs) | Groundwater Elevation (ft msl) |
|---|---|---|---|---|---|
| **Monitoring Wells Located Outside PCLE Zone** | | | | | |
| **606D17MW** | 462.46 | 457.16 to 447.16 | 11/17/1995 | | |
| | | | 5/1/1998 | 5.78 | 456.68 |
| | | | 8/1/1998 | 7.00 | 455.46 |
| | | | 2/1/1999 | 5.74 | 456.72 |
| | | | 9/1/1999 | 5.43 | 457.03 |
| | | | 6/1/2000 | 5.00 | 457.46 |
| | | | 6/1/2001 | 5.86 | 456.60 |
| | | | 2/9/2003 | | |
| **606D18MW** | 459.36 | 452.86 to 442.86 | 4/6/1998 | | |
| | | | 5/1/1998 | 4.58 | 454.78 |
| | | | 8/1/1998 | 5.51 | 453.85 |
| | | | 2/1/1999 | 4.74 | 454.62 |
| | | | 9/1/1999 | 5.74 | 453.62 |
| | | | 6/1/2000 | 4.54 | 454.82 |
| | | | 6/1/2001 | 4.32 | 455.04 |
| | | | 12/14/2002 | 4.31 | 455.05 |
| | | | 8/1/2003 | 5.67 | 453.69 |
| | | | 12/23/03 | 4.95 | 454.41 |
| | | | 07/04/04 | 4.95 | 454.41 |
| | | | 4/17/2005 | | |
| **606D23MW** | 454.94 | 436 to 426.34 | 05/03/98 | | |
| | | | 05/01/98 | 15.52 | 439.42 |
| | | | 08/01/98 | 2.72 | 452.22 |
| | | | 02/01/99 | 3.01 | 451.93 |
| | | | 09/01/99 | 2.19 | 452.75 |
| | | | 06/01/00 | 3.43 | 451.51 |
| | | | 06/01/01 | 3.66 | 451.28 |
| | | | 12/02/02 | 2.05 | 452.89 |
| | | | 06/03/03 | | |
| **606D25MW** | 457.53 | #REF! to #REF! | 04/05/98 | | |
| | | | 05/01/98 | 0.76 | 456.77 |
| | | | 08/01/98 | 0.71 | 456.82 |
| | | | 02/01/99 | 1.53 | 456.00 |
| | | | 09/01/99 | 1.47 | 456.06 |
| | | | 06/01/00 | 2.71 | 454.82 |
| | | | 06/01/01 | 0.97 | 456.56 |
| | | | 12/02/02 | 2.22 | 455.31 |
| | | | 08/01/03 | 1.73 | 455.80 |
| | | | 12/23/03 | 2.56 | 454.97 |
| | | | 07/04/04 | 3.35 | 454.18 |
| | | | 09/28/04 | 2.38 | 455.15 |
| | | | 4/18/2005 | | |

**Table 4-2B**

**Summary of Groundwater Gauging Data**
**Historical Monitoring Wells — SWMU 21**
**2016 RAER**
**Former NAS Dallas, Texas**
**Page 4 of 4**

| Monitoring Well | Top of Casing [1] (ft msl) | Screened Interval (ft msl) | Date | Depth to Water [2] (ft bgs) | Groundwater Elevation (ft msl) |
|---|---|---|---|---|---|
| 60701MW | 460.22 | 451.27 to 441.27 | 2/1/1998 | 3.38 | 456.84 |
| | | | 5/1/1998 | 3.89 | 456.33 |
| | | | 8/1/1998 | 4.87 | 455.35 |
| | | | 2/1/1999 | 3.89 | 456.33 |
| | | | 9/1/1999 | 4.39 | 455.83 |
| | | | 6/1/2000 | 3.09 | 457.13 |
| | | | 6/1/2001 | 3.60 | 456.62 |
| | | | 2/9/2003 | | |
| 608D147MW | 458.41 | 458.41 to 458.41 | 3/29/2005 | | |
| | | | 4/17/2005 | NA | NA |
| | | | 7/21/2005 | 18.75 | 439.66 |
| | | | 10/6/2005 | 5.50 | 452.91 |
| | | | 1/21/2006 | 5.48 | 452.93 |
| | | | 5/3/2006 | 8.02 | 450.39 |
| | | | 8/9/2006 | 7.16 | 451.25 |
| | | | 4/25/2007 | 6.41 | 452.00 |
| | | | 8/20/2007 | 8.21 | 450.20 |
| | | | 1/15/2008 | 7.59 | 450.82 |
| | | | 7/9/2008 | 5.05 | 453.36 |
| | | | 12/15/2008 | 4.81 | 453.60 |
| | | | 7/14/2009 | 5.65 | 452.76 |
| | 458.37 | 458.37 to 458.37 | 12/15/2009 | 4.47 | 453.90 |
| | | | 8/10/2010 | 5.30 | 453.07 |
| | | | 12/16/2010 | 4.99 | 453.38 |
| | | | 7/25/2011 | 4.46 | 453.91 |
| | | | 12/14/2011 | 3.83 | 454.54 |
| | | | 7/11/2012 | 3.80 | 454.57 |
| | | | 12/19/2012 | 4.05 | 454.32 |
| | | | 7/15/2013 | 4.34 | 454.03 |
| | | | 12/17/2013 | 3.10 | 455.27 |
| | | | 7/15/2014 | 4.34 | 454.03 |
| | | | 12/15/2014 | 4.56 | 453.81 |
| | | | 7/20/2015 | 3.48 | 454.89 |
| | | | 12/15/2015 | 3.06 | 455.31 |
| | | | 4/5/2016 | Well Plugged and Abandoned | |

bgs - below ground surface
ft - feet
msl - mean sea level
NA - Not Available or Applicable (i.e., abandoned, not installed, not measured)
PCLE - Protective Concentration Level Exceedance

Note:
1 - All monitoring wells on-site were resurveyed in May 2005 in accordance with the Compliance Plan Requirements.
Depth to water measurements taken from the top of the riser.

# TABLE 4-3
# SUMMARY OF GROUNDWATER GAUGING DATA

**Table 4-3A**

**Summary of Geochemical Parameters Measured in Groundwater**
**Long Term Monitoring Wells — SWMU 21**
**2016 RAER**
**Former NAS Dallas, Texas**


| Monitoring Well | Sampling Date | Sampling Round | SDG | Oxidation-Reduction Conditions | | | | | | | | Degradation Products | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Dissolved Oxygen[2] | Ferrous Iron[2] | Nitrate[3] | Nitrite[3] | ORP[1] | Phosphate[3] | Sulfate[3] | TOC[3] | Alkalinity[2] | Carbon Dioxide[2] | Chloride[3] | Ethane[3] | Ethene[3] | Methane[3] | pH[1] | Sulfide[3] |
| | | | Units | mg/L | mg/L | mg/L | mg/L | mV | mg/L | mg/L | mg/L | mg/L | mg/L | mg/L | ng/L | ng/L | µg/L | S.U. | mg/L |
| **Point of Exposure Monitoring Wells** | | | | | | | | | | | | | | | | | | | |
| **600D107MW** | 8/8/2000 | | | | | | | | | | | | | | | | | | |
| | 8/20/2000 | Round 6 | LGCY | 1.5 | 0.2 | NA | NA | 326.6 | NA | NA | NA | 70 | 60 | NA | NA | NA | NA | 6.63 | 0.01 U |
| | 12/5/2003 | Round 10 | C3L190206 | 1 | 0 | NA | NA | -13 | NA | 756 | NA | 300 | NA | 92.0 | NA | NA | NA | 6.62 | 0 |
| | 10/8/2005 | Round 14 | FIELD | 0.13 | NA | NA | NA | 32.0 | NA | NA | NA | NA | NA | NA | NA | NA | NA | 6.57 | NA |
| | 9/6/2007 | Round 18 | DALLASW003 | NA | NA | 0.05 U | 1.0 UL | NA | 0.5 U | 872 | 1.3 | 350 | 35 | 104 | 330 U | 330 U | 7.8 U | NA | 0.8 UL |
| | 9/6/2007 | Round 18 | FIELD | 0.36 | 0 | NA | NA | 25.0 | NA | NA | NA | NA | NA | NA | NA | NA | NA | 6.61 | NA |
| | 7/27/2011 | Round 26 | F84622 | 0.3 | 5 | 0.5 U | 0.5 U | -224.3 | 0.062 | 771 | 1.3 | 450 | 70 | 103 | 320 U | 430 U | 9.26 | 6.69 | 1.5 |
| | 7/11/2012 | Round 28 | F94831 | NA | NA | NA | NA | -221.4 | NA | NA | NA | NA | NA | NA | NA | NA | NA | 5.83 | NA |
| | 1/9/2013 | Round 29 | FA644 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| | 7/17/2013 | Round 30 | FA6508 | 0.4 | 0.4 | 0.50 U | 0.50 U | -161.2 | 0.050 JH | 805 | 1.5 | 350 | 50 | 86.2 | 320 U | 430 U | 14.6 | 6.53 | 1.7 |
| | 1/29/2014 | Round 31 | FA12873 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| | 7/23/2014 | Round 32 | 1407181 | 0.58 | 0.24 | 0.033 U | 0.66 U | -166.4 | 0.01 U | 754 | 1.73 J | NA | 100 | 74.8 | 0.001 U | 0.001 U | 0.0127 | 6.61 | 0.02 |
| | 1/21/2015 | Round 33 | 1501079 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| | 7/22/2015 | Round 34 | 1507178 | 0.69 | 0 | 0.033 U | 0.66 U | 11.7 | 0.69 | 56.9 | 4.08 | 183 | 50 | 9.32 | 0.001 U | 0.001 U | 6.29 | 6.31 | 0.02 |
| | 1/20/2015 | Round 35 | 1601126 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| | 7/21/2016 | Round 36 | 1607165 | 0 | 0.21 | 0.033 U | 0.033 U | -132 | 0.186 | 735 | 2.1 J | 483 | 0 | 79.5 | 0.001 U | 0.001 U | 19.1 | 6.93 | NA |
| **60606MW** | 11/17/1995 | | | | | | | | | | | | | | | | | | |
| | 11/5/1999 | Round 5 | DL330 | 0.4 | 0 | 2.5 U | 2.5 U | 222.4 | 2.5 U | 242 | NA | 362 | 135 | 32.1 | NA | NA | NA | 7.06 | 0 U |
| | 7/19/2000 | Round 6 | DL350 | 1 | 0.2 | 0.5 U | 0.5 U | 231.5 | 0.5 U | 254 | NA | 375 | 43 | 33.8 | NA | NA | NA | 6.98 | 0.01 U |
| | 6/19/2001 | Round 7 | DL363 | 0.3 | 0.2 | 0.10 U | 0.10 U | 145.3 | 0.026 U | 278 | NA | 100 | 25 | 37.0 | NA | NA | NA | 7.22 | 0.01 U |
| | 1/13/2003 | Round 8 | 140140 | 0.6 | 0.2 | 0.05 U | 0.05 U | 197 | 0.5 U | 320 | NA | 300 | 27.5 | 37.6 | NA | NA | NA | 7.31 | 0.01 U |
| | 12/9/2003 | Round 10 | C3L100326 | 0.6 | 0 | NA | NA | 146 | NA | 462 | NA | 175 | NA | 45.5 | NA | NA | NA | 6.91 | 0 |
| | 10/7/2005 | Round 14 | CTO260-16, 17 | 1 | 0 | NA | NA | 115 | 0.028 J | 400 | 0.81 J | 300 | 30 | 35 | 760 U | 350 U | 17 | 6.87 | 0.45 J |
| | 9/7/2007 | Round 18 | DALLASW004 | NA | NA | 0.05 U | 1.0 U | NA | 0.5 U | 414 | 0.73 | NA | NA | 43 | 330 U | 330 U | 24 | NA | 0.67 |
| | 9/7/2007 | Round 18 | FIELD | | | NA | NA | | NA | NA | NA | | | NA | NA | NA | NA | | NA |
| | 7/27/2011 | Round 26 | F84622 | 0.6 | 0 | 0.34 | 0.25 U | 25.9 | 0.02 | 310 | 0.71 | 160 | 13 | 41.2 | 320 U | 430 U | 3.05 | 7.22 | 0.56 |
| | 7/11/2012 | Round 28 | F94831 | NA | NA | NA | NA | -6.0 | NA | NA | NA | NA | NA | NA | NA | NA | NA | 7.18 | NA |
| | 1/9/2013 | Round 29 | FA644 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| | 7/17/2013 | Round 30 | FA6508 | 0.3 | 0 | 0.25 U | 0.25 U | 172.4 | 0.20 JH | 295 | 0.92 JU | 300 | 40 | 38.2 | 320 U | 430 U | 4.6 | 6.98 | 0.22 U |
| | 1/29/2014 | Round 31 | FA12873 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| | 7/23/2014 | Round 32 | 1407181 | 0.41 | 0 | 0.033 U | 0.033 U | 52.7 | 0.01 U | 277 J | 1.25 U | NA | 50 | 35.3 | 0.001 U | 0.001 U | 0.00335 J | 7.12 | 0.07 |
| | 1/21/2015 | Round 33 | 1501079 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| | 7/23/2015 | Round 34 | 1507187 | 0.67 | 0 | 0.033 U | 0.033 U | 16.9 | 0.01 U | 338 | 1.25 U | 413 | 55 | 37.1 | 0.001 U | 0.001 U | 6.16 | 6.62 | 0.02 |
| | 1/20/2015 | Round 35 | 1601126 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| | 7/22/2016 | Round 36 | 1607165 | 0 | 0.01 | 0.033 U | 0.033 U | | 0.0125 J | 283 | 1.25 U | 431 | 0 | 32.7 | 0.001 U | 0.001 U | 4.22 | 7.68 | NA |

**Table 4-3A**

**Summary of Geochemical Parameters Measured in Groundwater**
**Long Term Monitoring Wells — SWMU 21**
**2016 RAER**
**Former NAS Dallas, Texas**


| Monitoring Well | Sampling Date | Sampling Round | SDG | Oxidation-Reduction Conditions | | | | | | | | Degradation Products | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Dissolved Oxygen[2] | Ferrous Iron[2] | Nitrate[3] | Nitrite[3] | ORP[1] | Phosphate[3] | Sulfate[3] | TOC[3] | Alkalinity[2] | Carbon Dioxide[2] | Chloride[3] | Ethane[3] | Ethene[3] | Methane[3] | pH[1] | Sulfide[3] |
| | | | Units | mg/L | mg/L | mg/L | mg/L | mV | mg/L | mg/L | mg/L | mg/L | mg/L | mg/L | ng/L | ng/L | µg/L | S.U. | mg/L |
| 608D32MW | 5/11/1998 | | | | | | | | | | | | | | | | | | |
| | 4/5/1999 | Round 4 | LGCY | 0.6 | 0 | NA | NA | 247.8 | NA | NA | NA | 380 | 220 | NA | NA | NA | NA | 6.97 | 0 U |
| | 8/20/1999 | Round 5 | DL318, TTE09 | NA | NA | 2.5 U | 2.5 U | NA | 2.5 U | 886 | NA | NA | 82.7 | 86.9 | 59 | 112 | 25.66 | NA | NA |
| | 7/20/2000 | Round 6 | DL351 | 0.6 | 0.2 | 0.5 U | 0.5 U | 227.9 | 0.38 | 790 | NA | 305 | 55 | 97.5 | NA | NA | NA | 6.83 | 0.01 U |
| | 6/25/2001 | Round 7 | DL365 | 0.3 | 0.2 | 0.1 U | 0.1 U | 309.9 | 0.5 U | 782 | NA | 350 | 37 | 112 | 0.071 J | 0.066 J | 25 J | 7.08 | 0.01 U |
| | 1/24/2003 | Round 8 | 250113, TTN44 | 0.6 | 0.2 | 0.05 U | 0.5 U | 132 | 0.068 J | 655 | 1.7 | 350 | 55 | 82.1 | 0.04 | 0.05 | 52 | 7.08 | 0.01 U |
| | 12/7/2003 | Round 10 | C3L090143 | 0.9 | 0 | NA | NA | 28 | NA | 642 | NA | 175 | NA | 93.0 | NA | NA | NA | 7.68 | 0 |
| | 10/7/2005 | Round 14 | CTO260-16, 17 | 1.5 | 0 | NA | NA | 92 | 0.00991 U | 700 | 0.97 J | 250 | 23 | 84 | 760 U | 350 U | 35 | 6.69 | 0.14 U |
| | 9/7/2007 | Round 18 | DALLASW003 | NA | NA | 0.05 | 1 | NA | 0.5 | 953 | NA | NA | NA | 92.1 | 21 J | 140 | 2.8 | NA | 0.8 |
| | 9/7/2007 | Round 18 | FIELD | 5.29 | 0 | NA | NA | -119.0 | NA | NA | NA | 260 | 60 | NA | NA | NA | NA | 6.82 | NA |
| | 1/12/2010 | Round 23 | F70768 | NA | NA | NA | NA | 480.7 | NA | NA | NA | NA | NA | NA | NA | NA | NA | 6.67 | NA |
| | 7/14/2010 | Round 24 | F75199 | NA | NA | NA | NA | 18.5 | NA | NA | NA | NA | NA | NA | NA | NA | NA | 6.94 | NA |
| | 1/12/2011 | Round 25 | FIELD | | | NA | NA | 11.5 | NA | NA | NA | NA | NA | NA | NA | NA | NA | 6.55 | NA |
| | 7/26/2011 | Round 26 | F84622 | 0.6 | 0 | 1.7 | 0.5 U | -82.9 | 0.02 | 782 | 0.98 | 300 | 33 | 81 J | 320 U | 430 U | 1.93 | 6.93 | 0.3 U |
| | 7/11/2012 | Round 28 | F94831 | NA | NA | NA | NA | -10.5 | NA | NA | NA | NA | NA | NA | NA | NA | NA | 6.91 | NA |
| | 1/9/2013 | Round 29 | FA644 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| | 7/17/2013 | Round 30 | FA6508 | 0.3 | 0.1 | 0.50 U | 0.50 U | 9.2 | 0.49 | 748 | 1 | 350 | 50 | 90.9 | 320 U | 430 U | 37.3 | 6.93 | 0.22 U |
| | 1/29/2014 | Round 31 | FA12873 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| | 7/21/2014 | Round 32 | 1407162 | 0.37 | 0.45 | 0.033 U | 0.165 UJL | -11.6 | 0.01 U | 705 | 1.28 J | NA | 95 | 83.8 | 0.001 U | 0.001 U | 0.0332 | 6.69 | 0.09 |
| | 1/21/2015 | Round 33 | 1501079 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| | 7/22/2015 | Round 34 | 1507178 | 0.39 | 0.11 | 0.033 U | 0.033 U | -72.6 | .0000196 J | 2100 | 3.2 | 457 | 90 | 134 | 0.001 U | 0.001 U | 23 | 6.85 | 0.06 |
| | 1/20/2015 | Round 35 | 1601126 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| | 7/19/2016 | Round 36 | 1607165 | 0 | 0.17 | 0.033 U | 0.033 U | -23 | 0.0142 J | 684 | 1.25 U | 416 | 0 | 61.8 | 0.001 U | 0.001 U | 39.8 | 7.13 | NA |
| 608D132MW | 3/29/2005 | | | | | | | | | | | | | | | | | | |
| | 1/12/2010 | Round 23 | F70768 | NA | NA | NA | NA | 310.5 | NA | NA | NA | NA | NA | NA | NA | NA | NA | 6.73 | NA |
| | 7/14/2010 | Round 24 | F75199 | NA | NA | NA | NA | -36.1 | NA | NA | NA | NA | NA | NA | NA | NA | NA | 6.70 | NA |
| | 7/26/2011 | Round 26 | F84622 | 0.6 | 0.2 | 0.68 | 0.25 U | -95.9 | 0.028 | 645 | 1.4 | 350 | 50 | 49.7 J | 320 U | 430 U | 17.1 | 6.76 | 0.3 U |
| | 7/11/2012 | Round 28 | F94831 | NA | NA | NA | NA | -129.9 | NA | NA | NA | NA | NA | NA | NA | NA | NA | 6.95 | NA |
| | 1/9/2013 | Round 29 | FA644 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| | 7/17/2013 | Round 30 | FA6508 | 0.6 | 0.2 | 0.50 U | 0.77 J | 2.8 | 0.083 J | 791 | 1.4 | 400 | 50 | 56.2 | 320 U | 430 U | 12 | 6.85 | 0.23 U |
| | 1/29/2014 | Round 31 | FA12873 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| | 7/21/2014 | Round 32 | 1407162 | 0.45 | 0.12 | 0.033 U | 0.165 UJL | 179.2 | 0.01 U | 726 | 1.53 J | NA | 50 | 56.4 | 0.001 U | 0.001 U | 0.00719 | 6.89 | 0 |
| | 1/21/2015 | Round 33 | 1501079 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| | 7/23/2015 | Round 34 | 1507187 | 0.66 | 0.07 | 0.033 U | 0.033 U | 25.9 | 0.01 U | 512 | 1.47 J | 403 | 35 | 26.1 | 0.001 U | 0.001 U | 39.3 | 6.78 | 0.04 |
| | 1/20/2015 | Round 35 | 1601126 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| | 7/19/2016 | Round 36 | 1607165 | 0 | 0.04 | 0.0954 J | 0.033 U | 43 | 0.01 U | 394 | 1.58 J | 395 | 0 | 26.1 | 0.001 U | 0.001 U | 29.3 | 6.89 | NA |
| 608D136MW | 3/30/2005 | | | | | | | | | | | | | | | | | | |
| | 10/8/2005 | Round 14 | CTO260-18, 20 | 2.5 | 0 | NA | NA | 25 | 0.014 J | 660 | 1.1 | 250 | 40 | 88 | 760 U | 350 | 20 | 6.77 | 0.95 J |
| | 11/12/2007 | Round 18 | DALLASW003 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | 10000 U | 10000 U | 20 | NA | NA |
| | 11/12/2007 | Round 18 | FIELD | 0 | NA | NA | NA | 50.0 | NA | NA | NA | NA | NA | NA | NA | NA | NA | 6.91 | NA |
| | 1/12/2010 | Round 23 | F70768 | NA | NA | NA | NA | 322.2 | NA | NA | NA | NA | NA | NA | NA | NA | NA | 6.63 | NA |
| | 7/14/2010 | Round 24 | F75199 | NA | NA | NA | NA | 66.7 | NA | NA | NA | NA | NA | NA | NA | NA | NA | 6.95 | NA |
| | 1/12/2011 | Round 25 | FIELD | NA | NA | NA | NA | -99.7 | NA | NA | NA | NA | NA | NA | NA | NA | NA | 7.9 | NA |
| | 7/26/2011 | Round 26 | F84622 | 0.2 | 20 | 0.25 U | 0.25 U | -173.6 | 0.02 U | 517 | 0.86 | 250 | 50 | 81 J | 730 | 430 U | 10.6 | 7.8 | 0.3 U |
| | 1/11/2012 | Round 27 | FIELD | NA | NA | NA | NA | -122.4 | NA | NA | NA | NA | NA | NA | NA | NA | NA | 7.7 | NA |
| | 7/11/2012 | Round 28 | F94831 | NA | NA | NA | NA | -142.4 | NA | NA | NA | NA | NA | NA | NA | NA | NA | 7.01 | NA |
| | 1/9/2013 | Round 29 | FA644 | NA | NA | NA | NA | -156.1 | NA | NA | NA | NA | NA | NA | NA | NA | NA | 7.46 | NA |
| | 7/16/2013 | Round 30 | FA6508 | 0.8 | 4 | 0.50 U | 0.50 U | -142.1 | 0.040 JH | 752 | 1.2 | 250 | 25 | 88.9 | 3,100 | 430 U | 63.4 | 7.19 | 0.23 U |
| | 1/29/2014 | Round 31 | FA12873 | 0.47 | NA | NA | NA | -97.5 | NA | NA | NA | NA | NA | NA | NA | NA | NA | 7.17 | NA |
| | 7/21/2014 | Round 32 | 1407162 | 0.38 | 2.91 | 0.033 U | 0.165 U | -141 | 0.01 U | 641 | 1.42 J | NA | 35 | 75.7 | 0.00351 J | 0.001 U | 0.0949 | 7.49 | 0.03 |
| | 1/21/2015 | Round 33 | 1501079 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| | 7/23/2015 | Round 34 | 1507187 | 0.77 | 1.95 | 0.033 U | 0.165 U | -167.9 | 0.01 U | 49.9 | 1.25 U | 264 | 60 | 8.31 | 4.22 | 0.001 U | 194 | 6.82 | 0 |
| | 1/20/2015 | Round 35 | 1601126 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| | 7/21/2016 | Round 36 | 1607165 | 0 | 0.94 | 0.033 U | 0.033 U | -144 | 0.01 U | 619 | 1.25 U | 286 | 0 | 78.8 | .00235 J | 0.001 U | 116 | 7.51 | NA |

**Table 4-3A**

**Summary of Geochemical Parameters Measured in Groundwater**
**Long Term Monitoring Wells — SWMU 21**
**2016 RAER**
**Former NAS Dallas, Texas**


| Monitoring Well | Sampling Date | Sampling Round | SDG | Oxidation-Reduction Conditions | | | | | | | | Degradation Products | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Dissolved Oxygen[2] | Ferrous Iron[2] | Nitrate[3] | Nitrite[3] | ORP[1] | Phosphate[3] | Sulfate[3] | TOC[3] | Alkalinity[2] | Carbon Dioxide[2] | Chloride[3] | Ethane[3] | Ethene[3] | Methane[3] | pH[1] | Sulfide[3] |
| | | | Units | mg/L | mg/L | mg/L | mg/L | mV | mg/L | mg/L | mg/L | mg/L | mg/L | mg/L | ng/L | ng/L | µg/L | S.U. | mg/L |
| 608D138MW | 3/29/2005 | | | | | | | | | | | | | | | | | | |
| | 10/8/2005 | Round 14 | CTO260-16,17 | 2 | 0 | NA | NA | 8 | 0.00991 U | 690 | 1.3 | 250 | 32 | 49 | 760 U | 350 U | 7.4 U | 6.69 | 0.14 U |
| | 9/5/2007 | Round 18 | DALLASW003 | NA | NA | 0.068 | 1.0 U | NA | 0.5 UL | 557 | 1.3 | NA | NA | 73.8 | 330 U | 500 J | 12 | NA | 0.8 UL |
| | 9/5/2007 | Round 18 | FIELD | 1 | 1.4 | NA | NA | -63.0 | NA | NA | NA | 250 | 50 | NA | NA | NA | NA | 6.52 | NA |
| | 7/27/2011 | Round 26 | F84622 | 0.6 | 0.1 | 0.25 U | 0.25 U | 29.4 | 0.18 | 507 | 1.2 | 400 | 50 | 51.7 | 320 U | 430 U | 3.54 | 6.54 | 0.3 U |
| | 7/11/2012 | Round 28 | F94831 | NA | NA | NA | NA | -5.8 | NA | NA | NA | NA | NA | NA | NA | NA | NA | 6.81 | NA |
| | 1/9/2013 | Round 29 | FA644 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| | 7/17/2013 | Round 30 | FA6508 | 0.4 | 0.3 | 0.25 U | 0.25 U | 13.6 | 0.079 JH | 463 | 1.5 | 400 | 40 | 57.1 | 320 U | 430 U | 5.8 | 6.8 | 0.22 U |
| | 1/29/2014 | Round 31 | FA12873 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| | 7/23/2014 | Round 32 | 1407181 | 0.51 | 1.1 | 0.033 U | 0.66 U | -122 | 0.01 U | 448 | 1.79 J | NA | 70 | 65.1 | 0.001 U | 0.001 U | 0.00324 J | 6.92 | 0.06 |
| | 1/21/2015 | Round 33 | 1501079 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| | 7/22/2015 | Round 34 | 1507178 | 0.73 | 0.7 | 0.033 U | 0.66 U | -31.8 | .0000397 J | 421 | 1.25 U | 402 | 85 | 67.3 | 0.001 U | 0.001 U | 3.47 J | 6.41 | 0.14 |
| | 1/20/2015 | Round 35 | 1601126 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| | 7/21/2016 | Round 36 | 1607165 | 0 | 0 | 0.146 J | 0.033 U | 130 | 0.01 U | 429 | 1.44 J | 420 | 0 | 55.9 | 0.001 U | 0.001 U | 16.5 | 7.24 | NA |
| 608D140MW | 3/31/2005 | | | | | | | | | | | | | | | | | | |
| | 10/17/2005 | Round 14 | CTO260-19,20 | 0.8 | 0.4 | 0.004 U | 0.003 U | -60 | 0.00991 U | 520 | 1.4 | 250 | 40 | 66 | 760 U | 350 U | 0.17 U | 6.75 | 2.6 |
| | 9/5/2007 | Round 18 | DALLASW003 | 1 | 0 | 0.05 U | 1.0 U | 5 | 0.5 UL | 560 | 0.87 | 250 | 40 | 79.6 | 330 U | 330 | 11 U | NA | 0.8 UL |
| | 9/5/2007 | Round 18 | FIELD | 1 | 0 | NA | NA | 5 | NA | NA | NA | 250 | 40 | NA | NA | NA | NA | 6.64 | NA |
| | 7/27/2011 | Round 26 | F84622 | 0.3 | 0.1 | 0.25 U | 0.25 U | 5.8 | 0.02 U | 539 | 1 | 12 | 35 | 78 | 320 U | 430 U | 4.08 | 6.47 | 0.3 U |
| | 7/11/2012 | Round 28 | F94831 | NA | NA | NA | NA | -2.7 | NA | NA | NA | NA | NA | NA | NA | NA | NA | 6.78 | NA |
| | 1/9/2013 | Round 29 | FA644 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| | 7/17/2013 | Round 30 | FA6508 | 0.3 | 0.3 | 0.25 U | 0.25 U | 20 | 0.032 J | 319 | 1.2 U | 350 JH | 50 | 51.1 | 320 U | 430 U | 8.9 | 6.82 | 0.22 U |
| | 1/29/2014 | Round 31 | FIELD | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| | 7/23/2014 | Round 32 | 1407181 | 0.43 | 1.06 | 0.033 U | 0.66 U | -55.2 | 0.01 U | 490 | 1.49 J | NA | 100 | 78 | 0.001 U | 0.001 U | 0.00484 | 6.83 | 0.01 |
| | 1/21/2015 | Round 33 | 1501079 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| | 7/23/2015 | Round 34 | 1507187 | 0.8 | 1.59 | 0.033 U | 0.66 U | -97.1 | 0.01 U | 325 | 3.13 | 358 | 100 | 51.7 | 0.001 U | 0.001 U | 4.64 | 6.2 | 0.1 |
| | 1/20/2015 | Round 35 | 1601126 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| | 7/21/2016 | Round 36 | 1607165 | 0.96 | 0.04 | 0.033 U | 0.033 U | -146 | 0.287 | 87 | 6.77 | 330 | 0 | 20.1 | 0.001 U | 0.001 U | 3.65 J | 7.06 | NA |
| 608D141MW | 3/31/2005 | | | | | | | | | | | | | | | | | | |
| | 10/7/2005 | Round 14 | CTO260-16, 17 | 0.8 | 0 | NA | NA | 121 | 0.017 J | 690 | 0.92 J | 200 | 25 | 67 | 760 U | 350 U | 7.5 U | 6.75 | 0.14 U |
| | 9/6/2007 | Round 18 | DALLASW003 | NA | NA | 0.18 | 1.0 UL | NA | 0.5 U | 609 | 0.93 | NA | NA | 55.9 | 330 U | 330 U | 5.7 U | NA | 0.8 UL |
| | 9/6/2007 | Round 18 | FIELD | 1 | 0 | NA | NA | 115.0 | NA | NA | NA | 250 | 40 | NA | NA | NA | NA | 6.59 | NA |
| | 1/12/2011 | Round 25 | FIELD | NA | NA | NA | NA | 116.1 | NA | NA | NA | NA | NA | NA | NA | NA | NA | 6.89 | NA |
| | 7/27/2011 | Round 26 | F84622 | 0.3 | 0 | 0.5 U | 0.5 U | 31.7 | 0.02 U | 733 | 0.95 | 13 | 14 | 69.7 | 320 U | 430 U | 5.27 | 6.52 | 1.6 |
| | 7/11/2012 | Round 28 | F94831 | NA | NA | NA | NA | 63 | NA | NA | NA | NA | NA | NA | NA | NA | NA | 6.73 | NA |
| | 1/9/2013 | Round 29 | FA644 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| | 7/17/2013 | Round 30 | FA6508 | 0.3 | 0 | 0.25 U | 0.25 U | 100.2 | 0.038 J | 555 | 1.2 | 350 | 35 | 50.8 | 320 U | 430 U | 3.2 | 6.81 | 0.22 U |
| | 1/29/2014 | Round 31 | FA12873 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| | 7/23/2014 | Round 32 | 1407181 | 0.21 | 0.18 | 0.033 U | 0.66 U | -62.2 | 0.01 U | 472 | 1.39 J | NA | 100 | 52.7 | 0.001 U | 0.001 U | 0.00586 | 6.58 | 0.08 |
| | 1/21/2015 | Round 33 | 1501079 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| | 7/23/2015 | Round 34 | 1507187 | 1 | 0.09 | 0.033 U | 0.66 U | 26.1 | 0.01 U | 511 | 1.2 U | 429 | 90 | 23.5 | 0.001 U | 0.001 U | 8.64 | 6.27 | 0.12 |
| | 1/20/2015 | Round 35 | 1601126 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| | 7/21/2016 | Round 36 | 1607165 | 20.26 | 0.02 | 0.033 U | 0.033 U | 53 | 0.01 U | 680 | 1.25 U | 372 | 0 | 70.2 | 0.001 U | 0.001 U | 11.8 | 7.2 | NA |

**Table 4-3A**

**Summary of Geochemical Parameters Measured in Groundwater**
**Long Term Monitoring Wells — SWMU 21**
**2016 RAER**
**Former NAS Dallas, Texas**


| Monitoring Well | Sampling Date | Sampling Round | SDG | Oxidation-Reduction Conditions | | | | | | | | Degradation Products | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Dissolved Oxygen[2] | Ferrous Iron[2] | Nitrate[3] | Nitrite[3] | ORP[1] | Phosphate[3] | Sulfate[3] | TOC[3] | Alkalinity[2] | Carbon Dioxide[2] | Chloride[3] | Ethane[3] | Ethene[3] | Methane[3] | pH[1] | Sulfide[3] |
| | | | Units | mg/L | mg/L | mg/L | mg/L | mV | mg/L | mg/L | mg/L | mg/L | mg/L | mg/L | ng/L | ng/L | µg/L | S.U. | mg/L |
| 608D142MW | 3/31/2005 | | | | | | | | | | | | | | | | | | |
| | 9/5/2007 | Round 18 | DALLASW003 | NA | NA | 0.05 U | 1.0 U | NA | 0.5 UL | 912 | 0.88 | NA | NA | 196 | 330 U | 330 | 5.5 U | NA | 0.8 |
| | 9/5/2007 | Round 18 | FIELD | 0.6 | 0 | NA | NA | 212.0 | NA | NA | NA | 350 | 35 | NA | NA | NA | NA | 6.95 | NA |
| | 7/27/2011 | Round 26 | F84622 | 0.6 | 0 | 0.88 | 0.5 U | 27.9 | 0.02 U | 888 | 1.4 | 13 | 25 | 148 | 320 U | 430 U | 0.26 J | 6.99 | 0.3 U |
| | 7/11/2012 | Round 28 | F94831 | NA | NA | NA | NA | -63.7 | NA | NA | NA | NA | NA | NA | NA | NA | NA | 7.02 | NA |
| | 1/9/2013 | Round 29 | FA644 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| | 7/17/2013 | Round 30 | FA6508 | 0.2 | 0.2 | 0.50 U | 0.89 J | 108.7 | 0.14 JH | 1,190 | 1.8 | 350 | 35 | 235 | 320 U | 430 U | 5.5 | 6.89 | 0.22 U |
| | 1/29/2014 | Round 31 | FA12873 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| | 7/23/2014 | Round 32 | 1407181 | 0.31 | 0.23 | 0.033 U | 0.66 U | -9.8 | 0.01 U | 1330 | 2.2 J | NA | 100 | 246 | 0.001 U | 0.001 U | 0.00275 J | 6.95 | 0.09 |
| | 1/21/2015 | Round 33 | 1501079 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| | 7/22/2015 | Round 34 | 1507178 | 0.99 | 0 | 0.033 U | 0.66 U | 12.4 | 0.01 U | 1270 | 1.66 J | 466 | 100 | 256 | 0.001 U | 0.001 U | 5.38 | 6.59 | 0.08 |
| | 1/20/2015 | Round 35 | 1601126 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| | 7/22/2016 | Round 36 | 1607165 | 9.34 | 0.01 | 0.033 U | 0.033 U | 140 | 0.0142 J | 1010 | 1.54 J | 500 | 0 | 216 | 0.001 U | 0.001 U | 5.51 | 7.20 | NA |
| 608D143MW | 4/14/2005 | | | | | | | | | | | | | | | | | | |
| | 7/22/2005 | Round 13A | CTO260-11 | NA | NA | NA | NA | NA | NA | 570 K | 0.96 J | NA | NA | 62 | NA | NA | NA | NA | NA |
| | 10/9/2005 | Round 14 | CTO260-18, 20 | 1 | 0 | NA | NA | -36 | 0.0099 J | 560 | 1 J | 200 | 35 | 54 | 10,000 U | 10,000 U | 16 | 6.93 | 1.7 |
| | 9/5/2007 | Round 18 | DALLASW003 | NA | NA | 0.063 | 1.0 U | NA | 0.5 UL | 600 | 1.3 | NA | NA | 56.1 | 330 U | 330 | 20 | NA | 0.8 UL |
| | 9/5/2007 | Round 18 | FIELD | 0.4 | 0 | NA | NA | 134 | NA | NA | NA | 350 | 40 | NA | NA | NA | NA | 7.15 | NA |
| | 7/27/2011 | Round 26 | F84622 | 0.6 | 0.1 | 0.36 | 0.25 U | -70.5 | 0.042 | 591 | 0.82 | 160 | 15 | 46.2 | 320 U | 430 U | 6.91 | 7.1 | 0.3 U |
| | 7/11/2012 | Round 28 | F94831 | NA | NA | NA | NA | -62.4 | NA | NA | NA | NA | NA | NA | NA | NA | NA | 7.03 | NA |
| | 1/9/2013 | Round 29 | FA644 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| | 7/17/2013 | Round 30 | FA6508 | 0.3 | 0 | 0.50 U | 0.50 U | 206.1 | 0.37 | 540 | 1.1 | 275 | 28 | 41.4 | 320 U | 430 U | 12.9 | 6.64 | 0.22 U |
| | 1/29/2014 | Round 31 | FA12873 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| | 7/23/2014 | Round 32 | 1407181 | 0.24 | 0.13 | 0.033 U | 0.66 U | -75.7 | 0.01 U | 534 | 1.3 J | NA | 50 | 41.1 | 0.001 U | 0.001 U | 0.0107 | 6.77 | 0.03 |
| | 1/21/2015 | Round 33 | 1501079 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| | 7/22/2015 | Round 34 | 1507178 | 0.57 | 0.02 | 0.033 U | 0.66 U | -10.7 | 0.01 U | 654 | 1.2 U | 389 | 60 | 48.6 | 0.001 U | 0.001 U | 9.52 | 7.06 | 0.01 |
| | 1/20/2015 | Round 35 | 1601126 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| | 7/22/2016 | Round 36 | 1607165 | 0.74 | 0.33 | 1.02 | 1.85 | -91 | 0.0142 J | 230 | 4.71 | 175 | 0 | 53.8 | 0.001 U | 0.001 U | 3.76 | 11.74 | NA |
| 608D144MW | 3/31/2005 | | | | | | | | | | | | | | | | | | |
| | 7/22/2005 | Round 13A | CTO260-11 | NA | NA | NA | NA | NA | NA | 640 K | 1.4 | NA | NA | 120 | NA | NA | NA | NA | NA |
| | 10/8/2005 | Round 14 | CTO260-18, 20 | NA | NA | NA | NA | -42 | NA | NA | NA | NA | NA | NA | NA | NA | NA | 6.91 | NA |
| | 9/6/2007 | Round 18 | DALLASW003 | NA | NA | 0.05 U | 1.0 UL | NA | 0.5 U | 760 | 0.95 | NA | NA | 116 | 330 U | 330 U | 19 | NA | 0.8 UL |
| | 9/6/2007 | Round 18 | FIELD | 0.8 | 0 | NA | NA | -187 | NA | NA | NA | 400 | 30 | NA | NA | NA | NA | 6.98 | NA |
| | 7/27/2011 | Round 26 | F84622 | 0.4 | 0.1 | 0.5 U | 0.5 U | -20.4 | 0.043 | 770 | 1.2 | 100 | 0 | 92.8 | 320 U | 430 U | 6.76 | 7.25 | 0.3 U |
| | 7/11/2012 | Round 28 | F94831 | NA | NA | NA | NA | -45.7 | NA | NA | NA | NA | NA | NA | NA | NA | NA | 7.11 | NA |
| | 1/9/2013 | Round 29 | FA644 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| | 7/17/2013 | Round 30 | FA6508 | 0.6 | 0.1 | 0.50 U | 0.58 JH | -25.7 | 0.032 JH | 721 | 1.2 U | 400 | 35 | 66.4 | 320 U | 430 U | 10.4 | 7.09 | 0.22 U |
| | 1/29/2014 | Round 31 | FA12873 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| | 7/23/2014 | Round 32 | 1407181 | 0.52 | 0.37 | 0.033 U | 0.66 U | -51.4 | 0.01 U | 681 | 1.41 J | NA | 90 | 60.7 | 0.001 U | 0.001 U | 0.00448 | 7.03 | 0.46 |
| | 1/21/2015 | Round 33 | 1501079 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| | 7/22/2015 | Round 34 | 1507178 | 0.5 | 0.19 | 0.033 U | 0.66 U | -37.4 | 0.01 U | 734 | 1.2 U | 422 | 70 | 83 | 0.001 U | 0.001 U | 8.92 | 7.06 | 0 |
| | 1/20/2015 | Round 35 | 1601126 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| | 7/22/2016 | Round 36 | 1607165 | 0.19 | 0.01 | 0.033 U | 0.033 U | 35 | 0.0142 J | 688 | 1.25 U | 448 | 0 | 77.3 | 0.001 U | 0.001 U | 5.64 | 7.43 | NA |

**Table 4-3A**

**Summary of Geochemical Parameters Measured in Groundwater**
**Long Term Monitoring Wells — SWMU 21**
**2016 RAER**
**Former NAS Dallas, Texas**


| Monitoring Well | Sampling Date | Sampling Round | SDG | Oxidation-Reduction Conditions | | | | | | | | Degradation Products | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Dissolved Oxygen[2] | Ferrous Iron[2] | Nitrate[3] | Nitrite[3] | ORP[1] | Phosphate[3] | Sulfate[3] | TOC[3] | Alkalinity[2] | Carbon Dioxide[2] | Chloride[3] | Ethane[3] | Ethene[3] | Methane[3] | pH[1] | Sulfide[3] |
| | | | Units | mg/L | mg/L | mg/L | mg/L | mV | mg/L | mg/L | mg/L | mg/L | mg/L | mg/L | ng/L | ng/L | µg/L | S.U. | mg/L |
| 608D145MW | 3/31/2005 | | | | | | | | | | | | | | | | | | |
| | 7/22/2005 | Round 13A | CTO260-11 | NA | NA | NA | NA | NA | NA | 450 K | 0.97 J | NA | NA | 130 | NA | NA | NA | NA | NA |
| | 10/8/2005 | Round 14 | CTO260-18, 20 | NA | NA | NA | NA | 50 | NA | NA | NA | NA | NA | NA | NA | NA | NA | 6.84 | NA |
| | 9/6/2007 | Round 18 | DALLASW003 | NA | NA | 0.05 U | 1.0 UL | NA | 0.5 U | 598 | 0.9 | NA | NA | 148 | 330 U | 330 U | 8.7 U | NA | 0.8 UL |
| | 9/6/2007 | Round 18 | FIELD | 0.4 | 0 | NA | NA | -149 | NA | NA | NA | 300 | 32 | NA | NA | NA | NA | 6.67 | NA |
| | 7/27/2011 | Round 26 | F84622 | 0.5 | 0 | 0.89 JL | 0.5 U | 42.3 | 0.057 | 602 JL | 0.84 | 150 | 15 | 131 | 320 U | 430 U | 3.51 | 7.11 | 0.3 U |
| | 7/11/2012 | Round 28 | F94831 | NA | NA | NA | NA | -15.1 | NA | NA | NA | NA | NA | NA | NA | NA | NA | 7.02 | NA |
| | 1/9/2013 | Round 29 | FA644 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| | 7/17/2013 | Round 30 | FA6508 | 0.3 | 0.1 | 0.50 U | 0.50 U | 149.8 | 0.057 JH | 714 | 1.1 U | 275 | 35 | 144 | 320 U | 430 U | 4.2 | 6.78 | 1.4 |
| | 1/29/2014 | Round 31 | FA12873 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| | 7/23/2014 | Round 32 | 1407181 | 0.21 | 0.07 | 0.033 U | 0.66 U | -76.2 | 0.01 U | 680 | 1.32 J | NA | 60 | 134 | 0.001 U | 0.001 U | 0.00434 | 6.82 | 0.03 |
| | 1/21/2015 | Round 33 | 1501079 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| | 7/22/2015 | Round 34 | 1507178 | 0.66 | 0 | 0.033 U | 0.66 U | -13.1 | 0.01 U | 727 | 1.1 U | 405 | 75 | 147 | 0.001 U | 0.001 U | 3.07 J | 7.06 | 0 |
| | 1/20/2015 | Round 35 | 1601126 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| | 7/27/2016 | Round 36 | 1607165 | 0 | 0.67 | 0.033 U | 0.033 U | -36 | 0.01 U | 647 | 1.25 U | 457 | 0 | 148 | .001 UJL | .001 UJL | 3.8 JL | 7.26 | NA |
| 608D146MW | 3/29/2005 | | | | | | | | | | | | | | | | | | |
| | 7/22/2005 | Round 13A | CTO260-11 | NA | NA | NA | NA | NA | NA | 590 K | 1.2 | NA | NA | 92 | NA | NA | NA | NA | NA |
| | 10/7/2005 | Round 14 | CTO260-16, 17 | 1 | 0.2 | NA | NA | -61 | 0.00991 U | 510 | 0.83 J | 350 | 25 | 58 | 760 U | 350 U | 13 | 6.86 | 0.14 U |
| | 9/5/2007 | Round 18 | DALLASW003 | NA | NA | 0.05 U | 1.0 U | NA | 0.5 UL | 682 | 0.94 | NA | NA | 80.4 | 330 U | 330 | 26 | NA | 0.8 UL |
| | 9/5/2007 | Round 18 | FIELD | 0.3 | 0 | NA | NA | 23 | NA | NA | NA | 350 | 40 | NA | NA | NA | NA | 7.07 | NA |
| | 7/27/2011 | Round 26 | F84622 | 0.4 | 0 | 0.5 UJL | 0.5 U | 32.8 | 0.032 | 648 JL | 0.76 | 200 | 0 | 67.7 | 320 U | 430 U | 7.84 | 7.1 | 0.3 U |
| | 7/11/2012 | Round 28 | F94831 | NA | NA | NA | NA | -1.7 | NA | NA | NA | NA | NA | NA | NA | NA | NA | 6.87 | NA |
| | 1/9/2013 | Round 29 | FA644 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| | 7/17/2013 | Round 30 | FA6508 | 0.3 | 0.1 | 0.50 U | 0.50 U | 206.8 | 0.057 JH | 567 | 1.0 U | 300 | 21 | 53.1 | 320 U | 430 U | 11.4 | 6.65 | NA |
| | 1/29/2014 | Round 31 | FA12873 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| | 7/22/2014 | Round 32 | 1407174 | 0.16 | 0.12 | 0.033 U | 0.66 U | -74.7 | 0.01 U | 534 | 1.29 J | NA | 40 | 48.5 | 0.001 U | 0.001 U | 0.00725 | 6.72 | 0.02 |
| | 1/21/2015 | Round 33 | 1501079 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| | 7/22/2015 | Round 34 | 1507178 | 0.59 | 0.1 | 0.033 U | 0.66 U | 21.4 | 0.01 U | 640 | 1.0 U | 413 | 30 | 57.4 | 0.001 U | 0.001 U | 11.1 | 7.08 | 0.01 |
| | 1/20/2015 | Round 35 | 1601126 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| | 7/22/2016 | Round 36 | 1607165 | 0 | 0.13 | 0.033 U | 0.033 U | 105 | 0.0359 J | 599 | 1.25 U | 389 | 0 | 56.3 | 0.001 U | 0.001 U | 6.91 | 7.05 | NA |

**Table 4-3A**

**Summary of Geochemical Parameters Measured in Groundwater**
**Long Term Monitoring Wells — SWMU 21**
**2016 RAER**
**Former NAS Dallas, Texas**
**Page 6 of 7**

| Monitoring Well | Sampling Date | Sampling Round | SDG | Oxidation-Reduction Conditions | | | | | | | | Degradation Products | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Dissolved Oxygen[2] | Ferrous Iron[2] | Nitrate[3] | Nitrite[3] | ORP[1] | Phosphate[3] | Sulfate[3] | TOC[3] | Alkalinity[2] | Carbon Dioxide[2] | Chloride[3] | Ethane[3] | Ethene[3] | Methane[3] | pH[1] | Sulfide[3] |
| | | | Units | mg/L | mg/L | mg/L | mg/L | mV | mg/L | mg/L | mg/L | mg/L | mg/L | mg/L | ng/L | ng/L | µg/L | S.U. | mg/L |
| **Corrective Action Observation and Background Monitoring Wells** | | | | | | | | | | | | | | | | | | | |
| **600D89MW/ 608D161MW** | 8/18/1989 | | | | | | | | | | | | | | | | | | |
| | 8/18/1999 | Round 5 | DL318, TTE09 | 2.5 | 0 | 2.4 | 2 U | 255.8 | 1 U | 409 | NA | 376 | 240 | 40.1 | 97 | 625 | 2.299 | 6.92 | 0 U |
| | 7/12/2000 | Round 6 | DL349 | NA | NA | 1.2 | 0.5 U | NA | 0.5 U | 389 | NA | NA | NA | 70.6 | NA | NA | NA | NA | NA |
| | 7/12/2000 | Round 7 | DL368 | 0.6 | 0.2 | 1.1 | 0.10 U | 171.9 | 0.50 U | 377 | NA | 475 | 50 | 64.9 | NA | NA | NA | 7.08 | 0.01 U |
| | 1/20/2003 | Round 8 | 210141 | 0.8 | 0.2 | 0.36 | 0.05 U | 165 | 0.5 U | 346 | NA | 425 | 85 | 78.6 | NA | NA | NA | 6.9 | 0.01 U |
| | 12/5/2003 | Round 10 | C3L060114 | 0.6 | 0.2 | NA | NA | 121 | NA | 334 L | NA | 250 | NA | 71.7 | NA | NA | NA | 6.29 | 0.05 U |
| | 9/6/2007 | Round 18 | DALLASW003 | NA | NA | 0.11 | 1.0 UL | NA | 0.5 U | 429 | 0.86 | NA | NA | 69.3 | 330 U | 330 U | 1.5 U | NA | 0.8 UL |
| | 9/6/2007 | Round 18 | FIELD | 1 | 1.2 | NA | NA | 75 | NA | NA | NA | 200 | 35 | NA | NA | NA | NA | 6.76 | NA |
| | 7/27/2011 | Round 26 | F84665 | 0.2 | 0.1 | 0.5 U | 0.5 U | 79.4 | 0.042 | 748 | 1.5 | 300 | 50 | 55.1 | 320 U | 430 U | 5.16 | 6.55 | 0.35 |
| | 1/11/2012 | Round 27 | F88817 | NA | NA | NA | NA | -64.7 | NA | NA | NA | NA | NA | NA | NA | NA | NA | 7.38 | NA |
| | 7/11/2012 | Round 28 | F94831 | NA | NA | NA | NA | 67.4 | NA | NA | NA | NA | NA | NA | NA | NA | NA | 6.81 | NA |
| | 1/9/2013 | Round 29 | FA644 | NA | NA | NA | NA | 51.3 | NA | NA | NA | NA | NA | NA | NA | NA | NA | 6.98 | NA |
| | 7/17/2013 | Round 30 | FA6508 | 0.2 | 0 | 0.50 U | 0.50 U | 176.5 | 0.13 JH | 737 | 1.7 | 250 | 25 | 66.1 | 320 U | 430 U | 11.3 | 7.01 | 0.22 U |
| | 1/29/2014 | Round 31 | FA12873 | 0.43 | NA | NA | NA | 49.3 | NA | NA | NA | NA | NA | NA | NA | NA | NA | 6.9 | NA |
| | 7/23/2014 | Round 32 | 1407181 | 0.33 | 0.52 | 0.033 U | 0.66 U | -27.1 | 0.01 U | 713 | 1.88 J | NA | 90 | 61.4 | 0.001 U | 0.001 U | 0.0103 | 6.86 | 0.09 |
| | 1/21/2015 | Round 33 | 1501079 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| | 7/22/2015 | Round 34 | 1507178 | 0.88 | 3.3 | 0.033 U | 0.66 U | 29.9 | 0.01 U | 749 | 2.52 J | 402 | 100 | 59.5 | 0.001 U | 0.001 U | 5.21 | 6.42 | 0.61 |
| | 1/20/2015 | Round 35 | 1601126 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| | 7/21/2016 | Round 36 | 1607165 | 0 | 0.59 | 0.033 U | 0.033 U | 7.03 | 0.01 U | 654 | 1.5 J | 434 | 0 | 54.5 | 0.001 U | 0.001 U | 7.45 | 7.03 | NA |
| **608D33MW** | 4/2/1998 | | | | | | | | | | | | | | | | | | |
| | 11/8/1999 | Round 5 | DL332 | 1 | 0.1 | 0.47 | 2.5 U | 350.4 | 2.5 U | 914 | NA | 292 | 142 | 127 | NA | NA | NA | 6.91 | NA |
| | 7/20/2000 | Round 6 | DL351 | 1 | 0.2 | 0.66 | 0.5 U | 188.6 | 0.5 U | 1020 | NA | 315 | 10 U | 150 | NA | NA | NA | 6.8 | 0.01 U |
| | 7/9/2001 | Round 7 | DL368 | 0.6 | 0.2 | 0.16 | 0.10 U | 173.5 | 0.50 U | 954 | NA | 280 | 37 | 150 | NA | NA | NA | 7.08 | 0.01 U |
| | 1/13/2003 | Round 8 | 140140 | 1.5 | 0.2 | 0.38 | 0.05 U | 154 | 0.5 U | 907 | NA | 250 | 35 | 125 | NA | NA | NA | 6.88 | 0.01 U |
| | 12/8/2003 | Round 10 | C3L090143 | 0.4 | 0 | NA | NA | 161 | NA | 894 | NA | 175 | NA | 156 | NA | NA | NA | 7.65 | 0 |
| | 9/7/2007 | Round 18 | DALLASW004 | NA | NA | 0.05 U | 1.0 U | NA | 0.5 U | 459 | 2.4 | NA | NA | 72.2 | 330 U | 330 U | 7.1 U | NA | 0.8 U |
| | 9/7/2007 | Round 18 | FIELD | 1 | 0 | NA | NA | -154 | NA | NA | NA | 175 | 20 | NA | NA | NA | NA | 6.97 | NA |
| | 1/12/2011 | Round 25 | FIELD | NA | NA | NA | NA | -268.3 | NA | NA | NA | NA | NA | NA | NA | NA | NA | 12.45 | NA |
| | 7/26/2011 | Round 26 | F84622 | 0.3 | 0 | 0.66 | 0.43 | -148 | 0.02 U | 489 | 2.7 | 180 | 0 | 90.8 J | 320 U | 430 U | 5.48 | 9.76 | 0.38 |
| | 1/11/2011 | Round 27 | F88817 | NA | NA | NA | NA | -85.7 | NA | NA | NA | NA | NA | NA | NA | NA | NA | 8.93 | NA |
| | 7/11/2012 | Round 28 | F94831 | NA | NA | NA | NA | -30.9 | NA | NA | NA | NA | NA | NA | NA | NA | NA | 10.63 | NA |
| | 1/9/2013 | Round 29 | FA644 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| | 7/17/2013 | Round 30 | FA6508 | 2 | 0 | 1.3 | 0.25 U | -38.9 | 0.45 JH | 176 | 6.1 | 150 | 0 | 24.7 | 320 U | 430 U | 0.16 J | 11.04 | 0.22 U |
| | 1/29/2014 | Round 31 | FA12873 | 2.76 | NA | NA | NA | 16.1 | NA | NA | NA | NA | NA | NA | NA | NA | NA | 9.81 | NA |
| | 7/21/2014 | Round 32 | 1407162 | 1.4 | 0.25 | 0.704 | 0.033 U | -22.2 | 0.01 U | 288 J | 2.86 J | NA | 12.5 | 36 | 0.001 U | 0.001 U | 0.001 U | 10.94 | 0.01 |
| | 1/21/2015 | Round 33 | 1501079 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| | 7/23/2015 | Round 34 | 1507187 | 1.04 | 0 | .832 J | 0.033 U | 0.5 | 0.01 U | 158 | 3.78 | 66.6 | 5 | 22.5 | 0.001 U | 0.001 U | 1.12 J | 10.73 | 0.01 |
| | 1/20/2015 | Round 35 | 1601126 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| | 7/21/2016 | Round 36 | 1607165 | 0.26 | 0.31 | 0.28 | 0.033 U | -22 | 0.01 U | 139 | 3.05 | 53.5 | 2.5 | 19 | 0.001 U | 0.001 U | 0.001 U | 11.13 | NA |

**Table 4-3A**

**Summary of Geochemical Parameters Measured in Groundwater**
**Long Term Monitoring Wells — SWMU 21**
**2016 RAER**
**Former NAS Dallas, Texas**


| Monitoring Well | Sampling Date | Sampling Round | SDG | Oxidation-Reduction Conditions | | | | | | | | Degradation Products | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Dissolved Oxygen[2] | Ferrous Iron[2] | Nitrate[3] | Nitrite[3] | ORP[1] | Phosphate[3] | Sulfate[3] | TOC[3] | Alkalinity[2] | Carbon Dioxide[2] | Chloride[3] | Ethane[3] | Ethene[3] | Methane[3] | pH[1] | Sulfide[3] |
| | | | Units | mg/L | mg/L | mg/L | mg/L | mV | mg/L | mg/L | mg/L | mg/L | mg/L | mg/L | ng/L | ng/L | µg/L | S.U. | mg/L |
| 608D162MW | 1/29/2014 | | | Well Installed | | | | | | | | | | | | | | | |
| | 1/29/2014 | Round 31 | FA12873 | 0.27 | NA | NA | NA | -43.1 | NA | NA | NA | NA | NA | NA | NA | NA | NA | 6.9 | NA |
| | 7/23/2014 | Round 32 | 1407181 | 0.45 | 1.6 | 0.033 U | 0.033 U | -160 | 0.01 U | 270 J | 1.88 J | NA | 85 | 51 | 0.001 U | 0.001 U | 0.00864 | 6.93 | 0.04 |
| | 1/21/2015 | Round 33 | 1501079 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| | 7/22/2015 | Round 34 | 1507178 | 0.66 | 1.28 | 0.033 U | 0.033 U | -57.9 | 0.01 U | 575 | 1.47 J | 402 | 100 | 57 | 0.001 U | 0.001 U | 5.48 | 6.22 | 0.04 |
| | 1/20/2015 | Round 35 | 1601126 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| | 7/21/2016 | Round 36 | 1607165 | 0 | 0.53 | 0.0882 J | 0.033 U | 108 | 0.0159 J | 246 | 1.25 U | 426 | 0 | 47.7 | 0.001 U | 0.001 U | 2.35 J | 7.1 | NA |
| 608D163MW | 1/29/2014 | | | Well Installed | | | | | | | | | | | | | | | |
| | 1/29/2014 | Round 31 | FA12873 | 1.1 | NA | NA | NA | 12.8 | NA | NA | NA | NA | NA | NA | NA | NA | NA | 7.23 | NA |
| | 7/23/2014 | Round 32 | 1407181 | 0.55 | 0.34 | 0.033 U | 0.033 UJL | 280.1 | 0.01 U | 123 | 1.36 J | NA | 100 | 16.9 | 0.001 U | 0.001 U | 0.00549 | 7.05 | 0.05 |
| | 1/21/2015 | Round 33 | 1501079 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| | 7/22/2015 | Round 34 | 1507178 | 4.77 | 0 | 0.033 U | 0.033 U | -14.5 | 0.01 U | 147 | 1.1 U | 334 | 55 | 16.3 | 0.001 U | 0.001 U | 2.46 J | 6.85 | 0.07 |
| | 1/20/2015 | Round 35 | 1601126 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| | 7/21/2016 | Round 36 | 1607165 | 0 | 0.40 | 0.033 U | 0.033 U | -70 | 0.01 U | 139 | 1.25 U | 395 | 0 | 15.2 | 0.001 U | 0.001 U | 6.25 | 7.29 | NA |

mg/L - milligrams per liter
mV - millivolts
NA - Not Analyzed

TOC - Total Organic Carbon
mg/L - micrograms per liter
S.U. - Standard Units

ng/L - nanograms per liter
SDG - Sample Delivery Group
ORP - Oxidation/reduction potential
PCLE - Protective Concentration Level Exceedance

Notes:
1. Field measurement, Meter
2. Field measurement, Test Kit
3. Analytical Laboratory result

Analytical Result Qualifiers:
J, K (or H), L - Indicates that the chemical was detected; however, the associated numerical result may not be a precise representation of the amount that is actually present in the sample. The laboratory reported concentration is considered to be bias unknown (J), high (K
U - Indicates that the sample was not detected at the numerical detection limit (sample-specific quantitation limit) noted. Nondetected results from the laboratory are reported in this manner. This qualifier is added to a positive result (reported by the laboratory) if the

**Table 4-3B**

**Summary of Geochemical Parameters Measured in Groundwater**
**Historical Monitoring Wells — SWMU 21**
**2016**
**Former NAS Dallas, Texas**
**Page 1 of 2**

| Monitoring Well | Sampling Date | SDG | Oxidation-Reduction Conditions | | | | | | | | Degradation Products | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Dissolved Oxygen[2] | Ferrous Iron[2] | Nitrate[3] | Nitrite[3] | ORP[1] | Phosphate[3] | Sulfate[3] | TOC[3] | Alkalinity[2] | Carbon Dioxide[2] | Chloride[3] | Ethane[3] | Ethene[3] | Methane[3] | pH[1] | Sulfide[3] |
| | | Units | mg/L | mg/L | mg/L | mg/L | mV | mg/L | mg/L | mg/L | mg/L | mg/L | mg/L | mg/L | ng/L | mg/L | S.U. | mg/L |
| **Monitoring Well Inside the PCLE Zone** | | | | | | | | | | | | | | | | | | |
| **600D88MW** | 8/19/1999 | | | | | | | | | | | | | | | | | |
| | 8/19/1999 | DL318 | 1 | 0 | 0.84 | 2.5 U | 314.4 | 2.5 U | 866 | NA | 400 | 207 | 172 | 0.045 | 0.263 | 1.826 | 7.1 | 0 U |
| | 7/12/2000 | DL349 | 1.5 | 0.2 | 1 | 0.5 U | 228.3 | 0.5 U | 799 | NA | 375 | 65 | 145 | NA | NA | NA | 6.95 | 0.01 U |
| | 6/25/2001 | 608MWD32-7 | 0.3 | 0.2 | 0.74 | 0.10 U | 80.1 | 0.50 U | 782 | NA | 400 | 37 | 139 | 0.046 J | 0.085 J | 5.4 J | 6.86 | 0.01 U |
| | -- | | | | | | | | | | | | | | | | | |
| **600D103MW** | 8/9/2000 | | | | | | | | | | | | | | | | | |
| | 8/21/2000 | DL356 | 1 | 0.2 | 0.76 U | 0.092 | 295.1 | 0.5 U | 712 | NA | 65 | 4 | 84.3 | NA | NA | NA | 6.76 | 0.01 U |
| | 6/25/2001 | DL366 | 0.3 | 0.2 | 0.42 | 0.10 U | 131.1 | 0.50 U | 812 | NA | 375 | 40 | 127 | 0.087 J | 0.14 J | 4.7 J | 6.95 | 0.01 U |
| | 1/28/2003 | 250113, TTN44 | 0.8 | 0.2 | 0.012 J | 0.5 U | -30 | 0.5 U | 676 | 2.6 | 350 | 25 | 85.7 | 0.07 | 0.06 | 8.9 | 6.61 | 0.01 U |
| | 12/5/2003 | C3L190206 | 0.2 | 0 | NA | NA | 89 | NA | 1040 | NA | 300 | NA | 155 | NA | NA | NA | 6.7 | 0 |
| | 4/18/2005 | | | | | | | | | | | | | | | | | |
| **600D104MW** | 8/1/2000 | | | | | | | | | | | | | | | | | |
| | 8/21/2000 | DL356 | 1.5 | 0.2 | 0.46 U | 0.068 | 313.4 | 0.5 U | 697 | NA | 80 | 50 | 86.8 | NA | NA | NA | 6.7 | 0.01 U |
| | 10/20/2000 | | | | | | | | | | | | | | | | | |
| **600D105MW** | 8/7/2000 | | | | | | | | | | | | | | | | | |
| | 8/21/2000 | DL356 | 0.9 | 0.2 | 1.4 | 0.091 | 287.6 | 0.5 U | 769 | NA | 70 | 65 | 78.5 | NA | NA | NA | 6.76 | 0.01 U |
| | 10/20/2000 | | | | | | | | | | | | | | | | | |
| **600D106MW** | 8/8/2000 | | | | | | | | | | | | | | | | | |
| | 8/20/2000 | LGCY | 3 | 0.2 | NA | NA | 277.9 | NA | | NA | 80 | 35 | NA | NA | NA | NA | 6.93 | 0.01 U |
| | 12/5/2003 | C3L190206 | 3 | 0 | NA | NA | 103.0 | NA | 754 | NA | 100 | NA | 90.5 | NA | NA | NA | 6.85 | 0 |
| | 4/18/2005 | | | | | | | | | | | | | | | | | |
| **600D108MW** | 8/20/2000 | | | | | | | | | | | | | | | | | |
| | 8/20/2000 | LGCY | 5.5 | 0.2 | NA | NA | 371.8 | NA | NA | NA | 60 | 50 | NA | NA | NA | NA | 6.63 | 0.01 U |
| | 12/5/2003 | C3L190206 | 0.8 | 1.3 | NA | NA | -24 | NA | 651 | NA | 400 | NA | 132 | NA | NA | NA | 6.62 | 0 |
| | 4/18/2005 | | | | | | | | | | | | | | | | | |
| **60801MW** | 11/4/1999 | DL332, TTE14 | 0.3 | 0 | 2.5 U | 2.5 U | 565.7 | 2.5 U | 754 | NA | 404 | 272 | 75.5 | 0.056 | 0.056 | 12.34 | 6.78 | NA |
| | 7/20/2000 | DL351 | 1 | 0.2 | 0.5 U | 0.5 U | 251.5 | 0.5 U | 705 | NA | 450 | 80 | 73.8 | NA | NA | NA | 6.6 | 0.01 U |
| | 6/25/2001 | DL366 | 0.4 | 0.2 | 0.14 | 0.10 U | 140.1 | 0.50 U | 835 | NA | 375 | 50 | 54.8 | 0.038 J | 0.046 J | 10 J | 6.75 | 0.01 U |
| | -- | | | | | | | | | | | | | | | | | |
| **608D34MW** | 5/14/1998 | | | | | | | | | | | | | | | | | |
| | 11/8/1999 | DL332, TTE15 | 0.4 | 0 | 5 U | 5 U | 324.5 | 5 U | 1580 | NA | 404 | 288 | 119 | NA | NA | NA | 6.98 | NA |
| | 7/21/2000 | DL351 | 0.7 | 0.2 | 0.19 | 0.5 U | 306 | 5 U | 1670 | NA | 375 | 65 | 137 | NA | NA | NA | 6.72 | 0.01 U |
| | 6/26/2001 | DL366 | 0.2 | 0.2 | 0.09 | 0.10 U | 152.8 | 0.50 U | 1840 | NA | 260 | 40 | 146 | NA | NA | NA | 6.85 | 0.01 U |
| | 1/13/2003 | 140140 | 0.6 | 0.2 | 0.21 | 0.05 U | 191 | 0.5 U | 1590 | NA | 350 | 25 | 138 | NA | NA | NA | 6.7 | 0.01 U |
| | 12/7/2003 | C3L090143 | 1.5 | 0 | NA | NA | 108 | NA | 1510 | NA | 375 | NA | 125 | NA | NA | NA | 7.6 | 0 |
| | 9/7/2007 | DALLASW003 | NA | NA | 1.1 | 1.0 U | NA | 0.5 U | 752 | 1.5 B | NA | NA | 52.2 | 330 U | 330 U | 1.8 | NA | 0.67 U |
| | 9/7/2007 | FIELD | 0.8 | 0 | NA | NA | 209 | NA | NA | NA | 400 | 60 | NA | NA | NA | NA | 6.87 | NA |
| | 1/12/2010 | F70768 | NA | NA | NA | NA | 302.1 | NA | NA | NA | NA | NA | NA | NA | NA | NA | 6.57 | NA |
| | 7/14/2010 | F75199 | NA | NA | NA | NA | 64.0 | NA | NA | NA | NA | NA | NA | NA | NA | NA | 6.89 | NA |
| | 1/12/2011 | FIELD | NA | NA | NA | NA | -58.3 | NA | NA | NA | NA | NA | NA | NA | NA | NA | 6.95 | NA |
| | 7/26/2011 | F84622 | 0.3 | 0 | 1.8 | 0.5 U | -44.7 | 0.026 | 658 | 1.5 | 300 | 85 | 162 J | 320 U | 430 U | 0.16 | 6.95 | 0.3 U |
| | 1/11/2012 | F88817 | NA | NA | NA | NA | -19.4 | NA | NA | NA | NA | NA | NA | NA | NA | NA | 7.28 | NA |
| | 7/11/2012 | F94831 | NA | NA | NA | NA | 61.6 | NA | NA | NA | NA | NA | NA | NA | NA | NA | 6.66 | NA |
| | 1/9/2013 | FA644 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| | 7/17/2013 | FA6508 | 1 | 0 | 1.6 | 0.50 U | 62.6 | 0.35 JH | 684 | 1.4 | 200 | 20 | 197 | 320 U | 430 U | 0.19 J | 6.9 | 0.22 U |
| | 1/29/2014 | FA12873 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| | 7/21/2014 | 1407162 | 0.48 | 0.014 | 0.988 | 0.165 U | 73.1 | 0.01 U | 746 | 1.59 J | NA | 0 | 151 | 0.001 U | 0.001 U | 0.001 U | 6.89 | 0.01 |
| | 1/21/2015 | 1501079 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| | 7/23/2015 | 1507187 | 1.09 | 0.14 | 0.033 U | 0.66 U | 44.1 | 0.01 U | 274 | 2.24 J | 499 | 225 | 176 | 0.001 U | 0.001 U | 1.02 J | 6.8 | 0.06 |
| | 4/4/2016 | Well Plugged and Abandoned | | | | | | | | | | | | | | | | |
| **608D131MW** | 3/29/2005 | | | | | | | | | | | | | | | | | |
| | 10/8/2005 | CTO260-16, 17 | 1 | 0 | NA | NA | -4 | 0.01 J | 1200 | 2 | 240 | 45 | 42 | 760 U | 350 U | 24 | 6.56 | 0.14 U |
| | 9/7/2007 | DALLASW004 | NA | NA | 0.05 U | 1.0 U | NA | 0.5 U | 1320 | 2.0 B | NA | NA | 40.5 | 330 U | 330 U | 30.000 | NA | 0.78 U |
| | 9/7/2007 | FIELD | 1 | 0 | NA | NA | 59 | NA | NA | NA | 300 | 80 | NA | NA | NA | NA | 6.58 | NA |
| | 1/12/2011 | FIELD | | | | | 16.3 | | | | | | | | | | 6.25 | |
| | 7/26/2011 | F84622 | 0.35 | 2.5 | 0.5 U | 0.5 U | -107.1 | 0.1 | 1100 | 2.1 | 300 | 60 | 25.2 J | 320 U | 430 U | 15.6 | 6.77 | 0.3 U |
| | 7/11/2012 | F94831 | NA | NA | NA | NA | 46 | NA | NA | NA | NA | NA | NA | NA | NA | NA | 6.63 | NA |
| | 1/9/2013 | FA644 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| | 7/17/2013 | FA6508 | 0.6 | 0 | 0.50 U | 0.50 U | 73.0 | 0.040 JH | 1160 | 2.1 | 350 | 70 | 21.9 | 320 U | 430 U | 23.3 | 6.77 | 0.35 J |
| | 1/29/2014 | FA12873 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| | 7/21/2014 | 1407162 | 0.68 | 0.14 | 0.033 U | 0.66 UJL | 301.9 | 0.01 U | 1130 | 2.17 J | NA | 100 | 20.7 | 0.001 U | 0.001 U | 0.00264 J | 6.7 | 0.02 |
| | 1/21/2015 | 1501079 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| | 7/23/2015 | 1507187 | 0.78 | 0 | 0.033 U | 0.66 U | 26.4 | 0.01 U | 592 | 1.61 J | 423 | 150 | 61.3 | 0.001 U | 0.001 U | 13.3 | 6.64 | 0.05 |
| | 4/4/2016 | Well Plugged and Abandoned | | | | | | | | | | | | | | | | |
| **Monitoring Well Outside the PCLE Zone** | | | | | | | | | | | | | | | | | | |
| **60605MW** | 11/5/1999 | DL330, TTE14 | 0.4 | 0 | 2.5 U | 2.5 U | 339.2 | 2.5 U | 416 | NA | 378 | 163 | 104 | NA | NA | NA | 7.16 | NA |
| | 7/19/2000 | DL350 | 2 | 0.2 | 0.5 U | 0.5 U | 254.6 | 0.5 U | 433 | NA | 375 | 36 | 108 | NA | NA | NA | 6.95 | 0.01 U |
| | 6/20/2001 | DL364 | 0.3 | 0.2 | 0.045 U | 0.10 U | 90.9 | 0.50 U | 391 | NA | 275 | 23 | 102 | NA | NA | NA | 6.72 | 0.01 U |
| | 1/10/2003 | 110104 | 0.7 | 0.2 | 0.05 U | 0.05 U | 511 | 0.5 U | 426 | NA | 175 | 23 | 121 | NA | NA | NA | 7.17 | 0.01 U |
| | -- | | | | | | | | | | | | | | | | | |
| **606D17MW** | 11/3/1999 | DL330, TTE14 | 0.6 | 0.4 | 3.2 | 2.5 U | 417.2 | 2.5 U | 892 | NA | 412 | 198 | 36.9 | 0.038 | 0.026 | 7.814 | 7.03 | NA |
| | 7/19/2000 | DL350 | 0.5 | 0.2 | 2.4 | 0.5 U | 227.1 | 0.5 U | 908 | NA | 375 | 45 | 44 | NA | NA | NA | 6.72 | 0.01 U |
| | 6/21/2001 | DL364 | 0.6 | 0.2 | 1.9 | 0.10 U | 76.4 | 0.50 U | 875 | NA | 350 | 55 | 43.2 | NA | NA | NA | 6.84 | 0.01 U |
| | -- | | | | | | | | | | | | | | | | | |
| | 8/19/1999 | | | | | | | | | | | | | | | | | |

**Table 4-3B**

**Summary of Geochemical Parameters Measured in Groundwater**
**Historical Monitoring Wells — SWMU 21**
**2016**
**Former NAS Dallas, Texas**
**Page 2 of 2**

| Monitoring Well | Sampling Date | SDG | Oxidation-Reduction Conditions | | | | | | | | Degradation Products | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Dissolved Oxygen[2] | Ferrous Iron[2] | Nitrate[3] | Nitrite[3] | ORP[1] | Phosphate[3] | Sulfate[3] | TOC[3] | Alkalinity[2] | Carbon Dioxide[2] | Chloride[3] | Ethane[3] | Ethene[3] | Methane[3] | pH[1] | Sulfide[3] |
| | | Units | mg/L | mg/L | mg/L | mg/L | mV | mg/L | mg/L | mg/L | mg/L | mg/L | mg/L | mg/L | ng/L | mg/L | S.U. | mg/L |
| 606D18MW | 10/19/1999 | DL327,TTE13 | 0.4 | 0 | 10 U | 10 U | 297.3 | 10 U | 2180 | NA | 496 | 310 | 495 | 0.005 U | 0.059 | 0.539 | 6.79 | 0 U |
| | 7/19/2000 | DL350 | 2 | 0.2 | 0.06 | 0.5 U | 250.7 | 2.5 U | 2290 | NA | 480 | 50 | 556 | NA | NA | NA | 6.81 | 0.01 U |
| | 6/20/2001 | DL364 | 0.8 | 0.2 | 0.079 U | 0.10 U | 45.8 | 0.03 | 2170 | NA | 450 | 43 | 471 | NA | NA | NA | 6.82 | 0.01 U |
| | 1/10/2003 | 110104 | 0.6 | 0.2 | 0.05 U | 0.05 U | 506 | 0.5 U | 2320 | NA | 350 | 85 | 472 | NA | NA | NA | 6.91 | 0.01 U |
| | 12/9/2003 | C3L100326 | 0.4 | 0 | NA | NA | 499 | NA | 2050 | NA | 350 | | 369 | NA | NA | NA | 6.6 | 0 |
| | 4/17/2005 | | | | | | | | | | | | | | | | | |
| 606D23MW | 11/15/1999 | DL333, TTE15 | 0.6 | 0.8 | 20 U | 20 U | 162.4 | 20 U | 4270 | NA | 564 | 395 | 2130 | NA | NA | NA | 6.74 | NA |
| | 7/20/2000 | DL350 | 1.5 | 2 | 0.15 | 0.5 U | 76.4 | 2.5 U | 3970 | NA | 590 | 95 | 1820 | NA | NA | NA | 6.63 | 0.01 U |
| | 6/20/2001 | DL364 | 0.8 | 1 | 0.10 U | 1.0 U | 63.2 | 5.0 U | 3780 | NA | 550 | 150 | 1730 | NA | NA | NA | 6.76 | 0.01 U |
| | 1/13/2003 | 140140 | 0.8 | 0.2 | 0.14 | 0.5 U | 138 | 0.5 U | 4150 | NA | 500 | 140 | 2110 | NA | NA | NA | 6.91 | 0.01 U |
| | 6/3/2003 | | | | | | | | | | | | | | | | | |
| 606D25MW | 11/5/1999 | DL332, TTE14 | 1 | 0 | 10 U | 10 U | 324 | 10 U | 3920 | NA | 570 | 285 | 1490 | NA | NA | NA | 6.87 | NA |
| | 7/20/2000 | DL350 | 1.5 | 0.2 | 0.04 | 0.5 U | 215.6 | 2.5 U | 3900 | NA | 500 | 65 | 1320 | NA | NA | NA | 6.86 | 0.01 U |
| | 6/21/2001 | DL364 | 0.8 | 0.2 | 0.03 | 2.0 U | 83.1 | 0.50 U | 3970 | NA | 300 | 700 | 1490 | NA | NA | NA | 7.15 | 0.01 U |
| | 1/10/2003 | 110104 | 0.8 | 0.2 | 0.05 U | 0.5 U | 142 | 0.5 U | 3700 | NA | 500 | 110 | 1260 | NA | NA | NA | 6.92 | 0.01 U |
| | 12/9/2003 | C3L100326 | 0.8 | 0 | NA | NA | 161 | NA | 3140 | NA | 325 | NA | 963 | NA | NA | NA | 6.73 | 0 |
| | 4/17/2005 | | | | | | | | | | | | | | | | | |
| 60701MW | 8/19/1999 | DL318, TTE09 | 0.4 | 0 | 1.4 | 2 U | 191 | 2 U | 663 | NA | 396 | 250 | 46.2 | 0.105 | 0.033 | 5.938 | 6.95 | 0 U |
| | 7/20/2000 | DL350 | 0.8 | 0.2 | 1.2 | 0.5 U | 222.6 | 0.5 U | 611 | NA | 450 | 50 | 47.1 | NA | NA | NA | 6.79 | 0.01 U |
| | 7/9/2001 | DL368 | 0.3 | 0.2 | 0.71 | 0.10 U | 165.7 | 0.099 U | 637 | NA | 475 | 60 | 43.7 | NA | NA | NA | 6.73 | 0.01 U |
| | -- | | | | | | | | | | | | | | | | | |
| 608D147MW | 3/29/2005 | | | | | | | | | | | | | | | | | |
| | 10/9/2005 | CTO260-18, 20 | 4.5 | 0 | NA | NA | 212 | 0.031 J | 3200 | 3 | 400 | 70 | 1700 | 760 U | 350 U | 0.17 U | 6.67 | 0.2 J |
| | 9/6/2007 | DALLASW003 | NA | NA | 0.12 | 1.0 UL | NA | 0.5 | 4220 | 2.5 | NA | NA | 1850 | 330 U | 330 U | 1.4 U | NA | 0.8 |
| | 9/6/2007 | FIELD | 1.5 | 0 | NA | NA | -167 | NA | NA | NA | 500 | 80 | NA | NA | NA | NA | 6.52 | NA |
| | 7/27/2011 | F84622 | 1 | 0 | 13.8 JL | 5 UJL | 159.2 | 0.24 | 4270 JL | 3.5 | 110 | 100 | 1750 | 320 U | 430 U | 0.22 J | 6.73 | 0.3 U |
| | 7/11/2012 | F94831 | NA | NA | NA | NA | 113.7 | NA | NA | NA | NA | NA | NA | NA | NA | NA | 6.53 | NA |
| | 1/9/2013 | | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| | 7/17/2013 | FA6508 | 0.3 | 0 | 5.0 U | 5.0 U | 248.6 | 0.12 | 4,570 | 3.9 | 500 | 70 | 1640 | 320 U | 430 U | 0.44 J | 6.71 | 1.4 |
| | 1/29/2014 | FA12873 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| | 7/22/2014 | 1407174 | 0.52 | 0.14 | 0.033 U | 0.66 U | 304.7 | 0.01 U | 4450 | 3.48 | NA | 100 | 1630 | 0.001 U | 0.001 U | 0.001 U | 6.56 | 0 |
| | 1/21/2015 | 1501079 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| | 7/22/2015 | 1507178 | 0.55 | 0.1 | 0.033 U | 0.66 U | 76.8 | 0.01 U | 4980 | 3.64 | 608 | 225 | 1650 | 0.001 U | 0.001 U | 1.79 J | 6.54 | 0.01 |
| | 4/5/2016 | Well Plugged and Abandoned | | | | | | | | | | | | | | | | |

mg/L - milligrams per liter
mV - millivolts
NA - Not Analyzed

TOC - Total Organic Carbon
mg/L - micrograms per liter
S.U. - Standard Units

ng/L - nanograms per liter
SDG - Sample Delivery Group
ORP - Oxidation/reduction potential
PCLE - Protective Concentration Level Exceedance

Notes:
1. Field measurement, Meter
2. Field measurement, Test Kit
3. Analytical Laboratory result

Analytical Result Qualifiers:
J, K, L - Indicates that the chemical was detected; however, the associated numerical result may not be a precise representation of the amount that is actually present in the sample. The laboratory reported concentration is considered to be bias unknown (J), high (K), or low (L) estimate of the true concentration.
U - Indicates that the sample was not detected at the numerical detection limit (sample-specific quantitation limit) noted. Nondetected results from the laboratory are reported in this manner. This qualifier is added to a positive result (reported by the laboratory) if the detected concentration is determined to be attributable to contamination introduced

# TABLE 4-4
# SUMMARY OF CONCENTRATION vs. TIME ATTENUATION RATE CONSTANTS

# Table 4-4

## Summary of Concentration vs. Time Attenuation Rate Constants
## SWMU 21 Plume
## 2016 RAER
## Former NAS Dallas, Texas
## Page 1 of 16

| Monitoring Well ID | Sampling Date | Elapsed Time (Years) | Protective Concentration Level (mg/L) | Concentration Detected (mg/L) | Natural Log of Concentration (mg/L) | Degradation Rate from Natural Log ($K_{time}$) (mg/L per year) | Minimum Degradation Rate Required for Remedial Goals Natural Log ($K_{time}$) (mg/L per year) | Minimum Degradation Rate Met? (Yes/No) | Expected Remedial Goal Concentration (mg/L) | Expected Remedial Goal Concentration Met? (Yes/No) | Remedial Goals Being Met? (Yes/No) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Trichloroethene** | | | | | | | | | | | |
| 600D107MW | Aug-00 | 0.0 | 0.00500 | 0.04100 | -3.19 | -- | -- | -- | -- | -- | -- |
| | Jul-01 | 0.9 | 0.00500 | 0.04500 | -3.10 | -- | -- | -- | -- | -- | -- |
| | Jan-03 | 2.4 | 0.00500 | 0.06000 | -2.81 | -- | -- | -- | -- | -- | -- |
| | Sep-03 | 3.0 | 0.00500 | 0.07200 | -2.63 | 0.185 | -0.131 | No | 0.02753 | No | No |
| | Sep-03 | 3.0 | 0.00500 | 0.03100 | -3.47 | 0.059 | -0.131 | No | 0.02753 | No | No |
| | Dec-03 | 3.3 | 0.00500 | 0.07400 | -2.60 | 0.105 | -0.131 | No | 0.02662 | No | No |
| | Jul-04 | 3.9 | 0.00500 | 0.04200 J | -3.17 | 0.054 | -0.131 | No | 0.02446 | No | No |
| | Oct-04 | 4.2 | 0.00500 | 0.02700 | -3.61 | -0.021 | -0.131 | No | 0.02379 | No | No |
| | Apr-05 | 4.6 | 0.00500 | 0.03800 | -3.27 | -0.036 | -0.131 | No | 0.02236 | No | No |
| | Oct-05 | 5.1 | 0.00500 | 0.16000 J | -1.83 | 0.085 | -0.131 | No | 0.02090 | No | No |
| | May-06 | 5.7 | 0.00500 | 0.11000 | -2.21 | 0.129 | -0.131 | No | 0.01939 | No | No |
| | Aug-06 | 6.0 | 0.00500 | 0.12000 | -2.12 | 0.158 | -0.131 | No | 0.01860 | No | No |
| | Apr-07 | 6.7 | 0.00500 | 0.09100 | -2.40 | 0.154 | -0.131 | No | 0.01704 | No | No |
| | Sep-07 | 7.0 | 0.00500 | 0.11000 | -2.21 | 0.159 | -0.131 | No | 0.01627 | No | No |
| | Feb-08 | 7.5 | 0.00500 | 0.12000 | -2.12 | 0.163 | -0.131 | No | 0.01535 | No | No |
| | Jan-09 | 8.4 | 0.00500 | 0.08680 | -2.44 | 0.144 | -0.131 | No | 0.01362 | No | No |
| | Jul-09 | 8.9 | 0.00500 | 0.10900 | -2.22 | 0.138 | -0.131 | No | 0.01275 | No | No |
| | Jan-10 | 9.4 | 0.00500 | 0.06470 | -2.74 | 0.112 | -0.131 | No | 0.01195 | No | No |
| | Jul-10 | 9.9 | 0.00500 | 0.05950 | -2.82 | 0.090 | -0.131 | No | 0.01119 | No | No |
| | Jan-11 | 10.4 | 0.00500 | 0.00340 | -5.68 | -0.009 | -0.131 | Less Than PCL | 0.01048 | Less Than PCL | Less Than PCL |
| | Jul-11 | 10.9 | 0.00500 | 0.07060 | -2.65 | -0.003 | -0.131 | No | 0.00977 | No | No |
| | Jan-12 | 11.4 | 0.00500 | 0.00180 | -4.84 | -0.050 | -0.131 | No | 0.00920 | Yes | Evaluate Further |
| | Jul-12 | 11.9 | 0.00500 | 0.00790 | -4.84 | -0.085 | -0.131 | No | 0.00861 | Yes | Evaluate Further |
| | Jan-13 | 12.4 | 0.00500 | 0.00061 J | -7.40 | -0.162 | -0.131 | Less Than PCL | 0.00805 | Less Than PCL | Less Than PCL |
| | Jul-13 | 12.9 | 0.00500 | 0.09570 | -2.35 | -0.128 | -0.131 | No | 0.00755 | No | No |
| | Jan-14 | 13.4 | 0.00500 | 0.00190 J | -6.27 | -0.166 | -0.131 | Less Than PCL | 0.00706 | Less Than PCL | Less Than PCL |
| | Jul-14 | 13.9 | 0.00500 | 0.06310 | -2.76 | -0.140 | -0.131 | Yes | 0.00660 | No | Evaluate Further |
| | Jan-15 | 14.4 | 0.00500 | 0.00169 | -6.38 | -0.171 | -0.131 | Less Than PCL | 0.00618 | Less Than PCL | Less Than PCL |
| | Jul-15 | 14.9 | 0.00500 | 0.000978 J | -6.93 | -0.203 | -0.131 | Less Than PCL | 0.00579 | Less Than PCL | Less Than PCL |
| | Jan-16 | 15.4 | 0.00500 | 0.0008 J | -7.13 | -0.229 | -0.131 | Less Than PCL | 0.00542 | Less Than PCL | Less Than PCL |
| | Jul-16 | 15.9 | 0.00500 | 0.03110 | -3.47 | -0.206 | -0.131 | Yes | 0.00507 | No | Evaluate Further |
| 60606MW | Nov-95 | 0.0 | 0.00500 | 0.00500 U | -8.00 | -- | -- | -- | -- | -- | -- |
| | Nov-99 | 4.0 | 0.00500 | 0.00190 J | -6.27 | -- | -- | -- | -- | -- | -- |
| | Jul-00 | 4.7 | 0.00500 | 0.00220 J | -6.12 | -- | -- | -- | -- | -- | -- |
| | Jun-01 | 5.6 | 0.00500 | 0.00440 J | -5.43 | -- | -- | -- | -- | -- | -- |
| | Jan-03 | 7.2 | 0.00500 | 0.00740 | -4.91 | -- | -- | -- | -- | -- | -- |
| | Sep-03 | 7.8 | 0.00500 | 0.01900 | -3.96 | -- | -- | -- | -- | -- | -- |
| | Dec-03 | 8.1 | 0.00500 | 0.01600 | -4.14 | -- | -- | -- | -- | -- | -- |
| | Jul-04 | 8.7 | 0.00500 | 0.02800 | -3.58 | -- | -- | -- | -- | -- | -- |
| | Oct-04 | 8.9 | 0.00500 | 0.02800 | -3.58 | 0.727 | -0.029 | No | 0.00704 | No | No |
| | Apr-05 | 9.4 | 0.00500 | 0.05200 | -2.96 | 0.778 | -0.029 | No | 0.00694 | No | No |
| | Oct-05 | 9.9 | 0.00500 | 0.02000 | -3.91 | 0.465 | -0.029 | No | 0.00684 | No | No |
| | May-06 | 10.5 | 0.00500 | 0.01600 | -4.14 | 0.238 | -0.029 | No | 0.00673 | No | No |
| | Aug-06 | 10.8 | 0.00500 | 0.01400 | -4.27 | 0.114 | -0.029 | No | 0.00667 | No | No |
| | Apr-07 | 11.4 | 0.00500 | 0.02500 | -3.69 | 0.111 | -0.029 | No | 0.00655 | No | No |
| | Sep-07 | 11.8 | 0.00500 | 0.04800 | -3.04 | 0.171 | -0.029 | No | 0.00647 | No | No |
| | Feb-08 | 12.2 | 0.00500 | 0.04100 | -3.19 | 0.185 | -0.029 | No | 0.00640 | No | No |
| | Jul-08 | 12.7 | 0.00500 | 0.03660 | -3.31 | 0.179 | -0.029 | No | 0.00631 | No | No |
| | Jan-09 | 13.2 | 0.00500 | 0.03050 | -3.49 | 0.159 | -0.029 | No | 0.00623 | No | No |
| | Jul-09 | 13.7 | 0.00500 | 0.03910 | -3.24 | 0.155 | -0.029 | No | 0.00614 | No | No |
| | Jan-10 | 14.2 | 0.00500 | 0.04920 | -3.01 | 0.160 | -0.029 | No | 0.00605 | No | No |
| | Jul-10 | 14.7 | 0.00500 | 0.03510 | -3.35 | 0.145 | -0.029 | No | 0.00596 | No | No |
| | Jul-11 | 15.7 | 0.00500 | 0.02780 | -3.58 | 0.118 | -0.029 | No | 0.00579 | No | No |
| | Jan-12 | 16.2 | 0.00500 | 0.01230 | -4.40 | 0.070 | -0.029 | No | 0.00571 | No | No |
| | Jul-12 | 16.7 | 0.00500 | 0.01990 | -3.92 | 0.050 | -0.029 | No | 0.00563 | No | No |
| | Jan-13 | 17.2 | 0.00500 | 0.01350 | -4.31 | 0.025 | -0.029 | No | 0.00555 | No | No |
| | Jul-13 | 17.7 | 0.00500 | 0.00031 U | -8.00 | -0.085 | -0.029 | Less Than PCL | 0.00547 | Less Than PCL | Less Than PCL |
| | Jan-14 | 18.2 | 0.00500 | 0.01360 | -4.30 | -0.082 | -0.029 | Yes | 0.00539 | No | Evaluate Further |
| | Jul-14 | 18.7 | 0.00500 | 0.01620 | -4.12 | -0.076 | -0.029 | Yes | 0.00531 | No | Evaluate Further |
| | Jan-15 | 19.2 | 0.00500 | 0.01670 | -4.09 | -0.070 | -0.205 | No | 0.00696 | No | No |
| | Jul-15 | 19.7 | 0.00500 | 0.03360 | -3.39 | -0.052 | -0.029 | Yes | 0.00516 | No | Evaluate Further |
| | Jan-16 | 20.2 | 0.00500 | 0.04690 | -3.06 | -0.033 | -0.029 | Yes | 0.00509 | No | Evaluate Further |
| | Jul-16 | 20.7 | 0.00500 | 0.04880 | -3.02 | -0.017 | -0.029 | No | 0.00502 | No | No |

# Table 4-4

## Summary of Concentration vs. Time Attenuation Rate Constants
## SWMU 21 Plume
## 2016 RAER
## Former NAS Dallas, Texas
## Page 2 of 16

| Monitoring Well ID | Sampling Date | Elapsed Time (Years) | Protective Concentration Level (mg/L) | Concentration Detected (mg/L) | Natural Log of Concentration (mg/L) | Degradation Rate from Natural Log ($K_{time}$) (mg/L per year) | Minimum Degradation Rate Required for Remedial Goals Natural Log ($K_{time}$) (mg/L per year) | Minimum Degradation Rate Met? (Yes/No) | Expected Remedial Goal Concentration (mg/L) | Expected Remedial Goal Concentration Met? (Yes/No) | Remedial Goals Being Met? (Yes/No) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 608D32MW | May-98 | 0.0 | 0.00500 | 0.17000 | -1.77 | -- | -- | -- | -- | -- | -- |
| | Aug-98 | 0.3 | 0.00500 | 0.15000 | -1.90 | -- | -- | -- | -- | -- | -- |
| | Apr-99 | 0.9 | 0.00500 | 0.19000 | -1.66 | -- | -- | -- | -- | -- | -- |
| | Oct-99 | 1.4 | 0.00500 | 0.17000 | -1.77 | -- | -- | -- | -- | -- | -- |
| | Jul-00 | 2.2 | 0.00500 | 0.18000 | -1.71 | 0.048 | -0.193 | No | 0.11170 | No | No |
| | Jun-01 | 3.1 | 0.00500 | 0.25000 | -1.39 | 0.119 | -0.193 | No | 0.09335 | No | No |
| | Jan-03 | 4.7 | 0.00500 | 0.19000 | -1.66 | 0.056 | -0.193 | No | 0.06881 | No | No |
| | Aug-03 | 5.3 | 0.00500 | 0.23000 | -1.47 | 0.059 | -0.193 | No | 0.06146 | No | No |
| | Dec-03 | 5.6 | 0.00500 | 0.18000 J | -1.71 | 0.040 | -0.193 | No | 0.05821 | No | No |
| | Jul-04 | 6.2 | 0.00500 | 0.14000 | -1.97 | 0.011 | -0.193 | No | 0.05145 | No | No |
| | Oct-04 | 6.4 | 0.00500 | 0.09300 | -2.38 | -0.027 | -0.193 | No | 0.04940 | No | No |
| | Apr-05 | 6.9 | 0.00500 | 0.16000 | -1.83 | -0.025 | -0.193 | No | 0.04512 | No | No |
| | Oct-05 | 7.4 | 0.00500 | 0.16000 | -1.83 | -0.024 | -0.193 | No | 0.04096 | No | No |
| | Feb-06 | 7.7 | 0.00500 | 0.18000 | -1.71 | -0.019 | -0.193 | No | 0.03843 | No | No |
| | Dec-06 | 8.6 | 0.00500 | 0.04900 | -3.02 | -0.059 | -0.193 | No | 0.03275 | No | No |
| | Feb-07 | 8.8 | 0.00500 | 0.08200 | -2.50 | -0.071 | -0.193 | No | 0.03137 | No | No |
| | May-07 | 9.0 | 0.00500 | 0.09600 | -2.34 | -0.075 | -0.193 | No | 0.02999 | No | No |
| | Aug-07 | 9.3 | 0.00500 | 0.13000 | -2.04 | -0.070 | -0.193 | No | 0.02840 | No | No |
| | Nov-07 | 9.5 | 0.00500 | 0.13000 | -2.04 | -0.066 | -0.193 | No | 0.02724 | No | No |
| | Jan-08 | 9.7 | 0.00500 | 0.13000 | -2.04 | -0.063 | -0.193 | No | 0.02630 | No | No |
| | Jul-08 | 10.2 | 0.00500 | 0.12300 | -2.10 | -0.060 | -0.193 | No | 0.02386 | No | No |
| | Jan-09 | 10.7 | 0.00500 | 0.08730 | -2.44 | -0.064 | -0.193 | No | 0.02178 | No | No |
| | Jul-09 | 11.2 | 0.00500 | 0.12400 | -2.09 | -0.060 | -0.193 | No | 0.01978 | No | No |
| | Jan-10 | 11.7 | 0.00500 | 0.09090 | -2.40 | -0.062 | -0.193 | No | 0.01797 | No | No |
| | Jul-10 | 12.2 | 0.00500 | 0.14500 | -1.93 | -0.055 | -0.193 | No | 0.01631 | No | No |
| | Jan-11 | 12.7 | 0.00500 | 0.13300 | -2.02 | -0.051 | -0.193 | No | 0.01482 | No | No |
| | Jul-11 | 13.2 | 0.00500 | 0.12200 | -2.10 | -0.048 | -0.193 | No | 0.01336 | No | No |
| | Jan-12 | 13.7 | 0.00500 | 0.09440 | -2.36 | -0.048 | -0.193 | No | 0.01223 | No | No |
| | Jul-12 | 14.2 | 0.00500 | 0.08520 | -2.46 | -0.050 | -0.193 | No | 0.01111 | No | No |
| | Jan-13 | 14.7 | 0.00500 | 0.00900 | -4.71 | -0.080 | -0.193 | No | 0.01007 | Yes | Evaluate Further |
| | Jul-13 | 15.2 | 0.00500 | 0.11300 | -2.18 | -0.074 | -0.193 | No | 0.00915 | No | No |
| | Jan-14 | 15.7 | 0.00500 | 0.0012 J | -6.73 | -0.120 | -0.193 | Less Than PCL | 0.00830 | Less Than PCL | Less Than PCL |
| | Jul-14 | 16.2 | 0.00500 | 0.10500 | -2.25 | -0.110 | -0.193 | No | 0.00752 | No | No |
| | Jan-15 | 16.7 | 0.00500 | 0.02200 | -3.82 | -0.117 | -0.193 | No | 0.00682 | No | No |
| | Jul-15 | 17.2 | 0.00500 | 0.10100 | -2.29 | -0.107 | -0.193 | No | 0.00619 | No | No |
| | Jan-16 | 17.7 | 0.00500 | 0.00236 | -6.05 | -0.133 | -0.193 | Less Than PCL | 0.00562 | Less Than PCL | Less Than PCL |
| | Jul-16 | 18.2 | 0.00500 | 0.10000 | -2.30 | -0.122 | -0.193 | No | 0.00511 | No | No |
| 608D132MW | Apr-05 | 0.0 | 0.00500 | 0.06700 | -2.70 | -- | -- | -- | -- | -- | -- |
| | Jul-05 | 0.2 | 0.00500 | 0.03600 | -3.32 | -- | -- | -- | -- | -- | -- |
| | Oct-05 | 0.5 | 0.00500 | 0.07000 | -2.66 | -- | -- | -- | -- | -- | -- |
| | Feb-06 | 0.8 | 0.00500 | 0.07700 | -2.56 | -- | -- | -- | -- | -- | -- |
| | Dec-06 | 1.7 | 0.00500 | 0.09600 | -2.34 | 0.369 | -0.227 | No | 0.04545 | No | No |
| | Feb-07 | 1.9 | 0.00500 | 0.08100 | -2.51 | 0.286 | -0.227 | No | 0.04373 | No | No |
| | May-07 | 2.1 | 0.00500 | 0.07200 | -2.63 | 0.211 | -0.227 | No | 0.04145 | No | No |
| | Aug-07 | 2.4 | 0.00500 | 0.06400 | -2.75 | 0.139 | -0.227 | No | 0.03883 | No | No |
| | Nov-07 | 2.6 | 0.00500 | 0.05500 | -2.90 | 0.073 | -0.227 | No | 0.03705 | No | No |
| | Feb-08 | 2.8 | 0.00500 | 0.06300 | -2.76 | 0.051 | -0.227 | No | 0.03521 | No | No |
| | Jul-08 | 3.3 | 0.00500 | 0.06050 | -2.81 | 0.027 | -0.227 | No | 0.03153 | No | No |
| | Jan-09 | 3.8 | 0.00500 | 0.09270 | -2.38 | 0.061 | -0.227 | No | 0.02840 | No | No |
| | Jul-09 | 4.3 | 0.00500 | 0.10800 | -2.23 | 0.093 | -0.227 | No | 0.02533 | No | No |
| | Jan-10 | 4.8 | 0.00500 | 0.04500 JL | -3.10 | 0.032 | -0.227 | No | 0.02263 | No | No |
| | Jul-10 | 5.3 | 0.00500 | 0.02150 | -3.84 | -0.062 | -0.227 | No | 0.02019 | No | No |
| | Jan-11 | 5.8 | 0.00500 | 0.01810 | -4.01 | -0.129 | -0.227 | No | 0.01803 | No | No |
| | Jul-11 | 6.3 | 0.00500 | 0.07590 | -2.58 | -0.087 | -0.227 | No | 0.01595 | No | No |
| | Jan-12 | 6.8 | 0.00500 | 0.05450 | -2.91 | -0.075 | -0.227 | No | 0.01437 | No | No |
| | Jul-12 | 7.3 | 0.00500 | 0.04060 | -3.20 | -0.077 | -0.227 | No | 0.01283 | No | No |
| | Jan-13 | 7.8 | 0.00500 | 0.02080 | -3.87 | -0.103 | -0.227 | No | 0.01143 | No | No |
| | Jul-13 | 8.3 | 0.00500 | 0.08810 | -2.43 | -0.070 | -0.227 | No | 0.01021 | No | No |
| | Jan-14 | 8.8 | 0.00500 | 0.06640 | -2.71 | -0.054 | -0.227 | No | 0.00910 | No | No |
| | Jul-14 | 9.3 | 0.00500 | 0.07580 | -2.58 | -0.038 | -0.227 | No | 0.00809 | No | No |
| | Jan-15 | 9.8 | 0.00500 | 0.06330 | -2.76 | -0.030 | -0.242 | No | 0.00738 | No | No |
| | Jul-15 | 10.3 | 0.00500 | 0.04690 | -3.06 | -0.031 | -0.227 | No | 0.00644 | No | No |
| | Jan-16 | 10.8 | 0.00500 | 0.00585 | -5.14 | -0.074 | -0.227 | No | 0.00574 | No | No |
| | Jul-16 | 11.3 | 0.00500 | 0.0273 | -3.60 | -0.078 | -0.227 | No | 0.00513 | No | No |

# Table 4-4

## Summary of Concentration vs. Time Attenuation Rate Constants
## SWMU 21 Plume
## 2016 RAER
## Former NAS Dallas, Texas
## Page 3 of 16

| Monitoring Well ID | Sampling Date | Elapsed Time (Years) | Protective Concentration Level (mg/L) | Concentration Detected (mg/L) | Natural Log of Concentration (mg/L) | Degradation Rate from Natural Log ($K_{time}$) (mg/L per year) | Minimum Degradation Rate Required for Remedial Goals Natural Log ($K_{time}$) (mg/L per year) | Minimum Degradation Rate Met? (Yes/No) | Expected Remedial Goal Concentration (mg/L) | Expected Remedial Goal Concentration Met? (Yes/No) | Remedial Goals Being Met? (Yes/No) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 608D136MW | Apr-05 | 0.0 | 0.00500 | 0.20000 | -1.61 | -- | -- | -- | -- | -- | -- |
| | Jul-05 | 0.2 | 0.00500 | 0.11000 | -2.21 | -- | -- | -- | -- | -- | -- |
| | Oct-05 | 0.5 | 0.00500 | 0.16000 | -1.83 | -- | -- | -- | -- | -- | -- |
| | Feb-06 | 0.8 | 0.00500 | 0.15000 | -1.90 | -- | -- | -- | -- | -- | -- |
| | Dec-06 | 1.7 | 0.00500 | 0.22000 | -1.51 | 0.192 | -0.324 | No | 0.11574 | No | No |
| | Feb-07 | 1.9 | 0.00500 | 0.18000 | -1.71 | 0.145 | -0.324 | No | 0.10955 | No | No |
| | May-07 | 2.1 | 0.00500 | 0.14000 | -1.97 | 0.058 | -0.324 | No | 0.10151 | No | No |
| | Aug-07 | 2.4 | 0.00500 | 0.12000 | -2.12 | -0.018 | -0.324 | No | 0.09248 | No | No |
| | Nov-07 | 2.6 | 0.00500 | 0.06600 | -2.72 | -0.153 | -0.324 | No | 0.08653 | Yes | Evaluate Further |
| | Feb-08 | 2.8 | 0.00500 | 0.05300 | -2.94 | -0.258 | -0.324 | No | 0.08047 | Yes | Evaluate Further |
| | Jul-08 | 3.3 | 0.00500 | 0.07430 | -2.60 | -0.269 | -0.324 | No | 0.06878 | No | No |
| | Jan-09 | 3.8 | 0.00500 | 0.06480 | -2.74 | -0.277 | -0.324 | No | 0.05926 | No | No |
| | Jul-09 | 4.3 | 0.00500 | 0.04580 | -3.08 | -0.303 | -0.324 | No | 0.05034 | Yes | Evaluate Further |
| | Jan-10 | 4.8 | 0.00500 | 0.04210 | -3.17 | -0.313 | -0.324 | No | 0.04288 | Yes | Evaluate Further |
| | Jul-10 | 5.3 | 0.00500 | 0.07000 | -2.66 | -0.269 | -0.324 | No | 0.03646 | No | No |
| | Jan-11 | 5.8 | 0.00500 | 0.09380 | -2.37 | -0.213 | -0.324 | No | 0.03103 | No | No |
| | Jul-11 | 6.3 | 0.00500 | 0.08700 | -2.44 | -0.176 | -0.324 | No | 0.02608 | No | No |
| | Jan-12 | 6.8 | 0.00500 | 0.06860 | -2.68 | -0.159 | -0.324 | No | 0.02247 | No | No |
| | Jul-12 | 7.3 | 0.00500 | 0.09200 | -2.39 | -0.132 | -0.324 | No | 0.01912 | No | No |
| | Jan-13 | 7.8 | 0.00500 | 0.05450 | -2.91 | -0.131 | -0.324 | No | 0.01621 | No | No |
| | Jul-13 | 8.3 | 0.00500 | 0.09380 | -2.37 | -0.109 | -0.324 | No | 0.01381 | No | No |
| | Jan-14 | 8.8 | 0.00500 | 0.07900 | -2.54 | -0.097 | -0.324 | No | 0.01172 | No | No |
| | Jul-14 | 9.3 | 0.00500 | 0.01430 | -4.25 | -0.135 | -0.324 | No | 0.00992 | No | No |
| | Jan-15 | 9.8 | 0.00500 | 0.05500 | -2.90 | -0.127 | -0.324 | No | 0.00843 | No | No |
| | Jul-15 | 10.3 | 0.00500 | 0.03710 | -3.29 | -0.128 | -0.324 | No | 0.00717 | No | No |
| | Jan-16 | 10.8 | 0.00500 | 0.0241 | -3.73 | -0.137 | -0.324 | No | 0.00609 | No | No |
| | Jul-16 | 11.3 | 0.00500 | 0.0614 | -2.79 | -0.125 | -0.324 | No | 0.00518 | No | No |
| 608D138MW | Apr-05 | 0.0 | 0.00500 | 0.16000 | -1.83 | -- | -- | -- | -- | -- | -- |
| | Jul-05 | 0.2 | 0.00500 | 0.08100 | -2.51 | -- | -- | -- | -- | -- | -- |
| | Oct-05 | 0.5 | 0.00500 | 0.13000 | -2.04 | -- | -- | -- | -- | -- | -- |
| | Jan-06 | 0.8 | 0.00500 | 0.12000 | -2.12 | -- | -- | -- | -- | -- | -- |
| | Aug-06 | 1.4 | 0.00500 | 0.14000 | -1.97 | 0.070 | -0.304 | No | 0.10495 | No | No |
| | Apr-07 | 2.0 | 0.00500 | 0.09400 | -2.36 | -0.084 | -0.304 | No | 0.08704 | No | No |
| | Sep-07 | 2.4 | 0.00500 | 0.16000 | -1.83 | 0.036 | -0.304 | No | 0.07664 | No | No |
| | Jan-08 | 2.8 | 0.00500 | 0.00330 | -5.71 | -0.697 | -0.304 | Less Than PCL | 0.06799 | Less Than PCL | Less Than PCL |
| | Jul-08 | 3.3 | 0.00500 | 0.02460 | -3.71 | -0.656 | -0.304 | Yes | 0.05873 | Yes | Yes |
| | Jan-09 | 3.8 | 0.00500 | 0.02170 | -3.83 | -0.613 | -0.304 | Yes | 0.05086 | Yes | Yes |
| | Jul-09 | 4.3 | 0.00500 | 0.09690 | -2.33 | -0.400 | -0.304 | Yes | 0.04364 | No | Evaluate Further |
| | Jan-10 | 4.8 | 0.00500 | 0.00460 | -5.38 | -0.532 | -0.304 | Less Than PCL | 0.03754 | Less Than PCL | Less Than PCL |
| | Jul-10 | 5.3 | 0.00500 | 0.04510 | -3.10 | -0.419 | -0.304 | Yes | 0.03224 | No | Evaluate Further |
| | Jan-11 | 5.8 | 0.00500 | 0.00380 | -5.57 | -0.496 | -0.304 | Less Than PCL | 0.02771 | Less Than PCL | Less Than PCL |
| | Jul-11 | 6.3 | 0.00500 | 0.08690 | -2.44 | -0.354 | -0.304 | Yes | 0.02355 | No | Evaluate Further |
| | Jan-12 | 6.8 | 0.00500 | 0.00340 | -5.68 | -0.412 | -0.304 | Less Than PCL | 0.02047 | Less Than PCL | Less Than PCL |
| | Jul-12 | 7.3 | 0.00500 | 0.05720 | -2.86 | -0.322 | -0.304 | Yes | 0.01760 | No | Evaluate Further |
| | Jan-13 | 7.8 | 0.00500 | 0.00960 | -4.65 | -0.321 | -0.304 | Yes | 0.01508 | Yes | Yes |
| | Jul-13 | 8.3 | 0.00500 | 0.07140 | -2.64 | -0.247 | -0.304 | No | 0.01297 | No | No |
| | Jan-14 | 8.8 | 0.00500 | 0.01630 | -4.12 | -0.235 | -0.304 | No | 0.01112 | No | No |
| | Jul-14 | 9.3 | 0.00500 | 0.04910 | -3.01 | -0.193 | -0.304 | No | 0.00949 | No | No |
| | Jan-15 | 9.8 | 0.00500 | 0.00894 | -4.72 | -0.202 | -0.304 | No | 0.00816 | No | No |
| | Jul-15 | 10.3 | 0.00500 | 0.05470 | -2.91 | -0.164 | -0.304 | No | 0.00701 | No | No |
| | Jan-16 | 10.8 | 0.00500 | 0.00048 J | -7.64 | -0.234 | -0.304 | Less Than PCL | 0.00601 | Less Than PCL | Less Than PCL |
| | Jul-16 | 11.3 | 0.00500 | 0.0949 | -2.35 | -0.183 | -0.304 | No | 0.00517 | No | No |
| 608D140MW | Apr-05 | 0.0 | 0.00500 | 0.13000 | -2.04 | -- | -- | -- | -- | -- | -- |
| | Jul-05 | 0.2 | 0.00500 | 0.11000 | -2.21 | -- | -- | -- | -- | -- | -- |
| | Oct-05 | 0.5 | 0.00500 | 0.12000 | -2.12 | -- | -- | -- | -- | -- | -- |
| | Jan-06 | 0.8 | 0.00500 | 0.13000 | -2.04 | -- | -- | -- | -- | -- | -- |
| | Aug-06 | 1.4 | 0.00500 | 0.15000 | -1.90 | 0.155 | -0.285 | No | 0.08745 | No | No |
| | Apr-07 | 2.0 | 0.00500 | 0.12000 | -2.12 | 0.038 | -0.285 | No | 0.07335 | No | No |
| | Sep-07 | 2.4 | 0.00500 | 0.17000 | -1.77 | 0.103 | -0.285 | No | 0.06508 | No | No |
| | Jan-08 | 2.8 | 0.00500 | 0.07600 | -2.58 | -0.043 | -0.285 | No | 0.05815 | No | No |
| | Jul-08 | 3.3 | 0.00500 | 0.06230 | -2.78 | -0.136 | -0.285 | No | 0.05067 | No | No |
| | Jan-09 | 3.8 | 0.00500 | 0.02050 | -3.89 | -0.315 | -0.285 | Yes | 0.04426 | Yes | Yes |
| | Jul-09 | 4.3 | 0.00500 | 0.11300 | -2.18 | -0.213 | -0.285 | No | 0.03836 | No | No |
| | Jan-10 | 4.8 | 0.00500 | 0.09970 | -2.31 | -0.158 | -0.285 | No | 0.03327 | No | No |
| | Jul-10 | 5.3 | 0.00500 | 0.08910 | -2.42 | -0.128 | -0.285 | No | 0.02884 | No | No |
| | Jan-11 | 5.8 | 0.00500 | 0.01920 | -3.95 | -0.205 | -0.285 | No | 0.02501 | Yes | Evaluate Further |
| | Jul-11 | 6.3 | 0.00500 | 0.10700 | -2.23 | -0.151 | -0.285 | No | 0.02146 | No | No |
| | Jan-12 | 6.8 | 0.00500 | 0.04740 | -3.05 | -0.152 | -0.285 | No | 0.01882 | No | No |
| | Jul-12 | 7.3 | 0.00500 | 0.09680 | -2.34 | -0.120 | -0.285 | No | 0.01632 | No | No |
| | Jan-13 | 7.8 | 0.00500 | 0.00410 | -5.50 | -0.216 | -0.285 | Less Than PCL | 0.01391 | Less Than PCL | Less Than PCL |
| | Jul-13 | 8.3 | 0.00500 | 0.10400 | -2.26 | -0.169 | -0.285 | No | 0.01225 | No | No |
| | Jan-14 | 8.8 | 0.00500 | 0.00150 | -6.50 | -0.262 | -0.285 | Less Than PCL | 0.01060 | Less Than PCL | Less Than PCL |
| | Jul-14 | 9.3 | 0.00500 | 0.06000 | -2.81 | -0.225 | -0.285 | No | 0.00914 | No | No |
| | Jan-15 | 9.8 | 0.00500 | 0.00405 | -5.51 | -0.262 | -0.285 | Less Than PCL | 0.00792 | Less Than PCL | Less Than PCL |
| | Jul-15 | 10.3 | 0.00500 | 0.00944 | -4.66 | -0.268 | -0.285 | No | 0.00687 | No | No |
| | Jan-16 | 10.8 | 0.00500 | 0.0005 U | -7.60 | -0.331 | -0.285 | Less Than PCL | 0.00595 | Less Than PCL | Less Than PCL |
| | Jul-16 | 11.3 | 0.00500 | 0.00025 U | -8.00 | -0.384 | -0.285 | Less Than PCL | 0.00516 | Less Than PCL | Less Than PCL |

# Table 4-4

## Summary of Concentration vs. Time Attenuation Rate Constants
## SWMU 21 Plume
## 2016 RAER
## Former NAS Dallas, Texas
## Page 4 of 16

| Monitoring Well ID | Sampling Date | Elapsed Time (Years) | Protective Concentration Level (mg/L) | Concentration Detected (mg/L) | Natural Log of Concentration (mg/L) | Degradation Rate from Natural Log ($K_{time}$) (mg/L per year) | Minimum Degradation Rate Required for Remedial Goals Natural Log ($K_{time}$) (mg/L per year) | Minimum Degradation Rate Met? (Yes/No) | Expected Remedial Goal Concentration (mg/L) | Expected Remedial Goal Concentration Met? (Yes/No) | Remedial Goals Being Met? (Yes/No) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 608D141MW | Apr-05 | 0.0 | 0.00500 | 0.06700 | -2.70 | -- | -- | -- | -- | -- | -- |
| | Jul-05 | 0.2 | 0.00500 | 0.04800 | -3.04 | -- | -- | -- | -- | -- | -- |
| | Oct-05 | 0.5 | 0.00500 | 0.08200 | -2.50 | -- | -- | -- | -- | -- | -- |
| | Jan-06 | 0.8 | 0.00500 | 0.02600 | -3.65 | -- | -- | -- | -- | -- | -- |
| | Aug-06 | 1.4 | 0.00500 | 0.00600 | -5.12 | -1.761 | -0.227 | Yes | 0.04877 | Yes | Yes |
| | Apr-07 | 2.0 | 0.00500 | 0.01000 | -4.61 | -1.224 | -0.227 | Yes | 0.04247 | Yes | Yes |
| | Sep-07 | 2.4 | 0.00500 | 0.02900 | -3.54 | -0.674 | -0.227 | Yes | 0.03861 | Yes | Yes |
| | Jan-08 | 2.8 | 0.00500 | 0.00900 | -4.71 | -0.659 | -0.227 | Yes | 0.03530 | Yes | Yes |
| | Jul-08 | 3.3 | 0.00500 | 0.01650 | -4.10 | -0.507 | -0.227 | Yes | 0.03165 | Yes | Yes |
| | Jan-09 | 3.8 | 0.00500 | 0.00360 | -5.63 | -0.596 | -0.227 | Less Than PCL | 0.02840 | Less Than PCL | Less Than PCL |
| | Jul-09 | 4.3 | 0.00500 | 0.00230 | -6.07 | -0.659 | -0.227 | Less Than PCL | 0.02533 | Less Than PCL | Less Than PCL |
| | Jan-10 | 4.8 | 0.00500 | 0.02520 | -3.68 | -0.454 | -0.227 | Yes | 0.02263 | No | Evaluate Further |
| | Jul-10 | 5.3 | 0.00500 | 0.08590 | -2.45 | -0.225 | -0.227 | No | 0.02019 | No | No |
| | Jan-11 | 5.8 | 0.00500 | 0.12200 | -2.10 | -0.056 | -0.227 | No | 0.01803 | No | No |
| | Jul-11 | 6.3 | 0.00500 | 0.15000 | -1.90 | 0.064 | -0.227 | No | 0.01595 | No | No |
| | Jan-12 | 6.8 | 0.00500 | 0.11200 | -2.19 | 0.127 | -0.227 | No | 0.01437 | No | No |
| | Jul-12 | 7.3 | 0.00500 | 0.13200 | -2.02 | 0.173 | -0.227 | No | 0.01283 | No | No |
| | Jan-13 | 7.8 | 0.00500 | 0.03150 | -3.46 | 0.147 | -0.227 | No | 0.01143 | No | No |
| | Jul-13 | 8.3 | 0.00500 | 0.03550 | -3.34 | 0.130 | -0.227 | No | 0.01021 | No | No |
| | Jan-14 | 8.8 | 0.00500 | 0.02790 | -3.58 | 0.108 | -0.227 | No | 0.00910 | No | No |
| | Jul-14 | 9.3 | 0.00500 | 0.02010 | -3.91 | 0.082 | -0.227 | No | 0.00808 | No | No |
| | Jan-15 | 9.8 | 0.00500 | 0.01300 | -4.34 | 0.051 | -0.256 | No | 0.00756 | No | No |
| | Jul-15 | 10.3 | 0.00500 | 0.04680 | -3.06 | 0.056 | -0.227 | No | 0.00644 | No | No |
| | Jan-16 | 10.8 | 0.00500 | 0.0363 | -3.32 | 0.054 | -0.227 | No | 0.00574 | No | No |
| | Jul-16 | 11.3 | 0.00500 | 0.141 | -1.96 | 0.078 | -0.227 | No | 0.00513 | No | No |
| 608D142MW | Apr-05 | 0.0 | 0.00500 | 0.01200 | -4.42 | -- | -- | -- | -- | -- | -- |
| | Jul-05 | 0.2 | 0.00500 | 0.00500 | -5.30 | -- | -- | -- | -- | -- | -- |
| | Oct-05 | 0.5 | 0.00500 | 0.00800 | -4.83 | -- | -- | -- | -- | -- | -- |
| | Jan-06 | 0.8 | 0.00500 | 0.00700 | -4.96 | -- | -- | -- | -- | -- | -- |
| | Aug-06 | 1.4 | 0.00500 | 0.00900 | -4.71 | -0.011 | -0.077 | No | 0.01079 | Yes | Evaluate Further |
| | Apr-07 | 2.0 | 0.00500 | 0.00760 | -4.88 | -0.019 | -0.077 | No | 0.01029 | Yes | Evaluate Further |
| | Sep-07 | 2.4 | 0.00500 | 0.00610 | -5.10 | -0.079 | -0.077 | Yes | 0.00996 | Yes | Yes |
| | Jan-08 | 2.8 | 0.00500 | 0.00280 | -5.88 | -0.249 | -0.077 | Less Than PCL | 0.00967 | Less Than PCL | Less Than PCL |
| | Jul-08 | 3.3 | 0.00500 | 0.00280 | -5.88 | -0.306 | -0.077 | Less Than PCL | 0.00932 | Less Than PCL | Less Than PCL |
| | Jan-09 | 3.8 | 0.00500 | 0.00300 | -5.81 | -0.307 | -0.077 | Less Than PCL | 0.00898 | Less Than PCL | Less Than PCL |
| | Jul-09 | 4.3 | 0.00500 | 0.00490 | -5.32 | -0.239 | -0.077 | Less Than PCL | 0.00864 | Less Than PCL | Less Than PCL |
| | Jan-10 | 4.8 | 0.00500 | 0.00350 | -5.65 | -0.221 | -0.077 | Less Than PCL | 0.00832 | Less Than PCL | Less Than PCL |
| | Jul-10 | 5.3 | 0.00500 | 0.00310 | -5.78 | -0.211 | -0.077 | Less Than PCL | 0.00801 | Less Than PCL | Less Than PCL |
| | Jul-11 | 6.3 | 0.00500 | 0.00130 | -6.65 | -0.249 | -0.077 | Less Than PCL | 0.00740 | Less Than PCL | Less Than PCL |
| | Jan-12 | 6.8 | 0.00500 | 0.00450 | -5.40 | -0.194 | -0.077 | Less Than PCL | 0.00714 | Less Than PCL | Less Than PCL |
| | Jul-12 | 7.3 | 0.00500 | 0.00390 | -5.55 | -0.163 | -0.077 | Less Than PCL | 0.00687 | Less Than PCL | Less Than PCL |
| | Jan-13 | 7.8 | 0.00500 | 0.00061 J | -7.40 | -0.216 | -0.077 | Less Than PCL | 0.00661 | Less Than PCL | Less Than PCL |
| | Jul-13 | 8.3 | 0.00500 | 0.00520 | -5.26 | -0.170 | -0.077 | Yes | 0.00636 | Yes | Yes |
| | Jan-14 | 8.8 | 0.00500 | 0.00340 | -5.68 | -0.149 | -0.077 | Less Than PCL | 0.00612 | Less Than PCL | Less Than PCL |
| | Jul-14 | 9.3 | 0.00500 | 0.00577 | -5.16 | -0.117 | -0.077 | Yes | 0.00588 | Yes | Yes |
| | Jan-15 | 9.8 | 0.00500 | 0.00459 | -5.38 | -0.098 | -0.077 | Less Than PCL | 0.00566 | Less Than PCL | Less Than PCL |
| | Jul-15 | 10.3 | 0.00500 | 0.00955 | -4.65 | -0.066 | -0.077 | No | 0.00545 | No | No |
| | Jan-16 | 10.8 | 0.00500 | 0.00878 | -4.74 | -0.043 | -0.077 | No | 0.00524 | No | No |
| | Jul-16 | 11.3 | 0.00500 | 0.0151 | -4.19 | -0.014 | -0.077 | No | 0.00504 | No | No |
| 608D143MWR | Apr-05 | 0.0 | 0.00500 | 0.26000 | -1.35 | -- | -- | -- | -- | -- | -- |
| | Jul-05 | 0.3 | 0.00500 | 0.19000 | -1.66 | -- | -- | -- | -- | -- | -- |
| | Oct-05 | 0.5 | 0.00500 | 0.24000 J | -1.43 | -- | -- | -- | -- | -- | -- |
| | Jan-06 | 0.8 | 0.00500 | 0.20000 | -1.61 | -- | -- | -- | -- | -- | -- |
| | Aug-06 | 1.4 | 0.00500 | 0.18000 L | -1.71 | -0.215 | -0.347 | No | 0.16178 | No | No |
| | May-07 | 2.1 | 0.00500 | 0.16000 | -1.83 | -0.199 | -0.347 | No | 0.12720 | No | No |
| | Sep-07 | 2.4 | 0.00500 | 0.16000 | -1.83 | -0.178 | -0.347 | No | 0.11348 | No | No |
| | Jan-08 | 2.8 | 0.00500 | 0.19000 | -1.66 | -0.122 | -0.347 | No | 0.09877 | No | No |
| | Jul-08 | 3.3 | 0.00500 | 0.21100 | -1.56 | -0.071 | -0.347 | No | 0.08356 | No | No |
| | Jan-09 | 3.7 | 0.00500 | 0.19000 | -1.66 | -0.055 | -0.347 | No | 0.07088 | No | No |
| | Jul-09 | 4.2 | 0.00500 | 0.19400 | -1.64 | -0.041 | -0.347 | No | 0.05951 | No | No |
| | Jan-10 | 4.7 | 0.00500 | 0.25000 | -1.39 | -0.009 | -0.347 | No | 0.05010 | No | No |
| | Jul-10 | 5.2 | 0.00500 | 0.19100 | -1.66 | -0.010 | -0.347 | No | 0.04210 | No | No |
| | Jan-11 | 5.7 | 0.00500 | 0.09150 | -2.39 | -0.058 | -0.347 | No | 0.03541 | No | No |
| | Jul-11 | 6.3 | 0.00500 | 0.17300 | -1.75 | -0.051 | -0.347 | No | 0.02939 | No | No |
| | Jan-12 | 6.7 | 0.00500 | 0.17300 | -1.75 | -0.045 | -0.347 | No | 0.02505 | No | No |
| | Jul-12 | 7.2 | 0.00500 | 0.10900 | -2.22 | -0.060 | -0.347 | No | 0.02107 | No | No |
| | Jan-13 | 7.8 | 0.00500 | 0.10400 | -2.26 | -0.071 | -0.347 | No | 0.01766 | No | No |
| | Jul-13 | 8.2 | 0.00500 | 0.09560 | -2.35 | -0.081 | -0.347 | No | 0.01486 | No | No |
| | Jan-14 | 8.8 | 0.00500 | 0.11000 | -2.21 | -0.082 | -0.347 | No | 0.01247 | No | No |
| | Jul-14 | 9.3 | 0.00500 | 0.09880 | -2.31 | -0.085 | -0.347 | No | 0.01041 | No | No |
| | Jan-15 | 9.8 | 0.00500 | 0.08490 | -2.47 | -0.089 | -0.347 | No | 0.00875 | No | No |
| | Jul-15 | 10.3 | 0.00500 | 0.19100 | -1.66 | -0.073 | -0.347 | No | 0.00736 | No | No |
| | Jan-16 | 10.8 | 0.00500 | 0.0893 | -2.42 | -0.076 | -0.347 | No | 0.00617 | No | No |
| | Jul-16 | 11.3 | 0.00500 | 0.0769 | -2.57 | -0.081 | -0.347 | No | 0.00519 | No | No |

# Table 4-4

## Summary of Concentration vs. Time Attenuation Rate Constants
## SWMU 21 Plume
## 2016 RAER
## Former NAS Dallas, Texas
## Page 5 of 16

| Monitoring Well ID | Sampling Date | Elapsed Time (Years) | Protective Concentration Level (mg/L) | Concentration Detected (mg/L) | Natural Log of Concentration (mg/L) | Degradation Rate from Natural Log ($K_{time}$) (mg/L per year) | Minimum Degradation Rate Required for Remedial Goals Natural Log ($K_{time}$) (mg/L per year) | Minimum Degradation Rate Met? (Yes/No) | Expected Remedial Goal Concentration (mg/L) | Expected Remedial Goal Concentration Met? (Yes/No) | Remedial Goals Being Met? (Yes/No) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 608D144MW | Jul-05 | 0.0 | 0.00500 | 0.09100 | -2.40 | -- | -- | -- | -- | -- | -- |
| | Oct-05 | 0.2 | 0.00500 | 0.12000 | -2.12 | -- | -- | -- | -- | -- | -- |
| | Jan-06 | 0.5 | 0.00500 | 0.07500 | -2.59 | -- | -- | -- | -- | -- | -- |
| | Aug-06 | 1.1 | 0.00500 | 0.12000 | -2.12 | -- | -- | -- | -- | -- | -- |
| | May-07 | 1.8 | 0.00500 | 0.12000 | -2.12 | 0.143 | -0.261 | No | 0.05698 | No | No |
| | Sep-07 | 2.1 | 0.00500 | 0.12000 | -2.12 | 0.127 | -0.261 | No | 0.05226 | No | No |
| | Jan-08 | 2.5 | 0.00500 | 0.12000 | -2.12 | 0.110 | -0.261 | No | 0.04711 | No | No |
| | Jul-08 | 3.0 | 0.00500 | 0.10800 | -2.23 | 0.074 | -0.261 | No | 0.04154 | No | No |
| | Jul-09 | 4.0 | 0.00500 | 0.10800 | -2.23 | 0.044 | -0.261 | No | 0.03219 | No | No |
| | Jan-10 | 4.5 | 0.00500 | 0.11400 | -2.17 | 0.036 | -0.261 | No | 0.02828 | No | No |
| | Jul-10 | 5.0 | 0.00500 | 0.08280 | -2.49 | 0.002 | -0.261 | No | 0.02481 | No | No |
| | Jan-11 | 5.5 | 0.00500 | 0.12500 | -2.08 | 0.014 | -0.261 | No | 0.02179 | No | No |
| | Jul-11 | 6.0 | 0.00500 | 0.10500 | -2.25 | 0.009 | -0.261 | No | 0.01894 | No | No |
| | Jan-12 | 6.5 | 0.00500 | 0.15800 | -1.85 | 0.028 | -0.261 | No | 0.01679 | No | No |
| | Jul-12 | 7.0 | 0.00500 | 0.12500 | -2.08 | 0.029 | -0.261 | No | 0.01475 | No | No |
| | Jan-13 | 7.5 | 0.00500 | 0.12300 | -2.10 | 0.028 | -0.261 | No | 0.01291 | No | No |
| | Jul-13 | 8.0 | 0.00500 | 0.10800 | -2.23 | 0.022 | -0.261 | No | 0.01134 | No | No |
| | Jan-14 | 8.5 | 0.00500 | 0.09000 | -2.41 | 0.012 | -0.261 | No | 0.00994 | No | No |
| | Jul-14 | 9.0 | 0.00500 | 0.09860 | -2.32 | 0.007 | -0.261 | No | 0.00868 | No | No |
| | Jan-15 | 9.5 | 0.00500 | 0.07460 | -2.60 | -0.005 | -0.291 | No | 0.00800 | No | No |
| | Jul-15 | 10.0 | 0.00500 | 0.12700 | -2.06 | 0.000 | -0.261 | No | 0.00668 | No | No |
| | Jan-16 | 10.5 | 0.00500 | 0.0812 | -2.51 | -0.006 | -0.261 | No | 0.00586 | No | No |
| | Jul-16 | 11.0 | 0.00500 | 0.0993 | -2.31 | -0.007 | -0.261 | No | 0.00515 | No | No |
| 608D145MW | Jul-05 | 0.0 | 0.00500 | 0.01400 | -4.27 | -- | -- | -- | -- | -- | -- |
| | Oct-05 | 0.2 | 0.00500 | 0.01700 | -4.07 | -- | -- | -- | -- | -- | -- |
| | Jan-06 | 0.5 | 0.00500 | 0.01700 | -4.07 | -- | -- | -- | -- | -- | -- |
| | Aug-06 | 1.1 | 0.00500 | 0.01700 | -4.07 | -- | -- | -- | -- | -- | -- |
| | May-07 | 1.8 | 0.00500 | 0.01300 | -4.34 | -0.069 | -0.093 | No | 0.01186 | No | No |
| | Sep-07 | 2.1 | 0.00500 | 0.01600 | -4.14 | -0.029 | -0.093 | No | 0.01150 | No | No |
| | Jan-08 | 2.5 | 0.00500 | 0.00140 | -6.57 | -0.572 | -0.093 | Less Than PCL | 0.01108 | Less Than PCL | Less Than PCL |
| | Jul-08 | 3.0 | 0.00500 | 0.00820 | -4.80 | -0.436 | -0.093 | Yes | 0.01060 | Yes | Yes |
| | Jan-09 | 3.5 | 0.00500 | 0.00190 | -6.27 | -0.556 | -0.093 | Less Than PCL | 0.01014 | Less Than PCL | Less Than PCL |
| | Jul-09 | 4.0 | 0.00500 | 0.00970 | -4.64 | -0.387 | -0.093 | Yes | 0.00968 | No | Evaluate Further |
| | Jan-10 | 4.5 | 0.00500 | 0.00110 | -6.81 | -0.495 | -0.093 | Less Than PCL | 0.00925 | Less Than PCL | Less Than PCL |
| | Jul-10 | 5.0 | 0.00500 | 0.00420 | -5.47 | -0.423 | -0.093 | Less Than PCL | 0.00883 | Less Than PCL | Less Than PCL |
| | Jan-11 | 5.5 | 0.00500 | 0.00069 J | -7.28 | -0.494 | -0.093 | Less Than PCL | 0.00843 | Less Than PCL | Less Than PCL |
| | Jul-11 | 6.0 | 0.00500 | 0.00700 | -4.96 | -0.378 | -0.093 | Yes | 0.00802 | Yes | Yes |
| | Jan-12 | 6.5 | 0.00500 | 0.00042 J | -7.78 | -0.446 | -0.093 | Less Than PCL | 0.00769 | Less Than PCL | Less Than PCL |
| | Jul-12 | 7.0 | 0.00500 | 0.00760 | -4.88 | -0.344 | -0.093 | Yes | 0.00734 | No | Evaluate Further |
| | Jan-13 | 7.5 | 0.00500 | 0.00550 | -5.20 | -0.282 | -0.093 | Yes | 0.00700 | Yes | Yes |
| | Jul-13 | 8.0 | 0.00500 | 0.00790 | -4.84 | -0.219 | -0.093 | Yes | 0.00669 | No | Evaluate Further |
| | Jan-14 | 8.5 | 0.00500 | 0.00550 | -5.20 | -0.184 | -0.093 | Yes | 0.00638 | Yes | Yes |
| | Jul-14 | 9.0 | 0.00500 | 0.00638 | -5.05 | -0.151 | -0.093 | Yes | 0.00608 | No | Evaluate Further |
| | Jan-15 | 9.5 | 0.00500 | 0.00390 | -5.55 | -0.138 | -0.093 | Less Than PCL | 0.00581 | Less Than PCL | Less Than PCL |
| | Jul-15 | 10.0 | 0.00500 | 0.00390 | -5.55 | -0.127 | -0.093 | Less Than PCL | 0.00554 | Less Than PCL | Less Than PCL |
| | Jan-16 | 10.5 | 0.00500 | 0.00025 U | -8.00 | -0.172 | -0.093 | Less Than PCL | 0.00529 | Less Than PCL | Less Than PCL |
| | Jul-16 | 11.0 | 0.00500 | 0.00524 | -5.25 | -0.148 | -0.093 | Yes | 0.00505 | No | Evaluate Further |

# Table 4-4

## Summary of Concentration vs. Time Attenuation Rate Constants
## SWMU 21 Plume
## 2016 RAER
## Former NAS Dallas, Texas
## Page 6 of 16

| Monitoring Well ID | Sampling Date | Elapsed Time (Years) | Protective Concentration Level (mg/L) | Concentration Detected (mg/L) | Natural Log of Concentration (mg/L) | Degradation Rate from Natural Log ($K_{time}$) (mg/L per year) | Minimum Degradation Rate Required for Remedial Goals Natural Log ($K_{time}$) (mg/L per year) | Minimum Degradation Rate Met? (Yes/No) | Expected Remedial Goal Concentration (mg/L) | Expected Remedial Goal Concentration Met? (Yes/No) | Remedial Goals Being Met? (Yes/No) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 608D146MW | Jul-05 | 0.0 | 0.00500 | 0.11000 | -2.21 | -- | -- | -- | -- | -- | -- |
| | Oct-05 | 0.2 | 0.00500 | 0.08300 | -2.49 | -- | -- | -- | -- | -- | -- |
| | Jan-06 | 0.5 | 0.00500 | 0.05100 | -2.98 | -- | -- | -- | -- | -- | -- |
| | Aug-06 | 1.1 | 0.00500 | 0.15000 | -1.90 | -- | -- | -- | -- | -- | -- |
| | May-07 | 1.8 | 0.00500 | 0.15000 | -1.90 | 0.357 | -0.278 | No | 0.06680 | No | No |
| | Sep-07 | 2.1 | 0.00500 | 0.16000 | -1.83 | 0.345 | -0.278 | No | 0.06096 | No | No |
| | Jan-08 | 2.5 | 0.00500 | 0.15000 | -1.90 | 0.294 | -0.278 | No | 0.05455 | No | No |
| | Jul-08 | 3.0 | 0.00500 | 0.17000 | -1.77 | 0.269 | -0.278 | No | 0.04771 | No | No |
| | Jan-09 | 3.5 | 0.00500 | 0.16200 | -1.82 | 0.232 | -0.278 | No | 0.04182 | No | No |
| | Jul-09 | 4.0 | 0.00500 | 0.15700 | -1.85 | 0.195 | -0.278 | No | 0.03638 | No | No |
| | Jan-10 | 4.5 | 0.00500 | 0.15300 | -1.88 | 0.163 | -0.278 | No | 0.03167 | No | No |
| | Jul-10 | 5.0 | 0.00500 | 0.19200 | -1.65 | 0.157 | -0.278 | No | 0.02755 | No | No |
| | Jan-11 | 5.5 | 0.00500 | 0.18600 | -1.68 | 0.145 | -0.278 | No | 0.02398 | No | No |
| | Jul-11 | 6.0 | 0.00500 | 0.17200 | -1.76 | 0.129 | -0.278 | No | 0.02066 | No | No |
| | Jan-12 | 6.5 | 0.00500 | 0.17900 | -1.72 | 0.117 | -0.278 | No | 0.01818 | No | No |
| | Jul-12 | 7.0 | 0.00500 | 0.16100 | -1.83 | 0.102 | -0.278 | No | 0.01583 | No | No |
| | Jan-13 | 7.5 | 0.00500 | 0.13200 | -2.02 | 0.081 | -0.278 | No | 0.01374 | No | No |
| | Jul-13 | 8.0 | 0.00500 | 0.12000 | -2.12 | 0.061 | -0.278 | No | 0.01197 | No | No |
| | Jan-14 | 8.5 | 0.00500 | 0.11200 | -2.19 | 0.044 | -0.278 | No | 0.01039 | No | No |
| | Jul-14 | 9.0 | 0.00500 | 0.11500 | -2.16 | 0.032 | -0.278 | No | 0.00900 | No | No |
| | Jan-15 | 9.5 | 0.00500 | 0.08480 | -2.47 | 0.014 | -0.278 | No | 0.00783 | No | No |
| | Jul-15 | 10.0 | 0.00500 | 0.15000 | -1.90 | 0.015 | -0.278 | No | 0.00681 | No | No |
| | Jan-16 | 10.5 | 0.00500 | 0.14500 | -1.93 | 0.015 | -0.278 | No | 0.00592 | No | No |
| | Jul-16 | 11.0 | 0.00500 | 0.13900 | -1.97 | 0.013 | -0.278 | No | 0.00515 | No | No |
| 608D162MW | Jan-14 | 0.0 | 0.00500 | 0.00390 | -5.55 | -- | -- | -- | -- | -- | -- |
| | Jul-14 | 0.5 | 0.00500 | 0.00258 | -5.96 | -- | -- | -- | -- | -- | -- |
| | Jan-15 | 1.0 | 0.00500 | 0.00091 J | -7.00 | -- | -- | -- | -- | -- | -- |
| | Jul-15 | 1.5 | 0.00500 | 0.02160 | -3.84 | -- | -- | -- | -- | -- | -- |
| | Jan-16 | 2.0 | 0.00500 | 0.00268 | -5.92 | 0.269 | -0.278 | Less Than PCL | 0.00592 | Less Than PCL | Less Than PCL |
| | Jul-16 | 2.5 | 0.00500 | 0.00108 | -6.83 | -0.178 | -0.278 | Less Than PCL | 0.00515 | Less Than PCL | Less Than PCL |
| 608D163MW | Jan-14 | 0.0 | 0.00500 | 0.00030 U | -8.00 | -- | -- | -- | -- | -- | -- |
| | Jul-14 | 0.5 | 0.00500 | 0.00025 U | -8.00 | -- | -- | -- | -- | -- | -- |
| | Jan-15 | 1.0 | 0.00500 | 0.00025 U | -8.00 | -- | -- | -- | -- | -- | -- |
| | Jul-15 | 1.5 | 0.00500 | 0.00025 U | -8.00 | -- | -- | -- | -- | -- | -- |
| | Jan-16 | 2.0 | 0.00500 | 0.0005 U | -8.00 | 0.000 | -0.278 | Less Than PCL | 0.00592 | Less Than PCL | Less Than PCL |
| | Jul-16 | 2.5 | 0.00500 | 0.00025 U | -8.00 | 0.000 | -0.278 | Less Than PCL | 0.00515 | Less Than PCL | Less Than PCL |

# Table 4-4

## Summary of Concentration vs. Time Attenuation Rate Constants
## SWMU 21 Plume
## 2016 RAER
## Former NAS Dallas, Texas
## Page 7 of 16

| Monitoring Well ID | Sampling Date | Elapsed Time (Years) | Protective Concentration Level (mg/L) | Concentration Detected (mg/L) | Natural Log of Concentration (mg/L) | Degradation Rate from Natural Log ($K_{time}$) (mg/L per year) | Minimum Degradation Rate Required for Remedial Goals Natural Log ($K_{time}$) (mg/L per year) | Minimum Degradation Rate Met? (Yes/No) | Expected Remedial Goal Concentration (mg/L) | Expected Remedial Goal Concentration Met? (Yes/No) | Remedial Goals Being Met? (Yes/No) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| cis-1,2-Dichloroethene | | | | | | | | | | | |
| 600D107MW | Aug-00 | 0.0 | 0.07000 | 0.00310 J | -5.78 | -- | -- | -- | -- | -- | -- |
| | Jul-01 | 0.9 | 0.07000 | 0.00380 | -5.57 | -- | -- | -- | -- | -- | -- |
| | Jan-03 | 2.4 | 0.07000 | 0.00490 | -5.32 | -- | -- | -- | -- | -- | -- |
| | Sep-03 | 3.0 | 0.07000 | 0.00730 | -4.92 | -- | -- | -- | -- | -- | -- |
| | Sep-03 | 3.0 | 0.07000 | 0.00500 | -5.30 | -- | -- | -- | -- | -- | -- |
| | Dec-03 | 3.3 | 0.07000 | 0.00680 | -4.99 | -- | -- | -- | -- | -- | -- |
| | Jul-04 | 3.9 | 0.07000 | 0.00580 J | -5.15 | -- | -- | -- | -- | -- | -- |
| | Oct-04 | 4.2 | 0.07000 | 0.00430 | -5.45 | -- | -- | -- | -- | -- | -- |
| | Apr-05 | 4.6 | 0.07000 | 0.00400 | -5.52 | -- | -- | -- | -- | -- | -- |
| | Oct-05 | 5.1 | 0.07000 | 0.01000 J | -4.61 | -- | -- | -- | -- | -- | -- |
| | May-06 | 5.7 | 0.07000 | 0.00800 | -4.83 | -- | -- | -- | -- | -- | -- |
| | Aug-06 | 6.0 | 0.07000 | 0.00600 | -5.12 | -- | -- | -- | -- | -- | -- |
| | Apr-07 | 6.7 | 0.07000 | 0.00640 | -5.05 | -- | -- | -- | -- | -- | -- |
| | Sep-07 | 7.0 | 0.07000 | 0.00830 | -4.79 | -- | -- | -- | -- | -- | -- |
| | Jan-08 | 7.4 | 0.07000 | 0.00860 | -4.76 | -- | -- | -- | -- | -- | -- |
| | Jan-09 | 8.4 | 0.07000 | 0.00620 | -5.08 | -- | -- | -- | -- | -- | -- |
| | Jul-09 | 8.9 | 0.07000 | 0.01050 | -4.56 | -- | -- | -- | -- | -- | -- |
| | Jan-10 | 9.4 | 0.07000 | 0.00750 | -4.89 | -- | -- | -- | -- | -- | -- |
| | Jul-10 | 9.9 | 0.07000 | 0.04700 | -3.06 | -- | -- | -- | -- | -- | -- |
| | Jan-11 | 10.4 | 0.07000 | 0.09170 | -2.39 | -- | -- | -- | -- | -- | -- |
| | Jul-11 | 10.9 | 0.07000 | 0.06690 | -2.70 | -- | -- | -- | -- | -- | -- |
| | Jan-12 | 11.4 | 0.07000 | 0.10000 | -2.36 | -- | -- | -- | -- | -- | -- |
| | Jul-12 | 11.9 | 0.07000 | 0.09410 | -2.36 | -- | -- | -- | -- | -- | -- |
| | Jan-13 | 12.4 | 0.07000 | 0.02000 | -3.91 | -0.551 | -0.488 | Less Than PCL | 0.41218 | Less Than PCL | Less Than PCL |
| | Jul-13 | 12.9 | 0.07000 | 0.04380 | -3.13 | -0.424 | -0.488 | Less Than PCL | 0.32364 | Less Than PCL | Less Than PCL |
| | Jan-14 | 13.4 | 0.07000 | 0.10700 | -2.23 | -0.140 | -0.488 | No | 0.25276 | Yes | Evaluate Further |
| | Jul-14 | 13.9 | 0.07000 | 0.08440 | -2.47 | -0.049 | -0.488 | No | 0.19610 | Yes | Evaluate Further |
| | Jan-15 | 14.4 | 0.07000 | 0.13600 | -2.00 | 0.059 | -0.488 | No | 0.15377 | Yes | Evaluate Further |
| | Jul-15 | 14.9 | 0.07000 | 0.04030 | -3.21 | -0.022 | -0.488 | Less Than PCL | 0.12041 | Less Than PCL | Less Than PCL |
| | Jan-16 | 15.4 | 0.07000 | 0.0138 | -4.28 | -0.162 | -0.488 | Less Than PCL | 0.09417 | Less Than PCL | Less Than PCL |
| | Jul-16 | 15.9 | 0.07000 | 0.0795 | -2.53 | -0.102 | -0.488 | No | 0.07384 | No | No |
| 60606MW | Nov-95 | 0.0 | 0.07000 | 0.005 U | -8.00 | -- | -- | -- | -- | -- | -- |
| | Nov-99 | 4.0 | 0.07000 | 0.00045 J | -7.71 | -- | -- | -- | -- | -- | -- |
| | Jul-00 | 4.7 | 0.07000 | 0.00054 J | -7.52 | -- | -- | -- | -- | -- | -- |
| | Jun-01 | 5.6 | 0.07000 | 0.00170 J | -6.38 | -- | -- | -- | -- | -- | -- |
| | Jan-03 | 7.2 | 0.07000 | 0.00120 | -6.73 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Sep-03 | 7.8 | 0.07000 | 0.00320 | -5.74 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Dec-03 | 8.1 | 0.07000 | 0.00260 | -5.95 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-04 | 8.7 | 0.07000 | 0.00300 | -5.81 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Oct-04 | 8.9 | 0.07000 | 0.00400 | -5.52 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Apr-05 | 9.4 | 0.07000 | 0.00600 | -5.12 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Oct-05 | 9.9 | 0.07000 | 0.00200 | -6.21 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | May-06 | 10.5 | 0.07000 | 0.00200 | -6.21 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Aug-06 | 10.8 | 0.07000 | 0.00100 | -6.91 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Apr-07 | 11.4 | 0.07000 | 0.00260 | -5.95 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Sep-07 | 11.8 | 0.07000 | 0.00310 | -5.78 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-08 | 12.2 | 0.07000 | 0.00260 | -5.95 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-08 | 12.7 | 0.07000 | 0.00260 | -5.95 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-09 | 13.2 | 0.07000 | 0.00200 | -6.21 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-09 | 13.7 | 0.07000 | 0.00250 | -5.99 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-10 | 14.2 | 0.07000 | 0.00320 | -5.74 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-10 | 14.7 | 0.07000 | 0.00260 | -5.95 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-11 | 15.7 | 0.07000 | 0.00170 | -6.38 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-12 | 16.2 | 0.07000 | 0.00190 | -6.27 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-12 | 16.7 | 0.07000 | 0.00160 | -6.44 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-13 | 17.2 | 0.07000 | 0.01600 | -4.14 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-13 | 17.7 | 0.07000 | 0.00024 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-14 | 18.2 | 0.07000 | 0.00150 | -6.50 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-14 | 18.7 | 0.07000 | 0.00155 | -6.47 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-15 | 19.2 | 0.07000 | 0.00181 | -6.31 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-15 | 19.7 | 0.07000 | 0.00207 | -6.18 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-16 | 20.2 | 0.07000 | 0.00315 | -5.76 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-16 | 20.7 | 0.07000 | 0.00369 | -5.60 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |

# Table 4-4

## Summary of Concentration vs. Time Attenuation Rate Constants
## SWMU 21 Plume
## 2016 RAER
## Former NAS Dallas, Texas
## Page 8 of 16

| Monitoring Well ID | Sampling Date | Elapsed Time (Years) | Protective Concentration Level (mg/L) | Concentration Detected (mg/L) | Natural Log of Concentration (mg/L) | Degradation Rate from Natural Log ($K_{time}$) (mg/L per year) | Minimum Degradation Rate Required for Remedial Goals Natural Log ($K_{time}$) (mg/L per year) | Minimum Degradation Rate Met? (Yes/No) | Expected Remedial Goal Concentration (mg/L) | Expected Remedial Goal Concentration Met? (Yes/No) | Remedial Goals Being Met? (Yes/No) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 608D32MW | May-98 | 0.0 | 0.07000 | 0.00800 | -4.83 | -- | -- | -- | -- | -- | -- |
| | Aug-98 | 0.3 | 0.07000 | 0.00900 | -4.71 | -- | -- | -- | -- | -- | -- |
| | Apr-99 | 0.9 | 0.07000 | 0.00860 | -4.76 | -- | -- | -- | -- | -- | -- |
| | Oct-99 | 1.4 | 0.07000 | 0.01000 | -4.61 | -- | -- | -- | -- | -- | -- |
| | Jul-00 | 2.2 | 0.07000 | 0.00820 J | -4.80 | -- | -- | -- | -- | -- | -- |
| | Jun-01 | 3.1 | 0.07000 | 0.01100 | -4.51 | -- | -- | -- | -- | -- | -- |
| | Jan-03 | 4.7 | 0.07000 | 0.00750 J | -4.89 | -- | -- | -- | -- | -- | -- |
| | Aug-03 | 5.3 | 0.07000 | 0.01100 | -4.51 | -- | -- | -- | -- | -- | -- |
| | Dec-03 | 5.6 | 0.07000 | 0.00880 | -4.73 | -- | -- | -- | -- | -- | -- |
| | Jul-04 | 6.2 | 0.07000 | 0.00960 | -4.65 | -- | -- | -- | -- | -- | -- |
| | Oct-04 | 6.4 | 0.07000 | 0.00730 | -4.92 | -- | -- | -- | -- | -- | -- |
| | Apr-05 | 6.9 | 0.07000 | 0.01400 | -4.27 | -- | -- | -- | -- | -- | -- |
| | Oct-05 | 7.4 | 0.07000 | 0.01100 J | -4.51 | -- | -- | -- | -- | -- | -- |
| | Feb-06 | 7.7 | 0.07000 | 0.01200 | -4.42 | -- | -- | -- | -- | -- | -- |
| | Dec-06 | 8.6 | 0.07000 | 0.00300 | -5.81 | -- | -- | -- | -- | -- | -- |
| | Feb-07 | 8.8 | 0.07000 | 0.00600 | -5.12 | -- | -- | -- | -- | -- | -- |
| | May-07 | 9.0 | 0.07000 | 0.00700 | -4.96 | -- | -- | -- | -- | -- | -- |
| | Aug-07 | 9.3 | 0.07000 | 0.00690 | -4.98 | -- | -- | -- | -- | -- | -- |
| | Nov-07 | 9.5 | 0.07000 | 0.00850 | -4.77 | -- | -- | -- | -- | -- | -- |
| | Jan-08 | 9.7 | 0.07000 | 0.00860 | -4.76 | -- | -- | -- | -- | -- | -- |
| | Jul-08 | 10.2 | 0.07000 | 0.01060 | -4.55 | -- | -- | -- | -- | -- | -- |
| | Jan-09 | 10.7 | 0.07000 | 0.01540 | -4.17 | -- | -- | -- | -- | -- | -- |
| | Jul-09 | 11.2 | 0.07000 | 0.00710 | -4.95 | -- | -- | -- | -- | -- | -- |
| | Jan-10 | 11.7 | 0.07000 | 0.03580 | -3.33 | -- | -- | -- | -- | -- | -- |
| | Jul-10 | 12.2 | 0.07000 | 0.02030 | -3.90 | -- | -- | -- | -- | -- | -- |
| | Jan-11 | 12.7 | 0.07000 | 0.00690 | -4.98 | -- | -- | -- | -- | -- | -- |
| | Jul-11 | 13.2 | 0.07000 | 0.01230 | -4.40 | -- | -- | -- | -- | -- | -- |
| | Jan-12 | 13.7 | 0.07000 | 0.05520 | -2.90 | -- | -- | -- | -- | -- | -- |
| | Jul-12 | 14.2 | 0.07000 | 0.05560 | -2.89 | -- | -- | -- | -- | -- | -- |
| | Jan-13 | 14.7 | 0.07000 | 0.12400 | -2.09 | -- | -- | -- | -- | -- | -- |
| | Jul-13 | 15.2 | 0.07000 | 0.04040 | -3.21 | -- | -- | -- | -- | -- | -- |
| | Jan-14 | 15.7 | 0.07000 | 0.12200 | -2.10 | -- | -- | -- | -- | -- | -- |
| | Jul-14 | 16.2 | 0.07000 | 0.07840 | -2.55 | -- | -- | -- | -- | -- | -- |
| | Jan-15 | 16.7 | 0.07000 | 0.11100 | -2.20 | 0.089 | -0.157 | No | 0.09022 | No | No |
| | Jul-15 | 17.2 | 0.07000 | 0.07480 | -2.59 | 0.005 | -0.157 | No | 0.08338 | Yes | Evaluate Further |
| | Jan-16 | 17.7 | 0.07000 | 0.07980 | -2.53 | -0.012 | -0.157 | No | 0.07703 | No | No |
| | Jul-16 | 18.2 | 0.07000 | 0.03360 | -3.39 | -0.161 | -0.157 | Less Than PCL | 0.07122 | Less Than PCL | Less Than PCL |
| 608D132MW | Apr-05 | 0.0 | 0.07000 | 0.00030 | -8.11 | -- | -- | -- | -- | -- | -- |
| | Jul-05 | 0.2 | 0.07000 | 0.00200 | -6.21 | -- | -- | -- | -- | -- | -- |
| | Oct-05 | 0.5 | 0.07000 | 0.00400 | -5.52 | -- | -- | -- | -- | -- | -- |
| | Feb-06 | 0.8 | 0.07000 | 0.00400 | -5.52 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Dec-06 | 1.7 | 0.07000 | 0.00400 | -5.52 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Feb-07 | 1.9 | 0.07000 | 0.00400 | -5.52 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | May-07 | 2.1 | 0.07000 | 0.00400 | -5.52 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Aug-07 | 2.4 | 0.07000 | 0.00190 | -6.27 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Nov-07 | 2.6 | 0.07000 | 0.00220 | -6.12 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Feb-08 | 2.8 | 0.07000 | 0.00310 | -5.78 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-08 | 3.3 | 0.07000 | 0.00270 | -5.91 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-09 | 3.8 | 0.07000 | 0.00380 | -5.57 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-09 | 4.3 | 0.07000 | 0.00510 | -5.28 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-10 | 4.8 | 0.07000 | 0.00170 | -6.38 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-10 | 5.3 | 0.07000 | 0.00089 J | -7.02 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-11 | 5.8 | 0.07000 | 0.00780 | -4.85 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-11 | 6.3 | 0.07000 | 0.00310 | -5.78 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-12 | 6.8 | 0.07000 | 0.00320 | -5.74 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-12 | 7.3 | 0.07000 | 0.00610 | -5.10 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-13 | 7.8 | 0.07000 | 0.00980 | -4.63 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-13 | 8.3 | 0.07000 | 0.00450 | -5.40 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-14 | 8.8 | 0.07000 | 0.00440 | -5.43 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-14 | 9.3 | 0.07000 | 0.00419 | -5.48 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-15 | 9.8 | 0.07000 | 0.00365 | -5.61 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-15 | 10.3 | 0.07000 | 0.00237 | -6.04 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-16 | 10.8 | 0.07000 | 0.0005 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-16 | 11.3 | 0.07000 | 0.00133 | -6.62 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |

# Table 4-4

## Summary of Concentration vs. Time Attenuation Rate Constants
## SWMU 21 Plume
## 2016 RAER
## Former NAS Dallas, Texas
## Page 9 of 16

| Monitoring Well ID | Sampling Date | Elapsed Time (Years) | Protective Concentration Level (mg/L) | Concentration Detected (mg/L) | Natural Log of Concentration (mg/L) | Degradation Rate from Natural Log ($K_{time}$) (mg/L per year) | Minimum Degradation Rate Required for Remedial Goals Natural Log ($K_{time}$) (mg/L per year) | Minimum Degradation Rate Met? (Yes/No) | Expected Remedial Goal Concentration (mg/L) | Expected Remedial Goal Concentration Met? (Yes/No) | Remedial Goals Being Met? (Yes/No) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 608D136MW | Apr-05 | 0.0 | 0.07000 | 0.00900 | -4.71 | -- | -- | -- | -- | -- | -- |
| | Jul-05 | 0.2 | 0.07000 | 0.00700 | -4.96 | -- | -- | -- | -- | -- | -- |
| | Oct-05 | 0.5 | 0.07000 | 0.00800 | -4.83 | -- | -- | -- | -- | -- | -- |
| | Feb-06 | 0.8 | 0.07000 | 0.00700 | -4.96 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Dec-06 | 1.7 | 0.07000 | 0.02000 | -3.91 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Feb-07 | 1.9 | 0.07000 | 0.04000 | -3.22 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | May-07 | 2.1 | 0.07000 | 0.05400 | -2.92 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Aug-07 | 2.4 | 0.07000 | 0.02200 | -3.82 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Nov-07 | 2.6 | 0.07000 | 0.01100 | -4.51 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Feb-08 | 2.8 | 0.07000 | 0.00950 | -4.66 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-08 | 3.3 | 0.07000 | 0.01170 | -4.45 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-09 | 3.8 | 0.07000 | 0.00960 | -4.65 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-09 | 4.3 | 0.07000 | 0.00500 | -5.30 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-10 | 4.8 | 0.07000 | 0.00460 | -5.38 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-10 | 5.3 | 0.07000 | 0.00680 | -4.99 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-11 | 5.8 | 0.07000 | 0.00850 | -4.77 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-11 | 6.3 | 0.07000 | 0.01300 | -4.34 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-12 | 6.8 | 0.07000 | 0.03570 | -3.33 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-12 | 7.3 | 0.07000 | 0.02060 | -3.88 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-13 | 7.8 | 0.07000 | 0.0463 JH | -3.07 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-13 | 8.3 | 0.07000 | 0.03240 | -3.43 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-14 | 8.8 | 0.07000 | 0.04250 | -3.16 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-14 | 9.3 | 0.07000 | 0.0492 | -3.01 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-15 | 9.8 | 0.07000 | 0.0494 | -3.01 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-15 | 9.8 | 0.07000 | 0.0442 | -3.12 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-15 | 10.3 | 0.07000 | 0.05170 | -2.96 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-16 | 10.8 | 0.07000 | 0.0553 | -2.89 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-16 | 11.3 | 0.07000 | 0.0483 | -3.03 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| 608D138MW | Apr-05 | 0.0 | 0.07000 | 0.00900 | -4.71 | -- | -- | -- | -- | -- | -- |
| | Jul-05 | 0.2 | 0.07000 | 0.00700 | -4.96 | -- | -- | -- | -- | -- | -- |
| | Oct-05 | 0.5 | 0.07000 | 0.00700 | -4.96 | -- | -- | -- | -- | -- | -- |
| | Jan-06 | 0.8 | 0.07000 | 0.00700 | -4.96 | -- | -- | -- | -- | -- | -- |
| | Aug-06 | 1.4 | 0.07000 | 0.00600 | -5.12 | -- | -- | -- | -- | -- | -- |
| | Apr-07 | 2.0 | 0.07000 | 0.01000 | -4.61 | -- | -- | -- | -- | -- | -- |
| | Sep-07 | 2.4 | 0.07000 | 0.02400 | -3.73 | -- | -- | -- | -- | -- | -- |
| | Jan-08 | 2.8 | 0.07000 | 0.07900 | -2.54 | -- | -- | -- | -- | -- | -- |
| | Jul-08 | 3.3 | 0.07000 | 0.04870 | -3.02 | -- | -- | -- | -- | -- | -- |
| | Jan-09 | 3.8 | 0.07000 | 0.03150 | -3.46 | -- | -- | -- | -- | -- | -- |
| | Jul-09 | 4.3 | 0.07000 | 0.04160 | -3.18 | -- | -- | -- | -- | -- | -- |
| | Jan-10 | 4.8 | 0.07000 | 0.09550 | -2.35 | 0.051 | -0.014 | No | 0.07686 | No | No |
| | Jul-10 | 5.3 | 0.07000 | 0.05250 | -2.95 | 0.018 | -0.014 | Less Than PCL | 0.07632 | Less Than PCL | Less Than PCL |
| | Jan-11 | 5.8 | 0.07000 | 0.08750 | -2.44 | 0.116 | -0.014 | No | 0.07578 | No | No |
| | Jul-11 | 6.3 | 0.07000 | 0.01910 | -3.96 | -0.113 | -0.014 | Less Than PCL | 0.07521 | Less Than PCL | Less Than PCL |
| | Jan-12 | 6.8 | 0.07000 | 0.00210 | -6.17 | -0.505 | -0.014 | Less Than PCL | 0.07473 | Less Than PCL | Less Than PCL |
| | Jul-12 | 7.3 | 0.07000 | 0.02420 | -3.72 | -0.409 | -0.014 | Less Than PCL | 0.07420 | Less Than PCL | Less Than PCL |
| | Jan-13 | 7.8 | 0.07000 | 0.02420 | -3.72 | -0.338 | -0.014 | Less Than PCL | 0.07367 | Less Than PCL | Less Than PCL |
| | Jul-13 | 8.3 | 0.07000 | 0.01990 | -3.92 | -0.299 | -0.014 | Less Than PCL | 0.07316 | Less Than PCL | Less Than PCL |
| | Jan-14 | 8.8 | 0.07000 | 0.03870 | -3.25 | -0.221 | -0.014 | Less Than PCL | 0.07264 | Less Than PCL | Less Than PCL |
| | Jul-14 | 9.3 | 0.07000 | 0.0261 | -3.65 | -0.188 | -0.014 | Less Than PCL | 0.07211 | Less Than PCL | Less Than PCL |
| | Jan-15 | 9.8 | 0.07000 | 0.015 | -4.20 | -0.190 | -0.014 | Less Than PCL | 0.07161 | Less Than PCL | Less Than PCL |
| | Jul-15 | 10.3 | 0.07000 | 0.05920 | -2.83 | -0.127 | -0.014 | Less Than PCL | 0.07110 | Less Than PCL | Less Than PCL |
| | Jan-16 | 10.8 | 0.07000 | 0.10900 | -2.22 | -0.057 | -0.014 | Yes | 0.07060 | No | Evaluate Further |
| | Jul-16 | 11.3 | 0.07000 | 0.0175 | -4.05 | -0.071 | -0.014 | Less Than PCL | 0.07011 | Less Than PCL | Less Than PCL |
| 608D140MW | Apr-05 | 0.0 | 0.07000 | 0.00900 | -4.71 | -- | -- | -- | -- | -- | -- |
| | Jul-05 | 0.2 | 0.07000 | 0.01000 | -4.61 | -- | -- | -- | -- | -- | -- |
| | Oct-05 | 0.5 | 0.07000 | 0.01400 | -4.27 | -- | -- | -- | -- | -- | -- |
| | Jan-06 | 0.8 | 0.07000 | 0.01400 | -4.27 | -- | -- | -- | -- | -- | -- |
| | Aug-06 | 1.4 | 0.07000 | 0.01400 | -4.27 | -- | -- | -- | -- | -- | -- |
| | Apr-07 | 2.0 | 0.07000 | 0.01400 | -4.27 | -- | -- | -- | -- | -- | -- |
| | Sep-07 | 2.4 | 0.07000 | 0.01400 | -4.27 | -- | -- | -- | -- | -- | -- |
| | Jan-08 | 2.8 | 0.07000 | 0.02300 | -3.77 | -- | -- | -- | -- | -- | -- |
| | Jul-08 | 3.3 | 0.07000 | 0.05800 | -2.85 | -- | -- | -- | -- | -- | -- |
| | Jan-09 | 3.8 | 0.07000 | 0.08280 | -2.49 | -- | -- | -- | -- | -- | -- |
| | Jul-09 | 4.3 | 0.07000 | 0.02920 | -3.53 | -- | -- | -- | -- | -- | -- |
| | Jan-10 | 4.8 | 0.07000 | 0.07110 | -2.64 | -- | -- | -- | -- | -- | -- |
| | Jul-10 | 5.3 | 0.07000 | 0.02480 | -3.70 | -- | -- | -- | -- | -- | -- |
| | Jan-11 | 5.8 | 0.07000 | 0.09920 | -2.31 | 0.039 | -0.022 | No | 0.07924 | No | No |
| | Jul-11 | 6.3 | 0.07000 | 0.01990 | -3.92 | -0.260 | -0.022 | Less Than PCL | 0.07831 | Less Than PCL | Less Than PCL |
| | Jan-12 | 6.8 | 0.07000 | 0.04450 | -3.11 | -0.167 | -0.022 | Less Than PCL | 0.07752 | Less Than PCL | Less Than PCL |
| | Jul-12 | 7.3 | 0.07000 | 0.04060 | -3.20 | -0.129 | -0.022 | Less Than PCL | 0.07668 | Less Than PCL | Less Than PCL |
| | Jan-13 | 7.8 | 0.07000 | 0.09750 | -2.33 | 0.014 | -0.022 | No | 0.07582 | No | No |
| | Jul-13 | 8.3 | 0.07000 | 0.02760 | -3.59 | -0.051 | -0.022 | Less Than PCL | 0.07500 | Less Than PCL | Less Than PCL |
| | Jan-14 | 8.8 | 0.07000 | 0.09910 | -2.31 | 0.032 | -0.022 | No | 0.07417 | No | No |
| | Jul-14 | 9.3 | 0.07000 | 0.09290 | -2.38 | 0.074 | -0.022 | No | 0.07333 | No | No |
| | Jan-15 | 9.8 | 0.07000 | 0.08940 | -2.41 | 0.094 | -0.022 | No | 0.07253 | No | No |
| | Jul-15 | 10.3 | 0.07000 | 0.09490 | -2.35 | 0.107 | -0.022 | No | 0.07173 | No | No |
| | Jan-16 | 10.8 | 0.07000 | 0.00487 | -5.32 | -0.035 | -0.022 | Less Than PCL | 0.07094 | Less Than PCL | Less Than PCL |
| | Jul-16 | 11.3 | 0.07000 | 0.02450 | -3.71 | -0.058 | -0.022 | Less Than PCL | 0.07017 | Less Than PCL | Less Than PCL |

# Table 4-4

## Summary of Concentration vs. Time Attenuation Rate Constants
## SWMU 21 Plume
## 2016 RAER
## Former NAS Dallas, Texas
## Page 10 of 16

| Monitoring Well ID | Sampling Date | Elapsed Time (Years) | Protective Concentration Level (mg/L) | Concentration Detected (mg/L) | Natural Log of Concentration (mg/L) | Degradation Rate from Natural Log ($K_{time}$) (mg/L per year) | Minimum Degradation Rate Required for Remedial Goals Natural Log ($K_{time}$) (mg/L per year) | Minimum Degradation Rate Met? (Yes/No) | Expected Remedial Goal Concentration (mg/L) | Expected Remedial Goal Concentration Met? (Yes/No) | Remedial Goals Being Met? (Yes/No) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 608D141MW | Apr-05 | 0.0 | 0.07000 | 0.00700 | -4.96 | -- | -- | -- | -- | -- | -- |
| | Jul-05 | 0.2 | 0.07000 | 0.00500 | -5.30 | -- | -- | -- | -- | -- | -- |
| | Oct-05 | 0.5 | 0.07000 | 0.00600 | -5.12 | -- | -- | -- | -- | -- | -- |
| | Jan-06 | 0.8 | 0.07000 | 0.00400 | -5.52 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Aug-06 | 1.4 | 0.07000 | 0.00800 | -4.83 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Apr-07 | 2.0 | 0.07000 | 0.00590 | -5.13 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Sep-07 | 2.4 | 0.07000 | 0.00440 | -5.43 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-08 | 2.8 | 0.07000 | 0.00410 | -5.50 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-08 | 3.3 | 0.07000 | 0.00390 | -5.55 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-09 | 3.8 | 0.07000 | 0.00550 | -5.20 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-09 | 4.3 | 0.07000 | 0.00640 | -5.05 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-10 | 4.8 | 0.07000 | 0.00440 | -5.43 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-10 | 5.3 | 0.07000 | 0.00680 | -4.99 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-11 | 5.8 | 0.07000 | 0.00850 | -4.77 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-11 | 6.3 | 0.07000 | 0.01030 | -4.58 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-12 | 6.8 | 0.07000 | 0.00960 | -4.65 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-12 | 7.3 | 0.07000 | 0.00690 | -4.98 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-13 | 7.8 | 0.07000 | 0.00480 | -5.34 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-13 | 8.3 | 0.07000 | 0.00590 | -5.13 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-14 | 8.8 | 0.07000 | 0.00510 | -5.28 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-14 | 9.3 | 0.07000 | 0.00564 | -5.18 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-15 | 9.8 | 0.07000 | 0.00377 | -5.58 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-15 | 10.3 | 0.07000 | 0.00662 | -5.02 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-16 | 10.8 | 0.07000 | 0.00893 | -4.72 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-16 | 11.3 | 0.07000 | 0.0148 | -4.21 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| 608D142MWR | Apr-05 | 0.0 | 0.07000 | 0.00600 | -5.12 | -- | -- | -- | -- | -- | -- |
| | Jul-05 | 0.2 | 0.07000 | 0.00300 | -5.81 | -- | -- | -- | -- | -- | -- |
| | Oct-05 | 0.5 | 0.07000 | 0.00500 | -5.30 | -- | -- | -- | -- | -- | -- |
| | Jan-06 | 0.8 | 0.07000 | 0.00600 | -5.12 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Aug-06 | 1.4 | 0.07000 | 0.00500 | -5.30 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Apr-07 | 2.0 | 0.07000 | 0.00560 | -5.18 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Sep-07 | 2.4 | 0.07000 | 0.00570 | -5.17 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-08 | 2.8 | 0.07000 | 0.00410 | -5.50 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-08 | 3.3 | 0.07000 | 0.00420 | -5.47 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-09 | 3.8 | 0.07000 | 0.00430 | -5.45 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-09 | 4.3 | 0.07000 | 0.00490 | -5.32 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-10 | 4.8 | 0.07000 | 0.00380 | -5.57 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-10 | 5.3 | 0.07000 | 0.00370 | -5.60 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-11 | 6.3 | 0.07000 | 0.00150 | -6.50 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-12 | 6.8 | 0.07000 | 0.00300 | -5.81 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-12 | 7.3 | 0.07000 | 0.00520 | -5.26 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-13 | 7.8 | 0.07000 | 0.00350 | -5.65 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-13 | 8.3 | 0.07000 | 0.00490 | -5.32 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-14 | 8.8 | 0.07000 | 0.00440 | -5.43 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-14 | 9.3 | 0.07000 | 0.00436 | -5.44 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-15 | 9.8 | 0.07000 | 0.00335 | -5.70 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-15 | 10.3 | 0.07000 | 0.00462 | -5.38 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-16 | 10.8 | 0.07000 | 0.00365 | -5.61 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-16 | 11.3 | 0.07000 | 0.00566 | -5.17 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| 608D143MW | May-05 | 0.0 | 0.07000 | 0.02200 | -3.82 | -- | -- | -- | -- | -- | -- |
| | Jul-05 | 0.2 | 0.07000 | 0.05000 | -3.00 | -- | -- | -- | -- | -- | -- |
| | Oct-05 | 0.4 | 0.07000 | 0.02800 | -3.58 | -- | -- | -- | -- | -- | -- |
| | Jan-06 | 0.7 | 0.07000 | 0.01400 | -4.27 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Aug-06 | 1.3 | 0.07000 | 0.02800 L | -3.58 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Apr-07 | 1.9 | 0.07000 | 0.01200 | -4.42 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Sep-07 | 2.3 | 0.07000 | 0.01600 | -4.14 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-08 | 2.7 | 0.07000 | 0.01600 | -4.14 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-08 | 3.2 | 0.07000 | 0.01570 | -4.15 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-09 | 3.7 | 0.07000 | 0.05190 | -2.96 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-09 | 4.2 | 0.07000 | 0.02300 | -3.77 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-10 | 4.7 | 0.07000 | 0.01360 | -4.30 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-10 | 5.2 | 0.07000 | 0.06310 | -2.76 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-11 | 5.7 | 0.07000 | 0.00690 | -4.98 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-11 | 6.2 | 0.07000 | 0.02190 | -3.82 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-12 | 6.7 | 0.07000 | 0.03330 | -3.40 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-12 | 7.2 | 0.07000 | 0.05630 | -2.88 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-13 | 7.7 | 0.07000 | 0.01450 | -4.23 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-13 | 8.2 | 0.07000 | 0.05258 | -2.95 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-14 | 8.7 | 0.07000 | 0.02080 | -3.87 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-14 | 9.2 | 0.07000 | 0.039 | -3.24 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-15 | 9.7 | 0.07000 | 0.0069 | -4.98 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-15 | 10.2 | 0.07000 | 0.01780 | -4.03 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-16 | 10.7 | 0.07000 | 0.0885 | -2.42 | -- | NA | NA | NA | NA | Evaluate Further |
| | Jul-16 | 11.2 | 0.07000 | 0.0129 | -4.35 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |

# Table 4-4

## Summary of Concentration vs. Time Attenuation Rate Constants
## SWMU 21 Plume
## 2016 RAER
## Former NAS Dallas, Texas
## Page 11 of 16

| Monitoring Well ID | Sampling Date | Elapsed Time (Years) | Protective Concentration Level (mg/L) | Concentration Detected (mg/L) | Natural Log of Concentration (mg/L) | Degradation Rate from Natural Log ($K_{time}$) (mg/L per year) | Minimum Degradation Rate Required for Remedial Goals Natural Log ($K_{time}$) (mg/L per year) | Minimum Degradation Rate Met? (Yes/No) | Expected Remedial Goal Concentration (mg/L) | Expected Remedial Goal Concentration Met? (Yes/No) | Remedial Goals Being Met? (Yes/No) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 608D144MW | Jul-05 | 0.0 | 0.07000 | 0.01200 | -4.42 | -- | -- | -- | -- | -- | -- |
| | Oct-05 | 0.2 | 0.07000 | 0.01500 | -4.20 | -- | -- | -- | -- | -- | -- |
| | Jan-06 | 0.5 | 0.07000 | 0.01100 | -4.51 | -- | -- | -- | -- | -- | -- |
| | Aug-06 | 1.1 | 0.07000 | 0.01400 | -4.27 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | May-07 | 1.8 | 0.07000 | 0.01200 | -4.42 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Sep-07 | 2.1 | 0.07000 | 0.01400 | -4.27 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-08 | 2.5 | 0.07000 | 0.01500 | -4.20 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-08 | 3.0 | 0.07000 | 0.01310 | -4.34 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-09 | 4.0 | 0.07000 | 0.01550 | -4.17 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-10 | 4.5 | 0.07000 | 0.01130 | -4.48 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-10 | 5.0 | 0.07000 | 0.03330 | -3.40 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-11 | 5.5 | 0.07000 | 0.01630 | -4.12 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-11 | 6.0 | 0.07000 | 0.01380 | -4.28 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-12 | 6.5 | 0.07000 | 0.02140 | -3.84 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-12 | 7.0 | 0.07000 | 0.01600 | -4.14 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-13 | 7.5 | 0.07000 | 0.01190 | -4.43 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-13 | 8.0 | 0.07000 | 0.01590 | -4.14 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-14 | 8.5 | 0.07000 | 0.01450 | -4.23 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-14 | 9.0 | 0.07000 | 0.0241 | -3.73 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-15 | 9.5 | 0.07000 | 0.0207 | -3.88 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-15 | 10.0 | 0.07000 | 0.01610 | -4.13 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-16 | 10.5 | 0.07000 | 0.0221 | -3.81 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-16 | 11.0 | 0.07000 | 0.0418 | -3.17 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| 608D145MW | Jul-05 | 0.0 | 0.07000 | 0.00100 | -6.91 | -- | -- | -- | -- | -- | -- |
| | Oct-05 | 0.2 | 0.07000 | 0.00100 | -6.91 | -- | -- | -- | -- | -- | -- |
| | Jan-06 | 0.5 | 0.07000 | 0.00100 | -6.91 | -- | -- | -- | -- | -- | -- |
| | Aug-06 | 1.1 | 0.07000 | 0.00100 | -6.91 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | May-07 | 1.8 | 0.07000 | 0.00100 J | -6.91 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Sep-07 | 2.1 | 0.07000 | 0.00100 | -6.91 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-08 | 2.5 | 0.07000 | 0.00053 J | -7.54 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-08 | 3.0 | 0.07000 | 0.00082 J | -7.11 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-09 | 3.5 | 0.07000 | 0.00020 U | -8.52 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-09 | 4.0 | 0.07000 | 0.00053 J | -7.54 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-10 | 4.5 | 0.07000 | 0.00032 U | -8.05 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-10 | 5.0 | 0.07000 | 0.00370 | -6.91 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-11 | 5.5 | 0.07000 | 0.00110 | -6.91 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-11 | 6.0 | 0.07000 | 0.00053 J | -7.54 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-12 | 6.5 | 0.07000 | 0.00160 | -6.44 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-12 | 7.0 | 0.07000 | 0.00071 J | -7.25 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-13 | 7.5 | 0.07000 | 0.00024 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-13 | 8.0 | 0.07000 | 0.00076 J | -7.18 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-14 | 8.5 | 0.07000 | 0.00079 J | -7.14 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-14 | 9.0 | 0.07000 | 0.00089 J | -7.02 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-15 | 9.5 | 0.07000 | 0.00122 | -6.71 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-15 | 10.0 | 0.07000 | 0.00128 | -6.66 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-16 | 10.5 | 0.07000 | 0.00221 | -6.11 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-16 | 11.0 | 0.07000 | 0.00068 J | -7.29 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| 608D146MW | Jul-05 | 0.0 | 0.07000 | 0.01500 | -4.20 | -- | -- | -- | -- | -- | -- |
| | Oct-05 | 0.2 | 0.07000 | 0.01100 | -4.51 | -- | -- | -- | -- | -- | -- |
| | Jan-06 | 0.5 | 0.07000 | 0.00900 | -4.71 | -- | -- | -- | -- | -- | -- |
| | Aug-06 | 1.1 | 0.07000 | 0.01700 J | -4.07 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | May-07 | 1.8 | 0.07000 | 0.01600 | -4.14 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Sep-07 | 2.1 | 0.07000 | 0.01800 | -4.02 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-08 | 2.5 | 0.07000 | 0.01600 | -4.14 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-08 | 3.0 | 0.07000 | 0.01540 | -4.17 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-09 | 3.5 | 0.07000 | 0.01380 | -4.28 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-09 | 4.0 | 0.07000 | 0.01430 | -4.25 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-10 | 4.5 | 0.07000 | 0.01450 | -4.23 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-10 | 5.0 | 0.07000 | 0.01980 | -3.92 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-11 | 5.5 | 0.07000 | 0.01480 | -4.21 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-11 | 6.0 | 0.07000 | 0.01880 | -3.97 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-12 | 6.5 | 0.07000 | 0.01900 | -3.96 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-12 | 7.0 | 0.07000 | 0.01750 | -4.05 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-13 | 7.5 | 0.07000 | 0.01100 | -4.51 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-13 | 8.0 | 0.07000 | 0.01610 | -4.13 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-14 | 8.5 | 0.07000 | 0.01580 | -4.15 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-14 | 9.0 | 0.07000 | 0.0137 | -4.29 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-15 | 9.5 | 0.07000 | 0.0111 | -4.50 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-15 | 10.0 | 0.07000 | 0.01670 | -4.09 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-16 | 10.5 | 0.07000 | 0.01460 | -4.23 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-16 | 11.0 | 0.07000 | 0.0146 | -4.23 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| 608D162MW | Jan-14 | 0.0 | 0.07000 | 0.00079 J | -7.14 | -- | -- | -- | -- | -- | -- |
| | Jul-14 | 0.5 | 0.07000 | 0.00053 J | -7.54 | -- | -- | -- | -- | -- | -- |
| | Jan-15 | 1.0 | 0.07000 | 0.000263 J | -8.24 | -- | -- | -- | -- | -- | -- |
| | Jul-15 | 1.5 | 0.07000 | 0.00609 | -5.10 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-16 | 2.0 | 0.07000 | 0.00288 | -5.85 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-16 | 2.5 | 0.07000 | 0.00124 | -6.69 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| 608D163MW | Jan-14 | 0.0 | 0.07000 | 0.00033 U | -8.00 | -- | -- | -- | -- | -- | -- |
| | Jul-14 | 0.5 | 0.07000 | 0.00025 U | -8.00 | -- | -- | -- | -- | -- | -- |
| | Jan-15 | 1.0 | 0.07000 | 0.00026 J | -8.25 | -- | -- | -- | -- | -- | -- |
| | Jul-15 | 1.5 | 0.07000 | 0.00026 J | -8.25 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-16 | 2.0 | 0.07000 | 0.0005 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-16 | 2.5 | 0.07000 | 0.00025 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |

# Table 4-4

## Summary of Concentration vs. Time Attenuation Rate Constants
## SWMU 21 Plume
## 2016 RAER
## Former NAS Dallas, Texas
## Page 12 of 16

| Monitoring Well ID | Sampling Date | Elapsed Time (Years) | Protective Concentration Level (mg/L) | Concentration Detected (mg/L) | Natural Log of Concentration (mg/L) | Degradation Rate from Natural Log ($K_{time}$) (mg/L per year) | Minimum Degradation Rate Required for Remedial Goals Natural Log ($K_{time}$) (mg/L per year) | Minimum Degradation Rate Met? (Yes/No) | Expected Remedial Goal Concentration (mg/L) | Expected Remedial Goal Concentration Met? (Yes/No) | Remedial Goals Being Met? (Yes/No) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Vinyl Chloride** | | | | | | | | | | | |
| 600D107MW | Aug-00 | 0.0 | 0.00200 | 0.00500 U | -8.00 | -- | -- | -- | -- | -- | -- |
| | Jul-01 | 0.9 | 0.00200 | 0.01000 U | -8.00 | -- | -- | -- | -- | -- | -- |
| | Jan-03 | 2.4 | 0.00200 | 0.00200 U | -8.00 | -- | -- | -- | -- | -- | -- |
| | Sep-03 | 3.0 | 0.00200 | 0.00052 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Sep-03 | 3.0 | 0.00200 | 0.00026 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Dec-03 | 3.3 | 0.00200 | 0.00098 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-04 | 3.9 | 0.00200 | 0.00017 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Oct-04 | 4.2 | 0.00200 | 0.00017 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Apr-05 | 4.6 | 0.00200 | 0.00030 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Oct-05 | 5.1 | 0.00200 | 0.00030 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | May-06 | 5.7 | 0.00200 | 0.00060 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Aug-06 | 6.0 | 0.00200 | 0.00060 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Apr-07 | 6.7 | 0.00200 | 0.00020 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Sep-07 | 7.0 | 0.00200 | 0.00067 J | -7.31 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-08 | 7.4 | 0.00200 | 0.00043 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-09 | 8.4 | 0.00200 | 0.00030 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-09 | 8.9 | 0.00200 | 0.00030 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-10 | 9.4 | 0.00200 | 0.00028 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-10 | 9.9 | 0.00200 | 0.00028 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-11 | 10.4 | 0.00200 | 0.00120 | -6.73 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-12 | 11.4 | 0.00200 | 0.00057 | -7.47 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-11 | 10.9 | 0.00200 | 0.00041 J | -7.80 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-13 | 12.4 | 0.00200 | 0.00044 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-13 | 12.9 | 0.00200 | 0.00044 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-14 | 13.4 | 0.00200 | 0.00065 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-14 | 13.9 | 0.00200 | 0.00025 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-15 | 14.4 | 0.00200 | 0.0005 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-15 | 14.9 | 0.00200 | 0.0005 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-16 | 15.4 | 0.00200 | NS | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-16 | 15.9 | 0.00200 | 0.00037 J | -7.90 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| 60606MW | Nov-95 | 0.0 | 0.00200 | 0.01000 U | -8.00 | -- | -- | -- | -- | -- | -- |
| | Nov-99 | 4.0 | 0.00200 | 0.00500 U | -8.00 | -- | -- | -- | -- | -- | -- |
| | Jul-00 | 4.7 | 0.00200 | 0.00500 U | -8.00 | -- | -- | -- | -- | -- | -- |
| | Jun-01 | 5.6 | 0.00200 | 0.01000 U | -8.00 | -- | -- | -- | -- | -- | -- |
| | Jan-03 | 7.2 | 0.00200 | 0.00100 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Sep-03 | 7.8 | 0.00200 | 0.00026 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Dec-03 | 8.1 | 0.00200 | 0.00017 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-04 | 8.7 | 0.00200 | 0.00017 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Oct-04 | 8.9 | 0.00200 | 0.00017 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Apr-05 | 9.4 | 0.00200 | 0.00030 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Oct-05 | 9.9 | 0.00200 | 0.00030 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | May-06 | 10.5 | 0.00200 | 0.00060 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Aug-06 | 10.8 | 0.00200 | 0.00060 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Apr-07 | 11.4 | 0.00200 | 0.00020 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Sep-07 | 11.8 | 0.00200 | 0.00019 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-08 | 12.2 | 0.00200 | 0.00043 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-08 | 12.7 | 0.00200 | 0.00030 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-09 | 13.2 | 0.00200 | 0.00030 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-09 | 13.7 | 0.00200 | 0.00030 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-10 | 14.2 | 0.00200 | 0.00028 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-10 | 14.7 | 0.00200 | 0.00028 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-11 | 15.7 | 0.00200 | 0.00022 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-12 | 16.2 | 0.00200 | 0.00022 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-13 | 17.2 | 0.00200 | 0.00044 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-13 | 17.7 | 0.00200 | 0.00044 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-14 | 18.2 | 0.00200 | 0.00033 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-14 | 18.7 | 0.00200 | 0.00025 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-15 | 19.2 | 0.00200 | 0.00025 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-15 | 19.7 | 0.00200 | 0.00025 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-16 | 20.2 | 0.00200 | NS | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-16 | 20.7 | 0.00200 | 0.00025 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |

# Table 4-4

## Summary of Concentration vs. Time Attenuation Rate Constants
## SWMU 21 Plume
## 2016 RAER
## Former NAS Dallas, Texas
## Page 13 of 16

| Monitoring Well ID | Sampling Date | Elapsed Time (Years) | Protective Concentration Level (mg/L) | Concentration Detected (mg/L) | Natural Log of Concentration (mg/L) | Degradation Rate from Natural Log ($K_{time}$) (mg/L per year) | Minimum Degradation Rate Required for Remedial Goals Natural Log ($K_{time}$) (mg/L per year) | Minimum Degradation Rate Met? (Yes/No) | Expected Remedial Goal Concentration (mg/L) | Expected Remedial Goal Concentration Met? (Yes/No) | Remedial Goals Being Met? (Yes/No) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 608D32MW | Nov-95 | 0.0 | 0.00200 | -- | -- | -- | -- | -- | -- | -- | -- |
| | May-98 | 2.5 | 0.00200 | 0.00500 U | -8.00 | -- | -- | -- | -- | -- | -- |
| | Aug-98 | 2.8 | 0.00200 | 0.00500 U | -8.00 | -- | -- | -- | -- | -- | -- |
| | Apr-99 | 3.4 | 0.00200 | 0.00500 U | -8.00 | -- | -- | -- | -- | -- | -- |
| | Oct-99 | 3.9 | 0.00200 | 0.00720 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-00 | 4.7 | 0.00200 | 0.00830 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jun-01 | 5.6 | 0.00200 | 0.02000 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-03 | 7.2 | 0.00200 | 0.01000 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Aug-03 | 7.8 | 0.00200 | 0.00260 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Dec-03 | 8.1 | 0.00200 | 0.00098 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-04 | 8.7 | 0.00200 | 0.00170 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Oct-04 | 8.9 | 0.00200 | 0.00084 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Apr-05 | 9.4 | 0.00200 | 0.00030 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Oct-05 | 9.9 | 0.00200 | 0.00030 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Feb-06 | 10.2 | 0.00200 | 0.00030 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Dec-06 | 11.1 | 0.00200 | 0.00200 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Feb-07 | 11.3 | 0.00200 | 0.00060 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | May-07 | 11.5 | 0.00200 | 0.00060 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Aug-07 | 11.8 | 0.00200 | 0.00023 J | -8.38 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Nov-07 | 12.0 | 0.00200 | 0.00022 J | -8.42 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-08 | 12.2 | 0.00200 | 0.00043 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-08 | 12.7 | 0.00200 | 0.00060 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-09 | 13.2 | 0.00200 | 0.00030 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-09 | 13.7 | 0.00200 | 0.00060 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-10 | 14.2 | 0.00200 | 0.00028 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-10 | 14.7 | 0.00200 | 0.00022 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-11 | 15.2 | 0.00200 | 0.00044 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-11 | 15.7 | 0.00200 | 0.00022 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-12 | 16.2 | 0.00200 | 0.00022 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-13 | 17.2 | 0.00200 | 0.00088 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-13 | 17.7 | 0.00200 | 0.00088 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-14 | 18.2 | 0.00200 | 0.00065 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-14 | 18.7 | 0.00200 | 0.00025 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-15 | 19.2 | 0.00200 | NS | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-15 | 19.7 | 0.00200 | 0.00025 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-16 | 20.2 | 0.00200 | NS | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-16 | 20.7 | 0.00200 | 0.0005 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| 608D132MW | Apr-05 | 0.0 | 0.00200 | 0.00030 U | -8.00 | -- | -- | -- | -- | -- | -- |
| | Jul-05 | 0.2 | 0.00200 | 0.00030 U | -8.00 | -- | -- | -- | -- | -- | -- |
| | Oct-05 | 0.5 | 0.00200 | 0.00030 U | -8.00 | -- | -- | -- | -- | -- | -- |
| | Feb-06 | 0.8 | 0.00200 | 0.00030 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Dec-06 | 1.7 | 0.00200 | 0.00200 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Feb-07 | 1.9 | 0.00200 | 0.00060 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | May-07 | 2.1 | 0.00200 | 0.00060 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Aug-07 | 2.4 | 0.00200 | 0.00019 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Nov-07 | 2.6 | 0.00200 | 0.00020 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Feb-08 | 2.8 | 0.00200 | 0.00043 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-08 | 3.3 | 0.00200 | 0.00030 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-09 | 3.8 | 0.00200 | 0.00030 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-09 | 4.3 | 0.00200 | 0.00030 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-10 | 4.8 | 0.00200 | 0.00028 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-10 | 5.3 | 0.00200 | 0.00028 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-11 | 5.8 | 0.00200 | 0.00022 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-11 | 6.3 | 0.00200 | 0.00022 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-12 | 6.8 | 0.00200 | 0.00022 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-13 | 7.8 | 0.00200 | 0.00044 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-13 | 8.3 | 0.00200 | 0.00044 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-14 | 8.8 | 0.00200 | 0.00033 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-14 | 9.3 | 0.00200 | 0.00025 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-15 | 9.8 | 0.00200 | NS | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-15 | 10.3 | 0.00200 | 0.00025 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-16 | 10.8 | 0.00200 | NS | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-16 | 11.3 | 0.00200 | 0.00025 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |

# Table 4-4

## Summary of Concentration vs. Time Attenuation Rate Constants
## SWMU 21 Plume
## 2016 RAER
## Former NAS Dallas, Texas
## Page 14 of 16

| Monitoring Well ID | Sampling Date | Elapsed Time (Years) | Protective Concentration Level (mg/L) | Concentration Detected (mg/L) | Natural Log of Concentration (mg/L) | Degradation Rate from Natural Log ($K_{time}$) (mg/L per year) | Minimum Degradation Rate Required for Remedial Goals Natural Log ($K_{time}$) (mg/L per year) | Minimum Degradation Rate Met? (Yes/No) | Expected Remedial Goal Concentration (mg/L) | Expected Remedial Goal Concentration Met? (Yes/No) | Remedial Goals Being Met? (Yes/No) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 608D136MW | Apr-05 | 0.0 | 0.00200 | 0.00030 U | -8.00 | -- | -- | -- | -- | -- | -- |
| | Jul-05 | 0.2 | 0.00200 | 0.00030 U | -8.00 | -- | -- | -- | -- | -- | -- |
| | Oct-05 | 0.5 | 0.00200 | 0.00030 U | -8.00 | -- | -- | -- | -- | -- | -- |
| | Feb-06 | 0.8 | 0.00200 | 0.00030 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Dec-06 | 1.7 | 0.00200 | 0.00200 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Feb-07 | 1.9 | 0.00200 | 0.00060 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | May-07 | 2.1 | 0.00200 | 0.00060 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Aug-07 | 2.4 | 0.00200 | 0.00019 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Nov-07 | 2.6 | 0.00200 | 0.00020 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Feb-08 | 2.8 | 0.00200 | 0.00043 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-08 | 3.3 | 0.00200 | 0.00030 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-09 | 3.8 | 0.00200 | 0.00030 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-09 | 4.3 | 0.00200 | 0.00030 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-10 | 4.8 | 0.00200 | 0.00028 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-10 | 5.3 | 0.00200 | 0.00028 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-11 | 5.8 | 0.00200 | 0.00022 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-11 | 6.3 | 0.00200 | 0.00022 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-12 | 6.8 | 0.00200 | 0.00022 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-13 | 7.8 | 0.00200 | 0.00044 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-13 | 8.3 | 0.00200 | 0.00044 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-14 | 8.8 | 0.00200 | 0.00033 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-14 | 9.3 | 0.00200 | 0.00025 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-15 | 9.8 | 0.00200 | NS | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-15 | 10.3 | 0.00200 | .000301 J | -8.11 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-16 | 10.8 | 0.00200 | NS | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-16 | 11.3 | 0.00200 | 0.0005 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| 608D138MW | Apr-05 | 0.0 | 0.00200 | 0.00040 J | -7.82 | -- | -- | -- | -- | -- | -- |
| | Jul-05 | 0.2 | 0.00200 | 0.00030 U | -8.00 | -- | -- | -- | -- | -- | -- |
| | Oct-05 | 0.5 | 0.00200 | 0.00030 U | -8.00 | -- | -- | -- | -- | -- | -- |
| | Jan-06 | 0.8 | 0.00200 | 0.00030 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Aug-06 | 1.4 | 0.00200 | 0.00060 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Apr-07 | 2.0 | 0.00200 | 0.00033 J | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Sep-07 | 2.4 | 0.00200 | 0.00056 J | -7.49 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-08 | 2.8 | 0.00200 | 0.00043 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-08 | 3.3 | 0.00200 | 0.00030 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-09 | 3.8 | 0.00200 | 0.00030 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-09 | 4.3 | 0.00200 | 0.00030 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-10 | 4.8 | 0.00200 | 0.00028 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-10 | 5.3 | 0.00200 | 0.00028 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-11 | 5.8 | 0.00200 | 0.00022 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-11 | 6.3 | 0.00200 | 0.00022 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-12 | 6.8 | 0.00200 | 0.00022 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-13 | 7.8 | 0.00200 | 0.00044 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-13 | 8.3 | 0.00200 | 0.00044 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-14 | 8.8 | 0.00200 | 0.00033 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-14 | 9.3 | 0.00200 | 0.00025 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-15 | 9.8 | 0.00200 | NS | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-15 | 10.3 | 0.00200 | 0.00025 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-16 | 10.8 | 0.00200 | NS | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-16 | 11.3 | 0.00200 | 0.0005 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| 608D140MW | Oct-05 | 0.0 | 0.00200 | 0.00040 J | -7.82 | -- | -- | -- | -- | -- | -- |
| | Jan-06 | 0.3 | 0.00200 | 0.00050 J | -7.60 | -- | -- | -- | -- | -- | -- |
| | Aug-06 | 0.9 | 0.00200 | 0.00060 U | -8.00 | -- | -- | -- | -- | -- | -- |
| | Apr-07 | 1.5 | 0.00200 | 0.00052 J | -7.56 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Sep-07 | 1.9 | 0.00200 | 0.00069 J | -7.28 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-08 | 2.3 | 0.00200 | 0.00043 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-08 | 2.8 | 0.00200 | 0.00030 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-09 | 3.3 | 0.00200 | 0.00030 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-09 | 3.8 | 0.00200 | 0.00030 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-10 | 4.3 | 0.00200 | 0.00028 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-10 | 4.8 | 0.00200 | 0.00028 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-11 | 5.3 | 0.00200 | 0.00022 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-11 | 5.8 | 0.00200 | 0.00045 J | -7.71 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-12 | 6.3 | 0.00200 | 0.00022 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-13 | 7.3 | 0.00200 | 0.00044 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-13 | 7.8 | 0.00200 | 0.00088 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-14 | 8.3 | 0.00200 | 0.00033 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-14 | 8.8 | 0.00200 | 0.00049 J | -7.62 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-15 | 9.3 | 0.00200 | NS | -7.62 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-15 | 9.8 | 0.00200 | .000342 J | -7.98 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-16 | 10.3 | 0.00200 | NS | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-16 | 10.8 | 0.00200 | 0.00025 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| 608D141MW | Apr-05 | 0.0 | 0.00200 | 0.00030 U | -8.00 | -- | -- | -- | -- | -- | -- |
| | Jul-05 | 0.2 | 0.00200 | 0.00030 U | -8.00 | -- | -- | -- | -- | -- | -- |
| | Oct-05 | 0.5 | 0.00200 | 0.00030 U | -8.00 | -- | -- | -- | -- | -- | -- |
| | Jan-06 | 0.8 | 0.00200 | 0.00030 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Aug-06 | 1.4 | 0.00200 | 0.00060 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Apr-07 | 2.0 | 0.00200 | 0.00020 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Sep-07 | 2.4 | 0.00200 | 0.00023 J | -8.38 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-08 | 2.8 | 0.00200 | 0.00043 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-08 | 3.3 | 0.00200 | 0.00030 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-09 | 3.8 | 0.00200 | 0.00030 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-09 | 4.3 | 0.00200 | 0.00030 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-10 | 4.8 | 0.00200 | 0.00028 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-10 | 5.3 | 0.00200 | 0.00028 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-11 | 5.8 | 0.00200 | 0.00022 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-11 | 6.3 | 0.00200 | 0.00031 J | -8.08 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-12 | 6.8 | 0.00200 | 0.00039 J | -7.85 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-13 | 7.8 | 0.00200 | 0.00044 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-13 | 8.3 | 0.00200 | 0.00044 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-14 | 8.8 | 0.00200 | 0.00033 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-14 | 9.3 | 0.00200 | 0.00025 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-15 | 9.8 | 0.00200 | NS | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-15 | 10.3 | 0.00200 | 0.00025 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-16 | 10.8 | 0.00200 | NS | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-16 | 11.3 | 0.00200 | 0.0005 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |

# Table 4-4

## Summary of Concentration vs. Time Attenuation Rate Constants
## SWMU 21 Plume
## 2016 RAER
## Former NAS Dallas, Texas
## Page 15 of 16

| Monitoring Well ID | Sampling Date | Elapsed Time (Years) | Protective Concentration Level (mg/L) | Concentration Detected (mg/L) | Natural Log of Concentration (mg/L) | Degradation Rate from Natural Log ($K_{time}$) (mg/L per year) | Minimum Degradation Rate Required for Remedial Goals Natural Log ($K_{time}$) (mg/L per year) | Minimum Degradation Rate Met? (Yes/No) | Expected Remedial Goal Concentration (mg/L) | Expected Remedial Goal Concentration Met? (Yes/No) | Remedial Goals Being Met? (Yes/No) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 608D142MW | Apr-05 | 0.0 | 0.00200 | 0.00030 U | -8.00 | -- | -- | -- | -- | -- | -- |
| | Jul-05 | 0.2 | 0.00200 | 0.00030 U | -8.00 | -- | -- | -- | -- | -- | -- |
| | Oct-05 | 0.5 | 0.00200 | 0.00030 U | -8.00 | -- | -- | -- | -- | -- | -- |
| | Jan-06 | 0.8 | 0.00200 | 0.00030 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Aug-06 | 1.4 | 0.00200 | 0.00060 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Apr-07 | 2.0 | 0.00200 | 0.00020 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Sep-07 | 2.4 | 0.00200 | 0.00022 J | -8.42 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-08 | 2.8 | 0.00200 | 0.00043 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-08 | 3.3 | 0.00200 | 0.00030 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-09 | 3.8 | 0.00200 | 0.00030 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-09 | 4.3 | 0.00200 | 0.00030 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-10 | 4.8 | 0.00200 | 0.00028 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-10 | 5.3 | 0.00200 | 0.00028 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-11 | 6.3 | 0.00200 | 0.00022 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-12 | 6.8 | 0.00200 | 0.00022 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-13 | 7.8 | 0.00200 | 0.00044 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-13 | 8.3 | 0.00200 | 0.00044 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-14 | 8.8 | 0.00200 | 0.00033 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-14 | 9.3 | 0.00200 | 0.00025 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-15 | 9.8 | 0.00200 | NS | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-15 | 10.3 | 0.00200 | 0.00025 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-16 | 10.8 | 0.00200 | NS | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-16 | 11.3 | 0.00200 | 0.00025 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| 608D143MW | May-05 | 0.0 | 0.00200 | 0.00030 U | -8.00 | -- | -- | -- | -- | -- | -- |
| | Jul-05 | 0.2 | 0.00200 | 0.00050 J | -7.60 | -- | -- | -- | -- | -- | -- |
| | Oct-05 | 0.4 | 0.00200 | 0.00050 J | -7.60 | -- | -- | -- | -- | -- | -- |
| | Jan-06 | 0.7 | 0.00200 | 0.00030 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Aug-06 | 1.3 | 0.00200 | 0.00200 UL | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Apr-07 | 1.9 | 0.00200 | 0.00067 J | -7.31 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Sep-07 | 2.4 | 0.00200 | 0.00060 J | -7.42 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-08 | 2.7 | 0.00200 | 0.00043 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-08 | 3.2 | 0.00200 | 0.00060 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-09 | 3.7 | 0.00200 | 0.00150 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-09 | 4.2 | 0.00200 | 0.00060 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-10 | 4.7 | 0.00200 | 0.00056 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-10 | 5.2 | 0.00200 | 0.00056 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-11 | 5.7 | 0.00200 | 0.00022 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-11 | 6.2 | 0.00200 | 0.00022 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-12 | 6.7 | 0.00200 | 0.00077 J | -7.17 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-13 | 7.7 | 0.00200 | 0.00088 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-13 | 8.2 | 0.00200 | 0.00140 | -6.57 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-14 | 8.7 | 0.00200 | 0.00140 | -6.57 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-14 | 9.2 | 0.00200 | 0.00111 | -6.80 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-15 | 9.7 | 0.00200 | NS | -6.80 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-15 | 10.2 | 0.00200 | 0.00088 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-16 | 10.7 | 0.00200 | NS | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-16 | 11.2 | 0.00200 | 0.00308 | -5.78 | -- | NA | NA | NA | NA | Evaluate Further |
| 608D144MW | Jul-05 | 0.0 | 0.00200 | 0.00030 U | -8.00 | -- | -- | -- | -- | -- | -- |
| | Oct-05 | 0.2 | 0.00200 | 0.00030 U | -8.00 | -- | -- | -- | -- | -- | -- |
| | Jan-06 | 0.5 | 0.00200 | 0.00030 U | -8.00 | -- | -- | -- | -- | -- | -- |
| | Aug-06 | 1.1 | 0.00200 | 0.00060 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | May-07 | 1.8 | 0.00200 | 0.00089 J | -7.02 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Sep-07 | 2.1 | 0.00200 | 0.00050 J | -7.60 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-08 | 2.5 | 0.00200 | 0.00043 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-08 | 3.0 | 0.00200 | 0.00060 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-09 | 4.0 | 0.00200 | 0.00030 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-10 | 4.5 | 0.00200 | 0.00028 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-10 | 5.0 | 0.00200 | 0.00028 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-11 | 5.5 | 0.00200 | 0.00022 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-11 | 6.0 | 0.00200 | 0.00022 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-12 | 6.5 | 0.00200 | 0.00022 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-13 | 7.5 | 0.00200 | 0.00088 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-13 | 8.0 | 0.00200 | 0.00088 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-14 | 8.5 | 0.00200 | 0.00033 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-14 | 9.0 | 0.00200 | 0.00025 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-15 | 9.5 | 0.00200 | NS | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-15 | 10.0 | 0.00200 | 0.00025 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-16 | 10.5 | 0.00200 | NS | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-16 | 11.0 | 0.00200 | 0.00025 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| 608D145MW | Jul-05 | 0.0 | 0.00200 | 0.00030 U | -8.00 | -- | -- | -- | -- | -- | -- |
| | Oct-05 | 0.2 | 0.00200 | 0.00030 U | -8.00 | -- | -- | -- | -- | -- | -- |
| | Jan-06 | 0.5 | 0.00200 | 0.00030 U | -8.00 | -- | -- | -- | -- | -- | -- |
| | Aug-06 | 1.1 | 0.00200 | 0.00060 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | May-07 | 1.8 | 0.00200 | 0.00020 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Sep-07 | 2.1 | 0.00200 | 0.00020 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-08 | 2.5 | 0.00200 | 0.00043 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-08 | 3.0 | 0.00200 | 0.00030 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-09 | 3.5 | 0.00200 | 0.00030 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-09 | 4.0 | 0.00200 | 0.00030 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-10 | 4.5 | 0.00200 | 0.00028 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-10 | 5.0 | 0.00200 | 0.00028 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-11 | 5.5 | 0.00200 | 0.00022 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-11 | 6.0 | 0.00200 | 0.00022 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-12 | 6.5 | 0.00200 | 0.00022 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-13 | 7.5 | 0.00200 | 0.00044 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-13 | 8.0 | 0.00200 | 0.00044 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-14 | 8.5 | 0.00200 | 0.00033 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-14 | 9.0 | 0.00200 | 0.00025 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-15 | 9.5 | 0.00200 | NS | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-15 | 10.0 | 0.00200 | 0.00025 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-16 | 10.5 | 0.00200 | NS | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-16 | 11.0 | 0.00200 | 0.00025 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |

# Table 4-4

## Summary of Concentration vs. Time Attenuation Rate Constants
## SWMU 21 Plume
## 2016 RAER
## Former NAS Dallas, Texas
## Page 16 of 16

| Monitoring Well ID | Sampling Date | Elapsed Time (Years) | Protective Concentration Level (mg/L) | Concentration Detected (mg/L) | Natural Log of Concentration (mg/L) | Degradation Rate from Natural Log ($K_{time}$) (mg/L per year) | Minimum Degradation Rate Required for Remedial Goals Natural Log ($K_{time}$) (mg/L per year) | Minimum Degradation Rate Met? (Yes/No) | Expected Remedial Goal Concentration (mg/L) | Expected Remedial Goal Concentration Met? (Yes/No) | Remedial Goals Being Met? (Yes/No) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 608D146MW | Jul-05 | 0.0 | 0.00200 | 0.00030 U | -8.00 | -- | -- | -- | -- | -- | -- |
| | Oct-05 | 0.2 | 0.00200 | 0.00030 U | -8.00 | -- | -- | -- | -- | -- | -- |
| | Jan-06 | 0.5 | 0.00200 | 0.00030 U | -8.00 | -- | -- | -- | -- | -- | -- |
| | Aug-06 | 1.1 | 0.00200 | 0.00060 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | May-07 | 1.8 | 0.00200 | 0.00068 J | -7.29 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Sep-07 | 2.1 | 0.00200 | 0.00075 J | -7.20 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-08 | 2.5 | 0.00200 | 0.00043 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-08 | 3.0 | 0.00200 | 0.00060 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-09 | 3.5 | 0.00200 | 0.00060 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-09 | 4.0 | 0.00200 | 0.00060 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-10 | 4.5 | 0.00200 | 0.00056 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-10 | 5.0 | 0.00200 | 0.00056 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-11 | 5.5 | 0.00200 | 0.00044 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-11 | 6.0 | 0.00200 | 0.00027 J | -8.22 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-12 | 6.5 | 0.00200 | 0.00022 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-13 | 7.5 | 0.00200 | 0.00088 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-13 | 8.0 | 0.00200 | 0.00088 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-14 | 8.5 | 0.00200 | 0.00033 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-14 | 9.0 | 0.00200 | 0.0005 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-15 | 9.5 | 0.00200 | NS | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-15 | 10.0 | 0.00200 | 0.0005 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-16 | 10.5 | 0.00200 | NS | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-16 | 11.0 | 0.00200 | 0.0005 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| 608D162MW | Jan-14 | 0.0 | 0.00200 | 0.00033 U | -8.00 | -- | -- | -- | -- | -- | -- |
| | Jul-14 | 0.5 | 0.00200 | 0.00025 U | -8.00 | -- | -- | -- | -- | -- | -- |
| | Jan-15 | 1.0 | 0.00200 | NS | -8.00 | -- | -- | -- | -- | -- | -- |
| | Jul-15 | 1.5 | 0.00200 | 0.00025 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-16 | 2.0 | 0.00200 | NS | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-16 | 2.5 | 0.00200 | 0.00025 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| 608D163MW | Jan-14 | 0.0 | 0.00200 | 0.00033 U | -8.00 | -- | -- | -- | -- | -- | -- |
| | Jul-14 | 0.5 | 0.00200 | 0.00025 U | -8.00 | -- | -- | -- | -- | -- | -- |
| | Jan-15 | 1.0 | 0.00200 | NS | -8.00 | -- | -- | -- | -- | -- | -- |
| | Jul-15 | 1.5 | 0.00200 | 0.00025 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-16 | 2.0 | 0.00200 | NS | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-16 | 2.5 | 0.00200 | 0.00025 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |

mg/L - milligrams per liter
NA - Not Applicable
NS - Not Sampled

Notes:
Shaded areas indicate an exceedance.
For graphing purposes non-detect concentrations have been assigned a natural log value of -8.

Analytical Result Qualifiers:
J - Indicates that the chemical was detected. However, the associated numerical result may not be a precise representation of the amount that is actually present in the sample. The laboratory reported concentration is considered to be an estimate of the true concentration.
U - Indicates that the chemical was not detected at the numerical detection limit (sample-specific quantitation limit) noted. Nondetected results from the laboratory are reported in this manner. This qualifier is added to a positive result (reported by the laboratory) if the detected concentration is determined to be attributable to contamination introduced during field sampling or laboratory analysis.

# TABLE 4-5
# SUMMARY OF CONCENTRATION vs. DISTANCE ATTENUATION RATE CONSTANTS

# Table 4-5

## Summary of Concentration vs. Distance Attenuation Rate Constants
## SWMU 21 Plume
## 2016 RAER
## Former NAS Dallas, Texas
## Page 1 of 3

| Sampling Date | Protective Concentration Levels (mg/L) | Detected Concentration (mg/L) | | | | | Natural Log of COC Concentration (mg/L) | | | | | $K_{dist}$ [(mg/L) per foot] |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Centerline Monitoring Wells** | | **608D32MW** | **608D140MW** | **60606MW** | **608D146MW** | **608D147MW** | **608D32MW** | **608D140MW** | **60606MW** | **608D146MW** | **608D147MW** | |
| **Distance from source (ft)** | | **52** | **261** | **484** | **605** | **739** | **52** | **261** | **484** | **605** | **739** | |
| **Trichloroethene** | | | | | | | | | | | | |
| Dec-95 | **0.00500** | -- | -- | 0.00500 U | -- | -- | -- | -- | -8.00 | -- | -- | -- |
| May-98 | **0.00500** | 0.17000 | -- | NS | -- | -- | -1.77 | -- | -- | -- | -- | -- |
| Aug-98 | **0.00500** | 0.15000 | -- | NS | -- | -- | -1.90 | -- | -- | -- | -- | -- |
| Apr-99 | **0.00500** | 0.19000 | -- | NS | -- | -- | -1.66 | -- | -- | -- | -- | -- |
| Oct-99 | **0.00500** | 0.17000 | -- | 0.00190 J | -- | -- | -1.77 | -- | -6.27 | -- | -- | -0.0104 |
| Jul-00 | **0.00500** | 0.18000 | -- | 0.00220 J | -- | -- | -1.71 | -- | -6.12 | -- | -- | -0.0102 |
| Jun-01 | **0.00500** | 0.25000 | -- | 0.00440 J | -- | -- | -1.39 | -- | -5.43 | -- | -- | -0.0094 |
| Jan-03 | **0.00500** | 0.19000 | -- | 0.00740 | -- | -- | -1.66 | -- | -4.91 | -- | -- | -0.0075 |
| Aug-03 | **0.00500** | 0.23000 | -- | 0.01900 | -- | -- | -1.47 | -- | -3.96 | -- | -- | -0.0058 |
| Dec-03 | **0.00500** | 0.18000 J | -- | 0.01600 | -- | -- | -1.71 | -- | -4.14 | -- | -- | -0.0056 |
| Jul-04 | **0.00500** | 0.14000 | -- | 0.02800 | -- | -- | -1.97 | -- | -3.58 | -- | -- | -0.0037 |
| Oct-04 | **0.00500** | 0.09300 | -- | 0.02800 | -- | -- | -2.38 | -- | -3.58 | -- | -- | -0.0028 |
| Apr-05 | **0.00500** | 0.16000 | 0.13000 | 0.05200 | -- | 0.00030 U | -1.83 | -2.04 | -2.96 | -- | -8.00 | -0.0087 |
| Aug-05 | **0.00500** | NS | 0.11000 | NS | 0.11001 | 0.00030 U | -- | -2.21 | -- | -2.21 | -8.00 | -0.0097 |
| Oct-05 | **0.00500** | 0.16000 | 0.12000 | 0.02000 | 0.08300 | 0.00030 U | -1.83 | -2.12 | -3.91 | -2.49 | -8.00 | -0.0070 |
| Jan-06 | **0.00500** | 0.01800 | 0.13000 | 0.01600 | 0.05100 | 0.00030 U | -4.02 | -2.04 | -8.00 | -2.98 | -8.00 | -0.0053 |
| Aug-06 | **0.00500** | NS | 0.15000 | 0.01400 | 0.15000 | 0.00040 U | -- | -1.90 | -4.27 | -1.90 | -8.00 | -0.0100 |
| Apr-07 | **0.00500** | 0.09600 | 0.12000 | 0.02500 | 0.15000 | 0.00023 U | -2.34 | -2.12 | -3.69 | -1.90 | -8.00 | -0.0060 |
| Aug-07 | **0.00500** | 0.13000 | 0.17000 | 0.04800 | 0.16000 | 0.00023 U | -2.04 | -1.77 | -3.04 | -1.83 | -8.00 | -0.0064 |
| Jan-08 | **0.00500** | 0.13000 | 0.07600 | 0.04100 | 0.15000 | 0.00053 U | -2.04 | -2.58 | -3.19 | -1.90 | -8.00 | -0.0060 |
| Jul-08 | **0.00500** | 0.09690 | 0.06230 | 0.03660 | 0.17000 | 0.00032 U | -2.33 | -2.78 | -3.31 | -1.77 | -8.00 | -0.0055 |
| Jan-09 | **0.00500** | 0.08730 | 0.02050 | 0.03050 | 0.16200 | 0.00032 U | -2.44 | -3.89 | -3.49 | -1.82 | -8.00 | -0.0048 |
| Jul-09 | **0.00500** | 0.12400 | 0.11300 | 0.03910 | 0.15700 | 0.00032 U | -2.09 | -2.18 | -3.24 | -1.85 | -8.00 | -0.0061 |
| Jan-10 | **0.00500** | 0.09090 | 0.09970 | 0.04920 | 0.15300 | -- | -2.40 | -2.31 | -3.01 | -1.88 | -- | 0.0002 |
| Jul-10 | **0.00500** | 0.14500 | 0.08910 | 0.03510 | 0.19200 | -- | -1.93 | -2.42 | -3.35 | -1.65 | -- | -0.0004 |
| Jan-11 | **0.00500** | 0.13300 | 0.01920 | NS | 0.18600 | 0.00026 U | -2.02 | -3.95 | -- | -1.68 | -8.00 | -0.0053 |
| Jul-11 | **0.00500** | 0.12200 | 0.10700 | 0.02780 | 0.17200 | 0.00026 U | -2.10 | -2.23 | -3.58 | -1.76 | -8.00 | -0.0061 |
| Jan-12 | **0.00500** | 0.09440 | 0.04740 | 0.02130 | 0.17900 | 0.00026 U | -2.36 | -3.05 | -3.85 | -1.72 | -8.00 | -0.0054 |
| Jul-12 | **0.00500** | 0.08520 | 0.09680 | 0.01990 | 0.16100 | 0.00026 U | -2.46 | -2.34 | -3.92 | -8.00 | -8.00 | -0.0093 |
| Jan-13 | **0.00500** | 0.00900 | 0.00410 | 0.01350 | 0.13200 | 0.00031 U | -4.71 | -5.50 | -4.31 | -2.02 | -8.00 | -0.0013 |
| Jul-13 | **0.00500** | 0.11300 | 0.10400 | 0.00031 U | 0.12000 | 0.00031 U | -2.18 | -2.26 | -8.00 | -2.12 | -8.00 | -0.0070 |
| Jan-14 | **0.00500** | 0.0012 J | 0.00150 | 0.01360 | 0.11200 | 0.00030 U | -6.73 | -6.50 | -4.30 | -2.19 | -8.00 | 0.0017 |
| Jul-14 | **0.00500** | 0.10500 | 0.06000 | 0.01620 | 0.11500 | 0.0005 U | -2.25 | -2.81 | -4.12 | -2.16 | -8.00 | -0.0059 |
| Jan-15 | **0.00500** | 0.02200 | 0.00405 | 0.01670 | 0.08480 | 0.00025 U | -2.76 | -5.51 | -4.09 | -2.47 | -8.00 | -0.0040 |
| Jul-15 | **0.00500** | 0.10100 | 0.00944 | 0.03360 | 0.15000 | 0.00025 U | -2.29 | -4.66 | -3.39 | -1.90 | -8.00 | -0.0046 |
| Jan-16 | **0.00500** | 0.00236 | 0.0005 U | 0.04690 | 0.14500 | 0.00025 U | -2.76 | -5.51 | -4.09 | -2.47 | -8.00 | -0.0040 |
| Jul-16 | **0.00500** | 0.10000 | 0.00025 U | 0.04880 | 0.13900 | 0.00025 U | -2.29 | -4.66 | -3.39 | -1.90 | -8.00 | -0.0046 |

# Table 4-5

## Summary of Concentration vs. Distance Attenuation Rate Constants
## SWMU 21 Plume
## 2016 RAER
## Former NAS Dallas, Texas
## Page 2 of 3

| Sampling Date | Protective Concentration Levels (mg/L) | Detected Concentration (mg/L) | | | | | Natural Log of COC Concentration (mg/L) | | | | | $K_{dist}$ [(mg/L) per foot] |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Centerline Monitoring Wells** | | **608D32MW** | **608D140MW** | **60606MW** | **608D146MW** | **608D147MW** | **608D32MW** | **608D140MW** | **60606MW** | **608D146MW** | **608D147MW** | |
| **Distance from source (ft)** | | **52** | **261** | **484** | **605** | **739** | **52** | **261** | **484** | **605** | **739** | |
| **cis-1,2-Dichloroethene** | | | | | | | | | | | | |
| Dec-95 | **0.07000** | -- | -- | 0.00500 U | -- | -- | -- | -- | -8.00 | -- | -- | -- |
| May-98 | **0.07000** | 0.00800 | -- | NS | -- | -- | -4.83 | -- | -- | -- | -- | -- |
| Aug-98 | **0.07000** | 0.00900 | -- | NS | -- | -- | -4.71 | -- | -- | -- | -- | -- |
| Apr-99 | **0.07000** | 0.00860 | -- | NS | -- | -- | -4.76 | -- | -- | -- | -- | -- |
| Oct-99 | **0.07000** | 0.01000 | -- | 0.00045 J | -- | -- | -4.61 | -- | -7.71 | -- | -- | -0.0072 |
| Jul-00 | **0.07000** | 0.00820 J | -- | 0.00054 J | -- | -- | -4.80 | -- | -7.52 | -- | -- | -0.0063 |
| Jun-01 | **0.07000** | 0.01100 | -- | 0.00170 J | -- | -- | -4.51 | -- | -6.38 | -- | -- | -0.0043 |
| Jan-03 | **0.07000** | 0.00750 J | -- | 0.00120 | -- | -- | -4.89 | -- | -6.73 | -- | -- | -0.0042 |
| Aug-03 | **0.07000** | 0.01100 | -- | 0.00320 | -- | -- | -4.51 | -- | -5.74 | -- | -- | -0.0029 |
| Dec-03 | **0.07000** | 0.00880 | -- | 0.00260 | -- | -- | -1.71 | -- | -5.95 | -- | -- | -0.0098 |
| Jul-04 | **0.07000** | 0.00960 | -- | 0.00300 | -- | -- | -4.92 | -- | -5.81 | -- | -- | -0.0021 |
| Oct-04 | **0.07000** | 0.00730 | -- | 0.00400 | -- | -- | -4.92 | -- | -5.52 | -- | -- | -0.0014 |
| Apr-05 | **0.07000** | 0.01400 | 0.00900 | 0.00600 | -- | 0.00030 U | -4.27 | -4.71 | -5.12 | -- | -8.00 | -0.0052 |
| Aug-05 | **0.07000** | NS | 0.01000 | NS | 0.01500 | 0.00030 U | -- | -4.61 | -- | -4.20 | -8.00 | -0.0055 |
| Oct-05 | **0.07000** | 0.01100 J | 0.01400 | 0.00200 | 0.01100 | 0.00030 U | -4.51 | -4.27 | -6.21 | -4.51 | -8.00 | -0.0041 |
| Jan-06 | **0.07000** | 0.01200 | 0.01400 | 0.00200 | 0.00900 | 0.00030 U | -4.42 | -4.27 | -8.00 | -4.71 | -8.00 | -0.0046 |
| Aug-06 | **0.07000** | NS | 0.01400 | 0.00100 | 0.01700 J | 0.00050 U | -- | -4.27 | -6.91 | -4.07 | -8.00 | -0.0056 |
| Apr-07 | **0.07000** | 0.00700 | 0.01400 | 0.00260 | 0.01600 | 0.00014 U | -4.96 | -4.27 | -5.95 | -4.14 | -8.00 | -0.0032 |
| Aug-07 | **0.07000** | 0.00690 | 0.14000 | 0.00310 | 0.01800 | 0.00014 U | -4.98 | -1.97 | -5.78 | -4.02 | -8.00 | -0.0044 |
| Jan-08 | **0.07000** | 0.00860 | 0.02300 | 0.00260 | 0.01600 | 0.00032 U | -4.76 | -3.77 | -5.95 | -4.14 | -8.00 | -0.0038 |
| Jul-08 | **0.07000** | 0.01060 | 0.05800 | 0.00260 | 0.01540 | 0.00020 U | -4.55 | -2.85 | -5.95 | -4.17 | -8.00 | -0.0046 |
| Jan-09 | **0.07000** | 0.01540 | 0.08280 | 0.00200 | 0.01380 | 0.00020 U | -4.17 | -2.49 | -6.21 | -4.28 | -8.00 | -0.0053 |
| Jul-09 | **0.07000** | 0.00710 | 0.02920 | 0.00250 | 0.01430 | 0.00020 U | -4.95 | -3.53 | -5.99 | -4.25 | -8.00 | -0.0037 |
| Jan-10 | **0.07000** | 0.03580 | 0.07110 | 0.00320 | 0.01450 | -- | -3.33 | -2.64 | -5.74 | -4.23 | -- | -0.0034 |
| Jul-10 | **0.07000** | 0.02030 | 0.02480 | 0.00260 | 0.01980 | -- | -3.90 | -3.70 | -5.95 | -3.92 | -- | -0.0017 |
| Jan-11 | **0.07000** | 0.01300 | 0.09920 | NS | 0.01480 | 0.00026 U | -4.98 | -2.31 | -- | -4.21 | -8.00 | -0.0042 |
| Jul-11 | **0.07000** | 0.01230 | 0.01990 | 0.00170 | 0.01880 | 0.00026 U | -4.40 | -3.92 | -6.38 | -3.97 | -8.00 | -0.0041 |
| Jan-12 | **0.07000** | 0.05520 | 0.04450 | 0.00190 | 0.01900 | 0.00026 U | -2.90 | -3.11 | -6.27 | -3.96 | -8.00 | -0.0064 |
| Jul-12 | **0.07000** | 0.05560 | 0.04060 | 0.00160 | 0.01750 | 0.00026 U | -2.89 | -3.20 | -6.44 | -4.05 | -8.00 | -0.0065 |
| Jan-13 | **0.07000** | 0.12400 | 0.09750 | 0.01500 | 0.01100 | 0.00024 U | -2.09 | -2.33 | -4.20 | -4.51 | -8.00 | -0.0078 |
| Jul-13 | **0.07000** | 0.04040 | 0.02760 | 0.00024 U | 0.01610 | 0.00024 U | -3.21 | -3.59 | -8.00 | -4.13 | -8.00 | -0.0062 |
| Jan-14 | **0.07000** | 0.12200 | 0.09910 | 0.00150 | 0.01580 | 0.00033 U | -2.10 | -2.31 | -6.50 | -4.15 | -8.00 | -0.0080 |
| Jul-14 | **0.07000** | 0.07840 | 0.09290 | 0.00155 | 0.0137 | 0.0005 U | -2.55 | -2.38 | -6.47 | -4.29 | -8.00 | -0.0075 |
| Jan-15 | **0.07000** | 0.11100 | 0.08940 | 0.00181 | 0.0111 | 0.00025 U | -5.61 | -2.41 | -6.31 | -4.50 | -8.00 | -0.0037 |
| Jul-15 | **0.07000** | 0.07480 | 0.09490 | 0.00207 | 0.01670 | 0.00025 U | -2.59 | -2.35 | -6.18 | -4.09 | -8.00 | -0.0073 |
| Jan-16 | **0.07000** | 0.0798 | 0.00487 | 0.00315 | 0.0146 | NS | -5.61 | -2.41 | -6.31 | -4.50 | -8.00 | -0.0037 |
| Jul-16 | **0.07000** | 0.0336 | 0.0245 | 0.00369 | 0.0146 | 0.001 U | -2.59 | -2.35 | -6.18 | -4.09 | -8.00 | -0.0073 |

# Table 4-5

## Summary of Concentration vs. Distance Attenuation Rate Constants
## SWMU 21 Plume
## 2016 RAER
## Former NAS Dallas, Texas
## Page 3 of 3

| Sampling Date | Protective Concentration Levels (mg/L) | Detected Concentration (mg/L) | | | | | Natural Log of COC Concentration (mg/L) | | | | | $K_{dist}$ [(mg/L) per foot] |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Centerline Monitoring Wells** | | **608D32MW** | **608D140MW** | **60606MW** | **608D146MW** | **608D147MW** | **608D32MW** | **608D140MW** | **60606MW** | **608D146MW** | **608D147MW** | |
| **Distance from source (ft)** | | **52** | **261** | **484** | **605** | **739** | **52** | **261** | **484** | **605** | **739** | |
| **Vinyl Chloride** | | | | | | | | | | | | |
| Dec-95 | **0.00200** | -- | -- | 0.01000 U | -- | -- | -- | -- | -8.00 | -- | -- | -- |
| May-98 | **0.00200** | 0.00500 U | -- | NS | -- | -- | -8.00 | -- | -- | -- | -- | -- |
| Aug-98 | **0.00200** | 0.00500 U | -- | NS | -- | -- | -8.00 | -- | -- | -- | -- | -- |
| Apr-99 | **0.00200** | 0.00500 U | -- | NS | -- | -- | -8.00 | -- | -- | -- | -- | -- |
| Oct-99 | **0.00200** | 0.00720 U | -- | 0.00500 U | -- | -- | -8.00 | -- | -8.00 | -- | -- | 0.0000 |
| Jul-00 | **0.00200** | 0.00830 U | -- | 0.00500 U | -- | -- | -8.00 | -- | -8.00 | -- | -- | 0.0000 |
| Jun-01 | **0.00200** | 0.02000 U | -- | 0.01000 U | -- | -- | -8.00 | -- | -8.00 | -- | -- | 0.0000 |
| Jan-03 | **0.00200** | 0.01000 U | -- | 0.00100 U | -- | -- | -8.00 | -- | -8.00 | -- | -- | 0.0000 |
| Aug-03 | **0.00200** | 0.00260 U | -- | 0.00026 U | -- | -- | -8.00 | -- | -8.00 | -- | -- | 0.0000 |
| Dec-03 | **0.00200** | 0.00098 U | -- | 0.00017 U | -- | -- | -8.00 | -- | -8.00 | -- | -- | 0.0000 |
| Jul-04 | **0.00200** | 0.00170 U | -- | 0.00017 U | -- | -- | -8.00 | -- | -8.00 | -- | -- | 0.0000 |
| Oct-04 | **0.00200** | 0.00084 U | -- | 0.00017 U | -- | -- | -8.00 | -- | -8.00 | -- | -- | 0.0000 |
| Apr-05 | **0.00200** | 0.00030 U | 0.00030 U | 0.00030 U | -- | 0.00030 U | -8.00 | -8.00 | -8.00 | -- | -8.00 | 0.0000 |
| Aug-05 | **0.00200** | NS | 0.00050 J | NS | 0.00030 U | 0.00030 U | -- | -8.00 | -- | -8.00 | -8.00 | 0.0000 |
| Oct-05 | **0.00200** | 0.00030 U | 0.00040 J | 0.00030 U | 0.00030 U | 0.00030 U | -8.00 | -7.82 | -8.00 | -8.00 | -8.00 | -0.0001 |
| Jan-06 | **0.00200** | 0.00300 U | 0.00050 J | 0.00060 U | 0.00030 U | 0.00030 U | -8.00 | -7.60 | -8.00 | -8.00 | -8.00 | -0.0002 |
| Aug-06 | **0.00200** | NS | 0.00060 U | 0.00060 U | 0.00060 U | 0.00060 U | -- | -8.00 | -8.00 | -8.00 | -8.00 | 0.0000 |
| Apr-07 | **0.00200** | 0.00060 U | 0.00052 J | 0.00020 U | 0.00068 J | 0.00020 U | -8.00 | -7.56 | -8.00 | -7.29 | -8.00 | 0.0002 |
| Aug-07 | **0.00200** | 0.00023 J | 0.00069 J | 0.00019 U | 0.00075 J | 0.00020 U | -8.38 | -7.28 | -8.00 | -7.20 | -8.00 | 0.0005 |
| Jan-08 | **0.00200** | 0.00043 U | 0.00043 U | 0.00043 U | 0.00043 U | 0.00043 U | -8.00 | -8.00 | -8.00 | -8.00 | -8.00 | 0.0000 |
| Jul-08 | **0.00200** | 0.00060 U | 0.00030 U | 0.00030 U | 0.00060 U | 0.00030 U | -8.00 | -8.00 | -8.00 | -8.00 | -8.00 | 0.0000 |
| Jan-09 | **0.00200** | 0.00030 U | 0.00030 U | 0.00030 U | 0.00060 U | 0.00030 U | -8.00 | -8.00 | -8.00 | -8.00 | -8.00 | 0.0000 |
| Jul-09 | **0.00200** | 0.00060 U | 0.00030 U | 0.00030 U | 0.00060 U | 0.00021 U | -8.00 | -8.00 | -8.00 | -8.00 | -8.00 | 0.0000 |
| Jan-10 | **0.00200** | 0.00028 U | 0.00028 U | 0.00028 U | 0.00056 U | -- | -8.00 | -8.00 | -8.00 | -8.00 | -- | 0.0000 |
| Jul-10 | **0.00200** | 0.00028 U | 0.00028 U | 0.00028 U | 0.00056 U | -- | -8.00 | -8.00 | -8.00 | -8.00 | -- | 0.0000 |
| Jan-11 | **0.00200** | 0.00044 U | 0.00022 U | NS | 0.00044 U | 0.00020 U | -8.00 | -8.00 | -- | -8.00 | -8.00 | 0.0000 |
| Jul-11 | **0.00200** | 0.00022 U | 0.00045 J | 0.00022 U | 0.00027 J | 0.00002 U | -8.00 | -7.71 | -8.00 | -8.22 | -8.00 | -0.0003 |
| Jan-12 | **0.00200** | 0.00022 U | 0.00022 U | 0.00022 U | 0.00022 U | 0.00022 U | -8.00 | -8.00 | -8.00 | -8.00 | -8.00 | 0.0000 |
| Jul-12 | **0.00200** | NS | NS | NS | NS | NS | -- | -- | -- | -- | -- | 0.0000 |
| Jan-13 | **0.00200** | 0.00088 U | 0.00044 U | 0.00044 U | 0.00088 U | 0.00044 U | -8.00 | -8.00 | -8.00 | -8.00 | -8.00 | 0.0000 |
| Jul-13 | **0.00200** | 0.00088 U | 0.00088 U | 0.00044 U | 0.00088 U | 0.00044 U | -8.00 | -8.00 | -8.00 | -8.00 | -8.00 | 0.0000 |
| Jan-14 | **0.00200** | 0.00065 U | 0.00033 U | 0.00033 U | 0.00033 U | 0.00033 U | -8.00 | -8.00 | -8.00 | -8.00 | -8.00 | 0.0000 |
| Jul-14 | **0.00200** | 0.00025 U | 0.00049 J | 0.00025 U | 0.0005 U | 0.0005 U | -8.00 | -7.62 | -8.00 | -8.00 | -8.00 | -0.0002 |
| Jan-15 | **0.00200** | NS | NS | 0.00025 U | NS | NS | -- | -- | -8.00 | -- | -- | #DIV/0! |
| Jul-15 | **0.00200** | 0.00025 U | .000342 J | 0.00025 U | 0.0005 U | 0.0005 U | -8.00 | -8.00 | -8.00 | -8.00 | -8.00 | 0.0000 |
| Jan-16 | **0.00200** | NS | NS | NS | NS | NS | -- | -- | -8.00 | -- | -- | #DIV/0! |
| Jul-16 | **0.00200** | 0.0005 U | 0.00025 U | 0.00025 U | 0.0005 U | 0.0005 U | -8.00 | -8.00 | -8.00 | -8.00 | -8.00 | 0.0000 |

ft - feet
mg/L - milligrams per liter
NA - Not Applicable
NS - Not Sampled

Notes:
Shaded areas indicate an exceedance.
For graphing purposes non-detect concentrations and estimated concentrations below 0.0003 mg/L have been assigned a natural log value of -8.
Analytical Result Qualifiers:
J - Indicates that the chemical was detected. However, the associated numerical result may not be a precise representation of the amount that is actually present in the sample. The laboratory reported concentration is considered to be an estimate of the true concentration.
U - Indicates that the chemical was not detected at the numerical detection limit (sample-specific quantitation limit) noted. Nondetected results from the laboratory are reported in this manner. This qualifier is added to a positive result (reported by the laboratory) if the detected concentration is determined to be attributable to contamination introduced during field sampling or laboratory analysis.

# Plug and Abandonment Documentation

# STATE OF TEXAS PLUGGING REPORT for Tracking #158491

| | | | |
|---|---|---|---|
| Owner: | **NAS Dallas** | Owner Well #: | **608D34MW** |
| Address: | **8100 West Jefferson<br>Grand Prairie, TX 75051** | Grid #: | **33-17-1** |
| Well Location: | **8100 West Jefferson<br>Grand Prairie, TX 75051** | Latitude: | **32° 44' 25.8" N** |
| | | Longitude: | **096° 57' 46.3" W** |
| Well County: | **Dallas** | Elevation: | **No Data** |
| Well Type: | **Monitor** | | |

*Drilling Information*

| | | | |
|---|---|---|---|
| Company: | **No Data** | Date Drilled: | **No Data** |
| Driller: | **No Data** | License Number: | **No Data** |

| | *Diameter (in.)* | *Top Depth (ft.)* | *Bottom Depth (ft.)* |
|---|---|---|---|
| Borehole: | | **0** | **28** |

*Plugging Information*

Date Plugged: **4/4/2016** Plugger:

Plug Method: **Pour in 3/8 bentonite chips when standing water in well is less than 100 feet depth, cement top 2 feet**

Casing Left in Well:

**No Data**

Plug(s) Placed in Well:

| *Top (ft.)* | *Bottom (ft.)* | *Description (number of sacks & material)* |
|---|---|---|
| **0** | **2** | **Cement 2 Bags/Sacks** |
| **2** | **28** | **Bentonite 3 Bags/Sacks** |

Certification Data: The driller certified that the driller plugged this well (or the well was plugged under the driller's direct supervision) and that each and all of the statements herein are true and correct. The driller understood that failure to complete the required items will result in the reports(s) being returned for completion and resubmittal.

Company Information: **Strata Core Services, LLC**

**112 S. Norwood Drive**
**Hurst, TX 76053**

Driller Name: **Brad Eskue** License Number: **58164**

Comments: **No Data**

# STATE OF TEXAS PLUGGING REPORT for Tracking #158490

| | | | |
|---|---|---|---|
| Owner: | **NAS Dallas** | Owner Well #: | **608D147MW** |
| Address: | **8100 West Jefferson<br>Grand Prairie, TX** | Grid #: | **33-17-1** |
| Well Location: | **8100 West Jefferson<br>Grand Prairie, TX** | Latitude: | **32° 44' 25.8" N** |
| | | Longitude: | **096° 57' 46.3" W** |
| Well County: | **Dallas** | Elevation: | **No Data** |
| Well Type: | **Monitor** | | |

*Drilling Information*

| | | | |
|---|---|---|---|
| Company: | **No Data** | Date Drilled: | **No Data** |
| Driller: | **No Data** | License Number: | **No Data** |

| | *Diameter (in.)* | *Top Depth (ft.)* | *Bottom Depth (ft.)* |
|---|---|---|---|
| Borehole: | | **0** | **19** |

*Plugging Information*

Date Plugged: **4/5/2016** Plugger:

Plug Method: **Pour in 3/8 bentonite chips when standing water in well is less than 100 feet depth, cement top 2 feet**

Casing Left in Well:

**No Data**

Plug(s) Placed in Well:

| *Top (ft.)* | *Bottom (ft.)* | *Description (number of sacks & material)* |
|---|---|---|
| **0** | **2** | **Cement 2 Bags/Sacks** |
| **2** | **19** | **Bentonite 2 Bags/Sacks** |

Certification Data: The driller certified that the driller plugged this well (or the well was plugged under the driller's direct supervision) and that each and all of the statements herein are true and correct. The driller understood that failure to complete the required items will result in the reports(s) being returned for completion and resubmittal.

Company Information: **Strata Core Services, LLC**

**112 S. Norwood Drive**
**Hurst, TX 76053**

Driller Name: **Brad Eskue** License Number: **58164**

Comments: **No Data**

# STATE OF TEXAS PLUGGING REPORT for Tracking #158489

| | | | |
|---|---|---|---|
| Owner: | **NAS Dallas** | Owner Well #: | **608D131MW** |
| Address: | **8100 West Jefferson<br>Grand Prairie, TX 75051** | Grid #: | **33-17-1** |
| Well Location: | **8100 West Jefferson<br>Grand Prairie, TX 75051** | Latitude: | **32° 44' 25.8" N** |
| | | Longitude: | **096° 57' 46.3" W** |
| Well County: | **Dallas** | Elevation: | **No Data** |
| Well Type: | **Monitor** | | |

*Drilling Information*

| | | | |
|---|---|---|---|
| Company: | **No Data** | Date Drilled: | **No Data** |
| Driller: | **No Data** | License Number: | **No Data** |

| | *Diameter (in.)* | *Top Depth (ft.)* | *Bottom Depth (ft.)* |
|---|---|---|---|
| Borehole: | | **0** | **20** |

*Plugging Information*

Date Plugged: **4/4/2016** Plugger:

Plug Method: **Pour in 3/8 bentonite chips when standing water in well is less than 100 feet depth, cement top 2 feet**

Casing Left in Well:

**No Data**

Plug(s) Placed in Well:

| *Top (ft.)* | *Bottom (ft.)* | *Description (number of sacks & material)* |
|---|---|---|
| **0** | **2** | **Cement 2 Bags/Sacks** |
| **2** | **20** | **Bentonite 2 Bags/Sacks** |

Certification Data: The driller certified that the driller plugged this well (or the well was plugged under the driller's direct supervision) and that each and all of the statements herein are true and correct. The driller understood that failure to complete the required items will result in the reports(s) being returned for completion and resubmittal.

Company Information: **Strata Core Services, LLC**

**112 S. Norwood Drive**
**Hurst, TX 76053**

Driller Name: **Brad Eskue** License Number: **58164**

Comments: **No Data**

# APPENDIX 5
# SAMPLING PROCEDURES

Sampling collection and handling procedures were updated to follow Uniform Federal Policy (UFP) for Sample and Analysis Plans in the document titled, Tier II Sampling and Analysis Plan, Long Term Groundwater Monitoring Plan, Former Naval Air Station Dallas, Dallas, Texas, dated December 2014.

# APPENDIX 6
# LABORATORY DATA PACKAGES AND DATA USABILITY SUMMARIES

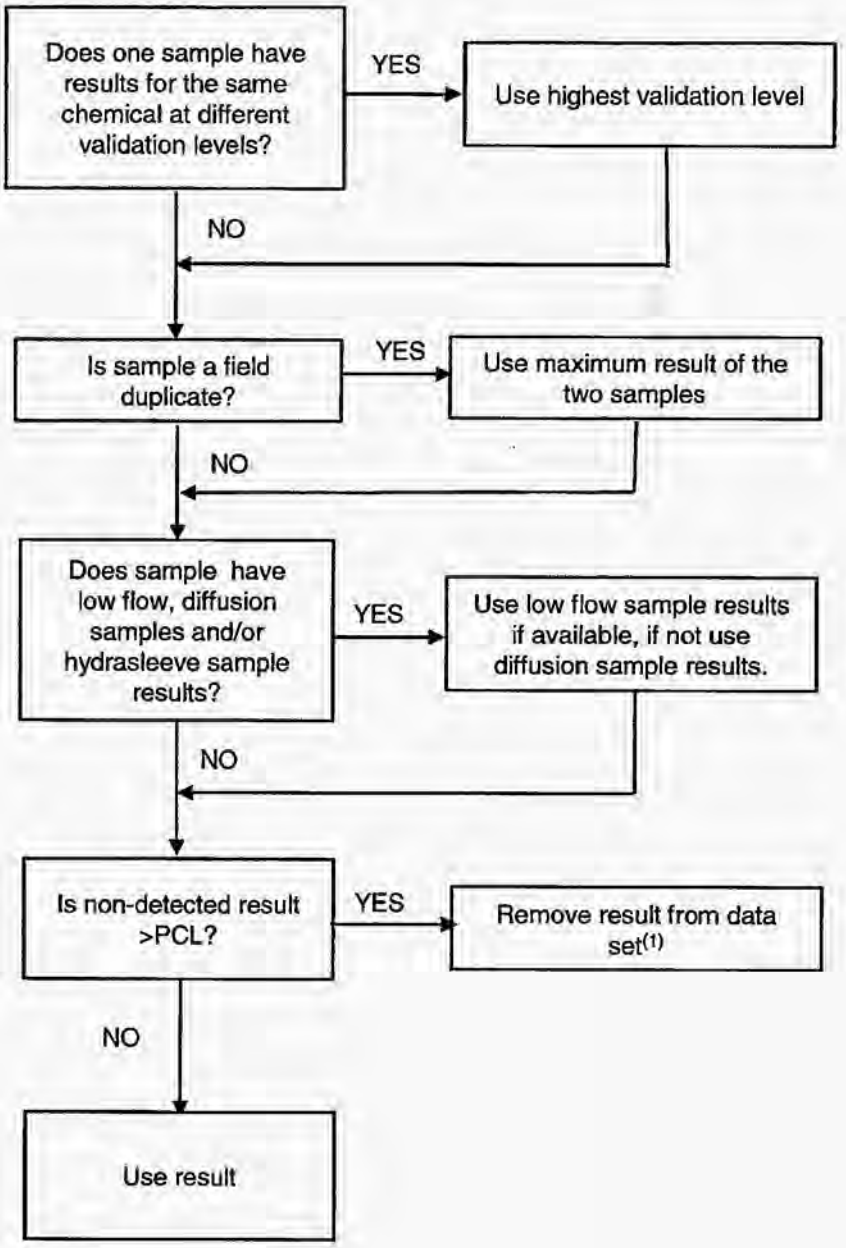
See the attached CD for the Laboratory Analytical Reports —
submitted with the 2016 RAER for SWMU 17/Building 1423
(sorted by Sample Delivery Group Number)

# APPENDIX 7
# STATISTICAL METHODOLOGY

Statistical Methodology has been submitted with the 2016 RAER for SWMU 17/Building 1423

GROUNDWATER DATABASE DEVELOPMENT FOR GRAPHING AND MANN KENDALL STATISTICAL EVALUATION

NAS DALLAS, TEXAS




NOTES:

(1) For 1,1,2,2-PCA and vinyl chloride the TRRP RES A limit < MDL of 5 U therefore only the non-detects > 5 U were removed from the data set.

# STDEV

See Also

Estimates standard deviation based on a sample. The standard deviation is a measure of how widely values are dispersed from the average value (the mean).

**Syntax**

**STDEV(number1**,number2,...)

Number1, number2, ... are 1 to 30 number arguments corresponding to a sample of a population. You can also use a single array or a reference to an array instead of arguments separated by commas.

**Remarks**

- STDEV assumes that its arguments are a sample of the population. If your data represents the entire population, then compute the standard deviation using STDEVP.
- The standard deviation is calculated using the "nonbiased" or "n-1" method.
- STDEV uses the following formula:
- $$\sqrt{\frac{n\sum x^2 - \left(\sum x\right)^2}{n(n-1)}}$$
  $$\sqrt{\frac{n\sum x^2 - \left(\sum x\right)^2}{n(n-1)}}$$
- Logical values such as TRUE and FALSE and text are ignored. If logical values and text must not be ignored, use the STDEVA worksheet function.

**Example**

Suppose 10 tools stamped from the same machine during a production run are collected as a random sample and measured for breaking strength.

The example may be easier to understand if you copy it to a blank worksheet.

How?

| | A |
|---|---|
| 1 | **Strength** |
| 2 | 1345 |
| 3 | 1301 |
| 4 | 1368 |
| 5 | 1322 |
| 6 | 1310 |
| 7 | 1370 |
| 8 | 1318 |
| 9 | 1350 |
| 10 | 1303 |
| 11 | 1299 |

| Formula | Description (Result) |
|---|---|
| =STDEV(A2:A11) | Standard deviation of breaking strength (27.46391572) |

# BEST-FIT LINE USING LINEAR REGRESSION

# LINEST

See Also

Calculates the statistics for a line by using the "least squares" method to calculate a straight line that best fits your data, and returns an array that describes the line. Because this function returns an array of values, it must be entered as an array formula.

The equation for the line is:

y = mx + b or

y = m1x1 + m2x2 + ... + b (if there are multiple ranges of x-values)

where the dependent y-value is a function of the independent x-values. The m-values are coefficients corresponding to each x-value, and b is a constant value. Note that y, x, and m can be vectors. The array that LINEST returns is {mn,mn-1,...,m1,b}. LINEST can also return additional regression statistics.

**Syntax**

**LINEST(known_y's**,known_x's,const,stats)

Known_y's is the set of y-values you already know in the relationship y = mx + b.

- If the array known_y's is in a single column, then each column of known_x's is interpreted as a separate variable.
- If the array known_y's is in a single row, then each row of known_x's is interpreted as a separate variable.

Known_x's is an optional set of x-values that you may already know in the relationship y = mx + b.

- The array known_x's can include one or more sets of variables. If only one variable is used, known_y's and known_x's can be ranges of any shape, as long as they have equal dimensions. If more than one variable is used, known_y's must be a vector (that is, a range with a height of one row or a width of one column).
- If known_x's is omitted, it is assumed to be the array {1,2,3,...} that is the same size as known_y's.

Const is a logical value specifying whether to force the constant b to equal 0.

- If const is TRUE or omitted, b is calculated normally.
- If const is FALSE, b is set equal to 0 and the m-values are adjusted to fit y = mx.

Stats is a logical value specifying whether to return additional regression statistics.

- If stats is TRUE, LINEST returns the additional regression statistics, so the returned array is {mn,mn-1,...,m1,b;sen,sen-1,...,se1,seb;r2,sey;F,df;ssreg,ssresid}.
- If stats is FALSE or omitted, LINEST returns only the m-coefficients and the constant b.

The additional regression statistics are as follows.

| Statistic | Description |
|---|---|
| se1,se2,...,sen | The standard error values for the coefficients m1,m2,...,mn. |
| Seb | The standard error value for the constant b (seb = #N/A when const is FALSE). |
| r2 | The coefficient of determination. Compares estimated and actual y-values, and ranges in value from 0 to 1. If it is 1, there is a perfect correlation in the sample — there is no difference between the estimated y-value and the actual y-value. At the other extreme, if the coefficient of determination is 0, the regression equation is not helpful in predicting a y-value. For information about how r2 is calculated, see "Remarks" later in this topic. |
| sey | The standard error for the y estimate. |
| F | The F statistic, or the F-observed value. Use the F statistic to determine whether the observed relationship between the dependent and independent variables occurs by chance. |
| df | The degrees of freedom. Use the degrees of freedom to help you find F-critical values in a statistical table. Compare the values you find in the table to the F statistic returned by LINEST to determine a confidence level for the model. |
| ssreg | The regression sum of squares. |
| ssresid | The residual sum of squares. |

The following illustration shows the order in which the additional regression statistics are returned.

| | A | B | C | D | E | F |
|---|---|---|---|---|---|---|
| 1 | $m_n$ | $m_{n-1}$ | ... | $m_2$ | $m_1$ | b |
| 2 | $se_n$ | $se_{n-1}$ | ... | $se_2$ | $se_1$ | $se_b$ |
| 3 | $r_2$ | $se_y$ | | | | |
| 4 | F | $d_f$ | | | | |
| 5 | $ss_{reg}$ | $ss_{resid}$ | | | | |

**Remarks**

- You can describe any straight line with the slope and the y-intercept:

  Slope (m):
  To find the slope of a line, often written as m, take two points on the line, (x1,y1) and (x2,y2); the slope is equal to (y2 - y1)/(x2 - x1).

  Y-intercept (b):
  The y-intercept of a line, often written as b, is the value of y at the point where the line crosses the y-axis.

  The equation of a straight line is y = mx + b. Once you know the values of m and b, you can calculate any point on the line by plugging the y- or x-value into that equation. You can also use the TREND function.

- When you have only one independent x-variable, you can obtain the slope and y-intercept values directly by using the following formulas:

  Slope:
  =INDEX(LINEST(known_y's,known_x's),1)

  Y-intercept:
  =INDEX(LINEST(known_y's,known_x's),2)

- The accuracy of the line calculated by LINEST depends on the degree of scatter in your data. The more linear the data, the more accurate the LINEST model. LINEST uses the method of least squares for determining the best fit for the data. When you have only one independent x-variable, the calculations for m and b are based on the following formulas:

$$m = \frac{n\left(\sum xy\right) - \left(\sum x\right)\left(\sum y\right)}{n\left(\sum\left(x^2\right)\right) - \left(\sum x\right)^2}$$

$$b = \frac{\left(\sum y\right)\left(\sum\left(x^2\right)\right) - \left(\sum x\right)\left(\sum xy\right)}{n\left(\sum\left(x^2\right)\right) - \left(\sum x\right)^2}$$

- The line- and curve-fitting functions LINEST and LOGEST can calculate the best straight line or exponential curve that fits your data. However, you have to decide which of the two results best fits your data. You can calculate TREND(known_y's,known_x's) for a straight line, or GROWTH(known_y's, known_x's) for an exponential curve. These functions, without the new_x's argument, return an array of y-values predicted along that line or curve at your actual data points. You can then compare the predicted values with the actual values. You may want to chart them both for a visual comparison.

- In regression analysis, Microsoft Excel calculates for each point the squared difference between the y-value estimated for that point and its actual y-value. The sum of these squared differences is called the residual sum of squares. Microsoft Excel then calculates the sum of the squared differences between the actual y-values and the average of the y-values, which is called the total sum of squares (regression sum of squares + residual sum of squares). The smaller the residual sum of squares is, compared with the total sum of squares, the larger the value of the coefficient of determination, r2, which is an indicator of how well the equation resulting from the regression analysis explains the relationship among the variables.

- Formulas that return arrays must be entered as array formulas.

- When entering an array constant such as known_x's as an argument, use commas to separate values in the same row and semicolons to separate rows. Separator characters may be different depending on your locale setting in **Regional Settings** or **Regional Options** in **Control Panel**.

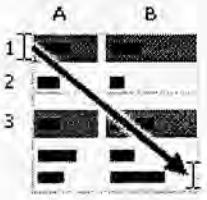
- Note that the y-values predicted by the regression equation may not be valid if they are outside the range of the y-values you used to determine the equation.

**Example 1 Slope and Y-Intercept**

The example may be easier to understand if you copy it to a blank worksheet.

How?

1. Create a blank workbook or worksheet.
2. Select the example in the Help topic. Do not select the row or column headers.




Selecting an example from Help

3. Press CTRL+C.
4. In the worksheet, select cell A1, and press CTRL+V.
5. To switch between viewing the results and viewing the formulas that return the results, press CTRL+` (grave accent), or on the **Tools** menu, point to **Formula Auditing**, and then click **Formula Auditing Mode**.

| | A | B |
|---|---|---|
| 1 | **Known y** | **Known x** |
| 2 | 1 | 0 |
| 3 | 9 | 4 |
| 4 | 5 | 2 |
| 5 | 7 | 3 |
| | **Formula** | **Formula** |
| | =LINEST(A2:A5,B2:B5,,FALSE) | |

**Note** The formula in the example must be entered as an array formula. After copying the example to a blank worksheet, select the range A7:B7 starting with the formula cell. Press F2, and then press CTRL+SHIFT+ENTER. If the formula is not entered as an array formula, the single result is 2.

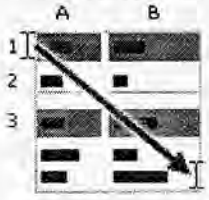
When entered as an array, the slope (2) and the y-intercept (1) are returned.

**Example 2 Simple Linear Regression**

The example may be easier to understand if you copy it to a blank worksheet.

How?

1. Create a blank workbook or worksheet.
2. Select the example in the Help topic. Do not select the row or column headers.




Selecting an example from Help

3. Press CTRL+C.
4. In the worksheet, select cell A1, and press CTRL+V.
5. To switch between viewing the results and viewing the formulas that return the results, press CTRL+` (grave accent), or on the **Tools** menu, point to **Formula Auditing**, and then click **Formula Auditing Mode**.

| | A | B |
|---|---|---|
| 1 | **Month** | **Sales** |
| 2 | 1 | 3100 |
| 3 | 2 | 4500 |
| 4 | 3 | 4400 |

| | | |
|---|---|---|
| **5** | 4 | 5400 |
| **6** | 5 | 7500 |
| **7** | 6 | 8100 |
| | **Formula** | **Description (Result)** |
| | =SUM(LINEST(B2:B7, A2:A7)*{9,1}) | Estimate sales for the ninth month (11000) |

In general, SUM({m,b}*{x,1}) equals mx + b, the estimated y-value for a given x-value. You can also use the TREND function.

**Example 3 Multiple Linear Regression**

Suppose a commercial developer is considering purchasing a group of small office buildings in an established business district.

The developer can use multiple linear regression analysis to estimate the value of an office building in a given area based on the following variables.

| Variable | Refers to the |
|---|---|
| y | Assessed value of the office building |
| x1 | Floor space in square feet |
| x2 | Number of offices |
| x3 | Number of entrances |
| x4 | Age of the office building in years |

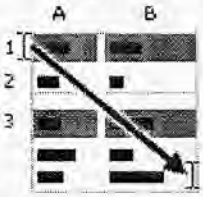
This example assumes that a straight-line relationship exists between each independent variable (x1, x2, x3, and x4) and the dependent variable (y), the value of office buildings in the area.

The developer randomly chooses a sample of 11 office buildings from a possible 1,500 office buildings and obtains the following data. "Half an entrance" means an entrance for deliveries only.

The example may be easier to understand if you copy it to a blank worksheet.

How?

1. Create a blank workbook or worksheet.
2. Select the example in the Help topic. Do not select the row or column headers.




Selecting an example from Help

3. Press CTRL+C.
4. In the worksheet, select cell A1, and press CTRL+V.
5. To switch between viewing the results and viewing the formulas that return the results, press CTRL+` (grave accent), or on the **Tools** menu, point to **Formula Auditing**, and then click **Formula Auditing Mode**.

| | A | B | C | D | E |
|---|---|---|---|---|---|
| **1** | **Floor space (x1)** | **Offices (x2)** | **Entrances (x3)** | **Age (x4)** | **Assessed value (y)** |
| **2** | 2310 | 2 | 2 | 20 | 142,000 |
| **3** | 2333 | 2 | 2 | 12 | 144,000 |
| **4** | 2356 | 3 | 1.5 | 33 | 151,000 |
| **5** | 2379 | 3 | 2 | 43 | 150,000 |

| | | | | | |
|---|---|---|---|---|---|
| **6** | 2402 | 2 | 3 | 53 | 139,000 |
| **7** | 2425 | 4 | 2 | 23 | 169,000 |
| **8** | 2448 | 2 | 1.5 | 99 | 126,000 |
| **9** | 2471 | 2 | 2 | 34 | 142,900 |
| **10** | 2494 | 3 | 3 | 23 | 163,000 |
| **11** | 2517 | 4 | 4 | 55 | 169,000 |
| **12** | 2540 | 2 | 3 | 22 | 149,000 |

**Formula**

=LINEST(E2:E12,A2:D12,TRUE,TRUE)

**Note** The formula in the example must be entered as an array formula. After copying the example to a blank worksheet, select the range A14:E18 starting with the formula cell. Press F2, and then press CTRL+SHIFT+ENTER. If the formula is not entered as an array formula, the single result is -234.2371645.

When entered as an array, the following regression statistics are returned. Use this key to identify the statistic you want.

| | A | B | C | D | E | F |
|---|---|---|---|---|---|---|
| 1 | $m_n$ | $m_{n-1}$ | ... | $m_2$ | $m_1$ | b |
| 2 | $se_n$ | $se_{n-1}$ | ... | $se_2$ | $se_1$ | $se_b$ |
| 3 | $r_2$ | $se_y$ | | | | |
| 4 | F | $d_f$ | | | | |
| 5 | $ss_{reg}$ | $ss_{resid}$ | | | | |

The multiple regression equation, y = m1*x1 + m2*x2 + m3*x3 + m4*x4 + b, can now be obtained using the values from row 14:

y = 27.64*x1 + 12,530*x2 + 2,553*x3+ 234.24*x4 + 52,318

The developer can now estimate the assessed value of an office building in the same area that has 2,500 square feet, three offices, and two entrances and is 25 years old, by using the following equation:

y = 27.64*2500 + 12530*3 + 2553*2 - 234.24*25 + 52318 = $158,261

Or you can copy the following table to cell A21 of the example workbook.

| Floor space (x1) | Offices (x2) | Entrances (x3) | Age (x4) | Assessed value (y) |
|---|---|---|---|---|
| 2500 | 3 | 2 | 25 | =D14*A22 + C14*B22 + B14*C22 + A14*D22 + E14 |

You can also use the TREND function to calculate this value.

**Example 4 Using The F And R2 Statistics**

In the previous example, the coefficient of determination, or r2, is 0.99675 (see cell A17 in the output for LINEST), which would indicate a strong relationship between the independent variables and the sale price. You can use the F statistic to determine whether these results, with such a high r2 value, occurred by chance.

Assume for the moment that in fact there is no relationship among the variables, but that you have drawn a rare sample of 11 office buildings that causes the statistical analysis to demonstrate a strong relationship. The term "Alpha" is used for the probability of erroneously concluding that there is a relationship.

There is a relationship among the variables if the F-observed statistic is greater than the F-critical value. The F-critical value can be obtained by referring to a table of F-critical values in many statistics textbooks. To read the table, assume a single-tailed test, use an Alpha value of 0.05, and for the degrees of freedom (abbreviated in most tables as v1 and v2), use v1 = k = 4 and v2 = n - (k + 1) = 11 - (4 + 1) = 6, where k is the number of variables in the regression analysis and n is the number of data points. The F-critical value is 4.53.

The F-observed value is 459.753674 (cell A18), which is substantially greater than the F-critical value of 4.53. Therefore, the regression equation is useful in predicting the assessed value of office buildings in this area.

**Example 5 Calculating The T-Statistics**

Another hypothesis test will determine whether each slope coefficient is useful in estimating the assessed value of an office building in example 3. For example, to test the age coefficient for statistical significance, divide -234.24 (age slope coefficient) by 13.268 (the estimated standard error of age coefficients in cell A15). The following is the t-observed value:

t = m4 ÷ se4 = -234.24 ÷ 13.268 = -17.7

If you consult a table in a statistics manual, you will find that t-critical, single tail, with 6 degrees of freedom and Alpha = 0.05 is 1.94. Because the absolute value of t, 17.7, is greater than 1.94, age is an important variable when estimating the assessed value of an office building. Each of

the other independent variables can be tested for statistical significance in a similar manner. The following are the t-observed values for each of the independent variables.

| Variable | t-observed value |
|---|---|
| Floor space | 5.1 |
| Number of offices | 31.3 |
| Number of entrances | 4.8 |
| Age | 17.7 |

These values all have an absolute value greater than 1.94; therefore, all the variables used in the regression equation are useful in predicting the assessed value of office buildings in this area.

## SLOPE OF BEST-FIT LINE

# SLOPE

See Also

Returns the slope of the linear regression line through data points in known_y's and known_x's. The slope is the vertical distance divided by the horizontal distance between any two points on the line, which is the rate of change along the regression line.

**Syntax**

**SLOPE(known_y's,known_x's)**

Known_y's is an array or cell range of numeric dependent data points.

Known_x's is the set of independent data points.

**Remarks**

- The arguments must be either numbers or names, arrays, or references that contain numbers.
- If an array or reference argument contains text, logical values, or empty cells, those values are ignored; however, cells with the value zero are included.
- If known_y's and known_x's are empty or have a different number of data points, SLOPE returns the #N/A error value.
- The equation for the slope of the regression line is:

$$b = \frac{n\sum xy - \left(\sum x\right)\left(\sum y\right)}{n\sum x^2 - \left(\sum x\right)^2}$$

**Example**

The example may be easier to understand if you copy it to a blank worksheet.

How?

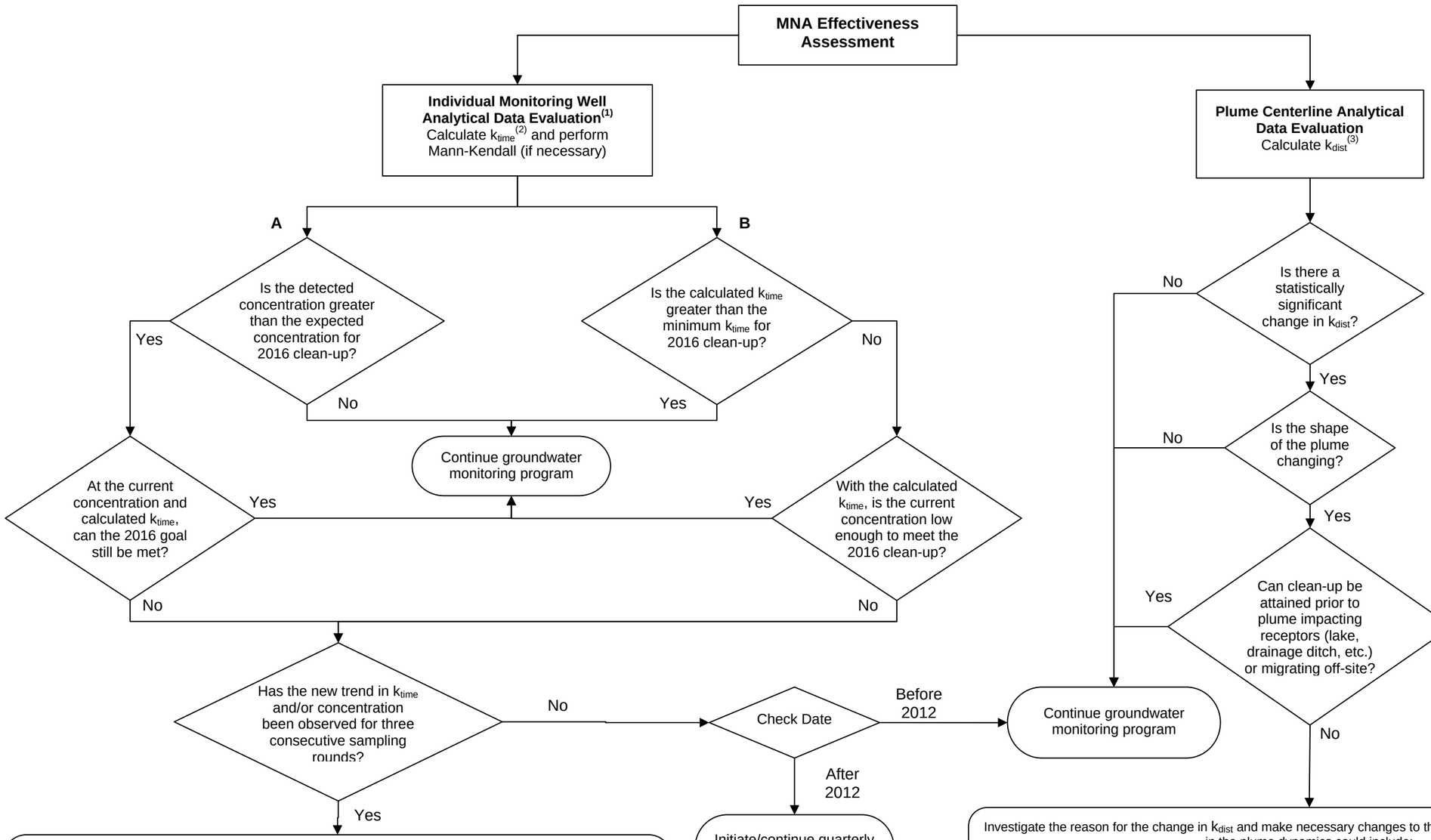
| | A | B |
|---|---|---|
| 1 | **Known y** | **Known x** |
| 2 | 2 | 6 |
| 3 | 3 | 5 |
| 4 | 9 | 11 |
| 5 | 1 | 7 |
| 6 | 8 | 5 |
| 7 | 7 | 4 |
| 8 | 5 | 4 |

| Formula | Description (Result) |
|---|---|
| =SLOPE(A2:A8,B2:B8) | Slope of the linear regression line through the data points above (0.305556) |

# MONITORED NATURAL ATTENUATION DATA EVALUATION

**DIAGRAM 3-1**
**MONITORED NATURAL ATTENUATION DATA EVALUATION**
**RESPONSE ACTION PLAN**

**NAS DALLAS, TEXAS**




Investigate the reason for the change in $k_{time}$ and make necessary changes to the remedial system. These changes in the plume dynamics could include:

| **Reason for $k_{time}$ Change** | **Recommended Changes in Remediation** |
|---|---|
| New source or new release | Identify new Responsible Party for continued remediation. |
| Geochemical change | Determine if chemical additives are necessary or technical impracticability of additional remediation. |
| Asymptotic degradation reached | Determine if active remediation or excavation are necessary or technical impracticability of additional remediation. |

Investigate the reason for the change in $k_{dist}$ and make necessary changes to the remedial system. These changes in the plume dynamics could include:

| **Reason for $K_{dist}$ Change** | **Recommended Changes in Remediation** |
|---|---|
| New source or new release | Identify new Responsible Party for continued remediation. |
| Migrating plume | Initiate abatement measures such as interceptor trench, slurry walls, pump recovery / capture system, etc. if receptors are threatened. |

Notes:
(1) Both pathways (A, B) must be evaluated for each of the chemicals of concern in each monitoring point along the plume's centerline.
(2) $k_{time}$ Concentration versus Time Attenuation Rate Constant
(3) $k_{dist}$ Concentration versus Distance Attenuation Rate Constant

# Assessment of MNA Performance Monitoring

## Introduction

The MNA monitoring well networks at the NAS Dallas groundwater plumes will provide the necessary analytical data to evaluate the dynamic behavior of the plumes over time, including contaminant and/or concentration reductions indicative of progress toward clean-up objectives, changes in plume boundaries, and changes in geochemistry. To this effect, these monitoring well networks include monitoring wells in areas hydraulically upgradient and sidegradient to the groundwater plume, in the historical source area, along the main body of the plume and immediately downgradient of the plume. The number and locations of monitoring points for each plume was selected based on the size of the plume, groundwater velocity, proximity to receptors (including cross-media transfer of COCs), and presence of preferential pathways for COC migration.

As required by the Compliance Plan for NAS Dallas (TCEQ, 2004), performance monitoring for MNA will be conducted in accordance with Response Action Plan (RAP) Worksheet 3.1 until all remedial action objectives have been met for the plume for at least two consecutive sampling events. Upon demonstration of the attainment of clean-up objectives, a three-year of post-remedial action monitoring will be implemented in accordance with the Compliance Plan for NAS Dallas (TCEQ, 2004) and as outlined on RAP Worksheet 4.1.

In addition to the COCs identified in the APAR (TtNUS, 2003) for each groundwater plume, daughter products that may be formed as a result of biotransformation or chemical processes will be monitored during the corrective action period at each plume. In order to ensure that there is a potential for continued transformation of the COCs within the groundwater plume, the geochemical environment will also be monitored (i.e., oxidation-reduction potential, dissolved oxygen, pH, etc.) every two years at a minimum. During the post-remedial action monitoring, the Compliance Plan requires that an expanded list of parameters be sampled including those COCs historically detected at the site. In order to minimize the chance of identifying constituent exceedances during the post-response action monitoring, the expanded list of parameters identified on RAP Worksheet 4.1 (Compliance Plan Table III) will be monitored every five years at a minimum.

Each new round of data will help develop a better understanding of the site and site processes and as a result, the conceptual site model for MNA will be continuously reevaluated from the standpoint of the observed plume shape, location, stability, and dynamics; attenuation rates; groundwater flow patterns; and geochemical regimes.

To evaluate progress towards achievement of clean-up objectives, data collected from the monitoring well network will be used to determine temporal and spatial trends in COC concentrations, comparisons of observed COC concentrations with benchmark concentrations, and, comparison of calculated attenuation rates with the rates required to meet remedial objectives within the required timeframe. Data will be interpreted with regard to variability so that attenuation-related changes and trends can be distinguished from other sources of variation in the data.

If a departure from a predicted trend is found, (i.e., exceeding benchmark concentration or unfavorable changes in attenuation rates), the deviation will be evaluated to determine how the changes may affect attainment of remedial goals for the individual monitoring wells, as well as, how the changes may affect the behavior of the entire plume (i.e., plume stability, reduction in COC concentrations, etc.). Departures from expected trends may not mean remedy failure, because there may be a range of attenuation rates that will achieve the desired remedial goals

in the allotted time; therefore their significance must be evaluated in the context of the site-related goals. If the potential impact on the remedy is negligible, revision of the conceptual site model may be the only outcome of such evaluation. However, if the potential for impact is significant, implementation of alternative remedies may be triggered or, at a minimum additional characterization to better define the factors limiting COC reduction and determine methods for mitigating the magnitude of their impact would be warranted. Other site-related data (i.e., geochemistry and potentiometric data) will continue to be evaluated to provide evidence of COC migration, fate, and attenuation processes. These data may be used to ascertain COC degradation and the continuation of appropriate conditions for attenuation at acceptable rates.

Following the individual monitoring well data analysis, plume behavior will be assessed to evaluate the continued effectiveness of the MNA remedy, as well as the adequacy of the monitoring program and conceptual site model for MNA. The ongoing monitoring program will provide the necessary data for continual refinement of the conceptual model and subsequently of the monitoring program itself. Upon completion of each sampling round, data analysis and determination of the effectiveness of the MNA remedy, plume-specific criteria will drive decisions affecting the continuity of the monitoring program.

At some plumes, source control and interim remedial activities have occurred between the original site characterization process and the implementation of performance monitoring. Because these activities are expected to change the site's characteristics and behavior, performance monitoring will require the continued refinement of the conceptual site model for MNA. This refinement of the conceptual site model may eventually be different from the original MNA conceptual site model based on the initial site characterization data. Development and implementation of the new conceptual site model for MNA will require the collection of additional data (i.e., quarterly monitoring for the first year after interim remedial activities and on a semi-annual basis thereafter) to establish baseline conditions, expediently depict new site characteristics and parameter variability, establish trends and estimate attenuation rates for COCs, determine if the plume characteristics have been altered, and assess the likelihood of meeting site remediation goals.

## Evaluation of New Data

Data interpretation will include the preliminary assessment of the COC concentration data collected for both the plume centerline (e.g., whole plume dynamics) as well as on individual COCs within each monitoring well. The interpretation will be conducted through graphs, tables, maps, statistics, and time-series plots. This will help in identifying patterns, relationships, and anomalies, such as possible "outliers" to the observed remedial trend of the plume. Scatter graphs (i.e., $k_{time}$ and $k_{dist}$ graphs) will show relationships between two variables that are not readily evident using purely numerical methods. Mapping the data in plan view and/or cross-section (i.e., isoconcentration maps, potentiometric maps, MNA parameter maps, etc.) will help understand patterns of COC distribution and migration, and relationships between geochemical zones and COC attenuation.

The initial data analysis and interpretation will focus on the detection of trends in the data for the COCs within individual monitoring wells and subsequently for the plume as a whole. First, the COC concentration data collected from each monitoring well will be used to determine the temporal trends that exist within the plume. The COC trends will also be evaluated at monitoring points located throughout the plume as a whole. In order to adequately interpret progress toward COC reduction goals for the plume, it is necessary to compare trends of individual monitoring wells to trends of other monitoring wells in the plume. Evaluating trends in data from all sampling locations in the plume will determine if the plume exhibits stability or reduction in COC concentrations. In addition, for each COC, spatial trends along the plume centerline [i.e., concentration vs. distance attenuation rate ($k_{dist}$)] will be evaluated. This analysis assists in evaluating the stability of the plume and its migration potential. Assessment of spatial plume behavior is necessary to ensure no unacceptable plume migration occurs.

Further evaluation will focus on the assessment of any departures from predicted trends and their impact on the potential for MNA to achieve plume-related goals. If the COC data points do not definitively indicate that the remedial goals are meeting the reasonable progress expectations, other data will be analyzed in order to properly interpret particular variances from the predicted performance (i.e., the site stratigraphy, groundwater chemistry, the groundwater flow field, the season of the year).

In addition, non-parametric statistical tests, such as the Mann-Kendall test, may be included in the data evaluation to establish the existence of a trend when the initial evaluation is inconclusive due to high data variability.

The process of MNA data evaluation is graphically depicted in Diagram 3-1.

### Individual Monitoring Well Analytical Data Evaluation

Evaluation of progress towards achievement of clean-up goals will focus primarily on temporal trends in COC concentration at individual attenuation monitoring point (AMP) wells within the plume. After each sampling event, temporal trends [i.e., concentration vs. time attenuation rate ($k_{time}$)], will be established for each AMP of the plume. Temporal trends ($k_{time}$) are particularly useful in evaluating if remedial goals can be met in the desired timeframe for the individual location. The analysis of temporal trends is useful for estimating the potential lifetime of the COC plume at the particular location.

The parameters to be evaluated in parallel to ensure reasonable progress is being made in the response action at the particular location are as follows:

- Direct comparison of detected concentrations to expected or benchmark concentration to meet remedial goals by the year 2016 for the monitoring wells along the centerline of the plume.

- Direct comparison of observed attenuation rate ($k_{time}$) from the chemical specific historical data available for the monitoring well versus the minimum attenuation rate ($k_{time}$) necessary to meet the 2016 clean-up date.

The following graph depicts the possible evaluation scenarios for the above parameters:

| | |
|---|---|
| **Measured COC Concentration < Expected COC Concentration**<br>**and**<br>**Observed $k_{time}$ > Minimum $k_{time}$**<br>Remedial goal is being met, continue performance monitoring | **Measured COC Concentration < Expected COC Concentration**<br>**and**<br>**Observed $k_{time}$ < Minimum $k_{time}$**<br>Evaluate further to ensure remedial goal is being met |
| **Measured COC Concentration > Expected COC Concentration**<br>**and**<br>**Observed $k_{time}$ > Minimum $k_{time}$**<br>Evaluate further to ensure remedial goal is being met | **Measured COC Concentration > Expected COC Concentration**<br>**and**<br>**Observed $k_{time}$ < Minimum $k_{time}$**<br>Remedial goal not being met, consider new response action |

1. Satisfactory progress is being made with the response action (top left quadrant) for an individual well location, if the detected concentration of the COC(s) is not greater than the 2016 clean-up curve expected concentration; and, the observed attenuation rate based on historical data available from the monitoring well is equal to or greater than the minimum attenuation rate necessary to meet clean-up by the year 2016 for the monitoring wells along the centerline of the plume.
2. Reasonable progress is not being made towards achieving the remedial goal (bottom right quadrant) if the detected concentration of the COC(s) exceeds the 2016 clean-up curve expected concentration; and the observed attenuation rate based on historical data available from the monitoring well is less than the minimum attenuation rate necessary to meet clean-up by the year 2016 for the monitoring wells along the centerline of the plume. A new response action may need to be implemented if this trend continues for at least three sampling rounds.
3. Further evaluation will be needed for the scenarios in the top right and bottom left quadrants before establishing if reasonable progress is being made towards achievement of the clean-up goals:
   - Reasonable progress is being made when the observed attenuation rate based on historical data is steep enough that clean-up can still be achieved by the year 2016, even though the detected concentration of a COC may be greater than the expected concentration during a particular sampling event (bottom left quadrant).
   - Reasonable progress is being made if the detected concentration of a COC in the sampling event is sufficiently below the expected concentration so that with an observed attenuation rate based on historical data greater than the calculated minimum attenuation rate necessary to meet PCLs by 2016, the remedial objectives can still be achieved by the year 2016 (top right quadrant).
   - Reasonable progress may not be made if either of the preceding two situations continues for at least three consecutive sampling rounds. At that point in the response action evaluation, a new response action may need to be implemented. In this case other statistical methods may be used to evaluate the data such as using non-parametric tests (i.e., Mann-Kendall) to determine if there has been a statistically significant change in degradation trends.

Plume Analytical Data Evaluation

Since a plume-wide trend implying progress toward restoration cannot be satisfactorily elucidated from monitoring only individual sampling locations, it will be necessary to compare trends among the AMP wells in the plume. Reduction in COC concentrations from all or most sampling locations within predicted ranges and/or at anticipated rates can be interpreted as a decrease in COC mass for the plume and will be indicative of effective remediation of the plume through MNA. Mixed trends in different portions of the plume may imply temporal changes in plume migration or may be simply attributed to the natural attenuation processes, and do not signify failure of MNA to achieve its goals in a timely manner. These variations will be evaluated in the context of the conceptual site model and sampling history before they are attributed to natural attenuation processes of other possible causes. To this effect, in cases of mixed trends it will be necessary to perform other comparisons in order to reach a conclusion of satisfactory progress. It will be particularly useful to evaluate trends in COC and daughter product concentrations (e.g., a decreasing trend in trichloroethene compared to an increasing trend in cis-1,2-dichloroethene in the same plume may indicate degradation of trichloroethene to cis-1,2-dichloroethene). Other trends of interest include changes in geochemistry that may indicate decrease in attenuation rates, such as changes in availability of electron donors and electron acceptors, changes in oxidation-reduction potential, or other primary geochemical indicators.

The complement to the evaluation of the behavior of the plume as a whole is the assessment of spatial trends. For each COC, spatial trends along the plume centerline [i.e., concentration vs. distance attenuation rate ($k_{dist}$)] will be evaluated. This analysis assists in evaluating the stability of the plume and its migration potential. $k_{dist}$ will be calculated for the monitoring wells along the plume centerline after each annual sampling round and will be depicted in centerline trend graphs ($k_{dist}$ graphs). Assessment of spatial plume behavior will be performed through visual interpretation of changes in plume shape over time as shown in the isoconcentration maps as well as centerline trend graphs.

**Assessment Conclusions and Recommendations**

As a result of the response action effectiveness evaluation, the MNA conceptual site model will be continuously refined/modified by incorporating any new data and data trends in COC and geochemistry values and changes in site hydrology. As new data is gathered there will be an ever-expanding database for the site that can be used for comparison with the changes in parameters noted between monitoring events as well as for comparison to predicted, acceptable trends. This continual evaluation of performance monitoring data will translate in better understanding of plume behavior and anticipated data variability and therefore assist in the proper interpretation of monitoring data.

Upon completion of each sampling round, data analysis and determination of the effectiveness of the MNA remedy, plume-specific criteria will drive decisions affecting the continuity of the monitoring program such as: the appropriateness of continuing the monitoring program without change, the need for modifications to the monitoring program (i.e., increased monitoring frequency, additional monitoring wells), need for additional characterization, implementation of a contingency or alternative remedy, or verification of attainment of remedial goals and termination of performance monitoring.

Site-related decisions regarding continuing, modifying, or terminating MNA performance monitoring will be made based on the analyses of spatial and temporal trends in COC concentration, as well as comparisons with predicted benchmarks and/or the specified concentration standard (i.e., COC PCLs). The following summarizes each potential decision

and why it may be chosen based on the perceived progress towards achievement of MNA remediation goals at the plume:

1. Continue Monitoring Program Without Change

   COC concentrations, including toxic transformation products and any mobilized by-products or secondary COCs must remain within the bounds of acceptable trends in order to continue the monitoring program without any change until all remedial action objectives have been met. Groundwater flow parameters must not have changed outside previously identified acceptable ranges. The geochemistry must not have changed in such a way as to indicate that the COC degradation or other natural attenuation processes would be significantly affected.

2. Modify the Monitoring Program

   Modification of the monitoring program may be needed to better reflect changing conditions or increased understanding of natural attenuation processes at the site. Changing conditions or the need to test key assumptions may require new sampling points or increases in monitoring parameters or frequency. Possible scenarios include:

   - Changes in groundwater flowrates or directions that indicate COCs may move farther downgradient, laterally or vertically into previously unimpacted areas, may warrant the need for additional monitoring wells.
   - Unfavorable changes in COC concentrations within the plume, or in the observed attenuation rate based on historic data, may warrant increased monitoring frequency. Sampling frequency may be increased if a sudden change in the trend of COC concentration reduction is noted in order to provide information to facilitate understanding of the change and provide earlier warning of further change. If the protectiveness of the remedy is in question (i.e., unfavorable observed attenuation rate change after 2012), a determination may be made to collect data on a more frequent schedule to properly interpret trends in time to implement contingency remedies, if necessary, to meet PCLs by 2016.
   - Detections of COCs outside the known plume, indicating potential plume expansion or plume migration, may warrant the need for additional monitoring wells.

3. Implement a Contingency or Alternative Remedy

   Alternative remedies can be considered for use in case MNA fails to perform at the desired effectiveness. Situations that may trigger the implementation of a contingency or other remedy modifications will depend on site conditions and include the following:

   - COC concentrations are not decreasing at the rate previously determined to be necessary to meet the remediation objectives by 2016. This assessment will involve the direct comparison of current analytical data with the expected plume clean-up benchmarks as well as evaluation of temporal trends (i.e., observed attenuation rates) in COC concentrations versus the minimum attenuation rates required to meet clean-up by the year 2016. If the protectiveness of the remedy is in question (i.e., more than three rounds of sampling fail to meet the criteria), implementation of a contingency or alternative remedy would generally be warranted.
   - COC concentrations at AMP wells exhibit an increasing trend not originally predicted during remedy selection. This situation would involve the identification and assessment of trends in COC concentration data, including transformation products, changes in geochemistry that may indicate decrease in attenuation rates explaining the lack of

progress toward clean-up objectives, and/or additional COC releases. For some locations in the plume, a detection of a significant change may not trigger immediate implementation of a contingency or alternative remedy. For instance, a low-level or otherwise limited COC concentration increase does not necessarily mean that remediation timeframes will be expanded, or that by the time the pulse moves downgradient to the boundary of the plume there will be a significant plume expansion. Or, in some cases, the detailed characterization and modeling of COC fate and migration may indicate that concentrations for certain COCs (i.e., daughter products) in some portions of the plume are expected to increase temporarily, yet MNA would still meet remedial objectives. If so, the temporary increase would not trigger the contingency or alternative remedy as long as the increase conformed to the predictions and MNA remained protective, allowing observation for several years to test model predictions, if time is available (i.e., before 2012). In situations where evaluation shows the observed COC concentration increases are expected to unacceptably increase the time for plume restoration beyond 2016, or cause unacceptable plume expansion, triggering the contingency or alternative remedy would generally be warranted.

- COCs are identified in monitoring wells located outside the original plume boundary indicating unacceptable plume expansion or migration. Detections of COCs outside of the predetermined plume boundaries may indicate unacceptable plume expansion. Implementation of an alternative or contingency remedy will depend on the locations of the new detections, and distance and possible COC migration rates between these monitoring points and receptors (i.e., surface water bodies, off-site property). Because the COC travel time from the location of the detections may be many years at some sites, there may be time for further monitoring and assessment before a contingency or alternative remedy would need to be implemented. In contrast, if the protectiveness of the remedy is in question (i.e., a significant trend of increasing COC concentration in downgradient wells was noted), there may be much less time available to assess the trend if there was only a short travel time to downgradient receptors. In this case, a contingency or alternative remedy may be triggered immediately.

4. Termination of Performance Monitoring

Once PCLs have been achieved at each of the AMP locations within a plume, showing that the MNA remedy goals have been met for two consecutive semi-annual sampling events for an individual PCLE zone, performance monitoring will be terminated and a period of verification monitoring will be initiated. Verification monitoring will include three years of semi-annual groundwater sampling in order to satisfy the requirements of the Compliance Plan for NAS Dallas (TCEQ, 2004). Sampling parameters for the verification of achieving the PCLs and locations will be in accordance with RAP Worksheet 4.0. This sampling will include all COCs that have been historically detected in the area of the former SWMU, not just the ones that were identified for remediation in the Response Action Plan. If no additional COC exceedances are identified during this three year period of post response action care monitoring, the monitoring system can be terminated, the monitoring wells will be abandoned, and the site will be removed from the permit.

### Effects of Data Variability on Data Interpretation

Data interpretation is affected by data variability. This variability is sometimes associated with natural causes or may be simply attributed to the natural attenuation processes. Due to the dynamic nature of natural attenuation processes, data typically exhibit fluctuations of various magnitudes. For example, there is an expected degree of natural variability within a plume that may include small-scale expansion and shrinkage in response to changes in groundwater flowrates and biological degradation rates throughout the year. COC concentrations in individual monitoring wells may fluctuate with changes in plume configuration caused by oscillations in groundwater flow. Also, changes in groundwater elevations can cause changes in COC concentrations measured in monitoring wells.

It is essential that each data point be interpreted in the context of its derivation in time and space. For instance, monitoring wells produce data that should be interpreted with respect to COC sources, site stratigraphy, the groundwater flow field, the plume, possible receptors, season of the year, and other relevant factors. Variations in sampling methodology should also be considered, due to possible differences in COC concentrations derived from different sampling techniques or devices. The analytical methodology may be evaluated in terms of accuracy, precision, and detection limits. This list of data considerations is not exhaustive, but merely emphasizes that a number (i.e., a data point) should be placed in context to be interpreted. The better the understanding on the derivation and context of the data, the more likely it is that the appropriate decision can be made based on the data.

Examination of historical and spatial patterns may provide information useful in assessing the source and significance of variability in the measured parameters. For instance, if there are multiple monitoring wells in the same plume that show a consistent trend for a number of monitoring variables across several monitoring events, then one may suspect a natural variation, such as recharge differences or geochemical changes in the system, and investigate a correlation of recharge, indicator parameters, or other external hydrologic factors with concentration as indicative of the likely cause of the change. If, on the other hand, a specific monitoring well shows an unusually large change in concentration between monitoring events, relative to nearby monitoring wells, then one may suspect a measurement factor or additional release source is involved and look at sampling techniques or other such factors that may influence the concentration change. Because plume variability should be taken into account when interpreting monitoring data, it is important to have a good estimate of natural variability derived from the site investigation and ongoing MNA performance monitoring.

# APPENDIX 8
# WASTE DISPOSAL MANIFESTS

Project #: 0-0

Order #: 140398

EFFECTIVE ENVIRONMENTAL

Please print or type. (Form designed for use on elite (12-pitch) typewriter.)

**NON-HAZARDOUS WASTE MANIFEST**

1. Generator ID Number: TX8170022786 / 65033
2. Page 1 of 1
3. Emergency Response Phone: 877-577-2669
4. Waste Tracking Number: NHM140398

5. Generator's Name and Mailing Address
Naval Air Station Dallas (NAS)
c/o EnSafe Inc., 4545 Fuller Dr., Suite 342
Irving, TX 75038
Generator's Phone: 972.792.3222 ATTN: Tom Wiberg

Generator's Site Address (if different than mailing address)
8100 West Jefferson
Dallas, TX 75211
RB TVW

6. Transporter 1 Company Name
Stericycle Specialty Waste Solutions Inc
Phd: 972 329 1200
State ID#: 98032 / H-4695
U.S. EPA ID Number: MNS000110924

7. Transporter 2 Company Name
U.S. EPA ID Number

8. Designated Facility Name and Site Address
Itasca Landfill TX, LP
2559 FM 66
Itasca, Texas 76055
State ID#: H0241C
U.S. EPA ID Number: n/a
Facility's Phone: 254 897 2511

| 9a. HM | 9b. U.S. DOT Description (including Proper Shipping Name, Hazard Class, ID Number, and Packing Group (if any)) | 10. Containers No. | Type | 11. Total Quantity | 12. Unit Wt./Vol. | |
|---|---|---|---|---|---|---|
| ☐ | 1 Non-regulated material (soil cuttings Class 2 solids) | 01 ~~02~~ | DM | 55 ~~110~~ | G | CESQ3012 Non-RCRA |
| ☐ | 2. Non-regulated material (purged ground and decon water) | 02 | DM | 110 ~~55~~ | G | CESQ1012 Non-RCRA |
| | 3. | | | | | |
| | 4. | | | | | |

13. Special Handling Instructions and Additional Information
01:IDW Soil cuttings NR (PF:5110167655) 55G
02:IDW purge and decon waters NR (PF:5110167656) 55G
RB TVW
11-1) 0.72 ton 11-2) 0.47 tons

14. **GENERATOR'S CERTIFICATION:** I certify the materials described above on this manifest are not subject to federal regulations for reporting proper disposal of Hazardous Waste.

Generator's/Offeror's Printed/Typed Name: X DAVID BARNEY
Signature: X
Month 5 Day 31 Year 16

15. International Shipments ☐ Import to U.S. ☐ Export from U.S. Port of entry/exit:
Transporter signature (for exports only): Date leaving U.S.:

16. Transporter Acknowledgment of Receipt of Materials

Transporter 1 Printed/Typed Name: Rafael Blaze
Signature:
Month 5 Day 31 Year 16

Transporter 2 Printed/Typed Name: Steven Vansickle
Signature:
Month 6 Day 9 Year 16

17. Discrepancy

17a. Discrepancy Indication Space ☐ Quantity ☐ Type ☐ Residue ☐ Partial Rejection ☐ Full Rejection

Manifest Reference Number:

17b. Alternate Facility (or Generator)
U.S. EPA ID Number
Facility's Phone

17c. Signature of Alternate Facility (or Generator)
Month Day Year

01: H132 02: H132

18. Designated Facility Owner or Operator: Certification of receipt of materials covered by the manifest except as noted in Item 17a

Printed/Typed Name: Jessica Anderson
Signature:
Month 6 Day 9 Year 16

GENERATOR

INT'L

TRANSPORTER

DESIGNATED FACILITY

6-NHM-C-C-11

2-DESIGNATED FACILITY TO GENERATOR

Project #: 0-0 Order #: 140398

EFFECTIVE ENVIRONMENTAL

Please print or type. (Form designed for use on elite (12-pitch) typewriter.)

**NON-HAZARDOUS WASTE MANIFEST**

1. Generator ID Number: TX8170022786 / 65033
2. Page 1 of 1
3. Emergency Response Phone: 877-577-2669
4. Waste Tracking Number: NHM140398

5. Generator's Name and Mailing Address
Naval Air Station Dallas (NAS)
c/o EnSafe Inc., 4545 Fuller Dr., Suite 342
Irving, TX 75038
Generator's Phone: 972-292-3222 ATTN: Tom Wiberg

Generator's Site Address (if different than mailing address)
8100 West Jefferson
Dallas, TX 75211

RJ TWW

6. Transporter 1 Company Name
Stericycle Specialty Waste Solutions Inc
Ph#: 972 329 1200
State ID#: S5627 / H-4565
U.S. EPA ID Number: MNS000110924

7. Transporter 2 Company Name
U.S. EPA ID Number:

8. Designated Facility Name and Site Address
Itasca Landfill TX, LP
2559 FM 56
Itasca, Texas 76055
State ID#: H0241C
U.S. EPA ID Number: n/a
Facility's Phone: 254 687 2511

| 9a. HM | 9b. U.S. DOT Description (including Proper Shipping Name, Hazard Class, ID Number, and Packing Group (if any)) | 10. Containers No. | Type | 11. Total Quantity | 12. Unit Wt./Vol. | |
|---|---|---|---|---|---|---|
| ☐ | 1. Non-regulated material (soil cuttings Class 2 solids) | 01 ~~02~~ | DM | 55 ~~110~~ | G | CESQ3012 Non-RCRA |
| ☐ | 2. Non-regulated material (purged ground and decon water) | 02 | DM | 110 ~~55~~ | G | CESQ1012 Non-RCRA |
| | 3. | | | | | |
| | 4. | | | | | |

13. Special Handling Instructions and Additional Information
01:IDW Soil cuttings NR (PF:5110167655) 55G
02:IDW purge and decon waters NR (PF:5110167656) 55G

RJ TWW

11-1) 0.72 ton 11-2) 0.47 ton

14. **GENERATOR'S CERTIFICATION:** I certify the materials described above on this manifest are not subject to federal regulations for reporting proper disposal of Hazardous Waste.

Generator's/Offeror's Printed/Typed Name: X DAVID BURNEY
Signature: X
Month 5 Day 31 Year 16

15. International Shipments ☐ Import to U.S. ☐ Export from U.S. Port of entry/exit:
Transporter signature (for exports only): Date leaving U.S.:

16. Transporter Acknowledgment of Receipt of Materials

Transporter 1 Printed/Typed Name: Rafael Blayze
Signature:
Month 5 Day 31 Year 16

Transporter 2 Printed/Typed Name: Steven Vansickle
Signature:
Month 6 Day 9 Year 16

17. Discrepancy

17a. Discrepancy Indication Space ☐ Quantity ☐ Type ☐ Residue ☐ Partial Rejection ☐ Full Rejection

Manifest Reference Number:

17b. Alternate Facility (or Generator) U.S. EPA ID Number
Facility's Phone:

17c. Signature of Alternate Facility (or Generator) Month Day Year

01: H132 02: H132

18. Designated Facility Owner or Operator: Certification of receipt of materials covered by the manifest except as noted in Item 17a

Printed/Typed Name: Jessica Anderson
Signature:
Month 6 Day 4 Year 16

GENERATOR

INT'L

TRANSPORTER

DESIGNATED FACILITY

6-NHM-C-C-11

3-DESIGNATED FACILITY TO GENERATOR

Project #: 0-0 Order #: 145925

E² EFFECTIVE ENVIRONMENTAL

Please print or type. (Form designed for use on elite (12-pitch) typewriter.)

**NON-HAZARDOUS WASTE MANIFEST**

1. Generator ID Number: TX8170022786 / 65033
2. Page 1 of 1
3. Emergency Response Phone: 877-577-2669
4. Waste Tracking Number: NHM-145925

5. Generator's Name and Mailing Address
Naval Air Station Dallas (NAS)
c/o EnSafe Inc., 4545 Fuller Dr., Suite 342
Irving, TX 75038
Generator's Phone: 972-792-3222 ATTN: Tom Wherg

Generator's Site Address (if different than mailing address)
8100 West Jefferson
Dallas, TX 75211

6. Transporter 1 Company Name
Stericycle Specialty Waste Solutions Inc
Ph#: 972 329 1200
State ID#: 88922 / H-1496
U.S. EPA ID Number: MNS000110924

7. Transporter 2 Company Name
U.S. EPA ID Number

8. Designated Facility Name and Site Address
Itasca Landfill TX. LP
2559 FM 66
Itasca, Texas 76055
State ID#: H0241C
U.S. EPA ID Number: n/a
Facility's Phone: 254 687 2511

| 9a. HM | 9b. U.S. DOT Description (including Proper Shipping Name, Hazard Class, ID Number, and Packing Group (if any)) | 10. Containers No. | 10. Containers Type | 11. Total Quantity | 12. Unit Wt./Vol. | |
|---|---|---|---|---|---|---|
| ☐ | 1. Non-regulated material (purged ground and decon water) | 04 | DM | 220 | G | CESQ1012 Non-RCRA |
| ☐ | 2. Non-regulated material (soil cuttings Class 2 solids) | 02 | DM | 110 | G | CESQ3012 Non-RCRA |
| | 3. | | | | | |
| | 4. | | | | | |

13. Special Handling Instructions and Additional Information
01:IDW purge and decon waters NR (PF:5110167856) 55G
02:IDW Soil cuttings NR (PF:5110167855) 55G

11.1) 0.94 tn
11.2) ~~0.29 tn~~ 0.35 tn

14. **GENERATOR'S CERTIFICATION:** I certify the materials described above on this manifest are not subject to federal regulations for reporting proper disposal of Hazardous Waste.

Generator's/Offeror's Printed/Typed Name: X DAVID BARNEY
Signature: X
Month 11 Day 8 Year 16

15. International Shipments ☐ Import to U.S. ☐ Export from U.S. Port of entry/exit:
Transporter signature (for exports only): Date leaving U.S.:

16. Transporter Acknowledgment of Receipt of Materials

Transporter 1 Printed/Typed Name: Jason L Boss
Signature:
Month 11 Day 8 Year 16

Transporter 2 Printed/Typed Name: Rafael Blanco
Signature:
Month 11 Day 14 Year 16

17. Discrepancy

17a. Discrepancy Indication Space ☐ Quantity ☐ Type ☐ Residue ☐ Partial Rejection ☐ Full Rejection

Manifest Reference Number:

17b. Alternate Facility (or Generator) U.S. EPA ID Number
Facility's Phone:

17c. Signature of Alternate Facility (or Generator) Month Day Year

01: H132 02: H132

18. Designated Facility Owner or Operator: Certification of receipt of materials covered by the manifest except as noted in Item 17a

Printed/Typed Name: Cindy Reed
Signature: Cindy Reed
Month 11 Day 14 Year 16

GENERATOR

INT'L

TRANSPORTER

DESIGNATED FACILITY

6-NHM-C-C-11

2-DESIGNATED FACILITY TO GENERATOR

# SWMUs 79/136 CENTRAL PLUME

# 2016 Response Action Effectiveness Report
## SWMU 79/136 Central Plume
## Former NAS Dallas, Texas

## Professional Signatures and Seals

**Professional Geoscientist**

| | | |
|---|---|---|
| *Thomas Wiberg* | *1619* | *30 November 2017* |
| Professional Geoscientist | Geoscientist License number | Expiration date |
| | *17 Jan 2017* | |
| Signature | Date | |
| *972-791-3222* | *972-791-0405* | *twiberg@ensafe.com* |
| Telephone number | FAX number | E-mail |

**Professional Engineer**

| | | |
|---|---|---|
| | | |
| Professional Engineer | P.E. License number | Expiration date |
| | | |
| Signature | Date | |
| | | |
| Telephone number | FAX number | E-mail |

**Registered Corrective Action Specialists (RCASs) and Corrective Action Project Managers (CAPMs)**
**For LPST sites only.**

| | | |
|---|---|---|
| | | |
| Registered Corrective Action Specialist | RCAS Registration number | Expiration date |
| | | |
| Signature | Date | |
| | | |
| Corrective Action Project Manager | CAPM Registration number | Expiration date |
| | | |
| Signature | Date | |
| | | |
| Telephone number | FAX number | E-mail |

**Seals, as applicable:**

# TEXAS COMMISSION ON ENVIRONMENTAL QUALITY
## Response Action Effectiveness Report

## Cover Page

**Regulatory ID number** (Solid waste registration number, VCP ID number, etc.) *Solid Waste Code #65033*

check one: ___ Initial RAER submittal for this onsite property X Subsequent RAER submittal

Report date: *January 2017* TCEQ Region No.: *4*

**TCEQ Program** (check one)

X Corrective Action (Mail Code 127)

___ Voluntary Cleanup Program (Mail Code 221)

___ Petroleum Storage Tank Program (Mail Code 137)

___ Superfund PRP Lead (Mail Code 143)

___ Municipal Solid Waste Permits (Mail Code 124)

**Onsite Property Information**

Onsite Property Name: *Former Naval Air Station Dallas (NAS Dallas) — SWMUs 79/136 Central Plume*

Street no. *8100* Pre dir: *West* Street name: *Jefferson* Street type *Blvd* Post dir: ___

City: *Dallas* County: *Dallas* County Code: *57* Zip: *75211*

Nearest street intersection or location description: ___

Latitude: Degrees, Minutes, Seconds OR Decimal Degrees (circle one) North *32°44'29.0"*

Longitude: Degrees, Minutes, Seconds OR Decimal Degrees (circle one) West *96°57'34.5"*

**Offsite Affected Property Information**

Offsite Affected Property Name: *Not Applicable (N/A)*

Street no. ___ Pre dir: ___ Street name: ___ Street type: ___ Post dir: ___

City: ___ County: ___ County Code: ___ Zip: ___

[X] Check if no offsite properties affected

**Contact Person Information and Acknowledgement**

Person (or company) Name: *Navy BRAC PMO East*

Contact Person: *Mr. David Barney* Title: *BRAC Environmental Coordinator*

Mailing Address: *4911 S. Broad Street, Building 679*

City: *Philadelphia* State: *PA* Zip: *19112* E-mail address **david.a.barney@navy.mil**

Phone: *617-753-4656* Fax: ___

By my signature below, I acknowledge the requirement of §350.2(a) that no person shall submit information to the executive director or to parties who are required to be provided information under this chapter which they know or reasonably should have known to be false or intentionally misleading, or fail to submit available information which is critical to the understanding of the matter at hand or to the basis of critical decisions which reasonably would have been influenced by that information. Violation of this rule may subject a person to the imposition of civil, criminal, or administrative penalties.

Signature of Person BARNEY.DAVID.A.1228582553 Digitally signed by BARNEY.DAVID.A.1228582553 DN: c=US, o=U.S. Government, ou=DoD, ou=PKI, ou=USN, cn=BARNEY.DAVID.A.1228582553 Date: 2017.01.18 06:46:46 -05'00' Name, print: *David Barney* Date: ___

Check the reports/forms previously submitted:

**Remedy Standard A**

____ Self-Implementation Notice Submittal date: _____

*X* Response Action Plan — Approval date: *Draft RAP submitted November 2004*

**Remedy Standard B**

____ Response Action Plan — Approval date: _____

List all media (surface soil, subsurface soil, groundwater, sediment, surface water, air) that contained or contains a PCLE zone and specify the response action that has been or will be taken for each media. Indicate the type of removal, decontamination, physical control, or institutional control action used in the response action.

| Media | COCs[1] | Removal | Decontamination | Physical Control | Institutional Control | Modified Response Objective[2] | | |
|---|---|---|---|---|---|---|---|---|
| | | | | | | PMZ | WCU | TI |
| *Soil* | Benzene<br>Benzo(a)anthracene<br>Benzo(a)pyrene<br>Benzo(b)fluoranthene<br>Dibenzofuran<br>Dibenzo(a,h)anthracene<br>Ethylbenzene<br>Indeno(1,2,3-cd)pyrene<br>Naphthalene<br>Trichloroethene | Excavation and offsite disposal (completed in 2003) | N/A | N/A | N/A | N/A | N/A | *N/A* |
| *Groundwater* | 1,2-Dichloroethane (1,2-DCA)<br>Benzene<br>cis-1,2-Dichloroethene (cis-1,2-DCE)<br>Tetrachloroethene(PCE)<br>Trichloroethene(TCE)<br>Vinyl Chloride(VC) | Excavation and offsite disposal of source areas (completed in 2003) | EMNA and MNA | N/A | N/A | N/A | N/A | *N/A* |

Current land use of the onsite affected property: _____ Residential *X* Commercial/industrial

Projected future land use of the onsite property (if known): *X* Residential *X* Commercial/industrial

Briefly describe the affected property and PCLE zones, the conclusions from the assessment activities, identify any affected or threatened receptors, and describe any other major site conditions. If any portion of the response action is necessitated due to an aesthetic or nuisance condition, identify the nature of that condition and identify that portion of the response action conducted to address it. If any media that contains a PCLE zone is not being addressed in this response action, provide justification.

**Affected Property: SWMUs 79/136 Central Plume**

**In 1989, a Resource Conservation and Recovery Act (RCRA) Facility Assessment (RFA) was performed at Naval Air Station (NAS) Dallas in accordance with the 1984 RCRA Hazardous and Solid Waste Amendments to evaluate potential releases at Solid Waste Management Units (SWMUs) and Areas of Concern (AOCs) and to make preliminary determinations regarding the need for further action. The RFA Report included data collected as part of a Preliminary Review, a Visual Site Inspection, and a Sampling Visit, as necessary, for 135 SWMUs and six AOCs at NAS Dallas (A. T. Kearney 1989).**

[1] Specify either a specific COC or, if the response action is the same for all COCs in one type, specify the type of COC (for example, VOCs, SVOCs, metals).

[2] If a modified groundwater response objective is being used, check the type(s) of modifications.

**In 1993, NAS Dallas was identified for closure under the Base Realignment and Closure Act (BRAC). As part of the base closure activities, an Environmental Baseline Survey (EBS) was conducted at NAS Dallas to identify any potential environmental concerns related to historical operations at the base (EnSafe/Allen & Hoshall 1994). During this EBS, additional site concerns were identified at numerous buildings across the installation. In order to strategically investigate the permitted and non-permitted SWMUs, AOCs, and additional site concerns identified in the EBS, the facility was divided into six sections, called "categories", based on property use and ownership. In 1995, the Navy initiated RCRA Facility Investigation (RFI) activities at NAS Dallas at Categories A through F. Submittal of the Final RFI Reports (issued as a series of six reports — one report per category) occurred during the period from November 2000 to March 2001 (Tetra Tech Inc. [Tetra Tech] 2000a-2001b). The RFI was completed under the requirements of the Texas Risk Reduction Standards (RRS) (30 Texas Administrative Code [TAC] 335, Subchapter S), the regulatory framework in effect at the time, and closure recommendations in the RFI Reports, which were based upon Risk Reduction Standard 2 — Industrial (RRS2-IND) criteria. The RFI Reports identified those areas that required further action based on the chemical constituents detected in the soil and/or groundwater at the base.**

**The RFI Reports received conditional approval by the Texas Natural Resource Conservation Commission, now the Texas Commission on Environmental Quality (TCEQ). Final approval of the RFI Reports by TCEQ was dependent upon landowner concurrence of the RRS2-IND clean-up standard.**

**In September of 1999, the Texas Risk Reduction Program (TRRP) (30 TAC 350) was promulgated. One of the major changes resulting from TRRP was eliminating site background as a closure criterion. The most stringent closure standard under TRRP is the Residential Remedy Standard A (RES A), which consists of closure for residential use with no engineering or institutional controls (ICs).**

**In March 2001, the Navy submitted a Notice of Intention to Switch to TRRP (30 TAC 350) for five of the six categories. The one category (Category C) that was not switched to TRRP, but remained under the RRS2-IND standards, was subsequently transferred to the Department of the Army.**

**In October 2002, an Affected Property Assessment Report (APAR) was produced based on evaluation of RFI data as well as data from follow-up investigations (Tetra Tech, 2002). The data included in the APAR was compared to TRRP RES A criteria to select those sites that may be closed with no land use encumbrances and to determine which sites required corrective action. The results of this comparison indicate that 23 SWMUs (1, 2, 6, 17, 18, 21, 31, 35, 36, 60, 79, 81, 83, 84, 85, 86, 92, 102, 108, 124, 136, 138, and 139) required further actions.**

**<u>SWMUs 79/136 Central Plume</u>**

**The Main Fuel Farm (MFF) (SWMU 136) is located on the east side of Former NAS Dallas and includes Buildings 138, 139, 140, 180, 190, and 230. The MFF is divided into the Northern Fuel Farm Compound and Southern Fuel Farm Compound, both of which included grassy mounds of fill material that covered buried underground storage tanks (USTs). Five former jet fuel USTs, buried in two earthen mounds, and two waste oil USTs were located in the Northern Fuel Farm Compound area. Three buried, bermed, and earthen-mounded steel fuel storage tanks were located in the Southern Fuel Farm Compound.**

**Nine dry wells, formerly used for disposal of liquid wastes, were reported in the MFF area. Dry Wells Nos. 1, 6, and 7 were located in the Northern Fuel Farm Compound. Dry Wells Nos. 2, 3, 4, 8, and 9 were located near Buildings 138, 139, and 140. Dry Well No. 5 was located in the Southern Fuel Farm Compound. Both the buried USTs and the dry wells have been identified as potential sources of contamination and as pathways for the introduction of contaminants to the subsurface. The USTs located in the MFF were removed by the Navy's Charleston Detachment in May and October 1998. Removal actions in the areas of Dry Well Nos. 1, 2, 4, 5, 6, and 9, addressing the dry well structures and surrounding soil, were conducted by the Navy's Remedial Action Contractor (RAC) during field activities commencing in October 1998. Dry Well Nos. 3, 7, and 8 could not be located.**

**The Main Fuel Farm Storm Sewer (MFFSS) (SWMU 79) is located on the northeast side of Former NAS Dallas to the east of the MFF. The MFFSS collected MFF surface water runoff and fuel spills, which were treated in oil/water separator (OWS) 44 that was removed in 1999 as part of a base-wide**

effort to remove USTs. The outfall point of SWMU 79 is adjacent to the northern property line of the base near Building 193. The drainage ditch continues off-base in a northeastward direction, eventually connecting with the continuation of the Texas Air National Guard (TANG) Drainage Ditch to the northeast of the base, where it discharges into Mountain Creek downstream of the Mountain Creek Lake Dam. The results of the RFI for the MFFSS area indicate that groundwater at the site has been impacted by both aromatic and chlorinated volatile organic compounds (VOC).

**Soil**

Based upon the data obtained during the RFI and subsequently evaluated in the APAR, further action was recommended at SWMUs 79/136 Central due to exceedances of VOCs in the soil. Consequently, excavation of impacted soil was recommended by the Navy and carried out by the Navy's RAC in 2003. The RACR for the soil removal activities was prepared and submitted to the TCEQ in March 2005. The RACR has undergone several review cycles by the City of Dallas, U.S. Environmental Protection Agency (U.S. EPA), and TCEQ and the final replacement pages for the RACR were submitted to the TCEQ in May 2008 (CH2M Hill, 2008). The TCEQ granted final approval of the RACR in July 2008 (TCEQ, 2008).

**Groundwater**

The results of the RFI for Category F (Tetra Tech, 2000c) indicate that groundwater at the site has been impacted by chlorinated Volatile Organic Compounds (CVOC). As described in the APAR, the groundwater of this SWMU is located within a Class 2 groundwater resource area. The high degree of heterogeneity associated with the shallow groundwater bearing unit (GWBU) onsite has resulted in a discrete groundwater Protective Concentration Level Exceedance (PCLE) zone associated with the SWMU 79/136 Central Plume that required a response action to reduce the concentration of chemicals of concern (COCs) to less than the respective critical Protective Concentration Levels (PCLs). Subsequent to the APAR, a Response Action Plan (RAP) was submitted to the TCEQ for groundwater at the SWMUs 79/136 Central Plume (Tetra Tech, 2004b).

As indicated in the initial RAP, enhanced monitored natural attenuation (EMNA) followed by monitored natural attenuation (MNA) was chosen as a decontamination remedy to address the PCLE zone that was identified at the SWMUs 79/136 Central Plume.

The EMNA pilot study was implemented in the area of highest dissolved-phase COC concentrations, known as Advanced Science Incorporated Area 5 (ASA-5) East. ASA-5 East is located between Category C and Category F at Former NAS Dallas, approximately 200 feet from the property boundary to the north. In late 2002 and early 2003, the first stage of the pilot study was initiated in the ASA-5 East area to determine the effectiveness of hydrofracturing and the injection of pre-treatment reagents to reduce COC mass in the subsurface. Initially, the pilot test returned favorable results with significant COC reduction in one of the target monitoring wells and moderate COC reduction in another. The pilot study work plan indicated that once the COC mass was reduced sufficiently through the pre-treatment process, the pilot test would be completed through the injection of a biological enhancing agent [i.e., lactic acid, Hydrogen Release Compound, etc.] to complete the reduction of the chlorinated COCs to their critical PCLs. The pilot test was, however, discontinued in 2005 when COCs were detected at increasing concentrations in the downgradient monitoring well (508F23MW). The Navy subsequently installed monitoring wells 508F57MW and 508F58MW downgradient of 508F23MW in 2006 to confirm that the COCs had not migrated offsite. Based on COC data collected from these monitoring wells, the Navy installed additional downgradient monitoring wells 508F59MW, 508F60MW, and 508F61MW to further confirm that the COCs had not migrated offsite. The results of the pilot study were presented in a report to the TCEQ in October 2008 and concluded that EMNA did not appear to be an appropriate remedial method to reduce the COC concentrations within the existing groundwater PCLE zone to levels less than their respective critical PCLs by the target year 2017. The TCEQ concurred with the findings of the final pilot test report in a letter dated 29 September 2009 (TCEQ, 2009).

A re-evaluation of plume dynamics was presented in an Alternatives Evaluation Report (AER) (Resolution Consultants, 2013), and a determination was made that MNA alone would not effectively reduce the concentrations of COCs in groundwater at SWMUs 79/136 to achieve remedial goals by the year 2017.

Given that the remedy for the 2004 Groundwater RAP for SWMU 79/136 Central will not achieve the critical PCLs within the timeframe specified, and as recommended by TCEQ in a letter dated May 26, 2015,

**failure of the response action triggers the implementation of contingency measures, which may include the selection of an appropriate alternate remedial measure. The Navy has proposed to implement enhanced MNA (EMNA) as an alternate remedy at the affected area of SWMU 18 groundwater plume in an effort to reduce COCs to below PCLs. This will allow the Navy to make a determination as to whether the technology is viable. Depending upon the results of the EMNA spot treatment at SWMU 18, alternative remedial measures may be proposed in a comprehensive RAP for SWMU 79/136 Central Plume. MNA will be continued for the upcoming year in accordance with the procedures and protocols described in the Groundwater RAP, dated November 2004.**

**In October 2015, the Navy submitted a revised RAP (Revision 3) (Resolution Consultants, 2015) to TCEQ. The purpose of the revised RAP was to remove monitor wells with no history of COC detections, or with COC detections below the applicable GWPS for at least the previous five consecutive years, from the current monitoring and sampling plan and confirmation sampling plan. In accordance with the RAPs, Resolution Consultants conducted plugging and abandonment (P&A) of select groundwater monitoring wells in April 2016. P&A actions were conducted by a state of Texas licensed driller (Strata Core Services, SCI). Three wells (508F50MW, 508G01MW, and 508G05MW) were abandoned at SWMUs 79/136 Central.**

**Potential receptors are onsite residents, onsite employees, and onsite construction workers. Since the groundwater PCLE zone is not projected to migrate offsite based on groundwater modeling results and other lines of evidence, it is not anticipated that offsite receptors will be affected. The possible routes of exposure to groundwater are inhalation (onsite residents, onsite employees, and onsite construction workers) and dermal contact (onsite construction workers). Ingestion is not a concern since during the implementation of the response actions as there is controlled access to the site, which limits potential exposures to contaminated groundwater (i.e., no potable or irrigation wells will be installed) through 2017. The potential for inhalation of vapor from groundwater through soil to outdoor air is insignificant because the maximum detected COC concentrations in groundwater are less than their respective inhalation of volatiles from groundwater ($^{Air}GW_{Inh-V}$) PCLs. Additionally, the indoor air sampling conducted in a sealed building at a similar plume at the base (Building 1406 within the SWMU 21 area) indicated that no CVOCs were detected in the indoor air (TtNUS, 2004b). The recent Vapor Intrusion Study at SWMU 21 (Resolution Consultants, 2015) also concluded that sub-slab TCE and cis-1,2-DCE concentrations were well below VISLs for sub-slab vapor as well as RSLs for indoor air. Furthermore, the analytical results indicated that neither TCE nor cis-1,2-DCE were detected in indoor air samples. Therefore, vapor intrusion is not a current concern at NAS Dallas.**

# CHRONOLOGY OF MAJOR EVENTS

| | |
|---|---|
| Sep. 1985 | Initial Assessment Study was prepared and submitted. |
| Jan. 1987 | Confirmation Study and Verification Step Report was prepared and submitted. |
| Mar. 1989 | RFA was prepared and submitted. |
| 1993 — 1994 | EBS was prepared and submitted. |
| Mar. 1994 | BRAC Cleanup Plan was prepared and submitted. |
| 1995 — 1996 | Basewide Round 1 groundwater sampling event (Directed Phase RFI). |
| 1996 — 1997 | Interim Draft RFI Reports were prepared and submitted for each category identified at the air station. |
| Mar. — June 1998 | Basewide Round 2 groundwater sampling event (Chase Phase RFI). |
| May — Oct. 1998 | MFF USTs were removed by the Navy's Charleston Detachment, along with other tanks basewide. |
| June 1998 — Jan. 1999 | Release Determination Report was prepared and submitted covering the removal of the MFF tanks. |
| Aug. — Sep. 1998 | Basewide Round 3 groundwater sampling event. |
| Sep. 1998 | Most military operations on NAS Dallas ceased and the air station was placed into caretaker status. |
| Dec. 1998 — Jan. 2000 | Removal of OWS basewide. |
| Jan. — Oct. 1999 | Basewide removal of hot spot areas of contamination. |
| Feb. — Apr. 1999 | Basewide Round 4 groundwater sampling event. |
| Sep. — Oct. 1999 | Removal of the remaining USTs basewide. |
| Sep. — Nov. 1999 | Basewide Round 5 groundwater sampling event. |
| July 1999 — Feb. 2000 | Basewide pre-Corrective Measures Study monitoring well installation and sampling event. |
| June — July 2000 | Preliminary groundwater investigation at ASA-5 site in the MFF/MFFSS area. |
| July — Aug. 2000 | Basewide Round 6 groundwater sampling event. |
| Aug. — Sep. 2000 | Aquifer tests were conducted at five sites across Former NAS Dallas to determine aquifer properties. |
| 2000 — 2001 | Final RFI Reports were prepared and submitted for each category. |
| June — July 2001 | Basewide Round 7 groundwater sampling event, including evaluation of alternate sampling methods (i.e., passive diffusion bag [PDB] and HydraSleeve). |
| Sep. 2001 | EMNA pilot test initiated at ASA-5 site (SWMUs 79/136) involving the injection of $KMnO_4$. |
| Feb. 2002 | MNA Groundwater Modeling Report for MFF/MFFSS was prepared and submitted. |
| Mar. 2002 | Technical Memorandum Groundwater Sampling Procedure Comparison for selected monitoring wells was prepared and submitted. |
| Oct. 2002 | APAR was prepared and submitted. |
| Dec. 2002 — Mar. 2003 | Basewide Round 8 groundwater sampling event. |
| Jan. 2003 | Monitoring Well Abandonment Plan was prepared and submitted. |
| Jan. 2003 | Draft MNA Groundwater Modeling Report for Category D Sites was prepared and submitted. |

| | |
|---|---|
| Jan. 2003 | Corrective action (excavation and disposal) initiated on the Rubble Landfill (SWMU 1). |
| Feb. 2003 | Draft RAP for MFF/MFFSS soils was prepared and submitted. |
| Apr. 2003 | Draft RAP for Category D Sites soils was prepared and submitted. |
| Apr. 2003 | Final Groundwater Report to satisfy Provision VIII.D.8 of the Former NAS Dallas RCRA Hazardous Waste Storage Permit (No. HW-50276) was prepared and submitted. |
| May 2003 | Self Implementation Notice (SIN) for TRRP RES A Soil Response Actions for SWMUs 2, 6, 18, 21, 31, 35, 36, 60, 79, 81, 83, 84, 85, 86, 102, 124, 138, and 139 was prepared and submitted. |
| June 2003 | Draft MNA Groundwater Modeling Report for Category B was prepared and submitted. |
| June 2003 | RCRA Permit renewal and Compliance Plan applications submitted to the TCEQ. |
| June 2003 | Corrective action (excavation, solidification, and disposal) initiated on the TANG Ponds (SWMU 92). |
| July — Aug. 2003 | Basewide Round 9 groundwater sampling event. |
| Aug. 2003 | Corrective action (excavation, disposal, and backfill) initiated on the sites covered in the SIN submitted in May 2003. |
| Aug. 2003 | 2002 Annual Groundwater Monitoring Report was prepared and submitted. |
| Dec. 2003 — Jan. 2004 | Basewide Round 10 groundwater sampling event. |
| Jan. 2004 | Soil RACR was prepared and submitted for the Rubble Landfill (SWMU 1). |
| Jan. 2004 | Soil RACR was prepared and submitted for the TANG Ponds (SWMU 92). |
| Mar. 2004 | TCEQ produced and distributed the Draft RCRA Permit and Draft Compliance Plan. |
| Apr. 2004 | Final Addendum to MNA Groundwater Modeling Report for MFF/MFFSS was prepared and submitted. |
| May 2004 | 2003 Groundwater Response Action Effectiveness Reports (RAER) were prepared and submitted. |
| June 2004 | Indoor and Outdoor Air Sampling at Building 1406 Report was prepared and submitted. |
| July 2004 | Basewide Round 11 groundwater sampling event. |
| July 2004 | Final MNA Groundwater Modeling Report for Category D was prepared and submitted. |
| Sep. 2004 | Final MNA Groundwater Modeling Report for Category B was prepared and submitted. |
| Sep. 2004 | TCEQ approved final closure documentation for the Miscellaneous Sites Soil RACR. |
| Oct. 2004 | Basewide Round 12 groundwater sampling event. |
| Oct. 2004 | TCEQ approved Final MNA Groundwater Modeling Report for Category D Sites at Former NAS Dallas. |
| Oct. 2004 | TCEQ approved Final Addendum to the MNA Groundwater Modeling Report for MFF/MFFSS at Former NAS Dallas. |
| Oct. 2004 | TCEQ approved Final Groundwater Report for Former NAS Dallas. |
| Oct. 2004 | TCEQ approved the 2002 Annual Groundwater Monitoring Report. |
| Nov. 2004 | Final RAP (Basewide) for groundwater was prepared and submitted. |

| | |
|---|---|
| Dec. 2004 | 2004 Semi-annual Groundwater Monitoring Report was prepared and submitted. |
| Dec. 2004 | TCEQ issued comments on the 2003 Groundwater RAERs. |
| Jan. 2005 | 2004 Groundwater RAERs were prepared and submitted. |
| Mar. 2005 | Monitoring Well Installation and Abandonment Plan was prepared and submitted. |
| Mar. 2005 | Draft 84 Sites Soil RACR was prepared and submitted. |
| Apr. 2005 | 2004 Groundwater RAERs were prepared and submitted. |
| Apr. 2005 | Basewide Round 13 groundwater sampling event. |
| June 2005 | Corrective action for groundwater (excavation, disposal, and backfill) initiated at SWMU 85. |
| June 2005 | Corrective action for groundwater (excavation, disposal, and backfill) initiated at SWMU 18. |
| July 2005 | Basewide Round 13 groundwater sampling event. |
| Aug. 2005 | TCEQ issued comments on the Draft 84 Sites Soil RACR. |
| Aug. 2005 | 2005 Semi-annual Groundwater Monitoring Report was prepared and submitted. |
| Sep. 2005 | TCEQ issued comments on the 2004 Groundwater RAPs. |
| Oct. 2005 | TCEQ issued comments on the 2004 Groundwater RAERs. |
| Oct. 2005 | Basewide Round 14 groundwater sampling event. |
| Oct. — Dec. 2005 | City of Dallas issued comments on the Draft 84 Sites Soil RACR. |
| Dec. 2005 | TCEQ issued comments on the 2005 Semi-annual Groundwater Monitoring Report. |
| Jan. 2006 | 2005 Groundwater RAERs were prepared and submitted. |
| Jan. 2006 | Basewide Round 15 groundwater sampling event. |
| Feb. 2006 | Revised Groundwater RAPS (Revision 2) were prepared and submitted covering SWMUs 17/Building 1423, 17/Building 1429, 18, 35, 85, 86, 108, 136 North, 136 South, and 139. |
| Mar. 2006 | RACR for groundwater removed at SWMUs 18 and 85 were prepared and submitted. |
| May 2006 | Basewide Round 15B groundwater sampling event. |
| May 2006 | TCEQ issued comments on the 2005 Groundwater RAERs. |
| June 2006 | 85 Sites, Defense Reutilization and Marketing Office (DRMO), and Naval Weapons Industrial Reserve Plant (NWIRP) SWMU 18 Soil RACRs (Revision 1) were prepared and submitted. |
| July 2006 | TCEQ issued comments on the Groundwater RAPs (Revision 2). |
| July 2006 | EMNA Pilot Test initiated at SWMU 21 involving the injection of zero valent iron. |
| Aug. 2006 | Basewide Round 16 groundwater sampling event. |
| Aug. 2006 | Responses to TCEQ comments on the Groundwater RAPs (Revision 2), including replacement pages, were prepared and submitted. |
| Nov. 2006 | Basewide Round 16B groundwater sampling event. |
| Dec. 2006 | RACR for groundwater PCL at SWMU 35 was prepared and submitted. |
| Dec. 2006 | TCEQ approves Groundwater RAP (Revision 2) covering SWMUs 17/Building 1423, 17/Building 1429, 18, 35, 85, 86, 108, 136 North, 136 South, and 139. |
| Jan. 2007 | 2006 Groundwater RAERs were prepared and submitted. |
| Apr. 2007 | Groundwater Sampling Work Plan Addendum, Slug Test Work Plan, and Monitoring Well Installation and Abandonment Work Plan were prepared and submitted. |

| | |
|---|---|
| Apr. — May 2007 | Basewide Round 17 groundwater sampling event. |
| Apr. — June 2007 | SWMU 18 OWS removal operations were conducted. |
| Apr. 2007 | Slug test operations conducted at SWMUs 18, 85, and 139. |
| Aug. — Sep. 2007 | Basewide Round 18 groundwater sampling event. |
| Nov. 2007 | Field Activities for SWMU 21 EMNA Pilot Study completed. |
| Jan. 2008 | Basewide Round 19 groundwater sampling event. |
| Jan. 2008 | 2007 Groundwater RAERs were prepared and submitted. |
| Feb. 2008 | TCEQ approves the Groundwater RACR for SWMU 35. |
| Apr. 2008 | Comments to the 85 Sites, DRMO, and NWIRP SWMU 18 Soil RACRs revisions were received from the TCEQ. |
| May 2008 | TCEQ issued comments on the 2007 Groundwater RAERs. |
| May 2008 | Response to the 85 Sites, DRMO, and NWIRP SWMU 18 Soil RACRs comments were submitted to the TCEQ. |
| July 2008 | Basewide Round 20 groundwater sampling event. |
| July 2008 | TCEQ grants final approval of the 85 Sites, DRMO, and NWIRP SWMU 18 Soil RACRs. |
| July 2008 | Response to TCEQ comments on 2007 Groundwater RAERs, replacement pages (Revision 1) to 2007 RAERs prepared and submitted. |
| Oct. 2008 | Technical Memorandum, ASA-5 East Site EMNA Pilot Study prepared and submitted. |
| Oct. 2008 | Technical Memorandum, Pilot Study at SWMU 21 prepared and submitted. |
| Oct. 2008 | SWMU 17/Building 1429 Pilot Test Work Plan prepared and submitted. |
| Dec. 2008 | SWMU 139 Groundwater RACR prepared and submitted. |
| Jan. 2009 | Basewide Round 21 groundwater sampling event. |
| Jan. 2009 | 2008 Groundwater RAERs prepared and submitted. |
| Jan. 2009 | Revised Groundwater RAPs for SWMU 21 (Revision 2) prepared and submitted. |
| Jan. 2009 | Revised Groundwater RAPs for SWMUs 79/136 Central (Revision 2) prepared and submitted. |
| Jan. 2009 | Revised Groundwater RAP for SWMU 136 South (Revision 4) prepared and submitted. |
| May 2009 | SWMU 21 Pilot Study additional groundwater sampling. |
| May 2009 | SWMU 79/136 Central non-compliant monitoring well groundwater sampling. |
| May 2009 | TCEQ grants conditional approval of the SWMU 139 Groundwater RACR. |
| June 2009 | ASA-5 Pilot Test injection points abandonment. |
| June 2009 | SWMU 35 monitoring well abandonment. |
| July 2009 | Basewide Round 22 groundwater sampling event. |
| July 2009 | SWMU 21 Pilot Study revised Technical Memorandum prepared and submitted. |
| Sep. 2009 | SWMU 21 Pilot Study monitoring wells abandonment. |
| Oct. 2009 | SWMU 136 South non-compliant monitoring well groundwater sampling. |
| Nov. 2009 | Response to TCEQ comments on 2008 Groundwater RAERs prepared and submitted. |
| Jan. 2010 | Basewide Round 23 groundwater sampling event. |
| Jan. 2010 | 2009 Groundwater RAERs prepared and submitted. |

| | |
|---|---|
| July 2010 | Basewide Round 24 groundwater sampling event. |
| Aug. 2010 | Basewide monitoring well network inspection and five-year survey. |
| Nov. 2010 | Response to TCEQ comments on 2009 Groundwater RAERs prepared and submitted. |
| Dec. 2010 | Monitoring wells general maintenance and minor repairs completed. |
| Jan. 2011 | Basewide Round 25 groundwater sampling event. |
| Jan. 2011 | 2010 Groundwater RAERs prepared and submitted. |
| March 2011 | Monitor well inspection at SWMU 21/SWMU 18 on monitoring wells within the 20-acre area leased to the Air National Guard. |
| May 2011 | Addendum to Monitoring Well Installation and Abandonment Plan prepared and submitted. |
| June 2011 | SWMU 139 monitoring wells plugged and abandoned. |
| June 2011 | SWMU 81 monitoring wells plugged and abandoned. |
| June 2011 | Repairs, abandonment and replacement of damaged monitoring wells at SWMU 21 and SWMU18. |
| July. 2011 | Basewide Round 26 groundwater sampling event. |
| Dec. 2011 | Response to TCEQ comments on 2010 Groundwater RAERs prepared and submitted. |
| Jan. 2012 | Basewide Round 27 groundwater sampling event. |
| March 2012 | 2011 Groundwater RAERs prepared and submitted. |
| July 2012 | Basewide Round 28 groundwater sampling event. |
| Aug. 2012 | EPA comments to the 2011 Groundwater RAER. |
| Oct. 2012 | TCEQ comments to the 2011 Groundwater RAER. |
| Jan. 2013 | Basewide Round 29 groundwater sampling event. |
| Jan. 2013 | 2012 Groundwater RAERs prepared and submitted |
| Feb. 2013 | TCEQ comments to the 2012 Groundwater RAER. |
| June 2013 | EPA comments to the 2012 Groundwater RAER. |
| July 2013 | Basewide Round 30 groundwater sampling event. |
| July 2013 | Response to TCEQ comments on 2012 Groundwater RAERs prepared and submitted. |
| Jan. 2014 | Basewide Round 31 groundwater sampling event. |
| Jan. 2014 | 2013 Groundwater RAERs prepared and submitted. |
| Feb. 2014 | TCEQ comments to the 2013 Groundwater RAER. |
| June 2014 | EPA comments to the 2013 Groundwater RAER. |
| July 2014 | Basewide Round 32 groundwater sampling event. |
| July 2014 | Response to TCEQ comments on 2013 Groundwater RAERs prepared and submitted. |
| Nov. 2014 | RCRA Permit renewal and Compliance Plan (Number 50276) applications submitted to the TCEQ. |
| Jan. 2015 | Basewide Round 33 groundwater sampling event. |
| Jan. 2015 | 2014 Groundwater RAERs prepared and submitted. |
| May 2015 | TCEQ Permit Renewal Application Technical Notice of Deficiency (NOD) Letter, dated May 26, 2015. |

| | |
|---|---|
| June 2015 | Meeting with TCEQ, EPA, and City of Dallas |
| June 2015 | TCEQ comments letter to the 2014 Groundwater RAER, dated June 10, 2015. |
| June 2015 | Submittal of Draft revised RAP for SWMU 17/Building 1429, received June 23, 2015. |
| June 2015 | Response to TCEQ comments to the Response to Permit Renewal Application Technical NOD Letter for Former Dallas Naval Air Station (NAS), Dallas, Texas, dated June 26, 2015. |
| July 2015 | Basewide Round 34 groundwater sampling event. |
| July 2015 | TCEQ Permit Renewal Application Second Technical Notice of Deficiency Letter, dated July 24, 2015. |
| July 2015 | Response to TCEQ Comments on the Technical Memorandum Pilot Study for SWMU 21, Rev. 1, July 2009 submitted to the TCEQ, dated July 24, 2015. |
| Oct. 2015 | Basewide submittal of Revised and Interim Response Action Plans. |
| Dec. 2015 | Draft Final Enhanced Monitored Natural Attenuation (EMNA) Spot Treatment Workplan for SWMU 18 prepared and submitted to TCEQ. |
| Dec. 2015 | Amendment to the Approved Class V Underground Injection Control (UIC) Permit (5X2600432) prepared and submitted to TCEQ. |
| Jan. 2016 | Basewide Round 35 groundwater sampling event. |
| Jan. 2016 | TCEQ, U.S. EPA, and City of Dallas approve EMNA workplan. |
| Jan. 2016 | 2015 Groundwater RAERs prepared and submitted. |
| Jan. 2016 | EMNA Spot Treatment Design Verification Testing at SWMU 18 by Resolution Consultants and Regenesis Remediation Services. |
| March 2016 | Draft Tier II Sampling and Analysis Plan Addendum #1, Long-Term Monitoring Plan Enhanced Monitored Natural Attenuation Spot Treatment at SWMU 18 Former Naval Air Station Dallas, Dallas, Texas prepared and submitted to TCEQ. |
| March 2016 | Amendment to the Approved Class V UIC Permit (5X2600432) prepared and submitted to TCEQ. |
| Apr. 2016 | TCEQ approves UIC amendment request. |
| Apr. 2016 | Basewide monitor well plugging and abandonment and operation and maintenance actions, installation of monitor well 508F98MW in SWMU 79 |
| Apr. 2016 | EMNA Spot Treatment at SWMU 18 baseline groundwater sampling event. |
| May 2016 | EMNA Spot Treatment at SWMU 18 injections by Resolution Consultants and Regenesis Remediation Services. |
| Jul. 2016 | Basewide Round 36 groundwater sampling event. |
| Aug. 2016 | Deploy passive diffusion bags at EMNA Spot Treatment well 606D152. |
| Sep. 2016 | Basewide operations and maintenance activities completed. |
| Sep. 2016 | EMNA Spot Treatment at SWMU 18 first quarterly performance groundwater monitoring event. |

| | |
|---|---|
| Sep. 2016 | Draft Tier II Sampling and Analysis Plan Addendum #2, Long-Term Monitoring Plan, Enhanced Monitored Natural Attenuation, Perfluoroalkyl Substances Groundwater Investigation, Former Naval Air Station Dallas, Dallas, Texas prepared and submitted to TCEQ. |

# Checklist for Report Completeness

Use this checklist to determine the portions of the form that must be submitted for this report. Answer all questions by checking Yes or No. If the answer is Yes include that portion of the report. If the answer is No, do not complete or submit that portion of the report. All form contents that are marked "Required" must be submitted. Form contents marked with an asterisk (*) are not included in the blank form and are to be provided by the person.

| | | | Report Contents | |
|---|---|---|---|---|
| | | Required | **Cover Page** | ☒ |
| | | Required | **Executive Summary** | ☒ |
| | | Required | **Checklist for Report Completeness** | ☒ |
| | | Required | **Worksheet 1.0** Response Action Objectives | ☒ |
| | | Required | **Attachment 1A*** Maps and Cross Sections | ☒ |
| | | Required | **Attachment 1B*** Graphs | ☒ |
| | | Required | **Attachment 1C*** Response Action Diagrams | ☐ *N/A* |
| No ☒ | Is a plume management zone being used as part of the response action? | ☐ Yes | **Worksheet 2.0** Plume Management Zone | ☐ |
| | | | **Attachment 2A*** Map of Plume Management Zone | ☐ |
| No ☒ | Was an area of technical impracticability approved for use as part of the response action? | ☐ Yes | **Worksheet 3.0** Technical Impracticability | ☐ |
| | | | **Attachment 3A*** Map of Technical Impracticability | ☐ |
| No ☒ | Are institutional controls used or required as part of the response action? | ☐ Yes | **Worksheet 4.0** Institutional Controls | ☐ |
| | | Required | **Worksheet 5.0** Performance Measures and Problems | ☒ |
| No ☐ | Have any operation and maintenance activities been conducted? | ☒ Yes | **Worksheet 6.0** Operation and Maintenance | ☒ |
| No ☒ | Has there been any change to the plans for post-response action care from that submitted in the RAP? | ☐ Yes | **Worksheet 7.0** Post-Response Action Care | ☐ |
| No ☐ | Was any information for this report obtained from outside sources? | ☒ Yes | **Appendix 1*** References | ☒ |
| No ☒ | Is an ESA and/or Compensatory Restoration being used as part of the response action? | ☐ Yes | **Appendix 2*** ESA and Compensatory Restoration | ☐ |

| Checklist for Report Completeness | ID No. *SWR 65033* *SWMUs 79/136 Central Plume* | Report Date: *01/17/2016* |
|---|---|---|

| | | | | |
|---|---|---|---|---|
| No ☒ | Are institutional controls or landowner concurrence required in the response action? | ☐ Yes → | **Appendix 3*** Institutional Controls and Landowner Concurrence | ☐ |
| No ☐ | Is there data or boring/monitor well information not previously submitted? | ☒ Yes → | **Appendix 4*** Data Tables, Boring Logs, and Well Completions | ☒ |
| No ☒ | Did sampling procedures differ from those described in the RAP? | ☐ Yes → | **Appendix 5*** Sampling Procedures | ☐ |
| No ☐ | Has any sampling been conducted for which the analytical results were not previously submitted? | ☒ Yes | **Appendix 6*** Laboratory Data Packages | ☒[1] |
| No ☐ | Were statistics or geostatistics used in the response action? | ☒ Yes → | **Appendix 7*** Statistical Methodology | ☒[2] |
| No ☐ | Were any wastes generated that were not reported through STEERS? | ☒ Yes | **Appendix 8*** Waste Disposition | ☒ |

***Notes:***

[1] Included with 2015 RAER in CD format.

[2] Included with 2015 RAER for SWMU 17/Building 1423.

Use this worksheet to describe the response action objectives in each media.

## Response Action Objectives — SWMUs 79/136 Central Plume

What is the selected remedy standard for this affected property? *X* A ___ B

List the environmental media to which this applies *Soil*

Repeat this section for each medium that had a different response action objective.

Provide a detailed description of the response action. Describe the removal actions, decontamination actions, treatment system(s), and/or physical or institutional control actions that have been conducted in each media and indicate if there were any differences between the actions taken and the actions proposed in the SIN or RAP.

**Based upon the data obtained during the RFI and subsequently evaluated in the APAR, further action was recommended at SWMUs 79/136 Central due to exceedances of VOCs in soil. Consequently, excavation of impacted soil in the MFF upgradient of SWMUs 79/136 was recommended by the Navy and carried out by the Navy's RAC in 2003. The RACR for the soil removal activities was prepared and submitted to the TCEQ in March 2005. The RACR has undergone several review cycles by the City of Dallas, U.S EPA, and TCEQ and the final replacement pages for the RACR were submitted to the TCEQ in May 2008 (CH2M Hill, 2008). The TCEQ granted final approval of the RACR in July 2008 (TCEQ, 2008).**

List the environmental media to which this applies *Groundwater*

Repeat this section for each medium that had a different response action objective.

Provide a detailed description of the response action. Describe the removal actions, decontamination actions, treatment system(s), and/or physical or institutional control actions that have been conducted in each media and indicate if there were any differences between the actions taken and the actions proposed in the SIN or RAP.

**Initially, the proposed groundwater response action for the site consisted of excavation of source areas in the MFF upgradient of SWMUs 79/136 (completed in 2003) as a removal remedy followed by EMNA and MNA as a two-stage decontamination remedy to reduce the concentration of COCs to less than their critical PCLs. The in-situ groundwater EMNA was recommended because the fate and transport modeling results (Tetra Tech, 2004a) indicated that within the range of sensitivity runs for the calibrated model used to simulate the natural biological reductive dechlorination process, this process would not reduce the chlorinated VOC concentrations to less than their respective PCLs in the required time period (i.e., on or before 2017). Therefore, the pilot study was conducted in late 2002 and early 2003 to evaluate the feasibility of injecting reagents into the subsurface of SWMUs 79/136 Central Plume to enhance the degradation of COCs at the site.**

**The EMNA pilot study was implemented in the area of highest dissolved-phase COC concentrations, known as ASA-5 East. ASA-5 East is located between Category C and Category F at Former NAS Dallas, approximately 200 feet from the property boundary to the north. The treatment zone covered approximately 150 feet by 70 feet horizontally and 25 feet vertically. In late 2002 and early 2003, the chemical oxidation phase of the pilot study was conducted in the ASA-5 East area to determine the effectiveness of EMNA by hydrofracturing coupled with the injection of pre-treatment reagents to reduce the COCs in the subsurface. The chemical oxidation phase of the pilot test returned favorable results with significant COC reduction in one of the target monitoring wells and moderate COC reductions in another. However, the pilot test was discontinued in 2005 when COCs were detected at increasing concentrations in the downgradient monitoring well (508F23MW). The Navy subsequently installed monitoring wells 508F57MW, 508F58MW, 508F59MW, 508F60MW, and 508F61MW downgradient of 508F23MW in 2006 and 2007 to confirm the extent of COC migration. The results of the pilot study were presented in a report issued in October 2008 (Tetra Tech, 2008). The TCEQ concurred with the findings of the final pilot test report in a letter dated 29 September 2009 (TCEQ, 2009).**

**The EMNA pilot study report concluded that reagent injection via hydraulic fracturing was limited in its treatment capacity and was not recommended for the site since reagent injection was promoting plume migration (Tetra Tech, 2008). In addition, the results of the chemical oxidation phase of the pilot study indicated that additional reagent injection would be necessary to achieve the COC mass and concentration reductions needed to reach the remedial goals by the year 2017. As a result of the plume migration, the injection of bio-enhancing substrates into the groundwater to enhance the natural biodegradation of the remaining chlorinated VOCs at the site was not conducted.**

**Based on the historical COC concentration trends to date for SWMU 79/136 Central, the groundwater plume lying under the City of Dallas, Exelon, and Army Reserve properties will not reach the clean-up goals by the year 2017 through MNA alone.**

**Based on the work conducted to date, it can be concluded that COC degradation has not been enhanced sufficiently at the SWMUs 79/136 Central groundwater plume to satisfy critical PCL concentrations on or before the year 2017. At this time, the only PCL exceeded at this site is the groundwater ingestion ($^{GW}GW_{ing}$) criteria. In addition, the current conceptual MNA model for the site indicates that the ongoing biological reductive dechlorination process can control plume expansion, and in time, reduce the COC concentrations within the existing groundwater PCLE zones to levels less than human health ingestion PCLs. This conclusion has been substantiated through the groundwater analytical results obtained during the post-pilot study period from monitoring wells downgradient of the SWMUs 79/136 Central Plume, as shown in the concentration versus (vs.) distance graphs included in Attachment 1B.**

Describe how the response action has, or is working towards, achievement of the property-specific response objectives for the PCLE zone in each medium in the context of the response objectives set forth in §350.32 or §350.33, as applicable. Explain how the response action is appropriate based on the hydrogeologic and COC characteristics. Describe any unprotective conditions that continued or resulted from the remedial actions and the actions taken to mitigate unprotective conditions.

**The results of the pilot test conducted at the SWMUs 79/136 Central plume indicate that the originally proposed response action of MNA and EMNA will not meet the groundwater response objectives of §350.32 for the contaminated groundwater in the PCLE zones. Neither MNA alone nor EMNA coupled with MNA will reduce the COCs to less than their critical PCLs on or before the year 2017 throughout the SWMU 79/136 Central groundwater plume by the year 2017.**

**The westernmost portion of the SWMU 79/136 Central plume extends 0.1 acres on City of Dallas property and 0.15 acres on land owned by Exelon. What makes the implementation of any active groundwater remediation options difficult is the fact that main water lines, gas lines, and electrical banks are present in the area that preclude the use of remedial alternatives such as thermal remediation and high pressure amendment injection. In addition, as depicted in current and historical groundwater gradient maps of the area, and as described in the Monitored Natural Attenuation Groundwater Modeling Report for Main Fuel Farm/Main Fuel Farm Storm Sewer (Tetra Tech, 2002), the area to the west of the Main Fuel Farm, where groundwater exceedances remain on City of Dallas property, has closely combined potentiometric surface contours. This is due to the very low horizontal hydraulic conductivities in this area caused by the absence of the hydraulically transmissive gravel clay layer resulting in the impedance of groundwater flow and a steep natural hydraulic gradient. This would hinder the success of alternate remedial options such as installation of ZVI borings (as formerly proposed for SWMU 17 Bldg. 1429) for which treatment effectiveness relies on the ability of groundwater to move across an area and come in contact with the ZVI for reductive dechlorination to occur.**

**Based on primary lines of evidence, neither MNA alone nor EMNA coupled with MNA appears to be an appropriate remedy to reduce the COCs to less than their critical PCLs on or before the year 2017 throughout the SWMUs 79/136 Central groundwater plume.**

**Therefore, in accordance with the Draft Groundwater RAP (Revision 1), dated November 2004, and as recommended by TCEQ in a letter dated May 26, 2015, failure of the response action triggers the implementation of contingency measures, which may include the selection of an appropriate alternate remedial measure. The Navy has proposed to implement EMNA as an alternate remedy at the affected area of SWMU 18 groundwater plume in an effort to reduce COCs to below PCLs. This will allow the Navy**

**to make a determination as to whether the technology is viable. Depending upon the results of the EMNA spot treatment at SWMU 18, alternative remedial measures may be proposed in a comprehensive RAP for SWMU 79/136 Central Plume, to follow. MNA will be continued for the upcoming year in accordance with the procedures and protocols described in the Groundwater RAP (Revision 1), dated November 2004.**

**The current COC concentrations detected in the groundwater at this site are less than the TCEQ default onsite employee or construction worker exposure criteria (i.e., dermal and inhalation exposures); therefore, these exposure pathways will not be a concern. The only PCL exceeded at this site is through groundwater ingestion ($^{GW}GW_{Ing}$). Ingestions is not a concern since during the implementation of the response actions there is controlled access to the site, which limits potential exposures to contaminated groundwater (i.e., no installation of potable or irrigation wells) through 2017.**

If different from the information provided in the RAP, explain how the COCs have been handled, treated, disposed, or transferred to another medium and document that the response action has not resulted in any additional exposure conditions due to response action activities.

*N/A*

Explain whether the response action is achieving, or will achieve, the objectives within the reasonable time frame.

**The current conceptual MNA model for the site indicates that the ongoing biological reductive dechlorination process can control plume expansion, and in time, reduce the COC concentrations within the existing groundwater PCLE zones to levels less than human health ingestion PCLs. At this time the data provides indication that effective remediation of the plume through MNA is occurring. This conclusion has been substantiated through the groundwater analytical results obtained post-pilot study from monitoring wells downgradient of the SWMUs 79/136 Central Plume as shown in the concentration vs. distance graphs included in Attachment 1B.**

**Based on the results of the pilot test conducted at the SWMU 79/136 Central plume, the originally proposed response action (the combined use of EMNA and MNA) as a decontamination remedy will not reduce the concentration of COCs to less than their critical PCLs by the year 2017. Further sampling will continue at this plume area in accordance with the RAP (Tetra Tech, 2004b).**

Are physical controls part of the response action? ____ Yes *X* No

If yes, describe the type and purpose of the physical control and discuss how the physical control has proven effective.

*N/A*

## Soil Response Action Objectives

When using removal and/or decontamination with controls or controls only, demonstrate that the physical control or combination of measures is reliably containing, and will continue to contain, COCs within and/or derived from the surface soil and subsurface soil PCLE zone materials over time.

*N/A*

Explain how the removal or decontamination action is reducing the concentration of COCs to the critical surface soil and subsurface soil PCL throughout the soil PCLE zone and preventing COC concentrations above the critical soil PCLs from migrating beyond the original boundary of the soil PCLE zone.

**The soils containing COC concentrations in excess of TRRP RES A were excavated by the Navy's RAC in 2003 from the upgradient source area at the MFF. Because no soils remain at the site in excess of TRRP RES A concentrations, there is no danger of COCs migrating beyond the original boundary of the**

**PCLE zone. The RACR for the soil removal activities was prepared and submitted to the TCEQ in March 2005. The RACR has undergone several review cycles by the City of Dallas, U.S. EPA, and TCEQ, and the final replacement pages for the RACR were submitted to the TCEQ in May 2008 (CH2M Hill, 2008). The TCEQ granted final approval of the RACR in July 2008 (TCEQ, 2008).**

## Groundwater Response Action Objectives — SWMUs 79/136 Central Plume

Name of groundwater-bearing unit to which this information applies *Upper Water Bearing Zone (Alluvial Overburden)*

Repeat this section for each groundwater-bearing unit for which a different response action is being conducted.

Groundwater Classification ___ 1 _X_ 2 ___ 3

Is a modified groundwater response action being used for any part of the groundwater PCLE zone (§350.33(f)(2), (3), or (4))? ___ Yes _X_ No

If yes, complete the appropriate portions of this report.

Explain how the removal or decontamination actions are reducing the concentration of COCs to the critical groundwater PCL throughout the groundwater PCLE zone and preventing COC concentrations above the critical groundwater PCL from migrating beyond the original boundary of the groundwater PCLE zone. If COC concentrations above the critical groundwater PCL have ever migrated beyond the original boundary of the groundwater PCLE zone, explain the actions taken to address the increase in the PCLE zone.

**While the fate and transport modeling results (Tetra Tech, 2004a) indicated that the ongoing biological reductive dechlorination process would not reduce the COC concentrations within the existing groundwater PCLE zones to levels less than their respective critical PCLs by the year 2017, the results did indicate that the PCLE zones would not expand, nor would the COCs migrate offsite at concentrations greater than the respective critical groundwater PCLs. However, during implementation of the pilot study conducted in late 2002 and early 2003 at the SWMUs 79/136 Central Plume to enhance the degradation of COCs at the site, increasing concentrations in the downgradient monitoring well (508F23MW) were noted and consequently the pilot test was discontinued. The chemical oxidation phase of the pilot test had returned favorable results with significant COC reduction in one of the target monitoring wells and moderate COC reductions in another.**

**The current conceptual MNA model for the site indicates that the ongoing biological reductive dechlorination process can control plume expansion, and in time (beyond 2017), reduce the COC concentrations within the existing groundwater PCLE zones to levels less than human health ingestion PCLs. This conclusion has been substantiated through the groundwater analytical results obtained post-pilot study from monitoring wells downgradient of the SWMUs 79/136 Central Plume as shown in the concentration vs. distance graphs included in Attachment 1B.**

Explain how the response actions are preventing COCs from migrating to air at concentrations above the PCLs for air if the groundwater-to-air PCLs ($^{Air}GW_{Inh\text{-}V}$) were exceeded.

**The indoor air sampling conducted in the sealed Building 1406 (worst case scenario) at SWMU 21 Plume area indicated that no chlorinated VOCs were detected in the indoor air (Tetra Tech, 2004a). Additionally, the maximum observed concentrations of the detected groundwater COCs in the SWMU 79/136 Central PCLE zones are less than their respective $^{Air}GW_{Inh\text{-}V}$ PCLs. However, the Navy is conducting additional evaluations of the groundwater to air pathway for SWMU 21.**

Explain how the response actions are preventing COCs from migrating to surface water at concentrations above the PCLs for groundwater discharges to surface water if surface water was a factor.

**Surface water is not a factor during the groundwater response action as the direction of groundwater flow is away from nearby surface water bodies (i.e., Mountain Creek Lake).**

Explain how the response actions are preventing human and ecological receptor exposure to the groundwater PCLE zone.

**The current COC concentrations detected in the groundwater at this site are less than the TCEQ default onsite employee or construction worker exposure criteria (i.e., dermal and inhalation exposures); therefore, these exposure pathways will not be a concern. The only PCL exceeded at this site is through groundwater ingestion ($^{GW}GW_{Ing}$). During the implementation of the in-situ groundwater response action, access to the site will be controlled by not permitting any potable or irrigation wells in the PCLE zone during remedial activities. Additionally, the PCLE zones are not expected to expand nor are COCs expected to migrate offsite at concentrations greater than the PCLs. This conclusion is substantiated through the groundwater sampling results obtained from monitoring wells in the downgradient portion of the SWMU 79/136 Central Plume and through the concentration vs. distance graphs included in Attachment 1B.**

## Waste Management

Describe the volume and final disposition or reuse location of waste or environmental media that has been removed from the affected property during the response action, if not previously reported under STEERS. Provide copies of all manifests, other documentation of disposition, and landowner consent for reuse of soil in Appendix 8.

**Excess soils and groundwater removed from the plume during monitoring well installation and groundwater recovered through the low-flow or PDB sampling method is placed into properly labeled 55-gallon capacity drums and stored at the site. Upon classification, waste disposal arrangements are made with a licensed waste disposal facility. Appendix 8 contains copies of the waste disposal manifests for groundwater generated during the 2016 sampling activities at Former NAS Dallas.**

# ATTACHMENT 1A
# MAPS AND CROSS SECTIONS

# AFFECTED PROPERTY MAP

Affected Property Map
Former NAS Dallas, Texas

January 2014 Isocontour
Gross PCLE Zone Outline
Demolished Building
Existing Structure
Owned by City of Dallas
Transferred from Exelon Corporation to City of Dallas
Transferred from Navy to City of Dallas
Transferred from Navy to City of Grand Prairie
Transferred from Navy to U.S. Army Reserve
Owned by Exelon Corporation

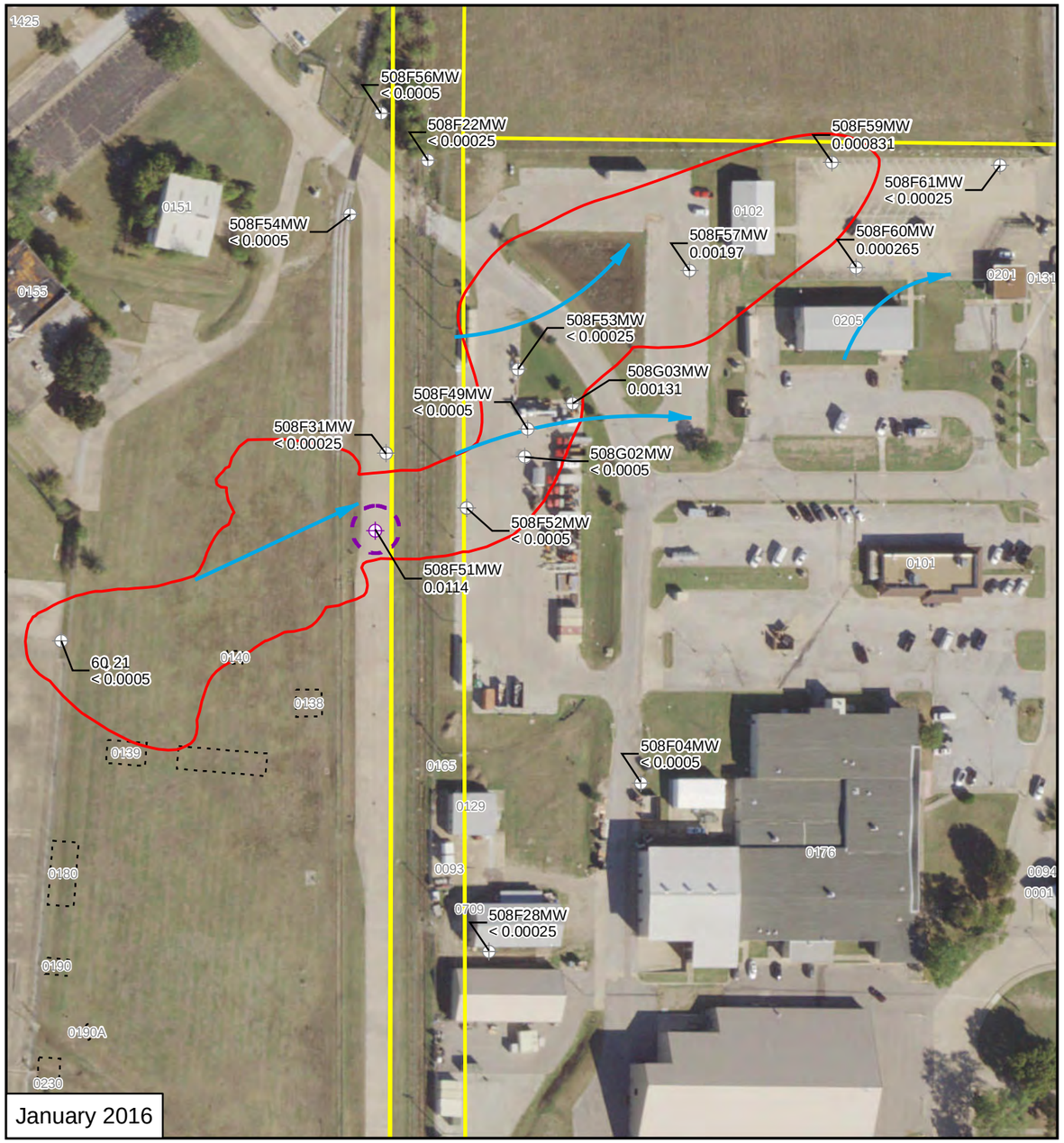
NAVFAC Naval Facilities Engineering Command

| | |
|---|---|
| REQUESTED BY: T. Wiberg | DATE: 9/21/2015 |
| DRAWN BY: A. Zimmerman | PROJECT NUMBER: 0888812796 |

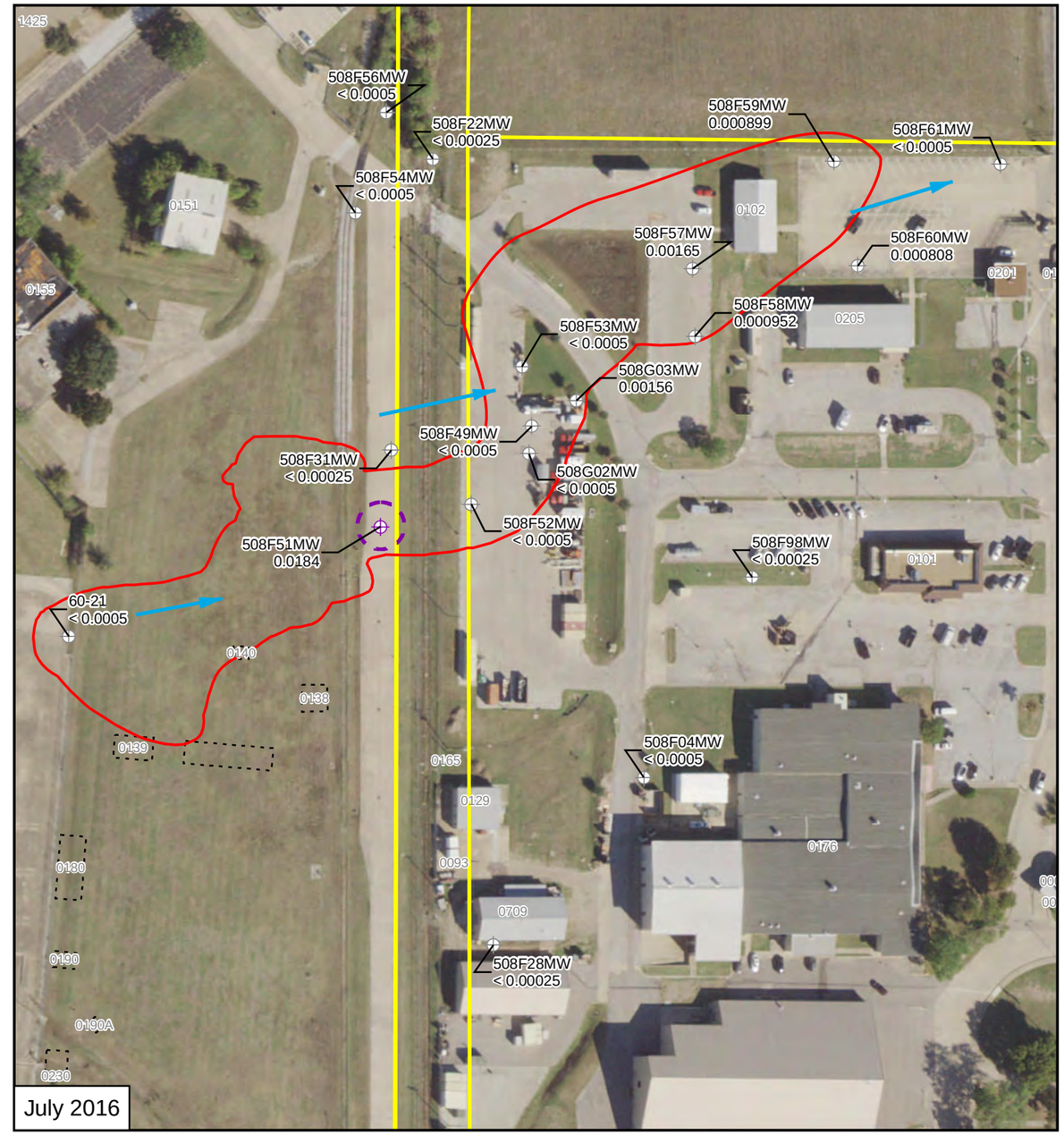
X:\Navy\NAS_Dallas\NAS_Dallas_Jan14_AffectedPropMap.mxd

Service Layer Credits: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community; State boundary is from the United States Census Bureau; Some data are from TetraTech.

# ISOCONCENTRATION CONTOUR MAPS




January 2016




July 2016

N

**1,2 DCA Concentration (mg/L)**

- ND - 0.005
- > 0.005 - 0.05

- Gross PCLE Zone Outline
- Property Boundary 2014
- Groundwater Flow Direction

**Isoconcentration Contours**

- 0.005 mg/L

- Demolished Building

Note: The PCL for 1,2 DCA = 0.005 mg/L

0 65 130 260 Feet

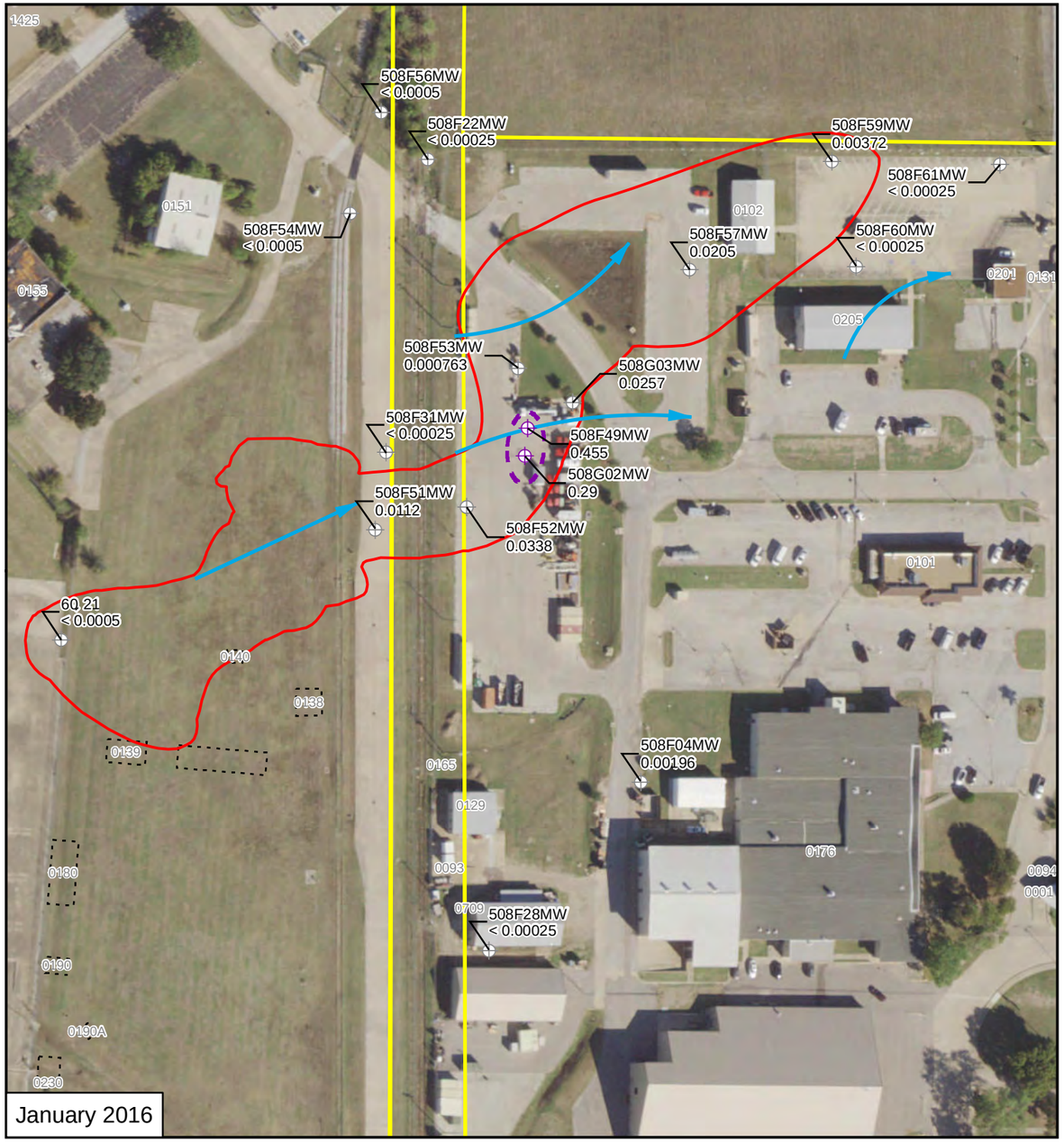
Figure 1A-2A
1,2 Dichloroethane Isoconcentration Contours
SWMU 79 / 136 Central Plume
2016 RAER
Former NAS Dallas, Texas

NAVFAC Naval Facilities Engineering Command

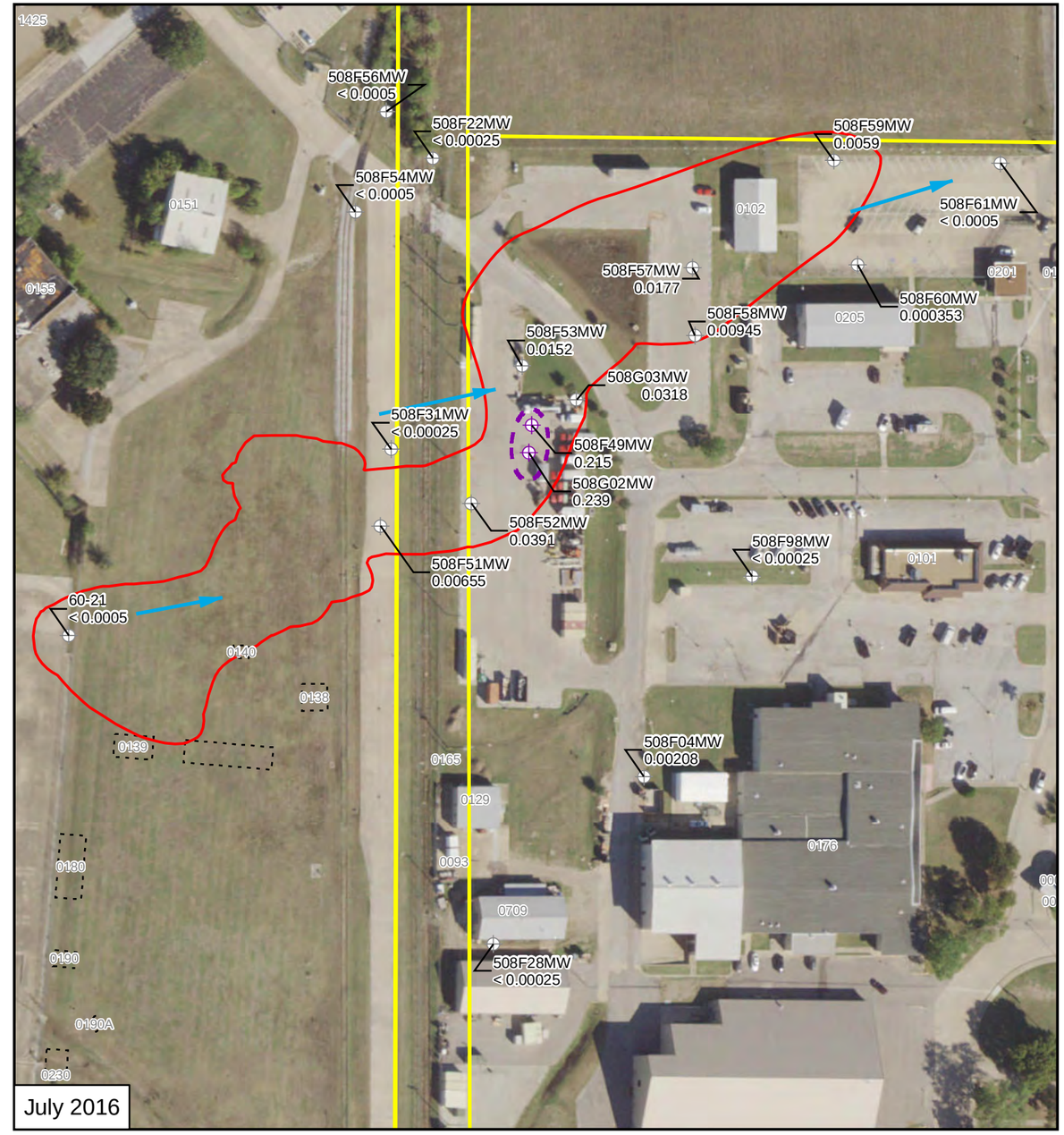
| | |
|---|---|
| REQUESTED BY: W. Ward | DATE: 11/22/2016 |
| DRAWN BY: A. Zimmerman | PROJECT NUMBER: 0888812796 |

Service Layer Credits: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

X:\Navy\NAS_Dallas\project\2016_RAER\2016_NAS_Dallas_iso_12DCA_SWMU79_136CentralPlume.mxd




January 2016




July 2016

**cis-1,2-DCE (mg/L)**

- ND - 0.07
- > 0.07 - 0.7

Gross PCLE Zone Outline

Property Boundary 2014

Groundwater Flow Direction

**Isoconcentration Contours**

0.07 mg/L

Demolished Building

Note: The PCL for 1,2 DCE = 0.07 mg/L

0 65 130 260 Feet

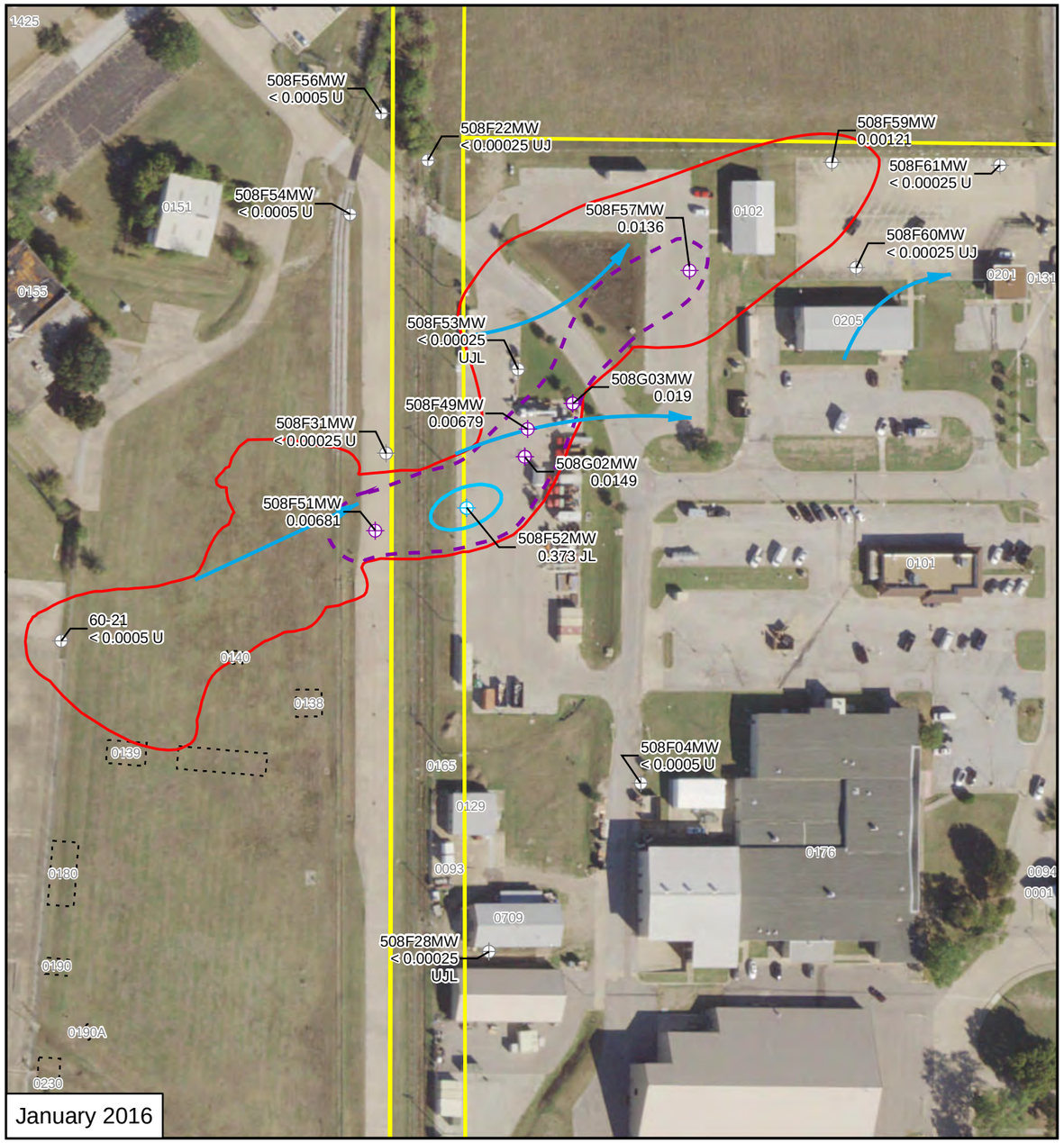
Figure 1A-2A
cis-1,2-Dichloroethane Isoconcentration Contours
SWMU 79 / 136 Central Plume
2016 RAER
Former NAS Dallas, Texas

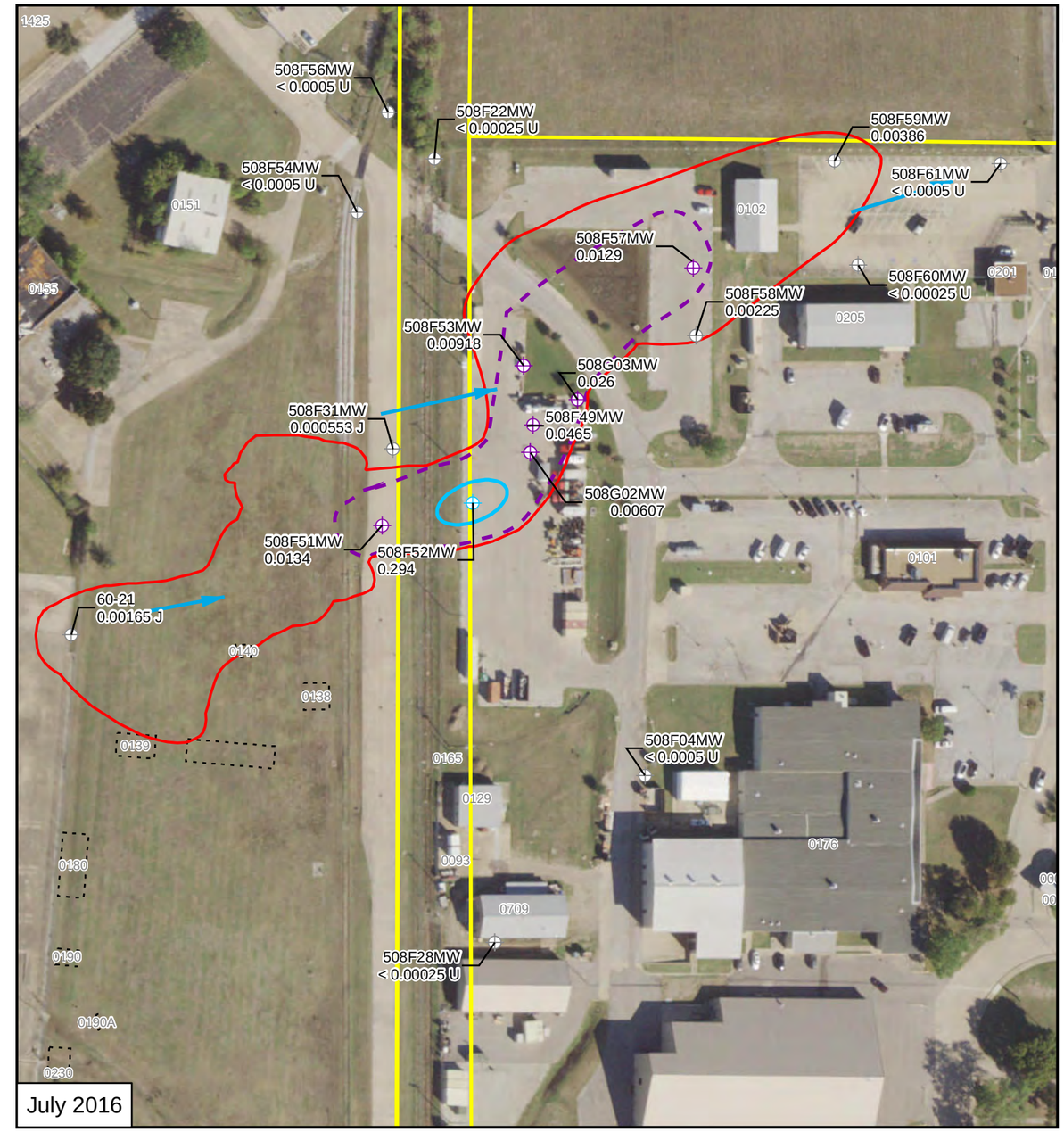
NAVFAC Naval Facilities Engineering Command

| | |
|---|---|
| REQUESTED BY: W. Ward | DATE: 11/17/2016 |
| DRAWN BY: A. Zimmerman | PROJECT NUMBER: 0888812796 |

X:\Navy\NAS_Dallas\project\2016_RAER\2016_NAS_Dallas_Iso_cis12DCA_SWMU79_136CentralPlume.mxd

Service Layer Credits: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community




N

**TCE Concentration (mg/L)**

- ND - 0.005
- > 0.005 - 0.05
- > 0.05 - 0.5

- Gross PCLE Zone Outline
- Property Boundary 2014
- Groundwater Flow Direction

**Isoconentration Contours**

- 0.005 mg/L
- 0.05 mg/L

- Demolished Building

Note: The PCL for TCE = 0.005 mg/L
J - Estimated value
L - Biased Low
U - Non-detect

0 65 130 260 Feet

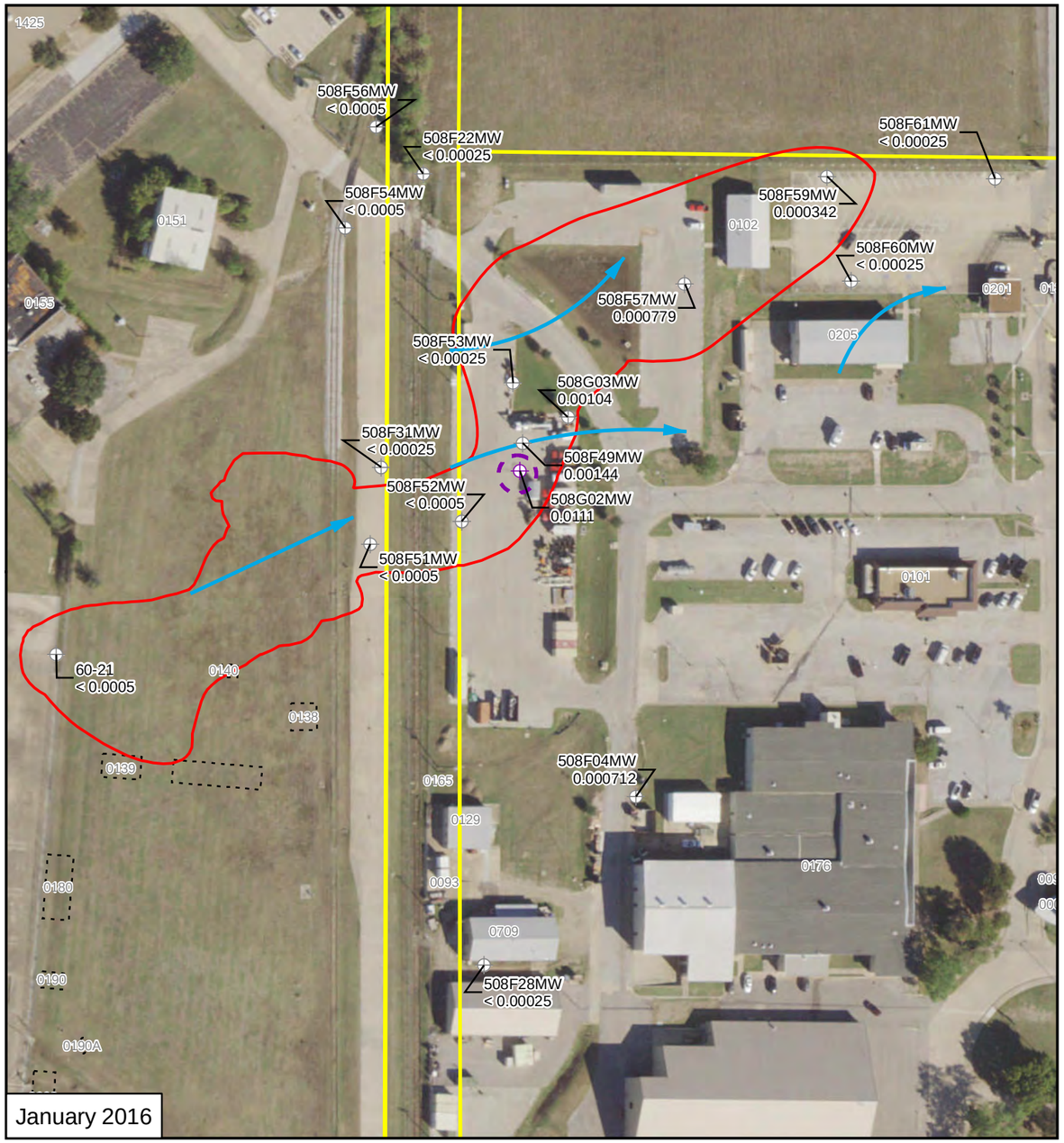
Figure 1A-2A
Trichloroethene Isoconcentration Contours
SWMU 79 / 136 Central Plume
2016 RAER
Former NAS Dallas, Texas

NAVFAC Naval Facilities Engineering Command

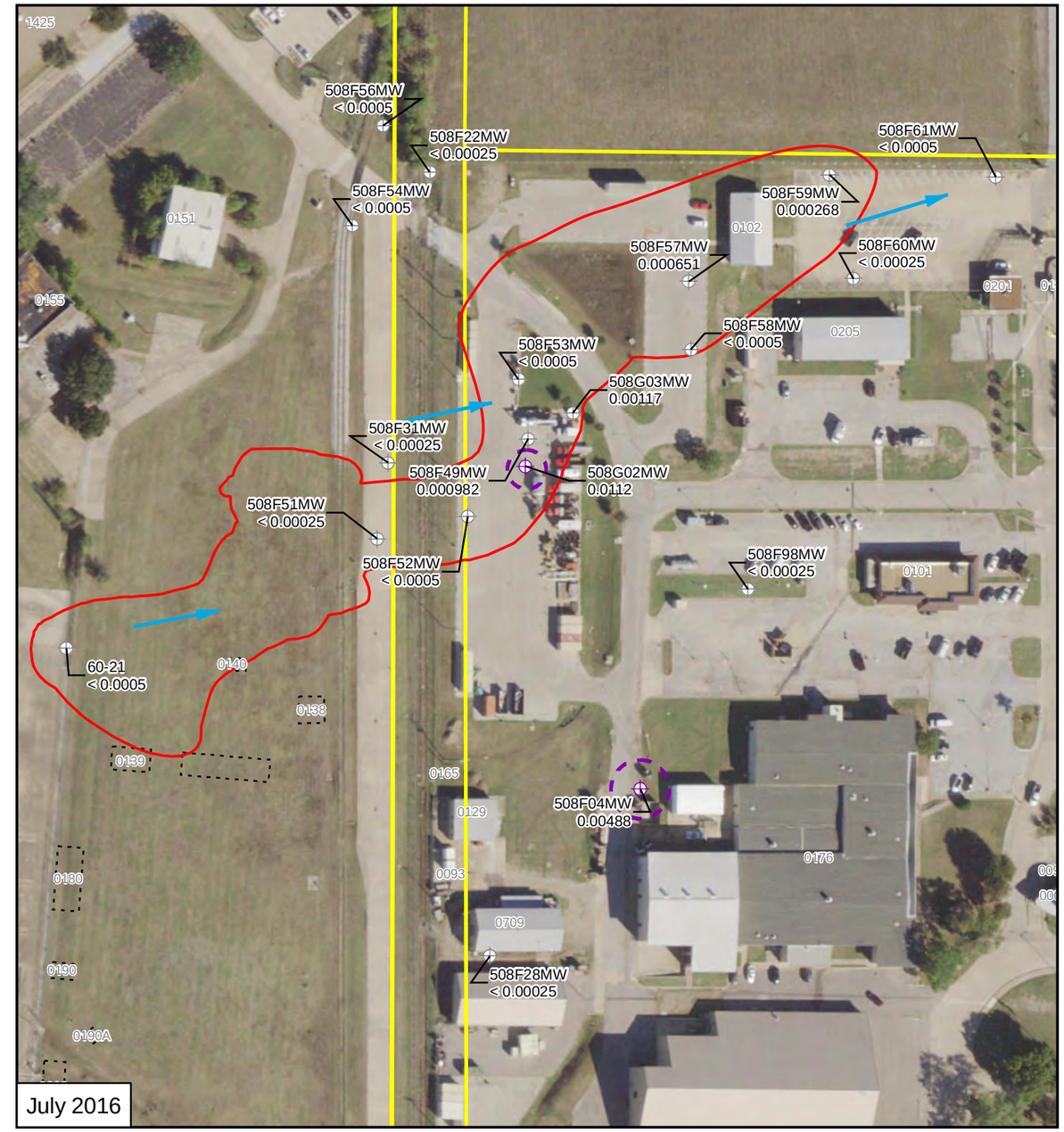
| | |
|---|---|
| REQUESTED BY: W. Ward | DATE: 11/22/2016 |
| DRAWN BY: A. Zimmerman | PROJECT NUMBER: 0888812796 |

X:\Navy\NAS_Dallas\project\2016_RAER\2016_NAS_Dallas_Iso_TCE_SWMU79_136CentralPlume.mxd

Service Layer Credits: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community




January 2016




July 2016

**VC Concentration (mg/L)**

- ND - 0.002
- > 0.002 - 0.02

Gross PCLE Zone Outline

Property Boundary 2014

Demolished Building

**Isoconcentration Contour**

0.002 mg/L

Note: The PCL for VC = 0.002 mg/L
< = Non-detect

0 65 130 195 260 Feet

Figure 1A-2D
Vinyl Chloride Isoconcentration Contours
SWMU 79 / 136 Central Plume
2016 RAER
Former NAS Dallas, Texas

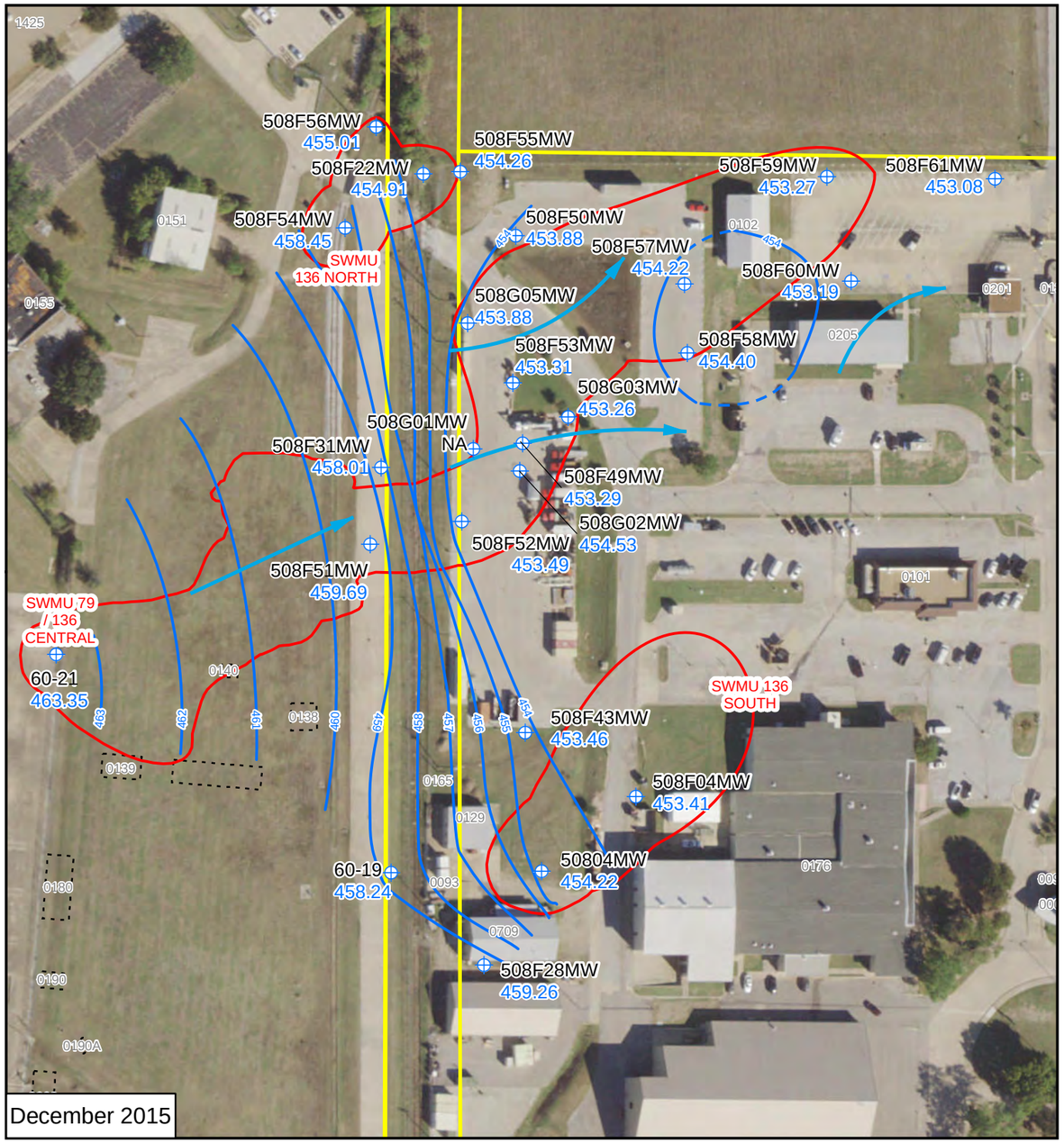
NAVFAC Naval Facilities Engineering Command

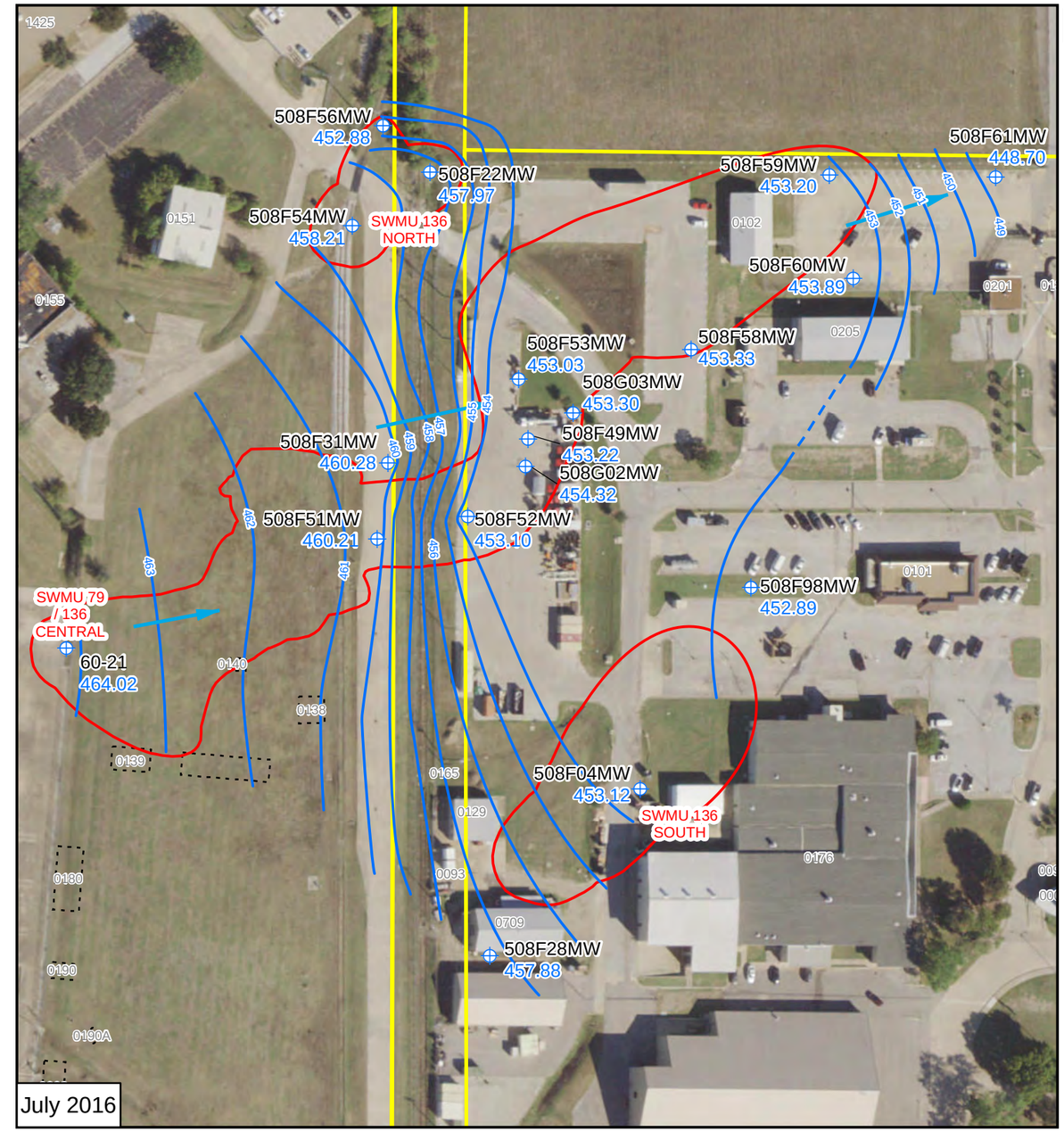
| | |
|---|---|
| REQUESTED BY: W. Ward | DATE: 12/12/2016 |
| DRAWN BY: M. Senne | PROJECT NUMBER: 0888812796 |

X:\Navy\NAS_Dallas\project\2016_RAER\2016_Jul_NAS_Dallas_Iso_VC_SWMU79_136CentralPlume.mxd

Source: Esri, DigitalGlobe, GeoEye, i-cubed, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community

# POTENTIOMETRIC SURFACE MAPS




N

Well Location

Potentiometric Surface Contour (dashed where inferred)

Groundwater Flow Direction

Gross PCLE Zone Outline

Property Boundary 2014

Demolished Building

Notes:
453.27 - Potentiometric Surface Contour (Feet above MSL)
NA = Elevation not measured at location

0 65 130 195 260 Feet

Figure 1A-3
Potentiometric Surface Map
SWMU 79 / 136 Central Plume
2016 RAER
Former NAS Dallas, Texas

NAVFAC Naval Facilities Engineering Command
RESOLUTION CONSULTANTS

| | |
|---|---|
| REQUESTED BY: L. Foss | DATE: 11/16/2016 |
| DRAWN BY: K. Burnum | PROJECT NUMBER: 0888812796 |

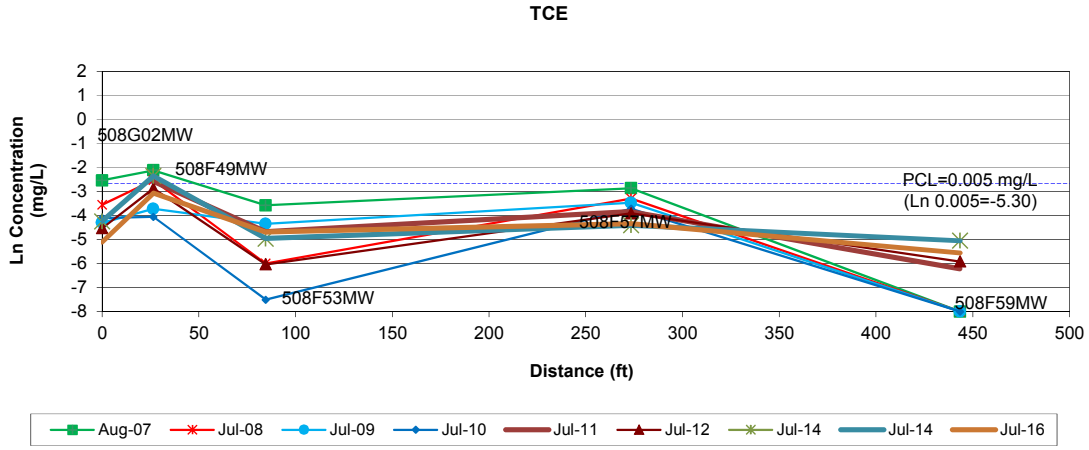
X:\Navy\NAS_Dallas\project\2016_RAER\2016_Jul_NAS_Dallas_Iso_POT_SWMU79_136Central.mxd

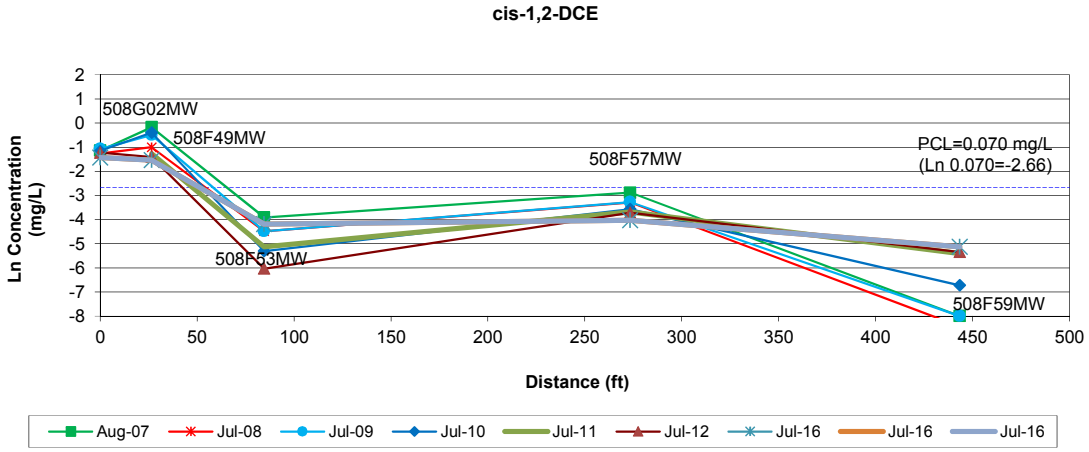
Service Layer Credits: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

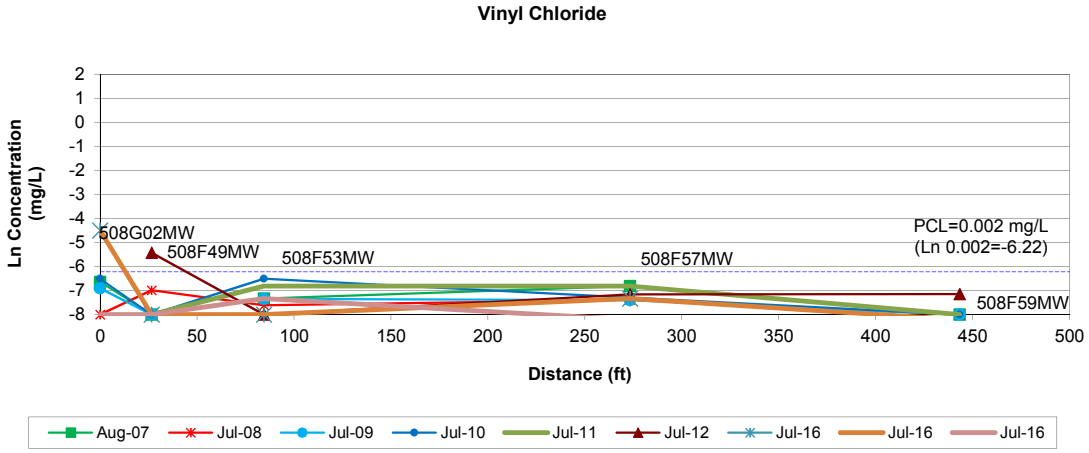
# ATTACHMENT 1B
# GRAPHS

# CONCENTRATION VS. DISTANCE GRAPHS
# SWMUs 79/136 CENTRAL PLUME
# 2016 RAER

## FORMER NAS DALLAS, TEXAS
## PAGE 1 OF 2



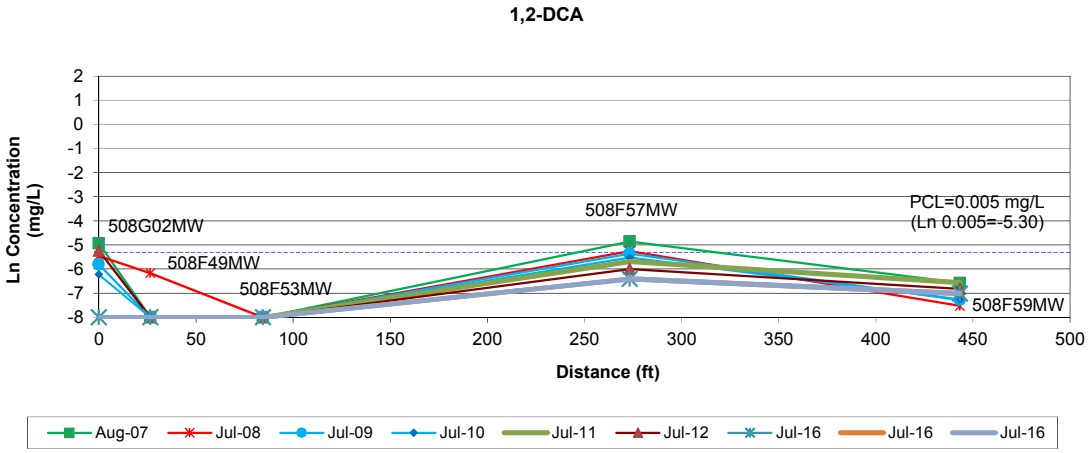




Notes: Graphed data points are taken from raw data.
Sample events using passive diffusion bag (PDB) are listed on Tables 4-1A and 4-1B in Appendix 4.

# CONCENTRATION VS. DISTANCE GRAPHS
# SWMUs 79/136 CENTRAL PLUME
# 2016 RAER

## FORMER NAS DALLAS, TEXAS
## PAGE 2 OF 2

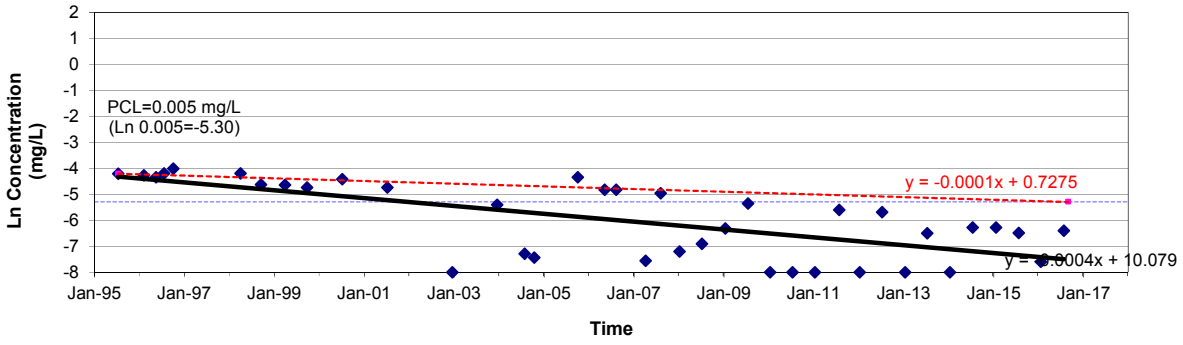



Notes: Graphed data points are taken from raw data.
Sample events using passive diffusion bag (PDB) are listed on Tables 4-1A and 4-1B in Appendix 4.

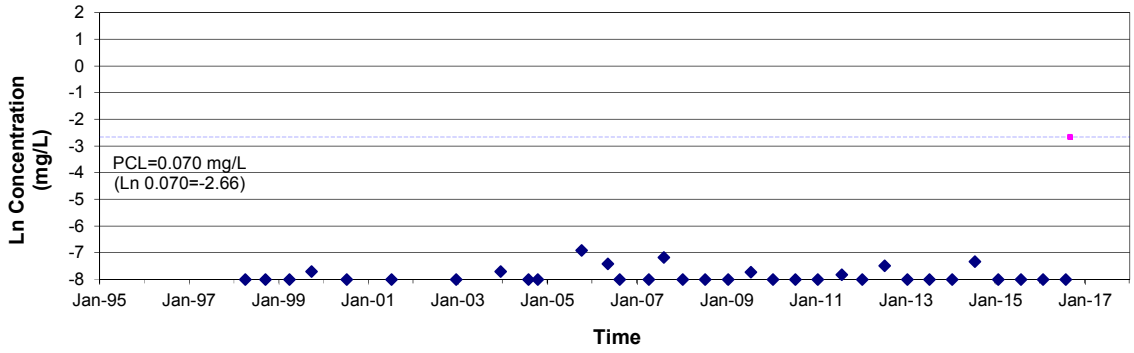
# CONCENTRATION VS. TIME GRAPHS
# WITH MINIMUM REQUIRED ATTENUATION RATE
# SWMUs 79/136 CENTRAL PLUME
# 60-21
# 2016 RAER

## FORMER NAS DALLAS, TEXAS
## PAGE 1 OF 2

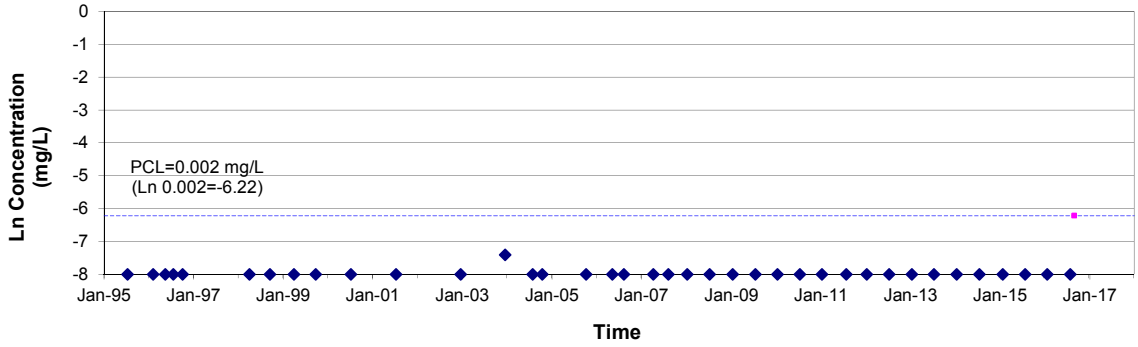
### TCE




### cis-1,2-DCE




### Vinyl Chloride

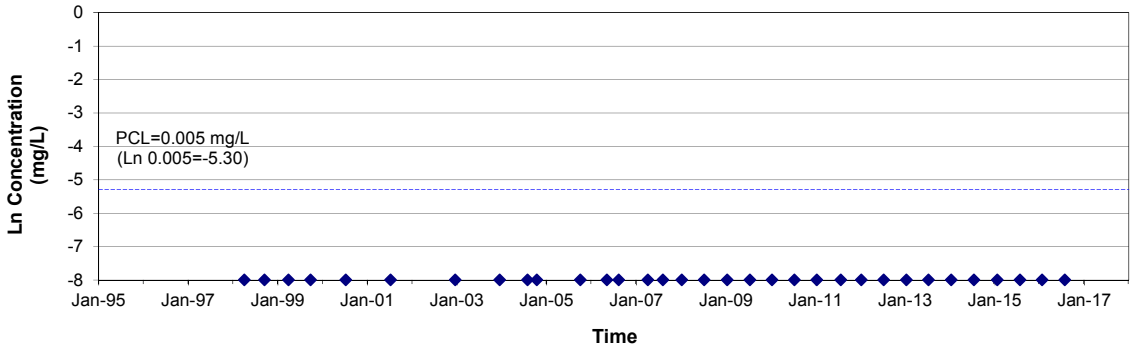



Notes: Red line and slope are based on minimum required attenuation rate ($k_{time}$) to meet PCL by 01 Sep 2016.
Black line and slope are based on linear regression of the raw data.
Sample events using passive diffusion bag (PDB) samplers are listed on Tables 4-1A and 4-1B in Appendix 4.

# CONCENTRATION VS. TIME GRAPHS
# WITH MINIMUM REQUIRED ATTENUATION RATE
# SWMUs 79/136 CENTRAL PLUME
# 60-21
# 2016 RAER

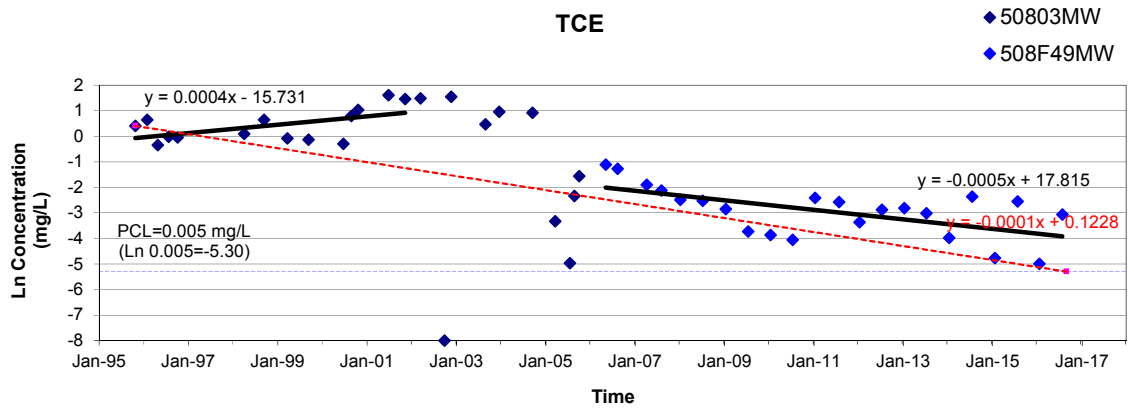
## FORMER NAS DALLAS, TEXAS
## PAGE 2 OF 2

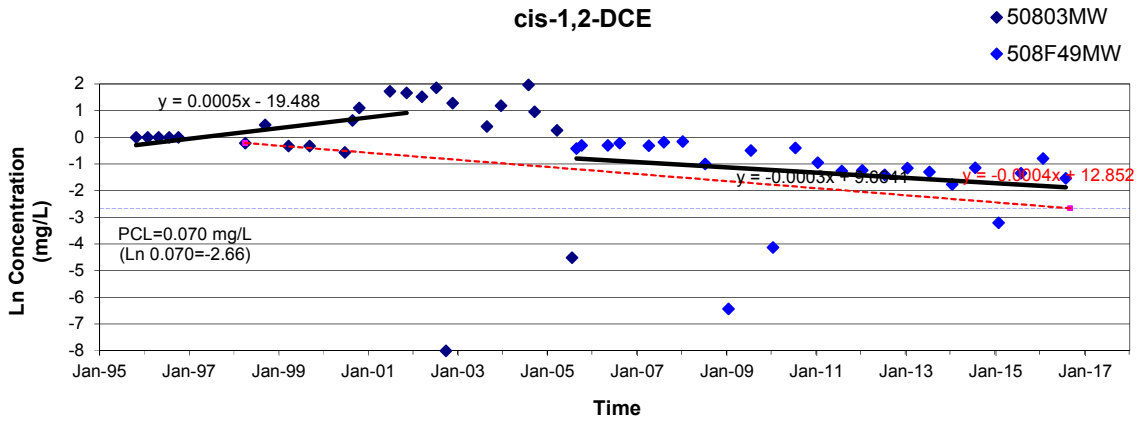
### 1,2-DCA

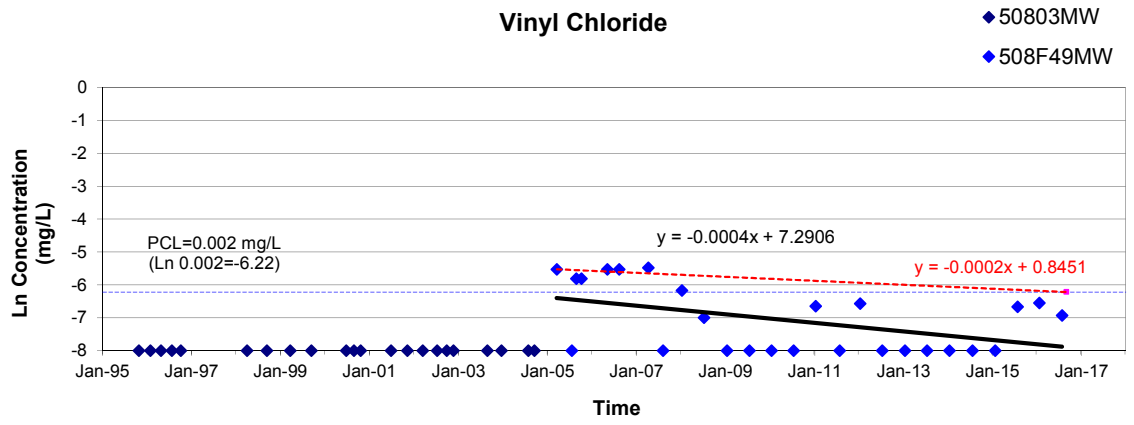


# CONCENTRATION VS. TIME GRAPHS
# WITH MINIMUM REQUIRED ATTENUATION RATE
# SWMUs 79/136 CENTRAL PLUME
# 50803MW-508F49MW
# 2016 RAER

## FORMER NAS DALLAS, TEXAS
## PAGE 1 OF 2



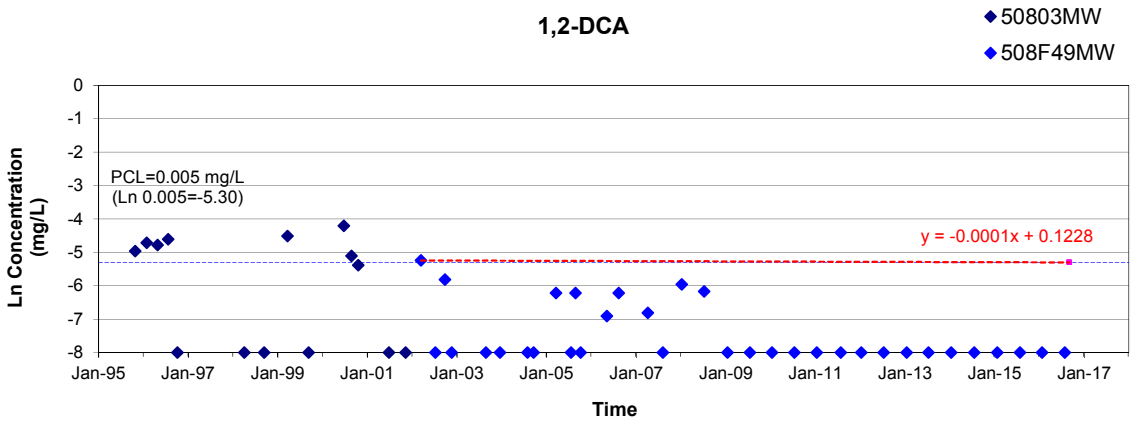




Notes: Red line and slope are based on minimum required attenuation rate ($k_{time}$) to meet PCL by 01 Sep 2016.
Black line and slope are based on linear regression of the raw data.
Sample events using passive diffusion bag (PDB) samplers are listed on Tables 4-1A and 4-1B in Appendix 4.

# CONCENTRATION VS. TIME GRAPHS
# WITH MINIMUM REQUIRED ATTENUATION RATE
# SWMUs 79/136 CENTRAL PLUME
# 50803MW-508F49MW
# 2016 RAER

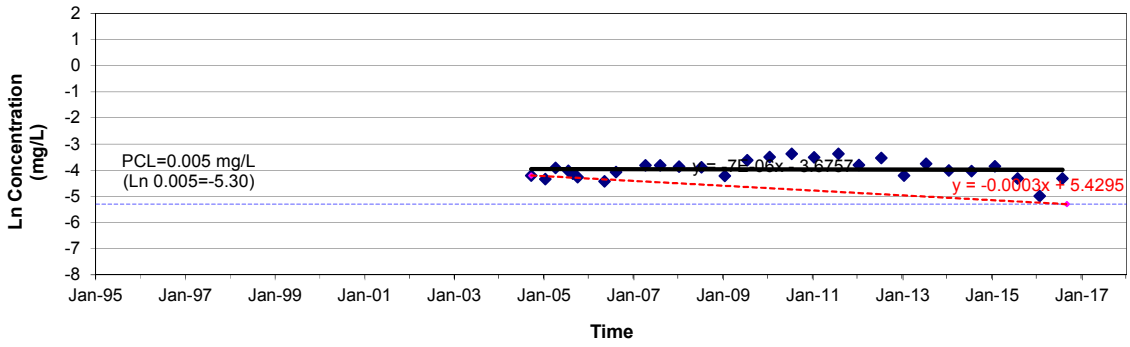
## FORMER NAS DALLAS, TEXAS
## PAGE 2 OF 2



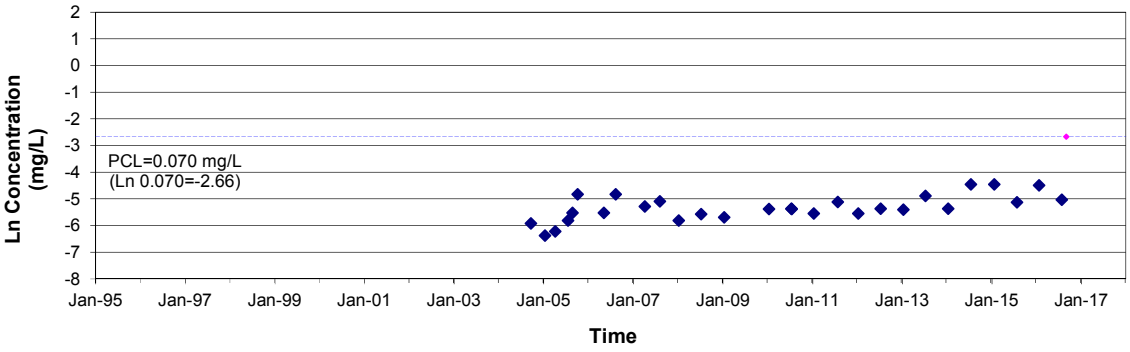
# CONCENTRATION VS. TIME GRAPHS
# WITH MINIMUM REQUIRED ATTENUATION RATE
# SWMUs 79/136 CENTRAL PLUME
# 508F51MW
# 2016 RAER

## FORMER NAS DALLAS, TEXAS
## PAGE 1 OF 2

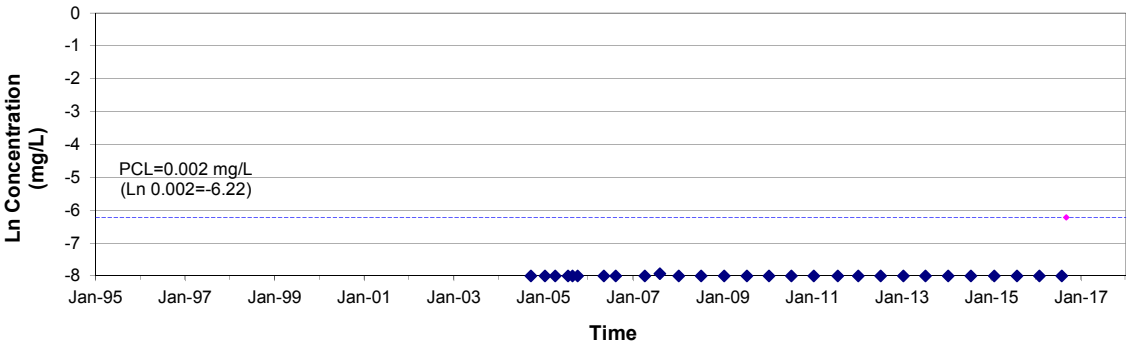
### TCE




### cis-1,2-DCE




### Vinyl Chloride

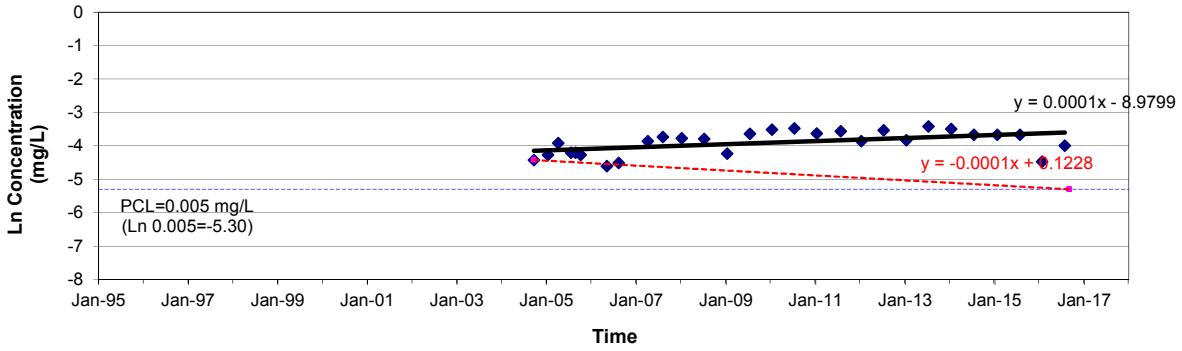



Notes: Red line and slope are based on minimum required attenuation rate ($k_{time}$) to meet PCL by 01 Sep 2016.
Black line and slope are based on linear regression of the raw data.
Sample events using passive diffusion bag (PDB) samplers are listed on Tables 4-1A and 4-1B in Appendix 4.

# CONCENTRATION VS. TIME GRAPHS
# WITH MINIMUM REQUIRED ATTENUATION RATE
# SWMUs 79/136 CENTRAL PLUME
# 508F51MW
# 2016 RAER

## FORMER NAS DALLAS, TEXAS
## PAGE 2 OF 2

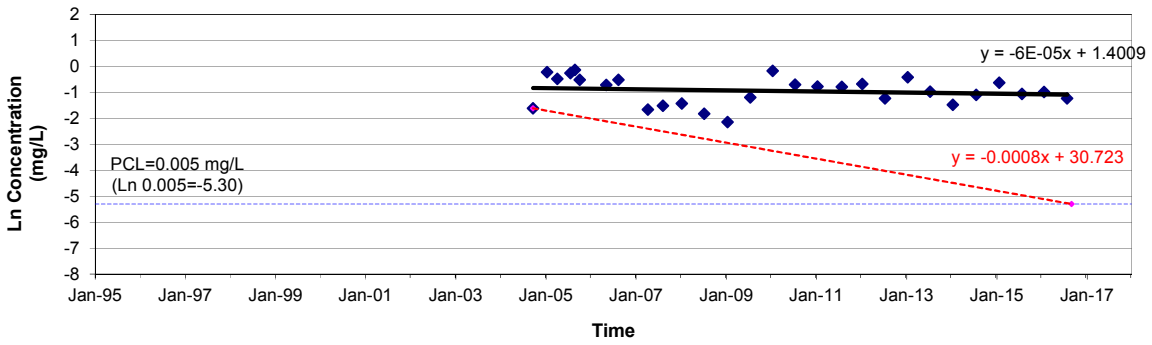
### 1,2-DCA



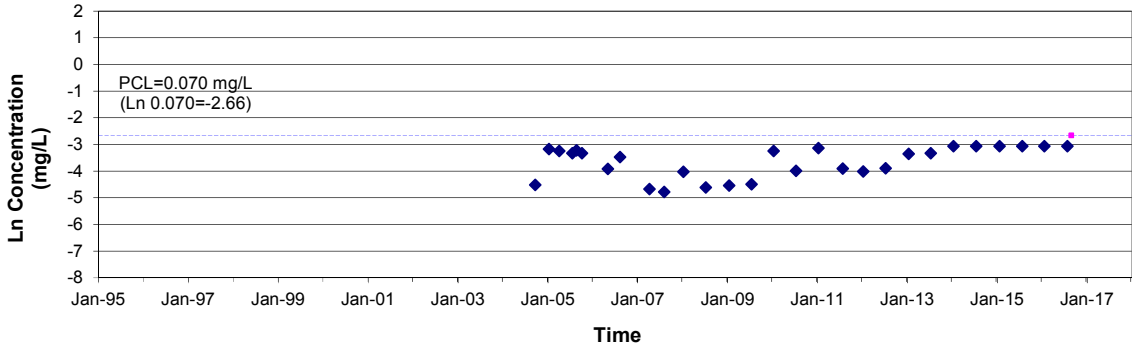
# CONCENTRATION VS. TIME GRAPHS
# WITH MINIMUM REQUIRED ATTENUATION RATE
# SWMUs 79/136 CENTRAL PLUME
# 508F52MW
# 2016 RAER

## FORMER NAS DALLAS, TEXAS
## PAGE 1 OF 2

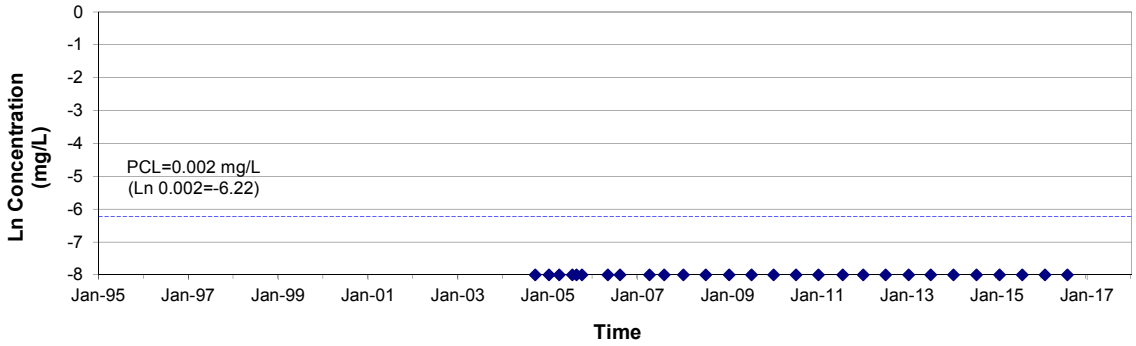
### TCE




### cis-1,2-DCE




### Vinyl Chloride

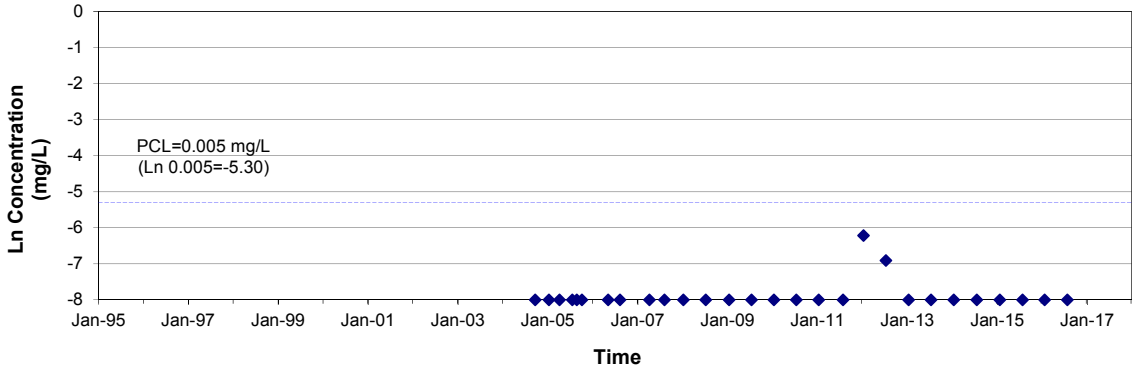



Notes: Red line and slope are based on minimum required attenuation rate ($k_{time}$) to meet PCL by 01 Sep 2016.
Black line and slope are based on linear regression of the raw data.
Sample events using passive diffusion bag (PDB) samplers are listed on Tables 4-1A and 4-1B in Appendix 4.

# CONCENTRATION VS. TIME GRAPHS
# WITH MINIMUM REQUIRED ATTENUATION RATE
# SWMUs 79/136 CENTRAL PLUME
# 508F52MW
# 2016 RAER

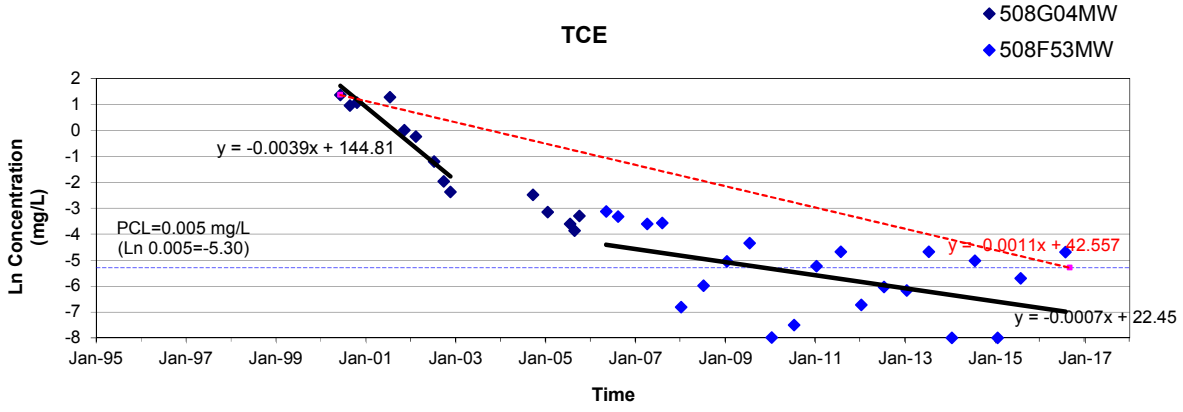
## FORMER NAS DALLAS, TEXAS
## PAGE 2 OF 2

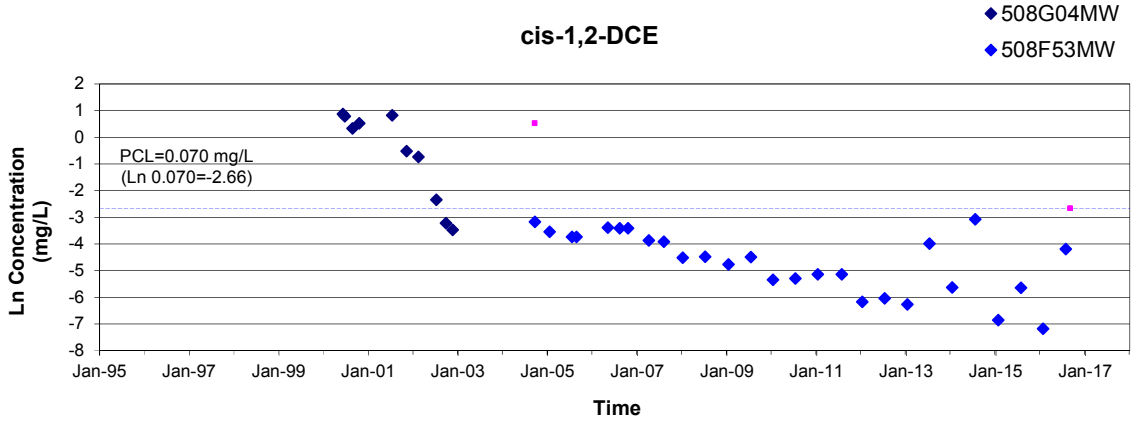
### 1,2-DCA

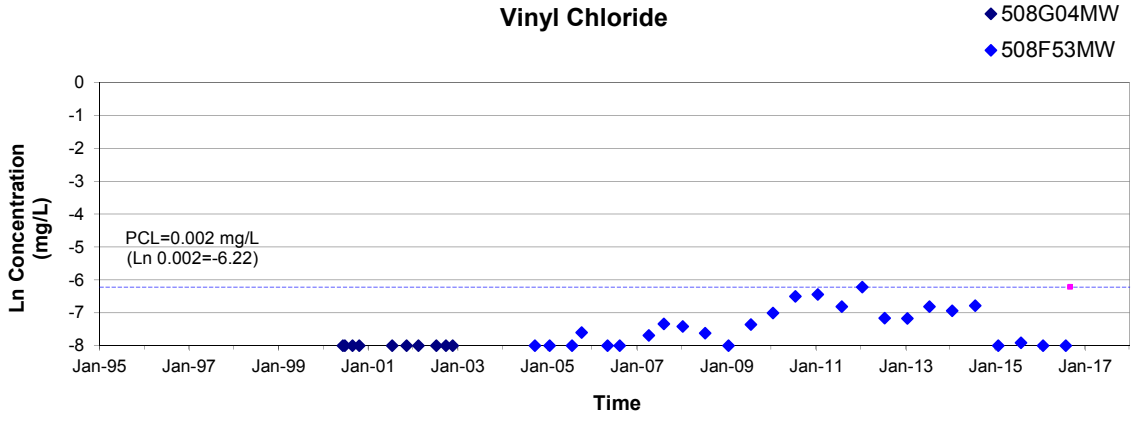


# CONCENTRATION VS. TIME GRAPHS
# WITH MINIMUM REQUIRED ATTENUATION RATE
# SWMUs 79/136 CENTRAL PLUME
# 508G04MW-508F53MW
# 2016 RAER

## FORMER NAS DALLAS, TEXAS
## PAGE 1 OF 2



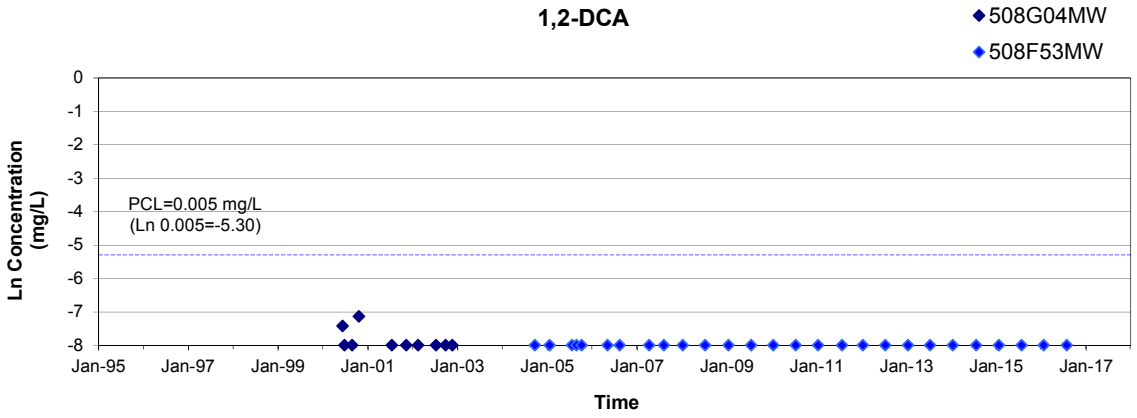




Notes: Red line and slope are based on minimum required attenuation rate ($k_{time}$) to meet PCL by 01 Sep 2016.
Black line and slope are based on linear regression of the raw data.
Sample events using passive diffusion bag (PDB) samplers are listed on Tables 4-1A and 4-1B in Appendix 4.

# CONCENTRATION VS. TIME GRAPHS
# WITH MINIMUM REQUIRED ATTENUATION RATE
# SWMUs 79/136 CENTRAL PLUME
# 508G04MW-508F53MW
# 2016 RAER

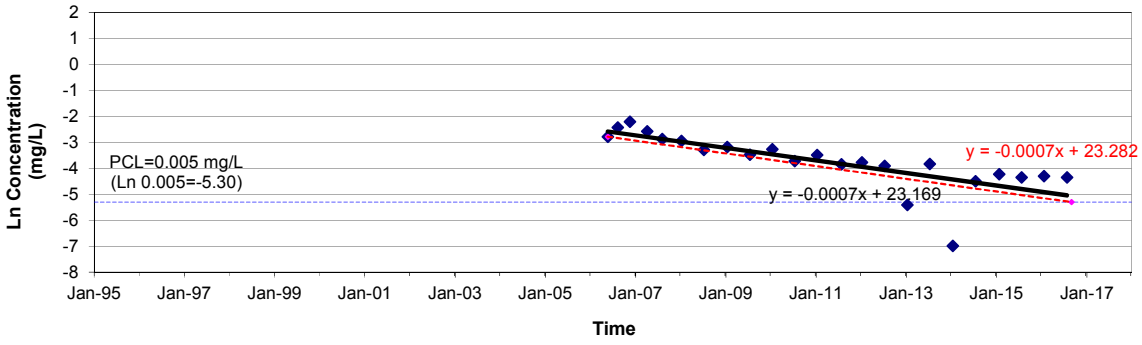
## FORMER NAS DALLAS, TEXAS
## PAGE 2 OF 2



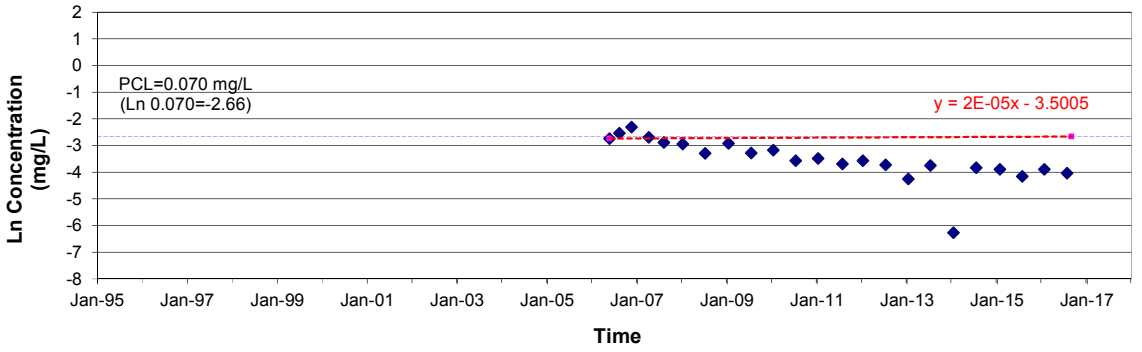
# CONCENTRATION VS. TIME GRAPHS
# WITH MINIMUM REQUIRED ATTENUATION RATE
# SWMUs 79/136 CENTRAL PLUME
# 508F57MW
# 2016 RAER

## FORMER NAS DALLAS, TEXAS
## PAGE 1 OF 2

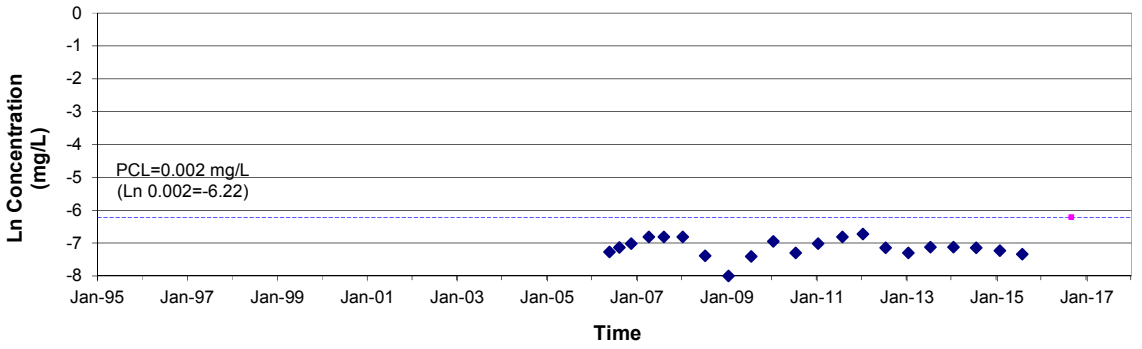
### TCE




### cis-1,2-DCE




### Vinyl Chloride

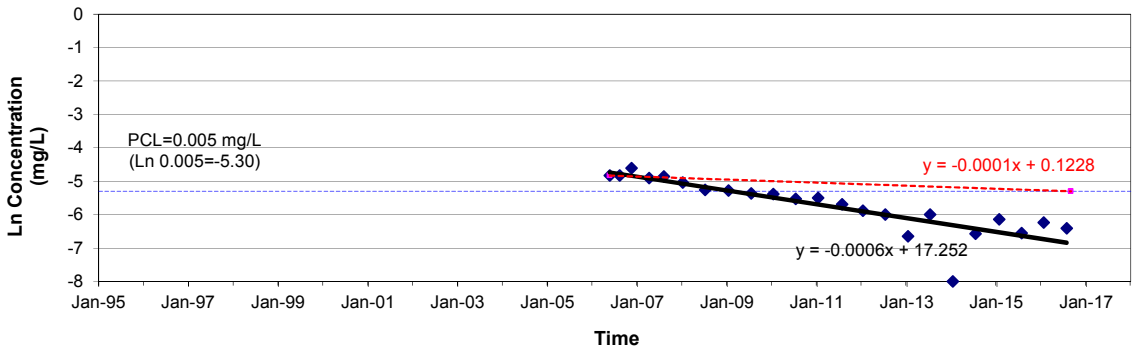



Notes: Red line and slope are based on minimum required attenuation rate ($k_{time}$) to meet PCL by 01 Sep 2016.
Black line and slope are based on linear regression of the raw data.
Sample events using passive diffusion bag (PDB) samplers are listed on Tables 4-1A and 4-1B in Appendix 4.

# CONCENTRATION VS. TIME GRAPHS
# WITH MINIMUM REQUIRED ATTENUATION RATE
# SWMUs 79/136 CENTRAL PLUME
# 508F57MW
# 2016 RAER

## FORMER NAS DALLAS, TEXAS
## PAGE 2 OF 2

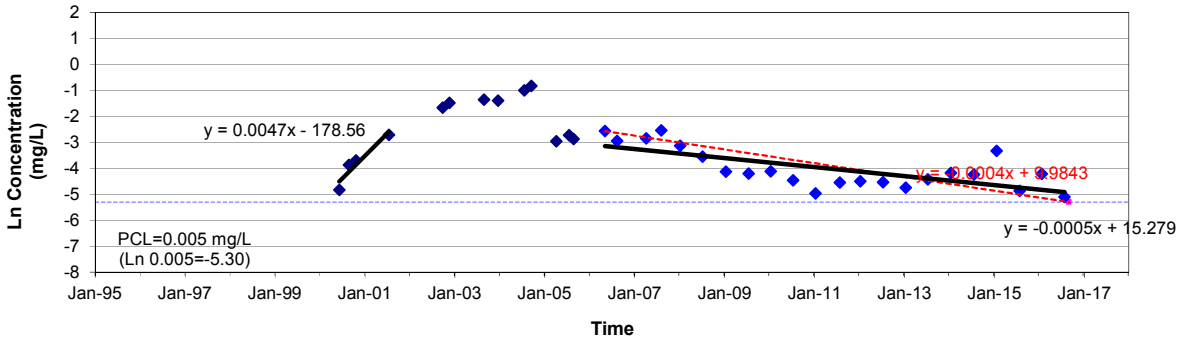
### 1,2-DCA



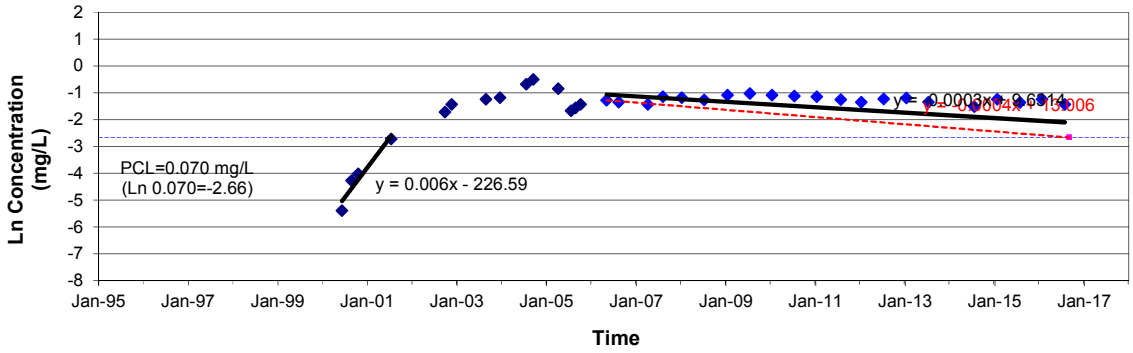
# CONCENTRATION VS. TIME GRAPHS
# WITH MINIMUM REQUIRED ATTENUATION RATE
# SWMUs 79/136 CENTRAL PLUME
# 508G02MW
# 2016 RAER

## FORMER NAS DALLAS, TEXAS
## PAGE 1 OF 2

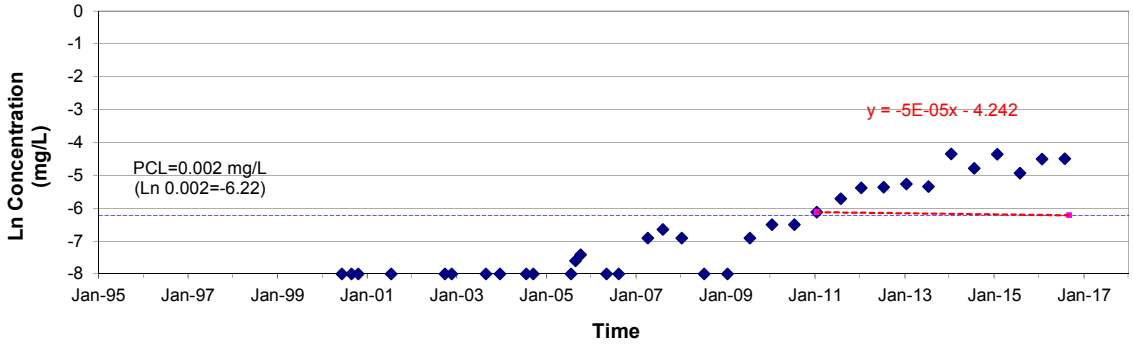
### TCE




### cis-1,2-DCE




### Vinyl Chloride

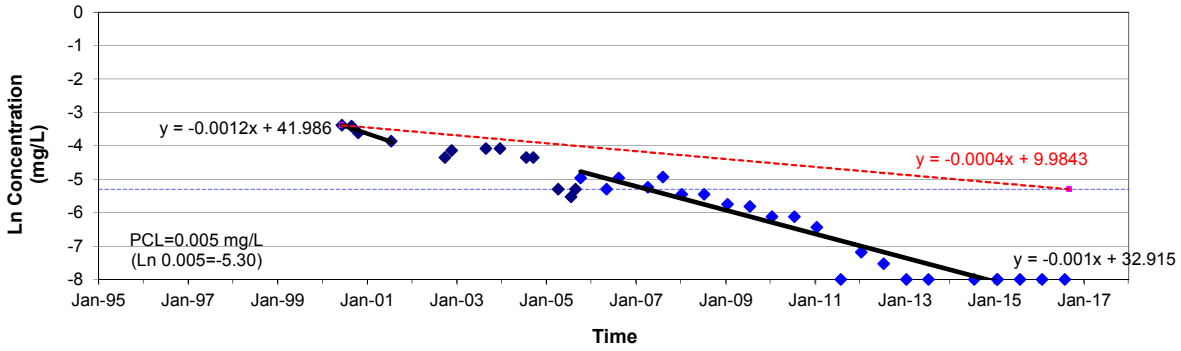



Notes: Red line and slope are based on minimum required attenuation rate ($k_{time}$) to meet PCL by 01 Sep 2016.
Black line and slope are based on linear regression of the raw data.
Sample events using passive diffusion bag (PDB) samplers are listed on Tables 4-1A and 4-1B in Appendix 4.

# CONCENTRATION VS. TIME GRAPHS
# WITH MINIMUM REQUIRED ATTENUATION RATE
# SWMUs 79/136 CENTRAL PLUME
# 508G02MW
# 2016 RAER

## FORMER NAS DALLAS, TEXAS
## PAGE 2 OF 2

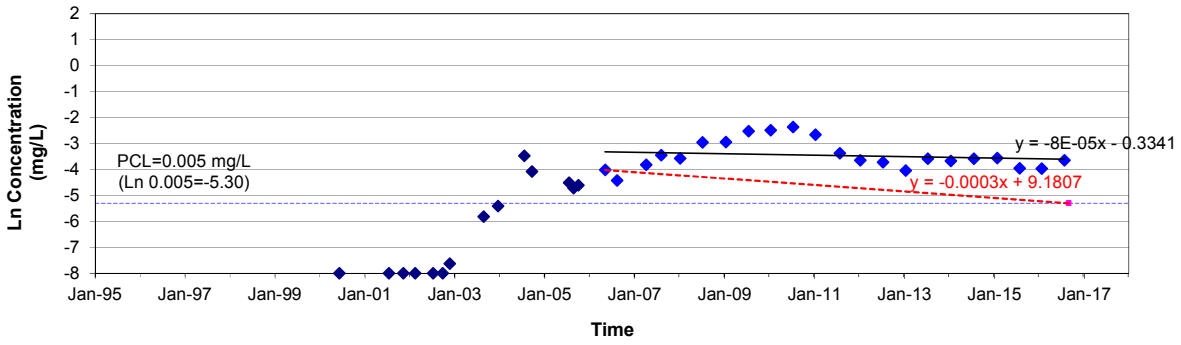
### 1,2-DCA



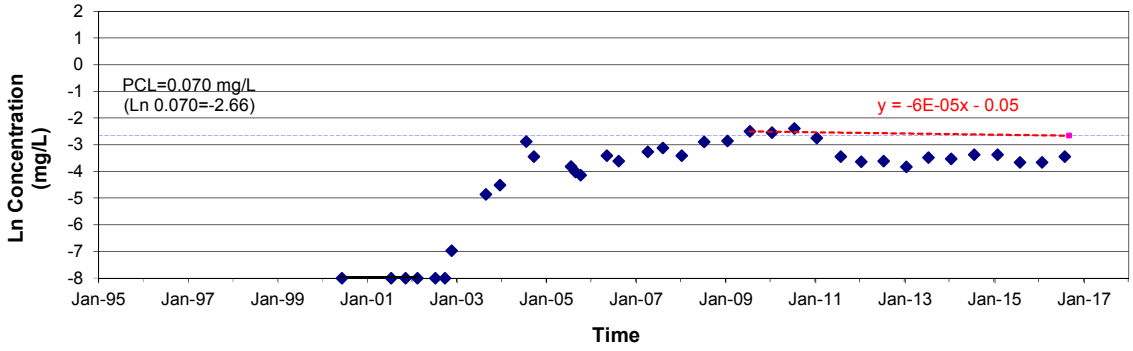
# CONCENTRATION VS. TIME GRAPHS
# WITH MINIMUM REQUIRED ATTENUATION RATE
# SWMUs 79/136 CENTRAL PLUME
# 508G03MW
# 2016 RAER

## FORMER NAS DALLAS, TEXAS
## PAGE 1 OF 2

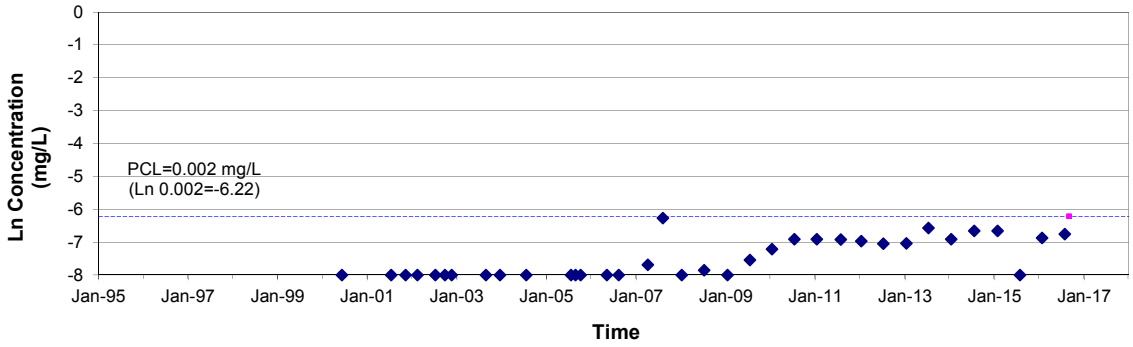
### TCE




### cis-1,2-DCE




### Vinyl Chloride

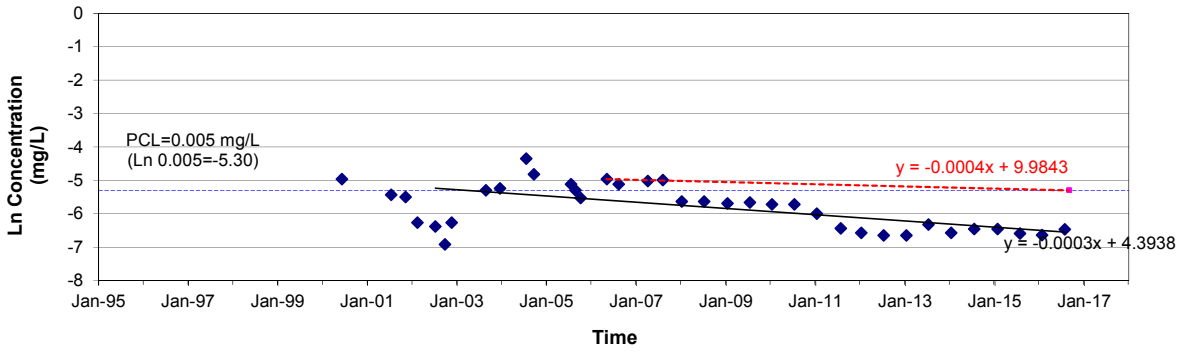



Notes: Red line and slope are based on minimum required attenuation rate ($k_{time}$) to meet PCL by 01 Sep 2016.
Black line and slope are based on linear regression of the raw data.
Sample events using passive diffusion bag (PDB) samplers are listed on Tables 4-1A and 4-1B in Appendix 4.

# CONCENTRATION VS. TIME GRAPHS
# WITH MINIMUM REQUIRED ATTENUATION RATE
# SWMUs 79/136 CENTRAL PLUME
# 508G03MW
# 2016 RAER

## FORMER NAS DALLAS, TEXAS
## PAGE 2 OF 2

### 1,2-DCA



## Performance Measures

List and describe the performance measures for each environmental medium containing a PCLE zone that are being used to determine if reasonable progress is being made by the response action in a timely manner. Provide documentation that these performance measures are being met. Attach additional information if necessary.

**EMNA Performance Measures**

**The approach to determining if EMNA was making reasonable progress in achieving the interim clean-up goals involved performing sequential groundwater monitoring and sampling during the pilot study implementation. The process and performance monitoring results provided the information necessary to optimize the chemical injection system and the results necessary to determine if the remedial objective would be reached.**

**The process and performance monitoring conducted during the pilot study included monitoring the primary COC (TCE) and its daughter products (cis-1,2-DCE, VC, ethane, and ethane) in addition to the geochemical indicator parameters (e.g., oxidation/reduction potential [ORP], dissolved oxygen [DO], pH, methane, total organic carbon [TOC], etc.) and other process monitoring parameters (e.g., Volatile Fatty Acids). These were measured in monitoring wells within the pilot test area between and downgradient of the injection points to provide basic information on the efficacy of chemical reagent delivery and the prevailing reduction-oxidation potential conditions created in the treatment zone (see RAP, Table 2A-2 [Tetra Tech, 2004b]). Significant positive changes in these parameters when compared to baseline conditions or monitoring wells outside the pilot test area indicated that the EMNA process was successfully influencing the subsurface.**

**The process and performance monitoring continued throughout the pilot test with COC and geochemical parameter sampling occurring on a more frequent basis than the semi-annual COC sampling identified for the remainder of the monitoring wells associated with the SWMUs 79/136 Central Plume. COC analytical data collected from these monitoring wells were used to determine TCE attenuation rates and the rate of daughter product generation and attenuation. These data provided the primary evidence that dechlorination was occurring and the rate in which it was occurring. The secondary evidence was determined from geochemical parameters collected from a selected number of monitoring wells. The data provided the information necessary to determine if the in-situ conditions were favorable for EMNA through dechlorination by the injection of a pre-treatment reagent ($KMnO_4$) via hydraulic fracturing followed by the injection of bio-enhancing substrates.**

**Reasonable progress of the response action was evaluated considering the following criteria:**

- **TCE is being chemically degraded at a rate that is sufficient to reach the interim clean-up goal (i.e., 95 percent concentration reduction during the pre-treatment phase).**
- **Geochemical data indicate that reducing conditions have been achieved in the treatment zone after the chemical oxidation phase has been completed.**

**Pilot Test Data Assessment**

**The EMNA pilot study was implemented in the area of highest dissolved-phase COC concentrations known as ASA-5 East. Initially, the pilot test returned favorable results with significant COC reduction in one of the target monitoring wells and moderate COC reductions in another. The pilot test was discontinued in 2005 when COCs were detected at increasing concentrations in the downgradient monitoring well (508F23MW). The Navy installed monitoring wells 508F57MW and 508F58MW downgradient of 508F23MW in 2006 to confirm that the COCs have not migrated offsite. Groundwater analytical results from monitoring well 508F57MW indicated that COCs are present at this location at concentrations greater than the critical PCLs as shown in Table 4-1A and the figures and graphs in Attachment 1A and Attachment 1B. As a result, the Navy installed additional downgradient monitoring wells 508F59MW, 508F60MW, and 508F61MW to confirm the extent of the migration. No exceedances were detected in these newly installed wells.**

**The EMNA pilot study report concluded that reagent injection via hydraulic fracturing was limited in its treatment capacity and was not recommended for the site since it was promoting plume migration (Tetra Tech, 2008). In addition, the results of the chemical oxidation phase of the pilot study indicated that additional reagent injection would be necessary to achieve the COC mass and concentration reductions needed to reach the remedial goals by the year 2017. As a result of the plume migration, the injection of bio-enhancing substrates into the groundwater to enhance the natural biodegradation of the remaining chlorinated VOCs at the site was not conducted. The TCEQ concurred with the findings of the final pilot test report in a letter dated 29 September 2009 (TCEQ, 2009). Pilot study injection points were plugged and abandoned in October 2009. Additionally, monitoring wells 508F23MW and 508G06MW were abandoned during site construction activities.**

**MNA Performance Measures**

**After the completion of the EMNA remedial response action at the SWMU 79/136 Central Plume, MNA was expected to address the remaining areas of PCLE exceedances. The approach to determine if MNA is consistently achieving the clean-up goals by 2017 involves sequential sampling events to monitor the size and shape of the PCLE zone changes over time. To this effect, a tiered sampling program incorporating performance, detection, and ambient monitoring is implemented. This sampling program involves the collection of analytical data on the COCs, groundwater flow, and geochemical parameters that may affect the progress of MNA and the likelihood of meeting site remediation goals. The design of the monitoring program allows a conclusion of success or failure to be drawn as early as possible during the response action while providing reasonable confidence in the conclusion.**

**Performance monitoring encompasses the sampling of the point of exposure (POE) wells (60-21, 508G02MW, 508G03MW, 508F49MW, 508F51MW, 508F52MW, 508F53MW, and 508F57MW) within the plume, a background monitoring well (508F31MW) outside the PCLE zone, and corrective action observation (CAO) wells (508F58MW, 508F59MW, 508F560MW, and 508F61MW). Data collected from these monitoring wells serve to check the plume shape and determine if it is shrinking or expanding, stable or migrating, thus triggering programmatic adjustments if necessary. COC analytical data collected from the monitoring wells located along the plume centerline are used to determine plume attenuation rates for individual chemical constituents ($k_{time}$) and for the plume as a whole ($k_{dist}$). Data collected from the background monitoring wells serve to determine if ambient conditions are changing that may affect the effectiveness of MNA in achieving the clean-up goals in a timely manner. The COC analytical results are presented in Table 4-1.**

**POE well 508G05MW and the corrective action observation (CAO) wells 508G01MW and 508F50MW had either no history of COC detections, or the COC detections have been below applicable GWPSs for at least the previous five consecutive years. The wells were abandoned on April 4, 2016, in accordance with the RAP submitted to TCEQ in October 2015. Well plugging reports are located in Appendix 4 and historical COC analytical results for P&A'd wells are included in Table 4-1B.**

**Performance monitoring for 2016 also entailed sampling for MNA parameters (pH, ORP, dissolved oxygen, iron, nitrate, nitrite, phosphate, sulfate, total organic carbon, chloride, ethene, ethane, and methane) during the July 2016 sampling event. MNA parameters are sampled on a biennial sampling schedule. The MNA parameters measured by field tests and laboratory analyses are presented in Table 4-2. MNA parameter data, as needed, serve as a secondary line of evidence to evaluate whether subsurface conditions continue to support natural attenuation.**

**The conceptual MNA site model for this plume is represented by the data Tables in Appendix 4, the isoconcentration maps and potentiometric surface maps included in Attachment 1A, and the concentration vs. time graphs in Attachment 1B.**

**After each semi-annual groundwater monitoring event, the COC concentration data collected was evaluated for both the entire plume as well as on a monitoring well by monitoring well basis in accordance with the RAP (Tetra Tech, 2004b). The initial data analysis and interpretation focused on the detection of**

**changes or trends in the data. Further evaluation focused on the assessment of the changes or trends and their impact on MNA to achieve site-related goals.**

**It was expected that upon completion of the EMNA pilot test the analytical data would indicate that the attenuation rates were sufficient to effectively remediate the plume on or before the year 2016. Reasonable progress of the response action was evaluated considering the following criteria:**

- **The monitoring well and COC specific $K_{time}$ attenuation rate based on the available historical sampling events is not more than the minimum attenuation rate necessary to meet clean-up goals by the year 2017.**
- **The monitoring well and COC specific concentration is less than the remedial benchmark concentration (calculated concentration goal based on the initial maximum concentration and the minimum rate necessary to achieve the remedial goals by 2017) for that sample date.**
- **The COC specific $k_{dist}$ attenuation rate based on the available historical sampling events indicates attenuation equal to or greater than the rate of COC migration from the suspected source area.**

**Response Action Progress**

**Table 4-3 summarizes the groundwater gauging data. The potentiometric surface maps for the December 2015 and July 2016 gauging events, included in Figure 1A-3 (Attachment 1A), indicate that the shape of the groundwater elevation contours and direction of groundwater flow remain consistent with previous sampling events.**

**The COC isoconcentration maps, prepared using the data collected during the January and July 2016 sampling events, are included in Figures 1A-2A, 1A-2B, 1A-2C, and 1A-2D (Attachment 1A). A review of 2016 data indicate:**

- **TCE, cis-1,2-DCE, 1,2-DCA, and VC are the COCs at SWMU 79/136 Central currently exceeding PCLs.**
- **TCE exceeded its PCL in seven of the thirteen monitor wells.**
- **TCE exceeded its PCL of 0.005 mg/L in monitoring wells 508F49MW (0.00679 and 0.0465 mg/L), 508F51MW (0.00681 and 0.01340 mg/L), 508F52MW (0.373 and 0.294 mg/L), 508F57MW (0.0136 and 0.0129 mg/L), 508G02MW (0.01490 and 0.00607 mg/L), and 508G03MW (0.019 and 0.026 mg/L) during both the January and July sampling events, and in 508F53MW (0.00918 mg/L) during the July sampling event only.**
- **Cis-1,2-DCE exceeded its PCL of 0.070 mg/L in monitoring wells 508F49MW (0.455 and 0.215 mg/L) and 508G02MW (0.29 and 0.239 mg/L) during both the January and July sampling events.**
- **1,2-DCA exceeded its PCL of 0.005 mg/L in monitoring well 508F51MW (0.0114 and 0.0184 mg/L) during both the January and July sampling events.**
- **VC exceeded its PCL in monitoring well 508G02MW (0.0111 and 0.0112 mg/L) during both the January and July sampling events.**

**Tables 4-4A, 4-4B, and 4-5 (Appendix 4) summarize the concentration vs. time and concentration vs. distance attenuation rate constants for the plume centerline. The graphs in Attachment 1B graphically depict the same attenuation rate constants summarized in Tables 4-4 and 4-5 and the minimum required attenuation rate to meet the remediation goals. Based on the data presented:**

- **Decreasing trends for TCE concentrations are occurring in monitoring wells 508F49MW, 508F57MW, 508G02MW, and 508F53MW.**
- **Flat to slightly increasing trends for TCE concentrations are evident in monitoring wells 508F51MW, 508F52MW, and 508G03MW.**
- **Cis-1,2-has decreasing trends in monitoring wells 508F49MW and 508G02MW.**
- **1,2-DCA has a decreasing trend over the last 3 years in monitoring well 508F51MW.**
- **Monitoring well 508F51MW, located on City of Dallas property upgradient of the EMNA pilot study area, continues to a show a decreasing trend in TCE and 1,2-DCA since 2010.**

**As discussed in the sections above, the EMNA pilot study report concluded that reagent injection via hydraulic fracturing was limited in its treatment capacity and was not recommended for the site because it was promoting plume migration.**

**Based on lines of evidence, the MNA process aided by EMNA does not appear to be the appropriate remedial method to reduce the COC mass and concentrations throughout the existing groundwater PCLE zone to levels less than their respective critical PCLs by the year 2017. Therefore, in accordance with the Groundwater RAP (Revision 1), and as recommended by TCEQ in a letter dated May 26, 2015, failure of the response action triggers the implementation of contingency measures, which may include the selection of an appropriate alternate remedial measure. The Navy has proposed to implement EMNA at the affected area of SWMU 18 groundwater plume in an effort to reduce COCs to below PCLs and evaluate an alternate remedy. This will allow the Navy to make a determination as to whether the technology is viable. Depending upon the results of the EMNA spot treatment at SWMU 18, alternative remedial measures may be proposed in a comprehensive RAP for SWMU 79/136 Central Plume, to follow. MNA will be continued for the upcoming year in accordance with the procedures and protocols described in the Groundwater RAP on record.**

## Problems

Complete the table for the response action. When the response action consists of several components or multiple actions, complete one table for each major component or action.

Response Action Name/Designation: *Groundwater Response Action*

List the problems that have been encountered during the response action, describe the impact of each problem, and the response to the problem.

| Description of the Problem | Impact | Did this cause a response action failure? | | Corrective Response |
|---|---|---|---|---|
| | | Yes | No | |
| **Monitoring well 508F57MW indicated COC concentrations greater than the critical PCLs.** | **The plume appears to be migrating downgradient.** | | **X** | **Installed three additional monitoring wells (508F59MW, 508F60MW, and 508F61MW) downgradient of 508F57MW in May 2007 to determine the extent of plume migration.** |
| **During January and July 2014 events, monitoring well 508F59MW indicated TCE concentrations greater than the critical PCL.** | **COC concentrations above PCLs may have migrated beyond the boundary of the historical PCLE zone.** | | **X** | **TCE concentrations have been less than the critical PCL at monitoring well 508F59MW since the January 2015 sampling event.** |

| Description of the Problem | Impact | Did this cause a response action failure? | | Corrective Response |
|---|---|---|---|---|
| | | Yes | No | |
| The current remedy, MNA aided by EMNA, does not appear to be capable of reducing concentrations of COCs by the cleanup goal of 2017. | In accordance with the Groundwater RAP on record, failure of the approved response action to meet critical PCLs triggers the implementation of contingency measures, which includes the selection of an appropriate alternate remedial measure. | X | | An Alternatives Evaluation Report (AER) was submitted to TCEQ. The Navy has proposed to implement EMNA as an alternate remedy at the affected area of SWMU 18 groundwater plume in an effort to reduce COCs to below PCLs. Depending on the results of the EMNA spot treatment at SWMU 18, alternative remedial measures may be proposed in a comprehensive RAP for SWMU 79/136 Central Plume. MNA will be continued at the SWMU 79/136 Central Plume for the upcoming year in accordance with the procedures and protocols described in the Draft Groundwater RAP (Revision 1), dated November 2004. |

Use this worksheet to describe the operation and maintenance (O&M) activities conducted for each response action.

Response Action Name/Designation: Well maintenance

List all portions of the response action to which this information applies. Repeat this worksheet for each major component or operation.

Describe the O&M and inspection activities that have been conducted to operate and maintain response action components.

**POE well 508G05MW and the CAO wells 508G01MW and 508F50MW had either no history of COC detections, or the COC detections have been below applicable GWPSs for at least the previous five consecutive years, and were abandoned on April 4, 2016, in accordance with the RAP submitted to TCEQ in October 2015. Well plugging reports are located in Appendix 4, and historical COC analytical results for P&A'd wells are included in Table 4-1B.**

**In September 2016, Resolution Consultants conducted a detailed evaluation of well maintenance needs for NAS Dallas SWMUs. Monitoring well 60-21 (a stickup well) was checked for integrity and security and was found in good condition. Monitoring wells 508F49MW, 508F51MW, 508F52MW, 508F53MW, 508F57MW, 508F58MW, 508F59MW, 508F60MW, 508F61MW, 508G02MW, and 508G03MW were re-fitted by tapping the rim eyelets and replacing bolts and washers in order to secure the lid. The surface completion at well 508F31MW could not be re-fitted, and additional well maintenance actions were completed October 12-13, 2016, that included coring and removal of existing flush mount well completion, and re-installation of flush-mount well skirts, rim, and lid.**

# APPENDIX 1
# REFERENCE LIST

# APPENDIX 1
# REFERENCES

A.T. Kearney, Inc. *RCRA Facility Assessment Preliminary Review/Visual Site Inspection.* Chicago, Illinois. 1989.

CH2M Hill. *85 Sites, Defense Reutilization and Marketing Office, and Naval Weapons Industrial Reserve Plant SWMU 18 Response Action Completion Report, Revision 2, Naval Air Station Dallas; Dallas, Texas.* Atlanta, Georgia. 2008.

EnSafe/Allen & Hoshall. *Naval Air Station Dallas Environmental Baseline Survey, Dallas, Texas*. 1994.

TCEQ. 2004.

— *Approval of RACR for Defense Reutilization and 85 Sites (Revision 2) and RACR for Naval Weapons Industrial Reserve Plant SWMU 18 (Revision 2), Former Naval Air Station Dallas, Texas.* 2008.

— *Comments on 2008 Response Action Effectiveness Report, Former Naval Air Station Dallas, Texas.* 2009.

Tetra Tech NUS, Inc. *RCRA Facility Investigation Report for Category C. Pittsburgh, Pennsylvania.* 2000a.

— *RCRA Facility Investigation Report for Category E. Pittsburgh, Pennsylvania.* 2000b.

— *RCRA Facility Investigation Report for Category F. Pittsburgh, Pennsylvania.* 2000c.

— *RCRA Facility Investigation Report for Category D. Pittsburgh, Pennsylvania.* 2001a.

— *RCRA Facility Investigation Report for Category B. Pittsburgh, Pennsylvania.* 2001b.

— *Affected Property Assessment Report. Houston, Texas*. 2002.

— *Final Monitored Natural Attenuation Groundwater Modeling Report for Category D. Pittsburgh, Pennsylvania.* 2004a.

— *Draft Response Action Plan. Pittsburgh, Pennsylvania.* 2004b.

— *Response Action Plan, Revision 2. Pittsburgh, Pennsylvania.* 2006.

— *EMNA Pilot Study Technical Memorandum*. *Pittsburgh, Pennsylvania.* 2008.

— *SWMU 79/136 Central Response Action Plan (Rev.2)*. *Pittsburgh, Pennsylvania.* 2009.

Resolution Consultants. *Draft Final Alternatives Evaluation Report, Former Naval Air Station, Dallas, Texas*. Norfolk, Virginia. August 2013.

— *Draft Vapor Intrusion Study Report, Buildings 1405, 1422, and 1424, Solid Waste Management Unit 21*. Norfolk, Virginia. September 2015.

— *Interim Revised Groundwater Response Action Plan for SWMU 79/136 Central Plume (Revision 1).* Norfolk, Virginia. October 2015.

# APPENDIX 4
# DATA TABLES

**Table 4-1 Summary of Chemicals of Concern Detected in Groundwater**
**Table 4-2 Summary of Geochemical Parameters Measured in Groundwater**
**Table 4-3 Summary of Groundwater Gauging Data**
**Table 4-4 Summary of Concentration vs. Time with Attenuation Action Levels**
**Table 4-5 Summary of Concentration vs. Distance Attenuation Rate Constants**

# TABLE 4-1
# SUMMARY OF CHEMICALS OF CONCERN DETECTED IN GROUNDWATER

**Table 4-1A**

**Summary of Chemicals of Concern Detected in Groundwater**
**Long Term Monitoring Wells — SWMUs 79/136 Central Plume**
**2016 RAER**
**Former NAS Dallas, Texas**
**Page 1 of 7**

| Monitoring Well ID | Sampling Date | Sampling Round | Chemicals of Concern (mg/L) | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | 1,1-Dichloroethene | 1,2-Dichloroethane | Benzene | Carbon Tetrachloride | Chloroform | Chloromethane | cis-1,2-Dichloroethene | Ethylbenzene | Methylene Chloride | Tetrachloroethene | trans-1,2-Dichloroethene | Trichloroethene | Vinyl Chloride |
| **Protective Concentration Levels (mg/L)** | | | **0.00700** | **0.00500** | **0.00500** | **0.00500** | **0.24000** | **0.07000** | **0.07000** | **0.70000** | **0.00500** | **0.00500** | **0.10000** | **0.00500** | **0.00200** |
| **Corrective Action Observation Monitoring Wells** | | | | | | | | | | | | | | | |
| **50803MW/ 508F49MW** | 10/25/1995 | Pre Round 1 | 0.00280 J | 0.00700 | 0.00500 U | 0.00500 U | 0.00500 U | 0.01000 U | NA | 0.00500 U | 0.00500 U | 0.00500 U | NA | 1.50000 | 0.01000 U |
| | 1/29/1996 | Pre Round 1 | 0.00340 J | 0.00900 | 0.00500 U | 0.00500 U | 0.00500 U | 0.01000 U | NA | 0.00500 U | 0.00500 U | 0.00500 U | NA | 1.90000 | 0.01000 U |
| | 4/25/1996 | Pre Round 1 | 0.00500 U | 0.00840 | 0.00500 U | 0.00500 U | 0.00500 U | 0.01000 U | NA | 0.00500 U | 0.02400 | 0.00500 U | NA | 0.71000 | 0.01000 U |
| | 7/22/1996 | Pre Round 1 | 0.00140 J | 0.01000 | 0.00500 U | 0.00500 U | 0.00500 U | 0.01000 U | NA | 0.00500 U | 0.00500 U | 0.00500 U | NA | 0.98000 | 0.01000 U |
| | 10/5/1996 | Round 1 | 0.00260 J | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.01000 U | NA | 0.00500 U | 0.00500 U | 0.00500 U | NA | 0.96000 | 0.01000 U |
| | 4/2/1998 | Round 2 | 0.05000 U | 0.05000 U | 0.05000 U | 0.05000 U | 0.05000 U | 0.05000 U | 0.81000 | 0.05000 U | 0.05000 U | 0.05000 U | 0.05000 U | 1.10000 | 0.05000 U |
| | 9/12/1998 | Round 3 | 0.42000 U | 0.42000 U | 0.42000 U | 0.42000 U | 0.42000 U | 0.42000 U | 1.60000 | 0.42000 U | 0.42000 U | 0.42000 U | 0.42000 U | 1.90000 | 0.42000 U |
| | 3/22/1999 | Round 4 | 0.03300 U | 0.01100 J | 0.03300 U | 0.03300 U | 0.03300 U | 0.03300 U | 0.72000 | 0.03300 U | 0.03300 U | 0.03300 U | 0.00310 J | 0.92000 | 0.03300 U |
| | 9/10/1999 | Round 5 | 0.03300 U | 0.03300 U | 0.03300 U | 0.03300 U | 0.03300 U | 0.03300 U | 0.72000 | 0.03300 U | 0.03300 U | 0.03300 U | 0.00350 J | 0.87000 | 0.03300 U |
| | 6/22/2000 | Round 6 | 0.02500 U | 0.01500 J | 0.02500 U | 0.02500 U | 0.02500 U | 0.02500 U | 0.57000 | 0.02500 U | 0.02500 U | 0.02500 U | 0.02500 U | 0.74000 | 0.02500 U |
| | 8/25/2000 | CCI | 0.00180 | 0.00610 | 0.00050 U | 0.00050 U | 0.00100 | 0.00100 U | 1.90000 | 0.00050 U | 0.00200 U | 0.00050 U | 0.00910 | 2.20000 | 0.00050 U |
| | 10/19/2000 | CCI | 0.00320 | 0.00460 | 0.00080 | 0.00050 U | 0.00150 | 0.00100 U | 3.00000 | 0.00050 U | 0.00200 U | 0.00050 U | 0.03600 | 2.80000 | 0.00050 U |
| | 6/25/2001 | Round 7 | 0.25000 U | 0.25000 U | 0.25000 U | 0.25000 U | 0.25000 U | 0.50000 U | 5.60000 | 0.25000 U | 0.18000 U | 0.25000 U | 0.03700 J | 5.00000 | 0.50000 U |
| | 11/8/2001 | ASA5R1 | 0.25000 U | 0.25000 U | 0.25000 U | 0.25000 U | 0.25000 U | 0.50000 U | 5.30000 | 0.25000 U | 0.25000 U | 0.25000 U | 0.04000 J | 4.30000 | 0.50000 U |
| | -- | Well Destroyed | | | | | | | | | | | | | |
| | 3/14/2002 | Replacement Well Installed | | | | | | | | | | | | | |
| | 3/14/2002 | ASA5R2 | 0.00580 | 0.00530 | 0.00130 J | 0.00500 U | 0.00330 J | 0.01000 U | 4.60000 | 0.00500 U | 0.00500 U | 0.00500 U | 0.05100 | 4.40000 | 0.01000 U |
| | 7/9/2002 | ASA5R3 | 0.25000 U | 0.25000 U | 0.25000 U | 0.25000 U | 0.25000 U | 0.50000 U | 6.40000 | 0.25000 U | 0.25000 U | 0.25000 U | 0.25000 U | 7.40000 | 0.50000 U |
| | 9/26/2002 | ASA5R4 | 0.00100 U | 0.00300 | 0.00140 | 0.00100 U | 0.00230 | 0.00100 U | 0.00100 U | NA | 0.00200 U | 0.00100 U | 0.00100 U | 0.00100 U | 0.00100 U |
| | 11/20/2002 | Round 8 | 0.12000 U | 0.12000 U | 0.12000 U | 0.12000 U | 0.12000 U | 0.12000 U | 3.60000 | 0.12000 U | 0.12000 U | 0.12000 U | 0.06200 U | 4.70000 | 0.12000 U |
| | 8/26/2003 | Round 9 | 0.00880 U | 0.00880 U | 0.00800 U | 0.00720 U | 0.00840 U | 0.01000 U | 1.50000 | 0.00760 U | 0.01100 U | 0.00480 U | 0.01000 J | 1.60000 | 0.01000 U |
| | 12/19/2003 | Round 10 | 0.02600 U | 0.01100 U | 0.01400 U | 0.02600 U | 0.01800 U | 0.00940 U | 3.30000 | 0.00011 U | 0.02000 U | 0.03000 U | 0.02400 U | 2.60000 | 0.02100 U |
| | 7/28/2004 | Round 11 | 0.12000 U | 0.03700 U | 0.08700 U | 0.08600 U | 0.03500 U | 0.06100 U | 7.20000 | 0.05800 U | 0.14000 U | 0.07300 U | 0.07900 U | 7.60000 | 0.05900 U |
| | 7/28/2004 | Round 11 (PDB) | 0.05300 U | 0.01600 U | 0.03700 U | 0.03700 U | 0.01500 U | 0.02600 U | 3.60000 | 0.02500 U | 0.06000 U | 0.03100 U | 0.03400 U | 2.70000 | 0.02500 U |
| | 9/16/2004 | Round 12 | 0.04400 U | 0.01300 U | 0.03100 U | 0.03100 U | 0.01300 U | 0.02200 U | 2.60000 | 0.02100 U | 0.05000 U | 0.02600 U | 0.02800 U | 2.50000 | 0.02100 U |
| | 3/19/2005 | Round 13 | 0.00200 | 0.00200 | 0.00060 J | 0.00030 U | 0.00040 U | 0.00200 UJ | 1.30000 | 0.00020 U | 0.00200 U | 0.00040 U | 0.02400 | 0.03600 | 0.00400 |
| | 7/19/2005 | Round 13A | 0.00040 U | 0.00030 U | 0.00060 J | 0.00030 U | 0.00040 U | 0.00030 U | 0.01100 | 0.00020 U | 0.00200 U | 0.00040 U | 0.00030 U | 0.00700 | 0.00030 U |
| | 8/24/2005 | Round 13B | 0.00200 | 0.00200 | 0.00070 J | 0.00030 U | 0.00040 U | 0.00060 J | 0.66000 | 0.00020 U | 0.00200 U | 0.00040 U | 0.01200 | 0.09600 | 0.00300 |
| | 10/19/2005 | Round 14 | 0.00300 J | 0.00030 U | 0.00070 J | 0.00030 U | 0.00040 U | 0.00030 U | 0.74000 | 0.00020 U | 0.00200 U | 0.00040 U | 0.01500 J | 0.21000 | 0.00300 J |
| | 5/7/2006 | Round 15 | 0.00600 | 0.00100 | 0.00060 J | 0.00050 U | 0.00040 U | 0.00060 U | 0.74000 | 0.00030 U | 0.00200 U | 0.00060 U | 0.01800 | 0.33000 | 0.00400 |
| | 8/13/2006 | Round 16 | 0.00600 | 0.00200 | 0.00060 J | 0.00050 U | 0.00040 U | 0.00060 U | 0.81000 | 0.00030 U | 0.00200 U | 0.00060 U | 0.02000 | 0.28000 | 0.00400 |
| | 5/9/2007 | Round 17 | 0.00380 | 0.00110 J | 0.00045 J | 0.00022 U | 0.00026 U | 0.00056 U | 0.73000 | 0.00180 U | 0.00250 U | 0.00020 U | 0.01900 | 0.15000 | 0.00420 J |
| | 5/9/2007 | Round 17 (PDB) | 0.00065 U | 0.00065 U | 0.00060 U | 0.00055 U | 0.00065 U | 0.00140 U | 0.66000 | 0.00070 U | 0.00500 J | 0.00050 U | 0.01700 | 0.07900 | 0.00100 U |
| | 8/29/2007 | Round 18 | 0.00420 U | 0.00150 U | 0.00110 U | 0.00140 U | 0.00018 U | 0.00400 U | 0.84000 | 0.00140 U | 0.01200 J | 0.00140 U | 0.01400 | 0.12000 | 0.00190 U |
| | 1/31/2008 | Round 19 | 0.00440 | 0.00150 | 0.00042 J | 0.00044 U | 0.00036 U | 0.00060 U | 0.73000 | 0.00040 U | 0.00040 U | 0.00046 U | 0.02100 | 0.08900 | 0.00210 |
| | 1/31/2008 | Round 19 (PDB) | 0.00250 | 0.00290 J | 0.00039 U | 0.00044 U | 0.00036 U | 0.00060 U | 0.36000 | 0.00040 U | 0.00040 U | 0.00046 U | 0.01000 | 0.08300 | 0.00130 J |
| | 7/24/2008 | Round 20 | 0.00290 | 0.00110 | 0.00043 J | 0.00022 U | 0.00028 U | 0.00061 U | 0.67700 | 0.00043 U | 0.00100 U | 0.00022 U | 0.02210 | 0.04930 | 0.00180 |
| | 7/24/2008 | Round 20 (PDB) | 0.00230 | 0.00210 | 0.00040 U | 0.00022 U | 0.00028 U | 0.00061 U | 0.36800 | 0.00043 U | 0.00100 U | 0.00022 U | 0.01110 | 0.07980 | 0.00092 J |
| | 1/14/2009 | Round 21 | 0.00540 U | 0.00340 U | 0.00400 U | 0.00220 U | 0.00280 U | 0.00610 U | 0.59900 | 0.00430 U | 0.02110 JH | 0.00220 U | 0.01720 | 0.05750 | 0.00300 U |
| | 7/16/2009 | Round 22 | 0.00540 U | 0.00340 U | 0.00400 U | 0.00022 U | 0.00280 U | 0.00610 U | 0.61200 | 0.00430 U | 0.01000 U | 0.00220 U | 0.01740 | 0.02420 | 0.00300 U |
| | 1/13/2010 | Round 23 | 0.00290 U | 0.00330 U | 0.00210 U | 0.00340 U | 0.00250 U | 0.00500 U | | 0.00200 U | 0.02000 U | 0.00440 U | 0.02310 | 0.02100 | 0.00028 U |
| | 1/13/2010 | Round 23 (PDB) | 0.00029 U | 0.00033 U | 0.00021 U | 0.00034 U | 0.00025 U | 0.00050 U | 0.01610 | 0.00020 U | 0.00200 U | 0.00044 U | 0.00052 J | 0.00800 | 0.00028 U |
| | 7/14/2010 | Round 24 | 0.00290 U | 0.00330 U | 0.00210 U | 0.00340 U | 0.00250 U | 0.00500 U | 0.67400 | 0.00200 U | 0.02000 U | 0.00440 U | 0.01720 | 0.01730 | 0.00028 U |
| | 7/14/2010 | Round 24 (PDB) | 0.00029 U | 0.00033 U | 0.00021 U | 0.00034 U | 0.00025 U | 0.00050 U | 0.02520 | 0.00020 U | 0.00200 U | 0.00044 U | 0.00062 J | 0.00550 | 0.00028 U |
| | 1/12/2011 | Round 25 (PDB) | 0.00170 | 0.00020 U | 0.00025 J | 0.00025 U | 0.00022 U | 0.00050 U | 0.36300 | 0.00020 U | 0.00200 U | 0.00025 U | 0.01340 | 0.08980 | 0.00130 |
| | 1/12/2011 | Round 25 | 0.00130 J | 0.00100 U | 0.00100 U | 0.00130 U | 0.00110 U | 0.00250 U | 0.38900 | 0.00100 U | 0.01760 J | 0.00130 U | 0.01250 | 0.07890 | 0.00110 U |
| | 7/28/2011 | Round 26 | 0.00120 U | 0.00100 U | 0.00100 U | 0.00130 U | 0.00110 U | 0.00250 U | 0.28200 | 0.00100 U | 0.01000 U | 0.00130 U | 0.00840 | 0.07600 | 0.00110 U |
| | 1/11/2012 | Round 27 (PDB) | 0.0012 U | 0.0010 U | 0.0010 U | 0.00130 U | 0.00110 U | 0.00250 U | 0.290 | 0.00100 U | 0.0150 J | 0.00130 U | 0.0084 | 0.0345 | 0.0011 U |
| | 1/12/2012 | Round 27 | 0.0012 U | 0.0010 U | 0.0010 U | 0.00130 U | 0.00110 U | 0.00250 U | 0.287 | 0.00100 U | 0.0102 J | 0.00130 U | 0.0081 | 0.0283 | 0.0014 J |
| | 7/12/2012 | Round 28 | 0.00092 J | 0.00050 U | 0.00050 U | 0.00063 U | 0.00055 U | 0.00130 U | 0.245 | 0.00050 U | NS | 0.00063 U | 0.0086 | 0.0565 | 0.00055 U |
| | 1/9/2013 | Round 29 | 0.0010 J | 0.00110 U | 0.00110 U | 0.00160 U | 0.00130 U | 0.00025 U | 0.316 | 0.00150 U | 0.010 U | 0.00160 U | 0.0118 | 0.060 | 0.00220 U |
| | 7/18/2013 | Round 30 | 0.00100 U | 0.00110 U | 0.00110 U | 0.00160 U | 0.00130 U | 0.00025 U | 0.274 | 0.00150 U | 0.0185 J | 0.00160 U | 0.0108 | 0.049 | 0.00220 U |
| | 2/24/2014 | Round 31 (PDB) | 0.0013 U | 0.0012 U | 0.0012 U | 0.002 U | 0.0016 U | 0.0027 U | 0.17200 | 0.0014 U | 0.0100 U | 0.0013 U | 0.0038 J | 0.0187 | 0.00160 U |
| | 7/21/2014 | Round 32 | 0.00094 J | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.31800 | 0.0005 U | 0.00328 J | 0.0005 U | 0.0146 | 0.095 | 0.0005 U |
| | 1/23/2015 | Round 33 (PDB) | 0.00025 U | 0.0005 U | 0.00025 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.27900 | 0.0005 U | 0.001 U | 0.0005 U | 0.0115 | 0.01930 | 0.000970 J |
| | 7/27/2015 | Round 34 | 0.000795 J | 0.00025 U | 0.00025 U | 0.00025 U | 0.00025 U | 0.00025 U | 0.26200 | 0.00025 U | NS | 0.00025 U | 0.0121 | 0.07840 | 0.00127 J |
| | 1/21/2016 | Round 35 (PDB) | 0.00082 J | 0.0005 UJ | 0.0005 U | 0.0005 UJ | 0.0005 U | 0.0005 U | 0.455 JL | 0.0005 U | 0.001 U | 0.0005 U | 0.0298 | 0.00679 | 0.00144 J |
| | 7/21/2016 | Round 36 | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.215 | 0.0005 U | 0.001 U | 0.0005 U | 0.0112 | 0.0465 | 0.00098 J |

**Table 4-1A**

**Summary of Chemicals of Concern Detected in Groundwater**
**Long Term Monitoring Wells — SWMUs 79/136 Central Plume**
**2016 RAER**
**Former NAS Dallas, Texas**
**Page 2 of 7**

| Monitoring Well ID | Sampling Date | Sampling Round | Chemicals of Concern (mg/L) | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | 1,1-Dichloroethene | 1,2-Dichloroethane | Benzene | Carbon Tetrachloride | Chloroform | Chloromethane | cis-1,2-Dichloroethene | Ethylbenzene | Methylene Chloride | Tetrachloroethene | trans-1,2-Dichloroethene | Trichloroethene | Vinyl Chloride |
| **Protective Concentration Levels (mg/L)** | | | **0.00700** | **0.00500** | **0.00500** | **0.00500** | **0.24000** | **0.07000** | **0.07000** | **0.70000** | **0.00500** | **0.00500** | **0.10000** | **0.00500** | **0.00200** |
| **508F51MW** | 9/15/2004 | | Well Installed | | | | | | | | | | | | |
| | 9/19/2004 | Round 12 | 0.00035 U | 0.01200 | 0.00025 U | 0.00025 U | 0.0001 U | 0.00017 U | 0.00270 | 0.00017 U | 0.00040 U | 0.00021 U | 0.00058 J | 0.01500 | 0.00017 U |
| | 1/10/2005 | -- | 0.00035 U | 0.01400 | 0.00025 U | 0.00025 U | 0.00010 U | 0.00017 U | 0.00170 | 0.00017 U | 0.00040 U | 0.00021 U | 0.00023 U | 0.01300 | 0.00017 U |
| | 3/19/2005 | Round 13 | 0.00040 U | 0.02000 | 0.00030 U | 0.00030 U | 0.00040 U | 0.00200 UJ | 0.00200 | 0.00020 U | 0.00200 U | 0.00040 U | 0.00030 J | 0.02000 | 0.00030 U |
| | 7/19/2005 | Round 13A | 0.00040 U | 0.01500 | 0.00030 U | 0.00030 U | 0.00040 U | 0.00030 U | 0.00300 | 0.00020 U | 0.00200 U | 0.00040 U | 0.00080 J | 0.01800 | 0.00030 U |
| | 8/25/2005 | Round 13B | 0.00040 U | 0.01500 | 0.00030 U | 0.00030 U | 0.00040 U | 0.00070 J | 0.00400 | 0.00020 U | 0.00200 U | 0.00040 U | 0.00090 J | 0.01600 | 0.00030 U |
| | 10/20/2005 | Round 14 | 0.00040 U | 0.01400 | 0.00030 U | 0.00030 U | 0.00040 U | 0.00030 U | 0.00800 | 0.00020 U | 0.00200 U | 0.00040 U | 0.00300 | 0.01400 | 0.00030 U |
| | 5/8/2006 | Round 15 | 0.00060 U | 0.01000 | 0.00050 U | 0.00050 U | 0.00040 U | 0.00060 U | 0.00400 | 0.00030 U | 0.00200 U | 0.00060 U | 0.00090 J | 0.01200 | 0.00060 U |
| | 8/11/2006 | Round 16 | 0.00060 U | 0.01100 | 0.00050 U | 0.00050 U | 0.00040 U | 0.00060 U | 0.00800 | 0.00030 U | 0.00200 UJ | 0.00060 U | 0.00200 | 0.01700 | 0.00060 U |
| | 5/10/2007 | Round 17 (PDB) | 0.00028 U | 0.02100 | 0.00013 U | 0.00020 U | 0.00023 U | 0.00017 U | 0.00510 | 0.00013 U | 0.00025 U | 0.00014 U | 0.00160 | 0.02200 | 0.00012 U |
| | 8/27/2007 | Round 18 | 0.00013 U | 0.02400 | 0.00012 U | 0.00011 U | 0.00013 U | 0.00064 J | 0.00620 | 0.00035 U | 0.00023 U | 0.00010 U | 0.00230 | 0.02200 | 0.00036 J |
| | 2/1/2008 | Round 19 (PDB) | 0.00039 U | 0.02300 | 0.00039 U | 0.00044 U | 0.00036 U | 0.00060 U | 0.00300 | 0.00040 U | 0.00040 U | 0.00046 U | 0.00082 J | 0.02100 | 0.00043 U |
| | 7/24/2008 | Round 20 (PDB) | 0.00054 U | 0.02260 | 0.00040 U | 0.00022 U | 0.00028 U | 0.00061 U | 0.00380 | 0.00043 U | 0.00100 U | 0.00022 U | 0.00100 | 0.02060 | 0.00030 U |
| | 1/13/2009 | Round 21 | 0.00054 U | 0.01450 | 0.00040 U | 0.00022 U | 0.00028 U | 0.00061 U | 0.00340 | 0.00043 U | 0.00100 U | 0.00022 U | 0.00130 | 0.01470 | 0.00030 U |
| | 7/16/2009 | Round 22 | 0.00540 U | 0.02620 | 0.00040 U | 0.00022 U | 0.00028 U | 0.00061 U | 0.00460 | 0.00043 U | 0.00100 U | 0.00022 U | 0.00210 | 0.02680 | 0.00030 U |
| | 1/13/2010 | Round 23 | 0.00029 U | 0.02990 | 0.00021 U | 0.00034 U | 0.00025 U | 0.00050 U | 0.00460 | 0.00020 U | 0.00200 U | 0.00044 U | 0.00210 | 0.03040 | 0.00028 U |
| | 7/14/2010 | Round 24 | 0.00029 U | 0.03090 | 0.00021 U | 0.00034 U | 0.00025 U | 0.00050 U | 0.00470 | 0.00020 U | 0.00200 U | 0.00044 U | 0.00150 | 0.03420 | 0.00028 U |
| | 1/12/2011 | Round 25 | 0.00023 U | 0.02660 | 0.00020 U | 0.00025 U | 0.00022 U | 0.00050 U | 0.00390 | 0.00020 U | 0.00200 U | 0.00025 U | 0.00160 | 0.03010 | 0.00022 U |
| | 7/28/2011 | Round 26 | 0.00023 U | 0.02840 | 0.00020 U | 0.00025 U | 0.00022 U | 0.00050 U | 0.00600 | 0.00020 U | 0.00200 U | 0.00025 U | 0.00240 | 0.03410 | 0.00022 U |
| | 1/11/2012 | Round 27 | 0.00025 U | 0.0211 | 0.00020 U | 0.00025 U | 0.00022 U | 0.00050 U | 0.0039 | 0.00020 U | 0.00200 U | 0.00025 U | 0.00020 U | 0.02230 | 0.00022 U |
| | 7/12/2012 | Round 28 | 0.00023 J | 0.0293 | 0.00020 U | 0.00025 U | 0.00022 U | 0.00050 U | 0.0047 | 0.00020 U | NS | 0.00025 U | 0.0017 | 0.02920 | 0.00022 U |
| | 1/9/2013 | Round 29 | 0.00021 J | 0.0218 | 0.00021 U | 0.00031 U | 0.00026 U | 0.00050 U | 0.0045 | 0.00029 U | 0.00200 U | 0.00032 U | 0.0018 | 0.01500 | 0.00044 U |
| | 7/18/2013 | Round 30 | 0.00031 J | 0.0327 | 0.00021 U | 0.00031 U | 0.00026 U | 0.00050 U | 0.0076 | 0.00029 U | 0.00200 U | 0.00032 U | 0.0030 | 0.02340 | 0.00044 U |
| | 2/24/2014 | Round 31 (PDB) | 0.00025 U | 0.03030 | 0.00024 U | 0.0004 U | 0.00031 U | 0.00053 U | 0.00470 | 0.00028 U | 0.0020 U | 0.00026 U | 0.0022 | 0.01820 | 0.00033 U |
| | 7/17/2014 | Round 32 | 0.00036 J | 0.02560 | 0.00025 U | 0.00025 U | 0.00025 U | 0.00025 U | 0.0116 | 0.00025 U | 0.0005 U | 0.00025 U | 0.00421 | 0.01770 | 0.00025 U |
| | 1/23/2015 | Round 33 (PDB) | 0.00025 U | 0.02560 | 0.0005 U | 0.00025 U | 0.00025 U | 0.00025 U | 0.0116 | 0.00025 U | 0.0005 U | 0.00025 U | 0.00493 | 0.02120 | 0.00025 U |
| | 7/24/2015 | Round 34 | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.00593 | 0.0005 U | 0.002 | 0.0005 U | 0.00242 | 0.01330 | 0.00025 U |
| | 1/21/2016 | Round 35 (PDB) | 0.0005 U | 0.0114 | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0112 | 0.0005 U | 0.001 U | 0.0005 U | 0.00473 | 0.00681 | 0.0005 U |
| | 7/21/2016 | Round 36 | 0.00025 U | 0.0184 | 0.00025 U | 0.00025 U | 0.00025 U | 0.00025 U | 0.00655 | 0.00025 U | 0.0005 U | 0.00025 U | 0.00241 | 0.01340 | 0.00025 U |
| **508F52MW** | 9/15/2004 | | Well Installed | | | | | | | | | | | | |
| | 9/20/2004 | Round 12 | 0.00350 U | 0.00100 U | 0.00250 U | 0.00250 U | 0.00100 U | 0.00170 U | 0.01100 | 0.00170 U | 0.00400 U | 0.00210 U | 0.00230 U | 0.20000 | 0.00170 U |
| | 1/11/2005 | -- | 0.01400 U | 0.00420 U | 0.01000 U | 0.00990 U | 0.00400 U | 0.00700 U | 0.04200 | 0.00670 U | 0.01600 U | 0.00830 U | 0.00910 U | 0.81000 | 0.00670 U |
| | 3/19/2005 | Round 13 | 0.00040 U | 0.00030 U | 0.00050 J | 0.00030 U | 0.00300 | 0.00200 UJ | 0.03900 | 0.00020 U | 0.00200 U | 0.00040 U | 0.00030 J | 0.62000 | 0.00030 U |
| | 7/19/2005 | Round 13A | 0.00040 U | 0.00030 U | 0.00070 J | 0.00030 U | 0.00300 | 0.00030 U | 0.03600 | 0.00020 U | 0.00200 U | 0.00040 U | 0.00030 J | 0.78000 | 0.00030 U |
| | 8/23/2005 | Round 13B | 0.00040 U | 0.00030 U | 0.00080 J | 0.00030 U | 0.00300 | 0.00070 J | 0.04000 | 0.00020 U | 0.00200 UJ | 0.00040 U | 0.00040 J | 0.88000 | 0.00030 U |
| | 10/19/2005 | Round 14 | 0.00040 U | 0.00030 U | 0.00060 J | 0.00030 U | 0.00300 J | 0.00030 U | 0.03600 J | 0.00020 U | 0.00200 U | 0.00040 U | 0.00030 U | 0.60000 J | 0.00030 U |
| | 5/6/2006 | Round 15 | 0.00060 U | 0.00040 U | 0.00050 U | 0.00050 U | 0.00200 | 0.00060 U | 0.02000 | 0.00030 U | 0.00200 U | 0.00060 U | 0.00060 U | 0.49000 | 0.00060 U |
| | 8/12/2006 | Round 16 | 0.00060 U | 0.00040 U | 0.00060 J | 0.00050 U | 0.00200 | 0.00060 U | 0.03100 | 0.00030 U | 0.00200 U | 0.00060 U | 0.00060 U | 0.60000 | 0.00060 U |
| | 5/10/2007 | Round 17 (PDB) | 0.00028 U | 0.00021 U | 0.00019 J | 0.00020 U | 0.00170 | 0.00017 U | 0.00940 | 0.00013 U | 0.00025 U | 0.00014 U | 0.00053 U | 0.19000 | 0.00012 U |
| | 8/29/2007 | Round 18 | 0.00084 U | 0.00030 U | 0.00022 U | 0.00028 U | 0.00092 U | 0.00080 U | 0.00840 | 0.00028 U | 0.00550 | 0.00028 U | 0.00080 U | 0.22000 | 0.00038 U |
| | 2/1/2008 | Round 19 (PDB) | 0.00039 U | 0.00026 U | 0.00039 U | 0.00044 U | 0.00180 | 0.00060 U | 0.01800 | 0.00040 U | 0.00040 U | 0.00046 U | 0.00048 U | 0.24000 J | 0.00043 U |
| | 7/24/2008 | Round 20 | 0.00054 U | 0.00034 U | 0.00040 U | 0.00022 U | 0.00064 J | 0.00061 U | 0.01000 | 0.00043 U | 0.00100 U | 0.00022 U | 0.00045 U | 0.16200 | 0.00030 U |
| | 1/14/2009 | Round 21 | 0.00110 U | 0.00068 U | 0.00080 U | 0.00044 U | 0.00056 U | 0.00120 U | 0.01070 | 0.00086 U | 0.00780 JH | 0.00044 U | 0.00090 U | 0.11700 | 0.00060 U |
| | 7/16/2009 | Round 22 | 0.00270 U | 0.00170 U | 0.00200 U | 0.00110 U | 0.00140 U | 0.00310 U | 0.01120 | 0.00220 U | 0.00500 J | 0.00110 U | 0.00230 U | 0.30400 | 0.00150 U |
| | 1/13/2010 | Round 23 | 0.00080 J | 0.00033 U | 0.00062 J | 0.00034 U | 0.00065 J | 0.00055 J | 0.03900 | 0.00020 U | 0.00200 U | 0.00044 U | 0.00086 J | 0.84300 | 0.00028 U |
| | 7/14/2010 | Round 24 | 0.00150 U | 0.00170 U | 0.00110 U | 0.00170 U | 0.00130 U | 0.00250 U | 0.01870 | 0.00100 U | 0.01000 U | 0.00220 U | 0.00170 U | 0.49600 | 0.00140 U |
| | 1/12/2011 | Round 25 | 0.00120 U | 0.00100 U | 0.00100 U | 0.00130 U | 0.00110 U | 0.00250 U | 0.04370 | 0.00100 U | 0.01000 U | 0.00130 U | 0.00180 U | 0.46500 | 0.00110 U |
| | 7/28/2011 | Round 26 | 0.00078 J | 0.00020 U | 0.00020 U | 0.00025 U | 0.00022 U | 0.00050 U | 0.02020 JL | 0.00020 U | 0.00200 U | 0.00025 U | 0.00160 | 0.45700 JL | 0.00022 U |
| | 1/11/2012 | Round 27 | 0.00250 U | 0.00200 U | 0.00200 U | 0.00250 U | 0.00220 U | 0.00500 U | 0.0181 | 0.00200 U | 0.02000 U | 0.00250 U | 0.00350 U | 0.51000 | 0.00220 U |
| | 7/12/2012 | Round 28 | 0.00120 U | 0.00100 U | 0.00100 U | 0.00130 U | 0.00110 U | 0.00250 U | 0.0204 | 0.00100 U | NS | 0.00130 U | 0.0076 | 0.29200 | 0.00110 U |
| | 1/9/2013 | Round 29 | 0.00083 J | 0.00022 U | 0.00041 J | 0.00031 U | 0.00042 J | 0.00500 U | 0.0353 | 0.00029 U | 0.00200 U | 0.00032 U | 0.0065 | 0.66100 | 0.00044 U |
| | 7/18/2013 | Round 30 | 0.00100 U | 0.00110 U | 0.00110 U | 0.00160 U | 0.00130 U | 0.00250 U | 0.0362 | 0.00150 U | 0.0100 U | 0.00160 U | 0.0147 | 0.38000 | 0.00220 U |
| | 2/24/2014 | Round 31 (PDB) | 0.00103 U | 0.00120 U | 0.00120 U | 0.0020 U | 0.00160 U | 0.00270 U | 0.04670 | 0.00140 U | 0.0100 U | 0.00130 U | 0.0183 | 0.22800 | 0.00160 U |
| | 7/21/2014 | Round 32 | 0.0006 J | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0361 | 0.0005 U | 0.001 U | 0.0005 U | 0.0133 | 0.33600 | 0.0005 U |
| | 1/23/2015 | Round 33 | 0.000646 J | 0.00025 U | 0.00025 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0554 | 0.0005 U | 0.001 U | 0.0005 U | 0.022 | 0.53700 | 0.0005 U |
| | 7/27/2015 | Round 34 | 0.000794 J | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.035 | 0.00025 U | 0.001 U | 0.0005 U | 0.0121 | 0.35000 | 0.0005 U |
| | 1/21/2016 | Round 35 (PDB) | 0.00075 J | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0338 | 0.0005 U | 0.001 U | 0.0005 U | 0.0115 | 0.373 JL | 0.0005 U |
| | 7/21/2016 | Round 36 | 0.00068 J | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0391 | 0.0005 U | 0.001 U | 0.0005 U | 0.0154 | 0.29400 | 0.0005 U |

**Table 4-1A**

**Summary of Chemicals of Concern Detected in Groundwater**
**Long Term Monitoring Wells — SWMUs 79/136 Central Plume**
**2016 RAER**
**Former NAS Dallas, Texas**
**Page 3 of 7**

| Monitoring Well ID | Sampling Date | Sampling Round | Chemicals of Concern (mg/L) | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | 1,1-Dichloroethene | 1,2-Dichloroethane | Benzene | Carbon Tetrachloride | Chloroform | Chloromethane | cis-1,2-Dichloroethene | Ethylbenzene | Methylene Chloride | Tetrachloroethene | trans-1,2-Dichloroethene | Trichloroethene | Vinyl Chloride |
| **Protective Concentration Levels (mg/L)** | | | **0.00700** | **0.00500** | **0.00500** | **0.00500** | **0.24000** | **0.07000** | **0.07000** | **0.70000** | **0.00500** | **0.00500** | **0.10000** | **0.00500** | **0.00200** |
| **508G02MW** | 6/7/2000 | | Well Installed | | | | | | | | | | | | |
| | 6/7/2000 | CCL | 0.00050 U | 0.03400 | 0.00050 U | 0.00050 U | 0.00050 U | 0.00100 U | 0.00460 | 0.00050 U | 0.00200 U | 0.00050 U | 0.00050 U | 0.00800 | 0.00050 U |
| | 8/25/2000 | CCL | 0.00050 U | 0.03300 | 0.00050 U | 0.00050 U | 0.00050 U | 0.00100 U | 0.01400 | 0.00050 U | 0.00200 U | 0.00050 U | 0.00050 U | 0.02100 | 0.00050 U |
| | 10/19/2000 | CCL | 0.00050 U | 0.02700 | 0.00050 U | 0.00050 U | 0.00050 U | 0.00100 U | 0.01800 | 0.00050 U | 0.00200 U | 0.00050 U | 0.00050 U | 0.02500 | 0.00050 U |
| | 7/14/2001 | Round 7 | 0.00500 U | 0.02100 | 0.00500 U | 0.00500 U | 0.00500 U | 0.01000 U | 0.06600 | 0.00500 U | 0.00500 U | 0.00500 U | 0.00250 U | 0.06700 | 0.01000 U |
| | 9/25/2002 | ASA 5R4 | 0.00100 U | 0.01300 | 0.00100 U | 0.00100 U | 0.00100 U | 0.00100 U | 0.18000 | NA | 0.00200 U | 0.00100 U | 0.00094 J | 0.19000 | 0.00100 U |
| | 11/19/2002 | Round 8 | 0.00670 U | 0.01600 | 0.00670 U | 0.00670 U | 0.00670 U | 0.00670 U | 0.24000 | 0.00670 U | 0.00670 U | 0.00670 U | 0.00330 U | 0.23000 | 0.00670 U |
| | 8/26/2003 | Round 9 | 0.00180 U | 0.01700 | 0.00160 U | 0.00140 U | 0.00170 U | 0.00210 U | 0.29000 | 0.00150 U | 0.00220 U | 0.00096 U | 0.00190 J | 0.26000 | 0.00210 U |
| | 12/19/2003 | Round 10 | 0.00210 U | 0.01700 | 0.00110 U | 0.00200 U | 0.00140 U | 0.00075 U | 0.31000 | 0.00011 U | 0.00160 U | 0.00240 U | 0.00190 U | 0.25000 | 0.00170 U |
| | 7/19/2004 | Round 11 | 0.00880 U | 0.01300 J | 0.00620 U | 0.00620 U | 0.00250 U | 0.00440 U | 0.51000 | 0.00420 U | 0.01000 U | 0.00520 U | 0.00420 U | 0.37000 | 0.00420 U |
| | 9/14/2004 | Round 12 | 0.00880 U | 0.01300 J | 0.00620 U | 0.00620 U | 0.00250 U | 0.00440 U | 0.61000 | 0.00420 U | 0.01000 U | 0.00520 U | 0.00570 U | 0.44000 | 0.00420 U |
| | 3/18/2005 | Round 13 | 0.00100 | 0.00500 | 0.00030 U | 0.00030 U | 0.00040 U | 0.00030 U | 0.43000 | 0.00020 U | 0.00200 U | 0.00040 U | 0.01300 | 0.05200 | 0.00030 J |
| | 7/19/2005 | Round 13A | 0.00040 U | 0.00400 | 0.00030 U | 0.00030 U | 0.00040 U | 0.00030 U | 0.19000 | 0.00020 U | 0.00200 U | 0.00040 U | 0.00600 | 0.06600 | 0.00030 U |
| | 8/24/2005 | Round 13B | 0.00040 U | 0.00500 | 0.00030 U | 0.00030 U | 0.00040 U | 0.00030 U | 0.21000 | 0.00020 U | 0.00200 U | 0.00040 U | 0.01000 | 0.05700 | 0.00050 J |
| | 10/19/2005 | Round 14 | 0.00040 U | 0.00700 J | 0.00030 U | 0.00030 U | 0.00040 U | 0.00030 U | 0.24000 J | 0.00020 U | 0.00200 U | 0.00040 U | 0.01500 J | 0.04700 J | 0.00060 J |
| | 5/6/2006 | Round 15 | 0.00060 U | 0.00500 | 0.00050 U | 0.00050 U | 0.00040 U | 0.00060 U | 0.28000 | 0.00030 U | 0.00200 U | 0.00060 U | 0.01700 | 0.07700 | 0.00090 J |
| | 8/12/2006 | Round 16 | 0.00060 U | 0.00700 | 0.00050 U | 0.00050 U | 0.00040 U | 0.00060 U | 0.26000 | 0.00030 U | 0.00200 U | 0.00060 U | 0.01400 | 0.05300 | 0.00090 J |
| | 4/28/2007 | Round 17 | 0.00039 J | 0.00530 | 0.00024 U | 0.00022 U | 0.00026 U | 0.00056 U | 0.24000 | 0.00070 U | 0.00046 U | 0.00020 U | 0.00930 | 0.05800 | 0.00100 J |
| | 8/28/2007 | Round 18 | 0.00042 UJ | 0.00720 J | 0.00013 J | 0.00014 UJ | 0.00010 UJ | 0.00040 UJ | 0.32000 | 0.00014 UJ | 0.00026 UJ | 0.00014 UJ | 0.01100 J | 0.07900 J | 0.00130 J |
| | 1/20/2008 | Round 19 | 0.00077 J | 0.00430 | 0.00039 U | 0.00044 U | 0.00036 U | 0.00060 U | 0.31000 | 0.00040 U | 0.00040 U | 0.00046 U | 0.01600 | 0.04400 | 0.00100 J |
| | 7/24/2008 | Round 20 | 0.00270 U | 0.00430 J | 0.00200 U | 0.00110 U | 0.00140 U | 0.00310 U | 0.28400 | 0.00220 U | 0.00870 J | 0.00110 U | 0.01410 | 0.02870 | 0.00150 U |
| | 1/14/2009 | Round 21 | 0.00270 U | 0.00320 J | 0.00200 U | 0.00110 U | 0.00140 U | 0.00310 U | 0.34100 J | 0.00220 U | 0.00760 JH | 0.00110 U | 0.01350 | 0.01620 | 0.00150 U |
| | 7/16/2009 | Round 22 | 0.00110 U | 0.00300 J | 0.00080 U | 0.00044 U | 0.00056 U | 0.00120 U | 0.35800 | 0.00086 U | 0.00200 U | 0.00044 U | 0.01820 | 0.01510 | 0.00100 J |
| | 1/13/2010 | Round 23 | 0.00059 J | 0.00220 | 0.00023 J | 0.00170 U | 0.00130 U | 0.00250 U | 0.33900 | 0.00100 U | 0.01160 U | 0.00220 U | 0.01800 | 0.01640 J | 0.00150 |
| | 7/14/2010 | Round 24 | 0.00068 J | 0.00220 | 0.00021 U | 0.00034 U | 0.00025 U | 0.00050 U | 0.32600 | 0.00020 U | 0.00200 U | 0.00044 U | 0.01630 | 0.01160 | 0.00150 |
| | 1/12/2011 | Round 25 | 0.00120 U | 0.00160 J | 0.00100 U | 0.00130 U | 0.00110 U | 0.00250 U | 0.32100 | 0.00100 U | 0.01790 J | 0.00130 U | 0.01860 | 0.00710 JH | 0.00220 J |
| | 7/28/2011 | Round 26 | 0.00120 U | 0.00100 U | 0.00100 U | 0.00130 U | 0.00110 U | 0.00250 U | 0.28700 | 0.00100 U | 0.01000 U | 0.00130 U | 0.01380 | 0.01060 | 0.00330 J |
| | 1/11/2012 | Round 27 | 0.00049 J | 0.00076 J | 0.00020 U | 0.00025 U | 0.00022 U | 0.00050 U | 0.260 | 0.00020 U | 0.00200 U | 0.00025 U | 0.0132 | 0.01120 | 0.0046 |
| | 7/12/2012 | Round 28 | 0.00064 J | 0.00053 J | 0.00020 U | 0.00025 U | 0.00022 U | 0.00050 U | 0.294 | 0.00020 U | NS | 0.00025 U | 0.0161 | 0.01060 | 0.0044 |
| | 1/9/2013 | Round 29 | 0.00100 U | 0.00110 U | 0.00110 U | 0.00160 U | 0.00130 U | 0.00250 U | 0.304 | 0.00150 U | 0.0118 J | 0.00160 U | 0.0138 | 0.00870 | 0.0052 |
| | 7/18/2013 | Round 30 | 0.00100 U | 0.00110 U | 0.00110 U | 0.00160 U | 0.00130 U | 0.00250 U | 0.261 | 0.00150 U | 0.0136 J | 0.00160 U | 0.0140 | 0.01200 | 0.0048 J |
| | 2/24/2014 | Round 31 (PDB) | 0.00058 J | 0.00030 J | 0.00024 U | 0.00040 U | 0.00031 U | 0.00053 U | 0.24300 | 0.00028 U | 0.0020 U | 0.00026 U | 0.0171 | 0.01540 | 0.01290 |
| | 7/21/2014 | Round 32 | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.22100 | 0.0005 U | 0.00121 J | 0.0005 U | 0.0129 | 0.01440 | 0.00835 |
| | 1/23/2015 | Round 33 | 0.0005 U | 0.00025 U | 0.00025 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.29100 | 0.00025 U | 0.001 U | 0.0005 U | 0.01700 | 0.03060 | 0.01280 |
| | 1/23/2015 | Round 33 | 0.0005 U | 0.00025 U | 0.00025 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.29400 | 0.00025 U | 0.001 U | 0.0005 U | 0.01700 | 0.03180 | 0.01230 |
| | 7/27/2015 | Round 34 | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.25900 | 0.0005 U | 0.001 U | 0.0005 U | 0.01720 | 0.00776 | 0.00720 |
| | 7/27/2015 | Round 34 | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.25900 | 0.0005 U | 0.001 U | 0.0005 U | 0.01770 | 0.00610 | 0.00683 |
| | 1/21/2016 | Round 35 (PDB) | 0.0005 U | 0.0005 UJ | 0.0005 U | 0.0005 UJ | 0.0005 U | 0.0005 U | 0.29000 | 0.0005 U | 0.001 U | 0.0005 U | 0.0183 | 0.01490 | 0.0111 |
| | 7/21/2016 | Round 36 | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.23900 | 0.0005 U | 0.001 U | 0.0005 U | 0.0152 | 0.00607 | 0.0112 |

**Table 4-1A**

**Summary of Chemicals of Concern Detected in Groundwater**
**Long Term Monitoring Wells — SWMUs 79/136 Central Plume**
**2016 RAER**
**Former NAS Dallas, Texas**
**Page 4 of 7**

| Monitoring Well ID | Sampling Date | Sampling Round | Chemicals of Concern (mg/L) | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | 1,1-Dichloroethene | 1,2-Dichloroethane | Benzene | Carbon Tetrachloride | Chloroform | Chloromethane | cis-1,2-Dichloroethene | Ethylbenzene | Methylene Chloride | Tetrachloroethene | trans-1,2-Dichloroethene | Trichloroethene | Vinyl Chloride |
| Protective Concentration Levels (mg/L) | | | 0.00700 | 0.00500 | 0.00500 | 0.00500 | 0.24000 | 0.07000 | 0.07000 | 0.70000 | 0.00500 | 0.00500 | 0.10000 | 0.00500 | 0.00200 |
| 508G03MW | 6/7/2000 | | Well Installed | | | | | | | | | | | | |
| | 6/7/2000 | CCL | 0.00050 U | 0.00700 | 0.00050 U | 0.00050 U | 0.00050 U | 0.00100 U | 0.00050 U | 0.00050 U | 0.00200 U | 0.00050 U | 0.00050 U | 0.00050 U | 0.00050 U |
| | 7/14/2001 | Round 7 | 0.00500 U | 0.00440 J | 0.00500 U | 0.00500 U | 0.00500 U | 0.01000 U | 0.00250 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00250 U | 0.00500 U | 0.01000 U |
| | 11/8/2001 | ASA 5R1 | 0.00500 U | 0.00410 J | 0.00500 U | 0.00500 U | 0.00500 U | 0.01000 U | 0.00250 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00250 U | 0.00500 U | 0.01000 U |
| | 2/13/2002 | ASA 5R2 | 0.00500 U | 0.00190 J | 0.00500 U | 0.00500 U | 0.00500 U | 0.01000 U | 0.00250 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00250 U | 0.00500 U | 0.01000 U |
| | 7/10/2002 | ASA 5R3 | 0.00500 U | 0.00170 J | 0.00500 U | 0.00500 U | 0.00500 U | 0.01000 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.01000 U |
| | 9/26/2002 | ASA 5R4 | 0.00100 U | 0.00099 J | 0.00100 U | 0.00100 U | 0.00100 U | 0.00100 U | 0.00100 U | NA | 0.00200 U | 0.00100 U | 0.00100 U | 0.00100 U | 0.00100 U |
| | 11/20/2002 | Round 8 | 0.00100 U | 0.00190 | 0.00100 U | 0.00100 U | 0.00100 U | 0.00100 U | 0.00094 | 0.00100 U | 0.00100 U | 0.00100 U | 0.00050 U | 0.00049 J | 0.00100 U |
| | 8/25/2003 | Round 9 | 0.00022 U | 0.00500 | 0.00020 U | 0.00018 U | 0.00021 U | 0.00026 U | 0.00770 | 0.00019 U | 0.00028 U | 0.00012 U | 0.00024 U | 0.00300 | 0.00026 U |
| | 12/19/2003 | Round 10 | 0.00021 U | 0.00530 | 0.00011 U | 0.00020 U | 0.00014 U | 0.00008 U | 0.01100 | 0.00011 U | 0.00016 U | 0.00024 U | 0.00019 U | 0.00450 | 0.00017 U |
| | 7/19/2004 | Round 11 | 0.00070 U | 0.01300 | 0.00050 U | 0.00049 U | 0.00020 U | 0.00035 U | 0.05600 | 0.00033 U | 0.00080 U | 0.00042 U | 0.00045 U | 0.03100 | 0.00034 U |
| | 9/19/2004 | Round 12 | 0.00035 U | 0.00810 | 0.00025 U | 0.00025 U | 0.00010 U | 0.00017 U | 0.03200 | 0.00017 U | 0.00040 U | 0.00021 U | 0.00023 U | 0.01700 | 0.00023 J |
| | 7/19/2005 | Round 13A | 0.00040 U | 0.00600 | 0.00030 U | 0.00030 U | 0.00040 U | 0.00030 U | 0.02200 | 0.00020 U | 0.00200 U | 0.00040 U | 0.00030 U | 0.01100 | 0.00030 U |
| | 8/25/2005 | Round 13B | 0.00040 U | 0.00500 | 0.00030 U | 0.00030 U | 0.00040 U | 0.00030 U | 0.01800 | 0.00020 U | 0.00200 U | 0.00040 U | 0.00030 U | 0.00900 | 0.00030 U |
| | 10/22/2005 | Round 14 | 0.00040 U | 0.00400 | 0.00030 U | 0.00030 U | 0.00040 U | 0.00030 U | 0.01600 | 0.00020 U | 0.00200 U | 0.00040 U | 0.00030 U | 0.01000 | 0.00030 U |
| | 5/7/2006 | Round 15 | 0.00060 U | 0.00700 | 0.00050 U | 0.00050 U | 0.00040 U | 0.00060 U | 0.03300 | 0.00030 U | 0.00200 U | 0.00060 U | 0.00060 U | 0.01800 | 0.00060 U |
| | 8/13/2006 | Round 16 | 0.00060 U | 0.00600 | 0.00050 U | 0.00050 U | 0.00040 U | 0.00060 U | 0.02700 | 0.00030 U | 0.00200 U | 0.00060 U | 0.00060 U | 0.01200 | 0.00060 U |
| | 4/28/2007 | Round 17 | 0.00013 U | 0.00660 | 0.00012 U | 0.00011 U | 0.00013 U | 0.00028 U | 0.03800 | 0.00035 U | 0.00023 U | 0.00010 U | 0.00062 J | 0.02200 | 0.00046 J |
| | 8/29/2007 | Round 18 | 0.00042 U | 0.00680 | 0.00011 U | 0.00014 U | 0.00010 U | 0.00040 U | 0.04400 | 0.00014 U | 0.00026 U | 0.00014 U | 0.00049 J | 0.03200 | 0.00019 U |
| | 1/20/2008 | Round 19 | 0.00039 U | 0.00360 | 0.00039 U | 0.00044 U | 0.00036 U | 0.00060 U | 0.03300 | 0.00040 U | 0.00040 U | 0.00046 U | 0.00056 J | 0.02800 | 0.00043 U |
| | 7/24/2008 | Round 20 | 0.00054 U | 0.00360 | 0.00040 U | 0.00022 U | 0.00028 U | 0.00061 U | 0.05540 | 0.00043 U | 0.00100 U | 0.00022 U | 0.00087 J | 0.05230 | 0.00039 J |
| | 1/14/2009 | Round 21 | 0.00054 U | 0.00340 | 0.00040 U | 0.00022 U | 0.00028 U | 0.00061 U | 0.05770 | 0.00043 U | 0.00100 U | 0.00022 U | 0.00082 J | 0.05310 | 0.00030 U |
| | 7/16/2009 | Round 22 | 0.00540 U | 0.00350 | 0.00040 U | 0.00022 U | 0.00028 U | 0.00061 U | 0.08210 | 0.00043 U | 0.00100 U | 0.00022 U | 0.00150 | 0.07990 | 0.00053 J |
| | 1/13/2010 | Round 23 | 0.00043 J | 0.00330 | 0.00021 U | 0.00034 U | 0.00025 U | 0.00050 U | 0.07810 | 0.00020 U | 0.00200 U | 0.00044 U | 0.00130 | 0.08290 | 0.00074 J |
| | 7/14/2010 | Round 24 | 0.00049 J | 0.00330 | 0.00021 U | 0.00034 U | 0.00025 U | 0.00050 U | 0.09130 | 0.00020 U | 0.00200 U | 0.00044 U | 0.00120 | 0.09370 | 0.00100 |
| | 1/12/2011 | Round 25 | 0.00044 J | 0.00250 | 0.00020 U | 0.00025 U | 0.00022 U | 0.00050 U | 0.06400 | 0.00020 U | 0.00200 U | 0.00025 U | 0.00130 | 0.07000 | 0.00100 |
| | 7/28/2011 | Round 26 | 0.00023 U | 0.0016 | 0.00020 U | 0.00025 U | 0.00022 U | 0.00050 U | 0.03200 | 0.00020 U | 0.00200 U | 0.00025 U | 0.00061 J | 0.03410 | 0.00099 J |
| | 1/11/2012 | Round 27 | 0.00025 U | 0.0013 | 0.00020 U | 0.00025 U | 0.00022 U | 0.00050 U | 0.0258 | 0.00020 U | 0.00200 U | 0.00025 U | 0.00052 J | 0.02600 | 0.00089 J |
| | 7/12/2012 | Round 28 | 0.00025 J | 0.0012 | 0.00020 U | 0.00025 U | 0.00022 U | 0.00050 U | 0.0256 | 0.00020 U | NS | 0.00025 U | 0.00056 J | 0.02320 | 0.00084 J |
| | 1/9/2013 | Round 29 | 0.00026 J | 0.0013 | 0.00021 U | 0.00031 U | 0.00026 U | 0.00050 U | 0.0217 | 0.00029 U | 0.00200 U | 0.00032 U | 0.00068 J | 0.01770 | 0.00088 J |
| | 7/18/2013 | Round 30 | 0.00028 J | 0.0018 | 0.00021 U | 0.00031 U | 0.00026 U | 0.00050 U | 0.0308 | 0.00029 U | 0.00200 U | 0.00032 U | 0.00079 J | 0.02770 | 0.0014 |
| | 2/24/2014 | Round 31 (PDB) | 0.00025 U | 0.0014 J | 0.00024 U | 0.0004 U | 0.00031 U | 0.00053 U | 0.02920 | 0.00028 U | 0.0020 U | 0.00026 U | 0.00071 J | 0.02540 | 0.00100 |
| | 7/21/2014 | Round 32 | 0.00027 | 0.00158 | 0.00025 U | 0.00025 U | 0.00025 U | 0.00025 U | 0.0342 | 0.00025 U | 0.0005 U | 0.00025 U | 0.0010 J | 0.02790 | 0.00129 |
| | 1/26/2015 | Round 33 | 0.000346 J | 0.00174 | 0.00025 U | 0.00025 U | 0.00025 U | 0.00025 U | 0.035 | 0.00025 U | 0.0005 U | 0.00025 U | 0.000950 J | 0.02680 | 0.00122 |
| | 1/26/2015 | Round 33 | 0.000295 J | 0.00167 | 0.00025 U | 0.00025 U | 0.00025 U | 0.00025 U | 0.0356 | 0.00025 U | 0.0005 U | 0.00025 U | 0.00105 | 0.02840 | 0.00107 |
| | 7/27/2015 | Round 34 | 0.0005 U | 0.0012 J | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0274 | 0.0005 U | 0.001 U | 0.0005 U | 0.0005 U | 0.02070 | 0.0005 U |
| | 7/27/2015 | Round 34 | 0.0005 U | 0.00138 J | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.026 | 0.0005 U | 0.001 U | 0.0005 U | 0.0005 U | 0.01920 | 0.0005 U |
| | 1/21/2016 | Round 35 (PDB) | 0.0005 U | 0.00131 J | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0257 | 0.0005 U | 0.001 U | 0.0005 U | 0.00077 J | 0.01900 | 0.00104 J |
| | 7/21/2016 | Round 36 | 0.00025 U | 0.00156 | 0.00025 U | 0.00025 U | 0.00025 U | 0.00025 U | 0.0318 | 0.00025 U | 0.0005 U | 0.00025 U | 0.00082 J | 0.02600 | 0.00117 |
| 508G04MW/ 508F53MW | 6/7/2000 | | Well Installed | | | | | | | | | | | | |
| | 6/7/2000 | CCI | 0.00360 | 0.00060 | 0.00140 | 0.00050 U | 0.00170 | 0.00100 U | 2.40000 | 0.00050 U | 0.00200 U | 0.00050 U | 0.02000 | 3.10000 | 0.00050 U |
| | 6/23/2000 | Round 6 | 0.12000 U | 0.12000 U | 0.12000 U | 0.12000 U | 0.12000 U | 0.12000 U | 2.20000 | 0.12000 U | 0.12000 U | 0.12000 U | 0.12000 U | 3.90000 | 0.12000 U |
| | 8/25/2000 | CCI | 0.00090 | 0.00050 U | 0.00060 | 0.00050 U | 0.00100 | 0.00100 U | 1.40000 | 0.00050 U | 0.00200 U | 0.00050 U | 0.01100 | 2.60000 | 0.00050 U |
| | 10/19/2000 | CCI | 0.00110 | 0.00080 | 0.00080 | 0.00050 U | 0.00120 | 0.00100 U | 1.70000 | 0.00050 U | 0.00200 U | 0.00050 U | 0.01500 | 2.90000 | 0.00050 U |
| | 7/14/2001 | Round 7 | 0.12000 U | 0.12000 U | 0.12000 U | 0.12000 U | 0.12000 U | 0.25000 U | 2.30000 | 0.12000 U | 0.12000 U | 0.12000 U | 0.01800 J | 3.60000 | 0.25000 U |
| | 11/8/2001 | ASA 5R1 | 0.03600 U | 0.03600 U | 0.03600 U | 0.03600 U | 0.03600 U | 0.07100 U | 0.60000 | 0.03600 U | 0.03200 J | 0.03600 U | 0.01800 U | 1.00000 | 0.07100 U |
| | 2/12/2002 | ASA 5R2 | 0.03100 U | 0.03100 U | 0.03100 U | 0.03100 U | 0.03100 U | 0.06200 U | 0.48000 | 0.03100 U | 0.03100 U | 0.03100 U | 0.00470 J | 0.79000 | 0.06200 U |
| | 7/9/2002 | ASA 5R3 | 0.01000 U | 0.01000 U | 0.01000 U | 0.01000 U | 0.01000 U | 0.02000 U | 0.09600 | 0.01000 U | 0.01000 U | 0.01000 U | 0.01000 U | 0.30000 | 0.02000 U |
| | 9/25/2002 | ASA 5R4 | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.04000 | NA | 0.01000 U | 0.00500 U | 0.00500 U | 0.14000 | 0.00500 U |
| | 11/19/2002 | Round 8 | 0.00330 U | 0.00330 U | 0.00330 U | 0.00330 U | 0.00330 U | 0.00330 U | 0.03100 | 0.00330 U | 0.00330 U | 0.00330 U | 0.00170 U | 0.09300 | 0.00330 U |
| | -- | | Well Destroyed | | | | | | | | | | | | |
| | 9/15/2004 | | Replacement Well Installed | | | | | | | | | | | | |
| | 9/20/2004 | Round 12 | 0.00180 U | 0.00052 U | 0.00120 U | 0.00120 U | 0.00050 U | 0.00087 U | 0.04200 | 0.00084 U | 0.00200 U | 0.00100 U | 0.00110 U | 0.08300 | 0.00084 U |
| | 1/11/2005 | -- | 0.00070 U | 0.00021 U | 0.00050 U | 0.00049 U | 0.00020 U | 0.00035 U | 0.02900 | 0.00033 U | 0.00080 U | 0.00042 U | 0.00045 U | 0.04300 | 0.00034 U |
| | 7/19/2005 | Round 13A | 0.00040 U | 0.00030 U | 0.00030 U | 0.00030 U | 0.00040 U | 0.00030 U | 0.02400 | 0.00020 U | 0.00200 U | 0.00040 U | 0.00060 J | 0.02700 | 0.00030 U |
| | 8/24/2005 | Round 13B | 0.00040 U | 0.00030 U | 0.00030 U | 0.00030 U | 0.00040 U | 0.00030 U | 0.02400 | 0.00020 U | 0.00200 U | 0.00040 U | 0.00070 J | 0.02100 | 0.00030 J |
| | 10/20/2005 | Round 14 | 0.00040 U | 0.00030 U | 0.00030 U | 0.00030 U | 0.00040 U | 0.00030 U | 0.03300 | 0.00020 U | 0.00200 U | 0.00040 U | 0.00100 J | 0.03700 | 0.00050 J |
| | 5/7/2006 | Round 15 | 0.00060 U | 0.00040 U | 0.00050 U | 0.00050 U | 0.00040 U | 0.00060 U | 0.03400 | 0.00030 U | 0.00200 U | 0.00060 U | 0.00100 | 0.04400 | 0.00060 U |
| | 8/13/2006 | Round 16 | 0.00060 U | 0.00040 U | 0.00050 U | 0.00050 U | 0.00040 U | 0.00060 U | 0.03300 | 0.00030 U | 0.00200 U | 0.00060 U | 0.00090 J | 0.03600 | 0.00060 U |
| | 4/28/2007 | Round 17 | 0.00013 U | 0.00013 U | 0.00012 U | 0.00011 U | 0.00013 U | 0.00028 U | 0.02100 | 0.00035 U | 0.00023 U | 0.00010 U | 0.00069 J | 0.02700 | 0.00046 J |
| | 8/28/2007 | Round 18 | 0.00042 U | 0.00015 U | 0.00011 U | 0.00014 U | 0.00010 U | 0.00048 J | 0.02000 | 0.00014 U | 0.00026 U | 0.00014 U | 0.00046 J | 0.02800 | 0.00065 J |
| | 2/1/2008 | Round 19 (PDB) | 0.00039 U | 0.00026 U | 0.00039 U | 0.00044 U | 0.00036 U | 0.00060 U | 0.01100 | 0.00040 U | 0.00040 U | 0.00046 U | 0.00048 U | 0.00110 | 0.00060 J |
| | 7/24/2008 | Round 20 (PDB) | 0.00054 U | 0.00034 U | 0.00040 U | 0.00022 U | 0.00028 U | 0.00061 U | 0.01140 | 0.00043 U | 0.00100 U | 0.00022 U | 0.00045 U | 0.00250 | 0.00049 J |
| | 1/14/2009 | Round 21 | 0.00054 U | 0.00034 U | 0.00040 U | 0.00022 U | 0.00028 U | 0.00061 U | 0.00850 | 0.00043 U | 0.00100 U | 0.00022 U | 0.00045 U | 0.00640 | 0.00030 U |
| | 7/16/2009 | Round 22 | 0.00540 U | 0.00034 U | 0.00040 U | 0.00022 U | 0.00028 U | 0.00061 U | 0.01130 | 0.00043 U | 0.00100 U | 0.00022 U | 0.00045 U | 0.01290 | 0.00064 J |
| | 1/13/2010 | Round 23 (PDB) | 0.00029 U | 0.00033 U | 0.00021 U | 0.00034 U | 0.00025 U | 0.00050 U | 0.00480 | 0.00020 U | 0.00200 U | 0.00044 U | 0.00034 U | 0.00034 J | 0.00091 J |
| | 7/14/2010 | Round 24 (PDB) | 0.00029 U | 0.00033 U | 0.00021 U | 0.00034 U | 0.00025 U | 0.00050 U | 0.00500 | 0.00020 U | 0.00200 U | 0.00044 U | 0.00034 U | 0.00055 J | 0.00150 |
| | 1/12/2011 | Round 25 (PDB) | 0.00023 U | 0.00020 U | 0.00020 U | 0.00025 U | 0.00022 U | 0.0005 U | 0.00590 | 0.00020 U | 0.00200 U | 0.00025 U | 0.00035 U | 0.00530 | 0.0016 |
| | 7/28/2011 | Round 26 | 0.00023 U | 0.00020 U | 0.00020 U | 0.00025 U | 0.00022 U | 0.0005 U | 0.00590 | 0.00020 U | 0.00200 U | 0.00025 U | 0.00035 U | 0.00930 | 0.0011 |
| | 1/11/2012 | Round 27 | 0.00025 U | 0.00020 U | 0.00020 U | 0.00025 U | 0.00022 U | 0.00050 U | 0.0021 | 0.00020 U | 0.00200 U | 0.00025 U | 0.00035 U | 0.0012 | 0.0020 |
| | 7/12/2012 | Round 28 | 0.00023 U | 0.00020 U | 0.00020 U | 0.00025 U | 0.00022 U | 0.00050 U | 0.0024 | 0.00020 U | NS | 0.00025 U | 0.00035 U | 0.0024 | 0.00078 J |
| | 1/9/2013 | Round 29 | 0.00020 U | 0.00022 U | 0.00021 U | 0.00031 U | 0.00026 U | 0.00050 U | 0.0019 | 0.00029 U | 0.00200 U | 0.00032 U | 0.00023 U | 0.0021 | 0.00077 J |
| | 7/18/2013 | Round 30 | 0.00023 J | 0.00022 U | 0.00021 U | 0.00031 U | 0.00026 U | 0.00050 U | 0.0185 | 0.00029 U | 0.00200 U | 0.00032 U | 0.00095 J | 0.0093 | 0.0011 |
| | 2/24/2014 | Round 31 (PDB) | 0.00025 U | 0.00024 U | 0.00024 U | 0.00040 U | 0.00031 U | 0.00053 U | 0.00360 | 0.00028 U | 0.0020 U | 0.00026 U | 0.00034 U | 0.0003 U | 0.00097 J |
| | 7/21/2014 | Round 32 | 0.00025 U | 0.00025 U | 0.00025 U | 0.00025 U | 0.00025 U | 0.00025 U | 0.0462 | 0.00025 U | 0.0005 U | 0.00025 U | 0.0030 | 0.007 | 0.00114 |
| | 1/23/2015 | Round 33 (PDB) | 0.00025 U | 0.0005 U | 0.0005 U | 0.00025 U | 0.00025 U | 0.00025 U | 0.00106 | 0.00025 U | 0.0005 U | 0.00025 U | 0.00025 U | 0.00025 U | 0.000443 J |
| | 7/27/2015 | Round 34 | 0.00025 U | 0.0005 U | 0.0005 U | 0.00025 U | 0.00025 U | 0.00025 U | 0.004 | 0.00025 U | 0.0005 U | 0.00025 U | 0.00025 U | 0.003 | 0.000368 J |
| | 1/21/2016 | Round 35 (PDB) | 0.00025 UJL | 0.00025 UJL | 0.00025 UJL | 0.00025 UJL | 0.00025 UJL | 0.00025 UJL | 0.00076 JL | 0.00025 UJL | 0.0005 UJL | 0.00025 UJL | 0.00025 UJL | 0.00025 UJL | 0.00025 UJL |
| | 7/21/2016 | Round 36 | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0152 | 0.0005 U | 0.00166 J | 0.0005 U | 0.00068 J | 0.00918 | 0.0005 U |

**Table 4-1A**

**Summary of Chemicals of Concern Detected in Groundwater**
**Long Term Monitoring Wells — SWMUs 79/136 Central Plume**
**2016 RAER**
**Former NAS Dallas, Texas**
**Page 5 of 7**

| Monitoring Well ID | Sampling Date | Sampling Round | Chemicals of Concern (mg/L) | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | 1,1-Dichloroethene | 1,2-Dichloroethane | Benzene | Carbon Tetrachloride | Chloroform | Chloromethane | cis-1,2-Dichloroethene | Ethylbenzene | Methylene Chloride | Tetrachloroethene | trans-1,2-Dichloroethene | Trichloroethene | Vinyl Chloride |
| **Protective Concentration Levels (mg/L)** | | | **0.00700** | **0.00500** | **0.00500** | **0.00500** | **0.24000** | **0.07000** | **0.07000** | **0.70000** | **0.00500** | **0.00500** | **0.10000** | **0.00500** | **0.00200** |
| **508F57MW** | 5/17/2006 | | Well Installed | | | | | | | | | | | | |
| | 5/23/2006 | Round 15 | 0.00060 U | 0.00800 | 0.00050 U | 0.00050 U | 0.00040 U | 0.00060 U | 0.06500 | 0.00030 U | 0.00200 U | 0.00060 U | 0.00070 J | 0.06200 | 0.00070 J |
| | 8/12/2006 | Round 16 | 0.00060 U | 0.00800 | 0.00050 U | 0.00050 U | 0.00040 U | 0.00060 U | 0.07900 J | 0.00030 U | 0.00200 U | 0.00060 U | 0.00100 | 0.08900 | 0.00080 J |
| | 11/18/2006 | Round 16B | 0.00060 U | 0.01000 | 0.00050 U | 0.00050 U | 0.00040 U | 0.00060 U | 0.10000 | 0.00030 U | 0.00200 U | 0.00060 U | 0.00100 | 0.11000 | 0.00090 J |
| | 4/28/2007 | Round 17 | 0.00058 J | 0.00740 | 0.00012 U | 0.00011 U | 0.00013 U | 0.00028 U | 0.06800 | 0.00035 U | 0.00023 U | 0.00010 U | 0.00079 J | 0.07600 | 0.00110 J |
| | 8/28/2007 | Round 18 | 0.00042 U | 0.00780 | 0.00011 U | 0.00014 U | 0.00010 U | 0.00040 U | 0.05600 | 0.00014 U | 0.00026 U | 0.00014 U | 0.00059 J | 0.05700 | 0.00110 J |
| | 1/19/2008 | Round 19 | 0.00039 U | 0.00650 | 0.00039 U | 0.00044 U | 0.00036 U | 0.00060 U | 0.05300 | 0.00040 U | 0.00040 U | 0.00046 U | 0.00048 U | 0.05300 | 0.00110 J |
| | 7/24/2008 | Round 20 | 0.00054 U | 0.00520 | 0.00040 U | 0.00022 U | 0.00028 U | 0.00061 U | 0.03750 | 0.00043 U | 0.00100 U | 0.00022 U | 0.00057 J | 0.03740 | 0.00062 J |
| | 1/14/2009 | Round 21 | 0.00540 U | 0.00510 | 0.00040 U | 0.00022 U | 0.00028 U | 0.00061 U | 0.05440 | 0.00043 U | 0.00100 U | 0.00022 U | 0.00053 J | 0.04160 | 0.00030 U |
| | 7/16/2009 | Round 22 | 0.00540 U | 0.00470 | 0.00040 U | 0.00022 U | 0.00028 U | 0.00061 U | 0.03780 | 0.00043 U | 0.00100 U | 0.00022 U | 0.00062 J | 0.03120 | 0.00061 J |
| | 1/13/2010 | Round 23 | 0.00029 U | 0.00460 | 0.00021 U | 0.00034 U | 0.00025 U | 0.00050 U | 0.04190 | 0.00020 U | 0.00200 U | 0.00044 U | 0.00071 J | 0.03810 | 0.00096 J |
| | 7/14/2010 | Round 24 | 0.00029 U | 0.00400 | 0.00021 U | 0.00034 U | 0.00025 U | 0.00050 U | 0.02820 | 0.00020 U | 0.00200 U | 0.00044 U | 0.00051 J | 0.02430 | 0.00068 J |
| | 1/12/2011 | Round 25 | 0.00023 U | 0.00410 | 0.00020 U | 0.00025 U | 0.00022 U | 0.00050 U | 0.03080 | 0.00020 U | 0.00200 U | 0.00025 U | 0.00065 J | 0.03060 | 0.0009 J |
| | 7/28/2011 | Round 26 | 0.00023 U | 0.00340 | 0.00020 U | 0.00025 U | 0.00022 U | 0.00050 U | 0.02520 | 0.00020 U | 0.00200 U | 0.00025 U | 0.00064 J | 0.02150 | 0.0011 |
| | 1/11/2012 | Round 27 | 0.00023 U | 0.0028 | 0.00020 U | 0.00025 U | 0.00022 U | 0.00050 U | 0.0282 | 0.00020 U | 0.00200 U | 0.00025 U | 0.00049 J | 0.0232 | 0.0012 |
| | 7/12/2012 | Round 28 | 0.00023 U | 0.0025 | 0.00020 U | 0.00025 U | 0.00022 U | 0.00050 U | 0.0243 | 0.00020 U | NS | 0.00025 U | 0.00051 J | 0.0201 | 0.00079 J |
| | 1/9/2013 | Round 29 | 0.00020 U | 0.0013 | 0.00021 U | 0.00031 U | 0.00026 U | 0.00050 U | 0.0143 | 0.00029 U | 0.00200 U | 0.00032 U | 0.00025 J | 0.0045 | 0.00068 J |
| | 7/18/2013 | Round 30 | 0.00020 U | 0.0025 | 0.00021 U | 0.00031 U | 0.00026 U | 0.00050 U | 0.0236 | 0.00029 U | 0.00200 U | 0.00032 U | 0.00058 J | 0.0216 | 0.00081 J |
| | 2/24/2014 | Round 31 (PDB) | 0.00025 U | 0.00024 U | 0.00024 U | 0.00040 U | 0.00031 U | 0.00053 U | 0.00190 | 0.00028 U | 0.00200 U | 0.00026 U | 0.00034 U | 0.00093 J | 0.00033 U |
| | 7/18/2014 | Round 32 | 0.00025 U | 0.00141 | 0.00025 U | 0.00025 U | 0.00025 U | 0.00025 U | 0.0218 | 0.00025 U | 0.0005 U | 0.00025 U | 0.0004 J | 0.0112 | 0.00079 J |
| | 1/26/2015 | Round 33 (PDB) | 0.00025 U | 0.00216 | 0.00025 U | 0.00025 U | 0.00025 U | 0.00025 U | 0.02040 | 0.00025 U | 0.0005 U | 0.00025 U | 0.00044 J | 0.0146 | 0.000727 J |
| | 7/27/2015 | Round 34 | 0.00025 U | 0.00143 | 0.00025 U | 0.00025 U | 0.00025 U | 0.00025 U | 0.016 | 0.00025 U | 0.0005 U | 0.00025 U | 0.00035 J | 0.0129 | 0.000646 J |
| | 1/21/2016 | Round 35 (PDB) | 0.0005 U | 0.00197 J | 0.0005 U | 0.0005 UJ | 0.0005 U | 0.0005 U | 0.0205 | 0.0005 U | 0.001 U | 0.0005 U | 0.0005 U | 0.0136 | 0.00078 J |
| | 7/21/2016 | Round 36 | 0.00025 U | 0.00165 | 0.00025 U | 0.00025 U | 0.00025 U | 0.00025 U | 0.0177 | 0.00025 U | 0.0005 U | 0.00025 U | 0.00038 J | 0.0129 | 0.00065 J |
| **60-21** | 8/11/1992 | Pre Round 1 | NA | NA | 0.00100 U | NA | NA | NA | NA | 0.00100 U | NA | NA | NA | NA | NA |
| | 6/16/1994 | Pre Round 1 | NA | NA | 0.00100 U | NA | NA | NA | NA | 0.00100 U | NA | NA | NA | NA | NA |
| | 12/7/1994 | Pre Round 1 | NA | NA | 0.00100 U | NA | NA | NA | NA | 0.00100 U | NA | NA | NA | NA | NA |
| | 6/13/1995 | Pre Round 1 | NA | NA | 0.00100 U | NA | NA | NA | NA | 0.00100 U | NA | NA | NA | NA | NA |
| | 7/12/1995 | Pre Round 1 | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.01000 U | 0.00500 U | 0.00500 U | 0.01000 U | 0.00500 U | 0.00500 U | 0.01490 | 0.01000 U |
| | 2/6/1996 | Pre Round 1 | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.01000 U | NA | 0.00500 U | 0.00500 U | 0.00490 J | NA | 0.01400 | 0.01000 U |
| | 5/14/1996 | Pre Round 1 | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.01000 U | NA | 0.00500 U | 0.00500 U | 0.00630 | NA | 0.01300 | 0.01000 U |
| | 7/18/1996 | Pre Round 1 | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.01000 U | NA | 0.00500 U | 0.00500 U | 0.00600 | NA | 0.01500 | 0.01000 U |
| | 10/2/1996 | Round 1 | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.01000 U | NA | 0.00500 U | 0.00500 U | 0.00600 | NA | 0.01800 | 0.01000 U |
| | 4/2/1998 | Round 2 | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00058 J | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00610 | 0.00500 U | 0.01500 | 0.00500 U |
| | 9/15/1998 | Round 3 | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00099 J | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00370 J | 0.00500 U | 0.00980 | 0.00500 U |
| | 3/29/1999 | Round 4 | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00072 J | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00440 J | 0.00500 U | 0.00960 | 0.00500 U |
| | 9/24/1999 | Round 5 | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00110 J | 0.00500 U | 0.00045 J | 0.00500 U | 0.00500 U | 0.00460 J | 0.00500 U | 0.00880 | 0.00500 U |
| | 7/7/2000 | Round 6 | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00610 | 0.00500 U | 0.01200 | 0.00500 U |
| | 7/9/2001 | Round 7 | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.01000 U | 0.00250 U | 0.00500 U | 0.00500 U | 0.00520 | 0.00250 U | 0.00880 | 0.01000 U |
| | 12/18/2002 | Round 8 | 0.00100 U | 0.00100 U | 0.00100 U | 0.00100 U | 0.00100 U | 0.00100 U | 0.00100 U | NA | 0.00200 U | 0.00100 U | 0.00100 U | 0.00100 U | 0.00100 U |
| | 12/16/2003 | Round 10 | 0.00021 U | 0.00009 U | 0.00011 U | 0.00020 U | 0.00021 J | 0.00008 U | 0.00045 J | 0.00011 U | 0.00016 U | 0.00340 | 0.00019 U | 0.00450 | 0.00061 J |
| | 7/28/2004 | Round 11 (PDB) | 0.00035 U | 0.00010 U | 0.00025 U | 0.00025 U | 0.00010 U | 0.00017 U | 0.00027 U | 0.00017 U | 0.00040 U | 0.00021 U | 0.00023 U | 0.00068 J | 0.00017 U |
| | 10/13/2004 | Round 12 (PDB) | 0.00035 U | 0.00010 U | 0.00025 U | 0.00025 U | 0.00010 U | 0.00017 U | 0.00027 U | 0.00017 U | 0.00040 U | 0.00021 U | 0.00023 U | 0.00059 J | 0.00017 U |
| | 10/19/2005 | Round 14 | 0.00040 U | 0.00030 U | 0.00030 U | 0.00030 U | 0.00040 U | 0.00030 U | 0.00100 J | 0.00020 U | 0.00200 U | 0.00600 J | 0.00030 U | 0.00900 J | 0.00030 U |
| | 10/19/2005 | Round 14 (PDB) | 0.00040 U | 0.00030 U | 0.00030 U | 0.00030 U | 0.00040 U | 0.00030 U | 0.00060 J | 0.00020 U | 0.00200 U | 0.00700 J | 0.00030 U | 0.01300 J | 0.00030 U |
| | 5/8/2006 | Round 15 | 0.00060 U | 0.00040 U | 0.00050 U | 0.00050 U | 0.00040 U | 0.00060 U | 0.00060 J | 0.00030 U | 0.00200 U | 0.00900 | 0.00060 U | 0.00800 | 0.00060 U |
| | 8/11/2006 | Round 16 | 0.00060 U | 0.00040 U | 0.00050 U | 0.00050 U | 0.00040 U | 0.00060 UJ | 0.00050 U | 0.00030 U | 0.00200 UJ | 0.00900 | 0.00060 U | 0.00800 | 0.00060 U |
| | 5/10/2007 | Round 17 (PDB) | 0.00028 U | 0.00021 U | 0.00027 J | 0.00020 U | 0.00023 U | 0.00017 U | 0.00045 U | 0.00013 U | 0.00025 U | 0.00014 U | 0.00053 U | 0.00052 J | 0.00012 U |
| | 8/27/2007 | Round 18 | 0.00013 U | 0.00013 U | 0.00012 U | 0.00011 U | 0.00046 U | 0.00028 U | 0.00076 J | 0.00035 U | 0.00023 U | 0.00690 | 0.00015 U | 0.00700 | 0.0002 U |
| | 1/31/2008 | Round 19 (PDB) | 0.00039 U | 0.00026 U | 0.00039 U | 0.00044 U | 0.00036 U | 0.00060 U | 0.00032 U | 0.00040 U | 0.00040 U | 0.00046 U | 0.00048 U | 0.00074 J | 0.00043 U |
| | 7/24/2008 | Round 20 (PDB) | 0.00054 U | 0.00034 U | 0.00040 U | 0.00022 U | 0.00028 U | 0.00061 U | 0.00028 J | 0.00043 U | 0.00100 U | 0.00022 U | 0.00045 U | 0.00100 | 0.00030 U |
| | 1/13/2009 | Round 21 (PDB) | 0.00054 U | 0.00034 U | 0.00040 U | 0.00022 U | 0.00028 U | 0.00061 U | 0.00031 J | 0.00043 U | 0.00100 U | 0.00056 J | 0.00045 U | 0.00180 | 0.00030 U |
| | 7/16/2009 | Round 22 | 0.00540 U | 0.00034 U | 0.00040 U | 0.00022 U | 0.00028 J | 0.00061 U | 0.00044 J | 0.00043 U | 0.00100 U | 0.00700 | 0.00045 U | 0.00470 | 0.00030 U |
| | 1/13/2010 | Round 23 (PDB) | 0.00029 U | 0.00033 U | 0.00021 U | 0.00034 U | 0.00025 U | 0.00050 U | 0.00032 U | 0.00020 U | 0.00200 U | 0.00044 U | 0.00034 U | 0.00024 U | 0.00028 U |
| | 7/14/2010 | Round 24 (PDB) | 0.00029 U | 0.00033 U | 0.00021 U | 0.00034 U | 0.00025 U | 0.00050 U | 0.00032 U | 0.00020 U | 0.00200 U | 0.00044 U | 0.00034 U | 0.00024 U | 0.00028 U |
| | 1/12/2011 | Round 25 (PDB) | 0.00023 U | 0.00020 U | 0.00020 U | 0.00025 U | 0.00022 U | 0.00050 U | 0.00026 U | 0.00020 U | 0.00200 U | 0.00025 U | 0.00035 U | 0.00026 U | 0.00022 U |
| | 7/28/2011 | Round 26 | 0.00023 U | 0.00020 U | 0.00020 U | 0.00025 U | 0.00022 U | 0.00050 U | 0.00040 J | 0.00020 U | 0.00200 U | 0.00530 | 0.00035 U | 0.00370 | 0.00022 U |
| | 1/11/2012 | Round 27 (PDB) | 0.00023 U | 0.00020 U | 0.00020 U | 0.00025 U | 0.00022 U | 0.00050 U | 0.00026 U | 0.00020 U | 0.00200 U | 0.00025 U | 0.00035 U | 0.00026 U | 0.00022 U |
| | 7/12/2012 | Round 28 | 0.00023 U | 0.00020 U | 0.00020 U | 0.00025 U | 0.00022 U | 0.00050 U | 0.00056 J | 0.00020 U | NS | 0.0046 | 0.00035 U | 0.0034 | 0.00022 U |
| | 1/9/2013 | Round 29 (PDB) | 0.00020 U | 0.00022 U | 0.00021 U | 0.00031 U | 0.00026 U | 0.00050 U | 0.00024 U | 0.00029 U | 0.00200 U | 0.00032 U | 0.00023 U | 0.00031 U | 0.00044 U |
| | 7/18/2013 | Round 30 | 0.00020 U | 0.00022 U | 0.00021 U | 0.00031 U | 0.00026 U | 0.00067 J | 0.00024 U | 0.00029 U | 0.00200 U | 0.0021 | 0.00023 U | 0.0015 | 0.00044 U |
| | 2/24/2014 | Round 31 (PDB) | 0.00025 U | 0.00024 U | 0.00024 U | 0.00040 U | 0.00031 U | 0.00053 U | 0.00033 U | 0.00028 U | 0.0020 U | 0.00026 U | 0.00034 U | 0.0003 U | 0.00033 U |
| | 7/17/2014 | Round 32 | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.00065 J | 0.0005 U | 0.001 U | 0.00249 | 0.0005 U | 0.00188 J | 0.0005 U |
| | 1/23/2015 | Round 33 (PDB) | 0.00025 U | 0.0005 U | 0.0005 U | 0.00025 U | 0.00025 U | 0.00025 U | 0.00025 U | 0.00025 U | 0.0005 U | 0.00025 U | 0.00025 U | 0.00025 U | 0.00025 U |
| | 7/27/2015 | Round 34 | 0.00025 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0001 U | 0.00210 | 0.0005 U | 0.002 | 0.00025 U |
| | 1/21/2016 | Round 35 (PDB) | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.001 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U |
| | 7/21/2016 | Round 36 | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.001 U | 0.00218 | 0.0005 U | 0.00165 J | 0.0005 U |

**Table 4-1A**

**Summary of Chemicals of Concern Detected in Groundwater**
**Long Term Monitoring Wells — SWMUs 79/136 Central Plume**
**2016 RAER**
**Former NAS Dallas, Texas**
**Page 6 of 7**

| Monitoring Well ID | Sampling Date | Sampling Round | Chemicals of Concern (mg/L) | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | 1,1-Dichloroethene | 1,2-Dichloroethane | Benzene | Carbon Tetrachloride | Chloroform | Chloromethane | cis-1,2-Dichloroethene | Ethylbenzene | Methylene Chloride | Tetrachloroethene | trans-1,2-Dichloroethene | Trichloroethene | Vinyl Chloride |
| **Protective Concentration Levels (mg/L)** | | | **0.00700** | **0.00500** | **0.00500** | **0.00500** | **0.24000** | **0.07000** | **0.07000** | **0.70000** | **0.00500** | **0.00500** | **0.10000** | **0.00500** | **0.00200** |
| **Point of Exposure and Background Monitoring Wells** | | | | | | | | | | | | | | | |
| **508F31MW** | 7/21/1999 | | Well Installed | | | | | | | | | | | | |
| | 6/23/2000 | Round 6 | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U |
| | 6/18/2001 | Round 7 | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.01000 U | 0.00250 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00250 U | 0.00500 U | 0.01000 U |
| | 1/9/2003 | Round 8 | 0.00100 U | 0.00100 U | 0.00100 U | 0.00100 U | 0.00100 U | 0.00100 U | 0.00100 U | NA | 0.00200 U | 0.00100 U | 0.00100 U | 0.00100 U | 0.00100 U |
| | 12/21/2003 | Round 10 | 0.00021 U | 0.00009 U | 0.00011 U | 0.00020 U | 0.00014 U | 0.00008 U | 0.00016 U | 0.00011 U | 0.00016 U | 0.00024 U | 0.00019 U | 0.00010 U | 0.00017 U |
| | 10/14/2004 | Round 12 (PDB) | 0.00035 U | 0.00010 U | 0.00025 U | 0.00025 U | 0.00010 U | 0.00017 U | 0.00027 U | 0.00017 U | 0.00040 U | 0.00021 U | 0.00023 U | 0.00022 U | 0.00017 U |
| | 10/11/2005 | Round 14 | 0.00040 U | 0.00030 U | 0.00030 U | 0.00030 U | 0.00040 U | 0.00030 U | 0.00030 U | 0.00020 U | 0.00200 U | 0.00040 U | 0.00030 U | 0.00030 U | 0.00030 U |
| | 5/8/2006 | Round 15 | 0.00060 U | 0.00040 U | 0.00050 U | 0.00050 U | 0.00040 U | 0.00060 U | 0.00050 U | 0.00030 U | 0.00200 U | 0.00060 U | 0.00060 U | 0.00040 U | 0.00060 U |
| | 8/11/2006 | Round 16 | 0.00060 U | 0.00040 U | 0.00050 U | 0.00050 U | 0.00040 U | 0.00060 UJ | 0.00050 U | 0.00030 U | 0.00200 UJ | 0.00060 U | 0.00060 U | 0.00040 U | 0.00060 U |
| | 5/10/2007 | Round 17 (PDB) | 0.00028 U | 0.00021 U | 0.00013 U | 0.00020 U | 0.00023 U | 0.00017 U | 0.00045 U | 0.00013 U | 0.00025 U | 0.00014 U | 0.00053 U | 0.00014 U | 0.00012 U |
| | 8/28/2007 | Round 18 | 0.00042 U | 0.00015 U | 0.00011 U | 0.00014 U | 0.00010 U | 0.00052 J | 0.00044 U | 0.00014 U | 0.00026 U | 0.00014 U | 0.00040 U | 0.00028 U | 0.00019 U |
| | 2/1/2008 | Round 19 (PDB) | 0.00039 U | 0.00026 U | 0.00039 U | 0.00044 U | 0.00036 U | 0.00060 U | 0.00032 U | 0.00040 U | 0.00040 U | 0.00046 U | 0.00048 U | 0.00053 U | 0.00043 U |
| | 7/24/2008 | Round 20 (PDB) | 0.00054 U | 0.00034 U | 0.00040 U | 0.00022 U | 0.00028 U | 0.00061 U | 0.00020 U | 0.00043 U | 0.00100 U | 0.00022 U | 0.00045 U | 0.00032 U | 0.00030 U |
| | 1/13/2009 | Round 21 | 0.00054 U | 0.00034 U | 0.00040 U | 0.00022 U | 0.00028 U | 0.00061 U | 0.00160 | 0.00043 U | 0.00100 U | 0.00110 | 0.00045 U | 0.00032 U | 0.00030 U |
| | 7/16/2009 | Round 22 | 0.00540 U | 0.00034 U | 0.00040 U | 0.00022 U | 0.00028 U | 0.00061 U | 0.00020 U | 0.00043 U | 0.00100 U | 0.00022 U | 0.00045 U | 0.00032 U | 0.00030 U |
| | 1/13/2010 | Round 23 (PDB) | 0.00029 U | 0.00033 U | 0.00021 U | 0.00034 U | 0.00025 U | 0.00050 U | 0.00032 U | 0.00020 U | 0.00200 U | 0.00044 U | 0.00034 U | 0.00024 U | 0.00028 U |
| | 7/14/2010 | Round 24 (PDB) | 0.00029 U | 0.00033 U | 0.00021 U | 0.00034 U | 0.00025 U | 0.00050 U | 0.00032 U | 0.00020 U | 0.00200 U | 0.00044 U | 0.00034 U | 0.00024 U | 0.00028 U |
| | 1/12/2011 | Round 25 (PDB) | 0.00023 U | 0.00020 U | 0.00020 U | 0.00025 U | 0.00022 U | 0.00050 U | 0.00026 U | 0.00020 U | 0.00200 U | 0.00025 U | 0.00035 U | 0.00026 U | 0.00022 U |
| | 7/28/2011 | Round 26 | 0.00023 U | 0.00020 U | 0.00020 U | 0.00025 U | 0.00022 U | 0.00050 U | 0.00026 U | 0.00020 U | 0.00200 U | 0.00025 U | 0.00035 U | 0.00026 U | 0.00022 U |
| | 1/11/2012 | Round 27 (PDB) | 0.00023 U | 0.00020 U | 0.00020 U | 0.00025 U | 0.00022 U | 0.00050 U | 0.00026 U | 0.00020 U | 0.00200 U | 0.00025 U | 0.00035 U | 0.00026 U | 0.00022 U |
| | 7/12/2012 | Round 28 | 0.00023 U | 0.00020 U | 0.00020 U | 0.00025 U | 0.00022 U | 0.00050 U | 0.00026 U | 0.00020 U | NS | 0.00025 U | 0.00035 U | 0.00026 U | 0.00022 U |
| | 1/9/2013 | Round 29 (PDB) | 0.00020 U | 0.00022 U | 0.00021 U | 0.00031 U | 0.00026 U | 0.00050 U | 0.00024 U | 0.00029 U | 0.00200 U | 0.00032 U | 0.00023 U | 0.00031 U | 0.00044 U |
| | 7/18/2013 | Round 30 | 0.00020 U | 0.00022 U | 0.00021 U | 0.00031 U | 0.00026 U | 0.00050 U | 0.00024 U | 0.00029 U | 0.00200 U | 0.00032 U | 0.00023 U | 0.00031 U | 0.00044 U |
| | 2/24/2014 | Round 31 (PDB) | 0.00025 U | 0.00024 U | 0.00024 U | 0.00040 U | 0.00031 U | 0.00053 U | 0.00033 U | 0.00028 U | 0.00200 U | 0.00026 U | 0.00034 U | 0.0003 U | 0.00033 U |
| | 7/17/2014 | Round 32 | 0.00025 U | 0.00025 U | 0.00025 U | 0.00025 U | 0.00025 U | 0.00025 U | 0.00025 U | 0.00025 U | 0.007 | 0.00025 U | 0.00025 U | 0.00025 U | 0.00025 U |
| | 1/23/2015 | Round 33 (PDB) | 0.00025 U | 0.00025 U | 0.00025 U | 0.00025 U | 0.00025 U | 0.00025 U | 0.00025 U | 0.00025 U | 0.0005 U | 0.00025 U | 0.00025 U | 0.00025 U | 0.00025 U |
| | 7/27/2015 | Round 34 | 0.00025 U | 0.00025 U | 0.00025 U | 0.00025 U | 0.00025 U | 0.00025 U | 0.00025 U | 0.00025 U | 0.0005 U | 0.00025 U | 0.00025 U | 0.00025 U | 0.00025 U |
| | 1/21/2016 | Round 35 (PDB) | 0.00025 U | 0.00025 U | 0.00025 U | 0.00025 U | 0.00025 U | 0.00025 UJ | 0.00025 U | 0.00025 U | 0.0005 U | 0.00025 U | 0.00025 U | 0.00025 U | 0.00025 UJ |
| | 7/21/2016 | Round 36 | 0.00025 U | 0.00025 U | 0.00025 U | 0.00025 U | 0.00025 U | 0.00025 U | 0.00025 U | 0.00025 U | 0.0005 U | 0.00025 U | 0.00025 U | 0.00055 J | 0.00025 U |
| **508F58MW** | 5/17/2006 | | Well Installed | | | | | | | | | | | | |
| | 5/23/2006 | Round 15 | 0.00060 U | 0.00080 J | 0.00050 U | 0.00050 U | 0.00040 U | 0.00060 U | 0.00050 U | 0.00030 U | 0.00200 U | 0.00060 U | 0.00060 U | 0.00040 U | 0.00060 U |
| | 8/11/2006 | Round 16 | 0.00060 U | 0.00040 U | 0.00040 U | 0.00040 U | 0.00040 U | 0.00060 U | 0.00050 U | 0.00030 U | 0.00200 UJ | 0.00060 U | 0.00060 U | 0.00040 U | 0.00060 U |
| | 11/18/2006 | Round 16B | 0.00060 U | 0.00040 U | 0.00050 U | 0.00050 U | 0.00040 U | 0.00060 U | 0.00050 U | 0.00030 U | 0.00200 U | 0.00060 U | 0.00060 U | 0.00040 U | 0.00060 U |
| | 5/10/2007 | Round 17 (PDB) | 0.00028 U | 0.00021 U | 0.00013 U | 0.00020 U | 0.00023 U | 0.00017 U | 0.00045 U | 0.00013 U | 0.00025 U | 0.00014 U | 0.00053 U | 0.00035 J | 0.00012 U |
| | 8/28/2007 | Round 18 | 0.00042 U | 0.00015 U | 0.00110 U | 0.00014 UJ | 0.00010 U | 0.00040 U | 0.00044 U | 0.00014 U | 0.00026 U | 0.00014 U | 0.00040 U | 0.00028 U | 0.00019 U |
| | 2/1/2008 | Round 19 (PDB) | 0.00039 U | 0.00071 J | 0.00039 U | 0.00044 U | 0.00036 U | 0.00060 U | 0.00130 | 0.00040 U | 0.00040 U | 0.00046 U | 0.00048 U | 0.00053 U | 0.00043 U |
| | 7/24/2008 | Round 20 (PDB) | 0.00054 U | 0.00057 J | 0.00040 U | 0.00022 U | 0.00028 U | 0.00061 U | 0.00130 | 0.00043 U | 0.00100 U | 0.00022 U | 0.00045 U | 0.00032 U | 0.00030 U |
| | 1/14/2009 | Round 21 | 0.00054 U | 0.00099 JH | 0.00040 U | 0.00022 U | 0.00028 U | 0.00061 U | 0.00270 JH | 0.00043 U | 0.00100 U | 0.00022 U | 0.00045 U | 0.00039 JH | 0.00030 U |
| | 7/16/2009 | Round 22 | 0.00540 U | 0.00085 J | 0.00040 U | 0.00022 U | 0.00028 U | 0.00061 U | 0.00290 | 0.00043 U | 0.00100 U | 0.00022 U | 0.00045 U | 0.00054 J | 0.00030 U |
| | 1/13/2010 | Round 23 | 0.00029 U | 0.00075 J | 0.00021 U | 0.00034 U | 0.00025 U | 0.00050 U | 0.00340 | 0.00020 U | 0.00200 U | 0.00044 U | 0.00034 U | 0.00075 J | 0.00046 J |
| | 7/14/2010 | Round 24 | 0.00029 U | 0.00084 J | 0.00021 U | 0.00034 U | 0.00025 U | 0.00050 U | 0.00370 | 0.00020 U | 0.00200 U | 0.00044 U | 0.00034 U | 0.00092 J | 0.00028 U |
| | 1/12/2011 | Round 25 | 0.00023 U | 0.001100 | 0.00020 U | 0.00025 U | 0.00022 U | 0.00050 U | 0.00650 | 0.00020 U | 0.00200 U | 0.00025 U | 0.00035 U | 0.00280 | 0.00042 J |
| | 7/28/2011 | Round 26 | 0.00023 U | 0.001400 | 0.00020 U | 0.00025 U | 0.00022 U | 0.00050 U | 0.00900 | 0.00020 U | 0.00200 U | 0.00025 U | 0.00035 U | 0.00490 | 0.00056 J |
| | 1/11/2012 | Round 27 | 0.00023 U | 0.0011 | 0.00020 U | 0.00025 U | 0.00022 U | 0.00050 U | 0.0066 | 0.00020 U | 0.00200 U | 0.00025 U | 0.00035 U | 0.0038 | 0.00028 J |
| | 7/12/2012 | Round 28 | 0.00023 U | 0.0017 | 0.00020 U | 0.00025 U | 0.00022 U | 0.00050 U | 0.0139 | 0.00020 U | NS | 0.00025 U | 0.00041 J | 0.0083 | 0.00040 J |
| | 1/9/2013 | Round 29 | 0.00020 U | 0.00022 U | 0.00021 U | 0.00031 U | 0.00026 U | 0.00050 U | 0.0011 | 0.00029 U | 0.00200 U | 0.00032 U | 0.00023 U | 0.00059 J | 0.00044 U |
| | 7/18/2013 | Round 30 | 0.00020 U | 0.00022 U | 0.00021 U | 0.00031 U | 0.00026 U | 0.00050 U | 0.0014 | 0.00029 U | 0.00200 U | 0.00032 U | 0.00023 U | 0.0011 | 0.00044 U |
| | 2/24/2014 | Round 31 (PDB) | 0.00025 U | 0.00096 U | 0.00024 U | 0.00040 U | 0.00031 U | 0.00053 U | 0.00700 | 0.00028 U | 0.00200 U | 0.00026 U | 0.00034 J | 0.0045 | 0.00033 U |
| | 7/18/2014 | Round 32 | 0.00025 U | 0.00089 J | 0.00025 U | 0.00025 U | 0.00025 U | 0.00025 U | 0.0102 | 0.00025 U | 0.0005 U | 0.00025 U | 0.00027 J | 0.0054 | 0.0004 J |
| | 1/26/2015 | Round 33 | 0.0005 U | 0.000957 J | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.00765 | 0.0005 U | 0.001 U | 0.0005 U | 0.0005 U | 0.0038 | 0.0005 U |
| | 7/27/2015 | Round 34 | 0.0005 U | 0.000918 J | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.009 | 0.0005 U | 0.001 U | 0.0005 U | 0.0005 U | 0.005 | 0.0005 U |
| | 1/21/2016 | Round 35 (PDB) | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS |
| | 7/21/2016 | Round 36 | 0.0005 U | 0.00095 J | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.00945 | 0.0005 U | 0.00159 J | 0.0005 U | 0.00069 J | 0.00225 | 0.0005 U |
| **508F59MW** | 5/20/2007 | Round 17 | 0.00042 U | 0.00160 | 0.00011 U | 0.00014 U | 0.00010 U | 0.00040 U | 0.00044 U | 0.00014 U | 0.00026 U | 0.00014 U | 0.00040 U | 0.00028 U | 0.00019 U |
| | 8/29/2007 | Round 18 | 0.00042 U | 0.00140 | 0.00011 U | 0.00014 U | 0.00010 U | 0.00058 J | 0.00044 U | 0.00014 U | 0.00026 U | 0.00014 U | 0.00040 U | 0.00028 U | 0.00019 U |
| | 11/14/2007 | Round 18A | 0.00042 U | 0.00120 | 0.00011 U | 0.00014 U | 0.00010 U | 0.00040 U | 0.00044 U | 0.00014 U | 0.00026 U | 0.00014 U | 0.00040 U | 0.00028 U | 0.00019 U |
| | 2/1/2008 | Round 19 (PDB) | 0.00039 U | 0.00026 U | 0.00039 U | 0.00044 U | 0.00036 U | 0.00060 U | 0.00032 U | 0.00040 U | 0.00040 U | 0.00046 U | 0.00048 U | 0.00053 U | 0.00043 U |
| | 7/24/2008 | Round 20 (PDB) | 0.00054 U | 0.00054 J | 0.00040 U | 0.00022 U | 0.00028 U | 0.00061 U | 0.00022 J | 0.00043 U | 0.00100 U | 0.00022 U | 0.00045 U | 0.00032 U | 0.00030 U |
| | 1/14/2009 | Round 21 (PDB) | 0.00054 U | 0.00056 J | 0.00040 U | 0.00022 U | 0.00028 U | 0.00061 U | 0.00041 J | 0.00043 U | 0.00100 U | 0.00022 U | 0.00045 U | 0.00032 U | 0.00030 U |
| | 7/16/2009 | Round 22 | 0.00540 U | 0.00069 J | 0.00040 U | 0.00022 U | 0.00028 U | 0.00061 U | 0.00020 U | 0.00043 U | 0.00100 U | 0.00022 U | 0.00045 U | 0.00032 U | 0.00030 U |
| | 1/13/2010 | Round 23 (PDB) | 0.00029 U | 0.00059 J | 0.00021 U | 0.00034 U | 0.00025 U | 0.00050 U | 0.00032 U | 0.00020 U | 0.00200 U | 0.00044 U | 0.00034 U | 0.00024 U | 0.00028 U |
| | 7/14/2010 | Round 24 (PDB) | 0.00029 U | 0.00071 J | 0.00021 U | 0.00034 U | 0.00025 U | 0.00050 U | 0.00120 | 0.00020 U | 0.00200 U | 0.00044 U | 0.00034 U | 0.00024 U | 0.00028 U |
| | 1/12/2011 | Round 25 (PDB) | 0.00023 U | 0.00050 J | 0.00020 U | 0.00025 U | 0.00022 U | 0.00050 U | 0.00081 J | 0.00020 U | 0.00200 U | 0.00025 U | 0.00035 U | 0.00026 U | 0.00032 J |
| | 7/28/2011 | Round 26 | 0.00023 U | 0.00140 | 0.00020 U | 0.00025 U | 0.00022 U | 0.00050 U | 0.00450 | 0.00020 U | 0.00200 U | 0.00025 U | 0.00035 U | 0.00200 | 0.00022 U |
| | 1/11/2012 | Round 27 (PDB) | 0.00023 U | 0.0013 | 0.00020 U | 0.00025 U | 0.00022 U | 0.00050 U | 0.0072 | 0.00020 U | 0.00200 U | 0.00025 U | 0.00035 U | 0.0024 | 0.00069 J |
| | 7/12/2012 | Round 28 | 0.00023 U | 0.0011 | 0.00020 U | 0.00025 U | 0.00022 U | 0.00050 U | 0.0048 | 0.00020 U | NS | 0.00025 U | 0.00035 U | 0.0027 | 0.00022 U |
| | 1/9/2013 | Round 29 (PDB) | 0.00020 U | 0.00066 J | 0.00021 U | 0.00031 U | 0.00026 U | 0.00050 U | 0.0031 | 0.00029 U | 0.00200 U | 0.00032 U | 0.00023 U | 0.00080 J | 0.00044 U |
| | 7/18/2013 | Round 30 | 0.00020 U | 0.00130 | 0.00021 U | 0.00031 U | 0.00026 U | 0.00050 U | 0.0094 | 0.00029 U | 0.00200 U | 0.00032 U | 0.00023 U | 0.0067 | 0.00062 J |
| | 2/24/2014 | Round 31 (PDB) | 0.00025 U | 0.00150 | 0.00024 U | 0.00040 U | 0.00031 U | 0.00053 U | 0.00900 | 0.00028 U | 0.00200 U | 0.00026 U | 0.00034 U | 0.0068 | 0.00033 U |
| | 7/22/2014 | Round 32 | 0.00025 U | 0.00115 | 0.00025 U | 0.00025 U | 0.00025 U | 0.00025 U | 0.00976 | 0.00025 U | 0.0005 U | 0.00025 U | 0.00025 U | 0.0064 | 0.00044 J |
| | 1/26/2015 | Round 33 (PDB) | 0.00025 U | 0.00101 | 0.00025 U | 0.00025 U | 0.00025 U | 0.00025 U | 0.00469 | 0.00025 U | 0.0005 U | 0.0005 U | 0.00025 U | 0.00139 | 0.00025 U |
| | 7/27/2015 | Round 34 | 0.0005 U | 0.00100 | 0.00025 U | 0.00025 U | 0.00025 U | 0.00025 U | 0.005 | 0.00025 U | 0.0005 U | 0.00025 U | 0.00025 U | 0.003 | 0.000378 J |
| | 1/22/2016 | Round 35 (PDB) | 0.00025 U | 0.00083 J | 0.00025 U | 0.00025 UJ | 0.00025 U | 0.00025 U | 0.00372 | 0.00025 U | 0.0005 U | 0.00025 U | 0.00025 U | 0.00121 | 0.00034 J |
| | 7/20/2016 | Round 36 | 0.00025 U | 0.0009 J | 0.00025 U | 0.00025 U | 0.00025 U | 0.00025 U | 0.0059 | 0.00025 U | 0.0005 U | 0.00025 U | 0.00025 U | 0.00386 | 0.00027 J |

**Table 4-1A**

**Summary of Chemicals of Concern Detected in Groundwater**
**Long Term Monitoring Wells — SWMUs 79/136 Central Plume**
**2016 RAER**
**Former NAS Dallas, Texas**
**Page 7 of 7**

| Monitoring Well ID | Sampling Date | Sampling Round | Chemicals of Concern (mg/L) | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | 1,1-Dichloroethene | 1,2-Dichloroethane | Benzene | Carbon Tetrachloride | Chloroform | Chloromethane | cis-1,2-Dichloroethene | Ethylbenzene | Methylene Chloride | Tetrachloroethene | trans-1,2-Dichloroethene | Trichloroethene | Vinyl Chloride |
| Protective Concentration Levels (mg/L) | | | 0.00700 | 0.00500 | 0.00500 | 0.00500 | 0.24000 | 0.07000 | 0.07000 | 0.70000 | 0.00500 | 0.00500 | 0.10000 | 0.00500 | 0.00200 |
| 508F60MW | 5/20/2007 | Round 17 | 0.00042 U | 0.00150 U | 0.00011 U | 0.00014 U | 0.00010 U | 0.00040 U | 0.00120 | 0.00014 U | 0.00026 U | 0.00014 U | 0.00040 U | 0.00028 U | 0.00019 U |
| | 8/29/2007 | Round 18 | 0.00042 U | 0.00140 | 0.00011 U | 0.00014 U | 0.00010 U | 0.00076 J | 0.00086 J | 0.00014 U | 0.00026 U | 0.00014 U | 0.00040 U | 0.00028 J | 0.00019 U |
| | 11/14/2007 | Round 18A | 0.00042 U | 0.00120 | 0.00011 U | 0.00014 U | 0.00010 U | 0.00040 U | 0.00110 | 0.00014 U | 0.00026 U | 0.00014 U | 0.00040 U | 0.00029 U | 0.00019 U |
| | 2/1/2008 | Round 19 (PDB) | 0.00039 U | 0.00026 U | 0.00039 U | 0.00044 U | 0.00036 U | 0.00060 U | 0.00076 J | 0.00040 U | 0.00040 U | 0.00046 U | 0.00048 U | 0.00053 U | 0.00043 U |
| | 7/24/2008 | Round 20 (PDB) | 0.00054 U | 0.00092 J | 0.00040 U | 0.00022 U | 0.00028 U | 0.00061 U | 0.00096 J | 0.00043 U | 0.00100 U | 0.00022 U | 0.00045 U | 0.00032 U | 0.00030 U |
| | 1/14/2009 | Round 21 (PDB) | 0.00054 U | 0.00038 J | 0.00040 U | 0.00022 U | 0.00028 U | 0.00061 U | 0.00026 J | 0.00043 U | 0.00100 U | 0.00022 U | 0.00045 U | 0.00032 U | 0.00030 U |
| | 7/16/2009 | Round 22 | 0.00540 U | 0.00064 J | 0.00040 U | 0.00022 U | 0.00028 U | 0.00061 U | 0.00060 J | 0.00043 U | 0.00100 U | 0.00022 U | 0.00045 U | 0.00032 U | 0.00030 U |
| | 1/13/2010 | Round 23 (PDB) | 0.00029 U | 0.00033 U | 0.00021 U | 0.00034 U | 0.00025 U | 0.00050 U | 0.00032 U | 0.00020 U | 0.00200 U | 0.00044 U | 0.00034 U | 0.00024 U | 0.00028 U |
| | 7/14/2010 | Round 24 (PDB) | 0.00029 U | 0.00100 | 0.00021 U | 0.00034 U | 0.00025 U | 0.00050 U | 0.00083 J | 0.00020 U | 0.00200 U | 0.00044 U | 0.00034 U | 0.00029 J | 0.00028 U |
| | 1/12/2011 | Round 25 (PDB) | 0.00023 U | 0.00028 J | 0.00020 U | 0.00025 U | 0.00022 U | 0.00050 U | 0.00026 J | 0.00020 U | 0.00200 U | 0.00025 U | 0.00035 U | 0.00037 J | 0.00022 U |
| | 7/28/2011 | Round 26 | 0.00023 U | 0.00091 J | 0.00020 U | 0.00025 U | 0.00022 U | 0.00050 U | 0.00087 J | 0.00020 U | 0.00200 U | 0.00025 U | 0.00035 U | 0.00026 U | 0.00022 U |
| | 1/11/2012 | Round 27 (PDB) | 0.00023 U | 0.00020 U | 0.00020 U | 0.00025 U | 0.00022 U | 0.00050 U | 0.00026 U | 0.00020 U | 0.00200 U | 0.00025 U | 0.00035 U | 0.00026 U | 0.00022 U |
| | 7/12/2012 | Round 28 | 0.00023 U | 0.00080 J | 0.00020 U | 0.00025 U | 0.00022 U | 0.00050 U | 0.00059 J | 0.00020 U | NS | 0.00025 U | 0.00035 U | 0.00026 U | 0.00022 U |
| | 1/9/2013 | Round 29 (PDB) | 0.00020 U | 0.00022 U | 0.00021 U | 0.00031 U | 0.00026 U | 0.00050 U | 0.00024 U | 0.00029 U | 0.00200 U | 0.00032 U | 0.00023 U | 0.00031 U | 0.00044 U |
| | 7/18/2013 | Round 30 | 0.00020 U | 0.00042 J | 0.00021 U | 0.00031 U | 0.00026 U | 0.00050 U | 0.00043 J | 0.00029 U | 0.00200 U | 0.00032 U | 0.00023 U | 0.00031 U | 0.00044 U |
| | 2/24/2014 | Round 31 (PDB) | 0.00025 U | 0.00024 U | 0.00024 U | 0.00040 U | 0.00031 U | 0.00053 U | 0.00033 U | 0.00028 U | 0.00200 U | 0.00026 U | 0.00034 U | 0.0003 U | 0.00033 U |
| | 7/22/2014 | Round 32 | 0.00025 U | 0.00025 U | 0.00025 U | 0.00025 U | 0.00025 U | 0.00025 U | 0.00025 U | 0.00025 U | 0.0005 U | 0.00025 U | 0.00025 U | 0.00025 U | 0.00025 U |
| | 1/26/2015 | Round 33 (PDB) | 0.00025 U | 0.00096 J | 0.0005 U | 0.00025 U | 0.00025 U | 0.00025 U | 0.00025 U | 0.0005 U | 0.0005 U | 0.00025 U | 0.00025 U | 0.00025 U | 0.00025 U |
| | 7/27/2015 | Round 34 | 0.00025 U | 0.000346 J | 0.0005 U | 0.00025 U | 0.00025 U | 0.00025 U | 0.00025 U | 0.0005 U | 0.0005 U | 0.00025 U | 0.00025 U | 0.00025 U | 0.00025 U |
| | 1/22/2016 | Round 35 (PDB) | 0.00025 UJ | 0.00026 J | 0.00025 U | 0.00025 UJ | 0.00025 UJ | 0.00025 U | 0.00025 UJ | 0.00025 UJ | 0.0005 U | 0.00025 UJ | 0.00025 U | 0.00025 UJ | 0.00025 U |
| | 7/20/2016 | Round 36 | 0.00025 U | 0.00081 J | 0.00025 U | 0.00025 U | 0.00025 U | 0.00025 U | 0.00035 J | 0.00025 U | 0.0005 U | 0.00025 U | 0.00025 U | 0.00025 U | 0.00025 U |
| 508F61MW | 5/20/2007 | Round 17 | 0.00042 U | 0.00015 U | 0.00011 U | 0.00014 U | 0.00010 U | 0.00040 U | 0.00044 U | 0.00014 U | 0.00026 U | 0.00014 U | 0.00040 U | 0.00028 U | 0.00019 U |
| | 8/29/2007 | Round 18 | 0.00013 U | 0.00013 U | 0.00012 U | 0.00011 U | 0.00013 U | 0.00028 U | 0.00014 U | 0.00035 U | 0.00023 U | 0.00010 U | 0.00015 U | 0.00023 U | 0.00020 U |
| | 11/15/2007 | Round 18A | 0.00042 U | 0.00015 U | 0.00011 U | 0.00014 U | 0.00010 U | 0.00040 U | 0.00044 U | 0.00014 U | 0.00026 U | 0.00014 U | 0.00040 U | 0.00028 U | 0.00019 U |
| | 2/1/2008 | Round 19 (PDB) | 0.00039 U | 0.00026 U | 0.00039 U | 0.00044 U | 0.00036 U | 0.00060 U | 0.00032 U | 0.00040 U | 0.00040 U | 0.00046 U | 0.00046 U | 0.00053 U | 0.00043 U |
| | 7/24/2008 | Round 20 (PDB) | 0.00054 U | 0.00034 U | 0.00040 U | 0.00022 U | 0.00028 U | 0.00061 U | 0.00020 U | 0.00043 U | 0.00100 U | 0.00022 U | 0.00045 U | 0.00032 U | 0.00030 U |
| | 1/14/2009 | Round 21 (PDB) | 0.00054 U | 0.00034 U | 0.00040 U | 0.00022 U | 0.00028 U | 0.00061 U | 0.00020 U | 0.00043 U | 0.00100 U | 0.00022 U | 0.00045 U | 0.00032 U | 0.00030 U |
| | 7/16/2009 | Round 22 | 0.00540 U | 0.00034 U | 0.00040 U | 0.00022 U | 0.00028 U | 0.00061 U | 0.00020 U | 0.00043 U | 0.00100 U | 0.00022 U | 0.00045 U | 0.00032 U | 0.00030 U |
| | 1/13/2010 | Round 23 (PDB) | 0.00029 U | 0.00033 U | 0.00021 U | 0.00034 U | 0.00025 U | 0.00050 U | 0.00032 U | 0.00020 U | 0.00200 U | 0.00044 U | 0.00034 U | 0.00024 U | 0.00028 U |
| | 7/14/2010 | Round 24 (PDB) | 0.00029 U | 0.00033 U | 0.00021 U | 0.00034 U | 0.00025 U | 0.00050 U | 0.00032 U | 0.00020 U | 0.00200 U | 0.00044 U | 0.00034 U | 0.00024 U | 0.00028 U |
| | 1/12/2011 | Round 25 (PDB) | 0.00023 U | 0.00020 U | 0.00020 U | 0.00025 U | 0.00022 U | 0.00050 U | 0.00026 U | 0.00020 U | 0.00200 U | 0.00025 U | 0.00035 U | 0.00026 U | 0.00022 U |
| | 7/28/2011 | Round 26 | 0.00023 U | 0.00020 U | 0.00020 U | 0.00025 U | 0.00022 U | 0.00050 U | 0.00026 U | 0.00020 U | 0.00200 U | 0.00025 U | 0.00035 U | 0.00026 U | 0.00022 U |
| | 1/11/2012 | Round 27 (PDB) | 0.00023 U | 0.00025 U | 0.00020 U | 0.00025 U | 0.00022 U | 0.00050 U | 0.00026 U | 0.00020 U | 0.00200 U | 0.00025 U | 0.00035 U | 0.00026 U | 0.00022 U |
| | 7/12/2012 | Round 28 | 0.00023 U | 0.00020 U | 0.00020 U | 0.00025 U | 0.00022 U | 0.00050 U | 0.00026 U | 0.00020 U | NS | 0.00025 U | 0.00035 U | 0.00026 U | 0.00022 U |
| | 1/9/2013 | Round 29 (PDB) | 0.00020 U | 0.00022 U | 0.00021 U | 0.00031 U | 0.00026 U | 0.00050 U | 0.00024 U | 0.00029 U | 0.00200 U | 0.00032 U | 0.00023 U | 0.00031 U | 0.00044 U |
| | 7/18/2013 | Round 30 | 0.00020 U | 0.00022 U | 0.00021 U | 0.00031 U | 0.00026 U | 0.00052 J | 0.00024 U | 0.00029 U | 0.00200 U | 0.00032 U | 0.00023 U | 0.00031 U | 0.00044 U |
| | 2/24/2014 | Round 31 (PDB) | 0.00025 U | 0.00024 U | 0.00024 U | 0.00040 U | 0.00031 U | 0.00053 U | 0.00033 U | 0.00028 U | 0.00200 U | 0.00026 U | 0.00034 U | 0.0003 U | 0.00033 U |
| | 7/22/2014 | Round 32 | 0.00025 U | 0.00025 U | 0.00025 U | 0.00025 U | 0.00025 U | 0.00025 U | 0.00025 U | 0.00025 U | 0.0005 U | 0.00025 U | 0.00025 U | 0.00025 U | 0.00025 U |
| | 1/26/2015 | Round 33 (PDB) | 0.00025 U | 0.00025 U | 0.00025 U | 0.00025 U | 0.00025 U | 0.00025 U | 0.00025 U | 0.00025 U | 0.0005 U | 0.00025 U | 0.00025 U | 0.00025 U | 0.00025 U |
| | 7/27/2015 | Round 34 | 0.00025 U | 0.00025 U | 0.00025 U | 0.00025 U | 0.00025 U | 0.00025 U | 0.00025 U | 0.00025 U | 0.0005 U | 0.00025 U | 0.00025 U | 0.00025 U | 0.00025 U |
| | 1/22/2016 | Round 35 (PDB) | 0.00025 U | 0.00025 U | 0.00025 U | 0.00025 U | 0.00025 U | 0.00025 U | 0.00025 U | 0.00025 U | 0.0005 U | 0.00025 U | 0.00025 U | 0.00025 U | 0.00025 U |
| | 7/20/2016 | Round 36 | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.00172 J | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U |

mg/L - milligrams per liter
NA - Not Applicable
NS - Not Sampled
NS-D - Not Sampled during this round due to insufficient water in the monitoring well
PDB - Passive Diffusion Bag
SDG - Sample Delivery Group
PCLE - Protective Concentration Level Exceedance

Note:
Shaded areas indicate an exceedance.

Analytical Result Qualifiers:
J - Indicates that the chemical was detected. However, the associated numerical result may not be a precise representation of the amount that is actually present in the sample. The laboratory reported concentration is considered to be an estimate of the true concentration.
U - Indicates that the chemical was not detected at the numerical detection limit (sample-specific quantitation limit) noted. Nondetected results from the laboratory are reported in this manner. This qualifier is added to a positive result (reported by the laboratory) if the detected concentration is determined to be attributable to contamination introduced during field sampling or laboratory analysis.
UJ - Indicates that the chemical was not detected. However, the detection limit (sample-specific quantitation limit) is considered to be estimated based on problems encountered during laboratory analysis. The associated numerical detection limit is regarded as inaccurate or imprecise.

**Table 4-1B**

**Summary of Chemicals of Concern Detected in Groundwater**
**Historical Monitoring Wells — SWMUs 79/136 Central Plumes**
**2016 RAER**
**Former NAS Dallas, Texas**
**Page 1 of 7**

| Monitoring Well | Sampling Date | Sampling Round | Chemicals of Concern (mg/L) | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | 1,1-Dichloroethene | 1,2-Dichloroethane | Benzene | Carbon Tetrachloride | Chloroform | Chloromethane | cis-1,2-Dichloroethene | Ethylbenzene | Methylene Chloride | Tetrachloroethene | trans-1,2-Dichloroethene | Trichloroethene | Vinyl Chloride |
| **Protective Concentration Levels (mg/L)** | | | **0.00700** | **0.00500** | **0.00500** | **0.00500** | **0.24000** | **0.07000** | **0.07000** | **0.70000** | **0.00500** | **0.00500** | **0.10000** | **0.00500** | **0.00200** |
| **Monitoring Wells Located Inside PCLE Zone** | | | | | | | | | | | | | | | |
| **508F23MW** | 7/12/1999 | Well Installed | | | | | | | | | | | | | |
| | 8/5/1999 | Round 5 | 0.00500 U | 0.00044 J | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 UJ | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U |
| | 6/23/2000 | Round 6 | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U |
| | 6/7/2001 | Round 7 | 0.00500 U | 0.00071 J | 0.00500 U | 0.00500 U | 0.00500 U | 0.01000 U | 0.00250 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00250 U | 0.00500 U | 0.01000 U |
| | 9/24/2002 | ASA 5R4 | 0.00100 U | 0.00100 U | 0.00100 U | 0.00100 U | 0.00100 U | 0.00100 U | 0.00100 U | NA | 0.00200 U | 0.00100 U | 0.00100 U | 0.00100 U | 0.00100 U |
| | 11/19/2002 | Round 8 | 0.00100 U | 0.00046 J | 0.00100 U | 0.00100 U | 0.00100 U | 0.00100 U | 0.00050 U | 0.00100 U | 0.00100 U | 0.00100 U | 0.00050 U | 0.00100 U | 0.00100 U |
| | 8/24/2003 | Round 9 | 0.00022 U | 0.00034 J | 0.00020 U | 0.00018 U | 0.00021 U | 0.00026 U | 0.00025 U | 0.00019 U | 0.00028 U | 0.00012 U | 0.00024 U | 0.00022 U | 0.00026 U |
| | 12/22/2003 | Round 10 | 0.00021 U | 0.00009 U | 0.00011 U | 0.00020 U | 0.00014 U | 0.00008 U | 0.00016 U | 0.00011 U | 0.00016 U | 0.00024 U | 0.00019 U | 0.00010 U | 0.00017 U |
| | 10/15/2004 | Round 12 (PDB) | 0.00035 U | 0.00060 J | 0.00025 U | 0.00025 U | 0.00010 U | 0.00017 U | 0.00027 U | 0.00017 U | 0.00040 U | 0.00021 U | 0.00023 U | 0.00022 U | 0.00017 U |
| | 10/10/2005 | Round 14 | 0.00040 U | 0.00300 | 0.00030 U | 0.00030 U | 0.00040 U | 0.00030 U | 0.05800 | 0.00020 U | 0.00200 U | 0.00040 U | 0.00050 J | 0.04600 | 0.00030 J |
| | 5/6/2006 | Round 15 | 0.00100 | 0.01000 | 0.00050 U | 0.00050 U | 0.00040 U | 0.00060 U | 0.23000 | 0.00030 U | 0.00200 U | 0.00060 U | 0.00300 | 0.27000 | 0.00100 J |
| | 8/11/2006 | Round 16 | 0.00060 U | 0.00400 | 0.00050 U | 0.00050 U | 0.00040 U | 0.00060 U | 0.08900 | 0.00030 U | 0.00200 UJ | 0.00060 U | 0.00100 J | 0.08800 | 0.00060 U |
| | 4/28/2007 | Round 17 | 0.00051 J | 0.00670 | 0.00024 U | 0.00022 U | 0.00026 U | 0.00056 U | 0.13000 | 0.00070 U | 0.00046 U | 0.00020 U | 0.00058 J | 0.14000 | 0.00120 J |
| | 8/27/2007 | Round 18 | 0.00013 U | 0.01000 | 0.00012 U | 0.00011 U | 0.00013 U | 0.00028 U | 0.14000 | 0.00035 U | 0.00023 U | 0.00010 U | 0.00180 | 0.15000 | 0.00150 J |
| | 1/19/2008 | Round 19 | 0.00061 J | 0.00500 | 0.00039 U | 0.00044 U | 0.00036 U | 0.00060 U | 0.09000 | 0.00040 U | 0.00040 U | 0.00046 U | 0.00100 | 0.08000 | 0.00069 J |
| | 7/24/2008 | Round 20 | 0.00067 J | 0.00700 | 0.00040 U | 0.00022 U | 0.00028 U | 0.00061 U | 0.07990 | 0.00043 U | 0.00100 U | 0.00022 U | 0.00120 | 0.09080 | 0.00098 J |
| | -- | Well Destroyed | | | | | | | | | | | | | |
| **508F25MW** | 7/22/1999 | Well Installed | | | | | | | | | | | | | |
| | 8/5/1999 | Round 5 | 0.00500 U | 0.00500 U | 0.00048 J | 0.00500 U | 0.00500 U | 0.00500 U | 0.00910 | 0.00500 U | 0.00500 UJ | 0.00500 U | 0.00500 U | 0.00150 J | 0.00120 J |
| | 6/27/2000 | Round 6 | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00430 J | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00480 J | 0.00170 J |
| | 6/8/2001 | Round 7 | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.01000 U | 0.00370 | 0.00500 U | 0.00500 U | 0.00500 U | 0.00250 U | 0.00580 | 0.01000 U |
| | 1/23/2003 | Round 8 (PDB) | 0.00100 U | 0.00027 J | 0.00100 U | 0.00100 U | 0.00100 U | 0.00100 U | 0.00410 | NA | 0.00200 U | 0.00100 U | 0.00100 U | 0.01900 | 0.00100 U |
| | 9/4/2003 | Round 9 | 0.00022 U | 0.00022 U | 0.00020 U | 0.00018 U | 0.00021 U | 0.00026 U | 0.00750 | 0.00019 U | 0.00028 U | 0.00012 U | 0.00024 U | 0.02200 | 0.00120 |
| | 9/4/2003 | Round 9 (PDB) | 0.00044 U | 0.00045 J | 0.00040 U | 0.00036 U | 0.00042 U | 0.00052 U | 0.00480 | 0.00038 U | 0.00056 U | 0.00024 U | 0.00048 U | 0.01700 | 0.00052 U |
| | 12/21/2003 | Round 10 | 0.00021 U | 0.00009 U | 0.00011 U | 0.00020 U | 0.00014 U | 0.00008 U | 0.00250 | 0.00011 U | 0.00016 U | 0.00024 U | 0.00019 U | 0.00310 | 0.00017 U |
| | 7/29/2004 | Round 11 (PDB) | 0.00035 U | 0.00046 J | 0.00025 U | 0.00025 U | 0.00010 U | 0.00017 U | 0.00340 | 0.00017 U | 0.00040 U | 0.00021 U | 0.00023 U | 0.01700 | 0.00017 U |
| | 10/13/2004 | Round 12 (PDB) | 0.00035 U | 0.00046 J | 0.00025 U | 0.00025 U | 0.00010 U | 0.00017 U | 0.00350 | 0.00017 U | 0.00040 U | 0.00021 U | 0.00023 U | 0.01800 | 0.00017 U |
| | 4/19/2005 | Well Abandoned | | | | | | | | | | | | | |
| **508F32MW** | 7/6/2000 | Well Installed | | | | | | | | | | | | | |
| | 7/6/2000 | Round 6 | 0.00500 U | 0.00500 U | 0.01000 | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U |
| | 6/21/2001 | Round 7 | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.01000 U | 0.00250 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00250 U | 0.00500 U | 0.01000 U |
| | 1/23/2003 | Round 8 (PDB) | 0.00100 U | 0.00100 U | 0.00100 U | 0.00100 U | 0.00100 U | 0.00100 U | 0.00100 U | NA | 0.00200 U | 0.00100 U | 0.00100 U | 0.00100 U | 0.00100 U |
| | 6/3/2003 | Well Abandoned | | | | | | | | | | | | | |
| **508F33MW** | 8/30/1999 | Well Installed | | | | | | | | | | | | | |
| | 9/22/1999 | Round 5 | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00540 | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.10000 | 0.00500 U |
| | 6/28/2000 | Round 6 | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00310 J | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.06100 | 0.00500 U |
| | 6/21/2001 | Round 7 | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.01000 U | 0.00250 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00250 U | 0.01200 | 0.01000 U |
| | 1/23/2003 | Round 8 (PDB) | 0.00100 U | 0.00100 U | 0.00100 U | 0.00100 U | 0.00100 U | 0.00100 U | 0.00100 U | NA | 0.00200 U | 0.00100 U | 0.00100 U | 0.00190 | 0.00100 U |
| | 6/3/2003 | Well Abandoned | | | | | | | | | | | | | |

**Table 4-1B**

**Summary of Chemicals of Concern Detected in Groundwater**
**Historical Monitoring Wells — SWMUs 79/136 Central Plumes**
**2016 RAER**
**Former NAS Dallas, Texas**
**Page 2 of 7**

| Monitoring Well | Sampling Date | Sampling Round | Chemicals of Concern (mg/L) | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | 1,1-Dichloroethene | 1,2-Dichloroethane | Benzene | Carbon Tetrachloride | Chloroform | Chloromethane | cis-1,2-Dichloroethene | Ethylbenzene | Methylene Chloride | Tetrachloroethene | trans-1,2-Dichloroethene | Trichloroethene | Vinyl Chloride |
| **Protective Concentration Levels (mg/L)** | | | **0.00700** | **0.00500** | **0.00500** | **0.00500** | **0.24000** | **0.07000** | **0.07000** | **0.70000** | **0.00500** | **0.00500** | **0.10000** | **0.00500** | **0.00200** |
| **508G05MW** | -- | Well Installed | | | | | | | | | | | | | |
| | 6/30/2000 | Round 6 | 0.00050 U | 0.00050 U | 0.00050 U | 0.00050 U | 0.00050 U | 0.00100 U | 0.00050 U | 0.00050 U | 0.00200 U | 0.00050 U | 0.00050 U | 0.00050 U | 0.00050 U |
| | 7/14/2001 | Round 7 | 0.00500 U | 0.00500 U | 0.00500 U | 0.00050 U | 0.00050 U | 0.01000 U | 0.00250 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00250 U | 0.00500 U | 0.01000 U |
| | 9/24/2002 | ASA5 Round 4 | 0.00100 U | 0.00100 U | 0.001 00 U | 0.001 00 U | 0.001 00 U | 0.001 00 U | 0.001 00 U | NA | 0.00200 U | 0.00100 U | 0.00100 U | 0.00100 U | 0.00100 U |
| | 11/19/2002 | Round 8 | 0.00330 U | 0.00330 U | 0.00330 U | 0.00330 U | 0.00330 U | 0.00330 U | 0.00170 U | 0.0033 J | 0.00330 U | 0.00330 U | 0.00170 U | 0.00330 U | 0.00330 U |
| | 8/26/2003 | Round 9 | 0.00044 U | 0.00044 U | 0.00040 U | 0.00036 U | 0.00042 U | 0.00052 U | 0.00050 U | 0.00038 U | 0.00056 U | 0.00024 U | 0.00048 U | 0.00150 J | 0.00052 U |
| | 12/17/2003 | Round 10 | 0.00021 U | 0.00009 U | 0.00011 U | 0.00020 U | 0.00014 U | 0.00008 U | 0.00016 U | 0.00011 U | 0.00016 U | 0.00024 U | 0.00019 U | 0.000095 U | 0.00017 U |
| | 9/19/2004 | Round 12 | 0.00035 U | 0.00010 U | 0.00025 U | 0.00025 U | 0.0001 U | 0.00017 U | 0.00094 J | 0.00017 U | 0.00040 U | 0.00021 U | 0.00023 U | 0.00022 U | 0.00035 J |
| | 8/24/2005 | Round 13B | 0.00040 U | 0.00030 U | 0.00030 J | 0.00030 U | 0.00040 U | 0.00040 J | 0.00100 | 0.00060 J | 0.00200 U | 0.00040 U | 0.00030 U | 0.00030 U | 0.00500 |
| | 10/20/2005 | Round 14 | 0.00040 U | 0.00030 U | 0.00030 U | 0.00030 U | 0.00040 U | 0.00030 U | 0.00050 J | 0.00060 J | 0.00200 U | 0.00040 U | 0.00030 U | 0.00030 U | 0.00300 |
| | 5/6/2006 | Round 15 | 0.00060 U | 0.00040 U | 0.00090 J | 0.00050 U | 0.00040 U | 0.00060 U | 0.00050 U | 0.00050 J | 0.00200 U | 0.00060 U | 0.00060 U | 0.00040 U | 0.00200 J |
| | 8/13/2006 | Round 16 | 0.00060 U | 0.00040 U | 0.00200 | 0.00050 U | 0.00040 U | 0.00060 U | 0.00050 U | 0.00060 J | 0.00200 U | 0.00060 U | 0.00060 U | 0.00040 U | 0.00100 J |
| | 4/28/2007 | Round 17 | 0.00013 U | 0.00013 U | 0.00330 | 0.00011 U | 0.00013 U | 0.00028 U | 0.00014 U | 0.00055 J | 0.00023 U | 0.00010 U | 0.00015 U | 0.00023 U | 0.00046 J |
| | 8/30/2007 | Round 18 | 0.00013 U | 0.00013 U | 0.00410 | 0.00011 U | 0.00013 U | 0.00028 U | 0.00014 U | 0.00042 J | 0.00023 U | 0.00010 U | 0.00015 U | 0.00023 U | 0.00045 J |
| | 1/19/2008 | Round 19 | 0.00039 U | 0.00026 U | 0.00490 | 0.00044 U | 0.00036 U | 0.00060 U | 0.00032 U | 0.00047 J | 0.00040 U | 0.00046 U | 0.00048 U | 0.00053 U | 0.00043 U |
| | 7/24/2008 | Round 20 | 0.00054 U | 0.00034 U | 0.00530 | 0.00022 U | 0.00028 U | 0.00061 U | 0.00020 U | 0.00060 J | 0.00100 U | 0.00022 U | 0.00045 U | 0.00032 U | 0.00036 J |
| | 1/14/2009 | Round 21 | 0.00054 U | 0.00034 U | 0.00420 | 0.00022 U | 0.00290 | 0.00061 U | 0.00020 U | 0.00043 U | 0.00100 U | 0.00022 U | 0.00045 U | 0.00032 U | 0.00030 U |
| | 7/16/2009 | Round 22 | 0.00540 U | 0.00034 U | 0.00530 | 0.00022 U | 0.00028 U | 0.00061 U | 0.00020 U | 0.00043 U | 0.00100 U | 0.00022 U | 0.00045 U | 0.00032 U | 0.00030 U |
| | 1/13/2010 | Round 23 | 0.00029 U | 0.00033 U | 0.00074 J | 0.00034 U | 0.00025 U | 0.00050 U | 0.00032 U | 0.00020 U | 0.00200 U | 0.00044 U | 0.00034 U | 0.00083 J | 0.00028 U |
| | 7/14/2010 | Round 24 | 0.00029 U | 0.00033 U | 0.00057 J | 0.00034 U | 0.00025 U | 0.00050 U | 0.00032 U | 0.00020 U | 0.00200 U | 0.00044 U | 0.00034 U | 0.00024 U | 0.00028 U |
| | 1/12/2011 | Round 25 | 0.00023 U | 0.00020 U | 0.00020 U | 0.00025 U | 0.0011 | 0.00050 U | 0.00026 U | 0.00024 J | 0.00200 U | 0.00025 U | 0.00035 U | 0.00026 U | 0.00022 U |
| | 7/28/2011 | Round 26 | 0.00023 U | 0.00020 U | 0.00020 U | 0.00025 U | 0.00074 J | 0.00050 U | 0.00026 U | 0.00020 U | 0.00200 U | 0.00025 U | 0.00035 U | 0.00026 U | 0.00022 U |
| | 1/11/2012 | Round 27 | 0.00023 U | 0.00020 U | 0.00020 U | 0.00025 U | 0.00082 J | 0.00050 U | 0.00026 U | 0.00020 U | 0.00200 U | 0.00025 U | 0.00035 U | 0.00026 U | 0.00022 U |
| | 7/12/2012 | Round 28 | 0.00023 U | 0.00020 U | 0.00020 U | 0.00025 U | 0.00022 U | 0.00050 U | 0.00026 U | 0.00026 J | NS | 0.00025 U | 0.00035 U | 0.00026 U | 0.00022 U |
| | 1/9/2013 | Round 29 | 0.00020 U | 0.00022 U | 0.00021 U | 0.00031 U | 0.00026 U | 0.00050 U | 0.00024 U | 0.00029 U | 0.00200 U | 0.00032 U | 0.00023 U | 0.00031 U | 0.00044 U |
| | 7/18/2013 | Round 30 | 0.00020 U | 0.00022 U | 0.00021 U | 0.00031 U | 0.00026 U | 0.00050 U | 0.00024 U | 0.00034 J | 0.00200 U | 0.00032 U | 0.00023 U | 0.00031 U | 0.00044 U |
| | 2/24/2014 | Round 31 (PDB) | 0.00025 U | 0.00024 U | 0.00024 U | 0.00040 U | 0.00031 U | 0.00053 U | 0.00033 U | 0.00028 U | 0.0020 U | 0.00026 U | 0.00034 U | 0.0003 U | 0.00033 |
| | 7/18/2014 | Round 32 | 0.00025 U | 0.00025 U | 0.00025 U | 0.00025 U | 0.00025 U | 0.00025 U | 0.00025 U | 0.00025 U | 0.0005 U | 0.00025 U | 0.00025 U | 0.00025 U | 0.00025 U |
| | 1/23/2015 | Round 33 | 0.00029 J | 0.0005 U | 0.00025 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.001 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U |
| | 7/27/2015 | Round 34 | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.001 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U |
| | 1/23/2016 | Well Abandoned | | | | | | | | | | | | | |
| **508G06MW** | 6/30/2000 | Well Installed | | | | | | | | | | | | | |
| | 6/30/2000 | CCI | 0.00050 U | 0.00050 U | 0.00050 U | 0.00050 U | 0.00050 U | 0.00100 U | 0.09000 | 0.00050 U | 0.00200 U | 0.00050 U | 0.00090 | 0.12000 | 0.00050 U |
| | 8/25/2000 | CCI | 0.00050 U | 0.00050 U | 0.00050 U | 0.00050 U | 0.00050 U | 0.00100 U | 0.04200 | 0.00050 U | 0.00200 U | 0.00050 U | 0.00050 U | 0.08000 | 0.00050 U |
| | 10/19/2000 | CCI | 0.00050 U | 0.00050 U | 0.00050 U | 0.00050 U | 0.00050 U | 0.00100 U | 0.12000 | 0.00050 U | 0.00200 U | 0.00050 U | 0.00260 | 0.18000 | 0.00050 U |
| | 7/14/2001 | Round 7 | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.01000 U | 0.00930 | 0.00500 U | 0.00150 J | 0.00500 U | 0.00250 U | 0.01100 | 0.01000 U |
| | 11/8/2001 | ASA 5R1 | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.01000 U | 0.01900 | 0.00500 U | 0.00500 U | 0.00500 U | 0.00250 U | 0.02900 | 0.01000 U |
| | 2/13/2002 | ASA 5R2 | 0.01700 U | 0.01700 U | 0.01700 U | 0.01700 U | 0.01700 U | 0.03300 U | 0.06000 | 0.01700 U | 0.01700 U | 0.01700 U | 0.00830 U | 0.09600 | 0.03300 U |
| | 7/9/2002 | ASA 5R3 | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.01000 U | 0.06700 | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.14000 | 0.01000 U |
| | 9/25/2002 | ASA 5R4 | 0.00300 U | 0.00300 U | 0.00300 U | 0.00300 U | 0.00300 U | 0.00300 U | 0.03300 | NA | 0.00600 U | 0.00300 U | 0.00300 U | 0.06900 | 0.00300 U |
| | 11/20/2002 | Round 8 | 0.00200 U | 0.00200 U | 0.00200 U | 0.00200 U | 0.00200 U | 0.00200 U | 0.03800 | 0.00200 U | 0.00200 U | 0.00200 U | 0.00076 J | 0.06000 | 0.00200 U |
| | 8/24/2003 | Round 9 | 0.00038 J | 0.00022 U | 0.00020 U | 0.00018 U | 0.00021 U | 0.00026 U | 0.03600 | 0.00019 U | 0.00028 U | 0.00012 U | 0.00088 | 0.02300 | 0.00026 U |
| | 12/18/2003 | Round 10 | 0.00021 U | 0.00009 U | 0.00011 U | 0.00020 U | 0.00014 U | 0.00008 U | 0.02500 | 0.00011 U | 0.00016 U | 0.00024 U | 0.00019 U | 0.01100 | 0.00017 U |
| | 7/19/2004 | Round 11 | 0.00035 U | 0.00010 U | 0.00025 U | 0.00025 U | 0.00010 U | 0.00017 U | 0.01200 J | 0.00017 U | 0.00040 U | 0.00021 U | 0.00032 J | 0.00500 | 0.00017 U |
| | 9/16/2004 | Round 12 | 0.00035 U | 0.00010 U | 0.00025 U | 0.00025 U | 0.00010 U | 0.00017 U | 0.01300 | 0.00017 U | 0.00040 U | 0.00021 U | 0.00023 U | 0.00410 | 0.00042 J |
| | 3/18/2005 | Round 13 | 0.00040 U | 0.00030 U | 0.00060 J | 0.00030 U | 0.00040 U | 0.00030 U | 0.01100 | 0.00020 U | 0.00200 U | 0.00040 U | 0.00040 J | 0.00300 | 0.00030 U |
| | 8/24/2005 | Round 13B | 0.00040 U | 0.00030 U | 0.00040 J | 0.00030 U | 0.00040 U | 0.00030 U | 0.00700 | 0.00020 U | 0.00200 UJ | 0.00040 U | 0.00030 U | 0.00300 | 0.00030 J |
| | 10/20/2005 | Round 14 | 0.00040 U | 0.00030 U | 0.00030 U | 0.00030 U | 0.00040 U | 0.00030 U | 0.00900 | 0.00020 U | 0.00200 U | 0.00040 U | 0.00030 U | 0.00300 | 0.00030 U |
| | 5/6/2006 | Round 15 | 0.00060 U | 0.00040 U | 0.00050 U | 0.00050 U | 0.00040 U | 0.00060 U | 0.00300 | 0.00030 U | 0.00200 U | 0.00060 U | 0.00060 U | 0.00200 | 0.00060 U |
| | 8/12/2006 | Round 16 | 0.00060 U | 0.00040 U | 0.00050 U | 0.00050 U | 0.00040 U | 0.00060 U | 0.00700 | 0.00030 U | 0.00200 U | 0.00060 U | 0.00060 U | 0.00300 | 0.00060 U |
| | 4/28/2007 | Round 17 | 0.00013 U | 0.00013 U | 0.00012 U | 0.00011 U | 0.00013 U | 0.00028 U | 0.00520 | 0.00035 U | 0.00023 U | 0.00010 U | 0.00015 U | 0.00180 | 0.00023 J |
| | 8/30/2007 | Round 18 | 0.00013 U | 0.00013 U | 0.00012 U | 0.00011 U | 0.00013 U | 0.00028 U | 0.00360 | 0.00035 U | 0.00023 U | 0.00010 U | 0.00015 U | 0.00120 | 0.00024 J |
| | 1/19/2008 | Round 19 | 0.00039 U | 0.00026 U | 0.00039 U | 0.00044 U | 0.00036 U | 0.00060 U | 0.00380 | 0.00040 U | 0.00040 U | 0.00046 U | 0.00048 U | 0.00150 | 0.00043 U |
| | 7/24/2008 | Round 20 | 0.00054 U | 0.00034 U | 0.00040 U | 0.00022 U | 0.00028 U | 0.00061 U | 0.00380 | 0.00043 U | 0.00100 U | 0.00022 U | 0.00045 U | 0.00160 | 0.00030 U |
| | -- | Well Destroyed | | | | | | | | | | | | | |

**Table 4-1B**

**Summary of Chemicals of Concern Detected in Groundwater**
**Historical Monitoring Wells — SWMUs 79/136 Central Plumes**
**2016 RAER**
**Former NAS Dallas, Texas**
**Page 3 of 7**

| Monitoring Well | Sampling Date | Sampling Round | Chemicals of Concern (mg/L) | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | 1,1-Dichloroethene | 1,2-Dichloroethane | Benzene | Carbon Tetrachloride | Chloroform | Chloromethane | cis-1,2-Dichloroethene | Ethylbenzene | Methylene Chloride | Tetrachloroethene | trans-1,2-Dichloroethene | Trichloroethene | Vinyl Chloride |
| **Protective Concentration Levels (mg/L)** | | | **0.00700** | **0.00500** | **0.00500** | **0.00500** | **0.24000** | **0.07000** | **0.07000** | **0.70000** | **0.00500** | **0.00500** | **0.10000** | **0.00500** | **0.00200** |
| **60-02** | 8/6/1992 | Pre Round 1 | NA | NA | 0.00130 U | NA | NA | NA | NA | 0.00130 U | NA | NA | NA | NA | NA |
| | 6/15/1994 | Pre Round 1 | NA | NA | 0.00200 | NA | NA | NA | NA | 0.00100 U | NA | NA | NA | NA | NA |
| | 12/6/1994 | Pre Round 1 | NA | NA | 0.00100 U | NA | NA | NA | NA | 0.00100 U | NA | NA | NA | NA | NA |
| | 6/12/1995 | Pre Round 1 | NA | NA | 0.00100 U | NA | NA | NA | NA | 0.00100 U | NA | NA | NA | NA | NA |
| | 7/11/1995 | Round 1 | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.01000 U | 0.00500 U | 0.00500 U | 0.01520 | 0.00500 U | 0.00500 U | 0.01770 | 0.00695 J |
| | 2/5/1996 | Round 1 | 0.00500 U | 0.00500 U | 0.00920 | 0.00500 U | 0.00500 U | 0.01000 U | NA | 0.00500 U | 0.00500 U | 0.00500 U | NA | 0.00500 U | 0.07300 |
| | 5/15/1996 | Round 1 | 0.00500 U | 0.00084 J | 0.00850 | 0.00500 UJ | 0.00500 U | 0.01000 U | NA | 0.00500 U | 0.00500 U | 0.00500 U | NA | 0.00500 U | 0.03200 |
| | 7/21/1996 | Round 1 | 0.00500 U | 0.00500 U | 0.01400 | 0.00500 U | 0.00500 U | 0.01000 U | NA | 0.00500 U | 0.00500 U | 0.00500 U | NA | 0.00500 U | 0.05400 |
| | 10/4/1996 | Round 1 | 0.00500 U | 0.00500 U | 0.02300 | 0.00500 U | 0.00500 U | 0.01000 U | NA | 0.00500 U | 0.00500 U | 0.00500 U | NA | 0.00500 U | 0.05400 |
| | 3/31/1998 | Round 2 | 0.00500 U | 0.00500 U | 0.00460 J | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00660 |
| | 9/14/1998 | Round 3 | 0.00500 U | 0.00500 U | 0.02400 | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00300 J | 0.00500 U | 0.02400 |
| | 10/20/1998 | Well Abandoned | | | | | | | | | | | | | |
| **60-04** | 3/17/1992 | Pre Round 1 | NA | NA | 0.00100 U | NA | NA | NA | NA | 0.00100 U | NA | NA | NA | NA | NA |
| | 6/15/1994 | Pre Round 1 | NA | NA | 0.00200 | NA | NA | NA | NA | 0.00100 U | NA | NA | NA | NA | NA |
| | 12/6/1994 | Pre Round 1 | NA | NA | 0.00100 | NA | NA | NA | NA | 0.00100 U | NA | NA | NA | NA | NA |
| | 6/12/1995 | Pre Round 1 | NA | NA | 0.00100 U | NA | NA | NA | NA | 0.00100 U | NA | NA | NA | NA | NA |
| | 7/13/1995 | Round 1 | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.01000 U | 0.02630 | 0.00500 U | 0.01000 U | 0.00500 U | 0.00500 U | 0.62800 | 0.01000 U |
| | 1/25/1996 | Round 1 | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.01000 U | NA | 0.00500 U | 0.00500 U | 0.00500 U | NA | 0.27000 | 0.01000 U |
| | 5/9/1996 | Round 1 | 0.00500 U | 0.00500 U | 0.00110 J | 0.00500 U | 0.00500 U | 0.01000 U | NA | 0.00500 U | 0.00500 U | 0.00500 U | NA | 0.32000 | 0.01000 U |
| | 7/21/1996 | Round 1 | 0.00500 U | 0.00110 J | 0.00150 J | 0.00500 U | 0.00500 U | 0.01000 U | NA | 0.00500 U | 0.00500 U | 0.00500 U | NA | 0.30000 | 0.01000 U |
| | 10/6/1996 | Round 1 | 0.01000 U | 0.01000 U | 0.01000 U | 0.01000 U | 0.01000 U | 0.02000 U | NA | 0.01000 U | 0.01000 U | 0.01000 U | NA | 0.28000 | 0.02000 U |
| | 3/31/1998 | Round 2 | 0.02000 U | 0.02000 U | 0.02000 U | 0.02000 U | 0.02000 U | 0.02000 U | 0.01700 J | 0.00210 J | 0.02000 U | 0.02000 U | 0.02000 U | 0.25000 | 0.02000 U |
| | NA | Well Abandoned | | | | | | | | | | | | | |
| **60-05** | 3/17/1992 | Pre Round 1 | NA | NA | 0.00100 U | NA | NA | NA | NA | 0.00100 U | NA | NA | NA | NA | NA |
| | 6/15/1994 | Pre Round 1 | NA | NA | 0.00100 | NA | NA | NA | NA | 0.00100 U | NA | NA | NA | NA | NA |
| | 12/6/1994 | Pre Round 1 | NA | NA | 0.00100 | NA | NA | NA | NA | 0.00100 U | NA | NA | NA | NA | NA |
| | 6/12/1995 | Pre Round 1 | NA | NA | 0.00100 U | NA | NA | NA | NA | 0.00100 U | NA | NA | NA | NA | NA |
| | 7/13/1995 | Round 1 | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.01000 U | 0.07930 | 0.00500 U | 0.01000 U | 0.00500 U | 0.00500 U | 0.74500 | 0.01000 U |
| | 1/25/1996 | Round 1 | 0.00160 J | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.01000 U | NA | 0.00500 U | 0.00500 U | 0.00500 U | NA | 0.40000 | 0.01000 U |
| | 5/9/1996 | Round 1 | 0.00500 U | 0.00140 J | 0.00500 U | 0.00500 U | 0.00500 U | 0.01000 U | NA | 0.00500 U | 0.00500 U | 0.00500 U | NA | 0.42000 | 0.01000 U |
| | 7/21/1996 | Round 1 | 0.00140 J | 0.00150 J | 0.00500 U | 0.00500 U | 0.00500 U | 0.01000 U | NA | 0.00500 U | 0.00500 U | 0.00075 J | NA | 0.34000 | 0.01000 U |
| | 10/4/1996 | Round 1 | 0.00170 J | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.01000 U | NA | 0.00500 U | 0.00500 U | 0.00084 J | NA | 0.34000 | 0.01000 U |
| | 3/31/1998 | Round 2 | 0.00620 U | 0.00620 U | 0.00620 U | 0.00620 U | 0.00620 U | 0.00620 U | 0.02700 | 0.00620 U | 0.00620 U | 0.00620 U | 0.00130 J | 0.18000 | 0.00620 U |
| | NA | Well Abandoned | | | | | | | | | | | | | |
| **60-08** | 3/18/1992 | Pre Round 1 | NA | NA | 0.00100 U | NA | NA | NA | NA | 0.00100 U | NA | NA | NA | NA | NA |
| | 6/15/1994 | Pre Round 1 | NA | NA | 0.00200 | NA | NA | NA | NA | 0.00100 U | NA | NA | NA | NA | NA |
| | 12/7/1994 | Pre Round 1 | NA | NA | 0.00100 U | NA | NA | NA | NA | 0.00100 U | NA | NA | NA | NA | NA |
| | 6/13/1995 | Pre Round 1 | NA | NA | 0.00100 U | NA | NA | NA | NA | 0.00100 U | NA | NA | NA | NA | NA |
| | 7/12/1995 | Pre Round 1 | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.01000 U | 0.00500 U | 0.00500 U | 0.01000 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.01000 U |
| | 2/6/1996 | Pre Round 1 | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.01000 U | NA | 0.00500 U | 0.00500 U | 0.00500 U | NA | 0.00440 J | 0.01000 U |
| | 5/15/1996 | Pre Round 1 | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 UJ | 0.00500 U | 0.01000 U | NA | 0.00500 U | 0.00500 U | 0.00500 U | NA | 0.00410 J | 0.01000 U |
| | 7/19/1996 | Pre Round 1 | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.01000 U | NA | 0.00500 U | 0.00500 U | 0.00500 U | NA | 0.00420 J | 0.01000 U |
| | 10/5/1996 | Round 1 | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.01000 U | NA | 0.00500 U | 0.00680 | 0.00500 U | NA | 0.00410 J | 0.01000 U |
| | 4/4/1998 | Round 2 | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00220 J | 0.00500 U | 0.00630 | 0.00500 U |
| | 9/14/1998 | Round 3 | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00081 J | 0.00500 U | 0.00450 J | 0.00500 U |
| | 3/28/1999 | Round 4 | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00088 J | 0.00500 U | 0.00210 J | 0.00500 U |
| | 9/20/1999 | Round 5 | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00030 J | 0.00500 U | 0.00500 U | 0.00170 J | 0.00500 U | 0.00420 J | 0.00500 U |
| | 6/28/2000 | Round 6 | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00190 J | 0.00500 U | 0.00460 J | 0.00500 U |
| | 6/24/2001 | Round 7 | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.01000 U | 0.00250 U | 0.00500 U | 0.00500 U | 0.00200 J | 0.00250 U | 0.00370 J | 0.01000 U |
| | 1/7/2003 | Round 8 | 0.00100 U | 0.00100 U | 0.00100 U | 0.00100 U | 0.00100 U | 0.00100 U | 0.00100 U | NA | 0.00200 U | 0.00150 | 0.00100 U | 0.00280 | 0.00100 U |
| | 1/23/2003 | Well Abandoned | | | | | | | | | | | | | |
| **60-09** | 3/18/1992 | Pre Round 1 | NA | NA | 0.00100 U | NA | NA | NA | NA | 0.00100 U | NA | NA | NA | NA | NA |
| | 6/15/1994 | Pre Round 1 | NA | NA | 0.00100 U | NA | NA | NA | NA | 0.00100 U | NA | NA | NA | NA | NA |
| | 12/6/1994 | Pre Round 1 | NA | NA | 0.00100 U | NA | NA | NA | NA | 0.00100 U | NA | NA | NA | NA | NA |
| | 6/13/1995 | Pre Round 1 | NA | NA | 0.00100 U | NA | NA | NA | NA | 0.00100 U | NA | NA | NA | NA | NA |
| | 7/11/1995 | Round 1 | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.01000 U | 0.00500 U | 0.00500 U | 0.00881 J | 0.00500 U | 0.00500 U | 0.00500 U | 0.01000 U |
| | 1/31/1996 | Round 1 | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.01000 U | NA | 0.00500 U | 0.00500 U | 0.00500 U | NA | 0.00480 J | 0.01000 U |
| | 5/15/1996 | Round 1 | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 UJ | 0.00500 U | 0.01000 U | NA | 0.00500 U | 0.00210 J | 0.00500 U | NA | 0.00370 J | 0.01000 U |
| | 7/19/1996 | Round 1 | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.01000 U | NA | 0.00500 U | 0.00500 U | 0.00500 U | NA | 0.00450 J | 0.01000 U |
| | 10/2/1996 | Round 1 | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.01000 U | NA | 0.00500 U | 0.00500 U | 0.00110 J | NA | 0.00660 | 0.01000 U |
| | 5/17/1998 | Round 2 | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00300 J | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00560 | 0.00500 U |
| | 9/14/1998 | Round 3 | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00064 J | 0.00500 U | 0.00290 J | 0.00500 U | 0.00500 U | 0.00073 J | 0.00500 U | 0.00530 | 0.00500 U |
| | 3/23/1999 | Round 4 | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00067 J | 0.00500 U | 0.0031 0 J | 0.00500 U | 0.00500 U | 0.00120 J | 0.00500 U | 0.00560 | 0.00500 U |
| | 4/13/1999 | Well Abandoned | | | | | | | | | | | | | |

**Table 4-1B**

**Summary of Chemicals of Concern Detected in Groundwater**
**Historical Monitoring Wells — SWMUs 79/136 Central Plumes**
**2016 RAER**
**Former NAS Dallas, Texas**
**Page 4 of 7**

| Monitoring Well | Sampling Date | Sampling Round | Chemicals of Concern (mg/L) | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | 1,1-Dichloroethene | 1,2-Dichloroethane | Benzene | Carbon Tetrachloride | Chloroform | Chloromethane | cis-1,2-Dichloroethene | Ethylbenzene | Methylene Chloride | Tetrachloroethene | trans-1,2-Dichloroethene | Trichloroethene | Vinyl Chloride |
| **Protective Concentration Levels (mg/L)** | | | **0.00700** | **0.00500** | **0.00500** | **0.00500** | **0.24000** | **0.07000** | **0.07000** | **0.70000** | **0.00500** | **0.00500** | **0.10000** | **0.00500** | **0.00200** |
| **Monitoring Wells Located Outside PCLE Zone** | | | | | | | | | | | | | | | |
| **50807MW** | 10/26/1995 | Pre Round 1 | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.01000 U | NA | 0.00500 U | 0.00500 U | 0.00500 U | NA | 0.00500 U | 0.01000 U |
| | 2/6/1996 | Pre Round 1 | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.01000 U | NA | 0.00500 U | 0.00500 U | 0.00500 U | NA | 0.00500 U | 0.01000 U |
| | 5/14/1996 | Pre Round 1 | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.01000 U | NA | 0.00500 U | 0.00500 U | 0.00500 U | NA | 0.00500 U | 0.01000 U |
| | 7/19/1996 | Pre Round 1 | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.01000 U | NA | 0.00500 U | 0.00500 U | 0.00500 U | NA | 0.00500 U | 0.01000 U |
| | 10/6/1996 | Round 1 | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.01000 U | NA | 0.00500 U | 0.00500 U | 0.00500 U | NA | 0.00500 U | 0.01000 U |
| | 4/2/1998 | Round 2 | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U |
| | 9/14/1999 | Round 5 | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00045 J | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U |
| | 6/23/2000 | Round 6 | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U |
| | 10/15/2004 | Round 12 (PDB) | 0.00035 U | 0.00010 U | 0.00025 U | 0.00025 U | 0.00010 U | 0.00017 U | 0.00027 U | 0.00017 U | 0.00040 U | 0.00021 U | 0.00023 U | 0.00022 U | 0.00017 U |
| | 4/18/2005 | Well Abandoned | | | | | | | | | | | | | |
| **508F12MW** | 3/30/1998 | Well Installed | | | | | | | | | | | | | |
| | 4/7/1998 | Round 2 | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U |
| | 8/29/1998 | Round 3 | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U |
| | 2/23/1999 | Round 4 | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00075 J | 0.00500 U |
| | 10/7/1999 | Round 5 | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U |
| | 6/22/2000 | Round 6 | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00130 J | 0.00500 U |
| | 6/10/2001 | Round 7 | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.01000 U | 0.00250 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00250 U | 0.00500 U | 0.01000 U |
| | 1/23/2003 | Round 8 (PDB) | 0.00100 U | 0.00100 U | 0.00100 U | 0.00100 U | 0.00100 U | 0.00100 U | 0.00100 U | NA | 0.00200 U | 0.00100 U | 0.00100 U | 0.00100 U | 0.00100 U |
| | 12/21/2003 | Round 10 | 0.00021 U | 0.00009 U | 0.00011 U | 0.00020 U | 0.00014 U | 0.00008 U | 0.00016 U | 0.00011 U | 0.00016 U | 0.00024 U | 0.00019 U | 0.00010 U | 0.00017 U |
| | 10/14/2004 | Round 12 (PDB) | 0.00035 U | 0.00010 U | 0.00025 U | 0.00025 U | 0.00010 U | 0.00017 U | 0.00027 U | 0.00017 U | 0.00040 U | 0.00021 U | 0.00023 U | 0.00022 U | 0.00017 U |
| | 4/19/2005 | Well Abandoned | | | | | | | | | | | | | |
| **508F13MW** | 3/31/1998 | Well Installed | | | | | | | | | | | | | |
| | 4/8/1998 | Round 2 | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U |
| | 8/28/1998 | Round 3 | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U |
| | 2/23/1999 | Round 4 | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U |
| | 10/7/1999 | Round 5 | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U |
| | 6/22/2000 | Round 6 | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U |
| | 6/9/2001 | Round 7 | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.01000 U | 0.00250 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00250 U | 0.00500 U | 0.01000 U |
| | 1/26/2003 | Round 8 (PDB) | 0.00100 U | 0.00100 U | 0.00100 U | 0.00100 U | 0.00100 U | 0.00100 U | 0.00100 U | NA | 0.00200 U | 0.00100 U | 0.00100 U | 0.00100 U | 0.00100 U |
| | 12/18/2003 | Round 10 | 0.00021 U | 0.00009 U | 0.00011 U | 0.00020 U | 0.00014 U | 0.00008 U | 0.00016 U | 0.00011 U | 0.00016 U | 0.00024 U | 0.00019 U | 0.00010 U | 0.00017 U |
| | 10/15/2004 | Round 12 (PDB) | 0.00035 U | 0.00010 U | 0.00025 U | 0.00025 U | 0.00010 U | 0.00017 U | 0.00027 U | 0.00017 U | 0.00040 U | 0.00021 U | 0.00023 U | 0.00022 U | 0.00017 U |
| | 4/25/2005 | Well Abandoned | | | | | | | | | | | | | |
| **508F27MW** | 7/21/1999 | Well Installed | | | | | | | | | | | | | |
| | 8/8/1999 | Round 5 | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00110 J | 0.00500 U | 0.00045 J | 0.00500 U | 0.00500 U | 0.00068 J | 0.00500 U | 0.00420 J | 0.00500 U |
| | 6/27/2000 | Round 6 | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00210 J | 0.00500 U |
| | 6/10/2001 | Round 7 | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.01000 U | 0.00250 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00250 U | 0.00200 J | 0.01000 U |
| | 1/13/2004 | Round 10 | 0.00021 U | 0.00009 U | 0.00011 U | 0.00020 U | 0.00014 U | 0.00008 U | 0.00034 J | 0.00011 U | 0.00016 U | 0.00190 | 0.00019 U | 0.00300 | 0.00017 U |
| | 10/15/2004 | Round 12 (PDB) | 0.00035 U | 0.00010 U | 0.00025 U | 0.00025 U | 0.00010 U | 0.00017 U | 0.00027 U | 0.00017 U | 0.00040 U | 0.00046 J | 0.00023 U | 0.00160 | 0.00017 U |
| | 4/18/2005 | Well Abandoned | | | | | | | | | | | | | |
| **508F30MW** | 6/27/2000 | Well Installed | | | | | | | | | | | | | |
| | 6/27/2000 | Round 6 | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U |
| | 6/12/2001 | Round 7 | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.01000 U | 0.00250 U | 0.00500 U | 0.00150 J | 0.00500 U | 0.00250 U | 0.00500 U | 0.01000 U |
| | 1/9/2003 | Round 8 | 0.00100 U | 0.00100 U | 0.00100 U | 0.00100 U | 0.00100 U | 0.00100 U | 0.00100 U | NA | 0.00200 U | 0.00100 U | 0.00100 U | 0.00100 U | 0.00100 U |
| | 12/21/2003 | Round 10 | 0.00021 U | 0.00009 U | 0.00011 U | 0.00020 U | 0.00014 U | 0.00008 U | 0.00016 U | 0.00011 U | 0.00016 U | 0.00024 U | 0.00019 U | 0.00010 U | 0.00017 U |
| | 10/14/2004 | Round 12 (PDB) | 0.00035 U | 0.00010 U | 0.00025 U | 0.00025 U | 0.00010 U | 0.00017 U | 0.00027 U | 0.00017 U | 0.00040 U | 0.00021 U | 0.00023 U | 0.00022 U | 0.00017 U |
| | 4/19/2005 | Well Abandoned | | | | | | | | | | | | | |
| **508F34MW** | 8/8/1999 | Well Installed | | | | | | | | | | | | | |
| | 8/8/1999 | Round 5 | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00089 J | 0.00500 U | 0.00060 J | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00290 J | 0.00500 U |
| | 6/27/2000 | Round 6 | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00270 J | 0.00500 U |
| | 6/10/2001 | Round 7 | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.01000 U | 0.00250 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00250 U | 0.00180 J | 0.01000 U |
| | 1/23/2003 | Well Abandoned | | | | | | | | | | | | | |
| **508F35MW** | 7/22/1999 | Well Installed | | | | | | | | | | | | | |
| | 8/8/1999 | Round 5 | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00074 J | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00180 J | 0.00500 U |
| | 6/28/2000 | Round 6 | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00160 J | 0.00500 U |
| | 6/10/2001 | Round 7 | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.01000 U | 0.00250 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00250 U | 0.00180 J | 0.01000 U |
| | 1/23/2003 | Well Abandoned | | | | | | | | | | | | | |

**Table 4-1B**

**Summary of Chemicals of Concern Detected in Groundwater**
**Historical Monitoring Wells — SWMUs 79/136 Central Plumes**
**2016 RAER**
**Former NAS Dallas, Texas**
**Page 5 of 7**

| Monitoring Well | Sampling Date | Sampling Round | Chemicals of Concern (mg/L) | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | 1,1-Dichloroethene | 1,2-Dichloroethane | Benzene | Carbon Tetrachloride | Chloroform | Chloromethane | cis-1,2-Dichloroethene | Ethylbenzene | Methylene Chloride | Tetrachloroethene | trans-1,2-Dichloroethene | Trichloroethene | Vinyl Chloride |
| **Protective Concentration Levels (mg/L)** | | | **0.00700** | **0.00500** | **0.00500** | **0.00500** | **0.24000** | **0.07000** | **0.07000** | **0.70000** | **0.00500** | **0.00500** | **0.10000** | **0.00500** | **0.00200** |
| **508F50MW** | 9/15/2004 | Well Installed | | | | | | | | | | | | | |
| | 9/20/2004 | Round 12 | 0.00035 U | 0.00010 U | 0.00240 | 0.00025 U | 0.00010 U | 0.00017 U | 0.00027 U | 0.00026 J | 0.00040 U | 0.00021 U | 0.00023 U | 0.00022 U | 0.00028 J |
| | 1/10/2005 | -- | 0.00035 U | 0.01400 | 0.00025 U | 0.00025 U | 0.00010 U | 0.00017 U | 0.00170 | 0.00017 U | 0.00040 U | 0.00021 U | 0.00023 U | 0.01300 | 0.00017 U |
| | 3/19/2005 | Round 13 | 0.00040 U | 0.00030 U | 0.00050 J | 0.00030 U | 0.00040 U | 0.00030 U | 0.00030 U | 0.00020 U | 0.00200 U | 0.00040 U | 0.00030 U | 0.00030 U | 0.00030 U |
| | 7/19/2005 | Round 13A | 0.00040 U | 0.00030 U | 0.00100 | 0.00030 U | 0.00040 U | 0.00030 U | 0.00030 U | 0.00020 U | 0.00200 U | 0.00040 U | 0.00050 J | 0.00030 U | 0.00030 U |
| | 8/23/2005 | Round 13B | 0.00040 U | 0.00030 U | 0.00300 | 0.00030 U | 0.00040 U | 0.00030 U | 0.00030 U | 0.00020 U | 0.00200 UJ | 0.00040 U | 0.00070 J | 0.00030 U | 0.00030 U |
| | 10/19/2005 | Round 14 | 0.00040 U | 0.00030 U | 0.00200 J | 0.00030 U | 0.00040 U | 0.00030 U | 0.00030 U | 0.00020 U | 0.00200 U | 0.00040 U | 0.00060 J | 0.00030 U | 0.00030 U |
| | 5/6/2006 | Round 15 | 0.00060 U | 0.00040 U | 0.00300 | 0.00050 U | 0.00040 U | 0.00060 U | 0.00050 U | 0.00030 U | 0.00200 U | 0.00060 U | 0.00060 U | 0.00040 U | 0.00060 U |
| | 8/12/2006 | Round 16 | 0.00060 U | 0.00040 U | 0.00200 | 0.00050 U | 0.00040 U | 0.00060 U | 0.00050 U | 0.00030 U | 0.00200 U | 0.00060 U | 0.00060 U | 0.00040 U | 0.00060 U |
| | 5/10/2007 | Round 17 (PDB) | 0.00028 U | 0.00021 U | 0.00130 | 0.00020 U | 0.00023 U | 0.00017 U | 0.00050 J | 0.00013 U | 0.00034 U | 0.00014 U | 0.00053 U | 0.00014 U | 0.00140 J |
| | 8/28/2007 | Round 18 | 0.00042 U | 0.00015 U | 0.00150 | 0.00014 U | 0.00010 U | 0.00040 U | 0.00044 U | 0.00014 U | 0.00026 U | 0.00014 U | 0.00040 U | 0.00028 U | 0.00180 J |
| | 2/1/2008 | Round 19 (PDB) | 0.00039 U | 0.00026 U | 0.00046 J | 0.00044 U | 0.00036 U | 0.00060 U | 0.00032 U | 0.00040 U | 0.00040 U | 0.00046 U | 0.00048 U | 0.00053 U | 0.00053 U |
| | 7/24/2008 | Round 20 (PDB) | 0.00054 U | 0.00034 U | 0.00170 | 0.00022 U | 0.00028 U | 0.00061 U | 0.00021 J | 0.00043 U | 0.00100 U | 0.00022 U | 0.00045 U | 0.00032 U | 0.00110 |
| | 1/14/2009 | Round 21 (PDB) | 0.00054 U | 0.00059 J | 0.00040 U | 0.00022 U | 0.00028 U | 0.00061 U | 0.03750 | 0.00043 U | 0.00100 U | 0.00025 J | 0.00440 | 0.01740 | 0.00031 J |
| | 7/16/2009 | Round 22 | 0.00540 U | 0.00034 U | 0.00040 U | 0.00022 U | 0.00028 U | 0.00061 U | 0.00020 U | 0.00043 U | 0.00100 U | 0.00022 U | 0.00045 U | 0.00032 U | 0.00030 U |
| | 1/13/2010 | Round 23 (PDB) | 0.00029 U | 0.00033 U | 0.00021 U | 0.00034 U | 0.00025 U | 0.00050 U | 0.00032 U | 0.00020 U | 0.00200 U | 0.00044 U | 0.00034 U | 0.00024 U | 0.00046 J |
| | 7/14/2010 | Round 24 (PDB) | 0.00029 U | 0.00033 U | 0.00021 U | 0.00034 U | 0.00025 U | 0.00050 U | 0.00032 U | 0.00020 U | 0.00200 U | 0.00044 U | 0.00034 U | 0.00024 U | 0.00040 J |
| | 1/12/2011 | Round 25 (PDB) | 0.00023 U | 0.00020 U | 0.00020 U | 0.00025 U | 0.00022 U | 0.00050 U | 0.00026 U | 0.00020 U | 0.00200 U | 0.00025 U | 0.00035 U | 0.00026 U | 0.00022 U |
| | 7/28/2011 | Round 26 | 0.00023 U | 0.00020 U | 0.00020 U | 0.00025 U | 0.00022 U | 0.00050 U | 0.00026 U | 0.00020 U | 0.00200 U | 0.00025 U | 0.00035 U | 0.00026 U | 0.00022 U |
| | 1/11/2012 | Round 27 (PDB) | 0.00023 U | 0.00020 U | 0.00020 U | 0.00025 U | 0.00022 U | 0.00050 U | 0.00026 U | 0.00020 U | 0.00200 U | 0.00025 U | 0.00035 U | 0.00026 U | 0.00022 U |
| | 7/12/2012 | Round 28 | 0.00023 U | 0.00020 U | 0.00020 U | 0.00025 U | 0.00022 U | 0.00050 U | 0.00026 U | 0.00020 U | NS | 0.00025 U | 0.00035 U | 0.00026 U | 0.00022 U |
| | 1/9/2013 | Round 29 (PDB) | 0.00020 U | 0.00022 U | 0.00021 U | 0.00031 U | 0.00026 U | 0.00050 U | 0.00024 U | 0.00029 U | 0.00200 U | 0.00032 U | 0.00023 U | 0.00031 U | 0.00044 U |
| | 7/18/2013 | Round 30 | 0.00020 U | 0.00022 U | 0.00021 U | 0.00031 U | 0.00026 U | 0.00050 U | 0.00024 U | 0.00029 U | 0.00200 U | 0.00032 U | 0.00023 U | 0.00031 U | 0.00044 U |
| | 2/24/2014 | Round 31 (PDB) | 0.00025 U | 0.00024 U | 0.00024 U | 0.00040 U | 0.00031 U | 0.00053 U | 0.00033 U | 0.00028 U | 0.00200 U | 0.00026 U | 0.00034 U | 0.0003 U | 0.00033 U |
| | 7/18/2014 | Round 32 | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.00100 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U |
| | 1/23/2015 | Round 33 (PDB) | 0.00025 U | 0.00025 U | 0.00025 U | 0.00025 U | 0.00025 U | 0.00025 U | 0.00025 U | 0.00025 U | 0.0005 U | 0.00025 U | 0.00025 U | 0.00025 U | 0.00025 U |
| | 7/27/2015 | Round 34 | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.00100 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U |
| | 1/23/2016 | Well Abandoned | | | | | | | | | | | | | |
| **60-01** | 3/18/1992 | Pre Round 1 | NA | NA | 0.00100 U | NA | NA | NA | NA | 0.00100 U | NA | NA | NA | NA | NA |
| | 8/6/1992 | Pre Round 1 | NA | NA | 0.00130 U | NA | NA | NA | NA | 0.00130 U | NA | NA | NA | NA | NA |
| | 8/6/1992 | Pre Round 1 | NA | NA | 0.00130 U | NA | NA | NA | NA | 0.00130 U | NA | NA | NA | NA | NA |
| | 6/15/1994 | Pre Round 1 | NA | NA | 0.00100 U | NA | NA | NA | NA | 0.00100 U | NA | NA | NA | NA | NA |
| | 12/6/1994 | Pre Round 1 | NA | NA | 0.00100 U | NA | NA | NA | NA | 0.00100 U | NA | NA | NA | NA | NA |
| | 6/12/1995 | Pre Round 1 | NA | NA | 0.00100 U | NA | NA | NA | NA | 0.00100 U | NA | NA | NA | NA | NA |
| | 7/11/1995 | Round 1 | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.01000 U | 0.00500 U | 0.00500 U | 0.01 000 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.01000 U |
| | 1/24/1996 | Round 1 | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.01000 U | NA | 0.00500 U | 0.00500 U | 0.00500 U | NA | 0.00500 U | 0.01000 U |
| | 5/8/1996 | Round 1 | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.01000 U | NA | 0.00500 U | 0.00500 U | 0.00500 U | NA | 0.00500 U | 0.01000 U |
| | 7/21/1996 | Round 1 | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.01000 U | NA | 0.00500 U | 0.00500 U | 0.00500 U | NA | 0.00061 J | 0.01000 U |
| | 10/4/1996 | Round 1 | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.01000 U | NA | 0.00500 U | 0.00500 U | 0.00500 U | NA | 0.00500 U | 0.01000 U |
| | 3/31/1998 | Round 2 | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U |
| | 9/14/1998 | Round 3 | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U |
| | 10/20/1998 | Well Abandoned | | | | | | | | | | | | | |
| **60-06** | 3/17/1992 | Pre Round 1 | NA | NA | 0.00100 U | NA | NA | NA | NA | 0.00100 U | NA | NA | NA | NA | NA |
| | 6/15/1994 | Pre Round 1 | NA | NA | 0.00100 U | NA | NA | NA | NA | 0.00100 U | NA | NA | NA | NA | NA |
| | 12/6/1994 | Pre Round 1 | NA | NA | 0.00100 U | NA | NA | NA | NA | 0.00100 U | NA | NA | NA | NA | NA |
| | 6/12/1995 | Pre Round 1 | NA | NA | 0.00100 U | NA | NA | NA | NA | 0.00100 U | NA | NA | NA | NA | NA |
| | 7/13/1995 | Round 1 | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.01000 U | 0.00500 U | 0.00500 U | 0.01000 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.01000 U |
| | 1/26/1996 | Round 1 | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.01000 U | NA | 0.00500 U | 0.00500 U | 0.00500 U | NA | 0.00500 U | 0.01000 U |
| | 5/9/1996 | Round 1 | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.01000 U | NA | 0.00500 U | 0.00500 U | 0.00500 U | NA | 0.00180 J | 0.01000 U |
| | 7/21/1996 | Round 1 | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.01000 U | NA | 0.00500 U | 0.00500 U | 0.00500 U | NA | 0.00170 J | 0.01000 U |
| | 10/4/1996 | Round 1 | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.01000 U | NA | 0.00500 U | 0.00500 U | 0.00500 U | NA | 0.00280 J | 0.01000 U |
| | 4/1/1998 | Round 2 | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00066 J | 0.00500 U |
| | NA | Well Abandoned | | | | | | | | | | | | | |
| **60-07** | 3/17/1992 | Pre Round 1 | NA | NA | 0.00100 U | NA | NA | NA | NA | 0.00340 | NA | NA | NA | NA | NA |
| | 6/15/1994 | Pre Round 1 | NA | NA | 0.00100 U | NA | NA | NA | NA | 0.00100 U | NA | NA | NA | NA | NA |
| | 12/6/1994 | Pre Round 1 | NA | NA | 0.00100 U | NA | NA | NA | NA | 0.00100 U | NA | NA | NA | NA | NA |
| | 6/12/1995 | Pre Round 1 | NA | NA | 0.00100 U | NA | NA | NA | NA | 0.00100 U | NA | NA | NA | NA | NA |
| | 7/13/1995 | Round 1 | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.01000 U | 0.00500 U | 0.00500 U | 0.01000 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.01000 U |
| | 1/26/1996 | Round 1 | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.01000 U | NA | 0.00500 U | 0.00540 U | 0.00500 U | NA | 0.00500 U | 0.01000 U |
| | 5/9/1996 | Round 1 | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.01000 U | NA | 0.00500 U | 0.00500 U | 0.00500 U | NA | 0.00500 U | 0.01000 U |
| | 7/21/1996 | Round 1 | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.01000 U | NA | 0.00500 U | 0.00500 U | 0.00500 U | NA | 0.00500 U | 0.01000 U |
| | 10/4/1996 | Round 1 | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.01000 U | NA | 0.00500 U | 0.00500 U | 0.00500 U | NA | 0.00500 U | 0.01000 U |
| | 4/1/1998 | Round 2 | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U |
| | NA | Well Abandoned | | | | | | | | | | | | | |

**Table 4-1B**

**Summary of Chemicals of Concern Detected in Groundwater**
**Historical Monitoring Wells — SWMUs 79/136 Central Plumes**
**2016 RAER**
**Former NAS Dallas, Texas**
**Page 6 of 7**

| Monitoring Well | Sampling Date | Sampling Round | Chemicals of Concern (mg/L) | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | 1,1-Dichloroethene | 1,2-Dichloroethane | Benzene | Carbon Tetrachloride | Chloroform | Chloromethane | cis-1,2-Dichloroethene | Ethylbenzene | Methylene Chloride | Tetrachloroethene | trans-1,2-Dichloroethene | Trichloroethene | Vinyl Chloride |
| **Protective Concentration Levels (mg/L)** | | | **0.00700** | **0.00500** | **0.00500** | **0.00500** | **0.24000** | **0.07000** | **0.07000** | **0.70000** | **0.00500** | **0.00500** | **0.10000** | **0.00500** | **0.00200** |
| **60-16** | 3/19/1992 | Pre Round 1 | NA | NA | 0.00510 | NA | NA | NA | NA | 0.00110 | NA | NA | NA | NA | NA |
| | 6/16/1994 | Pre Round 1 | NA | NA | 0.00200 | NA | NA | NA | NA | 0.00100 U | NA | NA | NA | NA | NA |
| | 12/7/1994 | Pre Round 1 | NA | NA | 0.00100 U | NA | NA | NA | NA | 0.00100 U | NA | NA | NA | NA | NA |
| | 6/12/1995 | Pre Round 1 | NA | NA | 0.00350 | NA | NA | NA | NA | 0.00100 U | NA | NA | NA | NA | NA |
| | 7/11/1995 | Pre Round 1 | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.01000 U | 0.00500 U | 0.00500 U | 0.01710 | 0.00500 U | 0.00500 U | 0.00500 U | 0.01000 U |
| | 1/23/1996 | Pre Round 1 | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.01000 U | NA | 0.00500 U | 0.00500 U | 0.00500 U | NA | 0.00500 U | 0.01000 U |
| | 5/2/1996 | Pre Round 1 | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.01000 U | NA | 0.00500 U | 0.00500 U | 0.00500 U | NA | 0.00500 U | 0.01000 U |
| | 7/16/1996 | Pre Round 1 | 0.00500 U | 0.00500 U | 0.00140 J | 0.00500 U | 0.00500 U | 0.01000 U | NA | 0.00500 U | 0.00500 U | 0.00500 U | NA | 0.00500 U | 0.01000 U |
| | 10/3/1996 | Round 1 | 0.00500 U | 0.00500 U | 0.00190 J | 0.00500 U | 0.00500 U | 0.01000 U | NA | 0.00500 U | 0.00500 U | 0.00500 U | NA | 0.00500 U | 0.01000 U |
| | 4/1/1998 | Round 2 | 0.00500 U | 0.00500 U | 0.00220 J | 0.00500 U | 0.00500 U | 0.00500 U | 0.02600 | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U |
| | 9/14/1998 | Round 3 | 0.00500 U | 0.00500 U | 0.00290 J | 0.00500 U | 0.00500 U | 0.00500 U | 0.02300 | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U |
| | 3/27/1999 | Round 4 | 0.00500 U | 0.00500 U | 0.00340 J | 0.00500 U | 0.00500 U | 0.00500 U | 0.02900 | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U |
| | 9/20/1999 | Round 5 | 0.00500 U | 0.00500 U | 0.00520 | 0.00500 U | 0.00500 U | 0.00500 U | 0.04200 | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U |
| | 6/28/2000 | Round 6 | 0.00500 U | 0.00500 U | 0.00600 | 0.00500 U | 0.00500 U | 0.00500 U | 0.04400 | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U |
| | 7/9/2001 | Round 7 | 0.00500 U | 0.00500 U | 0.00200 J | 0.00500 U | 0.00500 U | 0.01000 U | 0.01200 | 0.00500 U | 0.00500 U | 0.00500 U | 0.00250 U | 0.00500 U | 0.01000 U |
| | 1/11/2003 | Round 8 | 0.00100 U | 0.00100 U | 0.00120 | 0.00100 U | 0.00100 U | 0.00100 U | 0.00840 | NA | 0.00200 U | 0.00100 U | 0.00100 U | 0.00100 U | 0.00100 U |
| | NA | Well Destroyed | | | | | | | | | | | | | |
| **60-17** | 3/19/1992 | Pre Round 1 | NA | NA | 0.00100 U | NA | NA | NA | NA | 0.00100 U | NA | NA | NA | NA | NA |
| | 6/16/1994 | Pre Round 1 | NA | NA | 0.00100 U | NA | NA | NA | NA | 0.00100 U | NA | NA | NA | NA | NA |
| | 12/7/1994 | Pre Round 1 | NA | NA | 0.00100 U | NA | NA | NA | NA | 0.00100 U | NA | NA | NA | NA | NA |
| | 6/12/1995 | Pre Round 1 | NA | NA | 0.00100 U | NA | NA | NA | NA | 0.00100 U | NA | NA | NA | NA | NA |
| | 7/12/1995 | Pre Round 1 | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.01000 U | 0.00500 U | 0.00500 U | 0.01880 | 0.00500 U | 0.00500 U | 0.00500 U | 0.01000 U |
| | 1/23/1996 | Pre Round 1 | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.01000 U | NA | 0.00500 U | 0.00500 U | 0.00500 U | NA | 0.00500 U | 0.01000 U |
| | 5/3/1996 | Pre Round 1 | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.01000 U | NA | 0.00500 U | 0.00500 U | 0.00500 U | NA | 0.00500 U | 0.01000 U |
| | 7/16/1996 | Pre Round 1 | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.01000 U | NA | 0.00500 U | 0.00500 U | 0.00500 U | NA | 0.00500 U | 0.01000 U |
| | 10/4/1996 | Round 1 | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.01000 U | NA | 0.00500 U | 0.00500 U | 0.00500 U | NA | 0.00500 U | 0.01000 U |
| | 4/1/1998 | Round 2 | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U |
| | 3/27/1999 | Round 4 | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.12000 | 0.00500 U | 0.00500 U | 0.00500 U | 0.00071 J | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U |
| | 9/21/1999 | Round 5 | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.05500 | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U |
| | 6/28/2000 | Round 6 | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00300 J | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U |
| | 7/9/2001 | Round 7 | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00560 | 0.01000 U | 0.00250 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00250 U | 0.00500 U | 0.01000 U |
| | 1/7/2003 | Round 8 | 0.00100 U | 0.00100 U | 0.00100 U | 0.00100 U | 0.00100 U | 0.00100 U | 0.00100 U | NA | 0.00200 U | 0.00100 U | 0.00100 U | 0.00100 U | 0.00100 U |
| | 12/22/2003 | Round 10 | 0.00021 U | 0.00009 U | 0.00011 U | 0.00020 U | 0.00014 U | 0.00008 U | 0.00016 U | 0.00011 U | 0.00016 U | 0.00024 U | 0.00019 U | 0.00010 U | 0.00017 U |
| | 10/15/2004 | Round 12 (PDB) | 0.00035 U | 0.00010 U | 0.00025 U | 0.00025 U | 0.00010 U | 0.00017 U | 0.00027 U | 0.00017 U | 0.00040 U | 0.00021 U | 0.00023 U | 0.00022 U | 0.00017 U |
| | 4/18/2005 | Well Abandoned | | | | | | | | | | | | | |
| **60-18** | 3/19/1992 | Pre Round 1 | NA | NA | 0.00100 U | NA | NA | NA | NA | 0.00100 U | NA | NA | NA | NA | NA |
| | 6/16/1994 | Pre Round 1 | NA | NA | 0.00100 U | NA | NA | NA | NA | 0.00100 U | NA | NA | NA | NA | NA |
| | 12/7/1994 | Pre Round 1 | NA | NA | 0.00100 U | NA | NA | NA | NA | 0.00100 U | NA | NA | NA | NA | NA |
| | 6/12/1995 | Pre Round 1 | NA | NA | 0.00100 U | NA | NA | NA | NA | 0.00100 U | NA | NA | NA | NA | NA |
| | 7/12/1995 | Pre Round 1 | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.01000 U | 0.00500 U | 0.00500 U | 0.02000 | 0.00500 U | 0.00500 U | 0.00500 U | 0.01000 U |
| | 1/23/1996 | Pre Round 1 | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.01000 U | NA | 0.00500 U | 0.00500 U | 0.00500 U | NA | 0.00500 U | 0.01000 U |
| | 5/6/1996 | Pre Round 1 | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.01000 U | NA | 0.00500 U | 0.00500 U | 0.00500 U | NA | 0.00500 U | 0.01000 U |
| | 7/22/1996 | Pre Round 1 | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.01000 U | NA | 0.00500 U | 0.00500 U | 0.00500 U | NA | 0.00500 U | 0.01000 U |
| | 10/3/1996 | Round 1 | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.01000 U | NA | 0.00500 U | 0.00500 U | 0.00500 U | NA | 0.00500 U | 0.01000 U |
| | 4/1/1998 | Round 2 | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U |
| | 9/14/1998 | Round 3 | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U |
| | 3/27/1999 | Round 4 | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U |
| | 9/21/1999 | Round 5 | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00630 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U |
| | 6/28/2000 | Round 6 | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U |
| | 7/9/2001 | Round 7 | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.01000 U | 0.00250 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00250 U | 0.00500 U | 0.01000 U |
| | 1/9/2003 | Round 8 | 0.00100 U | 0.00100 U | 0.00100 U | 0.00100 U | 0.00100 U | 0.00100 U | 0.00100 U | NA | 0.00200 U | 0.00100 U | 0.00100 U | 0.00100 U | 0.00100 U |
| | 12/22/2003 | Round 10 | 0.00021 U | 0.00009 U | 0.00011 U | 0.00020 U | 0.00014 U | 0.00008 U | 0.00016 U | 0.00011 U | 0.00016 U | 0.00024 U | 0.00019 U | 0.00010 U | 0.00017 U |
| | 10/15/2004 | Round 12 (PDB) | 0.00035 U | 0.00010 U | 0.00025 U | 0.00025 U | 0.00010 U | 0.00017 U | 0.00027 U | 0.00017 U | 0.00040 U | 0.00021 U | 0.00023 U | 0.00022 U | 0.00017 U |
| | 4/18/2005 | Well Abandoned | | | | | | | | | | | | | |

**Table 4-1B**

**Summary of Chemicals of Concern Detected in Groundwater**
**Historical Monitoring Wells — SWMUs 79/136 Central Plumes**
**2016 RAER**
**Former NAS Dallas, Texas**
**Page 7 of 7**

| Monitoring Well | Sampling Date | Sampling Round | Chemicals of Concern (mg/L) | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | 1,1-Dichloroethene | 1,2-Dichloroethane | Benzene | Carbon Tetrachloride | Chloroform | Chloromethane | cis-1,2-Dichloroethene | Ethylbenzene | Methylene Chloride | Tetrachloroethene | trans-1,2-Dichloroethene | Trichloroethene | Vinyl Chloride |
| **Protective Concentration Levels (mg/L)** | | | **0.00700** | **0.00500** | **0.00500** | **0.00500** | **0.24000** | **0.07000** | **0.07000** | **0.70000** | **0.00500** | **0.00500** | **0.10000** | **0.00500** | **0.00200** |
| **508G01MW** | 6/7/2000 | Well Installed | | | | | | | | | | | | | |
| | 6/7/2000 | Round 6 | 0.00050 U | 0.00050 U | 0.00050 U | 0.00050 U | 0.00050 U | 0.00100 U | 0.00050 U | 0.00050 U | 0.00200 U | 0.00050 U | 0.00050 U | 0.00050 U | 0.00050 U |
| | 7/14/2001 | Round 7 | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.01000 U | 0.00250 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00250 U | 0.00500 U | 0.01000 U |
| | 9/26/2002 | ASA 5R4 | 0.00100 U | 0.00100 U | 0.00100 U | 0.00100 U | 0.00030 J | 0.00100 U | 0.00100 U | NA | 0.00200 U | 0.00100 U | 0.00100 U | 0.00100 U | 0.00100 U |
| | 12/21/2003 | Round 10 | 0.00021 U | 0.00009 U | 0.00011 U | 0.00020 U | 0.00014 U | 0.00008 U | 0.00016 U | 0.00011 U | 0.00016 U | 0.00024 U | 0.00019 U | 0.00010 U | 0.00017 U |
| | 10/14/2004 | Round 12 | 0.00035 U | 0.00010 U | 0.00025 U | 0.00025 U | 0.00050 J | 0.00017 U | 0.00027 U | 0.00082 J | 0.00040 U | 0.00021 U | 0.00023 U | 0.00022 U | 0.00017 U |
| | 10/19/2005 | Round 14 | 0.00040 U | 0.00030 U | 0.00030 U | 0.00030 U | 0.00040 U | 0.00030 U | 0.00030 U | 0.00020 U | 0.00200 U | 0.00040 U | 0.00030 U | 0.00030 U | 0.00030 U |
| | 5/7/2006 | Round 15 | 0.00060 U | 0.00040 U | 0.00050 U | 0.00050 U | 0.00060 J | 0.00060 U | 0.00050 U | 0.00030 U | 0.00200 U | 0.00060 U | 0.00060 U | 0.00100 J | 0.00060 U |
| | 8/12/2006 | Round 16 | 0.00060 U | 0.00040 U | 0.00050 U | 0.00050 U | 0.00040 U | 0.00060 U | 0.00050 U | 0.00030 U | 0.00200 U | 0.00060 U | 0.00060 U | 0.00050 J | 0.00060 U |
| | 4/28/2007 | Round 17 | 0.00013 U | 0.00013 U | 0.00012 U | 0.00011 U | 0.00013 U | 0.00028 U | 0.00014 U | 0.00035 U | 0.00023 U | 0.00010 U | 0.00015 U | 0.00023 U | 0.00020 U |
| | 8/28/2007 | Round 18 | 0.00042 U | 0.00015 U | 0.00011 U | 0.00014 U | 0.00010 U | 0.00040 U | 0.00044 U | 0.00014 U | 0.00026 U | 0.00014 U | 0.00040 U | 0.00028 U | 0.00019 U |
| | 1/20/2008 | Round 19 | 0.00039 U | 0.00026 U | 0.00039 U | 0.00044 U | 0.00036 U | 0.00060 U | 0.00032 U | 0.00040 U | 0.00040 U | 0.00046 U | 0.00048 U | 0.00053 U | 0.00043 U |
| | 7/24/2008 | Round 20 | 0.00054 U | 0.00034 U | 0.00040 U | 0.00022 U | 0.00028 U | 0.00061 U | 0.00020 U | 0.00043 U | 0.00100 U | 0.00022 U | 0.00045 U | 0.00032 U | 0.00030 U |
| | 1/14/2009 | Round 21 (PDB) | 0.00054 U | 0.00034 U | 0.00040 U | 0.00022 U | 0.00028 U | 0.00061 U | 0.00020 U | 0.00043 U | 0.00100 U | 0.00022 U | 0.00045 U | 0.00032 U | 0.00030 U |
| | 7/16/2009 | Round 22 | 0.00540 U | 0.00034 U | 0.00040 U | 0.00022 U | 0.00028 U | 0.00061 U | 0.00020 U | 0.00043 U | 0.00100 U | 0.00022 U | 0.00045 U | 0.00032 U | 0.00030 U |
| | 1/13/2010 | Round 23 (PDB) | 0.00029 U | 0.00033 U | 0.00021 U | 0.00034 U | 0.00025 U | 0.00050 U | 0.00032 U | 0.00020 U | 0.00200 U | 0.00044 U | 0.00034 U | 0.00024 U | 0.00028 U |
| | 7/14/2010 | Round 24 (PDB) | 0.00029 U | 0.00033 U | 0.00021 U | 0.00034 U | 0.00025 U | 0.00050 U | 0.00032 U | 0.00020 U | 0.00200 U | 0.00044 U | 0.00034 U | 0.00024 U | 0.00028 U |
| | 1/12/2011 | Round 25 | 0.00023 U | 0.00020 U | 0.00020 U | 0.00025 U | 0.00022 U | 0.00050 U | 0.00026 U | 0.00020 U | 0.00200 U | 0.00025 U | 0.00035 U | 0.00026 U | 0.00022 U |
| | 7/28/2011 | Round 26 | 0.00023 U | 0.00020 U | 0.00020 U | 0.00025 U | 0.00022 U | 0.00050 U | 0.00026 U | 0.00020 U | 0.00200 U | 0.00025 U | 0.00035 U | 0.00026 U | 0.00022 U |
| | 1/11/2012 | Round 27 | 0.00023 U | 0.00025 U | 0.00020 U | 0.00025 U | 0.00022 U | 0.00050 U | 0.00026 U | 0.00020 U | 0.00200 U | 0.00025 U | 0.00020 U | 0.00026 U | 0.00022 U |
| | 7/12/2012 | Round 28 | 0.00023 U | 0.00020 U | 0.00020 U | 0.00025 U | 0.00022 U | 0.00050 U | 0.00026 U | 0.00020 U | NS | 0.00025 U | 0.00035 U | 0.00026 U | 0.00022 U |
| | 1/9/2013 | Round 29 | 0.00020 U | 0.00022 U | 0.00021 U | 0.00031 U | 0.00026 U | 0.00050 U | 0.00024 U | 0.00029 U | 0.00200 U | 0.00032 U | 0.00023 U | 0.00031 U | 0.00044 U |
| | 7/18/2013 | Round 30 | 0.00020 U | 0.00022 U | 0.00021 U | 0.00031 U | 0.00026 U | 0.00050 U | 0.00024 U | 0.00029 U | 0.00200 U | 0.00032 U | 0.00023 U | 0.00031 U | 0.00044 U |
| | 2/24/2014 | Round 31 (PDB) | 0.00025 U | 0.00024 U | 0.00024 U | 0.00040 U | 0.00031 U | 0.00053 U | 0.00033 U | 0.00028 U | 0.00200 U | 0.00026 U | 0.00034 U | 0.0003 U | 0.00033 U |
| | 7/21/2014 | Round 32 | 0.00025 U | 0.00025 U | 0.00025 U | 0.00025 U | 0.00025 U | 0.00025 U | 0.00025 U | 0.00025 U | 0.0005 U | 0.00025 U | 0.00025 U | 0.00025 U | 0.00025 U |
| | 1/26/2015 | Round 33 | 0.00050 U | 0.00050 U | 0.00050 U | 0.00050 U | 0.00050 U | 0.00050 U | 0.00050 U | 0.00050 U | 0.001 U | 0.00050 U | 0.00050 U | 0.00050 U | 0.00050 U |
| | 7/27/2015 | Round 34 | 0.00025 U | 0.00025 U | 0.00025 U | 0.00025 U | 0.00025 U | 0.00025 U | 0.00025 U | 0.00025 U | 0.0005 U | 0.00025 U | 0.00025 U | 0.00025 U | 0.00025 U |
| | 1/23/2016 | Well Abandoned | | | | | | | | | | | | | |

mg/L - milligrams per liter
NA - Not Applicable
NS - Not Sampled
NS-D - Not Sampled during this round due to insufficient water in the monitoring well
PDB - Passive Diffusion Bag
SDG - Sample Delivery Group
PCLE - Protective Concentration Level Exceedance

Note:
Shaded areas indicate an exceedance.

Analytical Result Qualifiers:
J - Indicates that the chemical was detected. However, the associated numerical result may not be a precise representation of the amount that is actually present in the sample. The laboratory reported concentration is considered to be an estimate of the true concentration.
U - Indicates that the chemical was not detected at the numerical detection limit (sample-specific quantitation limit) noted. Nondetected results from the laboratory are reported in this manner. This qualifier is added to a positive result (reported by the laboratory) if the detected concentration is determined to be attributable to contamination introduced during field sampling or laboratory analysis.
UJ - Indicates that the chemical was not detected. However, the detection limit (sample-specific quantitation limit) is considered to be estimated based on problems encountered during laboratory analysis. The associated numerical detection limit is regarded as inaccurate or imprecise.

# TABLE 4-2
# SUMMARY OF GEOCHEMICAL PARAMETERS MEASURED IN GROUNDWATER

**Table 4-2A**

**Summary of Groundwater Gauging Data**
**Long Term Monitoring Wells — SWMUs 79/136 Central Plume**
**2016 RAER**
**Former NAS Dallas, Texas**
**Page 1 of 9**

| Monitoring Well | Top of Casing[1] (ft msl) | Screened Interval (ft msl) | Date | Depth to Water[2] (ft bgs) | Groundwater Elevation (ft msl) |
|---|---|---|---|---|---|
| **Corrective Action Observation Monitoring Wells** | | | | | |
| **50803MW/ 508F49MW** | 464.41 | 450.64 to 440.64 | 2/1/1998 | 8.27 | 456.14 |
| | | | 5/1/1998 | 8.37 | 456.04 |
| | | | 8/1/1998 | 10.05 | 454.36 |
| | | | 2/1/1999 | 9.07 | 455.34 |
| | | | 9/1/1999 | 9.50 | 454.91 |
| | | | 6/1/2000 | 8.06 | 456.35 |
| | | | 6/1/2001 | 8.90 | 455.51 |
| | | | 12/2/2002 | 10.07 | 454.34 |
| | | | 8/3/2004 | 10.16 | 454.25 |
| | | | 1/7/2004 | Well Plugged and Abandoned/Replaced by 508F48 MW | |
| | 464.27 | 449.82 to 439.82 | 3/12/2002 | Well Installed | |
| | | | 12/1/2003 | 10.49 | 453.78 |
| | | | 12/1/2004 | 8.30 | 455.97 |
| | | | 9/1/2004 | 11.01 | 453.26 |
| | 464.27 | 449.82 to 439.82 | 4/17/2005 | 10.95 | 453.32 |
| | | | 7/19/2005 | 11.12 | 453.15 |
| | | | 10/5/2005 | 11.98 | 452.29 |
| | | | 1/21/2006 | 12.71 | 451.56 |
| | | | 5/3/2006 | 11.48 | 452.79 |
| | | | 8/8/2006 | 12.09 | 452.18 |
| | | | 4/25/2007 | 11.99 | 452.28 |
| | | | 8/24/2007 | 10.95 | 453.32 |
| | | | 1/15/2008 | 11.53 | 452.74 |
| | | | 7/10/2008 | 12.00 | 452.27 |
| | | | 12/18/2008 | 10.29 | 453.98 |
| | | | 7/15/2009 | 9.63 | 454.64 |
| | 462.56 | 448.11 to 438.11 | 12/15/2009 | 8.67 | 453.89 |
| | | | 8/9/2010 | 9.12 | 453.44 |
| | | | 12/17/2010 | 9.74 | 452.82 |
| | | | 7/25/2011 | 9.48 | 453.08 |
| | | | 12/14/2011 | 9.35 | 453.21 |
| | | | 7/12/2012 | 9.88 | 452.68 |
| | | | 12/19/2012 | 10.90 | 451.66 |
| | | | 7/15/2013 | 10.25 | 452.31 |
| | | | 12/18/2013 | 9.30 | 453.26 |
| | | | 7/15/2014 | 10.08 | 452.48 |
| | | | 12/17/2014 | 10.71 | 451.85 |
| | | | 7/20/2015 | 9.10 | 453.46 |
| | | | 12/17/2015 | 9.27 | 453.29 |
| | | | 7/18/2016 | 9.34 | 453.22 |

**Table 4-2A**

**Summary of Groundwater Gauging Data**
**Long Term Monitoring Wells — SWMUs 79/136 Central Plume**
**2016 RAER**
**Former NAS Dallas, Texas**
**Page 2 of 9**

| Monitoring Well | Top of Casing[1] (ft msl) | Screened Interval (ft msl) | Date | Depth to Water[2] (ft bgs) | Groundwater Elevation (ft msl) |
|---|---|---|---|---|---|
| 508F51MW | 466.99 | 455.67 to 445.67 | 9/15/2004 | Well Installed | |
| | | | 9/29/2004 | 7.42 | 459.57 |
| | 466.55 | 455.23 to 445.23 | 4/17/2005 | 3.15 | 463.40 |
| | | | 7/19/2005 | 4.72 | 461.83 |
| | | | 10/5/2005 | 6.43 | 460.12 |
| | | | 1/21/2006 | 8.54 | 458.01 |
| | | | 5/2/2006 | 8.19 | 458.36 |
| | | | 8/9/2006 | 7.01 | 459.54 |
| | | | 4/25/2007 | 6.37 | 460.18 |
| | | | 8/22/2007 | 5.42 | 461.13 |
| | | | 1/15/2008 | 8.04 | 458.51 |
| | | | 7/10/2008 | 7.25 | 459.30 |
| | | | 12/18/2008 | 10.32 | 456.23 |
| | | | 7/14/2009 | 7.36 | 459.19 |
| | 466.55 | 455.23 to 445.23 | 12/15/2009 | 4.96 | 461.59 |
| | | | 8/9/2010 | 6.67 | 459.88 |
| | | | 12/17/2010 | 5.91 | 460.64 |
| | | | 7/25/2011 | 6.65 | 459.90 |
| | | | 12/14/2011 | 6.28 | 460.27 |
| | | | 7/12/2012 | 6.65 | 459.90 |
| | | | 12/19/2012 | 7.44 | 459.11 |
| | | | 7/15/2013 | 8.39 | 458.16 |
| | | | 12/18/2013 | 7.67 | 458.88 |
| | | | 7/15/2014 | 8.31 | 458.24 |
| | | | 12/17/2014 | 8.84 | 457.71 |
| | | | 7/20/2015 | 6.52 | 460.03 |
| | | | 12/17/2015 | 6.86 | 459.69 |
| | | | 7/18/2016 | 6.34 | 460.21 |

**Table 4-2A**

**Summary of Groundwater Gauging Data**
**Long Term Monitoring Wells — SWMUs 79/136 Central Plume**
**2016 RAER**
**Former NAS Dallas, Texas**
**Page 3 of 9**

| Monitoring Well | Top of Casing[1] (ft msl) | Screened Interval (ft msl) | Date | Depth to Water[2] (ft bgs) | Groundwater Elevation (ft msl) |
|---|---|---|---|---|---|
| 508F52MW | 464.39 | 450.97 to 440.97 | 9/15/2004 | Well Installed | |
| | | | 9/29/2004 | 10.76 | 453.63 |
| | 464.05 | 450.63 to 440.63 | 9/29/2004 | 11.35 | 452.70 |
| | | | 7/19/2005 | 10.99 | 453.06 |
| | | | 10/5/2005 | 11.86 | 452.19 |
| | | | 1/21/2006 | 12.57 | 451.48 |
| | | | 5/3/2006 | 12.07 | 451.98 |
| | | | 8/8/2006 | 12.06 | 451.99 |
| | | | 4/25/2007 | 11.66 | 452.39 |
| | | | 8/24/2007 | 11.01 | 453.04 |
| | | | 1/15/2008 | 11.59 | 452.46 |
| | | | 7/10/2008 | 11.33 | 452.72 |
| | | | 12/18/2008 | 10.31 | 453.74 |
| | | | 7/15/2009 | 11.02 | 453.03 |
| | 463.63 | 450.21 to 440.21 | 12/15/2009 | 9.70 | 453.93 |
| | | | 8/9/2010 | 10.41 | 453.22 |
| | | | 12/17/2010 | 10.59 | 453.04 |
| | | | 7/25/2011 | 10.59 | 453.04 |
| | | | 12/14/2011 | 10.52 | 453.11 |
| | | | 7/12/2012 | 10.76 | 452.87 |
| | | | 12/19/2012 | 11.51 | 452.12 |
| | | | 7/15/2013 | 11.20 | 452.43 |
| | | | 12/18/2013 | 10.61 | 453.02 |
| | | | 7/15/2014 | 11.40 | 452.23 |
| | | | 12/17/2014 | 11.70 | 451.93 |
| | | | 7/20/2015 | 9.99 | 453.64 |
| | | | 12/17/2015 | 10.14 | 453.49 |
| | | | 7/188/2016 | 10.53 | 453.10 |
| 508G02MW | 463.93 | 449.93 to 439.93 | 6/1/2000 | Well Installed | |
| | | | 6/1/2001 | NA | NA |
| | | | 12/14/2002 | NA | NA |
| | | | 8/1/2003 | 9.86 | 454.08 |
| | | | 12/23/2003 | 10.04 | 453.90 |
| | | | 7/4/2004 | 7.79 | 456.15 |
| | | | 9/29/2004 | 10.82 | 453.11 |
| | 463.88 | 449.88 to 439.88 | 4/17/2005 | 10.32 | 453.56 |
| | | | 7/19/2005 | 10.87 | 453.01 |
| | | | 10/5/2005 | 11.56 | 452.32 |
| | | | 1/21/2006 | 12.58 | 451.30 |
| | | | 5/3/2006 | 11.13 | 452.75 |
| | | | 8/8/2006 | 12.05 | 451.83 |
| | | | 4/25/2007 | 10.55 | 453.33 |
| | | | 8/22/2007 | 10.45 | 453.43 |
| | | | 1/15/2008 | 11.16 | 452.72 |
| | | | 7/24/2008 | 11.13 | 452.75 |
| | | | 12/18/2008 | 10.79 | 453.09 |
| | | | 7/15/2009 | NM | NM |
| | | | 12/15/2009 | NM | NM |
| | | | 8/9/2010 | NM | NM |
| | | | 12/17/2010 | NM | NM |
| | | | 7/25/2011 | NM | NM |
| | | | 12/14/2011 | 9.55 | NM |
| | | | 7/12/2012 | NM | NM |
| | | | 12/19/2012 | NM | NM |
| | | | 7/15/2013 | NM | NM |
| | | | 12/18/2013 | NM | NM |
| | | | 7/15/2014 | 10.21 | 453.67 |
| | | | 12/17/2014 | NM | NM |
| | | | 7/20/2015 | 9.30 | 454.58 |
| | | | 12/17/2015 | 9.35 | 454.53 |
| | | | 7/18/2016 | 9.56 | 454.32 |

**Table 4-2A**

**Summary of Groundwater Gauging Data**
**Long Term Monitoring Wells — SWMUs 79/136 Central Plume**
**2016 RAER**
**Former NAS Dallas, Texas**
**Page 4 of 9**

| Monitoring Well | Top of Casing[1] (ft msl) | Screened Interval (ft msl) | Date | Depth to Water[2] (ft bgs) | Groundwater Elevation (ft msl) |
|---|---|---|---|---|---|
| 508G03MW | 462.09 | 448.09 to 438.09 | 6/1/2000 | Well Installed | |
| | | | 6/1/2001 | NA | NA |
| | | | 12/14/2002 | NA | NA |
| | | | 8/1/2003 | 7.99 | 454.10 |
| | | | 12/23/2003 | 8.21 | 453.88 |
| | | | 7/4/2004 | NA | NA |
| | | | 9/29/2004 | 8.81 | 453.28 |
| | 462.04 | 448.04 to 438.04 | 4/17/2005 | 8.23 | 453.81 |
| | | | 7/19/2005 | 8.94 | 453.10 |
| | | | 10/5/2005 | 9.65 | 452.39 |
| | | | 1/21/2006 | 10.76 | 451.28 |
| | | | 5/3/2006 | 9.15 | 452.89 |
| | | | 8/8/2006 | 10.02 | 452.02 |
| | | | 4/25/2007 | 8.55 | 453.49 |
| | | | 8/22/2007 | 8.41 | 453.63 |
| | | | 1/15/2008 | 9.22 | 452.82 |
| | | | 7/24/2008 | 9.18 | 452.86 |
| | | | 12/18/2008 | 11.03 | 451.01 |
| | | | 7/15/2009 | NM | NM |
| | 462.06 | 448.06 to 438.06 | 12/15/2009 | NM | NM |
| | | | 8/9/2010 | NM | NM |
| | | | 12/17/2010 | NM | NM |
| | | | 7/25/2011 | NM | NM |
| | | | 12/14/2011 | 8.80 | NM |
| | | | 7/12/2012 | NM | NM |
| | | | 12/19/2012 | NM | NM |
| | | | 7/15/2013 | NM | NM |
| | | | 12/18/2013 | NM | NM |
| | | | 7/15/2014 | 9.81 | 452.25 |
| | | | 12/17/2014 | NM | NM |
| | | | 7/20/2015 | 8.60 | 453.46 |
| | | | 12/17/2015 | 8.80 | 453.26 |
| | | | 7/18/2016 | 8.76 | 453.30 |

**Table 4-2A**

**Summary of Groundwater Gauging Data**
**Long Term Monitoring Wells — SWMUs 79/136 Central Plume**
**2016 RAER**
**Former NAS Dallas, Texas**
**Page 5 of 9**

| Monitoring Well | Top of Casing[1] (ft msl) | Screened Interval (ft msl) | Date | Depth to Water[2] (ft bgs) | Groundwater Elevation (ft msl) |
|---|---|---|---|---|---|
| 508G04MW/ 508F53MW | 463.02 | 449.02 to 439.02 | 6/1/2001 | NA | NA |
| | | | 12/2/2002 | NM | NM |
| | | | 8/3/2004 | NA | NA |
| | | | 12/23/2003 | NA | NA |
| | | | 7/4/2004 | NA | NA |
| | | | 9/28/2004 | NA | NA |
| | | | 4/18/2005 | Well Plugged and Abandoned | |
| | 463.55 | 449.18 to 439.18 | 9/15/2004 | Well Installed | |
| | | | 9/29/2004 | 9.83 | 453.72 |
| | 463.38 | 449.01 to 439.01 | 4/17/2005 | 9.37 | 454.01 |
| | | | 7/19/2005 | 10.21 | 453.17 |
| | | | 10/5/2005 | 10.92 | 452.46 |
| | | | 1/21/2006 | 12.01 | 451.37 |
| | | | 5/3/2006 | 10.43 | 452.95 |
| | | | 8/8/2006 | 11.38 | 452.00 |
| | | | 4/25/2007 | 9.81 | 453.57 |
| | | | 8/24/2007 | 9.71 | 453.67 |
| | | | 1/15/2008 | 10.50 | 452.88 |
| | | | 7/10/2008 | 10.52 | 452.86 |
| | | | 1/14/2009 | 10.58 | 452.80 |
| | | | 7/15/2009 | 10.15 | 453.23 |
| | 462.53 | 448.16 to 438.16 | 12/15/2009 | 8.55 | 453.98 |
| | | | 8/9/2010 | 9.03 | 453.50 |
| | | | 12/17/2010 | 9.74 | 452.79 |
| | | | 7/25/2011 | 9.42 | 453.11 |
| | | | 12/14/2011 | 9.26 | 453.27 |
| | | | 7/12/2012 | 9.85 | 452.68 |
| | | | 12/19/2012 | 10.90 | 451.63 |
| | | | 7/15/2013 | 10.27 | 452.26 |
| | | | 12/18/2013 | 9.47 | 453.06 |
| | | | 7/15/2014 | 10.39 | 452.14 |
| | | | 12/17/2014 | 10.92 | 451.61 |
| | | | 7/20/2015 | 9.05 | 453.48 |
| | | | 12/17/2015 | 9.22 | 453.31 |
| | | | 7/18/2016 | 9.50 | 453.03 |

**Table 4-2A**

**Summary of Groundwater Gauging Data**
**Long Term Monitoring Wells — SWMUs 79/136 Central Plume**
**2016 RAER**
**Former NAS Dallas, Texas**
**Page 6 of 9**

| Monitoring Well | Top of Casing[1] (ft msl) | Screened Interval (ft msl) | Date | Depth to Water[2] (ft bgs) | Groundwater Elevation (ft msl) |
|---|---|---|---|---|---|
| 60-21 | 472.61 | 461.33 to 446.33 | 2/1/1998 | 7.28 | 465.33 |
| | | | 5/1/1998 | 7.66 | 464.95 |
| | | | 8/1/1998 | 8.88 | 463.73 |
| | | | 2/1/1999 | 8.00 | 464.61 |
| | | | 9/1/1999 | 8.89 | 463.72 |
| | | | 6/1/2000 | 6.58 | 466.03 |
| | | | 6/1/2001 | 7.12 | 465.49 |
| | | | 12/2/2002 | 7.53 | 465.08 |
| | | | 8/1/2003 | 8.70 | 463.91 |
| | | | 12/23/2003 | 9.58 | 463.03 |
| | | | 7/4/2004 | 6.43 | 466.18 |
| | | | 9/28/2004 | 7.98 | 464.63 |
| | 472.43 | 461.15 to 446.15 | 4/17/2005 | 6.57 | 465.86 |
| | | | 7/19/2005 | 8.14 | 464.29 |
| | | | 10/5/2005 | 9.81 | 462.62 |
| | | | 1/21/2006 | 11.48 | 460.95 |
| | | | 5/2/2006 | 9.98 | 462.45 |
| | | | 8/9/2006 | 10.31 | 462.12 |
| | | | 4/25/2007 | 7.84 | 464.59 |
| | | | 8/22/2007 | 7.18 | 465.25 |
| | | | 1/15/2008 | 9.02 | 463.41 |
| | | | 7/10/2008 | 8.58 | 463.85 |
| | | | 12/18/2008 | 9.86 | 462.57 |
| | | | 7/14/2009 | 9.20 | 463.23 |
| | 472.42 | 461.14 to 446.14 | 12/15/2009 | 7.18 | 465.24 |
| | | | 8/9/2010 | 7.91 | 464.51 |
| | | | 12/17/2010 | 9.63 | 462.79 |
| | | | 7/25/2011 | 8.37 | 464.05 |
| | | | 12/14/2011 | 9.90 | 462.52 |
| | | | 7/12/2012 | 9.05 | 463.37 |
| | | | 12/19/2012 | 11.30 | 461.12 |
| | | | 7/15/2013 | 10.03 | 462.39 |
| | | | 12/18/2013 | 10.25 | 462.17 |
| | | | 7/15/2014 | 10.49 | 461.93 |
| | | | 12/17/2014 | 11.45 | 460.97 |
| | | | 7/20/2015 | 8.11 | 464.31 |
| | | | 12/17/2015 | 9.07 | 463.35 |
| | | | 7/19/2016 | 8.40 | 464.02 |

**Table 4-2A**

**Summary of Groundwater Gauging Data**
**Long Term Monitoring Wells — SWMUs 79/136 Central Plume**
**2016 RAER**
**Former NAS Dallas, Texas**
**Page 7 of 9**

| Monitoring Well | Top of Casing[1] (ft msl) | Screened Interval (ft msl) | Date | Depth to Water[2] (ft bgs) | Groundwater Elevation (ft msl) |
|---|---|---|---|---|---|
| **Point of Exposure and Background Monitoring Wells** | | | | | |
| **508F31MW** | 465.89 | 454.89 to 444.89 | 7/21/1999 | Well Installed | |
| | | | 9/1/1999 | 12.48 | 453.41 |
| | | | 6/1/2000 | 5.10 | 460.79 |
| | | | 6/1/2001 | 5.39 | 460.50 |
| | | | 12/2/2002 | 6.19 | 459.70 |
| | | | 8/1/2003 | 5.45 | 460.44 |
| | | | 12/23/2003 | 7.24 | 458.65 |
| | | | 7/4/2004 | 3.46 | 462.43 |
| | | | 9/28/2004 | 4.43 | 461.46 |
| | 465.84 | 454.84 to 444.84 | 4/17/2005 | 4.52 | 461.32 |
| | | | 7/19/2005 | 5.46 | 460.38 |
| | | | 10/5/2005 | 7.15 | 458.69 |
| | | | 1/21/2006 | 9.22 | 456.62 |
| | | | 5/2/2006 | 7.65 | 458.19 |
| | | | 8/9/2006 | 6.75 | 459.09 |
| | | | 4/25/2007 | 5.14 | 460.70 |
| | | | 8/22/2007 | 4.31 | 461.53 |
| | | | 1/15/2008 | 6.79 | 459.05 |
| | | | 7/10/2008 | 5.63 | 460.21 |
| | | | 12/18/2008 | 10.36 | 455.48 |
| | | | 7/14/2009 | 6.37 | 459.47 |
| | 466.13 | 455.13 to 445.13 | 12/15/2009 | 5.85 | 460.28 |
| | | | 8/9/2010 | 5.43 | 460.70 |
| | | | 12/17/2010 | 7.49 | 458.64 |
| | | | 7/25/2011 | 5.70 | 460.43 |
| | | | 12/14/2011 | 8.05 | 458.08 |
| | | | 7/12/2012 | 7.08 | 459.05 |
| | | | 12/19/2012 | 8.94 | 457.19 |
| | | | 7/15/2013 | 7.11 | 459.02 |
| | | | 12/18/2013 | 8.40 | 457.73 |
| | | | 7/15/2014 | 7.53 | 458.60 |
| | | | 12/17/2014 | 9.52 | 456.61 |
| | | | 7/20/2015 | 6.54 | 459.59 |
| | | | 12/17/2015 | 8.12 | 458.01 |
| | | | 7/21/2016 | 5.85 | 460.28 |

**Table 4-2A**

**Summary of Groundwater Gauging Data**
**Long Term Monitoring Wells — SWMUs 79/136 Central Plume**
**2016 RAER**
**Former NAS Dallas, Texas**
**Page 8 of 9**

| Monitoring Well | Top of Casing[1] (ft msl) | Screened Interval (ft msl) | Date | Depth to Water[2] (ft bgs) | Groundwater Elevation (ft msl) |
|---|---|---|---|---|---|
| 508F58MW | 460.75 | 450.90 to 440.90 | 5/17/2006 | Well Installed | |
| | | | 5/23/2006 | 8.95 | 451.80 |
| | | | 8/8/2006 | 8.66 | 452.09 |
| | | | 11/18/2006 | 8.52 | 452.23 |
| | | | 4/25/2007 | 7.65 | 453.10 |
| | | | 8/22/2007 | 7.06 | 453.69 |
| | | | 1/15/2008 | 11.94 | 448.81 |
| | | | 7/10/2008 | 9.41 | 451.34 |
| | | | 12/18/2008 | 10.71 | 450.04 |
| | | | 7/15/2009 | 9.12 | 451.63 |
| | 461.60 | 451.75 to 441.75 | 12/15/2009 | 7.50 | 454.10 |
| | | | 8/9/2010 | 8.09 | 453.51 |
| | | | 12/17/2010 | 8.66 | 452.94 |
| | | | 7/25/2011 | 8.43 | 453.17 |
| | | | 12/14/2011 | 8.25 | 453.35 |
| | | | 7/12/2012 | 8.85 | 452.75 |
| | | | 12/19/2012 | 9.83 | 451.77 |
| | | | 7/15/2013 | 9.38 | 452.22 |
| | | | 12/18/2013 | 8.72 | 452.88 |
| | | | 7/15/2014 | 9.48 | 452.12 |
| | | | 12/17/2014 | 9.81 | 451.79 |
| | | | 7/20/2015 | 8.07 | 453.53 |
| | | | 12/17/2015 | 7.20 | 454.40 |
| | | | 7/18/2016 | 8.27 | 453.33 |
| 508F59MW | 459.41 | 451.41 to 441.41 | 5/17/2007 | Well Installed | |
| | | | 8/24/2007 | 5.61 | 453.80 |
| | | | 1/15/2008 | 6.36 | 453.05 |
| | | | 7/10/2008 | 6.48 | 452.93 |
| | | | 12/18/2008 | 7.51 | 451.90 |
| | | | 7/15/2009 | 7.02 | 452.39 |
| | 459.46 | 451.46 to 441.46 | 12/15/2009 | 5.47 | 453.99 |
| | | | 8/9/2010 | 5.81 | 453.65 |
| | | | 12/17/2010 | 6.54 | 452.92 |
| | | | 7/25/2011 | 6.21 | 453.25 |
| | | | 12/14/2011 | 6.02 | 453.44 |
| | | | 7/12/2012 | 6.75 | 452.71 |
| | | | 12/19/2012 | 7.78 | 451.68 |
| | | | 7/15/2013 | 7.20 | 452.26 |
| | | | 12/18/2013 | 6.55 | 452.91 |
| | | | 7/15/2014 | 6.14 | 453.32 |
| | | | 12/17/2014 | NA | NA |
| | | | 7/20/2015 | 5.85 | 453.61 |
| | | | 12/17/2015 | 6.19 | 453.27 |
| | | | 7/18/2016 | 6.26 | 453.20 |

**Table 4-2A**

**Summary of Groundwater Gauging Data**
**Long Term Monitoring Wells — SWMUs 79/136 Central Plume**
**2016 RAER**
**Former NAS Dallas, Texas**
**Page 9 of 9**

| Monitoring Well | Top of Casing[1] (ft msl) | Screened Interval (ft msl) | Date | Depth to Water[2] (ft bgs) | Groundwater Elevation (ft msl) |
|---|---|---|---|---|---|
| 508F60MW | 458.91 | 448.91 to 438.91 | 5/17/2007 | Well Installed | |
| | | | 8/24/2007 | 5.36 | 453.55 |
| | | | 1/15/2008 | 6.02 | 452.89 |
| | | | 7/10/2008 | 6.18 | 452.73 |
| | | | 12/18/2008 | 7.21 | 451.70 |
| | | | 7/15/2009 | 6.81 | 452.10 |
| | 458.97 | 448.97 to 438.97 | 12/15/2009 | 5.58 | 453.39 |
| | | | 8/9/2010 | 5.44 | 453.53 |
| | | | 12/17/2010 | 6.19 | 452.78 |
| | | | 7/25/2011 | 5.91 | 453.06 |
| | | | 12/14/2011 | 5.73 | 453.24 |
| | | | 7/12/2012 | 6.35 | 452.62 |
| | | | 12/19/2012 | 7.35 | 451.62 |
| | | | 7/15/2013 | 6.75 | 452.22 |
| | | | 12/18/2013 | 6.01 | 452.96 |
| | | | 7/15/2014 | 6.71 | 452.26 |
| | | | 12/17/2014 | 7.10 | 451.87 |
| | | | 7/20/2015 | 5.52 | 453.45 |
| | | | 12/17/2015 | 5.78 | 453.19 |
| | | | 7/18/2016 | 5.08 | 453.89 |
| 508F61MW | 457.43 | 448.18 to 438.18 | 5/17/2007 | Well Installed | |
| | | | 8/24/2007 | 4.42 | 453.01 |
| | | | 1/15/2008 | 4.49 | 452.94 |
| | | | 7/10/2008 | 5.28 | 452.15 |
| | | | 12/18/2008 | 5.23 | 452.20 |
| | | | 7/15/2009 | 5.90 | 451.53 |
| | 457.44 | 447.44 to 437.44 | 12/15/2009 | 4.48 | 452.96 |
| | | | 8/9/2010 | 3.86 | 453.58 |
| | | | 12/17/2010 | 4.31 | 453.13 |
| | | | 7/25/2011 | 4.30 | 453.14 |
| | | | 12/14/2011 | 4.74 | 452.70 |
| | | | 7/12/2012 | 4.75 | 452.69 |
| | | | 12/19/2012 | 6.52 | 450.92 |
| | | | 7/15/2013 | 5.20 | 452.24 |
| | | | 12/18/2013 | 4.62 | 452.82 |
| | | | 7/15/2014 | 5.55 | 451.89 |
| | | | 12/17/2014 | 6.12 | 451.32 |
| | | | 7/20/2015 | 3.82 | 453.62 |
| | | | 12/17/2015 | 4.36 | 453.08 |
| | | | 7/18/2016 | 8.74 | 448.70 |

bgs - below ground surface
ft - feet
msl - mean sea level

NA - Not Available or Applicable (i.e., abandoned, not installed, not measured)
PCLE - Protective Concentration Level Exceedance
NM - not measured

Notes:
1 - All monitoring wells on-site were resurveyed in May 2005 and September 2010 in accordance with the Compliance Plan Requirements
2 - Depth to water measurements taken from the top of the riser.

**Table 4-2B**

**Summary of Groundwater Gauging Data**
**Historical Monitoring Wells — SWMUs 79/136 Central Plume**
**2016 RAER**
**Former NAS Dallas, Texas**
**Page 1 of 5**

| Monitoring Well | Top of Casing[1] (ft msl) | Screened Interval (ft msl) | Date | Depth to Water[2] (ft bgs) | Groundwater Elevation (ft msl) |
|---|---|---|---|---|---|
| **Monitoring Wells Located Inside PCLE Zone** | | | | | |
| **508F23MW** | 464.83 | 440.10 to 435.10 | 7/12/1999 | Well Installed | |
| | | | 9/1/1999 | 10.89 | 453.94 |
| | | | 6/1/2000 | 9.62 | 455.21 |
| | | | 6/1/2001 | 10.06 | 454.77 |
| | | | 12/2/2002 | 10.11 | 454.72 |
| | | | 8/1/2003 | 10.80 | 454.03 |
| | | | 12/23/2003 | 11.01 | 453.82 |
| | | | 7/4/2004 | 9.12 | 455.71 |
| | | | 9/28/2004 | 11.30 | 453.53 |
| | 464.75 | 440.02 to 435.02 | 9/17/2005 | 10.68 | 454.07 |
| | | | 7/19/2005 | 11.55 | 453.20 |
| | | | 10/5/2005 | 12.32 | 452.43 |
| | | | 1/21/2006 | 13.48 | 451.27 |
| | | | 5/3/2006 | 11.86 | 452.89 |
| | | | 8/8/2006 | 12.85 | 451.90 |
| | | | 4/25/2007 | 11.15 | 453.60 |
| | | | 8/24/2007 | 11.02 | 453.73 |
| | | | 1/15/2008 | 11.72 | 453.03 |
| | | | 7/24/2008 | 11.86 | 452.89 |
| | | | 12/18/2008 | 10.41 | 454.34 |
| | | | -- | Well Destroyed | |
| **508F25MW** | 466.52 | 461.50 to 451.50 | 7/22/1999 | Well Installed | |
| | | | 9/1/1999 | 5.62 | 460.90 |
| | | | 6/1/2000 | 4.08 | 462.44 |
| | | | 6/1/2001 | 4.53 | 461.99 |
| | | | 12/2/2002 | 4.00 | 462.52 |
| | | | 8/1/2003 | 6.35 | 460.17 |
| | | | 12/23/2003 | 5.26 | 461.26 |
| | | | 7/4/2004 | 4.75 | 461.77 |
| | | | 9/28/2004 | 5.09 | 461.43 |
| | | | 4/19/2005 | Well Plugged and Abandoned | |
| **508F32MW** | 470.04 | 466.04 to 456.04 | 07/06/00 | Well Installed | |
| | | | 09/01/99 | 11.86 | 458.18 |
| | | | 06/01/00 | 5.75 | 464.29 |
| | | | 06/01/01 | 7.11 | 462.93 |
| | | | 12/02/02 | 3.56 | 466.48 |
| | | | 06/03/03 | Well Plugged and Abandoned | |
| **508F33MW** | 472.23 | 458.23 to 448.23 | 8/30/1999 | Well Installed | |
| | | | 9/1/1999 | 8.91 | 463.32 |
| | | | 6/1/2000 | 6.95 | 465.28 |
| | | | 6/1/2001 | 6.00 | 466.23 |
| | | | 12/2/2002 | 6.93 | 465.30 |
| | | | 6/3/2003 | Well Abandoned | |
| **508G06MW** | 463.53 | 449.53 to 439.53 | 6/28/2000 | Well Installed | |
| | | | 6/1/2001 | NA | NA |
| | | | 12/14/2002 | NA | NA |
| | | | 8/1/2003 | 9.30 | 454.23 |
| | | | 12/23/2003 | 9.57 | 453.96 |
| | | | 7/4/2004 | 7.60 | 455.93 |
| | | | 9/28/2004 | 9.95 | 453.58 |
| | 463.37 | 449.37 to 439.37 | 4/17/2005 | 8.96 | 454.41 |
| | | | 7/19/2005 | 10.07 | 453.30 |
| | | | 10/5/2005 | 10.75 | 452.62 |
| | | | 1/21/2006 | 11.94 | 451.43 |
| | | | 5/3/2006 | 10.35 | 453.02 |
| | | | 8/8/2006 | 11.25 | 452.12 |
| | | | 4/25/2007 | 9.84 | 453.53 |
| | | | 8/22/2007 | 9.56 | 453.81 |
| | | | 1/15/2008 | 10.49 | 452.88 |
| | | | 7/24/2008 | 13.16 | 450.21 |
| | | | 12/18/2008 | 10.00 | 453.37 |
| | | | 7/15/2009 | NA | NA |
| | | | -- | Well Destroyed | |

**Table 4-2B**

**Summary of Groundwater Gauging Data**
**Historical Monitoring Wells — SWMUs 79/136 Central Plume**
**2016 RAER**
**Former NAS Dallas, Texas**
**Page 2 of 5**

| Monitoring Well | Top of Casing[1] (ft msl) | Screened Interval (ft msl) | Date | Depth to Water[2] (ft bgs) | Groundwater Elevation (ft msl) |
|---|---|---|---|---|---|
| **60-02** | 470.14 | 453.04 to 443.04 | 5/1/1998 | 5.58 | 464.56 |
| | | | 8/1/1999 | 6.73 | 463.41 |
| | | | 2/1/1999 | NA | NA |
| | | | 9/1/1999 | NA | NA |
| | | | 10/20/98 | Well Plugged and Abandoned | |
| **60-04** | 471.28 | 453.82 to 443.82 | 5/28/1998 | NM | NM |
| | | | 8/18/1998 | Well Plugged and Abandoned | |
| **60-05** | 471.4 | 453.90 to 443.90 | 5/28/1998 | NM | NM |
| | | | 8/18/1998 | Well Plugged and Abandoned | |
| **60-08** | 469.46 | 455.46 to 445.46 | 2/1/1998 | 4.37 | 465.09 |
| | | | 5/1/1998 | 4.58 | 464.88 |
| | | | 8/1/1998 | 5.73 | 463.73 |
| | | | 2/1/1999 | 4.93 | 464.53 |
| | | | 9/1/1999 | 5.75 | 463.71 |
| | | | 6/1/2000 | 3.70 | 465.76 |
| | | | 6/1/2001 | 4.01 | 465.45 |
| | | | 12/2/2002 | 4.44 | 465.02 |
| | | | 1/23/2003 | Well Plugged and Abandoned | |
| **60-09** | 473.5 | 455.95 to 445.95 | 5/28/1998 | 8.65 | 464.85 |
| | | | 8/18/1998 | 9.85 | 463.65 |
| | | | 2/16/1999 | 9.03 | 464.47 |
| | | | 9/2/1999 | Well Plugged and Abandoned | |
| **60-16** | 471.67 | 456.64 to 446.64 | 2/1/1998 | 4.59 | 467.08 |
| | | | 5/1/1998 | 6.37 | 465.30 |
| | | | 8/1/1998 | 6.50 | 465.17 |
| | | | 2/1/1999 | 6.19 | 465.48 |
| | | | 9/1/1999 | 6.18 | 465.49 |
| | | | 6/1/2000 | 4.98 | 466.69 |
| | | | 6/1/2001 | 4.97 | 466.70 |
| | | | 12/2/2002 | 4.63 | 467.04 |
| | | | 8/1/2003 | 6.02 | 465.65 |
| | | | 3/7/2004 | Well Plugged and Abandoned | |
| **Monitoring Wells Located Outside PCLE Zone** | | | | | |
| **50807MW** | 469.02 | 460.24 to 450.24 | 2/1/1998 | 4.37 | 464.65 |
| | | | 5/1/1998 | 4.32 | 464.70 |
| | | | 8/1/1998 | Dry | Dry |
| | | | 2/1/1999 | 4.82 | 464.20 |
| | | | 9/1/1999 | 5.43 | 463.59 |
| | | | 6/1/2000 | 3.56 | 465.46 |
| | | | 6/1/2001 | 3.89 | 465.13 |
| | | | 12/2/2002 | NM | NM |
| | | | 8/1/2003 | NM | NM |
| | | | 12/23/2003 | NM | NM |
| | | | 7/4/2004 | NM | NM |
| | | | 9/28/2004 | 4.55 | 464.47 |
| | | | 4/18/2005 | Well Plugged and Abandoned | |
| **508F12MW** | 466.97 | 448.87 to 438.87 | 3/30/1998 | Well Installed | |
| | | | 5/1/1998 | 3.93 | 463.04 |
| | | | 8/1/1998 | 3.81 | 463.16 |
| | | | 2/1/1999 | 2.80 | 464.17 |
| | | | 9/1/1999 | 3.83 | 463.14 |
| | | | 6/1/2000 | 2.14 | 464.83 |
| | | | 6/1/2001 | 3.73 | 463.24 |
| | | | 12/2/2002 | 2.96 | 464.01 |
| | | | 8/1/2003 | 4.68 | 462.29 |
| | | | 12/23/2003 | 6.52 | 460.45 |
| | | | 7/4/2004 | 4.73 | 462.24 |
| | | | 9/28/2004 | 3.45 | 463.52 |
| | | | 4/19/2005 | Well Plugged and Abandoned | |

**Table 4-2B**

**Summary of Groundwater Gauging Data**
**Historical Monitoring Wells — SWMUs 79/136 Central Plume**
**2016 RAER**
**Former NAS Dallas, Texas**
**Page 3 of 5**

| Monitoring Well | Top of Casing[1] (ft msl) | Screened Interval (ft msl) | Date | Depth to Water[2] (ft bgs) | Groundwater Elevation (ft msl) |
|---|---|---|---|---|---|
| **508F13MW** | 463.55 | 454.45 to 444.45 | 3/31/1998 | Well Installed | |
| | | | 5/1/1998 | 7.70 | 455.85 |
| | | | 8/1/1998 | 9.19 | 454.36 |
| | | | 2/1/1999 | 8.59 | 454.96 |
| | | | 9/1/1999 | 8.41 | 455.14 |
| | | | 6/1/2000 | 8.35 | 455.20 |
| | | | 6/1/2001 | 8.26 | 455.29 |
| | | | 12/2/2002 | 8.69 | 454.86 |
| | | | 8/1/2003 | 9.50 | 454.05 |
| | | | 12/23/2003 | 9.26 | 454.29 |
| | | | 7/4/2004 | 7.73 | 455.82 |
| | | | 9/29/2004 | 9.96 | 453.59 |
| | | | 4/25/2005 | Well Plugged and Abandoned | |
| **508F27MW** | 470.78 | 463.92 to 453.92 | 7/21/1999 | Well Installed | |
| | | | 9/1/1999 | 7.17 | 463.61 |
| | | | 6/1/2000 | 6.41 | 464.37 |
| | | | 6/1/2001 | 6.34 | 464.44 |
| | | | 12/2/2002 | NM | NM |
| | | | 8/1/2003 | NM | NM |
| | | | 12/23/2003 | NM | NM |
| | | | 7/4/2004 | 5.69 | 465.09 |
| | | | 9/28/2004 | 5.71 | 465.07 |
| | | | 4/18/2005 | Well Plugged and Abandoned | |
| **508F30MW** | 466.07 | 462.07 to 452.07 | 6/27/2000 | Well Installed | |
| | | | 9/1/1999 | 4.76 | 461.31 |
| | | | 6/1/2000 | 6.75 | 459.32 |
| | | | 6/1/2001 | 4.01 | 462.06 |
| | | | 12/2/2002 | 5.19 | 460.88 |
| | | | 8/1/2003 | 4.25 | 461.82 |
| | | | 12/23/2003 | 6.12 | 459.95 |
| | | | 7/4/2004 | 4.10 | 461.97 |
| | | | 9/28/2004 | 4.08 | 461.99 |
| | | | 4/19/2005 | Well Plugged and Abandoned | |
| **508F34MW** | 469.07 | 464.09 to 454.09 | 8/8/1999 | Well Installed | |
| | | | 9/1/1999 | 5.73 | 463.34 |
| | | | 6/1/2000 | 5.23 | 463.84 |
| | | | 6/1/2001 | 4.42 | 464.65 |
| | | | 12/2/2002 | Well Plugged and Abandoned | |
| **508F35MW** | 469.27 | 455.60 to 445.60 | 7/22/1999 | Well Installed | |
| | | | 9/1/1999 | 5.87 | 463.40 |
| | | | 6/1/2000 | 4.13 | 465.14 |
| | | | 6/1/2001 | 4.27 | 465.00 |
| | | | 12/2/2002 | Well Plugged and Abandoned | |
| **508F50MW** | 463.67 | 446.67 to 436.67 | 9/15/2004 | Well Installed | |
| | | | 9/29/2004 | 9.85 | 453.82 |
| | 463.47 | 446.47 to 436.47 | 4/17/2005 | 8.97 | 454.50 |
| | | | 7/19/2005 | 10.02 | 453.45 |
| | | | 10/5/2005 | 10.81 | 452.66 |
| | | | 1/21/2006 | 12.02 | 451.45 |
| | | | 5/3/2006 | 10.48 | 452.99 |
| | | | 8/8/2006 | 11.19 | 452.28 |
| | | | 4/25/2007 | 10.06 | 453.41 |
| | | | 8/24/2007 | 9.51 | 453.96 |
| | | | 1/15/2008 | 10.37 | 453.10 |
| | | | 7/10/2008 | 10.42 | 453.05 |
| | | | 12/18/2008 | 10.38 | 453.09 |
| | | | 7/15/2009 | 9.50 | 453.97 |
| | 462.03 | 445.03 to 435.03 | 12/15/2009 | 8.00 | 454.03 |
| | | | 8/9/2010 | 8.32 | 453.71 |
| | | | 12/17/2010 | 9.08 | 452.95 |
| | | | 7/25/2011 | 8.67 | 453.36 |
| | | | 12/14/2011 | 8.50 | 453.53 |
| | | | 7/12/2012 | 9.28 | 452.75 |
| | | | 12/19/2012 | 9.30 | 452.73 |
| | | | 7/15/2013 | 9.76 | 452.27 |
| | | | 12/18/2013 | 9.05 | 452.98 |
| | | | 7/15/2014 | 9.70 | 452.33 |
| | | | 12/17/2014 | 10.33 | 451.70 |
| | | | 7/20/2015 | 8.42 | 453.61 |
| | | | 12/17/2015 | 8.15 | 453.88 |
| | | | 4/4/2016 | Well Plugged and Abandoned | |

**Table 4-2B**

**Summary of Groundwater Gauging Data**
**Historical Monitoring Wells — SWMUs 79/136 Central Plume**
**2016 RAER**
**Former NAS Dallas, Texas**
**Page 4 of 5**

| Monitoring Well | Top of Casing[1] (ft msl) | Screened Interval (ft msl) | Date | Depth to Water[2] (ft bgs) | Groundwater Elevation (ft msl) |
|---|---|---|---|---|---|
| 508G01MW | 463.65 | 446.65 to 436.65 | 6/1/2000 | Well Installed | |
| | | | 6/1/2001 | NA | NA |
| | | | 12/14/2002 | NA | NA |
| | | | 8/1/2003 | 9.36 | 454.29 |
| | | | 12/23/2003 | 9.71 | 453.94 |
| | | | 7/4/2004 | 7.35 | 456.30 |
| | | | 9/29/2004 | 10.41 | 453.24 |
| | 463.59 | 446.59 to 436.59 | 4/17/2005 | 9.92 | 453.67 |
| | | | 7/19/2005 | 10.43 | 453.16 |
| | | | 10/5/2005 | 11.25 | 452.34 |
| | | | 1/21/2006 | 12.38 | 451.21 |
| | | | 5/3/2006 | 10.82 | 452.77 |
| | | | 8/8/2006 | 11.71 | 451.88 |
| | | | 4/25/2007 | 10.29 | 453.30 |
| | | | 8/24/2007 | 10.14 | 453.45 |
| | | | 1/15/2008 | 10.80 | 452.79 |
| | | | 7/24/2008 | 10.84 | 452.75 |
| | | | 12/18/2008 | 10.96 | 452.63 |
| | | | 7/15/2009 | NM | NM |
| | 463.55 | 446.55 to 436.55 | 12/15/2009 | NM | NM |
| | | | 8/9/2010 | NM | NM |
| | | | 12/17/2015 | NM | NM |
| | | | 4/4/2016 | Well Plugged and Abandoned | |
| 508G05MW | 463.90 | 463.90 to 463.90 | 6/28/2000 | Well Installed | |
| | | | 12/14/2002 | NA | NA |
| | | | 8/1/2003 | 9.37 | 454.53 |
| | | | 12/23/2003 | 9.26 | 454.64 |
| | | | 7/4/2004 | 7.18 | 456.72 |
| | | | 9/29/2004 | 9.59 | 454.31 |
| | 463.95 | 463.95 to 463.95 | 4/17/2005 | 9.05 | 454.90 |
| | | | 7/19/2005 | 10.00 | 453.95 |
| | | | 10/5/2005 | 10.61 | 453.34 |
| | | | 1/21/2006 | 11.82 | 452.13 |
| | | | 5/3/2006 | 10.24 | 453.71 |
| | | | 8/8/2006 | 11.21 | 452.74 |
| | | | 4/25/2007 | 9.61 | 454.34 |
| | | | 8/22/2007 | 9.49 | 454.46 |
| | | | 1/15/2008 | 10.40 | 453.55 |
| | | | 7/10/2008 | NA | NA |
| | | | 12/18/2008 | 11.14 | 452.81 |
| | | | 7/15/2009 | 10.42 | 453.53 |
| | 463.39 | 463.39 to 463.39 | 12/15/2009 | 8.80 | 454.59 |
| | | | 8/9/2010 | 9.30 | 454.09 |
| | | | 12/17/2010 | 10.12 | 453.27 |
| | | | 7/25/2011 | 9.65 | 453.74 |
| | | | 12/14/2011 | 9.50 | 453.89 |
| | | | 7/12/2012 | 10.83 | 452.56 |
| | | | 12/19/2012 | 11.45 | 451.94 |
| | | | 7/15/2013 | 10.77 | 452.62 |
| | | | 12/18/2013 | 10.00 | 453.39 |
| | | | 7/15/2014 | 10.83 | 452.56 |
| | | | 12/17/2014 | 11.12 | 452.27 |
| | | | 7/20/2015 | 9.36 | 454.03 |
| | | | 12/17/2015 | 9.51 | 453.88 |
| | | | 4/4/2016 | Well Plugged and Abandoned | |

**Table 4-2B**

**Summary of Groundwater Gauging Data**
**Historical Monitoring Wells — SWMUs 79/136 Central Plume**
**2016 RAER**
**Former NAS Dallas, Texas**
**Page 5 of 5**

| Monitoring Well | Top of Casing[1] (ft msl) | Screened Interval (ft msl) | Date | Depth to Water[2] (ft bgs) | Groundwater Elevation (ft msl) |
|---|---|---|---|---|---|
| **60-01** | 470.14 | 452.57 to 442.57 | 5/1/1998 | 5.84 | 464.30 |
| | | | 8/1/1999 | 6.93 | 463.21 |
| | | | 2/1/1999 | NA | NA |
| | | | 9/1/1999 | NA | NA |
| | | | 6/1/2000 | | |
| **60-06** | 472.66 | 459.06 to 449.06 | 5/28/1998 | NM | NM |
| | | | 8/18/1998 | Well Plugged and Abandoned | |
| **60-07** | 472.69 | 455.24 to 445.24 | 5/28/1998 | NM | NM |
| | | | 8/18/1998 | Well Plugged and Abandoned | |
| **60-17** | 472.04 | 454.34 to 444.34 | 2/1/1998 | 6.49 | 465.55 |
| | | | 5/1/1998 | 6.54 | 465.50 |
| | | | 8/1/1998 | 7.59 | 464.45 |
| | | | 2/1/1999 | 2.41 | 469.63 |
| | | | 9/1/1999 | 6.08 | 465.96 |
| | | | 6/1/2000 | 3.28 | 468.76 |
| | | | 6/1/2001 | 4.71 | 467.33 |
| | | | 12/2/2002 | 2.55 | 469.49 |
| | | | 8/1/2003 | 6.49 | 465.55 |
| | | | 12/23/2003 | 5.80 | 466.24 |
| | | | 7/4/2004 | 5.19 | 466.85 |
| | | | 9/28/2004 | 5.71 | 466.33 |
| | | | 4/18/2005 | Well Plugged and Abandoned | |
| **60-18** | 472.30 | 459.60 to 449.60 | 2/1/1998 | 5.68 | 466.62 |
| | | | 5/1/1998 | 6.94 | 465.36 |
| | | | 8/1/1998 | 8.71 | 463.59 |
| | | | 2/1/1999 | 7.27 | 465.03 |
| | | | 9/1/1999 | 8.72 | 463.58 |
| | | | 6/1/2000 | 5.78 | 466.52 |
| | | | 6/1/2001 | 6.69 | 465.61 |
| | | | 12/2/2002 | 3.37 | 468.93 |
| | | | 8/1/2003 | 8.45 | 463.85 |
| | | | 12/23/2003 | 9.41 | 462.89 |
| | | | 7/4/2004 | 5.90 | 466.40 |
| | | | 9/28/2004 | 7.15 | 465.15 |
| | | | 4/18/2005 | Well Plugged and Abandoned | |

bgs - below ground surface
ft - feet
msl - mean sea level
NA - Not Available or Applicable (i.e., abandoned, not installed, not measured)
NM - Not Measured
PCLE - Protective Concentration Level Exceedance

Note:
1 - All monitoring wells on-site were resurveyed in May 2005 and September 2010 in accordance with the Compliance Plan Requirements.
2 - Depth to water measurements taken from the top of the riser.
Monitoring wells 508G01MW, 508G02MW, and 508G03MW had bent risers and could not be gauged on 7/15/09.

# TABLE 4-3
# SUMMARY OF GROUNDWATER GAUGING DATA

**Table 4-3A**

**Summary of Geochemical Parameters Measured in Groundwater**
**Long Term Monitoring Wells — SWMUs 79/136 Central Plume**
**2016 RAER**
**Former NAS Dallas, Texas**


| Monitoring Well | Sampling Date | Sampling Round | SDG | Oxidation-Reduction Conditions | | | | | | | | Degradation Products | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Dissolved Oxygen[2] | Ferrous Iron[2] | Nitrate[3] | Nitrite[3] | ORP[1] | Phosphate[3] | Sulfate[3] | TOC[3] | Alkalinity[2] | Carbon Dioxide[2] | Chloride[3] | Ethane[3] | Ethene[3] | Methane[3] | pH[1] | Sulfide[3] |
| | | | Units | mg/L | mg/L | mg/L | mg/L | mV | mg/L | mg/L | mg/L | mg/L | mg/L | mg/L | ng/L | ng/L | µg/L | S.U. | mg/L |
| **Monitoring Wells Located Inside PCLE Zone** | | | | | | | | | | | | | | | | | | | |
| **50803MW/ 508F49MW** | 3/14/2002 | Wells Installed | | | | | | | | | | | | | | | | | |
| | 3/14/2003 | ASA-5 Round 2 | DL618 | 2.5 | 4.4 | 0.39 | 0.5 U | 6.0 | 0.05 U | 2730 | NA | 450 | 85 | 2350 | NA | NA | NA | 6.56 | 0.01 U |
| | 7/9/2002 | ASA-5 Round 3 | 100191 | 1.0 | 2.2 | 0.50 U | 0.5 U | -34.0 | 2.6 | 3440 | 2.8 | 300 | 100 | 1480 | NA | NA | NA | 6.76 | 0.01 U |
| | 9/26/2002 | ASA-5 Round 4 | 70247 | >12 | NA | 0.16 | 0.25 U | 663.0 | 0.25 U | 2900 | 7.9 | NA | NA | 1510 | NA | NA | NA | 6.57 | NA |
| | 11/20/2002 | Round 8 | DL378 | NA | NA | 0.10 U | 0.1 U | NA | 0.5 UJ | 3400 | 4 | NA | NA | 1300 | NA | NA | NA | NA | NA |
| | 8/26/2003 | Round 9 | 26285 | 1.0 | 0.2 | NA | NA | 223.0 | 12.5 U | 3240 | 10 | 700 | 325 | 1 UR | NA | NA | NA | 6.52 | 0.01 U |
| | 12/19/2003 | Round 10 | C3L200111 | NA | NA | NA | NA | NA | NA | 3160 | NA | NA | NA | 1090 | NA | NA | NA | NA | NA |
| | 12/19/2003 | Round 10 | FIELD | 1.0 | 0.0 | NA | NA | 460.0 | NA | NA | NA | 400 | NA | NA | NA | NA | NA | 6.06 | 0.0 |
| | 9/16/2004 | Round 12 | C4I170149 | NA | NA | NA | NA | NA | NA | 3260 | 7.8 L | NA | NA | 1240 | NA | NA | NA | NA | NA |
| | 9/16/2004 | Round 12 | FIELD | 1.0 | 0.2 | NA | NA | 64.0 | NA | NA | NA | 600 | 80 | NA | NA | NA | NA | 6.35 | NA |
| | 9/16/2004 | Round 12 | P0409326 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | 170 | 100 | 8.3 | NA | NA |
| | 8/24/2005 | Round 13A | CTO260-22 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| | 10/19/2005 | Round 14 | CTO 260-23 | 1.0 | 0.0 | NA | NA | 77.0 | 0.00991 U | 3100 J | 5 | 700 | 250 | 1100 | 10,000 U | 10,000 U | 360 | 6.61 | 0.15 J |
| | 8/27/2007 | Round 18 | DALLASW002 | NA | NA | 0.05 U | 1.0 UR | NA | 0.5 UL | 2720 | 4.2 | NA | NA | 919 | 330 U | 330 U | 140 | NA | 0.8 U |
| | 8/27/2007 | Round 18 | FIELD | 1.0 | 0.0 | NA | NA | 103.0 | NA | NA | NA | 300 | 100 | NA | NA | NA | NA | 6.04 | NA |
| | 7/16/2009 | Round 22 | F66711 | 1.5 | 0.0 | 0.05 U | 2.5 UR | 2.9 | 0.02 U | 1910 | 4 JL | 650 | 230 | 731 | 320 U | 430 U | 136 | 6.60 | 0.6 U |
| | 1/13/2010 | Round 23 | F70773 | NA | NA | NA | NA | 135.9 | NA | NA | NA | NA | NA | NA | NA | NA | NA | 6.25 | NA |
| | 7/14/2010 | Round 24 | F75198 | NA | NA | NA | NA | 11.5 | NA | NA | NA | NA | NA | NA | NA | NA | NA | 6.52 | NA |
| | 1/12/2011 | Round 25 | FIELD | NA | NA | NA | NA | -61.6 | NA | NA | NA | NA | NA | NA | NA | NA | NA | 6.8 | NA |
| | 7/28/2011 | Round 26 | F84700 | 0.6 | 5 | 1.3 U | 0.25 R | -46.7 | 0.32 | 1720 | 3 | 500 | 160 | 521 | 350 | 430 U | 42.9 | 6.63 | 0.3 U |
| | 1/11/2012 | Round 27 | F88817 | NA | NA | NA | NA | -68.4 | NA | NA | NA | NA | NA | NA | NA | NA | NA | 6.2 | NA |
| | 7/12/2012 | Round 28 | F94831 | NA | NA | NA | NA | -49.1 | NA | NA | NA | NA | NA | NA | NA | NA | NA | 6.77 | NA |
| | 1/9/2013 | Round 29 | FA643 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| | 7/18/2013 | Round 30 | FA6575 | 0.2 | 5 | 2.5 U | 4.0 J | -68.2 | 0.14 | 2420 | 2.6 | 500 | 150 | 637 JL | 390 J | 430 U | 53.5 | 6.75 | 0.23 U |
| | 1/29/2014 | Round 31 | FA12873 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| | 7/21/2014 | Round 32 | 1407162 | 0.32 | 1.51 | 0.033 U | 0.825 U | -64.8 | 0.158 | 3020 | 2.74 J | NA | 100 | 718 | 0.001 U | 0.001 U | 0.0357 | 6.48 | 0.03 |
| | 1/23/2015 | Round 33 (PDB) | 1501096 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| | 7/27/2015 | Round 34 | 1507202 | 0.34 | 1.47 | 0.033 U | 0.825 U | -36.80 | 0.02 U | 3150.00 | 2.16 | 622.00 | 100.00 | 892.00 | 0.001 U | 0.001 U | 42.80 | 6.58 | 0.00 |
| | 1/20/2016 | Round 35 | 1601156 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| | 7/27/2016 | Round 36 | 1607165 | 0.00 | 1.61 | 0.033 U | 0.033 U | -45.00 | 0.01 U | 2910 | 2.7 J | 549 | 0 | 851 | 0.001 U | 0.001 U | 70.70 | 7.43 | NA |

**Table 4-3A**

**Summary of Geochemical Parameters Measured in Groundwater**
**Long Term Monitoring Wells — SWMUs 79/136 Central Plume**
**2016 RAER**
**Former NAS Dallas, Texas**


| Monitoring Well | Sampling Date | Sampling Round | SDG | Oxidation-Reduction Conditions | | | | | | | | Degradation Products | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Dissolved Oxygen[2] | Ferrous Iron[2] | Nitrate[3] | Nitrite[3] | ORP[1] | Phosphate[3] | Sulfate[3] | TOC[3] | Alkalinity[2] | Carbon Dioxide[2] | Chloride[3] | Ethane[3] | Ethene[3] | Methane[3] | pH[1] | Sulfide[3] |
| | | | Units | mg/L | mg/L | mg/L | mg/L | mV | mg/L | mg/L | mg/L | mg/L | mg/L | mg/L | ng/L | ng/L | µg/L | S.U. | mg/L |
| 508F51MW | 9/15/2004 | Wells Installed | | | | | | | | | | | | | | | | | |
| | 9/19/2004 | Round 12 | FIELD | 2.5 | 0.2 | NA | NA | 4.0 | NA | NA | NA | 300 | 75 | NA | NA | NA | NA | 6.72 | NA |
| | 8/25/2005 | Round 13A | CTO260-22 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | 10 U | 10 U | 11.0 U | NA | NA |
| | 8/25/2005 | Round 13A | FIELD_R14 | 0.4 | 0.6 | NA | NA | -24 | NA | NA | NA | 350 | 70 | NA | NA | NA | NA | 6.73 | NA |
| | 10/20/2005 | Round 14 | CTO 260-23 | 0.4 | 0.6 | NA | NA | -24.0 | 0.00991 U | 3300 J | 1.7 | 350 | 70 | 820 | 10,000 U | 10,000 U | 11 U | 6.73 | 0.14 UJ |
| | 8/27/2007 | Round 18 | DALLASW002 | NA | NA | 0.05 U | 1.0 UJ | NA | 0.5 U | 3920 | 1.8 | NA | NA | 878 | 330 U | 330 U | 4.5 U | NA | 0.8 |
| | 8/27/2007 | Round 18 | FIELD | 0.5 | 0.0 | NA | NA | 14.0 | NA | NA | NA | 450 | 105 | NA | NA | NA | NA | 6.57 | NA |
| | 7/16/2009 | Round 22 | F66711 | 0.3 | 0.0 | 0.05 U | 1.0 UR | 128.4 | 0.024 J | 2710 | 1.8 JL | 400 | 40 | 898 | 320 U | 430 U | 2.39 | 6.74 | 0.6 U |
| | 1/13/2010 | Round 23 | F70773 | NA | NA | NA | NA | 169.7 | NA | NA | NA | NA | NA | NA | NA | NA | NA | 6.57 | NA |
| | 7/14/2010 | Round 24 | F75198 | NA | NA | NA | NA | -99.2 | NA | NA | NA | NA | NA | NA | NA | NA | NA | 6.83 | NA |
| | 1/12/2011 | Round 25 | FIELD | NA | NA | NA | NA | 120.2 | NA | NA | NA | NA | NA | NA | NA | NA | NA | 6.86 | NA |
| | 7/28/2011 | Round 26 | F84700 | 0.3 | 0 | 2.5 U | 0.5 R | 61.8 | 0.02 U | 3840 | 1.7 | 400 | 70 | 884 | 320 U | 430 U | 1.14 | 6.65 | 0.3 U |
| | 1/11/2012 | Round 27 | F88817 | NA | NA | NA | NA | 139.5 | NA | NA | NA | NA | NA | NA | NA | NA | NA | 6.73 | NA |
| | 7/12/2012 | Round 28 | F94831 | NA | NA | NA | NA | -25.2 | NA | NA | NA | NA | NA | NA | NA | NA | NA | 6.72 | NA |
| | 1/9/2013 | Round 29 | FA643 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| | 7/18/2013 | Round 30 | FA6575 | NA | 1 | 2.5 U | 2.5 U | 37.7 | 0.25 | 3940 | 2 U | 300 | 50 | 859 | 320 U | 430 U | 4.6 | 6.86 | 0.22 U |
| | 1/29/2014 | Round 31 | FA12873 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| | 7/17/2014 | Round 32 | 1407130 | 0.43 | 0.79 | 0.033 U | 0.66 U | -14.5 | 0.01 U | 3660 | 2.24 J | NA | 100 | 807 | 0.001 U | 0.001 U | 0.00619 | 6.67 | 0.03 |
| | 1/23/2015 | Round 33 (PDB) | 1501096 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| | 7/24/2015 | Round 34 | 1507195 | 0.21 | 0.64 | 0.033 U | 0.66 U | -24.20 | .013 J | 3220.00 | 2.0 J | 485.00 | 160.00 | 622.00 | 0.001 U | 0.001 U | 9.23 | 6.69 | 0.02 |
| | 1/20/2015 | Round 35 | 1601156 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| | 7/21/2016 | Round 36 | 1607165 | 0.00 | 0.57 | 0.033 U | 0.43 | -28.00 | 0.01 U | 2150 | 2.1 J | 576 | 0 | 492 | 0.001 U | 0.001 U | 6.48 | 6.80 | NA |
| 508F52MW | 9/15/2004 | Wells Installed | | | | | | | | | | | | | | | | | |
| | 9/20/2004 | Round 12 | C4I210133 | NA | NA | NA | NA | NA | NA | 4500 | 3.2 | NA | NA | 1040 | NA | NA | NA | NA | NA |
| | 9/20/2004 | Round 12 | FIELD | 3.0 | 0.0 | NA | NA | 53.0 | NA | NA | NA | 400 | 70 | NA | NA | NA | NA | 6.75 | NA |
| | 9/20/2004 | Round 12 | P0409353 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | 240 | 270 | 2.7 | NA | NA |
| | 8/23/2005 | Round 13A | CTO260-22 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| | 10/19/2005 | Round 14 | CTO 260-23 | 0.8 | 0.0 | NA | NA | 14.0 | 0.019 J | 4400 J | 2 | 350 | 70 | 1700 | 10,000 U | 10,000 U | 3.1 U | 6.83 | 1.2 J |
| | 8/29/2007 | Round 18 | DALLASW002 | NA | NA | 0.34 | 1.0 UR | NA | 0.5 UL | 2740 | 4.2 | NA | NA | 458 | 330 U | 330 UJ | 1.8 U | NA | 0.8 U |
| | 8/29/2007 | Round 18 | FIELD | 1.0 | 0.0 | NA | NA | 95.0 | NA | NA | NA | 350 | 80 | NA | NA | NA | NA | 6.76 | NA |
| | 7/16/2009 | Round 22 | F66711 | 0.4 | 0.4 | 0.29 | 1.3 UR | -16.4 | 0.024 J | 1490 | 2.1 JL | 300 | 40 | 691 | 1000 | 430 U | 11.6 | 7.00 | 0.6 U |
| | 1/13/2010 | Round 23 | F70773 | NA | NA | NA | NA | 38.1 | NA | NA | NA | NA | NA | NA | NA | NA | NA | 6.55 | NA |
| | 7/14/2010 | Round 24 | F75198 | NA | NA | NA | NA | -32.0 | NA | NA | NA | NA | NA | NA | NA | NA | NA | 6.72 | NA |
| | 1/12/2011 | Round 25 | FIELD | NA | NA | NA | NA | -127.8 | NA | NA | NA | NA | NA | NA | NA | NA | NA | 7.15 | NA |
| | 7/28/2011 | Round 26 | F84700 | 1 | 1 | 4.4 | 0.5 U | -26.3 | 0.055 | 2390 | 1.8 | 700 | 0 | 1260 | 8290 | 430 U | 136 | 6.85 | 0.3 U |
| | 1/11/2012 | Round 27 | F88817 | NA | NA | NA | NA | 7.4 | NA | NA | NA | NA | NA | NA | NA | NA | NA | 6.69 | NA |
| | 7/12/2012 | Round 28 | F94831 | NA | NA | NA | NA | -35.9 | NA | NA | NA | NA | NA | NA | NA | NA | NA | 6.77 | NA |
| | 1/9/2013 | Round 29 | FA643 | NA | NA | NA | NA | -19.9 | NA | NA | NA | NA | NA | NA | NA | NA | NA | 6.84 | NA |
| | 7/18/2013 | Round 30 | FA6575 | 0.2 | 0.2 | 2.5 U | 2.5 U | -15.7 | 0.20 | 2240 | 1.7 U | 700 | 70 | 1400 JL | 1500 | 430 U | 133 | 6.9 | 0.23 U |
| | 1/29/2014 | Round 31 | FA12873 | 0.68 | NA | NA | NA | 38.7 | NA | NA | NA | NA | NA | NA | NA | NA | NA | 6.77 | NA |
| | 7/21/2014 | Round 32 | 1407162 | 0.41 | 0.56 | 0.033 U | 0.825 U | 48.9 | 0.0257 J | 2520 | 2.04 J | NA | 95 | 1380 | 0.00532 | 0.001 U | 0.131 | 6.79 | 0.05 |
| | 1/23/2015 | Round 33 | 1501096 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| | 7/27/2015 | Round 34 | 1507202 | 0.88 | 0.32 | 0.033 U | 0.825 U | -17.90 | 0.01 U | 2950.00 | 1.86 | 471.00 | 90.00 | 1440.00 | 20.60 | 0.001 U | 387.00 | 6.33 | 0.04 |
| | 1/20/2016 | Round 35 | 1601156 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| | 7/21/2016 | Round 36 | 1607165 | 0.00 | 0.53 | 0.033 U | 0.033 U | 14.00 | 0.0109 J | 2290 | 1.96 J | 436 | 0 | 1210 | 35300 | 0.001 U | 587 | 6.38 | NA |

**Table 4-3A**

**Summary of Geochemical Parameters Measured in Groundwater**
**Long Term Monitoring Wells — SWMUs 79/136 Central Plume**
**2016 RAER**
**Former NAS Dallas, Texas**


| Monitoring Well | Sampling Date | Sampling Round | SDG | Oxidation-Reduction Conditions | | | | | | | | Degradation Products | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Dissolved Oxygen[2] | Ferrous Iron[2] | Nitrate[3] | Nitrite[3] | ORP[1] | Phosphate[3] | Sulfate[3] | TOC[3] | Alkalinity[2] | Carbon Dioxide[2] | Chloride[3] | Ethane[3] | Ethene[3] | Methane[3] | pH[1] | Sulfide[3] |
| | | | Units | mg/L | mg/L | mg/L | mg/L | mV | mg/L | mg/L | mg/L | mg/L | mg/L | mg/L | ng/L | ng/L | µg/L | S.U. | mg/L |
| 508G04MW/ 508F53MW | 6/7/2000 | Wells Installed | | | | | | | | | | | | | | | | | |
| | 6/23/2000 | | DL343 | 0.8 | 0.2 | 0.1 U | 0.1 U | 102.8 | 0.1 U | 2220 | 46.4 | 109 | 10 | 888 | 0.02 U | 0.02 U | 30 | 8.27 | 0.01 U |
| | 11/8/2001 | | DL375,P0111155 | 12 > | 0.2 | 0.26 | 0.5 U | 98.7 | 2.2 U | 3600 | NA | 450 | 43 | 1180 | 0.016 J | 0.16 J | 2.7 J | 6.67 | 0.01 U |
| | 2/12/2002 | ASA-5 Round 2 | DL616 | 12 > | 0.2 | 2.3 | 0.31 | 207.5 | 0.50 U | 3790 | NA | 400 | 55 | 1310 | NA | NA | NA | 6.76 | 0.01 U |
| | 7/9/2002 | ASA-5 Round 3 | 100191 | 2.5 | 0.2 | 0.27 | 0.5 U | 104 | 2.5 U | 1270 | 9.5 | 400 | 115 | 360 | NA | NA | NA | 7.04 | 0.01 U |
| | 9/25/2002 | ASA-5 Round 4 | 60147 | 1 | 0.2 | 0.017 J | 0.050 U | 102 | 0.050 U | 841 | 7.8 | 400 | 70 | 361 | NA | NA | NA | 6.97 | 0.01 U |
| | 11/19/2002 | Round 8 | DL378 | NA | NA | 0.1 U | 0.1 U | NA | 0.5 UJ | 589 | 7 | NA | NA | 363 | | | | | |
| | 9/20/2004 | Round 12 | C4I210133 | NA | NA | NA | NA | NA | NA | 597 | 8.3 | NA | NA | 246 | NA | NA | NA | NA | NA |
| | 9/20/2004 | Round 12 | FIELD | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | 7.32 | NA |
| | 9/20/2004 | Round 12 | P0409353 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | 72 | 29 | 190 | NA | NA |
| | 8/24/2005 | Round 13A | CTO260-22 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| | 10/20/2005 | Round 14 | CTO 260-23 | 0.9 | 0.0 | NA | NA | 83.0 | 0.0099 J | 1000 J | 4.8 | 500 | 120 | 240 | 10,000 U | 10,000 U | 200 | 6.85 | 0.14 UJ |
| | 8/28/2007 | Round 18 | DALLASW002 | NA | NA | 0.05 U | 1.0 UR | NA | 0.5 U | 492 | 4.2 | NA | NA | 213 | 330 U | 330 UJ | 120 | NA | 0.8 U |
| | 8/28/2007 | Round 18 | FIELD | 0.5 | 0.0 | NA | NA | 27.0 | NA | NA | NA | 400 | 80 | NA | NA | NA | NA | 6.79 | NA |
| | 7/16/2009 | Round 22 | F66711 | 1.5 | 0.4 | 0.05 U | 0.5 UR | -29.1 | 0.03 J | 631 | 2.7 | 600 | 100 | 241 | 320 U | 430 U | 72.3 | 6.90 | 0.6 U |
| | 7/28/2011 | Round 26 | F84700 | 0.8 | 0.6 | 0.5 U | 0.5 U | -71.1 | 0.051 | 567 | 2.6 | 120 | 12 | 262 | 1200 | 430 U | 80.8 | 6.93 | 0.3 U |
| | 7/12/2012 | Round 28 | F94831 | NA | NA | NA | NA | 12.6 | NA | NA | NA | NA | NA | NA | NA | NA | NA | 6.78 | NA |
| | 1/9/2013 | Round 29 | FA643 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| | 7/18/2013 | Round 30 | FA6575 | 0.4 | 0.2 | 1.3 U | 1.3 U | -63.5 | 0.020 U | 1380 | 2.9 | 300 | 0 | 334 JL | 770 J | 430 U | 111 | 6.95 | 0.23 U |
| | 1/29/2014 | Round 31 | FA12873 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| | 7/21/2014 | Round 32 | 1407162 | 0.53 | 0.66 | 0.033 U | 0.66 U | 25.1 | 0.01 U | 3470 | 2.39 J | NA | 100 | 443 | 0.001 U | 0.001 U | 0.0686 | 6.72 | 0 |
| | 1/23/2015 | Round 33 (PDB) | 1501096 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| | 7/27/2015 | Round 34 | 1507202 | 0.58 | 0.00 | 0.033 U | 0.66 U | -43.30 | 0.020 U | 1100.00 | 2.72 J | 772.00 | 160.00 | 368.00 | 0.001 U | 0.001 U | 761.00 | 6.40 | 0.07 |
| | 1/20/2016 | Round 35 | 1601156 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| | 7/20/2016 | Round 36 | 1607165 | 0.00 | 0.00 | 0.033 U | 0.248 J | -69.00 | 0.01 U | 926 | 3.01 | 825 | 0 | 306 | 0.001 U | 0.001 U | 271.00 | 6.82 | NA |
| 508F57MW | 8/28/2007 | Round 18 | DALLASW002 | NA | NA | 0.05 U | 1.0 UR | NA | 0.5 U | 492 | 4.2 | NA | NA | 213 | 330 U | 330 UJ | 52 | NA | 0.8 U |
| | 8/28/2007 | Round 18 | FIELD | 1.0 | 0.0 | NA | NA | 66.0 | NA | NA | NA | 300 | 100 | NA | NA | NA | NA | 6.42 | NA |
| | 7/16/2009 | Round 22 | F66711 | 0.5 | 0.0 | 0.05 U | 0.5 UR | 56.4 | 0.03 J | 2270 | 1.7 | 400 | 60 | 444 | 320 U | 430 U | 18.8 | 6.45 | 0.6 U |
| | 1/13/2010 | Round 23 | F70773 | NA | NA | NA | NA | 135.7 | NA | NA | NA | NA | NA | NA | NA | NA | NA | 6.54 | NA |
| | 7/14/2010 | Round 24 | F75198 | NA | NA | NA | NA | 28.5 | NA | NA | NA | NA | NA | NA | NA | NA | NA | 6.74 | NA |
| | 1/12/2011 | Round 25 | FIELD | NA | NA | NA | NA | -43.1 | NA | NA | NA | NA | NA | NA | NA | NA | NA | 6.55 | NA |
| | 7/28/2011 | Round 26 | F84700 | 0.4 | 10 | 3.4 JL | 4.6 JL | -114.3 | 0.025 | 2110 | 0.3 | 14 | 13 | 442 | 1200 | 1300 | 63.6 | 6.68 | 0.3 U |
| | 1/11/2012 | Round 27 | F88817 | NA | NA | NA | NA | -84.6 | NA | NA | NA | NA | NA | NA | NA | NA | NA | 6.77 | NA |
| | 7/12/2012 | Round 28 | F94831 | NA | NA | NA | NA | -81.3 | NA | NA | NA | NA | NA | NA | NA | NA | NA | 6.82 | NA |
| | 1/9/2013 | Round 29 | FA643 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| | 7/18/2013 | Round 30 | FA6575 | 0.8 | 0 | 1.3 U | 1.3 U | -11.8 | 0.14 | 2100 | 1.5 U | 300 | 70 | 435 | 320 U | 430 U | 9.1 | 6.87 | 0.22 U |
| | 1/29/2014 | Round 31 | FA12873 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| | 7/18/2014 | Round 32 | 1407152 | 0.55 | 1.1 | 0.033 U | 0.66 U | 40.4 | 0.01 U | 3240 | 2.05 J | NA | 100 | 364 | 0.001 U | 0.001 U | 0.0615 | 6.62 | 0.01 |
| | 1/26/2015 | Round 33 (PDB) | 1501101 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| | 7/27/2015 | Round 34 | 1507202 | 0.65 | 0.18 | 0.033 U | 0.66 U | 69.40 | 0.01 U | 2440.00 | 1.5 U | 487.00 | 135.00 | 383.00 | 0.001 U | 0.001 U | 6.41 | 6.72 | 0.03 |
| | 1/20/2016 | Round 35 | 1601156 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| | 7/20/2016 | Round 36 | 1607165 | 0.00 | 0.57 | 0.133 J | 0.033 U | 15.00 | 0.01 U | 2060 | 1.34 J | 492 | 0 | 412 | 0.001 U | 0.001 U | 16.70 | 6.97 | NA |

**Table 4-3A**

**Summary of Geochemical Parameters Measured in Groundwater**
**Long Term Monitoring Wells — SWMUs 79/136 Central Plume**
**2016 RAER**
**Former NAS Dallas, Texas**


| Monitoring Well | Sampling Date | Sampling Round | SDG | Oxidation-Reduction Conditions | | | | | | | | Degradation Products | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Dissolved Oxygen[2] | Ferrous Iron[2] | Nitrate[3] | Nitrite[3] | ORP[1] | Phosphate[3] | Sulfate[3] | TOC[3] | Alkalinity[2] | Carbon Dioxide[2] | Chloride[3] | Ethane[3] | Ethene[3] | Methane[3] | pH[1] | Sulfide[3] |
| | | | Units | mg/L | mg/L | mg/L | mg/L | mV | mg/L | mg/L | mg/L | mg/L | mg/L | mg/L | ng/L | ng/L | µg/L | S.U. | mg/L |
| 508G02MW | 6/7/2000 | Wells Installed | | | | | | | | | | | | | | | | | |
| | 8/25/2000 | Round 6 | UNKNOWN | NA | NA | NA | NA | NA | NA | NA | 3.3 | NA | NA | NA | NA | NA | NA | NA | NA |
| | 10/19/2000 | Round 6 | UNKNOWN | NA | NA | NA | NA | NA | NA | NA | 2.9 | NA | NA | NA | NA | NA | NA | NA | NA |
| | 9/25/2002 | ASA-5 Round 4 | 60147 | NA | NA | 0.039 J | 0.25 U | NA | 0.25 U | 2310 | 1.8 | NA | NA | 649 | NA | NA | NA | NA | NA |
| | 9/25/2002 | ASA-5 Round 4 | FIELD | 4.0 | 0.2 | NA | NA | 84.0 | NA | NA | NA | 300 | 70 | NA | NA | NA | NA | 6.83 | 0.01 U |
| | 11/19/2002 | Round 8 | DL378 | NA | NA | 0.11 | 0.10 U | NA | 10 UJ | 2360 | 2 | NA | NA | 605 | NA | NA | NA | NA | NA |
| | 8/26/2003 | Round 9 | 26285 | NA | NA | NA | NA | NA | 10 U | 2580 | 2 | NA | NA | 437 L | NA | NA | NA | NA | NA |
| | 8/26/2003 | Round 9 | FIELD | 1.5 | 0.2 | NA | NA | 7.0 | NA | NA | NA | 270 | 35 | NA | NA | NA | NA | 6.87 | 0.01 U |
| | 12/19/2003 | Round 10 | C3L200111 | NA | NA | NA | NA | NA | NA | 2510 | NA | NA | NA | 672 | NA | NA | NA | NA | NA |
| | 12/19/2003 | Round 10 | FIELD | 1.0 | 0.0 | NA | NA | 123.0 | NA | NA | NA | 250 | NA | NA | NA | NA | NA | 6.33 | 0.0 |
| | 9/14/2004 | Round 12 | FIELD | 0.8 | 0.0 | NA | NA | 74.0 | NA | NA | NA | 350 | 50 | NA | NA | NA | NA | 6.65 | NA |
| | 8/24/2005 | Round 13A | CTO260-22 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| | 10/19/2005 | Round 14 | CTO 260-23 | 0.6 | 0.0 | NA | NA | 93.0 | 0.00991 U | 2500 J | 6.3 | 350 | 250 | 840 | 10,000 U | 10,000 U | 25 | 6.58 | 0.14 UJ |
| | 8/28/2007 | Round 18 | DALLASW002 | NA | NA | 0.05 U | 1.0 UR | NA | 0.5 U | 2500 | 3.2 | NA | NA | 649 | 330 U | 330 UJ | 110 | NA | 0.8 U |
| | 8/28/2007 | Round 18 | FIELD | 0.5 | 0.0 | NA | NA | 121.0 | NA | NA | NA | 750 | 260 | NA | NA | NA | NA | 6.42 | NA |
| | 7/16/2009 | Round 22 | F66711 | 0.6 | 0.0 | 0.05 U | 2.5 UR | 108.2 | 0.02 U | 1910 | 2.9 | 700 | 200 | 551 | 410 J | 430 U | 91.1 | 6.48 | 0.6 U |
| | 1/13/2010 | Round 23 | F70773 | NA | NA | NA | NA | 37.9 | NA | NA | NA | NA | NA | NA | NA | NA | NA | 6.32 | NA |
| | 7/14/2010 | Round 24 | F75198 | NA | NA | NA | NA | -28.8 | NA | NA | NA | NA | NA | NA | NA | NA | NA | 6.56 | NA |
| | 1/12/2011 | Round 25 | FIELD | NA | NA | NA | NA | -2.6 | NA | NA | NA | NA | NA | NA | NA | NA | NA | 6.21 | NA |
| | 7/28/2011 | Round 26 | F84700 | 0.6 | 0.0 | 0.5 R | 0.5 R | -45.7 | 0.14 | 2430 | 2.8 | 0 | 200 | 709 | 710 | 430 U | 61.4 | 6.73 | 0.3 U |
| | 1/11/2012 | Round 27 | F88817 | NA | NA | NA | NA | -36.1 | NA | NA | NA | NA | NA | NA | NA | NA | NA | 6.58 | NA |
| | 7/12/2012 | Round 28 | F94831 | NA | NA | NA | NA | 16.2 | NA | NA | NA | NA | NA | NA | NA | NA | NA | 6.63 | NA |
| | 1/9/2013 | Round 29 | FA643 | NA | NA | NA | NA | -6.3 | NA | NA | NA | NA | NA | NA | NA | NA | NA | 6.72 | NA |
| | 7/18/2013 | Round 30 | FA6575 | 0.2 | 0 | 2.5 U | 2.5 U | 34.6 | 0.061 J | 2110 | 2.4 | 700 | 130 | 564 JL | 320 J | 430 U | 56.5 | 6.75 | 0.22 U |
| | 1/29/2014 | Round 31 | FA12873 | 0.46 | NA | NA | NA | 43.7 | NA | NA | NA | NA | NA | NA | NA | NA | NA | 6.72 | NA |
| | 7/21/2014 | Round 32 | 1407162 | 0.2 | 0 | 0.033 U | 0.66 U | -33.4 | 0.01 U | 2080 | 2.47 J | NA | 100 | 647 | 0.001 U | 0.001 U | 0.075 | 6.44 | 0.01 |
| | 1/23/2015 | Round 33 | 1501096 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| | 7/27/2015 | Round 34 | 1507202 | 0.23 | 0.31 | 0.033 U | 0.66 U | 19.80 | 0.01 U | 2550.00 | 1.84 J | 613.00 | 140.00 | 752.00 | 1.34 J | 0.001 U | 97.60 | 3.54 | 0.00 |
| | 1/20/2016 | Round 35 | 1601156 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| | 7/21/2016 | Round 36 | 1607165 | 0.00 | 0.38 | 0.033 U | 0.033 U | 94.00 | 0.01 U | 2380 | 2.11 J | 636 | 0 | 760 | 1900 J | 0.001 U | 171 | 6.95 | NA |

**Table 4-3A**

**Summary of Geochemical Parameters Measured in Groundwater**
**Long Term Monitoring Wells — SWMUs 79/136 Central Plume**
**2016 RAER**
**Former NAS Dallas, Texas**


| Monitoring Well | Sampling Date | Sampling Round | SDG | Oxidation-Reduction Conditions | | | | | | | | Degradation Products | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Dissolved Oxygen[2] | Ferrous Iron[2] | Nitrate[3] | Nitrite[3] | ORP[1] | Phosphate[3] | Sulfate[3] | TOC[3] | Alkalinity[2] | Carbon Dioxide[2] | Chloride[3] | Ethane[3] | Ethene[3] | Methane[3] | pH[1] | Sulfide[3] |
| | | | Units | mg/L | mg/L | mg/L | mg/L | mV | mg/L | mg/L | mg/L | mg/L | mg/L | mg/L | ng/L | ng/L | µg/L | S.U. | mg/L |
| 508G03MW | 6/7/2000 | Wells Installed | | | | | | | | | | | | | | | | | |
| | 1/13/2010 | Round 23 | F70773 | NA | NA | NA | NA | 26.1 | NA | NA | NA | NA | NA | NA | NA | NA | NA | 6.51 | NA |
| | 7/14/2010 | Round 24 | F75198 | NA | NA | NA | NA | -0.5 | NA | NA | NA | NA | NA | NA | NA | NA | NA | 6.75 | NA |
| | 1/12/2011 | Round 25 | FIELD | NA | NA | NA | NA | -30.4 | NA | NA | NA | NA | NA | NA | NA | NA | NA | 6.43 | NA |
| | 7/28/2011 | Round 26 | F84700 | 0.3 | 0 | 1.3 U | 0.25 R | 17.4 | 0.087 | 2620 | 1.8 | 11 | 12 | 524 | 1700 | 430 U | 72.7 | 6.66 | 0.3 U |
| | 1/11/2012 | Round 27 | F88817 | NA | NA | NA | NA | 10.1 | NA | NA | NA | NA | NA | NA | NA | NA | NA | 6.73 | NA |
| | 7/12/2012 | Round 28 | F94831 | NA | NA | NA | NA | -44.8 | NA | NA | NA | NA | NA | NA | NA | NA | NA | 6.87 | NA |
| | 1/9/2013 | Round 29 | FA643 | NA | NA | NA | NA | -66.6 | NA | NA | NA | NA | NA | NA | NA | NA | NA | 6.88 | NA |
| | 7/18/2013 | Round 30 | FA6575 | 0.2 | 0.1 | 1.3 U | 1.3 U | 20.2 | 0.45 | 2100 | 1.8 | 500 | 70 | 399 | 360 U | 430 U | 149 J | 6.87 | 0.23 U |
| | 1/29/2014 | Round 31 | FA12873 | 0.29 | NA | NA | NA | 52.9 | NA | NA | NA | NA | NA | NA | NA | NA | NA | 6.81 | NA |
| | 7/21/2014 | Round 32 | 1407162 | 0.28 | 0.11 | 0.033 U | 0.66 U | -4.7 | 0.01 U | 2070 | 2 J | NA | 100 | 409 | 0.00319 J | 0.001 U | 0.18 | 6.56 | 0.07 |
| | 1/26/2015 | Round 33 | 1501101 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| | 7/27/2015 | Round 34 | 1507202 | 0.23 | 0.51 | 0.033 U | 0.66 U | 28.90 | 0.01 U | 2960.00 | 1.47 J | 569.00 | 145.00 | 495.00 | 0.001 U | 0.001 U | 117.00 | 3.63 | 0.00 |
| | 1/20/2016 | Round 35 | 1601156 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| | 7/20/2016 | Round 36 | 1607165 | 0.00 | 0.51 | 0.033 U | 0.033 U | 73.00 | 0.01 U | 2460 | 2.14 J | 623 | 0 | 494 | 4180 | 0.001 U | 159 | 6.76 | NA |
| 60-21 | 9/24/1999 | Round 5 | DL324,TTE11 | 0.4 | 0.0 | 10.00 U | 10.0 U | 208.8 | 2.6 | 3830 | NA | 528 | 369 | 1970 | 45 | 92 | 42.94 | 6.43 | 0.0 U |
| | 7/7/2000 | Round 6 | DL347 | 0.5 | 0.2 | 0.50 U | 2.5 U | 213.8 | 2.5 U | 3960 | NA | 500 | 225 | 1950 | NA | NA | NA | 6.42 | 0.01 U |
| | 12/16/2003 | Round 10 | C3L170177 | 0.8 | 0.0 | NA | NA | 405.0 | NA | 3900 | NA | 500 | NA | 1550 | NA | NA | NA | 6.97 | 0.0 |
| | 10/19/2005 | Round 14 | CTO260-22,23 | 0.3 | 0.0 | NA | NA | 128.0 | 0.00991 U | 5000 J | 2.4 | 500 | 160 | 1200 | 10,000 U | 10,000 U | 12 U | 6.58 | 1.4 J |
| | 8/27/2007 | Round 18 | DALLASW002 | NA | NA | 0.05 U | 1.0 UJ | NA | 0.5 U | 4180 | 2.7 | NA | NA | 952 | 330 U | 330 U | 14 | NA | 0.8 U |
| | 8/27/2007 | Round 18 | FIELD | 1.0 | 0.0 | NA | NA | 102.0 | NA | NA | NA | 500 | 100 | NA | NA | NA | NA | 6.51 | NA |
| | 7/16/2009 | Round 22 | F66711 | 0.7 | 0.1 | 0.26 | 2.5 UR | 97.1 | 0.088 J | 3690 | 2.8 JL | 400 | 50 | 805 | 320 U | 430 U | 0.29 | 6.58 | 0.6 U |
| | 7/28/2011 | Round 26 | F84700 | 0.4 | 0 | 2.5 UJL | 2.9 JL | -20.7 | 0.15 | 4130 | 2.6 | 600 | 70 | 765 | 320 U | 430 U | 4.77 | 6.65 | 0.3 U |
| | 7/12/2012 | Round 28 | F94831 | NA | NA | NA | NA | 56.9 | NA | NA | NA | NA | NA | NA | NA | NA | NA | 6.61 | NA |
| | 1/9/2013 | Round 29 | FA643 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| | 7/18/2013 | Round 30 | FA6575 | 0.3 | 0 | 1.3 U | 1.3 U | 117.2 | 0.25 | 1580 | 2.0 | 500 | 60 | 232 | 320 U | 430 U | 2.9 | 7.07 | 0.22 U |
| | 1/29/2014 | Round 31 | FA12873 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| | 7/17/2014 | Round 32 | 1407130 | 0.27 | 0.01 | 0.13 J | 0.66 U | -54.2 | 0.024 J | 2750 | 2.25 J | NA | 100 | 421 | 0.001 U | 0.001 U | 0.00514 | 6.57 | 0 |
| | 1/23/2015 | Round 33 (PDB) | 1501096 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| | 7/27/2015 | Round 34 | 1507202 | 0.88 | 0.04 | 0.25 U | 0.25 U | 16.40 | 0.01 U | 4190.00 | 1.76 J | 551.00 | 130.00 | 552.00 | 0.001 U | 0.001 U | 5.23 | 6.67 | 0.07 |
| | 1/20/2016 | Round 35 | 1601156 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| | 7/22/2016 | Round 36 | 1607165 | 0.00 | 0.09 | 0.033 U | 1.06 | | 0.0175 J | 3660 | 2.06 J | 592 | 0 | 516 | 0.001 U | 0.001 U | 4.23 | 6.85 | NA |

**Table 4-3A**

**Summary of Geochemical Parameters Measured in Groundwater**
**Long Term Monitoring Wells — SWMUs 79/136 Central Plume**
**2016 RAER**
**Former NAS Dallas, Texas**


| Monitoring Well | Sampling Date | Sampling Round | SDG | Oxidation-Reduction Conditions | | | | | | | | Degradation Products | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Dissolved Oxygen[2] | Ferrous Iron[2] | Nitrate[3] | Nitrite[3] | ORP[1] | Phosphate[3] | Sulfate[3] | TOC[3] | Alkalinity[2] | Carbon Dioxide[2] | Chloride[3] | Ethane[3] | Ethene[3] | Methane[3] | pH[1] | Sulfide[3] |
| | | | Units | mg/L | mg/L | mg/L | mg/L | mV | mg/L | mg/L | mg/L | mg/L | mg/L | mg/L | ng/L | ng/L | µg/L | S.U. | mg/L |
| **Monitoring Wells Located Outside the PCLE Zone** | | | | | | | | | | | | | | | | | | | |
| **508F31MW** | 7/21/1999 | Wells Installed | | | | | | | | | | | | | | | | | |
| | 6/23/2000 | Round 6 | DL342 | 1.0 | 0.2 | 1.50 | 0.1 U | 180.4 | 0.1 U | 2450 | NA | 200 | 23 | 1300 | NA | NA | NA | 6.74 | 0.01 U |
| | 6/18/2001 | Round 7 | DL363 | 1.5 | 0.2 | 0.82 | 1.0 U | 53.3 | 0.027 U | 3430 | NA | 300 | 45 | 1770 | NA | NA | NA | 6.90 | 0.01 U |
| | 1/9/2003 | Round 8 | 100319 | 1.5 | 0.2 | 0.44 | 0.5 U | 513.0 | 0.5 U | 3350 | NA | 160 | 43 | 1680 | NA | NA | NA | 6.74 | 0.01 U |
| | 12/21/2003 | Round 10 | C3L230193 | 1.5 | 0.0 | NA | NA | 524.0 | NA | 3360 | NA | 450 | NA | 1620 J | NA | NA | NA | 6.66 | 0.0 |
| | 10/10/2005 | Round 14 | FIELD | NA | NA | NA | NA | 125.0 | NA | NA | NA | NA | NA | NA | NA | NA | NA | 6.60 | NA |
| | 8/28/2007 | Round 18 | DALLASW002 | NA | NA | 0.082 | 1.0 UR | NA | 0.5 U | 2800 | 1.8 | NA | NA | 1400 | 330 U | 330 UJ | 1.1 U | NA | 0.8 U |
| | 8/28/2007 | Round 18 | FIELD | 0.9 | 0.0 | NA | NA | 63.0 | NA | NA | NA | 300 | 55 | NA | NA | NA | NA | 6.87 | NA |
| | 7/16/2009 | Round 22 | F66711 | 0.5 | 0.0 | 0.05 U | 2.5 UR | 209.8 | 0.02 U | 1790 | 2 JL | 400 | 50 | 950 | 320 U | 430 U | 0.21 J | 6.92 | 0.6 U |
| | 7/28/2011 | Round 26 | F84700 | 0.8 | 0 | 1.8 | 0.5 U | 49.5 | 0.083 | 936 | 2.1 | 12 | 25 | 470 | 320 U | 430 U | 0.16 U | 7.43 | 0.3 U |
| | 7/12/2012 | Round 28 | F94831 | NA | NA | NA | NA | 96.1 | NA | NA | NA | NA | NA | NA | NA | NA | NA | 6.68 | NA |
| | 1/9/2013 | Round 29 | FA643 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| | 7/18/2013 | Round 30 | FA6575 | 0.3 | 0 | 1 | 0.50 U | 69.2 | 0.055 J | 849 | 2.8 | 300 | 45 | 356 | 320 U | 430 U | 0.16 U | 6.95 | 0.53 J |
| | 1/29/2014 | Round 31 | FA12873 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| | 7/17/2014 | Round 32 | 1407130 | 0.5 | 0.15 | 0.892 | 0.33 U | 394.5 | 0.01 U | 1080 | 1.93 J | NA | 25 | 437 | 0.001 U | 0.001 U | 0.001 U | 7.01 | 0.02 |
| | 1/23/2015 | Round 33 (PDB) | 1501096 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| | 7/27/2015 | Round 34 | 1507202 | 1.31 | 0.29 | 0.05 U | 5.55 | 15.50 | 0.01 U | 974.00 | 1.63 J | 300.00 | 55.00 | 357.00 | 0.001 U | 0.001 U | 1.01 J | 6.96 | 0.00 |
| | 1/20/2016 | Round 35 | 1601156 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| | 7/21/2016 | Round 36 | 1607165 | 2.00 | 0.00 | 1.26 | 0.033 U | 52.00 | 0.01 U | 205 | 1.77 J | 245 | 0 | 134 | 0.001 U | 0.001 U | 0.001 U | 9.41 | NA |
| **508F58MW** | 8/28/2007 | Round 18 | DALLASW002 | NA | NA | 0.05 U | 1.0 UR | NA | 0.5 U | 3070 | 1.4 | NA | NA | 474 | 330 U | 330 UJ | 2 U | NA | 1.1 |
| | 8/28/2007 | Round 18 | FIELD | 1.0 | 0.0 | NA | NA | -60.0 | NA | NA | NA | 400 | 90 | NA | NA | NA | NA | 6.43 | NA |
| | 7/16/2009 | Round 22 | F66711 | 3.0 | 0.0 | 0.05 U | 0.5 UR | -158.7 | 0.04 J | 1940 | 4 | 350 | 40 | 516 | 320 U | 430 U | 5.98 | 6.70 | 0.6 U |
| | 1/13/2010 | Round 23 | F70773 | NA | NA | NA | NA | -88.2 | NA | NA | NA | NA | NA | NA | NA | NA | NA | 6.65 | NA |
| | 7/14/2010 | Round 24 | F75198 | NA | NA | NA | NA | -66.7 | NA | NA | NA | NA | NA | NA | NA | NA | NA | 6.99 | NA |
| | 1/12/2011 | Round 25 | FIELD | NA | NA | NA | NA | -123.7 | NA | NA | NA | NA | NA | NA | NA | NA | NA | 6.83 | NA |
| | 7/28/2011 | Round 26 | F84700 | 1 | 0.6 | 0.41 JL | 0.25 R | -48.8 | 0.17 | 1830 | 3.8 | 12 | 14 | 546 | 320 U | 430 U | 140 | 6.67 | 0.3 U |
| | 1/11/2012 | Round 27 | F88817 | NA | NA | NA | NA | -44.8 | NA | NA | NA | NA | NA | NA | NA | NA | NA | 6.84 | NA |
| | 7/12/2012 | Round 28 | F94831 | NA | NA | NA | NA | -30.8 | NA | NA | NA | NA | NA | NA | NA | NA | NA | 6.88 | NA |
| | 1/9/2013 | Round 329 | FA643 | NA | NA | NA | NA | -54.2 | NA | NA | NA | NA | NA | NA | NA | NA | NA | 6.97 | NA |
| | 7/18/2013 | Round 30 | FA6575 | 3 | 0 | 0.41 J | 0.25 U | 50.3 | 0.073 J | 239 | 11 | 300 | 25 | 100 | 320 U | 430 U | 8.7 | 7.31 | 0.27 J |
| | 1/29/2014 | Round 31 | FA12873 | 0.37 | NA | NA | NA | -5.4 | NA | NA | NA | NA | NA | NA | NA | NA | NA | 6.95 | NA |
| | 7/18/2014 | Round 32 | 1407152 | 0.4 | 0.45 | 0.033 U | 0.66 U | 27.3 | 0.01 U | 2010 | 2.52 J | NA | 45 | 690 | 0.001 U | 0.001 U | 0.175 | 6.8 | 0 |
| | 1/26/2015 | Round 33 | 1501101 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| | 7/27/2015 | Round 34 | 1507202 | 0.96 | 0.38 | 0.033 U | 0.66 U | -3.40 | 0.01 U | 2680.00 | 1.49 J | 431.00 | 95.00 | 751.00 | 0.001 U | 0.001 U | 100.00 | 6.73 | 0.00 |
| | 1/20/2016 | Round 35 | 1601156 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| | 7/20/2016 | Round 36 | 1607165 | 0.00 | 0.40 | 0.033 U | 0.033 U | -83.00 | 0.01 U | 1490 | 2.31 J | 391 | 0 | 881 | | | | 7.02 | NA |
| **508F59MW** | 8/29/2007 | Round 18 | DALLASW002 | NA | NA | 0.05 U | 1.0 UR | NA | 0.5 UL | 2640 | 2.2 | NA | NA | 720 | 330 U | 330 U | 7.1 U | NA | 0.8 U |
| | 8/29/2007 | Round 18 | FIELD | 0.8 | 0.0 | NA | NA | 13.0 | NA | NA | NA | 300 | 35 | NA | NA | NA | NA | 6.75 | NA |
| | 7/16/2009 | Round 22 | F66711 | 0.4 | 0.0 | 0.05 U | 2.5 UR | 246.8 | 0.13 | 1780 | 1.7 | 400 | 50 | 437 | 320 U | 430 U | 1.12 | 6.87 | 0.6 U |
| | 7/28/2011 | Round 26 | F84700 | 0.5 | 0.2 | 2.5 | 0.25 R | 1 | 0.15 | 2380 | 1.2 | 120 | 13 | 443 | 320 U | 430 U | 23.4 | 6.84 | 0.3 U |
| | 7/12/2012 | Round 28 | F94831 | NA | NA | NA | NA | -6.6 | NA | NA | NA | NA | NA | NA | NA | NA | NA | 6.89 | NA |
| | 1/9/2013 | Round 29 | FA643 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| | 7/18/2013 | Round 30 | FA6575 | 0.2 | 0.3 | 1.3 U | 1.3 U | -40 | 0.47 | 2490 | 1.5 U | 350 | 35 | 335 | 320 U | 430 U | 16.9 | 6.99 | 0.22 U |
| | 1/29/2014 | Round 31 | FA12873 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| | 7/22/2014 | Round 32 | 1407174 | 0.39 | 0.17 | 0.033 U | 0.66 U | 95.5 | 0.01 U | 2340 | 1.64 J | NA | 90 | 388 | 0.001 U | 0.001 U | 0.0134 | 6.73 | 0.35 |
| | 1/26/2015 | Round 33 (PDB) | 1501101 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| | 7/27/2015 | Round 34 | 1507202 | 0.77 | 0.34 | 0.033 U | 0.66 U | 15.90 | 0.01 U | 2520.00 | 1.5 U | 374.00 | 90.00 | 329.00 | 0.001 U | 0.001 U | 11.60 | 6.77 | 0.33 |
| | 1/20/2016 | Round 35 | 1601156 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| | 7/20/2016 | Round 36 | 1607165 | 0.00 | 0.25 | 0.033 U | 0.033 U | -50.00 | 0.01 U | 2250 | 1.25 U | 401 | 0 | 270 | | | 138.00 | 7.03 | NA |

**Table 4-3A**

**Summary of Geochemical Parameters Measured in Groundwater**
**Long Term Monitoring Wells — SWMUs 79/136 Central Plume**
**2016 RAER**
**Former NAS Dallas, Texas**


| Monitoring Well | Sampling Date | Sampling Round | SDG | Oxidation-Reduction Conditions | | | | | | | | Degradation Products | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Dissolved Oxygen[2] | Ferrous Iron[2] | Nitrate[3] | Nitrite[3] | ORP[1] | Phosphate[3] | Sulfate[3] | TOC[3] | Alkalinity[2] | Carbon Dioxide[2] | Chloride[3] | Ethane[3] | Ethene[3] | Methane[3] | pH[1] | Sulfide[3] |
| | | | Units | mg/L | mg/L | mg/L | mg/L | mV | mg/L | mg/L | mg/L | mg/L | mg/L | mg/L | ng/L | ng/L | µg/L | S.U. | mg/L |
| 508F60MW | 8/29/2007 | Round 18 | DALLASW002 | NA | NA | 0.05 U | 1.0 UR | NA | 0.5 UL | 2530 | 1.4 | NA | NA | 774 | 330 U | 330 U | 2.7 U | NA | 0.8 |
| | 8/29/2007 | Round 18 | FIELD | 0.5 | 0.0 | NA | NA | 51.0 | NA | NA | NA | 350 | 50 | NA | NA | NA | NA | 6.67 | NA |
| | 7/16/2009 | Round 22 | F66711 | 0.5 | 0.1 | 0.05 U | 2.5 UR | 279.9 | 0.024 J | 1940 | 1.5 | 300 | 40 | 710 | 320 U | 430 U | 0.63 | 6.81 | 0.6 U |
| | 7/28/2011 | Round 26 | F84700 | 0.5 | 0 | 2.9 | 0.25 R | 8.8 | 0.11 | 2340 | 1.5 | 150 | 13 | 761 | 320 U | 430 U | 750 | 6.8 | 0.3 U |
| | 7/12/2012 | Round 28 | F94831 | NA | NA | NA | NA | 42.4 | NA | NA | NA | NA | NA | NA | NA | NA | NA | 6.75 | NA |
| | 1/9/2013 | Round 29 | FA643 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| | 7/18/2013 | Round 30 | FA6575 | 0.2 | 0.1 | 2.5 U | 2.5 U | 10.9 | 0.020 U | 2620 | 1.8 | 400 | 50 | 773 JL | 320 U | 430 U | 0.42 J | 6.85 | 0.22 U |
| | 1/29/2014 | Round 31 | FA12873 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| | 7/22/2014 | Round 32 | 1407174 | 0.21 | 0.06 | 0.033 U | 0.66 U | -83.8 | 0.01 U | 2570 | 1.84 J | NA | 100 | 842 | 0.001 U | 0.001 U | 0.001 U | 6.64 | 0.01 |
| | 1/26/2015 | Round 33 (PDB) | 1501101 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| | 7/27/2015 | Round 34 | 1507202 | 0.54 | 0.00 | 0.033 U | 0.66 U | 94.40 | 0.01 U | 2750.00 | 1.36 J | 413.00 | 100.00 | 908.00 | 0.001 U | 0.001 U | 2.19 J | 6.65 | 0.00 |
| | 1/20/2016 | Round 35 | 1601156 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| | 7/20/2016 | Round 36 | 1607165 | 0.00 | 0.24 | 0.033 U | 0.033 U | 16.00 | 0.01 U | 2270 | 1.51 J | 395 | 0 | 719 | | | 9.90 | 6.05 | NA |
| 508F61MW | 8/30/2007 | Round 18 | DALLASW002 | NA | NA | 0.19 | 1.0 UJ | NA | 0.5 UL | 3300 | 1.3 | NA | NA | 982 | 330 U | 330 U | 4.5 | NA | 0.8 U |
| | 8/30/2007 | Round 18 | FIELD | 0.9 | 0.0 | NA | NA | 248.0 | NA | NA | NA | 225 | 28 | NA | NA | NA | NA | 6.68 | NA |
| | 7/16/2009 | Round 22 | F66711 | 0.4 | 0.0 | 0.05 U | 2.5 UR | 204.6 | 0.056 J | 2840 | 0.87 J | 300 | 40 | 574 | 320 U | 430 U | 0.16 U | 6.91 | 0.6 U |
| | 7/28/2011 | Round 26 | F84700 | 0.3 | 0 | 0.67 JL | 0.5 R | 0.6 | 0.02 U | 3440 | 0.97 | 180 | 12 | 692 | 320 U | 430 U | 0.84 | 6.94 | 0.3 U |
| | 7/12/2012 | Round 28 | F94831 | NA | NA | NA | NA | 40.8 | NA | NA | NA | NA | NA | NA | NA | NA | NA | 6.85 | NA |
| | 1/9/2013 | Round 29 | FA643 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| | 7/18/2013 | Round 30 | FA6575 | 0.2 | 0 | 2.5 U | 2.5 U | 26 | 0.34 | 3630 | 1.2 U | 300 | 40 | 528 | 320 U | 430 U | 1.1 | 7 | 0.24 U |
| | 1/29/2014 | Round 31 | FA12873 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| | 7/22/2014 | Round 32 | 1407174 | 0.42 | 2.45 | 0.033 U | 0.66 U | -102.5 | 0.01 U | 3280 | 1.25 U | NA | 90 | 553 | 0.001 U | 0.001 U | 0.00123 J | 6.92 | 0.03 |
| | 1/26/2015 | Round 33 (PDB) | 1501101 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| | 7/27/2015 | Round 34 | 1507202 | 0.57 | 0.27 | 0.033 U | 0.66 U | 3.00 | 0.01 U | 3690.00 | 1.25 U | 328.00 | 95.00 | 543.00 | 0.001 U | 0.001 U | 1.25 J | 6.81 | 0.03 |
| | 1/20/2016 | Round 35 | 1601156 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| | 7/20/2016 | Round 36 | 1607165 | 0.00 | 0.52 | 0.033 U | 0.033 U | -46.00 | 0.01 U | 2460 | 1.25 U | 251 | 0 | 344 | 0.001 U | 0.001 U | 0.001 U | 6.69 | NA |

mg/L - milligrams per liter
mV - millivolts
NA - Not Analyzed
ng/L - nanograms per liter
ORP - Oxidation/reduction potential

TOC - Total Organic Carbon
mg/L - micrograms per liter
S.U. - Standard Units
SDG - Sample Delivery Group
PCLE - Protective Concentration Level Exceedance

Notes:
1. Field measurement, Meter
2. Field measurement, Test Kit
3. Analytical Laboratory result

Analytical Result Qualifiers:
J, K, L - Indicates that the chemical was detected; however, the associated numerical result may not be a precise representation of the amount that is actually present in the sample. The laboratory reported concentration is considered to be bias unknown (J), high (K), or low (L)
U - Indicates that the sample was not detected at the numerical detection limit (sample-specific quantitation limit) noted. Nondetected results from the laboratory are reported in this manner. This qualifier is added to a positive result (reported by the laboratory) if the detected concentration is determined to be attributable to contamination introduced during field sampling or laboratory analysis.

**Table 4-3B**

**Summary of Geochemical Parameters Measured in Groundwater**
**Historical Monitoring Wells — SWMUs 79/136 Central Plume**
**2016 RAER**
**Former NAS Dallas, Texas**
**Page 1 of 4**

| Monitoring Well | Sampling Date | SDG | Oxidation-Reduction Conditions | | | | | | | | Degradation Products | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Dissolved Oxygen[2] | Ferrous Iron[2] | Nitrate[3] | Nitrite[3] | ORP[1] | Phosphate[3] | Sulfate[3] | TOC[3] | Alkalinity[2] | Carbon Dioxide[2] | Chloride[3] | Ethane[3] | Ethene[3] | Methane[3] | pH[1] | Sulfide[3] |
| | | Units | mg/L | mg/L | mg/L | mg/L | mV | mg/L | mg/L | mg/L | mg/L | mg/L | mg/L | mg/L | ng/L | mg/L | S.U. | mg/L |
| Monitoring Wells Located Inside PCLE Zone | | | | | | | | | | | | | | | | | | |
| 508G05MW | 8/25/2000 | UNKNOWN | NA | NA | NA | NA | NA | NA | NA | 12.8 | NA | NA | NA | NA | NA | NA | NA | NA |
| | 9/24/2002 | 250199 | 1.0 | 2.2 | 0.05 U | 0.25 U | -154.0 | 0.50 U | 2.1 | 5.2 | 500 | 100 | 24.6 | NA | NA | NA | 7.04 | 0.01 U |
| | 11/19/2002 | DL378 | NA | NA | 0.10 U | 0.10 U | -- | 0.5 UJ | 1.6 | 5 | NA | NA | 26.4 | NA | NA | NA | NA | NA |
| | 8/26/2003 | 26285 | 0.6 | 3.0 | NA | NA | -153.0 | 0.5 U | 1.2 | 5 | 370 | 108 | 28.1 L | NA | NA | NA | 6.88 | 0.01 U |
| | 12/17/2003 | C3L180179 | 1.0 | 3.3 | NA | NA | -90.0 | NA | 1.3 L | NA | 650 | NA | 28.2 | NA | NA | NA | 6.76 | 0.0 |
| | 9/19/2004 | FIELD | 1.0 | 4.5 | NA | NA | -139.0 | NA | NA | NA | 350 | 125 | NA | NA | NA | NA | 7.20 | NA |
| | 10/20/2005 | FIELD | NA | NA | NA | NA | -135.0 | NA | NA | NA | NA | NA | NA | NA | NA | NA | 6.80 | NA |
| | 8/30/2007 | DALLASW002 | NA | NA | 0.05 U | 1.0 UJ | NA | 0.5 UL | 4 | 3.7 | NA | NA | 151 | 4,200 | 2,800 | 2,100 | NA | 0.8 U |
| | 8/30/2007 | FIELD | 1.0 | 0.0 | NA | NA | -132.0 | NA | NA | NA | 300 | 35 | NA | NA | NA | NA | 6.75 | NA |
| | 7/16/2009 | F66711 | 2.0 | 3.0 | 0.05 U | 0.05 UR | -104.7 | 0.024 J | 32.6 | 4.3 JL | 400 | 120 | 143 | 7490 | 890 J | 1,600 | 6.80 | 0.6 U |
| | 1/13/2010 | F70773 | NA | NA | NA | NA | 135.9 | NA | NA | NA | NA | NA | NA | NA | NA | NA | 6.25 | NA |
| | 7/14/2010 | F75198 | NA | NA | NA | NA | 11.5 | NA | NA | NA | NA | NA | NA | NA | NA | NA | 6.52 | NA |
| | 1/12/2011 | FIELD | NA | NA | NA | NA | -112.5 | NA | NA | NA | NA | NA | NA | NA | NA | NA | 6.54 | NA |
| | 7/28/2011 | F84700 | 0.4 | 5 | 0.25 U | 0.25 U | -47.7 | 0.1 | 13.9 | 4.5 | 400 | 115 | 128 | 3910 | 430 U | 2,230 | 6.62 | 0.3 U |
| | 1/11/2012 | F88817 | NA | NA | NA | NA | -80.6 | NA | NA | NA | NA | NA | NA | NA | NA | NA | 6.79 | NA |
| | 7/12/2012 | F94831 | NA | NA | NA | NA | -49.1 | NA | NA | NA | NA | NA | NA | NA | NA | NA | 6.77 | NA |
| | 1/9/2013 | FA643 | NA | NA | NA | NA | -76.1 | NA | NA | NA | NA | NA | NA | NA | NA | NA | 6.98 | NA |
| | 7/18/2013 | FA6575 | 0.6 | 0.2 | 0.25 U | 0.25 U | -116.8 | 0.43 | 10.4 | 5.1 | 700 | 75 | 150 JL | 370 | 430 U | 2290 | 7 | 0.23 U |
| | 1/29/2014 | FA12873 | 0.26 | NA | NA | NA | -71.8 | NA | NA | NA | NA | NA | NA | NA | NA | NA | 6.89 | NA |
| | 7/18/2014 | 1407152 | 0.83 | 1.47 | 0.049 J | 0.033 U | 76.7 | 0.01 U | 34.7 | 5.21 | NA | 50 | 133 | 0.00536 | 0.001 U | 1.5 | 6.87 | 0 |
| | 1/23/2015 | 1501096 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| | 7/27/2015 | 1507202 | 0.29 | 2.17 | 0.25 U | 0.25 U | -101.50 | 0.01 U | 9.26 J | 4.32 | 232.00 | 105.00 | 111.00 | 2.98 J | 0.001 U | 138.00 | 3.65 | 0.00 |
| | 4/4/2016 | Well Plugged and Abandoned | | | | | | | | | | | | | | | | |

**Table 4-3B**

**Summary of Geochemical Parameters Measured in Groundwater**
**Historical Monitoring Wells — SWMUs 79/136 Central Plume**
**2016 RAER**
**Former NAS Dallas, Texas**
**Page 2 of 4**

| Monitoring Well | Sampling Date | SDG | Oxidation-Reduction Conditions | | | | | | | | Degradation Products | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Dissolved Oxygen[2] | Ferrous Iron[2] | Nitrate[3] | Nitrite[3] | ORP[1] | Phosphate[3] | Sulfate[3] | TOC[3] | Alkalinity[2] | Carbon Dioxide[2] | Chloride[3] | Ethane[3] | Ethene[3] | Methane[3] | pH[1] | Sulfide[3] |
| | | Units | mg/L | mg/L | mg/L | mg/L | mV | mg/L | mg/L | mg/L | mg/L | mg/L | mg/L | mg/L | ng/L | mg/L | S.U. | mg/L |
| **Monitoring Wells Located Outside PCLE Zone** | | | | | | | | | | | | | | | | | | |
| **50803MW** | 9/10/1999 | DL321 | 0.3 | 0 | 5 U | 5 U | 200 | 5 UJ | 3230 J | NA | 358 | 193 | 845 | 0.046 | 0.046 | 15.87 | 6.88 | 0 U |
| | 6/22/2000 | DL342 | 0.3 | 0.2 | 0.04 | 0.1 U | 131.5 | 0.1 U | 3030 | 26.3 | 380 | 35 | 893 | NA | NA | NA | 6.82 | 0.01 U |
| | 6/25/2001 | 608MWD32-7,DL366 | 1 | 2 | 0.07 | 2.0 U | 61.2 | 0.50 U | 3840 | NA | 350 | 70 | 1220 | 0.084 J | 0.12 J | 10 J | 6.86 | 0.01 U |
| | 11/8/2001 | DL375,P0111155 | 4 | 7 | 0.1 U | 2 UJ | -51.6 | 40.4 U | 3370 | NA | 650 | 250 | 1380 | 0.21 J | 0.64 J | 6.9 J | 6.46 | 0.01 U |
| | -- | Well Destroyed | | | | | | | | | | | | | | | | |
| **508F23MW** | 7/12/1999 | Wells Installed | | | | | | | | | | | | | | | | |
| | 6/23/2000 | DL342 | 0.3 | 0.2 | 0.04 | 0.1 U | 175.3 | 0.1 U | 1850 | NA | 500 | 50 | 426 | NA | NA | NA | 6.72 | 0.01 U |
| | 6/7/2001 | DL362 | 0.4 | 0.2 | 0.1 U | 0.1 U | 128.4 | 10 U | 5410 | NA | 500 | 70 | 325 | NA | NA | NA | 6.59 | 0.01 U |
| | 9/24/2002 | 250199 | 1 | 0.2 | 0.50 U | 0.50 U | -75 | 5.0 U | 4740 | 4.3 | 200 | 90 | 344 | NA | NA | NA | 6.76 | 0.01 U |
| | 11/19/2002 | DL378 | NA | NA | 0.1 U | 0.1 U | NA | 12.5 UJ | 4230 | 4 | NA | NA | 317 | NA | NA | NA | | |
| | 8/24/2003 | 26285 | 0.6 | 0.2 | NA | NA | -31 | 10 UJ | 4740 J | 4 | 500 | 100 | 324 L | NA | NA | NA | 7.67 | 0.25 U |
| | 12/22/2003 | C3L230193 | 1 | 0.2 | NA | NA | 6 | NA | 4880 | NA | 450 | NA | 73.0 J | NA | NA | NA | 6.65 | 0 |
| | 10/10/2005 | FIELD | NA | NA | NA | NA | -42 | NA | NA | NA | NA | NA | NA | NA | NA | NA | 6.64 | NA |
| | 8/27/2007 | DALLASW002 | NA | NA | 0.05 | 1.0 UJ | NA | 0.5 U | 3280 | 4.5 | NA | NA | 426 | NA | NA | NA | NA | 0.8 U |
| | 8/27/2007 | FIELD | 1 | 0 | NA | NA | -33 | NA | NA | NA | 400 | 80 | NA | 330 U | 1,000 | 210 | 6.67 | NA |
| **508F25MW** | 7/22/1999 | Wells Installed | | | | | | | | | | | | | | | | |
| | 6/27/2000 | DL345 | 1 | 1.2 | 0.5 U | 0.5 U | -23.7 | 0.5 U | 774 J | NA | 350 | 50 | 76.6 | NA | NA | NA | 6.91 | 0.01 U |
| | 12/21/2003 | C3L230193 | 1 | 0 | NA | NA | 11 | NA | 1600 | NA | 300 | NA | 323 J | NA | NA | NA | 6.05 | 0 |
| | 4/19/2005 | Well Abandoned | | | | | | | | | | | | | | | | |
| **508F32MW** | 7/6/2000 | Wells Installed | | | | | | | | | | | | | | | | |
| | 7/6/2000 | DL347 | 0.8 | 5 | 0.5 U | 0.5 U | -80.8 | 2.5 U | 4330 | NA | 750 | 150 | 454 | NA | NA | NA | 6.81 | 0.01 U |
| | 6/3/2003 | Well Abandoned | | | | | | | | | | | | | | | | |
| **508F33MW** | 8/30/1999 | Wells Installed | | | | | | | | | | | | | | | | |
| | 9/22/1999 | DL324,TTE11 | 1 | 0 | 10 U | 10 U | 208.9 | 10 U | 3810 | NA | 468 | 230 | 766 | 0.283 | 0.109 | 52.36 | 6.76 | 0 U |
| | 6/28/2000 | DL345 | 1 | 0.2 | 0.5 U | 0.5 U | 283.8 | 10 U | 3590 | NA | 500 | 65 | 729 | NA | NA | NA | 6.74 | 0.01 U |
| | 6/3/2003 | Well Abandoned | | | | | | | | | | | | | | | | |
| **508F50MW** | 9/15/2004 | Wells Installed | | | | | | | | | | | | | | | | |
| | 9/20/2004 | C4I210133,P0409353 | 0.8 | 2.5 | NA | NA | -115.0 | NA | 1510 | 5.2 | 350 | 70 | 104 | 18,000 | 25,000 | 5,100 | 6.65 | NA |
| | 8/23/2005 | CTO260-22 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| | 10/19/2005 | CTO260-23 | 0.8 | 2.0 | NA | NA | -163.0 | 0.00991 U | 2700 J | 2.4 | 700 | 70 | 140 | 100,000 U | 100,000 U | 4,400 | 6.97 | NA |
| | 8/28/2007 | DALLASW002 | NA | NA | 0.05 U | 1.0 UR | NA | 0.5 U | 915 | 3.5 | NA | NA | 215 | 16,000 | 2,100 J | 2000 | NA | 0.8 U |
| | 8/28/2007 | FIELD | 1.0 | 4.0 | NA | NA | -104.0 | NA | NA | NA | 100 | 130 | NA | NA | NA | NA | 6.32 | NA |
| | 7/16/2009 | F66711 | 1.0 | 0.0 | 0.05 U | 0.25 UR | -194.7 | 0.024 J | 1500 | 2.3 JL | 500 | 100 | 190 | 12100 | 430 U | 1310 | 6.52 | 0.6 U |
| | 7/28/2011 | F84700 | 0.2 | 7 | 1.3 U | 0.25 R | -10.2 | 0.11 | 2260 | 2.7 | 400 | 50 | 159 | 4410 | 430 U | 849 | 6.51 | 0.3 U |
| | 7/12/2012 | F94831 | NA | NA | NA | NA | -86.1 | NA | NA | NA | NA | NA | NA | NA | NA | NA | 6.58 | NA |
| | 1/9/2013 | FA643 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| | 7/18/2013 | FA6575 | 0.6 | 0 | 0.50 U | 0.50 U | -93.7 | 0.31 | 245 | 4.2 | 250 | 25 | 191 JL | 5000 | 430 U | 1680 | 6.9 | 0.23 U |
| | 1/29/2014 | FA12873 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| | 7/18/2014 | 1407152 | 0.26 | 1.31 | 0.033 U | 0.66 U | -95.4 | 0.01 U | 845 | 4.48 | NA | 100 | 169 | 0.00748 | 0.001 U | 2.21 | 6.25 | 0.01 |
| | 1/23/2015 | 1501096 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| | 7/27/2015 | 1507202 | 0.89 | 1.68 | 0.033 U | 0.66 U | -78.80 | 0.01 U | 2770.00 | 2.26 J | 442.00 | 100.00 | 125.00 | 0.001 U | 0.001 U | 256.00 | 6.69 | 0.00 |
| | 4/4/2016 | Well Plugged and Abandoned | | | | | | | | | | | | | | | | |

**Table 4-3B**

**Summary of Geochemical Parameters Measured in Groundwater**
**Historical Monitoring Wells — SWMUs 79/136 Central Plume**
**2016 RAER**
**Former NAS Dallas, Texas**
**Page 3 of 4**

| Monitoring Well | Sampling Date | SDG | Oxidation-Reduction Conditions | | | | | | | | Degradation Products | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Dissolved Oxygen[2] | Ferrous Iron[2] | Nitrate[3] | Nitrite[3] | ORP[1] | Phosphate[3] | Sulfate[3] | TOC[3] | Alkalinity[2] | Carbon Dioxide[2] | Chloride[3] | Ethane[3] | Ethene[3] | Methane[3] | pH[1] | Sulfide[3] |
| | | Units | mg/L | mg/L | mg/L | mg/L | mV | mg/L | mg/L | mg/L | mg/L | mg/L | mg/L | mg/L | ng/L | mg/L | S.U. | mg/L |
| 508G01MW | 6/7/2000 | Wells Installed | | | | | | | | | | | | | | | | |
| | 9/26/2002 | 70247 | 3.0 | 0.2 | 0.47 | 0.25 U | 137.0 | 0.25 U | 4170 | 1.1 | 300 | 60 | 848 | NA | NA | NA | 6.95 | 0.01 U |
| | 12/21/2003 | C3L230193 | 1.0 | 0.0 | NA | NA | 395 | NA | 4010 | NA | 250 | NA | 1070 J | NA | NA | NA | 6.50 | 0.0 |
| | 10/19/2005 | FIELD | NA | NA | NA | NA | 64.0 | NA | NA | NA | NA | NA | NA | NA | NA | NA | 6.91 | NA |
| | 8/28/2007 | DALLASW002 | NA | NA | 0.75 | 1.0 UR | NA | 0.5 UL | 4180 | 1.4 | NA | NA | 1130 | 330 U | 330 U | 1.2 U | NA | 0.8 U |
| | 8/28/2007 | FIELD | 0.9 | 0.1 | NA | NA | 197.0 | NA | NA | NA | 350 | 80 | NA | NA | NA | NA | 6.73 | NA |
| | 7/16/2009 | F66711 | 3.0 | 0.1 | 0.32 | 2.5 UR | 32.3 | 1 U | 3650 | 1.5 | 400 | 40 | 662 | 320 U | 430 U | 0.17 J | 6.85 | 0.6 U |
| | 1/13/2010 | F70773 | NA | NA | NA | NA | 115.0 | NA | NA | NA | NA | NA | NA | NA | NA | NA | 6.70 | NA |
| | 7/14/2010 | F75198 | NA | NA | NA | NA | 10.9 | NA | NA | NA | NA | NA | NA | NA | NA | NA | 6.96 | NA |
| | 1/12/2011 | FIELD | NA | NA | NA | NA | 48.1 | NA | NA | NA | NA | NA | NA | NA | NA | NA | 6.90 | NA |
| | 7/28/2011 | F84700 | 1 | 0 | 4.5 | 0.5 R | 62.9 | 0.17 | 4170 | 1.4 | 350 | 40 | 1010 | 320 U | 430 U | 0.36 | 6.87 | 0.3 U |
| | 7/12/2012 | F94831 | NA | NA | NA | NA | 6.2 | NA | NA | NA | NA | NA | NA | NA | NA | NA | 6.93 | NA |
| | 1/9/2013 | FA643 | NA | NA | NA | NA | 39.4 | NA | NA | NA | NA | NA | NA | NA | NA | NA | 7 | NA |
| | 7/18/2013 | FA6575 | NA | NA | 2.5 U | 2.5 U | 65.9 | 0.020 U | 3760 | 1.7 | NA | NA | 663 JL | 320 U | 430 U | 0.16 U | 7.31 | 0.62 U |
| | 1/29/2014 | FA12873 | 2.51 | NA | NA | NA | 70.6 | NA | NA | NA | NA | NA | NA | NA | NA | NA | 7.03 | NA |
| | 7/21/2014 | 1407162 | 3.52 | 0.28 | 0.251 | 0.825 U | 47.7 | 0.0327 J | 4140 | 1.43 J | NA | 90 | 661 | 0.001 U | 0.001 U | 0.001 U | 6.87 | 0.09 |
| | 1/26/2015 | 1501101 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| | 7/27/2015 | 1507202 | 1.88 | 0.64 | 2.5 U | 2.5 U | 50.40 | 0.020 U | 4050.00 | 1.25 U | 387.00 | 90.00 | 835.00 | 0.001 U | 0.001 U | 2.14 J | 6.34 | 0.00 |
| | 4/4/2016 | Well Plugged and Abandoned | | | | | | | | | | | | | | | | |
| 508G06MW | 6/3/2000 | Wells Installed | | | | | | | | | | | | | | | | |
| | 8/25/2000 | UNKNOWN | NA | NA | NA | NA | NA | NA | NA | 104 | NA | NA | NA | NA | NA | NA | NA | NA |
| | 10/19/2000 | UNKNOWN | NA | NA | NA | NA | NA | NA | NA | 73.1 | NA | NA | NA | NA | NA | NA | NA | NA |
| | 11/8/2001 | DL375,PO111155 | 0.3 | 3.5 | 0.1 U | 0.1 U | -62 | 0.095 U | 1690 | NA | 235 | 30 | 69.2 | 54 J | 130 J | 290 J | 6.71 | 0.01 U |
| | 2/13/2002 | DL616 | 1 | 1.1 | 0.10 U | 0.10 U | 239 | 0.040 U | 1590 | NA | 160 | 20 | 99.6 | NA | NA | NA | 6.92 | 0.01 U |
| | 7/9/2002 | 100191 | 1 | 1.2 | 0.05 U | 0.05 U | -103 | 2.5 U | 1540 | 8.3 | 170 | 70 | 109 | NA | NA | NA | 6.95 | 0.01 U |
| | 9/25/2002 | 60147 | 1 | 2.2 | 0.050 U | 0.050 U | -116 | 0.050 U | 1600 | 5.2 | 200 | 70 | 76.3 | NA | NA | NA | 6.81 | 0.01 U |
| | 11/20/2002 | DL378 | NA | NA | 0.1 U | 0.1 U | NA | 0.5 UJ | 1600 | 5 | NA | NA | 76.2 | NA | NA | NA | | |
| | 8/24/2003 | 26285 | 0.8 | 2 | NA | NA | -126 | 10 UJ | 1370 | 5 | 270 | 70 | 63.8 L | NA | NA | NA | 7.09 | 0.25 U |
| | 12/18/2003 | C3L190206 | 1 | 1.2 | NA | NA | -45 | NA | 1310 | NA | 500 | NA | 70.5 | NA | NA | NA | 6.75 | 0 |
| | 9/16/2004 | C4I170149,P0409326 | 1 | 1.4 | NA | NA | -118 | NA | 1190 | 5.7 L | 350 | 70 | 79.6 | 8,600 | 280 | 1,800 | 7.09 | NA |
| | 8/24/2005 | CTO260-22 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| | 10/20/2005 | CTO260-22 | 0.8 | 1.6 | NA | NA | -89 | 0.00991 U | 680 J | 3.2 | 350 | 120 | 110 | 8,600 J | 10,000 U | 790 | 6.68 | 0.3 J |
| | 8/30/2007 | DALLASW002 | NA | NA | 0.05 | 1.0 UJ | NA | 0.5 UL | 804 | 2.9 | NA | NA | 147 | 8,600 | 330 U | 480 | NA | 0.8 U |
| | 8/30/2007 | FIELD | 0.7 | 0.8 | NA | NA | -91 | NA | NA | NA | 450 | 70 | NA | NA | NA | NA | 6.54 | NA |
| | 4/4/2016 | Well Plugged and Abandoned | | | | | | | | | | | | | | | | |
| 60-08 | 9/1/2099 | DL321,TTE11 | 0.8 | 0.2 | 10 U | 10 U | 185.8 | 10 UJ | 3470 J | NA | 418 | 278 | 1080 | 0.052 | 0.056 | 5.464 | 6.69 | 0 U |
| | 6/28/2000 | DL345 | 0.8 | 0.2 | 0.5 U | 10 U | 171.3 | 10 U | 3560 | NA | 485 | 55 | 1060 J | NA | NA | NA | 6.46 | 0.01 U |
| | 6/3/2003 | Well Abandoned | | | | | | | | | | | | | | | | |

**Table 4-3B**

**Summary of Geochemical Parameters Measured in Groundwater**
**Historical Monitoring Wells — SWMUs 79/136 Central Plume**
**2016 RAER**
**Former NAS Dallas, Texas**
**Page 4 of 4**

| Monitoring Well | Sampling Date | SDG | Oxidation-Reduction Conditions | | | | | | | | Degradation Products | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Dissolved Oxygen[2] | Ferrous Iron[2] | Nitrate[3] | Nitrite[3] | ORP[1] | Phosphate[3] | Sulfate[3] | TOC[3] | Alkalinity[2] | Carbon Dioxide[2] | Chloride[3] | Ethane[3] | Ethene[3] | Methane[3] | pH[1] | Sulfide[3] |
| | | Units | mg/L | mg/L | mg/L | mg/L | mV | mg/L | mg/L | mg/L | mg/L | mg/L | mg/L | mg/L | ng/L | mg/L | S.U. | mg/L |
| **Monitoring Wells Located Outside the PCLE Plume** | | | | | | | | | | | | | | | | | | |
| **50807MW** | 9/14/1999 | DL321 | 0.4 | 0 | 10 U | 10 U | 268.4 | 10 UJ | 2100 J | NA | 204 | 228 | 226 | 0.005 | 0.02 | 0.607 | 6.94 | 0 U |
| | 6/23/2000 | DL342 | 0.6 | 0.2 | 0.03 | 0.1 U | 145.1 | 0.1 U | 1510 | NA | 300 | 43 | 76.8 | NA | NA | NA | 6.71 | 0.01 U |
| | 4/18/2005 | Well Abandoned | | | | | | | | | | | | | | | | |
| **508F12MW** | 3/30/1998 | Wells Installed | | | | | | | | | | | | | | | | |
| | 4/7/1998 | DL139 | NA | NA | 0.5 U | 2.5 U | NA | NA | 3050 | NA | NA | NA | 1030 | NA | NA | 1.8 | NA | NA |
| | 2/23/1999 | DL263 | NA | NA | 10 U | 10 U | NA | 10 U | 2910 J | NA | NA | NA | 942 J | NA | NA | 1.7 U | NA | NA |
| | 8/9/1999 | DL316,TTE7 | 0.3 | 0 | 10 U | 10 U | 203.1 | 10 U | 3420 | NA | 350 | 242 | 1150 | 0.01 | 0.066 | 1.6 | 6.77 | 0 U |
| | 6/22/2000 | DL342 | 0.6 | 0.2 | 0.1 U | 0.1 U | 131.9 | 0.1 U | 3510 | NA | 360 | 55 | 1210 | NA | NA | NA | 6.81 | 0.01 U |
| | 12/21/2003 | C3L230193 | 1 | 0 | NA | NA | 177 | NA | 3490 | NA | 200 | NA | 1170 J | NA | NA | NA | 6.15 | 0 |
| | 4/19/2005 | Well Abandoned | | | | | | | | | | | | | | | | |
| **508F13MW** | 3/31/1998 | Wells Installed | | | | | | | | | | | | | | | | |
| | 4/8/1998 | DL139 | NA | NA | 0.5 U | 0.5 U | NA | NA | 3240 | NA | NA | NA | 726 | NA | NA | 11 | NA | NA |
| | 2/23/1999 | DL263 | NA | NA | 10 U | 10 U | NA | 10 U | 3430 J | NA | NA | NA | 704 J | NA | NA | 6.3 | NA | NA |
| | 8/4/1999 | DL315,TTE7 | 0.4 | 0 | 10 U | 10 U | 164 | 10 UJ | 3520 | NA | 328 | 234 | 808 J | 0.101 | 0.293 | 11.02 | 6.35 | 0 U |
| | 6/22/2000 | DL342 | 0.6 | 0.2 | 0.06 | 0.1 U | 114.7 | 0.1 U | 3430 | NA | 265 | 40 | 680 | NA | NA | NA | 6.67 | 0.01 U |
| | 12/18/2003 | C3L190206 | 0.6 | 0.6 | NA | NA | -31 | NA | 2790 | NA | 250 | NA | 368 | NA | NA | NA | 7.82 | 0 |
| | 4/25/2005 | Well Abandoned | | | | | | | | | | | | | | | | |
| **508F27MW** | 7/21/1999 | Wells Installed | | | | | | | | | | | | | | | | |
| | 8/8/1999 | DL316,TTE7 | 5.5 | 0 | 20 U | 20 U | 242 | 20 U | 3660 | NA | 352 | 292 | 3970 | 0.018 | 0.125 | 0.377 | 6.73 | 0 U |
| | 6/27/2000 | DL344 | 2 | 0.2 | 0.5 U | 10 U | 207.6 | 0.5 U | 4250 J | NA | 360 | 40 | 3450 | NA | NA | NA | 6.58 | 0.01 U |
| | 1/13/2004 | C4A140117 | 2.5 | 0 | NA | NA | 107 | NA | 4220 | NA | 250 | NA | 1920 | NA | NA | NA | 6.77 | 0 |
| | 4/19/2005 | Well Abandoned | | | | | | | | | | | | | | | | |
| **508F30MW** | 6/27/2000 | Wells Installed | | | | | | | | | | | | | | | | |
| | 6/27/2000 | DL344 | 0.8 | 0.2 | 0.5 U | 5 U | 140.9 | 0.5 U | 1570 J | NA | 475 | 60 | 906 | NA | NA | NA | 6.77 | 0.02 |
| | 6/12/2001 | DL363 | 1 | 1 | 0.049 | 0.10 U | 11 | 0.50 U | 928 | NA | 750 | 155 | 575 | NA | NA | NA | 7.15 | 0.01 U |
| | 1/9/2003 | 100319 | 1 | 0.6 | 0.05 U | 0.05 U | -6 | 0.5 U | 720 | NA | 500 | 120 | 432 | NA | NA | NA | 6.96 | 0.01 U |
| | 12/21/2003 | C3L230193 | 1 | 0.9 | NA | NA | 39 | NA | 671 | NA | 1000 | NA | 374 J | NA | NA | NA | 6.86 | 0 |
| | 4/19/2005 | Well Abandoned | | | | | | | | | | | | | | | | |
| **508F34MW** | 8/8/1999 | Wells Installed | | | | | | | | | | | | | | | | |
| | 6/27/2000 | DL345 | 0.6 | 0.2 | 0.5 U | 2.5 U | 134 | 2.5 U | 3250 J | NA | 520 | 70 | 835 | NA | NA | NA | 6.62 | 0.01 U |
| | 1/23/2003 | Well Abandoned | | | | | | | | | | | | | | | | |
| **508F35MW** | 7/22/1999 | Wells Installed | | | | | | | | | | | | | | | | |
| | 6/28/2000 | DL345 | 1 | 0.6 | 0.5 U | 10 U | 271.1 | 10 U | 3230 | NA | 550 | 70 | 774 J | NA | NA | NA | 6.52 | 0.01 U |
| | 1/23/2003 | Well Abandoned | | | | | | | | | | | | | | | | |
| **60-16** | 9/20/1999 | DL321,TTE11 | 0.6 | 2.4 | 5 U | 5 U | 7.4 | 5 UJ | 1200 J | NA | 584 | 232 | 498 | 0.297 | 0.368 | 864 | 6.68 | 0 U |
| | 6/28/2000 | DL345 | 1 | 2 | 0.5 U | 5 U | -3.5 | 5 U | 759 | NA | 700 | 45 | 400 J | NA | NA | NA | 6.93 | 0.01 U |
| | -- | Well Abandoned | | | | | | | | | | | | | | | | |
| **60-17** | 9/21/1999 | DL324TTE11 | 3 | 0 | 0.19 | 0.5 U | 249.3 | 0.5 U | 78.5 | NA | 104 | 42 | 28.4 | 0.007 | 0.01 | 0.319 | 7.61 | 0 U |
| | 6/28/2000 | DL345 | 2.5 | 0.7 | 0.5 U | 0.5 U | 15 | 0.5 U | 58.8 | NA | 130 | 11.5 | 22.9 | NA | NA | NA | 6.95 | 0.01 U |
| | 12/22/2003 | C3L230193 | 0.8 | 0 | | NA | -31 | NA | 322 | NA | 125 | NA | 51.1 J | NA | NA | NA | 8.32 | 0 |
| | 4/18/2005 | Well Abandoned | | | | | | | | | | | | | | | | |
| **60-18** | 9/21/1999 | DL324,TTE11 | 0.5 | 1.3 | 10 U | 10 U | 10.5 | 1.4 | 3680 | NA | 342 | 193 | 1010 | 0.005 | 0.046 | 0.374 | 6.92 | 0 U |
| | 6/28/2000 | DL345 | 2 | 0.2 | 0.5 U | 0.5 U | 122.8 | 0.5 U | 467 | NA | 350 | 40 | 104 J | NA | NA | NA | 6.91 | 0.01 U |
| | 12/22/2003 | C3L230193 | 0.8 | 0 | NA | NA | 16 | NA | 1330 | NA | 250 | NA | 282 J | NA | NA | NA | 8.15 | 0 |
| | 4/18/2005 | Well Abandoned | | | | | | | | | | | | | | | | |

mg/L - milligrams per liter
mV - millivolts
NA - Not Analyzed
ng/L - nanograms per liter
ORP - Oxidation/reduction potential
TOC - Total Organic Carbon
mg/L - micrograms per liter
S.U. - Standard Units
SDG - Sample Delivery Group
PCLE - Protective Concentration Level Exceedance

Notes:
1. Field measurement, Meter
2. Field measurement, Test Kit
3. Analytical Laboratory result

Analytical Result Qualifiers:
J, K, L - Indicates that the chemical was detected; however, the associated numerical result may not be a precise representation of the amount that is actually present in the sample. The laboratory reported concentration is considered to be bias unknown (J), high (K), or low (L) estimate of the true concentratio
U - Indicates that the sample was not detected at the numerical detection limit (sample-specific quantitation limit) noted. Nondetected results from the laboratory are reported in this manner. This qualifier is added to a positive result (reported by the laboratory) if the detected concentration is determined to be attributable to contamination introduced durin

# TABLE 4-4
# SUMMARY OF CONCENTRATION vs. TIME WITH ATTENUATION ACTION LEVELS

**Table 4-4**

**Concentration vs. Time Attenuation Rate Constants**
**SWMUs 79/136 Central Plume**
**2016 RAER**
**Former NAS Dallas, Texas**
**Page 1 of 24**

| Monitoring Well ID | Sampling Date | Elapsed Time (Years) | Protective Concentration Level (mg/L) | Concentration Detected (mg/L) | Natural Log of Concentration (mg/L) | Degradation Rate from Natural Log ($K_{time}$) (mg/L per year) | Minimum Degradation Rate Required for Remedial Goals Natural Log ($K_{time}$) (mg/L per year) | Minimum Degradation Rate Met? (Yes/No) | Expected Remedial Goal Concentration (mg/L) | Expected Remedial Goal Concentration Met? (Yes/No) | Remedial Goals Being Met? (Yes/No) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Trichloroethene** | | | | | | | | | | | |
| 60-21 | Jul-95 | 0.0 | 0.00500 | 0.01490 | -4.21 | -- | -- | -- | -- | -- | -- |
| | Feb-96 | 0.6 | 0.00500 | 0.01400 | -4.27 | -- | -- | -- | -- | -- | -- |
| | May-96 | 0.8 | 0.00500 | 0.01300 | -4.34 | -- | -- | -- | -- | -- | -- |
| | Jul-96 | 1.0 | 0.00500 | 0.01500 | -4.20 | -0.045 | -0.052 | No | 0.01414 | No | No |
| | Oct-96 | 1.2 | 0.00500 | 0.01800 | -4.02 | 0.101 | -0.052 | No | 0.01399 | No | No |
| | Apr-98 | 2.7 | 0.00500 | 0.01500 | -4.20 | 0.024 | -0.052 | No | 0.01294 | No | No |
| | Sep-98 | 3.2 | 0.00500 | 0.00980 | -4.63 | -0.082 | -0.052 | Yes | 0.01264 | Yes | Yes |
| | Mar-99 | 3.7 | 0.00500 | 0.00960 | -4.65 | -0.112 | -0.052 | Yes | 0.01230 | Yes | Yes |
| | Sep-99 | 4.2 | 0.00500 | 0.00880 | -4.73 | -0.128 | -0.052 | Yes | 0.01199 | Yes | Yes |
| | Jul-00 | 5.0 | 0.00500 | 0.01200 | -4.42 | -0.095 | -0.052 | Yes | 0.01152 | No | Evaluate Further |
| | Jul-01 | 6.0 | 0.00500 | 0.00880 | -4.73 | -0.096 | -0.052 | Yes | 0.01093 | Yes | Yes |
| | Dec-02 | 7.4 | 0.00500 | 0.00100 U | -8.00 | -0.323 | -0.052 | Less Than PCL | 0.01015 | Less Than PCL | Less Than PCL |
| | Dec-03 | 8.4 | 0.00500 | 0.00450 | -5.40 | -0.263 | -0.052 | Less Than PCL | 0.00964 | Less Than PCL | Less Than PCL |
| | Jul-04 | 9.1 | 0.00500 | 0.00068 J | -7.29 | -0.310 | -0.052 | Less Than PCL | 0.00934 | Less Than PCL | Less Than PCL |
| | Oct-04 | 9.3 | 0.00500 | 0.00059 J | -7.44 | -0.338 | -0.052 | Less Than PCL | 0.00924 | Less Than PCL | Less Than PCL |
| | Oct-05 | 10.2 | 0.00500 | 0.01300 J | -4.34 | -0.250 | -0.052 | Yes | 0.00879 | No | Evaluate Further |
| | May-06 | 10.8 | 0.00500 | 0.00800 | -4.83 | -0.201 | -0.052 | Yes | 0.00852 | Yes | Yes |
| | Aug-06 | 11.1 | 0.00500 | 0.00800 | -4.83 | -0.168 | -0.052 | Yes | 0.00841 | Yes | Yes |
| | Apr-07 | 11.7 | 0.00500 | 0.00052 J | -7.56 | -0.198 | -0.052 | Less Than PCL | 0.00813 | Less Than PCL | Less Than PCL |
| | Aug-07 | 12.1 | 0.00500 | 0.00700 | -4.96 | -0.171 | -0.052 | Yes | 0.00799 | Yes | Yes |
| | Jan-08 | 12.5 | 0.00500 | 0.00074 J | -7.21 | -0.186 | -0.052 | Less Than PCL | 0.00782 | Less Than PCL | Less Than PCL |
| | Jul-08 | 13.0 | 0.00500 | 0.00100 | -6.91 | -0.192 | -0.052 | Less Than PCL | 0.00762 | Less Than PCL | Less Than PCL |
| | Jan-09 | 13.5 | 0.00500 | 0.00180 | -6.32 | -0.188 | -0.052 | Less Than PCL | 0.00742 | Less Than PCL | Less Than PCL |
| | Jul-09 | 14.0 | 0.00500 | 0.00470 | -5.36 | -0.169 | -0.052 | Less Than PCL | 0.00723 | Less Than PCL | Less Than PCL |
| | Jan-10 | 14.5 | 0.00500 | 0.00024 U | -8.00 | -0.187 | -0.052 | Less Than PCL | 0.00704 | Less Than PCL | Less Than PCL |
| | Jul-10 | 15.0 | 0.00500 | 0.00024 U | -8.00 | -0.200 | -0.052 | Less Than PCL | 0.00686 | Less Than PCL | Less Than PCL |
| | Jan-11 | 15.5 | 0.00500 | 0.00026 U | -8.00 | -0.209 | -0.052 | Less Than PCL | 0.00669 | Less Than PCL | Less Than PCL |
| | Jul-11 | 16.1 | 0.00500 | 0.00370 | -5.60 | -0.191 | -0.052 | Less Than PCL | 0.00651 | Less Than PCL | Less Than PCL |
| | Jan-12 | 16.5 | 0.00500 | 0.00026 U | -8.00 | -0.199 | -0.052 | Less Than PCL | 0.00635 | Less Than PCL | Less Than PCL |
| | Jul-12 | 17.0 | 0.00500 | 0.00340 | -5.68 | -0.183 | -0.052 | Less Than PCL | 0.00619 | Less Than PCL | Less Than PCL |
| | Jan-13 | 17.5 | 0.00500 | 0.00031 U | -8.00 | -0.189 | -0.052 | Less Than PCL | 0.00603 | Less Than PCL | Less Than PCL |
| | Jul-13 | 18.0 | 0.00500 | 0.0015 | -6.50 | -0.181 | -0.052 | Less Than PCL | 0.00588 | Less Than PCL | Less Than PCL |
| | Jan-14 | 18.5 | 0.00500 | 0.0003 U | -8.00 | -0.185 | -0.052 | Less Than PCL | 0.00573 | Less Than PCL | Less Than PCL |
| | Jul-14 | 19.0 | 0.00500 | 0.00188 J | -6.28 | -0.174 | -0.052 | Less Than PCL | 0.00558 | Less Than PCL | Less Than PCL |
| | Jan-15 | 19.5 | 0.00500 | 0.00025 U | -6.28 | -0.165 | -0.052 | Less Than PCL | 0.00543 | Less Than PCL | Less Than PCL |
| | Jul-15 | 20.1 | 0.00500 | 0.0015 | -6.49 | -0.158 | -0.052 | Less Than PCL | 0.00529 | Less Than PCL | Less Than PCL |
| | Jan-16 | 20.5 | 0.00500 | 0.0005 U | -7.60 | -0.158 | -0.052 | Less Than PCL | 0.00516 | Less Than PCL | Less Than PCL |
| | Jul-16 | 21.1 | 0.00500 | 0.00165 J | -6.41 | -0.151 | -0.052 | Less Than PCL | 0.00503 | Less Than PCL | Less Than PCL |
| 50803MW | Oct-95 | 0.0 | 0.00500 | 1.50000 | 0.41 | -- | -- | -- | -- | -- | -- |
| | Jan-96 | 0.3 | 0.00500 | 1.90000 | 0.64 | -- | -- | -- | -- | -- | -- |
| | Apr-96 | 0.5 | 0.00500 | 0.71000 | -0.34 | -- | -- | -- | -- | -- | -- |
| | Jul-96 | 0.7 | 0.00500 | 0.98000 | -0.02 | -0.907 | -0.273 | Yes | 1.22450 | Yes | Yes |
| | Oct-96 | 0.9 | 0.00500 | 0.96000 | -0.04 | -0.659 | -0.273 | Yes | 1.15763 | Yes | Yes |
| | Apr-98 | 2.4 | 0.00500 | 1.10000 | 0.10 | -0.115 | -0.273 | No | 0.77029 | No | No |
| | Sep-98 | 2.9 | 0.00500 | 1.90000 | 0.64 | 0.067 | -0.273 | No | 0.68178 | No | No |
| | Mar-99 | 3.4 | 0.00500 | 0.92000 | -0.08 | -0.006 | -0.273 | No | 0.59092 | No | No |
| | Sep-99 | 3.9 | 0.00500 | 0.87000 | -0.14 | -0.042 | -0.273 | No | 0.51951 | No | No |
| | Jun-00 | 4.7 | 0.00500 | 0.74000 | -0.30 | -0.074 | -0.273 | No | 0.41936 | No | No |
| | Aug-00 | 4.8 | 0.00500 | 2.20000 | 0.79 | -0.002 | -0.273 | No | 0.39973 | No | No |
| | Oct-00 | 5.0 | 0.00500 | 2.80000 | 1.03 | 0.054 | -0.273 | No | 0.38361 | No | No |
| | Jun-01 | 5.7 | 0.00500 | 5.00000 | 1.61 | 0.127 | -0.273 | No | 0.31835 | No | No |
| | Nov-01 | 6.0 | 0.00500 | 4.30000 | 1.46 | 0.163 | -0.273 | No | 0.28753 | No | No |

**Table 4-4**

**Concentration vs. Time Attenuation Rate Constants**
**SWMUs 79/136 Central Plume**
**2016 RAER**
**Former NAS Dallas, Texas**
**Page 2 of 24**

| Monitoring Well ID | Sampling Date | Elapsed Time (Years) | Protective Concentration Level (mg/L) | Concentration Detected (mg/L) | Natural Log of Concentration (mg/L) | Degradation Rate from Natural Log ($K_{time}$) (mg/L per year) | Minimum Degradation Rate Required for Remedial Goals Natural Log ($K_{time}$) (mg/L per year) | Minimum Degradation Rate Met? (Yes/No) | Expected Remedial Goal Concentration (mg/L) | Expected Remedial Goal Concentration Met? (Yes/No) | Remedial Goals Being Met? (Yes/No) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 508F49MW | Mar-02 | 6.4 | 0.00500 | 4.40000 | 1.48 | 0.186 | -0.273 | No | 0.26164 | No | No |
| | Jul-02 | 6.7 | 0.00500 | 7.40000 | 2.00 | 0.221 | -0.273 | No | 0.23969 | No | No |
| | Sep-02 | 6.9 | 0.00500 | 0.00100 U | -8.00 | -0.109 | -0.273 | Less Than PCL | 0.22592 | Less Than PCL | Less Than PCL |
| | Nov-02 | 7.1 | 0.00500 | 4.70000 | 1.55 | -0.051 | -0.273 | No | 0.21681 | No | No |
| | Aug-03 | 7.8 | 0.00500 | 1.60000 | 0.47 | -0.035 | -0.273 | No | 0.17593 | No | No |
| | Dec-03 | 8.2 | 0.00500 | 2.60000 | 0.96 | -0.008 | -0.273 | No | 0.16141 | No | No |
| | Jul-04 | 8.8 | 0.00500 | 7.60000 | 2.03 | 0.043 | -0.273 | No | 0.13669 | No | No |
| | Sep-04 | 8.9 | 0.00500 | 2.50000 | 0.92 | 0.053 | -0.273 | No | 0.13167 | No | No |
| | Mar-05 | 9.4 | 0.00500 | 0.03600 | -3.32 | -0.037 | -0.273 | No | 0.11472 | Yes | Evaluate Further |
| | Jul-05 | 9.7 | 0.00500 | 0.00700 | -4.96 | -0.142 | -0.273 | No | 0.10471 | Yes | Evaluate Further |
| | Aug-05 | 9.8 | 0.00500 | 0.09600 | -2.34 | -0.172 | -0.273 | No | 0.10192 | Yes | Evaluate Further |
| | Oct-05 | 9.9 | 0.00500 | 0.21000 | -1.56 | -0.183 | -0.273 | No | 0.09891 | No | No |
| | May-06 | 10.5 | 0.00500 | 0.33000 | -1.11 | -0.182 | -0.273 | No | 0.08414 | No | No |
| | Aug-06 | 10.8 | 0.00500 | 0.28000 | -1.27 | -0.184 | -0.273 | No | 0.07819 | No | No |
| | Apr-07 | 11.5 | 0.00500 | 0.15000 | -1.90 | -0.193 | -0.273 | No | 0.06547 | No | No |
| | Aug-07 | 11.8 | 0.00500 | 0.12000 | -2.12 | -0.203 | -0.273 | No | 0.05976 | No | No |
| | Jan-08 | 12.2 | 0.00500 | 0.08300 | -2.49 | -0.216 | -0.273 | No | 0.05325 | No | No |
| | Jul-08 | 12.7 | 0.00500 | 0.07980 | -2.53 | -0.225 | -0.273 | No | 0.04646 | No | No |
| | Jan-09 | 13.2 | 0.00500 | 0.05750 | -2.86 | -0.236 | -0.273 | No | 0.04030 | No | No |
| | Jul-09 | 13.7 | 0.00500 | 0.02420 | -3.72 | -0.255 | -0.273 | No | 0.03514 | Yes | Evaluate Further |
| | Jan-10 | 14.2 | 0.00500 | 0.02100 | -3.86 | -0.271 | -0.273 | No | 0.03069 | Yes | Evaluate Further |
| | Jul-10 | 14.7 | 0.00500 | 0.01730 | -4.06 | -0.285 | -0.273 | Yes | 0.02678 | Yes | Yes |
| | Jan-11 | 15.2 | 0.00500 | 0.08980 | -2.41 | -0.278 | -0.273 | Yes | 0.02337 | No | Evaluate Further |
| | Jul-11 | 15.8 | 0.00500 | 0.07600 | -2.58 | -0.271 | -0.273 | No | 0.02016 | No | No |
| | Jan-12 | 16.2 | 0.00500 | 0.03450 | -3.37 | -0.273 | -0.273 | No | 0.01779 | No | No |
| | Jul-12 | 16.7 | 0.00500 | 0.05650 | -2.87 | -0.268 | -0.273 | No | 0.01551 | No | No |
| | Jan-13 | 17.2 | 0.00500 | 0.060 | -2.81 | -0.262 | -0.273 | No | 0.01351 | No | No |
| | Jul-13 | 17.7 | 0.00500 | 0.0493 | -3.01 | -0.258 | -0.273 | No | 0.01179 | No | No |
| | Jan-14 | 18.2 | 0.00500 | 0.0187 | -3.98 | -0.261 | -0.273 | No | 0.01027 | No | No |
| | Jul-14 | 18.8 | 0.00500 | 0.0945 | -2.36 | -0.250 | -0.273 | No | 0.00892 | No | No |
| | Jan-15 | 19.3 | 0.00500 | 0.0085 | -4.77 | -0.258 | -0.406 | No | 0.00960 | Yes | Evaluate Further |
| | Jul-15 | 19.8 | 0.00500 | 0.0784 | -2.55 | -0.248 | -0.273 | No | 0.00676 | No | No |
| | Jan-16 | 20.3 | 0.00500 | 0.0068 | -4.99 | -0.254 | -0.273 | No | 0.00590 | No | No |
| | Jul-16 | 20.8 | 0.00500 | 0.0465 | -3.07 | -0.247 | -0.273 | No | 0.00514 | No | No |
| 508F51MW | Sep-04 | 0.0 | 0.00500 | 0.01500 | -4.20 | -- | -- | -- | -- | -- | -- |
| | Jan-05 | 0.3 | 0.00500 | 0.01300 | -4.34 | -- | -- | -- | -- | -- | -- |
| | Apr-05 | 0.5 | 0.00500 | 0.02000 | -3.91 | -- | -- | -- | -- | -- | -- |
| | Jul-05 | 0.8 | 0.00500 | 0.01800 | -4.02 | 0.338 | -0.092 | No | 0.01390 | No | No |
| | Aug-05 | 0.9 | 0.00500 | 0.01600 | -4.14 | 0.205 | -0.092 | No | 0.01378 | No | No |
| | Oct-05 | 1.0 | 0.00500 | 0.01400 | -4.27 | 0.069 | -0.092 | No | 0.01364 | No | No |
| | May-06 | 1.6 | 0.00500 | 0.01200 | -4.42 | -0.111 | -0.092 | Yes | 0.01291 | Yes | Yes |
| | Aug-06 | 1.9 | 0.00500 | 0.01700 | -4.07 | -0.028 | -0.092 | No | 0.01261 | No | No |
| | Apr-07 | 2.5 | 0.00500 | 0.02200 | -3.82 | 0.084 | -0.092 | No | 0.01187 | No | No |
| | Aug-07 | 2.9 | 0.00500 | 0.02200 | -3.82 | 0.117 | -0.092 | No | 0.01151 | No | No |
| | Jan-08 | 3.3 | 0.00500 | 0.02100 | -3.86 | 0.117 | -0.092 | No | 0.01108 | No | No |
| | Jul-08 | 3.8 | 0.00500 | 0.02060 | -3.88 | 0.107 | -0.092 | No | 0.01058 | No | No |
| | Jan-09 | 4.3 | 0.00500 | 0.01470 | -4.22 | 0.060 | -0.092 | No | 0.01009 | No | No |
| | Jul-09 | 4.8 | 0.00500 | 0.02680 | -3.62 | 0.084 | -0.092 | No | 0.00963 | No | No |
| | Jan-10 | 5.3 | 0.00500 | 0.03040 | -3.49 | 0.104 | -0.092 | No | 0.00920 | No | No |
| | Jul-10 | 5.8 | 0.00500 | 0.03420 | -3.38 | 0.120 | -0.092 | No | 0.00879 | No | No |
| | Jan-11 | 6.3 | 0.00500 | 0.03010 | -3.50 | 0.121 | -0.092 | No | 0.00840 | No | No |
| | Jul-11 | 6.9 | 0.00500 | 0.03410 | -3.38 | 0.124 | -0.092 | No | 0.00799 | No | No |
| | Jan-12 | 7.3 | 0.00500 | 0.02230 | -3.80 | 0.106 | -0.092 | No | 0.00766 | No | No |
| | Jul-12 | 7.8 | 0.00500 | 0.02920 | -3.53 | 0.101 | -0.092 | No | 0.00732 | No | No |
| | Jan-13 | 8.3 | 0.00500 | 0.0150 | -4.20 | 0.075 | -0.092 | No | 0.00698 | No | No |
| | Jul-13 | 8.8 | 0.00500 | 0.0234 | -3.76 | 0.068 | -0.092 | No | 0.00667 | No | No |
| | Jan-14 | 9.3 | 0.00500 | 0.0182 | -4.01 | 0.055 | -0.092 | No | 0.00637 | No | No |
| | Jul-14 | 9.8 | 0.00500 | 0.0177 | -4.03 | 0.045 | -0.092 | No | 0.00608 | No | No |
| | Jan-15 | 10.3 | 0.00500 | 0.0212 | -3.85 | 0.040 | -0.121 | No | 0.00608 | No | No |
| | Jul-15 | 10.9 | 0.00500 | 0.0133 | -4.32 | 0.027 | -0.092 | No | 0.00553 | No | No |
| | Jan-16 | 11.3 | 0.00500 | 0.0068 | -4.99 | 0.004 | -0.092 | No | 0.00529 | No | No |
| | Jul-16 | 11.9 | 0.00500 | 0.0134 | -4.31 | -0.003 | -0.092 | No | 0.00505 | No | No |

**Table 4-4**

**Concentration vs. Time Attenuation Rate Constants**
**SWMUs 79/136 Central Plume**
**2016 RAER**
**Former NAS Dallas, Texas**
**Page 3 of 24**

| Monitoring Well ID | Sampling Date | Elapsed Time (Years) | Protective Concentration Level (mg/L) | Concentration Detected (mg/L) | Natural Log of Concentration (mg/L) | Degradation Rate from Natural Log ($K_{time}$) (mg/L per year) | Minimum Degradation Rate Required for Remedial Goals Natural Log ($K_{time}$) (mg/L per year) | Minimum Degradation Rate Met? (Yes/No) | Expected Remedial Goal Concentration (mg/L) | Expected Remedial Goal Concentration Met? (Yes/No) | Remedial Goals Being Met? (Yes/No) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 508F52MW | Sep-04 | 0.0 | 0.00500 | 0.20000 | -1.61 | -- | -- | -- | -- | -- | -- |
| | Jan-05 | 0.3 | 0.00500 | 0.81000 | -0.21 | -- | -- | -- | -- | -- | -- |
| | Apr-05 | 0.5 | 0.00500 | 0.62000 | -0.48 | -- | -- | -- | -- | -- | -- |
| | Jul-05 | 0.8 | 0.00500 | 0.78000 | -0.25 | 1.460 | -0.309 | No | 0.15494 | No | No |
| | Aug-05 | 0.9 | 0.00500 | 0.88000 | -0.13 | 1.297 | -0.309 | No | 0.15030 | No | No |
| | Oct-05 | 1.0 | 0.00500 | 0.60000 J | -0.51 | 0.950 | -0.309 | No | 0.14530 | No | No |
| | May-06 | 1.6 | 0.00500 | 0.49000 | -0.71 | 0.354 | -0.309 | No | 0.12115 | No | No |
| | Aug-06 | 1.9 | 0.00500 | 0.60000 | -0.51 | 0.227 | -0.309 | No | 0.11152 | No | No |
| | Apr-07 | 2.5 | 0.00500 | 0.19000 | -1.66 | -0.188 | -0.309 | No | 0.09120 | No | No |
| | Aug-07 | 2.9 | 0.00500 | 0.22000 | -1.51 | -0.287 | -0.309 | No | 0.08226 | No | No |
| | Jan-08 | 3.3 | 0.00500 | 0.24000 J | -1.43 | -0.300 | -0.309 | No | 0.07222 | No | No |
| | Jul-08 | 3.8 | 0.00500 | 0.16200 | -1.82 | -0.337 | -0.309 | Yes | 0.06192 | No | Evaluate Further |
| | Jan-09 | 4.3 | 0.00500 | 0.11700 | -2.15 | -0.373 | -0.309 | Yes | 0.05274 | No | Evaluate Further |
| | Jul-09 | 4.8 | 0.00500 | 0.30400 | -1.19 | -0.293 | -0.309 | No | 0.04518 | No | No |
| | Jan-10 | 5.3 | 0.00500 | 0.84300 | -0.17 | -0.163 | -0.309 | No | 0.03877 | No | No |
| | Jul-10 | 5.8 | 0.00500 | 0.49600 | -0.70 | -0.111 | -0.309 | No | 0.03324 | No | No |
| | Jan-11 | 6.3 | 0.00500 | 0.46500 | -0.77 | -0.079 | -0.309 | No | 0.02850 | No | No |
| | Jul-11 | 6.9 | 0.00500 | 0.45700 JL | -0.78 | -0.057 | -0.309 | No | 0.02413 | No | No |
| | Jan-12 | 7.3 | 0.00500 | 0.51000 | -0.67 | -0.037 | -0.309 | No | 0.02095 | No | No |
| | Jul-12 | 7.8 | 0.00500 | 0.29200 | -1.23 | -0.042 | -0.309 | No | 0.01795 | No | No |
| | Jan-13 | 8.3 | 0.00500 | 0.661 | -0.41 | -0.019 | -0.309 | No | 0.01535 | No | No |
| | Jul-13 | 8.8 | 0.00500 | 0.380 | -0.97 | -0.018 | -0.309 | No | 0.01317 | No | No |
| | Jan-14 | 9.3 | 0.00500 | 0.228 | -1.48 | -0.031 | -0.309 | No | 0.01127 | No | No |
| | Jul-14 | 9.8 | 0.00500 | 0.336 | -1.09 | -0.030 | -0.309 | No | 0.00961 | No | No |
| | Jan-15 | 10.3 | 0.00500 | 0.537 | -0.62 | -0.020 | -0.437 | No | 0.00821 | No | No |
| | Jul-15 | 10.9 | 0.00500 | 0.350 | -1.05 | -0.020 | -0.309 | No | 0.00702 | No | No |
| | Jan-16 | 11.3 | 0.00500 | 0.373 JL | -0.99 | -0.018 | -0.309 | No | 0.00603 | No | No |
| | Jul-16 | 11.9 | 0.00500 | 0.294 | -1.22 | -0.021 | -0.309 | No | 0.00515 | No | No |
| 508F57MW | May-06 | 0.0 | 0.00500 | 0.06200 | -2.78 | -- | -- | -- | -- | -- | -- |
| | Aug-06 | 0.2 | 0.00500 | 0.08900 | -2.42 | -- | -- | -- | -- | -- | -- |
| | Nov-06 | 0.5 | 0.00500 | 0.11000 | -2.21 | -- | -- | -- | -- | -- | -- |
| | Apr-07 | 0.9 | 0.00500 | 0.07600 | -2.58 | -0.292 | -0.245 | Yes | 0.05006 | No | Evaluate Further |
| | Aug-07 | 1.2 | 0.00500 | 0.05700 | -2.86 | -0.917 | -0.245 | Yes | 0.04613 | No | Evaluate Further |
| | Jan-08 | 1.6 | 0.00500 | 0.05300 | -2.94 | -0.464 | -0.245 | Yes | 0.04160 | No | Evaluate Further |
| | Jul-08 | 2.1 | 0.00500 | 0.03740 | -3.29 | -0.465 | -0.245 | Yes | 0.03682 | No | Evaluate Further |
| | Jan-09 | 2.6 | 0.00500 | 0.04160 | -3.18 | -0.234 | -0.245 | No | 0.03241 | No | No |
| | Jul-09 | 3.2 | 0.00500 | 0.03120 | -3.47 | -0.175 | -0.245 | No | 0.02867 | No | No |
| | Jan-10 | 3.6 | 0.00500 | 0.03810 | -3.27 | -0.089 | -0.245 | No | 0.02539 | No | No |
| | Jul-10 | 4.1 | 0.00500 | 0.02430 | -3.72 | -0.252 | -0.245 | Yes | 0.02248 | No | Evaluate Further |
| | Jan-11 | 4.6 | 0.00500 | 0.03060 | -3.49 | -0.220 | -0.245 | No | 0.01989 | No | No |
| | Jul-11 | 5.2 | 0.00500 | 0.02150 | -3.84 | -0.125 | -0.245 | No | 0.01743 | No | No |
| | Jan-12 | 5.6 | 0.00500 | 0.02320 | -3.76 | -0.289 | -0.245 | Yes | 0.01558 | No | Evaluate Further |
| | Jul-12 | 6.1 | 0.00500 | 0.02010 | -3.91 | -0.074 | -0.245 | No | 0.01378 | No | No |
| | Jan-13 | 8.3 | 0.00500 | 0.0045 | -5.40 | -0.635 | -0.245 | Less Than PCL | 0.01218 | Less Than PCL | Less Than PCL |
| | Jul-13 | 8.8 | 0.00500 | 0.0216 | -3.84 | -0.189 | -0.245 | No | 0.01078 | No | No |
| | Jan-14 | 9.3 | 0.00500 | 0.00093 J | -6.98 | -1.589 | -0.245 | Less Than PCL | 0.00953 | Less Than PCL | Less Than PCL |
| | Jul-14 | 9.8 | 0.00500 | 0.01120 | -4.49 | -0.648 | -0.245 | Yes | 0.00841 | No | Evaluate Further |
| | Jan-15 | 10.4 | 0.00500 | 0.01460 | -4.23 | 2.652 | -0.245 | No | 0.00828 | No | No |
| | Jul-15 | 10.9 | 0.00500 | 0.01290 | -4.35 | 0.340 | -0.245 | No | 0.00655 | No | No |
| | Jan-16 | 11.3 | 0.00500 | 0.01360 | -4.30 | 1.090 | -0.245 | No | 0.00580 | No | No |
| | Jul-16 | 11.9 | 0.00500 | 0.01290 | -4.35 | 0.043 | -0.245 | No | 0.00512 | No | No |

**Table 4-4**

**Concentration vs. Time Attenuation Rate Constants**
**SWMUs 79/136 Central Plume**
**2016 RAER**
**Former NAS Dallas, Texas**
**Page 4 of 24**

| Monitoring Well ID | Sampling Date | Elapsed Time (Years) | Protective Concentration Level (mg/L) | Concentration Detected (mg/L) | Natural Log of Concentration (mg/L) | Degradation Rate from Natural Log ($K_{time}$) (mg/L per year) | Minimum Degradation Rate Required for Remedial Goals Natural Log ($K_{time}$) (mg/L per year) | Minimum Degradation Rate Met? (Yes/No) | Expected Remedial Goal Concentration (mg/L) | Expected Remedial Goal Concentration Met? (Yes/No) | Remedial Goals Being Met? (Yes/No) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 508G02MW | Jun-00 | 0.0 | 0.00500 | 0.00800 | -4.83 | -- | -- | -- | -- | -- | -- |
| | Aug-00 | 0.2 | 0.00500 | 0.02100 | -3.86 | -- | -- | -- | -- | -- | -- |
| | Oct-00 | 0.4 | 0.00500 | 0.02500 | -3.69 | -- | -- | -- | -- | -- | -- |
| | Jul-01 | 1.1 | 0.00500 | 0.06700 | -2.70 | -- | -- | -- | -- | -- | -- |
| | Sep-02 | 2.3 | 0.00500 | 0.19000 | -1.66 | -- | -- | -- | -- | -- | -- |
| | Nov-02 | 2.5 | 0.00500 | 0.23000 | -1.47 | -- | -- | -- | -- | -- | -- |
| | Aug-03 | 3.2 | 0.00500 | 0.26000 | -1.35 | -- | -- | -- | -- | -- | -- |
| | Dec-03 | 3.5 | 0.00500 | 0.25000 | -1.39 | -- | -- | -- | -- | -- | -- |
| | Jul-04 | 4.1 | 0.00500 | 0.37000 | -0.99 | -- | -- | -- | -- | -- | -- |
| | Sep-04 | 4.3 | 0.00500 | 0.44000 | -0.82 | -- | -- | -- | -- | -- | -- |
| | Apr-05 | 4.8 | 0.00500 | 0.05200 | -2.96 | -- | -- | -- | -- | -- | -- |
| | Jul-05 | 5.1 | 0.00500 | 0.06600 | -2.72 | -- | -- | -- | -- | -- | -- |
| | Aug-05 | 5.2 | 0.00500 | 0.05700 | -2.86 | -- | -- | -- | -- | -- | -- |
| | May-06 | 5.9 | 0.00500 | 0.07700 | -2.56 | -- | -- | -- | -- | -- | -- |
| | Aug-06 | 6.2 | 0.00500 | 0.05300 | -2.94 | -1.391 | -0.265 | Yes | 0.07172 | Yes | Yes |
| | Apr-07 | 6.8 | 0.00500 | 0.05800 | -2.85 | -0.225 | -0.265 | No | 0.06035 | Yes | Evaluate Further |
| | Aug-07 | 7.2 | 0.00500 | 0.07900 J | -2.54 | 0.057 | -0.265 | No | 0.05524 | No | No |
| | Jan-08 | 7.6 | 0.00500 | 0.04400 | -3.12 | -0.150 | -0.265 | No | 0.04940 | Yes | Evaluate Further |
| | Jul-08 | 8.1 | 0.00500 | 0.02870 | -3.55 | -0.329 | -0.265 | Yes | 0.04330 | Yes | Yes |
| | Jan-09 | 8.6 | 0.00500 | 0.01620 | -4.12 | -0.489 | -0.265 | Yes | 0.03772 | Yes | Yes |
| | Jul-09 | 9.1 | 0.00500 | 0.01510 | -4.19 | -0.519 | -0.265 | Yes | 0.03304 | Yes | Yes |
| | Jan-10 | 9.6 | 0.00500 | 0.01640 | -4.11 | -0.482 | -0.265 | Yes | 0.02897 | Yes | Yes |
| | Jul-10 | 10.1 | 0.00500 | 0.01160 | -4.46 | -0.477 | -0.265 | Yes | 0.02539 | Yes | Yes |
| | Jan-11 | 10.6 | 0.00500 | 0.00710 JH | -4.96 | -0.500 | -0.265 | Yes | 0.02225 | Yes | Yes |
| | Jul-11 | 11.1 | 0.00500 | 0.01060 | -4.55 | -0.457 | -0.265 | Yes | 0.01929 | Yes | Yes |
| | Jan-12 | 11.6 | 0.00500 | 0.01120 | -4.49 | -0.413 | -0.265 | Yes | 0.01709 | Yes | Yes |
| | Jul-12 | 12.1 | 0.00500 | 0.01080 | -4.53 | -0.376 | -0.265 | Yes | 0.01497 | Yes | Yes |
| | Jan-13 | 8.3 | 0.00500 | 0.00870 | -4.74 | -0.364 | -0.265 | Yes | 0.01309 | Yes | Yes |
| | Jul-13 | 8.8 | 0.00500 | 0.01200 | -4.42 | -0.364 | -0.265 | Yes | 0.01148 | No | Evaluate Further |
| | Jan-14 | 9.3 | 0.00500 | 0.01540 | -4.17 | -0.365 | -0.265 | Yes | 0.01004 | No | Evaluate Further |
| | Jul-14 | 9.8 | 0.00500 | 0.01440 | -4.24 | -0.365 | -0.265 | Yes | 0.00876 | No | Evaluate Further |
| | Jan-15 | 10.3 | 0.00500 | 0.03060 | -3.32 | -0.339 | -0.265 | Yes | 0.00765 | No | Evaluate Further |
| | Jul-15 | 10.9 | 0.00500 | 0.00776 | -4.86 | -0.349 | -0.265 | Yes | 0.00669 | No | Evaluate Further |
| | Jan-16 | 11.3 | 0.00500 | 0.01490 | -4.21 | -0.332 | -0.265 | Yes | 0.00587 | No | Evaluate Further |
| | Jul-16 | 11.9 | 0.00500 | 0.00607 | -5.10 | -0.342 | -0.265 | Yes | 0.00513 | No | Evaluate Further |
| 508G03MW | Jun-00 | 0.0 | 0.00500 | 0.00050 U | -8.00 | -- | -- | -- | -- | -- | -- |
| | Jul-01 | 1.1 | 0.00500 | 0.00500 U | -8.00 | -- | -- | -- | -- | -- | -- |
| | Nov-01 | 1.4 | 0.00500 | 0.00500 U | -8.00 | -- | -- | -- | -- | -- | -- |
| | Feb-02 | 1.7 | 0.00500 | 0.00500 U | -8.00 | -- | -- | -- | -- | -- | -- |
| | Jul-02 | 2.1 | 0.00500 | 0.00500 U | -8.00 | -- | -- | -- | -- | -- | -- |
| | Sep-02 | 2.3 | 0.00500 | 0.00100 U | -8.00 | -- | -- | -- | -- | -- | -- |
| | Nov-02 | 2.5 | 0.00500 | 0.00049 J | -7.62 | -- | -- | -- | -- | -- | -- |
| | Aug-03 | 3.2 | 0.00500 | 0.00300 | -5.81 | -- | -- | -- | -- | -- | -- |
| | Dec-03 | 3.5 | 0.00500 | 0.00450 | -5.40 | -- | -- | -- | -- | -- | -- |
| | Jul-04 | 4.1 | 0.00500 | 0.03100 | -3.47 | -- | -- | -- | -- | -- | -- |
| | Sep-04 | 4.3 | 0.00500 | 0.01700 | -4.07 | -- | -- | -- | -- | -- | -- |
| | Jul-05 | 5.1 | 0.00500 | 0.01100 | -4.51 | -- | -- | -- | -- | -- | -- |
| | Aug-05 | 5.2 | 0.00500 | 0.00900 | -4.71 | -- | -- | -- | -- | -- | -- |
| | Oct-05 | 5.3 | 0.00500 | 0.01000 | -4.61 | -- | -- | -- | -- | -- | -- |
| | May-06 | 5.9 | 0.00500 | 0.01800 | -4.02 | -- | -- | -- | -- | -- | -- |
| | Aug-06 | 6.2 | 0.00500 | 0.01200 | -4.42 | -- | -- | -- | -- | -- | -- |
| | Apr-07 | 6.8 | 0.00500 | 0.02200 | -3.82 | 0.351 | -0.124 | No | 0.01606 | No | No |
| | Aug-07 | 7.2 | 0.00500 | 0.03200 | -3.44 | 0.572 | -0.124 | No | 0.01541 | No | No |
| | Jan-08 | 7.6 | 0.00500 | 0.02800 | -3.58 | 0.456 | -0.124 | No | 0.01463 | No | No |
| | Jul-08 | 8.1 | 0.00500 | 0.05230 | -2.95 | 0.551 | -0.124 | No | 0.01375 | No | No |
| | Jan-09 | 8.6 | 0.00500 | 0.05310 | -2.94 | 0.517 | -0.124 | No | 0.01289 | No | No |
| | Jul-09 | 9.1 | 0.00500 | 0.07990 | -2.53 | 0.532 | -0.124 | No | 0.01211 | No | No |
| | Jan-10 | 9.6 | 0.00500 | 0.08290 | -2.49 | 0.505 | -0.124 | No | 0.01139 | No | No |
| | Jul-10 | 10.1 | 0.00500 | 0.09370 | -2.37 | 0.477 | -0.124 | No | 0.01071 | No | No |
| | Jan-11 | 10.6 | 0.00500 | 0.07000 | -2.66 | 0.410 | -0.124 | No | 0.01006 | No | No |
| | Jul-11 | 11.1 | 0.00500 | 0.03410 | -3.38 | 0.294 | -0.124 | No | 0.00941 | No | No |
| | Jan-12 | 11.6 | 0.00500 | 0.02600 | -3.65 | 0.199 | -0.124 | No | 0.00889 | No | No |
| | Jul-12 | 12.1 | 0.00500 | 0.02440 | -3.71 | 0.131 | -0.124 | No | 0.00836 | No | No |
| | Jan-13 | 8.3 | 0.00500 | 0.01770 | -4.03 | 0.137 | -0.124 | No | 0.00785 | No | No |
| | Jul-13 | 8.8 | 0.00500 | 0.02770 | -3.59 | 0.138 | -0.124 | No | 0.00738 | No | No |
| | Jan-14 | 9.3 | 0.00500 | 0.02540 | -3.67 | 0.134 | -0.124 | No | 0.00693 | No | No |
| | Jul-14 | 9.8 | 0.00500 | 0.02790 | -3.58 | 0.129 | -0.124 | No | 0.00650 | No | No |
| | Jan-15 | 10.4 | 0.00500 | 0.02840 | -3.56 | 0.120 | -0.124 | No | 0.00610 | No | No |
| | Jul-15 | 10.9 | 0.00500 | 0.01920 | -3.95 | 0.097 | -0.124 | No | 0.00573 | No | No |
| | Jan-16 | 11.3 | 0.00500 | 0.01900 | -3.96 | 0.072 | -0.124 | No | 0.00539 | No | No |
| | Jul-16 | 11.9 | 0.00500 | 0.02600 | -3.65 | 0.058 | -0.124 | No | 0.00506 | No | No |
| 508G04MW | Jun-00 | 0.0 | 0.00500 | 3.90000 | 1.36 | -- | -- | -- | -- | -- | -- |
| | Aug-00 | 0.2 | 0.00500 | 2.60000 | 0.96 | -- | -- | -- | -- | -- | -- |
| | Oct-00 | 0.4 | 0.00500 | 2.90000 | 1.06 | -- | -- | -- | -- | -- | -- |
| | Jul-01 | 1.1 | 0.00500 | 3.60000 | 1.28 | 0.065 | -0.410 | No | 2.48317 | No | No |
| | Nov-01 | 1.4 | 0.00500 | 1.00000 | 0.00 | -0.598 | -0.410 | Yes | 2.17744 | Yes | Yes |
| | Feb-02 | 1.7 | 0.00500 | 0.79000 | -0.24 | -0.792 | -0.410 | Yes | 1.95490 | Yes | Yes |
| | Jul-02 | 2.1 | 0.00500 | 0.30000 | -1.20 | -1.056 | -0.410 | Yes | 1.65742 | Yes | Yes |
| | Sep-02 | 2.3 | 0.00500 | 0.14000 | -1.97 | -1.278 | -0.410 | Yes | 1.51842 | Yes | Yes |
| | Nov-02 | 2.5 | 0.00500 | 0.09300 | -2.38 | -1.424 | -0.410 | Yes | 1.42747 | Yes | Yes |

**Table 4-4**

**Concentration vs. Time Attenuation Rate Constants**
**SWMUs 79/136 Central Plume**
**2016 RAER**
**Former NAS Dallas, Texas**
**Page 5 of 24**

| Monitoring Well ID | Sampling Date | Elapsed Time (Years) | Protective Concentration Level (mg/L) | Concentration Detected (mg/L) | Natural Log of Concentration (mg/L) | Degradation Rate from Natural Log ($K_{time}$) (mg/L per year) | Minimum Degradation Rate Required for Remedial Goals Natural Log ($K_{time}$) (mg/L per year) | Minimum Degradation Rate Met? (Yes/No) | Expected Remedial Goal Concentration (mg/L) | Expected Remedial Goal Concentration Met? (Yes/No) | Remedial Goals Being Met? (Yes/No) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 508F53MW | Sep-04 | 4.3 | 0.00500 | 0.08300 | -2.49 | -- | -- | -- | -- | -- | -- |
| | Jan-05 | 4.6 | 0.00500 | 0.04300 | -3.15 | -- | -- | -- | -- | -- | -- |
| | Jul-05 | 5.1 | 0.00500 | 0.02700 | -3.61 | -- | -- | -- | -- | -- | -- |
| | Aug-05 | 5.2 | 0.00500 | 0.02100 | -3.86 | -- | -- | -- | -- | -- | -- |
| | Oct-05 | 5.3 | 0.00500 | 0.03700 | -3.30 | -- | -- | -- | -- | -- | -- |
| | May-06 | 5.9 | 0.00500 | 0.04400 | -3.12 | -- | -- | -- | -- | -- | -- |
| | Aug-06 | 6.2 | 0.00500 | 0.03600 | -3.32 | -0.747 | -0.211 | Yes | 0.30891 | Yes | Yes |
| | Apr-07 | 6.8 | 0.00500 | 0.02700 | -3.61 | -0.516 | -0.211 | Yes | 0.23672 | Yes | Yes |
| | Aug-07 | 7.2 | 0.00500 | 0.02800 | -3.58 | -0.374 | -0.211 | Yes | 0.20641 | Yes | Yes |
| | Jan-08 | 7.6 | 0.00500 | 0.00110 | -6.81 | -1.720 | -0.211 | Less Than PCL | 0.17363 | Less Than PCL | Less Than PCL |
| | Jul-08 | 8.1 | 0.00500 | 0.00250 | -5.99 | -1.582 | -0.211 | Less Than PCL | 0.14154 | Less Than PCL | Less Than PCL |
| | Jan-09 | 8.6 | 0.00500 | 0.00640 | -5.05 | -1.101 | -0.211 | Yes | 0.11434 | Yes | Yes |
| | Jul-09 | 9.1 | 0.00500 | 0.01290 | -4.35 | -0.679 | -0.211 | Yes | 0.09310 | Yes | Yes |
| | Jan-10 | 9.6 | 0.00500 | 0.00034 J | -7.99 | -0.978 | -0.211 | Less Than PCL | 0.07598 | Less Than PCL | Less Than PCL |
| | Jul-10 | 10.1 | 0.00500 | 0.00055 J | -7.51 | -1.009 | -0.211 | Less Than PCL | 0.06193 | Less Than PCL | Less Than PCL |
| | Jan-11 | 10.6 | 0.00500 | 0.00530 | -5.24 | -0.755 | -0.211 | Yes | 0.05048 | Yes | Yes |
| | Jul-11 | 11.1 | 0.00500 | 0.00930 | -4.68 | -0.531 | -0.211 | Yes | 0.04046 | Yes | Yes |
| | Jan-12 | 11.6 | 0.00500 | 0.00120 | -6.73 | -0.526 | -0.211 | Less Than PCL | 0.03355 | Less Than PCL | Less Than PCL |
| | Jul-12 | 12.1 | 0.00500 | 0.00240 | -6.03 | -0.466 | -0.211 | Less Than PCL | 0.02731 | Less Than PCL | Less Than PCL |
| | Jan-13 | 12.6 | 0.00500 | 0.0021 | -6.17 | -0.422 | -0.211 | Less Than PCL | 0.02219 | Less Than PCL | Less Than PCL |
| | Jul-13 | 13.1 | 0.00500 | 0.0093 | -4.68 | -0.315 | -0.211 | Yes | 0.01811 | Yes | Yes |
| | Jan-14 | 13.6 | 0.00500 | 0.0003 U | -8.00 | -0.370 | -0.211 | Less Than PCL | 0.01471 | Less Than PCL | Less Than PCL |
| | Jul-14 | 14.1 | 0.00500 | 0.0066 | -5.03 | -0.295 | -0.211 | Yes | 0.01191 | Yes | Yes |
| | Jan-15 | 14.6 | 0.00500 | 0.00025 U | -8.00 | -0.332 | -0.211 | Less Than PCL | 0.00702 | Less Than PCL | Less Than PCL |
| | Jul-15 | 15.1 | 0.00500 | 0.0033 | -5.70 | -0.288 | -0.211 | Less Than PCL | 0.00785 | Less Than PCL | Less Than PCL |
| | Jan-16 | 15.6 | 0.00500 | 0.00025 UJL | -8.29 | -0.320 | -0.211 | Less Than PCL | 0.00642 | Less Than PCL | Less Than PCL |
| | Jul-16 | 16.1 | 0.00500 | 0.00918 | -4.69 | -0.252 | -0.211 | Yes | 0.00521 | No | Evaluate Further |
| 508F59MW | Apr-07 | 0.0 | 0.00500 | 0.00028 U | -8.00 | -- | -- | -- | -- | -- | -- |
| | Aug-07 | 0.3 | 0.00500 | 0.00028 U | -8.00 | -- | -- | -- | -- | -- | -- |
| | Jan-08 | 0.8 | 0.00500 | 0.00053 U | -8.00 | -- | -- | -- | -- | -- | -- |
| | Jul-08 | 1.3 | 0.00500 | 0.00032 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-09 | 1.8 | 0.00500 | 0.00032 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-09 | 2.3 | 0.00500 | 0.00032 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-10 | 2.8 | 0.00500 | 0.00024 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-10 | 3.3 | 0.00500 | 0.00024 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-11 | 3.8 | 0.00500 | 0.00026 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-11 | 4.3 | 0.00500 | 0.00200 | -6.21 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-12 | 4.8 | 0.00500 | 0.00240 | -6.03 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-12 | 5.3 | 0.00500 | 0.00270 | -5.91 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-13 | 12.6 | 0.00500 | 0.00080 J | -7.13 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-13 | 13.1 | 0.00500 | 0.0067 | -5.01 | -- | NA | NA | NA | NA | Evaluate Further |
| | Jan-14 | 13.6 | 0.00500 | 0.0068 | -4.99 | -- | NA | NA | NA | NA | Evaluate Further |
| | Jul-14 | 14.1 | 0.00500 | 0.0064 | -5.06 | -0.050 | -0.093 | No | 0.00609 | No | No |
| | Jan-15 | 14.6 | 0.00500 | 0.0014 | -6.58 | -0.933 | -0.093 | Less Than PCL | 0.00580 | Less Than PCL | Less Than PCL |
| | Jul-15 | 15.1 | 0.00500 | 0.0032 | -5.76 | -0.607 | -0.093 | Less Than PCL | 0.00554 | Less Than PCL | Less Than PCL |
| | Jan-16 | 15.6 | 0.00500 | 0.00121 | -6.72 | -0.697 | -0.093 | Less Than PCL | 0.00529 | Less Than PCL | Less Than PCL |
| | Jul-16 | 16.1 | 0.00500 | 0.00386 | -5.56 | -0.411 | -0.093 | Less Than PCL | 0.00505 | Less Than PCL | Less Than PCL |

**Table 4-4**

**Concentration vs. Time Attenuation Rate Constants**
**SWMUs 79/136 Central Plume**
**2016 RAER**
**Former NAS Dallas, Texas**
**Page 6 of 24**

| Monitoring Well ID | Sampling Date | Elapsed Time (Years) | Protective Concentration Level (mg/L) | Concentration Detected (mg/L) | Natural Log of Concentration (mg/L) | Degradation Rate from Natural Log ($K_{time}$) (mg/L per year) | Minimum Degradation Rate Required for Remedial Goals Natural Log ($K_{time}$) (mg/L per year) | Minimum Degradation Rate Met? (Yes/No) | Expected Remedial Goal Concentration (mg/L) | Expected Remedial Goal Concentration Met? (Yes/No) | Remedial Goals Being Met? (Yes/No) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 508F60MW | Apr-07 | 0.0 | 0.00500 | 0.00028 U | -8.00 | -- | -- | -- | -- | -- | -- |
| | Aug-07 | 0.3 | 0.00500 | 0.00028 J | -8.18 | -- | -- | -- | -- | -- | -- |
| | Jan-08 | 0.8 | 0.00500 | 0.00053 U | -8.00 | -- | -- | -- | -- | -- | -- |
| | Jul-08 | 1.3 | 0.00500 | 0.00032 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-09 | 1.8 | 0.00500 | 0.00032 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-09 | 2.3 | 0.00500 | 0.00032 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-10 | 2.8 | 0.00500 | 0.00024 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-10 | 3.3 | 0.00500 | 0.00029 J | -8.15 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-11 | 3.8 | 0.00500 | 0.00037 J | -7.90 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-11 | 4.3 | 0.00500 | 0.00026 U | -8.15 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-12 | 4.8 | 0.00500 | 0.00026 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-12 | 5.3 | 0.00500 | 0.00026 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-13 | 12.6 | 0.00500 | 0.00031 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-13 | 13.1 | 0.00500 | 0.00031 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-14 | 13.6 | 0.00500 | 0.0003 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-14 | 14.1 | 0.00500 | 0.00025 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-15 | 14.6 | 0.00500 | 0.00025 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-15 | 15.1 | 0.00500 | 0.00025 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-16 | 15.6 | 0.00500 | 0.00025 UJ | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-16 | 16.1 | 0.00500 | 0.00025 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| 508F61MW | Apr-07 | 0.0 | 0.00500 | 0.00028 U | -8.00 | -- | -- | -- | -- | -- | -- |
| | Aug-07 | 0.3 | 0.00500 | 0.00023 U | -8.00 | -- | -- | -- | -- | -- | -- |
| | Jan-08 | 0.8 | 0.00500 | 0.00053 U | -8.00 | -- | -- | -- | -- | -- | -- |
| | Jul-08 | 1.3 | 0.00500 | 0.00032 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-09 | 1.8 | 0.00500 | 0.00032 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-09 | 2.3 | 0.00500 | 0.00032 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-10 | 2.8 | 0.00500 | 0.00024 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-10 | 3.3 | 0.00500 | 0.00024 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-11 | 3.8 | 0.00500 | 0.00026 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-11 | 4.3 | 0.00500 | 0.00026 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-12 | 4.8 | 0.00500 | 0.00026 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-12 | 5.3 | 0.00500 | 0.00026 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-13 | 12.6 | 0.00500 | 0.00031 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-13 | 13.1 | 0.00500 | 0.00031 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-14 | 13.6 | 0.00500 | 0.0003 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-14 | 14.1 | 0.00500 | 0.00025 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-15 | 14.6 | 0.00500 | 0.00025 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-15 | 15.1 | 0.00500 | 0.00025 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-16 | 15.6 | 0.00500 | 0.00025 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-16 | 16.1 | 0.00500 | 0.0005 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |

**Table 4-4**

**Concentration vs. Time Attenuation Rate Constants**
**SWMUs 79/136 Central Plume**
**2016 RAER**
**Former NAS Dallas, Texas**
**Page 7 of 24**

| Monitoring Well ID | Sampling Date | Elapsed Time (Years) | Protective Concentration Level (mg/L) | Concentration Detected (mg/L) | Natural Log of Concentration (mg/L) | Degradation Rate from Natural Log ($K_{time}$) (mg/L per year) | Minimum Degradation Rate Required for Remedial Goals Natural Log ($K_{time}$) (mg/L per year) | Minimum Degradation Rate Met? (Yes/No) | Expected Remedial Goal Concentration (mg/L) | Expected Remedial Goal Concentration Met? (Yes/No) | Remedial Goals Being Met? (Yes/No) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **cis-1,2-Dichloroethene** | | | | | | | | | | | |
| 60-21 | Jul-95 | 0.0 | 0.07000 | 0.00500 U | -8.00 | -- | -- | -- | -- | -- | -- |
| | Feb-96 | 0.6 | 0.07000 | NA | -- | -- | -- | -- | -- | -- | -- |
| | May-96 | 0.8 | 0.07000 | NA | -- | -- | -- | -- | -- | -- | -- |
| | Jul-96 | 1.0 | 0.07000 | NA | -- | -- | -- | -- | -- | -- | -- |
| | Oct-96 | 1.2 | 0.07000 | NA | -- | -- | -- | -- | -- | -- | -- |
| | Apr-98 | 2.7 | 0.07000 | 0.00500 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Sep-98 | 3.2 | 0.07000 | 0.00500 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Mar-99 | 3.7 | 0.07000 | 0.00500 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Sep-99 | 4.2 | 0.07000 | 0.00045 J | -7.71 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-00 | 5.0 | 0.07000 | 0.00500 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-01 | 6.0 | 0.07000 | 0.00250 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Dec-02 | 7.4 | 0.07000 | 0.00100 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Dec-03 | 8.4 | 0.07000 | 0.00045 J | -7.71 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-04 | 9.1 | 0.07000 | 0.00027 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Oct-04 | 9.3 | 0.07000 | 0.00027 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Oct-05 | 10.2 | 0.07000 | 0.00100 J | -6.91 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | May-06 | 10.8 | 0.07000 | 0.00060 J | -7.42 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Aug-06 | 11.1 | 0.07000 | 0.00050 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Apr-07 | 11.7 | 0.07000 | 0.00045 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Aug-07 | 12.1 | 0.07000 | 0.00076 J | -7.18 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-08 | 12.5 | 0.07000 | 0.00032 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-08 | 13.0 | 0.07000 | 0.00028 J | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-09 | 13.5 | 0.07000 | 0.00031 J | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-09 | 14.0 | 0.07000 | 0.00044 J | -7.73 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-10 | 14.5 | 0.07000 | 0.00032 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-10 | 15.0 | 0.07000 | 0.00032 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-11 | 15.5 | 0.07000 | 0.00026 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-11 | 16.1 | 0.07000 | 0.00040 J | -7.82 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-12 | 16.5 | 0.07000 | 0.00026 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-12 | 17.0 | 0.07000 | 0.00056 J | -7.49 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-13 | 17.5 | 0.07000 | 0.00024 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-13 | 18.0 | 0.07000 | 0.00024 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-14 | 18.5 | 0.07000 | 0.00033 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-14 | 19.0 | 0.07000 | 0.00065 J | -7.34 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-15 | 19.5 | 0.07000 | 0.00025 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-15 | 20.1 | 0.07000 | 0.00025 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-16 | 20.5 | 0.07000 | 0.0005 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-16 | 21.1 | 0.07000 | 0.0005 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| 50803MW | Oct-95 | 0.0 | 0.07000 | NA | -- | -- | -- | -- | -- | -- | -- |
| | Jan-96 | 0.3 | 0.07000 | NA | -- | -- | -- | -- | -- | -- | -- |
| | Apr-96 | 0.5 | 0.07000 | NA | -- | -- | -- | -- | -- | -- | -- |
| | Jul-96 | 0.7 | 0.07000 | NA | -- | -- | -- | -- | -- | -- | -- |
| | Oct-96 | 0.9 | 0.07000 | NA | -- | -- | -- | -- | -- | -- | -- |
| | Apr-98 | 2.4 | 0.07000 | 0.81000 | -0.21 | -- | -- | -- | -- | -- | -- |
| | Sep-98 | 2.9 | 0.07000 | 1.60000 | 0.47 | -- | -- | -- | -- | -- | -- |
| | Mar-99 | 3.4 | 0.07000 | 0.72000 | -0.33 | -- | -- | -- | -- | -- | -- |
| | Sep-99 | 3.9 | 0.07000 | 0.72000 | -0.33 | -- | NA | NA | NA | NA | Evaluate Further |
| | Jun-00 | 4.7 | 0.07000 | 0.57000 | -0.56 | -0.286 | -0.133 | Yes | 0.60273 | Yes | Yes |
| | Aug-00 | 4.8 | 0.07000 | 1.90000 | 0.64 | 0.023 | -0.133 | No | 0.58886 | No | No |
| | Oct-00 | 5.0 | 0.07000 | 3.00000 | 1.10 | 0.230 | -0.133 | No | 0.57718 | No | No |
| | Jun-01 | 5.7 | 0.07000 | 5.60000 | 1.72 | 0.442 | -0.133 | No | 0.52717 | No | No |
| | Nov-01 | 6.0 | 0.07000 | 5.30000 | 1.67 | 0.512 | -0.133 | No | 0.50171 | No | No |

**Table 4-4**

**Concentration vs. Time Attenuation Rate Constants**
**SWMUs 79/136 Central Plume**
**2016 RAER**
**Former NAS Dallas, Texas**
**Page 8 of 24**

| Monitoring Well ID | Sampling Date | Elapsed Time (Years) | Protective Concentration Level (mg/L) | Concentration Detected (mg/L) | Natural Log of Concentration (mg/L) | Degradation Rate from Natural Log ($K_{time}$) (mg/L per year) | Minimum Degradation Rate Required for Remedial Goals Natural Log ($K_{time}$) (mg/L per year) | Minimum Degradation Rate Met? (Yes/No) | Expected Remedial Goal Concentration (mg/L) | Expected Remedial Goal Concentration Met? (Yes/No) | Remedial Goals Being Met? (Yes/No) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 508F49MW | Mar-02 | 6.4 | 0.07000 | 4.60000 | 1.53 | -- | -- | -- | -- | -- | -- |
| | Jul-02 | 6.7 | 0.07000 | 6.40000 | 1.86 | -- | -- | -- | -- | -- | -- |
| | Sep-02 | 6.9 | 0.07000 | 0.00100 U | -8.00 | -- | -- | -- | -- | -- | -- |
| | Nov-02 | 7.1 | 0.07000 | 3.60000 | 1.28 | -- | -- | -- | -- | -- | -- |
| | Aug-03 | 7.8 | 0.07000 | 1.50000 | 0.41 | -0.403 | -0.289 | Yes | 0.39514 | No | Evaluate Further |
| | Dec-03 | 8.2 | 0.07000 | 3.30000 | 1.19 | 0.544 | -0.289 | No | 0.37895 | No | No |
| | Jul-04 | 8.8 | 0.07000 | 7.20000 | 1.97 | 0.971 | -0.289 | No | 0.34953 | No | No |
| | Sep-04 | 8.9 | 0.07000 | 2.60000 | 0.96 | 0.863 | -0.289 | No | 0.34323 | No | No |
| | Mar-05 | 9.4 | 0.07000 | 1.30000 | 0.26 | 0.613 | -0.289 | No | 0.32099 | No | No |
| | Jul-05 | 9.7 | 0.07000 | 0.01100 | -4.51 | -0.193 | -0.289 | Less Than PCL | 0.30705 | Less Than PCL | Less Than PCL |
| | Aug-05 | 9.8 | 0.07000 | 0.66000 | -0.42 | -0.167 | -0.289 | No | 0.30305 | No | No |
| | Oct-05 | 10.0 | 0.07000 | 0.74000 | -0.30 | -0.140 | -0.289 | No | 0.29845 | No | No |
| | May-06 | 10.5 | 0.07000 | 0.74000 | -0.30 | -0.111 | -0.289 | No | 0.27609 | No | No |
| | Aug-06 | 10.8 | 0.07000 | 0.81000 | -0.21 | -0.083 | -0.289 | No | 0.26641 | No | No |
| | Apr-07 | 11.5 | 0.07000 | 0.73000 | -0.31 | -0.067 | -0.289 | No | 0.24440 | No | No |
| | Aug-07 | 11.8 | 0.07000 | 0.84000 | -0.17 | -0.046 | -0.289 | No | 0.23378 | No | No |
| | Jan-08 | 12.2 | 0.07000 | 0.86000 | -0.15 | -0.030 | -0.289 | No | 0.22104 | No | No |
| | Jul-08 | 12.7 | 0.07000 | 0.36800 | -1.00 | -0.060 | -0.289 | No | 0.20687 | No | No |
| | Jan-09 | 13.2 | 0.07000 | 0.00160 | -6.44 | -0.330 | -0.289 | Less Than PCL | 0.19305 | Less Than PCL | Less Than PCL |
| | Jul-09 | 13.7 | 0.07000 | 0.61200 | -0.49 | -0.267 | -0.289 | No | 0.18061 | No | No |
| | Jan-10 | 14.2 | 0.07000 | 0.01610 | -4.13 | -0.353 | -0.289 | Less Than PCL | 0.16909 | Less Than PCL | Less Than PCL |
| | Jul-10 | 14.7 | 0.07000 | 0.67400 | -0.39 | -0.283 | -0.289 | No | 0.15825 | No | No |
| | Jan-11 | 15.2 | 0.07000 | 0.38900 | -0.94 | -0.246 | -0.289 | No | 0.14811 | No | No |
| | Jul-11 | 15.8 | 0.07000 | 0.28200 | -1.27 | -0.223 | -0.289 | No | 0.13786 | No | No |
| | Jan-12 | 16.2 | 0.07000 | 0.29000 | -1.24 | -0.203 | -0.289 | No | 0.12973 | No | No |
| | Jul-12 | 16.7 | 0.07000 | 0.24500 | -1.41 | -0.189 | -0.289 | No | 0.12137 | No | No |
| | Jan-13 | 17.2 | 0.07000 | 0.31600 | -1.15 | -0.171 | -0.289 | No | 0.11347 | No | No |
| | Jul-13 | 17.7 | 0.07000 | 0.27400 | -1.29 | -0.158 | -0.289 | No | 0.10623 | No | No |
| | Jan-14 | 18.2 | 0.07000 | 0.17200 | -1.76 | -0.155 | -0.289 | No | 0.09931 | No | No |
| | Jul-14 | 18.8 | 0.07000 | 0.31800 | -1.15 | -0.142 | -0.289 | No | 0.09275 | No | No |
| | Jan-15 | 19.3 | 0.07000 | 0.04060 | -3.20 | -0.161 | -0.289 | Less Than PCL | 0.08658 | Less Than PCL | Less Than PCL |
| | Jul-15 | 19.8 | 0.07000 | 0.26200 | -1.34 | -0.149 | -0.289 | No | 0.08103 | No | No |
| | Jan-16 | 20.3 | 0.07000 | 0.455 JL | -0.79 | -0.131 | -0.289 | No | 0.07589 | No | No |
| | Jul-16 | 20.8 | 0.07000 | 0.21500 | -1.54 | -0.125 | -0.289 | No | 0.07092 | No | No |
| 508F51MW | Sep-04 | 0.0 | 0.07000 | 0.00270 | -5.91 | -- | -- | -- | -- | -- | -- |
| | Jan-05 | 0.3 | 0.07000 | 0.00170 | -6.38 | -- | -- | -- | -- | -- | -- |
| | Apr-05 | 0.5 | 0.07000 | 0.00200 | -6.21 | -- | -- | -- | -- | -- | -- |
| | Jul-05 | 0.8 | 0.07000 | 0.00300 | -5.81 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Aug-05 | 0.9 | 0.07000 | 0.00400 | -5.52 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Oct-05 | 1.0 | 0.07000 | 0.00800 | -4.83 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | May-06 | 1.6 | 0.07000 | 0.00400 | -5.52 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Aug-06 | 1.9 | 0.07000 | 0.00800 | -4.83 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Apr-07 | 2.5 | 0.07000 | 0.00510 | -5.28 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Aug-07 | 2.9 | 0.07000 | 0.00620 | -5.08 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-08 | 3.3 | 0.07000 | 0.00300 | -5.81 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-08 | 3.8 | 0.07000 | 0.00380 | -5.57 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-09 | 4.3 | 0.07000 | 0.00340 | -5.68 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-10 | 5.8 | 0.07000 | 0.00460 | -5.38 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-10 | 5.3 | 0.07000 | 0.00460 | -5.38 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-10 | 5.8 | 0.07000 | 0.00470 | -5.36 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-11 | 6.3 | 0.07000 | 0.00390 | -5.55 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-11 | 6.9 | 0.07000 | 0.00600 | -5.12 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-12 | 7.3 | 0.07000 | 0.00390 | -5.55 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-12 | 7.8 | 0.07000 | 0.00470 | -5.36 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-13 | 8.3 | 0.07000 | 0.0045 | -5.40 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-13 | 8.8 | 0.07000 | 0.0076 | -4.88 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-14 | 9.3 | 0.07000 | 0.0047 | -5.36 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-14 | 9.8 | 0.07000 | 0.0116 | -4.46 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-15 | 10.3 | 0.07000 | 0.0116 | -4.46 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-15 | 10.9 | 0.07000 | 0.0059 | -5.13 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-16 | 11.3 | 0.07000 | 0.0112 | -4.49 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-16 | 11.9 | 0.07000 | 0.00655 | -5.03 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |

**Table 4-4**

**Concentration vs. Time Attenuation Rate Constants**
**SWMUs 79/136 Central Plume**
**2016 RAER**
**Former NAS Dallas, Texas**
**Page 9 of 24**

| Monitoring Well ID | Sampling Date | Elapsed Time (Years) | Protective Concentration Level (mg/L) | Concentration Detected (mg/L) | Natural Log of Concentration (mg/L) | Degradation Rate from Natural Log ($K_{time}$) (mg/L per year) | Minimum Degradation Rate Required for Remedial Goals Natural Log ($K_{time}$) (mg/L per year) | Minimum Degradation Rate Met? (Yes/No) | Expected Remedial Goal Concentration (mg/L) | Expected Remedial Goal Concentration Met? (Yes/No) | Remedial Goals Being Met? (Yes/No) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 508F52MW | Sep-04 | 0.0 | 0.07000 | 0.01100 | -4.51 | -- | -- | -- | -- | -- | -- |
| | Jan-05 | 0.3 | 0.07000 | 0.04200 | -3.17 | -- | -- | -- | -- | -- | -- |
| | Apr-05 | 0.5 | 0.07000 | 0.03900 | -3.24 | -- | -- | -- | -- | -- | -- |
| | Jul-05 | 0.8 | 0.07000 | 0.03600 | -3.32 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Aug-05 | 0.9 | 0.07000 | 0.04000 | -3.22 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Oct-05 | 1.0 | 0.07000 | 0.03600 J | -3.32 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | May-06 | 1.6 | 0.07000 | 0.02000 | -3.91 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Aug-06 | 1.9 | 0.07000 | 0.03100 | -3.47 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Apr-07 | 2.5 | 0.07000 | 0.00940 | -4.67 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Aug-07 | 2.9 | 0.07000 | 0.00840 | -4.78 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-08 | 3.3 | 0.07000 | 0.01800 | -4.02 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-08 | 3.8 | 0.07000 | 0.01000 | -4.61 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-09 | 4.3 | 0.07000 | 0.01070 | -4.54 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-09 | 4.8 | 0.07000 | 0.01120 | -4.49 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-10 | 5.3 | 0.07000 | 0.03900 | -3.24 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-10 | 5.8 | 0.07000 | 0.01870 | -3.98 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-11 | 6.3 | 0.07000 | 0.04370 | -3.13 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-11 | 6.9 | 0.07000 | 0.02020 JL | -3.90 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-12 | 7.3 | 0.07000 | 0.01810 | -4.01 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-12 | 7.8 | 0.07000 | 0.02040 | -3.89 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-13 | 8.3 | 0.07000 | 0.0353 | -3.34 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-13 | 8.8 | 0.07000 | 0.0362 | -3.32 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-14 | 9.3 | 0.07000 | 0.0467 | -3.06 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-14 | 9.8 | 0.07000 | 0.0361 | -3.06 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-15 | 10.3 | 0.07000 | 0.0554 | -3.06 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-15 | 10.9 | 0.07000 | 0.0346 | -3.06 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-16 | 11.3 | 0.07000 | 0.0338 | -3.06 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-16 | 11.9 | 0.07000 | 0.0391 | -3.06 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| 508F57MW | May-06 | 0.0 | 0.07000 | 0.06500 | -2.73 | -- | -- | -- | -- | -- | -- |
| | Aug-06 | 0.2 | 0.07000 | 0.07900 J | -2.54 | -- | -- | -- | -- | -- | -- |
| | Nov-06 | 0.5 | 0.07000 | 0.10000 | -2.30 | -- | -- | -- | -- | -- | -- |
| | Apr-07 | 0.9 | 0.07000 | 0.06800 | -2.69 | 0.066 | 0.007 | Less Than PCL | 0.06541 | Less Than PCL | Less Than PCL |
| | Aug-07 | 1.2 | 0.07000 | 0.05600 | -2.88 | -0.187 | 0.007 | Less Than PCL | 0.06557 | Less Than PCL | Less Than PCL |
| | Jan-08 | 1.6 | 0.07000 | 0.05300 | -2.94 | -0.238 | 0.007 | Less Than PCL | 0.06577 | Less Than PCL | Less Than PCL |
| | Jul-08 | 2.1 | 0.07000 | 0.03750 | -3.28 | -0.329 | 0.007 | Less Than PCL | 0.06600 | Less Than PCL | Less Than PCL |
| | Jan-09 | 2.6 | 0.07000 | 0.05440 | -2.91 | -0.226 | 0.007 | Less Than PCL | 0.06625 | Less Than PCL | Less Than PCL |
| | Jul-09 | 3.2 | 0.07000 | 0.03780 | -3.28 | -0.233 | 0.007 | Less Than PCL | 0.06649 | Less Than PCL | Less Than PCL |
| | Jan-10 | 3.6 | 0.07000 | 0.04190 | -3.17 | -0.205 | 0.007 | Less Than PCL | 0.06673 | Less Than PCL | Less Than PCL |
| | Jul-10 | 4.1 | 0.07000 | 0.02820 | -3.57 | -0.225 | 0.007 | Less Than PCL | 0.06697 | Less Than PCL | Less Than PCL |
| | Jan-11 | 4.6 | 0.07000 | 0.03080 | -3.48 | -0.217 | 0.007 | Less Than PCL | 0.06721 | Less Than PCL | Less Than PCL |
| | Jul-11 | 5.2 | 0.07000 | 0.02520 | -3.68 | -0.219 | 0.007 | Less Than PCL | 0.06747 | Less Than PCL | Less Than PCL |
| | Jan-12 | 5.6 | 0.07000 | 0.02820 | -3.57 | -0.206 | 0.007 | Less Than PCL | 0.06770 | Less Than PCL | Less Than PCL |
| | Jul-12 | 6.1 | 0.07000 | 0.02430 | -3.72 | -0.200 | 0.007 | Less Than PCL | 0.06794 | Less Than PCL | Less Than PCL |
| | Jan-13 | 8.3 | 0.07000 | 0.0143 | -4.25 | -0.202 | 0.007 | Less Than PCL | 0.06819 | Less Than PCL | Less Than PCL |
| | Jul-13 | 8.8 | 0.07000 | 0.0236 | -3.75 | -0.175 | 0.007 | Less Than PCL | 0.06843 | Less Than PCL | Less Than PCL |
| | Jan-14 | 9.3 | 0.07000 | 0.0019 | -6.27 | -0.249 | 0.007 | Less Than PCL | 0.06868 | Less Than PCL | Less Than PCL |
| | Jul-14 | 9.8 | 0.07000 | 0.0218 | -3.83 | -0.216 | 0.007 | Less Than PCL | 0.06894 | Less Than PCL | Less Than PCL |
| | Jan-15 | 10.4 | 0.07000 | 0.0204 | -3.89 | -0.193 | 0.007 | Less Than PCL | 0.07420 | Less Than PCL | Less Than PCL |
| | Jul-15 | 10.9 | 0.07000 | 0.0158 | -4.15 | -0.181 | 0.007 | Less Than PCL | 0.06945 | Less Than PCL | Less Than PCL |
| | Jan-16 | 11.3 | 0.07000 | 0.0205 | -3.89 | -0.164 | 0.007 | Less Than PCL | 0.06969 | Less Than PCL | Less Than PCL |
| | Jul-16 | 11.9 | 0.07000 | 0.0177 | -4.03 | -0.154 | 0.007 | Less Than PCL | 0.06995 | Less Than PCL | Less Than PCL |

**Table 4-4**

**Concentration vs. Time Attenuation Rate Constants**
**SWMUs 79/136 Central Plume**
**2016 RAER**
**Former NAS Dallas, Texas**
**Page 10 of 24**

| Monitoring Well ID | Sampling Date | Elapsed Time (Years) | Protective Concentration Level (mg/L) | Concentration Detected (mg/L) | Natural Log of Concentration (mg/L) | Degradation Rate from Natural Log ($K_{time}$) (mg/L per year) | Minimum Degradation Rate Required for Remedial Goals Natural Log ($K_{time}$) (mg/L per year) | Minimum Degradation Rate Met? (Yes/No) | Expected Remedial Goal Concentration (mg/L) | Expected Remedial Goal Concentration Met? (Yes/No) | Remedial Goals Being Met? (Yes/No) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 508G02MW | Jun-00 | 0.0 | 0.07000 | 0.00460 | -5.38 | -- | -- | -- | -- | -- | -- |
| | Aug-00 | 0.2 | 0.07000 | 0.01400 | -4.27 | -- | -- | -- | -- | -- | -- |
| | Oct-00 | 0.4 | 0.07000 | 0.01800 | -4.02 | -- | -- | -- | -- | -- | -- |
| | Jul-01 | 1.1 | 0.07000 | 0.06600 | -2.72 | -- | -- | -- | -- | -- | -- |
| | Sep-02 | 2.3 | 0.07000 | 0.18000 | -1.71 | -- | -- | -- | -- | -- | -- |
| | Nov-02 | 2.5 | 0.07000 | 0.24000 | -1.43 | -- | -- | -- | -- | -- | -- |
| | Aug-03 | 3.2 | 0.07000 | 0.29000 | -1.24 | -- | -- | -- | -- | -- | -- |
| | Dec-03 | 3.5 | 0.07000 | 0.31000 | -1.17 | -- | -- | -- | -- | -- | -- |
| | Jul-04 | 4.1 | 0.07000 | 0.51000 | -0.67 | -- | -- | -- | -- | -- | -- |
| | Sep-04 | 4.3 | 0.07000 | 0.61000 | -0.49 | -- | -- | -- | -- | -- | -- |
| | Apr-05 | 4.8 | 0.07000 | 0.43000 | -0.84 | -- | -- | -- | -- | -- | -- |
| | Jul-05 | 5.1 | 0.07000 | 0.19000 | -1.66 | -- | -- | -- | -- | -- | -- |
| | Aug-05 | 5.2 | 0.07000 | 0.21000 | -1.56 | -- | -- | -- | -- | -- | -- |
| | Oct-05 | 5.3 | 0.07000 | 0.24000 J | -1.43 | -- | -- | -- | -- | -- | -- |
| | May-06 | 5.9 | 0.07000 | 0.28000 | -1.27 | -- | -- | -- | -- | -- | -- |
| | Aug-06 | 6.2 | 0.07000 | 0.26000 | -1.35 | -0.276 | -0.134 | Yes | 0.27009 | Yes | Yes |
| | Apr-07 | 6.8 | 0.07000 | 0.24000 | -1.43 | -0.159 | -0.134 | Yes | 0.24747 | Yes | Yes |
| | Aug-07 | 7.2 | 0.07000 | 0.32000 | -1.14 | 0.064 | -0.134 | No | 0.23661 | No | No |
| | Jan-08 | 7.6 | 0.07000 | 0.31000 | -1.17 | 0.089 | -0.134 | No | 0.22359 | No | No |
| | Jul-08 | 8.1 | 0.07000 | 0.28400 | -1.26 | 0.054 | -0.134 | No | 0.20912 | No | No |
| | Jan-09 | 8.6 | 0.07000 | 0.34100 J | -1.08 | 0.080 | -0.134 | No | 0.19501 | No | No |
| | Jul-09 | 9.1 | 0.07000 | 0.35800 | -1.03 | 0.091 | -0.134 | No | 0.18232 | No | No |
| | Jan-10 | 9.6 | 0.07000 | 0.33900 | -1.08 | 0.082 | -0.134 | No | 0.17059 | No | No |
| | Jul-10 | 10.1 | 0.07000 | 0.32600 | -1.12 | 0.068 | -0.134 | No | 0.15955 | No | No |
| | Jan-11 | 10.6 | 0.07000 | 0.32100 | -1.14 | 0.055 | -0.134 | No | 0.14922 | No | No |
| | Jul-11 | 11.1 | 0.07000 | 0.28700 | -1.25 | 0.037 | -0.134 | No | 0.13880 | No | No |
| | Jan-12 | 11.6 | 0.07000 | 0.26000 | -1.35 | 0.018 | -0.134 | No | 0.13053 | No | No |
| | Jul-12 | 12.1 | 0.07000 | 0.29400 | -1.22 | 0.013 | -0.134 | No | 0.12204 | No | No |
| | Jan-13 | 12.6 | 0.07000 | 0.30400 | -1.19 | 0.011 | -0.134 | No | 0.11401 | No | No |
| | Jul-13 | 13.1 | 0.07000 | 0.26100 | -1.34 | 0.003 | -0.134 | No | 0.10668 | No | No |
| | Jan-14 | 13.6 | 0.07000 | 0.00026 U | -8.25 | -0.283 | -0.134 | Less Than PCL | 0.09966 | Less Than PCL | Less Than PCL |
| | Jul-14 | 14.1 | 0.07000 | 0.22100 | -1.51 | -0.233 | -0.134 | Yes | 0.09301 | No | Evaluate Further |
| | Jan-15 | 14.6 | 0.07000 | 0.29100 | -1.23 | -0.185 | -0.134 | Yes | 0.08686 | No | Evaluate Further |
| | Jul-15 | 15.1 | 0.07000 | 0.25900 | -1.35 | -0.150 | -0.134 | Yes | 0.08115 | No | Evaluate Further |
| | Jan-16 | 15.6 | 0.07000 | 0.29000 | -1.24 | -0.120 | -0.134 | No | 0.07595 | No | No |
| | Jul-16 | 16.1 | 0.07000 | 0.23900 | -1.43 | -0.101 | -0.134 | No | 0.07093 | No | No |
| 508G03MW | Jun-00 | 0.0 | 0.07000 | 0.00050 U | -8.00 | -- | -- | -- | -- | -- | -- |
| | Jul-01 | 1.1 | 0.07000 | 0.00250 U | -8.00 | -- | -- | -- | -- | -- | -- |
| | Nov-01 | 1.4 | 0.07000 | 0.00250 U | -8.00 | -- | -- | -- | -- | -- | -- |
| | Feb-02 | 1.7 | 0.07000 | 0.00250 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-02 | 2.1 | 0.07000 | 0.00500 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Sep-02 | 2.3 | 0.07000 | 0.00100 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Nov-02 | 2.5 | 0.07000 | 0.00094 | -6.97 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Aug-03 | 3.2 | 0.07000 | 0.00770 | -4.87 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Dec-03 | 3.5 | 0.07000 | 0.01100 | -4.51 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-04 | 4.1 | 0.07000 | 0.05600 | -2.88 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Sep-04 | 4.3 | 0.07000 | 0.03200 | -3.44 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-05 | 5.1 | 0.07000 | 0.02200 | -3.82 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Aug-05 | 5.2 | 0.07000 | 0.01800 | -4.02 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Oct-05 | 5.3 | 0.07000 | 0.01600 | -4.14 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | May-06 | 5.9 | 0.07000 | 0.03300 | -3.41 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Aug-06 | 6.2 | 0.07000 | 0.02700 | -3.61 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Apr-07 | 6.8 | 0.07000 | 0.03800 | -3.27 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Aug-07 | 7.2 | 0.07000 | 0.04400 | -3.12 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-08 | 7.6 | 0.07000 | 0.03300 | -3.41 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-08 | 8.1 | 0.07000 | 0.05540 | -2.89 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-09 | 8.6 | 0.07000 | 0.05770 | -2.85 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-09 | 9.1 | 0.07000 | 0.08210 | -2.50 | 0.724 | -0.022 | No | 0.08210 | Yes | Evaluate Further |
| | Jan-10 | 9.6 | 0.07000 | 0.07810 | -2.55 | 0.688 | -0.022 | No | 0.08120 | Yes | Evaluate Further |
| | Jul-10 | 10.1 | 0.07000 | 0.09130 | -2.39 | 0.656 | -0.022 | No | 0.08030 | No | No |
| | Jan-11 | 10.6 | 0.07000 | 0.06400 | -2.75 | 0.616 | -0.022 | Less Than PCL | 0.07941 | Less Than PCL | Less Than PCL |
| | Jul-11 | 11.1 | 0.07000 | 0.03200 | -3.44 | 0.563 | -0.022 | Less Than PCL | 0.07845 | Less Than PCL | Less Than PCL |
| | Jan-12 | 11.6 | 0.07000 | 0.02630 | -3.64 | 0.513 | -0.022 | Less Than PCL | 0.07766 | Less Than PCL | Less Than PCL |
| | Jul-12 | 12.1 | 0.07000 | 0.02700 | -3.61 | 0.470 | -0.022 | Less Than PCL | 0.07679 | Less Than PCL | Less Than PCL |
| | Jan-13 | 12.6 | 0.07000 | 0.0217 | -3.83 | 0.428 | -0.022 | Less Than PCL | 0.07593 | Less Than PCL | Less Than PCL |
| | Jul-13 | 13.1 | 0.07000 | 0.0308 | -3.48 | 0.397 | -0.022 | Less Than PCL | 0.07509 | Less Than PCL | Less Than PCL |
| | Jan-14 | 13.6 | 0.07000 | 0.0292 | -3.53 | 0.368 | -0.022 | Less Than PCL | 0.07424 | Less Than PCL | Less Than PCL |
| | Jul-14 | 14.1 | 0.07000 | 0.0342 | -3.38 | 0.345 | -0.022 | Less Than PCL | 0.07339 | Less Than PCL | Less Than PCL |
| | Jan-15 | 14.6 | 0.07000 | 0.00356 | -3.38 | 0.323 | -0.022 | Less Than PCL | 0.07255 | Less Than PCL | Less Than PCL |
| | Jul-15 | 15.1 | 0.07000 | 0.0257 | -3.66 | 0.301 | -0.022 | Less Than PCL | 0.07174 | Less Than PCL | Less Than PCL |
| | Jan-16 | 15.6 | 0.07000 | 0.0257 | -3.66 | 0.280 | -0.022 | Less Than PCL | 0.07096 | Less Than PCL | Less Than PCL |
| | Jul-16 | 16.1 | 0.07000 | 0.0318 | -3.45 | 0.264 | -0.022 | Less Than PCL | 0.07015 | Less Than PCL | Less Than PCL |

**Table 4-4**

**Concentration vs. Time Attenuation Rate Constants**
**SWMUs 79/136 Central Plume**
**2016 RAER**
**Former NAS Dallas, Texas**
**Page 11 of 24**

| Monitoring Well ID | Sampling Date | Elapsed Time (Years) | Protective Concentration Level (mg/L) | Concentration Detected (mg/L) | Natural Log of Concentration (mg/L) | Degradation Rate from Natural Log ($K_{time}$) (mg/L per year) | Minimum Degradation Rate Required for Remedial Goals Natural Log ($K_{time}$) (mg/L per year) | Minimum Degradation Rate Met? (Yes/No) | Expected Remedial Goal Concentration (mg/L) | Expected Remedial Goal Concentration Met? (Yes/No) | Remedial Goals Being Met? (Yes/No) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 508G04MW | Jun-00 | 0.0 | 0.07000 | 2.40000 | 0.88 | -- | -- | -- | -- | -- | -- |
| | Jun-00 | 0.0 | 0.07000 | 2.20000 | 0.79 | -- | -- | -- | -- | -- | -- |
| | Aug-00 | 0.2 | 0.07000 | 1.40000 | 0.34 | -- | -- | -- | -- | -- | -- |
| | Oct-00 | 0.4 | 0.07000 | 1.70000 | 0.53 | -1.113 | -0.267 | Yes | 4.84214 | Yes | Yes |
| | Jul-01 | 1.1 | 0.07000 | 2.30000 | 0.83 | 0.071 | -0.267 | No | 3.98071 | Yes | Evaluate Further |
| | Nov-01 | 1.4 | 0.07000 | 0.60000 | -0.51 | -0.570 | -0.267 | Yes | 3.65442 | Yes | Yes |
| | Feb-02 | 1.7 | 0.07000 | 0.48000 | -0.73 | -0.757 | -0.267 | Yes | 3.40678 | Yes | Yes |
| | Jul-02 | 2.1 | 0.07000 | 0.09600 | -2.34 | -1.177 | -0.267 | Yes | 3.05970 | Yes | Yes |
| | Sep-02 | 2.3 | 0.07000 | 0.04000 | -3.22 | -1.473 | -0.267 | Less Than PCL | 2.89013 | Less Than PCL | Less Than PCL |
| | Nov-02 | 2.5 | 0.07000 | 0.03100 | -3.47 | -1.627 | -0.267 | Less Than PCL | 2.77624 | Less Than PCL | Less Than PCL |
| 508F53MW | Sep-04 | 4.3 | 0.07000 | 0.04200 | -3.17 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-05 | 4.6 | 0.07000 | 0.02900 | -3.54 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-05 | 5.1 | 0.07000 | 0.02400 | -3.73 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Aug-05 | 5.2 | 0.07000 | 0.02400 | -3.73 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Oct-06 | 6.4 | 0.07000 | 0.03300 | -3.41 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | May-06 | 5.9 | 0.07000 | 0.03400 | -3.38 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Aug-06 | 6.2 | 0.07000 | 0.03300 | -3.41 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Apr-07 | 6.8 | 0.07000 | 0.02100 | -3.86 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Aug-07 | 7.2 | 0.07000 | 0.02000 | -3.91 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-08 | 7.6 | 0.07000 | 0.01100 | -4.51 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-08 | 8.1 | 0.07000 | 0.01140 | -4.47 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-09 | 8.6 | 0.07000 | 0.00850 | -4.77 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-09 | 9.1 | 0.07000 | 0.01130 | -4.48 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-10 | 9.6 | 0.07000 | 0.00480 | -5.34 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-10 | 10.1 | 0.07000 | 0.00500 | -5.30 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-11 | 10.6 | 0.07000 | 0.00590 | -5.13 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-11 | 11.1 | 0.07000 | 0.00590 | -5.13 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-12 | 11.6 | 0.07000 | 0.00210 | -6.17 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-12 | 12.1 | 0.07000 | 0.00240 | -6.03 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-13 | 12.6 | 0.07000 | 0.0019 | -6.27 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-13 | 13.1 | 0.07000 | 0.0185 | -3.99 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-14 | 13.6 | 0.07000 | 0.0036 | -5.63 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-14 | 14.1 | 0.07000 | 0.0462 | -3.07 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-15 | 14.6 | 0.07000 | 0.00106 | -6.85 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-15 | 15.1 | 0.07000 | 0.0036 | -5.64 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-16 | 15.6 | 0.07000 | 0.00076 JL | -7.18 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-16 | 16.1 | 0.07000 | 0.0152 | -4.19 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| 508F59MW | Apr-07 | 0.0 | 0.07000 | 0.00044 U | -8.00 | -- | -- | -- | -- | -- | -- |
| | Aug-07 | 0.3 | 0.07000 | 0.00044 U | -8.00 | -- | -- | -- | -- | -- | -- |
| | Jan-08 | 0.8 | 0.07000 | 0.00032 U | -8.00 | -- | -- | -- | -- | -- | -- |
| | Jul-08 | 1.3 | 0.07000 | 0.00022 J | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-09 | 1.8 | 0.07000 | 0.00041 J | -7.80 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-09 | 2.3 | 0.07000 | 0.00020 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-10 | 2.8 | 0.07000 | 0.00032 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-10 | 3.3 | 0.07000 | 0.00120 | -6.73 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-11 | 3.8 | 0.07000 | 0.00081 J | -7.12 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-11 | 4.3 | 0.07000 | 0.00450 | -5.40 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-12 | 4.8 | 0.07000 | 0.00720 | -4.93 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-12 | 5.3 | 0.07000 | 0.00480 | -5.34 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-13 | 12.6 | 0.07000 | 0.0031 | -5.78 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-13 | 13.1 | 0.07000 | 0.0094 | -4.67 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-14 | 13.6 | 0.07000 | 0.0090 | -4.71 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-14 | 14.1 | 0.07000 | 0.00976 | -4.63 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-15 | 14.6 | 0.07000 | 0.00469 | -5.36 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-15 | 15.1 | 0.07000 | 0.0043 | -5.45 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-16 | 15.6 | 0.07000 | 0.00372 | -5.59 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-16 | 16.1 | 0.07000 | 0.0059 | -5.13 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |

**Table 4-4**

**Concentration vs. Time Attenuation Rate Constants**
**SWMUs 79/136 Central Plume**
**2016 RAER**
**Former NAS Dallas, Texas**
**Page 12 of 24**

| Monitoring Well ID | Sampling Date | Elapsed Time (Years) | Protective Concentration Level (mg/L) | Concentration Detected (mg/L) | Natural Log of Concentration (mg/L) | Degradation Rate from Natural Log ($K_{time}$) (mg/L per year) | Minimum Degradation Rate Required for Remedial Goals Natural Log ($K_{time}$) (mg/L per year) | Minimum Degradation Rate Met? (Yes/No) | Expected Remedial Goal Concentration (mg/L) | Expected Remedial Goal Concentration Met? (Yes/No) | Remedial Goals Being Met? (Yes/No) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 508F60MW | Apr-07 | 0.0 | 0.07000 | 0.00120 | -6.73 | -- | -- | -- | -- | -- | -- |
| | Aug-07 | 0.3 | 0.07000 | 0.00086 J | -7.06 | -- | -- | -- | -- | -- | -- |
| | Jan-08 | 0.8 | 0.07000 | 0.00076 J | -7.18 | -- | -- | -- | -- | -- | -- |
| | Jul-08 | 1.3 | 0.07000 | 0.00096 J | -6.95 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-09 | 1.8 | 0.07000 | 0.00026 J | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-09 | 2.3 | 0.07000 | 0.00060 J | -7.42 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-10 | 2.8 | 0.07000 | 0.00032 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-10 | 3.3 | 0.07000 | 0.00083 J | -7.09 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-11 | 3.8 | 0.07000 | 0.00026 J | -8.25 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-11 | 4.3 | 0.07000 | 0.00087 J | -7.05 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-12 | 4.8 | 0.07000 | 0.00026 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-12 | 5.3 | 0.07000 | 0.00059 J | -7.44 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-13 | 12.6 | 0.07000 | 0.00024 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-13 | 13.1 | 0.07000 | 0.00043 J | -7.75 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-14 | 13.6 | 0.07000 | 0.00033 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-14 | 14.1 | 0.07000 | 0.00025 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-15 | 14.6 | 0.07000 | 0.00025 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-15 | 15.1 | 0.07000 | 0.00025 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-16 | 15.6 | 0.07000 | 0.00025 UJ | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-16 | 16.1 | 0.07000 | 0.00035 J | -7.96 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| 508F61MW | Apr-07 | 0.0 | 0.07000 | 0.00044 U | -8.00 | -- | -- | -- | -- | -- | -- |
| | Aug-07 | 0.3 | 0.07000 | 0.00014 U | -8.00 | -- | -- | -- | -- | -- | -- |
| | Jan-08 | 0.8 | 0.07000 | 0.00032 U | -8.00 | -- | -- | -- | -- | -- | -- |
| | Jul-08 | 1.3 | 0.07000 | 0.00020 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-09 | 1.8 | 0.07000 | 0.00020 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-09 | 2.3 | 0.07000 | 0.00020 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-10 | 2.8 | 0.07000 | 0.00032 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-10 | 3.3 | 0.07000 | 0.00032 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-11 | 3.8 | 0.07000 | 0.00026 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-11 | 4.3 | 0.07000 | 0.00026 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-12 | 4.7 | 0.07000 | 0.00026 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-12 | 5.3 | 0.07000 | 0.00020 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-13 | 12.6 | 0.07000 | 0.00024 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-13 | 13.1 | 0.07000 | 0.00024 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-14 | 13.6 | 0.07000 | 0.00033 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-14 | 14.1 | 0.07000 | 0.00025 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-15 | 14.6 | 0.07000 | 0.00025 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-15 | 15.1 | 0.07000 | 0.00025 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-16 | 15.6 | 0.07000 | 0.00025 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-16 | 16.1 | 0.07000 | 0.0005 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |

**Table 4-4**

**Concentration vs. Time Attenuation Rate Constants**
**SWMUs 79/136 Central Plume**
**2016 RAER**
**Former NAS Dallas, Texas**
**Page 13 of 24**

| Monitoring Well ID | Sampling Date | Elapsed Time (Years) | Protective Concentration Level (mg/L) | Concentration Detected (mg/L) | Natural Log of Concentration (mg/L) | Degradation Rate from Natural Log ($K_{time}$) (mg/L per year) | Minimum Degradation Rate Required for Remedial Goals Natural Log ($K_{time}$) (mg/L per year) | Minimum Degradation Rate Met? (Yes/No) | Expected Remedial Goal Concentration (mg/L) | Expected Remedial Goal Concentration Met? (Yes/No) | Remedial Goals Being Met? (Yes/No) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Vinyl Chloride** | | | | | | | | | | | |
| 60-21 | Jul-95 | 0.0 | 0.00200 | 0.01000 U | -8.00 | -- | -- | -- | -- | -- | -- |
| | Feb-96 | 0.6 | 0.00200 | 0.01000 U | -8.00 | -- | -- | -- | -- | -- | -- |
| | May-96 | 0.8 | 0.00200 | 0.01000 U | -8.00 | -- | -- | -- | -- | -- | -- |
| | Jul-96 | 1.0 | 0.00200 | 0.01000 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Oct-96 | 1.2 | 0.00200 | 0.01000 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Apr-98 | 2.7 | 0.00200 | 0.00500 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Sep-98 | 3.2 | 0.00200 | 0.00500 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Mar-99 | 3.7 | 0.00200 | 0.00500 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Sep-99 | 4.2 | 0.00200 | 0.00500 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-00 | 5.0 | 0.00200 | 0.00500 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-01 | 6.0 | 0.00200 | 0.01000 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Dec-02 | 7.4 | 0.00200 | 0.00100 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Dec-03 | 8.4 | 0.00200 | 0.00061 J | -7.40 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-04 | 9.1 | 0.00200 | 0.00017 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Oct-04 | 9.3 | 0.00200 | 0.00017 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Oct-05 | 10.2 | 0.00200 | 0.00030 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | May-06 | 10.8 | 0.00200 | 0.00060 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Aug-06 | 11.1 | 0.00200 | 0.00060 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Apr-07 | 11.7 | 0.00200 | 0.00012 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Aug-07 | 12.1 | 0.00200 | 0.00020 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-08 | 12.5 | 0.00200 | 0.00043 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-08 | 13.0 | 0.00200 | 0.00030 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-09 | 13.5 | 0.00200 | 0.00030 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-09 | 14.0 | 0.00200 | 0.00030 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-10 | 14.5 | 0.00200 | 0.00028 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-10 | 15.0 | 0.00200 | 0.00028 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-11 | 15.5 | 0.00200 | 0.00022 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-11 | 16.1 | 0.00200 | 0.00022 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-12 | 16.5 | 0.00200 | 0.00022 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-12 | 17.0 | 0.00200 | 0.00022 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-13 | 17.5 | 0.00200 | 0.00044 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-13 | 18.0 | 0.00200 | 0.00044 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-14 | 18.5 | 0.00200 | 0.00033 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-14 | 19.0 | 0.00200 | 0.0005 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-15 | 19.5 | 0.00200 | 0..00025 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-15 | 20.1 | 0.00200 | 0..00025 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-16 | 20.5 | 0.00200 | 0.0005 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-16 | 21.1 | 0.00200 | 0.0005 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| 50803MW | Oct-95 | 0.0 | 0.00200 | 0.01000 U | -8.00 | -- | -- | -- | -- | -- | -- |
| | Jan-96 | 0.3 | 0.00200 | 0.01000 U | -8.00 | -- | -- | -- | -- | -- | -- |
| | Apr-96 | 0.5 | 0.00200 | 0.01000 U | -8.00 | -- | -- | -- | -- | -- | -- |
| | Jul-96 | 0.7 | 0.00200 | 0.01000 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Oct-96 | 0.9 | 0.00200 | 0.01000 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Apr-98 | 2.4 | 0.00200 | 0.05000 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Sep-98 | 2.9 | 0.00200 | 0.00500 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Mar-99 | 3.4 | 0.00200 | 0.03300 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Sep-99 | 3.9 | 0.00200 | 0.03300 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jun-00 | 4.7 | 0.00200 | 0.02500 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Aug-00 | 4.8 | 0.00200 | 0.00050 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Oct-00 | 5.0 | 0.00200 | 0.00050 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jun-01 | 5.7 | 0.00200 | 0.50000 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Nov-01 | 6.0 | 0.00200 | 0.50000 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |

**Table 4-4**

**Concentration vs. Time Attenuation Rate Constants**
**SWMUs 79/136 Central Plume**
**2016 RAER**
**Former NAS Dallas, Texas**
**Page 14 of 24**

| Monitoring Well ID | Sampling Date | Elapsed Time (Years) | Protective Concentration Level (mg/L) | Concentration Detected (mg/L) | Natural Log of Concentration (mg/L) | Degradation Rate from Natural Log ($K_{time}$) (mg/L per year) | Minimum Degradation Rate Required for Remedial Goals Natural Log ($K_{time}$) (mg/L per year) | Minimum Degradation Rate Met? (Yes/No) | Expected Remedial Goal Concentration (mg/L) | Expected Remedial Goal Concentration Met? (Yes/No) | Remedial Goals Being Met? (Yes/No) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 508F49MW | Mar-02 | 6.4 | 0.00200 | 0.01000 U | -8.00 | -- | -- | -- | -- | -- | -- |
| | Jul-02 | 6.7 | 0.00200 | 0.50000 U | -8.00 | -- | -- | -- | -- | -- | -- |
| | Sep-02 | 6.9 | 0.00200 | 0.00100 U | -8.00 | -- | -- | -- | -- | -- | -- |
| | Nov-02 | 7.1 | 0.00200 | 0.12000 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Aug-03 | 7.8 | 0.00200 | 0.01000 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Dec-03 | 8.2 | 0.00200 | 0.02100 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-04 | 8.8 | 0.00200 | 0.05900 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Sep-04 | 8.9 | 0.00200 | 0.02100 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Mar-05 | 9.4 | 0.00200 | 0.00400 | -5.52 | -- | NA | NA | NA | NA | Evaluate Further |
| | Jul-05 | 9.7 | 0.00200 | 0.00030 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Aug-05 | 9.8 | 0.00200 | 0.00300 | -5.81 | -- | NA | NA | NA | NA | Evaluate Further |
| | Oct-05 | 10.0 | 0.00200 | 0.00300 J | -5.81 | -- | NA | NA | NA | NA | Evaluate Further |
| | May-06 | 10.5 | 0.00200 | 0.00400 | -5.52 | 0.562 | -0.060 | No | 0.00373 | No | No |
| | Aug-06 | 10.8 | 0.00200 | 0.00400 | -5.52 | 0.616 | -0.060 | No | 0.00367 | No | No |
| | Apr-07 | 11.5 | 0.00200 | 0.00420 J | -5.47 | 0.494 | -0.060 | No | 0.00353 | No | No |
| | Aug-07 | 11.8 | 0.00200 | 0.00190 U | -8.00 | -0.240 | -0.060 | Less Than PCL | 0.00346 | Less Than PCL | Less Than PCL |
| | Jan-08 | 12.2 | 0.00200 | 0.00210 | -6.17 | -0.148 | -0.060 | Yes | 0.00338 | Yes | Yes |
| | Jul-08 | 12.7 | 0.00200 | 0.00092 J | -6.99 | -0.224 | -0.060 | Less Than PCL | 0.00328 | Less Than PCL | Less Than PCL |
| | Jan-09 | 13.2 | 0.00200 | 0.00300 U | -8.00 | -0.375 | -0.060 | Less Than PCL | 0.00317 | Less Than PCL | Less Than PCL |
| | Jul-09 | 13.7 | 0.00200 | 0.00300 U | -8.00 | -0.433 | -0.060 | Less Than PCL | 0.00308 | Less Than PCL | Less Than PCL |
| | Jan-10 | 14.2 | 0.00200 | 0.00280 U | -8.00 | -0.447 | -0.060 | Less Than PCL | 0.00299 | Less Than PCL | Less Than PCL |
| | Jul-10 | 14.7 | 0.00200 | 0.00028 U | -8.00 | -0.438 | -0.060 | Less Than PCL | 0.00290 | Less Than PCL | Less Than PCL |
| | Jan-11 | 15.2 | 0.00200 | 0.00130 | -6.65 | -0.336 | -0.060 | Less Than PCL | 0.00281 | Less Than PCL | Less Than PCL |
| | Jul-11 | 15.8 | 0.00200 | 0.00110 U | -8.00 | -0.334 | -0.060 | Less Than PCL | 0.00272 | Less Than PCL | Less Than PCL |
| | Jan-12 | 16.2 | 0.00200 | 0.00140 | -6.57 | -0.259 | -0.060 | Less Than PCL | 0.00265 | Less Than PCL | Less Than PCL |
| | Jul-12 | 16.7 | 0.00200 | 0.00055 U | -8.00 | -0.262 | -0.060 | Less Than PCL | 0.00257 | Less Than PCL | Less Than PCL |
| | Jan-13 | 17.2 | 0.00200 | 0.0022 U | -8.00 | -0.259 | -0.060 | Less Than PCL | 0.00249 | Less Than PCL | Less Than PCL |
| | Jul-13 | 17.7 | 0.00200 | 0.0022 U | -8.00 | -0.25 | -0.06 | Less Than PCL | 0.00242 | Less Than PCL | Less Than PCL |
| | Jan-14 | 18.2 | 0.00200 | 0.00160 U | -8.00 | -0.24 | -0.06 | Less Than PCL | 0.00235 | Less Than PCL | Less Than PCL |
| | Jul-14 | 18.8 | 0.00200 | 0.0005 U | -8.00 | -0.23 | -0.06 | Less Than PCL | 0.00227 | Less Than PCL | Less Than PCL |
| | Jan-15 | 19.3 | 0.00200 | 0.00025 U | -8.00 | -0.22 | -0.06 | Less Than PCL | 0.00220 | Less Than PCL | Less Than PCL |
| | Jul-15 | 19.8 | 0.00200 | 0.00127 J | -6.67 | -0.185 | -0.060 | Less Than PCL | 0.00214 | Less Than PCL | Less Than PCL |
| | Jan-16 | 20.3 | 0.00200 | 0.00144 J | -6.54 | -0.151 | -0.060 | Less Than PCL | 0.00207 | Less Than PCL | Less Than PCL |
| | Jul-16 | 20.8 | 0.00200 | 0.00098 J | -6.93 | -0.13 | -0.06 | Less Than PCL | 0.00201 | Less Than PCL | Less Than PCL |
| 508F51MW | Sep-04 | 0.0 | 0.00200 | 0.00170 U | -8.00 | -- | -- | -- | -- | -- | -- |
| | Jan-05 | 0.3 | 0.00200 | 0.00017 U | -8.00 | -- | -- | -- | -- | -- | -- |
| | Apr-05 | 0.5 | 0.00200 | 0.00200 U | -8.00 | -- | -- | -- | -- | -- | -- |
| | Jul-05 | 0.8 | 0.00200 | 0.00030 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Aug-05 | 0.9 | 0.00200 | 0.00030 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Oct-05 | 1.0 | 0.00200 | 0.00030 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | May-06 | 1.6 | 0.00200 | 0.00060 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Aug-06 | 1.9 | 0.00200 | 0.00060 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Apr-07 | 2.5 | 0.00200 | 0.00012 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Aug-07 | 2.9 | 0.00200 | 0.00036 J | -7.93 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-08 | 3.3 | 0.00200 | 0.00043 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-08 | 3.8 | 0.00200 | 0.00030 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-09 | 4.3 | 0.00200 | 0.00030 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-09 | 4.8 | 0.00200 | 0.00030 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-10 | 5.3 | 0.00200 | 0.00028 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-10 | 5.8 | 0.00200 | 0.00028 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-11 | 6.3 | 0.00200 | 0.00022 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-11 | 6.9 | 0.00200 | 0.00022 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-12 | 7.3 | 0.00200 | 0.00022 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-12 | 7.8 | 0.00200 | 0.00022 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-13 | 8.3 | 0.00200 | 0.00044 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-13 | 8.8 | 0.00200 | 0.00044 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-14 | 9.3 | 0.00200 | 0.00033 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-14 | 9.8 | 0.00200 | 0.00025 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-15 | 10.3 | 0.00200 | 0.00025 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-15 | 10.9 | 0.00200 | 0.00025 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-16 | 11.4 | 0.00200 | 0.0005 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-16 | 11.9 | 0.00200 | 0.00025 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |

**Table 4-4**

**Concentration vs. Time Attenuation Rate Constants**
**SWMUs 79/136 Central Plume**
**2016 RAER**
**Former NAS Dallas, Texas**
**Page 15 of 24**

| Monitoring Well ID | Sampling Date | Elapsed Time (Years) | Protective Concentration Level (mg/L) | Concentration Detected (mg/L) | Natural Log of Concentration (mg/L) | Degradation Rate from Natural Log ($K_{time}$) (mg/L per year) | Minimum Degradation Rate Required for Remedial Goals Natural Log ($K_{time}$) (mg/L per year) | Minimum Degradation Rate Met? (Yes/No) | Expected Remedial Goal Concentration (mg/L) | Expected Remedial Goal Concentration Met? (Yes/No) | Remedial Goals Being Met? (Yes/No) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 508F52MW | Sep-04 | 0.0 | 0.00200 | 0.00170 U | -8.00 | -- | -- | -- | -- | -- | -- |
| | Jan-05 | 0.3 | 0.00200 | 0.00670 U | -8.00 | -- | -- | -- | -- | -- | -- |
| | Apr-05 | 0.5 | 0.00200 | 0.00030 U | -8.00 | -- | -- | -- | -- | -- | -- |
| | Jul-05 | 0.8 | 0.00200 | 0.00030 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Aug-05 | 0.9 | 0.00200 | 0.00030 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Oct-05 | 1.0 | 0.00200 | 0.00030 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | May-06 | 1.6 | 0.00200 | 0.00060 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Aug-06 | 1.9 | 0.00200 | 0.00060 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Apr-07 | 2.5 | 0.00200 | 0.00012 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Aug-07 | 2.9 | 0.00200 | 0.00038 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-08 | 3.3 | 0.00200 | 0.00043 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-08 | 3.8 | 0.00200 | 0.00030 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-09 | 4.3 | 0.00200 | 0.00060 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-09 | 4.8 | 0.00200 | 0.00015 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-10 | 5.3 | 0.00200 | 0.00028 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-10 | 5.8 | 0.00200 | 0.00140 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-11 | 6.3 | 0.00200 | 0.00110 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-11 | 6.9 | 0.00200 | 0.00022 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-12 | 7.3 | 0.00200 | 0.0022 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-12 | 7.8 | 0.00200 | 0.0011 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-13 | 8.3 | 0.00200 | 0.00044 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-13 | 8.8 | 0.00200 | 0.0022 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-14 | 9.3 | 0.00200 | 0.00160 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-14 | 9.8 | 0.00200 | 0.0005 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-15 | 10.3 | 0.00200 | 0.0005 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-15 | 10.9 | 0.00200 | 0.0005 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-16 | 11.4 | 0.00200 | 0.0005 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-16 | 11.9 | 0.00200 | 0.0005 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| 508F57MW | May-06 | 0.0 | 0.00200 | 0.00070 J | -7.26 | -- | -- | -- | -- | -- | -- |
| | Aug-06 | 0.2 | 0.00200 | 0.00080 J | -7.13 | -- | -- | -- | -- | -- | -- |
| | Nov-06 | 0.5 | 0.00200 | 0.00090 J | -7.01 | -- | -- | -- | -- | -- | -- |
| | Apr-07 | 0.9 | 0.00200 | 0.00110 J | -6.81 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Aug-07 | 1.2 | 0.00200 | 0.00110 J | -6.81 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-08 | 1.6 | 0.00200 | 0.00110 J | -6.81 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-08 | 2.1 | 0.00200 | 0.00062 J | -7.39 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-09 | 2.6 | 0.00200 | 0.00030 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-09 | 3.2 | 0.00200 | 0.00061 J | -7.40 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-10 | 3.6 | 0.00200 | 0.00096 J | -6.95 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-10 | 4.1 | 0.00200 | 0.00068 J | -7.29 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-11 | 4.6 | 0.00200 | 0.00090 J | -7.01 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-11 | 5.2 | 0.00200 | 0.00110 | -6.81 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-12 | 5.6 | 0.00200 | 0.00120 | -6.73 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-12 | 6.1 | 0.00200 | 0.00079 J | -7.14 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-13 | 8.3 | 0.00200 | 0.00068 J | -7.29 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-13 | 8.8 | 0.00200 | 0.00081 J | -7.12 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-14 | 9.3 | 0.00200 | 0.00033 U | -7.12 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-14 | 9.8 | 0.00200 | 0.00079 J | -7.14 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-15 | 10.4 | 0.00200 | 0.00078 J | -7.23 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-15 | 10.9 | 0.00200 | 0.00065 J | -7.34 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |

**Table 4-4**

**Concentration vs. Time Attenuation Rate Constants**
**SWMUs 79/136 Central Plume**
**2016 RAER**
**Former NAS Dallas, Texas**
**Page 16 of 24**

| Monitoring Well ID | Sampling Date | Elapsed Time (Years) | Protective Concentration Level (mg/L) | Concentration Detected (mg/L) | Natural Log of Concentration (mg/L) | Degradation Rate from Natural Log ($K_{time}$) (mg/L per year) | Minimum Degradation Rate Required for Remedial Goals Natural Log ($K_{time}$) (mg/L per year) | Minimum Degradation Rate Met? (Yes/No) | Expected Remedial Goal Concentration (mg/L) | Expected Remedial Goal Concentration Met? (Yes/No) | Remedial Goals Being Met? (Yes/No) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 508G02MW | Jun-00 | 0.0 | 0.00200 | 0.00050 U | -8.00 | -- | -- | -- | -- | -- | -- |
| | Aug-00 | 0.2 | 0.00200 | 0.00050 U | -8.00 | -- | -- | -- | -- | -- | -- |
| | Oct-00 | 0.4 | 0.00200 | 0.00050 U | -8.00 | -- | -- | -- | -- | -- | -- |
| | Jul-01 | 1.1 | 0.00200 | 0.01000 U | -8.00 | -- | -- | -- | -- | -- | -- |
| | Sep-02 | 2.3 | 0.00200 | 0.00100 U | -8.00 | -- | -- | -- | -- | -- | -- |
| | Nov-02 | 2.5 | 0.00200 | 0.00670 U | -8.00 | -- | -- | -- | -- | -- | -- |
| | Aug-03 | 3.2 | 0.00200 | 0.00210 U | -8.00 | -- | -- | -- | -- | -- | -- |
| | Dec-03 | 3.5 | 0.00200 | 0.00170 U | -8.00 | -- | -- | -- | -- | -- | -- |
| | Jul-04 | 4.1 | 0.00200 | 0.00420 U | -8.00 | -- | -- | -- | -- | -- | -- |
| | Sep-04 | 4.3 | 0.00200 | 0.00420 U | -8.00 | -- | -- | -- | -- | -- | -- |
| | Apr-05 | 4.8 | 0.00200 | 0.00030 J | -8.11 | -- | -- | -- | -- | -- | -- |
| | Jul-05 | 5.1 | 0.00200 | 0.00030 U | -8.00 | -- | -- | -- | -- | -- | -- |
| | Aug-05 | 5.2 | 0.00200 | 0.00050 J | -7.60 | -- | -- | -- | -- | -- | -- |
| | Oct-05 | 5.3 | 0.00200 | 0.00060 J | -7.42 | -- | -- | -- | -- | -- | -- |
| | May-06 | 5.9 | 0.00200 | 0.00090 U | -8.00 | -- | -- | -- | -- | -- | -- |
| | Aug-06 | 6.2 | 0.00200 | 0.00090 U | -8.00 | -- | -- | -- | -- | -- | -- |
| | Apr-07 | 6.8 | 0.00200 | 0.00100 J | -6.91 | -- | -- | -- | -- | -- | -- |
| | Aug-07 | 7.2 | 0.00200 | 0.00130 J | -6.65 | -- | -- | -- | -- | -- | -- |
| | Jan-08 | 7.6 | 0.00200 | 0.00100 J | -6.91 | -- | -- | -- | -- | -- | -- |
| | Jul-08 | 8.1 | 0.00200 | 0.00150 U | -8.00 | -- | -- | -- | -- | -- | -- |
| | Jan-09 | 8.6 | 0.00200 | 0.00150 U | -8.00 | -- | -- | -- | -- | -- | -- |
| | Jul-09 | 9.1 | 0.00200 | 0.00100 J | -6.91 | -- | -- | -- | -- | -- | -- |
| | Jan-10 | 9.6 | 0.00200 | 0.00150 | -6.50 | -- | -- | -- | -- | -- | -- |
| | Jul-10 | 10.1 | 0.00200 | 0.00150 | -6.50 | -- | -- | -- | -- | -- | -- |
| | Jan-11 | 10.6 | 0.00200 | 0.00220 J | -6.12 | -- | -- | -- | -- | -- | -- |
| | Jul-11 | 11.1 | 0.00200 | 0.00330 J | -5.71 | -- | -- | -- | -- | -- | -- |
| | Jan-12 | 11.6 | 0.00200 | 0.00460 | -5.38 | -- | -- | -- | -- | -- | -- |
| | Jul-12 | 12.1 | 0.00200 | 0.00470 | -5.36 | -- | -- | -- | -- | -- | -- |
| | Jan-13 | 8.3 | 0.00200 | 0.0052 | -5.26 | -0.033 | -0.017 | Yes | 0.00213 | No | Evaluate Further |
| | Jul-13 | 8.8 | 0.00200 | 0.0048 J | -5.34 | -0.056 | -0.017 | Yes | 0.00211 | No | Evaluate Further |
| | Jan-14 | 9.3 | 0.00200 | 0.01290 | -4.35 | -0.138 | -0.017 | Yes | 0.00209 | No | Evaluate Further |
| | Jul-14 | 9.8 | 0.00200 | 0.00835 | -4.79 | -0.154 | -0.017 | Yes | 0.00207 | No | Evaluate Further |
| | Jan-15 | 10.3 | 0.00200 | 0.01280 | -4.36 | -0.145 | -0.017 | Yes | 0.00206 | No | Evaluate Further |
| | Jul-15 | 10.9 | 0.00200 | 0.00720 | -4.93 | -0.131 | -0.017 | Yes | 0.00204 | No | Evaluate Further |
| | Jan-16 | 11.3 | 0.00200 | 0.0111 | -4.50 | -0.078 | -0.017 | Yes | 0.00202 | No | Evaluate Further |
| | Jul-16 | 11.9 | 0.00200 | 0.0112 | -4.49 | -0.018 | -0.017 | Yes | 0.00200 | No | Evaluate Further |
| 508G03MW | Jun-00 | 0.0 | 0.00200 | 0.00050 U | -8.00 | -- | -- | -- | -- | -- | -- |
| | Jul-01 | 1.1 | 0.00200 | 0.01000 U | -8.00 | -- | -- | -- | -- | -- | -- |
| | Nov-01 | 1.4 | 0.00200 | 0.01000 U | -8.00 | -- | -- | -- | -- | -- | -- |
| | Feb-02 | 1.7 | 0.00200 | 0.01000 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-02 | 2.1 | 0.00200 | 0.01000 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Sep-02 | 2.3 | 0.00200 | 0.00100 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Nov-02 | 2.5 | 0.00200 | 0.00100 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Aug-03 | 3.2 | 0.00200 | 0.00026 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Dec-03 | 3.5 | 0.00200 | 0.00017 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-04 | 4.1 | 0.00200 | 0.00034 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Sep-04 | 4.3 | 0.00200 | 0.00023 J | -8.38 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-05 | 5.1 | 0.00200 | 0.00030 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Aug-05 | 5.2 | 0.00200 | 0.00030 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Oct-05 | 5.3 | 0.00200 | 0.00030 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | May-06 | 5.9 | 0.00200 | 0.00060 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Aug-06 | 6.2 | 0.00200 | 0.00060 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Apr-07 | 6.8 | 0.00200 | 0.00046 J | -7.68 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Aug-07 | 7.2 | 0.00200 | 0.00019 U | -6.27 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-08 | 7.6 | 0.00200 | 0.00043 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-08 | 8.1 | 0.00200 | 0.00039 J | -7.85 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-09 | 8.6 | 0.00200 | 0.00030 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-09 | 9.1 | 0.00200 | 0.00053 J | -7.54 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-10 | 9.6 | 0.00200 | 0.00074 J | -7.21 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-10 | 10.1 | 0.00200 | 0.00100 | -6.91 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-11 | 10.6 | 0.00200 | 0.00100 | -6.91 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-11 | 11.1 | 0.00200 | 0.00099 J | -6.92 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-12 | 11.6 | 0.00200 | 0.00094 J | -6.97 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-12 | 12.1 | 0.00200 | 0.00087 J | -7.05 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-13 | 8.3 | 0.00200 | 0.00088 J | -7.04 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-13 | 8.8 | 0.00200 | 0.00140 | -6.57 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-14 | 9.3 | 0.00200 | 0.00100 | -6.91 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-14 | 9.8 | 0.00200 | 0.00129 | -6.65 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-15 | 10.4 | 0.00200 | 0.0128 | -6.65 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-15 | 10.9 | 0.00200 | 0.0005 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-16 | 11.3 | 0.00200 | 0.00104 J | -6.87 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-16 | 11.9 | 0.00200 | 0.00117 | -6.75 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |

**Table 4-4**

**Concentration vs. Time Attenuation Rate Constants**
**SWMUs 79/136 Central Plume**
**2016 RAER**
**Former NAS Dallas, Texas**
**Page 17 of 24**

| Monitoring Well ID | Sampling Date | Elapsed Time (Years) | Protective Concentration Level (mg/L) | Concentration Detected (mg/L) | Natural Log of Concentration (mg/L) | Degradation Rate from Natural Log ($K_{time}$) (mg/L per year) | Minimum Degradation Rate Required for Remedial Goals Natural Log ($K_{time}$) (mg/L per year) | Minimum Degradation Rate Met? (Yes/No) | Expected Remedial Goal Concentration (mg/L) | Expected Remedial Goal Concentration Met? (Yes/No) | Remedial Goals Being Met? (Yes/No) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 508G04MW | Jun-00 | 0.0 | 0.00200 | 0.00050 U | -8.00 | -- | -- | -- | -- | -- | -- |
| | Jun-00 | 0.0 | 0.00200 | 0.12000 U | -8.00 | -- | -- | -- | -- | -- | -- |
| | Aug-00 | 0.2 | 0.00200 | 0.00050 U | -8.00 | -- | -- | -- | -- | -- | -- |
| | Oct-00 | 0.4 | 0.00200 | 0.00050 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-01 | 1.1 | 0.00200 | 0.25000 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Nov-01 | 1.4 | 0.00200 | 0.07100 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Feb-02 | 1.7 | 0.00200 | 0.06200 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-02 | 2.1 | 0.00200 | 0.02000 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Sep-02 | 2.3 | 0.00200 | 0.00500 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Nov-02 | 2.5 | 0.00200 | 0.00330 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| 508F53MW | Sep-04 | 4.3 | 0.00200 | 0.00084 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-05 | 4.6 | 0.00200 | 0.00034 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-05 | 5.1 | 0.00200 | 0.00030 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Aug-05 | 5.2 | 0.00200 | 0.00030 J | -8.11 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Oct-05 | 5.3 | 0.00200 | 0.00050 J | -7.60 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | May-06 | 5.9 | 0.00200 | 0.00060 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Aug-06 | 6.2 | 0.00200 | 0.00060 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Apr-07 | 6.8 | 0.00200 | 0.00046 J | -7.68 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Aug-07 | 7.2 | 0.00200 | 0.00065 J | -7.34 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-08 | 7.6 | 0.00200 | 0.00060 J | -7.42 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-08 | 8.1 | 0.00200 | 0.00049 J | -7.62 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-09 | 8.6 | 0.00200 | 0.00030 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-09 | 9.1 | 0.00200 | 0.00064 J | -7.35 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-10 | 9.6 | 0.00200 | 0.00091 J | -7.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-10 | 10.1 | 0.00200 | 0.00150 | -6.50 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-11 | 10.6 | 0.00200 | 0.00160 | -6.44 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-11 | 11.1 | 0.00200 | 0.00110 | -6.81 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-12 | 11.6 | 0.00200 | 0.00200 | -6.21 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-12 | 12.1 | 0.00200 | 0.00078 J | -7.16 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-13 | 12.6 | 0.00200 | 0.00077 J | -7.17 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-13 | 13.1 | 0.00200 | 0.0011 | -6.81 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-14 | 13.6 | 0.00200 | 0.00097 J | -6.94 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-14 | 14.1 | 0.00200 | 0.00114 | -6.78 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-15 | 14.6 | 0.00200 | 0.0005 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-15 | 15.1 | 0.00200 | 0.000368 J | -7.91 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-16 | 15.6 | 0.00200 | 0.00025 UJL | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-16 | 16.1 | 0.00200 | 0.0005 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| 508F59MW | Apr-07 | 0.0 | 0.00200 | 0.00019 U | -8.00 | -- | -- | -- | -- | -- | -- |
| | Aug-07 | 0.3 | 0.00200 | 0.00019 U | -8.00 | -- | -- | -- | -- | -- | -- |
| | Jan-08 | 0.8 | 0.00200 | 0.00043 U | -8.00 | -- | -- | -- | -- | -- | -- |
| | Jul-08 | 1.3 | 0.00200 | 0.00030 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-09 | 1.8 | 0.00200 | 0.00030 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-09 | 2.3 | 0.00200 | 0.00030 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-10 | 2.8 | 0.00200 | 0.00028 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-10 | 3.3 | 0.00200 | 0.00028 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-11 | 3.8 | 0.00200 | 0.00032 J | -8.05 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-11 | 4.3 | 0.00200 | 0.00022 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-12 | 4.8 | 0.00200 | 0.00069 J | -7.28 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-12 | 5.3 | 0.00200 | 0.00022 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-13 | 12.6 | 0.00200 | 0.00044 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-13 | 13.1 | 0.00200 | 0.00062 J | -7.39 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-14 | 13.6 | 0.00200 | 0.00033 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-14 | 14.1 | 0.00200 | 0.00044 J | -7.73 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-15 | 14.6 | 0.00200 | 0.0005 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-15 | 15.1 | 0.00200 | 0.000378 J | -7.88 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-16 | 15.6 | 0.00200 | 0.00034 J | -7.99 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-16 | 16.1 | 0.00200 | 0.00027 J | -8.22 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |

**Table 4-4**

**Concentration vs. Time Attenuation Rate Constants**
**SWMUs 79/136 Central Plume**
**2016 RAER**
**Former NAS Dallas, Texas**
**Page 18 of 24**

| Monitoring Well ID | Sampling Date | Elapsed Time (Years) | Protective Concentration Level (mg/L) | Concentration Detected (mg/L) | Natural Log of Concentration (mg/L) | Degradation Rate from Natural Log ($K_{time}$) (mg/L per year) | Minimum Degradation Rate Required for Remedial Goals Natural Log ($K_{time}$) (mg/L per year) | Minimum Degradation Rate Met? (Yes/No) | Expected Remedial Goal Concentration (mg/L) | Expected Remedial Goal Concentration Met? (Yes/No) | Remedial Goals Being Met? (Yes/No) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 508F60MW | Apr-07 | 0.0 | 0.00200 | 0.00019 U | -8.00 | -- | -- | -- | -- | -- | -- |
| | Aug-07 | 0.3 | 0.00200 | 0.00019 U | -8.00 | -- | -- | -- | -- | -- | -- |
| | Jan-08 | 0.8 | 0.00200 | 0.00043 U | -8.00 | -- | -- | -- | -- | -- | -- |
| | Jul-08 | 1.3 | 0.00200 | 0.00030 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-09 | 1.8 | 0.00200 | 0.00030 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-09 | 2.3 | 0.00200 | 0.00030 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-10 | 2.8 | 0.00200 | 0.00028 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-10 | 3.3 | 0.00200 | 0.00028 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-11 | 3.8 | 0.00200 | 0.00022 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-11 | 4.3 | 0.00200 | 0.00022 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-12 | 4.8 | 0.00200 | 0.00022 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-12 | 5.3 | 0.00200 | 0.00022 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-13 | 12.6 | 0.00200 | 0.00044 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-13 | 13.1 | 0.00200 | 0.00044 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-14 | 13.6 | 0.00200 | 0.00033 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-14 | 14.1 | 0.00200 | 0.00025 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-15 | 14.6 | 0.00200 | 0.00025 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | |
| | Jul-15 | 15.1 | 0.00200 | 0.00025 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-16 | 15.6 | 0.00200 | 0.00025 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-16 | 16.1 | 0.00200 | 0.00025 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| 508F61MW | Apr-07 | 0.0 | 0.00200 | 0.00019 U | -8.00 | -- | -- | -- | -- | -- | -- |
| | Aug-07 | 0.3 | 0.00200 | 0.00020 U | -8.00 | -- | -- | -- | -- | -- | -- |
| | Jan-08 | 0.8 | 0.00200 | 0.00043 U | -8.00 | -- | -- | -- | -- | -- | -- |
| | Jul-08 | 1.3 | 0.00200 | 0.00030 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-09 | 1.8 | 0.00200 | 0.00030 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-09 | 2.3 | 0.00200 | 0.00030 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-10 | 2.8 | 0.00200 | 0.00028 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-10 | 3.3 | 0.00200 | 0.00028 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-11 | 3.8 | 0.00200 | 0.00022 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-11 | 4.3 | 0.00200 | 0.00022 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-12 | 4.8 | 0.00200 | 0.00022 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-12 | 5.3 | 0.00200 | 0.00022 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-13 | 12.6 | 0.00200 | 0.00044 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-13 | 13.1 | 0.00200 | 0.00044 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-14 | 13.6 | 0.00200 | 0.00033 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-14 | 14.1 | 0.00200 | 0.00025 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-15 | 14.6 | 0.00200 | 0.00025 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-15 | 15.1 | 0.00200 | 0.00025 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-16 | 15.6 | 0.00200 | 0.00025 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-16 | 16.1 | 0.00200 | 0.0005 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |

**Table 4-4**

**Concentration vs. Time Attenuation Rate Constants**
**SWMUs 79/136 Central Plume**
**2016 RAER**
**Former NAS Dallas, Texas**
**Page 19 of 24**

| Monitoring Well ID | Sampling Date | Elapsed Time (Years) | Protective Concentration Level (mg/L) | Concentration Detected (mg/L) | Natural Log of Concentration (mg/L) | Degradation Rate from Natural Log ($K_{time}$) (mg/L per year) | Minimum Degradation Rate Required for Remedial Goals Natural Log ($K_{time}$) (mg/L per year) | Minimum Degradation Rate Met? (Yes/No) | Expected Remedial Goal Concentration (mg/L) | Expected Remedial Goal Concentration Met? (Yes/No) | Remedial Goals Being Met? (Yes/No) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **1,2-Dichloroethane** | | | | | | | | | | | |
| 60-21 | Jul-95 | 0.0 | 0.00500 | 0.00500 U | -8.00 | -- | -- | -- | -- | -- | -- |
| | Feb-96 | 0.6 | 0.00500 | 0.00500 U | -8.00 | -- | -- | -- | -- | -- | -- |
| | May-96 | 0.8 | 0.00500 | 0.00500 U | -8.00 | -- | -- | -- | -- | -- | -- |
| | Jul-96 | 1.0 | 0.00500 | 0.00500 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Oct-96 | 1.2 | 0.00500 | 0.00500 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Apr-98 | 2.7 | 0.00500 | 0.00500 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Sep-98 | 3.2 | 0.00500 | 0.00500 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Mar-99 | 3.7 | 0.00500 | 0.00500 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Sep-99 | 4.2 | 0.00500 | 0.00500 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-00 | 5.0 | 0.00500 | 0.00500 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-01 | 6.0 | 0.00500 | 0.00500 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Dec-02 | 7.4 | 0.00500 | 0.00100 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Dec-03 | 8.4 | 0.00500 | 0.00009 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-04 | 9.1 | 0.00500 | 0.00010 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Oct-04 | 9.3 | 0.00500 | 0.00010 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Oct-05 | 10.2 | 0.00500 | 0.00030 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | May-06 | 10.8 | 0.00500 | 0.00040 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Aug-06 | 11.1 | 0.00500 | 0.00040 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Apr-07 | 11.7 | 0.00500 | 0.00021 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Aug-07 | 12.1 | 0.00500 | 0.00013 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-08 | 12.5 | 0.00500 | 0.00026 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-08 | 13.0 | 0.00500 | 0.00034 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-09 | 13.5 | 0.00500 | 0.00034 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-09 | 14.0 | 0.00500 | 0.00034 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-10 | 14.5 | 0.00500 | 0.00033 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-10 | 15.0 | 0.00500 | 0.00033 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-11 | 15.5 | 0.00500 | 0.00020 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-11 | 16.1 | 0.00500 | 0.00020 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-12 | 16.5 | 0.00500 | 0.00020 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-12 | 17.0 | 0.00500 | 0.00020 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-13 | 17.5 | 0.00500 | 0.00022 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-13 | 18.0 | 0.00500 | 0.00022 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-14 | 18.5 | 0.00500 | 0.00024 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-14 | 19.0 | 0.00500 | 0.0005 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-15 | 19.5 | 0.00500 | 0.0005 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-15 | 20.1 | 0.00500 | 0.0005 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-16 | 20.5 | 0.00500 | 0.0005 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-16 | 21.1 | 0.00500 | 0.0005 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| 50803MW | Oct-95 | 0.0 | 0.00500 | 0.00700 | -4.96 | -- | -- | -- | -- | -- | -- |
| | Jan-96 | 0.3 | 0.00500 | 0.00900 | -4.71 | -- | -- | -- | -- | -- | -- |
| | Apr-96 | 0.5 | 0.00500 | 0.00840 | -4.78 | -- | -- | -- | -- | -- | -- |
| | Jul-96 | 0.7 | 0.00500 | 0.01000 | -4.61 | 0.410 | -0.004 | No | 0.00542 | No | No |
| | Oct-96 | 0.9 | 0.00500 | 0.00500 U | -8.00 | -2.396 | -0.004 | Less Than PCL | 0.00542 | Less Than PCL | Less Than PCL |
| | Apr-98 | 2.4 | 0.00500 | 0.05000 U | -8.00 | -1.491 | -0.004 | Less Than PCL | 0.00538 | Less Than PCL | Less Than PCL |
| | Sep-98 | 2.9 | 0.00500 | 0.42000 U | -8.00 | -1.268 | -0.004 | Less Than PCL | 0.00538 | Less Than PCL | Less Than PCL |
| | Mar-99 | 3.4 | 0.00500 | 0.01100 J | -4.51 | -0.506 | -0.004 | Yes | 0.00536 | No | Evaluate Further |
| | Sep-99 | 3.9 | 0.00500 | 0.03300 U | -8.00 | -0.607 | -0.004 | Less Than PCL | 0.00535 | Less Than PCL | Less Than PCL |
| | Jun-00 | 4.7 | 0.00500 | 0.01500 J | -4.20 | -0.208 | -0.004 | Yes | 0.00534 | No | Evaluate Further |
| | Aug-00 | 4.8 | 0.00500 | 0.00610 | -5.10 | -0.091 | -0.004 | Yes | 0.00533 | No | Evaluate Further |
| | Oct-00 | 5.0 | 0.00500 | 0.00460 | -5.38 | -0.043 | -0.004 | Less Than PCL | 0.00533 | Less Than PCL | Less Than PCL |
| | Jun-01 | 5.7 | 0.00500 | 0.25000 U | -8.00 | -0.163 | -0.004 | Less Than PCL | 0.00532 | Less Than PCL | Less Than PCL |
| | Nov-01 | 6.0 | 0.00500 | 0.25000 U | -8.00 | -0.238 | -0.004 | Less Than PCL | 0.00531 | Less Than PCL | Less Than PCL |

**Table 4-4**

**Concentration vs. Time Attenuation Rate Constants**
**SWMUs 79/136 Central Plume**
**2016 RAER**
**Former NAS Dallas, Texas**
**Page 20 of 24**

| Monitoring Well ID | Sampling Date | Elapsed Time (Years) | Protective Concentration Level (mg/L) | Concentration Detected (mg/L) | Natural Log of Concentration (mg/L) | Degradation Rate from Natural Log ($K_{time}$) (mg/L per year) | Minimum Degradation Rate Required for Remedial Goals Natural Log ($K_{time}$) (mg/L per year) | Minimum Degradation Rate Met? (Yes/No) | Expected Remedial Goal Concentration (mg/L) | Expected Remedial Goal Concentration Met? (Yes/No) | Remedial Goals Being Met? (Yes/No) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 508F49MW | Mar-02 | 6.4 | 0.00500 | 0.00530 | -5.24 | -0.159 | -0.004 | Yes | 0.00530 | Yes | Yes |
| | Jul-02 | 6.7 | 0.00500 | 0.25000 U | -8.00 | -0.213 | -0.004 | Less Than PCL | 0.00529 | Less Than PCL | Less Than PCL |
| | Sep-02 | 6.9 | 0.00500 | 0.00300 | -5.81 | -0.172 | -0.004 | Less Than PCL | 0.00529 | Less Than PCL | Less Than PCL |
| | Nov-02 | 7.1 | 0.00500 | 0.12000 U | -8.00 | -0.209 | -0.004 | Less Than PCL | 0.00529 | Less Than PCL | Less Than PCL |
| | Aug-03 | 7.8 | 0.00500 | 0.00880 U | -8.00 | -0.236 | -0.004 | Less Than PCL | 0.00527 | Less Than PCL | Less Than PCL |
| | Dec-03 | 8.2 | 0.00500 | 0.01100 U | -8.00 | -0.255 | -0.004 | Less Than PCL | 0.00526 | Less Than PCL | Less Than PCL |
| | Jul-04 | 8.8 | 0.00500 | 0.03700 U | -8.00 | -0.265 | -0.004 | Less Than PCL | 0.00525 | Less Than PCL | Less Than PCL |
| | Sep-04 | 8.9 | 0.00500 | 0.01300 U | -8.00 | -0.272 | -0.004 | Less Than PCL | 0.00525 | Less Than PCL | Less Than PCL |
| | Mar-05 | 9.4 | 0.00500 | 0.00200 | -6.21 | -0.233 | -0.004 | Less Than PCL | 0.00524 | Less Than PCL | Less Than PCL |
| | Jul-05 | 9.7 | 0.00500 | 0.00030 U | -8.00 | -0.239 | -0.004 | Less Than PCL | 0.00523 | Less Than PCL | Less Than PCL |
| | Aug-05 | 9.8 | 0.00500 | 0.00200 | -6.21 | -0.209 | -0.004 | Less Than PCL | 0.00523 | Less Than PCL | Less Than PCL |
| | Oct-05 | 10.0 | 0.00500 | 0.00030 U | -8.00 | -0.216 | -0.004 | Less Than PCL | 0.00522 | Less Than PCL | Less Than PCL |
| | May-06 | 10.5 | 0.00500 | 0.00100 | -6.91 | -0.201 | -0.004 | Less Than PCL | 0.00521 | Less Than PCL | Less Than PCL |
| | Aug-06 | 10.8 | 0.00500 | 0.00200 | -6.21 | -0.177 | -0.004 | Less Than PCL | 0.00521 | Less Than PCL | Less Than PCL |
| | Apr-07 | 11.5 | 0.00500 | 0.00110 J | -6.81 | -0.163 | -0.004 | Less Than PCL | 0.00519 | Less Than PCL | Less Than PCL |
| | Aug-07 | 11.8 | 0.00500 | 0.00150 U | -8.00 | -0.169 | -0.004 | Less Than PCL | 0.00519 | Less Than PCL | Less Than PCL |
| | Jan-08 | 12.2 | 0.00500 | 0.00260 | -5.95 | -0.143 | -0.004 | Less Than PCL | 0.00518 | Less Than PCL | Less Than PCL |
| | Jul-08 | 12.7 | 0.00500 | 0.00210 | -6.17 | -0.124 | -0.004 | Less Than PCL | 0.00517 | Less Than PCL | Less Than PCL |
| | Jan-09 | 13.2 | 0.00500 | 0.00340 U | -8.00 | -0.130 | -0.004 | Less Than PCL | 0.00516 | Less Than PCL | Less Than PCL |
| | Jul-09 | 13.7 | 0.00500 | 0.00340 U | -8.00 | -0.135 | -0.004 | Less Than PCL | 0.00515 | Less Than PCL | Less Than PCL |
| | Jan-10 | 14.2 | 0.00500 | 0.00330 U | -8.00 | -0.138 | -0.004 | Less Than PCL | 0.00514 | Less Than PCL | Less Than PCL |
| | Jul-10 | 14.7 | 0.00500 | 0.00033 U | -8.00 | -0.140 | -0.004 | Less Than PCL | 0.00513 | Less Than PCL | Less Than PCL |
| | Jan-11 | 15.2 | 0.00500 | 0.00020 U | -8.00 | -0.141 | -0.004 | Less Than PCL | 0.00511 | Less Than PCL | Less Than PCL |
| | Jul-11 | 15.8 | 0.00500 | 0.00100 U | -8.00 | -0.141 | -0.004 | Less Than PCL | 0.00510 | Less Than PCL | Less Than PCL |
| | Jan-12 | 16.2 | 0.00500 | 0.00100 U | -8.00 | -0.140 | -0.004 | Less Than PCL | 0.00509 | Less Than PCL | Less Than PCL |
| | Jul-12 | 16.7 | 0.00500 | 0.00050 U | -8.00 | -0.139 | -0.004 | Less Than PCL | 0.00508 | Less Than PCL | Less Than PCL |
| | Jul-13 | 17.7 | 0.00500 | 0.0011 U | -8.00 | -0.136 | -0.004 | Less Than PCL | 0.00506 | Less Than PCL | Less Than PCL |
| | Jan-13 | 17.2 | 0.00500 | 0.0011 U | -8.00 | -0.135 | -0.004 | Less Than PCL | 0.00507 | Less Than PCL | Less Than PCL |
| | Jan-14 | 18.2 | 0.00500 | 0.0012 U | -8.00 | -0.135 | -0.004 | Less Than PCL | 0.00507 | Less Than PCL | Less Than PCL |
| | Jul-14 | 18.8 | 0.00500 | 0.0005 U | -8.00 | -0.130 | -0.004 | Less Than PCL | 0.00504 | Less Than PCL | Less Than PCL |
| | Jan-15 | 19.3 | 0.00500 | 0.00025 U | -8.00 | -0.128 | -0.004 | Less Than PCL | 0.00503 | Less Than PCL | Less Than PCL |
| | Jul-15 | 19.8 | 0.00500 | 0.00025 U | -8.00 | -0.125 | -0.004 | Less Than PCL | 0.00502 | Less Than PCL | Less Than PCL |
| | Jan-16 | 20.3 | 0.00500 | 0.0005 UJ | -8.00 | -0.122 | -0.004 | Less Than PCL | 0.00501 | Less Than PCL | Less Than PCL |
| | Jul-16 | 20.8 | 0.00500 | 0.0005 U | -8.00 | -0.120 | -0.004 | Less Than PCL | 0.00500 | Less Than PCL | Less Than PCL |
| 508F51MW | Sep-04 | 0.0 | 0.00500 | 0.01200 | -4.42 | -- | -- | -- | -- | -- | -- |
| | Jan-05 | 0.3 | 0.00500 | 0.01400 | -4.27 | -- | -- | -- | -- | -- | -- |
| | Apr-05 | 0.5 | 0.00500 | 0.02000 | -3.91 | -- | -- | -- | -- | -- | -- |
| | Jul-05 | 0.8 | 0.00500 | 0.01500 | -4.20 | 0.368 | -0.073 | No | 0.01129 | No | No |
| | Aug-05 | 0.9 | 0.00500 | 0.01500 | -4.20 | 0.237 | -0.073 | No | 0.01121 | No | No |
| | Oct-05 | 1.0 | 0.00500 | 0.01400 | -4.27 | 0.133 | -0.073 | No | 0.01112 | No | No |
| | May-06 | 1.6 | 0.00500 | 0.01000 | -4.61 | -0.140 | -0.073 | Yes | 0.01065 | Yes | Yes |
| | Aug-06 | 1.9 | 0.00500 | 0.01100 | -4.51 | -0.169 | -0.073 | Yes | 0.01045 | No | Evaluate Further |
| | Apr-07 | 2.5 | 0.00500 | 0.02100 | -3.86 | 0.030 | -0.073 | No | 0.00996 | No | No |
| | Aug-07 | 2.9 | 0.00500 | 0.02400 | -3.73 | 0.123 | -0.073 | No | 0.00972 | No | No |
| | Jan-08 | 3.3 | 0.00500 | 0.02300 | -3.77 | 0.150 | -0.073 | No | 0.00942 | No | No |
| | Jul-08 | 3.8 | 0.00500 | 0.02260 | -3.79 | 0.152 | -0.073 | No | 0.00909 | No | No |
| | Jan-09 | 4.3 | 0.00500 | 0.01450 | -4.23 | 0.099 | -0.073 | No | 0.00875 | No | No |
| | Jul-09 | 4.8 | 0.00500 | 0.02620 | -3.64 | 0.116 | -0.073 | No | 0.00843 | No | No |
| | Jan-10 | 5.3 | 0.00500 | 0.02990 | -3.51 | 0.132 | -0.073 | No | 0.00813 | No | No |
| | Jul-10 | 5.8 | 0.00500 | 0.03090 | -3.48 | 0.139 | -0.073 | No | 0.00784 | No | No |
| | Jan-11 | 6.3 | 0.00500 | 0.02660 | -3.63 | 0.132 | -0.073 | No | 0.00756 | No | No |
| | Jul-11 | 6.9 | 0.00500 | 0.02840 | -3.56 | 0.127 | -0.073 | No | 0.00726 | No | No |
| | Jan-12 | 7.3 | 0.00500 | 0.02110 | -3.86 | 0.109 | -0.073 | No | 0.00702 | No | No |
| | Jul-12 | 7.8 | 0.00500 | 0.02930 | -3.53 | 0.107 | -0.073 | No | 0.00677 | No | No |
| | Jan-13 | 8.3 | 0.00500 | 0.0218 | -3.83 | 0.094 | -0.073 | No | 0.00653 | No | No |
| | Jul-13 | 8.8 | 0.00500 | 0.0327 | -3.42 | 0.095 | -0.073 | No | 0.00629 | No | No |
| | Jan-14 | 9.3 | 0.00500 | 0.0303 | -3.50 | 0.093 | -0.073 | No | 0.00606 | No | No |
| | Jul-14 | 9.8 | 0.00500 | 0.0256 | -3.67 | 0.086 | -0.073 | No | 0.00584 | No | No |
| | Jan-15 | 10.3 | 0.00500 | 0.0256 | -3.67 | 0.079 | -0.121 | No | 0.00608 | No | No |
| | Jul-15 | 10.9 | 0.00500 | 0.0256 | -3.67 | 0.074 | -0.073 | No | 0.00542 | No | No |
| | Jan-16 | 11.3 | 0.00500 | 0.0114 | -4.47 | 0.054 | -0.073 | No | 0.00523 | No | No |
| | Jul-16 | 11.9 | 0.00500 | 0.0184 | -4.00 | 0.046 | -0.073 | No | 0.00504 | No | No |

**Table 4-4**

**Concentration vs. Time Attenuation Rate Constants**
**SWMUs 79/136 Central Plume**
**2016 RAER**
**Former NAS Dallas, Texas**
**Page 21 of 24**

| Monitoring Well ID | Sampling Date | Elapsed Time (Years) | Protective Concentration Level (mg/L) | Concentration Detected (mg/L) | Natural Log of Concentration (mg/L) | Degradation Rate from Natural Log ($K_{time}$) (mg/L per year) | Minimum Degradation Rate Required for Remedial Goals Natural Log ($K_{time}$) (mg/L per year) | Minimum Degradation Rate Met? (Yes/No) | Expected Remedial Goal Concentration (mg/L) | Expected Remedial Goal Concentration Met? (Yes/No) | Remedial Goals Being Met? (Yes/No) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 508F52MW | Sep-04 | 0.0 | 0.00500 | 0.00100 U | -8.00 | -- | -- | -- | -- | -- | -- |
| | Jan-05 | 0.3 | 0.00500 | 0.00420 U | -8.00 | -- | -- | -- | -- | -- | -- |
| | Apr-05 | 0.5 | 0.00500 | 0.00030 U | -8.00 | -- | -- | -- | -- | -- | -- |
| | Jul-05 | 0.8 | 0.00500 | 0.00030 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Aug-05 | 0.9 | 0.00500 | 0.00030 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Oct-05 | 1.0 | 0.00500 | 0.00030 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | May-06 | 1.6 | 0.00500 | 0.00040 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Aug-06 | 1.9 | 0.00500 | 0.00040 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Apr-07 | 2.5 | 0.00500 | 0.00021 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Aug-07 | 2.9 | 0.00500 | 0.00030 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-08 | 3.3 | 0.00500 | 0.00026 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-08 | 3.8 | 0.00500 | 0.00034 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-09 | 4.3 | 0.00500 | 0.00068 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-09 | 4.8 | 0.00500 | 0.00170 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-10 | 5.3 | 0.00500 | 0.00033 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-10 | 5.8 | 0.00500 | 0.00170 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-11 | 6.3 | 0.00500 | 0.00100 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-11 | 6.9 | 0.00500 | 0.00020 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-12 | 7.3 | 0.00500 | 0.00200 U | -6.21 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-12 | 7.8 | 0.00500 | 0.0010 U | -6.91 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-13 | 8.3 | 0.00500 | 0.00022 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-13 | 8.8 | 0.00500 | 0.00110 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-14 | 9.3 | 0.00500 | 0.00120 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-14 | 9.8 | 0.00500 | 0.0005 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-15 | 10.3 | 0.00500 | 0.00025 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-15 | 10.9 | 0.00500 | 0.00025 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-16 | 11.3 | 0.00500 | 0.0005 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-16 | 11.9 | 0.00500 | 0.0005 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| 508F57MW | May-06 | 0.0 | 0.00500 | 0.00800 | -4.83 | -- | -- | -- | -- | -- | -- |
| | Aug-06 | 0.2 | 0.00500 | 0.00800 | -4.83 | -- | -- | -- | -- | -- | -- |
| | Nov-06 | 0.5 | 0.00500 | 0.01000 | -4.61 | -- | -- | -- | -- | -- | -- |
| | Apr-07 | 0.9 | 0.00500 | 0.00740 | -4.91 | -0.041 | -0.046 | No | 0.00769 | Yes | Evaluate Further |
| | Aug-07 | 1.2 | 0.00500 | 0.00780 | -4.85 | -0.060 | -0.046 | Yes | 0.00757 | No | Evaluate Further |
| | Jan-08 | 1.6 | 0.00500 | 0.00650 | -5.04 | -0.138 | -0.046 | Yes | 0.00743 | Yes | Yes |
| | Jul-08 | 2.1 | 0.00500 | 0.00520 | -5.26 | -0.213 | -0.046 | Yes | 0.00726 | Yes | Yes |
| | Jan-09 | 2.6 | 0.00500 | 0.00510 | -5.28 | -0.216 | -0.046 | Yes | 0.00709 | Yes | Yes |
| | Jul-09 | 3.2 | 0.00500 | 0.00470 | -5.36 | -0.212 | -0.046 | Less Than PCL | 0.00693 | Less Than PCL | Less Than PCL |
| | Jan-10 | 3.6 | 0.00500 | 0.00460 | -5.38 | -0.198 | -0.046 | Less Than PCL | 0.00677 | Less Than PCL | Less Than PCL |
| | Jul-10 | 4.1 | 0.00500 | 0.00400 | -5.52 | -0.196 | -0.046 | Less Than PCL | 0.00662 | Less Than PCL | Less Than PCL |
| | Jan-11 | 4.6 | 0.00500 | 0.00410 | -5.50 | -0.184 | -0.046 | Less Than PCL | 0.00647 | Less Than PCL | Less Than PCL |
| | Jul-11 | 5.2 | 0.00500 | 0.00340 | -5.68 | -0.184 | -0.046 | Less Than PCL | 0.00631 | Less Than PCL | Less Than PCL |
| | Jan-12 | 5.6 | 0.00500 | 0.00280 | -5.88 | -0.191 | -0.046 | Less Than PCL | 0.00618 | Less Than PCL | Less Than PCL |
| | Jul-12 | 6.1 | 0.00500 | 0.00250 | -5.99 | -0.196 | -0.046 | Less Than PCL | 0.00604 | Less Than PCL | Less Than PCL |
| | Jan-13 | 8.3 | 0.00500 | 0.0013 | -6.65 | -0.214 | -0.046 | Less Than PCL | 0.00590 | Less Than PCL | Less Than PCL |
| | Jul-13 | 8.8 | 0.00500 | 0.0025 | -5.99 | -0.188 | -0.046 | Less Than PCL | 0.00577 | Less Than PCL | Less Than PCL |
| | Jan-14 | 9.3 | 0.00500 | 0.00024 U | -8.00 | -0.244 | -0.046 | Less Than PCL | 0.00564 | Less Than PCL | Less Than PCL |
| | Jul-14 | 9.8 | 0.00500 | 0.00141 | -6.56 | -0.230 | -0.046 | Less Than PCL | 0.00551 | Less Than PCL | Less Than PCL |
| | Jan-15 | 10.4 | 0.00500 | 0.00216 | -6.14 | -0.206 | -0.071 | Less Than PCL | 0.00560 | Less Than PCL | Less Than PCL |
| | Jul-15 | 10.9 | 0.00500 | 0.0014 | -6.55 | -0.197 | -0.046 | Less Than PCL | 0.00526 | Less Than PCL | Less Than PCL |
| | Jan-16 | 11.3 | 0.00500 | 0.00197 J | -6.23 | -0.182 | -0.046 | Less Than PCL | 0.00514 | Less Than PCL | Less Than PCL |
| | Jul-16 | 11.9 | 0.00500 | 0.00165 | -6.41 | -0.172 | -0.046 | Less Than PCL | 0.00502 | Less Than PCL | Less Than PCL |

**Table 4-4**

**Concentration vs. Time Attenuation Rate Constants**
**SWMUs 79/136 Central Plume**
**2016 RAER**
**Former NAS Dallas, Texas**
**Page 22 of 24**

| Monitoring Well ID | Sampling Date | Elapsed Time (Years) | Protective Concentration Level (mg/L) | Concentration Detected (mg/L) | Natural Log of Concentration (mg/L) | Degradation Rate from Natural Log ($K_{time}$) (mg/L per year) | Minimum Degradation Rate Required for Remedial Goals Natural Log ($K_{time}$) (mg/L per year) | Minimum Degradation Rate Met? (Yes/No) | Expected Remedial Goal Concentration (mg/L) | Expected Remedial Goal Concentration Met? (Yes/No) | Remedial Goals Being Met? (Yes/No) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 508G02MW | Jun-00 | 0.0 | 0.00500 | 0.03400 | -3.38 | -- | -- | -- | -- | -- | -- |
| | Aug-00 | 0.2 | 0.00500 | 0.03300 | -3.41 | -- | -- | -- | -- | -- | -- |
| | Oct-00 | 0.4 | 0.00500 | 0.02700 | -3.61 | -- | -- | -- | -- | -- | -- |
| | Jul-01 | 1.1 | 0.00500 | 0.02100 | -3.86 | -- | -- | -- | -- | -- | -- |
| | Sep-02 | 2.3 | 0.00500 | 0.01300 | -4.34 | -0.420 | -0.118 | Yes | 0.02592 | Yes | Yes |
| | Nov-02 | 2.5 | 0.00500 | 0.01600 | -4.14 | -0.353 | -0.118 | Yes | 0.02546 | Yes | Yes |
| | Aug-03 | 3.2 | 0.00500 | 0.01700 | -4.07 | -0.264 | -0.118 | Yes | 0.02326 | Yes | Yes |
| | Dec-03 | 3.5 | 0.00500 | 0.01700 | -4.07 | -0.219 | -0.118 | Yes | 0.02241 | Yes | Yes |
| | Jul-04 | 4.1 | 0.00500 | 0.01300 J | -4.34 | -0.212 | -0.118 | Yes | 0.02092 | Yes | Yes |
| | Sep-04 | 4.3 | 0.00500 | 0.01300 J | -4.34 | -0.206 | -0.118 | Yes | 0.02053 | Yes | Yes |
| | Apr-05 | 4.8 | 0.00500 | 0.00500 | -5.30 | -0.269 | -0.118 | Less Than PCL | 0.01923 | Less Than PCL | Less Than PCL |
| | Jul-05 | 5.1 | 0.00500 | 0.00400 | -5.52 | -0.316 | -0.118 | Less Than PCL | 0.01859 | Less Than PCL | Less Than PCL |
| | Aug-05 | 5.2 | 0.00500 | 0.00500 | -5.30 | -0.331 | -0.118 | Less Than PCL | 0.01837 | Less Than PCL | Less Than PCL |
| | Oct-05 | 5.3 | 0.00500 | 0.00700 J | -4.96 | -0.324 | -0.118 | Yes | 0.01813 | Yes | Yes |
| | May-06 | 5.9 | 0.00500 | 0.00500 | -5.30 | -0.325 | -0.118 | Less Than PCL | 0.01692 | Less Than PCL | Less Than PCL |
| | Aug-06 | 6.2 | 0.00500 | 0.00700 | -4.96 | -0.308 | -0.118 | Yes | 0.01639 | Yes | Yes |
| | Apr-07 | 6.8 | 0.00500 | 0.00530 | -5.24 | -0.297 | -0.118 | Yes | 0.01518 | Yes | Yes |
| | Aug-07 | 7.2 | 0.00500 | 0.00720 J | -4.93 | -0.274 | -0.118 | Yes | 0.01459 | Yes | Yes |
| | Jan-08 | 7.6 | 0.00500 | 0.00430 | -5.45 | -0.271 | -0.118 | Less Than PCL | 0.01388 | Less Than PCL | Less Than PCL |
| | Jul-08 | 8.1 | 0.00500 | 0.00430 J | -5.45 | -0.263 | -0.118 | Less Than PCL | 0.01309 | Less Than PCL | Less Than PCL |
| | Jan-09 | 8.6 | 0.00500 | 0.00320 J | -5.74 | -0.263 | -0.118 | Less Than PCL | 0.01231 | Less Than PCL | Less Than PCL |
| | Jul-09 | 9.1 | 0.00500 | 0.00300 J | -5.81 | -0.261 | -0.118 | Less Than PCL | 0.01160 | Less Than PCL | Less Than PCL |
| | Jan-10 | 9.6 | 0.00500 | 0.00220 | -6.12 | -0.263 | -0.118 | Less Than PCL | 0.01094 | Less Than PCL | Less Than PCL |
| | Jul-10 | 10.1 | 0.00500 | 0.00220 | -6.12 | -0.263 | -0.118 | Less Than PCL | 0.01032 | Less Than PCL | Less Than PCL |
| | Jan-11 | 10.6 | 0.00500 | 0.00160 J | -6.44 | -0.266 | -0.118 | Less Than PCL | 0.00973 | Less Than PCL | Less Than PCL |
| | Jul-11 | 11.1 | 0.00500 | 0.00100 U | -8.00 | -0.298 | -0.118 | Less Than PCL | 0.00913 | Less Than PCL | Less Than PCL |
| | Jan-12 | 11.6 | 0.00500 | 0.00076 J | -7.18 | -0.305 | -0.118 | Less Than PCL | 0.00865 | Less Than PCL | Less Than PCL |
| | Jul-12 | 12.1 | 0.00500 | 0.00054 J | -7.52 | -0.314 | -0.118 | Less Than PCL | 0.00815 | Less Than PCL | Less Than PCL |
| | Jan-13 | 8.3 | 0.00500 | 0.0011 U | -8.00 | -0.327 | -0.118 | Less Than PCL | 0.00768 | Less Than PCL | Less Than PCL |
| | Jul-13 | 8.8 | 0.00500 | 0.0011 U | -8.00 | -0.341 | -0.118 | Less Than PCL | 0.00724 | Less Than PCL | Less Than PCL |
| | Jan-14 | 9.3 | 0.00500 | 0.00030 J | -8.11 | -0.355 | -0.118 | Less Than PCL | 0.00682 | Less Than PCL | Less Than PCL |
| | Jul-14 | 9.8 | 0.00500 | 0.0005 U | -8.00 | -0.366 | -0.118 | Less Than PCL | 0.00642 | Less Than PCL | Less Than PCL |
| | Jan-15 | 10.3 | 0.00500 | 0.00025 U | -8.00 | -0.376 | -0.118 | Less Than PCL | 0.00604 | Less Than PCL | Less Than PCL |
| | Jan-15 | 10.3 | 0.00500 | 0.0005 U | -8.00 | -0.385 | -0.118 | Less Than PCL | 0.00525 | Less Than PCL | Less Than PCL |
| | Jul-15 | 10.9 | 0.00500 | 0.0005 U | -8.00 | -0.391 | -0.118 | Less Than PCL | 0.00569 | Less Than PCL | Less Than PCL |
| | Jan-16 | 11.3 | 0.00500 | 0.0005 UJ | -8.00 | -0.396 | -0.118 | Less Than PCL | 0.00537 | Less Than PCL | Less Than PCL |
| | Jul-16 | 11.9 | 0.00500 | 0.0005 U | -8.00 | -0.398 | -0.118 | Less Than PCL | 0.00506 | Less Than PCL | Less Than PCL |
| 508G03MW | Jun-00 | 0.0 | 0.00500 | 0.00700 | -4.96 | -- | -- | -- | -- | -- | -- |
| | Jul-01 | 1.1 | 0.00500 | 0.00440 J | -5.43 | -- | -- | -- | -- | -- | -- |
| | Nov-01 | 1.4 | 0.00500 | 0.00410 J | -5.50 | -- | -- | -- | -- | -- | -- |
| | Feb-02 | 1.7 | 0.00500 | 0.00190 J | -6.27 | -- | -- | -- | -- | -- | -- |
| | Jul-02 | 2.1 | 0.00500 | 0.00170 J | -6.38 | -- | -- | -- | -- | -- | -- |
| | Sep-02 | 2.3 | 0.00500 | 0.00099 J | -6.92 | -- | -- | -- | -- | -- | -- |
| | Nov-02 | 2.5 | 0.00500 | 0.00190 | -6.27 | -- | -- | -- | -- | -- | -- |
| | Aug-03 | 3.2 | 0.00500 | 0.00500 | -5.30 | -- | -- | -- | -- | -- | -- |
| | Dec-03 | 3.5 | 0.00500 | 0.00530 | -5.24 | -- | -- | -- | -- | -- | -- |
| | Jul-04 | 4.1 | 0.00500 | 0.01300 | -4.34 | -- | -- | -- | -- | -- | -- |
| | Sep-04 | 4.3 | 0.00500 | 0.00810 | -4.82 | -- | -- | -- | -- | -- | -- |
| | Jul-05 | 5.1 | 0.00500 | 0.00600 | -5.12 | -- | -- | -- | -- | -- | -- |
| | Aug-05 | 5.2 | 0.00500 | 0.00500 | -5.30 | -- | -- | -- | -- | -- | -- |
| | Oct-05 | 5.3 | 0.00500 | 0.00400 | -5.52 | -- | -- | -- | -- | -- | -- |
| | May-06 | 5.9 | 0.00500 | 0.00700 | -4.96 | -- | -- | -- | -- | -- | -- |
| | Aug-06 | 6.2 | 0.00500 | 0.00600 | -5.12 | -0.574 | -0.033 | Yes | 0.00694 | Yes | Yes |
| | Apr-07 | 6.8 | 0.00500 | 0.00660 | -5.02 | -0.025 | -0.033 | No | 0.00679 | Yes | Evaluate Further |
| | Aug-07 | 7.2 | 0.00500 | 0.00680 | -4.99 | 0.016 | -0.033 | No | 0.00672 | No | No |
| | Jan-08 | 7.6 | 0.00500 | 0.00360 | -5.63 | -0.262 | -0.033 | Less Than PCL | 0.00663 | Less Than PCL | Less Than PCL |
| | Jul-08 | 8.1 | 0.00500 | 0.00360 | -5.63 | -0.305 | -0.033 | Less Than PCL | 0.00652 | Less Than PCL | Less Than PCL |
| | Jan-09 | 8.6 | 0.00500 | 0.00340 | -5.68 | -0.295 | -0.033 | Less Than PCL | 0.00641 | Less Than PCL | Less Than PCL |
| | Jul-09 | 9.1 | 0.00500 | 0.00350 | -5.65 | -0.258 | -0.033 | Less Than PCL | 0.00631 | Less Than PCL | Less Than PCL |
| | Jan-10 | 9.6 | 0.00500 | 0.00330 | -5.71 | -0.231 | -0.033 | Less Than PCL | 0.00621 | Less Than PCL | Less Than PCL |
| | Jul-10 | 10.1 | 0.00500 | 0.00330 | -5.71 | -0.205 | -0.033 | Less Than PCL | 0.00611 | Less Than PCL | Less Than PCL |
| | Jan-11 | 10.6 | 0.00500 | 0.00250 | -5.99 | -0.208 | -0.033 | Less Than PCL | 0.00601 | Less Than PCL | Less Than PCL |
| | Jul-11 | 11.1 | 0.00500 | 0.00160 | -6.44 | -0.237 | -0.033 | Less Than PCL | 0.00590 | Less Than PCL | Less Than PCL |
| | Jan-12 | 11.6 | 0.00500 | 0.00140 | -6.57 | -0.256 | -0.033 | Less Than PCL | 0.00582 | Less Than PCL | Less Than PCL |
| | Jul-12 | 12.1 | 0.00500 | 0.00130 J | -6.65 | -0.264 | -0.033 | Less Than PCL | 0.00572 | Less Than PCL | Less Than PCL |
| | Jan-13 | 8.3 | 0.00500 | 0.0013 | -6.65 | -0.253 | -0.033 | Less Than PCL | 0.00563 | Less Than PCL | Less Than PCL |
| | Jul-13 | 8.8 | 0.00500 | 0.0018 | -6.32 | -0.252 | -0.033 | Less Than PCL | 0.00554 | Less Than PCL | Less Than PCL |
| | Jan-14 | 9.3 | 0.00500 | 0.0014 J | -6.57 | -0.258 | -0.033 | Less Than PCL | 0.00545 | Less Than PCL | Less Than PCL |
| | Jul-14 | 9.8 | 0.00500 | 0.00158 | -6.45 | -0.264 | -0.033 | Less Than PCL | 0.00536 | Less Than PCL | Less Than PCL |
| | Jan-15 | 10.4 | 0.00500 | 0.00167 | -6.45 | -0.268 | -0.033 | Less Than PCL | 0.00527 | Less Than PCL | Less Than PCL |
| | Jul-15 | 10.9 | 0.00500 | 0.00138 J | -6.59 | -0.274 | -0.033 | Less Than PCL | 0.00518 | Less Than PCL | Less Than PCL |
| | Jan-16 | 11.3 | 0.00500 | 0.00131 J | -6.64 | -0.277 | -0.033 | Less Than PCL | 0.00510 | Less Than PCL | Less Than PCL |
| | Jul-16 | 11.9 | 0.00500 | 0.00156 | -6.46 | -0.268 | -0.033 | Less Than PCL | 0.00502 | Less Than PCL | Less Than PCL |

**Table 4-4**

**Concentration vs. Time Attenuation Rate Constants**
**SWMUs 79/136 Central Plume**
**2016 RAER**
**Former NAS Dallas, Texas**
**Page 23 of 24**

| Monitoring Well ID | Sampling Date | Elapsed Time (Years) | Protective Concentration Level (mg/L) | Concentration Detected (mg/L) | Natural Log of Concentration (mg/L) | Degradation Rate from Natural Log ($K_{time}$) (mg/L per year) | Minimum Degradation Rate Required for Remedial Goals Natural Log ($K_{time}$) (mg/L per year) | Minimum Degradation Rate Met? (Yes/No) | Expected Remedial Goal Concentration (mg/L) | Expected Remedial Goal Concentration Met? (Yes/No) | Remedial Goals Being Met? (Yes/No) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 508G04MW | Jun-00 | 0.0 | 0.00500 | 0.00060 | -7.42 | -- | -- | -- | -- | -- | -- |
| | Jun-00 | 0.0 | 0.00500 | 0.12000 U | -8.00 | -- | -- | -- | -- | -- | -- |
| | Aug-00 | 0.2 | 0.00500 | 0.00050 U | -8.00 | -- | -- | -- | -- | -- | -- |
| | Oct-00 | 0.4 | 0.00500 | 0.00080 | -7.13 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-01 | 1.1 | 0.00500 | 0.12000 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Nov-01 | 1.4 | 0.00500 | 0.03600 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Feb-02 | 1.7 | 0.00500 | 0.03100 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-02 | 2.1 | 0.00500 | 0.01000 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Sep-02 | 2.3 | 0.00500 | 0.00500 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Nov-02 | 2.5 | 0.00500 | 0.00330 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| 508F53MW | Sep-04 | 4.3 | 0.00500 | 0.00052 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-05 | 4.6 | 0.00500 | 0.00021 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-05 | 5.1 | 0.00500 | 0.00030 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Aug-05 | 5.2 | 0.00500 | 0.00030 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Oct-05 | 5.3 | 0.00500 | 0.00030 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | May-06 | 5.9 | 0.00500 | 0.00040 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Aug-06 | 6.2 | 0.00500 | 0.00040 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Apr-07 | 6.8 | 0.00500 | 0.00013 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Aug-07 | 7.2 | 0.00500 | 0.00015 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-08 | 7.6 | 0.00500 | 0.00026 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-08 | 8.1 | 0.00500 | 0.00034 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-09 | 8.6 | 0.00500 | 0.00034 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-09 | 9.1 | 0.00500 | 0.00034 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-10 | 9.6 | 0.00500 | 0.00033 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-10 | 10.1 | 0.00500 | 0.00033 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-11 | 10.6 | 0.00500 | 0.00020 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-11 | 11.1 | 0.00500 | 0.00020 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-12 | 11.6 | 0.00500 | 0.00020 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-12 | 12.1 | 0.00500 | 0.00020 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-13 | 12.6 | 0.00500 | 0.00022 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-13 | 13.1 | 0.00500 | 0.00022 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-14 | 13.6 | 0.00500 | 0.00024 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-14 | 14.1 | 0.00500 | 0.00025 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-15 | 14.6 | 0.00500 | 0.0005 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-15 | 15.1 | 0.00500 | 0.0005 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-16 | 15.6 | 0.00500 | 0.00025 UJL | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-16 | 16.1 | 0.00500 | 0.0005 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| 508F59MW | Apr-07 | 0.0 | 0.00500 | 0.00160 | -6.44 | -- | -- | -- | -- | -- | -- |
| | Aug-07 | 0.3 | 0.00500 | 0.00140 | -6.57 | -- | -- | -- | -- | -- | -- |
| | Jan-08 | 0.8 | 0.00500 | 0.00026 U | -8.00 | -- | -- | -- | -- | -- | -- |
| | Jul-08 | 1.3 | 0.00500 | 0.00054 J | -7.52 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-09 | 1.8 | 0.00500 | 0.00056 J | -7.49 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-09 | 2.3 | 0.00500 | 0.00069 J | -7.28 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-10 | 2.8 | 0.00500 | 0.00059 J | -7.44 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-10 | 3.3 | 0.00500 | 0.00071 J | -4.95 | -- | NA | NA | NA | NA | Evaluate Further |
| | Jan-11 | 3.8 | 0.00500 | 0.00050 J | -7.60 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-11 | 4.3 | 0.00500 | 0.00140 | -6.57 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-12 | 4.8 | 0.00500 | 0.00130 | -6.65 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-12 | 5.3 | 0.00500 | 0.00110 | -6.81 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-13 | 12.6 | 0.00500 | 0.00066 J | -7.32 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-13 | 13.1 | 0.00500 | 0.0013 | -6.65 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-14 | 13.6 | 0.00500 | 0.0015 | -6.50 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-14 | 14.1 | 0.00500 | 0.00115 | -6.77 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-15 | 14.6 | 0.00500 | 0.00101 | -6.90 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-15 | 15.1 | 0.00500 | 0.0010 | -6.91 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-16 | 15.6 | 0.00500 | 0.00083 J | -7.09 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-16 | 16.1 | 0.00500 | 0.0009 J | -7.01 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |

**Table 4-4**

**Concentration vs. Time Attenuation Rate Constants**
**SWMUs 79/136 Central Plume**
**2016 RAER**
**Former NAS Dallas, Texas**
**Page 24 of 24**

| Monitoring Well ID | Sampling Date | Elapsed Time (Years) | Protective Concentration Level (mg/L) | Concentration Detected (mg/L) | Natural Log of Concentration (mg/L) | Degradation Rate from Natural Log ($K_{time}$) (mg/L per year) | Minimum Degradation Rate Required for Remedial Goals Natural Log ($K_{time}$) (mg/L per year) | Minimum Degradation Rate Met? (Yes/No) | Expected Remedial Goal Concentration (mg/L) | Expected Remedial Goal Concentration Met? (Yes/No) | Remedial Goals Being Met? (Yes/No) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 508F60MW | Apr-07 | 0.0 | 0.00500 | 0.00150 U | -8.00 | -- | -- | -- | -- | -- | -- |
| | Aug-07 | 0.3 | 0.00500 | 0.00140 | -6.57 | -- | -- | -- | -- | -- | -- |
| | Jan-08 | 0.8 | 0.00500 | 0.00026 U | -8.00 | -- | -- | -- | -- | -- | -- |
| | Jul-08 | 1.3 | 0.00500 | 0.00092 J | -6.99 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-09 | 1.8 | 0.00500 | 0.00038 J | -7.88 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-09 | 2.3 | 0.00500 | 0.00064 J | -7.35 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-10 | 2.8 | 0.00500 | 0.00033 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-10 | 3.3 | 0.00500 | 0.00100 | -6.91 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-11 | 3.8 | 0.00500 | 0.00028 J | -8.18 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-11 | 4.3 | 0.00500 | 0.00091 J | -7.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-12 | 4.8 | 0.00500 | 0.00020 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-12 | 5.3 | 0.00500 | 0.00080 J | -7.13 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-13 | 12.6 | 0.00500 | 0.00022 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-13 | 13.1 | 0.00500 | 0.00042 J | -7.78 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-14 | 13.6 | 0.00500 | 0.00024 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-14 | 14.1 | 0.00500 | 0.00025 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-15 | 14.6 | 0.00500 | 0.00096 J | -6.95 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-15 | 15.1 | 0.00500 | 0.000346 J | -7.97 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-16 | 15.6 | 0.00500 | 0.00026 J | -8.25 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-16 | 16.1 | 0.00500 | 0.00081 J | -7.12 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| 508F61MW | Apr-07 | 0.0 | 0.00500 | 0.00015 U | -8.00 | -- | -- | -- | -- | -- | -- |
| | Aug-07 | 0.3 | 0.00500 | 0.00013 U | -8.00 | -- | -- | -- | -- | -- | -- |
| | Jan-08 | 0.8 | 0.00500 | 0.00026 U | -8.00 | -- | -- | -- | -- | -- | -- |
| | Jul-08 | 1.3 | 0.00500 | 0.00034 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-09 | 1.8 | 0.00500 | 0.00034 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-09 | 2.3 | 0.00500 | 0.00034 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-10 | 2.8 | 0.00500 | 0.00033 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-10 | 3.3 | 0.00500 | 0.00033 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-11 | 3.8 | 0.00500 | 0.00020 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-11 | 4.3 | 0.00500 | 0.00020 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-12 | 4.8 | 0.00500 | 0.00020 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-12 | 5.3 | 0.00500 | 0.00020 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-13 | 12.6 | 0.00500 | 0.00022 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-13 | 13.1 | 0.00500 | 0.00022 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-14 | 13.6 | 0.00500 | 0.00024 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-14 | 14.1 | 0.00500 | 0.00025 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-15 | 14.6 | 0.00500 | 0.00025 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-15 | 15.1 | 0.00500 | 0.00025 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-16 | 15.1 | 0.00500 | 0.00025 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-16 | 16.1 | 0.00500 | 0.0005 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |

mg/L - milligrams per liter
NA - Not Applicable
NS - Not Sampled

Notes:
Shaded areas indicate an exceedance.
For graphing purposes non-detect concentrations have been assigned a natural log value of -8.

Analytical Result Qualifiers:
J - Indicates that the chemical was detected. However, the associated numerical result may not be a precise representation of the amount that is actually present in the sample. The laboratory reported concentration is
U - Indicates that the chemical was not detected at the numerical detection limit (sample-specific quantitation limit) noted. Nondetected results from the laboratory are reported in this manner. This qualifier is added to a

# TABLE 4-5
# SUMMARY OF CONCENTRATION vs. DISTANCE ATTENUATION RATE CONSTANTS

**Table 4-5**

**Summary of Concentration vs. Distance Attenuation Rate Constants**
**SWMUs 79/136 Central Plume**
**2016 RAER**

**Former NAS Dallas, Texas**
**Page 1 of 2**

| Sampling Date | Protective Concentration Levels (mg/L) | Detected Concentration (mg/L) | | | | | Natural Log of COC Concentration (mg/L) | | | | | $K_{dist}$ [(mg/L) per foot] |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Centerline Monitoring Wells** | | **508G02MW** | **508F49MW** | **508F53MW** | **508F57MW** | **508F59MW** | **508G02MW** | **508F49MW** | **508F53MW** | **508F57MW** | **508F59MW** | |
| **Distance from source (ft)** | | **0** | **27** | **85** | **273** | **443** | **0** | **27** | **85** | **273** | **443** | |
| **Trichloroethene** | | | | | | | | | | | | |
| Oct-96 | **0.00500** | -- | 0.96000 | -- | -- | -- | -- | -0.04 | -- | -- | -- | -- |
| Apr-98 | **0.00500** | -- | 1.10000 | -- | -- | -- | -- | 0.10 | -- | -- | -- | -- |
| Sep-98 | **0.00500** | -- | 1.90000 | -- | -- | -- | -- | 0.64 | -- | -- | -- | -- |
| Mar-99 | **0.00500** | -- | 0.92000 | -- | -- | -- | -- | -0.08 | -- | -- | -- | -- |
| Sep-99 | **0.00500** | -- | 0.87000 | -- | -- | -- | -- | -0.14 | -- | -- | -- | -- |
| Jul-00 | **0.00500** | 0.02100 | 0.74000 | -- | -- | -- | -3.86 | -0.30 | -- | -- | -- | 0.1343 |
| Jul-01 | **0.00500** | 0.06700 | 5.00000 | -- | -- | -- | -2.70 | 1.61 | -- | -- | -- | 0.1626 |
| Dec-02 | **0.00500** | 0.23000 | 4.70000 | -- | -- | -- | -1.47 | 1.55 | -- | -- | -- | 0.1138 |
| Aug-03 | **0.00500** | 0.26000 | 1.60000 | -- | -- | -- | -1.35 | 0.47 | -- | -- | -- | 0.0685 |
| Dec-03 | **0.00500** | 0.25000 | 2.60000 | -- | -- | -- | -1.39 | 0.96 | -- | -- | -- | 0.0883 |
| Jul-04 | **0.00500** | 0.37000 | 7.60000 | -- | -- | -- | -0.99 | 2.03 | -- | -- | -- | 0.1140 |
| Sep-04 | **0.00500** | 0.44000 | 2.50000 | 0.08300 | -- | -- | -0.82 | 0.92 | -2.49 | -- | -- | -0.0261 |
| Mar-05 | **0.00500** | 0.05200 | 0.03600 | NS | -- | -- | -2.96 | -3.32 | -- | -- | -- | -0.0139 |
| Oct-05 | **0.00500** | 0.04700 J | 0.21000 | 0.03700 | -- | -- | -3.06 | -1.56 | -3.30 | -- | -- | -0.0072 |
| Jan-06 | **0.00500** | 0.07700 | 0.33000 | 0.04400 | -- | -- | -2.56 | -1.11 | -3.12 | -- | -- | -0.0112 |
| Aug-06 | **0.00500** | 0.05700 | 0.29000 | 0.03600 | 0.08900 | -- | -2.86 | -1.24 | -3.32 | -2.42 | -- | -0.0006 |
| Apr-07 | **0.00500** | 0.05800 | 0.15000 | 0.02700 | 0.07600 | 0.00028 U | -2.85 | -1.90 | -3.61 | -2.58 | -8.00 | -0.0104 |
| Aug-07 | **0.00500** | 0.07900 J | 0.12000 | 0.02800 | 0.05700 | 0.00028 U | -2.54 | -2.12 | -3.58 | -2.86 | -8.00 | -0.0107 |
| Jan-08 | **0.00500** | 0.04400 | 0.08300 | 0.00110 | 0.001100 | 0.000530 U | -3.12 | -2.49 | -6.81 | -6.81 | -8.00 | -0.0108 |
| Jul-08 | **0.00500** | 0.02870 | 0.07980 | 0.00250 | 0.037400 | 0.00032 U | -3.55 | -2.53 | -5.99 | -3.29 | -8.00 | -0.0081 |
| Jan-09 | **0.00500** | 0.01620 | 0.05750 | 0.00640 | 0.04160 | 0.00032 U | -4.12 | -2.86 | -5.05 | -3.18 | -8.00 | -0.0076 |
| Jul-09 | **0.00500** | 0.01360 | 0.02420 | 0.01290 | 0.03120 | 0.00032 U | -4.30 | -3.72 | -4.35 | -3.47 | -8.00 | -0.0071 |
| Jan-10 | **0.00500** | 0.01640 | 0.02100 | 0.00034 J | 0.03810 | 0.00024 U | -4.11 | -3.86 | -7.99 | -3.27 | -8.00 | -0.0050 |
| Jul-10 | **0.00500** | 0.01660 | 0.01730 | 0.00055 J | 0.02430 | 0.00024 U | -4.10 | -4.06 | -7.51 | -3.72 | -8.00 | -0.0054 |
| Jan-11 | **0.00500** | 0.00710 J | 0.08980 | 0.00530 | 0.03060 | 0.00026 U | -4.95 | -2.41 | -5.24 | -3.49 | -8.00 | -0.0072 |
| Jul-11 | **0.00500** | 0.01060 | 0.07600 | 0.00930 | 0.02150 | 0.00200 | -4.55 | -2.58 | -4.68 | -3.84 | -6.21 | -0.0046 |
| Jan-12 | **0.00500** | 0.01120 | 0.03450 | 0.00120 | 0.02320 | 0.00240 | -4.49 | -3.37 | -6.73 | -3.76 | -6.03 | -0.0023 |
| Jul-12 | **0.00500** | 0.01080 | 0.05650 | 0.00240 | 0.02010 | 0.00270 | -4.53 | -2.87 | -6.03 | -3.91 | -5.91 | -0.0030 |
| Jan-13 | **0.00500** | 0.0087 | 0.06000 | 0.0021 | 0.0045 | 0.00080 J | -4.74 | -2.81 | -6.17 | -5.40 | -7.13 | -0.0062 |
| Jul-13 | **0.00500** | 0.0120 | 0.04930 | 0.00930 | 0.0216 | 0.00670 | -4.42 | -3.01 | -4.68 | -3.84 | -5.01 | -0.0019 |
| Feb-14 | **0.00500** | 0.0154 | 0.01870 | 0.0003 U | 0.00093 J | 0.00680 | -4.17 | -3.98 | -8.00 | -6.98 | -4.99 | -0.0017 |
| Jul-14 | **0.00500** | 0.0144 | 0.09500 | 0.0070 | 0.0122 | 0.00640 | -4.24 | -2.35 | -4.96 | -4.41 | -5.05 | -0.0031 |
| Jan-15 | **0.00500** | 0.0318 | 0.00849 | 0.00025 U | 0.0146 | 0.00139 | -3.45 | -4.77 | -8.00 | -4.23 | -6.58 | -0.0028 |
| Jul-15 | **0.00500** | 0.0078 | 0.07840 | 0.0033 | 0.0129 | 0.00316 | -4.86 | -2.55 | -5.70 | -4.35 | -5.76 | -0.0032 |
| Jan-16 | **0.00500** | 0.0149 | 0.00679 | 0.00025 UJL | 0.0136 | 0.00121 | -4.21 | -4.99 | -8.00 | -4.30 | -6.72 | -0.0020 |
| Jul-16 | **0.00500** | 0.00607 | 0.04650 | 0.00918 | 0.0129 | 0.00386 | -5.10 | -3.07 | -4.69 | -4.35 | -5.56 | -0.0025 |
| **cis-1,2-Dichloroethene** | | | | | | | | | | | | |
| Oct-96 | **0.07000** | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| Apr-98 | **0.07000** | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| Sep-98 | **0.07000** | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| Mar-99 | **0.07000** | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| Sep-99 | **0.07000** | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| Jul-00 | **0.07000** | 0.01400 | -- | -- | -- | -- | -8.00 | -- | -- | -- | -- | -- |
| Jul-01 | **0.07000** | 0.06600 | -- | -- | -- | -- | -8.00 | -- | -- | -- | -- | -- |
| Dec-02 | **0.07000** | 0.24000 | 3.60000 | -- | -- | -- | -1.43 | 1.28 | -- | -- | -- | 0.1021 |
| Aug-03 | **0.07000** | 0.29000 | 1.50000 | -- | -- | -- | -1.24 | 0.41 | -- | -- | -- | 0.0620 |
| Dec-03 | **0.07000** | 0.31000 | 3.30000 | -- | -- | -- | -1.17 | 1.19 | -- | -- | -- | 0.0892 |
| Jul-04 | **0.07000** | 0.51000 | 7.20000 | -- | -- | -- | -0.67 | 1.97 | -- | -- | -- | 0.0998 |
| Sep-04 | **0.07000** | 0.61000 | 2.60000 | 0.04200 | -- | -- | -0.49 | 0.96 | -3.17 | -- | -- | -0.0381 |
| Mar-05 | **0.07000** | 0.43000 | 1.30000 | NS | -- | -- | -0.84 | 0.26 | -- | -- | -- | 0.0417 |
| Oct-05 | **0.07000** | 0.24000 J | 0.74000 | 0.03300 | -- | -- | -1.43 | -0.30 | -3.41 | -- | -- | -0.0284 |
| Jan-06 | **0.07000** | 0.28000 | 0.74000 | 0.03400 | -- | -- | -1.27 | -0.30 | -3.38 | -- | -- | -0.0295 |
| Aug-06 | **0.07000** | 0.26000 | 0.81000 | 0.03300 | 0.07900 J | -- | -1.35 | -0.21 | -3.41 | -2.54 | -- | -0.0058 |
| Apr-07 | **0.07000** | 0.24000 | 0.73000 | 0.02100 | 0.06800 | 0.00044 U | -1.43 | -0.31 | -3.86 | -2.69 | -8.00 | -0.0135 |
| Aug-07 | **0.07000** | 0.32000 | 0.84000 | 0.02000 | 0.05600 | 0.00044 U | -1.14 | -0.17 | -3.91 | -2.88 | -8.00 | -0.0141 |
| Jan-08 | **0.07000** | 0.31000 | 0.34000 | 0.01100 | 0.01100 | 0.00032 U | -1.17 | -1.08 | -4.51 | -4.51 | -8.00 | -0.0141 |
| Jul-08 | **0.07000** | 0.28400 | 0.36800 | 0.01140 | 0.03750 | 0.00022 J | -1.26 | -1.00 | -4.47 | -3.28 | -8.42 | -0.0140 |
| Jan-09 | **0.07000** | 0.341 J | 0.59900 | 0.00850 | 0.05440 | 0.00041 J | -1.08 | -0.51 | -4.77 | -2.91 | -7.80 | -0.0130 |
| Jul-09 | **0.07000** | 0.34100 | 0.61200 | 0.01130 | 0.03780 | 0.0002 U | -1.08 | -0.49 | -4.48 | -3.28 | -8.00 | -0.0138 |
| Jan-10 | **0.07000** | 0.33900 | 0.01610 | 0.00480 | 0.04190 | 0.00032 U | -1.08 | -4.13 | -5.34 | -3.17 | -8.00 | -0.0097 |
| Jul-10 | **0.07000** | 0.31400 | 0.67400 | 0.00500 | 0.02820 | 0.00120 | -1.16 | -0.39 | -5.30 | -3.57 | -6.73 | -0.0111 |
| Jan-11 | **0.07000** | 0.32100 | 0.38900 | 0.00590 | 0.03080 | 0.00081 J | -1.14 | -0.94 | -5.13 | -3.48 | -7.12 | -0.0114 |
| Jul-11 | **0.07000** | 0.28700 | 0.28200 | 0.00590 | 0.02520 | 0.00450 | -1.25 | -1.27 | -5.13 | -3.68 | -5.40 | -0.0077 |
| Jan-12 | **0.07000** | 0.26000 | 0.29000 | 0.00210 | 0.02820 | 0.00720 | -1.35 | -1.24 | -6.17 | -3.57 | -4.93 | -0.0061 |
| Jul-12 | **0.07000** | 0.29400 | 0.24500 | 0.00240 | 0.02430 | 0.00480 | -1.22 | -1.41 | -6.03 | -3.72 | -5.34 | -0.0070 |
| Jan-13 | **0.07000** | 0.30400 | 0.31600 | 0.0019 | 0.0143 | 0.0031 | -1.19 | -1.15 | -6.27 | -4.25 | -5.78 | -0.0084 |
| Jul-13 | **0.07000** | 0.26100 | 0.27400 | 0.0185 | 0.02360 | 0.00940 | -1.34 | -1.29 | -3.99 | -3.75 | -4.67 | -0.0069 |
| Feb-14 | **0.07000** | 0.24300 | 0.17200 | 0.0036 | 0.0019 | 0.00900 | -1.41 | -1.76 | -5.63 | -6.27 | -4.71 | -0.0074 |
| Jul-14 | **0.07000** | 0.22100 | 0.31800 | 0.0462 | 0.0218 | 0.00976 | -1.51 | -1.15 | -3.07 | -3.83 | -4.63 | -0.0073 |
| Jan-15 | **0.07000** | 0.29400 | 0.04060 | 0.0011 | 0.0204 | 0.00469 | -1.22 | -3.20 | -6.85 | -3.89 | -5.36 | -0.0050 |
| Jul-15 | **0.07000** | 0.2590 | 0.26200 | 0.0036 | 0.01580 | 0.00430 | -1.35 | -1.34 | -5.64 | -4.15 | -5.45 | -0.0077 |
| Jan-16 | **0.07000** | 0.29 | 0.455 JL | 0.00076 JL | 0.0205 | 0.00372 | -1.35 | -1.34 | -5.64 | -4.15 | -5.45 | -0.0077 |
| Jul-16 | **0.07000** | 0.239 | 0.21500 | 0.0152 | 0.0177 | 0.0059 | -1.43 | -1.54 | -4.19 | -4.03 | -5.13 | -0.0075 |

**Table 4-5**

**Summary of Concentration vs. Distance Attenuation Rate Constants**
**SWMUs 79/136 Central Plume**
**2016 RAER**

**Former NAS Dallas, Texas**


| Sampling Date | Protective Concentration Levels (mg/L) | Detected Concentration (mg/L) | | | | | Natural Log of COC Concentration (mg/L) | | | | | $K_{dist}$ [(mg/L) per foot] |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Centerline Monitoring Wells** | | **508G02MW** | **508F49MW** | **508F53MW** | **508F57MW** | **508F59MW** | **508G02MW** | **508F49MW** | **508F53MW** | **508F57MW** | **508F59MW** | |
| **Distance from source (ft)** | | **0** | **27** | **85** | **273** | **443** | **0** | **27** | **85** | **273** | **443** | |
| **Vinyl Chloride** | | | | | | | | | | | | |
| Oct-96 | **0.00200** | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| Apr-98 | **0.00200** | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| Sep-98 | **0.00200** | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| Mar-99 | **0.00200** | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| Sep-99 | **0.00200** | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| Jul-00 | **0.00200** | 0.00050 U | -- | -- | -- | -- | -8.00 | -- | -- | -- | -- | -- |
| Jul-01 | **0.00200** | 0.01000 U | -- | -- | -- | -- | -8.00 | -- | -- | -- | -- | -- |
| Dec-02 | **0.00200** | 0.00670 U | 0.12000 U | -- | -- | -- | -8.00 | -8.00 | -- | -- | -- | 0.0000 |
| Aug-03 | **0.00200** | 0.00210 U | 0.01000 U | -- | -- | -- | -8.00 | -8.00 | -- | -- | -- | 0.0000 |
| Dec-03 | **0.00200** | 0.00170 U | 0.02100 U | -- | -- | -- | -8.00 | -8.00 | -- | -- | -- | 0.0000 |
| Jul-04 | **0.00200** | 0.00420 U | 0.05900 U | -- | -- | -- | -8.00 | -8.00 | -- | -- | -- | 0.0000 |
| Sep-04 | **0.00200** | 0.00420 U | 0.02100 U | 0.00084 U | -- | -- | -8.00 | -8.00 | -8.00 | -- | -- | 0.0000 |
| Mar-05 | **0.00200** | 0.00030 J | 0.00400 | NS | -- | -- | -8.11 | -5.52 | -- | -- | -- | 0.0977 |
| Oct-05 | **0.00200** | 0.00060 J | 0.00300 J | 0.00050 J | -- | -- | -7.42 | -5.81 | -7.60 | -- | -- | -0.0068 |
| Jan-06 | **0.00200** | 0.00090 J | 0.00400 | 0.00060 U | -- | -- | -7.01 | -5.52 | -8.00 | -- | -- | -0.0167 |
| Aug-06 | **0.00200** | 0.00090 J | 0.00400 | 0.00060 U | 0.00080 J | -- | -7.01 | -5.52 | -8.00 | -7.13 | -- | -0.0025 |
| Apr-07 | **0.00200** | 0.001 J | 0.00420 J | 0.00046 J | 0.00110 J | 0.00019 U | -6.91 | -5.47 | -7.68 | -6.81 | -8.00 | -0.0030 |
| Aug-07 | **0.00200** | 0.00130 J | 0.00190 U | 0.00065 J | 0.00110 J | 0.00019 U | -6.65 | -8.00 | -7.34 | -6.81 | -8.00 | -0.0011 |
| Jan-08 | **0.00200** | 0.00100 J | 0.00130 J | 0.00060 J | 0.00060 J | 0.00043 U | -6.91 | -6.65 | -7.42 | -7.42 | -8.00 | -0.0025 |
| Jul-08 | **0.00200** | 0.0015 U | 0.00092 J | 0.00049 J | 0.00062 J | 0.00030 U | -8.00 | -6.99 | -7.62 | -7.39 | -8.00 | -0.0007 |
| Jan-09 | **0.00200** | 0.0015 U | 0.00300 U | 0.00030 U | 0.0003 U | 0.00030 U | -8.00 | -8.00 | -8.00 | -8.00 | -8.00 | 0.0000 |
| Jul-09 | **0.00200** | 0.00100 J | 0.00300 U | 0.00064 J | 0.00061 J | 0.00030 U | -6.91 | -8.00 | -7.35 | -7.40 | -8.00 | -0.0012 |
| Jan-10 | **0.00200** | 0.0015 | 0.00280 U | 0.00091 J | 0.00096 J | 0.00028 U | -6.50 | -8.00 | -7.00 | -6.95 | -8.00 | -0.0015 |
| Jul-10 | **0.00200** | 0.0015 | 0.00280 U | 0.0015 | 0.00068 J | 0.00028 U | -6.50 | -8.00 | -6.50 | -7.29 | -8.00 | -0.0021 |
| Jan-11 | **0.00200** | 0.00220 J | 0.0013 | 0.0016 | 0.00090 J | 0.00032 J | -6.12 | -6.65 | -6.44 | -7.01 | -8.05 | -0.0038 |
| Jul-11 | **0.00200** | 0.00330 J | 0.00110 U | 0.0011 | 0.0011 | 0.00022 U | -5.71 | -8.00 | -6.81 | -6.81 | -8.00 | -0.0024 |
| Jan-12 | **0.00200** | 0.00460 | 0.0011 U | 0.002 | 0.0012 | 0.00069 J | -5.38 | -8.00 | -6.21 | -6.73 | -7.28 | -0.0017 |
| Jul-12 | **0.00200** | 0.00440 | 0.00055 U | 0.00078 J | 0.00079 J | 0.00022 U | -5.43 | -8.00 | -7.16 | -7.14 | -8.00 | -0.0028 |
| Jan-13 * | **0.00200** | 0.00520 | 0.00220 U | 0.00077 J | 0.00068 J | 0.00044 U | -5.26 | -8.00 | -7.17 | -7.29 | -8.00 | -0.0031 |
| Jul-13 * | **0.00200** | 0.0048 J | 0.00220 U | 0.0011 | 0.00081 J | 0.00062 J | -5.34 | -8.00 | -6.81 | -7.12 | -7.39 | -0.0019 |
| Feb-14 | **0.00200** | 0.01290 | 0.00160 U | 0.00097 J | 0.00033 U | 0.00033 U | -4.35 | -8.00 | -6.94 | -8.00 | -8.00 | -0.0049 |
| Jul-14 | **0.00200** | 0.00835 | 0.0005 U | 0.00114 | 0.00079 J | 0.00044 J | -4.79 | -8.00 | -6.78 | -7.14 | -7.73 | -0.0033 |
| Jan-15 | **0.00200** | 0.01280 | 0.00025 U | 0.0005 U | 0.000727 J | 0.0005 U | -4.36 | -8.00 | -8.00 | -7.23 | -8.00 | -0.0037 |
| Jul-15 | **0.00200** | 0.0072 | 0.00127 J | 0.000368 J | 0.000646 J | 0.000378 J | -4.93 | -8.00 | -7.91 | -7.34 | -7.88 | -0.0029 |
| Jan-16 | **0.00200** | 0.0111 | 0.00144 J | 0.00025 UJL | 0.00078 J | 0.00034 J | -4.93 | -8.00 | -8.00 | -7.23 | -8.00 | -0.0030 |
| Jul-16 | **0.00200** | 0.0112 | 0.00098 J | 0.0005 U | 0.00065 J | 0.00027 J | -4.49 | -8.00 | -8.00 | -7.34 | -8.22 | -0.0040 |
| **1,2-Dichloroethane** | | | | | | | | | | | | |
| Oct-96 | **0.00500** | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| Apr-98 | **0.00500** | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| Sep-98 | **0.00500** | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| Mar-99 | **0.00500** | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| Sep-99 | **0.00500** | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| Jul-00 | **0.00500** | 0.03300 | -- | -- | -- | -- | -3.41 | -- | -- | -- | -- | -- |
| Jul-01 | **0.00500** | 0.02100 | -- | -- | -- | -- | -3.86 | -- | -- | -- | -- | -- |
| Dec-02 | **0.00500** | 0.01600 | 0.12000 U | -- | -- | -- | -4.14 | -8.00 | -- | -- | -- | -0.1457 |
| Aug-03 | **0.00500** | 0.01700 | 0.00880 U | -- | -- | -- | -4.07 | -8.00 | -- | -- | -- | -0.1480 |
| Dec-03 | **0.00500** | 0.01700 | 0.01100 U | -- | -- | -- | -4.07 | -8.00 | -- | -- | -- | -0.1480 |
| Jul-04 | **0.00500** | 0.01300 J | 0.03700 U | -- | -- | -- | -4.34 | -8.00 | -- | -- | -- | -0.1379 |
| Sep-04 | **0.00500** | 0.01300 J | 0.01300 U | 0.00052 U | -- | -- | -4.34 | -8.00 | -8.00 | -- | -- | -0.0362 |
| Mar-05 | **0.00500** | 0.00500 | 0.00200 | NS | -- | -- | -5.30 | -6.21 | -- | -- | -- | -0.0346 |
| Oct-05 | **0.00500** | 0.00700 J | 0.00030 U | 0.00030 U | -- | -- | -4.96 | -8.00 | -8.00 | -- | -- | -0.0301 |
| Jan-06 | **0.00500** | 0.00500 | 0.00100 | 0.00040 U | -- | -- | -5.30 | -6.91 | -8.00 | -- | -- | -0.0298 |
| Aug-06 | **0.00500** | 0.00700 | 0.00200 | 0.00040 U | 0.00800 | -- | -4.96 | -6.21 | -8.00 | -4.83 | -- | 0.0032 |
| Apr-07 | **0.00500** | 0.00530 | 0.00110 J | 0.00013 U | 0.00740 | 0.00160 | -5.24 | -6.81 | -8.00 | -4.91 | -6.44 | 0.0010 |
| Aug-07 | **0.00500** | 0.00720 J | 0.00150 U | 0.00015 U | 0.00780 | 0.00140 | -4.93 | -8.00 | -8.00 | -4.85 | -6.57 | 0.0016 |
| Jan-08 | **0.00500** | 0.00430 | 0.00260 | 0.00026 U | 0.00650 | 0.00026 U | -5.45 | -5.95 | -8.00 | -5.04 | -8.00 | -0.0027 |
| Jul-08 | **0.00500** | 0.0043 J | 0.00210 | 0.00034 U | 0.00520 | 0.00054 J | -5.45 | -6.17 | -8.00 | -5.26 | -7.52 | -0.0018 |
| Jan-09 | **0.00500** | 0.0032 J | 0.00340 U | 0.00034 U | 0.00510 | 0.00056 J | -5.74 | -8.00 | -8.00 | -5.28 | -7.49 | 0.0004 |
| Jul-09 | **0.00500** | 0.003 J | 0.00340 U | 0.00034 U | 0.00470 | 0.00069 J | -5.81 | -8.00 | -8.00 | -5.36 | -7.28 | 0.0009 |
| Jan-10 | **0.00500** | 0.0022 | 0.00330 U | 0.00033 U | 0.00460 | 0.00059 J | -6.12 | -8.00 | -8.00 | -5.38 | -7.44 | 0.0009 |
| Jul-10 | **0.00500** | 0.002 | 0.00330 U | 0.00033 U | 0.00400 | 0.00071 J | -6.21 | -8.00 | -8.00 | -5.52 | -7.25 | 0.0013 |
| Jan-11 | **0.00500** | 0.00160 J | 0.00020 U | 0.00020 U | 0.00410 | 0.0005 J | -6.44 | -8.00 | -8.00 | -5.50 | -7.60 | 0.0009 |
| Jul-11 | **0.00500** | 0.00100 U | 0.00100 U | 0.00020 U | 0.00340 | 0.00140 | -8.00 | -8.00 | -8.00 | -5.68 | -6.57 | 0.0045 |
| Jan-12 | **0.00500** | 0.00076 J | 0.00100 U | 0.00020 U | 0.00280 | 0.00130 | -7.18 | -8.00 | -8.00 | -5.88 | -6.65 | 0.0033 |
| Jul-12 | **0.00500** | 0.00053 J | 0.00050 U | 0.00020 U | 0.00250 | 0.00110 | -5.24 | -8.00 | -8.00 | -5.99 | -6.81 | 0.0006 |
| Jan-13 | **0.00500** | 0.0011 U | 0.0011 U | 0.00022 U | 0.0013 | 0.00066 J | -8.00 | -8.00 | -8.00 | -6.65 | -7.32 | 0.0024 |
| Jul-13 | **0.00500** | 0.0011 U | 0.0011 U | 0.00022 U | 0.0025 | 0.00130 | -8.00 | -8.00 | -8.00 | -5.99 | -6.65 | 0.0042 |
| Feb-14 | **0.00500** | 0.00030 J | 0.0012 U | 0.00024 U | 0.00024 U | 0.00150 | -8.00 | -8.00 | -8.00 | -5.99 | -6.65 | 0.0042 |
| Jul-14 | **0.00500** | 0.0005 U | 0.0005 U | 0.0025 U | 0.00141 | 0.00115 | -8.00 | -8.00 | -8.00 | -6.56 | -6.77 | 0.0035 |
| Jan-15 | **0.00500** | 0.00025 U | 0.00025 U | 0.0005 U | 0.00216 | 0.00101 | -8.00 | -8.00 | -8.00 | -6.14 | -6.90 | 0.0036 |
| Jul-15 | **0.00500** | 0.00025 U | 0.00025 U | 0.0005 U | 0.00143 | 0.00100 | -8.00 | -8.00 | -8.00 | -6.14 | -6.90 | 0.0036 |
| Jan-16 | **0.00500** | 0.0005 UJ | 0.0005 UJ | 0.00025 UJL | 0.00197 J | 0.00083 J | -8.00 | -8.00 | -8.00 | -6.23 | -7.09 | 0.0031 |
| Jul-16 | **0.00500** | 0.0005 U | 0.0005 U | 0.0005 U | 0.00165 | 0.0009 J | -8.00 | -8.00 | -8.00 | -6.41 | -7.01 | 0.0031 |

mg/L - milligram per liter
NA - Not Applicable
NS - Not Sampled

Notes:
Shaded areas indicate an exceedance.
For graphing purposes non-detect concentrations and estimated concentrations below 0.0003 mg/L have been assigned a natural log value of -8.

Analytical Result Qualifiers:
J - Indicates that the chemical was detected. However, the associated numerical result may not be a precise representation of the amount that is actually present in the sample. The laboratory reported concentration is considered to be an estimate of the true concentration.
U - Indicates that the chemical was not detected at the numerical detection limit (sample-specific quantitation limit) noted. Nondetected results from the laboratory are reported in this manner. This qualifier is added to a positive result (reported by the laboratory) if the detected concentration is determined to be attributable to contamination introduced during field sampling or laboratory analysis.

# Plug and Abandonment Documentation

# STATE OF TEXAS PLUGGING REPORT for Tracking #158494

| | | | |
|---|---|---|---|
| Owner: | **NAS Dallas** | Owner Well #: | **508G05MW** |
| Address: | **8100 West Jefferson<br>Grand Prairie, TX 75051** | Grid #: | **33-17-1** |
| Well Location: | **8100 West Jefferson<br>Grand Prairie, TX 75051** | Latitude: | **32° 44' 25.8" N** |
| | | Longitude: | **096° 57' 46.3" W** |
| Well County: | **Dallas** | Elevation: | **No Data** |
| Well Type: | **Monitor** | | |

*Drilling Information*

| | | | |
|---|---|---|---|
| Company: | **No Data** | Date Drilled: | **No Data** |
| Driller: | **No Data** | License Number: | **No Data** |

| | *Diameter (in.)* | *Top Depth (ft.)* | *Bottom Depth (ft.)* |
|---|---|---|---|
| Borehole: | | **0** | **24.5** |

*Plugging Information*

Date Plugged: **4/4/2016** Plugger:

Plug Method: **Pour in 3/8 bentonite chips when standing water in well is less than 100 feet depth, cement top 2 feet**

Casing Left in Well:

**No Data**

Plug(s) Placed in Well:

| *Top (ft.)* | *Bottom (ft.)* | *Description (number of sacks & material)* |
|---|---|---|
| **0** | **2** | **Cement 2 Bags/Sacks** |
| **2** | **24.5** | **Bentonite 2 Bags/Sacks** |

Certification Data: The driller certified that the driller plugged this well (or the well was plugged under the driller's direct supervision) and that each and all of the statements herein are true and correct. The driller understood that failure to complete the required items will result in the reports(s) being returned for completion and resubmittal.

Company Information: **Strata Core Services, LLC**

**112 S. Norwood Drive**
**Hurst, TX 76053**

Driller Name: **Brad Eskue** License Number: **58164**

Comments: **No Data**

# STATE OF TEXAS PLUGGING REPORT for Tracking #158493

| | | | |
|---|---|---|---|
| Owner: | **NAS Dallas** | Owner Well #: | **508G01MW** |
| Address: | **8100 West Jefferson<br>Grand Prairie, TX 75051** | Grid #: | **33-17-1** |
| Well Location: | **8100 West Jefferson<br>Grand Prairie, TX 75051** | Latitude: | **32° 44' 25.8" N** |
| | | Longitude: | **096° 57' 46.3" W** |
| Well County: | **Dallas** | Elevation: | **No Data** |
| Well Type: | **Monitor** | | |

*Drilling Information*

| | | | |
|---|---|---|---|
| Company: | **No Data** | Date Drilled: | **No Data** |
| Driller: | **No Data** | License Number: | **No Data** |

| | *Diameter (in.)* | *Top Depth (ft.)* | *Bottom Depth (ft.)* |
|---|---|---|---|
| Borehole: | | **0** | **27** |

*Plugging Information*

Date Plugged: **4/4/2016** Plugger:

Plug Method: **Pour in 3/8 bentonite chips when standing water in well is less than 100 feet depth, cement top 2 feet**

Casing Left in Well: **No Data**

Plug(s) Placed in Well:

| *Top (ft.)* | *Bottom (ft.)* | *Description (number of sacks & material)* |
|---|---|---|
| **0** | **2** | **Cement 2 Bags/Sacks** |
| **2** | **27** | **Bentonite 2 Bags/Sacks** |

Certification Data: The driller certified that the driller plugged this well (or the well was plugged under the driller's direct supervision) and that each and all of the statements herein are true and correct. The driller understood that failure to complete the required items will result in the reports(s) being returned for completion and resubmittal.

Company Information: **Strata Core Services, LLC**

**112 S. Norwood Drive**
**Hurst, TX 76053**

Driller Name: **Brad Eskue** License Number: **58164**

Comments: **No Data**

# STATE OF TEXAS PLUGGING REPORT for Tracking #158492

| | | | |
|---|---|---|---|
| Owner: | NAS Dallas | Owner Well #: | 508F50MW |
| Address: | 8100 West Jefferson<br>Grand Prairie, TX 75051 | Grid #: | 33-17-1 |
| Well Location: | 8100 West Jefferson<br>Grand Prairie, TX 75051 | Latitude: | 32° 44' 25.8" N |
| | | Longitude: | 096° 57' 46.3" W |
| Well County: | Dallas | Elevation: | No Data |
| Well Type: | Monitor | | |

*Drilling Information*

| | | | |
|---|---|---|---|
| Company: | No Data | Date Drilled: | No Data |
| Driller: | No Data | License Number: | No Data |

| | *Diameter (in.)* | *Top Depth (ft.)* | *Bottom Depth (ft.)* |
|---|---|---|---|
| Borehole: | | 0 | 24.3 |

*Plugging Information*

Date Plugged: **4/4/2016** Plugger:

Plug Method: **Pour in 3/8 bentonite chips when standing water in well is less than 100 feet depth, cement top 2 feet**

Casing Left in Well: **No Data**

Plug(s) Placed in Well:

| *Top (ft.)* | *Bottom (ft.)* | *Description (number of sacks & material)* |
|---|---|---|
| 0 | 2 | Cement 2 Bags/Sacks |
| 2 | 24.3 | Bentonite 2 Bags/Sacks |

Certification Data: The driller certified that the driller plugged this well (or the well was plugged under the driller's direct supervision) and that each and all of the statements herein are true and correct. The driller understood that failure to complete the required items will result in the reports(s) being returned for completion and resubmittal.

Company Information: **Strata Core Services, LLC**
**112 S. Norwood Drive**
**Hurst, TX 76053**

Driller Name: **Brad Eskue** License Number: **58164**

Comments: **No Data**

# APPENDIX 5
# SAMPLING PROCEDURES

Sampling collection and handling procedures were updated to follow Uniform Federal Policy (UFP) for Sample and Analysis Plans in the document titled, Tier II Sampling and Analysis Plan, Long Term Groundwater Monitoring Plan, Former Naval Air Station Dallas, Dallas, Texas, dated December 2014.

# APPENDIX 6
# LABORATORY DATA PACKAGES AND DATA USABILITY SUMMARIES

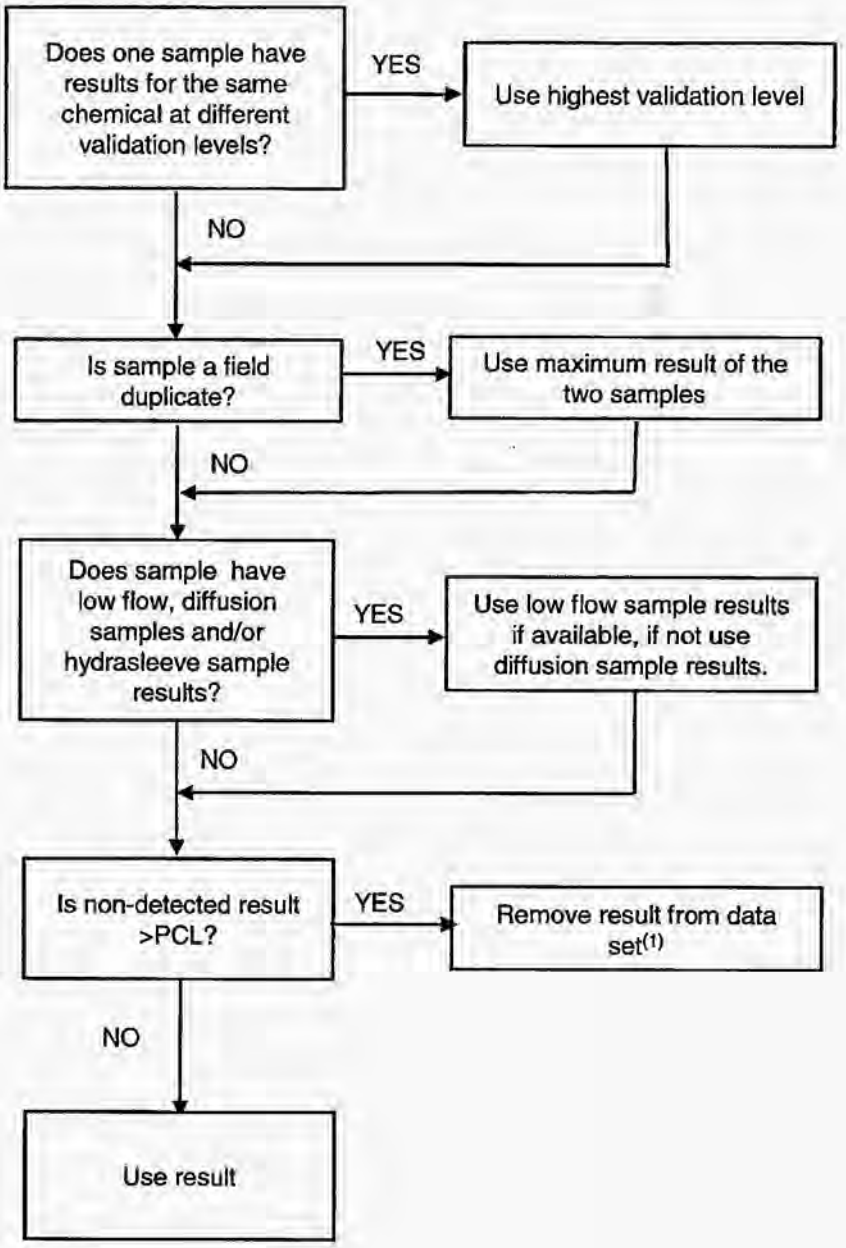
See the attached CD for the Laboratory Analytical Reports —
submitted with the 2016 RAER for SWMU 17/Building 1423
(sorted by Sample Delivery Group Number)

# APPENDIX 7
# STATISTICAL METHODOLOGY

Statistical Methodology has been submitted with the 2016 RAER for SWMU 17/Building 1423

GROUNDWATER DATABASE DEVELOPMENT FOR GRAPHING AND MANN KENDALL STATISTICAL EVALUATION

NAS DALLAS, TEXAS




NOTES:

(1) For 1,1,2,2-PCA and vinyl chloride the TRRP RES A limit < MDL of 5 U therefore only the non-detects > 5 U were removed from the data set.

# STDEV

See Also

Estimates standard deviation based on a sample. The standard deviation is a measure of how widely values are dispersed from the average value (the mean).

**Syntax**

**STDEV(number1**,number2,...)

Number1, number2, ... are 1 to 30 number arguments corresponding to a sample of a population. You can also use a single array or a reference to an array instead of arguments separated by commas.

**Remarks**

- STDEV assumes that its arguments are a sample of the population. If your data represents the entire population, then compute the standard deviation using STDEVP.
- The standard deviation is calculated using the "nonbiased" or "n-1" method.
- STDEV uses the following formula:
- $$\sqrt{\frac{n\sum x^2 - \left(\sum x\right)^2}{n(n-1)}}$$
  $$\sqrt{\frac{n\sum x^2 - \left(\sum x\right)^2}{n(n-1)}}$$
- Logical values such as TRUE and FALSE and text are ignored. If logical values and text must not be ignored, use the STDEVA worksheet function.

**Example**

Suppose 10 tools stamped from the same machine during a production run are collected as a random sample and measured for breaking strength.

The example may be easier to understand if you copy it to a blank worksheet.

How?

| | A |
|---|---|
| 1 | **Strength** |
| 2 | 1345 |
| 3 | 1301 |
| 4 | 1368 |
| 5 | 1322 |
| 6 | 1310 |
| 7 | 1370 |
| 8 | 1318 |
| 9 | 1350 |
| 10 | 1303 |
| 11 | 1299 |

| Formula | Description (Result) |
|---|---|
| =STDEV(A2:A11) | Standard deviation of breaking strength (27.46391572) |

# BEST-FIT LINE USING LINEAR REGRESSION

# LINEST

See Also

Calculates the statistics for a line by using the "least squares" method to calculate a straight line that best fits your data, and returns an array that describes the line. Because this function returns an array of values, it must be entered as an array formula.

The equation for the line is:

y = mx + b or

y = m1x1 + m2x2 + ... + b (if there are multiple ranges of x-values)

where the dependent y-value is a function of the independent x-values. The m-values are coefficients corresponding to each x-value, and b is a constant value. Note that y, x, and m can be vectors. The array that LINEST returns is {mn,mn-1,...,m1,b}. LINEST can also return additional regression statistics.

**Syntax**

**LINEST(known_y's**,known_x's,const,stats)

Known_y's is the set of y-values you already know in the relationship y = mx + b.

- If the array known_y's is in a single column, then each column of known_x's is interpreted as a separate variable.
- If the array known_y's is in a single row, then each row of known_x's is interpreted as a separate variable.

Known_x's is an optional set of x-values that you may already know in the relationship y = mx + b.

- The array known_x's can include one or more sets of variables. If only one variable is used, known_y's and known_x's can be ranges of any shape, as long as they have equal dimensions. If more than one variable is used, known_y's must be a vector (that is, a range with a height of one row or a width of one column).
- If known_x's is omitted, it is assumed to be the array {1,2,3,...} that is the same size as known_y's.

Const is a logical value specifying whether to force the constant b to equal 0.

- If const is TRUE or omitted, b is calculated normally.
- If const is FALSE, b is set equal to 0 and the m-values are adjusted to fit y = mx.

Stats is a logical value specifying whether to return additional regression statistics.

- If stats is TRUE, LINEST returns the additional regression statistics, so the returned array is {mn,mn-1,...,m1,b;sen,sen-1,...,se1,seb;r2,sey;F,df;ssreg,ssresid}.
- If stats is FALSE or omitted, LINEST returns only the m-coefficients and the constant b.

The additional regression statistics are as follows.

| Statistic | Description |
|---|---|
| se1,se2,...,sen | The standard error values for the coefficients m1,m2,...,mn. |
| Seb | The standard error value for the constant b (seb = #N/A when const is FALSE). |
| r2 | The coefficient of determination. Compares estimated and actual y-values, and ranges in value from 0 to 1. If it is 1, there is a perfect correlation in the sample — there is no difference between the estimated y-value and the actual y-value. At the other extreme, if the coefficient of determination is 0, the regression equation is not helpful in predicting a y-value. For information about how r2 is calculated, see "Remarks" later in this topic. |
| sey | The standard error for the y estimate. |
| F | The F statistic, or the F-observed value. Use the F statistic to determine whether the observed relationship between the dependent and independent variables occurs by chance. |
| df | The degrees of freedom. Use the degrees of freedom to help you find F-critical values in a statistical table. Compare the values you find in the table to the F statistic returned by LINEST to determine a confidence level for the model. |
| ssreg | The regression sum of squares. |
| ssresid | The residual sum of squares. |

The following illustration shows the order in which the additional regression statistics are returned.

| | A | B | C | D | E | F |
|---|---|---|---|---|---|---|
| 1 | $m_n$ | $m_{n-1}$ | ... | $m_2$ | $m_1$ | b |
| 2 | $se_n$ | $se_{n-1}$ | ... | $se_2$ | $se_1$ | $se_b$ |
| 3 | $r_2$ | $se_y$ | | | | |
| 4 | F | $d_f$ | | | | |
| 5 | $ss_{reg}$ | $ss_{resid}$ | | | | |

**Remarks**

- You can describe any straight line with the slope and the y-intercept:

  Slope (m):
  To find the slope of a line, often written as m, take two points on the line, (x1,y1) and (x2,y2); the slope is equal to (y2 - y1)/(x2 - x1).

  Y-intercept (b):
  The y-intercept of a line, often written as b, is the value of y at the point where the line crosses the y-axis.

  The equation of a straight line is y = mx + b. Once you know the values of m and b, you can calculate any point on the line by plugging the y- or x-value into that equation. You can also use the TREND function.

- When you have only one independent x-variable, you can obtain the slope and y-intercept values directly by using the following formulas:

  Slope:
  =INDEX(LINEST(known_y's,known_x's),1)

  Y-intercept:
  =INDEX(LINEST(known_y's,known_x's),2)

- The accuracy of the line calculated by LINEST depends on the degree of scatter in your data. The more linear the data, the more accurate the LINEST model. LINEST uses the method of least squares for determining the best fit for the data. When you have only one independent x-variable, the calculations for m and b are based on the following formulas:

$$m = \frac{n\left(\sum xy\right) - \left(\sum x\right)\left(\sum y\right)}{n\left(\sum\left(x^2\right)\right) - \left(\sum x\right)^2}$$

$$b = \frac{\left(\sum y\right)\left(\sum\left(x^2\right)\right) - \left(\sum x\right)\left(\sum xy\right)}{n\left(\sum\left(x^2\right)\right) - \left(\sum x\right)^2}$$

- The line- and curve-fitting functions LINEST and LOGEST can calculate the best straight line or exponential curve that fits your data. However, you have to decide which of the two results best fits your data. You can calculate TREND(known_y's,known_x's) for a straight line, or GROWTH(known_y's, known_x's) for an exponential curve. These functions, without the new_x's argument, return an array of y-values predicted along that line or curve at your actual data points. You can then compare the predicted values with the actual values. You may want to chart them both for a visual comparison.

- In regression analysis, Microsoft Excel calculates for each point the squared difference between the y-value estimated for that point and its actual y-value. The sum of these squared differences is called the residual sum of squares. Microsoft Excel then calculates the sum of the squared differences between the actual y-values and the average of the y-values, which is called the total sum of squares (regression sum of squares + residual sum of squares). The smaller the residual sum of squares is, compared with the total sum of squares, the larger the value of the coefficient of determination, r2, which is an indicator of how well the equation resulting from the regression analysis explains the relationship among the variables.

- Formulas that return arrays must be entered as array formulas.

- When entering an array constant such as known_x's as an argument, use commas to separate values in the same row and semicolons to separate rows. Separator characters may be different depending on your locale setting in **Regional Settings** or **Regional Options** in **Control Panel**.

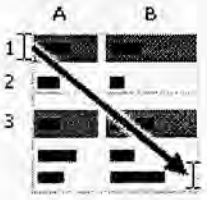
- Note that the y-values predicted by the regression equation may not be valid if they are outside the range of the y-values you used to determine the equation.

**Example 1 Slope and Y-Intercept**

The example may be easier to understand if you copy it to a blank worksheet.

How?

1. Create a blank workbook or worksheet.
2. Select the example in the Help topic. Do not select the row or column headers.




Selecting an example from Help

3. Press CTRL+C.
4. In the worksheet, select cell A1, and press CTRL+V.
5. To switch between viewing the results and viewing the formulas that return the results, press CTRL+` (grave accent), or on the **Tools** menu, point to **Formula Auditing**, and then click **Formula Auditing Mode**.

| | A | B |
|---|---|---|
| 1 | **Known y** | **Known x** |
| 2 | 1 | 0 |
| 3 | 9 | 4 |
| 4 | 5 | 2 |
| 5 | 7 | 3 |
| | **Formula** | **Formula** |
| | =LINEST(A2:A5,B2:B5,,FALSE) | |

**Note** The formula in the example must be entered as an array formula. After copying the example to a blank worksheet, select the range A7:B7 starting with the formula cell. Press F2, and then press CTRL+SHIFT+ENTER. If the formula is not entered as an array formula, the single result is 2.

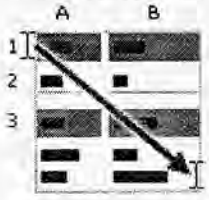
When entered as an array, the slope (2) and the y-intercept (1) are returned.

**Example 2 Simple Linear Regression**

The example may be easier to understand if you copy it to a blank worksheet.

How?

1. Create a blank workbook or worksheet.
2. Select the example in the Help topic. Do not select the row or column headers.




Selecting an example from Help

3. Press CTRL+C.
4. In the worksheet, select cell A1, and press CTRL+V.
5. To switch between viewing the results and viewing the formulas that return the results, press CTRL+` (grave accent), or on the **Tools** menu, point to **Formula Auditing**, and then click **Formula Auditing Mode**.

| | A | B |
|---|---|---|
| 1 | **Month** | **Sales** |
| 2 | 1 | 3100 |
| 3 | 2 | 4500 |
| 4 | 3 | 4400 |

| | | |
|---|---|---|
| **5** | 4 | 5400 |
| **6** | 5 | 7500 |
| **7** | 6 | 8100 |
| | **Formula** | **Description (Result)** |
| | =SUM(LINEST(B2:B7, A2:A7)*{9,1}) | Estimate sales for the ninth month (11000) |

In general, SUM({m,b}*{x,1}) equals mx + b, the estimated y-value for a given x-value. You can also use the TREND function.

**Example 3 Multiple Linear Regression**

Suppose a commercial developer is considering purchasing a group of small office buildings in an established business district.

The developer can use multiple linear regression analysis to estimate the value of an office building in a given area based on the following variables.

| Variable | Refers to the |
|---|---|
| y | Assessed value of the office building |
| x1 | Floor space in square feet |
| x2 | Number of offices |
| x3 | Number of entrances |
| x4 | Age of the office building in years |

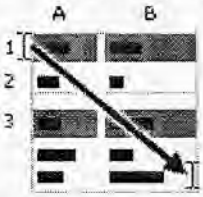
This example assumes that a straight-line relationship exists between each independent variable (x1, x2, x3, and x4) and the dependent variable (y), the value of office buildings in the area.

The developer randomly chooses a sample of 11 office buildings from a possible 1,500 office buildings and obtains the following data. "Half an entrance" means an entrance for deliveries only.

The example may be easier to understand if you copy it to a blank worksheet.

How?

1. Create a blank workbook or worksheet.
2. Select the example in the Help topic. Do not select the row or column headers.




Selecting an example from Help

3. Press CTRL+C.
4. In the worksheet, select cell A1, and press CTRL+V.
5. To switch between viewing the results and viewing the formulas that return the results, press CTRL+` (grave accent), or on the **Tools** menu, point to **Formula Auditing**, and then click **Formula Auditing Mode**.

| | A | B | C | D | E |
|---|---|---|---|---|---|
| **1** | **Floor space (x1)** | **Offices (x2)** | **Entrances (x3)** | **Age (x4)** | **Assessed value (y)** |
| **2** | 2310 | 2 | 2 | 20 | 142,000 |
| **3** | 2333 | 2 | 2 | 12 | 144,000 |
| **4** | 2356 | 3 | 1.5 | 33 | 151,000 |
| **5** | 2379 | 3 | 2 | 43 | 150,000 |

| | | | | | |
|---|---|---|---|---|---|
| **6** | 2402 | 2 | 3 | 53 | 139,000 |
| **7** | 2425 | 4 | 2 | 23 | 169,000 |
| **8** | 2448 | 2 | 1.5 | 99 | 126,000 |
| **9** | 2471 | 2 | 2 | 34 | 142,900 |
| **10** | 2494 | 3 | 3 | 23 | 163,000 |
| **11** | 2517 | 4 | 4 | 55 | 169,000 |
| **12** | 2540 | 2 | 3 | 22 | 149,000 |

**Formula**

=LINEST(E2:E12,A2:D12,TRUE,TRUE)

**Note** The formula in the example must be entered as an array formula. After copying the example to a blank worksheet, select the range A14:E18 starting with the formula cell. Press F2, and then press CTRL+SHIFT+ENTER. If the formula is not entered as an array formula, the single result is -234.2371645.

When entered as an array, the following regression statistics are returned. Use this key to identify the statistic you want.

| | A | B | C | D | E | F |
|---|---|---|---|---|---|---|
| 1 | $m_n$ | $m_{n-1}$ | ... | $m_2$ | $m_1$ | b |
| 2 | $se_n$ | $se_{n-1}$ | ... | $se_2$ | $se_1$ | $se_b$ |
| 3 | $r_2$ | $se_y$ | | | | |
| 4 | F | $d_f$ | | | | |
| 5 | $ss_{reg}$ | $ss_{resid}$ | | | | |

The multiple regression equation, y = m1*x1 + m2*x2 + m3*x3 + m4*x4 + b, can now be obtained using the values from row 14:

y = 27.64*x1 + 12,530*x2 + 2,553*x3+ 234.24*x4 + 52,318

The developer can now estimate the assessed value of an office building in the same area that has 2,500 square feet, three offices, and two entrances and is 25 years old, by using the following equation:

y = 27.64*2500 + 12530*3 + 2553*2 - 234.24*25 + 52318 = $158,261

Or you can copy the following table to cell A21 of the example workbook.

| Floor space (x1) | Offices (x2) | Entrances (x3) | Age (x4) | Assessed value (y) |
|---|---|---|---|---|
| 2500 | 3 | 2 | 25 | =D14*A22 + C14*B22 + B14*C22 + A14*D22 + E14 |

You can also use the TREND function to calculate this value.

**Example 4 Using The F And R2 Statistics**

In the previous example, the coefficient of determination, or r2, is 0.99675 (see cell A17 in the output for LINEST), which would indicate a strong relationship between the independent variables and the sale price. You can use the F statistic to determine whether these results, with such a high r2 value, occurred by chance.

Assume for the moment that in fact there is no relationship among the variables, but that you have drawn a rare sample of 11 office buildings that causes the statistical analysis to demonstrate a strong relationship. The term "Alpha" is used for the probability of erroneously concluding that there is a relationship.

There is a relationship among the variables if the F-observed statistic is greater than the F-critical value. The F-critical value can be obtained by referring to a table of F-critical values in many statistics textbooks. To read the table, assume a single-tailed test, use an Alpha value of 0.05, and for the degrees of freedom (abbreviated in most tables as v1 and v2), use v1 = k = 4 and v2 = n - (k + 1) = 11 - (4 + 1) = 6, where k is the number of variables in the regression analysis and n is the number of data points. The F-critical value is 4.53.

The F-observed value is 459.753674 (cell A18), which is substantially greater than the F-critical value of 4.53. Therefore, the regression equation is useful in predicting the assessed value of office buildings in this area.

**Example 5 Calculating The T-Statistics**

Another hypothesis test will determine whether each slope coefficient is useful in estimating the assessed value of an office building in example 3. For example, to test the age coefficient for statistical significance, divide -234.24 (age slope coefficient) by 13.268 (the estimated standard error of age coefficients in cell A15). The following is the t-observed value:

t = m4 ÷ se4 = -234.24 ÷ 13.268 = -17.7

If you consult a table in a statistics manual, you will find that t-critical, single tail, with 6 degrees of freedom and Alpha = 0.05 is 1.94. Because the absolute value of t, 17.7, is greater than 1.94, age is an important variable when estimating the assessed value of an office building. Each of

the other independent variables can be tested for statistical significance in a similar manner. The following are the t-observed values for each of the independent variables.

| Variable | t-observed value |
|---|---|
| Floor space | 5.1 |
| Number of offices | 31.3 |
| Number of entrances | 4.8 |
| Age | 17.7 |

These values all have an absolute value greater than 1.94; therefore, all the variables used in the regression equation are useful in predicting the assessed value of office buildings in this area.

## SLOPE OF BEST-FIT LINE

# SLOPE

See Also

Returns the slope of the linear regression line through data points in known_y's and known_x's. The slope is the vertical distance divided by the horizontal distance between any two points on the line, which is the rate of change along the regression line.

**Syntax**

**SLOPE(known_y's,known_x's)**

Known_y's is an array or cell range of numeric dependent data points.

Known_x's is the set of independent data points.

**Remarks**

- The arguments must be either numbers or names, arrays, or references that contain numbers.
- If an array or reference argument contains text, logical values, or empty cells, those values are ignored; however, cells with the value zero are included.
- If known_y's and known_x's are empty or have a different number of data points, SLOPE returns the #N/A error value.
- The equation for the slope of the regression line is:

$$b = \frac{n\sum xy - \left(\sum x\right)\left(\sum y\right)}{n\sum x^2 - \left(\sum x\right)^2}$$

**Example**

The example may be easier to understand if you copy it to a blank worksheet.

How?

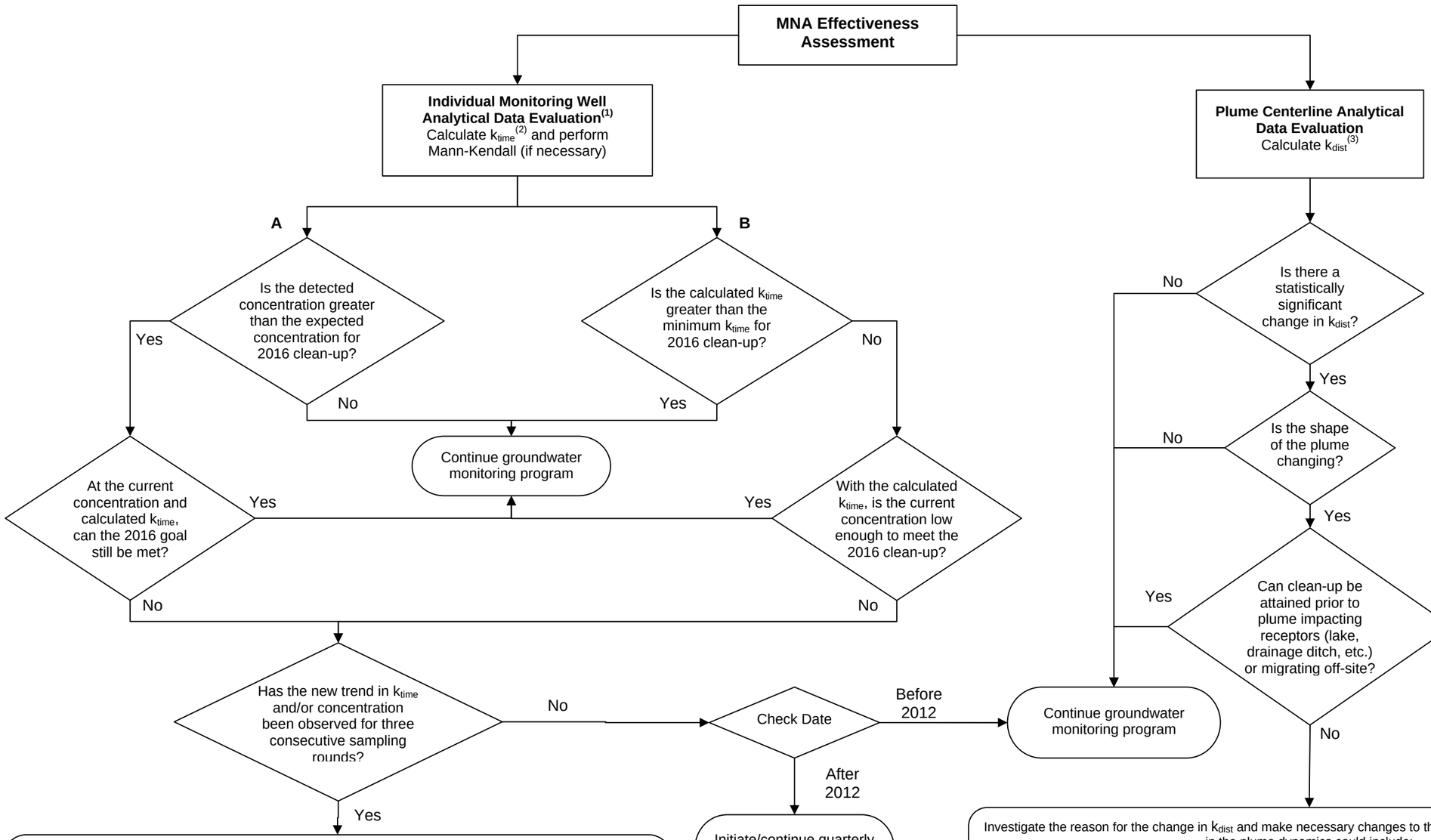
| | A | B |
|---|---|---|
| 1 | **Known y** | **Known x** |
| 2 | 2 | 6 |
| 3 | 3 | 5 |
| 4 | 9 | 11 |
| 5 | 1 | 7 |
| 6 | 8 | 5 |
| 7 | 7 | 4 |
| 8 | 5 | 4 |

| Formula | Description (Result) |
|---|---|
| =SLOPE(A2:A8,B2:B8) | Slope of the linear regression line through the data points above (0.305556) |

# MONITORED NATURAL ATTENUATION DATA EVALUATION

**DIAGRAM 3-1**
**MONITORED NATURAL ATTENUATION DATA EVALUATION**
**RESPONSE ACTION PLAN**

**NAS DALLAS, TEXAS**




Investigate the reason for the change in $k_{time}$ and make necessary changes to the remedial system. These changes in the plume dynamics could include:

| **Reason for $k_{time}$ Change** | **Recommended Changes in Remediation** |
|---|---|
| New source or new release | Identify new Responsible Party for continued remediation. |
| Geochemical change | Determine if chemical additives are necessary or technical impracticability of additional remediation. |
| Asymptotic degradation reached | Determine if active remediation or excavation are necessary or technical impracticability of additional remediation. |

Investigate the reason for the change in $k_{dist}$ and make necessary changes to the remedial system. These changes in the plume dynamics could include:

| **Reason for $K_{dist}$ Change** | **Recommended Changes in Remediation** |
|---|---|
| New source or new release | Identify new Responsible Party for continued remediation. |
| Migrating plume | Initiate abatement measures such as interceptor trench, slurry walls, pump recovery / capture system, etc. if receptors are threatened. |

Notes:
(1) Both pathways (A, B) must be evaluated for each of the chemicals of concern in each monitoring point along the plume's centerline.
(2) $k_{time}$ Concentration versus Time Attenuation Rate Constant
(3) $k_{dist}$ Concentration versus Distance Attenuation Rate Constant

# Assessment of MNA Performance Monitoring

## Introduction

The MNA monitoring well networks at the NAS Dallas groundwater plumes will provide the necessary analytical data to evaluate the dynamic behavior of the plumes over time, including contaminant and/or concentration reductions indicative of progress toward clean-up objectives, changes in plume boundaries, and changes in geochemistry. To this effect, these monitoring well networks include monitoring wells in areas hydraulically upgradient and sidegradient to the groundwater plume, in the historical source area, along the main body of the plume and immediately downgradient of the plume. The number and locations of monitoring points for each plume was selected based on the size of the plume, groundwater velocity, proximity to receptors (including cross-media transfer of COCs), and presence of preferential pathways for COC migration.

As required by the Compliance Plan for NAS Dallas (TCEQ, 2004), performance monitoring for MNA will be conducted in accordance with Response Action Plan (RAP) Worksheet 3.1 until all remedial action objectives have been met for the plume for at least two consecutive sampling events. Upon demonstration of the attainment of clean-up objectives, a three-year of post-remedial action monitoring will be implemented in accordance with the Compliance Plan for NAS Dallas (TCEQ, 2004) and as outlined on RAP Worksheet 4.1.

In addition to the COCs identified in the APAR (TtNUS, 2003) for each groundwater plume, daughter products that may be formed as a result of biotransformation or chemical processes will be monitored during the corrective action period at each plume. In order to ensure that there is a potential for continued transformation of the COCs within the groundwater plume, the geochemical environment will also be monitored (i.e., oxidation-reduction potential, dissolved oxygen, pH, etc.) every two years at a minimum. During the post-remedial action monitoring, the Compliance Plan requires that an expanded list of parameters be sampled including those COCs historically detected at the site. In order to minimize the chance of identifying constituent exceedances during the post-response action monitoring, the expanded list of parameters identified on RAP Worksheet 4.1 (Compliance Plan Table III) will be monitored every five years at a minimum.

Each new round of data will help develop a better understanding of the site and site processes and as a result, the conceptual site model for MNA will be continuously reevaluated from the standpoint of the observed plume shape, location, stability, and dynamics; attenuation rates; groundwater flow patterns; and geochemical regimes.

To evaluate progress towards achievement of clean-up objectives, data collected from the monitoring well network will be used to determine temporal and spatial trends in COC concentrations, comparisons of observed COC concentrations with benchmark concentrations, and, comparison of calculated attenuation rates with the rates required to meet remedial objectives within the required timeframe. Data will be interpreted with regard to variability so that attenuation-related changes and trends can be distinguished from other sources of variation in the data.

If a departure from a predicted trend is found, (i.e., exceeding benchmark concentration or unfavorable changes in attenuation rates), the deviation will be evaluated to determine how the changes may affect attainment of remedial goals for the individual monitoring wells, as well as, how the changes may affect the behavior of the entire plume (i.e., plume stability, reduction in COC concentrations, etc.). Departures from expected trends may not mean remedy failure, because there may be a range of attenuation rates that will achieve the desired remedial goals

in the allotted time; therefore their significance must be evaluated in the context of the site-related goals. If the potential impact on the remedy is negligible, revision of the conceptual site model may be the only outcome of such evaluation. However, if the potential for impact is significant, implementation of alternative remedies may be triggered or, at a minimum additional characterization to better define the factors limiting COC reduction and determine methods for mitigating the magnitude of their impact would be warranted. Other site-related data (i.e., geochemistry and potentiometric data) will continue to be evaluated to provide evidence of COC migration, fate, and attenuation processes. These data may be used to ascertain COC degradation and the continuation of appropriate conditions for attenuation at acceptable rates.

Following the individual monitoring well data analysis, plume behavior will be assessed to evaluate the continued effectiveness of the MNA remedy, as well as the adequacy of the monitoring program and conceptual site model for MNA. The ongoing monitoring program will provide the necessary data for continual refinement of the conceptual model and subsequently of the monitoring program itself. Upon completion of each sampling round, data analysis and determination of the effectiveness of the MNA remedy, plume-specific criteria will drive decisions affecting the continuity of the monitoring program.

At some plumes, source control and interim remedial activities have occurred between the original site characterization process and the implementation of performance monitoring. Because these activities are expected to change the site's characteristics and behavior, performance monitoring will require the continued refinement of the conceptual site model for MNA. This refinement of the conceptual site model may eventually be different from the original MNA conceptual site model based on the initial site characterization data. Development and implementation of the new conceptual site model for MNA will require the collection of additional data (i.e., quarterly monitoring for the first year after interim remedial activities and on a semi-annual basis thereafter) to establish baseline conditions, expediently depict new site characteristics and parameter variability, establish trends and estimate attenuation rates for COCs, determine if the plume characteristics have been altered, and assess the likelihood of meeting site remediation goals.

## Evaluation of New Data

Data interpretation will include the preliminary assessment of the COC concentration data collected for both the plume centerline (e.g., whole plume dynamics) as well as on individual COCs within each monitoring well. The interpretation will be conducted through graphs, tables, maps, statistics, and time-series plots. This will help in identifying patterns, relationships, and anomalies, such as possible "outliers" to the observed remedial trend of the plume. Scatter graphs (i.e., $k_{time}$ and $k_{dist}$ graphs) will show relationships between two variables that are not readily evident using purely numerical methods. Mapping the data in plan view and/or cross-section (i.e., isoconcentration maps, potentiometric maps, MNA parameter maps, etc.) will help understand patterns of COC distribution and migration, and relationships between geochemical zones and COC attenuation.

The initial data analysis and interpretation will focus on the detection of trends in the data for the COCs within individual monitoring wells and subsequently for the plume as a whole. First, the COC concentration data collected from each monitoring well will be used to determine the temporal trends that exist within the plume. The COC trends will also be evaluated at monitoring points located throughout the plume as a whole. In order to adequately interpret progress toward COC reduction goals for the plume, it is necessary to compare trends of individual monitoring wells to trends of other monitoring wells in the plume. Evaluating trends in data from all sampling locations in the plume will determine if the plume exhibits stability or reduction in COC concentrations. In addition, for each COC, spatial trends along the plume centerline [i.e., concentration vs. distance attenuation rate ($k_{dist}$)] will be evaluated. This analysis assists in evaluating the stability of the plume and its migration potential. Assessment of spatial plume behavior is necessary to ensure no unacceptable plume migration occurs.

Further evaluation will focus on the assessment of any departures from predicted trends and their impact on the potential for MNA to achieve plume-related goals. If the COC data points do not definitively indicate that the remedial goals are meeting the reasonable progress expectations, other data will be analyzed in order to properly interpret particular variances from the predicted performance (i.e., the site stratigraphy, groundwater chemistry, the groundwater flow field, the season of the year).

In addition, non-parametric statistical tests, such as the Mann-Kendall test, may be included in the data evaluation to establish the existence of a trend when the initial evaluation is inconclusive due to high data variability.

The process of MNA data evaluation is graphically depicted in Diagram 3-1.

### Individual Monitoring Well Analytical Data Evaluation

Evaluation of progress towards achievement of clean-up goals will focus primarily on temporal trends in COC concentration at individual attenuation monitoring point (AMP) wells within the plume. After each sampling event, temporal trends [i.e., concentration vs. time attenuation rate ($k_{time}$)], will be established for each AMP of the plume. Temporal trends ($k_{time}$) are particularly useful in evaluating if remedial goals can be met in the desired timeframe for the individual location. The analysis of temporal trends is useful for estimating the potential lifetime of the COC plume at the particular location.

The parameters to be evaluated in parallel to ensure reasonable progress is being made in the response action at the particular location are as follows:

- Direct comparison of detected concentrations to expected or benchmark concentration to meet remedial goals by the year 2016 for the monitoring wells along the centerline of the plume.

- Direct comparison of observed attenuation rate ($k_{time}$) from the chemical specific historical data available for the monitoring well versus the minimum attenuation rate ($k_{time}$) necessary to meet the 2016 clean-up date.

The following graph depicts the possible evaluation scenarios for the above parameters:

| | |
|---|---|
| **Measured COC Concentration < Expected COC Concentration**<br>**and**<br>**Observed $k_{time}$ > Minimum $k_{time}$**<br>Remedial goal is being met, continue performance monitoring | **Measured COC Concentration < Expected COC Concentration**<br>**and**<br>**Observed $k_{time}$ < Minimum $k_{time}$**<br>Evaluate further to ensure remedial goal is being met |
| **Measured COC Concentration > Expected COC Concentration**<br>**and**<br>**Observed $k_{time}$ > Minimum $k_{time}$**<br>Evaluate further to ensure remedial goal is being met | **Measured COC Concentration > Expected COC Concentration**<br>**and**<br>**Observed $k_{time}$ < Minimum $k_{time}$**<br>Remedial goal not being met, consider new response action |

1. Satisfactory progress is being made with the response action (top left quadrant) for an individual well location, if the detected concentration of the COC(s) is not greater than the 2016 clean-up curve expected concentration; and, the observed attenuation rate based on historical data available from the monitoring well is equal to or greater than the minimum attenuation rate necessary to meet clean-up by the year 2016 for the monitoring wells along the centerline of the plume.
2. Reasonable progress is not being made towards achieving the remedial goal (bottom right quadrant) if the detected concentration of the COC(s) exceeds the 2016 clean-up curve expected concentration; and the observed attenuation rate based on historical data available from the monitoring well is less than the minimum attenuation rate necessary to meet clean-up by the year 2016 for the monitoring wells along the centerline of the plume. A new response action may need to be implemented if this trend continues for at least three sampling rounds.
3. Further evaluation will be needed for the scenarios in the top right and bottom left quadrants before establishing if reasonable progress is being made towards achievement of the clean-up goals:
   - Reasonable progress is being made when the observed attenuation rate based on historical data is steep enough that clean-up can still be achieved by the year 2016, even though the detected concentration of a COC may be greater than the expected concentration during a particular sampling event (bottom left quadrant).
   - Reasonable progress is being made if the detected concentration of a COC in the sampling event is sufficiently below the expected concentration so that with an observed attenuation rate based on historical data greater than the calculated minimum attenuation rate necessary to meet PCLs by 2016, the remedial objectives can still be achieved by the year 2016 (top right quadrant).
   - Reasonable progress may not be made if either of the preceding two situations continues for at least three consecutive sampling rounds. At that point in the response action evaluation, a new response action may need to be implemented. In this case other statistical methods may be used to evaluate the data such as using non-parametric tests (i.e., Mann-Kendall) to determine if there has been a statistically significant change in degradation trends.

Plume Analytical Data Evaluation

Since a plume-wide trend implying progress toward restoration cannot be satisfactorily elucidated from monitoring only individual sampling locations, it will be necessary to compare trends among the AMP wells in the plume. Reduction in COC concentrations from all or most sampling locations within predicted ranges and/or at anticipated rates can be interpreted as a decrease in COC mass for the plume and will be indicative of effective remediation of the plume through MNA. Mixed trends in different portions of the plume may imply temporal changes in plume migration or may be simply attributed to the natural attenuation processes, and do not signify failure of MNA to achieve its goals in a timely manner. These variations will be evaluated in the context of the conceptual site model and sampling history before they are attributed to natural attenuation processes of other possible causes. To this effect, in cases of mixed trends it will be necessary to perform other comparisons in order to reach a conclusion of satisfactory progress. It will be particularly useful to evaluate trends in COC and daughter product concentrations (e.g., a decreasing trend in trichloroethene compared to an increasing trend in cis-1,2-dichloroethene in the same plume may indicate degradation of trichloroethene to cis-1,2-dichloroethene). Other trends of interest include changes in geochemistry that may indicate decrease in attenuation rates, such as changes in availability of electron donors and electron acceptors, changes in oxidation-reduction potential, or other primary geochemical indicators.

The complement to the evaluation of the behavior of the plume as a whole is the assessment of spatial trends. For each COC, spatial trends along the plume centerline [i.e., concentration vs. distance attenuation rate ($k_{dist}$)] will be evaluated. This analysis assists in evaluating the stability of the plume and its migration potential. $k_{dist}$ will be calculated for the monitoring wells along the plume centerline after each annual sampling round and will be depicted in centerline trend graphs ($k_{dist}$ graphs). Assessment of spatial plume behavior will be performed through visual interpretation of changes in plume shape over time as shown in the isoconcentration maps as well as centerline trend graphs.

**Assessment Conclusions and Recommendations**

As a result of the response action effectiveness evaluation, the MNA conceptual site model will be continuously refined/modified by incorporating any new data and data trends in COC and geochemistry values and changes in site hydrology. As new data is gathered there will be an ever-expanding database for the site that can be used for comparison with the changes in parameters noted between monitoring events as well as for comparison to predicted, acceptable trends. This continual evaluation of performance monitoring data will translate in better understanding of plume behavior and anticipated data variability and therefore assist in the proper interpretation of monitoring data.

Upon completion of each sampling round, data analysis and determination of the effectiveness of the MNA remedy, plume-specific criteria will drive decisions affecting the continuity of the monitoring program such as: the appropriateness of continuing the monitoring program without change, the need for modifications to the monitoring program (i.e., increased monitoring frequency, additional monitoring wells), need for additional characterization, implementation of a contingency or alternative remedy, or verification of attainment of remedial goals and termination of performance monitoring.

Site-related decisions regarding continuing, modifying, or terminating MNA performance monitoring will be made based on the analyses of spatial and temporal trends in COC concentration, as well as comparisons with predicted benchmarks and/or the specified concentration standard (i.e., COC PCLs). The following summarizes each potential decision

and why it may be chosen based on the perceived progress towards achievement of MNA remediation goals at the plume:

1. Continue Monitoring Program Without Change

   COC concentrations, including toxic transformation products and any mobilized by-products or secondary COCs must remain within the bounds of acceptable trends in order to continue the monitoring program without any change until all remedial action objectives have been met. Groundwater flow parameters must not have changed outside previously identified acceptable ranges. The geochemistry must not have changed in such a way as to indicate that the COC degradation or other natural attenuation processes would be significantly affected.

2. Modify the Monitoring Program

   Modification of the monitoring program may be needed to better reflect changing conditions or increased understanding of natural attenuation processes at the site. Changing conditions or the need to test key assumptions may require new sampling points or increases in monitoring parameters or frequency. Possible scenarios include:

   - Changes in groundwater flowrates or directions that indicate COCs may move farther downgradient, laterally or vertically into previously unimpacted areas, may warrant the need for additional monitoring wells.
   - Unfavorable changes in COC concentrations within the plume, or in the observed attenuation rate based on historic data, may warrant increased monitoring frequency. Sampling frequency may be increased if a sudden change in the trend of COC concentration reduction is noted in order to provide information to facilitate understanding of the change and provide earlier warning of further change. If the protectiveness of the remedy is in question (i.e., unfavorable observed attenuation rate change after 2012), a determination may be made to collect data on a more frequent schedule to properly interpret trends in time to implement contingency remedies, if necessary, to meet PCLs by 2016.
   - Detections of COCs outside the known plume, indicating potential plume expansion or plume migration, may warrant the need for additional monitoring wells.

3. Implement a Contingency or Alternative Remedy

   Alternative remedies can be considered for use in case MNA fails to perform at the desired effectiveness. Situations that may trigger the implementation of a contingency or other remedy modifications will depend on site conditions and include the following:

   - COC concentrations are not decreasing at the rate previously determined to be necessary to meet the remediation objectives by 2016. This assessment will involve the direct comparison of current analytical data with the expected plume clean-up benchmarks as well as evaluation of temporal trends (i.e., observed attenuation rates) in COC concentrations versus the minimum attenuation rates required to meet clean-up by the year 2016. If the protectiveness of the remedy is in question (i.e., more than three rounds of sampling fail to meet the criteria), implementation of a contingency or alternative remedy would generally be warranted.
   - COC concentrations at AMP wells exhibit an increasing trend not originally predicted during remedy selection. This situation would involve the identification and assessment of trends in COC concentration data, including transformation products, changes in geochemistry that may indicate decrease in attenuation rates explaining the lack of

progress toward clean-up objectives, and/or additional COC releases. For some locations in the plume, a detection of a significant change may not trigger immediate implementation of a contingency or alternative remedy. For instance, a low-level or otherwise limited COC concentration increase does not necessarily mean that remediation timeframes will be expanded, or that by the time the pulse moves downgradient to the boundary of the plume there will be a significant plume expansion. Or, in some cases, the detailed characterization and modeling of COC fate and migration may indicate that concentrations for certain COCs (i.e., daughter products) in some portions of the plume are expected to increase temporarily, yet MNA would still meet remedial objectives. If so, the temporary increase would not trigger the contingency or alternative remedy as long as the increase conformed to the predictions and MNA remained protective, allowing observation for several years to test model predictions, if time is available (i.e., before 2012). In situations where evaluation shows the observed COC concentration increases are expected to unacceptably increase the time for plume restoration beyond 2016, or cause unacceptable plume expansion, triggering the contingency or alternative remedy would generally be warranted.

- COCs are identified in monitoring wells located outside the original plume boundary indicating unacceptable plume expansion or migration. Detections of COCs outside of the predetermined plume boundaries may indicate unacceptable plume expansion. Implementation of an alternative or contingency remedy will depend on the locations of the new detections, and distance and possible COC migration rates between these monitoring points and receptors (i.e., surface water bodies, off-site property). Because the COC travel time from the location of the detections may be many years at some sites, there may be time for further monitoring and assessment before a contingency or alternative remedy would need to be implemented. In contrast, if the protectiveness of the remedy is in question (i.e., a significant trend of increasing COC concentration in downgradient wells was noted), there may be much less time available to assess the trend if there was only a short travel time to downgradient receptors. In this case, a contingency or alternative remedy may be triggered immediately.

4. Termination of Performance Monitoring

Once PCLs have been achieved at each of the AMP locations within a plume, showing that the MNA remedy goals have been met for two consecutive semi-annual sampling events for an individual PCLE zone, performance monitoring will be terminated and a period of verification monitoring will be initiated. Verification monitoring will include three years of semi-annual groundwater sampling in order to satisfy the requirements of the Compliance Plan for NAS Dallas (TCEQ, 2004). Sampling parameters for the verification of achieving the PCLs and locations will be in accordance with RAP Worksheet 4.0. This sampling will include all COCs that have been historically detected in the area of the former SWMU, not just the ones that were identified for remediation in the Response Action Plan. If no additional COC exceedances are identified during this three year period of post response action care monitoring, the monitoring system can be terminated, the monitoring wells will be abandoned, and the site will be removed from the permit.

### Effects of Data Variability on Data Interpretation

Data interpretation is affected by data variability. This variability is sometimes associated with natural causes or may be simply attributed to the natural attenuation processes. Due to the dynamic nature of natural attenuation processes, data typically exhibit fluctuations of various magnitudes. For example, there is an expected degree of natural variability within a plume that may include small-scale expansion and shrinkage in response to changes in groundwater flowrates and biological degradation rates throughout the year. COC concentrations in individual monitoring wells may fluctuate with changes in plume configuration caused by oscillations in groundwater flow. Also, changes in groundwater elevations can cause changes in COC concentrations measured in monitoring wells.

It is essential that each data point be interpreted in the context of its derivation in time and space. For instance, monitoring wells produce data that should be interpreted with respect to COC sources, site stratigraphy, the groundwater flow field, the plume, possible receptors, season of the year, and other relevant factors. Variations in sampling methodology should also be considered, due to possible differences in COC concentrations derived from different sampling techniques or devices. The analytical methodology may be evaluated in terms of accuracy, precision, and detection limits. This list of data considerations is not exhaustive, but merely emphasizes that a number (i.e., a data point) should be placed in context to be interpreted. The better the understanding on the derivation and context of the data, the more likely it is that the appropriate decision can be made based on the data.

Examination of historical and spatial patterns may provide information useful in assessing the source and significance of variability in the measured parameters. For instance, if there are multiple monitoring wells in the same plume that show a consistent trend for a number of monitoring variables across several monitoring events, then one may suspect a natural variation, such as recharge differences or geochemical changes in the system, and investigate a correlation of recharge, indicator parameters, or other external hydrologic factors with concentration as indicative of the likely cause of the change. If, on the other hand, a specific monitoring well shows an unusually large change in concentration between monitoring events, relative to nearby monitoring wells, then one may suspect a measurement factor or additional release source is involved and look at sampling techniques or other such factors that may influence the concentration change. Because plume variability should be taken into account when interpreting monitoring data, it is important to have a good estimate of natural variability derived from the site investigation and ongoing MNA performance monitoring.

# APPENDIX 8
# WASTE DISPOSAL MANIFESTS

Project #: 0-0

Order #: 140398

EFFECTIVE ENVIRONMENTAL

Please print or type. (Form designed for use on elite (12-pitch) typewriter.)

**NON-HAZARDOUS WASTE MANIFEST**

1. Generator ID Number: TX8170022786 / 65033
2. Page 1 of 1
3. Emergency Response Phone: 877-577-2669
4. Waste Tracking Number: NHM140398

5. Generator's Name and Mailing Address
Naval Air Station Dallas (NAS)
c/o EnSafe Inc., 4545 Fuller Dr., Suite 342
Irving, TX 75038
Generator's Phone: 972.792.3222 ATTN: Tom Wiberg

Generator's Site Address (if different than mailing address)
8100 West Jefferson
Dallas, TX 75211
RB TVW

6. Transporter 1 Company Name
Stericycle Specialty Waste Solutions Inc
Phd: 972 329 1200
State ID#: 98032 / H-4695
U.S. EPA ID Number: MNS000110924

7. Transporter 2 Company Name
U.S. EPA ID Number

8. Designated Facility Name and Site Address
Itasca Landfill TX, LP
2559 FM 66
Itasca, Texas 76055
State ID#: H0241C
U.S. EPA ID Number: n/a
Facility's Phone: 254 897 2511

| 9a. HM | 9b. U.S. DOT Description (including Proper Shipping Name, Hazard Class, ID Number, and Packing Group (if any)) | 10. Containers No. | Type | 11. Total Quantity | 12. Unit Wt./Vol. | |
|---|---|---|---|---|---|---|
| ☐ | 1 Non-regulated material (soil cuttings Class 2 solids) | 01 ~~02~~ | DM | 55 ~~110~~ | G | CESQ3012 Non-RCRA |
| ☐ | 2. Non-regulated material (purged ground and decon water) | 02 | DM | 110 ~~55~~ | G | CESQ1012 Non-RCRA |
| | 3. | | | | | |
| | 4. | | | | | |

13. Special Handling Instructions and Additional Information
01:IDW Soil cuttings NR (PF:5110167655) 55G
02:IDW purge and decon waters NR (PF:5110167656) 55G
RB TVW
11-1) 0.72 ton 11-2) 0.47 tons

14. **GENERATOR'S CERTIFICATION:** I certify the materials described above on this manifest are not subject to federal regulations for reporting proper disposal of Hazardous Waste.

Generator's/Offeror's Printed/Typed Name: X DAVID BARNEY
Signature: X
Month 5 Day 31 Year 16

15. International Shipments ☐ Import to U.S. ☐ Export from U.S. Port of entry/exit:
Transporter signature (for exports only): Date leaving U.S.:

16. Transporter Acknowledgment of Receipt of Materials

Transporter 1 Printed/Typed Name: Rafael Blaze
Signature:
Month 5 Day 31 Year 16

Transporter 2 Printed/Typed Name: Steven Vansickle
Signature:
Month 6 Day 9 Year 16

17. Discrepancy

17a. Discrepancy Indication Space ☐ Quantity ☐ Type ☐ Residue ☐ Partial Rejection ☐ Full Rejection

Manifest Reference Number:

17b. Alternate Facility (or Generator)
U.S. EPA ID Number
Facility's Phone

17c. Signature of Alternate Facility (or Generator)
Month Day Year

01: H132 02: H132

18. Designated Facility Owner or Operator: Certification of receipt of materials covered by the manifest except as noted in Item 17a

Printed/Typed Name: Jessica Anderson
Signature:
Month 6 Day 9 Year 16

GENERATOR

INT'L

TRANSPORTER

DESIGNATED FACILITY

6-NHM-C-C-11

2-DESIGNATED FACILITY TO GENERATOR

Project #: 0-0 Order #: 140398

EFFECTIVE ENVIRONMENTAL

Please print or type. (Form designed for use on elite (12-pitch) typewriter.)

**NON-HAZARDOUS WASTE MANIFEST**

1. Generator ID Number: TX8170022786 / 65033
2. Page 1 of 1
3. Emergency Response Phone: 877-577-2669
4. Waste Tracking Number: NHM140398

5. Generator's Name and Mailing Address
Naval Air Station Dallas (NAS)
c/o EnSafe Inc., 4545 Fuller Dr., Suite 342
Irving, TX 75038
Generator's Phone: 972-292-3222 ATTN: Tom Wiberg

Generator's Site Address (if different than mailing address)
8100 West Jefferson
Dallas, TX 75211

RJ TWW

6. Transporter 1 Company Name
Stericycle Specialty Waste Solutions Inc
Ph#: 972 329 1200
State ID#: S5627 / H-4565
U.S. EPA ID Number: MNS000110924

7. Transporter 2 Company Name
U.S. EPA ID Number:

8. Designated Facility Name and Site Address
Itasca Landfill TX, LP
2559 FM 56
Itasca, Texas 76055
State ID#: H0241C
U.S. EPA ID Number: n/a
Facility's Phone: 254 687 2511

| 9a. HM | 9b. U.S. DOT Description (including Proper Shipping Name, Hazard Class, ID Number, and Packing Group (if any)) | 10. Containers No. | Type | 11. Total Quantity | 12. Unit Wt./Vol. | |
|---|---|---|---|---|---|---|
| ☐ | 1. Non-regulated material (soil cuttings Class 2 solids) | 01 ~~02~~ | DM | 55 ~~110~~ | G | CESQ3012 Non-RCRA |
| ☐ | 2. Non-regulated material (purged ground and decon water) | 02 | DM | 110 ~~55~~ | G | CESQ1012 Non-RCRA |
| | 3. | | | | | |
| | 4. | | | | | |

13. Special Handling Instructions and Additional Information
01:IDW Soil cuttings NR (PF:5110167655) 55G
02:IDW purge and decon waters NR (PF:5110167656) 55G

RJ TWW

11-1) 0.72 ton 11-2) 0.47 ton

14. **GENERATOR'S CERTIFICATION:** I certify the materials described above on this manifest are not subject to federal regulations for reporting proper disposal of Hazardous Waste.

Generator's/Offeror's Printed/Typed Name: X DAVID BURNEY
Signature: X
Month 5 Day 31 Year 16

15. International Shipments ☐ Import to U.S. ☐ Export from U.S. Port of entry/exit:
Transporter signature (for exports only): Date leaving U.S.:

16. Transporter Acknowledgment of Receipt of Materials

Transporter 1 Printed/Typed Name: Rafael Blayze
Signature:
Month 5 Day 31 Year 16

Transporter 2 Printed/Typed Name: Steven Vansickle
Signature:
Month 6 Day 9 Year 16

17. Discrepancy

17a. Discrepancy Indication Space ☐ Quantity ☐ Type ☐ Residue ☐ Partial Rejection ☐ Full Rejection

Manifest Reference Number:

17b. Alternate Facility (or Generator) U.S. EPA ID Number
Facility's Phone:

17c. Signature of Alternate Facility (or Generator) Month Day Year

01: H132 02: H132

18. Designated Facility Owner or Operator: Certification of receipt of materials covered by the manifest except as noted in Item 17a

Printed/Typed Name: Jessica Anderson
Signature:
Month 6 Day 4 Year 16

GENERATOR

INT'L

TRANSPORTER

DESIGNATED FACILITY

6-NHM-C-C-11

3-DESIGNATED FACILITY TO GENERATOR

Project #: 0-0 Order #: 145925

E² EFFECTIVE ENVIRONMENTAL

Please print or type. (Form designed for use on elite (12-pitch) typewriter.)

**NON-HAZARDOUS WASTE MANIFEST**

1. Generator ID Number: TX8170022786 / 65033
2. Page 1 of 1
3. Emergency Response Phone: 877-577-2669
4. Waste Tracking Number: NHM-145925

5. Generator's Name and Mailing Address
Naval Air Station Dallas (NAS)
c/o EnSafe Inc., 4545 Fuller Dr., Suite 342
Irving, TX 75038
Generator's Phone: 972-792-3222 ATTN: Tom Wherg

Generator's Site Address (if different than mailing address)
8100 West Jefferson
Dallas, TX 75211

6. Transporter 1 Company Name
Stericycle Specialty Waste Solutions Inc
Ph#: 972 329 1200
State ID#: 88922 / H-1496
U.S. EPA ID Number: MNS000110924

7. Transporter 2 Company Name
U.S. EPA ID Number

8. Designated Facility Name and Site Address
Itasca Landfill TX. LP
2559 FM 66
Itasca, Texas 76055
State ID#: H0241C
U.S. EPA ID Number: n/a
Facility's Phone: 254 687 2511

| 9a. HM | 9b. U.S. DOT Description (including Proper Shipping Name, Hazard Class, ID Number, and Packing Group (if any)) | 10. Containers No. | 10. Containers Type | 11. Total Quantity | 12. Unit Wt./Vol. | |
|---|---|---|---|---|---|---|
| ☐ | 1. Non-regulated material (purged ground and decon water) | 04 | DM | 220 | G | CESQ1012 Non-RCRA |
| ☐ | 2. Non-regulated material (soil cuttings Class 2 solids) | 02 | DM | 110 | G | CESQ3012 Non-RCRA |
| | 3. | | | | | |
| | 4. | | | | | |

13. Special Handling Instructions and Additional Information
01:IDW purge and decon waters NR (PF:5110167856) 55G
02:IDW Soil cuttings NR (PF:5110167855) 55G

11.1) 0.94 tn
11.2) ~~0.29 tn~~ 0.35 tn

14. **GENERATOR'S CERTIFICATION:** I certify the materials described above on this manifest are not subject to federal regulations for reporting proper disposal of Hazardous Waste.

Generator's/Offeror's Printed/Typed Name: X DAVID BARNEY
Signature: X
Month 11 Day 8 Year 16

15. International Shipments ☐ Import to U.S. ☐ Export from U.S. Port of entry/exit:
Transporter signature (for exports only): Date leaving U.S.:

16. Transporter Acknowledgment of Receipt of Materials

Transporter 1 Printed/Typed Name: Jason L Boss
Signature:
Month 11 Day 8 Year 16

Transporter 2 Printed/Typed Name: Rafael Blanco
Signature:
Month 11 Day 14 Year 16

17. Discrepancy

17a. Discrepancy Indication Space ☐ Quantity ☐ Type ☐ Residue ☐ Partial Rejection ☐ Full Rejection

Manifest Reference Number:

17b. Alternate Facility (or Generator) U.S. EPA ID Number
Facility's Phone:

17c. Signature of Alternate Facility (or Generator) Month Day Year

01: H132 02: H132

18. Designated Facility Owner or Operator: Certification of receipt of materials covered by the manifest except as noted in Item 17a

Printed/Typed Name: Cindy Reed
Signature: Cindy Reed
Month 11 Day 14 Year 16

GENERATOR

INT'L

TRANSPORTER

DESIGNATED FACILITY

6-NHM-C-C-11

2-DESIGNATED FACILITY TO GENERATOR

# SWMU 136 NORTH PLUME

# 2016 Response Action Effectiveness Report
## SWMU 136 North Plume
## Former NAS Dallas, Texas

## Professional Signatures and Seals

**Professional Geoscientist**

| | | |
|---|---|---|
| *Thomas Wiberg* | *1619* | *30 November 2017* |
| Professional Geoscientist | Geoscientist License number | Expiration date |
| | *17 Jan 2017* | |
| Signature | Date | |
| *972-791-3222* | *972-791-0405* | *twiberg@ensafe.com* |
| Telephone number | FAX number | E-mail |

**Professional Engineer**

| | | |
|---|---|---|
| | | |
| Professional Engineer | P.E. License number | Expiration date |
| | | |
| Signature | Date | |
| | | |
| Telephone number | FAX number | E-mail |

**Registered Corrective Action Specialists (RCASs) and Corrective Action Project Managers (CAPMs)**
**For LPST sites only.**

| | | |
|---|---|---|
| | | |
| Registered Corrective Action Specialist | RCAS Registration number | Expiration date |
| | | |
| Signature | Date | |
| | | |
| Corrective Action Project Manager | CAPM Registration number | Expiration date |
| | | |
| Signature | Date | |
| | | |
| Telephone number | FAX number | E-mail |

**Seals, as applicable:**

# TEXAS COMMISSION ON ENVIRONMENTAL QUALITY
## Response Action Effectiveness Report

## Cover Page

**Regulatory ID number** (Solid waste registration number, VCP ID number, etc.) *Solid Waste Code #65033*

check one: ___ Initial RAER submittal for this onsite property X Subsequent RAER submittal

Report date: *January 2017* TCEQ Region No.: *4*

**TCEQ Program** (check one)

X Corrective Action (Mail Code 127)
___ Voluntary Cleanup Program (Mail Code 221)
___ Petroleum Storage Tank Program (Mail Code 137)
___ Superfund PRP Lead (Mail Code 143)
___ Municipal Solid Waste Permits (Mail Code 124)

**Onsite Property Information**

Onsite Property Name: *Former Naval Air Station Dallas (NAS Dallas) — SWMU 136 North Plume*

Street no. *8100* Pre dir: *West* Street name: *Jefferson* Street type *Blvd* Post dir: ___

City: *Dallas* County: *Dallas* County Code: *57* Zip: *75211*

Nearest street intersection or location description: ___

Latitude: Degrees, Minutes, Seconds OR Decimal Degrees (circle one) North *32°44'31.5"*

Longitude: Degrees, Minutes, Seconds OR Decimal Degrees (circle one) West *96°57'36.5"*

**Offsite Affected Property Information**

Offsite Affected Property Name: *Not Applicable (N/A)*

Street no. ___ Pre dir: ___ Street name: ___ Street type: ___ Post dir: ___

City: ___ County: ___ County Code: ___ Zip: ___

[X] Check if no offsite properties affected

**Contact Person Information and Acknowledgement**

Person (or company) Name: *Navy BRAC PMO East*

Contact Person: *Mr. David Barney* Title: *BRAC Environmental Coordinator*

Mailing Address: *4911 S. Broad Street, Building 679*

City: *Philadelphia* State: *PA* Zip: *19112* E-mail address **david.a.barney@navy.mil**

Phone: *617-753-4656* Fax: ___

By my signature below, I acknowledge the requirement of §350.2(a) that no person shall submit information to the executive director or to parties who are required to be provided information under this chapter which they know or reasonably should have known to be false or intentionally misleading, or fail to submit available information which is critical to the understanding of the matter at hand or to the basis of critical decisions which reasonably would have been influenced by that information. Violation of this rule may subject a person to the imposition of civil, criminal, or administrative penalties.

Signature of Person BARNEY.DAVID.A.1228582553 Digitally signed by BARNEY.DAVID.A.1228582553 DN: c=US, o=U.S. Government, ou=DoD, ou=PKI, ou=USN, cn=BARNEY.DAVID.A.1228582553 Date: 2017.01.18 06:51:11 -05'00' Name, print: *David Barney* Date: ___

heck the reports/forms previously submitted:

**Remedy Standard A**

___ Self-Implementation Notice Submittal date: _____

*X* Response Action Plan — Approval date: *December 2006*

**Remedy Standard B**

___ Response Action Plan — Approval date: _____

List all media (surface soil, subsurface soil, groundwater, sediment, surface water, air) that contained or contains a PCLE zone and specify the response action that has been or will be taken for each media. Indicate the type of removal, decontamination, physical control, or institutional control action used in the response action.

| Media | COCs | Removal | Decontamination | Physical Control | Institutional Control | Modified Response Objective | | |
|---|---|---|---|---|---|---|---|---|
| | | | | | | PMZ | WCU | TI |
| Soil | Benzene<br>Ethylbenzene<br>Trichloroethene (TCE) | Excavation and offsite disposal (completed in 2003) | N/A | N/A | N/A | N/A | N/A | N/A |
| Groundwater | Benzene<br>cis-1,2-Dichloroethene (cis-1,2-DCE)<br>Trichloroethene<br>Vinyl Chloride (VC) | Excavation and offsite disposal of source areas (completed in 2003) | MNA | N/A | N/A | N/A | N/A | N/A |

Current land use of the onsite affected property: ___ Residential *X* Commercial/industrial

Projected future land use of the onsite property (if known): *X* Residential ___ Commercial/industrial

Briefly describe the affected property and PCLE zones, the conclusions from the assessment activities, identify any affected or threatened receptors, and describe any other major site conditions. If any portion of the response action is necessitated due to an aesthetic or nuisance condition, identify the nature of that condition and identify that portion of the response action conducted to address it. If any media that contains a PCLE zone is not being addressed in this response action, provide justification.

**Affected Property: SWMU 136 North Plume**

**In 1989, a Resource Conservation and Recovery Act (RCRA) Facility Assessment (RFA) was performed at Naval Air Station (NAS) Dallas in accordance with the 1984 RCRA Hazardous and Solid Waste Amendments to evaluate potential releases at Solid Waste Management Units (SWMUs) and Areas of Concern (AOCs) and to make preliminary determinations regarding the need for further action. The RFA Report included data collected as part of a Preliminary Review, a Visual Site Inspection, and a Sampling Visit, as necessary, for 135 SWMUs and six AOCs at NAS Dallas (A.T. Kearney 1989).**

**In 1993, NAS Dallas was identified for closure under the Base Realignment and Closure Act (BRAC). As part of the base closure activities, an Environmental Baseline Survey (EBS) was conducted at NAS Dallas to identify any potential environmental concerns related to historical operations at the base (EnSafe/Allen & Hoshall 1994). During this EBS, additional site concerns were identified at numerous buildings across the installation. In order to strategically investigate the permitted and non-permitted SWMUs, AOCs, and additional site concerns identified in the EBS, the facility was divided into six sections, called "categories", based on property use and ownership. In 1995, the Navy initiated RCRA Facility Investigation (RFI) activities at NAS Dallas at Categories A through F. Submittal of the Final RFI Reports (issued as a series of six reports — one report per category) occurred during the period from November 2000 to March 2001 (Tetra Tech NUS, Inc. [Tetra Tech] 2000a — 2001b). The RFI was completed under the requirements of the Texas Risk Reduction Standards (RRS) (30 Texas Administrative Code [TAC] 335, Subchapter S), the regulatory framework in effect at the time, and closure recommendations in the RFI Reports were based upon Risk Reduction Standard 2 — Industrial (RRS2-IND) criteria. The RFI Reports identified those areas**

**that required further action based on the chemical constituents detected in the soil and/or groundwater at the base.**

**The RFI Reports received conditional approval by the Texas Natural Resource Conservation Commission now the Texas Commission on Environmental Quality (TCEQ). Final approval of the RFI Reports by TCEQ was dependent upon landowner concurrence of the RRS2-IND clean-up standard.**

**In September of 1999, the Texas Risk Reduction Program (TRRP) (30 TAC 350) was promulgated. One of the major changes resulting from TRRP was eliminating site background as a closure criterion. The most stringent closure standard under TRRP is the Residential Remedy Standard A (RES A), which consists of closure for residential use with no engineering or institutional controls.**

**In March 2001, the Navy submitted a Notice of Intention to Switch to TRRP (30 TAC 350) for five of the six categories. The one category (Category C) that was not switched to TRRP, but remained under the RRS2-IND standards, was subsequently transferred to the Department of the Army.**

**In October 2002, an Affected Property Assessment Report (APAR) was produced based on evaluation of RFI data as well as data from follow-up investigations (Tetra Tech 2002). The data included in the APAR was compared to TRRP RES A criteria to select those sites that may be closed with no land use encumbrances and to determine which sites required corrective action. The results of this comparison indicate that 20 SWMUs (1, 2, 6, 17, 18, 21, 31, 35, 36, 60, 79, 81, 83, 84, 85, 86, 92, 102, 108, 124, 136, 138, and 139) required further actions.**

**As a result of the numerous investigations at NAS Dallas, the facility has an established monitoring well network that provides monitoring for each of the above-listed sites. Groundwater monitoring has been conducted through this network since 1995. As identified in the APAR, the groundwater of this SWMU is located within a Class 2 groundwater area.**

**SWMU 136 North Plume**

**The Main Fuel Farm (MFF) (SWMU 136) is located on the east side of Former NAS Dallas and includes Buildings 138, 139, 140, 180, 190, and 230. The MFF is divided into the Northern Fuel Farm Compound and Southern Fuel Farm Compound, both of which included grassy mounds of fill material that once covered buried underground storage tanks (USTs). Five former jet fuel USTs were buried in two earthen mounds, and two waste oil USTs were located in the Northern Fuel Farm Compound area. Three buried, bermed, and earthen-mounded steel fuel storage tanks were located in the Southern Fuel Farm Compound.**

**Nine dry wells, formerly used for disposal of liquid wastes, were reported in the MFF area. Dry Wells Nos. 1, 6, and 7 were located in the Northern Fuel Farm Compound. Dry Wells Nos. 2, 3, 4, 8, and 9 were located near Buildings 138, 139, and 140. Dry Well No. 5 was located in the Southern Fuel Farm Compound. Both the buried underground storage tanks and the dry wells have been identified as potential sources of contamination and as pathways for the introduction of contaminants to the subsurface. The USTs located in the MFF were removed by the Navy's Charleston Detachment in May and October 1998. Removal actions in the areas of Dry Well Nos. 1, 2, 4, 5, 6, and 9, addressing the dry well structures and surrounding soil, were conducted by the Navy's Remedial Action Contractor (RAC) during field activities commencing in October 1998. Dry Well Nos. 3, 7, and 8 could not be located.**

**As discussed in the RFI Report for Category F (Tetra Tech 2000c), the probable source for chlorinated volatile organic compounds (CVOCs) in the subsurface at the SWMU 136 North plume area is historical fuel handling operations in the MFF's Northern Fuel Farm Compound and/or releases from the dry wells. The primary contributing sources of chemicals of concern (COCs) to the groundwater plume (e.g., tanks, oil/water separators, and dry wells) were removed in 1998 by the Navy's Charleston Detachment.**

**Soil**

**Based upon the data obtained during the RFI, further action was recommended at SWMU 136 North due to exceedances of VOCs in soil. Consequently, excavation of impacted soil was recommended by the Navy and carried out by the Navy's RAC in 2003. The Response Action Completion Report (RACR) for the soil removal activities was prepared and submitted to the TCEQ in March 2005. The RACR has undergone**

several review cycles by the City of Dallas, U.S. Environmental Protection Agency (U.S. EPA), and TCEQ and the final replacement pages for the RACR were submitted to the TCEQ in May 2008 (CH2M Hill 2008). The TCEQ granted final approval of the RACR in July 2008 (TCEQ 2008).

**Groundwater**

The results of the RFI for Category F (Tetra Tech 2000c) indicate that groundwater at the site has been impacted by CVOCs. As described in the APAR, the groundwater of this SWMU is located within a Class 2 groundwater resource area. The high degree of heterogeneity associated with the shallow groundwater bearing unit (GWBU) has resulted in a discrete groundwater Protective Concentration Level Exceedance (PCLE) zone associated with the SWMU 136 North Plume that required a response action to reduce the concentration of COCs to less than respective critical PCLs. Subsequent to the APAR, a Response Action Plan (RAP) was submitted to the TCEQ for groundwater at the SWMU 136 North Plume. The revised RAP received TCEQ approval in December 2006.

As determined in the RAP, excavation followed by MNA was chosen as a decontamination remedy to address the PCLE zone identified at the SWMU 136 North Plume (Tetra Tech 2006). The MNA remedy intends for concentrations of COCs in groundwater to attenuate to rates less than the critical PCLs by means of in-situ biological reductive dechlorination by the year 2017. The remedy involves sequential sampling events to determine changes in the plume over time and includes one year of confirmation groundwater sampling to confirm that PCLs have consistently been achieved and no rebound has occurred.

In October 2015, the Navy submitted a revised RAP (Revision 3) (Resolution Consultants, 2015) to TCEQ. The purpose of the revised RAP was to remove monitor wells from the current monitoring and sampling plan and confirmation sampling plan. In accordance with the RAPs, Resolution Consultants conducted plugging and abandonment (P&A) of select groundwater monitoring wells in April 2016. P&A actions were conducted by a state of Texas licensed driller (Strata Core Services, SCI). Monitoring well 508F55MW was P&A'd at SWMU 136 North .

Potential receptors are onsite residents, onsite employees, and onsite construction workers. Since the groundwater PCLE zone is not projected to migrate offsite based on groundwater modeling results and other lines of evidence, it is not anticipated that offsite receptors will be affected. The possible routes of exposure to groundwater are inhalation (onsite residents, onsite employees, and onsite construction workers) and dermal contact (onsite construction workers). Ingestion is not a concern since during the implementation of the response actions as there is controlled access to the site, which limits potential exposures to contaminated groundwater (i.e., no potable or irrigation wells will be installed) through 2017. The potential for inhalation of vapor from groundwater through soil to outdoor air is insignificant because the maximum detected COC concentrations in groundwater are less than their respective inhalation of volatiles from groundwater ($^{Air}GW_{Inh\text{-}V}$) PCLs. Additionally, the indoor air sampling conducted in a sealed building at a similar plume at the base (Building 1406 within the SWMU 21 area) indicated that no CVOCs were detected in the indoor air (TtNUS, 2004b). The recent Vapor Intrusion Study at SWMU 21 (Resolution Consultants, 2015) also concluded that sub-slab TCE and cis-1,2-DCE concentrations were well below VISLs for sub-slab vapor as well as RSLs for indoor air. Furthermore, the analytical results indicated that neither TCE nor cis-1,2-DCE were detected in indoor air samples. Therefore, vapor intrusion is not a current concern at NAS Dallas.

## CHRONOLOGY OF MAJOR EVENTS

| | |
|---|---|
| Sep. 1985 | Initial Assessment Study was prepared and submitted. |
| Jan. 1987 | Confirmation Study and Verification Step Report was prepared and submitted. |
| Mar. 1989 | RFA was prepared and submitted. |
| 1993 — 1994 | EBS was prepared and submitted. |
| Mar. 1994 | BRAC Cleanup Plan was prepared and submitted. |
| 1995 — 1996 | Basewide Round 1 groundwater sampling event (Directed Phase RFI). |
| 1996 — 1997 | Interim Draft RFI Reports were prepared and submitted for each category identified at the air station. |
| Mar. — June 1998 | Basewide Round 2 groundwater sampling event (Chase Phase RFI). |
| May — Oct. 1998 | MFF USTs were removed by the Navy's Charleston Detachment, along with other tanks basewide. |
| June 1998 — Jan. 1999 | Release Determination Report was prepared and submitted covering the removal of the MFF tanks. |
| Aug. — Sep. 1998 | Basewide Round 3 groundwater sampling event. |
| Sep. 1998 | Most military operations on NAS Dallas ceased and the air station was placed into caretaker status. |
| Dec. 1998 — Jan. 2000 | Removal of oil/water separators (OWS) basewide. |
| Jan. — Oct. 1999 | Basewide removal of hot spot areas of contamination. |
| Feb. — Apr. 1999 | Basewide Round 4 groundwater sampling event. |
| Sep. — Oct. 1999 | Removal of the remaining USTs basewide. |
| Sep. — Nov. 1999 | Basewide Round 5 groundwater sampling event. |
| July 1999 — Feb. 2000 | Basewide pre-Corrective Measures Study monitoring well installation and sampling event. |
| June — July 2000 | Preliminary groundwater investigation at Advanced Science Incorporated Area-5 (ASA-5) site in the MFF/Main Fuel Farm Storm Sewer (MFF/MFFSS) area. |
| July — Aug. 2000 | Basewide Round 6 groundwater sampling event. |
| Aug. — Sep. 2000 | Aquifer tests were conducted at five sites across Former NAS Dallas to determine aquifer properties. |
| 2000 — 2001 | Final RFI Reports were prepared and submitted for each category. |
| June — July 2001 | Basewide Round 7 groundwater sampling event, including evaluation of alternate sampling methods (i.e., passive diffusion bag [PDB] and HydraSleeve). |
| Sep. 2001 | Enhanced Monitored Natural Attenuation (EMNA) pilot test initiated at ASA-5 site (SWMUs 79/136) involving the injection of potassium permanganate ($KMnO_4$). |
| Feb. 2002 | MNA Groundwater Modeling Report for MFF/MFFSS was prepared and submitted. |

| | |
|---|---|
| Mar. 2002 | Technical Memorandum Groundwater Sampling Procedure Comparison for selected monitoring wells was prepared and submitted. |
| Oct. 2002 | APAR was prepared and submitted. |
| Dec. 2002 — Mar. 2003 | Basewide Round 8 groundwater sampling event. |
| Jan. 2003 | Monitoring Well Abandonment Plan was prepared and submitted. |
| Jan. 2003 | Draft MNA Groundwater Modeling Report for Category D Sites was prepared and submitted. |
| Jan. 2003 | Corrective action (excavation and disposal) initiated on the Rubble Landfill (SWMU) 1). |
| Feb. 2003 | Draft RAP for MFF/MFFSS soils was prepared and submitted. |
| Apr. 2003 | Draft RAP for Category D Sites soils was prepared and submitted. |
| Apr. 2003 | Final Groundwater Report to satisfy Provision VIII.D.8 of the Former NAS Dallas RCRA Hazardous Waste Storage Permit (No. HW-50276) was prepared and submitted. |
| May 2003 | Self Implementation Notice (SIN) for TRRP RES A Soil Response Actions for SWMUs 2, 6, 18, 21, 31, 35, 36, 60, 79, 81, 83, 84, 85, 86, 102, 124, 138, and 139 was prepared and submitted. |
| June 2003 | Draft MNA Groundwater Modeling Report for Category B was prepared and submitted. |
| June 2003 | RCRA Permit renewal and Compliance Plan applications submitted to the TCEQ. |
| June 2003 | Corrective action (excavation, solidification, and disposal) initiated on the Texas Air National Guard (TANG) Ponds (SWMU 92). |
| July — Aug. 2003 | Basewide Round 9 groundwater sampling event. |
| Aug. 2003 | Corrective action (excavation, disposal, and backfill) initiated on the sites covered in the SIN submitted in May 2003. |
| Aug. 2003 | 2002 Annual Groundwater Monitoring Report was prepared and submitted. |
| Dec. 2003 — Jan. 2004 | Basewide Round 10 groundwater sampling event. |
| Jan. 2004 | Soil RACR was prepared and submitted for the Rubble Landfill (SWMU 1). |
| Jan. 2004 | Soil RACR was prepared and submitted for the TANG Ponds (SWMU 92). |
| Mar. 2004 | TCEQ produced and distributed the Draft RCRA Permit and Draft Compliance Plan. |
| Apr. 2004 | Final Addendum to MNA Groundwater Modeling Report for MFF/MFFSS was prepared and submitted. |
| May 2004 | 2003 Groundwater Response Action Effectiveness Reports (RAER) were prepared and submitted. |
| June 2004 | Indoor and Outdoor Air Sampling at Building 1406 Report was prepared and submitted. |
| July 2004 | Basewide Round 11 groundwater sampling event. |

| | |
|---|---|
| July 2004 | Final MNA Groundwater Modeling Report for Category D was prepared and submitted. |
| Sep. 2004 | Final MNA Groundwater Modeling Report for Category B was prepared and submitted. |
| Sep. 2004 | TCEQ approved final closure documentation for the Miscellaneous Sites Soil RACR. |
| Oct. 2004 | Basewide Round 12 groundwater sampling event. |
| Oct. 2004 | TCEQ approved Final MNA Groundwater Modeling Report for Category D Sites at Former NAS Dallas. |
| Oct. 2004 | TCEQ approved Final Addendum to the MNA Groundwater Modeling Report for MFF/MFFSS at Former NAS Dallas. |
| Oct. 2004 | TCEQ approved Final Groundwater Report for Former NAS Dallas. |
| Oct. 2004 | TCEQ approved the 2002 Annual Groundwater Monitoring Report. |
| Nov. 2004 | Final RAP (Basewide) for groundwater was prepared and submitted. |
| Dec. 2004 | 2004 Semi-annual Groundwater Monitoring Report was prepared and submitted. |
| Dec. 2004 | TCEQ issued comments on the 2003 Groundwater RAERs. |
| Jan. 2005 | 2004 Groundwater RAERs were prepared and submitted. |
| Mar. 2005 | Monitoring Well Installation and Abandonment Plan was prepared and submitted. |
| Mar. 2005 | Draft 84 Sites Soil RACR was prepared and submitted. |
| Apr. 2005 | 2004 Groundwater RAERs were prepared and submitted. |
| Apr. 2005 | Basewide Round 13 groundwater sampling event. |
| June 2005 | Corrective action for groundwater (excavation, disposal, and backfill) initiated at SWMU 85. |
| June 2005 | Corrective action for groundwater (excavation, disposal, and backfill) initiated at SWMU 18. |
| July 2005 | Basewide Round 13 groundwater sampling event. |
| Aug. 2005 | TCEQ issued comments on the Draft 84 Sites Soil RACR. |
| Aug. 2005 | 2005 Semi-annual Groundwater Monitoring Report was prepared and submitted. |
| Sep. 2005 | TCEQ issued comments on the 2004 Groundwater RAPs. |
| Oct. 2005 | TCEQ issued comments on the 2004 Groundwater RAERs. |
| Oct. 2005 | Basewide Round 14 groundwater sampling event. |
| Oct. — Dec. 2005 | City of Dallas issued comments on the Draft 84 Sites Soil RACR. |
| Dec. 2005 | TCEQ issued comments on the 2005 Semi-annual Groundwater Monitoring Report. |
| Jan. 2006 | 2005 Groundwater RAERs were prepared and submitted. |
| Jan. 2006 | Basewide Round 15 groundwater sampling event. |

| | |
|---|---|
| Feb. 2006 | Revised Groundwater RAPS (Revision 2) were prepared and submitted covering SWMUs 17/Building 1423, 17/Building 1429, 18, 35, 85, 86, 108, 136 North, 136 South, and 139. |
| Mar. 2006 | RACR for groundwater removed at SWMUs 18 and 85 were prepared and submitted. |
| May 2006 | Basewide Round 15B groundwater sampling event. |
| May 2006 | TCEQ issued comments on the 2005 Groundwater RAERs. |
| June 2006 | 85 Sites, Defense Reutilization and Marketing Office (DRMO), and Naval Weapons Industrial Reserve Plant (NWIRP) SWMU 18 Soil RACRs (Revision 1) were prepared and submitted. |
| July 2006 | TCEQ issued comments on the Groundwater RAPs (Revision 2). |
| July 2006 | EMNA Pilot Test initiated at SWMU 21 involving the injection of zero valent iron. |
| Aug. 2006 | Basewide Round 16 groundwater sampling event. |
| Aug. 2006 | Responses to TCEQ comments on the Groundwater RAPs (Revision 2), including replacement pages, were prepared and submitted. |
| Nov. 2006 | Basewide Round 16B groundwater sampling event. |
| Dec. 2006 | RACR for groundwater PCL at SWMU 35 was prepared and submitted. |
| Dec. 2006 | TCEQ approves Groundwater RAP (Revision 2) covering SWMUs 17/Building 1423, 17/Building 1429, 18, 35, 85, 86, 108, 136 North, 136 South, and 139. |
| Jan. 2007 | 2006 Groundwater RAERs were prepared and submitted. |
| Apr. 2007 | Groundwater Sampling Work Plan Addendum, Slug Test Work Plan, and Monitoring Well Installation and Abandonment Work Plan were prepared and submitted. |
| Apr. — May 2007 | Basewide Round 17 groundwater sampling event. |
| Apr. — June 2007 | SWMU 18 OWS removal operations were conducted. |
| Apr. 2007 | Slug test operations conducted at SWMUs 18, 85, and 139. |
| Aug. — Sep. 2007 | Basewide Round 18 groundwater sampling event. |
| Nov. 2007 | Field Activities for SWMU 21 EMNA Pilot Study completed. |
| Jan. 2008 | Basewide Round 19 groundwater sampling event. |
| Jan. 2008 | 2007 Groundwater RAERs were prepared and submitted. |
| Feb. 2008 | TCEQ approves the Groundwater RACR for SWMU 35. |
| Apr. 2008 | Comments to the 85 Sites, DRMO, and NWIRP SWMU 18 Soil RACRs revisions were received from the TCEQ. |
| May 2008 | TCEQ issued comments on the 2007 Groundwater RAERs. |
| May 2008 | Response to the 85 Sites, DRMO, and NWIRP SWMU 18 Soil RACRs comments were submitted to the TCEQ. |
| July 2008 | Basewide Round 20 groundwater sampling event. |

| | |
|---|---|
| July 2008 | TCEQ grants final approval of the 85 Sites, DRMO, and NWIRP SWMU 18 Soil RACRs. |
| July 2008 | Response to TCEQ comments on 2007 Groundwater RAERs, replacement pages (Revision 1) to 2007 RAERs prepared and submitted. |
| Oct. 2008 | Technical Memorandum, ASA-5 East Site EMNA Pilot Study prepared and submitted. |
| Oct. 2008 | Technical Memorandum, Pilot Study at SWMU 21 prepared and submitted. |
| Oct. 2008 | SWMU 17/Building 1429 Pilot Test Work Plan prepared and submitted. |
| Dec. 2008 | SWMU 139 Groundwater RACR prepared and submitted. |
| Jan. 2009 | Basewide Round 21 groundwater sampling event. |
| Jan. 2009 | 2008 Groundwater RAERs prepared and submitted. |
| Jan. 2009 | Revised Groundwater RAPs for SWMU 21 (Revision 2) prepared and submitted. |
| Jan. 2009 | Revised Groundwater RAPs for SWMUs 79/136 Central (Revision 2) prepared and submitted. |
| Jan. 2009 | Revised Groundwater RAP for SWMU 136 South (Revision 4) prepared and submitted. |
| May 2009 | SWMU 21 Pilot Study additional groundwater sampling. |
| May 2009 | SWMU 79/136 Central non-compliant monitoring well groundwater sampling. |
| May. 2009 | TCEQ grants conditional approval of the SWMU 139 Groundwater RACR. |
| June 2009 | ASA-5 Pilot Test injection points abandonment. |
| June 2009 | SWMU 35 monitoring well abandonment. |
| July 2009 | Basewide Round 22 groundwater sampling event. |
| Sep. 2009 | SWMU 21 Pilot Study monitoring wells abandonment. |
| Oct. 2009 | Revised Technical Memorandum, SWMU 21 Pilot Study prepared and submitted. |
| Oct. 2009 | SWMU 136 South non-compliant monitoring well groundwater sampling. |
| Nov. 2009 | Response to TCEQ comments on 2008 Groundwater RAERs prepared and submitted. |
| Jan. 2010 | Basewide Round 23 groundwater sampling event. |
| Jan. 2010 | 2009 Groundwater RAERs prepared and submitted. |
| July 2010 | Basewide Round 24 groundwater sampling event. |
| Aug. 2010 | Basewide monitoring well network inspection and five-year survey. |
| Nov. 2010 | Response to TCEQ comments on 2009 Groundwater RAERs prepared and submitted. |
| Dec. 2010 | Monitoring wells general maintenance and minor repairs completed. |
| Jan. 2011 | Basewide Round 25 groundwater sampling event. |
| Jan. 2011 | 2010 Groundwater RAERs prepared and submitted. |

| | |
|---|---|
| March 2011 | Monitoring well inspection at SWMU 21/SWMU 18 on monitoring wells within the 20-acre area leased to the Air National Guard. |
| May 2011 | Addendum to Monitoring Well Installation and Abandonment Plan prepared and submitted. |
| June 2011 | SWMU 139 monitoring wells plugged and abandoned. |
| June 2011 | SWMU 81 monitoring wells plugged and abandoned. |
| June 2011 | Repairs, abandonment and replacement of damaged monitoring wells at SWMU 21 and SWMU18. |
| July. 2011 | Basewide Round 26 groundwater sampling event. |
| Dec. 2011 | Response to TCEQ comments on 2010 Groundwater RAERs prepared and submitted. |
| Jan. 2012 | Basewide Round 27 groundwater sampling event. |
| March 2012 | 2011 groundwater RAERs prepared and submitted. |
| July 2012 | Basewide Round 28 groundwater sampling event. |
| Aug. 2012 | EPA comments to the 2011 Groundwater RAER. |
| Oct. 2012 | TCEQ comments to the 2011 Groundwater RAER. |
| Jan. 2013 | Basewide Round 29 groundwater sampling event. |
| Jan. 2013 | 2012 Groundwater RAERs prepared and submitted. |
| Feb. 2013 | TCEQ comments to the 2012 Groundwater RAER. |
| June 2013 | EPA comments to the 2012 Groundwater RAER. |
| July 2013 | Basewide Round 30 groundwater sampling event. |
| July 2013 | Response to TCEQ comments on 2012 Groundwater RAERs prepared and submitted. |
| Jan. 2014 | Basewide Round 31 groundwater sampling event. |
| Jan. 2014 | 2013 Groundwater RAERs prepared and submitted |
| Feb. 2014 | TCEQ comments to the 2013 Groundwater RAER. |
| June 2014 | EPA comments to the 2013 Groundwater RAER. |
| July 2014 | Basewide Round 32 groundwater sampling event. |
| July 2014 | Response to TCEQ comments on 2013 Groundwater RAERs prepared and submitted. |
| Nov. 2014 | RCRA Permit renewal and Compliance Plan (Number 50276) applications submitted to the TCEQ. |
| Jan. 2015 | Basewide Round 33 groundwater sampling event. |
| Jan. 2015 | 2014 Groundwater RAERs prepared and submitted. |
| May 2015 | TCEQ Permit Renewal Application Technical Notice of Deficiency (NOD) Letter, dated May 26, 2015. |
| June 2015 | Meeting with TCEQ, EPA, and City of Dallas. |

| | |
|---|---|
| June 2015 | TCEQ comments letter to the 2014 Groundwater RAER, dated June 10, 2015. |
| June 2015 | Submittal of Draft revised RAP for SWMU 17/Building 1429, received June 23, 2015. |
| June 2015 | Response to TCEQ comments to the Response to Permit Renewal Application Technical NOD Letter for Former Dallas Naval Air Station (NAS), Dallas, Texas, dated June 26, 2015. |
| July 2015 | Basewide Round 34 groundwater sampling event. |
| July 2015 | TCEQ Permit Renewal Application Second Technical Notice of Deficiency Letter, dated July 24, 2015. |
| July 2015 | Response to TCEQ Comments on the Technical Memorandum Pilot Study for SWMU 21, Rev. 1, July 2009 submitted to the TCEQ, dated July 24, 2015. |
| Oct. 2015 | Basewide submittal of Revised and Interim Response Action Plans. |
| Dec. 2015 | Draft Final Enhanced Monitored Natural Attenuation (EMNA) Spot Treatment Workplan for SWMU 18 prepared and submitted to TCEQ. |
| Dec. 2015 | Amendment to the Approved Class V Underground Injection Control (UIC) Permit (5X2600432) prepared and submitted to TCEQ. |
| Jan. 2016 | Basewide Round 35 groundwater sampling event. |
| Jan. 2016 | TCEQ, U.S. EPA, and City of Dallas approve EMNA workplan. |
| Jan. 2016 | 2015 Groundwater RAERs prepared and submitted. |
| Jan. 2016 | EMNA Spot Treatment Design Verification Testing at SWMU 18 by Resolution Consultants and Regenesis Remediation Services. |
| March 2016 | Draft Tier II Sampling and Analysis Plan Addendum #1, Long-Term Monitoring Plan Enhanced Monitored Natural Attenuation Spot Treatment at SWMU 18 Former Naval Air Station Dallas, Dallas, Texas prepared and submitted to TCEQ. |
| March 2016 | Amendment to the Approved Class V UIC Permit (5X2600432) prepared and submitted to TCEQ. |
| Apr. 2016 | TCEQ approves UIC amendment request. |
| Apr. 2016 | Basewide plug and abandon and operation and maintenance actions, installation of monitor well 508F98MW in SWMU 79 |
| Apr. 2016 | EMNA Spot Treatment at SWMU 18 baseline groundwater sampling event. |
| May 2016 | EMNA Spot Treatment at SWMU 18 injections by Resolution Consultants and Regenesis Remediation Services. |
| Jul. 2016 | Basewide Round 36 groundwater sampling event. |
| Aug. 2016 | Deploy passive diffusion bags at EMNA Spot Treatment well 606D152MW. |
| Sep. 2016 | Basewide operations and maintenance activities completed. |

| | |
|---|---|
| Sep. 2016 | EMNA Spot Treatment at SWMU 18 first quarterly performance groundwater monitoring event. |
| Sep. 2016 | Draft Tier II Sampling and Analysis Plan Addendum #2, Long-Term Monitoring Plan, Enhanced Monitored Natural Attenuation, Perfluoroalkyl Substances Groundwater Investigation, Former Naval Air Station Dallas, Dallas, Texas prepared and submitted to TCEQ. |

# Checklist for Report Completeness

Use this checklist to determine the portions of the form that must be submitted for this report. Answer all questions by checking Yes or No. If the answer is Yes include that portion of the report. If the answer is No, do not complete or submit that portion of the report. All form contents that are marked "Required" must be submitted. Form contents marked with an asterisk (*) are not included in the blank form and are to be provided by the person.

| | | | Report Contents | |
|---|---|---|---|---|
| | | Required | **Cover Page** | ☒ |
| | | Required | **Executive Summary** | ☒ |
| | | Required | **Checklist for Report Completeness** | ☒ |
| | | Required | **Worksheet 1.0** Response Action Objectives | ☒ |
| | | Required | **Attachment 1A*** Maps and Cross Sections | ☒ |
| | | Required | **Attachment 1B*** Graphs | ☒ |
| | | Required | **Attachment 1C*** Response Action Diagrams | ☐ *N/A* |
| No ☒ | Is a plume management zone being used as part of the response action? | ☐ Yes | **Worksheet 2.0** Plume Management Zone | ☐ |
| | | | **Attachment 2A*** Map of Plume Management Zone | ☐ |
| No ☒ | Was an area of technical impracticability approved for use as part of the response action? | ☐ Yes | **Worksheet 3.0** Technical Impracticability | ☐ |
| | | | **Attachment 3A*** Map of Technical Impracticability | ☐ |
| No ☒ | Are institutional controls used or required as part of the response action? | ☐ Yes | **Worksheet 4.0** Institutional Controls | ☐ |
| | | Required | **Worksheet 5.0** Performance Measures and Problems | ☒ |
| No ☐ | Have any operation and maintenance activities been conducted? | ☒ Yes | **Worksheet 6.0** Operation and Maintenance | ☒ |
| No ☒ | Has there been any change to the plans for post-response action care from that submitted in the RAP? | ☐ Yes | **Worksheet 7.0** Post-Response Action Care | ☐ |
| No ☐ | Was any information for this report obtained from outside sources? | ☒ Yes | **Appendix 1*** References | ☒ |
| No ☒ | Is an ESA and/or Compensatory Restoration being used as part of the response action? | ☐ Yes | **Appendix 2*** ESA and Compensatory Restoration | ☐ |

| | | | | |
|---|---|---|---|---|
| No ☒ | Are institutional controls or landowner concurrence required in the response action? | ☐ Yes | **Appendix 3*** Institutional Controls and Landowner Concurrence | ☐ |
| No ☐ | Is there data or boring/monitor well information not previously submitted? | ☒ Yes | **Appendix 4*** Data Tables, Boring Logs, and Well Completions | ☒ |
| No ☒ | Did sampling procedures differ from those described in the RAP? | ☐ Yes → | **Appendix 5*** Sampling Procedures | ☐ |
| No ☐ | Has any sampling been conducted for which the analytical results were not previously submitted? | ☒ Yes → | **Appendix 6*** Laboratory Data Packages | ☒[1] |
| No ☐ | Were statistics or geostatistics used in the response action? | ☒ Yes → | **Appendix 7*** Statistical Methodology | ☒[2] |
| No ☐ | Were any wastes generated that were not reported through STEERS? | ☒ Yes → | **Appendix 8*** Waste Disposition | ☒ |

***Notes:***

[1] Included with 2015 RAER in CD format.

[2] Included with 2015 RAER for SWMU 17/Building 1423.

Use this worksheet to describe the response action objectives in each media.

## Response Action Objectives — SWMU 136 North Plume

What is the selected remedy standard for this affected property? *X* A ___ B

List the environmental media to which this applies **Soil**

Repeat this section for each medium that had a different response action objective.

Provide a detailed description of the response action. Describe the removal actions, decontamination actions, treatment system(s), and/or physical or institutional control actions that have been conducted in each media and indicate if there were any differences between the actions taken and the actions proposed in the SIN or RAP.

**Based upon the data obtained during the RFI and subsequently evaluated in the APAR, further action was recommended at SWMU 136 North due to exceedances of VOCs in soil. Consequently, excavation of impacted soil was recommended by the Navy and carried out by the Navy's RAC in 2003. The RACR for the soil removal activities was prepared and submitted to the TCEQ in March 2005. The RACR has undergone several review cycles by the City of Dallas, U.S. EPA, and TCEQ and the final replacement pages for the RACR were submitted to the TCEQ in May 2008 (CH2M Hill 2008). The TCEQ granted final approval of the RACR in July 2008 (TCEQ 2008).**

List the environmental media to which this applies **Groundwater**

Repeat this section for each medium that had a different response action objective.

Provide a detailed description of the response action. Describe the removal actions, decontamination actions, treatment system(s), and/or physical or institutional control actions that have been conducted in each media and indicate if there were any differences between the actions taken and the actions proposed in the SIN or RAP.

**The groundwater response action for the site consists of groundwater excavation as a removal remedy followed by MNA as a decontamination remedy to reduce the concentration of COCs to less than their critical PCLs. The excavation of impacted groundwater was implemented by the Navy's RAC in 2003.**

**MNA at SWMU 136 North Plume includes the following elements:**

- **Decontamination through the ongoing biological and chemical reductive dechlorination processes.**
- **A monitoring/confirmation sampling program to evaluate the progress of the decontamination.**

**The fate and transport modeling results in the Final Addendum to MNA Groundwater Modeling Report for Main Fuel Farm/Main Fuel Farm Storm Sewer (Tetra Tech 2004) indicate that there will be no expansion of the PCLE zone or offsite migration of COCs at concentrations greater than the respective critical groundwater PCLs.**

Describe how the response action has, or is working towards, achievement of the property-specific response objectives for the PCLE zone in each medium in the context of the response objectives set forth in §350.32 or §350.33, as applicable. Explain how the response action is appropriate based on the hydrogeologic and COC characteristics. Describe any unprotective conditions that continued or resulted from the remedial actions and the actions taken to mitigate unprotective conditions.

**The response action for the contaminated groundwater in the PCLE zone will meet groundwater response objectives of §350.32 by the use of groundwater excavation as a removal remedy followed by MNA as a decontamination remedy to reduce the concentration of COCs within the PCLE zone to less than their critical PCLs. The Navy considers excavation followed by MNA appropriate based on the ongoing evaluation process which has demonstrated that MNA is capable of reducing the concentrations of COCs in the PCLE zone within a reasonable time frame, while controlling plume expansion.**

**During the implementation of the response action activities, there will be controlled access to the site and limited potential exposures to contaminated groundwater due to site restrictions on potable or irrigation well installation through 2017. Additionally, the fate and transport modeling results (Tetra Tech 2004) predict that there will be no expansion of the PCLE zone or offsite migration of COCs at concentrations greater than the respective critical groundwater PCLs. Because this decontaminating remedy is based on an in-situ technology, the potential short-term exposures normally associated with the implementation of ex-situ technologies (i.e., dermal and inhalation exposures) were not a concern.**

If different from the information provided in the RAP, explain how the COCs have been handled, treated, disposed, or transferred to another medium and document that the response action has not resulted in any additional exposure conditions due to response action activities.

*N/A*

Explain whether the response action is achieving, or will achieve, the objectives within the reasonable time frame.

**The groundwater PCLE zone was originally identified for benzene, cis-1,2-DCE, TCE, and VC. The strongest evidence for natural attention is the reduction of contaminant levels observed in samples from monitoring wells over the period of record and the elimination of the groundwater plume. Specifically, natural attenuation has reduced concentrations of all COCs to levels below respective groundwater PCLs with only low level detections (well below respective PCLs) for cis-1,2-DCE and VC occurring in one monitoring well. COC concentration data indicate concentration versus (vs.) time attenuation rates ($K_{time}$) achieving clean-up goals and decreasing trends in concentration levels.**

**Maps in Attachment 1A, data tables in Appendix 4, and graphs in Attachment 1B show the historical PCLE zone presented in the RAP (Tetra Tech NUS, 2006) is no longer present. The remaining COCs detected in groundwater, cis-1,2-DCE and VC, show decreasing concentration trends providing additional indications that effective remediation of the plume through MNA is occurring within the expected time frame.**

Are physical controls part of the response action? ____ Yes *X* No

If yes, describe the type and purpose of the physical control and discuss how the physical control has proven effective.

*N/A*

## Soil Response Action Objectives

When using removal and/or decontamination with controls or controls only, demonstrate that the physical control or combination of measures is reliably containing, and will continue to contain, COCs within and/or derived from the surface soil and subsurface soil PCLE zone materials over time.

*N/A*

Explain how the removal or decontamination action is reducing the concentration of COCs to the critical surface soil and subsurface soil PCL throughout the soil PCLE zone and preventing COC concentrations above the critical soil PCLs from migrating beyond the original boundary of the soil PCLE zone.

**The soils containing COC concentrations in excess of TRRP RES A were excavated by the Navy's RAC in 2003. Since no soils remain at the site in excess of TRRP RES A concentrations, there is no threat of COCs migrating beyond the original boundary of the PCLE zone. The RACR for the soil removal activities was prepared and submitted to the TCEQ in March 2005. The RACR for the soil removal activities was prepared and submitted to the TCEQ in March 2005. The RACR has undergone several review cycles by the City of Dallas, U.S. EPA, and TCEQ and the final replacement pages for the RACR were submitted to the TCEQ in May 2008 (CH2M Hill 2008). The TCEQ granted final approval of the RACR in July 2008** ***(TCEQ 2008).***

## Groundwater Response Action Objectives — SWMU 136 North Plume

Name of groundwater-bearing unit to which this information applies *Upper Water Bearing Zone (Alluvial Overburden)*

Repeat this section for each groundwater-bearing unit for which a different response action is being conducted.

Groundwater Classification ____ 1 _X_ 2 ___ 3

Is a modified groundwater response action being used for any part of the groundwater PCLE zone (§350.33(f)(2), (3), or (4))? ___ Yes _X_ No

If yes, complete the appropriate portions of this report.

Explain how the removal or decontamination actions are reducing the concentration of COCs to the critical groundwater PCL throughout the groundwater PCLE zone and preventing COC concentrations above the critical groundwater PCL from migrating beyond the original boundary of the groundwater PCLE zone. If COC concentrations above the critical groundwater PCL have ever migrated beyond the original boundary of the groundwater PCLE zone, explain the actions taken to address the increase in the PCLE zone.

**The response action has consistently reduced concentrations of benzene, cis-1,2-DCE, TCE, and VC to levels below respective groundwater PCLs, thereby eliminating the groundwater plume.**

**Maps in Attachment 1A, data tables in Appendix 4, and graphs in Attachment 1B show the historical PCLE zone presented in the RAP (Tetra Tech NUS, 2006) is no longer present.**

**COCs have not been detected above critical PCLs since July 2014 and do not exhibit increasing trends, thereby achieving the groundwater protection standards (GWPS) as outlined in Section IV.F of the Compliance Plan No. 50276 for NAS Dallas and indicating performance monitoring at SWMU 136 North should conclude. In accordance with the approved Groundwater RAP (Revision 2), the last monitoring samples are to be considered the confirmation samples and this data will be included in the RACR, to follow. Confirmation monitoring should be initiated in accordance with Section IV.F of the Compliance Plan and the approved Groundwater RAP (Revision 2) and is anticipated to include three years of monitoring for an extended list of parameters (VOCs by U.S. Environmental Protection Agency [EPA] Method SW846-8260B, semi volatile organic compounds [SVOCs] by U.S. EPA Method SW846-8270C, metals by U.S. EPA Method SW846-6000/7000 series, pesticides by U.S. EPA Method SW846-8081A, polychlorinated biphenyls [PCBs] by U.S. EPA Method SW846 8082, and polynuclear aromatic hydrocarbons [PAHs] by SW846 8310).**

Explain how the response actions are preventing COCs from migrating to air at concentrations above the PCLs for air if the groundwater-to-air PCLs ($^{Air}GW_{Inh-V}$) were exceeded.

**The maximum observed concentrations of the detected groundwater COCs in the PCLE zone are less than their respective $^{Air}GW_{Inh-V}$ PCLs.**

Explain how the response actions are preventing COCs from migrating to surface water at concentrations above the PCLs for groundwater discharges to surface water if surface water was a factor.

**As shown in the RAP (Tetra Tech 2006), surface water is not a factor. Additionally, the fate and transport modeling results (Tetra Tech 2004) indicate that the PCLE zone will not migrate beyond the Former NAS Dallas property line; therefore, there will be no threat to offsite human or ecological receptors.**

Explain how the response actions are preventing human and ecological receptor exposure to the groundwater PCLE zone.

**The response action is based on an in-situ technology that will permanently degrade the COCs. During the implementation of the in-situ groundwater response action, access to the site will be controlled by not permitting any potable or irrigation wells in the PCLE zone during remedial activities. Additionally, the fate and transport modeling results (Tetra Tech 2004) indicate that the PCLE zone will not migrate beyond the Former NAS Dallas property line; therefore, there will be no threat to offsite human or ecological receptors.**

## Waste Management

Describe the volume and final disposition or reuse location of waste or environmental media that has been removed from the affected property during the response action, if not previously reported under STEERS. Provide copies of all manifests, other documentation of disposition, and landowner consent for reuse of soil in Appendix 8.

**Excess groundwater recovered through the low-flow or PDB sampling method is placed into properly labeled 55-gallon capacity drums and stored at the site. Upon classification, waste disposal arrangements are made with a licensed waste disposal facility. Appendix 8 contains copies of the waste disposal manifests for groundwater generated during the 2016 sampling activities at Former NAS Dallas.**

# ATTACHMENT 1A
# MAPS AND CROSS SECTIONS

# AFFECTED PROPERTY MAP

Affected Property Map
Former NAS Dallas, Texas

January 2014 Isocontour
Gross PCLE Zone Outline
Demolished Building
Existing Structure
Owned by City of Dallas
Transferred from Exelon Corporation to City of Dallas
Transferred from Navy to City of Dallas
Transferred from Navy to City of Grand Prairie
Transferred from Navy to U.S. Army Reserve
Owned by Exelon Corporation

NAVFAC Naval Facilities Engineering Command

| | |
|---|---|
| REQUESTED BY: T. Wiberg | DATE: 9/21/2015 |
| DRAWN BY: A. Zimmerman | PROJECT NUMBER: 0888812796 |

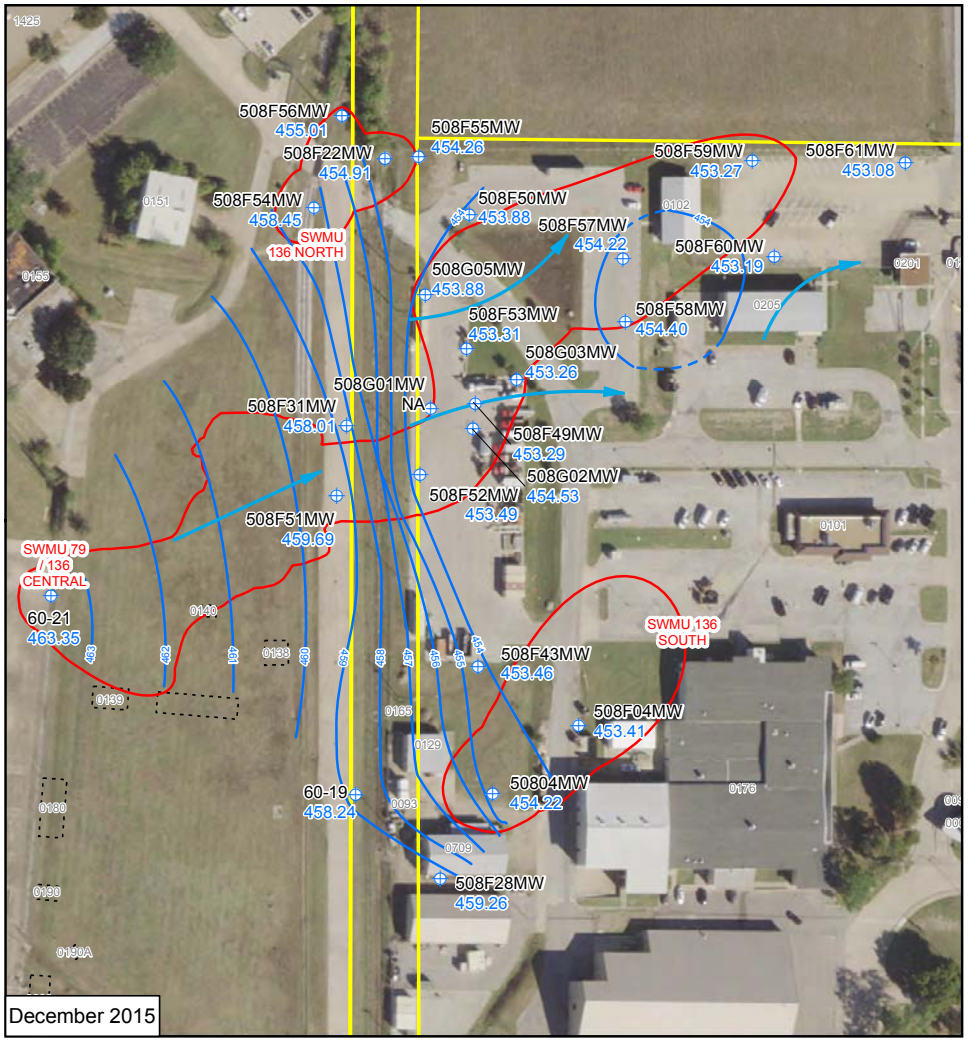
X:\Navy\NAS_Dallas\NAS_Dallas_Jan14_AffectedPropMap.mxd

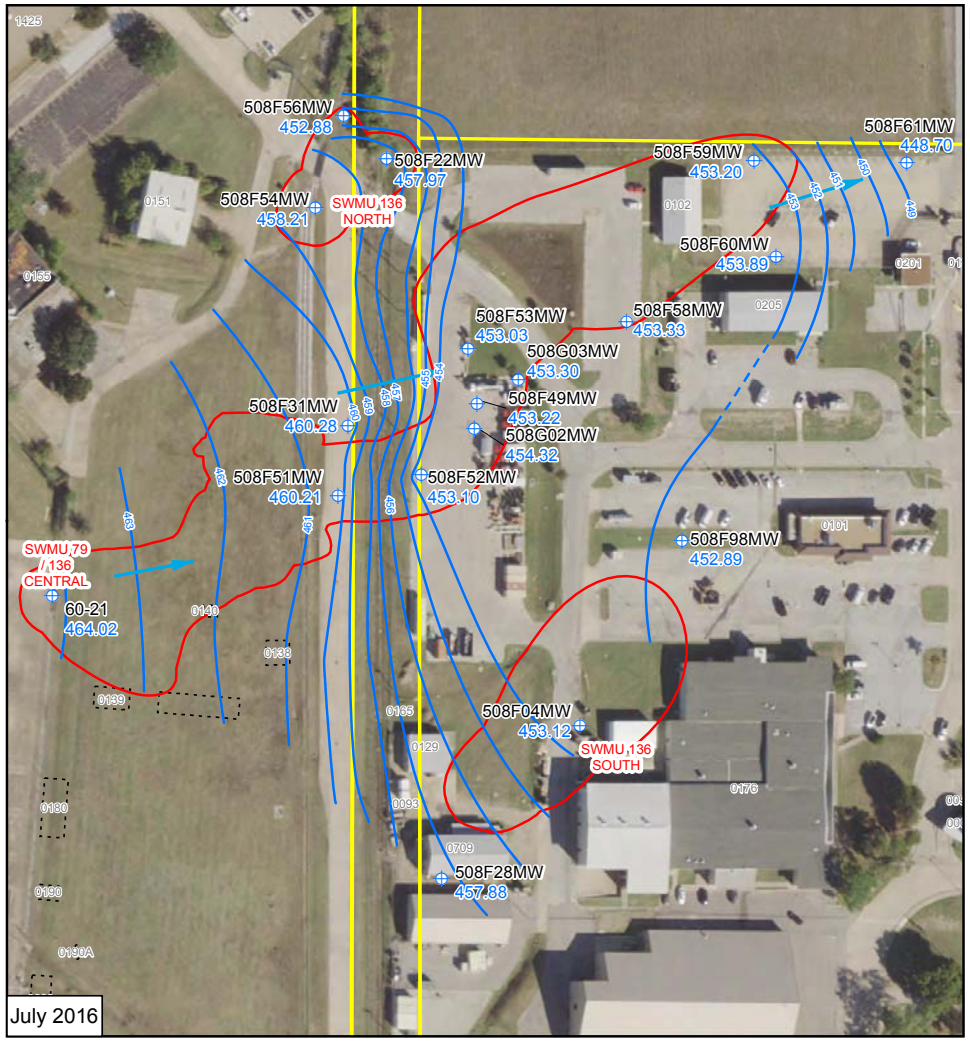
Service Layer Credits: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community; State boundary is from the United States Census Bureau; Some data are from TetraTech.

## ISOCONCENTRATION CONTOUR MAPS

None Included.

# POTENTIOMETRIC SURFACE MAPS




N

Well Location

Potentiometric Surface Contour (dashed where inferred)

Groundwater Flow Direction

Gross PCLE Zone Outline

Property Boundary 2014

Demolished Building

Notes:
453.27 - Potentiometric Surface Contour (Feet above MSL)
NA = Elevation not measured at location

0 65 130 195 260 Feet

Figure 1A-3
Potentiometric Surface Map
SWMU 79 / 136 Central Plume
2016 RAER
Former NAS Dallas, Texas

NAVFAC Naval Facilities Engineering Command

| | |
|---|---|
| REQUESTED BY: L. Foss | DATE: 11/16/2016 |
| DRAWN BY: K. Burnum | PROJECT NUMBER: 0888812796 |

Service Layer Credits: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

X:\Navy\NAS_Dallas\project\2016_RAER\2016_Jul_NAS_Dallas_loc_POT_SWMU79_136Central.mxd

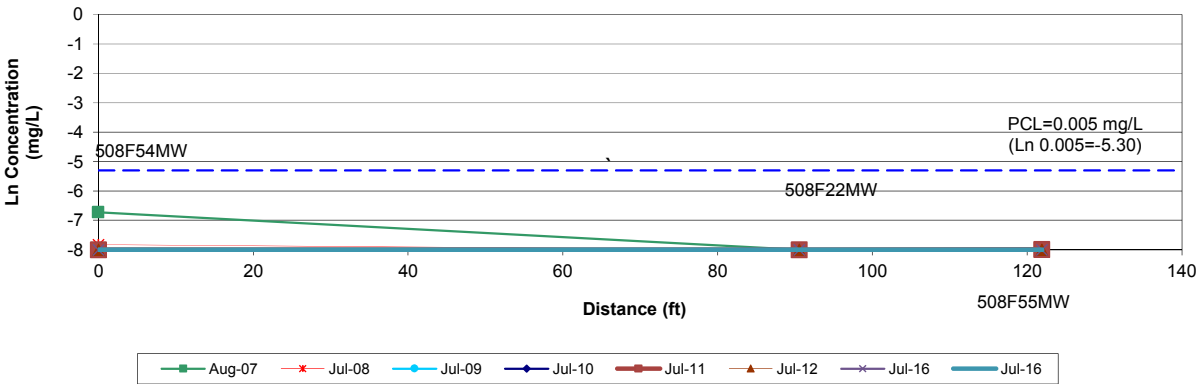
**ATTACHMENT 1B**

**GRAPHS**

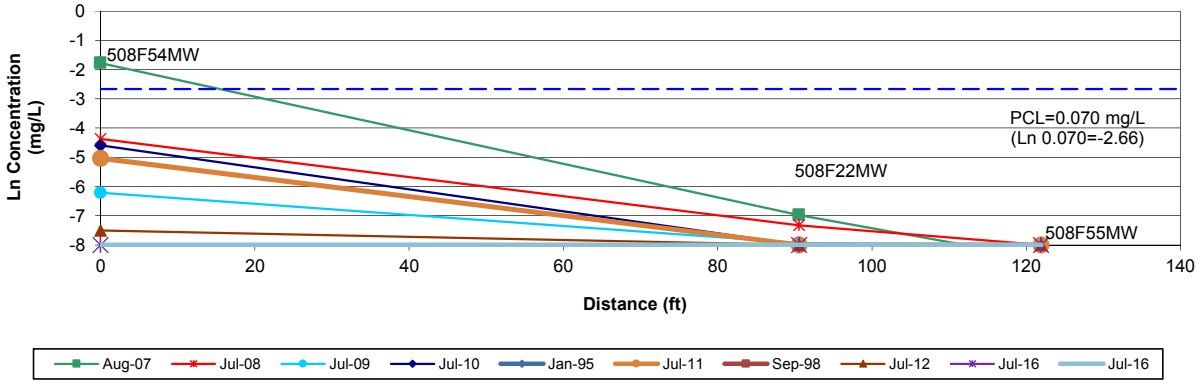
# CONCENTRATION VS. DISTANCE GRAPHS
# SWMU 136 NORTH PLUME
# 2016 RAER

## FORMER NAS DALLAS, TEXAS
## PAGE 1 OF 2

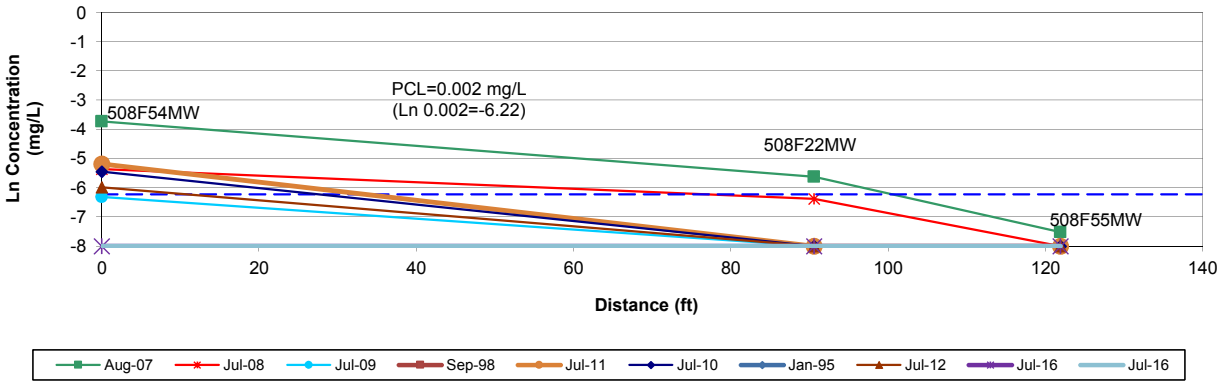
**TCE**




**cis-1,2-DCE**



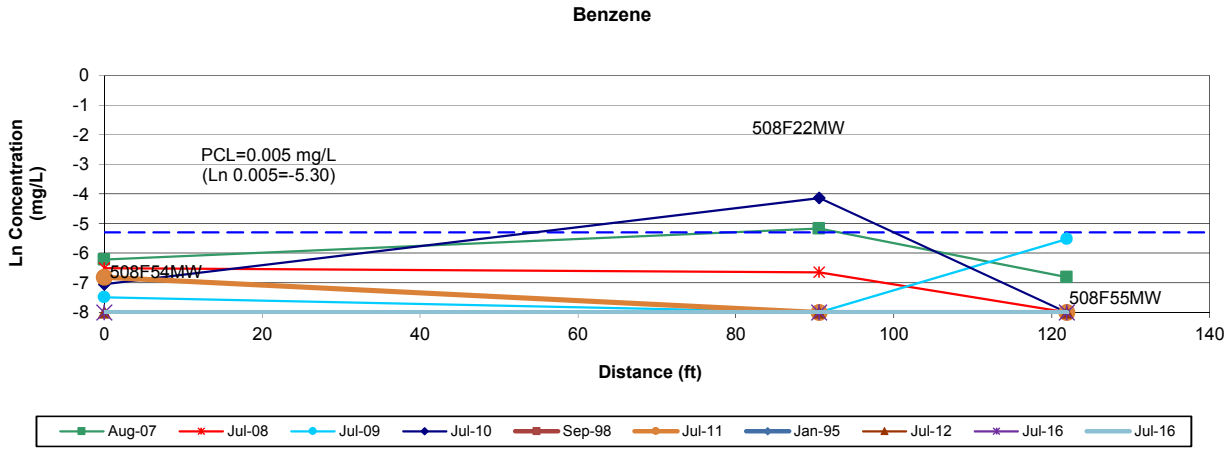

**Vinyl Chloride**




Notes: Graphed data points are taken from raw data.
Sample events using passive diffusion bag (PDB) samplers are listed on Tables 4-1A and 4-1B in Appendix 4.

# CONCENTRATION VS. DISTANCE GRAPHS
# SWMU 136 NORTH PLUME
# 2016 RAER

## FORMER NAS DALLAS, TEXAS
## PAGE 2 OF 2

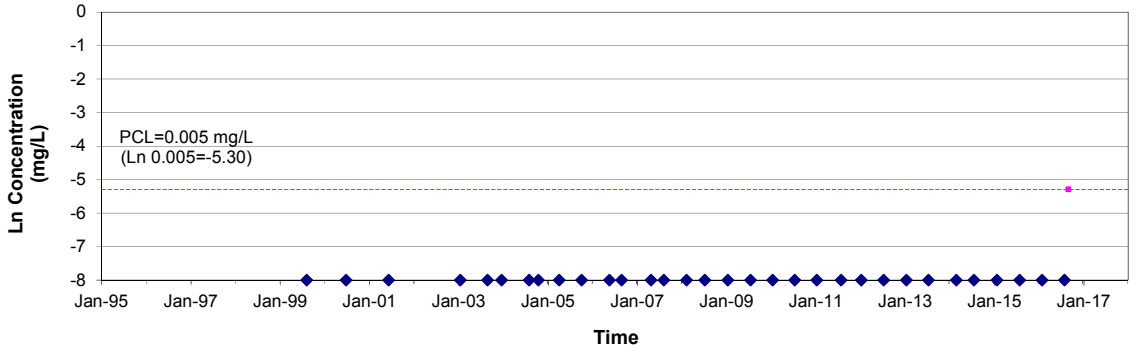



Notes: Graphed data points are taken from raw data.
Sample events using passive diffusion bag (PDB) samplers are listed on Tables 4-1A and 4-1B in Appendix 4.

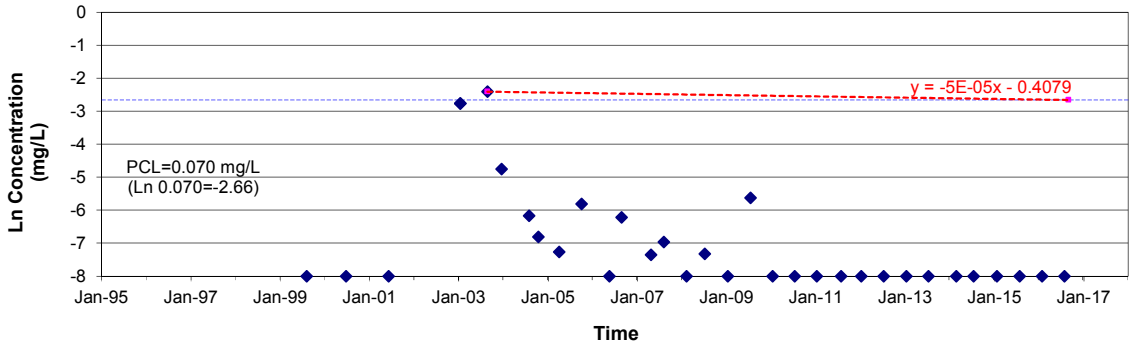
# CONCENTRATION VS. TIME GRAPHS
# WITH MINIMUM REQUIRED ATTENUATION RATE
# SWMU 136 NORTH PLUME
# 508F22MW
# 2016 RAER

## FORMER NAS DALLAS, TEXAS
## PAGE 1 OF 2

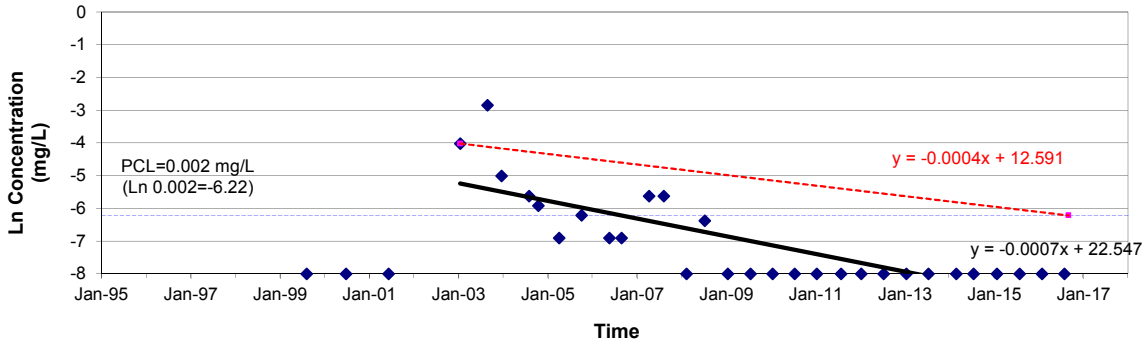
### TCE




### cis-1,2-DCE



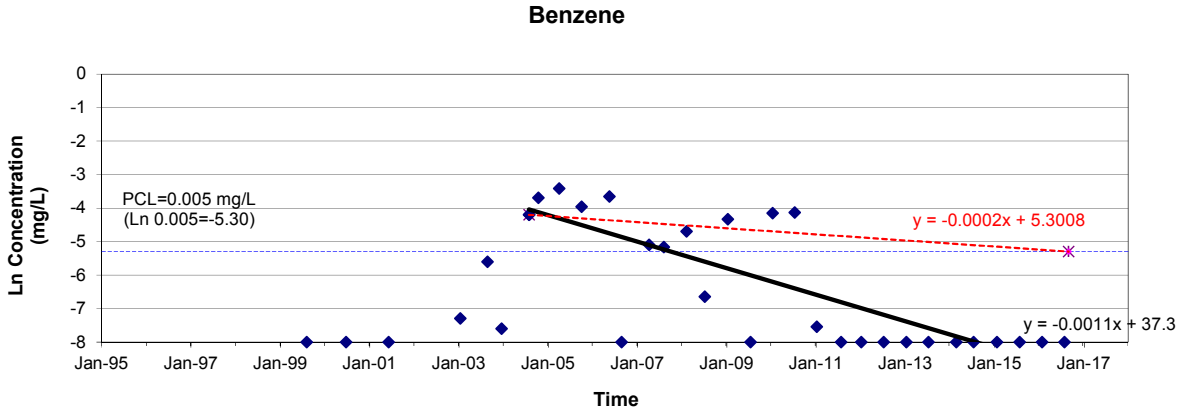

### Vinyl Chloride




Notes: Red line and slope are based on minimum required attenuation rate (ktime) to meet PCL by 01 Sep 2016.
Black line and slope are based on linear regression of the raw data.
Sample events using permeable diffusion bag (PDB) samplers are listed on Tables 4-1A and 4-1B in Appendix 4.

# CONCENTRATION VS. TIME GRAPHS
# WITH MINIMUM REQUIRED ATTENUATION RATE
# SWMU 136 NORTH PLUME
# 508F22MW
# 2016 RAER

## FORMER NAS DALLAS, TEXAS
## PAGE 2 OF 2

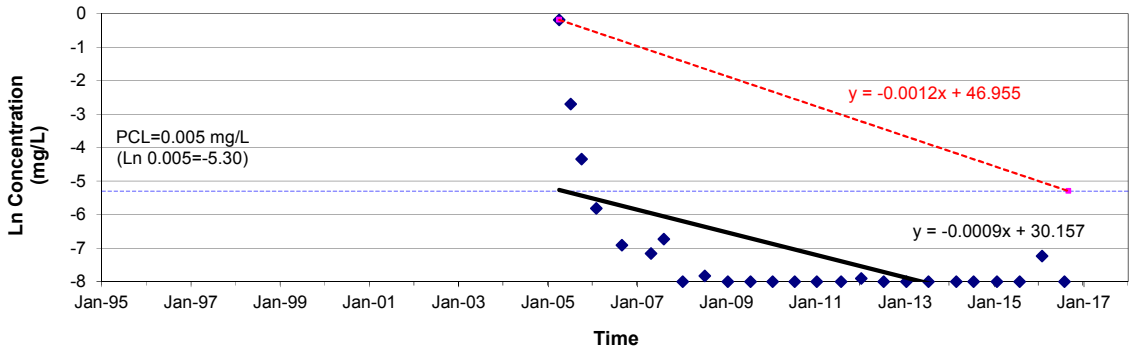



Notes: Red line and slope are based on minimum required attenuation rate (ktime) to meet PCL by 01 Sep 2016.
Black line and slope are based on linear regression of the raw data.
Sample events using permeable diffusion bag (PDB) samplers are listed on Tables 4-1A and 4-1B in Appendix 4.

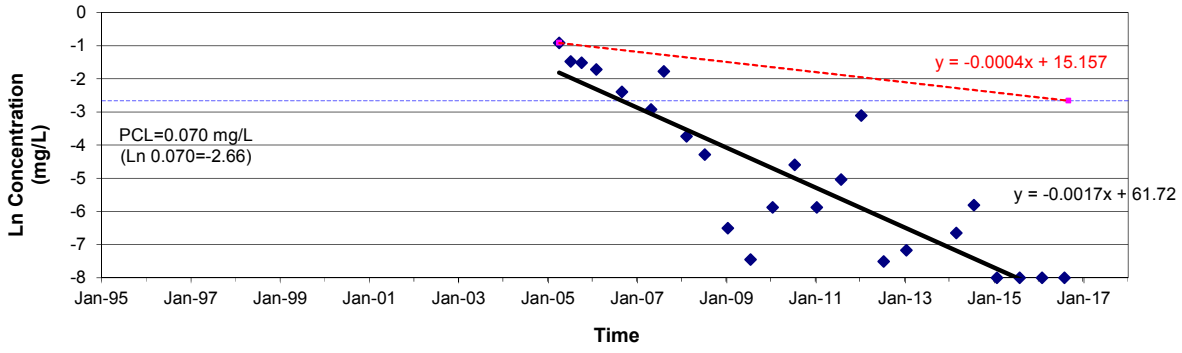
# CONCENTRATION VS. TIME GRAPHS
# WITH MINIMUM REQUIRED ATTENUATION RATE
# SWMU 136 NORTH PLUME
# 508F54MW
# 2016 RAER

## FORMER NAS DALLAS, TEXAS
## PAGE 1 OF 2

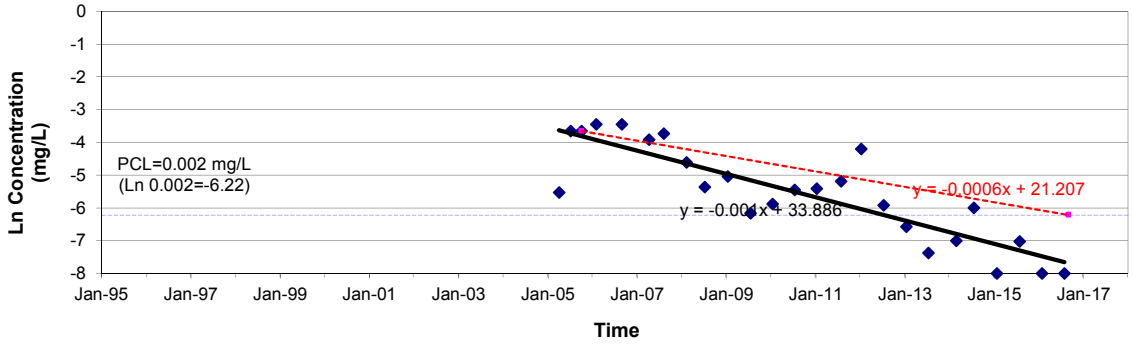
### TCE




### cis-1,2-DCE




### Vinyl Chloride

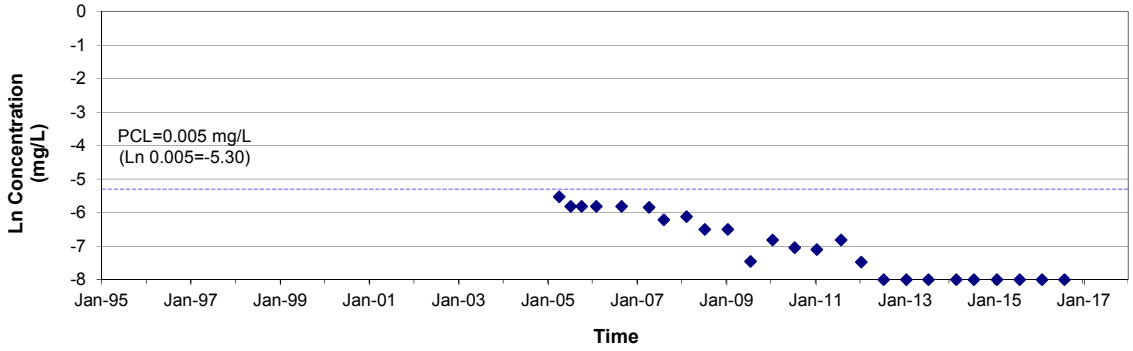



Notes: Red line and slope are based on minimum required attenuation rate (ktime) to meet PCL by 01 Sep 2016.
Black line and slope are based on linear regression of the raw data.
Sample events using permeable diffusion bag (PDB) samplers are listed on Tables 4-1A and 4-1B in Appendix 4.

# CONCENTRATION VS. TIME GRAPHS
# WITH MINIMUM REQUIRED ATTENUATION RATE
# SWMU 136 NORTH PLUME
# 508F54MW
# 2016 RAER

## FORMER NAS DALLAS, TEXAS
## PAGE 2 OF 2

### Benzene

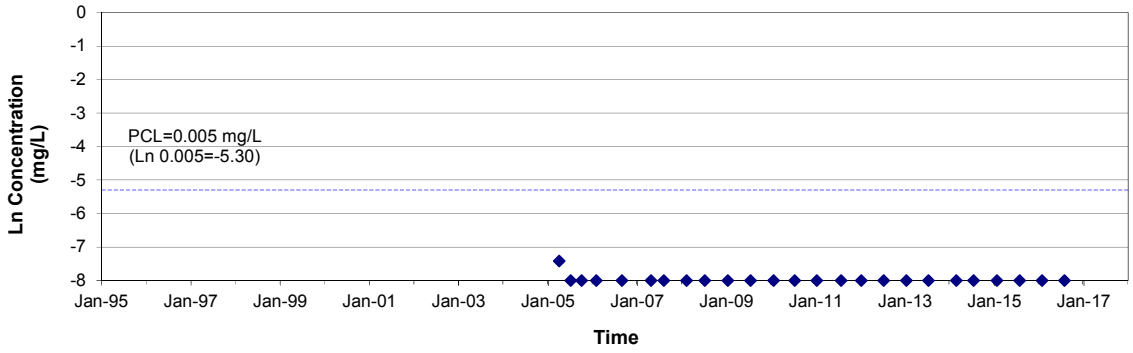



Notes: Red line and slope are based on minimum required attenuation rate (ktime) to meet PCL by 01 Sep 2016.
Black line and slope are based on linear regression of the raw data.
Sample events using permeable diffusion bag (PDB) samplers are listed on Tables 4-1A and 4-1B in Appendix 4.

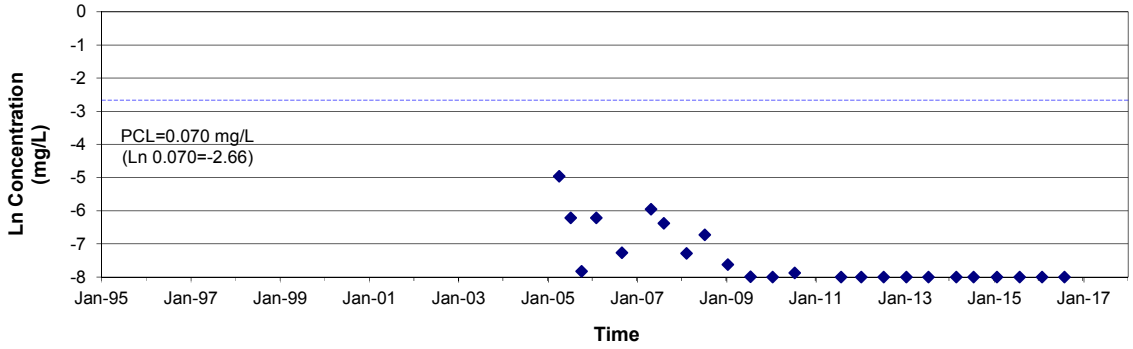
# CONCENTRATION VS. TIME GRAPHS
# WITH MINIMUM REQUIRED ATTENUATION RATE
# SWMU 136 NORTH PLUME
# 508F56MW
# 2016 RAER

## FORMER NAS DALLAS, TEXAS

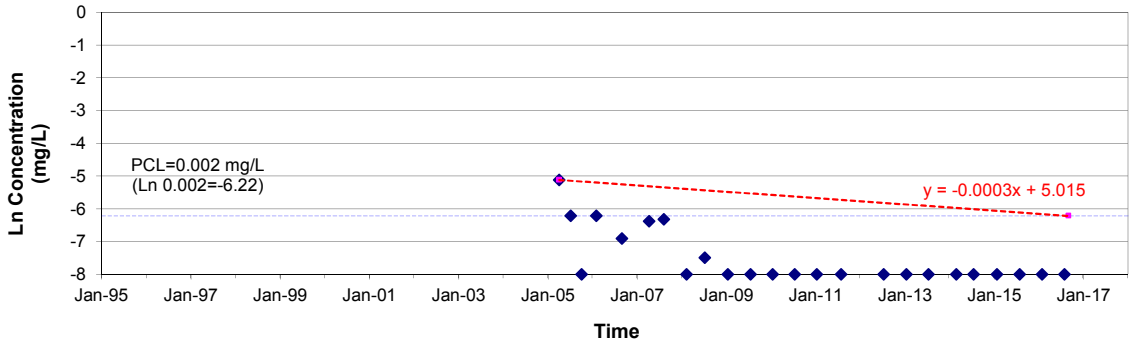

### TCE




### cis-1,2-DCE




### Vinyl Chloride

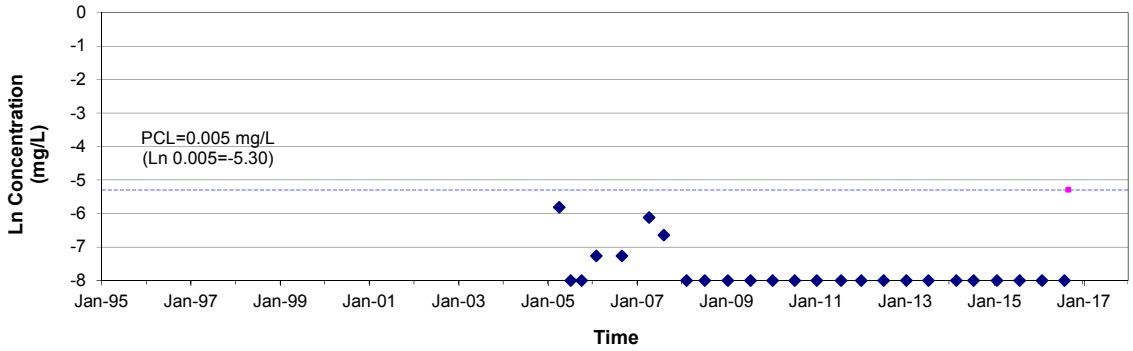



Notes: Red line and slope are based on minimum required attenuation rate (ktime) to meet PCL by 01 Sep 2016.
Black line and slope are based on linear regression of the raw data.
Sample events using permeable diffusion bag (PDB) samplers are listed on Tables 4-1A and 4-1B in Appendix 4.

# CONCENTRATION VS. TIME GRAPHS
# WITH MINIMUM REQUIRED ATTENUATION RATE
# SWMU 136 NORTH PLUME
# 508F56MW
# 2016 RAER

## FORMER NAS DALLAS, TEXAS
## PAGE 2 OF 2

### Benzene




Notes: Red line and slope are based on minimum required attenuation rate (ktime) to meet PCL by 01 Sep 2016.
Black line and slope are based on linear regression of the raw data.
Sample events using permeable diffusion bag (PDB) samplers are listed on Tables 4-1A and 4-1B in Appendix 4.

## Performance Measures

List and describe the performance measures for each environmental medium containing a PCLE zone that are being used to determine if reasonable progress is being made by the response action in a timely manner. Provide documentation that these performance measures are being met. Attach additional information if necessary.

**Performance Measures**

**The approach to determine if MNA is consistently achieving the clean-up goals by 2017 involves sequential sampling events to monitor the size and shape of the PCLE zone over time. To this effect, a tiered sampling program incorporating performance, detection, and ambient monitoring was implemented. This sampling program allows the collection of data on the COCs, groundwater flow, and geochemical parameters that may affect the progress of MNA and the likelihood of meeting site remediation goals. The design of the monitoring program allows a conclusion of success or failure to be drawn as early as possible during the response action implementation while providing reasonable confidence in the conclusion.**

**Performance monitoring encompasses the sampling of the point of exposure (POE) wells 508F22MW and 508F54MW within the plume and the background monitoring well 508F56MW outside the PCLE zone. , Data collected from these monitoring wells serve to check the plume shape and determine if it is shrinking or expanding, stable or migrating, thus triggering programmatic adjustments if necessary. COC analytical data collected from the monitoring wells located along the plume centerline were used to determine plume attenuation rates for individual chemical constituents ($k_{time}$) and for the plume as a whole ($k_{dist}$). Data collected from the background monitoring wells served to monitor any changes in the ambient conditions that impact the effectiveness of MNA in achieving the clean-up goal in a timely manner. The COC analytical results are summarized in Table 4-1.**

**Corrective action observation (CAO) well 508F55MW has had COC detections below applicable GWPSs for at least the previous five consecutive years, and were abandoned on April 7, 2016, in accordance with the RAP submitted to TCEQ in October 2015. Well plugging reports are located in Appendix 4, and historical COC analytical results for P&A'd wells are included in Table 4-1B.**

**Performance monitoring for 2016 also entailed sampling for MNA parameters (pH, ORP, dissolved oxygen, ferrous iron, alkalinity, hydrogen sulfide, carbon dioxide, nitrate, nitrite, orthophosphate, sulfate, sulfide, total organic carbon, chloride, ethene, ethane, and methane) during the July 2016 sampling event. MNA parameters are sampled on a biennial sampling schedule. The MNA parameters measured by field tests and laboratory analyses are presented in Table 4-2. MNA parameter data, as needed, serve as a secondary line of evidence to evaluate whether subsurface conditions continue to support natural attenuation.**

**The conceptual MNA site model for this plume is represented in the data tables in Appendix 4, the isoconcentration maps and potentiometric surface maps included in Attachment 1A, and the concentration vs. time graphs in Attachment 1B.**

**After each semi-annual groundwater monitoring event, the COC concentration data collected were evaluated for both the entire plume and monitoring well by monitoring well basis in accordance with the RAP (Tetra Tech 2006). The initial data analysis and interpretation focused on the detection of trend changes in the data. Further evaluation focused on the assessment of the changes or trends and their impact on MNA in achieving the site-related goals.**

**It was expected that the analytical data would indicate that the attenuation rates were sufficient to effectively remediate the plume on or before the year 2017. Reasonable progress of the response action was evaluated considering the following criteria:**

- **The monitoring well's COC specific $k_{time}$ attenuation rate based on the available sampling data is not more than the minimum attenuation rate necessary to meet the remedial goals by the year 2017.**

- **The monitoring well's COC specific concentration is less than the remedial benchmark concentration (calculated concentration goal based on the initial maximum concentration and the minimum rate necessary to meet the remedial goals by 2017) for that sample date.**
- **The COC specific $k_{dist}$ attenuation rate based on the available sampling data indicates an actual attenuation equal to or greater than the rate of COC migration from the suspected source area.**

**Response Action Progress**

**Table 4-3 summarizes the groundwater gauging data. The potentiometric surface maps for the December 2015 and July 2016 gauging events, included in Figure 1A-3 (Attachment 1A), indicate that the shape of the groundwater elevation contours and direction of groundwater flow remain consistent with previous sampling events.**

**No COC isoconcentration contour maps were included as part of Attachment 1A for the January and July sampling events because detected COC concentrations were less than the critical PCLs in sampled monitoring wells. There is no evidence of migration of the PCLE zone at concentrations greater than the respective critical groundwater PCLs.**

**Tables 4-4 and 4-5 (Appendix 4) summarize the concentration vs. time and concentration vs. distance attenuation rate constants for the plume centerline. The graphs in Attachment 1B graphically depict the same attenuation rate constants summarized in Tables 4-4 and 4-5 and the minimum required attenuation rate to meet the remediation goals. The data presented show overall decreasing trends to levels below critical PCLs for site COCs.**

**Based on lines of evidence, excavation followed by MNA has been an appropriate remedial method to reduce COCs to their critical PCLs, as concentrations of COCs have not been detected above critical PCLs since July 2014 and do not exhibit an increasing trends. Therefore, the implemented remedy has achieved groundwater protection standards (GWPS) as outlined in Section IV.F of the Compliance Plan No. 50276 for NAS Dallas and indicating performance monitoring at SWMU 136 North should conclude. In accordance with the approved Groundwater RAP (Revision 2), the last monitoring samples are to be considered the confirmation samples and this data will be included in the RACR, to follow.**

**Confirmation Performance Measures**

**Because analytical data show that concentrations of COCs are less than PCLs, termination of performance monitoring and initiation of verification monitoring will be implemented.**

**Confirmation monitoring will be initiated in accordance with Section IV.F of the Compliance Plan and the approved Groundwater RAP (Revision 2) and will include three years of semi-annual groundwater monitoring for an extended list of parameters (VOCs by U.S. Environmental Protection Agency [EPA] Method SW846-8260B, semi volatile organic compounds [SVOCs] by U.S. EPA Method SW846-8270C, metals by U.S. EPA Method SW846-6000/7000 series, pesticides by U.S. EPA Method SW846-8081A, polychlorinated biphenyls [PCBs] by U.S. EPA Method SW846 8082, and polynuclear aromatic hydrocarbons [PAHs] by SW846 8310).**

## Problems

Complete the table for the response action. When the response action consists of several components or multiple actions, complete one table for each major component or action.

Response Action Name/Designation: *Groundwater Response Action*

List the problems that have been encountered during the response action, describe the impact of each problem, and the response to the problem.

| Description of the Problem | Impact | Did this cause a response action failure? | Corrective Response |
|---|---|---|---|

| | | Yes | No | |
|---|---|---|---|---|
| **None** | | | | |

| Operation and Maintenance | RAER Worksheet 6.0 | Page 1 of 1 |
|---|---|---|
| | ID No. *SWR 65033* *SWMU 136 North Plume* | Report Date: *01/17/2017* |

Use this worksheet to describe the operation and maintenance (O&M) activities conducted for each response action.

Response Action Name/Designation: Well maintenance

List all portions of the response action to which this information applies. Repeat this worksheet for each major component or operation.

Describe the O&M and inspection activities that have been conducted to operate and maintain response action components.

**Monitoring well 508F55MW has had COC detections below applicable GWPSs for at least the previous five consecutive years, and was abandoned on April 7, 2016, in accordance with the RAP submitted to TCEQ in October 2015. Well plugging reports are located in Appendix 4, and historical COC analytical results for P&A'd wells are included in Table 4-1B.**

**In September 2016, Resolution Consultants conducted a detailed evaluation of well maintenance needs for NAS Dallas SWMUs. The surface completion at monitoring well 508F54MW was re-fitted by tapping the rim eyelets, and replacing bolts and washers in order to secure the lid. Monitor wells 508F22MW and 508F56MW (stickup wells) were in good condition, all pads and bollards were stable, and the wells were locked.**

# APPENDIX 1
# REFERENCE LIST

# APPENDIX 1
# REFERENCES

A.T. Kearney, Inc. *RCRA Facility Assessment Preliminary Review/Visual Site Inspection.* Chicago, Illinois. 1989.

CH2M Hill. *85 Sites, Defense Reutilization and Marketing Office, and Naval Weapons Industrial Reserve Plant SWMU 18 Response Action Completion Report, Revision 2, Naval Air Station Dallas; Dallas, Texas.* Atlanta, Georgia. 2008.

EnSafe/Allen & Hoshall. *Naval Air Station Dallas Environmental Baseline Survey, Dallas, Texas*. 1994.

Texas Commission on Environmental Quality. *Approval of Response Action Effectiveness Reports for Defense Reutilization and Marketing Office and 85 Sites (Revision 2) and Response Action Effectiveness Reports for Naval Weapons Industrial Reserve Plant SWMU 18 (Revision 2), Former Naval Air Station Dallas, Texas.* 2008.

Tetra Tech NUS, Inc. *RCRA Facility Investigation Report for Category C. Pittsburgh, Pennsylvania.* 2000a.

— *RCRA Facility Investigation Report for Category E. Pittsburgh, Pennsylvania.* 2000b.

— *RCRA Facility Investigation Report for Category F. Pittsburgh, Pennsylvania.* 2000c.

— *RCRA Facility Investigation Report for Category D. Pittsburgh, Pennsylvania.* 2001a.

— *RCRA Facility Investigation Report for Category B. Pittsburgh, Pennsylvania.* 2001b.

— *Affected Property Assessment Report. Houston, Texas*. 2002.

— *Final Monitoring Natural Attenuation Groundwater Modeling Report for Category D. Pittsburgh, Pennsylvania.* 2004.

— *Response Action Plan, Revision 2. Pittsburgh, Pennsylvania.* 2006.

Resolution Consultants. *Draft Final Alternatives Evaluation Report, Former Naval Air Station, Dallas, Texas*. Norfolk, Virginia. August 2013.

— *Draft Vapor Intrusion Study Report, Buildings 1405, 1422, and 1424, Solid Waste Management Unit 21*. Norfolk, Virginia. September 2015.

— *Revised Groundwater Response Action Plan for SWMU 136 North Plume (Revision 3).* Norfolk, Virginia. October 2015.

# APPENDIX 4
# DATA TABLES

**Table 4-1 Summary of Chemicals of Concern Detected in Groundwater**
**Table 4-2 Summary of Geochemical Parameters Measured in Groundwater**
**Table 4-3 Summary of Groundwater Gauging Data**
**Table 4-4 Summary of Concentration vs. Time Attenuation Rate Constants**
**Table 4-5 Summary of Concentration vs. Distance Attenuation Rate Constants**

# TABLE 4-1
# SUMMARY OF CHEMICALS OF CONCERN DETECTED IN GROUNDWATER

**Table 4-1A**

**Summary of Chemicals of Concern Detected in Groundwater**
**Long Term Monitoring Wells — SWMU 136 North Plume**
**2016 RAER**
**Former NAS Dallas, Texas**
**Page 1 of 3**

| Monitoring Well | Sampling Date | Sampling Round | Chemicals of Concern (mg/L) | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | 1,1-Dichloroethene | 1,2-Dichloroethane | Benzene | Carbon Tetrachloride | Chloroform | Chloromethane | cis-1,2-Dichloroethene | Ethylbenzene | Methylene Chloride | Tetrachloroethene | trans-1,2-Dichloroethene | Trichloroethene | Vinyl Chloride |
| **Protective Concentration Levels (mg/L)** | | | **0.00700** | **0.00500** | **0.00500** | **0.00500** | **0.24000** | **0.07000** | **0.07000** | **0.70000** | **0.00500** | **0.00500** | **0.10000** | **0.00500** | **0.00200** |
| **Monitoring Wells Located Inside PCLE Zone** | | | | | | | | | | | | | | | |
| **508F22MW** | 7/12/1999 | | Well Installed | | | | | | | | | | | | |
| | 8/6/1999 | Round 5 | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U |
| | 6/23/2000 | Round 6 | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U |
| | 6/7/2001 | Round 7 | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.01000 U | 0.00250 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00250 U | 0.00500 U | 0.01000 U |
| | 1/14/2003 | Round 8 | 0.00100 U | 0.00100 U | 0.00068 J | 0.00100 U | 0.00100 U | 0.00100 U | 0.06300 | NA | 0.00200 U | 0.00100 U | 0.00100 U | 0.00100 U | 0.01800 |
| | 8/24/2003 | Round 9 | 0.00073 U | 0.00073 U | 0.00370 | 0.00060 U | 0.00070 U | 0.00087 U | 0.09000 | 0.00063 U | 0.00093 U | 0.00040 U | 0.00080 U | 0.00073 U | 0.05800 |
| | 12/17/2003 | Round 10 | 0.00021 U | 0.00009 U | 0.00050 J | 0.00020 U | 0.00014 U | 0.00008 U | 0.00860 J | 0.00011 U | 0.00016 U | 0.00024 U | 0.00019 U | 0.00010 U | 0.00670 J |
| | 7/29/2004 | Round 11 (PDB) | 0.00035 U | 0.00010 U | 0.01500 | 0.00025 U | 0.00010 U | 0.00017 U | 0.00210 | 0.00017 U | 0.00040 U | 0.00021 U | 0.00130 | 0.00022 U | 0.00360 |
| | 10/13/2004 | Round 12 (PDB) | 0.00035 U | 0.00010 U | 0.02500 | 0.00025 U | 0.00010 U | 0.00017 U | 0.00110 | 0.00017 U | 0.00040 U | 0.00021 U | 0.00180 | 0.00022 U | 0.00270 |
| | 4/3/2005 | Round 13 (PDB) | 0.00040 U | 0.00030 U | 0.03300 | 0.00030 U | 0.00040 U | 0.00030 U | 0.00070 J | 0.00020 U | 0.00200 U | 0.00040 U | 0.00200 | 0.00030 U | 0.00100 J |
| | 10/10/2005 | Round 14 | 0.00040 U | 0.00030 U | 0.01600 | 0.00030 U | 0.00040 U | 0.00030 U | 0.00300 | 0.00020 U | 0.00200 U | 0.00040 U | 0.00050 J | 0.00030 U | 0.00200 |
| | 10/10/2005 | Round 14 (PDB) | 0.00040 U | 0.00030 U | 0.01900 | 0.00030 U | 0.00040 U | 0.00030 U | 0.00300 | 0.00020 U | 0.00200 U | 0.00040 U | 0.00060 J | 0.00030 U | 0.00200 |
| | 5/18/2006 | Round 15 (PDB) | 0.00060 U | 0.00040 U | 0.02600 | 0.00050 U | 0.00040 U | 0.00060 U | 0.00050 U | 0.00030 U | 0.00200 U | 0.00060 U | 0.00060 U | 0.00040 U | 0.00100 J |
| | 8/26/2006 | Round 16 (PDB) | 0.00060 U | 0.00040 U | 0.00100 UJ | 0.00100 UJ | 0.00040 U | 0.00060 U | 0.00200 J | 0.00030 U | 0.00200 U | 0.00060 U | 0.00060 U | 0.00040 U | 0.00100 J |
| | 5/10/2007 | Round 17 (PDB) | 0.00028 U | 0.00021 U | 0.00610 | 0.00020 U | 0.00023 U | 0.00017 U | 0.00064 J | 0.00013 U | 0.00030 U | 0.00014 U | 0.00053 U | 0.00014 U | 0.00360 |
| | 8/31/2007 | Round 18 | 0.00013 U | 0.00013 U | 0.00570 | 0.00011 U | 0.00013 U | 0.00047 U | 0.00094 J | 0.00035 U | 0.00023 U | 0.00010 U | 0.00015 U | 0.00023 U | 0.00360 J |
| | 2/1/2008 | Round 19 (PDB) | 0.00039 U | 0.00026 U | 0.00910 | 0.00044 U | 0.00036 U | 0.00060 U | 0.00032 U | 0.00040 U | 0.00040 U | 0.00046 U | 0.00048 U | 0.00053 U | 0.00043 U |
| | 7/24/2008 | Round 20 (PDB) | 0.00054 U | 0.00034 U | 0.00130 | 0.00022 U | 0.00028 U | 0.00061 U | 0.00066 J | 0.00043 U | 0.00100 U | 0.00022 U | 0.00045 U | 0.00032 U | 0.00170 |
| | 1/12/2009 | Round 21 (PDB) | 0.00054 U | 0.00034 U | 0.01310 | 0.00022 U | 0.00028 U | 0.00061 U | 0.00020 U | 0.00043 U | 0.00100 U | 0.00022 U | 0.00045 U | 0.00032 U | 0.00030 U |
| | 7/16/2009 | Round 22 | 0.00054 U | 0.00034 U | 0.00040 U | 0.00022 U | 0.00028 U | 0.00061 U | 0.00036 J | 0.00043 U | 0.00100 U | 0.00022 U | 0.00045 U | 0.00032 U | 0.00030 U |
| | 1/12/2010 | Round 23 (PDB) | 0.00029 U | 0.00033 U | 0.01570 | 0.00034 U | 0.00025 U | 0.00050 U | 0.00032 U | 0.00022 J | 0.00200 U | 0.00044 U | 0.00034 U | 0.00024 U | 0.00028 U |
| | 7/14/2010 | Round 24 (PDB) | 0.00029 U | 0.00033 U | 0.01600 | 0.00034 U | 0.00025 U | 0.00050 U | 0.00032 U | 0.00033 J | 0.00200 U | 0.00044 U | 0.00034 U | 0.00024 U | 0.00028 U |
| | 1/11/2011 | Round 25 (PDB) | 0.00023 U | 0.00020 U | 0.00053 J | 0.00025 U | 0.00022 U | 0.00050 U | 0.00026 U | 0.00020 U | 0.00200 U | 0.00025 U | 0.00035 U | 0.00026 U | 0.00022 U |
| | 7/28/2011 | Round 26 | 0.00023 U | 0.00020 U | 0.00020 U | 0.00025 U | 0.00022 U | 0.00050 U | 0.00026 U | 0.00025 J | 0.00200 U | 0.00025 U | 0.00035 U | 0.00026 U | 0.00022 U |
| | 1/10/2012 | Round 27 (PDB) | 0.00023 U | 0.00020 U | 0.00020 U | 0.00025 U | 0.00022 U | 0.00050 U | 0.00026 U | 0.00020 U | 0.0020 U | 0.00025 U | 0.00035 U | 0.00026 U | 0.00022 U |
| | 7/10/2012 | Round 28 | 0.00023 U | 0.00020 U | 0.00020 U | 0.00025 U | 0.00022 U | 0.00050 U | 0.00026 U | 0.00020 U | NS | 0.00025 U | 0.00035 U | 0.00026 U | 0.00022 U |
| | 1/8/2013 | Round 29 (PDB) | 0.00020 U | 0.00022 U | 0.00021 U | 0.00031 U | 0.00026 U | 0.00050 U | 0.00024 U | 0.00029 U | 0.0020 U | 0.00032 U | 0.00023 U | 0.00031 U | 0.00044 U |
| | 7/15/2013 | Round 30 | 0.00020 U | 0.00022 U | 0.00021 U | 0.00031 U | 0.00026 U | 0.00050 U | 0.00024 U | 0.00029 U | 0.0020 U | 0.00032 U | 0.00023 U | 0.00031 U | 0.00044 U |
| | 2/25/2014 | Round 31 (PDB) | 0.00025 U | 0.00024 U | 0.00024 U | 0.0004 U | 0.00031 U | 0.00053 U | 0.00033 U | 0.00028 U | 0.002 U | 0.00026 U | 0.00034 U | 0.0003 U | 0.00033 U |
| | 7/18/2014 | Round 32 | 0.00025 U | 0.00025 U | 0.00025 U | 0.00025 U | 0.00025 U | 0.00025 U | 0.00025 U | 0.00025 U | 0.0005 U | 0.00025 U | 0.00025 U | 0.00025 U | 0.00025 U |
| | 1/23/2015 | Round 33 (PDB) | 0.00025 U | 0.00025 U | 0.00025 U | 0.00025 U | 0.00025 U | 0.00025 U | 0.00025 U | 0.00025 U | NS | 0.00025 U | 0.00025 U | 0.00025 U | 0.00025 U |
| | 7/28/2015 | Round 34 | 0.00025 U | 0.00025 U | 0.00025 U | 0.00025 U | 0.00025 U | 0.00025 U | 0.00025 U | 0.00025 U | NS | 0.00025 U | 0.00025 U | 0.00025 U | 0.00025 U |
| | 1/22/2016 | Round 35 (PDB) | 0.00025 UJ | 0.00025 UJ | 0.00025 U | 0.00025 UJ | 0.00025 UJ | 0.00025 U | 0.00025 UJ | 0.00025 UJ | NA | 0.00025 UJ | 0.00025 U | 0.00025 UJ | 0.00025 U |
| | 7/27/2016 | Round 36 | 0.00025 U | 0.00025 U | 0.00025 U | 0.00025 U | 0.00025 U | 0.00025 U | 0.00025 U | 0.00025 U | 0.0005 U | 0.00025 U | 0.00025 U | 0.00025 U | 0.00025 U |

**Table 4-1A**

**Summary of Chemicals of Concern Detected in Groundwater**
**Long Term Monitoring Wells — SWMU 136 North Plume**
**2016 RAER**
**Former NAS Dallas, Texas**
**Page 2 of 3**

| Monitoring Well | Sampling Date | Sampling Round | Chemicals of Concern (mg/L) | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | 1,1-Dichloroethene | 1,2-Dichloroethane | Benzene | Carbon Tetrachloride | Chloroform | Chloromethane | cis-1,2-Dichloroethene | Ethylbenzene | Methylene Chloride | Tetrachloroethene | trans-1,2-Dichloroethene | Trichloroethene | Vinyl Chloride |
| Protective Concentration Levels (mg/L) | | | 0.00700 | 0.00500 | 0.00500 | 0.00500 | 0.24000 | 0.07000 | 0.07000 | 0.70000 | 0.00500 | 0.00500 | 0.10000 | 0.00500 | 0.00200 |
| 508F54MW | 4/14/2005 | | Well Installed | | | | | | | | | | | | |
| | 4/30/2005 | Round 13 | 0.00050 J | 0.00030 U | 0.00400 | 0.00030 U | 0.00040 U | 0.00030 U | 0.40000 | 0.00020 U | 0.00200 U | 0.00040 U | 0.00600 | 0.83000 | 0.00400 |
| | 4/30/2005 | Round 13 (PDB) | 0.00100 | 0.00030 U | 0.00100 | 0.00030 U | 0.00040 U | 0.00030 U | 0.18000 | 0.00020 U | 0.00200 U | 0.00040 U | 0.00200 | 0.30000 | 0.00300 |
| | 8/2/2005 | Round 13 B | 0.00050 J | 0.00030 U | 0.00200 | 0.00030 U | 0.00040 U | 0.00030 U | 0.15000 | 0.00020 U | 0.00200 U | 0.00040 U | 0.00200 | 0.05100 | 0.01200 |
| | 8/2/2005 | Round 13B (PDB) | 0.00080 J | 0.00030 U | 0.00300 | 0.00030 U | 0.00040 U | 0.00030 U | 0.23000 | 0.00020 U | 0.00200 U | 0.00040 U | 0.00300 | 0.06700 | 0.02600 |
| | 10/18/2005 | Round 14 | 0.00080 J | 0.00030 U | 0.00300 J | 0.00030 U | 0.00040 U | 0.00030 U | 0.16000 J | 0.00020 U | 0.00200 U | 0.00040 U | 0.00200 J | 0.01300 J | 0.02500 J |
| | 10/18/2005 | Round 14 (PDB) | 0.00040 U | 0.00030 U | 0.00300 J | 0.00030 U | 0.00040 U | 0.00030 U | 0.22000 J | 0.00020 U | 0.00200 U | 0.00040 U | 0.00200 J | 0.00800 J | 0.02600 J |
| | 1/31/2006 | Round 15 | 0.00040 J | 0.00030 U | 0.00300 | 0.00030 U | 0.00040 U | 0.00030 U | 0.18000 | 0.00020 U | 0.00200 U | 0.00040 U | 0.00200 | 0.00300 J | 0.03200 J |
| | 8/29/2006 | Round 16 | 0.00060 U | 0.00040 U | 0.00200 | 0.00050 U | 0.00040 U | 0.00060 U | 0.06000 | 0.00030 U | 0.00200 U | 0.00060 U | 0.00100 | 0.00100 | 0.02000 |
| | 8/29/2006 | Round 16 (PDB) | 0.00060 U | 0.00040 U | 0.00300 | 0.00050 U | 0.00040 U | 0.00060 U | 0.09200 | 0.00030 U | 0.00200 U | 0.00060 U | 0.00200 | 0.00080 J | 0.03200 |
| | 5/10/2007 | Round 17 | 0.00028 U | 0.00021 U | 0.00290 | 0.00020 U | 0.00023 U | 0.00017 U | 0.05400 | 0.00013 U | 0.00025 U | 0.00014 U | 0.00110 | 0.00078 J | 0.02000 |
| | 5/10/2007 | Round 17 (PDB) | 0.00028 U | 0.00021 U | 0.00230 | 0.00020 U | 0.00023 U | 0.00017 U | 0.04200 | 0.00013 U | 0.00025 U | 0.00014 U | 0.00120 | 0.00048 J | 0.00900 |
| | 8/31/2007 | Round 18 | 0.00043 J | 0.00013 U | 0.00200 | 0.00011 U | 0.00013 U | 0.00034 U | 0.17000 | 0.00035 U | 0.00023 U | 0.00010 U | 0.00320 | 0.00120 | 0.02400 J |
| | 1/30/2008 | Round 19 | 0.00039 U | 0.00026 U | 0.00220 | 0.00044 U | 0.00036 U | 0.00060 U | 0.02400 | 0.00040 U | 0.00040 U | 0.00046 U | 0.00048 U | 0.00053 U | 0.00980 |
| | 1/30/2008 | Round 19 (PDB) | 0.00039 U | 0.00026 U | 0.00180 | 0.00044 U | 0.00036 U | 0.00060 U | 0.02000 | 0.00040 U | 0.00040 U | 0.00046 U | 0.00048 U | 0.00053 U | 0.00700 |
| | 7/24/2008 | Round 20 | 0.00054 U | 0.00034 U | 0.00130 | 0.00022 U | 0.00028 U | 0.00061 U | 0.01380 | 0.00043 U | 0.00100 U | 0.00022 U | 0.00045 U | 0.00040 J | 0.00350 |
| | 7/24/2008 | Round 20 (PDB) | 0.00054 U | 0.00034 U | 0.00150 | 0.00022 U | 0.00028 U | 0.00061 U | 0.01270 | 0.00043 U | 0.00100 U | 0.00022 U | 0.00045 U | 0.00032 U | 0.00470 |
| | 1/12/2009 | Round 21 | 0.00054 U | 0.00034 U | 0.00130 | 0.00022 U | 0.00028 U | 0.00061 U | 0.00580 | 0.00043 U | 0.00100 U | 0.00022 U | 0.00045 U | 0.00032 U | 0.00480 |
| | 1/12/2009 | Round 21 (PDB) | 0.00054 U | 0.00034 U | 0.00150 | 0.00022 U | 0.00028 U | 0.00061 U | 0.00650 | 0.00043 U | 0.00100 U | 0.00022 U | 0.00045 U | 0.00032 U | 0.00590 |
| | 7/16/2009 | Round 22 | 0.00054 U | 0.00034 U | 0.00058 J | 0.00022 U | 0.00028 U | 0.00061 U | 0.00210 | 0.00043 U | 0.00100 U | 0.00022 U | 0.00045 U | 0.00032 U | 0.00190 |
| | 1/12/2010 | Round 23 | 0.00029 U | 0.00033 U | 0.00110 | 0.00034 U | 0.00025 U | 0.00050 U | 0.00280 | 0.00020 U | 0.00200 U | 0.00044 U | 0.00034 U | 0.00024 U | 0.00280 |
| | 1/12/2010 | Round 23 (PDB) | 0.00029 U | 0.00033 U | 0.00100 | 0.00034 U | 0.00025 U | 0.00050 U | 0.00240 | 0.00020 U | 0.00200 U | 0.00044 U | 0.00034 U | 0.00024 U | 0.00270 |
| | 7/14/2010 | Round 24 | 0.00029 U | 0.00033 U | 0.00087 J | 0.00034 U | 0.00025 U | 0.00050 U | 0.01010 | 0.00020 U | 0.00200 U | 0.00044 U | 0.00034 U | 0.00024 U | 0.00430 |
| | 7/14/2010 | Round 24 (PDB) | 0.00029 U | 0.00033 U | 0.00084 J | 0.00034 U | 0.00025 U | 0.00050 U | 0.00300 | 0.00020 U | 0.00200 U | 0.00044 U | 0.00034 U | 0.00024 U | 0.00310 |
| | 1/11/2011 | Round 25 (PDB) | 0.00023 U | 0.00020 U | 0.00083 J | 0.00025 U | 0.00022 U | 0.00050 U | 0.00065 J | 0.00020 U | 0.00200 U | 0.00025 U | 0.00035 U | 0.00026 U | 0.00100 |
| | 1/11/2011 | Round 25 | 0.00023 U | 0.00020 U | 0.00082 J | 0.00025 U | 0.00022 U | 0.00050 U | 0.00280 | 0.00020 U | 0.00200 U | 0.00025 U | 0.00035 U | 0.00026 U | 0.00450 |
| | 7/28/2011 | Round 26 | 0.00023 U | 0.00020 U | 0.00110 | 0.00025 U | 0.00022 U | 0.00050 U | 0.00650 | 0.00020 U | 0.00200 U | 0.00025 U | 0.00035 U | 0.00026 U | 0.00560 |
| | 1/10/2012 | Round 27 (PDB) | 0.00023 U | 0.00020 U | 0.00041 J | 0.00025 U | 0.00022 U | 0.00050 U | 0.0016 | 0.00020 U | 0.0020 U | 0.00025 U | 0.00035 U | 0.00026 U | 0.0052 |
| | 1/11/2012 | Round 27 | 0.00027 U | 0.00020 U | 0.00057 J | 0.00025 U | 0.00022 U | 0.00050 U | 0.00447 | 0.00020 U | 0.0020 U | 0.00025 U | 0.0011 | 0.00037 J | 0.0151 |
| | 7/10/2012 | Round 28 | 0.00023 U | 0.00020 U | 0.00020 U | 0.00025 U | 0.00022 U | 0.00050 U | 0.00055 J | 0.00020 U | NS | 0.00025 U | 0.00035 U | 0.00026 U | 0.0027 |
| | 1/8/2013 | Round 29 (PDB) | 0.00020 U | 0.00022 U | 0.00021 U | 0.00031 U | 0.00026 U | 0.00050 U | 0.00034 J | 0.00029 U | 0.0020 U | 0.00032 U | 0.00023 U | 0.00031 U | 0.0013 |
| | 1/9/2013 | Round 29 | 0.00020 U | 0.00022 U | 0.00021 U | 0.00031 U | 0.00026 U | 0.00050 U | 0.00077 J | 0.00029 U | 0.0020 U | 0.00032 U | 0.00023 U | 0.00031 U | 0.0014 |
| | 7/15/2013 | Round 30 | 0.00020 U | 0.00022 U | 0.00021 U | 0.00031 U | 0.00026 U | 0.00050 U | 0.00033 J | 0.00029 U | 0.0020 U | 0.00032 U | 0.00023 U | 0.00031 U | 0.00063 J |
| | 2/25/2014 | Round 31 (PDB) | 0.00025 U | 0.00024 U | 0.00024 U | 0.0004 U | 0.00031 U | 0.00053 U | 0.0013 | 0.00028 U | 0.002 U | 0.00026 U | 0.00034 U | 0.0003 U | 0.00091 J |
| | 7/17/2014 | Round 32 | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.003 | 0.0005 U | 0.001 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.00205 |
| | 1/23/2015 | Round 33 | 0.00025 U | 0.00025 U | 0.00025 U | 0.00025 U | 0.00025 U | 0.00025 U | 0.00025 U | 0.00025 U | NS | 0.00025 U | 0.00025 U | 0.00025 U | 0.00025 U |
| | 7/28/2015 | Round 34 | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.00244 | 0.0005 U | NS | 0.0005 U | 0.0005 U | 0.0005 U | 0.000894 J |
| | 1/22/2016 | Round 35 (PDB) | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | NA | 0.0005 U | 0.0005 U | 0.00072 J | 0.0005 U |
| | 7/20/2016 | Round 36 | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0016 J | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U |

**Table 4-1A**

**Summary of Chemicals of Concern Detected in Groundwater**
**Long Term Monitoring Wells — SWMU 136 North Plume**
**2016 RAER**
**Former NAS Dallas, Texas**
**Page 3 of 3**

| Monitoring Well | Sampling Date | Sampling Round | Chemicals of Concern (mg/L) | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | 1,1-Dichloroethene | 1,2-Dichloroethane | Benzene | Carbon Tetrachloride | Chloroform | Chloromethane | cis-1,2-Dichloroethene | Ethylbenzene | Methylene Chloride | Tetrachloroethene | trans-1,2-Dichloroethene | Trichloroethene | Vinyl Chloride |
| **Protective Concentration Levels (mg/L)** | | | **0.00700** | **0.00500** | **0.00500** | **0.00500** | **0.24000** | **0.07000** | **0.07000** | **0.70000** | **0.00500** | **0.00500** | **0.10000** | **0.00500** | **0.00200** |
| **Monitoring Wells Located Outside PCLE Zone** | | | | | | | | | | | | | | | |
| **508F56MW** | 4/14/2005 | Well Installed | | | | | | | | | | | | | |
| | 4/16/2005 | Round 13 | 0.00040 U | 0.00030 U | 0.00300 | 0.00030 U | 0.00040 U | 0.00030 U | 0.00700 | 0.00020 U | 0.00200 U | 0.00040 U | 0.00040 J | 0.00060 J | 0.00600 |
| | 8/4/2005 | Round 13B (PDB) | 0.00040 U | 0.00030 U | 0.00030 U | 0.00030 U | 0.00040 U | 0.00030 U | 0.00200 | 0.00020 U | 0.00200 U | 0.00040 U | 0.00030 U | 0.00030 U | 0.00200 |
| | 10/22/2005 | Round 14 (PDB) | 0.00040 U | 0.00030 U | 0.00030 U | 0.00030 U | 0.00040 U | 0.00030 U | 0.00040 J | 0.00020 U | 0.00200 U | 0.00040 U | 0.00030 U | 0.00030 U | 0.00030 U |
| | 1/31/2006 | Round 15 | 0.00040 U | 0.00030 U | 0.00070 J | 0.00030 U | 0.00040 U | 0.00030 U | 0.00200 | 0.00020 U | 0.00200 U | 0.00040 U | 0.00030 U | 0.00030 U | 0.00200 J |
| | 8/29/2006 | Round 16 (PDB) | 0.00060 U | 0.00040 U | 0.00070 J | 0.00050 U | 0.00040 U | 0.00060 U | 0.00070 J | 0.00030 U | 0.00200 U | 0.00060 U | 0.00060 U | 0.00040 U | 0.00100 J |
| | 5/10/2007 | Round 17 (PDB) | 0.00028 U | 0.00021 U | 0.00220 | 0.00020 U | 0.00023 U | 0.00017 U | 0.00260 | 0.00013 U | 0.00042 U | 0.00014 U | 0.00053 U | 0.00014 U | 0.00170 J |
| | 8/30/2007 | Round 18 | 0.00013 U | 0.00013 U | 0.00130 | 0.00011 U | 0.00013 U | 0.00028 U | 0.00170 | 0.00035 U | 0.00023 U | 0.00010 U | 0.00015 U | 0.00023 U | 0.00180 J |
| | 2/1/2008 | Round 19 (PDB) | 0.00039 U | 0.00026 U | 0.00039 U | 0.00044 U | 0.00036 U | 0.00060 U | 0.00069 J | 0.00040 U | 0.00040 U | 0.00046 U | 0.00048 U | 0.00053 U | 0.00043 U |
| | 7/24/2008 | Round 20 (PDB) | 0.00054 U | 0.00034 U | 0.00040 U | 0.00022 U | 0.00028 U | 0.00061 U | 0.00120 | 0.00043 U | 0.00100 U | 0.00022 U | 0.00045 U | 0.00032 U | 0.00056 J |
| | 1/12/2009 | Round 21 (PDB) | 0.00054 U | 0.00034 U | 0.00040 U | 0.00022 U | 0.00028 U | 0.00061 U | 0.00049 J | 0.00043 U | 0.00100 U | 0.00022 U | 0.00045 U | 0.00032 U | 0.00030 U |
| | 7/16/2009 | Round 22 | 0.00054 U | 0.00034 U | 0.00040 U | 0.00022 U | 0.00031 J | 0.00061 U | 0.00034 J | 0.00043 U | 0.00100 U | 0.00022 U | 0.00045 U | 0.00032 U | 0.00030 U |
| | 1/12/2010 | Round 23 (PDB) | 0.00029 U | 0.00033 U | 0.00021 U | 0.00034 U | 0.00025 U | 0.00050 U | 0.00032 U | 0.00020 U | 0.00200 U | 0.00044 U | 0.00034 U | 0.00024 U | 0.00028 U |
| | 7/14/2010 | Round 24 (PDB) | 0.00029 U | 0.00033 U | 0.00021 U | 0.00034 U | 0.00025 U | 0.00050 U | 0.00038 J | 0.00020 U | 0.00200 U | 0.00044 U | 0.00034 U | 0.00024 U | 0.00028 U |
| | 1/11/2011 | Round 25 (PDB) | 0.00023 U | 0.00020 U | 0.00020 U | 0.00025 U | 0.00022 U | 0.00050 U | 0.00033 J | 0.00020 U | 0.00200 U | 0.00025 U | 0.00035 U | 0.00026 U | 0.00022 U |
| | 7/28/2011 | Round 26 | 0.00023 U | 0.00020 U | 0.00020 U | 0.00025 U | 0.00065 J | 0.00050 U | 0.00026 U | 0.00020 U | 0.00200 U | 0.00025 U | 0.00035 U | 0.00026 U | 0.00022 U |
| | 1/10/2012 | Round 27 (PDB) | 0.00023 U | 0.00020 U | 0.00020 U | 0.00025 U | 0.00022 U | 0.00050 U | 0.00026 U | 0.00020 U | 0.0020 U | 0.00025 U | 0.00035 U | 0.00026 U | 0.00027 J |
| | 7/10/2012 | Round 28 | 0.00023 U | 0.00020 U | 0.00020 U | 0.00025 U | 0.00022 U | 0.00050 U | 0.00026 U | 0.00020 U | NS | 0.00025 U | 0.00035 U | 0.00026 U | 0.00022 U |
| | 1/8/2013 | Round 29 (PDB) | 0.00020 U | 0.00022 U | 0.00021 U | 0.00031 U | 0.00026 U | 0.00050 U | 0.00024 U | 0.00029 U | 0.0020 U | 0.00032 U | 0.00023 U | 0.00031 U | 0.00044 U |
| | 7/15/2013 | Round 30 | 0.00020 U | 0.00022 U | 0.00021 U | 0.00031 U | 0.00026 U | 0.00050 U | 0.00024 U | 0.00029 U | 0.0020 U | 0.00032 U | 0.00023 U | 0.00031 U | 0.00044 U |
| | 2/25/2014 | Round 31 (PDB) | 0.00025 U | 0.00024 U | 0.00024 U | 0.0004 U | 0.00031 U | 0.00053 U | 0.00033 U | 0.00028 U | 0.002 U | 0.00026 U | 0.00034 U | 0.0003 U | 0.00033 U |
| | 7/17/2014 | Round 32 | 0.00025 U | 0.00025 U | 0.00025 U | 0.00025 U | 0.00025 U | 0.00025 U | 0.00025 U | 0.00025 U | 0.0005 U | 0.00025 U | 0.00025 U | 0.00025 U | 0.00025 U |
| | 1/23/2015 | Round 33 (PDB) | 0.00025 U | 0.00025 U | 0.00025 U | 0.00025 U | 0.00025 U | 0.00025 U | 0.00025 U | 0.00025 U | NS | 0.00025 U | 0.00025 U | 0.00025 U | 0.00025 U |
| | 7/28/2015 | Round 34 | 0.00025 U | 0.00025 U | 0.00025 U | 0.00025 U | 0.00025 U | 0.00025 U | 0.00025 U | 0.00025 U | NS | 0.00025 U | 0.00025 U | 0.00025 U | 0.00025 U |
| | 1/22/2016 | Round 35 (PDB) | 0.0005 U | 0.0005 UJ | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | NA | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U |
| | 7/20/2016 | Round 36 | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.00158 J | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U |

Note:
mg/L - milligrams per liter
NA - Not Applicable
NS - Not Sampled
NS-D - Not Sampled during this round due to insufficient water in the monitoring wel
PDB - Passive Diffusion Bag
SDG - Sample Delivery Group
PCLE - Protective Concentration Level Exceedance
Shaded areas indicate an exceedance.

Analytical Result Qualifiers:
J - Indicates that the chemical was detected. However, the associated numerical result may not be a precise representation of the amount that is actually present in the sample. The laboratory reported concentration is considered to be an estimate of the true concentration.

U - Indicates that the chemical was not detected at the numerical detection limit (sample-specific quantitation limit) noted. Nondetected results from the laboratory are reported in this manner. This qualifier is added to a positive result (reported by the laboratory) if the detected concentration is determined to be attributable to contamination introduced during field sampling or laboratory analysis.
UJ - Indicates that the chemical was not detected. However, the detection limit (sample-specific quantitation limit) is considered to be estimated based on problems encountered during laboratory analysis. The associated numerical detection limit is regarded as inaccurate or imprecise.

**Table 4-1B**

**Summary of Chemicals of Concern Detected in Groundwater**
**Historical Monitoring Wells — SWMU 136 North Plume**
**2016 RAER**
**Fromer NAS Dallas, Texas**
**Page 1 of 3**

| detected in groundwater, | Sampling Date | Chemicals of Concern (mg/L) | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 1,1-Dichloroethene | 1,2-Dichloroethane | Benzene | Carbon Tetrachloride | Chloroform | Chloromethane | cis-1,2-Dichloroethene | Ethylbenzene | Methylene Chloride | Tetrachloroethene | trans-1,2-Dichloroethene | Trichloroethene | Vinyl Chloride |
| Protective Concentration Leve | | 0.00700 | 0.00500 | 0.00500 | 0.00500 | 0.24000 | 0.07000 | 0.07000 | 0.70000 | 0.00500 | 0.00500 | 0.10000 | 0.00500 | 0.00200 |
| Monitoring Wells Located Inside PCLE Zone | | | | | | | | | | | | | | |
| 50801MW | 10/25/1995 | 0.00500 U | 0.00500 U | 0.11000 | 0.00500 U | 0.00500 U | 0.01000 U | NA | 0.00730 | 0.00500 U | 0.00500 U | NA | 0.12000 | 0.00560 J |
| | 1/29/1996 | 0.05000 U | 0.05000 U | 0.19000 | 0.05000 U | 0.05000 U | 0.10000 U | NA | 0.02500 | 0.05000 U | 0.05000 U | NA | 1.10000 | 0.10000 U |
| | 4/26/1996 | 0.00500 U | 0.00500 U | 0.13000 | 0.00500 U | 0.00500 U | 0.01000 U | NA | 0.00500 U | 0.00500 U | 0.00140 J | NA | 1.00000 | 0.02100 |
| | 7/21/1996 | 0.00820 | 0.00500 U | 0.06700 | 0.00500 U | 0.00500 U | 0.01000 U | NA | 0.00500 U | 0.00500 U | 0.00500 U | NA | 5.70000 | 0.05200 |
| | 10/6/1996 | 0.00085 J | 0.00500 U | 0.26000 | 0.00067 J | 0.00500 U | 0.01000 U | NA | 0.01400 | 0.00500 U | 0.00500 U | NA | 0.03900 | 0.01700 |
| | 4/2/1998 | 0.01000 U | 0.01000 U | 0.20000 | 0.01000 U | 0.01000 U | 0.01000 U | 0.09800 | 0.01000 U | 0.01000 U | 0.01000 U | 0.00600 J | 0.05800 | 0.02300 |
| | 9/12/1998 | 0.05000 U | 0.05000 U | 0.27000 | 0.05000 U | 0.05000 U | 0.05000 U | 0.06200 | 0.01100 J | 0.00500 U | 0.05000 U | 0.00550 J | 0.02500 J | 0.00910 J |
| | 3/27/1999 | 0.00830 U | 0.00830 U | 0.28000 | 0.00830 U | 0.00830 U | 0.00830 U | 0.13000 | 0.00180 J | 0.00830 U | 0.00830 U | 0.00830 U | 0.03000 | 0.02400 |
| | 9/9/1999 | 0.06200 U | 0.06200 U | 0.36000 | 0.06200 U | 0.06200 U | 0.06200 U | 0.03500 J | 0.02700 J | 0.06200 U | 0.06200 U | 0.06200 U | 0.05900 J | 0.06200 U |
| | 6/22/2000 | 0.01000 U | 0.01000 U | 0.25000 | 0.01000 U | 0.01000 U | 0.01000 U | 0.03600 | 0.00800 J | 0.01000 U | 0.01000 U | 0.00580 J | 0.00630 J | 0.01800 |
| | 6/25/2001 | 0.01000 U | 0.01000 U | 0.29000 | 0.01000 U | 0.01000 U | 0.02000 U | 0.08700 | 0.01000 U | 0.00500 U | 0.01000 U | 0.00560 | 0.00360 J | 0.01600 J |
| | 6/25/2001 | 0.01000 U | 0.01000 U | 0.27000 | 0.01000 U | 0.01000 U | 0.02000 U | 0.10000 | 0.01000 U | 0.00500 U | 0.01000 U | 0.00540 | 0.00520 J | 0.01500 J |
| | 1/24/2003 | 0.00400 U | 0.00400 U | 0.11000 | 0.00400 U | 0.00400 U | 0.00400 U | 0.06100 | NA | 0.00800 U | 0.00400 U | 0.00440 | 0.02200 | 0.00520 |
| | 6/3/2003 | Well Abandoned | | | | | | | | | | | | |
| 50808MW | 1/9/1997 | 0.00500 U | 0.00500 U | 0.00250 J | 0.00500 U | 0.00170 J | 0.01000 U | NA | 0.00320 J | 0.00140 J | 0.00500 U | NA | 0.00500 U | 0.01000 U |
| | 5/18/1998 | 0.00500 U | 0.00500 U | 0.00057 J | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U |
| | 9/13/1998 | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U |
| | 3/27/1999 | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U |
| | 10/6/1999 | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U |
| | 6/22/2000 | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U |
| | 6/11/2001 | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.01000 U | 0.00250 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00250 U | 0.00500 U | 0.01000 U |
| | 1/14/2003 | 0.00100 U | 0.00100 U | 0.00100 U | 0.00100 U | 0.00100 U | 0.00100 U | 0.00100 U | NA | 0.00200 U | 0.00100 U | 0.00100 U | 0.00100 U | 0.00100 U |
| | 6/3/2003 | Well Abandoned | | | | | | | | | | | | |

**Table 4-1B**

**Summary of Chemicals of Concern Detected in Groundwater**
**Historical Monitoring Wells — SWMU 136 North Plume**
**2016 RAER**
**Fromer NAS Dallas, Texas**
**Page 2 of 3**

| detected in groundwater, | Sampling Date | Chemicals of Concern (mg/L) | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 1,1-Dichloroethene | 1,2-Dichloroethane | Benzene | Carbon Tetrachloride | Chloroform | Chloromethane | cis-1,2-Dichloroethene | Ethylbenzene | Methylene Chloride | Tetrachloroethene | trans-1,2-Dichloroethene | Trichloroethene | Vinyl Chloride |
| Protective Concentration Leve | | 0.00700 | 0.00500 | 0.00500 | 0.00500 | 0.24000 | 0.07000 | 0.07000 | 0.70000 | 0.00500 | 0.00500 | 0.10000 | 0.00500 | 0.00200 |
| Monitoring Wells Located Outside PCLE Zone | | | | | | | | | | | | | | |
| 508F09MW | 4/2/1998 | Well Installed | | | | | | | | | | | | |
| | 5/3/1998 | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U |
| | 8/29/1998 | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U |
| | -- | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS |
| | 10/5/1999 | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U |
| | 6/26/2000 | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U |
| | 6/11/2001 | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.01000 U | 0.00250 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00250 U | 0.00500 U | 0.01000 U |
| | -- | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS |
| | -- | Well Destroyed | | | | | | | | | | | | |
| 508F21MW | 3/31/1998 | Well Installed | | | | | | | | | | | | |
| | 5/3/1998 | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U |
| | 8/29/1998 | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U |
| | -- | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS |
| | 10/6/1999 | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U |
| | 6/22/2000 | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U |
| | 6/11/2001 | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.01000 U | 0.00250 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00250 U | 0.00500 U | 0.01000 U |
| | 1/9/2003 | 0.00100 U | 0.00100 U | 0.00100 U | 0.00100 U | 0.00100 U | 0.00100 U | 0.00100 U | NA | 0.00200 U | 0.00100 U | 0.00100 U | 0.00100 U | 0.00100 U |
| | -- | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS |
| | -- | Well Destroyed | | | | | | | | | | | | |
| 508F55MW | 4/13/2005 | Well Installed | | | | | | | | | | | | |
| | 4/15/2005 | 0.00040 U | 0.00030 U | 0.00030 U | 0.00030 U | 0.00040 U | 0.00030 U | 0.00090 J | 0.00020 U | 0.00200 U | 0.00040 U | 0.00030 U | 0.00080 J | 0.00030 U |
| | 8/4/2005 | 0.00040 U | 0.00030 U | 0.00030 U | 0.00030 U | 0.00040 U | 0.00030 U | 0.00030 U | 0.00020 U | 0.00200 U | 0.00040 U | 0.00030 U | 0.00030 U | 0.00030 U |
| | 10/21/2005 | 0.00040 U | 0.00030 U | 0.00030 U | 0.00030 U | 0.00040 U | 0.00030 U | 0.00030 U | 0.00020 U | 0.00200 U | 0.00040 U | 0.00030 U | 0.00030 U | 0.00030 U |
| | 1/31/2006 | 0.00040 U | 0.00030 U | 0.00030 U | 0.00030 U | 0.00040 U | 0.00030 U | 0.00030 U | 0.00020 U | 0.00200 U | 0.00040 U | 0.00030 U | 0.00030 U | 0.00030 U |
| | 8/26/2006 | 0.00060 U | 0.00040 U | 0.00100 UJ | 0.00100 UJ | 0.00040 U | 0.00060 U | 0.00100 UJ | 0.00030 U | 0.00200 U | 0.00060 U | 0.00060 U | 0.00040 U | 0.00060 U |
| | 5/10/2007 | 0.00110 U | 0.00084 U | 0.00052 U | 0.00080 U | 0.00092 U | 0.00068 U | 0.00180 U | 0.00052 U | 0.00210 U | 0.00056 U | 0.00210 U | 0.00056 U | 0.00048 U |
| | 8/30/2007 | 0.00013 U | 0.00013 U | 0.00110 | 0.00011 U | 0.00013 U | 0.00028 U | 0.00021 J | 0.00035 U | 0.00023 U | 0.00010 U | 0.00015 U | 0.00023 U | 0.00054 J |
| | 2/1/2008 | 0.00039 U | 0.00026 U | 0.00039 U | 0.00044 U | 0.00036 U | 0.00060 U | 0.00032 U | 0.00040 U | 0.00048 J | 0.00046 U | 0.00048 U | 0.00053 U | 0.00043 U |
| | 7/24/2008 | 0.00054 U | 0.00034 U | 0.00040 U | 0.00022 U | 0.00028 U | 0.00061 U | 0.00020 U | 0.00043 U | 0.00100 U | 0.00022 U | 0.00045 U | 0.00032 U | 0.00030 U |
| | 1/12/2009 | 0.00054 U | 0.00034 U | 0.00040 U | 0.00022 U | 0.00028 U | 0.00061 U | 0.00020 U | 0.00043 U | 0.00100 U | 0.00022 U | 0.00045 U | 0.00032 U | 0.00030 U |
| | 7/16/2009 | 0.00054 U | 0.00034 U | 0.00400 | 0.00022 U | 0.00028 U | 0.00061 U | 0.00020 U | 0.00043 U | 0.00100 U | 0.00022 U | 0.00045 U | 0.00032 U | 0.00030 U |
| | 1/12/2010 | 0.00029 U | 0.00033 U | 0.00021 U | 0.00034 U | 0.00025 U | 0.00050 U | 0.00032 U | 0.00020 U | 0.00200 U | 0.00044 U | 0.00034 U | 0.00024 U | 0.00028 U |
| | 7/14/2010 | 0.00029 U | 0.00033 U | 0.00021 U | 0.00034 U | 0.00025 U | 0.00050 U | 0.00032 U | 0.00020 U | 0.00200 U | 0.00044 U | 0.00034 U | 0.00024 U | 0.00028 U |
| | 1/11/2011 | 0.00023 U | 0.00020 U | 0.00020 U | 0.00025 U | 0.00022 U | 0.00050 U | 0.00026 U | 0.00020 U | 0.00200 U | 0.00025 U | 0.00035 U | 0.00026 U | 0.00022 U |
| | 7/28/2011 | 0.00023 U | 0.00020 U | 0.00020 U | 0.00025 U | 0.00022 U | 0.00050 U | 0.00026 U | 0.00020 U | 0.00200 U | 0.00025 U | 0.00035 U | 0.00034 J | 0.00022 U |
| | 1/10/2012 | 0.00023 U | 0.00020 U | 0.00020 U | 0.00025 U | 0.00022 U | 0.00050 U | 0.00026 U | 0.00020 U | 0.0020 U | 0.00025 U | 0.00035 U | 0.00026 U | 0.00022 U |
| | 7/10/2012 | 0.00023 U | 0.00020 U | 0.00020 U | 0.00025 U | 0.00022 U | 0.00050 U | 0.00026 U | 0.00020 U | NS | 0.00025 U | 0.00035 U | 0.00026 U | 0.00022 U |
| | 1/8/2013 | 0.00020 U | 0.00022 U | 0.00021 U | 0.00031 U | 0.00026 U | 0.00050 U | 0.00024 U | 0.00029 U | 0.0020 U | 0.00032 U | 0.00023 U | 0.00031 U | 0.00044 U |
| | 7/15/2013 | 0.00020 U | 0.00022 U | 0.00021 U | 0.00031 U | 0.00026 U | 0.00050 U | 0.00024 U | 0.00029 U | 0.0020 U | 0.00032 U | 0.00023 U | 0.00031 U | 0.00044 U |
| | 2/25/2014 | 0.00025 U | 0.00024 U | 0.00024 U | 0.0004 U | 0.00031 U | 0.00053 U | 0.00033 U | 0.00028 U | 0.002 U | 0.00026 U | 0.00034 U | 0.0003 U | 0.00033 U |
| | 7/18/2014 | 0.00025 U | 0.00025 U | 0.00025 U | 0.00025 U | 0.00025 U | 0.00025 U | 0.00025 U | 0.00025 U | 0.0005 U | 0.00025 U | 0.00025 U | 0.00025 U | 0.00025 U |
| | 1/23/2015 | 0.00025 U | 0.00025 U | 0.00025 U | 0.00025 U | 0.00025 U | 0.00025 U | 0.00025 U | 0.00025 U | NS | 0.00025 U | 0.00025 U | 0.00025 U | 0.00025 U |
| | 7/28/2015 | 0.00025 U | 0.00025 U | 0.00025 U | 0.00025 U | 0.00025 U | 0.00025 U | 0.00025 U | 0.00025 U | NS | 0.00025 U | 0.00025 U | 0.00025 U | 0.00025 U |
| | 1/23/2016 | Well Abandoned | | | | | | | | | | | | |

**Table 4-1B**

**Summary of Chemicals of Concern Detected in Groundwater**
**Historical Monitoring Wells — SWMU 136 North Plume**
**2016 RAER**
**Fromer NAS Dallas, Texas**
**Page 3 of 3**

| detected in groundwater, | Sampling Date | Chemicals of Concern (mg/L) | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 1,1-Dichloroethene | 1,2-Dichloroethane | Benzene | Carbon Tetrachloride | Chloroform | Chloromethane | cis-1,2-Dichloroethene | Ethylbenzene | Methylene Chloride | Tetrachloroethene | trans-1,2-Dichloroethene | Trichloroethene | Vinyl Chloride |
| **Protective Concentration Leve** | | **0.00700** | **0.00500** | **0.00500** | **0.00500** | **0.24000** | **0.07000** | **0.07000** | **0.70000** | **0.00500** | **0.00500** | **0.10000** | **0.00500** | **0.00200** |
| **60-20** | 8/11/1992 | NA | NA | 0.00100 U | NA | NA | NA | NA | 0.00100 U | NA | NA | NA | NA | NA |
| | 6/16/1994 | NA | NA | 0.00100 U | NA | NA | NA | NA | 0.00100 U | NA | NA | NA | NA | NA |
| | 12/7/1994 | NA | NA | 0.00100 U | NA | NA | NA | NA | 0.00100 U | NA | NA | NA | NA | NA |
| | 1/10/1995 | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.01000 U | NA | 0.00500 U | 0.00500 U | 0.00500 U | NA | 0.00500 U | 0.01000 U |
| | 6/13/1995 | NA | NA | 0.00100 U | NA | NA | NA | NA | 0.00100 U | NA | NA | NA | NA | NA |
| | 7/13/1995 | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.01000 U | 0.00500 U | 0.00500 U | 0.01000 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.01000 U |
| | 1/23/1996 | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.01000 U | NA | 0.00500 U | 0.00500 U | 0.00500 U | NA | 0.00500 U | 0.01000 U |
| | 5/10/1996 | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.01000 U | NA | 0.00500 U | 0.00500 U | 0.00500 U | NA | 0.00500 U | 0.01000 U |
| | 7/16/1996 | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.01000 U | NA | 0.00500 U | 0.00500 U | 0.00500 U | NA | 0.00500 U | 0.01000 U |
| | 10/2/1996 | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.01000 U | NA | 0.00500 U | 0.00500 U | 0.00500 U | NA | 0.00500 U | 0.01000 U |
| | 5/18/1998 | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U |
| | -- | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS |
| | -- | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS |
| | 9/24/1999 | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U |
| | 7/6/2000 | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U |
| | 7/9/2001 | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.01000 U | 0.00250 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00250 U | 0.00500 U | 0.01000 U |
| | 1/8/2003 | 0.00100 U | 0.00100 U | 0.00100 U | 0.00100 U | 0.00100 U | 0.00100 U | 0.00100 U | NA | 0.00200 U | 0.00100 U | 0.00100 U | 0.00100 U | 0.00100 U |
| | -- | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS |
| | 12/17/2003 | 0.00021 U | 0.00009 U | 0.00011 U | 0.00020 U | 0.00014 U | 0.00008 U | 0.00330 | 0.00011 U | 0.00016 U | 0.00024 U | 0.00019 U | 0.00010 U | 0.00180 |
| | -- | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS |
| | 10/15/2004 | 0.00035 U | 0.00010 U | 0.00041 J | 0.00025 U | 0.00010 U | 0.00017 U | 0.00027 U | 0.00017 U | 0.00040 U | 0.00021 U | 0.00023 U | 0.00022 U | 0.00017 U |
| | 4/18/2005 | Well Abandoned | | | | | | | | | | | | |

mg/L - milligrams per liter
NA - Not Applicable
NS - Not Sampled
PDB - Passive Diffusion Bag
SDG - Sample Delivery Group
PCLE - Protective Concentration Level Exceedance

Note:
Shaded areas indicate an exceedance.

Analytical Result Qualifiers:
J - Indicates that the chemical was detected. However, the associated numerical result may not be a precise representation of the amount that is actually present in the sample. The laboratory reported concentration is considered to be an estimate of the true concentration.
U - Indicates that the chemical was not detected at the numerical detection limit (sample-specific quantitation limit) noted. Nondetected results from the laboratory are reported in this manner. This qualifier is added to a positive result (reported by the laboratory) if the detected concentration is determined to be attributable to contamination introduced during field sampling or laboratory analysis.
UJ - Indicates that the chemical was not detected. However, the detection limit (sample-specific quantitation limit) is considered to be estimated based on problems encountered during laboratory analysis. The associated numerical detection limit is regarded as inaccurate or imprecise.

# TABLE 4-2
# SUMMARY OF GEOCHEMICAL PARAMETERS MEASURED IN GROUNDWATER

**Table 4-2A**

**Summary of Groundwater Gauging Data**
**Long Term Monitoring Wells — SWMU 136 North Plume**
**2016 RAER**
**Former NAS Dallas, Texas**
**Page 1 of 2**

| Monitoring Well | Top of Casing [1] (ft msl) | Screened Interval (ft msl) | Date | Depth to Water [2] (ft bgs) | Groundwater Elevation (ft msl) |
|---|---|---|---|---|---|
| **Monitoring Wells Located Inside PCLE Zone** | | | | | |
| 508F22MW | 465.62 | 449.07 to 439.07 | 7/12/1999 | Well Installed | |
| | | | 9/1/1999 | 11.66 | 453.96 |
| | | | 6/1/2000 | 9.76 | 455.86 |
| | | | 6/1/2001 | 10.62 | 455.00 |
| | | | 12/2/2002 | 8.57 | 457.05 |
| | | | 8/1/2003 | 10.40 | 455.22 |
| | | | 12/23/2003 | 11.15 | 454.47 |
| | | | 7/4/2004 | 8.65 | 456.97 |
| | | | 9/28/2004 | 11.09 | 454.53 |
| | 465.70 | 449.15 to 439.15 | 4/17/2005 | 10.09 | 455.61 |
| | | | 7/21/2005 | 11.27 | 454.43 |
| | | | 10/2/2005 | 11.45 | 454.25 |
| | | | 1/22/2006 | 13.39 | 452.31 |
| | | | 5/2/2006 | 10.89 | 454.81 |
| | | | 8/9/2006 | 12.41 | 453.29 |
| | | | 4/25/2007 | 10.42 | 455.28 |
| | | | 8/24/2007 | 10.74 | 454.96 |
| | | | 1/15/2008 | 11.66 | 454.04 |
| | | | 7/10/2008 | 11.68 | 454.02 |
| | | | 12/18/2008 | 12.58 | 453.12 |
| | | | 7/15/2009 | 12.11 | 453.59 |
| | 465.61 | 449.06 to 439.06 | 12/15/2009 | 10.11 | 455.50 |
| | | | 8/9/2010 | 10.91 | 454.70 |
| | | | 12/17/2010 | 11.87 | 453.74 |
| | | | 7/25/2011 | 10.82 | 454.79 |
| | | | 12/14/2011 | 10.75 | 454.86 |
| | | | 7/10/2012 | 12.02 | 453.59 |
| | | | 12/19/2012 | 13.08 | 452.53 |
| | | | 7/15/2013 | 12.43 | 453.18 |
| | | | 12/18/2013 | 11.55 | 454.06 |
| | | | 7/15/2014 | 12.68 | 452.93 |
| | | | 12/17/2014 | 12.86 | 452.75 |
| | | | 7/20/2015 | 11.62 | 453.99 |
| | | | 12/17/2015 | 10.7 | 454.91 |
| | | | 7/18/2016 | 7.64 | 457.97 |
| 508F54MW | 468.36 | 456.74 to 446.74 | 4/14/2005 | Well Installed | |
| | | | 4/17/2005 | 22.00 | 446.36 |
| | | | 7/18/2005 | 9.73 | 458.63 |
| | | | 10/3/2005 | 9.71 | 458.65 |
| | | | 1/17/2006 | 11.15 | 457.21 |
| | 464.76 | 453.13 to 443.13 | 5/2/2006 | 8.88 | 455.88 |
| | | | 8/9/2006 | 7.02 | 457.74 |
| | | | 4/25/2007 | 6.35 | 458.41 |
| | | | 8/22/2007 | 5.45 | 459.31 |
| | | | 1/15/2008 | 7.82 | 456.94 |
| | | | 7/10/2008 | 6.25 | 458.51 |
| | | | 12/19/2008 | 5.98 | 458.78 |
| | | | 7/15/2009 | 6.41 | 458.35 |
| | 464.73 | 453.10 to 443.10 | 12/15/2009 | 6.30 | 458.43 |
| | | | 8/9/2010 | 6.29 | 458.44 |
| | | | 12/17/2010 | 7.10 | 457.63 |
| | | | 7/25/2011 | 7.04 | 457.69 |
| | | | 12/14/2011 | 6.85 | 457.88 |
| | | | 7/10/2012 | 6.19 | 458.54 |
| | | | 12/19/2012 | 7.66 | 457.07 |
| | | | 7/15/2013 | 7.73 | 457.00 |
| | | | 12/18/2013 | 7.25 | 457.48 |
| | | | 7/15/2014 | 8.6 | 456.13 |
| | | | 12/17/2014 | 7.75 | 456.98 |
| | | | 7/20/2015 | 6.88 | 457.85 |
| | | | 12/17/2015 | 6.28 | 458.45 |
| | | | 7/18/2016 | 6.52 | 458.21 |

**Table 4-2A**

**Summary of Groundwater Gauging Data**
**Long Term Monitoring Wells — SWMU 136 North Plume**
**2016 RAER**
**Former NAS Dallas, Texas**
**Page 2 of 2**

| Monitoring Well | Top of Casing [1] (ft msl) | Screened Interval (ft msl) | Date | Depth to Water [2] (ft bgs) | Groundwater Elevation (ft msl) |
|---|---|---|---|---|---|
| **Monitoring Wells Located Outside PCLE Zone** | | | | | |
| **508F56MW** | 466.68 | 454.05 to 444.05 | 4/14/2005 | Well Installed | |
| | | | 4/17/2005 | 8.35 | 458.33 |
| | | | 7/21/2005 | 12.46 | 454.22 |
| | | | 10/4/2005 | 12.61 | 454.07 |
| | | | 1/17/2006 | 14.44 | 452.24 |
| | | | 5/2/2006 | 12.07 | 454.61 |
| | | | 8/9/2006 | 13.73 | 452.95 |
| | | | 4/25/2007 | 11.65 | 455.03 |
| | | | 8/22/2007 | 11.91 | 454.77 |
| | | | 1/15/2008 | 12.83 | 453.85 |
| | | | 7/10/2008 | 17.53 | 449.15 |
| | | | 12/19/2008 | 13.72 | 452.96 |
| | | | 7/15/2009 | 13.54 | 453.14 |
| | 466.72 | 454.09 to 444.09 | 12/15/2009 | 11.29 | 455.43 |
| | | | 8/9/2010 | 12.06 | 454.66 |
| | | | 12/17/2010 | 12.90 | 453.82 |
| | | | 7/25/2011 | 11.77 | 454.95 |
| | | | 12/14/2011 | 11.81 | 454.91 |
| | | | 7/10/2012 | 12.98 | 453.74 |
| | | | 12/19/2012 | 14.00 | 452.72 |
| | | | 7/15/2013 | 13.42 | 453.30 |
| | | | 12/18/2013 | 12.57 | 454.15 |
| | | | 7/15/2014 | 13.73 | 452.99 |
| | | | 12/17/2014 | 13.88 | 452.84 |
| | | | 7/20/2015 | 13.28 | 452.33 |
| | | | 12/17/2015 | 11.71 | 455.01 |
| | | | 7/18/2016 | 12.73 | 452.88 |

bgs - below ground surface
NA - Not Available or Applicable (i.e., abandoned, not installed, not measured)
ft - feet
msl - mean sea level
PCLE - Protective Concentration Level Exceedance

Notes:
1 - All monitoring wells on-site were resurveyed in May 2005 and September 2010 in accordance with the Compliance Plan Requirements.
2 - Depth to water measurements taken from the top of the riser.

**Table 4-2B**

**Summary of Groundwater Gauging Data**
**Historical Monitoring Wells — SWMU 136 North Plume**
**2016 RAER**
**Former NAS Dallas, Texas**
**Page 1 of 2**

| Monitoring Well | Top of Casing [1] (ft msl) | Screened Interval (ft msl) | Date | Depth to Water [2] (ft bgs) | Groundwater Elevation (ft msl) |
|---|---|---|---|---|---|
| **Monitoring Wells Located Inside PCLE Zone** | | | | | |
| **50801MW** | 464.72 | 455.82 to 445.82 | 10/9/1995 | Well Installed | |
| | | | 2/1/1998 | 8.44 | 456.28 |
| | | | 5/1/1998 | 8.77 | 455.95 |
| | | | 8/1/1998 | 10.54 | 454.18 |
| | | | 2/1/1999 | 9.42 | 455.30 |
| | | | 9/1/1999 | 10.27 | 454.45 |
| | | | 6/1/2000 | 8.88 | 455.84 |
| | | | 6/1/2001 | 9.58 | 455.14 |
| | | | 12/2/2002 | 6.76 | 457.96 |
| | | | 6/3/2003 | Well Plugged and Abandoned | |
| **50808MW** | 466.80 | 454.50 to 444.50 | 12/17/1996 | Well Installed | |
| | | | 5/1/1998 | 11.46 | 455.34 |
| | | | 8/1/1998 | 13.25 | 453.55 |
| | | | 2/1/1999 | 12.18 | 454.62 |
| | | | 9/1/1999 | 12.82 | 453.98 |
| | | | 6/1/2000 | 11.08 | 455.72 |
| | | | 6/1/2001 | 11.91 | 454.89 |
| | | | 12/2/2002 | 10.33 | 456.47 |
| | | | 6/3/2003 | Well Plugged and Abandoned | |

**Table 4-2B**

**Summary of Groundwater Gauging Data**
**Historical Monitoring Wells — SWMU 136 North Plume**
**2016 RAER**
**Former NAS Dallas, Texas**
**Page 2 of 2**

| Monitoring Well | Top of Casing [1] (ft msl) | Screened Interval (ft msl) | Date | Depth to Water [2] (ft bgs) | Groundwater Elevation (ft msl) |
|---|---|---|---|---|---|
| **Monitoring Wells Located Outside PCLE Zone** | | | | | |
| **60-20** | 471.91 | 451.93 to 441.93 | 2/1/1998 | 4.34 | 467.57 |
| | | | 5/1/1998 | 6.92 | 464.99 |
| | | | 8/1/1998 | 8.80 | 463.11 |
| | | | 2/1/1999 | 6.14 | 465.77 |
| | | | 9/1/1999 | 8.32 | 463.59 |
| | | | 6/1/2000 | 4.68 | 467.23 |
| | | | 6/1/2001 | 6.35 | 465.56 |
| | | | 12/2/2002 | 6.10 | 465.81 |
| | | | 8/1/2003 | 8.52 | 463.39 |
| | | | 12/23/2003 | 8.42 | 463.49 |
| | | | 7/4/2004 | 6.39 | 465.52 |
| | | | 9/28/2004 | 8.03 | 463.88 |
| | | | 4/18/2005 | Well Plugged and Abandoned | |
| **508F09MW** | 465.73 | 450.73 to 440.73 | 4/2/1998 | Well Installed | |
| | | | 5/1/1998 | 9.93 | 455.80 |
| | | | 8/1/1998 | 11.90 | 453.83 |
| | | | 2/1/1999 | 10.51 | 455.22 |
| | | | 9/1/1999 | 11.24 | 454.49 |
| | | | 6/1/2000 | 9.69 | 456.04 |
| | | | 6/1/2001 | 10.31 | 455.42 |
| | | | 12/2/2002 | Well Plugged and Abandoned | |
| **508F21MW** | 465.41 | 457.61 to 447.61 | 3/31/1998 | Well Installed | |
| | | | 5/1/1998 | 6.80 | 458.61 |
| | | | 8/1/1998 | 11.14 | 454.27 |
| | | | 2/1/1999 | 10.41 | 455.00 |
| | | | 9/1/1999 | 10.87 | 454.54 |
| | | | 6/1/2000 | 9.92 | 455.49 |
| | | | 6/1/2001 | 10.43 | 454.98 |
| | | | 12/2/2002 | 7.80 | 457.61 |
| | | | 8/1/2003 | 8.97 | 456.44 |
| | | | 1/7/2004 | Well Plugged and Abandoned | |
| **508F55MW** | 463.65 | 463.65 to 463.65 | 4/13/2005 | Well Installed | |
| | | | 4/17/2005 | 8.36 | 455.29 |
| | | | 7/21/2005 | 9.40 | 454.25 |
| | | | 10/4/2005 | 9.82 | 453.83 |
| | | | 1/17/2006 | 11.45 | 452.20 |
| | | | 5/2/2006 | 10.27 | 453.38 |
| | | | 8/9/2006 | 10.51 | 453.14 |
| | | | 4/25/2007 | 9.27 | 454.38 |
| | | | 1/15/2008 | 9.90 | 453.75 |
| | | | 7/10/2008 | 9.93 | 453.72 |
| | | | 12/18/2008 | 10.83 | 452.82 |
| | | | 7/15/2009 | 10.61 | 453.04 |
| | 463.69 | 463.69 to 463.69 | 12/15/2009 | 8.68 | 455.01 |
| | | | 8/9/2010 | 9.34 | 454.35 |
| | | | 12/17/2010 | 10.10 | 453.59 |
| | | | 7/25/2011 | 9.30 | 454.39 |
| | | | 12/14/2011 | 9.09 | 454.60 |
| | | | 7/10/2012 | 10.25 | 453.44 |
| | | | 12/19/2012 | 11.25 | 452.44 |
| | | | 7/15/2013 | 10.76 | 452.93 |
| | | | 12/18/2013 | 9.8 | 453.89 |
| | | | 7/15/2014 | 11.02 | 452.67 |
| | | | 12/17/2014 | 11.43 | 452.26 |
| | | | 7/20/2015 | 9.81 | 453.88 |
| | | | 12/17/2015 | 9.43 | 454.26 |
| | | | 4/7/2016 | Well Plugged and Abandoned | |

bgs - below ground surface
ft - feet
msl - mean sea level
NA - Not Available or Applicable (i.e., abandoned, not installed, not measured)
PCLE - Protective Concentration Level Exceedance

Note:
1 - All monitoring wells on-site were resurveyed in May 2005 in accordance with the Compliance Plan Requirements.
Depth to water measurements taken from the top of the riser.

# TABLE 4-3
# SUMMARY OF GROUNDWATER GAUGING DATA

**Table 4-3A**

**Summary of Geochemical Parameters Measured in Groundwater**
**Long Term Monitoring Wells — SWMU 136 North Plume**
**2016 RAER**
**Former NAS Dallas, Texas**
**Page 1 of 3**

| Monitoring Well | Sampling Date | Sampling Round | SDG | Oxidation-Reduction Conditions | | | | | | | | Degradation Products | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Dissolved Oxygen[2] | Ferrous Iron[2] | Nitrate[3] | Nitrite[3] | ORP[1] | Phosphate[3] | Sulfate[3] | TOC[3] | Alkalinity[2] | Carbon Dioxide[2] | Chloride[3] | Ethane[3] | Ethene[3] | Methane[3] | pH[1] | Sulfide[3] |
| | | | Units | mg/L | mg/L | mg/L | mg/L | mV | mg/L | mg/L | mg/L | mg/L | mg/L | mg/L | ng/L | ng/L | µg/L | S.U. | mg/L |
| **Monitoring Wells Located Inside PCLE Zone** | | | | | | | | | | | | | | | | | | | |
| **508F22MW** | 7/12/1999 | **Well Installed** | | | | | | | | | | | | | | | | | |
| | 8/6/1999 | Round 5 | DL315 | NA | NA | 0.5 U | 0.5 U | NA | 0.50 UJ | 124 | NA | NA | NA | 3.8 J | NA | NA | 1,400 | NA | NA |
| | 8/6/1999 | Round 5 | LGCY | 0.5 | 0.8 | NA | NA | 18.7 | NA | NA | NA | 393 | 173 | NA | NA | NA | NA | 6.96 | 0.00 U |
| | 8/6/1999 | Round 5 | TTE7 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | 31 | 589 | 1,519 | NA | NA |
| | 6/23/2000 | Round 6 | DL342 | NA | NA | 0.1 U | 0.1 U | NA | 0.10 U | 8.1 | NA | NA | NA | 4.6 | NA | NA | NA | NA | NA |
| | 6/23/2000 | Round 6 | LGCY | 0.6 | 3.4 | NA | NA | -112.5 | NA | NA | NA | 275 | 23 | NA | NA | NA | NA | 6.99 | 0.01 U |
| | 6/7/2001 | Round 7 | DL362 | NA | NA | 0.10 U | 0.10 U | NA | 0.50 U | 13.7 | NA | NA | NA | 4.1 | NA | NA | NA | NA | NA |
| | 6/7/2001 | Round 7 | FIELD | 0.8 | 2.4 | NA | NA | -104.7 | NA | NA | NA | 500 | 30 | NA | NA | NA | NA | 6.84 | 0.01 U |
| | 1/14/2003 | Round 8 | 150138 | NA | NA | 0.05 U | 0.05 U | NA | 0.50 U | 38 | NA | NA | NA | 94.2 | NA | NA | NA | NA | NA |
| | 1/14/2003 | Round 8 | FIELD | 0.4 | 3.5 | NA | NA | -130 | NA | NA | NA | 325 | 30 | NA | NA | NA | NA | 7.24 | 0.01 U |
| | 12/17/2003 | Round 10 | C3L180179 | NA | NA | NA | NA | NA | NA | 647 L | NA | NA | NA | 47.8 | NA | NA | NA | NA | NA |
| | 12/17/2003 | Round 10 | FIELD | 0.6 | 3.2 | NA | NA | -104 | NA | NA | NA | 350 | NA | NA | NA | NA | NA | 6.91 | 0.00 |
| | 10/10/2005 | Round 14 | CTO260-18 | NA | NA | NA | NA | NA | 0.00991 U | 1100 | 1.8 | NA | NA | 110.0 | NA | NA | NA | NA | 0.14 U |
| | 10/10/2005 | Round 14 | CTO260-20 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | 20,000 U | 20,000 U | 2,300 | NA | NA |
| | 10/10/2005 | Round 14 | FIELD R14 | 1.5 | 2.8 | NA | NA | -153 | NA | NA | NA | 275 | 42 | NA | NA | NA | NA | 6.74 | NA |
| | 8/31/2007 | Round 18 | DALLASW003 | NA | NA | 0.091 | 1.0 U | NA | 0.50 UL | 214 | 2.7 | NA | NA | 262.0 | 23,000 | 3,500 | 990 | NA | 0.80 UL |
| | 8/31/2007 | Round 18 | FIELD | 2.0 | 1.0 | NA | NA | -131.0 | NA | NA | NA | 300 | 70 | NA | NA | NA | NA | 6.68 | NA |
| | 7/16/2009 | Round 22 | F66710 | 1.0 | 0.0 | 0.05 U | 0.25 UR | -67.6 | 0.026 J | 1720 | 2.6 JL | 300 | 200 | 186.0 | 12,600 | 430 U | 829 | 6.59 | 0.60 UJL |
| | 7/28/2011 | Round 26 | F84701 | 0.4 | 7 | 0.25 R | 0.25 R | -123.1 | 0.049 | 114 | 3 | 400 | 100 | 96 | 4010 | 430 U | 1,500 | 7.01 | 0.3 U |
| | 7/10/2012 | Round 28 | F94831 | NA | NA | NA | NA | -86.6 | NA | NA | NA | NA | NA | NA | NA | NA | NA | 6.72 | NA |
| | 1/8/2013 | Round 29 | FA626 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| | 7/15/2013 | Round 30 | FA6425 | 0.3 | 6 | 0.25 U | 0.25 U | -73.0 | 0.020 U | 356 | 3.1 | 400 | 40 | 72.9 JL | 320 U | 430 U | 1660 | 6.91 | 0.24 J |
| | 1/30/2014 | Round 31 | FA12817 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| | 7/18/2014 | Round 32 | 1407152 | 0.39 | 0.96 | 0.033 U | 0.033 U | -101.4 | 0.01 U | 241 | 2.98 J | NA | 100 | 98.7 | 0.00392 J | 0.001 U | 0.475 | 5.93 | 0.01 |
| | 1/23/2015 | Round 33 | 1501096 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| | 7/28/2015 | Round 34 | 1507213 | 1.67 | 1.3 | 0.033 U | .356 J | -64.2 | 0.01 U | 1940 | 1.66 | 422 | 100 | 93.6 | 0.001 U | 0.001 U | 401 | 6.75 | 0.01 |
| | 1/20/2016 | Round 35 | 1601151 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| | 7/27/2016 | Round 36 | 1607216 | 0 | 2.89 | 0.033 U | 0.033 U | -113 | 0.01 U | 2070 | 1.62 J | 418 | | 76.9 | .001 UJL | .001 UJL | 220 JL | 6.93 | NA |

**Table 4-3A**

**Summary of Geochemical Parameters Measured in Groundwater**
**Long Term Monitoring Wells — SWMU 136 North Plume**
**2016 RAER**
**Former NAS Dallas, Texas**
**Page 2 of 3**

| Monitoring Well | Sampling Date | Sampling Round | SDG | Oxidation-Reduction Conditions | | | | | | | | Degradation Products | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Dissolved Oxygen[2] | Ferrous Iron[2] | Nitrate[3] | Nitrite[3] | ORP[1] | Phosphate[3] | Sulfate[3] | TOC[3] | Alkalinity[2] | Carbon Dioxide[2] | Chloride[3] | Ethane[3] | Ethene[3] | Methane[3] | pH[1] | Sulfide[3] |
| | | | Units | mg/L | mg/L | mg/L | mg/L | mV | mg/L | mg/L | mg/L | mg/L | mg/L | mg/L | ng/L | ng/L | µg/L | S.U. | mg/L |
| 508F54MW | 4/14/2005 | Well Installed | | | | | | | | | | | | | | | | | |
| | 10/18/2005 | Round 14 | CTO260-22 | NA | NA | NA | NA | NA | 0.05 U | 1000 | 10 | NA | NA | 270.0 | 100,000 U | 11,000 J | 3,400 | NA | 1.00 U |
| | 10/18/2005 | Round 14 | FIELD R14 | 0.6 | 4.5 | NA | NA | -107 | NA | NA | NA | 350 | 160 | NA | NA | NA | NA | 6.58 | NA |
| | 8/31/2007 | Round18 | DALLASW003 | NA | NA | 0.05 U | 1.0 U | NA | 0.50 UL | 1500 | 10.6 | NA | NA | 352.0 | 8,600 | 2,100 | 3.0 | NA | 0.80 UL |
| | 8/31/2007 | Round 18 | FIELD | 1.0 | 2.0 | NA | NA | -118.0 | NA | NA | NA | 350 | 80 | NA | NA | NA | NA | 6.61 | NA |
| | 7/16/2009 | Round 22 | F66710 | 0.6 | 10.0 | 0.05 U | 0.5 UR | -119.9 | 0.035 J | 128 | 9.2 JL | 350 | 70 | 593.0 | 6,250 | 660 | 6,430 | 6.65 | 0.60 UJL |
| | 1/12/2010 | Round 23 | F70766 | NA | NA | NA | NA | -14.0 | NA | NA | NA | NA | NA | NA | NA | NA | NA | 6.53 | NA |
| | 7/14/2010 | Round 24 | F75195 | NA | NA | NA | NA | -162.8 | NA | NA | NA | NA | NA | NA | NA | NA | NA | 6.93 | NA |
| | 1/11/2011 | Round 25 | FIELD | NA | NA | NA | NA | -89.6 | NA | NA | NA | NA | NA | NA | NA | NA | NA | 6.95 | NA |
| | 7/28/2011 | Round 26 | F84701 | 0.6 | 10 | 0.5 R | 0.5 R | -123.4 | 0.02 U | 24.8 | 12 JL | 700 | 100 | 640 | 11,600 J | 430 U | 5,390 J | 6.98 | 0.3 U |
| | 1/10/2012 | Round 27 | F88817 | NA | NA | NA | NA | -124.4 | NA | NA | NA | NA | NA | NA | NA | NA | NA | 7.29 | NA |
| | 7/10/2012 | Round 28 | F94831 | NA | NA | NA | NA | -80.7 | NA | NA | NA | NA | NA | NA | NA | NA | NA | 6.83 | NA |
| | 1/8/2013 | Round 29 | FA626 | NA | NA | NA | NA | -63.1 | NA | NA | NA | NA | NA | NA | NA | NA | NA | 6.99 | NA |
| | 7/15/2013 | Round 30 | FA6425 | 0.4 | 6 | 0.50 U | 0.50 U | -86.3 | 0.022 J | 271 | 12.1 | 170 | 1000 | 782 JL | 320 U | 430 U | 2020 | 6.95 | 0.32 J |
| | 1/30/2014 | Round 31 | FA12817 | 0.34 | NA | NA | NA | -81.1 | NA | NA | NA | NA | NA | NA | NA | NA | NA | 6.95 | NA |
| | 7/17/2014 | Round 32 | 1407130 | 0.2 | 1.59 | 0.033 U | 0.165 UJL | -70.1 | 0.01 U | 395 | 9.97 | NA | 100 | 746 | 0.00529 | 0.001 U | 0.704 | 6.71 | 0.01 |
| | 1/23/2015 | Round 33 | 1501096 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| | 7/24/2015 | Round 34 | 1507195 | 0.29 | 2.97 | 0.033 U | 0.033 U | -110.1 | 0.031 | 795 | 9.73 | 693 | 165 | 770 | 3.53 | 0.001 U | 267 | 6.73 | 0.01 |
| | 1/20/2016 | Round 35 | 1601151 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| | 7/20/2016 | Round 36 | 1607216 | 0 | 2.21 | 0.033 U | 0.033 U | -136 | 0.01 U | 356 | 9.12 | 750 | | 437 | 6.06 | 0.001 U | 1630 | 6.99 | NA |

**Table 4-3A**

**Summary of Geochemical Parameters Measured in Groundwater**
**Long Term Monitoring Wells — SWMU 136 North Plume**
**2016 RAER**
**Former NAS Dallas, Texas**
**Page 3 of 3**

| Monitoring Well | Sampling Date | Sampling Round | SDG | Oxidation-Reduction Conditions | | | | | | | | Degradation Products | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Dissolved Oxygen[2] | Ferrous Iron[2] | Nitrate[3] | Nitrite[3] | ORP[1] | Phosphate[3] | Sulfate[3] | TOC[3] | Alkalinity[2] | Carbon Dioxide[2] | Chloride[3] | Ethane[3] | Ethene[3] | Methane[3] | pH[1] | Sulfide[3] |
| | | | Units | mg/L | mg/L | mg/L | mg/L | mV | mg/L | mg/L | mg/L | mg/L | mg/L | mg/L | ng/L | ng/L | µg/L | S.U. | mg/L |
| 508F56MW | 4/14/2005 | Well Installed | | | | | | | | | | | | | | | | | |
| | 8/31/2007 | Round 18 | FIELD | 1.0 | 0.0 | NA | NA | -119.0 | NA | NA | NA | 80 | 35 | NA | NA | NA | NA | 6.69 | NA |
| | 8/31/2007 | Round 18 | DALLASW002 | NA | NA | 0.066 | 1.0 UJ | NA | 0.50 UL | 766 | 4.1 | NA | NA | 132.0 | 12,000 | 530 J | 4,500 | NA | 0.80 U |
| | 7/16/2009 | Round 22 | F66710 | 0.5 | 10.0 | 0.05 U | 0.05 UR | -93.6 | 0.03 J | 517 | 4.7 JL | 400 | 70 | 69.3 | 3,530 | 430 U | 1,960 | 6.85 | 0.60 UJL |
| | 7/25/2011 | Round 26 | F84701 | 0.5 | 10 | 0.05 R | 0.05 R | -133.6 | 0.02 U | 9.3 | 5.4 | 400 | 80 | 36.4 | 810 J | 860 U | 1,890 | 6.8 | 0.3 U |
| | 7/10/2012 | Round 28 | F94831 | NA | NA | NA | NA | -66.1 | NA | NA | NA | NA | NA | NA | NA | NA | NA | 6.8 | NA |
| | 1/8/2013 | Round 29 | FA626 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| | 7/15/2013 | Round 30 | FA6425 | 0.3 | 5 | 0.25 U | 0.25 U | -100.1 | 0.020 U | 280 | 3.8 | 250 | 50 | 36.9 JL | 320 U | 430 U | 2510 | 7.08 | 0.22 U |
| | 1/30/2014 | Round 31 | FA12817 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| | 7/17/2014 | Round 32 | 1407130 | 0.5 | 0.64 | 0.033 U | 0.033 U | -81.7 | 0.01 U | 43.4 | 4.48 | NA | 75 | 21.6 | 0.001 U | 0.001 U | 3.14 | 6.85 | 0 |
| | 1/23/2015 | Round 33 | 1501096 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| | 7/24/2015 | Round 34 | 1507195 | 0.28 | 3.3 | 0.033 U | 0.033 U | -100.4 | 0.016 | 820 | 3.24 | 413 | 125 | 16.8 | 0.001 U | 0.001 U | 1260 | 6.8 | 0.02 |
| | 1/20/2016 | Round 35 | 1601151 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| | 7/20/2016 | Round 36 | 1607216 | 0.1 | 0.02 | 0.033 U | 0.033 U | -128 | 0.01 U | 413 | 3.69 | 411 | | 19.7 | 0.001 U | 0.001 U | 2200 | 7.5 | NA |

***Notes:***

mg/L - milligrams per liter
mV - millivolts
NA - Not Analyzed
ng/L - nanograms per liter
ORP - Oxidation/reduction potential
TOC - Total Organic Carbon
mg/L - micrograms per liter
S.U. - Standard Units
SDG - Sample Delivery Group
PCLE - Protective Concentration Level Exceedance

1. Field measurement, Meter
2. Field measurement, Test Kit
3. Analytical Laboratory result

Analytical Result Qualifiers:
J, K, L - Indicates that the chemical was detected; however, the associated numerical result may not be a precise representation of the amount that is actually present in the sample. The laboratory reported concentration is considered to be bias unknown (J), high (K), or low (L) estimate of the true concentration.
D - Indicates that the samples was diluted
U - Indicates that the sample was not detected at the numerical detection limit (sample-specific quantitation limit) noted. Nondetected results from the laboratory are reported in this manner. This qualifier is added to a positive result (reported by the laboratory) if the detected concentration is determined to be attributable to contamination introduced during field sampling or laboratory analysis.

**Table 4-3B**

**Summary of Geochemical Parameters Measured in Groundwater**
**Historical Monitoring Wells — SWMU 136 North Plume**
**2016 RAER**
**Former NAS Dallas, Texas**
**Page 1 of 2**

| Monitoring Well | Sampling Date | SDG | Oxidation-Reduction Conditions | | | | | | | | Degradation Products | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Dissolved Oxygen[2] | Ferrous Iron[2] | Nitrate[3] | Nitrite[3] | ORP[1] | Phosphate[3] | Sulfate[3] | TOC[3] | Alkalinity[2] | Carbon Dioxide[2] | Chloride[3] | Ethane[3] | Ethene[3] | Methane[3] | pH[1] | Sulfide[3] |
| | | Units | mg/L | mg/L | mg/L | mg/L | mV | mg/L | mg/L | mg/L | mg/L | mg/L | mg/L | mg/L | ng/L | mg/L | S.U. | mg/L |
| **Monitoring Wells Located Inside the PCLE Zone** | | | | | | | | | | | | | | | | | | |
| 50801MW | 9/9/1999 | DL321 | NA | NA | 0.5 U | 0.5 U | NA | 0.5 UJ | 7.7 J | NA | NA | NA | 55.7 | NA | NA | NA | NA | NA |
| | 9/9/1999 | LGCY | 0.1 | 5.5 | NA | NA | NA | NA | NA | NA | 464 | 287 | NA | NA | NA | NA | 6.82 | 0 U |
| | 9/9/1999 | TTE11 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | 15.151 | 72.609 | 9766 | NA | NA |
| | 6/22/2000 | DL342 | NA | NA | 0.1 U | 0.04 | NA | 0.1 U | 2.7 | NA | NA | NA | 52.4 | NA | NA | NA | NA | NA |
| | 6/22/2000 | LGCY | 0.3 | 5.2 | NA | NA | 85.5 | NA | NA | NA | 275 | 100 | NA | NA | NA | NA | 6.76 | 0.01 U |
| | 6/25/2001 | 608MWD32-7 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | 16 J | 64 J | 9700 J | NA | NA |
| | 6/25/2001 | DL366 | NA | NA | 0.10 U | 0.10 U | NA | 0.50 U | 4.8 | NA | NA | NA | 63.9 | NA | NA | NA | NA | NA |
| | 6/25/2001 | FIELD | 0.2 | 3.5 | NA | NA | -100.6 | NA | NA | NA | 350 | 50 | NA | NA | NA | NA | 6.72 | 0.01 U |
| | 1/24/2003 | 250113 | NA | NA | 0.05 U | 0.05 U | NA | 0.5 U | 13 | 9.2 | NA | NA | 59 | NA | NA | NA | NA | NA |
| | 1/24/2003 | FIELD | 0.8 | 3 | NA | NA | -131 | NA | NA | NA | 300 | 30 | NA | NA | NA | NA | 6.79 | 0.01 U |
| | 1/24/2003 | TTN44 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | 11.87 | 57.56 | 7107.8 | NA | NA |
| | 6/3/2003 | Well Abandoned | | | | | | | | | | | | | | | | |
| 50808MW | 3/27/1999 | LGCY | 0.3 | 5.4 | NA | NA | 31.5 | NA | NA | NA | 534 | 310 | NA | NA | NA | NA | 6.71 | 0.3 |
| | 10/6/1999 | DL326 | NA | NA | 0.5 U | 0.5 U | NA | 0.5 U | 14.5 | NA | NA | NA | 13.2 | NA | NA | NA | NA | NA |
| | 10/6/1999 | TTE12 | NA | NA | NA | NA | NA | NA | NA | NA | NA | 132.5 | NA | 0 | 0.053 | 7300 | NA | NA |
| | 6/22/2000 | DL342 | NA | NA | 0.1 | 0.1 U | NA | 0.1 U | 34.2 | NA | NA | NA | 14.6 | NA | NA | NA | NA | NA |
| | 6/22/2000 | LGCY | 0.4 | 4.2 | NA | NA | 86.5 | NA | NA | NA | 500 | 65 | NA | NA | NA | NA | 6.76 | 0.01 U |
| | 6/11/2001 | DL362 | NA | NA | 0.10 U | 0.10 U | NA | 0.055 U | 20.0 | NA | NA | NA | 13.1 | NA | NA | NA | NA | NA |
| | 6/11/2001 | FIELD | 0.8 | 4.6 | NA | NA | -104.3 | NA | NA | NA | 500 > | 60 | NA | NA | NA | NA | 7.09 | 0.01 U |
| | 1/14/2003 | 150138 | NA | NA | 0.05 U | 0.05 U | NA | 0.5 U | 15 | NA | NA | NA | 12.5 | NA | NA | NA | NA | NA |
| | 1/14/2003 | FIELD | 0.8 | 3.2 | NA | NA | -93 | NA | NA | NA | 550 | 100 | NA | NA | NA | NA | 7 | 0.1 |
| | 6/3/2003 | Well Abandoned | | | | | | | | | | | | | | | | |
| **Monitoring Wells Located Outside the PCLE Zone** | | | | | | | | | | | | | | | | | | |
| 508F09MW | 4/2/1998 | Well Installed | | | | | | | | | | | | | | | | |
| | 10/5/1999 | DL326 | NA | NA | 5 U | 5 U | NA | 25 U | 1410 | NA | NA | NA | 29.3 | NA | NA | NA | NA | NA |
| | 10/5/1999 | LGCY | 0.6 | 6 | NA | NA | -87.7 | NA | NA | NA | 296 | 239 | NA | NA | NA | NA | 6.99 | 0 U |
| | 10/5/1999 | TTE12 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | 0.471 | 1.013 | 2733 | NA | NA |
| | 6/26/2000 | DL344 | NA | NA | 0.5 U | 0.5 U | NA | 0.5 U | 10.1 | NA | NA | NA | 31.9 | NA | NA | NA | NA | NA |
| | 6/26/2000 | LGCY | 0.4 | 4 | NA | NA | -97.8 | NA | NA | NA | 550 | 55 | NA | NA | NA | NA | 6.85 | 0.01 U |
| | 6/11/2001 | DL362 | NA | NA | 0.10 U | 0.10 U | NA | 0.31 U | 43.0 | NA | NA | NA | 26.0 | NA | NA | NA | NA | NA |
| | 6/11/2001 | FIELD | 0.6 | 3.45 | NA | NA | 88.4 | NA | NA | NA | 560 | 60 | NA | NA | NA | NA | 6.86 | 0.01 U |
| | -- | Well Destroyed | | | | | | | | | | | | | | | | |
| 508F21MW | 3/31/1998 | Well Installed | | | | | | | | | | | | | | | | |
| | 10/6/1999 | DL326 | NA | NA | 2.5 U | 2.5 U | NA | 2.5 U | 418 | NA | NA | NA | 160 | NA | NA | NA | NA | NA |
| | 10/6/1999 | LGCY | 0.4 | 4.3 | NA | NA | -52.8 | NA | NA | NA | 534 | 391 | NA | NA | NA | NA | 6.67 | 0 U |
| | 10/6/1999 | TTE12 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | 0.076 | 0.894 | 2890 | NA | NA |
| | 6/22/2000 | DL342 | NA | NA | 0.05 | 0.1 U | NA | 0.1 U | 577 | NA | NA | NA | 149 | NA | NA | NA | NA | NA |
| | 6/22/2000 | LGCY | 0.8 | 6.4 | NA | NA | -60 | NA | NA | NA | 550 | 135 | NA | NA | NA | NA | 6.5 | 0.01 U |
| | 6/11/2001 | DL362 | NA | NA | 0.046 | 0.10 U | NA | 0.019 U | 446 | NA | NA | NA | 158 | NA | NA | NA | NA | NA |
| | 6/11/2001 | FIELD | 0.4 | 3 | NA | NA | -82.9 | NA | NA | NA | 500 > | 190 | NA | NA | NA | NA | 6.6 | 0.01 U |
| | 1/9/2003 | 100319 | NA | NA | 0.05 U | 0.05 U | NA | 0.5 U | 129 | NA | NA | NA | 169 | NA | NA | NA | NA | NA |
| | -- | Well Abandoned | | | | | | | | | | | | | | | | |

**Table 4-3B**

**Summary of Geochemical Parameters Measured in Groundwater**
**Historical Monitoring Wells — SWMU 136 North Plume**
**2016 RAER**
**Former NAS Dallas, Texas**
**Page 2 of 2**

| Monitoring Well | Sampling Date | SDG | Oxidation-Reduction Conditions | | | | | | | | Degradation Products | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Dissolved Oxygen[2] | Ferrous Iron[2] | Nitrate[3] | Nitrite[3] | ORP[1] | Phosphate[3] | Sulfate[3] | TOC[3] | Alkalinity[2] | Carbon Dioxide[2] | Chloride[3] | Ethane[3] | Ethene[3] | Methane[3] | pH[1] | Sulfide[3] |
| | | Units | mg/L | mg/L | mg/L | mg/L | mV | mg/L | mg/L | mg/L | mg/L | mg/L | mg/L | mg/L | ng/L | mg/L | S.U. | mg/L |
| 508F55MW | 4/13/2005 | Well Installed | | | | | | | | | | | | | | | | |
| | 8/31/2007 | FIELD | 1.0 | 0.0 | NA | NA | -138.0 | NA | NA | NA | 350 | 40 | NA | NA | NA | NA | 6.57 | NA |
| | 8/31/2007 | DALLASW002 | NA | NA | 0.15 | 1.0 UJ | NA | 0.50 UL | 7.0 | 3.7 | NA | NA | 122.0 | 3,100 | 360 J | 2,500 | NA | 0.80 U |
| | 7/16/2009 | F66710 | 4.0 | 10.0 | 0.05 U | 0.25 UR | -87.3 | 0.033 J | 11.4 | 3.0 JL | 350 | 140 | 184.0 | 5,680 | 520 | 2,520 | 6.80 | 0.60 UJL |
| | 7/28/2011 | F84701 | 0.6 | 3 | 0.25 R | 0.25 R | -132.3 | 0.02 U | 7.4 | 2.9 | 350 | 60 | 157 | 7,510 | 430 U | 2,610 | 7.21 | 0.3 U |
| | 7/10/2012 | F94831 | NA | NA | NA | NA | -102.3 | NA | NA | NA | NA | NA | NA | NA | NA | NA | 6.52 | NA |
| | 1/8/2013 | FA626 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| | 7/15/2013 | FA6425 | 0.8 | 6 | 0.25 U | 0.25 U | -113.6 | 0.020 U | 11.8 | 3.3 | 350 | 700 | 122 JL | 320 U | 430 U | 5780 | 6.71 | 0.85 |
| | 1/30/2014 | FA12817 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| | 7/18/2014 | 1407152 | 0.3 | 1.82 | 0.033 U | 0.033 U | -110.6 | 0.01 U | 39.3 | 4.62 | NA | 100 | 114 | 0.00631 | 0.001 U | 4.27 | 6.43 | 0.04 |
| | 1/23/2015 | 1501096 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| | 7/28/2015 | 1507213 | 0.67 | 1.91 | 0.033 U | 0.033 U | -110.1 | 0.01 U | 21.3 | 2.36 | 541 | 100 | 91.4 | 1.89 | 0.001 U | 2280 | 6.82 | 0 |
| | 4/7/2016 | Well Plugged and Abandoned | | | | | | | | | | | | | | | | |
| 60-20 | 9/24/1999 | DL324 | NA | NA | 1 U | 1 U | NA | 1 U | 191 | NA | NA | NA | 117 | NA | NA | NA | NA | NA |
| | 9/24/1999 | LGCY | 0.6 | 3.6 | NA | NA | -44.8 | NA | NA | NA | 494 | 282 | NA | NA | NA | NA | 6.79 | 0.05 |
| | 9/24/1999 | TTE11 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | 0.023 | 0.016 | 1587 | NA | NA |
| | 7/6/2000 | DL347 | NA | NA | 0.5 U | 0.5 U | NA | 0.5 U | 259 | NA | NA | NA | 140 | NA | NA | NA | NA | NA |
| | 7/6/2000 | FIELD | 5 | 1.1 | NA | NA | -22 | NA | NA | NA | 450 | NA | NA | NA | NA | NA | 6.79 | 0 |
| | 7/6/2000 | LGCY | 0.8 | 4 | NA | NA | -77 | NA | NA | NA | 500 | 70 | NA | NA | NA | NA | 6.67 | 0.01 U |
| | 7/9/2001 | DL368 | NA | NA | 0.10 U | 0.10 U | NA | 0.5 U | 272 | NA | NA | NA | 130 | NA | NA | NA | NA | NA |
| | 7/9/2001 | FIELD | 0.6 | 3.5 | NA | NA | -15.5 | NA | NA | NA | 550 | 57 | NA | NA | NA | NA | 6.95 | 0.01 U |
| | 1/8/2003 | 90226 | NA | NA | 0.05 U | 0.05 U | NA | 0.5 U | 222 | NA | NA | NA | 117 | NA | NA | NA | NA | NA |
| | 1/8/2003 | FIELD | 0.6 | 2.15 | NA | NA | -85 | NA | NA | NA | 500 | 50 | NA | NA | NA | NA | 6.86 | 0.01 U |
| | 12/17/2003 | C3L180179 | NA | NA | NA | NA | NA | NA | 604 L | NA | NA | NA | 98.5 | NA | NA | NA | NA | NA |
| | 12/17/2003 | FIELD | 5 | 1.1 | NA | NA | -22 | NA | NA | NA | 450 | NA | NA | NA | NA | NA | 6.79 | 0 |
| | 4/18/2005 | Well Abandoned | | | | | | | | | | | | | | | | |

mg/L - milligrams per liter
mV - millivolts
NA - Not Analyzed
ng/L - nanograms per liter
ORP - Oxidation/reduction potential
TOC - Total Organic Carbon

***Notes:***
mg/L - micrograms per liter
S.U. - Standard Units
SDG - Sample Delivery Group
PCLE - Protective Concentration Level Exceedance

1. Field measurement, Meter
2. Field measurement, Test Kit
3. Analytical Laboratory result

Analytical Result Qualifiers:
J, K, L - Indicates that the chemical was detected; however, the associated numerical result may not be a precise representation of the amount that is actually present in the sample. The laboratory reported concentration is considered to be bias unknown (J), high (K), or low (L) estimate of the true concentration.
U - Indicates that the sample was not detected at the numerical detection limit (sample-specific quantitation limit) noted. Nondetected results from the laboratory are reported in this manner. This qualifier is added to a positive result (reported by the laboratory) if the detected concentration is determined to be attributable to contamination

# TABLE 4-4
# SUMMARY OF CONCENTRATION vs. TIME ATTENUATION RATE CONSTANTS

**Table 4-4**

**Summary of Concentration vs. Time Attenuation Rate Constants**
**SWMU 136 North Plume**
**2016 RAER**
**Former NAS Dallas, Texas**
**Page 1 of 5**

| Monitoring Well ID | Sampling Date | Elapsed Time (Years) | Protective Concentration Level (mg/L) | Concentration Detected (mg/L) | Natural Log of Concentration (mg/L) | Degradation Rate from Natural Log ($K_{time}$) (mg/L per year) | Minimum Degradation Rate Required for Remedial Goals Natural Log ($K_{time}$) (mg/L per year) | Minimum Degradation Rate Met? (Yes/No) | Expected Remedial Goal Concentration (mg/L) | Expected Remedial Goal Concentration Met? (Yes/No) | Remedial Goals Being Met? (Yes/No) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Trichloroethene** | | | | | | | | | | | |
| 508F22MW | Aug-99 | 0.0 | 0.00500 | 0.00500 U | -8.00 | -- | -- | -- | -- | -- | -- |
| | Jun-00 | 0.9 | 0.00500 | 0.00500 U | -8.00 | -- | -- | -- | -- | -- | -- |
| | Jun-01 | 1.8 | 0.00500 | 0.00500 U | -8.00 | -- | -- | -- | -- | -- | -- |
| | Jan-03 | 3.4 | 0.00500 | 0.00100 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Aug-03 | 4.1 | 0.00500 | 0.00073 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Dec-03 | 4.4 | 0.00500 | 0.00010 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-04 | 5.0 | 0.00500 | 0.00022 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Oct-04 | 5.2 | 0.00500 | 0.00022 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Apr-05 | 5.7 | 0.00500 | 0.00030 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Oct-05 | 6.2 | 0.00500 | 0.00030 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | May-06 | 6.8 | 0.00500 | 0.00040 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Aug-06 | 7.1 | 0.00500 | 0.00040 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Apr-07 | 7.7 | 0.00500 | 0.00014 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Aug-07 | 8.0 | 0.00500 | 0.00023 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Feb-08 | 8.5 | 0.00500 | 0.00053 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-08 | 8.9 | 0.00500 | 0.00032 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-09 | 9.4 | 0.00500 | 0.00032 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-09 | 10.0 | 0.00500 | 0.00032 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-10 | 10.4 | 0.00500 | 0.00024 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-10 | 10.9 | 0.00500 | 0.00024 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-11 | 11.4 | 0.00500 | 0.00026 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-11 | 12.0 | 0.00500 | 0.00026 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-12 | 12.4 | 0.00500 | 0.00026 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-12 | 12.9 | 0.00500 | 0.00026 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-13 | 13.4 | 0.00500 | 0.00031 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-13 | 13.9 | 0.00500 | 0.00031 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Feb-14 | | 0.00500 | 0.0003 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-14 | 15.0 | 0.00500 | 0.00025 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-15 | 15.5 | 0.00500 | 0.00025 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-15 | 16.0 | 0.00500 | 0.00025 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-16 | 16.5 | 0.00500 | 0.00025 UJ | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-16 | 17.0 | 0.00500 | 0.00025 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| 508F54MW | Apr-05 | 0.0 | 0.00500 | 0.83000 | -0.19 | -- | -- | -- | -- | -- | -- |
| | Jul-05 | 0.3 | 0.00500 | 0.06700 | -2.70 | -- | -- | -- | -- | -- | -- |
| | Oct-05 | 0.5 | 0.00500 | 0.01300 J | -4.34 | -- | -- | -- | -- | -- | -- |
| | Jan-06 | 0.8 | 0.00500 | 0.00300 J | -5.81 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Aug-06 | 1.4 | 0.00500 | 0.00100 | -6.91 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Apr-07 | 2.1 | 0.00500 | 0.00078 J | -7.16 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Aug-07 | 2.3 | 0.00500 | 0.00120 | -6.73 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-08 | 2.8 | 0.00500 | 0.00053 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-08 | 3.3 | 0.00500 | 0.00040 J | -7.82 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-09 | 3.8 | 0.00500 | 0.00032 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-09 | 4.3 | 0.00500 | 0.00032 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-10 | 4.8 | 0.00500 | 0.00024 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-10 | 5.3 | 0.00500 | 0.00024 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-11 | 5.8 | 0.00500 | 0.00026 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-11 | 6.3 | 0.00500 | 0.00026 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-12 | 6.8 | 0.00500 | 0.00037 | -7.90 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-12 | 7.3 | 0.00500 | 0.00026 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-13 | 13.4 | 0.00500 | 0.00031 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-13 | 13.9 | 0.00500 | 0.00031 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Feb-14 | 14.6 | 0.00500 | 0.0003 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-14 | 15.0 | 0.00500 | 0.0005 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-15 | 15.5 | 0.00500 | 0.0005 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-15 | 16.0 | 0.00500 | 0.0005 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-16 | 16.5 | 0.00500 | 0.00072 J | -7.24 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-16 | 17.0 | 0.00500 | 0.0005 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| 508F56MW | Apr-05 | 0.0 | 0.00500 | 0.00060 J | -7.42 | -- | -- | -- | -- | -- | -- |
| | Jul-05 | 0.3 | 0.00500 | 0.00030 U | -8.00 | -- | -- | -- | -- | -- | -- |
| | Oct-05 | 0.5 | 0.00500 | 0.00030 U | -8.00 | -- | -- | -- | -- | -- | -- |
| | Jan-06 | 0.8 | 0.00500 | 0.00030 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Aug-06 | 1.4 | 0.00500 | 0.00040 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Apr-07 | 2.1 | 0.00500 | 0.00014 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Aug-07 | 2.3 | 0.00500 | 0.00023 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Feb-08 | 2.9 | 0.00500 | 0.00053 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-08 | 3.3 | 0.00500 | 0.00032 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-09 | 3.8 | 0.00500 | 0.00032 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-09 | 4.3 | 0.00500 | 0.00032 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-10 | 4.8 | 0.00500 | 0.00024 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-10 | 5.3 | 0.00500 | 0.00024 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-11 | 5.8 | 0.00500 | 0.00026 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-11 | 6.3 | 0.00500 | 0.00026 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-12 | 6.8 | 0.00500 | 0.00026 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-12 | 7.3 | 0.00500 | 0.00026 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-13 | 13.4 | 0.00500 | 0.00031 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-13 | 13.9 | 0.00500 | 0.00031 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Feb-14 | 14.6 | 0.00500 | 0.0003 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-14 | 15.0 | 0.00500 | 0.00025 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-15 | 15.5 | 0.00500 | 0.00025 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-15 | 16.0 | 0.00500 | 0.00025 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-16 | 16.5 | 0.00500 | 0.0005 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-16 | 17.0 | 0.00500 | 0.0005 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |

**Table 4-4**

**Summary of Concentration vs. Time Attenuation Rate Constants**
**SWMU 136 North Plume**
**2016 RAER**
**Former NAS Dallas, Texas**
**Page 2 of 5**

| Monitoring Well ID | Sampling Date | Elapsed Time (Years) | Protective Concentration Level (mg/L) | Concentration Detected (mg/L) | Natural Log of Concentration (mg/L) | Degradation Rate from Natural Log ($K_{time}$) (mg/L per year) | Minimum Degradation Rate Required for Remedial Goals Natural Log ($K_{time}$) (mg/L per year) | Minimum Degradation Rate Met? (Yes/No) | Expected Remedial Goal Concentration (mg/L) | Expected Remedial Goal Concentration Met? (Yes/No) | Remedial Goals Being Met? (Yes/No) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **cis-1,2-Dichloroethene** | | | | | | | | | | | |
| **508F22MW** | Aug-99 | 0.0 | 0.07000 | 0.00500 U | -8.00 | -- | -- | -- | -- | -- | -- |
| | Jun-00 | 0.9 | 0.07000 | 0.00500 U | -8.00 | -- | -- | -- | -- | -- | -- |
| | Jun-01 | 1.8 | 0.07000 | 0.00250 U | -8.00 | -- | -- | -- | -- | -- | -- |
| | Jan-03 | 3.4 | 0.07000 | 0.06300 | -2.76 | -- | -- | -- | -- | -- | -- |
| | Aug-03 | 4.1 | 0.07000 | 0.09000 | -2.41 | -- | NA | NA | NA | NA | Evaluate Further |
| | Dec-03 | 4.4 | 0.07000 | 0.00860 J | -4.76 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-04 | 5.0 | 0.07000 | 0.00210 | -6.17 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Oct-04 | 5.2 | 0.07000 | 0.00110 | -6.81 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Apr-05 | 5.7 | 0.07000 | 0.00070 J | -7.26 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Oct-05 | 6.2 | 0.07000 | 0.00300 | -5.81 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | May-06 | 6.8 | 0.07000 | 0.00050 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Aug-06 | 7.1 | 0.07000 | 0.00200 J | -6.21 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Apr-07 | 7.7 | 0.07000 | 0.00064 J | -7.35 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Aug-07 | 8.0 | 0.07000 | 0.00094 J | -6.97 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Feb-08 | 8.5 | 0.07000 | 0.00032 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-08 | 8.9 | 0.07000 | 0.00066 J | -7.32 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-09 | 9.4 | 0.07000 | 0.00032 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-09 | 10.0 | 0.07000 | 0.00036 J | -5.63 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-10 | 10.4 | 0.07000 | 0.00032 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-10 | 10.9 | 0.07000 | 0.00032 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-11 | 11.4 | 0.07000 | 0.00026 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-11 | 12.0 | 0.07000 | 0.00026 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-12 | 12.4 | 0.07000 | 0.00026 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-12 | 12.9 | 0.07000 | 0.00026 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-13 | 13.4 | 0.07000 | 0.00024 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-13 | 13.9 | 0.07000 | 0.00024 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Feb-14 | 14.6 | 0.07000 | 0.00033 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-14 | 15.0 | 0.07000 | 0.00025 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-15 | 15.5 | 0.07000 | 0.00025 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-15 | 16.0 | 0.07000 | 0.00025 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-16 | 16.5 | 0.07000 | 0.00025 UJ | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-16 | 17.0 | 0.07000 | 0.00025 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| **508F54MW** | Apr-05 | 0.0 | 0.07000 | 0.40000 | -0.92 | -- | -- | -- | -- | -- | -- |
| | Jul-05 | 0.3 | 0.07000 | 0.23000 | -1.47 | -- | -- | -- | -- | -- | -- |
| | Oct-05 | 0.5 | 0.07000 | 0.22000 J | -1.51 | -- | -- | -- | -- | -- | -- |
| | Jan-06 | 0.8 | 0.07000 | 0.18000 | -1.71 | -0.878 | -0.153 | Yes | 0.35241 | Yes | Yes |
| | Aug-06 | 1.4 | 0.07000 | 0.09200 | -2.39 | -0.943 | -0.153 | Yes | 0.32279 | Yes | Yes |
| | Apr-07 | 2.1 | 0.07000 | 0.05400 | -2.92 | -0.921 | -0.153 | Less Than PCL | 0.29234 | Less Than PCL | Less Than PCL |
| | Aug-07 | 2.3 | 0.07000 | 0.17000 | -1.77 | -0.543 | -0.153 | Yes | 0.27966 | Yes | Yes |
| | Feb-08 | 2.9 | 0.07000 | 0.02400 | -3.73 | -0.735 | -0.153 | Less Than PCL | 0.25885 | Less Than PCL | Less Than PCL |
| | Jul-08 | 3.3 | 0.07000 | 0.01380 | -4.28 | -0.856 | -0.153 | Less Than PCL | 0.24301 | Less Than PCL | Less Than PCL |
| | Jan-09 | 3.8 | 0.07000 | 0.00150 | -6.50 | -1.147 | -0.153 | Less Than PCL | 0.22464 | Less Than PCL | Less Than PCL |
| | Jul-09 | 4.3 | 0.07000 | 0.00058 J | -7.45 | -1.338 | -0.153 | Less Than PCL | 0.20792 | Less Than PCL | Less Than PCL |
| | Jan-10 | 4.8 | 0.07000 | 0.00280 | -5.88 | -1.245 | -0.153 | Less Than PCL | 0.19285 | Less Than PCL | Less Than PCL |
| | Jul-10 | 5.3 | 0.07000 | 0.01010 | -4.60 | -1.048 | -0.153 | Less Than PCL | 0.17865 | Less Than PCL | Less Than PCL |
| | Jan-11 | 5.8 | 0.07000 | 0.00280 | -5.88 | -0.978 | -0.153 | Less Than PCL | 0.16563 | Less Than PCL | Less Than PCL |
| | Jul-11 | 6.3 | 0.07000 | 0.00650 | -5.04 | -0.856 | -0.153 | Less Than PCL | 0.15247 | Less Than PCL | Less Than PCL |
| | Jan-12 | 6.8 | 0.07000 | 0.04470 | -3.11 | -0.665 | -0.153 | Less Than PCL | 0.14225 | Less Than PCL | Less Than PCL |
| | Jul-12 | 7.3 | 0.07000 | 0.00055 | -7.51 | -0.711 | -0.153 | Less Than PCL | 0.13182 | Less Than PCL | Less Than PCL |
| | Jan-13 | 13.4 | 0.07000 | 0.00077 J | -7.17 | -0.512 | -0.153 | Less Than PCL | 0.12191 | Less Than PCL | Less Than PCL |
| | Jul-13 | 13.9 | 0.07000 | 0.00033 J | -8.02 | -0.499 | -0.153 | Less Than PCL | 0.11303 | Less Than PCL | Less Than PCL |
| | Feb-14 | 14.6 | 0.07000 | 0.0013 | -6.65 | -0.410 | -0.153 | Less Than PCL | 0.10279 | Less Than PCL | Less Than PCL |
| | Jul-14 | 15.0 | 0.07000 | 0.003 | -5.81 | -0.356 | -0.153 | Less Than PCL | 0.09683 | Less Than PCL | Less Than PCL |
| | Jan-15 | 15.5 | 0.07000 | 0.00025 U | -8.00 | -0.355 | -0.153 | Less Than PCL | 0.08947 | Less Than PCL | Less Than PCL |
| | Jul-15 | 16.0 | 0.07000 | 0.00244 | -8.00 | -0.352 | -0.153 | Less Than PCL | 0.08278 | Less Than PCL | Less Than PCL |
| | Jan-16 | 16.5 | 0.07000 | 0.0005 U | -8.00 | -0.347 | -0.153 | Less Than PCL | 0.07665 | Less Than PCL | Less Than PCL |
| | Jul-16 | 17.0 | 0.07000 | 0.0005 U | -8.00 | -0.342 | -0.153 | Less Than PCL | 0.07103 | Less Than PCL | Less Than PCL |
| **508F56MW** | Apr-05 | 0.0 | 0.07000 | 0.00700 | -4.96 | -- | -- | -- | -- | -- | -- |
| | Jul-05 | 0.3 | 0.07000 | 0.00200 | -6.21 | -- | -- | -- | -- | -- | -- |
| | Oct-05 | 0.5 | 0.07000 | 0.00040 J | -7.82 | -- | -- | -- | -- | -- | -- |
| | Jan-06 | 0.8 | 0.07000 | 0.00200 | -6.21 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Aug-06 | 1.4 | 0.07000 | 0.00070 J | -7.26 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Apr-07 | 2.1 | 0.07000 | 0.00260 | -5.95 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Aug-07 | 2.3 | 0.07000 | 0.00170 | -6.38 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Feb-08 | 2.9 | 0.07000 | 0.00069 J | -7.28 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-08 | 3.3 | 0.07000 | 0.00120 | -6.73 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-09 | 3.8 | 0.07000 | 0.00049 J | -7.62 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-09 | 4.3 | 0.07000 | 0.00034 J | -7.99 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-10 | 4.8 | 0.07000 | 0.00032 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-10 | 5.3 | 0.07000 | 0.00038 J | -7.88 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-11 | 5.8 | 0.07000 | 0.00033 J | -8.02 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-11 | 6.3 | 0.07000 | 0.00026 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-12 | 6.8 | 0.07000 | 0.00020 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-12 | 7.3 | 0.07000 | 0.00026 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-13 | 13.4 | 0.07000 | 0.00024 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-13 | 13.9 | 0.07000 | 0.00024 U | -8.00 | -- | 0.202 | Less Than PCL | 0.03717 | Less Than PCL | Less Than PCL |
| | Feb-14 | 14.6 | 0.07000 | 0.00033 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-14 | 15.0 | 0.07000 | 0.00025 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-15 | 15.5 | 0.07000 | 0.00025 U | -8.00 | -- | 0.202 | Less Than PCL | 0.05062 | Less Than PCL | Less Than PCL |
| | Jul-15 | 16.0 | 0.07000 | 0.00025 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-16 | 16.5 | 0.07000 | 0.0005 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-16 | 17.0 | 0.07000 | 0.0005 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |

**Table 4-4**

**Summary of Concentration vs. Time Attenuation Rate Constants**
**SWMU 136 North Plume**
**2016 RAER**
**Former NAS Dallas, Texas**
**Page 3 of 5**

| Monitoring Well ID | Sampling Date | Elapsed Time (Years) | Protective Concentration Level (mg/L) | Concentration Detected (mg/L) | Natural Log of Concentration (mg/L) | Degradation Rate from Natural Log ($K_{time}$) (mg/L per year) | Minimum Degradation Rate Required for Remedial Goals Natural Log ($K_{time}$) (mg/L per year) | Minimum Degradation Rate Met? (Yes/No) | Expected Remedial Goal Concentration (mg/L) | Expected Remedial Goal Concentration Met? (Yes/No) | Remedial Goals Being Met? (Yes/No) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Vinyl Chloride** | | | | | | | | | | | |
| 508F22MW | Aug-99 | 0.0 | 0.00200 | 0.00500 U | -8.00 | -- | -- | -- | -- | -- | -- |
| | Jun-00 | 0.9 | 0.00200 | 0.00500 U | -8.00 | -- | -- | -- | -- | -- | -- |
| | Jun-01 | 1.8 | 0.00200 | 0.01000 U | -8.00 | -- | -- | -- | -- | -- | -- |
| | Jan-03 | 3.4 | 0.00200 | 0.01800 | -4.02 | -- | -- | -- | -- | -- | -- |
| | Aug-03 | 4.1 | 0.00200 | 0.05800 | -2.85 | -- | -- | -- | -- | -- | -- |
| | Dec-03 | 4.4 | 0.00200 | 0.00670 J | -5.01 | -- | -- | -- | -- | -- | -- |
| | Jul-04 | 5.0 | 0.00200 | 0.00360 | -5.63 | -1.282 | -0.161 | Yes | 0.01405 | Yes | Yes |
| | Oct-04 | 5.2 | 0.00200 | 0.00270 | -5.91 | -1.393 | -0.161 | Yes | 0.01358 | Yes | Yes |
| | Apr-05 | 5.7 | 0.00200 | 0.00100 J | -6.91 | -1.543 | -0.161 | Less Than PCL | 0.01259 | Less Than PCL | Less Than PCL |
| | Oct-05 | 6.2 | 0.00200 | 0.00200 | -6.21 | -1.240 | -0.161 | Less Than PCL | 0.01161 | Less Than PCL | Less Than PCL |
| | May-06 | 6.8 | 0.00200 | 0.00100 J | -6.91 | -1.097 | -0.161 | Less Than PCL | 0.01051 | Less Than PCL | Less Than PCL |
| | Aug-06 | 7.1 | 0.00200 | 0.00100 J | -6.91 | -0.997 | -0.161 | Less Than PCL | 0.01005 | Less Than PCL | Less Than PCL |
| | Apr-07 | 7.7 | 0.00200 | 0.00360 | -5.63 | -0.708 | -0.161 | Yes | 0.00911 | Yes | Yes |
| | Aug-07 | 8.0 | 0.00200 | 0.00360 J | -5.63 | -0.539 | -0.161 | Yes | 0.00863 | Yes | Yes |
| | Feb-08 | 8.5 | 0.00200 | 0.000430 U | -8.00 | -0.616 | -0.161 | Less Than PCL | 0.00795 | Less Than PCL | Less Than PCL |
| | Jul-08 | 8.9 | 0.00200 | 0.00170 | -6.38 | -0.528 | -0.161 | Less Than PCL | 0.00744 | Less Than PCL | Less Than PCL |
| | Jan-09 | 9.4 | 0.00200 | 0.00030 U | -8.00 | -0.556 | -0.161 | Less Than PCL | 0.00685 | Less Than PCL | Less Than PCL |
| | Jul-09 | 10.0 | 0.00200 | 0.00030 U | -8.00 | -0.559 | -0.161 | Less Than PCL | 0.00631 | Less Than PCL | Less Than PCL |
| | Jan-10 | 10.4 | 0.00200 | 0.00028 U | -8.00 | -0.548 | -0.161 | Less Than PCL | 0.00583 | Less Than PCL | Less Than PCL |
| | Jul-10 | 10.9 | 0.00200 | 0.00028 U | -8.00 | -0.528 | -0.161 | Less Than PCL | 0.00538 | Less Than PCL | Less Than PCL |
| | Jan-11 | 11.4 | 0.00200 | 0.00022 U | -8.00 | -0.504 | -0.161 | Less Than PCL | 0.00496 | Less Than PCL | Less Than PCL |
| | Jul-11 | 12.0 | 0.00200 | 0.00022 U | -8.00 | -0.478 | -0.161 | Less Than PCL | 0.00455 | Less Than PCL | Less Than PCL |
| | Jan-12 | 12.4 | 0.00200 | 0.00022 U | -8.00 | -0.452 | -0.161 | Less Than PCL | 0.00423 | Less Than PCL | Less Than PCL |
| | Jul-12 | 12.9 | 0.00200 | 0.00022 U | -8.00 | -0.427 | -0.161 | Less Than PCL | 0.00390 | Less Than PCL | Less Than PCL |
| | Jan-13 | 13.4 | 0.00200 | 0.00044 U | -8.00 | -0.403 | -0.161 | Less Than PCL | 0.00359 | Less Than PCL | Less Than PCL |
| | Jul-13 | 13.9 | 0.00200 | 0.00044 U | -8.00 | -0.380 | -0.161 | Less Than PCL | 0.00332 | Less Than PCL | Less Than PCL |
| | Feb-14 | 14.6 | 0.00200 | 0.00033 U | -8.00 | -0.357 | -0.161 | Less Than PCL | 0.00300 | Less Than PCL | Less Than PCL |
| | Jul-14 | 15.0 | 0.00200 | 0.00025 U | -8.00 | -0.337 | -0.161 | Less Than PCL | 0.00282 | Less Than PCL | Less Than PCL |
| | Jan-15 | 15.5 | 0.00200 | 0.00025 U | -8.00 | -0.318 | -0.161 | Less Than PCL | 0.00259 | Less Than PCL | Less Than PCL |
| | Jul-15 | 16.0 | 0.00200 | 0.00025 U | -8.00 | -0.301 | -0.161 | Less Than PCL | 0.00239 | Less Than PCL | Less Than PCL |
| | Jan-16 | 16.5 | 0.00200 | 0.00025 U | -8.00 | -0.285 | -0.161 | Less Than PCL | 0.00220 | Less Than PCL | Less Than PCL |
| | Jul-16 | 17.0 | 0.00200 | 0.00025 U | -8.00 | -0.270 | -0.161 | Less Than PCL | 0.00203 | Less Than PCL | Less Than PCL |
| 508F54MW | Apr-05 | 0.0 | 0.00200 | 0.00400 | -5.52 | -- | -- | -- | -- | -- | -- |
| | Jul-05 | 0.3 | 0.00200 | 0.02600 | -3.65 | -- | -- | -- | -- | -- | -- |
| | Oct-05 | 0.5 | 0.00200 | 0.02600 J | -3.65 | -- | -- | -- | -- | -- | -- |
| | Jan-06 | 0.8 | 0.00200 | 0.03200 J | -3.44 | 0.376 | -0.235 | No | 0.02407 | No | No |
| | Aug-06 | 1.4 | 0.00200 | 0.03200 | -3.44 | 0.207 | -0.235 | No | 0.02103 | No | No |
| | Apr-07 | 2.0 | 0.00200 | 0.02000 | -3.91 | -0.107 | -0.235 | No | 0.01824 | No | No |
| | Aug-07 | 2.3 | 0.00200 | 0.02400 J | -3.73 | -0.097 | -0.235 | No | 0.01686 | No | No |
| | Feb-08 | 2.9 | 0.00200 | 0.01000 | -4.61 | -0.292 | -0.235 | Yes | 0.01497 | Yes | Yes |
| | Jul-08 | 3.3 | 0.00200 | 0.00470 | -5.36 | -0.485 | -0.235 | Yes | 0.01358 | Yes | Yes |
| | Jan-09 | 3.8 | 0.00200 | 0.00650 | -5.04 | -0.492 | -0.235 | Yes | 0.01204 | Yes | Yes |
| | Jul-09 | 4.3 | 0.00200 | 0.00210 | -6.17 | -0.601 | -0.235 | Yes | 0.01068 | Yes | Yes |
| | Jan-10 | 4.8 | 0.00200 | 0.00280 | -5.88 | -0.601 | -0.235 | Yes | 0.00952 | Yes | Yes |
| | Jul-10 | 5.3 | 0.00200 | 0.00430 | -5.45 | -0.540 | -0.235 | Yes | 0.00846 | Yes | Yes |
| | Jan-11 | 5.8 | 0.00200 | 0.00450 | -5.40 | -0.481 | -0.235 | Yes | 0.00753 | Yes | Yes |
| | Jul-11 | 6.3 | 0.00200 | 0.00560 | -5.18 | -0.415 | -0.235 | Yes | 0.00663 | Yes | Yes |
| | Jan-12 | 6.8 | 0.00200 | 0.01510 | -4.19 | -0.311 | -0.235 | Yes | 0.00596 | No | Evaluate Further |
| | Jul-12 | 7.3 | 0.00200 | 0.00270 | -5.91 | -0.315 | -0.235 | Yes | 0.00530 | Yes | Yes |
| | Jan-13 | 13.4 | 0.00200 | 0.0014 | -6.57 | -0.249 | -0.235 | Less Than PCL | 0.00470 | Less Than PCL | Less Than PCL |
| | Jul-13 | 13.9 | 0.00200 | 0.00063 J | -7.37 | -0.252 | -0.235 | Less Than PCL | 0.00418 | Less Than PCL | Less Than PCL |
| | Feb-14 | 14.6 | 0.00200 | 0.00091 J | -7.00 | -0.242 | -0.235 | Less Than PCL | 0.00361 | Less Than PCL | Less Than PCL |
| | Jul-14 | 15.0 | 0.00200 | 0.00205 | -5.99 | -0.213 | -0.235 | No | 0.00330 | Yes | Evaluate Further |
| | Jan-15 | 15.5 | 0.00200 | 0.00025 U | -8.00 | -0.227 | -0.235 | Less Than PCL | 0.00292 | Less Than PCL | Less Than PCL |
| | Jul-15 | 16.0 | 0.00200 | 0.000894 J | -7.02 | -0.221 | -0.235 | Less Than PCL | 0.00259 | Less Than PCL | Less Than PCL |
| | Jan-16 | 16.5 | 0.00200 | 0.0005 U | -8.00 | -0.227 | -0.235 | Less Than PCL | 0.00230 | Less Than PCL | Less Than PCL |
| | Jul-16 | 17.0 | 0.00200 | 0.0005 U | -8.00 | -0.231 | -0.235 | Less Than PCL | 0.00205 | Less Than PCL | Less Than PCL |
| 508F56MW | Apr-05 | 0.0 | 0.00200 | 0.00600 | -5.12 | -- | -- | -- | -- | -- | -- |
| | Jul-05 | 0.3 | 0.00200 | 0.00200 | -6.21 | -- | -- | -- | -- | -- | -- |
| | Oct-05 | 0.5 | 0.00200 | 0.00030 U | -8.00 | -- | -- | -- | -- | -- | -- |
| | Jan-06 | 0.8 | 0.00200 | 0.00200 J | -6.21 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Aug-06 | 1.4 | 0.00200 | 0.00100 J | -6.91 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Apr-07 | 2.0 | 0.00200 | 0.00170 J | -6.38 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Aug-07 | 2.3 | 0.00200 | 0.00180 J | -6.32 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Feb-08 | 2.9 | 0.00200 | 0.000430 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-08 | 3.3 | 0.00200 | 0.00056 J | -7.49 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-09 | 3.8 | 0.00200 | 0.00030 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-09 | 4.3 | 0.00200 | 0.00030 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-10 | 4.8 | 0.00200 | 0.00028 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-10 | 5.3 | 0.00200 | 0.00028 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-11 | 5.8 | 0.00200 | 0.00022 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-11 | 6.3 | 0.00200 | 0.00022 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-12 | 6.8 | 0.00200 | 0.00027 J | -8.22 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-12 | 7.3 | 0.00200 | 0.00022 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-13 | 13.4 | 0.00200 | 0.00044 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-13 | 13.9 | 0.00200 | 0.00044 U | -8.00 | -- | -0.096 | Less Than PCL | 0.00271 | Less Than PCL | Less Than PCL |
| | Feb-14 | 14.6 | 0.00200 | 0.00033 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-14 | 15.0 | 0.00200 | 0.00025 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-15 | 15.5 | 0.00200 | 0.00025 U | -8.00 | -- | -0.096 | Less Than PCL | 0.00233 | Less Than PCL | Less Than PCL |
| | Jul-15 | 16.0 | 0.00200 | 0.00025 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-16 | 16.5 | 0.00200 | 0.0005 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-16 | 17.0 | 0.00200 | 0.0005 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |

**Table 4-4**

**Summary of Concentration vs. Time Attenuation Rate Constants**
**SWMU 136 North Plume**
**2016 RAER**
**Former NAS Dallas, Texas**
**Page 4 of 5**

| Monitoring Well ID | Sampling Date | Elapsed Time (Years) | Protective Concentration Level (mg/L) | Concentration Detected (mg/L) | Natural Log of Concentration (mg/L) | Degradation Rate from Natural Log ($K_{time}$) (mg/L per year) | Minimum Degradation Rate Required for Remedial Goals Natural Log ($K_{time}$) (mg/L per year) | Minimum Degradation Rate Met? (Yes/No) | Expected Remedial Goal Concentration (mg/L) | Expected Remedial Goal Concentration Met? (Yes/No) | Remedial Goals Being Met? (Yes/No) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | **Benzene** | | | | | |
| 508F22MW | Aug-99 | 0.0 | 0.00500 | 0.00500 U | -8.00 | -- | -- | -- | -- | -- | -- |
| | Jun-00 | 0.9 | 0.00500 | 0.00500 U | -8.00 | -- | -- | -- | -- | -- | -- |
| | Jun-01 | 1.8 | 0.00500 | 0.00500 U | -8.00 | -- | -- | -- | -- | -- | -- |
| | Jan-03 | 3.4 | 0.00500 | 0.00068 J | -7.29 | -- | -- | -- | -- | -- | -- |
| | Aug-03 | 4.1 | 0.00500 | 0.00370 | -5.60 | -- | -- | -- | -- | -- | -- |
| | Dec-03 | 4.4 | 0.00500 | 0.00050 J | -7.60 | -- | -- | -- | -- | -- | -- |
| | Jul-04 | 5.0 | 0.00500 | 0.01500 | -4.20 | -- | -- | -- | -- | -- | -- |
| | Oct-04 | 5.2 | 0.00500 | 0.02500 | -3.69 | -- | -- | -- | -- | -- | -- |
| | Apr-05 | 5.7 | 0.00500 | 0.03300 | -3.41 | -- | -- | -- | -- | -- | -- |
| | Oct-05 | 6.2 | 0.00500 | 0.01900 | -3.96 | 0.153 | -0.091 | No | 0.01348 | No | No |
| | May-06 | 6.8 | 0.00500 | 0.02600 | -3.65 | 0.138 | -0.091 | No | 0.01274 | No | No |
| | Aug-06 | 7.1 | 0.00500 | 0.00100 UJ | -8.00 | -1.200 | -0.091 | Less Than PCL | 0.01242 | Less Than PCL | Less Than PCL |
| | Apr-07 | 7.7 | 0.00500 | 0.00610 | -5.10 | -0.857 | -0.091 | Yes | 0.01175 | Yes | Yes |
| | Aug-07 | 8.0 | 0.00500 | 0.00570 | -5.17 | -0.690 | -0.091 | Yes | 0.01140 | Yes | Yes |
| | Feb-08 | 8.5 | 0.00500 | 0.00910 | -4.70 | -0.489 | -0.091 | Yes | 0.01089 | Yes | Yes |
| | Jul-08 | 8.9 | 0.00500 | 0.00130 | -6.65 | -0.594 | -0.091 | Less Than PCL | 0.01048 | Less Than PCL | Less Than PCL |
| | Jan-09 | 9.4 | 0.00500 | 0.01310 | -4.34 | -0.391 | -0.091 | Yes | 0.01001 | No | Evaluate Further |
| | Jul-09 | 10.0 | 0.00500 | 0.00040 U | -8.00 | -0.569 | -0.091 | Less Than PCL | 0.00956 | Less Than PCL | Less Than PCL |
| | Jan-10 | 10.4 | 0.00500 | 0.01570 | -4.15 | -0.375 | -0.091 | Yes | 0.00914 | No | Evaluate Further |
| | Jul-10 | 10.9 | 0.00500 | 0.01600 | -4.14 | -0.242 | -0.091 | Yes | 0.00873 | No | Evaluate Further |
| | Jan-11 | 11.4 | 0.00500 | 0.00053 J | -7.54 | -0.337 | -0.091 | Less Than PCL | 0.00835 | Less Than PCL | Less Than PCL |
| | Jul-11 | 12.0 | 0.00500 | 0.00020 U | -8.00 | -0.412 | -0.091 | Less Than PCL | 0.00795 | Less Than PCL | Less Than PCL |
| | Jan-12 | 12.4 | 0.00500 | 0.00020 U | -8.00 | -0.455 | -0.091 | Less Than PCL | 0.00762 | Less Than PCL | Less Than PCL |
| | Jul-12 | 12.9 | 0.00500 | 0.00020 U | -8.00 | -0.476 | -0.091 | Less Than PCL | 0.00729 | Less Than PCL | Less Than PCL |
| | Jan-13 | 13.4 | 0.00500 | 0.00021 U | -8.00 | -0.483 | -0.091 | Less Than PCL | 0.00696 | Less Than PCL | Less Than PCL |
| | Jul-13 | 13.9 | 0.00500 | 0.00021 U | -8.00 | -0.480 | -0.091 | Less Than PCL | 0.00665 | Less Than PCL | Less Than PCL |
| | Feb-14 | 14.6 | 0.00500 | 0.00024 U | -8.00 | -0.470 | -0.091 | Less Than PCL | 0.00628 | Less Than PCL | Less Than PCL |
| | Jul-14 | 15.0 | 0.00500 | 0.00025 U | -8.00 | -0.458 | -0.091 | Less Than PCL | 0.00607 | Less Than PCL | Less Than PCL |
| | Jan-15 | 15.5 | 0.00500 | 0.00025 U | -8.00 | -0.444 | -0.091 | Less Than PCL | 0.00579 | Less Than PCL | Less Than PCL |
| | Jul-15 | 16.0 | 0.00500 | 0.00025 U | -8.00 | -0.428 | -0.091 | Less Than PCL | 0.00552 | Less Than PCL | Less Than PCL |
| | Jan-16 | 16.5 | 0.00500 | 0.00025 U | -8.00 | -0.411 | -0.091 | Less Than PCL | 0.00528 | Less Than PCL | Less Than PCL |
| | Jul-16 | 17.0 | 0.00500 | 0.00025 U | -8.00 | -0.395 | -0.091 | Less Than PCL | 0.00504 | Less Than PCL | Less Than PCL |
| 508F54MW | Apr-05 | 0.0 | 0.00500 | 0.00400 | -5.52 | -- | -- | -- | -- | -- | -- |
| | Jul-05 | 0.3 | 0.00500 | 0.00300 | -5.81 | -- | -- | -- | -- | -- | -- |
| | Oct-05 | 0.5 | 0.00500 | 0.00300 J | -5.81 | -- | -- | -- | -- | -- | -- |
| | Jan-06 | 0.8 | 0.00500 | 0.00300 | -5.81 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Aug-06 | 1.4 | 0.00500 | 0.00300 | -5.81 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Apr-07 | 2.0 | 0.00500 | 0.00290 | -5.84 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Aug-07 | 2.3 | 0.00500 | 0.00200 | -6.21 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Feb-08 | 2.9 | 0.00500 | 0.00220 | -6.12 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-08 | 3.3 | 0.00500 | 0.00150 | -6.50 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-09 | 3.8 | 0.00500 | 0.00150 | -6.50 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-09 | 4.3 | 0.00500 | 0.00058 J | -7.45 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-10 | 4.8 | 0.00500 | 0.00110 | -6.81 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-10 | 5.3 | 0.00500 | 0.00087 | -7.05 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-11 | 5.8 | 0.00500 | 0.00082 J | -7.11 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-11 | 6.3 | 0.00500 | 0.00110 | -6.81 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-12 | 6.8 | 0.00500 | 0.00057 | -7.47 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-12 | 7.3 | 0.00500 | 0.00020 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-13 | 13.4 | 0.00500 | 0.00021 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-13 | 13.9 | 0.00500 | 0.00021 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Feb-14 | 14.6 | 0.00500 | 0.00024 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-14 | 15.0 | 0.00500 | 0.0005 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-15 | 15.5 | 0.00500 | 0.0005 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-15 | 16.0 | 0.00500 | 0.0005 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-16 | 16.5 | 0.00500 | 0.0005 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-16 | 17.0 | 0.00500 | 0.0005 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |

**Table 4-4**

**Summary of Concentration vs. Time Attenuation Rate Constants**
**SWMU 136 North Plume**
**2016 RAER**
**Former NAS Dallas, Texas**
**Page 5 of 5**

| Monitoring Well ID | Sampling Date | Elapsed Time (Years) | Protective Concentration Level (mg/L) | Concentration Detected (mg/L) | Natural Log of Concentration (mg/L) | Degradation Rate from Natural Log ($K_{time}$) (mg/L per year) | Minimum Degradation Rate Required for Remedial Goals Natural Log ($K_{time}$) (mg/L per year) | Minimum Degradation Rate Met? (Yes/No) | Expected Remedial Goal Concentration (mg/L) | Expected Remedial Goal Concentration Met? (Yes/No) | Remedial Goals Being Met? (Yes/No) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 508F56MW | Apr-05 | 0.0 | 0.00500 | 0.00300 | -5.81 | -- | -- | -- | -- | -- | -- |
| | Jul-05 | 0.3 | 0.00500 | 0.00030 U | -8.00 | -- | -- | -- | -- | -- | -- |
| | Oct-05 | 0.5 | 0.00500 | 0.00030 U | -8.00 | -- | -- | -- | -- | -- | -- |
| | Jan-06 | 0.8 | 0.00500 | 0.00070 J | -7.26 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Aug-06 | 1.4 | 0.00500 | 0.00070 J | -7.26 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Apr-07 | 2.0 | 0.00500 | 0.00220 | -6.12 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Aug-07 | 2.3 | 0.00500 | 0.00130 | -6.65 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Feb-08 | 2.9 | 0.00500 | 0.000390 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-08 | 3.3 | 0.00500 | 0.00040 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-09 | 3.8 | 0.00500 | 0.00040 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-09 | 4.3 | 0.00500 | 0.00040 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-10 | 4.8 | 0.00500 | 0.00021 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-10 | 5.3 | 0.00500 | 0.00021 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-11 | 5.8 | 0.00500 | 0.00020 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-11 | 6.3 | 0.00500 | 0.00020 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-12 | 6.8 | 0.00500 | 0.00020 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-12 | 7.3 | 0.00500 | 0.00020 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-13 | 13.4 | 0.00500 | 0.00021 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-13 | 13.9 | 0.00500 | 0.00021 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Feb-14 | 14.6 | 0.00500 | 0.00024 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-14 | 15.0 | 0.00500 | 0.00025 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-15 | 15.5 | 0.00500 | 0.00025 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-15 | 16.0 | 0.00500 | 0.00025 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-16 | 16.5 | 0.00500 | 0.0005 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-16 | 17.0 | 0.00500 | 0.0005 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |

mg/L - milligrams per liter
NA - Not Applicable
NS - Not Sampled
NS-D - Not Sampled due to Dry Well

Notes:
Shaded areas indicate an exceedance.
For graphing purposes non-detect concentrations have been assigned a natural log value of -8.00.

Analytical Result Qualifiers:

J - Indicates that the chemical was detected. However, the associated numerical result may not be a precise representation of the amount that is actually present in the sample. The laboratory reported concentration is considered to be an estimate of the true concentration.
U - Indicates that the chemical was not detected at the numerical detection limit (sample-specific quantitation limit) noted. Nondetected results from the laboratory are reported in this manner. This qualifier is added to a positive result (reported by the laboratory) if the detected concentration is determined to be attributable to contamination introduced during field sampling or laboratory analysis.

# TABLE 4-5
# SUMMARY OF CONCENTRATION vs. DISTANCE ATTENUATION RATE CONSTANTS

**Table 4-5**

**Summary of Concentration vs. Distance Attenuation Rate Constants**
**SWMU 136 North Plume**
**2016 RAER**
**Former NAS Dallas, Texas**
**Page 1 of 4**

| Sampling Date | Elapsed Time (years) | Protective Concentration Levels (mg/L) | Detected Concentration (mg/L) | | | Natural Log of COC Concentration (mg/L) | | | $K_{dist}$ [(mg/L) per foot] |
|---|---|---|---|---|---|---|---|---|---|
| **Centerline Monitoring Wells** | | | **508F54MW** | **508F22MW** | **508F55MW** | **508F54MW** | **508F22MW** | **508F55MW** | |
| **Distance from source (ft)** | | | **0** | **91** | **122** | **0** | **91** | **122** | |
| **Trichloroethene** | | | | | | | | | |
| Aug-99 | 4.6 | 0.00500 | -- | 0.00500 U | -- | -- | -8.00 | -- | -- |
| Jun-00 | 5.5 | 0.00500 | -- | 0.00500 U | -- | -- | -8.00 | -- | -- |
| Jun-01 | 6.4 | 0.00500 | -- | 0.00500 U | -- | -- | -8.00 | -- | -- |
| Jan-03 | 8.0 | 0.00500 | -- | 0.00100 U | -- | -- | -8.00 | -- | -- |
| Aug-03 | 8.6 | 0.00500 | -- | 0.00073 U | -- | -- | -8.00 | -- | -- |
| Dec-03 | 8.9 | 0.00500 | -- | 0.00010 U | -- | -- | -8.00 | -- | -- |
| Jul-04 | 9.6 | 0.00500 | -- | 0.00022 U | -- | -- | -8.00 | -- | -- |
| Oct-04 | 9.8 | 0.00500 | -- | 0.00022 U | -- | -- | -8.00 | -- | -- |
| Apr-05 | 10.2 | 0.00500 | 0.83000 | 0.00030 U | 0.00080 J | -0.19 | -8.00 | -7.13 | -0.0635 |
| Oct-05 | 10.8 | 0.00500 | 0.01300 J | 0.00030 U | 0.00030 U | -4.34 | -8.00 | -8.00 | -0.0323 |
| Jan-06 | 11.1 | 0.00500 | 0.00300 J | 0.00040 U | 0.00030 U | -5.81 | -8.00 | -8.00 | -0.0194 |
| Aug-06 | 11.6 | 0.00500 | 0.00100 | 0.00040 U | 0.00040 U | -6.91 | -8.00 | -8.00 | -0.0097 |
| Apr-07 | 12.3 | 0.00500 | 0.00078 J | 0.00014 U | 0.00056 U | -7.16 | -8.00 | -8.00 | -0.0075 |
| Aug-07 | 12.6 | 0.00500 | 0.00120 | 0.00023 U | 0.00023 U | -6.73 | -8.00 | -8.00 | -0.0113 |
| Feb-08 | 13.1 | 0.00500 | 0.00053 U | 0.00053 U | 0.00053 U | -8.00 | -8.00 | -8.00 | 0.0000 |
| Jul-08 | 13.5 | 0.00500 | 0.00040 J | 0.00032 U | 0.00032 U | -7.82 | -8.00 | -8.00 | -0.0016 |
| Jan-09 | 14.0 | 0.00500 | 0.00032 U | 0.00032 U | 0.00032 U | -8.00 | -8.00 | -8.00 | 0.0000 |
| Jul-09 | 14.5 | 0.00500 | 0.00032 U | 0.00032 U | 0.00032 U | -8.00 | -8.00 | -8.00 | 0.0000 |
| Jan-10 | 15.0 | 0.00500 | 0.00024 U | 0.00024 U | 0.00024 U | -8.00 | -8.00 | -8.00 | 0.0000 |
| Jul-10 | 15.5 | 0.00500 | 0.00024 U | 0.00024 U | 0.00024 U | -8.00 | -8.00 | -8.00 | 0.0000 |
| Jan-11 | 16.0 | 0.00500 | 0.00026 U | 0.00026 U | 0.00026 U | -8.00 | -8.00 | -8.00 | 0.0000 |
| Jul-11 | 16.6 | 0.00500 | 0.00026 U | 0.00026 U | 0.00034 J | -8.00 | -8.00 | -7.99 | 0.0001 |
| Jan-12 | 17.0 | 0.00500 | 0.00026 U | 0.00026 U | 0.00026 U | -8.00 | -8.00 | -8.00 | 0.0000 |
| Jul-12 | 17.5 | 0.00500 | 0.00026 U | 0.00026 U | 0.00026 U | -8.00 | -8.00 | -8.00 | 0.0000 |
| Jan-13 | 18.0 | 0.00500 | 0.00031 U | 0.00031 U | 0.00031 U | -8.00 | -8.00 | -8.00 | 0.0000 |
| Jul-13 | 18.5 | 0.00500 | 0.00031 U | 0.00031 U | 0.00031 U | -8.00 | -8.00 | -8.00 | 0.0000 |
| Feb-14 | 19.1 | 0.00500 | 0.0003 U | 0.0003 U | 0.0003 U | -8.00 | -8.00 | -8.00 | 0.0000 |
| Jul-14 | 19.5 | 0.00500 | 0.0005 U | 0.00025 U | 0.00025 U | -8.00 | -8.00 | -8.00 | 0.0000 |
| Jan-15 | 20.1 | 0.00500 | 0.0005 U | 0.00025 U | 0.00025 U | -5.30 | -8.00 | -8.00 | -0.0239 |
| Jul-15 | 20.6 | 0.00500 | 0.0005 U | 0.00025 U | 0.00025 U | -8.00 | -8.00 | -8.00 | 0.0000 |
| Jan-16 | 21.1 | 0.00500 | 0.00072 J | 0.00025 UJ | 0.00025 U | -7.24 | -8.00 | -8.00 | -0.0067 |
| Jul-16 | 21.6 | 0.00500 | 0.0005 U | 0.00025 U | 0.00025 U | -8.00 | -8.00 | -8.00 | 0.0000 |

**Table 4-5**

**Summary of Concentration vs. Distance Attenuation Rate Constants**
**SWMU 136 North Plume**
**2016 RAER**
**Former NAS Dallas, Texas**
**Page 2 of 4**

| Sampling Date | Elapsed Time (years) | Protective Concentration Levels (mg/L) | Detected Concentration (mg/L) | | | Natural Log of COC Concentration (mg/L) | | | $K_{dist}$ [(mg/L) per foot] |
|---|---|---|---|---|---|---|---|---|---|
| **Centerline Monitoring Wells** | | | **508F54MW** | **508F22MW** | **508F55MW** | **508F54MW** | **508F22MW** | **508F55MW** | |
| **Distance from source (ft)** | | | **0** | **91** | **122** | **0** | **91** | **122** | |
| **cis-1,2-Dichloroethene** | | | | | | | | | |
| Aug-99 | 4.6 | 0.07000 | -- | 0.00500 U | -- | -- | -8.00 | -- | -- |
| Jun-00 | 5.5 | 0.07000 | -- | 0.00500 U | -- | -- | -8.00 | -- | -- |
| Jun-01 | 6.4 | 0.07000 | -- | 0.00250 U | -- | -- | -8.00 | -- | -- |
| Jan-03 | 8.0 | 0.07000 | -- | 0.06300 | -- | -- | -2.76 | -- | -- |
| Aug-03 | 8.6 | 0.07000 | -- | 0.09000 | -- | -- | -2.41 | -- | -- |
| Dec-03 | 8.9 | 0.07000 | -- | 0.00860 J | -- | -- | -4.76 | -- | -- |
| Jul-04 | 9.6 | 0.07000 | -- | 0.00210 | -- | -- | -6.17 | -- | -- |
| Oct-04 | 9.8 | 0.07000 | -- | 0.00110 | -- | -- | -6.81 | -- | -- |
| Apr-05 | 10.2 | 0.07000 | 0.40000 | 0.00070 J | 0.00090 J | -0.92 | -7.26 | -7.01 | -0.0545 |
| Oct-05 | 10.8 | 0.07000 | 0.22000 J | 0.00300 | 0.00030 U | -1.51 | -5.81 | -8.00 | -0.0519 |
| Jan-06 | 11.1 | 0.07000 | 0.18000 | 0.00050 U | 0.00030 U | -1.71 | -8.00 | -8.00 | -0.0555 |
| Aug-06 | 11.6 | 0.07000 | 0.09200 | 0.00200 J | 0.00100 UJ | -2.39 | -6.21 | -6.91 | -0.0382 |
| Apr-07 | 12.3 | 0.07000 | 0.05400 | 0.00064 J | 0.00180 U | -2.92 | -5.05 | -8.00 | -0.0376 |
| Aug-07 | 12.6 | 0.07000 | 0.17000 | 0.00094 J | 0.00021 J | -1.77 | -6.97 | -8.47 | -0.0555 |
| Feb-08 | 13.1 | 0.07000 | 0.01380 | 0.00032 U | 0.00032 U | -4.28 | -8.00 | -8.00 | -0.0328 |
| Jul-08 | 13.5 | 0.07000 | 0.01270 | 0.00066 J | 0.00020 U | -4.37 | -7.32 | -8.00 | -0.0304 |
| Jan-09 | 14.0 | 0.07000 | 0.00650 | 0.00020 U | 0.00020 U | -5.04 | -8.00 | -8.00 | -0.0262 |
| Jul-09 | 14.5 | 0.07000 | 0.00200 | 0.00036 J | 0.00020 U | -6.21 | -7.93 | -8.00 | -0.0156 |
| Jan-10 | 15.0 | 0.07000 | 0.00280 | 0.00032 U | 0.00032 U | -5.88 | -8.00 | -8.00 | -0.0187 |
| Jul-10 | 15.5 | 0.07000 | 0.01010 | 0.00032 U | 0.00032 U | -4.60 | -8.00 | -8.00 | -0.0301 |
| Jan-11 | 16.0 | 0.07000 | 0.00280 | 0.00026 U | 0.00026 U | -5.88 | -8.00 | -8.00 | -0.0187 |
| Jul-11 | 16.6 | 0.07000 | 0.00650 | 0.00026 U | 0.00026 U | -5.04 | -8.00 | -8.00 | -0.0262 |
| Jan-12 | 17.0 | 0.07000 | 0.00160 | 0.00026 U | 0.00026 U | -6.44 | -8.00 | -8.00 | -0.0138 |
| Jul-12 | 17.5 | 0.07000 | 0.00055 | 0.00026 U | 0.00026 U | -7.51 | -8.00 | -8.00 | -0.0044 |
| Jan-13 | 18.0 | 0.07000 | 0.00077 J | 0.00024 U | 0.00024 U | -7.17 | -8.00 | -8.00 | -0.0073 |
| Jul-13 | 18.5 | 0.07000 | 0.00033 J | 0.00024 U | 0.00024 U | -8.02 | -8.00 | -8.00 | 0.0001 |
| Feb-14 | 19.1 | 0.07000 | 0.0013 | 0.00033 U | 0.00033 U | -6.65 | -8.00 | -8.00 | -0.0120 |
| Jul-14 | 19.5 | 0.07000 | 0.003 | 0.00025 U | 0.00025 U | -5.81 | -8.00 | -8.00 | -0.0194 |
| Jan-15 | 20.1 | 0.07000 | 0.0005 U | 0.00025 U | 0.00025 U | -8.00 | -8.00 | -8.00 | 0.0000 |
| Jul-15 | 20.6 | 0.07000 | 0.00244 | 0.00025 U | 0.00025 U | -6.02 | -8.00 | -8.00 | -0.0175 |
| Jan-16 | 21.1 | 0.07000 | 0.0005 U | 0.00025 UJ | 0.00025 U | -8.00 | -8.00 | -8.00 | 0.0000 |
| Jul-16 | 21.6 | 0.07000 | 0.0005 U | 0.00025 U | 0.00025 U | -8.00 | -8.00 | -8.00 | 0.0000 |

**Table 4-5**

**Summary of Concentration vs. Distance Attenuation Rate Constants**
**SWMU 136 North Plume**
**2016 RAER**
**Former NAS Dallas, Texas**
**Page 3 of 4**

| Sampling Date | Elapsed Time (years) | Protective Concentration Levels (mg/L) | Detected Concentration (mg/L) | | | Natural Log of COC Concentration (mg/L) | | | $K_{dist}$ [(mg/L) per foot] |
|---|---|---|---|---|---|---|---|---|---|
| **Centerline Monitoring Wells** | | | **508F54MW** | **508F22MW** | **508F55MW** | **508F54MW** | **508F22MW** | **508F55MW** | |
| **Distance from source (ft)** | | | **0** | **91** | **122** | **0** | **91** | **122** | |
| **Vinyl Chloride** | | | | | | | | | |
| Aug-99 | 4.6 | 0.00200 | -- | 0.00500 U | -- | -- | -8.00 | -- | -- |
| Jun-00 | 5.5 | 0.00200 | -- | 0.00500 U | -- | -- | -8.00 | -- | -- |
| Jun-01 | 6.4 | 0.00200 | -- | 0.01000 U | -- | -- | -8.00 | -- | -- |
| Jan-03 | 8.0 | 0.00200 | -- | 0.01800 | -- | -- | -4.02 | -- | -- |
| Aug-03 | 8.6 | 0.00200 | -- | 0.05800 | -- | -- | -2.85 | -- | -- |
| Dec-03 | 8.9 | 0.00200 | -- | 0.00670 J | -- | -- | -5.01 | -- | -- |
| Jul-04 | 9.6 | 0.00200 | -- | 0.00360 | -- | -- | -5.63 | -- | -- |
| Oct-04 | 9.8 | 0.00200 | -- | 0.00270 | -- | -- | -5.91 | -- | -- |
| Apr-05 | 10.2 | 0.00200 | 0.00400 | 0.00100 J | 0.00030 U | -5.52 | -6.91 | -8.00 | -0.0192 |
| Oct-05 | 10.8 | 0.00200 | 0.02600 J | 0.00200 | 0.00030 U | -3.65 | -6.21 | -8.00 | -0.0340 |
| Jan-06 | 11.1 | 0.00200 | 0.03200 J | 0.00100 J | 0.00030 U | -3.44 | -6.91 | -8.00 | -0.0376 |
| Aug-06 | 11.6 | 0.00200 | 0.03200 | 0.00100 J | 0.00060 U | -3.44 | -6.91 | -8.00 | -0.0376 |
| Apr-07 | 12.3 | 0.00200 | 0.02000 | 0.00360 | 0.00048 U | -3.91 | -5.63 | -8.00 | -0.0303 |
| Aug-07 | 12.6 | 0.00200 | 0.02400 J | 0.00360 J | 0.00054 J | -3.73 | -5.63 | -7.52 | -0.0289 |
| Feb-08 | 13.1 | 0.00200 | 0.00350 | 0.00043 U | 0.00043 U | -5.65 | -8.00 | -8.00 | -0.0207 |
| Jul-08 | 13.5 | 0.00200 | 0.00470 | 0.00170 | 0.00030 U | -5.36 | -6.38 | -8.00 | -0.0193 |
| Jan-09 | 14.0 | 0.00200 | 0.00590 | 0.00030 U | 0.00030 U | -5.13 | -8.00 | -8.00 | -0.0253 |
| Jul-09 | 14.5 | 0.00200 | 0.00180 | 0.00300 U | 0.00300 U | -6.32 | -8.00 | -8.00 | -0.0148 |
| Jan-10 | 15.0 | 0.00200 | 0.00280 | 0.00028 U | 0.00028 U | -5.88 | -8.00 | -8.00 | -0.0187 |
| Jul-10 | 15.5 | 0.00200 | 0.00430 | 0.00028 U | 0.00028 U | -5.45 | -8.00 | -8.00 | -0.0225 |
| Jan-11 | 16.0 | 0.00200 | 0.00450 | 0.00022 U | 0.00022 U | -5.40 | -8.00 | -8.00 | -0.0229 |
| Jul-11 | 16.6 | 0.00200 | 0.00560 | 0.00022 U | 0.00022 U | -5.18 | -8.00 | -8.00 | -0.0249 |
| Jan-12 | 17.0 | 0.00200 | 0.00520 | 0.00022 U | 0.00022 U | -5.26 | -8.00 | -8.00 | -0.0242 |
| Jul-12 | 17.5 | 0.00200 | 0.00250 | 0.00022 U | 0.00022 U | -5.99 | -8.00 | -8.00 | -0.0177 |
| Jan-13 | 18.0 | 0.00200 | 0.0014 | 0.00044 U | 0.00044 U | -6.57 | -8.00 | -8.00 | -0.0126 |
| Jul-13 | 18.5 | 0.00200 | 0.00063 J | 0.00044 U | 0.00044 U | -7.37 | -8.00 | -8.00 | -0.0056 |
| Feb-14 | 19.1 | 0.00200 | 0.00091 J | 0.00033 U | 0.00033 U | -7.00 | -8.00 | -8.00 | -0.0088 |
| Jul-14 | 19.5 | 0.00200 | 0.00205 | 0.00025 U | 0.00025 U | -6.19 | -8.00 | -8.00 | -0.0160 |
| Jan-15 | 20.1 | 0.00200 | 0.0005 U | 0.00025 U | 0.00025 U | -6.19 | -8.00 | -8.00 | -0.0160 |
| Jul-15 | 20.6 | 0.00200 | 0.000894 J | 0.00025 U | 0.00025 U | -7.02 | -8.00 | -8.00 | -0.0087 |
| Jan-16 | 21.1 | 0.00200 | 0.0005 U | 0.00025 U | 0.00025 U | -8.00 | -8.00 | -8.00 | 0.0000 |
| Jul-16 | 21.6 | 0.00200 | 0.0005 U | 0.00025 U | 0.00025 U | -8.00 | -8.00 | -8.00 | 0.0000 |

**Table 4-5**

**Summary of Concentration vs. Distance Attenuation Rate Constants**
**SWMU 136 North Plume**
**2016 RAER**
**Former NAS Dallas, Texas**
**Page 4 of 4**

| Sampling Date | Elapsed Time (years) | Protective Concentration Levels (mg/L) | Detected Concentration (mg/L) | | | Natural Log of COC Concentration (mg/L) | | | $K_{dist}$ [(mg/L) per foot] |
|---|---|---|---|---|---|---|---|---|---|
| **Centerline Monitoring Wells** | | | **508F54MW** | **508F22MW** | **508F55MW** | **508F54MW** | **508F22MW** | **508F55MW** | |
| **Distance from source (ft)** | | | **0** | **91** | **122** | **0** | **91** | **122** | |
| **Benzene** | | | | | | | | | |
| Aug-99 | 4.6 | 0.00500 | -- | 0.00500 U | -- | -- | -8.00 | -- | -- |
| Jun-00 | 5.5 | 0.00500 | -- | 0.00500 U | -- | -- | -8.00 | -- | -- |
| Jun-01 | 6.4 | 0.00500 | -- | 0.00500 U | -- | -- | -8.00 | -- | -- |
| Jan-03 | 8.0 | 0.00500 | -- | 0.00068 J | -- | -- | -7.29 | -- | -- |
| Aug-03 | 8.6 | 0.00500 | -- | 0.00370 | -- | -- | -5.60 | -- | -- |
| Dec-03 | 8.9 | 0.00500 | -- | 0.00050 J | -- | -- | -7.60 | -- | -- |
| Jul-04 | 9.6 | 0.00500 | -- | 0.01500 | -- | -- | -4.20 | -- | -- |
| Oct-04 | 9.8 | 0.00500 | -- | 0.02500 | -- | -- | -3.69 | -- | -- |
| Apr-05 | 10.2 | 0.00500 | 0.00400 | 0.03300 | 0.00030 U | -5.52 | -3.41 | -8.00 | -0.0106 |
| Oct-05 | 10.8 | 0.00500 | 0.00300 J | 0.01900 | 0.00030 U | -5.81 | -3.96 | -8.00 | -0.0094 |
| Jan-06 | 11.1 | 0.00500 | 0.00300 | 0.02600 | 0.00030 U | -5.81 | -3.65 | -8.00 | -0.0086 |
| Aug-06 | 11.6 | 0.00500 | 0.00300 | 0.00100 UJ | 0.00100 UJ | -5.81 | -6.91 | -6.91 | -0.0097 |
| Apr-07 | 12.3 | 0.00500 | 0.00290 | 0.00610 | 0.0052 U | -5.84 | -5.10 | -8.00 | -0.0119 |
| Aug-07 | 12.6 | 0.00500 | 0.00200 | 0.00570 | 0.00110 | -6.21 | -5.17 | -6.81 | -0.0012 |
| Feb-08 | 13.1 | 0.00500 | 0.00130 | 0.00910 | 0.000390 U | -6.65 | -4.70 | -8.00 | -0.0038 |
| Jul-08 | 13.5 | 0.00500 | 0.00150 | 0.00130 | 0.00040 U | -6.50 | -6.65 | -8.00 | -0.0099 |
| Jan-09 | 14.0 | 0.00500 | 0.00150 | 0.01310 | 0.00040 U | -6.50 | -4.34 | -8.00 | -0.0042 |
| Jul-09 | 14.5 | 0.00500 | 0.00056 J | 0.00040 U | 0.00400 | -7.49 | -8.00 | -5.52 | 0.0113 |
| Jan-10 | 15.0 | 0.00500 | 0.00110 | 0.01570 | 0.00021 U | -6.81 | -4.15 | -8.00 | -0.0010 |
| Jul-10 | 15.5 | 0.00500 | 0.00087 | 0.01600 | 0.00021 U | -7.05 | -4.14 | -8.00 | 0.0011 |
| Jan-11 | 16.0 | 0.00500 | 0.00082 J | 0.00053 J | 0.00020 U | -7.11 | -7.54 | -8.00 | -0.0068 |
| Jul-11 | 16.6 | 0.00500 | 0.00110 | 0.00020 U | 0.00020 U | -6.81 | -8.00 | -8.00 | -0.0105 |
| Jan-12 | 17.0 | 0.00500 | 0.00041 J | 0.00020 U | 0.00020 U | -7.80 | -8.00 | -8.00 | -0.0018 |
| Jul-12 | 17.5 | 0.00500 | 0.00020 U | 0.00020 U | 0.00020 U | -8.00 | -8.00 | -8.00 | 0.0000 |
| Jan-13 | 18.0 | 0.00500 | 0.00021 U | 0.00021 U | 0.00021 U | -8.00 | -8.00 | -8.00 | 0.0000 |
| Jul-13 | 18.5 | 0.00500 | 0.00021 U | 0.00021 U | 0.00021 U | -8.00 | -8.00 | -8.00 | 0.0000 |
| Feb-14 | 19.1 | 0.00500 | 0.00024 U | 0.00024 U | 0.00024 U | -8.00 | -8.00 | -8.00 | 0.0000 |
| Jul-14 | 19.5 | 0.00500 | 0.0005 U | 0.00025 U | 0.00025 U | -8.00 | -8.00 | -8.00 | 0.0000 |
| Jan-15 | 20.1 | 0.00500 | 0.0005 U | 0.00025 U | 0.00025 U | -8.00 | -8.00 | -8.00 | 0.0000 |
| Jul-15 | 20.6 | 0.00500 | 0.0005 U | 0.00025 U | 0.00025 U | -8.00 | -8.00 | -8.00 | 0.0000 |
| Jan-16 | 21.1 | 0.00500 | 0.0005 U | 0.00025 UJ | 0.00025 U | -8.00 | -8.00 | -8.00 | 0.0000 |
| Jul-16 | 21.6 | 0.00500 | 0.0005 U | 0.00025 U | 0.00025 U | -8.00 | -8.00 | -8.00 | 0.0000 |

ft - feet
mg/L - milligrams per liter
NA - Not Applicable
NS - Not Sampled

Notes:
Shaded areas indicate an exceedance.
For graphing purposes non-detect concentrations and estimated concentrations below 0.0003 mg/L have been assigned a natural log value of -8.

Analytical Result Qualifiers:
J - Indicates that the chemical was detected. However, the associated numerical result may not be a precise representation of the amount that is actually present in the sample. The laboratory reported concentration is considered to be an estimate of the true concentration.
U - Indicates that the chemical was not detected at the numerical detection limit (sample-specific quantitation limit) noted. Nondetected results from the laboratory are reported in this manner. This qualifier is added to a positive result (reported by the laboratory) if the detected concentration is determined to be attributable to contamination introduced during field sampling or laboratory analysis.

# Plug and Abandonment Documentation

# STATE OF TEXAS PLUGGING REPORT for Tracking #158495

| | | | |
|---|---|---|---|
| Owner: | **NAS Dallas** | Owner Well #: | **508F55MW** |
| Address: | **8100 West Jefferson<br>Grand Prairie, TX 75051** | Grid #: | **33-17-1** |
| Well Location: | **8100 West Jefferson<br>Grand Prairie, TX 75051** | Latitude: | **32° 44' 25.8" N** |
| | | Longitude: | **096° 57' 46.3" W** |
| Well County: | **Dallas** | Elevation: | **No Data** |
| Well Type: | **Monitor** | | |

*Drilling Information*

| | | | |
|---|---|---|---|
| Company: | **No Data** | Date Drilled: | **No Data** |
| Driller: | **No Data** | License Number: | **No Data** |

| | *Diameter (in.)* | *Top Depth (ft.)* | *Bottom Depth (ft.)* |
|---|---|---|---|
| Borehole: | | **0** | **21.9** |

*Plugging Information*

Date Plugged: **4/7/2016** Plugger:

Plug Method: **Pour in 3/8 bentonite chips when standing water in well is less than 100 feet depth, cement top 2 feet**

Casing Left in Well:

**No Data**

Plug(s) Placed in Well:

| *Top (ft.)* | *Bottom (ft.)* | *Description (number of sacks & material)* |
|---|---|---|
| **0** | **2** | **Cement 2 Bags/Sacks** |
| **2** | **21.9** | **Bentonite 2 Bags/Sacks** |

Certification Data: The driller certified that the driller plugged this well (or the well was plugged under the driller's direct supervision) and that each and all of the statements herein are true and correct. The driller understood that failure to complete the required items will result in the reports(s) being returned for completion and resubmittal.

Company Information: **Strata Core Services, LLC**

**112 S. Norwood Drive**
**Hurst, TX 76053**

Driller Name: **Brad Eskue** License Number: **58164**

Comments: **No Data**

# APPENDIX 5
# SAMPLING PROCEDURES

Sampling collection and handling procedures were updated to follow Uniform Federal Policy (UFP) for Sample and Analysis Plans in the document titled, Tier II Sampling and Analysis Plan, Long Term Groundwater Monitoring Plan, Former Naval Air Station Dallas, Dallas, Texas, dated December 2014

# APPENDIX 6
# LABORATORY DATA PACKAGES AND DATA USABILITY SUMMARIES

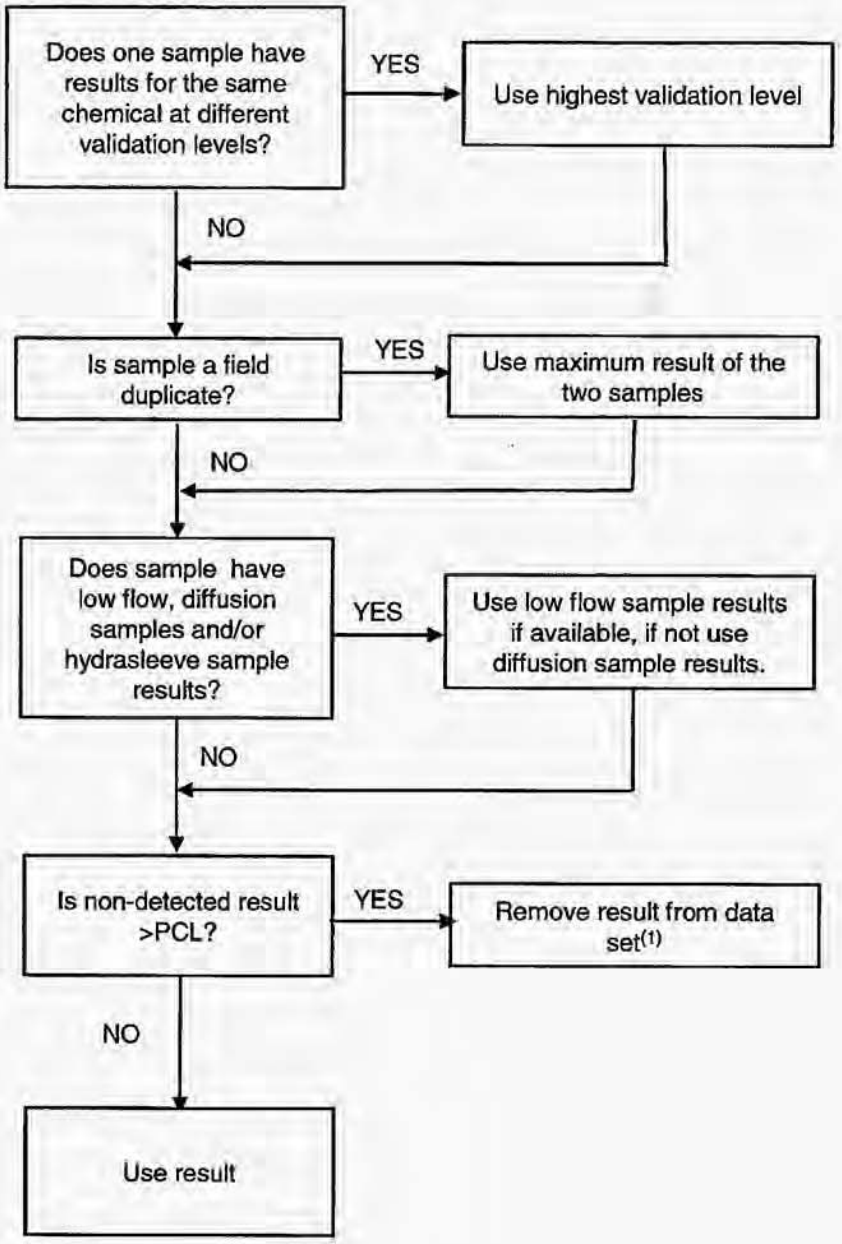
See the attached CD for the Laboratory Analytical Reports —
submitted with the 2016 RAER for SWMU 17/Building 1423
(sorted by Sample Delivery Group Number)

# APPENDIX 7
# STATISTICAL METHODOLOGY

Statistical Methodology has been submitted with the 2016 RAER for SWMU 17/Building 1423

GROUNDWATER DATABASE DEVELOPMENT FOR GRAPHING AND MANN KENDALL STATISTICAL EVALUATION
CATEGORY F MNA GROUNDWATER MODELING REPORT ADDENDUM

NAS DALLAS, TEXAS




NOTES:

(1) For 1,1,2,2-PCA and vinyl chloride the TRRP RES A limit < MDL of 5 U therefore only the non-detects > 5 U were removed from the data set.

# STDEV

See Also

Estimates standard deviation based on a sample. The standard deviation is a measure of how widely values are dispersed from the average value (the mean).

**Syntax**

**STDEV(number1**,number2,...)

Number1, number2, ... are 1 to 30 number arguments corresponding to a sample of a population. You can also use a single array or a reference to an array instead of arguments separated by commas.

**Remarks**

- STDEV assumes that its arguments are a sample of the population. If your data represents the entire population, then compute the standard deviation using STDEVP.
- The standard deviation is calculated using the "nonbiased" or "n-1" method.
- STDEV uses the following formula:
- $$\sqrt{\frac{n\sum x^2-\left(\sum x\right)^2}{n(n-1)}}$$

$$\sqrt{\frac{n\sum x^2-\left(\sum x\right)^2}{n(n-1)}}$$

- Logical values such as TRUE and FALSE and text are ignored. If logical values and text must not be ignored, use the STDEVA worksheet function.

**Example**

Suppose 10 tools stamped from the same machine during a production run are collected as a random sample and measured for breaking strength.

The example may be easier to understand if you copy it to a blank worksheet.

How?

| | A |
|---|---|
| 1 | **Strength** |
| 2 | 1345 |
| 3 | 1301 |
| 4 | 1368 |
| 5 | 1322 |
| 6 | 1310 |
| 7 | 1370 |
| 8 | 1318 |
| 9 | 1350 |
| 10 | 1303 |
| 11 | 1299 |

| Formula | Description (Result) |
|---|---|
| =STDEV(A2:A11) | Standard deviation of breaking strength (27.46391572) |

# BEST-FIT LINE USING LINEAR REGRESSION

# LINEST

See Also

Calculates the statistics for a line by using the "least squares" method to calculate a straight line that best fits your data, and returns an array that describes the line. Because this function returns an array of values, it must be entered as an array formula.

The equation for the line is:

y = mx + b or

y = m1x1 + m2x2 + ... + b (if there are multiple ranges of x-values)

where the dependent y-value is a function of the independent x-values. The m-values are coefficients corresponding to each x-value, and b is a constant value. Note that y, x, and m can be vectors. The array that LINEST returns is {mn,mn-1,...,m1,b}. LINEST can also return additional regression statistics.

**Syntax**

**LINEST(known_y's**,known_x's,const,stats)

Known_y's is the set of y-values you already know in the relationship y = mx + b.

- If the array known_y's is in a single column, then each column of known_x's is interpreted as a separate variable.
- If the array known_y's is in a single row, then each row of known_x's is interpreted as a separate variable.

Known_x's is an optional set of x-values that you may already know in the relationship y = mx + b.

- The array known_x's can include one or more sets of variables. If only one variable is used, known_y's and known_x's can be ranges of any shape, as long as they have equal dimensions. If more than one variable is used, known_y's must be a vector (that is, a range with a height of one row or a width of one column).
- If known_x's is omitted, it is assumed to be the array {1,2,3,...} that is the same size as known_y's.

Const is a logical value specifying whether to force the constant b to equal 0.

- If const is TRUE or omitted, b is calculated normally.
- If const is FALSE, b is set equal to 0 and the m-values are adjusted to fit y = mx.

Stats is a logical value specifying whether to return additional regression statistics.

- If stats is TRUE, LINEST returns the additional regression statistics, so the returned array is {mn,mn-1,...,m1,b;sen,sen-1,...,se1,seb;r2,sey;F,df;ssreg,ssresid}.
- If stats is FALSE or omitted, LINEST returns only the m-coefficients and the constant b.

The additional regression statistics are as follows.

| Statistic | Description |
|---|---|
| se1,se2,...,sen | The standard error values for the coefficients m1,m2,...,mn. |
| Seb | The standard error value for the constant b (seb = #N/A when const is FALSE). |
| r2 | The coefficient of determination. Compares estimated and actual y-values, and ranges in value from 0 to 1. If it is 1, there is a perfect correlation in the sample — there is no difference between the estimated y-value and the actual y-value. At the other extreme, if the coefficient of determination is 0, the regression equation is not helpful in predicting a y-value. For information about how r2 is calculated, see "Remarks" later in this topic. |
| sey | The standard error for the y estimate. |
| F | The F statistic, or the F-observed value. Use the F statistic to determine whether the observed relationship between the dependent and independent variables occurs by chance. |
| df | The degrees of freedom. Use the degrees of freedom to help you find F-critical values in a statistical table. Compare the values you find in the table to the F statistic returned by LINEST to determine a confidence level for the model. |
| ssreg | The regression sum of squares. |
| ssresid | The residual sum of squares. |

The following illustration shows the order in which the additional regression statistics are returned.

| | A | B | C | D | E | F |
|---|---|---|---|---|---|---|
| 1 | $m_n$ | $m_{n-1}$ | ... | $m_2$ | $m_1$ | b |
| 2 | $se_n$ | $se_{n-1}$ | ... | $se_2$ | $se_1$ | $se_b$ |
| 3 | $r_2$ | $se_y$ | | | | |
| 4 | F | $d_f$ | | | | |
| 5 | $ss_{reg}$ | $ss_{resid}$ | | | | |

**Remarks**

- You can describe any straight line with the slope and the y-intercept:

  Slope (m):
  To find the slope of a line, often written as m, take two points on the line, (x1,y1) and (x2,y2); the slope is equal to (y2 - y1)/(x2 - x1).

  Y-intercept (b):
  The y-intercept of a line, often written as b, is the value of y at the point where the line crosses the y-axis.

  The equation of a straight line is y = mx + b. Once you know the values of m and b, you can calculate any point on the line by plugging the y- or x-value into that equation. You can also use the TREND function.

- When you have only one independent x-variable, you can obtain the slope and y-intercept values directly by using the following formulas:

  Slope:
  =INDEX(LINEST(known_y's,known_x's),1)

  Y-intercept:
  =INDEX(LINEST(known_y's,known_x's),2)

- The accuracy of the line calculated by LINEST depends on the degree of scatter in your data. The more linear the data, the more accurate the LINEST model. LINEST uses the method of least squares for determining the best fit for the data. When you have only one independent x-variable, the calculations for m and b are based on the following formulas:

$$m = \frac{n\left(\sum xy\right) - \left(\sum x\right)\left(\sum y\right)}{n\left(\sum\left(x^2\right)\right) - \left(\sum x\right)^2}$$

$$b = \frac{\left(\sum y\right)\left(\sum\left(x^2\right)\right) - \left(\sum x\right)\left(\sum xy\right)}{n\left(\sum\left(x^2\right)\right) - \left(\sum x\right)^2}$$

- The line- and curve-fitting functions LINEST and LOGEST can calculate the best straight line or exponential curve that fits your data. However, you have to decide which of the two results best fits your data. You can calculate TREND(known_y's,known_x's) for a straight line, or GROWTH(known_y's, known_x's) for an exponential curve. These functions, without the new_x's argument, return an array of y-values predicted along that line or curve at your actual data points. You can then compare the predicted values with the actual values. You may want to chart them both for a visual comparison.

- In regression analysis, Microsoft Excel calculates for each point the squared difference between the y-value estimated for that point and its actual y-value. The sum of these squared differences is called the residual sum of squares. Microsoft Excel then calculates the sum of the squared differences between the actual y-values and the average of the y-values, which is called the total sum of squares (regression sum of squares + residual sum of squares). The smaller the residual sum of squares is, compared with the total sum of squares, the larger the value of the coefficient of determination, r2, which is an indicator of how well the equation resulting from the regression analysis explains the relationship among the variables.

- Formulas that return arrays must be entered as array formulas.

- When entering an array constant such as known_x's as an argument, use commas to separate values in the same row and semicolons to separate rows. Separator characters may be different depending on your locale setting in **Regional Settings** or **Regional Options** in **Control Panel**.

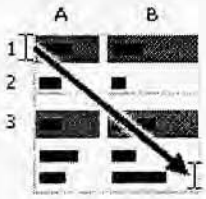
- Note that the y-values predicted by the regression equation may not be valid if they are outside the range of the y-values you used to determine the equation.

**Example 1 Slope and Y-Intercept**

The example may be easier to understand if you copy it to a blank worksheet.

How?

1. Create a blank workbook or worksheet.
2. Select the example in the Help topic. Do not select the row or column headers.




Selecting an example from Help

3. Press CTRL+C.
4. In the worksheet, select cell A1, and press CTRL+V.
5. To switch between viewing the results and viewing the formulas that return the results, press CTRL+` (grave accent), or on the **Tools** menu, point to **Formula Auditing**, and then click **Formula Auditing Mode**.

| | A | B |
|---|---|---|
| 1 | **Known y** | **Known x** |
| 2 | 1 | 0 |
| 3 | 9 | 4 |
| 4 | 5 | 2 |
| 5 | 7 | 3 |
| | **Formula** | **Formula** |
| | =LINEST(A2:A5,B2:B5,,FALSE) | |

**Note** The formula in the example must be entered as an array formula. After copying the example to a blank worksheet, select the range A7:B7 starting with the formula cell. Press F2, and then press CTRL+SHIFT+ENTER. If the formula is not entered as an array formula, the single result is 2.

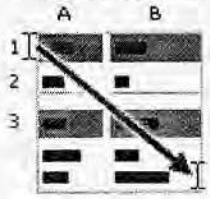
When entered as an array, the slope (2) and the y-intercept (1) are returned.

**Example 2 Simple Linear Regression**

The example may be easier to understand if you copy it to a blank worksheet.

How?

1. Create a blank workbook or worksheet.
2. Select the example in the Help topic. Do not select the row or column headers.




Selecting an example from Help

3. Press CTRL+C.
4. In the worksheet, select cell A1, and press CTRL+V.
5. To switch between viewing the results and viewing the formulas that return the results, press CTRL+` (grave accent), or on the **Tools** menu, point to **Formula Auditing**, and then click **Formula Auditing Mode**.

| | A | B |
|---|---|---|
| 1 | **Month** | **Sales** |
| 2 | 1 | 3100 |
| 3 | 2 | 4500 |
| 4 | 3 | 4400 |

| | | |
|---|---|---|
| **5** | 4 | 5400 |
| **6** | 5 | 7500 |
| **7** | 6 | 8100 |
| | **Formula** | **Description (Result)** |
| | =SUM(LINEST(B2:B7, A2:A7)*{9,1}) | Estimate sales for the ninth month (11000) |

In general, SUM({m,b}*{x,1}) equals mx + b, the estimated y-value for a given x-value. You can also use the TREND function.

**Example 3 Multiple Linear Regression**

Suppose a commercial developer is considering purchasing a group of small office buildings in an established business district.

The developer can use multiple linear regression analysis to estimate the value of an office building in a given area based on the following variables.

| Variable | Refers to the |
|---|---|
| y | Assessed value of the office building |
| x1 | Floor space in square feet |
| x2 | Number of offices |
| x3 | Number of entrances |
| x4 | Age of the office building in years |

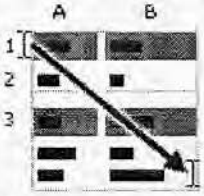
This example assumes that a straight-line relationship exists between each independent variable (x1, x2, x3, and x4) and the dependent variable (y), the value of office buildings in the area.

The developer randomly chooses a sample of 11 office buildings from a possible 1,500 office buildings and obtains the following data. "Half an entrance" means an entrance for deliveries only.

The example may be easier to understand if you copy it to a blank worksheet.

How?

1. Create a blank workbook or worksheet.
2. Select the example in the Help topic. Do not select the row or column headers.




Selecting an example from Help

3. Press CTRL+C.
4. In the worksheet, select cell A1, and press CTRL+V.
5. To switch between viewing the results and viewing the formulas that return the results, press CTRL+` (grave accent), or on the **Tools** menu, point to **Formula Auditing**, and then click **Formula Auditing Mode**.

| | A | B | C | D | E |
|---|---|---|---|---|---|
| **1** | **Floor space (x1)** | **Offices (x2)** | **Entrances (x3)** | **Age (x4)** | **Assessed value (y)** |
| **2** | 2310 | 2 | 2 | 20 | 142,000 |
| **3** | 2333 | 2 | 2 | 12 | 144,000 |
| **4** | 2356 | 3 | 1.5 | 33 | 151,000 |
| **5** | 2379 | 3 | 2 | 43 | 150,000 |

| | | | | | |
|---|---|---|---|---|---|
| **6** | 2402 | 2 | 3 | 53 | 139,000 |
| **7** | 2425 | 4 | 2 | 23 | 169,000 |
| **8** | 2448 | 2 | 1.5 | 99 | 126,000 |
| **9** | 2471 | 2 | 2 | 34 | 142,900 |
| **10** | 2494 | 3 | 3 | 23 | 163,000 |
| **11** | 2517 | 4 | 4 | 55 | 169,000 |
| **12** | 2540 | 2 | 3 | 22 | 149,000 |

**Formula**

=LINEST(E2:E12,A2:D12,TRUE,TRUE)

**Note** The formula in the example must be entered as an array formula. After copying the example to a blank worksheet, select the range A14:E18 starting with the formula cell. Press F2, and then press CTRL+SHIFT+ENTER. If the formula is not entered as an array formula, the single result is -234.2371645.

When entered as an array, the following regression statistics are returned. Use this key to identify the statistic you want.

| | A | B | C | D | E | F |
|---|---|---|---|---|---|---|
| 1 | $m_n$ | $m_{n-1}$ | ... | $m_2$ | $m_1$ | b |
| 2 | $se_n$ | $se_{n-1}$ | ... | $se_2$ | $se_1$ | $se_b$ |
| 3 | $r_2$ | $se_y$ | | | | |
| 4 | F | $d_f$ | | | | |
| 5 | $ss_{reg}$ | $ss_{resid}$ | | | | |

The multiple regression equation, y = m1*x1 + m2*x2 + m3*x3 + m4*x4 + b, can now be obtained using the values from row 14:

y = 27.64*x1 + 12,530*x2 + 2,553*x3+ 234.24*x4 + 52,318

The developer can now estimate the assessed value of an office building in the same area that has 2,500 square feet, three offices, and two entrances and is 25 years old, by using the following equation:

y = 27.64*2500 + 12530*3 + 2553*2 - 234.24*25 + 52318 = $158,261

Or you can copy the following table to cell A21 of the example workbook.

| Floor space (x1) | Offices (x2) | Entrances (x3) | Age (x4) | Assessed value (y) |
|---|---|---|---|---|
| 2500 | 3 | 2 | 25 | =D14*A22 + C14*B22 + B14*C22 + A14*D22 + E14 |

You can also use the TREND function to calculate this value.

**Example 4 Using The F And R2 Statistics**

In the previous example, the coefficient of determination, or r2, is 0.99675 (see cell A17 in the output for LINEST), which would indicate a strong relationship between the independent variables and the sale price. You can use the F statistic to determine whether these results, with such a high r2 value, occurred by chance.

Assume for the moment that in fact there is no relationship among the variables, but that you have drawn a rare sample of 11 office buildings that causes the statistical analysis to demonstrate a strong relationship. The term "Alpha" is used for the probability of erroneously concluding that there is a relationship.

There is a relationship among the variables if the F-observed statistic is greater than the F-critical value. The F-critical value can be obtained by referring to a table of F-critical values in many statistics textbooks. To read the table, assume a single-tailed test, use an Alpha value of 0.05, and for the degrees of freedom (abbreviated in most tables as v1 and v2), use v1 = k = 4 and v2 = n - (k + 1) = 11 - (4 + 1) = 6, where k is the number of variables in the regression analysis and n is the number of data points. The F-critical value is 4.53.

The F-observed value is 459.753674 (cell A18), which is substantially greater than the F-critical value of 4.53. Therefore, the regression equation is useful in predicting the assessed value of office buildings in this area.

**Example 5 Calculating The T-Statistics**

Another hypothesis test will determine whether each slope coefficient is useful in estimating the assessed value of an office building in example 3. For example, to test the age coefficient for statistical significance, divide -234.24 (age slope coefficient) by 13.268 (the estimated standard error of age coefficients in cell A15). The following is the t-observed value:

t = m4 ÷ se4 = -234.24 ÷ 13.268 = -17.7

If you consult a table in a statistics manual, you will find that t-critical, single tail, with 6 degrees of freedom and Alpha = 0.05 is 1.94. Because the absolute value of t, 17.7, is greater than 1.94, age is an important variable when estimating the assessed value of an office building. Each of

the other independent variables can be tested for statistical significance in a similar manner. The following are the t-observed values for each of the independent variables.

| Variable | t-observed value |
|---|---|
| Floor space | 5.1 |
| Number of offices | 31.3 |
| Number of entrances | 4.8 |
| Age | 17.7 |

These values all have an absolute value greater than 1.94; therefore, all the variables used in the regression equation are useful in predicting the assessed value of office buildings in this area.

## SLOPE OF BEST-FIT LINE

# SLOPE

See Also

Returns the slope of the linear regression line through data points in known_y's and known_x's. The slope is the vertical distance divided by the horizontal distance between any two points on the line, which is the rate of change along the regression line.

**Syntax**

**SLOPE(known_y's,known_x's)**

Known_y's is an array or cell range of numeric dependent data points.

Known_x's is the set of independent data points.

**Remarks**

- The arguments must be either numbers or names, arrays, or references that contain numbers.
- If an array or reference argument contains text, logical values, or empty cells, those values are ignored; however, cells with the value zero are included.
- If known_y's and known_x's are empty or have a different number of data points, SLOPE returns the #N/A error value.
- The equation for the slope of the regression line is:

$$b = \frac{n\sum xy - \left(\sum x\right)\left(\sum y\right)}{n\sum x^2 - \left(\sum x\right)^2}$$

**Example**

The example may be easier to understand if you copy it to a blank worksheet.

How?

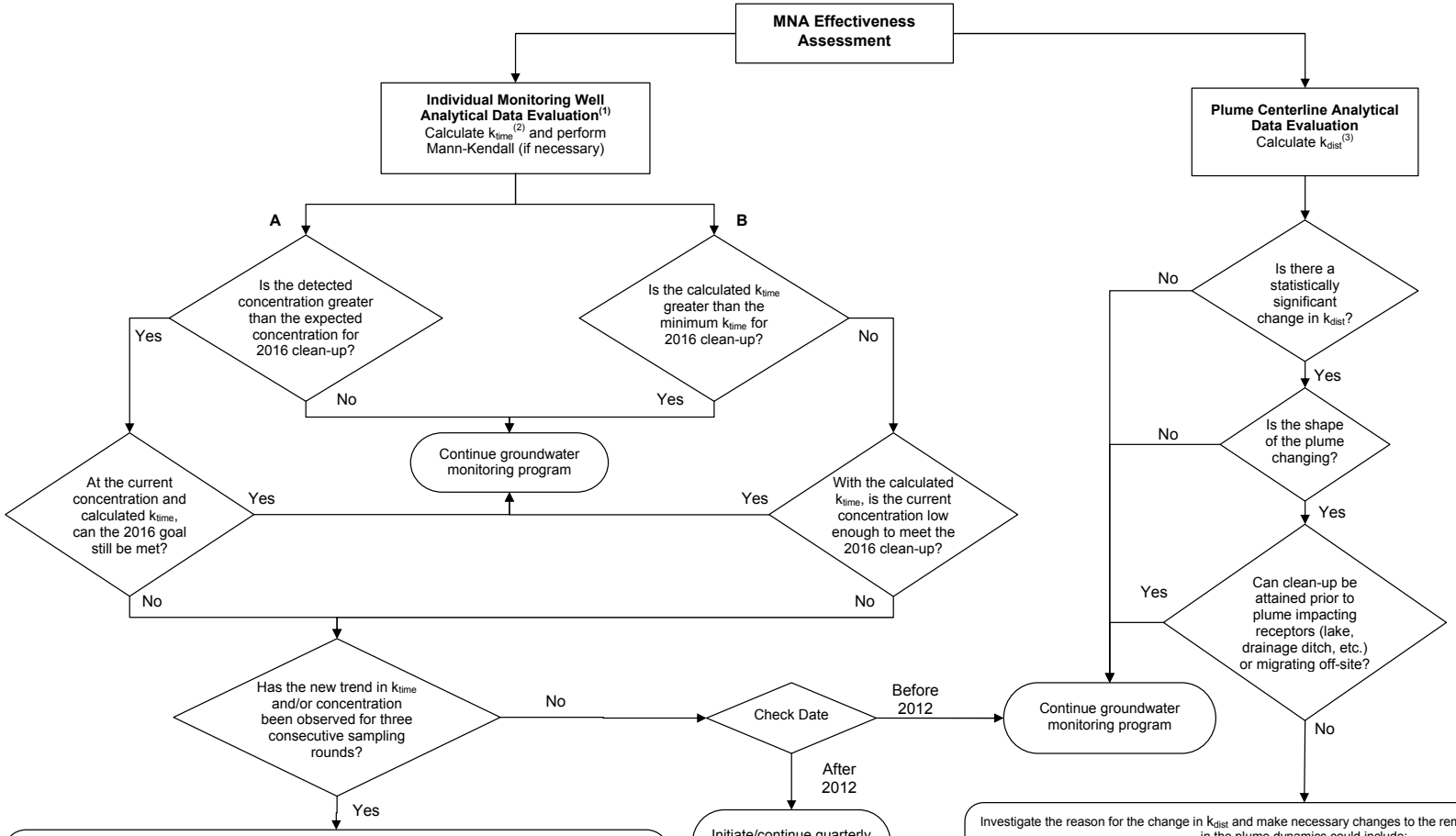
| | A | B |
|---|---|---|
| 1 | **Known y** | **Known x** |
| 2 | 2 | 6 |
| 3 | 3 | 5 |
| 4 | 9 | 11 |
| 5 | 1 | 7 |
| 6 | 8 | 5 |
| 7 | 7 | 4 |
| 8 | 5 | 4 |

| Formula | Description (Result) |
|---|---|
| =SLOPE(A2:A8,B2:B8) | Slope of the linear regression line through the data points above (0.305556) |

# MONITORED NATURAL ATTENUATION DATA EVALUATION

**DIAGRAM 3-1**
**MONITORED NATURAL ATTENUATION DATA EVALUATION**
**RESPONSE ACTION PLAN**

**NAS DALLAS, TEXAS**




Investigate the reason for the change in $k_{time}$ and make necessary changes to the remedial system. These changes in the plume dynamics could include:

| Reason for $k_{time}$ Change | Recommended Changes in Remediation |
|---|---|
| New source or new release | Identify new Responsible Party for continued remediation. |
| Geochemical change | Determine if chemical additives are necessary or technical impracticability of additional remediation. |
| Asymptotic degradation reached | Determine if active remediation or excavation are necessary or technical impracticability of additional remediation. |

Investigate the reason for the change in $k_{dist}$ and make necessary changes to the remedial system. These changes in the plume dynamics could include:

| Reason for $K_{dist}$ Change | Recommended Changes in Remediation |
|---|---|
| New source or new release | Identify new Responsible Party for continued remediation. |
| Migrating plume | Initiate abatement measures such as interceptor trench, slurry walls, pump recovery / capture system, etc. if receptors are threatened. |

Notes:
(1) Both pathways (A, B) must be evaluated for each of the chemicals of concern in each monitoring point along the plume's centerline.
(2) $k_{time}$ Concentration versus Time Attenuation Rate Constant
(3) $k_{dist}$ Concentration versus Distance Attenuation Rate Constant

# Assessment of MNA Performance Monitoring

## Introduction

The MNA monitoring well networks at the NAS Dallas groundwater plumes will provide the necessary analytical data to evaluate the dynamic behavior of the plumes over time, including contaminant and/or concentration reductions indicative of progress toward clean-up objectives, changes in plume boundaries, and changes in geochemistry. To this effect, these monitoring well networks include monitoring wells in areas hydraulically upgradient and sidegradient to the groundwater plume, in the historical source area, along the main body of the plume and immediately downgradient of the plume. The number and locations of monitoring points for each plume was selected based on the size of the plume, groundwater velocity, proximity to receptors (including cross-media transfer of COCs), and presence of preferential pathways for COC migration.

As required by the Compliance Plan for NAS Dallas (TCEQ, 2004), performance monitoring for MNA will be conducted in accordance with Response Action Plan (RAP) Worksheet 3.1 until all remedial action objectives have been met for the plume for at least two consecutive sampling events. Upon demonstration of the attainment of clean-up objectives, a three-year of post-remedial action monitoring will be implemented in accordance with the Compliance Plan for NAS Dallas (TCEQ, 2004) and as outlined on RAP Worksheet 4.1.

In addition to the COCs identified in the APAR (TtNUS, 2003) for each groundwater plume, daughter products that may be formed as a result of biotransformation or chemical processes will be monitored during the corrective action period at each plume. In order to ensure that there is a potential for continued transformation of the COCs within the groundwater plume, the geochemical environment will also be monitored (i.e., oxidation-reduction potential, dissolved oxygen, pH, etc.) every two years at a minimum. During the post-remedial action monitoring, the Compliance Plan requires that an expanded list of parameters be sampled including those COCs historically detected at the site. In order to minimize the chance of identifying constituent exceedances during the post-response action monitoring, the expanded list of parameters identified on RAP Worksheet 4.1 (Compliance Plan Table III) will be monitored every five years at a minimum.

Each new round of data will help develop a better understanding of the site and site processes and as a result, the conceptual site model for MNA will be continuously reevaluated from the standpoint of the observed plume shape, location, stability, and dynamics; attenuation rates; groundwater flow patterns; and geochemical regimes.

To evaluate progress towards achievement of clean-up objectives, data collected from the monitoring well network will be used to determine temporal and spatial trends in COC concentrations, comparisons of observed COC concentrations with benchmark concentrations, and, comparison of calculated attenuation rates with the rates required to meet remedial objectives within the required timeframe. Data will be interpreted with regard to variability so that attenuation-related changes and trends can be distinguished from other sources of variation in the data.

If a departure from a predicted trend is found, (i.e., exceeding benchmark concentration or unfavorable changes in attenuation rates), the deviation will be evaluated to determine how the changes may affect attainment of remedial goals for the individual monitoring wells, as well as, how the changes may affect the behavior of the entire plume (i.e., plume stability, reduction in COC concentrations, etc.). Departures from expected trends may not mean remedy failure, because there may be a range of attenuation rates that will achieve the desired remedial goals

in the allotted time; therefore their significance must be evaluated in the context of the site-related goals. If the potential impact on the remedy is negligible, revision of the conceptual site model may be the only outcome of such evaluation. However, if the potential for impact is significant, implementation of alternative remedies may be triggered or, at a minimum additional characterization to better define the factors limiting COC reduction and determine methods for mitigating the magnitude of their impact would be warranted. Other site-related data (i.e., geochemistry and potentiometric data) will continue to be evaluated to provide evidence of COC migration, fate, and attenuation processes. These data may be used to ascertain COC degradation and the continuation of appropriate conditions for attenuation at acceptable rates.

Following the individual monitoring well data analysis, plume behavior will be assessed to evaluate the continued effectiveness of the MNA remedy, as well as the adequacy of the monitoring program and conceptual site model for MNA. The ongoing monitoring program will provide the necessary data for continual refinement of the conceptual model and subsequently of the monitoring program itself. Upon completion of each sampling round, data analysis and determination of the effectiveness of the MNA remedy, plume-specific criteria will drive decisions affecting the continuity of the monitoring program.

At some plumes, source control and interim remedial activities have occurred between the original site characterization process and the implementation of performance monitoring. Because these activities are expected to change the site's characteristics and behavior, performance monitoring will require the continued refinement of the conceptual site model for MNA. This refinement of the conceptual site model may eventually be different from the original MNA conceptual site model based on the initial site characterization data. Development and implementation of the new conceptual site model for MNA will require the collection of additional data (i.e., quarterly monitoring for the first year after interim remedial activities and on a semi-annual basis thereafter) to establish baseline conditions, expediently depict new site characteristics and parameter variability, establish trends and estimate attenuation rates for COCs, determine if the plume characteristics have been altered, and assess the likelihood of meeting site remediation goals.

## Evaluation of New Data

Data interpretation will include the preliminary assessment of the COC concentration data collected for both the plume centerline (e.g., whole plume dynamics) as well as on individual COCs within each monitoring well. The interpretation will be conducted through graphs, tables, maps, statistics, and time-series plots. This will help in identifying patterns, relationships, and anomalies, such as possible "outliers" to the observed remedial trend of the plume. Scatter graphs (i.e., $k_{time}$ and $k_{dist}$ graphs) will show relationships between two variables that are not readily evident using purely numerical methods. Mapping the data in plan view and/or cross-section (i.e., isoconcentration maps, potentiometric maps, MNA parameter maps, etc.) will help understand patterns of COC distribution and migration, and relationships between geochemical zones and COC attenuation.

The initial data analysis and interpretation will focus on the detection of trends in the data for the COCs within individual monitoring wells and subsequently for the plume as a whole. First, the COC concentration data collected from each monitoring well will be used to determine the temporal trends that exist within the plume. The COC trends will also be evaluated at monitoring points located throughout the plume as a whole. In order to adequately interpret progress toward COC reduction goals for the plume, it is necessary to compare trends of individual monitoring wells to trends of other monitoring wells in the plume. Evaluating trends in data from all sampling locations in the plume will determine if the plume exhibits stability or reduction in COC concentrations. In addition, for each COC, spatial trends along the plume centerline [i.e., concentration vs. distance attenuation rate ($k_{dist}$)] will be evaluated. This analysis assists in evaluating the stability of the plume and its migration potential. Assessment of spatial plume behavior is necessary to ensure no unacceptable plume migration occurs.

Further evaluation will focus on the assessment of any departures from predicted trends and their impact on the potential for MNA to achieve plume-related goals. If the COC data points do not definitively indicate that the remedial goals are meeting the reasonable progress expectations, other data will be analyzed in order to properly interpret particular variances from the predicted performance (i.e., the site stratigraphy, groundwater chemistry, the groundwater flow field, the season of the year).

In addition, non-parametric statistical tests, such as the Mann-Kendall test, may be included in the data evaluation to establish the existence of a trend when the initial evaluation is inconclusive due to high data variability.

The process of MNA data evaluation is graphically depicted in Diagram 3-1.

### Individual Monitoring Well Analytical Data Evaluation

Evaluation of progress towards achievement of clean-up goals will focus primarily on temporal trends in COC concentration at individual attenuation monitoring point (AMP) wells within the plume. After each sampling event, temporal trends [i.e., concentration vs. time attenuation rate ($k_{time}$)], will be established for each AMP of the plume. Temporal trends ($k_{time}$) are particularly useful in evaluating if remedial goals can be met in the desired timeframe for the individual location. The analysis of temporal trends is useful for estimating the potential lifetime of the COC plume at the particular location.

The parameters to be evaluated in parallel to ensure reasonable progress is being made in the response action at the particular location are as follows:

- Direct comparison of detected concentrations to expected or benchmark concentration to meet remedial goals by the year 2016 for the monitoring wells along the centerline of the plume.

- Direct comparison of observed attenuation rate ($k_{time}$) from the chemical specific historical data available for the monitoring well versus the minimum attenuation rate ($k_{time}$) necessary to meet the 2016 clean-up date.

The following graph depicts the possible evaluation scenarios for the above parameters:

| | |
|---|---|
| **Measured COC Concentration < Expected COC Concentration**<br>**and**<br>**Observed $k_{time}$ > Minimum $k_{time}$**<br>Remedial goal is being met, continue performance monitoring | **Measured COC Concentration < Expected COC Concentration**<br>**and**<br>**Observed $k_{time}$ < Minimum $k_{time}$**<br>Evaluate further to ensure remedial goal is being met |
| **Measured COC Concentration > Expected COC Concentration**<br>**and**<br>**Observed $k_{time}$ > Minimum $k_{time}$**<br>Evaluate further to ensure remedial goal is being met | **Measured COC Concentration > Expected COC Concentration**<br>**and**<br>**Observed $k_{time}$ < Minimum $k_{time}$**<br>Remedial goal not being met, consider new response action |

1. Satisfactory progress is being made with the response action (top left quadrant) for an individual well location, if the detected concentration of the COC(s) is not greater than the 2016 clean-up curve expected concentration; and, the observed attenuation rate based on historical data available from the monitoring well is equal to or greater than the minimum attenuation rate necessary to meet clean-up by the year 2016 for the monitoring wells along the centerline of the plume.
2. Reasonable progress is not being made towards achieving the remedial goal (bottom right quadrant) if the detected concentration of the COC(s) exceeds the 2016 clean-up curve expected concentration; and the observed attenuation rate based on historical data available from the monitoring well is less than the minimum attenuation rate necessary to meet clean-up by the year 2016 for the monitoring wells along the centerline of the plume. A new response action may need to be implemented if this trend continues for at least three sampling rounds.
3. Further evaluation will be needed for the scenarios in the top right and bottom left quadrants before establishing if reasonable progress is being made towards achievement of the clean-up goals:
   - Reasonable progress is being made when the observed attenuation rate based on historical data is steep enough that clean-up can still be achieved by the year 2016, even though the detected concentration of a COC may be greater than the expected concentration during a particular sampling event (bottom left quadrant).
   - Reasonable progress is being made if the detected concentration of a COC in the sampling event is sufficiently below the expected concentration so that with an observed attenuation rate based on historical data greater than the calculated minimum attenuation rate necessary to meet PCLs by 2016, the remedial objectives can still be achieved by the year 2016 (top right quadrant).
   - Reasonable progress may not be made if either of the preceding two situations continues for at least three consecutive sampling rounds. At that point in the response action evaluation, a new response action may need to be implemented. In this case other statistical methods may be used to evaluate the data such as using non-parametric tests (i.e., Mann-Kendall) to determine if there has been a statistically significant change in degradation trends.

Plume Analytical Data Evaluation

Since a plume-wide trend implying progress toward restoration cannot be satisfactorily elucidated from monitoring only individual sampling locations, it will be necessary to compare trends among the AMP wells in the plume. Reduction in COC concentrations from all or most sampling locations within predicted ranges and/or at anticipated rates can be interpreted as a decrease in COC mass for the plume and will be indicative of effective remediation of the plume through MNA. Mixed trends in different portions of the plume may imply temporal changes in plume migration or may be simply attributed to the natural attenuation processes, and do not signify failure of MNA to achieve its goals in a timely manner. These variations will be evaluated in the context of the conceptual site model and sampling history before they are attributed to natural attenuation processes of other possible causes. To this effect, in cases of mixed trends it will be necessary to perform other comparisons in order to reach a conclusion of satisfactory progress. It will be particularly useful to evaluate trends in COC and daughter product concentrations (e.g., a decreasing trend in trichloroethene compared to an increasing trend in cis-1,2-dichloroethene in the same plume may indicate degradation of trichloroethene to cis-1,2-dichloroethene). Other trends of interest include changes in geochemistry that may indicate decrease in attenuation rates, such as changes in availability of electron donors and electron acceptors, changes in oxidation-reduction potential, or other primary geochemical indicators.

The complement to the evaluation of the behavior of the plume as a whole is the assessment of spatial trends. For each COC, spatial trends along the plume centerline [i.e., concentration vs. distance attenuation rate ($k_{dist}$)] will be evaluated. This analysis assists in evaluating the stability of the plume and its migration potential. $k_{dist}$ will be calculated for the monitoring wells along the plume centerline after each annual sampling round and will be depicted in centerline trend graphs ($k_{dist}$ graphs). Assessment of spatial plume behavior will be performed through visual interpretation of changes in plume shape over time as shown in the isoconcentration maps as well as centerline trend graphs.

**Assessment Conclusions and Recommendations**

As a result of the response action effectiveness evaluation, the MNA conceptual site model will be continuously refined/modified by incorporating any new data and data trends in COC and geochemistry values and changes in site hydrology. As new data is gathered there will be an ever-expanding database for the site that can be used for comparison with the changes in parameters noted between monitoring events as well as for comparison to predicted, acceptable trends. This continual evaluation of performance monitoring data will translate in better understanding of plume behavior and anticipated data variability and therefore assist in the proper interpretation of monitoring data.

Upon completion of each sampling round, data analysis and determination of the effectiveness of the MNA remedy, plume-specific criteria will drive decisions affecting the continuity of the monitoring program such as: the appropriateness of continuing the monitoring program without change, the need for modifications to the monitoring program (i.e., increased monitoring frequency, additional monitoring wells), need for additional characterization, implementation of a contingency or alternative remedy, or verification of attainment of remedial goals and termination of performance monitoring.

Site-related decisions regarding continuing, modifying, or terminating MNA performance monitoring will be made based on the analyses of spatial and temporal trends in COC concentration, as well as comparisons with predicted benchmarks and/or the specified concentration standard (i.e., COC PCLs). The following summarizes each potential decision

and why it may be chosen based on the perceived progress towards achievement of MNA remediation goals at the plume:

1. Continue Monitoring Program Without Change

   COC concentrations, including toxic transformation products and any mobilized by-products or secondary COCs must remain within the bounds of acceptable trends in order to continue the monitoring program without any change until all remedial action objectives have been met. Groundwater flow parameters must not have changed outside previously identified acceptable ranges. The geochemistry must not have changed in such a way as to indicate that the COC degradation or other natural attenuation processes would be significantly affected.

2. Modify the Monitoring Program

   Modification of the monitoring program may be needed to better reflect changing conditions or increased understanding of natural attenuation processes at the site. Changing conditions or the need to test key assumptions may require new sampling points or increases in monitoring parameters or frequency. Possible scenarios include:

   - Changes in groundwater flowrates or directions that indicate COCs may move farther downgradient, laterally or vertically into previously unimpacted areas, may warrant the need for additional monitoring wells.
   - Unfavorable changes in COC concentrations within the plume, or in the observed attenuation rate based on historic data, may warrant increased monitoring frequency. Sampling frequency may be increased if a sudden change in the trend of COC concentration reduction is noted in order to provide information to facilitate understanding of the change and provide earlier warning of further change. If the protectiveness of the remedy is in question (i.e., unfavorable observed attenuation rate change after 2012), a determination may be made to collect data on a more frequent schedule to properly interpret trends in time to implement contingency remedies, if necessary, to meet PCLs by 2016.
   - Detections of COCs outside the known plume, indicating potential plume expansion or plume migration, may warrant the need for additional monitoring wells.

3. Implement a Contingency or Alternative Remedy

   Alternative remedies can be considered for use in case MNA fails to perform at the desired effectiveness. Situations that may trigger the implementation of a contingency or other remedy modifications will depend on site conditions and include the following:

   - COC concentrations are not decreasing at the rate previously determined to be necessary to meet the remediation objectives by 2016. This assessment will involve the direct comparison of current analytical data with the expected plume clean-up benchmarks as well as evaluation of temporal trends (i.e., observed attenuation rates) in COC concentrations versus the minimum attenuation rates required to meet clean-up by the year 2016. If the protectiveness of the remedy is in question (i.e., more than three rounds of sampling fail to meet the criteria), implementation of a contingency or alternative remedy would generally be warranted.
   - COC concentrations at AMP wells exhibit an increasing trend not originally predicted during remedy selection. This situation would involve the identification and assessment of trends in COC concentration data, including transformation products, changes in geochemistry that may indicate decrease in attenuation rates explaining the lack of

progress toward clean-up objectives, and/or additional COC releases. For some locations in the plume, a detection of a significant change may not trigger immediate implementation of a contingency or alternative remedy. For instance, a low-level or otherwise limited COC concentration increase does not necessarily mean that remediation timeframes will be expanded, or that by the time the pulse moves downgradient to the boundary of the plume there will be a significant plume expansion. Or, in some cases, the detailed characterization and modeling of COC fate and migration may indicate that concentrations for certain COCs (i.e., daughter products) in some portions of the plume are expected to increase temporarily, yet MNA would still meet remedial objectives. If so, the temporary increase would not trigger the contingency or alternative remedy as long as the increase conformed to the predictions and MNA remained protective, allowing observation for several years to test model predictions, if time is available (i.e., before 2012). In situations where evaluation shows the observed COC concentration increases are expected to unacceptably increase the time for plume restoration beyond 2016, or cause unacceptable plume expansion, triggering the contingency or alternative remedy would generally be warranted.

- COCs are identified in monitoring wells located outside the original plume boundary indicating unacceptable plume expansion or migration. Detections of COCs outside of the predetermined plume boundaries may indicate unacceptable plume expansion. Implementation of an alternative or contingency remedy will depend on the locations of the new detections, and distance and possible COC migration rates between these monitoring points and receptors (i.e., surface water bodies, off-site property). Because the COC travel time from the location of the detections may be many years at some sites, there may be time for further monitoring and assessment before a contingency or alternative remedy would need to be implemented. In contrast, if the protectiveness of the remedy is in question (i.e., a significant trend of increasing COC concentration in downgradient wells was noted), there may be much less time available to assess the trend if there was only a short travel time to downgradient receptors. In this case, a contingency or alternative remedy may be triggered immediately.

4. Termination of Performance Monitoring

Once PCLs have been achieved at each of the AMP locations within a plume, showing that the MNA remedy goals have been met for two consecutive semi-annual sampling events for an individual PCLE zone, performance monitoring will be terminated and a period of verification monitoring will be initiated. Verification monitoring will include three years of semi-annual groundwater sampling in order to satisfy the requirements of the Compliance Plan for NAS Dallas (TCEQ, 2004). Sampling parameters for the verification of achieving the PCLs and locations will be in accordance with RAP Worksheet 4.0. This sampling will include all COCs that have been historically detected in the area of the former SWMU, not just the ones that were identified for remediation in the Response Action Plan. If no additional COC exceedances are identified during this three year period of post response action care monitoring, the monitoring system can be terminated, the monitoring wells will be abandoned, and the site will be removed from the permit.

**Effects of Data Variability on Data Interpretation**

Data interpretation is affected by data variability. This variability is sometimes associated with natural causes or may be simply attributed to the natural attenuation processes. Due to the dynamic nature of natural attenuation processes, data typically exhibit fluctuations of various magnitudes. For example, there is an expected degree of natural variability within a plume that may include small-scale expansion and shrinkage in response to changes in groundwater flowrates and biological degradation rates throughout the year. COC concentrations in individual monitoring wells may fluctuate with changes in plume configuration caused by oscillations in groundwater flow. Also, changes in groundwater elevations can cause changes in COC concentrations measured in monitoring wells.

It is essential that each data point be interpreted in the context of its derivation in time and space. For instance, monitoring wells produce data that should be interpreted with respect to COC sources, site stratigraphy, the groundwater flow field, the plume, possible receptors, season of the year, and other relevant factors. Variations in sampling methodology should also be considered, due to possible differences in COC concentrations derived from different sampling techniques or devices. The analytical methodology may be evaluated in terms of accuracy, precision, and detection limits. This list of data considerations is not exhaustive, but merely emphasizes that a number (i.e., a data point) should be placed in context to be interpreted. The better the understanding on the derivation and context of the data, the more likely it is that the appropriate decision can be made based on the data.

Examination of historical and spatial patterns may provide information useful in assessing the source and significance of variability in the measured parameters. For instance, if there are multiple monitoring wells in the same plume that show a consistent trend for a number of monitoring variables across several monitoring events, then one may suspect a natural variation, such as recharge differences or geochemical changes in the system, and investigate a correlation of recharge, indicator parameters, or other external hydrologic factors with concentration as indicative of the likely cause of the change. If, on the other hand, a specific monitoring well shows an unusually large change in concentration between monitoring events, relative to nearby monitoring wells, then one may suspect a measurement factor or additional release source is involved and look at sampling techniques or other such factors that may influence the concentration change. Because plume variability should be taken into account when interpreting monitoring data, it is important to have a good estimate of natural variability derived from the site investigation and ongoing MNA performance monitoring.

# APPENDIX 8
# WASTE DISPOSAL MANIFESTS

Project #: 0-0

Order #: 140398

EFFECTIVE ENVIRONMENTAL

Please print or type. (Form designed for use on elite (12-pitch) typewriter.)

**NON-HAZARDOUS WASTE MANIFEST**

1. Generator ID Number: TX8170022786 / 65033
2. Page 1 of 1
3. Emergency Response Phone: 877-577-2669
4. Waste Tracking Number: NHM140398

5. Generator's Name and Mailing Address
Naval Air Station Dallas (NAS)
c/o EnSafe Inc., 4545 Fuller Dr., Suite 342
Irving, TX 75038
Generator's Phone: 972.792.3222 ATTN: Tom Wiberg

Generator's Site Address (if different than mailing address)
8100 West Jefferson
Dallas, TX 75211
RB TVW

6. Transporter 1 Company Name
Stericycle Specialty Waste Solutions Inc
Phd: 972 329 1200
State ID#: 88032 / H-4695
U.S. EPA ID Number: MNS000110924

7. Transporter 2 Company Name
U.S. EPA ID Number

8. Designated Facility Name and Site Address
Itasca Landfill TX, LP
2559 FM 66
Itasca, Texas 76055
State ID#: H0241C
U.S. EPA ID Number: n/a
Facility's Phone: 254 897 2511

| 9a. HM | 9b. U.S. DOT Description (including Proper Shipping Name, Hazard Class, ID Number, and Packing Group (if any)) | 10. Containers No. | Type | 11. Total Quantity | 12. Unit Wt./Vol. | |
|---|---|---|---|---|---|---|
| ☐ | 1 Non-regulated material (soil cuttings Class 2 solids) | 01 ~~02~~ | DM | 55 ~~110~~ | G | CESQ3012 Non-RCRA |
| ☐ | 2. Non-regulated material (purged ground and decon water) | 02 | DM | 110 ~~55~~ | G | CESQ1012 Non-RCRA |
| | 3. | | | | | |
| | 4. | | | | | |

13. Special Handling Instructions and Additional Information
01:IDW Soil cuttings NR (PF:5110167655) 55G
02:IDW purge and decon waters NR (PF:5110167656) 55G
RB TVW
11-1) 0.72 ton 11-2) 0.47 tons

14. **GENERATOR'S CERTIFICATION:** I certify the materials described above on this manifest are not subject to federal regulations for reporting proper disposal of Hazardous Waste.

Generator's/Offeror's Printed/Typed Name: X DAVID BARNEY
Signature: X
Month 5 Day 31 Year 16

15. International Shipments ☐ Import to U.S. ☐ Export from U.S. Port of entry/exit:
Transporter signature (for exports only): Date leaving U.S.:

16. Transporter Acknowledgment of Receipt of Materials

Transporter 1 Printed/Typed Name: Rafael Blaze
Signature:
Month 5 Day 31 Year 16

Transporter 2 Printed/Typed Name: Steven Vansickle
Signature:
Month 6 Day 9 Year 16

17. Discrepancy

17a. Discrepancy Indication Space ☐ Quantity ☐ Type ☐ Residue ☐ Partial Rejection ☐ Full Rejection

Manifest Reference Number:

17b. Alternate Facility (or Generator) U.S. EPA ID Number
Facility's Phone

17c. Signature of Alternate Facility (or Generator) Month Day Year

01: H132 02: H132

18. Designated Facility Owner or Operator: Certification of receipt of materials covered by the manifest except as noted in Item 17a

Printed/Typed Name: Jessica Anderson
Signature:
Month 6 Day 9 Year 16

GENERATOR

INT'L

TRANSPORTER

DESIGNATED FACILITY

6-NHM-C-C-11

2-DESIGNATED FACILITY TO GENERATOR

Project #: 0-0 Order #: 140398

EFFECTIVE ENVIRONMENTAL

Please print or type. (Form designed for use on elite (12-pitch) typewriter.)

**NON-HAZARDOUS WASTE MANIFEST**

1. Generator ID Number: TX8170022786 / 65033
2. Page 1 of 1
3. Emergency Response Phone: 877-577-2669
4. Waste Tracking Number: NHM140398

5. Generator's Name and Mailing Address
Naval Air Station Dallas (NAS)
c/o EnSafe Inc., 4545 Fuller Dr., Suite 342
Irving, TX 75038
Generator's Phone: 972-292-3222 ATTN: Tom Wiberg

Generator's Site Address (if different than mailing address)
8100 West Jefferson
Dallas, TX 75211

RJ TWW

6. Transporter 1 Company Name: Stericycle Specialty Waste Solutions Inc
Phone: 972 329 1200
State ID#: S5627 / M-4565
U.S. EPA ID Number: MNS000110924

7. Transporter 2 Company Name
U.S. EPA ID Number

8. Designated Facility Name and Site Address
Itasca Landfill TX, LP
2559 FM 56
Itasca, Texas 76055
State ID#: H0241C
U.S. EPA ID Number: n/a
Facility's Phone: 254 687 2511

| 9a. HM | 9b. U.S. DOT Description (including Proper Shipping Name, Hazard Class, ID Number, and Packing Group (if any)) | 10. Containers No. | Type | 11. Total Quantity | 12. Unit Wt./Vol. | |
|---|---|---|---|---|---|---|
| ☐ | 1. Non-regulated material (soil cuttings Class 2 solids) | 01 ~~02~~ | DM | 55 ~~110~~ | G | CESQ3012 Non-RCRA |
| ☐ | 2. Non-regulated material (purged ground and decon water) | 02 | DM | 110 ~~55~~ | G | CESQ1012 Non-RCRA |
| | 3. | | | | | |
| | 4. | | | | | |

13. Special Handling Instructions and Additional Information
01:IDW Soil cuttings NR (PF:5110167655) 55G
02:IDW purge and decon waters NR (PF:5110167656) 55G

RJ TWW

11-1) 0.72 ton 11-2) 0.47 ton

14. **GENERATOR'S CERTIFICATION:** I certify the materials described above on this manifest are not subject to federal regulations for reporting proper disposal of Hazardous Waste.

Generator's/Offeror's Printed/Typed Name: X DAVID BARNEY
Signature: X
Month 5 Day 31 Year 16

15. International Shipments ☐ Import to U.S. ☐ Export from U.S. Port of entry/exit:
Transporter signature (for exports only): Date leaving U.S.:

16. Transporter Acknowledgment of Receipt of Materials

Transporter 1 Printed/Typed Name: Rafael Blayze
Signature:
Month 5 Day 31 Year 16

Transporter 2 Printed/Typed Name: Steven Vansickle
Signature:
Month 6 Day 9 Year 16

17. Discrepancy

17a. Discrepancy Indication Space ☐ Quantity ☐ Type ☐ Residue ☐ Partial Rejection ☐ Full Rejection

Manifest Reference Number:

17b. Alternate Facility (or Generator)
U.S. EPA ID Number
Facility's Phone:

17c. Signature of Alternate Facility (or Generator)
Month Day Year

01: H132 02: H132

18. Designated Facility Owner or Operator: Certification of receipt of materials covered by the manifest except as noted in Item 17a

Printed/Typed Name: Jessica Anderson
Signature:
Month 6 Day 14 Year 16

GENERATOR

INT'L

TRANSPORTER

DESIGNATED FACILITY

6-NHM-C-C-11

3-DESIGNATED FACILITY TO GENERATOR

Project #: 0-0

Order #: 145925

EFFECTIVE ENVIRONMENTAL

Please print or type. (Form designed for use on elite (12-pitch) typewriter.)

GENERATOR

**NON-HAZARDOUS WASTE MANIFEST**

1. Generator ID Number: TX8170022786 / 65033

2. Page 1 of 1

3. Emergency Response Phone: 877-577-2669

4. Waste Tracking Number: NHM-145925

5. Generator's Name and Mailing Address
Naval Air Station Dallas (NAS)
c/o EnSafe Inc., 4545 Fuller Dr., Suite 342
Irving, TX 75038
Generator's Phone: 972-792-3222 ATTN: Tom Wherg

Generator's Site Address (if different than mailing address)
8100 West Jefferson
Dallas, TX 75211

6. Transporter 1 Company Name
Stericycle Specialty Waste Solutions Inc
Ph#: 972 329 1200
State ID#: 88922 / H-1496
U.S. EPA ID Number: MNS000110924

7. Transporter 2 Company Name
U.S. EPA ID Number

8. Designated Facility Name and Site Address
Itasca Landfill TX. LP
2559 FM 66
Itasca, Texas 76055
State ID#: H0241C
U.S. EPA ID Number: n/a
Facility's Phone: 254 687 2511

| 9a. HM | 9b. U.S. DOT Description (including Proper Shipping Name, Hazard Class, ID Number, and Packing Group (if any)) | 10. Containers No. | 10. Containers Type | 11. Total Quantity | 12. Unit Wt./Vol. | |
|---|---|---|---|---|---|---|
| ☐ | 1. Non-regulated material (purged ground and decon water) | 04 | DM | 220 | G | CESQ1012 Non-RCRA |
| ☐ | 2. Non-regulated material (soil cuttings Class 2 solids) | 02 | DM | 110 | G | CESQ3012 Non-RCRA |
| | 3. | | | | | |
| | 4. | | | | | |

13. Special Handling Instructions and Additional Information
01:IDW purge and decon waters NR (PF:5110167856) 55G
02:IDW Soil cuttings NR (PF:5110167855) 55G

11.1) 0.94 tn
11.2) ~~0.29 tn~~ 0.35 tn

14. **GENERATOR'S CERTIFICATION:** I certify the materials described above on this manifest are not subject to federal regulations for reporting proper disposal of Hazardous Waste.

Generator's/Offeror's Printed/Typed Name: X DAVID BARNEY
Signature: X
Month 11 Day 8 Year 16

INT'L

15. International Shipments ☐ Import to U.S. ☐ Export from U.S. Port of entry/exit:
Transporter signature (for exports only): Date leaving U.S.:

TRANSPORTER

16. Transporter Acknowledgment of Receipt of Materials

Transporter 1 Printed/Typed Name: Jason L Boss
Signature:
Month 11 Day 8 Year 16

Transporter 2 Printed/Typed Name: Rafael Blanco
Signature:
Month 11 Day 14 Year 16

DESIGNATED FACILITY

17. Discrepancy

17a. Discrepancy Indication Space ☐ Quantity ☐ Type ☐ Residue ☐ Partial Rejection ☐ Full Rejection

Manifest Reference Number:

17b. Alternate Facility (or Generator) U.S. EPA ID Number

Facility's Phone:

17c. Signature of Alternate Facility (or Generator) Month Day Year

01: H132 02: H132

18. Designated Facility Owner or Operator: Certification of receipt of materials covered by the manifest except as noted in Item 17a

Printed/Typed Name: Cindy Reed
Signature: Cindy Reed
Month 11 Day 14 Year 16

6-NHM-C-C-11

2-DESIGNATED FACILITY TO GENERATOR

# SWMU 136 SOUTH PLUME

# 2016 Response Action Effectiveness Report
## SWMU 136 South Plume
## Former NAS Dallas, Texas

## Professional Signatures and Seals

**Professional Geoscientist**

| | | |
|---|---|---|
| *Thomas Wiberg* | *1619* | *30 November 2017* |
| Professional Geoscientist | Geoscientist License number | Expiration date |
| | *17 Jan 2017* | |
| Signature | Date | |
| *972-791-3222* | *972-791-0405* | *twiberg@ensafe.com* |
| Telephone number | FAX number | E-mail |

**Professional Engineer**

| | | |
|---|---|---|
| | | |
| Professional Engineer | P.E. License number | Expiration date |
| | | |
| Signature | Date | |
| | | |
| Telephone number | FAX number | E-mail |

**Registered Corrective Action Specialists (RCASs) and Corrective Action Project Managers (CAPMs)**
**For LPST sites only.**

| | | |
|---|---|---|
| | | |
| Registered Corrective Action Specialist | RCAS Registration number | Expiration date |
| | | |
| Signature | Date | |
| | | |
| Corrective Action Project Manager | CAPM Registration number | Expiration date |
| | | |
| Signature | Date | |
| | | |
| Telephone number | FAX number | E-mail |

**Seals, as applicable:**

| Executive Summary | ID No. SWR 65033 SWMU 136 South Plume | Report Date: 01/17/2017 |
|---|---|---|

# TEXAS COMMISSION ON ENVIRONMENTAL QUALITY
## Response Action Effectiveness Report

## Cover Page

**Regulatory ID number** (Solid waste registration number, VCP ID number, etc.) *Solid Waste Code #65033*

check one: ___ Initial RAER submittal for this onsite property X Subsequent RAER submittal

Report date: *January 2017* TCEQ Region No.: *4*

**TCEQ Program** (check one)

X Corrective Action (Mail Code 127)

___ Voluntary Cleanup Program (Mail Code 221)

___ Petroleum Storage Tank Program (Mail Code 137)

___ Superfund PRP Lead (Mail Code 143)

___ Municipal Solid Waste Permits (Mail Code 124)

**Onsite Property Information**

Onsite Property Name: *Former Naval Air Station Dallas (NAS Dallas) — SWMU 136 South Plume*

Street no. *8100* Pre dir: *West* Street name: *Jefferson* Street type *Blvd* Post dir: ___

City: *Dallas* County: *Dallas* County Code: *57* Zip: *75211*

Nearest street intersection or location description: ___

Latitude: Degrees, Minutes, Seconds OR Decimal Degrees (circle one) North *32°44'25.0"*

Longitude: Degrees, Minutes, Seconds OR Decimal Degrees (circle one) West *96°57'34.0"*

**Offsite Affected Property Information**

Offsite Affected Property Name: *Not Applicable (N/A)*

Street no. ___ Pre dir: ___ Street name: ___ Street type: ___ Post dir: ___

City: ___ County: ___ County Code: ___ Zip: ___

[X] Check if no offsite properties affected

**Contact Person Information and Acknowledgement**

Person (or company) Name: *Navy BRAC PMO East*

Contact Person: *Mr. David Barney* Title: *BRAC Environmental Coordinator*

Mailing Address: *4911 S. Broad Street, Building 679*

City: *Philadelphia* State: *PA* Zip: *19112* E-mail address **david.a.barney@navy.mil**

Phone: *617-753-4656* Fax: ___

By my signature below, I acknowledge the requirement of §350.2(a) that no person shall submit information to the executive director or to parties who are required to be provided information under this chapter which they know or reasonably should have known to be false or intentionally misleading, or fail to submit available information which is critical to the understanding of the matter at hand or to the basis of critical decisions which reasonably would have been influenced by that information. Violation of this rule may subject a person to the imposition of civil, criminal, or administrative penalties.

Signature of Person BARNEY.DAVID.A.1228582553 Digitally signed by BARNEY.DAVID.A.1228582553 DN: c=US, o=U.S. Government, ou=DoD, ou=PKI, ou=USN, cn=BARNEY.DAVID.A.1228582553 Date: 2017.01.18 06:52:27 -05'00' Name, print: *David Barney* Date: ___

Check the reports/forms previously submitted:

**Remedy Standard A**

____ Self-Implementation Notice Submittal date: _____

*X* Response Action Plan — Approval date: *December 2006*

**Remedy Standard B**

____ Response Action Plan — Approval date: _____

List all media (surface soil, subsurface soil, groundwater, sediment, surface water, air) that contained or contains a PCLE zone and specify the response action that has been or will be taken for each media. Indicate the type of removal, decontamination, physical control, or institutional control action used in the response action.

| Media | COCs | Removal | Decontamination | Physical Control | Institutional Control | Modified Response Objective | | |
|---|---|---|---|---|---|---|---|---|
| | | | | | | PMZ | WCU | TI |
| Soil | Benzene | Excavation and offsite disposal (completed in 2003) | N/A | N/A | N/A | N/A | N/A | N/A |
| Groundwater | Benzene<br>cis-1,2-Dichloroethene (cis-1,2-DCE)<br>Tetrachloroethene (PCE)<br>Trichloroethene (TCE) | N/A | MNA | N/A | N/A | N/A | N/A | N/A |

Current land use of the onsite affected property: ___ Residential *X* Commercial/industrial

Projected future land use of the onsite property (if known): ___ Residential *X* Commercial/industrial

Briefly describe the affected property and PCLE zones, the conclusions from the assessment activities, identify any affected or threatened receptors, and describe any other major site conditions. If any portion of the response action is necessitated due to an aesthetic or nuisance condition, identify the nature of that condition and identify that portion of the response action conducted to address it. If any media that contains a PCLE zone is not being addressed in this response action, provide justification.

**Affected Property: SWMU 136 South Plume**

**In 1989, a Resource Conservation and Recovery Act (RCRA) Facility Assessment (RFA) was performed at Naval Air Station (NAS) Dallas in accordance with the 1984 RCRA Hazardous and Solid Waste Amendments to evaluate potential releases at Solid Waste Management Units (SWMUs) and Areas of Concern (AOCs) and to make preliminary determinations regarding the need for further action. The RFA Report included data collected as part of a Preliminary Review, a Visual Site Inspection, and a Sampling Visit, as necessary, for 135 SWMUs and six AOCs at NAS Dallas (A.T. Kearney 1989).**

**In 1993, NAS Dallas was identified for closure under the Base Realignment and Closure Act (BRAC). As part of the base closure activities, an Environmental Baseline Survey (EBS) was conducted at NAS Dallas to identify any potential environmental concerns related to historical operations at the base (EnSafe/Allen & Hoshall 1994). During this EBS, additional site concerns were identified at numerous buildings across the installation. In order to strategically investigate the permitted and non-permitted SWMUs, AOCs, and additional site concerns identified in the EBS, the facility was divided into six sections, called "categories", based on property use and ownership. In 1995, the Navy initiated RCRA Facility Investigation (RFI) activities at NAS Dallas at Categories A through F.**

**Submittal of the Final RFI Reports (issued as a series of six reports — one report per category) occurred during the period from November 2000 to March 2001 (Tetra Tech, Inc. [Tetra Tech] 2000-2001). The RFI was completed under the requirements of the Texas Risk Reduction Standards (RRS) (30 Texas Administrative Code [TAC] 335, Subchapter S), the regulatory framework in effect at the time, and closure recommendations in the RFI Reports were based upon Risk Reduction Standard 2 — Industrial (RRS2-IND) criteria. The RFI Reports identified those areas that required further action based on the chemical constituents detected in the soil and/or groundwater at the base.**

**The RFI Reports received conditional approval by the Texas Natural Resource Conservation Commission (TNRCC), now the Texas Commission on Environmental Quality (TCEQ). Final approval of the RFI Reports by TCEQ was dependent upon landowner concurrence of the RRS2-IND clean-up standard.**

**In September of 1999, the Texas Risk Reduction Program (TRRP) (30 TAC 350) was promulgated. One of the major changes resulting from TRRP was eliminating site background as a closure criterion. The most stringent closure standard under TRRP is the Residential Remedy Standard A (RES A), which consists of closure for residential use with no engineering or institutional controls.**

**In March 2001, the Navy submitted a Notice of Intention to Switch to TRRP (30 TAC 350) for five of the six categories. The one category (Category C) that was not switched to TRRP, but remained under the RRS2-IND standards, was subsequently transferred to the Department of the Army.**

**In October 2002, an Affected Property Assessment Report (APAR) was produced based on evaluation of RFI data as well as data from follow-up investigations (Tetra Tech 2002). The data included in the APAR was compared to TRRP RES A criteria to select those sites that may be closed with no land use encumbrances and to determine which sites required corrective action. The results of this comparison indicate that 23 SWMUs (1, 2, 6, 17, 18, 21, 31, 35, 36, 60, 79, 81, 83, 84, 85, 86, 92, 102, 108, 124, 136, 138, and 139) required further actions.**

**SWMU 136 South Plume**

**The Main Fuel Farm (MFF) (SWMU 136) is located on the east side of Former NAS Dallas and includes Buildings 138, 139, 140, 180, 190, and 230. The MFF is divided into the Northern Fuel Farm Compound and Southern Fuel Farm Compound, both of which included grassy mounds of fill material that once covered buried underground storage tanks (USTs). Five former jet fuel USTs were buried in two earthen mounds, and two waste oil USTs were located in the Northern Fuel Farm Compound area. Three buried, bermed, and earthen-mounded steel fuel storage tanks were located in the Southern Fuel Farm Compound.**

**Nine dry wells, formerly used for disposal of liquid wastes, were reported in the MFF area. Dry Wells Nos. 1, 6, and 7 were located in the Northern Fuel Farm Compound. Dry Wells Nos. 2, 3, 4, 8, and 9 were located near Buildings 138, 139, and 140. Dry Well No. 5 was located in the Southern Fuel Farm**

**Compound. Both the buried underground storage tanks and the dry wells have been identified as potential sources of contamination and as pathways for the introduction of contaminants to the subsurface. The USTs located in the MFF were removed by the Navy's Charleston Detachment in May and October 1998. Removal actions in the areas of Dry Well Nos. 1, 2, 4, 5, 6, and 9, addressing the dry well structures and surrounding soil, were conducted by the Navy's Remedial Action Contractor (RAC) during field activities commencing in October 1998. Dry Well Nos. 3, 7, and 8 could not be located.**

**As discussed in the RFI Report for Category F (Tetra Tech 2000c), the probable source for chlorinated volatile organic compounds (CVOC) in the subsurface at the SWMU 136 South plume area is historical fuel handling operations in the MFF's Southern Fuel Farm Compound and/or releases from the dry wells. The primary contributing sources of chemicals of concern (COC) to the groundwater plume (e.g., tanks, oil/water separators, and dry wells) were removed in 1998 by the Navy's Charleston Detachment. With the removal of contaminated soils (secondary source) by the Navy's RAC to the TCEQ's Tier I Residential Protective Concentration Levels (PCLs) in August and September of 2003, there is no longer a contributing source of COCs to the groundwater in the SWMU 136 South plume area (CCI 2008).**

**Soil**

**Based upon the data obtained during the RFI, further action was recommended at SWMU 136 South due to exceedances of VOCs in soil. Consequently, excavation of impacted soil was recommended by the Navy and carried out by the Navy's Response Action Contractor (RAC) in 2003. The Response Action Completion report (RACR) for the soil removal activities was prepared and submitted to the TCEQ in March 2005. The RACR has undergone several review cycles by the City of Dallas, U.S. Environmental Protection Agency (U.S. EPA), and TCEQ and the final replacement pages for the RACR were submitted to the TCEQ in May 2008 (CH2M Hill 2008). The TCEQ granted final approval of the RACR in July 2008 (TCEQ 2008).**

**Groundwater**

**The results of the RFI for Category F (Tetra Tech 2000c) indicate that groundwater at the site has been impacted by chlorinated VOCs. As described in the APAR, the groundwater of this SWMU is located within a Class 2 groundwater resource area. The high degree of heterogeneity associated with the shallow water bearing zone onsite has resulted in a discrete groundwater Protective Concentration Level Exceedance (PCLE) zone associated with the SWMU 136 South Plume that required a response action to reduce the concentrations of COCs to less than the respective critical PCLs.**

**Subsequent to the APAR, a Response Action Plan (RAP) was submitted to the TCEQ for groundwater at the SWMU 136 South Plume. As indicated in the RAP, monitored natural attenuation (MNA) was chosen as a decontamination remedy to address the PCLE zone that has been identified at the SWMU 136 South Plume (Tetra Tech 2006). The revised RAP received TCEQ approval in December 2006.**

**In October 2015, the Navy submitted a revised RAP (Revision 3) (Resolution Consultants, 2015) to TCEQ. The purpose of the revised RAP was to remove monitor wells, with no history of COC detections or with COC detections below the applicable GWPS for at least the previous five consecutive years, from the current monitoring and sampling plan and confirmation sampling plan. In accordance with the RAPs, Resolution Consultants conducted plugging and abandonment (P&A) of select groundwater monitoring wells in April 2016. P&A actions were conducted by a state of Texas licensed driller (Strata Core Services, SCI). Monitoring wells 50804MW, 508F43MW, and 60-19 were abandoned at SWMU 136 South.**

**Potential receptors are onsite residents, onsite employees, and onsite construction workers. Since the groundwater PCLE zone is not projected to migrate offsite based on groundwater modeling results and other lines of evidence, it is not anticipated that offsite receptors will be affected. The possible routes of exposure to groundwater are inhalation (onsite residents, onsite employees, and onsite construction workers) and dermal contact (onsite construction workers). The groundwater ingestion pathway will not be a concern since, under the amended RAP, a restrictive covenant prohibiting the use of groundwater (i.e., no installation of potable or irrigation wells) will be filed with the county as an attachment to the deed on this property. Ingestion is not a concern since during the implementation of the response actions as there is controlled access to the site, which limits potential exposures to contaminated groundwater (i.e., no potable or irrigation wells will be installed) through 2017. The potential for inhalation of vapor from groundwater through soil to outdoor air is insignificant, because the maximum detected COC concentrations in groundwater are less than their respective inhalation of volatiles from groundwater ($^{Air}GW_{Inh\text{-}V}$) PCLs.**

## CHRONOLOGY OF MAJOR EVENTS

| | |
|---|---|
| Sep. 1985 | Initial Assessment Study was prepared and submitted. |
| Jan. 1987 | Confirmation Study and Verification Step Report was prepared and submitted. |
| Mar. 1989 | RFA was prepared and submitted. |
| 1993 — 1994 | EBS was prepared and submitted. |
| Mar. 1994 | BRAC Cleanup Plan was prepared and submitted. |
| 1995 — 1996 | Basewide Round 1 groundwater sampling event (Directed Phase RFI). |
| 1996 — 1997 | Interim Draft RCRA RFI Reports were prepared and submitted for each category identified at the air station. |
| Mar. — June 1998 | Basewide Round 2 groundwater sampling event (Chase Phase RFI). |
| May — Oct. 1998 | MFF USTs were removed by the Navy's Charleston Detachment, along with other tanks basewide. |
| June 1998 — Jan. 1999 | Release Determination Report was prepared and submitted covering the removal of the MFF tanks. |
| Aug. — Sep. 1998 | Basewide Round 3 groundwater sampling event. |
| Sep. 1998 | Most military operations on NAS Dallas ceased and the air station was placed into caretaker status. |
| Dec. 1998 — Jan. 2000 | Removal of oil/water separators (OWS) basewide. |
| Jan. — Oct. 1999 | Basewide removal of hot spot areas of contamination. |
| Feb. — Apr. 1999 | Basewide Round 4 groundwater sampling event. |
| Sep. — Oct. 1999 | Removal of the remaining USTs basewide. |
| Sep. — Nov. 1999 | Basewide Round 5 groundwater sampling event. |
| July 1999 — Feb. 2000 | Basewide pre-Corrective Measures Study monitoring well installation and sampling event. |
| June — July 2000 | Preliminary groundwater investigation at Advanced Science Incorporated Area -5 (ASA-5) site in the MFF/Main Fuel Farm Storm Sewer (MFF/MFFSS) area. |
| July — Aug. 2000 | Basewide Round 6 groundwater sampling event. |
| Aug. — Sep. 2000 | Aquifer tests were conducted at five sites across Former NAS Dallas to determine aquifer properties. |
| 2000 — 2001 | Final RFI Reports were prepared and submitted for each category. |
| June — July 2001 | Basewide Round 7 groundwater sampling event, including evaluation of alternate sampling methods (i.e., passive diffusion bag [PDB] and HydraSleeve). |
| Sep. 2001 | Enhanced Monitored Natural Attenuation (EMNA) pilot test initiated at ASA-5 site (SWMUs 79/136) involving the injection of $KMnO_4$. |

| | |
|---|---|
| Feb. 2002 | MNA Groundwater Modeling Report for MFF/MFFSS was prepared and submitted. |
| Mar. 2002 | Technical Memorandum Groundwater Sampling Procedure Comparison for selected monitoring wells was prepared and submitted. |
| Oct. 2002 | APAR was prepared and submitted. |
| Dec. 2002 — Mar. 2003 | Basewide Round 8 groundwater sampling event. |
| Jan. 2003 | Monitoring Well Abandonment Plan was prepared and submitted. |
| Jan. 2003 | Draft MNA Groundwater Modeling Report for Category D Sites was prepared and submitted. |
| Jan. 2003 | Corrective action (excavation and disposal) initiated on the Rubble Landfill (SWMU) 1). |
| Feb. 2003 | Draft RAP for MFF/MFFSS soils was prepared and submitted. |
| Apr. 2003 | Draft RAP for Category D Sites soils was prepared and submitted. |
| Apr. 2003 | Final Groundwater Report to satisfy Provision VIII.D.8 of the Former NAS Dallas RCRA Hazardous Waste Storage Permit (No. HW-50276) was prepared and submitted. |
| May 2003 | Self Implementation Notice (SIN) for TRRP RES A Soil Response Actions for SWMUs 2, 6, 18, 21, 31, 35, 36, 60, 79, 81, 83, 84, 85, 86, 102, 124, 138, and 139 was prepared and submitted. |
| June 2003 | Draft MNA Groundwater Modeling Report for Category B was prepared and submitted. |
| June 2003 | RCRA Permit renewal and Compliance Plan applications submitted to the TCEQ. |
| June 2003 | Corrective action (excavation, solidification, and disposal) initiated on the Texas Air National Guard (TANG) Ponds (SWMU 92). |
| July — Aug. 2003 | Basewide Round 9 groundwater sampling event. |
| Aug. 2003 | Corrective action (excavation, disposal, and backfill) initiated on the sites covered in the SIN submitted in May 2003. |
| Aug. 2003 | 2002 Annual Groundwater Monitoring Report was prepared and submitted. |
| Dec. 2003 — Jan. 2004 | Basewide Round 10 groundwater sampling event. |
| Jan. 2004 | Soil RACR was prepared and submitted for the Rubble Landfill (SWMU 1). |
| Jan. 2004 | Soil RACR was prepared and submitted for the TANG Ponds (SWMU 92). |
| Mar. 2004 | TCEQ produced and distributed the Draft RCRA Permit and Draft Compliance Plan. |
| Apr. 2004 | Final Addendum to MNA Groundwater Modeling Report for MFF/MFFSS was prepared and submitted. |
| May 2004 | 2003 Groundwater Response Action Effectiveness Reports (RAER) were prepared and submitted. |

| | |
|---|---|
| June 2004 | Indoor and Outdoor Air Sampling at Building 1406 Report was prepared and submitted. |
| July 2004 | Basewide Round 11 groundwater sampling event. |
| July 2004 | Final MNA Groundwater Modeling Report for Category D was prepared and submitted. |
| Sep. 2004 | Final MNA Groundwater Modeling Report for Category B was prepared and submitted. |
| Sep. 2004 | TCEQ approved final closure documentation for the Miscellaneous Sites Soil RACR. |
| Oct. 2004 | Basewide Round 12 groundwater sampling event. |
| Oct. 2004 | TCEQ approved Final MNA Groundwater Modeling Report for Category D Sites at Former NAS Dallas. |
| Oct. 2004 | TCEQ approved Final Addendum to the MNA Groundwater Modeling Report for MFF/MFFSS at Former NAS Dallas. |
| Oct. 2004 | TCEQ approved Final Groundwater Report for Former NAS Dallas. |
| Oct. 2004 | TCEQ approved the 2002 Annual Groundwater Monitoring Report. |
| Nov. 2004 | Final RAP (Basewide) for groundwater was prepared and submitted. |
| Dec. 2004 | 2004 Semi-annual Groundwater Monitoring Report was prepared and submitted. |
| Dec. 2004 | TCEQ issued comments on the 2003 Groundwater RAERs. |
| Jan. 2005 | 2004 Groundwater RAERs were prepared and submitted. |
| Mar. 2005 | Monitoring Well Installation and Abandonment Plan was prepared and submitted. |
| Mar. 2005 | Draft 84 Sites Soil RACR was prepared and submitted. |
| Apr. 2005 | 2004 Groundwater RAERs were prepared and submitted. |
| Apr. 2005 | Basewide Round 13 groundwater sampling event. |
| June 2005 | Corrective action for groundwater (excavation, disposal, and backfill) initiated at SWMU 85. |
| June 2005 | Corrective action for groundwater (excavation, disposal, and backfill) initiated at SWMU 18. |
| July 2005 | Basewide Round 13 groundwater sampling event. |
| Aug. 2005 | TCEQ issued comments on the Draft 84 Sites Soil RACR. |
| Aug. 2005 | 2005 Semi-annual Groundwater Monitoring Report was prepared and submitted. |
| Sep. 2005 | TCEQ issued comments on the 2004 Groundwater RAPs. |
| Oct. 2005 | TCEQ issued comments on the 2004 Groundwater RAERs. |
| Oct. 2005 | Basewide Round 14 groundwater sampling event. |
| Oct. — Dec. 2005 | City of Dallas issued comments on the Draft 84 Sites Soil RACR. |

| | |
|---|---|
| Dec. 2005 | TCEQ issued comments on the 2005 Semi-annual Groundwater Monitoring Report. |
| Jan. 2006 | 2005 Groundwater RAERs were prepared and submitted. |
| Jan. 2006 | Basewide Round 15 groundwater sampling event. |
| Feb. 2006 | Revised Groundwater RAPS (Revision 2) were prepared and submitted covering SWMUs 17/Building 1423, 17/Building 1429, 18, 35, 85, 86, 108, 136 North, 136 South, and 139. |
| Mar. 2006 | RACR for groundwater removed at SWMUs 18 and 85 were prepared and submitted. |
| May 2006 | Basewide Round 15B groundwater sampling event. |
| May 2006 | TCEQ issued comments on the 2005 Groundwater RAERs. |
| June 2006 | 85 Sites, Defense Reutilization and Marketing Office (DRMO), and Naval Weapons Industrial Reserve Plant (NWIRP) SWMU 18 Soil RACRs (Revision 1) were prepared and submitted. |
| July 2006 | TCEQ issued comments on the Groundwater RAPs (Revision 2). |
| July 2006 | EMNA Pilot Test initiated at SWMU 21 involving the injection of zero valent iron. |
| Aug. 2006 | Basewide Round 16 groundwater sampling event. |
| Aug. 2006 | Responses to TCEQ comments on the Groundwater RAPs (Revision 2), including replacement pages, were prepared and submitted. |
| Nov. 2006 | Basewide Round 16B groundwater sampling event. |
| Dec. 2006 | RACR for groundwater Protective Concentration Level (PCL) at SWMU 35 was prepared and submitted. |
| Dec. 2006 | TCEQ approves Groundwater RAP (Revision 2) covering SWMUs 17/Building 1423, 17/Building 1429, 18, 35, 85, 86, 108, 136 North, 136 South, and 139. |
| Jan. 2007 | 2006 Groundwater RAERs were prepared and submitted. |
| Apr. 2007 | Groundwater Sampling Work Plan Addendum, Slug Test Work Plan, and Monitoring Well Installation and Abandonment Work Plan were prepared and submitted. |
| Apr. — May 2007 | Basewide Round 17 groundwater sampling event. |
| Apr. — June 2007 | SWMU 18 OWS removal operations were conducted. |
| Apr. 2007 | Slug test operations conducted at SWMUs 18, 85, and 139. |
| Aug. — Sep. 2007 | Basewide Round 18 groundwater sampling event. |
| Nov. 2007 | Field Activities for SWMU 21 EMNA Pilot Study completed. |
| Jan. 2008 | Basewide Round 19 groundwater sampling event. |
| Jan. 2008 | 2007 Groundwater RAERs were prepared and submitted. |
| Feb. 2008 | TCEQ approves the Groundwater RACR for SWMU 35. |

| | |
|---|---|
| Apr. 2008 | Comments to the 85 Sites, DRMO, and NWIRP SWMU 18 Soil RACRs revisions were received from the TCEQ. |
| May 2008 | TCEQ issued comments on the 2007 Groundwater RAERs. |
| May 2008 | Response to the 85 Sites, DRMO, and NWIRP SWMU 18 Soil RACRs comments were submitted to the TCEQ. |
| July 2008 | Basewide Round 20 groundwater sampling event. |
| July 2008 | TCEQ grants final approval of the 85 Sites, DRMO, and NWIRP SWMU 18 Soil RACRs. |
| July 2008 | Response to TCEQ comments on 2007 Groundwater RAERs, replacement pages (Revision 1) to 2007 RAERs prepared and submitted. |
| Oct. 2008 | Technical Memorandum, ASA-5 East Site EMNA Pilot Study prepared and submitted. |
| Oct. 2008 | Technical Memorandum, Pilot Study at SWMU 21 prepared and submitted. |
| Oct. 2008 | SWMU 17/Building 1429 Pilot Test Work Plan prepared and submitted. |
| Dec. 2008 | SWMU 139 Groundwater RACR prepared and submitted. |
| Jan. 2009 | Basewide Round 21 groundwater sampling event. |
| Jan. 2009 | 2008 Groundwater RAERs prepared and submitted. |
| Jan. 2009 | Revised Groundwater RAPs for SWMU 21 (Revision 2) prepared and submitted. |
| Jan. 2009 | Revised Groundwater RAPs for SWMUs 79/136 Central (Revision 2) prepared and submitted. |
| Jan. 2009 | Revised Groundwater RAP for SWMU 136 South (Revision 4) prepared and submitted. |
| May 2009 | SWMU 21 Pilot Study additional groundwater sampling. |
| May 2009 | SWMU 79/136 Central non-compliant monitoring well groundwater sampling. |
| May 2009 | TCEQ grants conditional approval of the SWMU 139 Groundwater RACR. |
| June 2009 | ASA-5 Pilot Test injection points abandonment. |
| June 2009 | SWMU 35 monitoring well abandonment. |
| July 2009 | Basewide Round 22 groundwater sampling event. |
| July 2009 | SWMU 21 Pilot Study revised Technical Memorandum prepared and submitted. |
| Sep. 2009 | SWMU 21 Pilot Study monitoring wells abandonment. |
| Oct. 2009 | SWMU 136 South non-compliant monitoring well groundwater sampling. |
| Nov. 2009 | Response to TCEQ comments on 2008 Groundwater RAERs prepared and submitted. |
| Jan. 2010 | Basewide Round 23 groundwater sampling event. |
| Jan. 2010 | 2009 Groundwater RAERs prepared and submitted. |
| July 2010 | Basewide Round 24 groundwater sampling event. |

| | |
|---|---|
| Aug. 2010 | Basewide monitoring well network inspection and five-year survey. |
| Nov. 2010 | Response to TCEQ comments on 2009 Groundwater RAERs prepared and submitted. |
| Dec. 2010 | Monitoring wells general maintenance and minor repairs completed. |
| Jan. 2011 | Basewide Round 25 groundwater sampling event. |
| Jan. 2011 | 2010 Groundwater RAERs prepared and submitted. |
| March 2011 | Monitoring well inspection at SWMU 21/SWMU 18 on monitoring wells within the 20-acre area leased to the Air National Guard. |
| May 2011 | Addendum to Monitoring Well Installation and Abandonment Plan prepared and submitted. |
| June 2011 | SWMU 139 monitoring wells plugged and abandoned. |
| June 2011 | SWMU 81 monitoring wells plugged and abandoned. |
| June 2011 | Repairs, abandonment and replacement of damaged monitoring wells at SWMU 21 and SWMU18. |
| July. 2011 | Basewide Round 26 groundwater sampling event. |
| Dec. 2011 | Response to TCEQ comments on 2010 Groundwater RAERs prepared and submitted. |
| Jan. 2012 | Basewide Round 27 groundwater sampling event. |
| March 2012 | 2011 Groundwater RAERs prepared and submitted. |
| July 2012 | Basewide Round 28 groundwater sampling event. |
| Aug. 2012 | EPA comments to the 2011 Groundwater RAER. |
| Oct. 2012 | TCEQ comments to the 2011 Groundwater RAER. |
| Jan. 2013 | Basewide Round 29 groundwater sampling event. |
| Jan. 2013 | 2012 Groundwater RAERs prepared and submitted |
| Feb. 2013 | TCEQ comments to the 2012 Groundwater RAER. |
| June 2013 | EPA comments to the 2012 Groundwater RAER. |
| July 2013 | Basewide Round 30 groundwater sampling event. |
| July 2013 | Response to TCEQ comments on 2012 Groundwater RAERs prepared and submitted. |
| Jan. 2014 | Basewide Round 31 groundwater sampling event. |
| Jan. 2014 | 2013 Groundwater RAERs prepared and submitted |
| Feb. 2014 | TCEQ comments to the 2013 Groundwater RAER. |
| June 2014 | EPA comments to the 2013 Groundwater RAER. |
| July 2014 | Basewide Round 32 groundwater sampling event. |
| July 2014 | Response to TCEQ comments on 2013 Groundwater RAERs prepared and submitted. |
| Nov. 2014 | RCRA Permit renewal and Compliance Plan (Number 50276) applications submitted to the TCEQ. |
| Jan. 2015 | Basewide Round 33 groundwater sampling event. |

| | |
|---|---|
| Jan. 2015 | 2014 Groundwater RAERs prepared and submitted. |
| May 2015 | TCEQ Permit Renewal Application Technical Notice of Deficiency (NOD) Letter, dated May 26, 2015. |
| June 2015 | Meeting with TCEQ, EPA, and City of Dallas. |
| June 2015 | TCEQ comments letter to the 2014 Groundwater RAER, dated June 10, 2015. |
| June 2015 | Submittal of Draft revised RAP for SWMU 17/Building 1429, received June 23, 2015. |
| June 2015 | Response to TCEQ comments to the Response to Permit Renewal Application Technical NOD Letter for Former Dallas Naval Air Station (NAS), Dallas, Texas, dated June 26, 2015. |
| July 2015 | Basewide Round 34 groundwater sampling event. |
| July 2015 | TCEQ Permit Renewal Application Second Technical Notice of Deficiency Letter, dated July 24, 2015. |
| July 2015 | Response to TCEQ Comments on the Technical Memorandum Pilot Study for SWMU 21, Rev. 1, July 2009 submitted to the TCEQ, dated July 24, 2015. |
| Oct. 2015 | Basewide submittal of Revised and Interim Response Action Plans. |
| Dec. 2015 | Draft Final Enhanced Monitored Natural Attenuation (EMNA) Spot Treatment Workplan for SWMU 18 prepared and submitted to TCEQ. |
| Dec. 2015 | Amendment to the Approved Class V Underground Injection Control (UIC) Permit (5X2600432) prepared and submitted to TCEQ. |
| Jan. 2016 | Basewide Round 35 groundwater sampling event. |
| Jan. 2016 | TCEQ, U.S. EPA, and City of Dallas approve EMNA workplan. |
| Jan. 2016 | 2015 Groundwater RAERs prepared and submitted. |
| Jan. 2016 | EMNA Spot Treatment Design Verification Testing at SWMU 18 by Resolution Consultants and Regenesis Remediation Services. |
| March 2016 | Draft Tier II Sampling and Analysis Plan Addendum #1, Long-Term Monitoring Plan Enhanced Monitored Natural Attenuation Spot Treatment at SWMU 18 Former Naval Air Station Dallas, Dallas, Texas prepared and submitted to TCEQ. |
| March 2016 | Amendment to the Approved Class V UIC Permit (5X2600432) prepared and submitted to TCEQ. |
| Apr. 2016 | TCEQ approves UIC amendment request. |
| Apr. 2016 | Basewide monitor well plugging and abandonment and operation and maintenance actions, installation of monitor well 508F98MW in SWMU 79 |
| Apr. 2016 | EMNA Spot Treatment at SWMU 18 baseline groundwater sampling event. |
| May 2016 | EMNA Spot Treatment at SWMU 18 injections by Resolution Consultants and Regenesis Remediation Services. |

| | |
|---|---|
| Jul. 2016 | Basewide Round 36 groundwater sampling event. |
| Aug. 2016 | Deploy passive diffusion bags at EMNA Spot Treatment well 606D152MW. |
| Sep. 2016 | Basewide operations and maintenance activities completed. |
| Sep. 2016 | EMNA Spot Treatment at SWMU 18 first quarterly performance groundwater monitoring event. |
| Sep. 2016 | Draft Tier II Sampling and Analysis Plan Addendum #2, Long-Term Monitoring Plan, Enhanced Monitored Natural Attenuation, Perfluoroalkyl Substances Groundwater Investigation, Former Naval Air Station Dallas, Dallas, Texas prepared and submitted to TCEQ. |

# Checklist for Report Completeness

Use this checklist to determine the portions of the form that must be submitted for this report. Answer all questions by checking Yes or No. If the answer is Yes include that portion of the report. If the answer is No, do not complete or submit that portion of the report. All form contents that are marked "Required" must be submitted. Form contents marked with an asterisk (*) are not included in the blank form and are to be provided by the person.

| | | | Report Contents | |
|---|---|---|---|---|
| | | Required | **Cover Page** | ☒ |
| | | Required | **Executive Summary** | ☒ |
| | | Required | **Checklist for Report Completeness** | ☒ |
| | | Required | **Worksheet 1.0** Response Action Objectives | ☒ |
| | | Required | **Attachment 1A*** Maps and Cross Sections | ☒ |
| | | Required | **Attachment 1B*** Graphs | ☒ |
| | | Required | **Attachment 1C*** Response Action Diagrams | ☐ *N/A* |
| No ☒ | Is a plume management zone being used as part of the response action? | ☐ Yes | **Worksheet 2.0** Plume Management Zone | ☐ |
| | | | **Attachment 2A*** Map of Plume Management Zone | ☐ |
| No ☒ | Was an area of technical impracticability approved for use as part of the response action? | ☐ Yes | **Worksheet 3.0** Technical Impracticability | ☐ |
| | | | **Attachment 3A*** Map of Technical Impracticability | ☐ |
| No ☒ | Are institutional controls used or required as part of the response action? | ☐ Yes | **Worksheet 4.0** Institutional Controls | ☐ |
| | | Required | **Worksheet 5.0** Performance Measures and Problems | ☒ |
| No ☐ | Have any operation and maintenance activities been conducted? | ☒ Yes | **Worksheet 6.0** Operation and Maintenance | ☒ |
| No ☒ | Has there been any change to the plans for post-response action care from that submitted in the RAP? | ☐ Yes | **Worksheet 7.0** Post-Response Action Care | ☐ |
| No ☐ | Was any information for this report obtained from outside sources? | ☒ Yes | **Appendix 1*** References | ☒ |
| No ☒ | Is an ESA and/or Compensatory Restoration being used as part of the response action? | ☐ Yes | **Appendix 2*** ESA and Compensatory Restoration | ☐ |

| Checklist for Report Completeness | ID No. *SWR 65033 SWMU 136 South Plume* | Report Date: *01/17/2017* |
|---|---|---|

| | | | | |
|---|---|---|---|---|
| No ☒ | Are institutional controls or landowner concurrence required in the response action? | ☐ Yes | **Appendix 3*** Institutional Controls and Landowner Concurrence | ☐ |
| No ☐ | Is there data or boring/monitor well information not previously submitted? | ☒ Yes | **Appendix 4*** Data Tables, Boring Logs, and Well Completions | ☒ |
| No ☒ | Did sampling procedures differ from those described in the RAP? | ☐ Yes → | **Appendix 5*** Sampling Procedures | ☐ |
| No ☐ | Has any sampling been conducted for which the analytical results were not previously submitted? | ☒ Yes → | **Appendix 6*** Laboratory Data Packages | ☒[1] |
| No ☐ | Were statistics or geostatistics used in the response action? | ☒ Yes → | **Appendix 7*** Statistical Methodology | ☒[2] |
| No ☐ | Were any wastes generated that were not reported through STEERS? | ☒ Yes | **Appendix 8*** Waste Disposition | ☒ |

***Notes:***

[1] Included with 2016 RAER in CD format.

[2] Included with 2016 RAER for SWMU 17/Building 1423.

Use this worksheet to describe the response action objectives in each media.

## Response Action Objectives — SWMU 136 South Plume

What is the selected remedy standard for this affected property? *X* A ____ B

List the environmental media to which this applies **Soil**

Repeat this section for each medium that had a different response action objective.

Provide a detailed description of the response action. Describe the removal actions, decontamination actions, treatment system(s), and/or physical or institutional control actions that have been conducted in each media and indicate if there were any differences between the actions taken and the actions proposed in the SIN or RAP.

**Based upon the data obtained during the RFI and subsequently evaluated in the APAR, further action was recommended at SWMU 136 South due to exceedances of VOCs in the soil. Consequently, excavation of impacted soil was recommended by the Navy and carried out by the Navy's Response Action Contractor (RAC) in 2003. The RACR for the soil removal activities was prepared and submitted to the TCEQ in March 2005. The RACR has undergone several review cycles by the City of Dallas, U.S. EPA, and TCEQ and the final replacement pages for the RACR were submitted to the TCEQ in May 2008 (CH2M Hill 2008). The TCEQ granted final approval of the RACR in July 2008 (TCEQ 2008).**

List the environmental media to which this applies **Groundwater**

Repeat this section for each medium that had a different response action objective.

Provide a detailed description of the response action. Describe the removal actions, decontamination actions, treatment system(s), and/or physical or institutional control actions that have been conducted in each media and indicate if there were any differences between the actions taken and the actions proposed in the SIN or RAP.

**The groundwater response action for the site consists of groundwater MNA as a decontamination remedy to reduce the concentration of COCs to less than their critical PCLs. MNA includes the following elements:**

- **Decontamination through the ongoing biological and chemical reductive dechlorination processes.**
- **A monitoring/confirmation sampling program to evaluate the progress of the decontamination.**

Describe how the response action has, or is working towards, achievement of the property-specific response objectives for the PCLE zone in each medium in the context of the response objectives set forth in §350.32 or §350.33, as applicable. Explain how the response action is appropriate based on the hydrogeologic and COC characteristics. Describe any unprotective conditions that continued or resulted from the remedial actions and the actions taken to mitigate unprotective conditions.

**The response action for the contaminated groundwater in the PCLE zone is currently meeting groundwater response objectives of §350.32 by the use of MNA as a decontamination remedy to reduce the concentration of COCs within the PCLE zone to less than their critical PCLs. The Navy considers MNA appropriate based on the ongoing evaluation process which has demonstrated that MNA is capable of reducing the concentrations of COCs in the PCLE zone within a reasonable time frame, while controlling plume expansion.**

**During the implementation of the response action activities, there was controlled access to the site and limited potential exposure to contaminated groundwater due to site restrictions on potable or irrigation well installation through 2017. Because this decontaminating remedy was based on an in-situ technology, the potential short-term exposures normally associated with the implementation of ex-situ technologies (i.e., dermal and inhalation exposures) were not a concern.**

If different from the information provided in the RAP, explain how the COCs have been handled, treated, disposed, or transferred to another medium and document that the response action has not resulted in any additional exposure conditions due to response action activities.

*N/A*

Explain whether the response action is achieving, or will achieve, the objectives within the reasonable time frame.

**The groundwater PCLE zone was originally identified for benzene, cis-1,2-DCE, PCE, and TCE. The strongest evidence for natural attention is the reduction of COC levels observed in samples from monitoring wells over the period of record. Specifically, soil removal combined with natural attenuation has reduced concentrations of COCs at monitoring well 508F04MW to levels below respective groundwater PCLs, with the exception of VC during the July 2016 sampling event.**

**In the July 2009 sampling event, after almost 10 years of no COCs being detected at the point of exposure monitoring well 508F47MW, TCE and cis-1,2-DCE exceeded respective PCLs. From 2010 to 2013, concentrations for both COCs occurred at levels slightly below and above PCLs. Starting with the January 2014 sampling event, TCE was detected above its PCL during five consecutive sampling events**

**In March 2016, contractors for the Army Reserve working on resurfacing a parking lot covered or destroyed monitoring well 508F47MW. Attempts to locate the monitoring well were unsuccessful, and a replacement well (508F98MW) was installed on April 5, 2016. The well was developed and subsequently sampled during the July 2016 sampling event.**

**In accordance with the approved Groundwater RAP (Revision 2) (TtNUS, 2006), failure of the response action triggers the implementation of contingency measures, which may include the selection of an appropriate alternate remedial measure. The Navy has proposed to implement enhanced MNA (EMNA) as an alternate remedy at the affected area of SWMU 18 groundwater plume in an effort to reduce COCs to below PCLs. This will allow the Navy to make a determination as to whether the technology is viable. Depending on the results of the EMNA spot treatment at SWMU 18, alternative remedial measures may be proposed in a comprehensive RAP for SWMU 136 South Plume if VC concentrations at monitoring well 508F04MW do not reach clean-up goals. MNA will be continued at the SWMU 136 South Plume for the upcoming year in accordance with the procedures and protocols described in the Groundwater RAP (Revision 2) (Tetra Tech, 2006).**

**Maps in Attachment 1A, data tables in Appendix 4, and graphs in Attachment 1B show the historical PCLE zone presented in the RAP (Tetra Tech 2006) and current groundwater data.**

Are physical controls part of the response action? ____ Yes *X* No

If yes, describe the type and purpose of the physical control and discuss how the physical control has proven effective.

*N/A*

## Soil Response Action Objectives

When using removal and/or decontamination with controls or controls only, demonstrate that the physical control or combination of measures is reliably containing, and will continue to contain, COCs within and/or derived from the surface soil and subsurface soil PCLE zone materials over time.

*N/A*

Explain how the removal or decontamination action is reducing the concentration of COCs to the critical surface soil and subsurface soil PCL throughout the soil PCLE zone and preventing COC concentrations above the critical soil PCLs from migrating beyond the original boundary of the soil PCLE zone.

**The soils containing COC concentrations in excess of TRRP RES A were excavated by the Navy's RAC in 2003. Since no soils remain at the site in excess of TRRP RES A concentrations, there is no danger of COCs migrating beyond the original boundary of the PCLE zone. The RACR for the soil removal activities was prepared and submitted to the TCEQ in March 2005. The RACR has undergone several review cycles by the City of Dallas, U.S. EPA, and TCEQ and the final replacement pages for the RACR were submitted to the TCEQ in May 2008 (CH2M Hill 2008). The TCEQ granted final approval of the RACR in July 2008 (TCEQ 2008).**

## Groundwater Response Action Objectives — SWMU 136 South Plume

Name of groundwater-bearing unit to which this information applies **Upper Water Bearing Zone (Alluvial Overburden)**

Repeat this section for each groundwater-bearing unit for which a different response action is being conducted.

Groundwater Classification ___ 1 *X* 2 ___ 3

Is a modified groundwater response action being used for any part of the groundwater PCLE zone (§350.33(f)(2), (3), or (4))? ___ Yes *X* No

If yes, complete the appropriate portions of this report.

Explain how the removal or decontamination actions are reducing the concentration of COCs to the critical groundwater PCL throughout the groundwater PCLE zone and preventing COC concentrations above the critical groundwater PCL from migrating beyond the original boundary of the groundwater PCLE zone. If COC concentrations above the critical groundwater PCL have ever migrated beyond the original boundary of the groundwater PCLE zone, explain the actions taken to address the increase in the PCLE zone.

**The soils containing COC concentrations in excess of TRRP RES A were excavated by the Navy's RAC in 2003, thus reducing a possible source for COCs in groundwater and the possible migration of COCs beyond the original boundary of the PCLE zone. In addition, COC concentrations observed in samples from monitoring wells over the period of record have decreased. Specifically, MNA combined with soil removal actions have reduced concentrations of all COCs at monitoring well 508F04MW to levels below respective groundwater PCLs, with the exception of a low level detection for VC in 508F04MW during the July 2016 sampling event.**

**TCE was detected above its PCL during 5 consecutive sampling events at monitoring well 508F47MW before it was destroyed. TCE was then not detected above laboratory reporting levels in replacement well 508F98 MW for the July 2016 sampling event. TCE data for monitoring well 508F98MW will be closely monitored during future sampling events to verify concentrations trends. If TCE concentrations do increase above PCLs, the Navy proposes to perform an investigation downgradient of monitoring well 508F47MW to quantify if COCs have migrated beyond the boundary of the historical PCLE zone. As previously indicated, alternative remedial actions may be implemented at the outlier monitoring well following ongoing investigations at SWMU 18.**

Explain how the response actions are preventing COCs from migrating to air at concentrations above the PCLs for air if the groundwater-to-air PCLs ($^{Air}GW_{Inh\text{-}v}$) were exceeded.

**The response action is based on an in-situ technology that will permanently degrade the COCs. During the implementation of the in-situ groundwater response action, access to the site will be controlled by not permitting any potable or irrigation wells in the PCLE zone during remedial activities. Additionally, the fate and transport modeling results (Tetra Tech 2004) indicate that the PCLE zone will not migrate**

**beyond the Former NAS Dallas property line; therefore, there will be no threat to offsite human or ecological receptors.**

Explain how the response actions are preventing COCs from migrating to surface water at concentrations above the PCLs for groundwater discharges to surface water if surface water was a factor.

**As shown in the approved RAP (Tetra Tech 2006), surface water is not a factor during the groundwater response action as the direction of groundwater flow is away from nearby surface water bodies (i.e., Mountain Creek Lake).**

Explain how the response actions are preventing human and ecological receptor exposure to the groundwater PCLE zone.

**The COC concentrations at the site are less than the TCEQ default $^{Air}GW_{Inh\text{-}V}$ and $^{SW}GW$ exposure pathways.**

## Waste Management

Describe the volume and final disposition or reuse location of waste or environmental media that has been removed from the affected property during the response action, if not previously reported under STEERS. Provide copies of all manifests, other documentation of disposition, and landowner consent for reuse of soil in Appendix 8.

**Excess groundwater recovered through the low-flow or PDB sampling method is placed into properly labeled 55-gallon capacity drums and stored at the site. Upon classification, waste disposal arrangements are made with a licensed waste disposal facility. Appendix 8 contains copies of the waste disposal manifests for groundwater generated during the 2016 sampling activities at Former NAS Dallas.**

# ATTACHMENT 1A
# MAPS AND CROSS SECTIONS

# AFFECTED PROPERTY MAP

Affected Property Map
Former NAS Dallas, Texas

January 2014 Isocontour
Gross PCLE Zone Outline
Demolished Building
Existing Structure
Owned by City of Dallas
Transferred from Exelon Corporation to City of Dallas
Transferred from Navy to City of Dallas
Transferred from Navy to City of Grand Prairie
Transferred from Navy to U.S. Army Reserve
Owned by Exelon Corporation

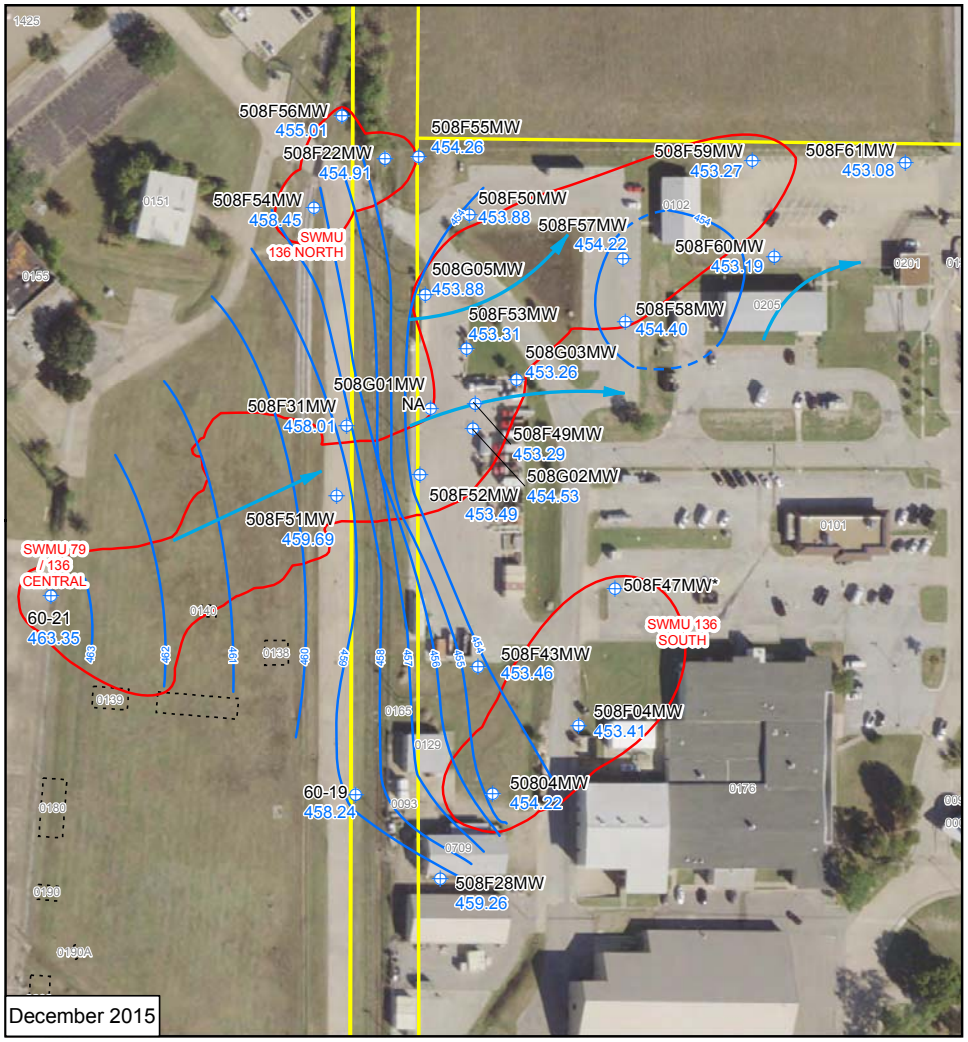
NAVFAC Naval Facilities Engineering Command

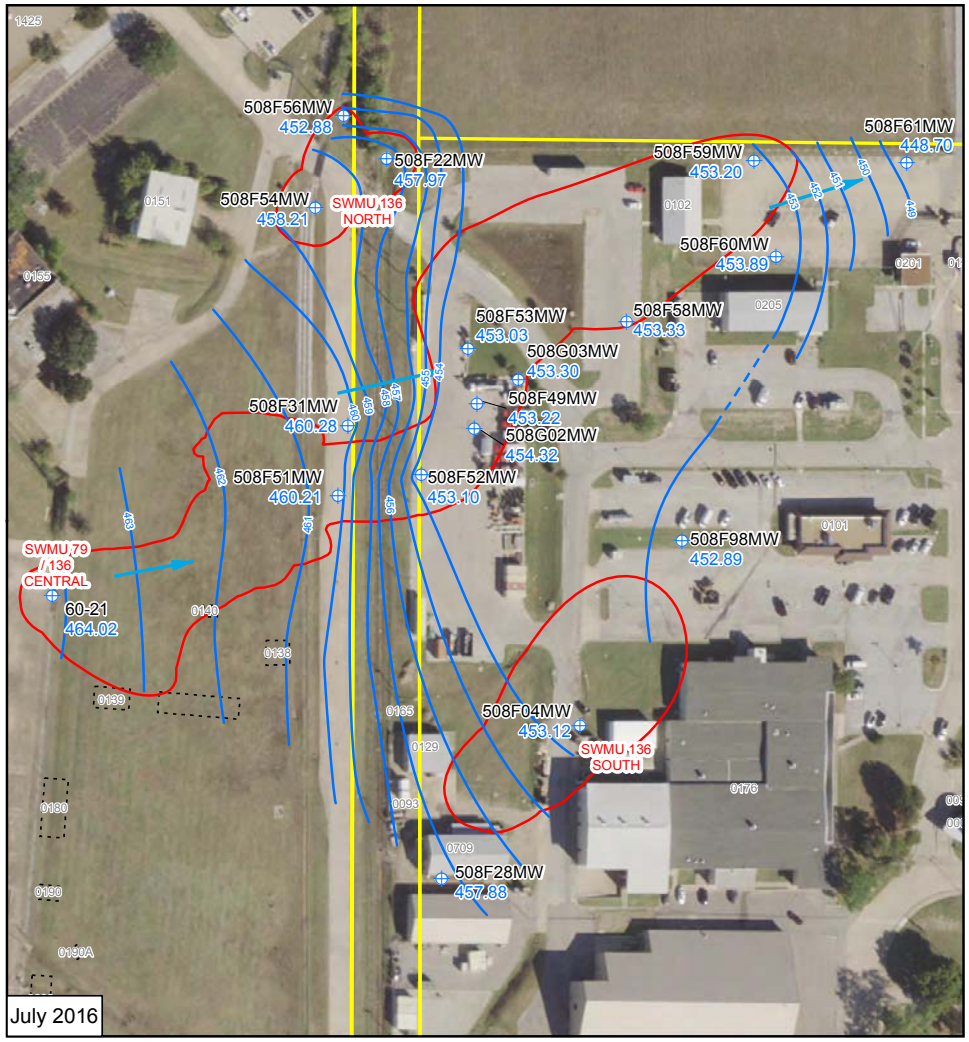
| | |
|---|---|
| REQUESTED BY: T. Wiberg | DATE: 9/21/2015 |
| DRAWN BY: A. Zimmerman | PROJECT NUMBER: 0888812796 |

X:\Navy\NAS_Dallas\NAS_Dallas_Jan14_AffectedPropMap.mxd

Service Layer Credits: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community; State boundary is from the United States Census Bureau; Some data are from TetraTech.

# POTENTIOMETRIC SURFACE MAPS




N

Well Location

Potentiometric Surface Contour (dashed where inferred)

Groundwater Flow Direction

Gross PCLE Zone Outline

Property Boundary 2014

Demolished Building

Notes:
453.27 - Potentiometric Surface Contour (Feet above MSL)
NA = Elevation not measured at location
* Monitoring well 508F47MW was covered or destroyed prohibiting the collection of December 2015 water level data.
This monitoring well was replace by 508F98MW on April 5, 2016.

0 65 130 195 260 Feet

Figure 1A-3
Potentiometric Surface Map
SWMU 79 / 136 Central Plume
2016 RAER
Former NAS Dallas, Texas

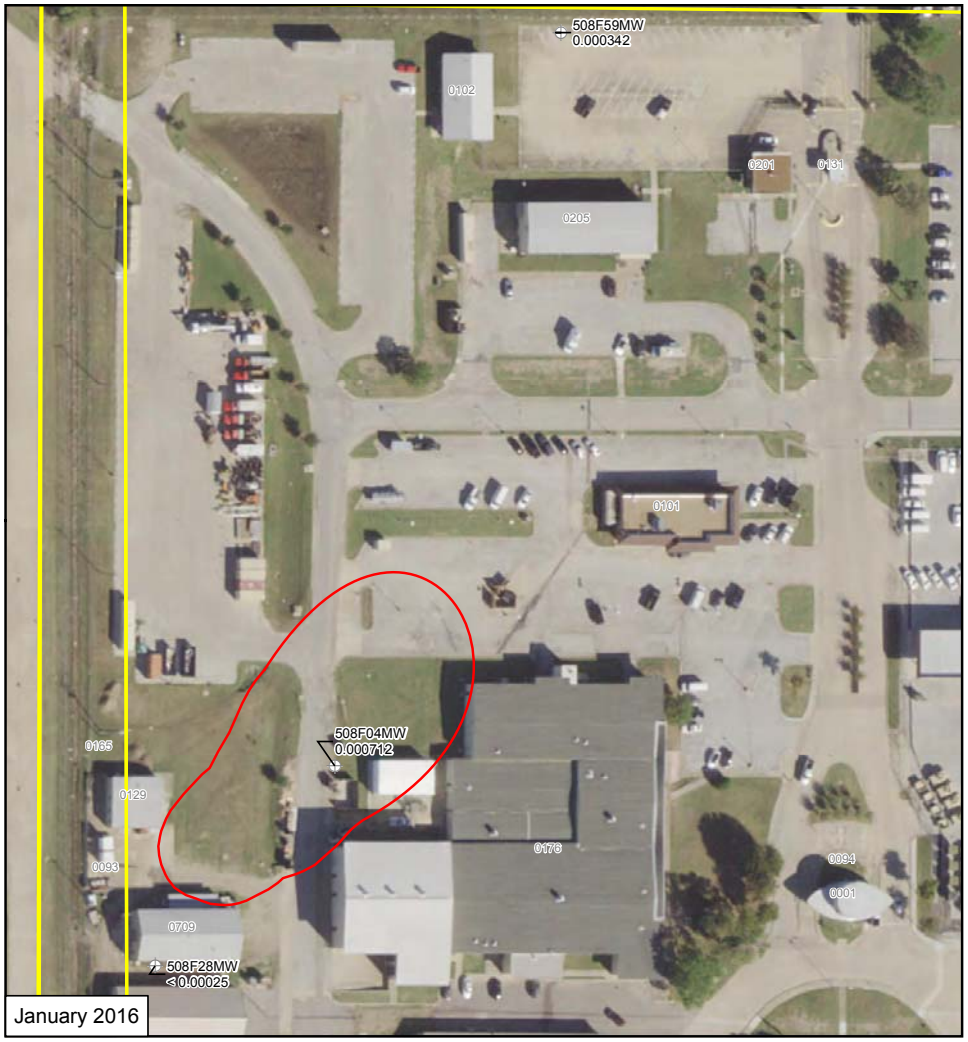
NAVFAC Naval Facilities Engineering Command

| | |
|---|---|
| REQUESTED BY: L. Foss | DATE: 12/2/2016 |
| DRAWN BY: K. Burnum | PROJECT NUMBER: 0888812796 |

Service Layer Credits: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

X:\Navy\NAS_Dallas\project\2016_RAER\2016_Jul_NAS_Dallas_loc_POT_SWMU79_136Central.mxd

# ISOCONCENTRATION CONTOUR MAPS



N

**VC (mg/L)**

- ND - 0.002
- > 0.002 - 0.02
- Gross PCLE Zone Outline
- Property Boundary 2014

**Isoconcentration Contours**

- 0.002 mg/L

Demolished Building

Note: The PCL for VC - 0.002 mg/L
NA - Not Analyzed
J - Estimated value
L - Biased Low
U - Non-detect

0 40 80 120 160 200 Feet

Figure 1A-2C
Vinyl Chloride Isoconcentration Contours
SWMU 136 South Plume
2016 RAER
Former NAS Dallas, Texas

NAVFAC Naval Facilities Engineering Command

| | |
|---|---|
| REQUESTED BY: E. Brickman | DATE: 11/22/2016 |
| DRAWN BY: M. Senne | PROJECT NUMBER: 0888812796 |

Source: Esri, DigitalGlobe, GeoEye, i-cubed, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community

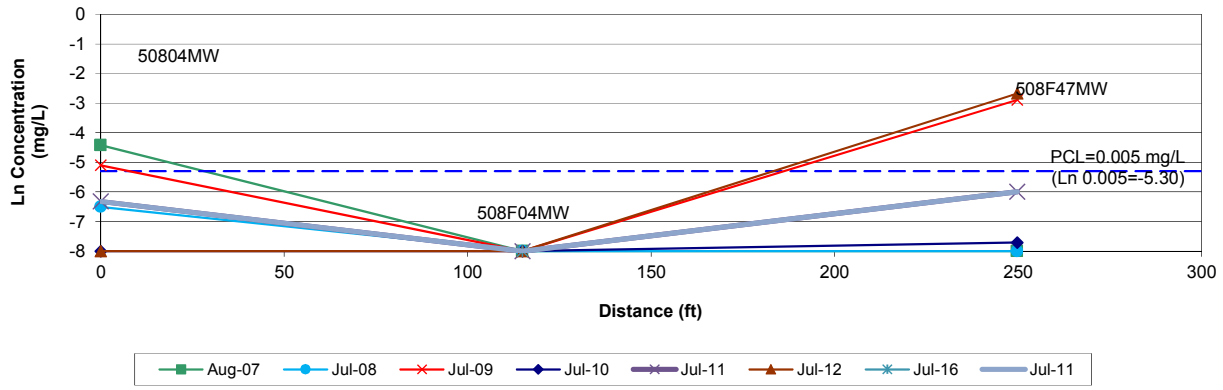
X:\Navy\NAS_Dallas\project\2016_RAER\2016_Jul_NAS_Dallas_tce_VC_SWMU136SouthPlume.mxd

# ATTACHMENT 1B
# GRAPHS

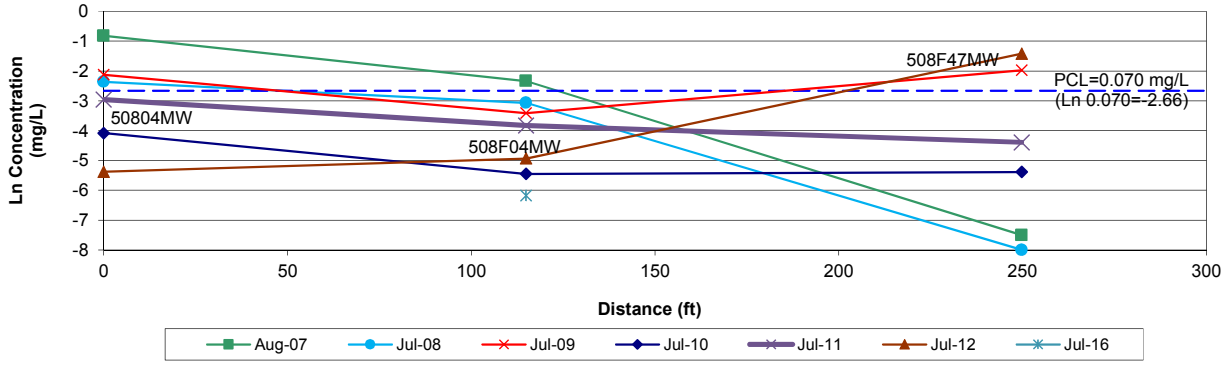
# ATTACHMENT 1B
# CONCENTRATION VS. DISTANCE GRAPHS
# SWMU 136 SOUTH PLUME
# 2016 RAER

## FORMER NAS DALLAS, TEXAS

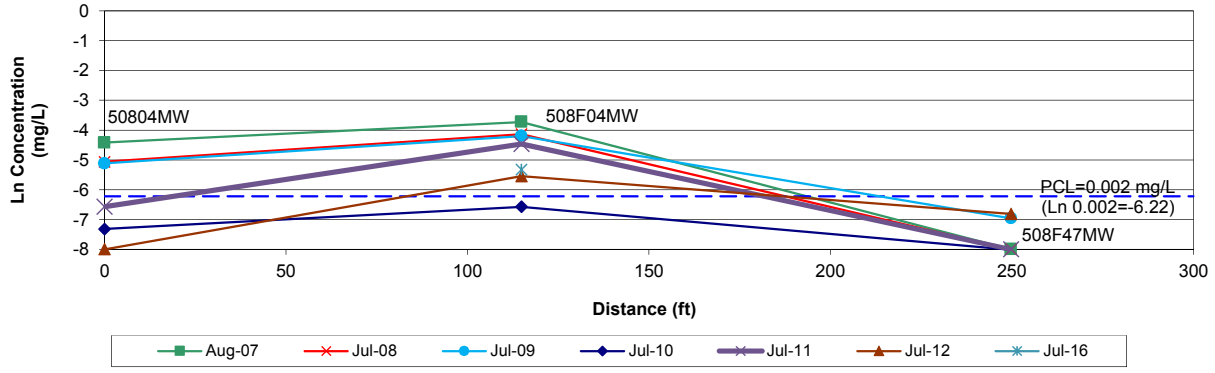

**TCE**




**cis-1,2-DCE**

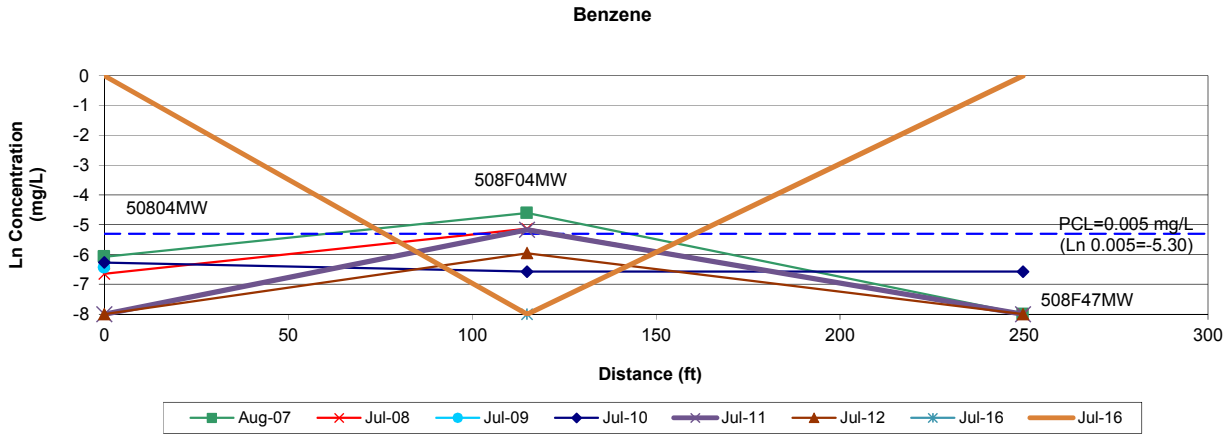



**Vinyl Chloride**



# ATTACHMENT 1B
# CONCENTRATION VS. DISTANCE GRAPHS
# SWMU 136 SOUTH PLUME
# 2016 RAER

## FORMER NAS DALLAS, TEXAS

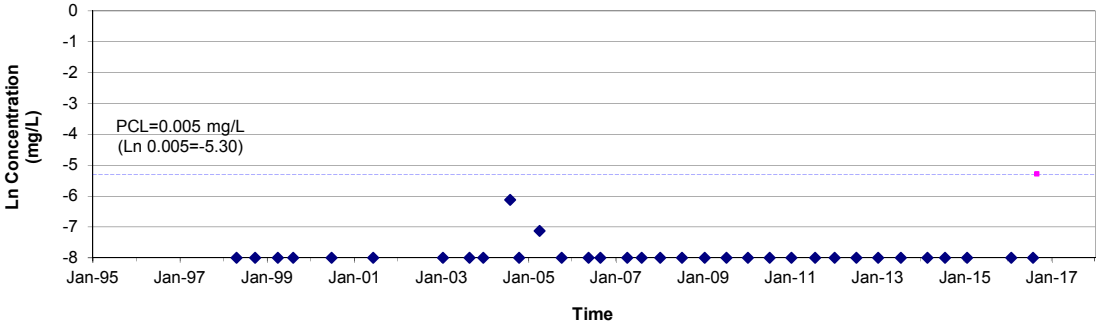




Notes: Graphed data points are taken from raw data.
Sample events using passive diffusion bag (PDB) samplers are listed on Tables 4-1A and 4-1B in Appendix 4.

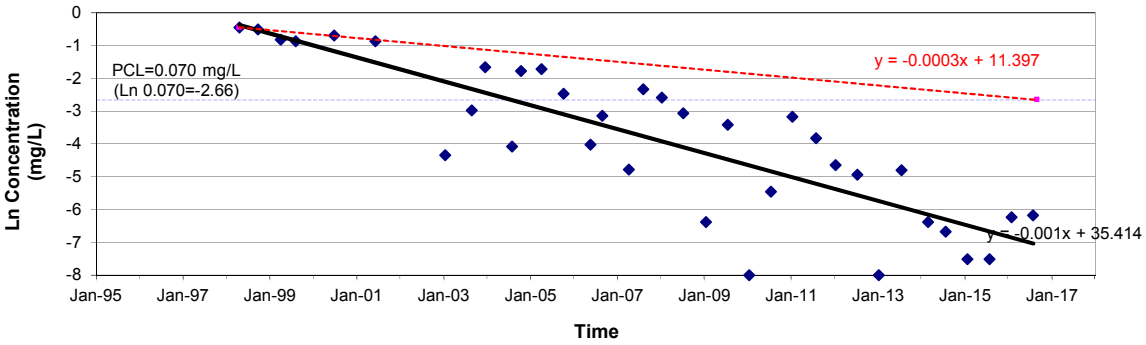
# CONCENTRATION VS. TIME GRAPHS
# WITH MINIMUM REQUIRED ATTENUATION RATES
# SWMU 136 SOUTH PLUME
# 508F04MW
# 2016 RAER

## FORMER NAS DALLAS, TEXAS
## PAGE 1 OF 2

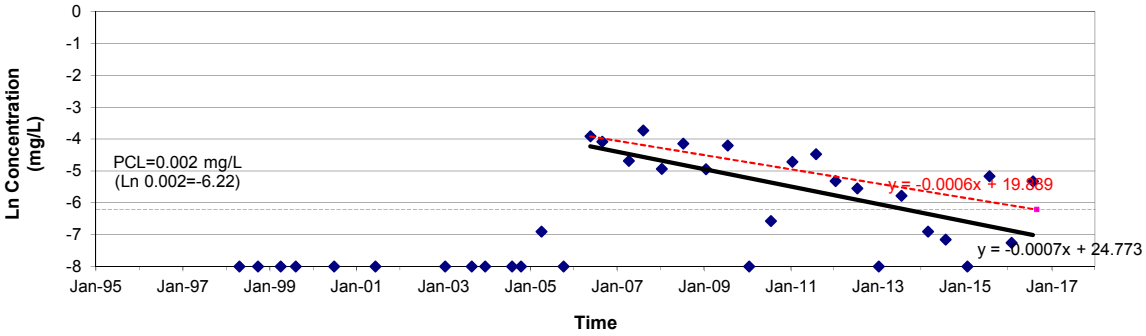
### TCE




### cis-1,2-DCE




### Vinyl Chloride

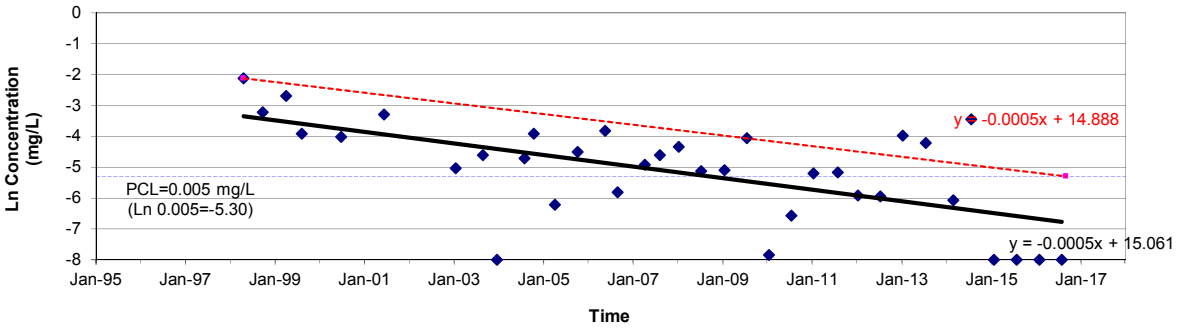



Notes: Red line and slope are based on minimum required attenuation rate (ktime) to meet PCL by 01 Sep 2016.
Black line and slope are based on linear regression of the raw data.
Sample events using permeable diffusion bag (PDB) samplers are listed on Tables 4-1A and 4-1B in Appendix 4.

# CONCENTRATION VS. TIME GRAPHS
# WITH MINIMUM REQUIRED ATTENUATION RATES
# SWMU 136 SOUTH PLUME
# 508F04MW
# 2016 RAER

## FORMER NAS DALLAS, TEXAS
## PAGE 2 OF 2

**Benzene**

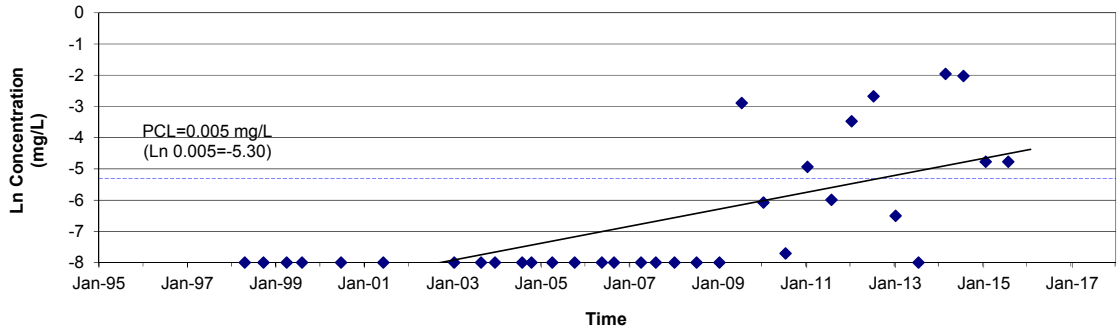



Notes: Red line and slope are based on minimum required attenuation rate (ktime) to meet PCL by 01 Sep 2016.
Black line and slope are based on linear regression of the raw data.
Sample events using permeable diffusion bag (PDB) samplers are listed on Tables 4-1A and 4-1B in Appendix 4.

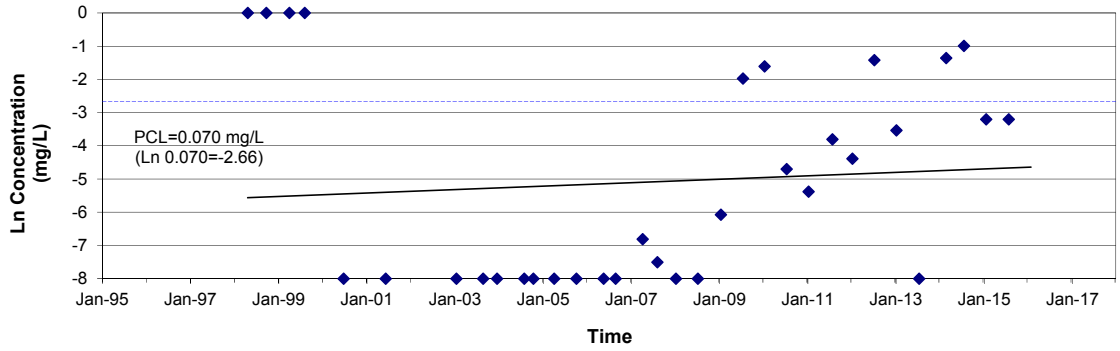
# CONCENTRATION VS. TIME GRAPHS
# WITH MINIMUM REQUIRED ATTENUATION RATES
# SWMU 136 SOUTH PLUME
# 508F47MW
# 2016 RAER

## FORMER NAS DALLAS, TEXAS
## PAGE 1 OF 2

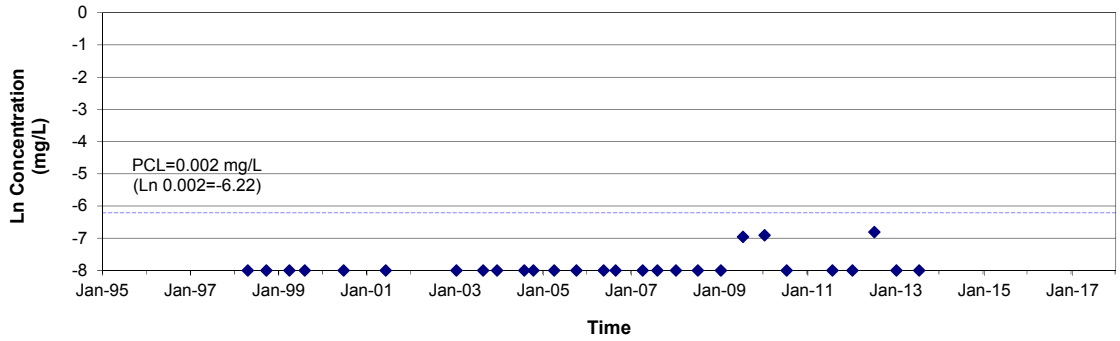
### TCE




### cis-1,2-DCE

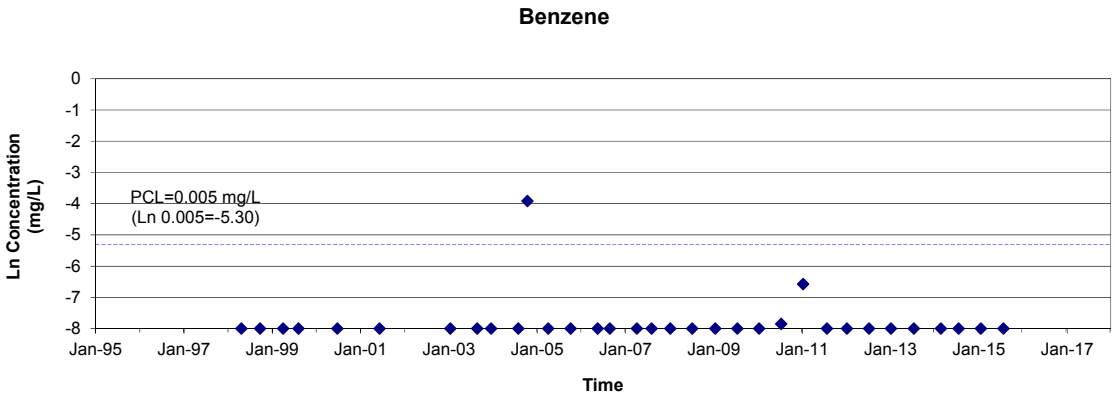



### Vinyl Chloride



# CONCENTRATION VS. TIME GRAPHS
# WITH MINIMUM REQUIRED ATTENUATION RATES
# SWMU 136 SOUTH PLUME
# 508F47MW
# 2016 RAER

## FORMER NAS DALLAS, TEXAS
## PAGE 2 OF 2

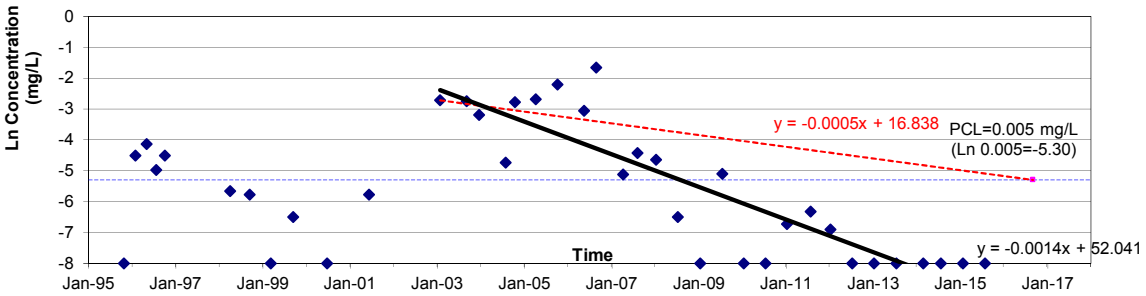



Notes: Red line and slope are based on minimum required attenuation rate (ktime) to meet PCL by 01 Sep 2016.
Black line and slope are based on linear regression of the raw data.
Sample events using permeable diffusion bag (PDB) samplers are listed on Tables 4-1A and 4-1B in Appendix 4.

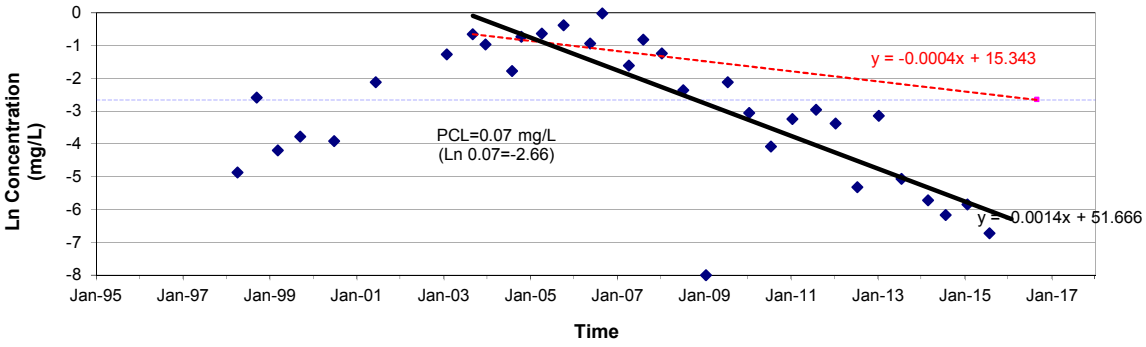
# CONCENTRATION VS. TIME GRAPHS
# WITH MINIMUM REQUIRED ATTENUATION RATES
# SWMU 136 SOUTH PLUME
# 50804MW
# 2016 RAER

## FORMER NAS DALLAS, TEXAS
## PAGE 1 OF 2

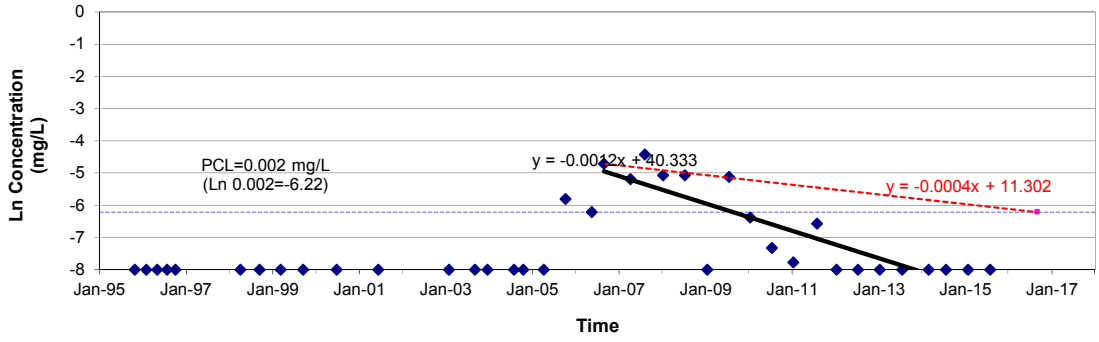
### TCE




### cis-1,2-DCE




### Vinyl Chloride

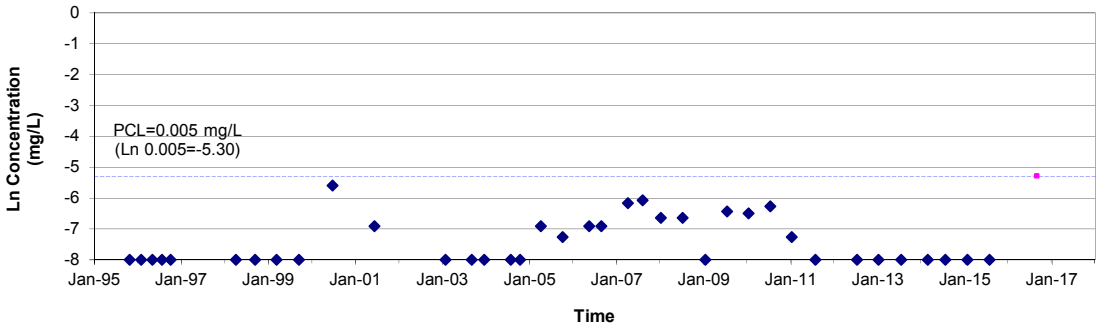



Notes: Red line and slope are based on minimum required attenuation rate (ktime) to meet PCL by 01 Sep 2016.
Black line and slope are based on linear regression of the raw data.
Sample events using permeable diffusion bag (PDB) samplers are listed on Tables 4-1A and 4-1B in Appendix 4.

# CONCENTRATION VS. TIME GRAPHS
# WITH MINIMUM REQUIRED ATTENUATION RATES
# SWMU 136 SOUTH PLUME
# 50804MW
# 2016 RAER

## FORMER NAS DALLAS, TEXAS
## PAGE 2 OF 2

**Benzene**




Notes: Red line and slope are based on minimum required attenuation rate (ktime) to meet PCL by 01 Sep 2016.
Black line and slope are based on linear regression of the raw data.
Sample events using permeable diffusion bag (PDB) samplers are listed on Tables 4-1A and 4-1B in Appendix 4.

0

## Performance Measures

List and describe the performance measures for each environmental medium containing a PCLE zone that are being used to determine if reasonable progress is being made by the response action in a timely manner. Provide documentation that these performance measures are being met. Attach additional information if necessary.

**Performance Measures**

**The approach to determine if MNA is making reasonable progress in meeting the clean-up goals by the year 2017 involves sequential sampling events to monitor the size and shape of the PCLE zone changes over time. To this effect, a tiered sampling program incorporating performance, detection, and ambient monitoring was implemented. This sampling program allows the collection of data on the COCs, groundwater flow, and geochemical parameters that may affect the progress of MNA and the likelihood of meeting site remediation goals. The design of the monitoring program allows a conclusion of success or failure to be drawn as early as possible during the response action implementation while providing reasonable confidence in the conclusion.**

**Performance monitoring encompasses the sampling of the point of exposure (POE) wells 508F04MW and 508F98MW within the plume and the background monitoring well 508F28MW outside the PCLE zone. Data collected from these monitoring wells serve to check the plume shape and determine if it is shrinking or expanding, stable or migrating, thus triggering programmatic adjustments if necessary. COC analytical data collected from the monitoring wells located along the plume centerline were used to determine plume attenuation rates for individual chemical constituents ($k_{time}$) and for the plume as a whole ($k_{dist}$). Data collected from the background monitoring wells served to monitor any changes in the ambient conditions that may impact the effectiveness of MNA in achieving the clean-up goal in a timely manner. The COC analytical results are summarized in Table 4-1.**

**POE well 50804MW, the background monitoring well 60-19, and the corrective action observation (COE) well 508F43MW had either no history of COC detections, or the COC detections have been below applicable GWPSs for at least the previous five consecutive years, and were abandoned on April 7, 2016, in accordance with the RAP submitted to TCEQ in October 2015. Well plugging reports are located in Appendix 4, and historical COC analytical results for P&A'd wells are included in Table 4-1B.**

**Performance monitoring for 2016 also entailed sampling for MNA parameters (pH, ORP, dissolved oxygen, alkalinity, hydrogen sulfide, carbon dioxide, ferrous iron, nitrate, nitrite, orthophosphate, sulfide, sulfate, total organic carbon, chloride, ethene, ethane, and methane) during the July 2016 sampling event. MNA parameters are sampled on a biennial sampling schedule. The MNA parameters measured by field tests and laboratory analyses are presented in Table 4-2. MNA parameter data, as needed, serve as a secondary line of evidence to evaluate whether subsurface conditions continue to support natural attenuation.**

**The conceptual MNA site model for this plume is represented in the data Tables in Appendix 4, the isoconcentration maps and potentiometric surface maps included in Attachment 1A, and the concentration versus (vs.) time and concentration vs. distance graphs provided in Attachment 1B.**

**After each semi-annual groundwater monitoring event, the COC concentration data collected were evaluated for both the entire plume and monitoring well by monitoring well basis as detailed in Appendix 7. The initial data analysis and interpretation focused on the detection of trend changes in the data. Further evaluation focused on the assessment of the changes or trends and their impact on MNA in achieving the site-related goals. If the COC data did not definitively indicate that reasonable progress was being made toward achieving the remedial goals, other data were analyzed in order to properly interpret particular variances from the predicted performance (i.e., the site stratigraphy and geochemistry, the groundwater flow field, the season of the year, etc.). In addition, non-parametric statistical tests, such as the Mann-Kendall test, were used in the data evaluation to establish the existence of a statistically significant change in degradation trends when the initial evaluation was inconclusive.**

**The evaluation of the analytical data was used to identify any outlier monitoring wells that indicated conditions contrary to the expected remedial performance in the plume. The outlier monitoring wells are at locations where MNA has slowed or ceased to the point that the remedial goals may not be achieved,**

**even though the remainder of the plume is on track to meet the closure criteria. The outlier monitoring wells may require a punctual change or additional measures to enhance MNA in the affected areas.**

**It was expected that the analytical data will indicate that the attenuation rates were sufficient to effectively remediate the plume on or before the year 2017. Reasonable progress of the response action was evaluated considering the following criteria:**

- **The monitoring well's COC specific $k_{time}$ attenuation rate based on the available sampling data is not more than the minimum attenuation rate necessary to meet the remedial goals by the year 2017.**
- **The monitoring well's COC specific concentration is less than the remedial benchmark concentration (calculated concentration goal based on the initial maximum concentration and the minimum rate necessary to meet the remedial goals by 2017) for that sample date.**
- **The COC specific $k_{dist}$ attenuation rate based on the available sampling data indicates an actual attenuation equal to or greater than the rate of COC migration from the suspected source area.**

**Response Action Progress**

**Table 4-3 summarizes the groundwater gauging data. The potentiometric surface maps for the December 2015 and July 2016 sampling events, included in Figure 1A-3 (Attachment 1A), indicate that the shape of the groundwater elevation contours and direction of groundwater flow remain consistent with previous sampling events.**

**The COC isoconcentration contour maps, prepared using the data collected during the January and July 2016 sampling events, are included in Figures 1A-2A through 1A-2C (Attachment 1A). A review of the 2016 data indicate:**

- **VC is the only COC at SWMU 136 South currently exceeding PCLs.**
- **VC exceeded its PCL in only one of the three monitor wells (508F04MW).**
- **VC slightly exceeded its PCL of 0.002 mg/L at monitoring well 508F04MW (0.00488 mg/L) during the July sampling event.**

**Tables 4-4 and 4-5 (Appendix 4) summarize the concentration vs. time and concentration vs. distance attenuation rate constants for the plume centerline. The graphs in Attachment 1B graphically depict the same attenuation rate constants summarized in Tables 4-4 and 4-5 and the minimum required attenuation rate to meet the remediation goals. Based on the data presented:**

- **SWMU 136 South monitoring wells have met 2017 remedial goals (excluding the low level detection for VC in 508F04MW during the July sampling event), indicating that effective remediation of portions of the plume through soil remediation and MNA has occurred.**

**TCE was detected above its PCL during 5 consecutive sampling events at monitoring well 508F47MW before it was destroyed. TCE was then not detected above laboratory reporting levels in replacement well 508F98 MW for the July 2016 sampling event. TCE data for monitoring well 508F98MW will be closely monitored during future sampling events to verify concentrations trends. If TCE concentrations do increase above PCLs, the Navy proposes to perform an investigation downgradient of monitoring well 508F47MW to quantify if COCs have migrated beyond the boundary of the historical PCLE zone.**

**In accordance with the approved Groundwater RAP (Revision 2) (TtNUS, 2006), failure of the response action triggers the implementation of contingency measures, which may include the selection of an appropriate alternate remedial measure. The Navy has proposed to implement EMNA as an alternate remedy at the affected area of SWMU 18 groundwater plume in an effort to reduce COCs to below PCLs. This will allow the Navy to make a determination as to whether the technology is viable. Depending upon the results of the EMNA spot treatment at SWMU 18, alternative remedial measures may be proposed in a comprehensive RAP for SWMU 136 South Plume. MNA will be continued at the SWMU 136 South Plume for the upcoming year in accordance with the procedures and protocols described in the Groundwater RAP (Revision 2) (Tetra Tech, 2006).**

## Problems

Complete the table for the response action. When the response action consists of several components or multiple actions, complete one table for each major component or action.

Response Action Name/Designation: *Groundwater Response Action*

List the problems that have been encountered during the response action, describe the impact of each problem, and the response to the problem.

| Description of the Problem | Impact | Did this cause a response action failure? | | Corrective Response |
|---|---|---|---|---|
| | | Yes | No | |
| **Results from the July 2009 sampling event from monitoring well 508F43MW indicated concentrations of TCE and cis-1,2-DCE greater than respective PCLs. Following concentrations fluctuated above and below the PCL until 2012, at which time results for TCE remained above the PCL.** | **COC concentrations above PCLs may have migrated beyond the boundary of the historical PCLE zone.** | **X** | | **The Navy proposes to install an additional monitoring well downgradient of monitoring well 508F47MW to quantify if COCs have migrated beyond the boundary of the historical PCLE zone.** |
| **TCE concentration data for outlier monitoring well 508F43MW for 2015 confirmed an increasing trend and indicate MNA will not effectively reduce concentrations to achieve remedial goals by the cleanup date of 2017.** | **In accordance with the approved RAP (TtNUS, 2006), failure of the approved response action to meet critical PCLs triggers the implementation of contingency measures, which includes the selection of an appropriate alternate remedial measure.** | **x** | | **The Navy has proposed to implement EMNA as an alternate remedy at the affected area of SWMU 18 groundwater plume in an effort to reduce COCs to below PCLs. This will allow the Navy to make a determination as to whether the technology is viable. Depending on the results of the EMNA spot treatment at SWMU 18, alternative remedial measures may be proposed in a comprehensive RAP for SWMU 136 South Plume, to follow. MNA will be continued at the SWMU 136 South Plume for the upcoming year in accordance with the procedures and protocols described in the Groundwater RAP (Revision 2) (Tetra Tech, 2006).** |
| **Monitor well 508F47MW was destroyed/covered during a construction event** | **Area of concern was no longer being sampled** | **x** | | **Monitor well 508F47MW was replaced with monitor well 508F98MW in April 2016** |

Use this worksheet to describe the operation and maintenance (O&M) activities conducted for each response action.

Response Action Name/Designation: Well maintenance

List all portions of the response action to which this information applies. Repeat this worksheet for each major component or operation.

Describe the O&M and inspection activities that have been conducted to operate and maintain response action components.

**POE well 50804MW, background monitoring well 60-19, and COE well 508F43MW had either no history of COC detections, or the COC detections have been below applicable GWPSs for at least the previous five consecutive years, and were abandoned on April 7, 2016, in accordance with the RAP submitted to TCEQ in October 2015. Well plug reports are located in Appendix 4, and historical COC analytical results for P&A'd wells are included in Table 4-1B.**

**In September 2016, Resolution Consultants conducted a detailed evaluation of well maintenance needs for NAS Dallas SWMUs. The surface completion at monitoring wells 508F04MW and 508F28MW were re-fitted by tapping the rim eyelets and replacing bolts and washers in order to secure the lid.**

# APPENDIX 1
# REFERENCE LIST

# APPENDIX 1
# REFERENCES

A.T. Kearney, Inc. *RCRA Facility Assessment Preliminary Review/Visual Site Inspection.* Chicago, Illinois. 1989.

CH2M HILL Constructors, Inc. *Response Action Completion Report, Miscellaneous Sites, Naval Air Station Dallas.* Atlanta, Georgia. 2003.

CH2M Hill. *85 Sites, Defense Reutilization and Marketing Office, and Naval Weapons Industrial Reserve Plant SWMU 18 Response Action Completion Report, Revision 3, Naval Air Station Dallas, Dallas, Texas.* Atlanta, Georgia. 2008.

EnSafe/Allen & Hoshall. *Naval Air Station Dallas Environmental Baseline Survey, Dallas, Texas.* Memphis, Tennessee. 1994.

Texas Commission on Environmental Quality. *Approval of Response Action Effectiveness Reports for Defense Reutilization and Marketing Office, and 85 Sites (Revision 2) and Response Action Effectiveness Reports for Naval Weapons Industrial Reserve Plant SWMU 18 (Revision 2), Former Naval Air Station Dallas.* Austin, Texas. *2008.*

Tetra Tech NUS, Inc. *RCRA Facility Investigation Report for Category C. Pittsburgh, Pennsylvania.* 2000a.

— *RCRA Facility Investigation Report for Category E. Pittsburgh, Pennsylvania.* 2000b.

— *RCRA Facility Investigation Report for Category F. Pittsburgh, Pennsylvania.* 2000c.

— *RCRA Facility Investigation Report for Category D. Pittsburgh, Pennsylvania.* 2001a.

— *RCRA Facility Investigation Report for Category B. Pittsburgh, Pennsylvania.* 2001b.

— *Affected Property Assessment Report. Houston, Texas*. 2002.

— *Final MNA Groundwater Modeling Report for Category D. Pittsburgh, Pennsylvania.* 2004.

— *Response Action Plan, Revision 2. Pittsburgh, Pennsylvania.* 2006.

— *Groundwater Response Action Plan for SWMU 136 South.* Pittsburgh, Pennsylvania. 2009.

Resolution Consultants. *Draft Final Alternatives Evaluation Report, Former Naval Air Station, Dallas, Texas*. Norfolk, Virginia. August 2013.

— *Draft Vapor Intrusion Study Report, Buildings 1405, 1422, and 1424, Solid Waste Management Unit 21*. Norfolk, Virginia. September 2015.

— *Revised Groundwater Response Action Plan for SWMU 136 South Plume (Revision 3).* Norfolk, Virginia. October 2015.

# APPENDIX 4
# DATA TABLES

**Table 4-1 Summary of Chemicals of Concern Detected in Groundwater**
**Table 4-2 Summary of Geochemical Parameters Measured in Groundwater**
**Table 4-3 Summary of Groundwater Gauging Data**
**Table 4-4 Summary of Concentration vs. Time with Attenuation Action Levels**
**Table 4-5 Summary of Concentration vs. Distance Attenuation Rate Constants**

# TABLE 4-1
# SUMMARY OF CHEMICALS OF CONCERN DETECTED IN GROUNDWATER

**Table 4-1A**

**Summary of Chemicals of Concern Detected in Groundwater**
**SWMU 136 South Plume**
**2016 RAER**
**Former NAS Dallas, Texas**
**Page 1 of 3**

| Monitoring Well | Sampling Date | Sampling Round | Chemicals of Concern (mg/L) | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | 1,1-Dichloroethene | 1,2-Dichloroethane | Benzene | Carbon Tetrachloride | Chloroform | Chloromethane | cis-1,2-Dichloroethene | Ethylbenzene | Methylene Chloride | Tetrachloroethene | trans-1,2-Dichloroethene | Trichloroethene | Vinyl Chloride |
| **Protective Concentration Levels (mg/L)** | | | **0.00700** | **0.00500** | **0.00500** | **0.00500** | **0.24000** | **0.07000** | **0.07000** | **0.70000** | **0.00500** | **0.00500** | **0.10000** | **0.00500** | **0.00200** |
| **Monitoring Wells Located Inside PCLE Zone** | | | | | | | | | | | | | | | |
| **508F04MW** | 4/1/1998 | | Well Installed | | | | | | | | | | | | |
| | 5/11/1998 | Round 2 | 0.03300 U | 0.03300 U | 0.12000 | 0.03300 U | 0.03300 U | 0.03300 U | 0.64000 | 0.74000 | 0.03300 U | 0.03300 U | 0.02100 J | 0.03300 U | 0.03300 U |
| | 8/28/1998 | Round 3 | 0.02500 U | 0.02500 U | 0.04000 | 0.02500 U | 0.02500 U | 0.02500 U | 0.60000 | 0.14000 | 0.02500 U | 0.02500 U | 0.02500 U | 0.02500 U | 0.02500 U |
| | 3/13/1999 | Round 4 | 0.03300 U | 0.03300 U | 0.06800 | 0.03300 U | 0.03300 U | 0.03300 U | 0.44000 | 0.09500 | 0.03300 U | 0.03300 U | 0.01200 J | 0.03300 U | 0.03300 U |
| | 9/28/1999 | Round 5 | 0.02100 U | 0.02100 U | 0.02000 J | 0.02100 U | 0.02100 U | 0.02100 U | 0.42000 | 0.00290 J | 0.02100 U | 0.02100 U | 0.01300 J | 0.02100 U | 0.02100 U |
| | 6/26/2000 | Round 6 | 0.01700 U | 0.01700 U | 0.01800 | 0.01700 U | 0.01700 U | 0.01700 U | 0.50000 | 0.00490 J | 0.01700 U | 0.01700 U | 0.01700 | 0.01700 U | 0.01700 U |
| | 6/9/2001 | Round 7 | 0.01700 U | 0.01700 U | 0.03700 | 0.01700 U | 0.01700 U | 0.03300 U | 0.42000 | 0.00330 J | 0.01700 U | 0.01700 U | 0.01100 | 0.01700 U | 0.03300 U |
| | 1/26/2003 | Round 8 (PDB) | 0.00100 U | 0.00100 U | 0.00650 | 0.00100 U | 0.00100 U | 0.00100 U | 0.01300 | NA | 0.00200 U | 0.00100 U | 0.00100 U | 0.00100 U | 0.00100 U |
| | 8/26/2003 | Round 9 (PDB) | 0.00044 U | 0.00044 U | 0.01000 | 0.00036 U | 0.00042 U | 0.00052 U | 0.05100 | 0.00038 U | 0.00056 U | 0.00024 U | 0.00048 U | 0.00044 U | 0.00052 U |
| | 1/11/2004 | Round 10 | 0.00210 U | 0.00092 U | 0.00110 U | 0.00200 U | 0.00140 U | 0.00075 U | 0.19000 | 0.00011 U | 0.00160 U | 0.00240 U | 0.00190 U | 0.00095 U | 0.00170 U |
| | 7/28/2004 | Round 11 | 0.00180 U | 0.00052 U | 0.00900 | 0.00120 U | 0.00050 U | 0.00087 U | 0.13000 | 0.00140 J | 0.00200 U | 0.00100 U | 0.00110 U | 0.00110 U | 0.00084 U |
| | 7/28/2004 | Round 11 (PDB) | 0.00180 UJ | 0.00052 UJ | 0.00720 J | 0.00120 UJ | 0.00050 UJ | 0.00087 UJ | 0.17000 J | 0.00084 UJ | 0.00200 UJ | 0.00100 UJ | 0.00110 UJ | 0.00220 J | 0.00084 UJ |
| | 10/14/2004 | Round 12 (PDB) | 0.00350 U | 0.00100 U | 0.02000 J | 0.00250 U | 0.00100 U | 0.00170 U | 0.17000 | 0.00230 J | 0.00400 U | 0.00210 U | 0.00230 U | 0.00220 U | 0.00170 U |
| | 4/3/2005 | Round 13 (PDB) | 0.00040 U | 0.00030 U | 0.00200 | 0.00030 U | 0.00040 U | 0.00030 U | 0.18000 | 0.00090 J | 0.00200 U | 0.00040 U | 0.00400 | 0.00080 J | 0.00100 J |
| | 10/11/2005 | Round 14 | 0.00040 U | 0.00030 U | 0.01100 | 0.00030 U | 0.00040 U | 0.00030 U | 0.08500 | 0.00600 | 0.00200 U | 0.00040 U | 0.00400 | 0.00030 U | 0.00030 U |
| | 5/18/2006 | Round 15 (PDB) | 0.00060 U | 0.00040 U | 0.02200 | 0.00050 U | 0.00040 U | 0.00060 U | 0.01800 | 0.00030 U | 0.00200 U | 0.00060 U | 0.00060 U | 0.00040 U | 0.02000 |
| | 8/26/2006 | Round 16 (PDB) | 0.00060 U | 0.00040 U | 0.00300 J | 0.00100 UJ | 0.00040 U | 0.00060 U | 0.04300 J | 0.00030 U | 0.00200 U | 0.00060 U | 0.00200 | 0.00040 U | 0.01700 |
| | 5/14/2007 | Round 17 (PDB) | 0.00028 U | 0.00021 U | 0.00730 | 0.00020 U | 0.00023 U | 0.00017 U | 0.00840 | 0.00037 J | 0.00025 U | 0.00014 U | 0.00053 U | 0.00014 U | 0.00930 |
| | 9/4/2007 | Round 18 | 0.00013 U | 0.00023 J | 0.01000 | 0.00011 U | 0.00013 U | 0.00028 U | 0.09700 | 0.00035 U | 0.00023 U | 0.00010 U | 0.01000 | 0.00023 U | 0.02400 J |
| | 1/31/2008 | Round 19 | 0.00039 U | 0.00026 U | 0.00590 | 0.00044 U | 0.00036 U | 0.00060 U | 0.07500 | 0.00060 J | 0.00040 U | 0.00046 U | 0.00660 | 0.00053 U | 0.01300 |
| | 1/31/2008 | Round 19 (PDB) | 0.00039 U | 0.00026 U | 0.00720 | 0.00044 U | 0.00036 U | 0.00060 U | 0.03100 | 0.00040 U | 0.00040 U | 0.00046 U | 0.00200 | 0.00053 U | 0.00700 |
| | 7/24/2008 | Round 20 (PDB) | 0.00024 U | 0.00034 U | 0.00590 | 0.00022 U | 0.00028 U | 0.00061 U | 0.04650 | 0.00043 U | 0.00100 U | 0.00022 U | 0.00260 | 0.00032 U | 0.01600 |
| | 1/14/2009 | Round 21 (PDB) | 0.00054 U | 0.00034 U | 0.00610 | 0.00022 U | 0.00028 U | 0.00061 U | 0.00170 | 0.00043 U | 0.00100 U | 0.00022 U | 0.00045 U | 0.00032 U | 0.00710 |
| | 7/17/2009 | Round 22 | 0.00054 U | 0.00034 U | 0.01720 | 0.00022 U | 0.00028 U | 0.00061 U | 0.03300 | 0.00043 U | 0.00100 U | 0.00022 U | 0.00110 | 0.00032 U | 0.01500 |
| | 1/12/2010 | Round 23 (PDB) | 0.00029 U | 0.00033 U | 0.00039 J | 0.00034 U | 0.00025 U | 0.00050 U | 0.00032 U | 0.00020 U | 0.00200 U | 0.00044 U | 0.00034 U | 0.00024 U | 0.00028 U |
| | 7/14/2010 | Round 24 (PDB) | 0.00029 U | 0.00033 U | 0.00140 | 0.00034 U | 0.00025 U | 0.00050 U | 0.00430 | 0.00020 U | 0.00200 U | 0.00044 U | 0.00034 U | 0.00024 U | 0.00140 |
| | 1/11/2011 | Round 25 | 0.00023 U | 0.00020 U | 0.00550 | 0.00025 U | 0.00022 U | 0.00050 U | 0.04200 | 0.00038 J | 0.00200 U | 0.00025 U | 0.00370 | 0.00026 U | 0.00900 |
| | 7/28/2011 | Round 26 | 0.00023 U | 0.00020 U | 0.00570 | 0.00025 U | 0.00054 J | 0.00050 U | 0.02180 | 0.00020 U | 0.00200 U | 0.00025 U | 0.00100 | 0.00026 U | 0.01150 |
| | 1/10/2012 | Round 27 | 0.00023 U | 0.00020 U | 0.0027 | 0.00025 U | 0.00022 U | 0.00050 U | 0.0096 | 0.00023 J | 0.0020 U | 0.00025 U | 0.00035 U | 0.00026 U | 0.00490 |
| | 7/10/2012 | Round 28 | 0.00023 U | 0.00020 U | 0.0026 | 0.00025 U | 0.00022 U | 0.00050 U | 0.0072 | 0.00020 U | NS | 0.00025 U | 0.00035 U | 0.00026 U | 0.00390 |
| | 1/8/2013 | Round 29 (PDB) | 0.00020 U | 0.00022 U | 0.01870 | 0.00031 U | 0.00026 U | 0.00050 U | 0.00024 U | 0.00029 J | 0.0020 U | 0.00032 U | 0.00023 U | 0.00031 U | 0.00044 U |
| | 7/16/2013 | Round 30 | 0.00023 U | 0.00022 U | 0.01470 | 0.00031 U | 0.00026 U | 0.00050 U | 0.0082 | 0.00057 J | 0.0020 U | 0.00032 U | 0.00029 J | 0.00031 U | 0.00310 |
| | 2/25/2014 | Round 31 (PDB) | 0.00025 U | 0.00024 U | 0.0023 | 0.00040 U | 0.00031 U | 0.00053 U | 0.0017 | 0.00028 U | NS | 0.00026 U | 0.00034 U | 0.0003 U | 0.001 |
| | 7/22/2014 | Round 32 | 0.0005 U | 0.0005 U | 0.03190 | 0.0005 U | 0.0005 U | 0.0005 U | 0.00126 J | 0.00147 J | 0.001 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.00078 J |
| | 7/22/2014 | Round 32 | 0.0005 U | 0.0005 U | 0.03190 | 0.0005 U | 0.0005 U | 0.0005 U | 0.00126 J | 0.00147 J | 0.001 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.00078 J |
| | 1/22/2015 | Round 33 (PDB) | 0.00025 U | 0.00025 U | 0.00025 U | 0.00025 U | 0.00025 U | 0.00025 U | 0.000546 J | 0.00025 U | NS | 0.00025 U | 0.00025 J | 0.00025 U | 0.00025 U |
| | 7/28/2015 | Round 34 | 0.0005 U | 0.0005 U | 0.00197 | 0.0005 U | 0.0005 U | 0.0005 U | 0.0031 | 0.0005 U | 0.001 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.00571 |
| | 1/22/2016 | Round 35 (PDB) | 0.0005 U | 0.0005 UJ | 0.0005 U | 0.0005 UJ | 0.0005 U | 0.0005 U | 0.00196 J | 0.0005 U | NA | 0.0005 U | 0.0005 U | 0.0005 U | 0.00071 J |
| | 7/28/2016 | Round 36 | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.00208 | 0.0005 U | 0.001 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.00488 |

**Table 4-1A**

**Summary of Chemicals of Concern Detected in Groundwater**
**SWMU 136 South Plume**
**2016 RAER**
**Former NAS Dallas, Texas**
**Page 2 of 3**

| Monitoring Well | Sampling Date | Sampling Round | Chemicals of Concern (mg/L) | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | 1,1-Dichloroethene | 1,2-Dichloroethane | Benzene | Carbon Tetrachloride | Chloroform | Chloromethane | cis-1,2-Dichloroethene | Ethylbenzene | Methylene Chloride | Tetrachloroethene | trans-1,2-Dichloroethene | Trichloroethene | Vinyl Chloride |
| **Protective Concentration Levels (mg/L)** | | | **0.00700** | **0.00500** | **0.00500** | **0.00500** | **0.24000** | **0.07000** | **0.07000** | **0.70000** | **0.00500** | **0.00500** | **0.10000** | **0.00500** | **0.00200** |
| **50805MW** | 10/25/1995 | Pre Round 1 | 0.00500 U | 0.00500 U | 0.06100 | 0.00500 U | 0.00500 U | 0.01000 U | NA | 0.03500 | 0.00500 U | 0.00500 U | NA | 0.00190 J | 0.01000 U |
| | 1/29/1996 | Pre Round 1 | 0.00500 U | 0.00500 U | 0.02400 | 0.00500 U | 0.00500 U | 0.01000 U | NA | 0.01500 | 0.00500 U | 0.00500 U | NA | 0.00190 J | 0.01000 U |
| | 4/30/1996 | Pre Round 1 | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.01000 U | NA | 0.00500 U | 0.00500 U | 0.00500 U | NA | 0.00500 U | 0.01000 U |
| | 7/22/1996 | Pre Round 1 | 0.00500 U | 0.00500 U | 0.03000 | 0.00500 U | 0.00500 U | 0.01000 U | NA | 0.02600 | 0.00500 U | 0.00500 U | NA | 0.00500 U | 0.01000 U |
| | 10/6/1996 | Round 1 | 0.00500 U | 0.00500 U | 0.03200 | 0.00500 U | 0.00500 U | 0.01000 U | NA | 0.03300 | 0.00500 U | 0.00500 U | NA | 0.00500 U | 0.01000 U |
| | 5/12/1998 | Round 2 | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U |
| | 9/12/1998 | Round 3 | 0.00500 U | 0.00500 U | 0.00280 J | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00046 J | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U |
| | 4/2/1999 | Round 4 | 0.00500 U | 0.00500 U | 0.00210 J | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U |
| | 9/13/1999 | Round 5 | 0.00500 UJ | 0.00500 UJ | 0.00300 J | 0.00500 UJ | 0.00500 UJ | 0.00500 UJ | 0.00500 UJ | 0.00047 J | 0.00500 UJ | 0.00500 UJ | 0.00500 UJ | 0.00500 UJ | 0.00500 UJ |
| | 6/23/2000 | Round 6 | 0.00500 U | 0.00500 U | 0.00160 J | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U |
| | 1/13/2004 | Round 10 | 0.01000 U | 0.00460 U | 0.11000 | 0.01000 U | 0.00700 U | 0.00380 U | 0.00810 U | 1.30000 | 0.00800 U | 0.01200 U | 0.00950 U | 0.00470 U | 0.00830 U |
| | 4/5/2005 | Round 13 | 0.00040 U | 0.00030 U | 0.00200 | 0.00030 U | 0.00040 U | 0.00030 U | 0.00030 U | 0.09300 | 0.00200 U | 0.00040 U | 0.00030 U | 0.00030 U | 0.00030 U |
| | 10/11/2005 | Round 14 | 0.00040 U | 0.00030 U | 0.02500 | 0.00030 U | 0.00040 U | 0.00030 U | 0.00030 U | 0.03100 | 0.00200 U | 0.00040 U | 0.00030 U | 0.00030 U | 0.00030 U |
| | 5/7/2006 | Round 15 | 0.00060 U | 0.00040 U | 0.09000 | 0.00050 U | 0.00040 U | 0.00060 U | 0.00050 U | 0.02800 | 0.00200 U | 0.00060 U | 0.00060 U | 0.00040 U | 0.00080 J |
| | 8/13/2006 | Round 16 | 0.00060 U | 0.00040 U | 0.04800 | 0.00050 U | 0.00040 U | 0.00060 U | 0.00050 U | 0.01700 | 0.00200 U | 0.00060 U | 0.00060 U | 0.00040 U | 0.00060 U |
| | 4/28/2007 | Round 17 | 0.00065 U | 0.00065 U | 0.07700 | 0.00055 U | 0.00065 U | 0.00140 U | 0.00070 U | 0.02100 | 0.00120 U | 0.00050 U | 0.00075 U | 0.00120 J | 0.00100 U |
| | 8/31/2007 | Round 18 | 0.00013 U | 0.00013 U | 0.07600 | 0.00011 U | 0.00013 U | 0.00028 U | 0.00014 U | 0.01800 | 0.00023 U | 0.00010 U | 0.00015 U | 0.00023 U | 0.00020 U |
| | 1/20/2008 | Round 19 | 0.00039 U | 0.00026 U | 0.02600 | 0.00044 U | 0.00036 U | 0.00060 U | 0.00062 J | 0.08200 | 0.00040 U | 0.00046 U | 0.00048 U | 0.00053 U | 0.00043 U |
| | 7/22/2008 | Round 20 | 0.00054 U | 0.00034 U | 0.02450 | 0.00022 U | 0.00290 | 0.00061 U | 0.00020 U | 0.00990 | 0.00100 U | 0.00022 U | 0.00045 U | 0.00032 U | 0.00030 U |
| | 1/14/2009 | Round 21 | 0.00054 U | 0.00034 U | 0.00750 | 0.00022 U | 0.00028 U | 0.00061 U | 0.00020 U | 0.00880 JH | 0.00100 U | 0.00022 U | 0.00045 U | 0.00032 U | 0.00030 U |
| | 7/17/2009 | Round 22 | 0.00054 U | 0.00060 J | 0.00580 | 0.00022 U | 0.00028 U | 0.00061 U | 0.00020 U | 0.01020 | 0.00100 U | 0.00022 U | 0.00045 U | 0.00032 U | 0.00030 U |
| | 1/12/2010 | Round 23 | 0.00029 U | 0.00033 U | 0.00120 | 0.00034 U | 0.00025 U | 0.00050 U | 0.00032 U | 0.00140 | 0.00200 U | 0.00044 U | 0.00034 U | 0.00024 U | 0.00028 U |
| | 7/14/2010 | Round 24 | 0.00029 U | 0.00033 U | 0.00085 J | 0.00034 U | 0.00025 U | 0.00050 U | 0.00032 U | 0.00081 J | 0.00200 U | 0.00044 U | 0.00034 U | 0.00024 U | 0.00028 U |
| | 1/11/2011 | Round 25 | Well Not Sampled - Covered | | | | | | | | | | | | |
| | 7/28/2011 | Round 26 | Well Not Sampled - Covered | | | | | | | | | | | | |
| | 1/10/2012 | Round 27 | Well Not Sampled - Covered | | | | | | | | | | | | |
| | 7/10/2012 | Round 28 | Well Not Sampled - Covered | | | | | | | | | | | | |
| | 1/8/2013 | Round 29 | Well Not Sampled - Covered | | | | | | | | | | | | |
| | 7/16/2013 | Round 30 | Well Not Sampled - Covered | | | | | | | | | | | | |
| | 2/25/2014 | Round 31 | Well Not Sampled - Covered | | | | | | | | | | | | |
| | 7/22/2014 | Round 32 | Well Not Sampled - Covered | | | | | | | | | | | | |
| | 1/22/2015 | Round 33 | Well Not Sampled - Covered | | | | | | | | | | | | |
| | 7/28/2015 | Round 34 | Well Not Sampled - Covered | | | | | | | | | | | | |
| | 1/22/2016 | Round 35 | Well Not Sampled - Covered | | | | | | | | | | | | |
| | 7/28/2016 | Round 36 | Well Not Sampled - Covered | | | | | | | | | | | | |

**Table 4-1A**

**Summary of Chemicals of Concern Detected in Groundwater**
**SWMU 136 South Plume**
**2016 RAER**
**Former NAS Dallas, Texas**
**Page 3 of 3**

| Monitoring Well | Sampling Date | Sampling Round | Chemicals of Concern (mg/L) | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | 1,1-Dichloroethene | 1,2-Dichloroethane | Benzene | Carbon Tetrachloride | Chloroform | Chloromethane | cis-1,2-Dichloroethene | Ethylbenzene | Methylene Chloride | Tetrachloroethene | trans-1,2-Dichloroethene | Trichloroethene | Vinyl Chloride |
| **Protective Concentration Levels (mg/L)** | | | **0.00700** | **0.00500** | **0.00500** | **0.00500** | **0.24000** | **0.07000** | **0.07000** | **0.70000** | **0.00500** | **0.00500** | **0.10000** | **0.00500** | **0.00200** |
| **Monitoring Wells Located Outside PCLE Zone** | | | | | | | | | | | | | | | |
| **508F28MW** | 7/13/1999 | Well Installed | | | | | | | | | | | | | |
| | 8/5/1999 | Round 5 | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U |
| | 6/27/2000 | Round 6 | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U |
| | 6/10/2001 | Round 7 | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.01000 U | 0.00250 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00250 U | 0.00500 U | 0.01000 U |
| | 1/23/2003 | Round 8 (PDB) | 0.00100 U | 0.00100 U | 0.00100 U | 0.00100 U | 0.00100 U | 0.00100 U | 0.00100 U | NA | 0.00200 U | 0.00100 U | 0.00100 U | 0.00100 U | 0.00100 U |
| | 1/13/2004 | Round 10 | 0.00021 U | 0.00009 U | 0.00011 U | 0.00020 U | 0.00014 U | 0.00008 U | 0.00016 U | 0.00011 U | 0.00016 U | 0.00024 U | 0.00019 U | 0.00010 U | 0.00017 U |
| | 10/15/2004 | Round 12 (PDB) | 0.00035 U | 0.00010 U | 0.00025 U | 0.00025 U | 0.00010 U | 0.00017 U | 0.00027 U | 0.00017 U | 0.00040 U | 0.00021 U | 0.00023 U | 0.00022 U | 0.00017 U |
| | 10/21/2005 | Round 14 (PDB) | 0.00040 U | 0.00030 U | 0.00030 U | 0.00030 U | 0.00040 U | 0.00030 U | 0.00030 U | 0.00020 U | 0.00200 U | 0.00040 U | 0.00030 U | 0.00030 U | 0.00030 U |
| | 5/18/2006 | Round 15 (PDB) | 0.00060 U | 0.00040 U | 0.00050 U | 0.00050 U | 0.00040 U | 0.00060 U | 0.00050 U | 0.00030 U | 0.00200 U | 0.00060 U | 0.00060 U | 0.00040 U | 0.00060 U |
| | 8/26/2006 | Round 16 (PDB) | 0.00060 U | 0.00040 U | 0.00100 UJ | 0.00100 UJ | 0.00040 U | 0.00060 U | 0.00100 UJ | 0.00030 U | 0.00200 U | 0.00060 U | 0.00060 U | 0.00040 U | 0.00060 U |
| | 5/14/2007 | Round 17 (PDB) | 0.00028 U | 0.00021 U | 0.00013 U | 0.00020 U | 0.00023 U | 0.00017 U | 0.00045 U | 0.00013 U | 0.00025 U | 0.00014 U | 0.00053 U | 0.00014 U | 0.00012 U |
| | 8/31/2007 | Round 18 | 0.00013 U | 0.00013 U | 0.00012 U | 0.00011 U | 0.00013 U | 0.00028 U | 0.00014 U | 0.00035 U | 0.00023 U | 0.00010 U | 0.00015 U | 0.00023 U | 0.00020 U |
| | 2/1/2008 | Round 19 (PDB) | 0.00039 U | 0.00026 U | 0.00039 U | 0.00044 U | 0.00036 U | 0.00060 U | 0.00032 U | 0.00040 U | 0.00040 U | 0.00046 U | 0.00048 U | 0.00053 U | 0.00043 U |
| | 7/24/2008 | Round 20 (PDB) | 0.00054 U | 0.00034 U | 0.00040 U | 0.00022 U | 0.00028 U | 0.00061 U | 0.00020 U | 0.00043 U | 0.00100 U | 0.00022 U | 0.00045 U | 0.00032 U | 0.00030 U |
| | 1/14/2009 | Round 21 (PDB) | 0.00054 U | 0.00034 U | 0.00040 U | 0.00022 U | 0.00028 U | 0.00061 U | 0.00020 U | 0.00043 U | 0.00100 U | 0.00022 U | 0.00045 U | 0.00032 U | 0.00030 U |
| | 7/17/2009 | Round 22 | 0.00054 U | 0.00034 U | 0.00040 U | 0.00022 U | 0.00028 U | 0.00067 J | 0.00020 U | 0.00043 U | 0.00100 U | 0.00022 U | 0.00045 U | 0.00032 U | 0.00030 U |
| | 1/12/2010 | Round 23 (PDB) | 0.00029 U | 0.00033 U | 0.00021 U | 0.00034 U | 0.00025 U | 0.00050 U | 0.00032 U | 0.00020 U | 0.00200 U | 0.00044 U | 0.00034 U | 0.00024 U | 0.00028 U |
| | 7/14/2010 | Round 24 (PDB) | 0.00029 U | 0.00033 U | 0.00021 U | 0.00034 U | 0.00025 U | 0.00050 U | 0.00032 U | 0.00020 U | 0.00200 U | 0.00044 U | 0.00034 U | 0.00024 U | 0.00028 U |
| | 1/11/2011 | Round 25 | 0.00023 U | 0.00020 U | 0.00020 U | 0.00025 U | 0.00022 U | 0.00050 U | 0.00026 U | 0.00020 U | 0.00200 U | 0.00025 U | 0.00035 U | 0.00026 U | 0.00022 U |
| | 7/28/2011 | Round 26 | 0.00023 U | 0.00020 U | 0.00020 U | 0.00025 U | 0.00022 U | 0.00050 U | 0.00026 U | 0.00020 U | 0.00200 U | 0.00025 U | 0.00035 U | 0.00026 U | 0.00022 U |
| | 1/10/2012 | Round 27 | 0.00023 U | 0.00020 U | 0.00020 U | 0.00025 U | 0.00022 U | 0.00050 U | 0.00026 U | 0.00020 U | 0.0020 U | 0.00025 U | 0.00035 U | 0.00026 U | 0.00022 U |
| | 7/10/2012 | Round 28 | 0.00023 U | 0.00020 U | 0.00020 U | 0.00025 U | 0.00022 U | 0.00050 U | 0.00026 U | 0.00020 U | NS | 0.00025 U | 0.00035 U | 0.00026 U | 0.00022 U |
| | 1/8/2013 | Round 29 (PDB) | 0.00020 U | 0.00022 U | 0.00021 U | 0.00031 U | 0.00026 U | 0.00050 U | 0.00024 U | 0.00029 U | 0.0020 U | 0.00032 U | 0.00023 U | 0.00031 U | 0.00044 U |
| | 7/16/2013 | Round 30 | 0.00020 U | 0.00022 U | 0.00021 U | 0.00031 U | 0.00026 U | 0.00050 U | 0.00024 U | 0.00029 U | 0.0020 U | 0.00032 U | 0.00023 U | 0.00031 U | 0.00044 U |
| | 2/25/2014 | Round 31 (PDB) | 0.00025 U | 0.00024 U | 0.00024 U | 0.00040 U | 0.00031 U | 0.00053 U | 0.00033 U | 0.00028 U | NS | 0.00026 U | 0.00034 U | 0.00030 U | 0.00033 U |
| | 7/22/2014 | Round 32 | 0.00025 U | 0.00025 U | 0.00025 U | 0.00025 U | 0.00025 U | 0.00025 U | 0.00025 U | 0.00025 U | 0.0005 U | 0.00025 U | 0.00025 U | 0.00025 U | 0.00025 U |
| | 1/22/2015 | Round 33 (PDB) | 0.00025 U | 0.00025 U | 0.00025 U | 0.00025 U | 0.00025 U | 0.00025 U | 0.00025 U | 0.00025 U | NS | 0.00025 U | 0.00025 U | 0.00025 U | 0.00025 U |
| | 7/28/2015 | Round 34 | 0.00025 U | 0.00025 U | 0.00025 U | 0.00025 U | 0.00025 U | 0.00025 U | 0.000703 J | 0.00025 U | 0.0005 U | 0.00025 U | 0.00025 U | 0.00331 | 0.00025 U |
| | 1/22/2016 | Round 35 (PDB) | 0.00025 UJL | 0.00025 UJL | 0.00025 UJL | 0.00025 UJL | 0.00025 UJL | 0.00025 UJL | 0.00025 UJL | 0.00025 UJL | NA | 0.00025 UJL | 0.00025 UJL | 0.00025 UJL | 0.00025 UJL |
| | 7/28/2016 | Round 36 | 0.00025 U | 0.00025 U | 0.00025 U | 0.00025 U | 0.00025 U | 0.00025 U | 0.00025 U | 0.00025 U | 0.0005 U | 0.00025 U | 0.00025 U | 0.00025 U | 0.00025 U |
| **508F98MW** | 4/5/2016 | Well Installed | | | | | | | | | | | | | |
| | 8/2/2016 | Round 36 | 0.00025 U | 0.00025 U | 0.00025 U | 0.00025 U | 0.00025 U | 0.00025 U | 0.00025 U | 0.00025 U | 0.0005 U | 0.00025 U | 0.00025 U | 0.00025 U | 0.00025 U |

mg/L - milligrams per liter
NA - Not Applicable
NS - Not Sampled
NS-D - Not Sampled during this round due to insufficient water in the monitoring well
PDB - Passive Diffusion Bag
SDG - Sample Delivery Group
PCLE - Protective Concentration Level Exceedance

Note:
Shaded areas indicate an exceedance.
Monitoring Well 50805MW has been covered by a storage container preventing access since July 2010.

Analytical Result Qualifiers:
J - Indicates that the chemical was detected. However, the associated numerical result may not be a precise representation of the amount that is actually present in the sample. The laboratory reported concentration is considered to be an estimate of the true concentration.
U - Indicates that the chemical was not detected at the numerical detection limit (sample-specific quantitation limit) noted. Nondetected results from the laboratory are reported in this manner. This qualifier is added to a positive result (reported by the laboratory) if the detected concentration is determined to be attributable to contamination introduced during field sampling
UJ - Indicates that the chemical was not detected. However, the detection limit (sample-specific quantitation limit) is considered to be estimated based on problems encountered during laboratory analysis. The associated numerical detection limit is regarded as inaccurate or imprecise.

**Table 4-1B**

**Summary of Chemicals of Concern Detected in Groundwater**
**Historical Monitoring Wells – SWMU 136 South Plume**
**2016 RAER**

**Former NAS Dallas, Texas**
**Page 1 of 3**

| Monitoring Well | Sampling Date | Chemicals of Concern (mg/L) | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 1,1-Dichloroethene | 1,2-Dichloroethane | Benzene | Carbon Tetrachloride | Chloroform | Chloromethane | cis-1,2-Dichloroethene | Ethylbenzene | Methylene Chloride | Tetrachloroethene | trans-1,2-Dichloroethene | Trichloroethene | Vinyl Chloride |
| Protective Concentration Level | | 0.00700 | 0.00500 | 0.00500 | 0.00500 | 0.24000 | 0.07000 | 0.07000 | 0.70000 | 0.00500 | 0.00500 | 0.10000 | 0.00500 | 0.00200 |
| Monitoring Wells Located Inside PCLE Zone | | | | | | | | | | | | | | |
| 50804MW | 10/25/1995 | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.01000 U | NA | 0.00500 U | 0.00500 U | 0.00500 U | NA | 0.00940 U | 0.01000 U |
| | 1/29/1996 | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.01000 U | NA | 0.00500 U | 0.00500 U | 0.00500 U | NA | 0.01100 | 0.01000 U |
| | 5/1/1996 | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.01000 U | NA | 0.00500 U | 0.00500 U | 0.00500 U | NA | 0.01600 | 0.01000 U |
| | 7/22/1996 | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.01000 U | NA | 0.00500 U | 0.00500 U | 0.00500 U | NA | 0.00690 | 0.01000 U |
| | 10/1/1996 | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.01000 U | NA | 0.00500 U | 0.00500 U | 0.00500 U | NA | 0.01100 | 0.01000 U |
| | 4/2/1998 | 0.00830 U | 0.00830 U | 0.00830 U | 0.00830 U | 0.00830 U | 0.00830 U | 0.00770 J | 0.00830 U | 0.00830 U | 0.00830 U | 0.00830 U | 0.00350 J | 0.00830 U |
| | 9/12/1998 | 0.01200 U | 0.01200 U | 0.01200 U | 0.01200 U | 0.01200 U | 0.01200 U | 0.07500 | 0.01200 U | 0.01200 U | 0.01200 U | 0.01200 U | 0.00310 J | 0.01200 U |
| | 3/9/1999 | 0.01700 U | 0.01700 U | 0.01700 U | 0.01700 U | 0.01700 U | 0.01700 U | 0.01500 J | 0.01700 U | 0.01700 U | 0.01700 U | 0.01700 U | 0.01700 U | 0.01700 U |
| | 9/13/1999 | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.02300 | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00150 J | 0.00500 U |
| | 6/23/2000 | 0.00500 U | 0.00500 U | 0.00370 J | 0.00500 U | 0.00500 U | 0.00500 U | 0.02000 | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U |
| | 6/9/2001 | 0.00500 U | 0.00500 U | 0.00100 J | 0.00500 U | 0.00500 U | 0.01000 U | 0.12000 | 0.00500 U | 0.00500 U | 0.00500 U | 0.00250 | 0.00310 J | 0.01000 U |
| | 1/26/2003 | 0.01000 U | 0.01000 U | 0.01000 U | 0.01000 U | 0.01000 U | 0.01000 U | 0.28000 | NA | 0.02000 U | 0.01000 U | 0.03100 | 0.06600 | 0.01000 U |
| | 9/3/2003 | 0.00370 U | 0.00370 U | 0.00330 U | 0.00300 U | 0.00350 U | 0.00430 U | 0.47000 | 0.00320 U | 0.00470 U | 0.00200 U | 0.08100 | 0.06400 | 0.00430 U |
| | 9/3/2003 | 0.00130 U | 0.00130 U | 0.00110 U | 0.00100 U | 0.00120 U | 0.00150 U | 0.17000 | 0.00110 U | 0.00160 U | 0.00069 U | 0.01200 | 0.00410 J | 0.00150 U |
| | 9/3/2003 | 0.00440 U | 0.00440 U | 0.00400 U | 0.00360 U | 0.00420 U | 0.00520 U | 0.52000 | 0.00380 U | 0.00560 U | 0.00240 U | 0.09700 | 0.05000 | 0.00520 U |
| | 12/18/2003 | 0.00310 U | 0.00140 U | 0.00170 U | 0.00310 U | 0.00210 U | 0.00110 U | 0.38000 | 0.00011 U | 0.00240 U | 0.00360 U | 0.05800 | 0.04100 | 0.00250 U |
| | 7/28/2004 | 0.00350 U | 0.00100 U | 0.00250 U | 0.00250 U | 0.00100 U | 0.00170 U | 0.17000 | 0.00170 U | 0.00400 U | 0.00210 U | 0.01800 | 0.00880 J | 0.00170 U |
| | 7/28/2004 | 0.00180 UJ | 0.00052 UJ | 0.00120 UJ | 0.00120 UJ | 0.00050 UJ | 0.00087 UJ | 0.14000 J | 0.00084 UJ | 0.00200 UJ | 0.00100 UJ | 0.00900 J | 0.00220 J | 0.00084 UJ |
| | 10/14/2004 | 0.00700 U | 0.00210 U | 0.00500 U | 0.00490 U | 0.00200 U | 0.00350 U | 0.46000 | 0.00330 U | 0.00800 U | 0.00420 U | 0.06900 | 0.06200 | 0.00340 U |
| | 10/14/2004 | 0.00700 U | 0.00210 U | 0.00500 U | 0.00490 U | 0.00200 U | 0.00350 U | 0.48000 | 0.00330 U | 0.00800 U | 0.00420 U | 0.07500 | 0.05900 | 0.00340 U |
| | 4/5/2005 | 0.00040 U | 0.00030 U | 0.00090 J | 0.00030 U | 0.00040 U | 0.00030 U | 0.53000 | 0.00020 U | 0.00200 U | 0.00040 U | 0.12000 | 0.06800 | 0.00030 U |
| | 4/5/2005 | 0.00040 U | 0.00030 U | 0.00100 | 0.00030 U | 0.00040 U | 0.00030 U | 0.53000 | 0.00020 U | 0.00200 U | 0.00040 U | 0.11000 | 0.05600 | 0.00030 U |
| | 10/18/2005 | 0.00040 U | 0.00030 U | 0.00030 U | 0.00030 U | 0.00040 U | 0.00030 U | 0.68000 | 0.00020 U | 0.00200 U | 0.00040 U | 0.17000 J | 0.11000 J | 0.00300 J |
| | 10/18/2005 | 0.00040 U | 0.00030 U | 0.00070 J | 0.00030 U | 0.00040 U | 0.00030 U | 0.48000 | 0.00020 U | 0.00200 U | 0.00040 U | 0.09300 J | 0.02800 J | 0.00200 J |
| | 5/16/2006 | 0.00060 U | 0.00040 U | 0.00100 | 0.00050 U | 0.00040 U | 0.00060 U | 0.39000 J | 0.00030 U | 0.00200 UJ | 0.00060 U | 0.09100 | 0.04700 | 0.00200 |
| | 5/16/2006 | 0.00060 U | 0.00040 U | 0.00100 | 0.00050 U | 0.00040 U | 0.00060 U | 0.34000 J | 0.00030 U | 0.00200 UJ | 0.00060 U | 0.07500 | 0.03700 | 0.00200 |
| | 8/26/2006 | 0.00100 | 0.00040 U | 0.00090 J | 0.00050 U | 0.00040 U | 0.00060 U | 0.98000 J | 0.00030 U | 0.00500 UJ | 0.00060 U | 0.25000 | 0.19000 | 0.00060 U |
| | 8/26/2006 | 0.00100 | 0.00040 U | 0.00100 J | 0.00050 U | 0.00040 U | 0.00060 U | 0.93000 J | 0.00030 U | 0.00500 UJ | 0.00060 U | 0.22000 | 0.13000 | 0.00900 |
| | 5/9/2007 | 0.00026 U | 0.00026 U | 0.00210 | 0.00022 U | 0.00026 U | 0.00056 U | 0.20000 | 0.00070 U | 0.00310 U | 0.00020 U | 0.03400 | 0.00410 | 0.00560 J |
| | 5/9/2007 | 0.00013 U | 0.00013 U | 0.00190 J | 0.00011 U | 0.00013 U | 0.00028 U | 0.19000 | 0.00035 U | 0.00023 U | 0.00010 U | 0.03900 | 0.00600 | 0.00490 J |
| | 8/31/2007 | 0.00065 U | 0.00065 U | 0.00230 J | 0.00055 U | 0.00065 U | 0.00140 U | 0.44000 | 0.00180 U | 0.00540 J | 0.00050 U | 0.09600 | 0.01200 | 0.01200 J |
| | 1/20/2008 | 0.00039 U | 0.00026 U | 0.00130 | 0.00044 U | 0.00036 U | 0.00060 U | 0.29000 | 0.00040 U | 0.00040 U | 0.00046 U | 0.06000 | 0.00960 | 0.00630 |
| | 7/22/2008 | 0.00054 U | 0.00034 U | 0.00130 | 0.00022 U | 0.00074 J | 0.00061 U | 0.09450 | 0.00043 U | 0.00100 U | 0.00022 U | 0.01670 | 0.00150 | 0.00630 |
| | 1/14/2009 | 0.00054 U | 0.00034 U | 0.00040 U | 0.00022 U | 0.00028 U | 0.00061 U | 0.00020 U | 0.00043 U | 0.00100 U | 0.00022 U | 0.00045 U | 0.00032 U | 0.00030 U |
| | 7/17/2009 | 0.00054 U | 0.00034 U | 0.00160 | 0.00022 U | 0.00028 U | 0.00061 U | 0.12000 | 0.00043 U | 0.00100 U | 0.00022 U | 0.03600 | 0.00610 | 0.00600 |
| | 1/12/2010 | 0.00029 U | 0.00033 U | 0.00150 | 0.00034 U | 0.00025 U | 0.00050 U | 0.04730 | 0.00020 U | 0.00200 U | 0.00044 U | 0.00500 | 0.00024 U | 0.00170 |
| | 1/12/2010 | 0.00029 U | 0.00033 U | 0.00022 J | 0.00034 U | 0.00025 U | 0.00050 U | 0.01070 | 0.00020 U | 0.00200 U | 0.00044 U | 0.00071 J | 0.00024 U | 0.00028 U |
| | 7/14/2010 | 0.00029 U | 0.00033 U | 0.00190 | 0.00034 U | 0.00025 U | 0.00050 U | 0.01690 | 0.00020 U | 0.00200 U | 0.00044 U | 0.00160 | 0.00024 U | 0.00066 J |
| | 1/11/2011 | 0.00023 U | 0.00020 U | 0.00070 J | 0.00025 U | 0.00022 U | 0.00050 U | 0.03910 | 0.00020 U | 0.00200 U | 0.00025 U | 0.00440 | 0.00120 | 0.00042 J |
| | 7/28/2011 | 0.00023 U | 0.00020 U | 0.00020 U | 0.00025 U | 0.00022 U | 0.00050 U | 0.05210 | 0.00020 U | 0.00410 J | 0.00025 U | 0.00680 | 0.0018 | 0.0014 |
| | 1/10/2012 | 0.00023 U | 0.00020 U | 0.00023 J | 0.00025 U | 0.00022 U | 0.00050 U | 0.0342 | 0.00020 U | 0.0020 U | 0.00025 U | 0.0049 | 0.0010 | 0.00025 J |
| | 7/10/2012 | 0.00023 U | 0.00020 U | 0.00020 U | 0.00025 U | 0.00022 U | 0.00050 U | 0.0049 | 0.00020 U | NS | 0.00025 U | 0.00046 J | 0.00026 U | 0.00022 U |
| | 1/8/2013 | 0.00020 U | 0.00022 U | 0.00021 U | 0.00031 U | 0.00026 U | 0.00050 U | 0.0432 | 0.00029 U | 0.0020 U | 0.00032 U | 0.0046 | 0.00031 U | 0.00044 U |
| | 7/16/2013 | 0.00020 U | 0.00022 U | 0.00021 U | 0.00025 U | 0.00022 U | 0.00050 U | 0.0063 | 0.00029 U | 0.0020 U | 0.00032 U | 0.00088 J | 0.00031 U | 0.00044 U |
| | 2/25/2014 | 0.00025 U | 0.00024 U | 0.00024 U | 0.00040 U | 0.00031 U | 0.00053 U | 0.0033 | 0.00028 U | NS | 0.00026 U | 0.00034 U | 0.00030 U | 0.00033 U |
| | 7/22/2014 | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.00209 | 0.0005 U | 0.001 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U |
| | 1/23/2015 | 0.00025 U | 0.00025 U | 0.00025 U | 0.00025 U | 0.00025 U | 0.00025 U | 0.0027 | 0.00025 U | NS | 0.00025 U | 0.000261 J | 0.00025 U | 0.00025 U |
| | 7/28/2015 | 0.00025 U | 0.00025 U | 0.00025 U | 0.00025 U | 0.00025 U | 0.00025 U | 0.00121 | 0.00025 U | 0.001 U | 0.00025 U | 0.0005 U | 0.00025 U | 0.00025 U |
| | 1/20/2016 | Well Abandoned | | | | | | | | | | | | |
| 508F47MW | 8/14/2000 | Well Installed | | | | | | | | | | | | |
| | 9/6/2000 | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U |
| | 6/21/2001 | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.01000 U | 0.00250 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00250 U | 0.00500 U | 0.01000 U |
| | 12/17/2002 | 0.00100 U | 0.00100 U | 0.00100 U | 0.00100 U | 0.00100 U | 0.00100 UJ | 0.00100 U | NA | 0.00200 U | 0.00100 U | 0.00100 U | 0.00100 U | 0.00100 U |
| | -- | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS |
| | 12/17/2003 | 0.00021 U | 0.00009 U | 0.00011 U | 0.00020 U | 0.00014 U | 0.00008 U | 0.00016 U | 0.00011 U | 0.00016 U | 0.00024 U | 0.00019 U | 0.00010 U | 0.00017 U |
| | -- | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS |
| | 10/15/2004 | 0.00035 U | 0.00010 U | 0.00025 U | 0.00025 U | 0.00010 U | 0.00017 U | 0.00027 U | 0.00017 U | 0.00040 U | 0.00021 U | 0.00023 U | 0.00022 U | 0.00017 U |
| | 4/3/2005 | 0.00040 U | 0.00030 U | 0.00030 U | 0.00030 U | 0.00040 U | 0.00030 U | 0.00030 U | 0.00020 U | 0.00200 U | 0.00040 U | 0.00030 U | 0.00030 U | 0.00030 U |
| | 10/11/2005 | 0.00040 U | 0.00030 U | 0.00030 U | 0.00030 U | 0.00040 U | 0.00030 U | 0.00030 U | 0.00020 U | 0.00200 U | 0.00040 U | 0.00030 U | 0.00030 U | 0.00030 U |
| | 5/18/2006 | 0.00060 U | 0.00040 U | 0.00050 U | 0.00050 U | 0.00040 U | 0.00060 U | 0.00050 U | 0.00030 U | 0.00200 U | 0.00060 U | 0.00060 U | 0.00040 U | 0.00060 U |
| | 8/26/2006 | 0.00060 U | 0.00040 U | 0.00100 UJ | 0.00100 UJ | 0.00040 U | 0.00060 U | 0.00100 UJ | 0.00030 U | 0.00200 U | 0.00060 U | 0.00060 U | 0.00040 U | 0.00060 U |
| | 5/14/2007 | 0.00028 U | 0.00092 J | 0.00013 U | 0.00020 U | 0.00023 U | 0.00017 U | 0.00110 | 0.00013 U | 0.00025 U | 0.00014 U | 0.00053 U | 0.00014 U | 0.00012 U |
| | 9/4/2007 | 0.00013 U | 0.00150 | 0.00012 U | 0.00011 U | 0.00013 U | 0.00059 U | 0.00055 J | 0.00035 U | 0.00023 U | 0.00010 U | 0.00015 U | 0.00023 U | 0.00020 U |
| | 2/1/2008 | 0.00039 U | 0.00053 J | 0.00039 U | 0.00044 U | 0.00036 U | 0.00060 U | 0.00032 U | 0.00040 U | 0.00040 U | 0.00046 U | 0.00048 U | 0.00053 U | 0.00043 U |
| | 7/24/2008 | 0.00054 U | 0.00034 | 0.00040 U | 0.00022 U | 0.00028 U | 0.00061 U | 0.00020 U | 0.00043 U | 0.00100 U | 0.00022 U | 0.00045 U | 0.00032 U | 0.00030 U |
| | 1/14/2009 | 0.00054 U | 0.00040 J | 0.00040 U | 0.00022 U | 0.00028 U | 0.00061 U | 0.00230 | 0.00043 U | 0.00100 U | 0.00022 U | 0.00045 U | 0.00032 U | 0.00030 U |
| | 7/17/2009 | 0.00061 J | 0.00490 | 0.00040 U | 0.00022 U | 0.00028 U | 0.00061 U | 0.13900 | 0.00043 U | 0.00100 U | 0.00022 U | 0.00290 | 0.05560 | 0.00095 J |
| | 10/7/2009 | 0.00049 J | 0.00400 | 0.00026 U | 0.00022 U | 0.00032 U | 0.00036 UJ | 0.20000 | 0.00021 U | 0.00100 U | 0.00090 U | 0.00200 | 0.04000 | 0.00100 J |
| | 1/12/2010 | 0.00029 U | 0.00046 J | 0.00039 J | 0.00034 U | 0.00025 U | 0.00050 U | 0.00910 | 0.00020 U | 0.00200 U | 0.00044 U | 0.00034 U | 0.00230 | 0.00028 U |
| | 7/14/2010 | 0.00029 U | 0.00041 J | 0.00140 | 0.00034 U | 0.00025 U | 0.00050 U | 0.00460 | 0.00020 U | 0.00200 U | 0.00044 U | 0.00034 U | 0.00045 J | 0.00033 J |
| | 1/11/2011 | 0.00023 U | 0.00100 | 0.00020 U | 0.00025 U | 0.00022 U | 0.00050 U | 0.02230 | 0.00020 U | 0.00200 U | 0.00025 U | 0.00035 U | 0.00720 | 0.00022 U |
| | 7/28/2011 | 0.00023 U | 0.00080 J | 0.00020 U | 0.00025 U | 0.00022 U | 0.00050 U | 0.01240 | 0.00020 U | 0.00200 U | 0.00025 U | 0.00035 U | 0.00250 | 0.00022 U |
| | 1/10/2012 | 0.00023 U | 0.0010 | 0.00020 U | 0.00025 U | 0.00022 U | 0.00050 U | 0.10100 | 0.00020 U | 0.0020 U | 0.00025 U | 0.0013 | 0.03100 | 0.00046 J |
| | 7/10/2012 | 0.00072 J | 0.0015 | 0.00020 U | 0.00025 U | 0.00022 U | 0.00050 U | 0.24200 | 0.00020 U | NS | 0.00025 U | 0.0031 | 0.06890 | 0.0011 |
| | 1/8/2013 | 0.00020 U | 0.00022 U | 0.00021 U | 0.00031 U | 0.00026 U | 0.00050 U | 0.0292 | 0.00029 U | 0.0020 U | 0.00032 U | 0.00023 U | 0.0015 | 0.00044 U |
| | 7/16/2013 | 0.00020 U | 0.00022 U | 0.00021 U | 0.00031 U | 0.00026 U | 0.00050 U | 0.00024 U | 0.00029 U | 0.0020 U | 0.00032 U | 0.00023 U | 0.00031 U | 0.00044 U |
| | 2/25/2014 | 0.00110 J | 0.00190 J | 0.00049 U | 0.00079 U | 0.00062 U | 0.00110 U | 0.2570 | 0.00056 U | NS | 0.00051 U | 0.0042 | 0.141 | 0.00110 J |
| | 7/22/2014 | 0.00074 J | 0.0011 J | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.3720 | 0.0005 U | 0.001 U | 0.0005 U | 0.0038 | 0.132 | 0.00063 J |
| | 1/22/2014 | 0.00074 J | 0.0011 J | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0406 | 0.0005 U | 0.001 U | 0.0005 U | 0.0038 | 0.132 | 0.00063 J |
| | 1/22/2015 | 0.00025 U | 0.00025 U | 0.00025 U | 0.00025 U | 0.00025 U | 0.00025 U | 0.0406 | 0.00025 U | NS | 0.00025 U | 0.000344 J | 0.00849 | 0.00025 U |
| | 7/28/2015 | 0.000734 J | 0.00095 J | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.3080 | 0.0005 U | 0.001 U | 0.0005 U | 0.00323 | 0.0837 | 0.000735 J |
| | 7/28/2016 | Well Destroyed | | | | | | | | | | | | |

**Table 4-1B**

**Summary of Chemicals of Concern Detected in Groundwater**
**Historical Monitoring Wells – SWMU 136 South Plume**
**2016 RAER**

**Former NAS Dallas, Texas**
**Page 2 of 3**

| Monitoring Well | Sampling Date | Chemicals of Concern (mg/L) | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 1,1-Dichloroethene | 1,2-Dichloroethane | Benzene | Carbon Tetrachloride | Chloroform | Chloromethane | cis-1,2-Dichloroethene | Ethylbenzene | Methylene Chloride | Tetrachloroethene | trans-1,2-Dichloroethene | Trichloroethene | Vinyl Chloride |
| Protective Concentration Level | | 0.00700 | 0.00500 | 0.00500 | 0.00500 | 0.24000 | 0.07000 | 0.07000 | 0.70000 | 0.00500 | 0.00500 | 0.10000 | 0.00500 | 0.00200 |
| Monitoring Wells Located Outside PCLE Zone | | | | | | | | | | | | | | |
| 508F05MW | 4/1/1998 | Well Installed | | | | | | | | | | | | |
| | 5/12/1998 | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U |
| | 8/28/1998 | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U |
| | -- | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS |
| | 9/28/1999 | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U |
| | 6/23/2000 | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U |
| | 6/9/2001 | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.01000 U | 0.00250 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00250 U | 0.00500 U | 0.01000 U |
| | 1/26/2003 | 0.00100 U | 0.00100 U | 0.00100 U | 0.00100 U | 0.00100 U | 0.00100 U | 0.00100 U | NA | 0.00200 U | 0.00100 U | 0.00100 U | 0.00100 U | 0.00100 U |
| | -- | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS |
| | 1/11/2004 | 0.00021 U | 0.00009 U | 0.00011 U | 0.00020 U | 0.00014 U | 0.00008 U | 0.00016 U | 0.00011 U | 0.00016 U | 0.00024 U | 0.00019 U | 0.00010 U | 0.00017 U |
| | -- | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS |
| | 10/15/2004 | 0.00035 U | 0.00010 U | 0.00025 U | 0.00025 U | 0.00010 U | 0.00017 U | 0.00027 U | 0.00017 U | 0.00040 U | 0.00021 U | 0.00023 U | 0.00022 U | 0.00017 U |
| | 4/25/2005 | Well Abandoned | | | | | | | | | | | | |
| 508F39MW | 8/14/2000 | Well Installed | | | | | | | | | | | | |
| | 9/19/2000 | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U |
| | 6/18/2001 | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.01000 U | 0.00250 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00250 U | 0.00500 U | 0.01000 U |
| | 1/22/2003 | 0.00100 U | 0.00100 U | 0.00100 U | 0.00100 U | 0.00100 U | 0.00100 U | 0.00100 U | NA | 0.00200 U | 0.00100 U | 0.00100 U | 0.00100 U | 0.00100 U |
| | -- | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS |
| | 12/17/2003 | 0.00021 U | 0.00009 U | 0.00011 U | 0.00020 U | 0.00014 U | 0.00008 U | 0.00016 U | 0.00011 U | 0.00016 U | 0.00024 U | 0.00019 U | 0.00010 U | 0.00017 U |
| | -- | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS |
| | -- | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS |
| | 4/25/2005 | Well Abandoned | | | | | | | | | | | | |
| 508F46MW | 8/9/2000 | Well Installed | | | | | | | | | | | | |
| | 9/6/2000 | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U |
| | 6/22/2001 | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.01000 U | 0.00250 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00250 U | 0.00500 U | 0.01000 U |
| | 1/26/2003 | 0.00100 U | 0.00100 U | 0.00100 U | 0.00100 U | 0.00100 U | 0.00100 U | 0.00100 U | NA | 0.00200 U | 0.00100 U | 0.00100 U | 0.00100 U | 0.00100 U |
| | -- | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS |
| | 12/17/2003 | 0.00021 U | 0.00009 U | 0.00011 U | 0.00020 U | 0.00014 U | 0.00008 U | 0.00016 U | 0.00011 U | 0.00016 U | 0.00024 U | 0.00019 U | 0.00010 U | 0.00017 U |
| | -- | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS |
| | -- | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS |
| | 4/25/2005 | Well Abandoned | | | | | | | | | | | | |
| 595C03MW | 3/16/1998 | Well Installed | | | | | | | | | | | | |
| | 4/16/1998 | 0.01000 U | 0.01000 U | 0.01000 U | 0.01000 U | 0.01000 U | 0.01000 U | 0.01000 U | 0.01000 U | 0.01000 U | 0.01000 U | 0.01000 U | 0.01000 U | 0.01000 U |
| | 8/26/1998 | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U |
| | 3/16/1999 | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U |
| | 10/8/1999 | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00680 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U |
| | 6/27/2000 | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U |
| | 6/12/2001 | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.01000 U | 0.00250 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00250 U | 0.00500 U | 0.01000 U |
| | 1/22/2003 | 0.00100 U | 0.00100 U | 0.00100 U | 0.00100 U | 0.00100 U | 0.00100 U | 0.00100 U | NA | 0.00200 U | 0.00100 U | 0.00100 U | 0.00100 U | 0.00100 U |
| | -- | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS |
| | 12/17/2003 | 0.00021 U | 0.00009 U | 0.00011 U | 0.00020 U | 0.00014 U | 0.00008 U | 0.00016 U | 0.00011 U | 0.00016 U | 0.00024 U | 0.00019 U | 0.00010 U | 0.00017 U |
| | -- | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS |
| | -- | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS |
| | 4/25/2005 | Well Abandoned | | | | | | | | | | | | |
| 508F43MW | 8/7/2000 | Well Installed | | | | | | | | | | | | |
| | 8/21/2000 | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U |
| | 6/21/2001 | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.01000 U | 0.00250 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00250 U | 0.00500 U | 0.01000 U |
| | 1/27/2003 | 0.00100 U | 0.00100 U | 0.00100 U | 0.00100 U | 0.00100 U | 0.00100 U | 0.00100 U | NA | 0.00200 U | 0.00100 U | 0.00100 U | 0.00100 U | 0.00100 U |
| | 12/17/2003 | 0.00021 U | 0.00009 U | 0.00011 U | 0.00020 U | 0.00014 U | 0.00008 U | 0.00016 U | 0.00011 U | 0.00016 U | 0.00024 U | 0.00019 U | 0.00010 U | 0.00017 U |
| | 10/15/2004 | 0.00035 U | 0.00010 U | 0.00025 U | 0.00025 U | 0.00010 U | 0.00017 U | 0.00027 U | 0.00017 U | 0.00040 U | 0.00021 U | 0.00023 U | 0.00022 U | 0.00017 U |
| | 10/21/2005 | 0.00040 U | 0.00030 U | 0.00030 U | 0.00030 U | 0.00040 U | 0.00030 U | 0.00030 U | 0.00020 U | 0.00200 U | 0.00040 U | 0.00030 U | 0.00030 U | 0.00030 U |
| | 5/18/2006 | 0.00060 U | 0.00040 U | 0.00050 U | 0.00050 U | 0.00040 U | 0.00060 U | 0.00050 U | 0.00030 U | 0.00200 U | 0.00060 U | 0.00060 U | 0.00040 U | 0.00060 U |
| | 8/26/2006 | 0.00060 U | 0.00040 U | 0.00100 UJ | 0.00100 UJ | 0.00040 U | 0.00060 U | 0.00100 UJ | 0.00030 U | 0.00200 U | 0.00060 U | 0.00060 U | 0.00040 U | 0.00060 U |
| | 5/14/2007 | 0.00028 U | 0.00021 U | 0.00013 U | 0.00020 U | 0.00023 U | 0.00017 U | 0.00045 U | 0.00013 U | 0.00025 U | 0.00014 U | 0.00053 U | 0.00014 U | 0.00012 U |
| | 9/4/2007 | 0.00013 U | 0.00013 U | 0.00012 U | 0.00011 U | 0.00013 U | 0.00081 U | 0.00014 U | 0.00035 U | 0.00023 U | 0.00010 U | 0.00023 U | 0.00015 U | 0.00020 U |
| | 2/1/2008 | 0.00039 U | 0.00026 U | 0.00039 U | 0.00044 U | 0.00036 U | 0.00060 U | 0.00032 U | 0.00040 U | 0.00040 U | 0.00046 U | 0.00048 U | 0.00053 U | 0.00043 U |
| | 7/24/2008 | 0.00054 U | 0.00034 U | 0.00040 U | 0.00022 U | 0.00028 U | 0.00061 U | 0.00020 U | 0.00043 U | 0.00100 U | 0.00022 U | 0.00045 U | 0.00032 U | 0.00030 U |
| | 1/14/2009 | 0.00054 U | 0.00034 U | 0.00040 U | 0.00022 U | 0.00028 U | 0.00061 U | 0.00020 U | 0.00043 U | 0.00100 U | 0.00022 U | 0.00045 U | 0.00032 U | 0.00030 U |
| | 7/17/2009 | 0.00054 U | 0.00034 U | 0.00040 U | 0.00022 U | 0.00028 U | 0.00061 U | 0.00020 U | 0.00043 U | 0.00100 U | 0.00022 U | 0.00045 U | 0.00032 U | 0.00030 U |
| | 1/12/2010 | 0.00029 U | 0.00033 U | 0.00021 U | 0.00034 U | 0.00025 U | 0.00050 U | 0.00032 U | 0.00020 U | 0.00200 U | 0.00044 U | 0.00034 U | 0.00024 U | 0.00028 U |
| | 7/14/2010 | 0.00029 U | 0.00033 U | 0.00021 U | 0.00034 U | 0.00025 U | 0.00050 U | 0.00032 U | 0.00020 U | 0.00200 U | 0.00044 U | 0.00034 U | 0.00024 U | 0.00028 U |
| | 1/11/2011 | 0.00023 U | 0.00020 U | 0.00020 U | 0.00025 U | 0.00022 U | 0.00050 U | 0.00026 U | 0.00020 U | 0.00200 U | 0.00025 U | 0.00035 U | 0.00026 U | 0.00022 U |
| | 7/28/2011 | 0.00023 U | 0.00020 U | 0.00020 U | 0.00025 U | 0.00022 U | 0.00050 U | 0.00026 U | 0.00020 U | 0.00200 U | 0.00025 U | 0.00035 U | 0.00026 U | 0.00022 U |
| | 1/10/2012 | 0.00023 U | 0.00020 U | 0.00020 U | 0.00025 U | 0.00022 U | 0.00050 U | 0.00026 U | 0.00020 U | 0.0020 U | 0.00025 U | 0.00035 U | 0.00026 U | 0.00022 U |
| | 7/10/2012 | 0.00023 U | 0.00020 U | 0.00020 U | 0.00025 U | 0.00022 U | 0.00050 U | 0.00026 U | 0.00020 U | NS | 0.00025 U | 0.00035 U | 0.00026 U | 0.00022 U |
| | 1/8/2013 | 0.00020 U | 0.00022 U | 0.00021 U | 0.00031 U | 0.00026 U | 0.00050 U | 0.00024 U | 0.00029 U | 0.0020 U | 0.00032 U | 0.00023 U | 0.00031 U | 0.00044 U |
| | 7/16/2013 | 0.0020 | 0.0025 | 0.00031 J | 0.00031 U | 0.00026 U | 0.00050 U | 0.553 | 0.00029 U | 0.0020 U | 0.00032 U | 0.0083 | 0.205 | 0.0013 |
| | 2/25/2014 | 0.00025 U | 0.00024 U | 0.00024 U | 0.00040 U | 0.00031 U | 0.00053 U | 0.00033 U | 0.00028 U | NS | 0.00026 U | 0.00034 U | 0.00030 U | 0.00033 U |
| | 7/21/2014 | 0.00025 U | 0.00025 U | 0.00025 U | 0.00025 U | 0.00025 U | 0.00025 U | 0.00027 J | 0.00025 U | 0.0005 U | 0.00025 U | 0.00025 U | 0.00037 J | 0.00025 U |
| | 1/22/2015 | 0.00025 U | 0.00025 U | 0.00025 U | 0.00025 U | 0.00025 U | 0.00025 U | 0.00025 U | 0.00025 U | NS | 0.00025 U | 0.00025 U | 0.00025 U | 0.00025 U |
| | 7/28/2015 | 0.00025 U | 0.00025 U | 0.00025 U | 0.00025 U | 0.00025 U | 0.00025 U | 0.00025 U | 0.00025 U | 0.0005 U | 0.00025 U | 0.00025 U | 0.00025 U | 0.00025 U |
| | 1/20/2016 | Well Abandoned | | | | | | | | | | | | |

**Table 4-1B**

**Summary of Chemicals of Concern Detected in Groundwater**
**Historical Monitoring Wells – SWMU 136 South Plume**
**2016 RAER**

**Former NAS Dallas, Texas**
**Page 3 of 3**

| Monitoring Well | Sampling Date | Chemicals of Concern (mg/L) | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 1,1-Dichloroethene | 1,2-Dichloroethane | Benzene | Carbon Tetrachloride | Chloroform | Chloromethane | cis-1,2-Dichloroethene | Ethylbenzene | Methylene Chloride | Tetrachloroethene | trans-1,2-Dichloroethene | Trichloroethene | Vinyl Chloride |
| Protective Concentration Level | | 0.00700 | 0.00500 | 0.00500 | 0.00500 | 0.24000 | 0.07000 | 0.07000 | 0.70000 | 0.00500 | 0.00500 | 0.10000 | 0.00500 | 0.00200 |
| 508F44MW | 8/9/2000 | Well Installed | | | | | | | | | | | | |
| | 9/6/2000 | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U |
| | 10/20/2000 | Well Abandoned | | | | | | | | | | | | |
| 508F45MW | 8/14/2000 | Well Installed | | | | | | | | | | | | |
| | 9/6/2000 | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U |
| | 10/20/2000 | Well Abandoned | | | | | | | | | | | | |
| 508F48MW | 8/14/2000 | Well Installed | | | | | | | | | | | | |
| | 7/13/2001 | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.01000 U | 0.00250 U | 0.00500 U | 0.00500 U | 0.0025 U | 0.00500 U | 0.01000 U | |
| | 12/17/2002 | 0.00100 U | 0.00100 U | 0.00100 U | 0.00100 U | 0.00100 U | 0.00100 UJ | 0.00100 U | NA | 0.00200 U | 0.00100 U | 0.00100 U | 0.00100 U | 0.00100 U |
| | 12/17/2003 | 0.00021 U | 0.000092 U | 0.00011 U | 0.00020 U | 0.00014 U | 0.000075 U | 0.00016 U | 0.00011 U | 0.00016 U | 0.00024 U | 0.00019 U | 0.000095 U | 0.00017 U |
| | 4/25/2005 | Well Abandoned | | | | | | | | | | | | |
| 60-19 | 8/11/1992 | NA | NA | 0.00100 U | NA | NA | NA | NA | 0.00100 U | NA | NA | NA | NA | NA |
| | 6/16/1994 | NA | NA | 0.00100 U | NA | NA | NA | NA | 0.00100 U | NA | NA | NA | NA | NA |
| | 12/7/1994 | NA | NA | 0.00100 U | NA | NA | NA | NA | 0.00100 U | NA | NA | NA | NA | NA |
| | 6/13/1995 | NA | NA | 0.00100 U | NA | NA | NA | NA | 0.00100 U | NA | NA | NA | NA | NA |
| | 7/11/1995 | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.01000 U | 0.00500 U | 0.00500 U | 0.01030 | 0.00500 U | 0.00500 U | 0.00500 U | 0.01000 U |
| | 1/25/1996 | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.01000 U | NA | 0.00500 U | 0.00500 U | 0.00500 U | NA | 0.00500 U | 0.01000 U |
| | 5/15/1996 | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 UJ | 0.00500 U | 0.01000 U | NA | 0.00500 U | 0.00500 U | 0.00500 U | NA | 0.00500 U | 0.01000 U |
| | 7/15/1996 | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.01000 U | NA | 0.00500 U | 0.00500 U | 0.00500 U | NA | 0.00500 U | 0.01000 U |
| | 10/1/1996 | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.01000 U | NA | 0.00500 U | 0.00500 U | 0.00500 U | NA | 0.00500 U | 0.01000 U |
| | 4/2/1998 | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U |
| | 3/29/1999 | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U |
| | 9/23/1999 | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00570 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U |
| | 7/7/2000 | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U |
| | 7/11/2001 | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.01000 U | 0.00250 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00250 U | 0.00500 U | 0.01000 U |
| | 12/18/2002 | 0.00100 U | 0.00100 U | 0.00100 U | 0.00100 U | 0.00025 J | 0.00100 U | 0.00100 U | NA | 0.00200 U | 0.00330 | 0.00100 U | 0.00490 | 0.00100 U |
| | 12/21/2003 | 0.00021 U | 0.00009 U | 0.00011 U | 0.00020 U | 0.00014 U | 0.00008 U | 0.00016 U | 0.00011 U | 0.00016 U | 0.00024 U | 0.00019 U | 0.00010 U | 0.00017 U |
| | 10/19/2005 | 0.00040 U | 0.00030 U | 0.00030 U | 0.00030 U | 0.00040 U | 0.00040 J | 0.00030 U | 0.00020 U | 0.00200 U | 0.00040 U | 0.00030 U | 0.00030 U | 0.00030 U |
| | 5/18/2006 | 0.00060 U | 0.00040 U | 0.00050 U | 0.00050 U | 0.00040 U | 0.00060 U | 0.00050 U | 0.00030 U | 0.00200 U | 0.00060 U | 0.00060 U | 0.00050 J | 0.00060 U |
| | 8/24/2006 | 0.00060 U | 0.00040 U | 0.00050 U | 0.00100 UJ | 0.00040 U | 0.00060 U | 0.00050 U | 0.00030 U | 0.00200 U | 0.00060 U | 0.00060 U | 0.00040 U | 0.00060 U |
| | 5/11/2007 | 0.00028 U | 0.00021 U | 0.00013 U | 0.00020 U | 0.00023 U | 0.00017 U | 0.00045 U | 0.00013 U | 0.00025 U | 0.00014 U | 0.00053 U | 0.00014 U | 0.00012 U |
| | 9/5/2007 | 0.00013 U | 0.00013 U | 0.00012 U | 0.00011 U | 0.00013 U | 0.00028 U | 0.00014 U | 0.00035 U | 0.00023 U | 0.00010 U | 0.00015 U | 0.00023 U | 0.00020 U |
| | 2/1/2008 | 0.00039 U | 0.00026 U | 0.00039 U | 0.00044 U | 0.00036 U | 0.00060 U | 0.00032 U | 0.00040 U | 0.00040 U | 0.00046 U | 0.00048 U | 0.00053 U | 0.00043 U |
| | 7/23/2008 | 0.00054 U | 0.00034 U | 0.00040 U | 0.00022 U | 0.00028 U | 0.00061 U | 0.00020 U | 0.00043 U | 0.00100 U | 0.00022 U | 0.00045 U | 0.00032 U | 0.00030 U |
| | 1/13/2009 | 0.00054 U | 0.00034 U | 0.00040 U | 0.00022 U | 0.00028 U | 0.00061 U | 0.00020 U | 0.00043 U | 0.00100 U | 0.00022 U | 0.00045 U | 0.00032 U | 0.00030 U |
| | 7/17/2009 | 0.00054 U | 0.00034 U | 0.00040 U | 0.00022 U | 0.00028 U | 0.00061 U | 0.00020 U | 0.00043 U | 0.00100 U | 0.00022 U | 0.00045 U | 0.00032 U | 0.00030 U |
| | 1/12/2010 | 0.00029 U | 0.00033 U | 0.00021 U | 0.00034 U | 0.00025 U | 0.00050 U | 0.00032 U | 0.00020 U | 0.00200 U | 0.00044 U | 0.00034 U | 0.00024 U | 0.00028 U |
| | 7/14/2010 | 0.00029 U | 0.00033 U | 0.00021 U | 0.00034 U | 0.00025 U | 0.00051 J | 0.00032 U | 0.00020 U | 0.00200 U | 0.00044 U | 0.00034 U | 0.00024 U | 0.00028 U |
| | 1/11/2011 | 0.00023 U | 0.00020 U | 0.00020 U | 0.00025 U | 0.00022 U | 0.00050 U | 0.00026 U | 0.00020 U | 0.00200 U | 0.00025 U | 0.00035 U | 0.00026 U | 0.00022 U |
| | 7/28/2011 | 0.00023 U | 0.00020 U | 0.00020 U | 0.00025 U | 0.00022 U | 0.00050 U | 0.00026 U | 0.00020 U | 0.00200 U | 0.00025 U | 0.00035 U | 0.00026 U | 0.00022 U |
| | 1/10/2012 | 0.00023 U | 0.00020 U | 0.00020 U | 0.00025 U | 0.00022 U | 0.00050 U | 0.00026 U | 0.00020 U | 0.0020 U | 0.00025 U | 0.00035 U | 0.00026 U | 0.00022 U |
| | 7/10/2012 | 0.00023 U | 0.00020 U | 0.00020 U | 0.00025 U | 0.00022 U | 0.00050 U | 0.00026 U | 0.00020 U | NS | 0.00025 U | 0.00035 U | 0.00026 U | 0.00022 U |
| | 1/8/2013 | 0.00020 U | 0.00022 U | 0.00021 U | 0.00031 U | 0.00026 U | 0.00050 U | 0.00024 U | 0.00029 U | 0.0020 U | 0.00032 U | 0.00023 U | 0.00031 U | 0.00044 U |
| | 7/16/2013 | 0.00020 U | 0.00022 U | 0.00021 U | 0.00031 U | 0.00026 U | 0.00050 U | 0.00024 U | 0.00029 U | 0.0020 U | 0.00032 U | 0.00023 U | 0.00031 U | 0.00044 U |
| | 2/25/2014 | 0.00025 U | 0.00024 U | 0.00024 U | 0.00040 U | 0.00031 U | 0.00053 U | 0.00033 U | 0.00028 U | NS | 0.00026 U | 0.00034 U | 0.00030 U | 0.00033 U |
| | 7/17/2014 | 0.00025 U | 0.00025 U | 0.00025 U | 0.00025 U | 0.00025 U | 0.00025 U | 0.00025 U | 0.00025 U | 0.0005 U | 0.00025 U | 0.00025 U | 0.00025 U | 0.00025 U |
| | 1/23/2015 | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | NS | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U |
| | 7/28/2015 | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U |
| | 1/20/2016 | Well Abandoned | | | | | | | | | | | | |

mg/L - milligrams per liter
NA - Not Applicable
NS - Not Sampled
NS-D - Not Sampled during this round due to insufficient water in the monitoring well
PDB - Passive Diffusion Bag
SDG - Sample Delivery Group
PCLE - Protective Concentration Level Exceedance

Note:
Shaded areas indicate an exceedance.

Analytical Result Qualifiers:
J - Indicates that the chemical was detected. However, the associated numerical result may not be a precise representation of the amount that is actually present in the sample. The laboratory reported concentration is considered to be an estimate of the true concentration.
U - Indicates that the chemical was not detected at the numerical detection limit (sample-specific quantitation limit) noted. Nondetected results from the laboratory are reported in this manner. This qualifier is added to a positive result (reported by the laboratory) if the detected concentration is determined to be attributable to contamination introduced during field sampling or laboratory analysis.
UJ - Indicates that the chemical was not detected. However, the detection limit (sample-specific quantitation limit) is considered to be estimated based on problems encountered during laboratory analysis. The associated numerical detection limit is regarded as inaccurate or

# TABLE 4-2
# SUMMARY OF GEOCHEMICAL PARAMETERS MEASURED IN GROUNDWATER

**Table 4-2A**

**Summary of Groundwater Gauging Data**
**SWMU 136 South Plume**
**2016 RAER**
**Former NAS Dallas, Texas**
**Page 1 of 4**

| Monitoring Well | Top of Casing [1] (ft msl) | Screened Interval (ft msl) | Date | Depth to Water [2] (ft bgs) | Groundwater Elevation (ft msl) |
|---|---|---|---|---|---|
| **Corrective Action Observation Monitoring Wells** | | | | | |
| **50805MW** | 466.19 | 462.65 to 452.65 | 10/6/1995 | Well Installed | |
| | | | 2/1/1998 | 5.17 | 461.02 |
| | | | 5/1/1998 | 6.31 | 459.88 |
| | | | 8/1/1998 | 7.23 | 458.96 |
| | | | 2/1/1999 | 6.73 | 459.46 |
| | | | 9/1/1999 | 6.90 | 459.29 |
| | | | 6/1/2000 | 13.87 | 452.32 |
| | | | 6/1/2001 | 6.55 | 459.64 |
| | | | 12/2/2002 | 7.47 | 458.72 |
| | | | 8/1/2003 | 8.69 | 457.50 |
| | | | 12/23/2003 | 8.02 | 458.17 |
| | | | 7/4/2004 | 6.38 | 459.81 |
| | | | 9/29/2004 | 7.39 | 458.80 |
| | 465.94 | 462.40 to 452.40 | 4/17/2005 | 6.80 | 459.14 |
| | | | 7/22/2005 | 8.90 | 457.04 |
| | | | 10/4/2005 | 9.16 | 456.78 |
| | | | 1/21/2006 | 10.61 | 455.33 |
| | | | 5/2/2006 | 8.63 | 457.31 |
| | | | 8/8/2006 | 8.85 | 457.09 |
| | | | 4/25/2007 | 6.87 | 459.07 |
| | | | 8/24/2007 | 6.74 | 459.20 |
| | | | 1/15/2008 | 8.40 | 457.54 |
| | | | 7/22/2008 | 7.95 | 457.99 |
| | | | 12/18/2008 | 9.61 | 456.33 |
| | | | 1/14/2009 | 9.82 | 456.12 |
| | | | 7/15/2009 | 8.15 | 457.79 |
| | | | 12/15/2009 | 7.08 | 458.86 |
| | | | 8/9/2010 | 7.83 | 458.11 |
| | | | 12/17/2010 | NA | NA |
| | | | 7/25/2011 | NA | NA |
| | | | 12/14/2011 | NA | NA |
| | | | 7/10/2012 | NA | NA |
| | | | 12/19/2012 | NA | NA |
| | | | 7/15/2013 | NA | NA |
| | | | 12/18/2013 | NA | NA |
| | | | 7/15/2014 | NA | NA |
| | | | 12/17/2014 | NA | NA |
| | | | 7/20/2015 | NA | NA |
| | | | 12/17/2015 | NA | NA |
| | | | 7/18/2016 | NA | NA |

**Table 4-2A**

**Summary of Groundwater Gauging Data**
**SWMU 136 South Plume**
**2016 RAER**
**Former NAS Dallas, Texas**
**Page 2 of 4**

| Monitoring Well | Top of Casing [1] (ft msl) | Screened Interval (ft msl) | Date | Depth to Water [2] (ft bgs) | Groundwater Elevation (ft msl) |
|---|---|---|---|---|---|
| 508F04MW | 463.81 | 456.31 to 446.31 | 4/1/1998 | Well Installed | |
| | | | 5/1/1998 | 7.85 | 455.96 |
| | | | 8/1/1998 | 9.43 | 454.38 |
| | | | 2/1/1999 | 8.53 | 455.28 |
| | | | 9/1/1999 | 8.89 | 454.92 |
| | | | 6/1/2000 | 7.40 | 456.41 |
| | | | 6/1/2001 | 8.52 | 455.29 |
| | | | 12/2/2002 | 9.30 | 454.51 |
| | | | 8/1/2003 | 9.49 | 454.32 |
| | | | 12/23/2003 | 9.71 | 454.10 |
| | | | 7/4/2004 | 7.36 | 456.45 |
| | | | 9/29/2004 | 10.60 | 453.21 |
| | 463.63 | 456.13 to 446.13 | 4/17/2005 | 10.46 | 453.17 |
| | | | 7/22/2005 | 11.05 | 452.58 |
| | | | 10/4/2005 | 11.41 | 452.22 |
| | | | 1/21/2006 | 12.25 | 451.38 |
| | | | 5/2/2006 | 10.81 | 452.82 |
| | | | 8/8/2006 | 11.65 | 451.98 |
| | | | 4/25/2007 | 10.28 | 453.35 |
| | | | 8/24/2007 | 10.35 | 453.28 |
| | | | 1/15/2008 | 10.82 | 452.81 |
| | | | 7/10/2008 | 11.02 | 452.61 |
| | | | 12/18/2008 | 13.36 | 450.27 |
| | | | 7/15/2009 | 11.38 | 452.25 |
| | 463.60 | 456.10 to 446.10 | 12/15/2009 | 9.99 | 453.61 |
| | | | 8/9/2010 | 10.49 | 453.11 |
| | | | 12/17/2010 | 11.08 | 452.52 |
| | | | 7/25/2011 | 10.96 | 452.64 |
| | | | 12/14/2011 | 10.80 | 452.80 |
| | | | 7/10/2012 | 11.10 | 452.50 |
| | | | 12/19/2012 | 12.27 | 451.33 |
| | | | 7/15/2013 | 11.53 | 452.07 |
| | | | 12/18/2013 | 10.24 | 453.36 |
| | | | 7/15/2014 | 11.31 | 452.29 |
| | | | 12/17/2014 | 11.90 | 451.70 |
| | | | 7/20/2015 | 10.38 | 453.22 |
| | | | 12/17/2015 | 10.19 | 453.41 |
| | | | 7/18/2016 | 10.48 | 453.12 |

**Table 4-2A**

**Summary of Groundwater Gauging Data**
**SWMU 136 South Plume**
**2016 RAER**
**Former NAS Dallas, Texas**
**Page 3 of 4**

| Monitoring Well | Top of Casing [1] (ft msl) | Screened Interval (ft msl) | Date | Depth to Water [2] (ft bgs) | Groundwater Elevation (ft msl) |
|---|---|---|---|---|---|
| **Point of Exposure and Background Monitoring Wells** | | | | | |
| **508F28MW** | 466.10 | 455.87 to 445.87 | 7/13/1999 | Well Installed | |
| | | | 9/1/1999 | 9.31 | 456.79 |
| | | | 6/1/2000 | 4.35 | 461.75 |
| | | | 6/1/2001 | 6.82 | 459.28 |
| | | | 12/2/2002 | 4.97 | 461.13 |
| | | | 8/1/2003 | 7.99 | 458.11 |
| | | | 12/23/2003 | 7.62 | 458.48 |
| | | | 7/4/2004 | 5.06 | 461.04 |
| | | | 9/29/2004 | 7.42 | 458.68 |
| | 465.98 | 455.75 to 445.75 | 4/17/2005 | 7.78 | 458.20 |
| | | | 7/22/2005 | 9.01 | 456.97 |
| | | | 10/4/2005 | 10.24 | 455.74 |
| | | | 1/21/2006 | 11.81 | 454.17 |
| | | | 5/2/2006 | 8.36 | 457.62 |
| | | | 8/8/2006 | 10.31 | 455.67 |
| | | | 4/25/2007 | 7.02 | 458.96 |
| | | | 8/24/2007 | 7.54 | 458.44 |
| | | | 1/15/2008 | 8.74 | 457.24 |
| | | | 7/10/2008 | 9.45 | 456.53 |
| | | | 12/18/2008 | 10.31 | 455.67 |
| | | | 7/15/2009 | NA | NA |
| | 465.98 | 455.75 to 445.75 | 12/15/2009 | 7.45 | 458.53 |
| | | | 8/9/2010 | 8.18 | 457.80 |
| | | | 12/17/2010 | 7.83 | 458.15 |
| | | | 7/25/2011 | 9.43 | 456.55 |
| | | | 12/14/2011 | 8.64 | 457.34 |
| | | | 7/10/2012 | 9.51 | 456.47 |
| | | | 12/19/2012 | 11.11 | 454.87 |
| | | | 7/15/2013 | 9.50 | 456.48 |
| | | | 12/18/2013 | 7.23 | 458.75 |
| | | | 7/15/2014 | 9.05 | 456.93 |
| | | | 12/17/2014 | 10.34 | 455.64 |
| | | | 7/20/2015 | 7.97 | 458.01 |
| | | | 12/17/2015 | 6.72 | 459.26 |
| | | | 7/18/2016 | 8.10 | 457.88 |

**Table 4-2A**

**Summary of Groundwater Gauging Data**
**SWMU 136 South Plume**
**2016 RAER**
**Former NAS Dallas, Texas**
**Page 4 of 4**

| Monitoring Well | Top of Casing [1] (ft msl) | Screened Interval (ft msl) | Date | Depth to Water [2] (ft bgs) | Groundwater Elevation (ft msl) |
|---|---|---|---|---|---|
| 508F47MW | 460.91 | 450.91 to 446.91 | 8/14/2000 | Well Installed | |
| | | | 6/1/2001 | 5.84 | 455.07 |
| | | | 12/14/2002 | 5.93 | 454.98 |
| | | | 8/1/2003 | 6.74 | 454.17 |
| | | | 12/23/2003 | 7.00 | 453.91 |
| | | | 7/4/2004 | 4.72 | 456.19 |
| | | | 9/29/2004 | 7.86 | 453.05 |
| | 460.76 | 450.76 to 446.76 | 4/17/2005 | 7.88 | 452.88 |
| | | | 7/22/2005 | 8.20 | 452.56 |
| | | | 10/4/2005 | 8.75 | 452.01 |
| | | | 1/21/2006 | 9.56 | 451.20 |
| | | | 5/2/2006 | 8.14 | 452.62 |
| | | | 8/8/2006 | 9.11 | 451.65 |
| | | | 4/25/2007 | 7.69 | 453.07 |
| | | | 8/24/2007 | 7.45 | 453.31 |
| | | | 1/15/2008 | 8.12 | 452.64 |
| | | | 7/10/2008 | 8.38 | 452.38 |
| | | | 12/18/2008 | 9.21 | 451.55 |
| | | | 7/15/2009 | 8.75 | 452.01 |
| | 460.77 | 450.77 to 446.77 | 12/15/2009 | 7.39 | 453.38 |
| | | | 8/9/2010 | 7.88 | 452.89 |
| | | | 12/17/2010 | 8.39 | 452.38 |
| | | | 7/25/2011 | 8.29 | 452.48 |
| | | | 12/14/2011 | 8.05 | 452.72 |
| | | | 7/10/2012 | 8.41 | 452.36 |
| | | | 12/19/2012 | 9.50 | 451.27 |
| | | | 7/15/2013 | 8.78 | 451.99 |
| | | | 12/18/2013 | 7.55 | 453.22 |
| | | | 7/15/2014 | 8.55 | 452.22 |
| | | | 12/17/2014 | 9.21 | 451.56 |
| | | | 7/20/2015 | 7.77 | 453.00 |
| | | | | Well Destroyed | |
| 508F98MW | | -10.00 to -15.00 | 4/5/2016 | Well Installed | |
| | | | 7/18/2016 | 7.60 | -7.60 |

bgs - below ground surface
ft - feet
msl - mean sea level
NA - Not Available or Applicable (i.e., abandoned, not installed, not measured)
PCLE - Protective Concentration Level Exceedance

Notes:
1 - All monitoring wells on-site were resurveyed in May 2005 and September 2010 in accordance with the Compliance Plan Requirements.
2 - Depth to water measurements taken from the top of the riser.

**TABLE 4-2B**

**SUMMARY OF GROUNDWATER GAUGING DATA**
**HISTORICAL MONITORING WELLS - SWMU 136 SOUTH PLUME**
**2016 RAER**

**FORMER NAS DALLAS, TEXAS**
**PAGE 1 OF 4**

| Monitoring Well | Top of Casing [1] (ft msl) | Screened Interval (ft msl) | Date | Depth to Water [2] (ft bgs) | Groundwater Elevation (ft msl) |
|---|---|---|---|---|---|
| **Monitoring Wells Located Inside PCLE Zone** | | | | | |
| **50804MW** | 464.73 | 455.90 to 445.90 | 11/14/1995 | Well Installed | |
| | | | 2/1/1998 | 8.30 | 456.43 |
| | | | 5/1/1998 | 8.45 | 456.28 |
| | | | 8/1/1998 | 10.13 | 454.60 |
| | | | 2/1/1999 | 9.24 | 455.49 |
| | | | 9/1/1999 | 9.53 | 455.20 |
| | | | 6/1/2000 | 8.04 | 456.69 |
| | | | 6/1/2001 | 9.21 | 455.52 |
| | | | 12/2/2002 | 9.29 | 455.44 |
| | | | 8/1/2003 | 10.19 | 454.54 |
| | | | 12/23/2003 | 10.34 | 454.39 |
| | | | 7/4/2004 | 7.81 | 456.92 |
| | | | 9/29/2004 | 11.10 | 453.63 |
| | 464.59 | 455.76 to 445.76 | 4/17/2005 | 10.95 | 453.64 |
| | | | 7/22/2005 | 11.46 | 453.13 |
| | | | 10/3/2005 | 11.99 | 452.60 |
| | | | 1/21/2006 | 12.94 | 451.65 |
| | | | 5/2/2006 | 11.32 | 453.27 |
| | | | 8/8/2006 | 12.32 | 452.27 |
| | | | 4/25/2007 | 10.71 | 453.88 |
| | | | 8/24/2007 | 10.66 | 453.93 |
| | | | 1/15/2008 | 11.37 | 453.22 |
| | | | 7/10/2008 | 11.51 | 453.08 |
| | | | 12/18/2008 | 10.91 | 453.68 |
| | | | 1/14/2009 | 13.05 | 451.54 |
| | | | 7/15/2009 | 11.89 | 452.70 |
| | 464.54 | 455.71 to 445.71 | 12/15/2009 | 10.25 | 454.29 |
| | | | 8/9/2010 | 10.79 | 453.75 |
| | | | 12/17/2010 | 11.69 | 452.85 |
| | | | 7/25/2011 | 11.56 | 452.98 |
| | | | 12/14/2011 | 11.39 | 453.15 |
| | | | 7/10/2012 | 11.77 | 452.77 |
| | | | 12/19/2012 | 13.01 | 451.53 |
| | | | 7/15/2013 | 12.06 | 452.48 |
| | | | 12/18/2013 | 10.71 | 453.83 |
| | | | 7/15/2014 | 11.67 | 452.87 |
| | | | 12/17/2014 | 12.58 | 451.96 |
| | | | 7/20/2015 | 10.85 | 453.69 |
| | | | 12/17/2015 | 10.32 | 454.22 |
| | | | 4/7/2016 | Well Plugged and Abandoned | |

**TABLE 4-2B**

**SUMMARY OF GROUNDWATER GAUGING DATA
HISTORICAL MONITORING WELLS - SWMU 136 SOUTH PLUME
2016 RAER**

**FORMER NAS DALLAS, TEXAS
PAGE 2 OF 4**

| Monitoring Well | Top of Casing [1] (ft msl) | Screened Interval (ft msl) | Date | Depth to Water [2] (ft bgs) | Groundwater Elevation (ft msl) |
|---|---|---|---|---|---|
| **Monitoring Wells Located Outside PCLE Zone** | | | | | |
| **60-19** | 468.64 | 447.29 to 432.29 | 2/1/1998 | 9.18 | 459.46 |
| | | | 5/1/1998 | 9.22 | 459.42 |
| | | | 8/1/1998 | 9.64 | 459.00 |
| | | | 2/1/1999 | 9.44 | 459.20 |
| | | | 9/1/1999 | 9.53 | 459.11 |
| | | | 6/1/2000 | 8.68 | 459.96 |
| | | | 6/1/2001 | 8.63 | 460.01 |
| | | | 12/2/2002 | 9.30 | 459.34 |
| | | | 8/1/2003 | 9.63 | 459.01 |
| | | | 12/23/2003 | 10.05 | 458.59 |
| | | | 7/4/2004 | 7.46 | 461.18 |
| | | | 9/28/2004 | 8.73 | 459.91 |
| | 468.43 | 447.08 to 432.08 | 4/17/2005 | 8.48 | 459.95 |
| | | | 7/22/2005 | 9.72 | 458.71 |
| | | | 10/4/2005 | 10.41 | 458.02 |
| | | | 1/21/2006 | 11.80 | 456.63 |
| | | | 5/2/2006 | 10.94 | 457.49 |
| | | | 8/8/2006 | 10.56 | 457.87 |
| | | | 4/25/2007 | 8.58 | 459.85 |
| | | | 8/24/2007 | 7.99 | 460.44 |
| | | | 1/15/2008 | 9.24 | 459.19 |
| | | | 7/10/2008 | 9.60 | 458.83 |
| | | | 12/18/2008 | 10.96 | 457.47 |
| | | | 7/15/2009 | 10.20 | 458.23 |
| | 468.43 | 447.08 to 432.08 | 12/15/2009 | 8.16 | 460.27 |
| | | | 8/9/2010 | 9.16 | 459.27 |
| | | | 12/17/2010 | 9.96 | 458.47 |
| | | | 7/25/2011 | 9.95 | 458.48 |
| | | | 12/14/2011 | 10.60 | 457.83 |
| | | | 7/10/2012 | 11.64 | 456.79 |
| | | | 12/19/2012 | 11.58 | 456.85 |
| | | | 7/15/2013 | 11.30 | 457.13 |
| | | | 12/18/2013 | 10.92 | 457.51 |
| | | | 7/15/2014 | 11.22 | 457.21 |
| | | | 12/17/2014 | 12.09 | 456.34 |
| | | | 7/20/2015 | 9.93 | 458.50 |
| | | | 12/17/2015 | 10.19 | 458.24 |
| | | | 4/7/2016 | Well Plugged and Abandoned | |

**TABLE 4-2B**

**SUMMARY OF GROUNDWATER GAUGING DATA**
**HISTORICAL MONITORING WELLS - SWMU 136 SOUTH PLUME**
**2016 RAER**

**FORMER NAS DALLAS, TEXAS**
**PAGE 3 OF 4**

| Monitoring Well | Top of Casing [1] (ft msl) | Screened Interval (ft msl) | Date | Depth to Water [2] (ft bgs) | Groundwater Elevation (ft msl) |
|---|---|---|---|---|---|
| 508F05MW | 465.56 | 456.36 to 446.36 | 4/1/1998 | Well Installed | |
| | | | 5/1/1998 | 9.32 | 456.24 |
| | | | 8/1/1998 | 9.19 | 456.37 |
| | | | 2/1/1999 | 9.03 | 456.53 |
| | | | 9/1/1999 | 8.74 | 456.82 |
| | | | 6/1/2000 | 7.64 | 457.92 |
| | | | 6/1/2001 | 8.28 | 457.28 |
| | | | 12/2/2002 | 8.82 | 456.74 |
| | | | 8/1/2003 | 9.05 | 456.51 |
| | | | 12/23/2003 | 9.23 | 456.33 |
| | | | 7/4/2004 | 7.74 | 457.82 |
| | | | 9/29/2004 | 9.22 | 456.34 |
| | | | 4/25/2005 | Well Plugged and Abandoned | |
| 508F39MW | 460.80 | 454.80 to 444.80 | 8/14/2000 | Well Installed | |
| | | | 6/1/2001 | 5.77 | 455.03 |
| | | | 12/14/2002 | 5.80 | 455.00 |
| | | | 8/1/2003 | 6.48 | 454.32 |
| | | | 12/23/2003 | 6.85 | 453.95 |
| | | | 7/4/2004 | 4.60 | 456.20 |
| | | | 9/29/2004 | 2.77 | 458.03 |
| | | | 4/25/2005 | Well Plugged and Abandoned | |
| 508F43MW | 462.21 | 447.21 to 442.21 | 8/7/2000 | Well Installed | |
| | | | 6/1/2001 | 7.93 | 454.28 |
| | | | 12/14/2002 | 5.89 | 456.32 |
| | | | 8/1/2003 | 6.75 | 455.46 |
| | | | 12/23/2003 | 6.88 | 455.33 |
| | | | 7/4/2004 | 6.18 | 456.03 |
| | 462.10 | 447.10 to 442.10 | 4/17/2005 | 8.02 | 454.08 |
| | | | 7/22/2005 | 8.71 | 453.39 |
| | | | 10/4/2005 | 9.08 | 453.02 |
| | | | 1/21/2006 | 10.04 | 452.06 |
| | | | 5/2/2006 | 9.35 | 452.75 |
| | | | 8/8/2006 | 9.58 | 452.52 |
| | | | 4/25/2007 | 8.48 | 453.62 |
| | | | 8/24/2007 | 7.76 | 454.34 |
| | | | 1/15/2008 | 8.71 | 453.39 |
| | | | 7/10/2008 | 8.68 | 453.42 |
| | | | 12/18/2008 | 9.93 | 452.17 |
| | | | 7/15/2009 | 9.10 | 453.00 |
| | 462.08 | 447.08 to 442.08 | 12/15/2009 | 8.00 | 454.08 |
| | | | 8/9/2010 | 8.33 | 453.75 |
| | | | 12/17/2010 | 8.84 | 453.24 |
| | | | 7/25/2011 | 8.86 | 453.22 |
| | | | 12/14/2011 | 8.85 | 453.23 |
| | | | 7/10/2012 | 9.05 | 453.03 |
| | | | 12/19/2012 | 9.92 | 452.16 |
| | | | 7/15/2013 | 9.71 | 452.37 |
| | | | 12/18/2013 | 8.57 | 453.51 |
| | | | 7/15/2014 | 9.85 | 452.23 |
| | | | 12/17/2014 | 10.30 | 451.78 |
| | | | 7/20/2015 | 8.38 | 453.70 |
| | | | 12/17/2015 | 8.62 | 453.46 |
| | | | 4/7/2016 | Well Plugged and Abandoned | |

**TABLE 4-2B**

**SUMMARY OF GROUNDWATER GAUGING DATA
HISTORICAL MONITORING WELLS - SWMU 136 SOUTH PLUME
2016 RAER**

**FORMER NAS DALLAS, TEXAS
PAGE 4 OF 4**

| Monitoring Well | Top of Casing [1] (ft msl) | Screened Interval (ft msl) | Date | Depth to Water [2] (ft bgs) | Groundwater Elevation (ft msl) |
|---|---|---|---|---|---|
| **508F44MW** | 461.39 | 453.39 to 443.39 | 8/9/2000 | Well Installed | |
| | | | 6/20/2000 | NA | NA |
| | | | 6/1/2001 | NA | NA |
| | | | 12/14/2002 | Well Plugged and Abandoned | |
| **508F45MW** | 460.31 | 454.31 to 444.31 | 8/9/2000 | Well Installed | |
| | | | 6/20/2000 | NA | NA |
| | | | 6/1/2001 | NA | NA |
| | | | 12/14/2002 | Well Plugged and Abandoned | |
| **508F46MW** | 461.05 | 449.05 to 439.05 | 8/9/2000 | Well Installed | |
| | | | 6/1/2001 | 6.08 | 454.97 |
| | | | 12/14/2002 | 6.08 | 454.97 |
| | | | 8/1/2003 | 6.74 | 454.31 |
| | | | 12/23/2003 | 7.09 | 453.96 |
| | | | 7/4/2004 | 4.83 | 456.22 |
| | | | 9/29/2004 | 8.09 | 452.96 |
| | | | 4/25/2005 | Well Plugged and Abandoned | |
| **508F48MW** | 461.17 | 458.17 to 453.17 | 8/14/2000 | Well Installed | |
| | | | 6/1/2001 | 1.45 | 459.72 |
| | | | 12/2/2002 | 0.54 | 460.63 |
| | | | 8/1/2003 | 1.62 | 459.55 |
| | | | 12/23/2003 | 2.24 | 458.93 |
| | | | 7/4/2004 | 2.42 | 458.75 |
| | | | 9/29/2004 | Well Plugged and Abandoned | |
| **595C03MW** | 461.05 | 452.75 to 442.75 | 3/16/1998 | Well Installed | |
| | | | 5/1/1998 | 5.11 | 455.94 |
| | | | 8/1/1998 | 6.73 | 454.32 |
| | | | 2/1/1999 | 5.71 | 455.34 |
| | | | 9/1/1999 | 5.90 | 455.15 |
| | | | 6/1/2000 | 4.95 | 456.10 |
| | | | 6/1/2001 | 5.74 | 455.31 |
| | | | 12/2/2002 | 5.98 | 455.07 |
| | | | 8/1/2003 | 6.69 | 454.36 |
| | | | 12/23/2003 | 6.99 | 454.06 |
| | | | 7/4/2004 | 4.72 | 456.33 |
| | | | 9/29/2004 | 8.05 | 453.00 |
| | | | 4/25/2005 | Well Plugged and Abandoned | |

bgs - below ground surface
ft - feet
msl - mean sea level
NA - Not Available or Applicable (i.e., abandoned, not installed, not measured)
PCLE - Protective Concentration Level Exceedance
Note:
1 - All monitoring wells on-site were resurveyed in May 2005 in accordance with the Compliance Plan Requirements.
Depth to water measurements taken from the top of the riser.

# TABLE 4-3
# SUMMARY OF GROUNDWATER GAUGING DATA

**Table 4-3A**

**Summary of Geochemical Parameters Measured in Groundwater**
**SWMU 136 South Plume**
**2016 RAER**
**Former NAS Dallas, Texas**
**Page 1 of 2**

| Monitoring Well | Sampling Date | Sampling Round | SDG | Oxidation-Reduction Conditions | | | | | | | | Degradation Products | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Dissolved Oxygen[2] | Ferrous Iron[2] | Nitrate[3] | Nitrite[3] | ORP[1] | Phosphate[3] | Sulfate[3] | TOC[3] | Alkalinity[2] | Carbon Dioxide[2] | Chloride[3] | Ethane[3] | Ethene[3] | Methane[3] | pH[1] | Sulfide[3] |
| | | | Units | mg/L | mg/L | mg/L | mg/L | mV | mg/L | mg/L | mg/L | mg/L | mg/L | mg/L | ng/L | ng/L | µg/L | S.U. | mg/L |
| **Monitoring Wells Located Inside PCLE Zone** | | | | | | | | | | | | | | | | | | | |
| **508F04MW** | 9/28/1999 | Round 5 | DL324 | NA | NA | 2 U | 2 U | NA | 2 U | 508 | NA | NA | NA | 38.7 | NA | NA | NA | NA | NA |
| | 9/28/1999 | Round 5 | LGCY | 0.6 | 0.04 | NA | NA | -60.2 | NA | NA | NA | 582 | 223 | NA | NA | NA | NA | 7.11 | 2.20 |
| | 9/28/1999 | Round 5 | TTE11 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | 22,202 | 1,187 | 3,372 | NA | NA |
| | 6/26/2000 | Round 6 | DL344 | NA | NA | 0.5 U | 0.5 U | NA | 0.5 U | 650 | NA | NA | NA | 49.5 | NA | NA | NA | NA | NA |
| | 6/26/2000 | Round 6 | LGCY | 0.6 | 3 | NA | NA | -102.3 | NA | NA | NA | 450 | 33 | NA | NA | NA | NA | 6.84 | 0.01 U |
| | 1/11/2004 | Round 10 | C4A130231 | NA | NA | NA | NA | NA | NA | 544 | NA | NA | NA | 81.1 | NA | NA | NA | NA | NA |
| | 1/11/2004 | Round 10 | FIELD | 0.8 | 2 | NA | NA | -134.0 | NA | NA | NA | 250 | NA | NA | NA | NA | NA | 8.00 | 0 |
| | 10/11/2005 | Round 14 | CTO260-19 | NA | NA | 0.004 U | 0.003 U | NA | 0.014 J | 480 | 3 | NA | NA | 49 | NA | NA | NA | NA | 0.30 J |
| | 10/11/2005 | Round 14 | CTO260-20 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | 20,000 U | 20,000 U | 1,900 | NA | NA |
| | 10/11/2005 | Round 18 | FIELD_R14 | 0.8 | 2 | NA | NA | -165.0 | NA | NA | NA | 300 | 70 | NA | NA | NA | NA | 7.00 | NA |
| | 8/31/2007 | Round 18 | DALLASW003 | NA | NA | 0.05 U | 1.0 U | NA | 0.5 UL | 588 | 3.1 | NA | NA | 58.2 | 13,000 | 1700 L | 350 | NA | 0.80 UL |
| | 8/31/2007 | Round 22 | FIELD | 1 | 1.6 | NA | NA | -172.0 | NA | NA | NA | 350 | 60 | NA | NA | NA | NA | 7.01 | NA |
| | 7/17/2009 | Round 23 | F66749 | 1 | 2 | 0.05 U | 0.05 U | -142.8 | 0.026 J | 406 | 3.3 JL | 500 | 100 | 58.1 | 8,390 | 760 J | 2,150 | 6.91 | 0.60 UR |
| | 1/11/2011 | Round 25 | FIELD | NA | NA | NA | NA | -157.3 | NA | NA | NA | NA | NA | NA | NA | NA | NA | 7.46 | NA |
| | 7/28/2011 | Round 26 | F84702 | 0.3 | 1 | 0.25 R | 0.25 R | -106 | 0.02 U | 318 | 3.2 | 13 | 13 | 42.6 | 5,060 | 430 U | 1,780 | 6.93 | 0.3 U |
| | 1/10/2012 | Round 27 | F88817 | NA | NA | NA | NA | -128.1 | NA | NA | NA | NA | NA | NA | NA | NA | NA | 6.99 | NA |
| | 7/28/2012 | Round 28 | F94831 | NA | NA | NA | NA | -51.7 | NA | NA | NA | NA | NA | NA | NA | NA | NA | 7.06 | NA |
| | 1/8/2013 | Round 29 | - | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| | 7/16/2013 | Round 30 | FA6472 | 0.3 | 1.0 | 0.25 U | 0.25 U | -93.3 | 0.020 U | 347 | 3.2 | 700 | 35 | 46.0 | 5900 | 430 U | 2.070 | 7.18 | 0.61 JH |
| | 1/28/2014 | Round 31 | FA12826 | 0.37 | NA | NA | NA | -57.6 | NA | NA | NA | NA | NA | NA | NA | NA | NA | 7.09 | NA |
| | 7/22/2014 | Round 32 | 1407174 | 0.27 | 1.46 | 0.033 U | 0.033 U | -118 | 0.01 U | 219 | 3.55 | NA | 100 | 46 | 0.00938 | 0.001 U | 2.35 | 6.88 | 0.09 |
| | 1/22/2015 | Round 33 | 1501087 | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS |
| | 7/28/2015 | Round 34 | 1507213 | 0.51 | 1.58 | 0.033 U | 0.033 U | -115.9 | 0.01 U | 296 | 2.48 J | 667 | 100 | 33.5 | 6.22 | 0.001 U | 1,810 | 7.01 | 0.35 |
| | 1/20/2015 | Round 35 | 1601156 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| | 7/21/2016 | Round 36 | 1607165 | 0 | 1.08 | 0.033 U | 0.033 U | -126 | 0.01 U | 229 | 2.32 J | 597 | | 22 | 4.44 | 0.001 U | 745 | 7.27 | NA |

**Table 4-3A**

**Summary of Geochemical Parameters Measured in Groundwater**
**SWMU 136 South Plume**
**2016 RAER**
**Former NAS Dallas, Texas**
**Page 2 of 2**

| Monitoring Well | Sampling Date | Sampling Round | SDG | Oxidation-Reduction Conditions | | | | | | | | Degradation Products | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Dissolved Oxygen[2] | Ferrous Iron[2] | Nitrate[3] | Nitrite[3] | ORP[1] | Phosphate[3] | Sulfate[3] | TOC[3] | Alkalinity[2] | Carbon Dioxide[2] | Chloride[3] | Ethane[3] | Ethene[3] | Methane[3] | pH[1] | Sulfide[3] |
| | | | Units | mg/L | mg/L | mg/L | mg/L | mV | mg/L | mg/L | mg/L | mg/L | mg/L | mg/L | ng/L | ng/L | µg/L | S.U. | mg/L |
| **Monitoring Wells Located Outside the PCLE Zone** | | | | | | | | | | | | | | | | | | | |
| **508F28MW** | 7/13/1999 | Well Installed | | | | | | | | | | | | | | | | | |
| | 8/5/1999 | Round 5 | DL315 | NA | NA | 5 U | 5 U | NA | 5 UJ | 1660 | NA | NA | NA | 27.6 J | NA | NA | 2.7 | NA | NA |
| | 8/5/1999 | Round 5 | LGCY | 4 | 0.3 | NA | NA | 127.8 | NA | NA | NA | 380 | 232 | NA | NA | NA | NA | 7.06 | 0 U |
| | 8/5/1999 | Round 5 | TTE7 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | 34 | 395 | 3.874 | NA | NA |
| | 6/27/2000 | Round 6 | DL344 | NA | NA | 0.5 U | 0.5 U | NA | 0.5 U | 1130 | NA | NA | NA | 18 | NA | NA | NA | NA | NA |
| | 6/27/2000 | Round 6 | LGCY | 2 | 0.2 | NA | NA | 123.4 | NA | NA | NA | 450 | 60 | NA | NA | NA | NA | 6.71 | 0.01 U |
| | 1/13/2004 | Round 10 | C4A140117 | NA | NA | NA | NA | NA | NA | 808 | NA | NA | NA | 13.2 | NA | NA | NA | NA | NA |
| | 1/13/2004 | Round 10 | FIELD | 1 | 0.3 | NA | NA | -32.0 | NA | NA | NA | 500 | NA | NA | NA | NA | NA | 6.18 | 0 |
| | 8/31/2007 | Round 18 | DALLASW003 | NA | NA | 0.059 | 1.0 U | NA | 0.5 UL | 687 | 1.7 | NA | NA | 14.9 | 330 U | 330 U | 1.4 U | NA | 0.80 UL |
| | 8/31/2007 | Round 18 | FIELD | 0.9 | 0 | NA | NA | -150.0 | NA | NA | NA | 500 | 75 | NA | NA | NA | NA | 6.77 | NA |
| | 7/17/2009 | Round 22 | F66749 | 2 | 0 | 0.05 U | 0.05 U | 13.9 | 0.02 U | 614 | 1.8 JL | 500 | 70 | 12.5 | 320 U | 430 U | 0.29 J | 6.72 | 0.60 UR |
| | 1/11/2011 | Round 25 | FIELD | NA | NA | NA | NA | 29.2 | NA | NA | NA | NA | NA | NA | NA | NA | NA | 7.5 | NA |
| | 7/28/2011 | Round 26 | F84702 | 0.6 | 0.1 | 0.56 JL | 0.25 R | 25.3 | 0.11 | 555 | 2.1 | 150 | 12 | 9 | 320 U | 430 U | 0.16 U | 6.97 | 0.3 U |
| | 1/11/2012 | Round 27 | F88817 | NA | NA | NA | NA | 157.5 | NA | NA | NA | NA | NA | NA | NA | NA | NA | 7.13 | NA |
| | 7/28/2012 | Round 28 | F94831 | NA | NA | NA | NA | -55.6 | NA | NA | NA | NA | NA | NA | NA | NA | NA | 6.45 | NA |
| | 1/8/2013 | Round 29 | - | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| | 7/16/2013 | Round 30 | FA6472 | 0.4 | 0.1 | 0.25 U | 0.25 U | 136.9 | 0.17 JL | 481 | 2.3 | 500 | 70 | 9.2 J | 320 U | 430 U | 1.3 | 6.75 | 0.22 U |
| | 1/28/2014 | Round 31 | FA12826 | 0.66 | NA | NA | NA | 68 | NA | NA | NA | NA | NA | NA | NA | NA | NA | 6.99 | NA |
| | 7/22/2014 | Round 32 | 1407174 | 1.31 | 0.22 | 0.072 J | 0.66 U | 322.5 | 0.01 U | 484 | 2.41 J | NA | 95 | 8.27 | 0.001 U | 0.001 U | 0.001 U | 6.83 | 0.05 |
| | 1/22/2015 | Round 33 | 1501087 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| | 7/28/2015 | Round 34 | 1507213 | 1.83 | 0 | 0.25 U | 0.25 U | 0.25 U | 0.01 U | 3,150 | 1.93 J | 445 | 80 | 170 | 0.001 U | 0.001 U | 1.36 | 6.41 | 0.02 |
| | 1/20/2015 | Round 35 | 1601156 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| | 7/21/2016 | Round 36 | 1607165 | 0 | 0.12 | 0.0803 J | 0.033 U | 129 | 0.01 U | 415 | 1.59 J | 597 | | 7.73 | 0.001 U | 0.001 U | 1 U | 7.07 | NA |
| **508F98MW** | 4/5/2016 | Well Installed | | | | | | | | | | | | | | | | | |
| | 8/2/2016 | Round 36 | 1607216 | 0 | 0.09 | 0.25 U | 0.25 U | 54 | 0.01 U | 1,670 | 1.43 J | 568 | NA | 84.1 | 0.001 U | 0.001 U | 1.52 J | 7.03 | NA |

mg/L - milligrams per liter
mV - millivolts
NA - Not Analyzed
ng/L - nanograms per liter
ORP - Oxidation/reduction potential

TOC - Total Organic Carbon
mg/L - micrograms per liter
S.U. - Standard Units
SDG - Sample Delivery Group
PCLE - Protective Concentration Level Exceedance

Notes:
1. Field measurement, Meter
2. Field measurement, Test Kit
3. Analytical Laboratory result

Analytical Result Qualifiers:
J, K, L - Indicates that the chemical was detected; however, the associated numerical result may not be a precise representation of the amount that is actually present in the sample. The laboratory reported concentration is considered to be bias unknown (J), high (K), or low (L)
U - Indicates that the sample was not detected at the numerical detection limit (sample-specific quantitation limit) noted. Nondetected results from the laboratory are reported in this manner. This qualifier is added to a positive result (reported by the laboratory) if the detected

**Table 4-3B**

**Summary of Geochemical Parameters Measured in Groundwater**
**Historical Monitoring Wells — SWMU 136 South Plume**
**2016 RAER**

**Former NAS Dallas, Texas**
**Page 1 of 4**

| Monitoring Well | Sampling Date | SDG | Oxidation-Reduction Conditions | | | | | | | | Degradation Products | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Dissolved Oxygen[2] | Ferrous Iron[2] | Nitrate[3] | Nitrite[3] | ORP[1] | Phosphate[3] | Sulfate[3] | TOC[3] | Alkalinity[2] | Carbon Dioxide[2] | Chloride[3] | Ethane[3] | Ethene[3] | Methane[3] | pH[1] | Sulfide[3] |
| | | Units | mg/L | mg/L | mg/L | mg/L | mV | mg/L | mg/L | mg/L | mg/L | mg/L | mg/L | mg/L | ng/L | mg/L | S.U. | mg/L |
| **Monitoring Wells Located Inside PCLE Zone** | | | | | | | | | | | | | | | | | | |
| **50804MW** | 9/13/1999 | DL321 | NA | NA | 2 U | 2 U | NA | 2 UJ | 641 J | NA | NA | NA | 31.3 | NA | NA | NA | NA | NA |
| | 9/13/1999 | LGCY | 0.4 | 2 | NA | NA | -28.9 | NA | NA | NA | 504 | 249 | NA | NA | NA | NA | 7.26 | 0 U |
| | 9/13/1999 | TTE11 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | 3,414 | 59 | 429.4 | NA | NA |
| | 6/23/2000 | DL342 | NA | NA | 0.1 U | 0.1 U | NA | 0.1 U | 676 | NA | NA | NA | 30.7 | NA | NA | NA | NA | NA |
| | 6/23/2000 | LGCY | 0.6 | 1.6 | NA | NA | -49.9 | NA | NA | NA | 450 | 27 | NA | NA | NA | NA | 7.02 | 0.02 |
| | 12/18/2003 | C3L190206 | NA | NA | NA | NA | NA | NA | 1270 | NA | NA | NA | 54.1 | NA | NA | NA | NA | NA |
| | 12/18/2003 | FIELD | 0.8 | 1.2 | NA | NA | -38.0 | NA | NA | NA | 350 | NA | NA | NA | NA | NA | 7.98 | 0 |
| | 10/18/2005 | CTO260-21, 22 | NA | NA | NA | NA | NA | 0.05 U | 1500 | 3.6 | NA | NA | 43 | 6,200 J | 10,000 U | 270 | NA | 1.20 |
| | 10/18/2005 | FIELD_R14 | 0.8 | 2 | NA | NA | -115.0 | NA | NA | NA | 350 | 70 | NA | NA | NA | NA | 6.80 | NA |
| | 8/31/2007 | DALLASW003 | NA | NA | 0.05 U | 1.0 U | NA | 0.5 UL | 1040 | 3.1 | NA | NA | 34.6 | 8,800 | 610 J | 62 | NA | 0.80 |
| | 8/31/2007 | FIELD | 1 | 1 | NA | NA | -121.0 | NA | NA | NA | 200 | 60 | NA | NA | NA | NA | 6.90 | NA |
| | 7/17/2009 | F66749 | 1 | 1 | 0.05 U | 0.05 U | -61.4 | 0.02 U | 571 | 2.6 JL | 400 | 40 | 28.1 | 4,170 | 430 U | 470 | 7.00 | 0.60 UR |
| | 1/12/2010 | F70772 | NA | NA | NA | NA | -76.0 | NA | NA | NA | NA | NA | NA | NA | NA | NA | 6.81 | NA |
| | 7/14/2010 | F75196 | NA | NA | NA | NA | -156.8 | NA | NA | NA | NA | NA | NA | NA | NA | NA | 7.24 | NA |
| | 1/11/2011 | FIELD | NA | NA | NA | NA | -84.6 | NA | NA | NA | NA | NA | NA | NA | NA | NA | 7.94 | NA |
| | 7/28/2011 | F84702 | 0.3 | 2 | 0.25 U | 0.25 U | -64.4 | 0.02 U | 473 | 1.9 | 400 | 20 | 21.7 | 1400 | 430 U | 195 J | 6.95 | 0.3 U |
| | 1/10/2012 | F88817 | NA | NA | NA | NA | -89.6 | NA | NA | NA | NA | NA | NA | NA | NA | NA | 7.17 | NA |
| | 7/28/2012 | F94831 | NA | NA | NA | NA | -92.3 | NA | NA | NA | NA | NA | NA | NA | NA | NA | 6.94 | NA |
| | 1/8/2013 | - | NA | NA | NA | NA | -83.2 | NA | NA | NA | NA | NA | NA | NA | NA | NA | 7.23 | NA |
| | 7/16/2013 | FA6472 | 0.2 | 1.0 | 0.25 U | 0.31 J | -59.7 | 0.13 | 301 | 1.5 | 400 | 30 | 16.1 | 320 | 430 | 0.268 | 6.92 | 1.4 |
| | 1/28/2014 | FA12826 | 0.72 | NA | NA | NA | -73.5 | NA | NA | NA | NA | NA | NA | NA | NA | NA | 7.21 | NA |
| | 7/22/2014 | 1407174 | 0.2 | 0.63 | 0.033 U | 0.033 UJL | -89.1 | 0.01 U | 239 | 1.52 J | NA | 40 | 11.6 | 0.001 U | 0.001 U | 0.138 JH | 7.13 | 0.03 |
| | 1/23/2015 | 1501096 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| | 7/28/2015 | 1507213 | 0.57 | 0.52 | 0.25 U | 0.25 U | -84.3 | 0.01 U | 310 | 1.2 U | 366 | 55 | 18.5 | 0.001 U | 0.001 U | 193 | 7 | 0.05 |
| | 4/7/2016 | Well Plugged and Abandoned | | | | | | | | | | | | | | | | |
| **50805MW** | 9/13/1999 | Round 5 | NA | NA | 2 U | 2 U | NA | 2 UJ | 281 J | NA | NA | NA | 250 | NA | NA | NA | NA | NA |
| | 9/13/1999 | Round 5 | 0.4 | 2 | NA | NA | -78.3 | NA | NA | NA | 494 | 189 | NA | NA | NA | NA | 7.09 | 0 U |
| | 9/13/1999 | Round 5 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | 49,996 | 5 U | 2,540 | NA | NA |
| | 6/23/2000 | Round 6 | NA | NA | 0.09 | 0.1 U | NA | 0.1 U | 294 | NA | NA | NA | 272 | NA | NA | NA | NA | NA |
| | 6/23/2000 | Round 6 | 0.6 | 1.8 | NA | NA | -122.5 | NA | NA | NA | 320 | 27 | NA | NA | NA | NA | 7.48 | 0.01 U |
| | 1/13/2004 | Round 10 | NA | NA | NA | NA | NA | NA | 129 L | NA | NA | NA | 341 | NA | NA | NA | NA | NA |
| | 1/13/2004 | Round 10 | 0.6 | 1.2 | NA | NA | -240.0 | NA | NA | NA | 300 | NA | NA | NA | NA | NA | 7.44 | 0 |
| | 10/11/2005 | Round 14 | NA | NA | 0.004 U | 0.003 U | NA | 0.068 | 76 | 5.8 | NA | NA | 270 | 50,000 U | 50,000 U | 4,600 | NA | 0.75 J |
| | 10/11/2005 | Round 14 | 2 | 2.4 | NA | NA | -153.0 | NA | NA | NA | 350 | 30 | NA | NA | NA | NA | 7.02 | NA |
| | 8/31/2007 | Round 18 | NA | NA | 0.05 U | 1.0 U | NA | 0.5 UL | 2.1 | 14.6 | NA | NA | 102 | 51,000 | 330 U | 3,900 | NA | 0.80 UL |
| | 8/31/2007 | Round 18 | 1 | 1.2 | NA | NA | -210.0 | NA | NA | NA | 500 | 27 | NA | NA | NA | NA | 7.10 | NA |
| | 7/17/2009 | Round 22 | 1 | 0.9 | 0.05 U | 0.05 U | -297.0 | 0.23 | 40.6 | 14.7 JL | 600 | 45 | 48.5 | 39,500 | 430 U | 4,400 J | 7.10 | 9.50 JL |
| | 1/12/2010 | Round 23 | NA | NA | NA | NA | -246.9 | NA | NA | NA | NA | NA | NA | NA | NA | NA | 6.95 | NA |
| | 7/14/2010 | Round 24 | NA | NA | NA | NA | -176.6 | NA | NA | NA | NA | NA | NA | NA | NA | NA | 7.14 | NA |
| | 1/11/2011 | Round 25 | NA | NA | NA | NA | NS | NA | NA | NA | NA | NA | NA | NA | NA | NA | NS | NA |
| | 7/28/2011 | Round 26 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| | - | Round 27 | Well Not Sampled - Covered | | | | | | | | | | | | | | | |
| | - | Round 28 | Well Not Sampled - Covered | | | | | | | | | | | | | | | |
| | - | Round 29 | Well Not Sampled - Covered | | | | | | | | | | | | | | | |
| | - | Round 30 | Well Not Sampled - Covered | | | | | | | | | | | | | | | |
| | 1/28/2014 | Round 31 | Well Not Sampled - Covered | | | | | | | | | | | | | | | |
| | 7/22/2014 | Round 32 | Well Not Sampled - Covered | | | | | | | | | | | | | | | |
| | 1/22/2015 | Round 33 | Well Not Sampled - Covered | | | | | | | | | | | | | | | |
| | 7/28/2015 | Round 34 | Well Not Sampled - Covered | | | | | | | | | | | | | | | |
| | 4/28/2016 | Well Destroyed | | | | | | | | | | | | | | | | |

**Table 4-3B**

**Summary of Geochemical Parameters Measured in Groundwater**
**Historical Monitoring Wells — SWMU 136 South Plume**
**2016 RAER**

**Former NAS Dallas, Texas**
**Page 2 of 4**

| Monitoring Well | Sampling Date | SDG | Oxidation-Reduction Conditions | | | | | | | | Degradation Products | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Dissolved Oxygen[2] | Ferrous Iron[2] | Nitrate[3] | Nitrite[3] | ORP[1] | Phosphate[3] | Sulfate[3] | TOC[3] | Alkalinity[2] | Carbon Dioxide[2] | Chloride[3] | Ethane[3] | Ethene[3] | Methane[3] | pH[1] | Sulfide[3] |
| | | Units | mg/L | mg/L | mg/L | mg/L | mV | mg/L | mg/L | mg/L | mg/L | mg/L | mg/L | mg/L | ng/L | mg/L | S.U. | mg/L |
| 508F47MW | 8/14/2000 | | Well Installed | | | | | | | | | | | | | | | |
| | 9/6/2000 | Round 6 | NA | NA | 0.5 U | 0.5 U | NA | 0.5 U | 290 | NA | NA | NA | 92.3 | NA | NA | NA | NA | NA |
| | 9/6/2000 | Round 6 | 1.5 | 0.2 | NA | NA | 302.9 | NA | NA | NA | 500 | 65 | NA | NA | NA | NA | 6.90 | 0.01 U |
| | 12/17/2003 | Round 10 | NA | NA | NA | NA | NA | NA | 460 L | NA | NA | NA | 102 | NA | NA | NA | NA | NA |
| | 12/17/2003 | Round 10 | 0.8 | 0.2 | NA | NA | -40.0 | NA | NA | NA | 350 | NA | NA | NA | NA | NA | 6.48 | 0 |
| | 10/11/2005 | Round 14 | NA | NA | 0.004 U | 0.003 U | NA | 0.013 J | 420 | 2 | NA | NA | 78 | NA | NA | NA | NA | 0.15 J |
| | 10/11/2005 | Round 14 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | 10,000 U | 10,000 U | 170 | NA | NA |
| | 10/11/2005 | Round 14 | 0.7 | 0.9 | NA | NA | -122.0 | NA | NA | NA | 350 | 50 | NA | NA | NA | NA | 6.89 | NA |
| | 8/31/2007 | Round 18 | NA | NA | 0.063 | 1.0 U | NA | 0.5 UL | 400 | 1.4 | NA | NA | 63.2 | 330 U | 330 UL | 75 | NA | 0.80 UL |
| | 8/31/2007 | Round 18 | 0.4 | 0.4 | NA | NA | -75.0 | NA | NA | NA | 350 | 60 | NA | NA | NA | NA | 6.90 | NA |
| | 7/17/2009 | Round 22 | 0.4 | 0.4 | 0.14 | I UR | -9.1 | 0.02 U | 894 | 4.3 JL | 400 | 70 | 266 | 460 J | 430 U | 160 | 6.90 | 0.60 UR |
| | 1/11/2011 | Round 25 | NA | NA | NA | NA | 20.0 | NA | NA | NA | NA | NA | NA | NA | NA | NA | 7.51 | NA |
| | 7/28/2011 | Round 26 | 1 | 0.3 | 0.5 U | 0.5 U | -119.3 | 0.15 | 529 | 2.6 | 100 | 0 | 163 | 320 U | 430 U | 171 | 6.98 | 0.3 U |
| | 1/10/2012 | Round 27 | NA | NA | NA | NA | 103 | NA | NA | NA | NA | NA | NA | NA | NA | NA | 6.93 | NA |
| | 7/28/2012 | Round 28 | NA | NA | NA | NA | -1.1 | NA | NA | NA | NA | NA | NA | NA | NA | NA | 6.74 | NA |
| | 1/8/2013 | Round 29 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| | 7/16/2013 | Round 30 | 0.6 | 0 | 3.2 J | 2.5 U | 131.4 | 0.13 | 3310 | 4.9 | 300 | 40 | 304 | 320 U | 430 U | 0.66 | 6.38 | 0.22 U |
| | 1/28/2014 | Round 31 | 0.6 | NA | NA | NA | 48.8 | NA | NA | NA | NA | NA | NA | NA | NA | NA | 6.83 | NA |
| | 7/22/2014 | Round 32 | 0.62 | 0.51 | 0.06 J | 0.66 U | 339.1 | 0.01 U | 984 | 2.75 J | NA | 50 | 217 | 0.001 U | 0.001 U | 0.0825 | 6.77 | 0.07 |
| | 1/22/2015 | Round 33 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| | 7/28/2015 | Round 34 | 0.63 | 0.51 | 0.5 U | 0.5 U | -48.9 | 0.01 U | 941 | 2.17 J | 569 | 115 | 207 | 0.001 U | 0.001 U | 253 | 6.77 | 0.06 |
| | 4/28/2016 | | Well Destroyed | | | | | | | | | | | | | | | |

**Table 4-3B**

**Summary of Geochemical Parameters Measured in Groundwater**
**Historical Monitoring Wells — SWMU 136 South Plume**
**2016 RAER**

**Former NAS Dallas, Texas**
**Page 3 of 4**

| Monitoring Well | Sampling Date | SDG | Oxidation-Reduction Conditions | | | | | | | | Degradation Products | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Dissolved Oxygen[2] | Ferrous Iron[2] | Nitrate[3] | Nitrite[3] | ORP[1] | Phosphate[3] | Sulfate[3] | TOC[3] | Alkalinity[2] | Carbon Dioxide[2] | Chloride[3] | Ethane[3] | Ethene[3] | Methane[3] | pH[1] | Sulfide[3] |
| | | Units | mg/L | mg/L | mg/L | mg/L | mV | mg/L | mg/L | mg/L | mg/L | mg/L | mg/L | mg/L | ng/L | mg/L | S.U. | mg/L |
| **Monitoring Wells Located Outside PCLE Zone** | | | | | | | | | | | | | | | | | | |
| **508F05MW** | 4/1/1998 | Well Installed | | | | | | | | | | | | | | | | |
| | 9/28/1999 | DL324 | NA | NA | 2 U | 2 U | NA | 2 U | 395 | NA | NA | NA | 113 | NA | NA | NA | NA | NA |
| | 9/28/1999 | LGCY | 0.6 | 4.2 | NA | NA | -48.3 | NA | NA | NA | 604 | 351 | NA | NA | NA | NA | 6.72 | 0.025 |
| | 9/28/1999 | TTE11 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | 29.262 | 0.135 | 1225 | NA | NA |
| | 6/23/2000 | DL342 | NA | NA | 0.1 U | 0.05 | NA | 0.1 U | 340 | NA | NA | NA | 140 | NA | NA | NA | NA | NA |
| | 6/23/2000 | LGCY | 0.6 | 3 | NA | NA | -80.5 | NA | NA | NA | 400 | 60 | NA | NA | NA | NA | 6.66 | 0.01 U |
| | 1/11/2004 | C4A130231 | NA | NA | NA | NA | NA | NA | 207 | NA | NA | NA | 130 | NA | NA | NA | NA | NA |
| | 1/11/2004 | FIELD | 1 | 2.6 | NA | NA | -76 | NA | NA | NA | 250 | NA | NA | NA | NA | NA | 7.51 | 0 |
| | 4/25/2005 | Well Abandoned | | | | | | | | | | | | | | | | |
| **508F39MW** | 8/14/2000 | Well Installed | | | | | | | | | | | | | | | | |
| | 9/19/2000 | DL360 | NA | NA | 0.5 U | 0.5 U | NA | 0.5 U | 217 | NA | NA | NA | 80.1 | NA | NA | NA | NA | NA |
| | 9/19/2000 | UNKNOWN | 5 | 0.2 | NA | NA | 303.8 | NA | NA | NA | 410 | 70 | NA | NA | NA | NA | 6.82 | 0.01 U |
| | 6/18/2001 | DL363 | NA | NA | 0.10 U | 0.10 U | NA | 0.035 U | 175 | NA | NA | NA | 66.8 | NA | NA | NA | NA | NA |
| | 6/18/2001 | FIELD | 0.8 | 0.2 | NA | NA | 95.6 | NA | NA | NA | 600 | 35 | NA | NA | NA | NA | 6.92 | 0.01 U |
| | 1/22/2003 | 230152 | NA | NA | 0.05 U | 0.05 U | NA | 0.5 U | 196 | NA | NA | NA | 115 | NA | NA | NA | NA | NA |
| | 1/22/2003 | FIELD | 1 | 0.2 | NA | NA | 493 | NA | NA | NA | 500 | 45 | NA | NA | NA | NA | 7.07 | 0.01 U |
| | 12/17/2003 | C3L180179 | NA | NA | NA | NA | NA | NA | 311 L | NA | NA | NA | 121 | NA | NA | NA | NA | NA |
| | 12/17/2003 | FIELD | 1 | 0 | NA | NA | 475 | NA | NA | NA | 325 | NA | NA | NA | NA | NA | 6.45 | 0 |
| | 4/25/2005 | Well Abandoned | | | | | | | | | | | | | | | | |
| **508F43MW** | 8/7/2000 | Well Installed | | | | | | | | | | | | | | | | |
| | 8/21/2000 | DL356 | NA | NA | 0.03 U | 0.5 U | NA | 2.5 U | 6430 | NA | NA | NA | 582 | NA | NA | NA | NA | NA |
| | 8/21/2000 | LGCY | 6 | 0.2 | NA | NA | 278.3 | NA | NA | NA | 70 | 30 | NA | NA | NA | NA | 6.96 | 0.01 U |
| | 12/17/2003 | C3L180179 | NA | NA | NA | NA | NA | NA | 3790 L | NA | NA | NA | ` | NA | NA | NA | NA | NA |
| | 12/17/2003 | FIELD | 2 | 2.6 | NA | NA | 9.0 | NA | NA | NA | 175 | NA | NA | NA | NA | NA | 7.74 | 0 |
| | 8/31/2007 | DALLASW003 | NA | NA | 0.05 U | 1.0 U | NA | 0.5 UL | 5300 | 2 | NA | NA | 392 | 330 U | 330 UL | 3.1 U | NA | 0.80 UL |
| | 8/31/2007 | FIELD | 1 | 1.5 | NA | NA | -52.0 | NA | NA | NA | 350 | 80 | NA | NA | NA | NA | 6.75 | NA |
| | 7/16/2009 | F66749 | 1 | 0.6 | 0.05 | 0.5 UR | 28.5 | 0.033 J | 3350 | 1.9 JL | 400 | 80 | 391 | 320 U | 430 U | 0.54 | 6.58 | 0.60 UR |
| | 1/11/2011 | FIELD | NA | NA | NA | NA | 10.2 | NA | NA | NA | NA | NA | NA | NA | NA | NA | 8.13 | NA |
| | 7/28/2011 | F84702 | 1 | 0.6 | 2.5 R | 0.5 R | -10.6 | 0.21 | 4820 | 2.8 | 150 | 12 | 387 | 320 U | 430 U | 0.43 J | 6.97 | 0.3 U |
| | 1/11/2012 | F88817 | NA | NA | NA | NA | -78.8 | NA | NA | NA | NA | NA | NA | NA | NA | NA | 6.88 | NA |
| | 7/28/2012 | F94831 | NA | NA | NA | NA | 2.8 | NA | NA | NA | NA | NA | NA | NA | NA | NA | 6.82 | NA |
| | 1/8/2013 | - | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| | 7/16/2013 | FA6472 | 0.6 | 1 | 0.50 U | 0.50 U | -25.7 | 0.020 U | 1130 | 2.3 | 300 | 25 | 298 | 320 U | 430 U | 155 | 6.94 | 0.22 U |
| | 1/28/2014 | FA12826 | 0.39 | NA | NA | NA | -14.6 | NA | NA | NA | NA | NA | NA | NA | NA | NA | 6.89 | NA |
| | 7/21/2014 | 1407162 | 0.81 | 1.52 | 0.033 U | 0.825 U | 267.9 | 0.0397 J | 4750 | 2.5 J | NA | 60 | 458 | 0.001 U | 0.001 U | 0.001 U | 7 | 0.31 |
| | 1/22/2015 | 1501087 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| | 7/28/2015 | 1507213 | 0.61 | 0.18 | 0.033 U | 0.825 U | 26 | 0.033 J | 4,520 | 2.45 J | 428 | 100 | 327 | 0.001 U | 0.001 U | 1.64 | 6.84 | 0.02 |
| | 4/7/2016 | Well Plugged and Abandoned | | | | | | | | | | | | | | | | |
| **508F44MW** | 9/6/2000 | DL359 | NA | NA | 0.5 U | 0.5 U | NA | 0.5 U | 467 | NA | NA | NA | 230 | NA | NA | NA | NA | NA |
| | 9/6/2000 | UNKNOWN | 0.6 | 0.2 | NA | NA | -60 | NA | NA | NA | 400 | 80 | NA | NA | NA | NA | 6.9 | 0.01 U |
| **508F45MW** | 9/6/2000 | DL359 | NA | NA | 0.5 U | 0.5 U | NA | 0.5 U | 990 | NA | NA | NA | 308 | NA | NA | NA | NA | NA |
| | 9/6/2000 | UNKNOWN | 1 | 0.2 | NA | NA | -67.4 | NA | NA | NA | 250 | 115 | NA | NA | NA | NA | 6.98 | 0.01 U |
| **508F46MW** | 8/9/2000 | Well Installed | | | | | | | | | | | | | | | | |
| | 9/6/2000 | DL359 | NA | NA | 0.5 U | 0.5 U | NA | 5 U | 4700 | NA | NA | NA | 227 | NA | NA | NA | NA | NA |
| | 9/6/2000 | UNKNOWN | 4 | 0.2 | NA | NA | 311.7 | NA | NA | NA | 350 | 70 | NA | NA | NA | NA | 6.91 | 0.01 U |
| | 12/17/2003 | C3L180179 | NA | NA | NA | NA | NA | NA | 4370 L | NA | NA | NA | 193 | NA | NA | NA | NA | NA |
| | 12/17/2003 | FIELD | 2 | 0.2 | NA | NA | 17 | NA | NA | NA | 250 | NA | NA | NA | NA | NA | 6.35 | 0 |
| | 4/25/2005 | Well Abandoned | | | | | | | | | | | | | | | | |
| **508F48MW** | 12/17/2003 | C3L180179 | NA | NA | NA | NA | NA | NA | 562 L | NA | NA | NA | 248 | NA | NA | NA | NA | NA |
| | 12/17/2003 | FIELD | 1 | 0 | NA | NA | 73 | NA | NA | NA | 475 | NA | NA | NA | NA | NA | 6.62 | 0 |
| | 4/25/2005 | Well Abandoned | | | | | | | | | | | | | | | | |

**Table 4-3B**

**Summary of Geochemical Parameters Measured in Groundwater**
**Historical Monitoring Wells — SWMU 136 South Plume**
**2016 RAER**

**Former NAS Dallas, Texas**
**Page 4 of 4**

| Monitoring Well | Sampling Date | SDG | Oxidation-Reduction Conditions | | | | | | | | Degradation Products | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Dissolved Oxygen[2] | Ferrous Iron[2] | Nitrate[3] | Nitrite[3] | ORP[1] | Phosphate[3] | Sulfate[3] | TOC[3] | Alkalinity[2] | Carbon Dioxide[2] | Chloride[3] | Ethane[3] | Ethene[3] | Methane[3] | pH[1] | Sulfide[3] |
| | | Units | mg/L | mg/L | mg/L | mg/L | mV | mg/L | mg/L | mg/L | mg/L | mg/L | mg/L | mg/L | ng/L | mg/L | S.U. | mg/L |
| 595C03MW | 3/16/1998 | | Well Installed | | | | | | | | | | | | | | | |
| | 10/8/1999 | DL327 | NA | NA | 2 U | 2 U | NA | 2 UJ | 301 | NA | NA | NA | 42.8 | NA | NA | NA | NA | NA |
| | 10/8/1999 | LGCY | 0.4 | 3.4 | NA | NA | -49.9 | NA | NA | NA | 552 | 319 | NA | NA | NA | NA | 6.96 | 0 U |
| | 10/8/1999 | TTE12 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | 3.817 | 0.187 | 476.5 | NA | NA |
| | 6/27/2000 | DL345 | NA | NA | 0.5 U | 0.5 U | NA | 0.5 U | 326 J | NA | NA | NA | 59.3 | NA | NA | NA | NA | NA |
| | 6/27/2000 | LGCY | 2 | 3.4 | NA | NA | -69.1 | NA | NA | NA | 500 | 60 | NA | NA | NA | NA | 6.7 | 0.01 U |
| | 6/12/2001 | DL363 | NA | NA | 0.10 U | 0.10 U | NA | 0.50 U | 319 | NA | NA | NA | 70.6 | NA | NA | NA | NA | NA |
| | 6/12/2001 | FIELD | 0.35 | 4 | NA | NA | 4.9 | NA | NA | NA | 690 | 60 | NA | NA | NA | NA | 7.04 | 0.01 U |
| | 1/22/2003 | 230152 | NA | NA | 0.05 U | 0.05 U | NA | 0.5 U | 461 | NA | NA | NA | 111 | NA | NA | NA | NA | NA |
| | 1/22/2003 | FIELD | 0.6 | 4 | NA | NA | -90 | NA | NA | NA | 400 | 50 | NA | NA | NA | NA | 7.12 | 0.01 U |
| | 12/17/2003 | C3L180179 | NA | NA | NA | NA | NA | NA | 685 L | NA | NA | NA | 145 | NA | NA | NA | NA | NA |
| | 12/17/2003 | FIELD | 1 | 0 | NA | NA | -100 | NA | NA | NA | 300 | NA | NA | NA | NA | NA | 6.34 | 0 |
| | 4/25/2005 | | Well Abandoned | | | | | | | | | | | | | | | |
| 508F23MW | 8/27/2007 | DALLASW002 | NA | NA | 0.05 | 1.0 UJ | NA | 0.5 U | 3280 | 4.5 | NA | NA | 426 | 330 U | 1,000 | 210 | NA | 0.8 U |
| | 8/27/2007 | FIELD | 1 | 0 | NA | NA | -33 | NA | NA | NA | 400 | 80 | NA | NA | NA | NA | 6.67 | NA |
| 60-19 | 9/23/1999 | DL324 | NA | NA | 10 U | 10 U | NA | 10 U | 3580 | NA | NA | NA | 254 | NA | NA | NA | NA | NA |
| | 9/23/1999 | LGCY | 0.6 | 1 | NA | NA | 118.0 | NA | NA | NA | 286 | 146 | NA | NA | NA | NA | 6.94 | 0 U |
| | 9/23/1999 | TTE11 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | 8 | 72 | 6.12 | NA | NA |
| | 7/7/2000 | DL348 | NA | NA | 0.5 U | 0.5 U | NA | 2.5 U | 3300 | NA | NA | NA | 295 | NA | NA | NA | NA | NA |
| | 7/7/2000 | LGCY | 0.8 | 0.8 | NA | NA | -8.7 | NA | NA | NA | 300 | 23 | NA | NA | NA | NA | 7.13 | 0.01 U |
| | 12/21/2003 | C3L230193 | NA | NA | NA | NA | NA | NA | 3600 | NA | NA | NA | 295 J | NA | NA | NA | NA | NA |
| | 12/21/2003 | FIELD | 1.5 | 0.9 | NA | NA | 15.0 | NA | NA | NA | 350 | NA | NA | NA | NA | NA | 6.83 | 0 |
| | 8/31/2007 | DALLASW003 | NA | NA | 0.05 U | 1.0 U | NA | 0.5 UL | 3360 | 1.1 | NA | NA | 306 | 330 U | 330 UL | 7.9 U | NA | 0.80 UL |
| | 8/31/2007 | FIELD | 1 | 0 | NA | NA | -160.0 | NA | NA | NA | 350 | 0 | NA | NA | NA | NA | 7.46 | NA |
| | 7/17/2009 | F66749 | NR | 0.7 | 0.05 U | 0.25 UR | -214.1 | 0.02 U | 2670 | 2 | 190 | 18 | 289 | 320 U | 64,000 J | 4.36 | 9.12 | 0.60 UR |
| | 1/12/2010 | F70772 | NA | NA | NA | NA | 20.3 | NA | NA | NA | NA | NA | NA | NA | NA | NA | 11.67 | NA |
| | 7/14/2010 | F75196 | NA | NA | NA | NA | -221.6 | NA | NA | NA | NA | NA | NA | NA | NA | NA | 11.41 | NA |
| | 1/11/2011 | FIELD | NA | NA | NA | NA | -81.4 | NA | NA | NA | NA | NA | NA | NA | NA | NA | 7.73 | NA |
| | 7/28/2011 | F84702 | 0.5 | 3 | 0.48 JL | 0.25 R | -59.4 | 0.02 U | 3790 | 1.1 | 400 | 60 | 308 | 320 U | 430 U | 3,940 | 6.87 | 0.44 |
| | 1/11/2012 | F88817 | NA | NA | NA | NA | -6.9 | NA | NA | NA | NA | NA | NA | NA | NA | NA | 6.94 | NA |
| | 7/28/2012 | F94831 | NA | NA | NA | NA | -79.9 | NA | NA | NA | NA | NA | NA | NA | NA | NA | 7.07 | NA |
| | 1/8/2013 | - | NA | NA | NA | NA | -42.1 | NA | NA | NA | NA | NA | NA | NA | NA | NA | 7.32 | NA |
| | 7/16/2013 | FA6472 | 0.8 | 1.0 | 2.5 U | 2.5 U | -54.4 | 0.020 U | 3300 | 1.2 U | 250 | 35 | 285 | 320 U | 430 U | 6.3 | 7.18 | 0.22 U |
| | 1/28/2014 | FA12826 | 0.6 | NA | NA | NA | 12 | NA | NA | NA | NA | NA | NA | NA | NA | NA | 6.97 | NA |
| | 7/17/2014 | 1407130 | 0.54 | NA | 0.033 U | 0.66 U | -49.1 | 0.01 U | 3520 | 1.5 J | NA | NA | 301 | 0.001 U | 0.001 U | 0.00418 | 6.89 | NA |
| | 1/23/2015 | 1501096 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| | 7/28/2015 | 1507213 | 0.3 | 0.97 | 0.033 U | 0.66 U | -85.8 | 0.01 U | 4380 | 1.54 J | 418 | 70 | 265 | 0.001 U | 0.001 U | 7.92 | 6.63 | 0 |
| | 4/7/2016 | | Well Plugged and Abandoned | | | | | | | | | | | | | | | |

mg/L - milligrams per liter
mV - millivolts
NA - Not Analyzed
ng/L - nanograms per liter
ORP - Oxidation/reduction potential
TOC - Total Organic Carbon
mg/L - micrograms per liter
S.U. - Standard Units
SDG - Sample Delivery Group
PCLE - Protective Concentration Level Exceedance

Notes:
1. Field measurement, Meter
2. Field measurement, Test Kit
3. Analytical Laboratory result

Analytical Result Qualifiers:
J, K, L - Indicates that the chemical was detected; however, the associated numerical result may not be a precise representation of the amount that is actually present in the sample. The laboratory reported concentration is considered to be bias unknown (J), high (K), or low (L) estimate of the true concentratio
U - Indicates that the sample was not detected at the numerical detection limit (sample-specific quantitation limit) noted. Nondetected results from the laboratory are reported in this manner. This qualifier is added to a positive result (reported by the laboratory) if the detected concentration is determined to be attributable to contamination introduce

# TABLE 4-4
# SUMMARY OF CONCENTRATION vs. TIME WITH ATTENUATION ACTION LEVELS

**Table 4-5**

**Summary of Concentration vs. Time Attenuation Rate Constants**
**SWMU 136 South Plume**
**2016 RAER**
**Former NAS Dallas, Texas**
**Page 1 of 9**

| Monitoring Well ID | Sampling Date | Elapsed Time (Years) | Protective Concentration Level (mg/L) | Concentration Detected (mg/L) | Natural Log of Concentration (mg/L) | Degradation Rate from Natural Log ($K_{time}$) (mg/L per year) | Minimum Degradation Rate Required for Remedial Goals Natural Log ($K_{time}$) (mg/L per year) | Minimum Degradation Rate Met? (Yes/No) | Expected Remedial Goal Concentration (mg/L) | Expected Remedial Goal Concentration Met? (Yes/No) | Remedial Goals Being Met? (Yes/No) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Trichloroethene** | | | | | | | | | | | |
| 50804MW | Oct-95 | 0.0 | 0.00500 | 0.00940 U | -8.00 | -- | -- | -- | -- | -- | -- |
| | Jan-96 | 0.3 | 0.00500 | 0.01100 | -4.51 | -- | -- | -- | -- | -- | -- |
| | May-96 | 0.5 | 0.00500 | 0.01600 | -4.14 | -- | -- | -- | -- | -- | -- |
| | Jul-96 | 0.7 | 0.00500 | 0.00690 | -4.98 | -0.918 | -0.057 | Yes | 0.01580 | Yes | Yes |
| | Oct-96 | 0.9 | 0.00500 | 0.01100 | -4.51 | -0.378 | -0.057 | Yes | 0.01562 | Yes | Yes |
| | Apr-98 | 2.4 | 0.00500 | 0.00350 J | -5.65 | -0.595 | -0.057 | Less Than PCL | 0.01434 | Less Than PCL | Less Than PCL |
| | Sep-98 | 2.9 | 0.00500 | 0.00310 J | -5.78 | -0.564 | -0.057 | Less Than PCL | 0.01398 | Less Than PCL | Less Than PCL |
| | Mar-99 | 3.4 | 0.00500 | 0.01700 U | -8.00 | -0.916 | -0.057 | Less Than PCL | 0.01359 | Less Than PCL | Less Than PCL |
| | Sep-99 | 3.9 | 0.00500 | 0.00150 J | -6.50 | -0.780 | -0.057 | Less Than PCL | 0.01320 | Less Than PCL | Less Than PCL |
| | Jun-00 | 4.7 | 0.00500 | 0.00500 U | -8.00 | -0.817 | -0.057 | Less Than PCL | 0.01262 | Less Than PCL | Less Than PCL |
| | Jun-01 | 5.6 | 0.00500 | 0.00310 J | -5.78 | -0.543 | -0.057 | Less Than PCL | 0.01195 | Less Than PCL | Less Than PCL |
| | Jan-03 | 7.3 | 0.00500 | 0.06600 | -2.72 | -0.078 | -0.057 | Yes | 0.01088 | No | Evaluate Further |
| | Sep-03 | 7.9 | 0.00500 | 0.06400 | -2.75 | 0.112 | -0.057 | No | 0.01051 | No | No |
| | Dec-03 | 8.2 | 0.00500 | 0.04100 | -3.19 | 0.184 | -0.057 | No | 0.01034 | No | No |
| | Jul-04 | 8.8 | 0.00500 | 0.00880 J | -4.73 | 0.163 | -0.057 | No | 0.00999 | Yes | Evaluate Further |
| | Oct-04 | 9.0 | 0.00500 | 0.06200 | -2.78 | 0.212 | -0.057 | No | 0.00987 | No | No |
| | Apr-05 | 9.5 | 0.00500 | 0.06800 | -2.69 | 0.245 | -0.057 | No | 0.00960 | No | No |
| | Oct-05 | 10.0 | 0.00500 | 0.11000 J | -2.21 | 0.279 | -0.057 | No | 0.00933 | No | No |
| | May-06 | 10.6 | 0.00500 | 0.04700 | -3.06 | 0.280 | -0.057 | No | 0.00901 | No | No |
| | Aug-06 | 10.8 | 0.00500 | 0.19000 | -1.66 | 0.309 | -0.057 | No | 0.00887 | No | No |
| | Apr-07 | 11.5 | 0.00500 | 0.00600 | -5.12 | 0.259 | -0.057 | No | 0.00856 | Yes | Evaluate Further |
| | Aug-07 | 11.8 | 0.00500 | 0.01200 | -4.42 | 0.232 | -0.057 | No | 0.00840 | No | No |
| | Jan-08 | 12.2 | 0.00500 | 0.00960 | -4.65 | 0.206 | -0.057 | No | 0.00820 | No | No |
| | Jul-08 | 12.7 | 0.00500 | 0.00150 | -6.50 | 0.154 | -0.057 | Less Than PCL | 0.00797 | Less Than PCL | Less Than PCL |
| | Jan-09 | 13.2 | 0.00500 | 0.00032 U | -8.00 | 0.089 | -0.057 | Less Than PCL | 0.00774 | Less Than PCL | Less Than PCL |
| | Jul-09 | 13.7 | 0.00500 | 0.00610 | -5.10 | 0.075 | -0.057 | No | 0.00752 | Yes | Evaluate Further |
| | Jan-10 | 14.2 | 0.00500 | 0.00024 U | -8.00 | 0.025 | -0.057 | Less Than PCL | 0.00731 | Less Than PCL | Less Than PCL |
| | Jul-10 | 14.7 | 0.00500 | 0.00024 U | -8.00 | -0.016 | -0.057 | Less Than PCL | 0.00710 | Less Than PCL | Less Than PCL |
| | Jan-11 | 15.2 | 0.00500 | 0.00120 | -6.73 | -0.035 | -0.057 | Less Than PCL | 0.00690 | Less Than PCL | Less Than PCL |
| | Jul-11 | 15.8 | 0.00500 | 0.00180 | -6.32 | -0.047 | -0.057 | Less Than PCL | 0.00669 | Less Than PCL | Less Than PCL |
| | Jan-12 | 16.2 | 0.00500 | 0.00100 | -6.91 | -0.062 | -0.057 | Less Than PCL | 0.00652 | Less Than PCL | Less Than PCL |
| | Jul-12 | 16.7 | 0.00500 | 0.00026 U | -8.00 | -0.086 | -0.057 | Less Than PCL | 0.00634 | Less Than PCL | Less Than PCL |
| | Jan-13 | 17.2 | 0.00500 | 0.00031 U | -8.00 | -0.105 | -0.057 | Less Than PCL | 0.00616 | Less Than PCL | Less Than PCL |
| | Jul-13 | 17.7 | 0.00500 | 0.00031 U | -8.00 | -0.121 | -0.057 | Less Than PCL | 0.00598 | Less Than PCL | Less Than PCL |
| | Feb-14 | 18.4 | 0.00500 | 0.0003 U | -8.00 | -0.135 | -0.057 | Less Than PCL | 0.00577 | Less Than PCL | Less Than PCL |
| | Jul-14 | 18.8 | 0.00500 | 0.0005 U | -8.00 | -0.145 | -0.057 | Less Than PCL | 0.00564 | Less Than PCL | Less Than PCL |
| | Jan-15 | 19.3 | 0.00500 | 0.00025 U | -8.00 | -0.154 | -0.057 | Less Than PCL | 0.00548 | Less Than PCL | Less Than PCL |
| | Jul-15 | 19.8 | 0.00500 | 0.00025 U | -8.00 | -0.161 | -0.057 | Less Than PCL | 0.00532 | Less Than PCL | Less Than PCL |
| | Jan-16 | Well Abandoned | | | | | | | | | |

**Table 4-5**

**Summary of Concentration vs. Time Attenuation Rate Constants**
**SWMU 136 South Plume**
**2016 RAER**
**Former NAS Dallas, Texas**
**Page 2 of 9**

| Monitoring Well ID | Sampling Date | Elapsed Time (Years) | Protective Concentration Level (mg/L) | Concentration Detected (mg/L) | Natural Log of Concentration (mg/L) | Degradation Rate from Natural Log ($K_{time}$) (mg/L per year) | Minimum Degradation Rate Required for Remedial Goals Natural Log ($K_{time}$) (mg/L per year) | Minimum Degradation Rate Met? (Yes/No) | Expected Remedial Goal Concentration (mg/L) | Expected Remedial Goal Concentration Met? (Yes/No) | Remedial Goals Being Met? (Yes/No) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 508F47MW | Apr-98 | 0.0 | 0.00500 | -- | -8.00 | -- | -- | -- | -- | -- | -- |
| | Sep-98 | 0.4 | 0.00500 | -- | -8.00 | -- | -- | -- | -- | -- | -- |
| | Apr-99 | 0.9 | 0.00500 | -- | -8.00 | -- | -- | -- | -- | -- | -- |
| | Aug-99 | 1.3 | 0.00500 | -- | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jun-00 | 2.2 | 0.00500 | 0.00500 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jun-01 | 3.1 | 0.00500 | 0.00500 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-03 | 4.7 | 0.00500 | 0.00100 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Aug-03 | 5.3 | 0.00500 | -- | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Dec-03 | 5.7 | 0.00500 | 0.00010 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-04 | 6.3 | 0.00500 | -- | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Oct-04 | 6.5 | 0.00500 | 0.00022 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Apr-05 | 7.0 | 0.00500 | 0.00030 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Oct-05 | 7.5 | 0.00500 | 0.00030 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | May-06 | 8.1 | 0.00500 | 0.00040 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Aug-06 | 8.4 | 0.00500 | 0.00040 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Apr-07 | 9.0 | 0.00500 | 0.00014 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Aug-07 | 9.3 | 0.00500 | 0.00023 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-08 | 9.7 | 0.00500 | 0.00053 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-08 | 10.2 | 0.00500 | 0.00032 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-09 | 10.7 | 0.00500 | 0.00032 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-09 | 11.2 | 0.00500 | 0.05560 | -2.89 | -- | NA | NA | NA | NA | Evaluate Further |
| | Jan-10 | 11.7 | 0.00500 | 0.00230 | -6.07 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-10 | 12.2 | 0.00500 | 0.00045 J | -7.71 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-11 | 12.7 | 0.00500 | 0.00720 | -4.93 | -1.560 | 0.392 | Yes | 0.00055 | No | Evaluate Further |
| | Jul-11 | 13.3 | 0.00500 | 0.0025 | -5.99 | -0.989 | 0.392 | Less Than PCL | 0.00068 | Less Than PCL | Less Than PCL |
| | Jan-12 | 13.7 | 0.00500 | 0.03100 | -3.47 | -0.001 | 0.392 | Yes | 0.00081 | No | Evaluate Further |
| | Jul-12 | 14.2 | 0.00500 | 0.06890 | -2.68 | 0.533 | 0.392 | No | 0.00098 | No | No |
| | Jan-13 | 14.7 | 0.00500 | 0.0015 | -6.50 | 0.076 | 0.392 | Less Than PCL | 0.00120 | Less Than PCL | Less Than PCL |
| | Jul-13 | 15.2 | 0.00500 | 0.00031 U | -8.00 | -0.345 | 0.392 | Less Than PCL | 0.00146 | Less Than PCL | Less Than PCL |
| | Feb-14 | 15.9 | 0.00500 | 0.14100 | -1.96 | 0.135 | 0.392 | Yes | 0.00186 | No | Evaluate Further |
| | Jul-14 | 16.3 | 0.00500 | 0.13200 | -2.02 | 0.370 | 0.392 | Yes | 0.00218 | No | Evaluate Further |
| | Jan-15 | 16.8 | 0.00500 | 0.00849 | -4.77 | 0.284 | 0.392 | Yes | 0.00266 | No | Evaluate Further |
| | Jul-15 | 17.3 | 0.00500 | 0.08370 | -4.77 | 0.222 | 0.392 | Yes | 0.00325 | No | Evaluate Further |
| | Jan-16 | Well Destroyed | | | | | | | | | |
| 508F04MW | Apr-98 | 0.0 | 0.00500 | 0.03300 U | -8.00 | -- | -- | -- | -- | -- | -- |
| | Sep-98 | 0.4 | 0.00500 | 0.02500 U | -8.00 | -- | -- | -- | -- | -- | -- |
| | Apr-99 | 0.9 | 0.00500 | 0.03300 U | -8.00 | -- | -- | -- | -- | -- | -- |
| | Aug-99 | 1.3 | 0.00500 | 0.02100 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jun-00 | 2.2 | 0.00500 | 0.01700 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jun-01 | 3.1 | 0.00500 | 0.01700 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-03 | 4.7 | 0.00500 | 0.00100 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Aug-03 | 5.3 | 0.00500 | 0.00044 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Dec-03 | 5.7 | 0.00500 | 0.00095 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-04 | 6.3 | 0.00500 | 0.00220 J | -6.12 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Oct-04 | 6.5 | 0.00500 | 0.00220 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Apr-05 | 7.0 | 0.00500 | 0.00080 J | -7.13 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Oct-05 | 7.5 | 0.00500 | 0.00030 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | May-06 | 8.1 | 0.00500 | 0.00040 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Aug-06 | 8.4 | 0.00500 | 0.00040 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Apr-07 | 9.0 | 0.00500 | 0.00014 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Aug-07 | 9.3 | 0.00500 | 0.00023 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-08 | 9.7 | 0.00500 | 0.00053 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-08 | 10.2 | 0.00500 | 0.00032 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-09 | 10.7 | 0.00500 | 0.00032 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-09 | 11.2 | 0.00500 | 0.00032 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-10 | 11.7 | 0.00500 | 0.00024 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-10 | 12.2 | 0.00500 | 0.00024 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-11 | 12.7 | 0.00500 | 0.00026 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-11 | 13.3 | 0.00500 | 0.00026 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-12 | 13.7 | 0.00500 | 0.00026 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-12 | 14.2 | 0.00500 | 0.00026 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-13 | 14.7 | 0.00500 | 0.00031 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-13 | 15.2 | 0.00500 | 0.00031 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Feb-14 | 15.9 | 0.00500 | 0.0003 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-14 | 16.3 | 0.00500 | 0.0005 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-15 | 16.8 | 0.00500 | 0.00025 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-16 | 17.8 | 0.00500 | 0.0005 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-16 | 18.3 | 0.00500 | 0.0005 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |

**Table 4-5**

**Summary of Concentration vs. Time Attenuation Rate Constants**
**SWMU 136 South Plume**
**2016 RAER**
**Former NAS Dallas, Texas**
**Page 3 of 9**

| Monitoring Well ID | Sampling Date | Elapsed Time (Years) | Protective Concentration Level (mg/L) | Concentration Detected (mg/L) | Natural Log of Concentration (mg/L) | Degradation Rate from Natural Log ($K_{time}$) (mg/L per year) | Minimum Degradation Rate Required for Remedial Goals Natural Log ($K_{time}$) (mg/L per year) | Minimum Degradation Rate Met? (Yes/No) | Expected Remedial Goal Concentration (mg/L) | Expected Remedial Goal Concentration Met? (Yes/No) | Remedial Goals Being Met? (Yes/No) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **cis-1,2-Dichloroethene** | | | | | | | | | | | |
| 50804MW | Oct-95 | 0.0 | 0.07000 | -- | -- | -- | -- | -- | -- | -- | -- |
| | Jan-96 | 0.3 | 0.07000 | -- | -- | -- | -- | -- | -- | -- | -- |
| | May-96 | 0.5 | 0.07000 | -- | -- | -- | -- | -- | -- | -- | -- |
| | Jul-96 | 0.7 | 0.07000 | -- | -- | -- | -- | -- | -- | -- | -- |
| | Oct-96 | 0.9 | 0.07000 | -- | -- | -- | -- | -- | -- | -- | -- |
| | Apr-98 | 2.4 | 0.07000 | 0.00770 J | -4.87 | -- | -- | -- | -- | -- | -- |
| | Sep-98 | 2.9 | 0.07000 | 0.07500 | -2.59 | -- | -- | -- | -- | -- | -- |
| | Mar-99 | 3.4 | 0.07000 | 0.01500 J | -4.20 | -- | -- | -- | -- | -- | -- |
| | Sep-99 | 3.9 | 0.07000 | 0.02300 | -3.77 | 0.315 | 0.120 | Less Than PCL | 0.00916 | Less Than PCL | Less Than PCL |
| | Jun-00 | 4.7 | 0.07000 | 0.02000 | -3.91 | 0.100 | 0.120 | Less Than PCL | 0.01005 | Less Than PCL | Less Than PCL |
| | Jun-01 | 5.6 | 0.07000 | 0.12000 | -2.12 | 0.498 | 0.120 | No | 0.01128 | No | No |
| | Jan-03 | 7.3 | 0.07000 | 0.28000 | -1.27 | 0.599 | 0.120 | No | 0.01372 | No | No |
| | Sep-03 | 7.9 | 0.07000 | 0.52000 | -0.65 | 0.650 | 0.120 | No | 0.01474 | No | No |
| | Dec-03 | 8.2 | 0.07000 | 0.38000 | -0.97 | 0.630 | 0.120 | No | 0.01527 | No | No |
| | Jul-04 | 8.8 | 0.07000 | 0.17000 | -1.77 | 0.542 | 0.120 | No | 0.01643 | No | No |
| | Oct-04 | 9.0 | 0.07000 | 0.48000 | -0.73 | 0.541 | 0.120 | No | 0.01685 | No | No |
| | Apr-05 | 9.5 | 0.07000 | 0.53000 | -0.63 | 0.534 | 0.120 | No | 0.01784 | No | No |
| | Oct-05 | 10.0 | 0.07000 | 0.68000 | -0.39 | 0.528 | 0.120 | No | 0.01894 | No | No |
| | May-06 | 10.6 | 0.07000 | 0.39000 J | -0.94 | 0.491 | 0.120 | No | 0.02038 | No | No |
| | Aug-06 | 10.8 | 0.07000 | 0.98000 J | -0.02 | 0.491 | 0.120 | No | 0.02107 | No | No |
| | Apr-07 | 11.5 | 0.07000 | 0.20000 | -1.61 | 0.434 | 0.120 | No | 0.02268 | No | No |
| | Aug-07 | 11.8 | 0.07000 | 0.44000 | -0.82 | 0.410 | 0.120 | No | 0.02360 | No | No |
| | Jan-08 | 12.2 | 0.07000 | 0.29000 | -1.24 | 0.377 | 0.120 | No | 0.02483 | No | No |
| | Jul-08 | 12.7 | 0.07000 | 0.09450 | -2.36 | 0.321 | 0.120 | No | 0.02636 | No | No |
| | Jan-09 | 13.2 | 0.07000 | 0.0002 U | -8.00 | 0.151 | 0.120 | Less Than PCL | 0.02805 | Less Than PCL | Less Than PCL |
| | Jul-09 | 13.7 | 0.07000 | 0.12000 | -2.12 | 0.135 | 0.120 | No | 0.02979 | No | No |
| | Jan-10 | 14.2 | 0.07000 | 0.04730 | -3.05 | 0.103 | 0.120 | Less Than PCL | 0.03160 | Less Than PCL | Less Than PCL |
| | Jul-10 | 14.7 | 0.07000 | 0.01690 | -4.08 | 0.059 | 0.120 | Less Than PCL | 0.03355 | Less Than PCL | Less Than PCL |
| | Jan-11 | 15.2 | 0.07000 | 0.03910 | -3.24 | 0.037 | 0.120 | Less Than PCL | 0.03561 | Less Than PCL | Less Than PCL |
| | Jul-11 | 15.8 | 0.07000 | 0.05210 | -2.95 | 0.023 | 0.120 | Less Than PCL | 0.03800 | Less Than PCL | Less Than PCL |
| | Jan-12 | 16.2 | 0.07000 | 0.03420 | -3.38 | 0.005 | 0.120 | Less Than PCL | 0.04013 | Less Than PCL | Less Than PCL |
| | Jul-12 | 16.7 | 0.07000 | 0.00490 | -5.32 | -0.036 | 0.120 | Less Than PCL | 0.04259 | Less Than PCL | Less Than PCL |
| | Jan-13 | 17.2 | 0.07000 | 0.0432 | -3.14 | -0.041 | 0.120 | Less Than PCL | 0.04522 | Less Than PCL | Less Than PCL |
| | Jul-13 | 17.7 | 0.07000 | 0.0063 | -5.07 | -0.068 | 0.120 | Less Than PCL | 0.04811 | Less Than PCL | Less Than PCL |
| | Feb-14 | 18.4 | 0.07000 | 0.0033 | -5.71 | -0.099 | 0.120 | Less Than PCL | 0.05178 | Less Than PCL | Less Than PCL |
| | Jul-14 | 18.8 | 0.07000 | 0.00209 | -6.17 | -0.128 | 0.120 | Less Than PCL | 0.05434 | Less Than PCL | Less Than PCL |
| | Jan-15 | 19.3 | 0.07000 | 0.00289 | -5.85 | -0.148 | 0.120 | Less Than PCL | 0.05772 | Less Than PCL | Less Than PCL |
| | Jul-15 | 19.8 | 0.07000 | 0.00121 | -6.72 | -0.173 | 0.120 | Less Than PCL | 0.06137 | Less Than PCL | Less Than PCL |
| | Jan-16 | Well Abandoned | | | | | | | | | |
| 50805MW | Oct-95 | 0.0 | 0.07000 | -- | -- | -- | -- | -- | -- | -- | -- |
| | Jan-96 | 0.3 | 0.07000 | -- | -- | -- | -- | -- | -- | -- | -- |
| | May-96 | 0.5 | 0.07000 | -- | -- | -- | -- | -- | -- | -- | -- |
| | Jul-96 | 0.7 | 0.07000 | -- | -- | -- | -- | -- | -- | -- | -- |
| | Oct-96 | 0.9 | 0.07000 | -- | -- | -- | -- | -- | -- | -- | -- |
| | Apr-98 | 2.5 | 0.07000 | 0.00500 U | -8.00 | -- | -- | -- | -- | -- | -- |
| | Sep-98 | 2.9 | 0.07000 | 0.00500 U | -8.00 | -- | -- | -- | -- | -- | -- |
| | Apr-99 | 3.4 | 0.07000 | 0.00500 U | -8.00 | -- | -- | -- | -- | -- | -- |
| | Aug-99 | 3.8 | 0.07000 | 0.00500 UJ | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jun-00 | 4.7 | 0.07000 | 0.00500 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jun-01 | 5.6 | 0.07000 | NS | -- | -- | NA | NA | NA | NA | Evaluate Further |
| | Jan-03 | 7.2 | 0.07000 | NS | -- | -- | NA | NA | NA | NA | Evaluate Further |
| | Aug-03 | 7.8 | 0.07000 | NS | -- | -- | NA | NA | NA | NA | Evaluate Further |
| | Dec-03 | 8.2 | 0.07000 | 0.00810 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-04 | 8.8 | 0.07000 | NS | -- | -- | NA | NA | NA | NA | Evaluate Further |
| | Oct-04 | 9.0 | 0.07000 | NS | -- | -- | NA | NA | NA | NA | Evaluate Further |
| | Apr-05 | 9.4 | 0.07000 | 0.00030 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Oct-05 | 10.0 | 0.07000 | 0.00030 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | May-06 | 10.5 | 0.07000 | 0.00050 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Aug-06 | 10.8 | 0.07000 | 0.00050 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Apr-07 | 11.5 | 0.07000 | 0.0007 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Aug-07 | 11.8 | 0.07000 | 0.00014 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-08 | 12.2 | 0.07000 | 0.00062 J | -5.08 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-08 | 12.7 | 0.07000 | 0.00020 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-09 | 13.2 | 0.07000 | 0.00020 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-09 | 13.7 | 0.07000 | 0.00020 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-10 | 14.2 | 0.07000 | 0.00032 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-10 | 14.7 | 0.07000 | 0.00032 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-11 | Well Covered | | | | | | | | | |

**Table 4-5**

**Summary of Concentration vs. Time Attenuation Rate Constants**
**SWMU 136 South Plume**
**2016 RAER**
**Former NAS Dallas, Texas**
**Page 4 of 9**

| Monitoring Well ID | Sampling Date | Elapsed Time (Years) | Protective Concentration Level (mg/L) | Concentration Detected (mg/L) | Natural Log of Concentration (mg/L) | Degradation Rate from Natural Log ($K_{time}$) (mg/L per year) | Minimum Degradation Rate Required for Remedial Goals Natural Log ($K_{time}$) (mg/L per year) | Minimum Degradation Rate Met? (Yes/No) | Expected Remedial Goal Concentration (mg/L) | Expected Remedial Goal Concentration Met? (Yes/No) | Remedial Goals Being Met? (Yes/No) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 508F47MW | Apr-98 | 0.0 | 0.07000 | -- | -- | -- | -- | -- | -- | -- | -- |
| | Sep-98 | 0.4 | 0.07000 | -- | -- | -- | -- | -- | -- | -- | -- |
| | Apr-99 | 0.9 | 0.07000 | -- | -- | -- | -- | -- | -- | -- | -- |
| | Aug-99 | 1.3 | 0.07000 | -- | -- | -- | -- | -- | -- | -- | -- |
| | Jun-00 | 2.2 | 0.07000 | 0.00500 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jun-01 | 3.1 | 0.07000 | 0.00250 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-03 | 4.7 | 0.07000 | 0.00100 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Aug-03 | 5.3 | 0.07000 | -- | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Dec-03 | 5.7 | 0.07000 | 0.00016 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-04 | 6.3 | 0.07000 | -- | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Oct-04 | 6.5 | 0.07000 | 0.00027 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Apr-05 | 7.0 | 0.07000 | 0.00030 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Oct-05 | 7.5 | 0.07000 | 0.00030 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | May-06 | 8.1 | 0.07000 | 0.00050 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Aug-06 | 8.4 | 0.07000 | 0.00100 UJ | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Apr-07 | 9.0 | 0.07000 | 0.00110 | -6.81 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Aug-07 | 9.3 | 0.07000 | 0.00055 J | -7.51 | -- | NA | NA | NA | NA | Evaluate Further |
| | Jan-08 | 9.7 | 0.07000 | 0.00032 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-08 | 10.2 | 0.07000 | 0.00020 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-09 | 10.7 | 0.07000 | 0.00230 | -6.07 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-09 | 11.2 | 0.07000 | 0.13900 | -1.97 | -- | NA | NA | NA | NA | Evaluate Further |
| | Jan-10 | 11.7 | 0.07000 | 0.20000 | -1.61 | -- | NA | NA | NA | NA | Evaluate Further |
| | Jul-10 | 12.2 | 0.07000 | 0.00910 | -4.70 | 0.902 | -0.096 | Less Than PCL | 0.12632 | Less Than PCL | Less Than PCL |
| | Jan-11 | 12.7 | 0.07000 | 0.00460 | -5.38 | -0.268 | -0.096 | Less Than PCL | 0.12044 | Less Than PCL | Less Than PCL |
| | Jul-11 | 13.3 | 0.07000 | 0.02230 | -3.80 | -0.108 | -0.096 | Less Than PCL | 0.11432 | Less Than PCL | Less Than PCL |
| | Jan-12 | 13.7 | 0.07000 | 0.01240 | -4.39 | -0.167 | -0.096 | Less Than PCL | 0.10943 | Less Than PCL | Less Than PCL |
| | Jul-12 | 14.2 | 0.07000 | 0.24200 | -1.42 | 0.314 | -0.096 | No | 0.10431 | No | No |
| | Jan-13 | 14.7 | 0.07000 | 0.0292 | -3.53 | 0.239 | -0.096 | Less Than PCL | 0.09942 | Less Than PCL | Less Than PCL |
| | Jul-13 | 15.2 | 0.07000 | 0.00024 U | -8.00 | -0.303 | -0.096 | Less Than PCL | 0.09459 | Less Than PCL | Less Than PCL |
| | Feb-14 | 15.9 | 0.07000 | 0.25700 | -1.36 | 0.031 | -0.096 | No | 0.08917 | No | No |
| | Jul-14 | 16.3 | 0.07000 | 0.37200 | -0.99 | 0.241 | -0.096 | No | 0.08579 | No | No |
| | Jan-15 | 16.8 | 0.07000 | 0.04060 | -3.20 | 0.215 | -0.096 | Less Than PCL | 0.08173 | Less Than PCL | Less Than PCL |
| | Jul-15 | 17.3 | 0.07000 | 0.30800 | -3.20 | 0.193 | -0.096 | Less Than PCL | 0.07780 | Less Than PCL | Less Than PCL |
| | Jan-16 | Well Destroyed | | | | | | | | | |
| 508F04MW | Apr-98 | 0.0 | 0.07000 | 0.64000 | -0.45 | -- | -- | -- | -- | Yes | Evaluate Further |
| | Sep-98 | 0.4 | 0.07000 | 0.60000 | -0.51 | -- | -- | -- | -- | -- | -- |
| | Apr-99 | 0.9 | 0.07000 | 0.44000 | -0.82 | -- | -- | -- | -- | -- | -- |
| | Aug-99 | 1.3 | 0.07000 | 0.42000 | -0.87 | -0.362 | -0.120 | Yes | 0.54755 | Yes | Yes |
| | Jun-00 | 2.2 | 0.07000 | 0.50000 | -0.69 | -0.140 | -0.120 | Yes | 0.49237 | No | Evaluate Further |
| | Jun-01 | 3.1 | 0.07000 | 0.42000 | -0.87 | -0.112 | -0.120 | No | 0.43883 | Yes | Evaluate Further |
| | Jan-03 | 4.7 | 0.07000 | 0.01300 | -4.34 | -0.683 | -0.120 | Less Than PCL | 0.36170 | Less Than PCL | Less Than PCL |
| | Aug-03 | 5.3 | 0.07000 | 0.05100 | -2.98 | -0.610 | -0.120 | Less Than PCL | 0.33616 | Less Than PCL | Less Than PCL |
| | Dec-03 | 5.7 | 0.07000 | 0.19000 | -1.66 | -0.461 | -0.120 | Yes | 0.32365 | Yes | Yes |
| | Jul-04 | 6.3 | 0.07000 | 0.17000 J | -4.07 | -0.523 | -0.120 | Less Than PCL | 0.30050 | Less Than PCL | Less Than PCL |
| | Oct-04 | 6.5 | 0.07000 | 0.17000 | -1.77 | -0.430 | -0.120 | Yes | 0.29306 | Yes | Yes |
| | Apr-05 | 7.0 | 0.07000 | 0.18000 | -1.71 | -0.358 | -0.120 | Yes | 0.27690 | Yes | Yes |
| | Oct-05 | 7.5 | 0.07000 | 0.08500 | -2.47 | -0.332 | -0.120 | Yes | 0.26051 | Yes | Yes |
| | May-06 | 8.1 | 0.07000 | 0.01800 | -4.02 | -0.364 | -0.120 | Less Than PCL | 0.24187 | Less Than PCL | Less Than PCL |
| | Aug-06 | 8.4 | 0.07000 | 0.04300 J | -3.15 | -0.354 | -0.120 | Less Than PCL | 0.23402 | Less Than PCL | Less Than PCL |
| | Apr-07 | 9.0 | 0.07000 | 0.00840 | -4.78 | -0.389 | -0.120 | Less Than PCL | 0.21736 | Less Than PCL | Less Than PCL |
| | Aug-07 | 9.3 | 0.07000 | 0.09700 | -2.33 | -0.345 | -0.120 | Yes | 0.20878 | Yes | Yes |
| | Jan-08 | 9.7 | 0.07000 | 0.07500 | -2.59 | -0.314 | -0.120 | Yes | 0.19844 | Yes | Yes |
| | Jul-08 | 10.2 | 0.07000 | 0.04650 | -3.07 | -0.298 | -0.120 | Less Than PCL | 0.18688 | Less Than PCL | Less Than PCL |
| | Jan-09 | 10.7 | 0.07000 | 0.00170 | -6.38 | -0.354 | -0.120 | Less Than PCL | 0.17553 | Less Than PCL | Less Than PCL |
| | Jul-09 | 11.2 | 0.07000 | 0.03300 | -3.41 | -0.334 | -0.120 | Less Than PCL | 0.16524 | Less Than PCL | Less Than PCL |
| | Jan-10 | 11.7 | 0.07000 | 0.00032 U | -8.00 | -0.402 | -0.120 | Less Than PCL | 0.15572 | Less Than PCL | Less Than PCL |
| | Jul-10 | 12.2 | 0.07000 | 0.00430 | -5.45 | -0.407 | -0.120 | Less Than PCL | 0.14660 | Less Than PCL | Less Than PCL |
| | Jan-11 | 12.7 | 0.07000 | 0.04200 | -3.17 | -0.370 | -0.120 | Less Than PCL | 0.13810 | Less Than PCL | Less Than PCL |
| | Jul-11 | 13.3 | 0.07000 | 0.02180 | -3.83 | -0.348 | -0.120 | Less Than PCL | 0.12937 | Less Than PCL | Less Than PCL |
| | Jan-12 | 13.7 | 0.07000 | 0.00960 | -4.65 | -0.339 | -0.120 | Less Than PCL | 0.12248 | Less Than PCL | Less Than PCL |
| | Jul-12 | 14.2 | 0.07000 | 0.00720 | -4.93 | -0.333 | -0.120 | Less Than PCL | 0.11534 | Less Than PCL | Less Than PCL |
| | Jan-13 | 14.7 | 0.07000 | 0.00024 U | -8.00 | -0.366 | -0.120 | Less Than PCL | 0.10862 | Less Than PCL | Less Than PCL |
| | Jul-13 | 15.2 | 0.07000 | 0.0082 | -4.80 | -0.352 | -0.120 | Less Than PCL | 0.10206 | Less Than PCL | Less Than PCL |
| | Feb-14 | 15.9 | 0.07000 | 0.0017 | -6.38 | -0.356 | -0.120 | Less Than PCL | 0.09479 | Less Than PCL | Less Than PCL |
| | Jul-14 | 16.3 | 0.07000 | 0.00126 J | -6.68 | -0.361 | -0.120 | Less Than PCL | 0.09030 | Less Than PCL | Less Than PCL |
| | Jan-15 | 16.8 | 0.07000 | 0.000546 J | -7.51 | -0.372 | -0.120 | Less Than PCL | 0.08498 | Less Than PCL | Less Than PCL |
| | Jul-15 | 17.3 | 0.07000 | 0.00308 | -7.51 | -0.380 | -0.120 | Less Than PCL | 0.07990 | Less Than PCL | Less Than PCL |
| | Jan-16 | 17.8 | 0.07000 | 0.00196 J | -6.23 | -0.372 | -0.120 | Less Than PCL | 0.07519 | Less Than PCL | Less Than PCL |
| | Jul-16 | 18.3 | 0.07000 | 0.00208 | -6.18 | -0.364 | -0.120 | Less Than PCL | 0.07081 | Less Than PCL | Less Than PCL |

**Table 4-5**

**Summary of Concentration vs. Time Attenuation Rate Constants**
**SWMU 136 South Plume**
**2016 RAER**
**Former NAS Dallas, Texas**
**Page 5 of 9**

| Monitoring Well ID | Sampling Date | Elapsed Time (Years) | Protective Concentration Level (mg/L) | Concentration Detected (mg/L) | Natural Log of Concentration (mg/L) | Degradation Rate from Natural Log ($K_{time}$) (mg/L per year) | Minimum Degradation Rate Required for Remedial Goals Natural Log ($K_{time}$) (mg/L per year) | Minimum Degradation Rate Met? (Yes/No) | Expected Remedial Goal Concentration (mg/L) | Expected Remedial Goal Concentration Met? (Yes/No) | Remedial Goals Being Met? (Yes/No) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Vinyl Chloride** | | | | | | | | | | | |
| 50804MW | Oct-95 | 0.0 | 0.00200 | 0.01000 U | -8.00 | -- | -- | -- | -- | -- | -- |
| | Jan-96 | 0.3 | 0.00200 | 0.01000 U | -8.00 | -- | -- | -- | -- | -- | -- |
| | May-96 | 0.5 | 0.00200 | 0.01000 U | -8.00 | -- | -- | -- | -- | -- | -- |
| | Jul-96 | 0.7 | 0.00200 | 0.01000 U | -8.00 | -- | -- | -- | -- | -- | -- |
| | Oct-96 | 0.9 | 0.00200 | 0.01000 U | -8.00 | -- | -- | -- | -- | -- | -- |
| | Apr-98 | 2.4 | 0.00200 | 0.00830 U | -8.00 | -- | -- | -- | -- | -- | -- |
| | Sep-98 | 2.9 | 0.00200 | 0.01200 U | -8.00 | -- | -- | -- | -- | -- | -- |
| | Mar-99 | 3.4 | 0.00200 | 0.01700 U | -8.00 | -- | -- | -- | -- | -- | -- |
| | Sep-99 | 3.9 | 0.00200 | 0.00500 U | -8.00 | -- | -- | -- | -- | -- | -- |
| | Jun-00 | 4.7 | 0.00200 | 0.00500 U | -8.00 | -- | -- | -- | -- | -- | -- |
| | Jun-01 | 5.6 | 0.00200 | 0.01000 U | -8.00 | -- | -- | -- | -- | -- | -- |
| | Jan-03 | 7.3 | 0.00200 | 0.01000 U | -8.00 | -- | -- | -- | -- | -- | -- |
| | Sep-03 | 7.9 | 0.00200 | 0.00520 U | -8.00 | -- | -- | -- | -- | -- | -- |
| | Dec-03 | 8.2 | 0.00200 | 0.00250 U | -8.00 | -- | -- | -- | -- | -- | -- |
| | Jul-04 | 8.8 | 0.00200 | 0.00170 U | -8.00 | -- | -- | -- | -- | -- | -- |
| | Oct-04 | 9.0 | 0.00200 | 0.00340 U | -8.00 | -- | -- | -- | -- | -- | -- |
| | Apr-05 | 9.5 | 0.00200 | 0.00030 U | -8.00 | -- | -- | -- | -- | -- | -- |
| | Oct-05 | 10.0 | 0.00200 | 0.00300 J | -5.81 | -- | -- | -- | -- | -- | -- |
| | May-06 | 10.6 | 0.00200 | 0.00200 | -6.21 | -- | -- | -- | -- | -- | -- |
| | Aug-06 | 10.8 | 0.00200 | 0.00900 | -4.71 | -- | -- | -- | -- | -- | -- |
| | Apr-07 | 11.5 | 0.00200 | 0.0056 J | -5.18 | -- | -- | -- | -- | -- | -- |
| | Aug-07 | 11.8 | 0.00200 | 0.0120 J | -4.42 | 0.170 | -0.150 | No | 0.00781 | No | No |
| | Jan-08 | 12.2 | 0.00200 | 0.00630 | -5.07 | -0.108 | -0.150 | No | 0.00733 | Yes | Evaluate Further |
| | Jul-08 | 12.7 | 0.00200 | 0.0063 | -5.07 | -0.152 | -0.150 | Yes | 0.00680 | Yes | Yes |
| | Jan-09 | 13.2 | 0.00200 | 0.00021 U | -8.00 | -1.074 | -0.150 | Less Than PCL | 0.00629 | Less Than PCL | Less Than PCL |
| | Jul-09 | 13.7 | 0.00200 | 0.00600 | -5.12 | -0.579 | -0.150 | Yes | 0.00583 | No | Evaluate Further |
| | Jan-10 | 14.2 | 0.00200 | 0.00170 | -6.38 | -0.559 | -0.150 | Less Than PCL | 0.00542 | Less Than PCL | Less Than PCL |
| | Jul-10 | 14.7 | 0.00200 | 0.00066 J | -7.32 | -0.644 | -0.150 | Less Than PCL | 0.00502 | Less Than PCL | Less Than PCL |
| | Jan-11 | 15.2 | 0.00200 | 0.00042 J | -7.78 | -0.701 | -0.150 | Less Than PCL | 0.00466 | Less Than PCL | Less Than PCL |
| | Jul-11 | 15.8 | 0.00200 | 0.00140 | -6.57 | -0.580 | -0.150 | Less Than PCL | 0.00430 | Less Than PCL | Less Than PCL |
| | Jan-12 | 16.2 | 0.00200 | 0.00022 U | -8.00 | -0.606 | -0.150 | Less Than PCL | 0.00402 | Less Than PCL | Less Than PCL |
| | Jul-12 | 16.7 | 0.00200 | 0.00022 U | -8.00 | -0.600 | -0.150 | Less Than PCL | 0.00373 | Less Than PCL | Less Than PCL |
| | Jan-13 | 17.2 | 0.00200 | 0.00044 U | -8.00 | -0.580 | -0.150 | Less Than PCL | 0.00346 | Less Than PCL | Less Than PCL |
| | Jul-13 | 17.7 | 0.00200 | 0.00044 U | -8.00 | -0.551 | -0.150 | Less Than PCL | 0.00320 | Less Than PCL | Less Than PCL |
| | Feb-14 | 18.4 | 0.00200 | 0.00033 U | -8.00 | -0.516 | -0.150 | Less Than PCL | 0.00292 | Less Than PCL | Less Than PCL |
| | Jul-14 | 18.8 | 0.00200 | 0.0005 U | -8.00 | -0.484 | -0.150 | Less Than PCL | 0.00275 | Less Than PCL | Less Than PCL |
| | Jan-15 | 19.3 | 0.00200 | 0.00025 U | -8.00 | -0.454 | -0.150 | Less Than PCL | 0.00255 | Less Than PCL | Less Than PCL |
| | Jul-15 | 19.8 | 0.00200 | 0.00025 U | -8.00 | -0.424 | -0.150 | Less Than PCL | 0.00236 | Less Than PCL | Less Than PCL |
| | Jan-16 | Well Abandoned | | | | | | | | | |
| 50805MW | Oct-95 | 0.0 | 0.00200 | 0.01000 U | -6.27 | -- | -- | -- | -- | -- | -- |
| | Jan-96 | 0.3 | 0.00200 | 0.01000 U | -6.27 | -- | -- | -- | -- | -- | -- |
| | May-96 | 0.5 | 0.00200 | 0.01000 U | -8.00 | -- | -- | -- | -- | -- | -- |
| | Jul-96 | 0.7 | 0.00200 | 0.01000 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Oct-96 | 0.9 | 0.00200 | 0.01000 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Apr-98 | 2.5 | 0.00200 | 0.00500 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Sep-98 | 2.9 | 0.00200 | 0.00500 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Apr-99 | 3.4 | 0.00200 | 0.00500 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Aug-99 | 3.8 | 0.00200 | 0.00500 UJ | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jun-00 | 4.7 | 0.00200 | 0.00500 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jun-01 | 5.6 | 0.00200 | NS | -- | -- | NA | NA | NA | NA | Evaluate Further |
| | Jan-03 | 7.2 | 0.00200 | NS | -- | -- | NA | NA | NA | NA | Evaluate Further |
| | Aug-03 | 7.8 | 0.00200 | NS | -- | -- | NA | NA | NA | NA | Evaluate Further |
| | Dec-03 | 8.2 | 0.00200 | 0.00830 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-04 | 8.8 | 0.00200 | NS | -- | -- | NA | NA | NA | NA | Evaluate Further |
| | Oct-04 | 9.0 | 0.00200 | NS | -- | -- | NA | NA | NA | NA | Evaluate Further |
| | Apr-05 | 9.4 | 0.00200 | 0.00030 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Oct-05 | 10.0 | 0.00200 | 0.00030 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | May-06 | 10.5 | 0.00200 | 0.00080 J | -7.13 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Aug-06 | 10.8 | 0.00200 | 0.00060 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Apr-07 | 11.5 | 0.00200 | 0.00100 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Aug-07 | 11.8 | 0.00200 | 0.00020 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-08 | 12.2 | 0.00200 | 0.00043 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-08 | 12.7 | 0.00200 | 0.00030 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-09 | 13.2 | 0.00200 | 0.00030 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-09 | 13.7 | 0.00200 | 0.00030 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-10 | 14.2 | 0.00200 | 0.00028 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-10 | 14.7 | 0.00200 | 0.00028 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-10 | 14.7 | 0.00200 | 0.00028 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-10 | 14.7 | 0.00200 | 0.00028 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-10 | 14.7 | 0.00200 | 0.00028 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-11 | Well Covered | | | | | | | | | |

**Table 4-5**

**Summary of Concentration vs. Time Attenuation Rate Constants**
**SWMU 136 South Plume**
**2016 RAER**
**Former NAS Dallas, Texas**


| Monitoring Well ID | Sampling Date | Elapsed Time (Years) | Protective Concentration Level (mg/L) | Concentration Detected (mg/L) | Natural Log of Concentration (mg/L) | Degradation Rate from Natural Log ($K_{time}$) (mg/L per year) | Minimum Degradation Rate Required for Remedial Goals Natural Log ($K_{time}$) (mg/L per year) | Minimum Degradation Rate Met? (Yes/No) | Expected Remedial Goal Concentration (mg/L) | Expected Remedial Goal Concentration Met? (Yes/No) | Remedial Goals Being Met? (Yes/No) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 508F47MW | Apr-98 | 0.0 | 0.00200 | -- | -8.00 | -- | -- | -- | -- | -- | -- |
| | Sep-98 | 0.4 | 0.00200 | -- | -8.00 | -- | -- | -- | -- | -- | -- |
| | Apr-99 | 0.9 | 0.00200 | -- | -8.00 | -- | -- | -- | -- | -- | -- |
| | Aug-99 | 1.3 | 0.00200 | -- | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jun-00 | 2.2 | 0.00200 | 0.00500 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jun-01 | 3.1 | 0.00200 | 0.01000 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-03 | 4.7 | 0.00200 | 0.00100 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Aug-03 | 5.3 | 0.00200 | -- | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Dec-03 | 5.7 | 0.00200 | 0.00017 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-04 | 6.3 | 0.00200 | -- | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Oct-04 | 6.5 | 0.00200 | 0.00017 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Apr-05 | 7.0 | 0.00200 | 0.00030 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Oct-05 | 7.5 | 0.00200 | 0.00030 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | May-06 | 8.1 | 0.00200 | 0.00060 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Aug-06 | 8.4 | 0.00200 | 0.00060 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Apr-07 | 9.0 | 0.00200 | 0.00012 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Aug-07 | 9.3 | 0.00200 | 0.00020 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-08 | 9.7 | 0.00200 | 0.00043 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-08 | 10.2 | 0.00200 | 0.00030 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-09 | 10.7 | 0.00200 | 0.00030 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-09 | 11.2 | 0.00200 | 0.00095 J | -6.96 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-10 | 11.7 | 0.00200 | 0.00100 J | -6.91 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-10 | 12.2 | 0.00200 | 0.00028 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-11 | 12.7 | 0.00200 | 0.00033 J | -8.02 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-11 | 13.3 | 0.00200 | 0.00022 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-12 | 13.7 | 0.00200 | 0.00022 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-12 | 14.2 | 0.00200 | 0.0011 | -6.81 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-13 | 14.7 | 0.00200 | 0.00044 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-13 | 15.2 | 0.00200 | 0.00044 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Feb-14 | 15.9 | 0.00200 | 0.00110 J | -6.81 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-14 | 16.3 | 0.00200 | 0.00063 J | -7.37 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-15 | 16.8 | 0.00200 | 0.00025 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-15 | 17.3 | 0.00200 | 0.000735 J | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-16 | Well Destroyed | | | | | | | | | |
| 508F04MW | Apr-98 | 0.0 | 0.00200 | 0.03300 U | -8.00 | -- | -- | -- | -- | -- | -- |
| | Sep-98 | 0.4 | 0.00200 | 0.02500 U | -8.00 | -- | -- | -- | -- | -- | -- |
| | Apr-99 | 0.9 | 0.00200 | 0.03300 U | -8.00 | -- | -- | -- | -- | -- | -- |
| | Aug-99 | 1.3 | 0.00200 | 0.02100 U | -8.00 | -- | NA | Less Than PCL | -- | -- | -- |
| | Jun-00 | 2.2 | 0.00200 | 0.01700 U | -8.00 | -- | NA | Less Than PCL | -- | -- | -- |
| | Jun-01 | 3.1 | 0.00200 | 0.03300 U | -8.00 | -- | NA | Less Than PCL | -- | -- | -- |
| | Jan-03 | 4.7 | 0.00200 | 0.00100 U | -8.00 | -- | NA | Less Than PCL | -- | -- | -- |
| | Aug-03 | 5.3 | 0.00200 | 0.00052 U | -8.00 | -- | NA | Less Than PCL | -- | -- | -- |
| | Dec-03 | 5.7 | 0.00200 | 0.00170 U | -8.00 | -- | NA | Less Than PCL | -- | -- | -- |
| | Jul-04 | 6.3 | 0.00200 | 0.00084 U | -8.00 | -- | NA | Less Than PCL | -- | -- | -- |
| | Oct-04 | 6.5 | 0.00200 | 0.00170 U | -8.00 | -- | NA | Less Than PCL | -- | -- | -- |
| | Apr-05 | 7.0 | 0.00200 | 0.00100 J | -6.91 | -- | NA | Less Than PCL | -- | -- | -- |
| | Oct-05 | 7.5 | 0.00200 | 0.00030 U | -8.00 | -- | NA | Less Than PCL | -- | -- | -- |
| | May-06 | 8.1 | 0.00200 | 0.02000 | -3.91 | -- | NA | NA | -- | -- | -- |
| | Aug-06 | 8.4 | 0.00200 | 0.01700 | -4.07 | -- | NA | NA | -- | -- | -- |
| | Apr-07 | 9.0 | 0.00200 | 0.00930 | -4.68 | -- | NA | NA | -- | -- | -- |
| | Aug-07 | 9.3 | 0.00200 | 0.0240 J | -3.73 | -0.061 | -0.224 | No | 0.01522 | No | No |
| | Jan-08 | 9.7 | 0.00200 | 0.00720 | -4.93 | -0.417 | -0.224 | Yes | 0.01385 | Yes | Yes |
| | Jul-08 | 10.2 | 0.00200 | 0.01600 | -4.14 | -0.185 | -0.224 | No | 0.01239 | No | No |
| | Jan-09 | 10.7 | 0.00200 | 0.00710 | -4.95 | -0.286 | -0.224 | Yes | 0.01103 | Yes | Yes |
| | Jul-09 | 11.2 | 0.00200 | 0.01500 | -4.20 | -0.155 | -0.224 | No | 0.00986 | No | No |
| | Jan-10 | 11.7 | 0.00200 | 0.00028 U | -8.00 | -0.651 | -0.224 | Less Than PCL | 0.00883 | Less Than PCL | Less Than PCL |
| | Jul-10 | 12.2 | 0.00200 | 0.00140 | -6.57 | -0.683 | -0.224 | Less Than PCL | 0.00789 | Less Than PCL | Less Than PCL |
| | Jan-11 | 12.7 | 0.00200 | 0.00900 | -4.71 | -0.482 | -0.224 | Yes | 0.00706 | No | Evaluate Further |
| | Jul-11 | 13.3 | 0.00200 | 0.01150 | -4.47 | -0.327 | -0.224 | Yes | 0.00626 | No | Evaluate Further |
| | Jan-12 | 13.7 | 0.00200 | 0.00490 | -5.32 | -0.286 | -0.224 | Yes | 0.00565 | Yes | Yes |
| | Jul-12 | 14.2 | 0.00200 | 0.00390 | -5.55 | -0.266 | -0.224 | Yes | 0.00506 | Yes | Yes |
| | Jan-13 | 14.7 | 0.00200 | 0.00044 U | -8.00 | -0.375 | -0.224 | Less Than PCL | 0.00452 | Less Than PCL | Less Than PCL |
| | Jul-13 | 15.2 | 0.00200 | 0.0031 | -5.78 | -0.335 | -0.224 | Yes | 0.00403 | Yes | Yes |
| | Feb-14 | 15.9 | 0.00200 | 0.0010 | -6.91 | -0.346 | -0.224 | Less Than PCL | 0.00351 | Less Than PCL | Less Than PCL |
| | Jul-14 | 16.3 | 0.00200 | 0.00078 J | -7.16 | -0.358 | -0.224 | Less Than PCL | 0.00321 | Less Than PCL | Less Than PCL |
| | Jan-15 | 16.8 | 0.00200 | 0.00025 U | -8.00 | -0.388 | -0.224 | Less Than PCL | 0.00287 | Less Than PCL | Less Than PCL |
| | Jul-15 | 17.3 | 0.00200 | 0.00571 | -5.17 | -0.320 | -0.224 | Yes | 0.00256 | No | Evaluate Further |
| | Jan-16 | 17.8 | 0.00200 | 0.00071 J | -7.25 | -0.322 | -0.224 | Less Than PCL | 0.00228 | Less Than PCL | Less Than PCL |
| | Jul-16 | 18.3 | 0.00200 | 0.0049 | -5.32 | -0.272 | -0.224 | Yes | 0.00204 | No | Evaluate Further |

**Table 4-5**

**Summary of Concentration vs. Time Attenuation Rate Constants**
**SWMU 136 South Plume**
**2016 RAER**
**Former NAS Dallas, Texas**


| Monitoring Well ID | Sampling Date | Elapsed Time (Years) | Protective Concentration Level (mg/L) | Concentration Detected (mg/L) | Natural Log of Concentration (mg/L) | Degradation Rate from Natural Log ($K_{time}$) (mg/L per year) | Minimum Degradation Rate Required for Remedial Goals Natural Log ($K_{time}$) (mg/L per year) | Minimum Degradation Rate Met? (Yes/No) | Expected Remedial Goal Concentration (mg/L) | Expected Remedial Goal Concentration Met? (Yes/No) | Remedial Goals Being Met? (Yes/No) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Benzene** | | | | | | | | | | | |
| 50804MW | Oct-95 | 0.0 | 0.00500 | 0.00500 U | -8.00 | -- | -- | -- | -- | -- | -- |
| | Jan-96 | 0.3 | 0.00500 | 0.00500 U | -8.00 | -- | -- | -- | -- | -- | -- |
| | May-96 | 0.5 | 0.00500 | 0.00500 U | -8.00 | -- | -- | -- | -- | -- | -- |
| | Jul-96 | 0.7 | 0.00500 | 0.00500 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Oct-96 | 0.9 | 0.00500 | 0.00500 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Apr-98 | 2.4 | 0.00500 | 0.00830 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Sep-98 | 2.9 | 0.00500 | 0.01200 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Mar-99 | 3.4 | 0.00500 | 0.01700 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Sep-99 | 3.9 | 0.00500 | 0.00500 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jun-00 | 4.7 | 0.00500 | 0.00370 J | -5.60 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jun-01 | 5.6 | 0.00500 | 0.00100 J | -6.91 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-03 | 7.3 | 0.00500 | 0.01000 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Sep-03 | 7.9 | 0.00500 | 0.00400 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Dec-03 | 8.2 | 0.00500 | 0.00170 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-04 | 8.8 | 0.00500 | 0.00250 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Oct-04 | 9.0 | 0.00500 | 0.00500 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Apr-05 | 9.5 | 0.00500 | 0.00100 | -6.91 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Oct-05 | 10.0 | 0.00500 | 0.00070 J | -7.26 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | May-06 | 10.6 | 0.00500 | 0.00100 | -6.91 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Aug-06 | 10.8 | 0.00500 | 0.00100 J | -6.91 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Apr-07 | 11.5 | 0.00500 | 0.00210 | -6.17 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Aug-07 | 11.8 | 0.00500 | 0.00230 J | -6.07 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-08 | 12.2 | 0.00500 | 0.00130 | -6.65 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-08 | 12.7 | 0.00500 | 0.0013 | -6.65 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-09 | 13.2 | 0.00500 | 0.00040 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-09 | 13.7 | 0.00500 | 0.00160 | -6.44 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-10 | 14.2 | 0.00500 | 0.00150 | -6.50 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-10 | 14.7 | 0.00500 | 0.00190 | -6.27 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-11 | 15.2 | 0.00500 | 0.00070 J | -7.26 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-11 | 15.8 | 0.00500 | 0.00020 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-12 | 16.2 | 0.00500 | 0.00023 J | -8.38 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-12 | 16.7 | 0.00500 | 0.00020 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-13 | 17.2 | 0.00500 | 0.00021 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-13 | 17.7 | 0.00500 | 0.00021 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Feb-14 | 18.4 | 0.00500 | 0.00024 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-14 | 18.8 | 0.00500 | 0.0005 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-15 | 19.3 | 0.00500 | 0.00025 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-15 | 19.8 | 0.00500 | 0.00025 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-16 | Well Abandoned | | | | | | | | | |
| 50805MW | Oct-95 | 0.0 | 0.00500 | 0.06100 | -2.80 | -- | -- | -- | -- | -- | -- |
| | Jan-96 | 0.3 | 0.00500 | 0.02400 | -3.73 | -- | -- | -- | -- | -- | -- |
| | May-96 | 0.5 | 0.00500 | 0.00500 U | -8.00 | -- | -- | -- | -- | -- | -- |
| | Jul-96 | 0.7 | 0.00500 | 0.03000 | -3.51 | -2.787 | -0.120 | Yes | 0.05581 | Yes | Yes |
| | Oct-96 | 0.9 | 0.00500 | 0.03200 | -3.44 | -0.693 | -0.120 | Yes | 0.05452 | Yes | Yes |
| | Apr-98 | 2.5 | 0.00500 | 0.00500 U | -8.00 | -1.690 | -0.120 | Less Than PCL | 0.04527 | Less Than PCL | Less Than PCL |
| | Sep-98 | 2.9 | 0.00500 | 0.00280 J | -5.88 | -1.087 | -0.120 | Less Than PCL | 0.04303 | Less Than PCL | Less Than PCL |
| | Apr-99 | 3.4 | 0.00500 | 0.00210 J | -6.17 | -0.857 | -0.120 | Less Than PCL | 0.04041 | Less Than PCL | Less Than PCL |
| | Aug-99 | 3.8 | 0.00500 | 0.00300 J | -5.81 | -0.685 | -0.120 | Less Than PCL | 0.03876 | Less Than PCL | Less Than PCL |
| | Jun-00 | 4.7 | 0.00500 | 0.00160 J | -6.44 | -0.592 | -0.120 | Less Than PCL | 0.03487 | Less Than PCL | Less Than PCL |
| | Dec-03 | 8.2 | 0.00500 | 0.11000 | -2.21 | 0.046 | -0.120 | No | 0.02296 | No | No |
| | Apr-05 | 9.5 | 0.00500 | 0.00200 | -6.21 | -0.042 | -0.120 | Less Than PCL | 0.01965 | Less Than PCL | Less Than PCL |
| | Oct-05 | 10.0 | 0.00500 | 0.02500 | -3.69 | 0.035 | -0.120 | No | 0.01850 | No | No |
| | May-06 | 10.5 | 0.00500 | 0.09000 | -2.41 | 0.116 | -0.120 | No | 0.01724 | No | No |
| | Aug-06 | 10.8 | 0.00500 | 0.04800 | -3.04 | 0.144 | -0.120 | No | 0.01670 | No | No |
| | Apr-07 | 11.5 | 0.00500 | 0.07700 | -2.56 | 0.172 | -0.120 | No | 0.01545 | No | No |
| | Aug-07 | 11.8 | 0.00500 | 0.07600 | -2.58 | 0.190 | -0.120 | No | 0.01484 | No | No |
| | Jan-08 | 12.2 | 0.00500 | 0.02600 | -3.65 | 0.182 | -0.120 | No | 0.01411 | No | No |
| | Jul-08 | 12.7 | 0.00500 | 0.02450 | -3.71 | 0.173 | -0.120 | No | 0.01329 | No | No |
| | Jan-09 | 13.2 | 0.00500 | 0.00750 | -4.89 | 0.148 | -0.120 | No | 0.01249 | Yes | Evaluate Further |
| | Jul-09 | 13.7 | 0.00500 | 0.00580 | -5.15 | 0.124 | -0.120 | No | 0.01176 | Yes | Evaluate Further |
| | Jan-10 | 14.2 | 0.00500 | 0.00120 | -6.73 | 0.084 | -0.120 | Less Than PCL | 0.01108 | Less Than PCL | Less Than PCL |
| | Jul-10 | 14.7 | 0.00500 | 0.00085 J | -7.07 | 0.047 | -0.120 | Less Than PCL | 0.01044 | Less Than PCL | Less Than PCL |
| | Jan-11 | Well Covered | | | | | | | | | |

**Table 4-5**

**Summary of Concentration vs. Time Attenuation Rate Constants**
**SWMU 136 South Plume**
**2016 RAER**
**Former NAS Dallas, Texas**


| Monitoring Well ID | Sampling Date | Elapsed Time (Years) | Protective Concentration Level (mg/L) | Concentration Detected (mg/L) | Natural Log of Concentration (mg/L) | Degradation Rate from Natural Log ($K_{time}$) (mg/L per year) | Minimum Degradation Rate Required for Remedial Goals Natural Log ($K_{time}$) (mg/L per year) | Minimum Degradation Rate Met? (Yes/No) | Expected Remedial Goal Concentration (mg/L) | Expected Remedial Goal Concentration Met? (Yes/No) | Remedial Goals Being Met? (Yes/No) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 508F47MW | Apr-98 | 0.0 | 0.00500 | -- | -8.00 | -- | -- | -- | -- | -- | -- |
| | Sep-98 | 0.4 | 0.00500 | -- | -8.00 | -- | -- | -- | -- | -- | -- |
| | Apr-99 | 0.9 | 0.00500 | -- | -8.00 | -- | -- | -- | -- | -- | -- |
| | Aug-99 | 1.3 | 0.00500 | -- | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jun-00 | 2.2 | 0.00500 | 0.00500 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jun-01 | 3.1 | 0.00500 | 0.00500 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-03 | 4.7 | 0.00500 | 0.00100 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Aug-03 | 5.3 | 0.00500 | -- | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Dec-03 | 5.7 | 0.00500 | 0.00011 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-04 | 6.3 | 0.00500 | -- | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Oct-04 | 6.5 | 0.00500 | 0.00025 U | -3.91 | -- | NA | NA | NA | NA | Evaluate Further |
| | Apr-05 | 7.0 | 0.00500 | 0.00030 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Oct-05 | 7.5 | 0.00500 | 0.00030 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | May-06 | 8.1 | 0.00500 | 0.00050 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Aug-06 | 8.4 | 0.00500 | 0.00100 UJ | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Apr-07 | 9.0 | 0.00500 | 0.00013 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Aug-07 | 9.3 | 0.00500 | 0.00012 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-08 | 9.7 | 0.00500 | 0.00039 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-08 | 10.2 | 0.00500 | 0.00040 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-09 | 10.7 | 0.00500 | 0.00040 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-09 | 11.2 | 0.00500 | 0.00040 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-10 | 11.7 | 0.00500 | 0.00026 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-10 | 12.2 | 0.00500 | 0.00039 J | -7.85 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-11 | 12.7 | 0.00500 | 0.0014 | -6.57 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-11 | 13.3 | 0.00500 | 0.00020 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-12 | 13.7 | 0.00500 | 0.00020 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-12 | 14.2 | 0.00500 | 0.00020 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-13 | 14.7 | 0.00500 | 0.00021 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-13 | 15.2 | 0.00500 | 0.00021 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Feb-14 | 15.9 | 0.00500 | 0.00049 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-14 | 16.3 | 0.00500 | 0.0005 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-15 | 16.8 | 0.00500 | 0.00025 U | -8.00 | -- | NA | Less Than PCL | 0.00661 | Less Than PCL | Less Than PCL |
| | Jul-15 | 17.3 | 0.00500 | 0.00025 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-16 | Well Destroyed | | | | | | | | | |

**Table 4-5**

**Summary of Concentration vs. Time Attenuation Rate Constants**
**SWMU 136 South Plume**
**2016 RAER**
**Former NAS Dallas, Texas**


| Monitoring Well ID | Sampling Date | Elapsed Time (Years) | Protective Concentration Level (mg/L) | Concentration Detected (mg/L) | Natural Log of Concentration (mg/L) | Degradation Rate from Natural Log ($K_{time}$) (mg/L per year) | Minimum Degradation Rate Required for Remedial Goals Natural Log ($K_{time}$) (mg/L per year) | Minimum Degradation Rate Met? (Yes/No) | Expected Remedial Goal Concentration (mg/L) | Expected Remedial Goal Concentration Met? (Yes/No) | Remedial Goals Being Met? (Yes/No) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Apr-98 | 0.0 | 0.00500 | 0.12000 | -2.12 | -- | -- | -- | -- | -- | -- |
| | Sep-98 | 0.4 | 0.00500 | 0.04000 | -3.22 | -- | -- | -- | -- | -- | -- |
| | Apr-99 | 0.9 | 0.00500 | 0.06800 | -2.69 | -- | -- | -- | -- | -- | -- |
| | Aug-99 | 1.3 | 0.00500 | 0.02000 J | -3.91 | -1.043 | -0.173 | Yes | 0.09591 | Yes | Yes |
| | Jun-00 | 2.2 | 0.00500 | 0.01800 | -4.02 | -0.809 | -0.173 | Yes | 0.08234 | Yes | Yes |
| | Jun-01 | 3.1 | 0.00500 | 0.03700 | -3.30 | -0.366 | -0.173 | Yes | 0.06980 | Yes | Yes |
| | Jan-03 | 4.7 | 0.00500 | 0.00650 | -5.04 | -0.468 | -0.173 | Yes | 0.05288 | Yes | Yes |
| | Aug-03 | 5.3 | 0.00500 | 0.01000 | -4.61 | -0.410 | -0.173 | Yes | 0.04760 | Yes | Yes |
| | Dec-03 | 5.7 | 0.00500 | 0.00110 U | -8.00 | -0.649 | -0.173 | Less Than PCL | 0.04508 | Less Than PCL | Less Than PCL |
| | Jul-04 | 6.3 | 0.00500 | 0.00900 | -4.71 | -0.534 | -0.173 | Yes | 0.04052 | Yes | Yes |
| | Oct-04 | 6.5 | 0.00500 | 0.02000 J | -3.91 | -0.424 | -0.173 | Yes | 0.03909 | Yes | Yes |
| | Apr-05 | 7.0 | 0.00500 | 0.00200 | -6.21 | -0.448 | -0.173 | Less Than PCL | 0.03603 | Less Than PCL | Less Than PCL |
| | Oct-05 | 7.5 | 0.00500 | 0.01100 | -4.51 | -0.386 | -0.173 | Yes | 0.03300 | Yes | Yes |
| | May-06 | 8.1 | 0.00500 | 0.02200 | -3.82 | -0.306 | -0.173 | Yes | 0.02967 | Yes | Yes |
| | Aug-06 | 8.4 | 0.00500 | 0.00300 J | -5.81 | -0.314 | -0.173 | Less Than PCL | 0.02830 | Less Than PCL | Less Than PCL |
| | Apr-07 | 9.0 | 0.00500 | 0.00730 | -4.92 | -0.287 | -0.173 | Yes | 0.02545 | Yes | Yes |
| | Aug-07 | 9.3 | 0.00500 | 0.01000 | -4.61 | -0.257 | -0.173 | Yes | 0.02402 | Yes | Yes |
| **508F04MW** | Jan-08 | 9.7 | 0.00500 | 0.01300 | -4.34 | -0.225 | -0.173 | Yes | 0.02233 | Yes | Yes |
| | Jul-08 | 10.2 | 0.00500 | 0.00590 | -5.13 | -0.215 | -0.173 | Yes | 0.02048 | Yes | Yes |
| | Jan-09 | 10.7 | 0.00500 | 0.00610 | -5.10 | -0.205 | -0.173 | Yes | 0.01872 | Yes | Yes |
| | Jul-09 | 11.2 | 0.00500 | 0.01720 | -4.06 | -0.173 | -0.173 | Yes | 0.01717 | No | Evaluate Further |
| | Jan-10 | 11.7 | 0.00500 | 0.00039 J | -7.85 | -0.219 | -0.173 | Less Than PCL | 0.01576 | Less Than PCL | Less Than PCL |
| | Jul-10 | 12.2 | 0.00500 | 0.00140 | -6.57 | -0.230 | -0.173 | Less Than PCL | 0.01445 | Less Than PCL | Less Than PCL |
| | Jan-11 | 12.7 | 0.00500 | 0.00550 | -5.20 | -0.215 | -0.173 | Yes | 0.01327 | Yes | Yes |
| | Jul-11 | 13.3 | 0.00500 | 0.00570 | -5.17 | -0.200 | -0.173 | Yes | 0.01208 | Yes | Yes |
| | Jan-12 | 13.7 | 0.00500 | 0.0027 | -5.91 | -0.197 | -0.173 | Less Than PCL | 0.01117 | Less Than PCL | Less Than PCL |
| | Jul-12 | 14.2 | 0.00500 | 0.0026 | -5.95 | -0.195 | -0.173 | Less Than PCL | 0.01024 | Less Than PCL | Less Than PCL |
| | Jan-13 | 14.7 | 0.00500 | 0.0187 | -3.98 | -0.166 | -0.173 | No | 0.00940 | No | No |
| | Jul-13 | 15.2 | 0.00500 | 0.0147 | -4.22 | -0.143 | -0.173 | No | 0.00859 | No | No |
| | Feb-14 | 15.9 | 0.00500 | 0.0023 | -6.07 | -0.146 | -0.173 | Less Than PCL | 0.00773 | Less Than PCL | Less Than PCL |
| | Jul-14 | 16.3 | 0.00500 | 0.0319 | -3.45 | -0.118 | -0.173 | No | 0.00721 | No | No |
| | Jan-15 | 16.8 | 0.00500 | 0.00025 U | -8.00 | -0.141 | -0.173 | Less Than PCL | 0.00661 | Less Than PCL | Less Than PCL |
| | Jul-15 | 17.3 | 0.00500 | 0.00197 | -8.00 | -0.160 | -0.173 | Less Than PCL | 0.00605 | Less Than PCL | Less Than PCL |
| | Jan-16 | 17.8 | 0.00500 | 0.0005 U | -8.00 | -0.175 | -0.173 | Less Than PCL | 0.00554 | Less Than PCL | Less Than PCL |
| | Jul-16 | 18.3 | 0.00500 | 0.0005 U | -8.00 | -0.187 | -0.173 | Less Than PCL | 0.00508 | Less Than PCL | Less Than PCL |

mg/L - milligrams per liter
NA - Not Applicable
NS - Not Sampled
NS-D - Not Sampled due to Dry Well

Notes:
Shaded areas indicate an exceedance.
For graphing purposes non-detect concentrations have been assigned a natural log value of -8.
Monitoring Well 50805MW has been covered by a storage container preventing access since July 2010.
Monitoring Well 50804MW was plugged and abandoned in April 2016.
Monitoring Well 508F47MW was destroyed prior to sampling in January 2016.

Analytical Result Qualifiers:

J - Indicates that the chemical was detected. However, the associated numerical result may not be a precise representation of the amount that is actually present in the sample. The laboratory reported concentration is considered to be an estimate of the true concentration.

U - Indicates that the chemical was not detected at the numerical detection limit (sample-specific quantitation limit) noted. Nondetected results from the laboratory are reported in this manner. This qualifier is added to a positive result (reported by the laboratory) if the detected concentration is determined to be attributable to contamination introduced during field sampling or laboratory analysis.

UJ - Indicates that the chemical was not detected. However, the detection limit (sample-specific quantitation limit) is considered to be estimated based on problems encountered during laboratory analysis. The associated numerical detection limit is regarded as inaccurate or imprecise.

# TABLE 4-5
# SUMMARY OF CONCENTRATION vs. DISTANCE ATTENUATION RATE CONSTANTS

**Table 4-5**

**Summary of Concentration vs. Distance Attenuation Rate Constants**
**SWMU 136 South Plume**
**2016 RAER**

**NAS Dallas, Texas**


| Sampling Date | Protective Concentration Levels (mg/L) | Detected Concentration (mg/L) | | | Natural Log of COC Concentration (mg/L) | | | $K_{dist}$ [(mg/L) per foot] |
|---|---|---|---|---|---|---|---|---|
| **Centerline Monitoring Wells** | | **50804MW** | **508F04MW** | **508F47MW** | **50804MW** | **508F04MW** | **508F47MW** | |
| **Distance from source (ft)** | | **0** | **115** | **250** | 0 | 115 | 250 | |
| **Trichloroethene** | | | | | | | | |
| Oct-96 | 0.00500 | 0.01100 | -- | -- | -4.51 | -- | -- | -- |
| Apr-98 | 0.00500 | 0.00350 J | 0.03300 U | -- | -5.65 | -8.00 | -- | -0.0204 |
| Sep-98 | 0.00500 | 0.00310 J | 0.02500 U | -- | -5.78 | -8.00 | -- | -0.0194 |
| Mar-99 | 0.00500 | 0.01700 U | 0.03300 U | -- | -8.00 | -8.00 | -- | 0.0000 |
| Sep-99 | 0.00500 | 0.00150 J | 0.02100 U | -- | -6.50 | -8.00 | -- | -0.0130 |
| Jun-00 | 0.00500 | 0.00500 U | 0.01700 U | 0.00500 U | -8.00 | -8.00 | -8.00 | 0.0000 |
| Jun-01 | 0.00500 | 0.00310 J | 0.01700 U | 0.00500 U | -5.78 | -8.00 | -8.00 | -0.0086 |
| Jan-03 | 0.00500 | 0.06600 | 0.00100 U | 0.00100 U | -2.72 | -8.00 | -8.00 | -0.0205 |
| Sep-03 | 0.00500 | 0.06400 | 0.00044 U | NS | -2.75 | -8.00 | -- | -0.0457 |
| Dec-03 | 0.00500 | 0.04100 | 0.00095 U | 0.00010 U | -3.19 | -8.00 | -8.00 | -0.0187 |
| Jul-04 | 0.00500 | 0.00880 J | 0.00220 J | NS | -4.73 | -3.82 | -- | 0.0080 |
| Oct-04 | 0.00500 | 0.06200 | 0.00220 U | 0.00022 U | -2.78 | -8.00 | -8.00 | -0.0203 |
| Apr-05 | 0.00500 | 0.06800 | 0.00080 J | 0.00030 U | -2.69 | -7.13 | -8.00 | -0.0208 |
| Oct-05 | 0.00500 | 0.11000 J | 0.00030 U | 0.00030 U | -2.21 | -8.00 | -8.00 | -0.0225 |
| May-06 | 0.00500 | 0.04700 | 0.00040 U | 0.00040 U | -3.06 | -8.00 | -8.00 | -0.0192 |
| Aug-06 | 0.00500 | 0.19000 | 0.00040 U | 0.00040 U | -1.66 | -8.00 | -8.00 | -0.0247 |
| Apr-07 | 0.00500 | 0.00600 | 0.00014 U | 0.00014 U | -5.12 | -8.00 | -8.00 | -0.0112 |
| Aug-07 | 0.00500 | 0.01200 | 0.00023 U | 0.00023 U | -4.42 | -8.00 | -8.00 | -0.0139 |
| Jan-08 | 0.00500 | 0.00960 | 0.00053 U | 0.00053 U | -4.65 | -8.00 | -8.00 | -0.0130 |
| Jul-08 | 0.00500 | 0.00150 | 0.00032 U | 0.00032 U | -6.50 | -8.00 | -8.00 | -0.0058 |
| Jan-09 | 0.00500 | 0.00032 U | 0.00032 U | 0.00032 U | -8.00 | -8.00 | -8.00 | 0.0000 |
| Jul-09 | 0.00500 | 0.00610 | 0.00032 U | 0.05560 | -5.10 | -8.00 | -2.89 | 0.0097 |
| Jan-10 | 0.00500 | 0.00024 U | 0.00024 U | 0.00230 | -8.00 | -8.00 | -6.07 | 0.0079 |
| Jul-10 | 0.00500 | 0.00024 U | 0.00024 U | 0.00045 J | -8.00 | -8.00 | -7.71 | 0.0012 |
| Jan-11 | 0.00500 | 0.00120 | 0.00026 U | 0.00720 | -6.73 | -8.00 | -4.93 | 0.0076 |
| Jul-11 | 0.00500 | 0.00180 | 0.00026 U | 0.00250 | -6.32 | -8.00 | -5.99 | 0.0017 |
| Jan-12 | 0.00500 | 0.00099 J | 0.00026 U | 0.03100 | -6.92 | -8.00 | -3.47 | 0.0144 |
| Jul-12 | 0.00500 | 0.00026 U | 0.00026 U | 0.06890 | -8.00 | -8.00 | -2.68 | 0.0218 |
| Jan-13 | 0.00500 | 0.00031 U | 0.00031 U | 0.0015 | -8.00 | -8.00 | -6.50 | 0.0061 |
| Jul-13 | 0.00500 | 0.00031 U | 0.00031 U | 0.00031 U | -8.00 | -8.00 | -8.00 | 0.0000 |
| Feb-14 | 0.00500 | 0.00030 U | 0.0003 U | 0.14100 | -8.00 | -8.00 | -1.96 | 0.0248 |
| Jul-14 | 0.00500 | 0.0005 U | 0.0005 U | 0.13200 | -8.00 | -8.00 | -2.02 | 0.0245 |
| Jan-15 | 0.00500 | 0.00025 U | 0.0005 U | 0.00849 | -8.00 | -8.00 | -4.77 | 0.0133 |
| Jul-15 | 0.00500 | 0.00025 U | 0.0005 U | 0.08370 | -8.00 | -8.00 | -4.77 | 0.0133 |
| Jan-16 | 0.00500 | -- | 0.0005 U | -- | -- | -8.00 | -- | -- |
| Jul-16 | 0.00500 | -- | 0.0005 U | -- | -- | -8.00 | -- | -- |

**Table 4-5**

**Summary of Concentration vs. Distance Attenuation Rate Constants**
**SWMU 136 South Plume**
**2016 RAER**

**NAS Dallas, Texas**


| Sampling Date | Protective Concentration Levels (mg/L) | Detected Concentration (mg/L) | | | Natural Log of COC Concentration (mg/L) | | | $K_{dist}$ [(mg/L) per foot] |
|---|---|---|---|---|---|---|---|---|
| **Centerline Monitoring Wells** | | **50804MW** | **508F04MW** | **508F47MW** | **50804MW** | **508F04MW** | **508F47MW** | |
| **Distance from source (ft)** | | **0** | **115** | **250** | 0 | 115 | 250 | |
| **cis-1,2-Dichloroethene** | | | | | | | | |
| Oct-96 | 0.07000 | -- | -- | -- | -- | -- | -- | -- |
| Apr-98 | 0.07000 | 0.00770 J | 0.64000 | -- | -4.87 | -0.45 | -- | 0.0385 |
| Sep-98 | 0.07000 | 0.07500 | 0.60000 | -- | -2.59 | -0.51 | -- | 0.0181 |
| Mar-99 | 0.07000 | 0.01500 J | 0.44000 | -- | -4.20 | -0.82 | -- | 0.0294 |
| Sep-99 | 0.07000 | 0.02300 | 0.42000 | -- | -3.77 | -0.87 | -- | 0.0253 |
| Jun-00 | 0.07000 | 0.02000 | 0.50000 | 0.00500 U | -3.91 | -0.69 | -8.00 | -0.0175 |
| Jun-01 | 0.07000 | 0.12000 | 0.42000 | 0.00250 U | -2.12 | -0.87 | -8.00 | -0.0244 |
| Jan-03 | 0.07000 | 0.28000 | 0.01300 | 0.00100 U | -1.27 | -4.34 | -8.00 | -0.0269 |
| Sep-03 | 0.07000 | 0.52000 | 0.05100 | NS | -0.65 | -2.98 | -- | -0.0202 |
| Dec-03 | 0.07000 | 0.38000 | 0.19000 | 0.00016 U | -0.97 | -1.66 | -8.00 | -0.0287 |
| Jul-04 | 0.07000 | 0.17000 | 0.17000 J | NS | -1.77 | -1.77 | -- | 0.0000 |
| Oct-04 | 0.07000 | 0.48000 | 0.17000 | 0.00027 U | -0.73 | -1.77 | -8.00 | -0.0296 |
| Apr-05 | 0.07000 | 0.53000 | 0.18000 | 0.00030 U | -0.63 | -1.71 | -8.00 | -0.0300 |
| Oct-05 | 0.07000 | 0.68000 | 0.08500 | 0.00030 U | -0.39 | -2.47 | -8.00 | -0.0308 |
| May-06 | 0.07000 | 0.39000 J | 0.01800 | 0.00050 U | -0.94 | -4.02 | -8.00 | -0.0283 |
| Aug-06 | 0.07000 | 0.98000 J | 0.04300 J | 0.00100 UJ | -0.02 | -3.15 | -6.91 | -0.0276 |
| Apr-07 | 0.07000 | 0.20000 | 0.00840 | 0.00110 | -1.61 | -4.78 | -6.81 | -0.0207 |
| Aug-07 | 0.07000 | 0.44000 | 0.09700 | 0.00055 J | -0.82 | -2.33 | -7.51 | -0.0271 |
| Jan-08 | 0.07000 | 0.29000 | 0.07500 | 0.00032 U | -1.24 | -2.59 | -8.00 | -0.0275 |
| Jul-08 | 0.07000 | 0.09450 | 0.04650 | 0.0002 U | -2.36 | -3.07 | -8.00 | -0.0230 |
| Jan-09 | 0.07000 | 0.00020 U | 0.00170 | 0.00230 | -8.00 | -6.38 | -6.07 | 0.0076 |
| Jul-09 | 0.07000 | 0.12000 | 0.03300 | 0.13900 | -2.12 | -3.41 | -1.97 | 0.0009 |
| Jan-10 | 0.07000 | 0.04730 | 0.00032 U | 0.00910 | -3.05 | -8.00 | -4.70 | -0.0057 |
| Jul-10 | 0.07000 | 0.01690 | 0.00430 | 0.00460 | -4.08 | -5.45 | -5.38 | -0.0050 |
| Jan-11 | 0.07000 | 0.03910 | 0.04200 | 0.02230 | -3.24 | -3.17 | -3.80 | -0.0023 |
| Jul-11 | 0.07000 | 0.05210 | 0.02180 | 0.01240 | -2.95 | -3.83 | -4.39 | -0.0057 |
| Jan-12 | 0.07000 | 0.02810 | 0.00960 | 0.10100 | -3.57 | -4.65 | -2.29 | 0.0055 |
| Jul-12 | 0.07000 | 0.00460 | 0.00720 | 0.24200 | -5.38 | -4.93 | -1.42 | 0.0162 |
| Jan-13 | 0.07000 | 0.04320 | 0.00024 U | 0.0292 | -3.14 | -8.00 | -1.23 | 0.0089 |
| Jul-13 | 0.07000 | 0.00630 | 0.0082 | 0.00024 U | -3.17 | -4.80 | -8.00 | -0.0195 |
| Feb-14 | 0.07000 | 0.00330 | 0.0017 | 0.25700 | -5.71 | -6.38 | -1.36 | 0.0180 |
| Jul-14 | 0.07000 | 0.00209 | 0.00126 J | 0.37200 | -6.17 | -6.68 | -0.99 | 0.0214 |
| Jan-15 | 0.07000 | 0.00289 | 0.000546 J | 0.04060 | -5.85 | -7.51 | -3.20 | 0.0112 |
| Jul-15 | 0.07000 | 0.00121 | 0.00308 | 0.30800 | -5.85 | -5.78 | -1.18 | 0.0191 |
| Jan-16 | 0.07000 | -- | 0.00196 J | -- | -- | -6.23 | -- | -- |
| Jul-16 | 0.07000 | -- | 0.00208 | -- | -- | -6.18 | -- | -- |

**Table 4-5**

**Summary of Concentration vs. Distance Attenuation Rate Constants**
**SWMU 136 South Plume**
**2016 RAER**

**NAS Dallas, Texas**
**Page 3 of 4**

| Sampling Date | Protective Concentration Levels (mg/L) | Detected Concentration (mg/L) | | | Natural Log of COC Concentration (mg/L) | | | $K_{dist}$ [(mg/L) per foot] |
|---|---|---|---|---|---|---|---|---|
| **Centerline Monitoring Wells** | | **50804MW** | **508F04MW** | **508F47MW** | **50804MW** | **508F04MW** | **508F47MW** | |
| **Distance from source (ft)** | | **0** | **115** | **250** | 0 | 115 | 250 | |
| **Vinyl Chloride** | | | | | | | | |
| Oct-96 | 0.00200 | 0.01000 U | -- | -- | -8.00 | -- | -- | -- |
| Apr-98 | 0.00200 | 0.00830 U | 0.03300 U | -- | -8.00 | -8.00 | -- | 0.0000 |
| Sep-98 | 0.00200 | 0.01200 U | 0.02500 U | -- | -8.00 | -8.00 | -- | 0.0000 |
| Mar-99 | 0.00200 | 0.01700 U | 0.03300 U | -- | -8.00 | -8.00 | -- | 0.0000 |
| Sep-99 | 0.00200 | 0.00500 U | 0.02100 U | -- | -8.00 | -8.00 | -- | 0.0000 |
| Jun-00 | 0.00200 | 0.00500 U | 0.01700 U | 0.00500 U | -8.00 | -8.00 | -8.00 | 0.0000 |
| Jun-01 | 0.00200 | 0.01000 U | 0.03300 U | 0.01000 U | -8.00 | -8.00 | -8.00 | 0.0000 |
| Jan-03 | 0.00200 | 0.01000 U | 0.00100 U | 0.00100 U | -8.00 | -8.00 | -8.00 | 0.0000 |
| Sep-03 | 0.00200 | 0.00520 U | 0.00052 U | NS | -8.00 | -8.00 | -- | 0.0000 |
| Dec-03 | 0.00200 | 0.00250 U | 0.00170 U | 0.00017 U | -8.00 | -8.00 | -8.00 | 0.0000 |
| Jul-04 | 0.00200 | 0.00170 U | 0.00084 U | NS | -8.00 | -8.00 | -- | 0.0000 |
| Oct-04 | 0.00200 | 0.00340 U | 0.00170 U | 0.00017 U | -8.00 | -8.00 | -8.00 | 0.0000 |
| Apr-05 | 0.00200 | 0.00030 U | 0.00100 J | 0.00030 U | -8.00 | -6.91 | -8.00 | -0.0002 |
| Oct-05 | 0.00200 | 0.00300 J | 0.00030 U | 0.00030 U | -5.81 | -8.00 | -8.00 | -0.0085 |
| May-06 | 0.00200 | 0.00200 | 0.02000 | 0.00060 U | -6.21 | -3.91 | -8.00 | -0.0078 |
| Aug-06 | 0.00200 | 0.00900 | 0.01700 | 0.00060 U | -4.71 | -4.07 | -8.00 | -0.0136 |
| Apr-07 | 0.00200 | 0.0056 J | 0.00930 | 0.00012 U | -5.18 | -4.68 | -8.00 | -0.0117 |
| Aug-07 | 0.00200 | 0.01200 | 0.02400 | 0.00020 U | -4.42 | -3.73 | -8.00 | -0.0148 |
| Jan-08 | 0.00200 | 0.00630 | 0.01300 | 0.00043 U | -5.07 | -4.34 | -8.00 | -0.0122 |
| Jul-08 | 0.00200 | 0.00630 | 0.01600 | 0.00030 U | -5.07 | -4.14 | -8.00 | -0.0122 |
| Jan-09 | 0.00200 | 0.00021 U | 0.00710 | 0.00030 U | -8.00 | -4.95 | -8.00 | -0.0006 |
| Jul-09 | 0.00200 | 0.00600 | 0.01500 | 0.00095 J | -5.12 | -4.20 | -6.96 | -0.0078 |
| Jan-10 | 0.00200 | 0.00170 | 0.00028 U | 0.00028 U | -6.38 | -8.00 | -8.00 | -0.0063 |
| Jul-10 | 0.00200 | 0.00066 J | 0.00140 | 0.00033 J | -7.32 | -6.57 | -8.02 | -0.0030 |
| Jan-11 | 0.00200 | 0.00042 J | 0.00900 | 0.00022 U | -7.78 | -4.71 | -8.00 | -0.0016 |
| Jul-11 | 0.00200 | 0.00140 | 0.01150 | 0.00022 U | -6.57 | -4.47 | -8.00 | -0.0063 |
| Jan-12 | 0.00200 | 0.00022 U | 0.00490 | 0.00046 J | -8.00 | -5.32 | -7.68 | 0.0007 |
| Jul-12 | 0.00200 | 0.00022 U | 0.00390 | 0.00110 | -8.00 | -5.55 | -6.81 | 0.0044 |
| Jan-13 | 0.00200 | 0.00044 U | 0.00044 U | 0.00044 U | -8.00 | -8.00 | -8.00 | 0.0000 |
| Jul-13 | 0.00200 | 0.00044 U | 0.0031 | 0.00044 U | -8.00 | -5.78 | -8.00 | -0.0005 |
| Feb-14 | 0.00200 | 0.00033 U | 0.001 | 0.00110 J | -8.00 | -6.91 | -6.81 | 0.0046 |
| Jul-14 | 0.00200 | 0.0005 U | 0.00078 J | 0.00063 J | -8.00 | -7.16 | -7.37 | 0.0024 |
| Jan-15 | 0.00200 | 0.00025 U | 0.00025 U | 0.00025 U | -8.00 | -8.00 | -8.00 | 0.0000 |
| Jul-15 | 0.00200 | 0.00025 U | 0.00571 | 0.000735 J | -8.00 | -5.17 | -7.22 | 0.0026 |
| Jan-16 | 0.00200 | -- | 0.00071 J | -- | -- | -7.25 | -- | -- |
| Jul-16 | 0.00200 | -- | 0.00488 | -- | -- | -5.32 | -- | -- |

**Table 4-5**

**Summary of Concentration vs. Distance Attenuation Rate Constants**
**SWMU 136 South Plume**
**2016 RAER**

**NAS Dallas, Texas**


| Sampling Date | Protective Concentration Levels (mg/L) | Detected Concentration (mg/L) | | | Natural Log of COC Concentration (mg/L) | | | $K_{dist}$ [(mg/L) per foot] |
|---|---|---|---|---|---|---|---|---|
| **Centerline Monitoring Wells** | | **50804MW** | **508F04MW** | **508F47MW** | **50804MW** | **508F04MW** | **508F47MW** | |
| **Distance from source (ft)** | | **0** | **115** | **250** | 0 | 115 | 250 | |
| **Benzene** | | | | | | | | |
| Jan-95 | 0.00500 | 0.00500 U | -- | -- | -8.00 | -- | -- | -- |
| Mar-98 | 0.00500 | 0.00830 U | 0.12000 | -- | -8.00 | -2.12 | -- | 0.0512 |
| Sep-98 | 0.00500 | 0.01200 U | 0.04000 | -- | -8.00 | -3.22 | -- | 0.0416 |
| Feb-99 | 0.00500 | 0.01700 U | 0.06800 | -- | -8.00 | -2.69 | -- | 0.0462 |
| Aug-99 | 0.00500 | 0.00500 U | 0.02000 J | -- | -8.00 | -3.91 | -- | 0.0356 |
| Jun-00 | 0.00500 | 0.00370 J | 0.01800 | 0.00500 U | -5.60 | -4.02 | -8.00 | -0.0102 |
| Jun-01 | 0.00500 | 0.00100 J | 0.03700 | 0.00500 U | -6.91 | -3.30 | -8.00 | -0.0052 |
| Jan-03 | 0.00500 | 0.01000 U | 0.00650 | 0.00100 U | -8.00 | -5.04 | -8.00 | -0.0006 |
| Aug-03 | 0.00500 | 0.00400 U | 0.01000 | NS | -8.00 | -4.61 | -- | 0.0295 |
| Dec-03 | 0.00500 | 0.00170 U | 0.00110 U | 0.00011 U | -8.00 | -8.00 | -8.00 | 0.0000 |
| Jul-04 | 0.00500 | 0.00250 U | 0.00900 | NS | -8.00 | -4.71 | -- | 0.0286 |
| Oct-04 | 0.00500 | 0.00500 U | 0.02000 J | 0.00025 U | -8.00 | -3.91 | -8.00 | -0.0009 |
| Apr-05 | 0.00500 | 0.00100 | 0.00200 | 0.00030 U | -6.91 | -6.21 | -8.00 | -0.0046 |
| Oct-05 | 0.00500 | 0.00070 J | 0.01100 | 0.00030 U | -7.26 | -4.51 | -8.00 | -0.0036 |
| May-06 | 0.00500 | 0.00100 | 0.02200 | 0.0050 U | -6.91 | -3.82 | -8.00 | -0.0051 |
| Aug-06 | 0.00500 | 0.00100 J | 0.00300 J | 0.00100 UJ | -6.91 | -5.81 | -6.91 | -0.0002 |
| Apr-07 | 0.00500 | 0.00210 | 0.00730 | 0.00013 U | -6.17 | -5.81 | -6.91 | -0.0031 |
| Aug-07 | 0.00500 | 0.00230 J | 0.01000 | 0.00012 U | -6.07 | -4.61 | -8.00 | -0.0082 |
| Jan-08 | 0.00500 | 0.00130 | 0.00720 | 0.00039 U | -6.65 | -4.93 | -8.00 | -0.0059 |
| Jul-08 | 0.00500 | 0.00130 | 0.00590 | 0.00040 U | -6.65 | -5.13 | -8.00 | -0.0059 |
| Jan-09 | 0.00500 | 0.00040 U | 0.00610 | 0.00040 U | -8.00 | -5.10 | -8.00 | -0.0006 |
| Jul-09 | 0.00500 | 0.00160 | 0.01720 | 0.00040 U | -6.44 | -4.06 | -8.00 | -0.0069 |
| Jan-10 | 0.00500 | 0.00150 | 0.00039 J | 0.00039 J | -6.50 | -7.85 | -7.85 | -0.0052 |
| Jul-10 | 0.00500 | 0.00190 | 0.00140 | 0.00140 | -6.27 | -6.57 | -6.57 | -0.0012 |
| Jan-11 | 0.00500 | 0.00070 J | 0.00550 | 0.00020 U | -7.26 | -5.20 | -8.00 | -0.0035 |
| Jul-11 | 0.00500 | 0.00020 U | 0.00570 | 0.00020 U | -8.00 | -5.17 | -8.00 | -0.0006 |
| Jan-12 | 0.00500 | 0.00023 J | 0.00270 | 0.00020 U | -8.38 | -5.91 | -8.00 | 0.0010 |
| Jul-12 | 0.00500 | 0.00020 U | 0.00260 | 0.00020 U | -8.00 | -5.95 | -8.00 | -0.0004 |
| Jan-13 | 0.00500 | 0.00021 U | 0.0187 | 0.00021 U | -8.00 | -3.98 | -8.00 | -0.0009 |
| Jul-13 | 0.00500 | 0.00021 U | 0.0147 | 0.00021 U | -8.00 | -4.22 | -8.00 | -0.0008 |
| Feb-14 | 0.00500 | 0.00024 U | 0.0023 | 0.00049 U | -8.00 | -6.07 | -8.00 | -0.0004 |
| Jul-14 | 0.00500 | 0.0005 U | 0.0319 | 0.0005 U | -8.00 | -3.45 | -8.00 | -0.0010 |
| Jan-15 | 0.00500 | 0.00025 U | 0.00025 U | 0.0005 U | -8.00 | -3.45 | -8.00 | -0.0010 |
| Jul-15 | 0.00500 | 0.00025 U | 0.00197 | 0.0005 U | -8.00 | -6.23 | -8.00 | -0.0004 |
| Jan-16 | 0.00500 | -- | 0.0005 U | -- | -- | -8.00 | -- | -- |
| Jul-16 | 0.00500 | -- | 0.0005 U | -- | -- | -8.00 | -- | -- |

ft - feet
mg/L - milligrams per liter
NA - Not Applicable
NS - Not Sampled

Notes:
Shaded areas indicate an exceedance.
For graphing purposes non-detect concentrations and estimated concentrations below 0.0003 mg/L have been assigned a natural log value of -8.
Monitoring Well 50804MW was plugged and abandoned in April 2016.
Monitoring Well 508F47MW was destroyed prior to sampling in January 2016.

Analytical Result Qualifiers:
J - Indicates that the chemical was detected. However, the associated numerical result may not be a precise representation of the amount that is actually present in the sample. The laboratory reported concentration is considered to be an estimate of the true concentration.
U - Indicates that the chemical was not detected at the numerical detection limit (sample-specific quantitation limit) noted. Nondetected results from the laboratory are reported in this manner. This qualifier is added to a positive result (reported by the laboratory) if the detected concentration is determined to be attributable to contamination introduced during field sampling or laboratory analysis.

# Plug and Abandonment, Well Installation Documentation

# STATE OF TEXAS PLUGGING REPORT for Tracking #158498

| | | | |
|---|---|---|---|
| Owner: | NAS Dallas | Owner Well #: | 60-19 |
| Address: | 8100 West Jefferson<br>Grand Prairie, TX 75051 | Grid #: | 33-17-1 |
| Well Location: | 8100 West Jefferson<br>Grand Prairie, TX 75051 | Latitude: | 32° 44' 25.8" N |
| | | Longitude: | 096° 57' 46.3" W |
| Well County: | Dallas | Elevation: | No Data |
| Well Type: | Monitor | | |

*Drilling Information*

| | | | |
|---|---|---|---|
| Company: | No Data | Date Drilled: | No Data |
| Driller: | No Data | License Number: | No Data |

| | Diameter (in.) | Top Depth (ft.) | Bottom Depth (ft.) |
|---|---|---|---|
| Borehole: | | 0 | 36.4 |

*Plugging Information*

Date Plugged: **4/7/2016** Plugger:

Plug Method: **Pour in 3/8 bentonite chips when standing water in well is less than 100 feet depth, cement top 2 feet**

Casing Left in Well: **No Data**

Plug(s) Placed in Well:

| Top (ft.) | Bottom (ft.) | Description (number of sacks & material) |
|---|---|---|
| 0 | 2 | Cement 2 Bags/Sacks |
| 2 | 36.4 | Bentonite 4 Bags/Sacks |

Certification Data: The driller certified that the driller plugged this well (or the well was plugged under the driller's direct supervision) and that each and all of the statements herein are true and correct. The driller understood that failure to complete the required items will result in the reports(s) being returned for completion and resubmittal.

Company Information: **Strata Core Services, LLC**
**112 S. Norwood Drive**
**Hurst, TX 76053**

Driller Name: **Brad Eskue** License Number: **58164**

Comments: **No Data**

# STATE OF TEXAS PLUGGING REPORT for Tracking #158497

| | | | |
|---|---|---|---|
| Owner: | NAS Dallas | Owner Well #: | 508F43MW |
| Address: | 8100 West Jefferson<br>Grand Prairie, TX 75051 | Grid #: | 33-17-1 |
| Well Location: | 8100 West Jefferson<br>Grand Prairie, TX 75051 | Latitude: | 32° 44' 25.8" N |
| | | Longitude: | 096° 57' 46.3" W |
| Well County: | Dallas | Elevation: | No Data |
| Well Type: | Monitor | | |

*Drilling Information*

| | | | |
|---|---|---|---|
| Company: | No Data | Date Drilled: | No Data |
| Driller: | No Data | License Number: | No Data |

| | Diameter (in.) | Top Depth (ft.) | Bottom Depth (ft.) |
|---|---|---|---|
| Borehole: | | 0 | 20 |

*Plugging Information*

Date Plugged: **4/7/2016** Plugger:

Plug Method: **Pour in 3/8 bentonite chips when standing water in well is less than 100 feet depth, cement top 2 feet**

Casing Left in Well: **No Data**

Plug(s) Placed in Well:

| Top (ft.) | Bottom (ft.) | Description (number of sacks & material) |
|---|---|---|
| 0 | 2 | Cement 2 Bags/Sacks |
| 2 | 20 | Bentonite 2 Bags/Sacks |

Certification Data: The driller certified that the driller plugged this well (or the well was plugged under the driller's direct supervision) and that each and all of the statements herein are true and correct. The driller understood that failure to complete the required items will result in the reports(s) being returned for completion and resubmittal.

Company Information: **Strata Core Services, LLC**
**112 S. Norwood Drive**
**Hurst, TX 76053**

Driller Name: **Brad Eskue** License Number: **58164**

Comments: **No Data**

# STATE OF TEXAS PLUGGING REPORT for Tracking #158496

| | | | |
|---|---|---|---|
| Owner: | NAS Dallas | Owner Well #: | 50804MW |
| Address: | 8100 West Jefferson<br>Grand Prairie, TX 75051 | Grid #: | 33-17-1 |
| Well Location: | 8100 West Jefferson<br>Grand Prairie, TX 75051 | Latitude: | 32° 44' 25.8" N |
| | | Longitude: | 096° 57' 46.3" W |
| Well County: | Dallas | Elevation: | No Data |
| Well Type: | Monitor | | |

*Drilling Information*

| | | | |
|---|---|---|---|
| Company: | No Data | Date Drilled: | No Data |
| Driller: | No Data | License Number: | No Data |

| | Diameter (in.) | Top Depth (ft.) | Bottom Depth (ft.) |
|---|---|---|---|
| Borehole: | | 0 | 18.8 |

*Plugging Information*

Date Plugged: **4/7/2016** Plugger:

Plug Method: **Pour in 3/8 bentonite chips when standing water in well is less than 100 feet depth, cement top 2 feet**

Casing Left in Well: **No Data**

Plug(s) Placed in Well:

| Top (ft.) | Bottom (ft.) | Description (number of sacks & material) |
|---|---|---|
| 0 | 2 | Cement 2 Bags/Sacks |
| 2 | 18.8 | Bentonite 2 Bags/Sacks |

Certification Data: The driller certified that the driller plugged this well (or the well was plugged under the driller's direct supervision) and that each and all of the statements herein are true and correct. The driller understood that failure to complete the required items will result in the reports(s) being returned for completion and resubmittal.

Company Information: **Strata Core Services, LLC**
**112 S. Norwood Drive**
**Hurst, TX 76053**

Driller Name: **Brad Eskue** License Number: **58164**

Comments: **No Data**

# APPENDIX 5
# SAMPLING PROCEDURES

Sampling collection and handling procedures were updated to follow Uniform Federal Policy (UFP) for Sample and Analysis Plans in the document titled, Tier II Sampling and Analysis Plan, Long Term Groundwater Monitoring Plan, Former Naval Air Station Dallas, Dallas, Texas, dated December 2014.

# APPENDIX 6
# LABORATORY DATA PACKAGES AND DATA USABILITY SUMMARIES

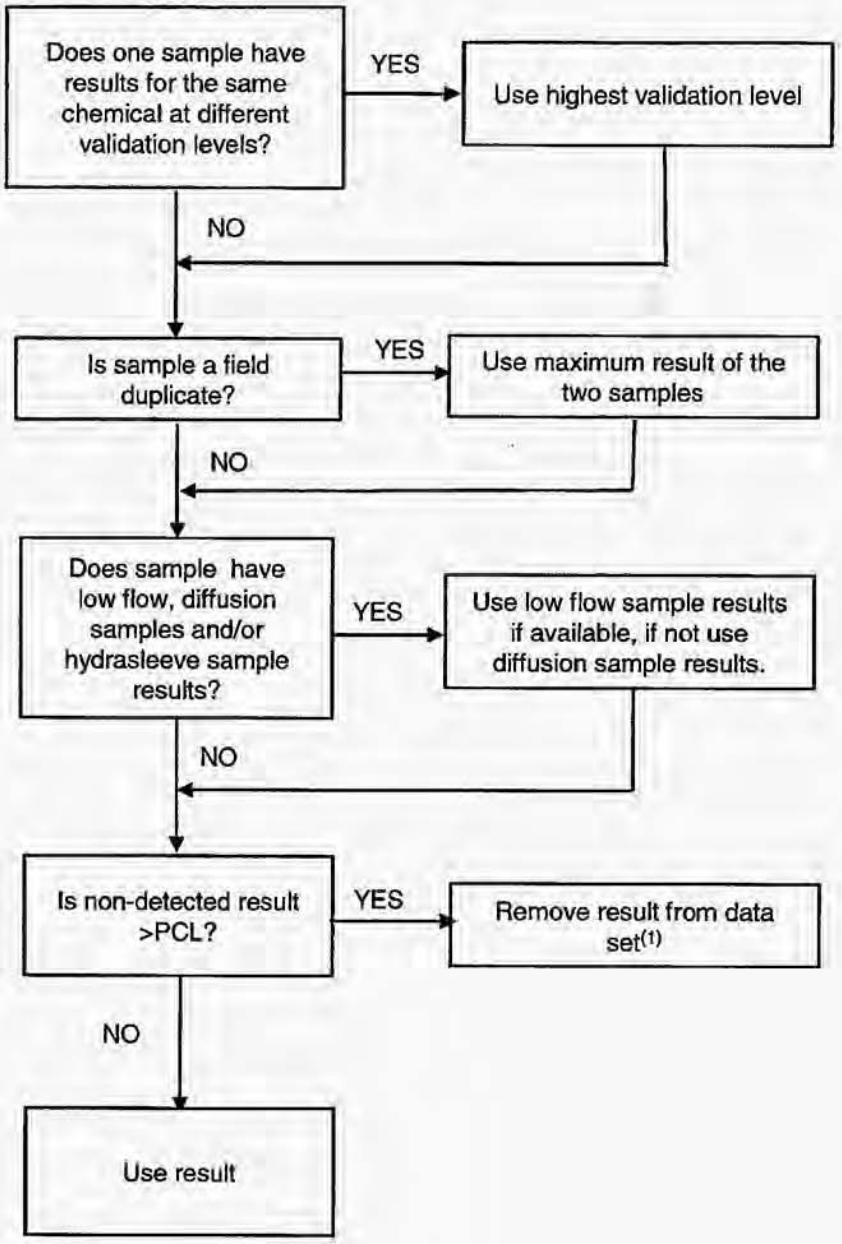
See the attached CD for the Laboratory Analytical Reports —
submitted with the 2016 RAER for SWMU 17/Building 1423
(sorted by Sample Delivery Group Number)

# APPENDIX 7
# STATISTICAL METHODOLOGY

Statistical Methodology has been submitted with the 2016 RAER for SWMU 17/Building 1423

GROUNDWATER DATABASE DEVELOPMENT FOR GRAPHING AND MANN KENDALL STATISTICAL EVALUATION
CATEGORY F MNA GROUNDWATER MODELING REPORT ADDENDUM

NAS DALLAS, TEXAS




NOTES:

(1) For 1,1,2,2-PCA and vinyl chloride the TRRP RES A limit < MDL of 5 U therefore only the non-detects > 5 U were removed from the data set.

# STDEV

See Also

Estimates standard deviation based on a sample. The standard deviation is a measure of how widely values are dispersed from the average value (the mean).

**Syntax**

**STDEV(number1**,number2,...)

Number1, number2, ... are 1 to 30 number arguments corresponding to a sample of a population. You can also use a single array or a reference to an array instead of arguments separated by commas.

**Remarks**

- STDEV assumes that its arguments are a sample of the population. If your data represents the entire population, then compute the standard deviation using STDEVP.
- The standard deviation is calculated using the "nonbiased" or "n-1" method.
- STDEV uses the following formula:
- $$\sqrt{\frac{n\sum x^2-\left(\sum x\right)^2}{n(n-1)}}$$

$$\sqrt{\frac{n\sum x^2-\left(\sum x\right)^2}{n(n-1)}}$$

- Logical values such as TRUE and FALSE and text are ignored. If logical values and text must not be ignored, use the STDEVA worksheet function.

**Example**

Suppose 10 tools stamped from the same machine during a production run are collected as a random sample and measured for breaking strength.

The example may be easier to understand if you copy it to a blank worksheet.

How?

| | A |
|---|---|
| 1 | **Strength** |
| 2 | 1345 |
| 3 | 1301 |
| 4 | 1368 |
| 5 | 1322 |
| 6 | 1310 |
| 7 | 1370 |
| 8 | 1318 |
| 9 | 1350 |
| 10 | 1303 |
| 11 | 1299 |

| Formula | Description (Result) |
|---|---|
| =STDEV(A2:A11) | Standard deviation of breaking strength (27.46391572) |

# BEST-FIT LINE USING LINEAR REGRESSION

# LINEST

See Also

Calculates the statistics for a line by using the "least squares" method to calculate a straight line that best fits your data, and returns an array that describes the line. Because this function returns an array of values, it must be entered as an array formula.

The equation for the line is:

y = mx + b or

y = m1x1 + m2x2 + ... + b (if there are multiple ranges of x-values)

where the dependent y-value is a function of the independent x-values. The m-values are coefficients corresponding to each x-value, and b is a constant value. Note that y, x, and m can be vectors. The array that LINEST returns is {mn,mn-1,...,m1,b}. LINEST can also return additional regression statistics.

**Syntax**

**LINEST(known_y's**,known_x's,const,stats)

Known_y's is the set of y-values you already know in the relationship y = mx + b.

- If the array known_y's is in a single column, then each column of known_x's is interpreted as a separate variable.
- If the array known_y's is in a single row, then each row of known_x's is interpreted as a separate variable.

Known_x's is an optional set of x-values that you may already know in the relationship y = mx + b.

- The array known_x's can include one or more sets of variables. If only one variable is used, known_y's and known_x's can be ranges of any shape, as long as they have equal dimensions. If more than one variable is used, known_y's must be a vector (that is, a range with a height of one row or a width of one column).
- If known_x's is omitted, it is assumed to be the array {1,2,3,...} that is the same size as known_y's.

Const is a logical value specifying whether to force the constant b to equal 0.

- If const is TRUE or omitted, b is calculated normally.
- If const is FALSE, b is set equal to 0 and the m-values are adjusted to fit y = mx.

Stats is a logical value specifying whether to return additional regression statistics.

- If stats is TRUE, LINEST returns the additional regression statistics, so the returned array is {mn,mn-1,...,m1,b;sen,sen-1,...,se1,seb;r2,sey;F,df;ssreg,ssresid}.
- If stats is FALSE or omitted, LINEST returns only the m-coefficients and the constant b.

The additional regression statistics are as follows.

| Statistic | Description |
|---|---|
| se1,se2,...,sen | The standard error values for the coefficients m1,m2,...,mn. |
| Seb | The standard error value for the constant b (seb = #N/A when const is FALSE). |
| r2 | The coefficient of determination. Compares estimated and actual y-values, and ranges in value from 0 to 1. If it is 1, there is a perfect correlation in the sample — there is no difference between the estimated y-value and the actual y-value. At the other extreme, if the coefficient of determination is 0, the regression equation is not helpful in predicting a y-value. For information about how r2 is calculated, see "Remarks" later in this topic. |
| sey | The standard error for the y estimate. |
| F | The F statistic, or the F-observed value. Use the F statistic to determine whether the observed relationship between the dependent and independent variables occurs by chance. |
| df | The degrees of freedom. Use the degrees of freedom to help you find F-critical values in a statistical table. Compare the values you find in the table to the F statistic returned by LINEST to determine a confidence level for the model. |
| ssreg | The regression sum of squares. |
| ssresid | The residual sum of squares. |

The following illustration shows the order in which the additional regression statistics are returned.

| | A | B | C | D | E | F |
|---|---|---|---|---|---|---|
| 1 | $m_n$ | $m_{n-1}$ | ... | $m_2$ | $m_1$ | b |
| 2 | $se_n$ | $se_{n-1}$ | ... | $se_2$ | $se_1$ | $se_b$ |
| 3 | $r_2$ | $se_y$ | | | | |
| 4 | F | $d_f$ | | | | |
| 5 | $ss_{reg}$ | $ss_{resid}$ | | | | |

**Remarks**

- You can describe any straight line with the slope and the y-intercept:

  Slope (m):
  To find the slope of a line, often written as m, take two points on the line, (x1,y1) and (x2,y2); the slope is equal to (y2 - y1)/(x2 - x1).

  Y-intercept (b):
  The y-intercept of a line, often written as b, is the value of y at the point where the line crosses the y-axis.

  The equation of a straight line is y = mx + b. Once you know the values of m and b, you can calculate any point on the line by plugging the y- or x-value into that equation. You can also use the TREND function.

- When you have only one independent x-variable, you can obtain the slope and y-intercept values directly by using the following formulas:

  Slope:
  =INDEX(LINEST(known_y's,known_x's),1)

  Y-intercept:
  =INDEX(LINEST(known_y's,known_x's),2)

- The accuracy of the line calculated by LINEST depends on the degree of scatter in your data. The more linear the data, the more accurate the LINEST model. LINEST uses the method of least squares for determining the best fit for the data. When you have only one independent x-variable, the calculations for m and b are based on the following formulas:

$$m = \frac{n\left(\sum xy\right) - \left(\sum x\right)\left(\sum y\right)}{n\left(\sum\left(x^2\right)\right) - \left(\sum x\right)^2}$$

$$b = \frac{\left(\sum y\right)\left(\sum\left(x^2\right)\right) - \left(\sum x\right)\left(\sum xy\right)}{n\left(\sum\left(x^2\right)\right) - \left(\sum x\right)^2}$$

- The line- and curve-fitting functions LINEST and LOGEST can calculate the best straight line or exponential curve that fits your data. However, you have to decide which of the two results best fits your data. You can calculate TREND(known_y's,known_x's) for a straight line, or GROWTH(known_y's, known_x's) for an exponential curve. These functions, without the new_x's argument, return an array of y-values predicted along that line or curve at your actual data points. You can then compare the predicted values with the actual values. You may want to chart them both for a visual comparison.

- In regression analysis, Microsoft Excel calculates for each point the squared difference between the y-value estimated for that point and its actual y-value. The sum of these squared differences is called the residual sum of squares. Microsoft Excel then calculates the sum of the squared differences between the actual y-values and the average of the y-values, which is called the total sum of squares (regression sum of squares + residual sum of squares). The smaller the residual sum of squares is, compared with the total sum of squares, the larger the value of the coefficient of determination, r2, which is an indicator of how well the equation resulting from the regression analysis explains the relationship among the variables.

- Formulas that return arrays must be entered as array formulas.

- When entering an array constant such as known_x's as an argument, use commas to separate values in the same row and semicolons to separate rows. Separator characters may be different depending on your locale setting in **Regional Settings** or **Regional Options** in **Control Panel**.

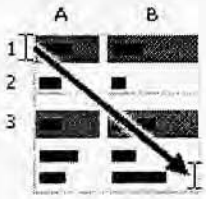
- Note that the y-values predicted by the regression equation may not be valid if they are outside the range of the y-values you used to determine the equation.

**Example 1 Slope and Y-Intercept**

The example may be easier to understand if you copy it to a blank worksheet.

How?

1. Create a blank workbook or worksheet.
2. Select the example in the Help topic. Do not select the row or column headers.




Selecting an example from Help

3. Press CTRL+C.
4. In the worksheet, select cell A1, and press CTRL+V.
5. To switch between viewing the results and viewing the formulas that return the results, press CTRL+` (grave accent), or on the **Tools** menu, point to **Formula Auditing**, and then click **Formula Auditing Mode**.

| | A | B |
|---|---|---|
| 1 | **Known y** | **Known x** |
| 2 | 1 | 0 |
| 3 | 9 | 4 |
| 4 | 5 | 2 |
| 5 | 7 | 3 |
| | **Formula** | **Formula** |
| | =LINEST(A2:A5,B2:B5,,FALSE) | |

**Note** The formula in the example must be entered as an array formula. After copying the example to a blank worksheet, select the range A7:B7 starting with the formula cell. Press F2, and then press CTRL+SHIFT+ENTER. If the formula is not entered as an array formula, the single result is 2.

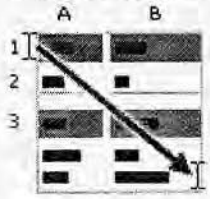
When entered as an array, the slope (2) and the y-intercept (1) are returned.

**Example 2 Simple Linear Regression**

The example may be easier to understand if you copy it to a blank worksheet.

How?

1. Create a blank workbook or worksheet.
2. Select the example in the Help topic. Do not select the row or column headers.




Selecting an example from Help

3. Press CTRL+C.
4. In the worksheet, select cell A1, and press CTRL+V.
5. To switch between viewing the results and viewing the formulas that return the results, press CTRL+` (grave accent), or on the **Tools** menu, point to **Formula Auditing**, and then click **Formula Auditing Mode**.

| | A | B |
|---|---|---|
| 1 | **Month** | **Sales** |
| 2 | 1 | 3100 |
| 3 | 2 | 4500 |
| 4 | 3 | 4400 |

| | | |
|---|---|---|
| **5** | 4 | 5400 |
| **6** | 5 | 7500 |
| **7** | 6 | 8100 |
| | **Formula** | **Description (Result)** |
| | =SUM(LINEST(B2:B7, A2:A7)*{9,1}) | Estimate sales for the ninth month (11000) |

In general, SUM({m,b}*{x,1}) equals mx + b, the estimated y-value for a given x-value. You can also use the TREND function.

**Example 3 Multiple Linear Regression**

Suppose a commercial developer is considering purchasing a group of small office buildings in an established business district.

The developer can use multiple linear regression analysis to estimate the value of an office building in a given area based on the following variables.

| Variable | Refers to the |
|---|---|
| y | Assessed value of the office building |
| x1 | Floor space in square feet |
| x2 | Number of offices |
| x3 | Number of entrances |
| x4 | Age of the office building in years |

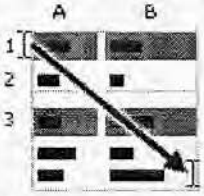
This example assumes that a straight-line relationship exists between each independent variable (x1, x2, x3, and x4) and the dependent variable (y), the value of office buildings in the area.

The developer randomly chooses a sample of 11 office buildings from a possible 1,500 office buildings and obtains the following data. "Half an entrance" means an entrance for deliveries only.

The example may be easier to understand if you copy it to a blank worksheet.

How?

1. Create a blank workbook or worksheet.
2. Select the example in the Help topic. Do not select the row or column headers.




Selecting an example from Help

3. Press CTRL+C.
4. In the worksheet, select cell A1, and press CTRL+V.
5. To switch between viewing the results and viewing the formulas that return the results, press CTRL+` (grave accent), or on the **Tools** menu, point to **Formula Auditing**, and then click **Formula Auditing Mode**.

| | A | B | C | D | E |
|---|---|---|---|---|---|
| **1** | **Floor space (x1)** | **Offices (x2)** | **Entrances (x3)** | **Age (x4)** | **Assessed value (y)** |
| **2** | 2310 | 2 | 2 | 20 | 142,000 |
| **3** | 2333 | 2 | 2 | 12 | 144,000 |
| **4** | 2356 | 3 | 1.5 | 33 | 151,000 |
| **5** | 2379 | 3 | 2 | 43 | 150,000 |

| | | | | | |
|---|---|---|---|---|---|
| **6** | 2402 | 2 | 3 | 53 | 139,000 |
| **7** | 2425 | 4 | 2 | 23 | 169,000 |
| **8** | 2448 | 2 | 1.5 | 99 | 126,000 |
| **9** | 2471 | 2 | 2 | 34 | 142,900 |
| **10** | 2494 | 3 | 3 | 23 | 163,000 |
| **11** | 2517 | 4 | 4 | 55 | 169,000 |
| **12** | 2540 | 2 | 3 | 22 | 149,000 |

**Formula**

=LINEST(E2:E12,A2:D12,TRUE,TRUE)

**Note** The formula in the example must be entered as an array formula. After copying the example to a blank worksheet, select the range A14:E18 starting with the formula cell. Press F2, and then press CTRL+SHIFT+ENTER. If the formula is not entered as an array formula, the single result is -234.2371645.

When entered as an array, the following regression statistics are returned. Use this key to identify the statistic you want.

| | A | B | C | D | E | F |
|---|---|---|---|---|---|---|
| 1 | $m_n$ | $m_{n-1}$ | ... | $m_2$ | $m_1$ | b |
| 2 | $se_n$ | $se_{n-1}$ | ... | $se_2$ | $se_1$ | $se_b$ |
| 3 | $r_2$ | $se_y$ | | | | |
| 4 | F | $d_f$ | | | | |
| 5 | $ss_{reg}$ | $ss_{resid}$ | | | | |

The multiple regression equation, y = m1*x1 + m2*x2 + m3*x3 + m4*x4 + b, can now be obtained using the values from row 14:

y = 27.64*x1 + 12,530*x2 + 2,553*x3+ 234.24*x4 + 52,318

The developer can now estimate the assessed value of an office building in the same area that has 2,500 square feet, three offices, and two entrances and is 25 years old, by using the following equation:

y = 27.64*2500 + 12530*3 + 2553*2 - 234.24*25 + 52318 = $158,261

Or you can copy the following table to cell A21 of the example workbook.

| Floor space (x1) | Offices (x2) | Entrances (x3) | Age (x4) | Assessed value (y) |
|---|---|---|---|---|
| 2500 | 3 | 2 | 25 | =D14*A22 + C14*B22 + B14*C22 + A14*D22 + E14 |

You can also use the TREND function to calculate this value.

**Example 4 Using The F And R2 Statistics**

In the previous example, the coefficient of determination, or r2, is 0.99675 (see cell A17 in the output for LINEST), which would indicate a strong relationship between the independent variables and the sale price. You can use the F statistic to determine whether these results, with such a high r2 value, occurred by chance.

Assume for the moment that in fact there is no relationship among the variables, but that you have drawn a rare sample of 11 office buildings that causes the statistical analysis to demonstrate a strong relationship. The term "Alpha" is used for the probability of erroneously concluding that there is a relationship.

There is a relationship among the variables if the F-observed statistic is greater than the F-critical value. The F-critical value can be obtained by referring to a table of F-critical values in many statistics textbooks. To read the table, assume a single-tailed test, use an Alpha value of 0.05, and for the degrees of freedom (abbreviated in most tables as v1 and v2), use v1 = k = 4 and v2 = n - (k + 1) = 11 - (4 + 1) = 6, where k is the number of variables in the regression analysis and n is the number of data points. The F-critical value is 4.53.

The F-observed value is 459.753674 (cell A18), which is substantially greater than the F-critical value of 4.53. Therefore, the regression equation is useful in predicting the assessed value of office buildings in this area.

**Example 5 Calculating The T-Statistics**

Another hypothesis test will determine whether each slope coefficient is useful in estimating the assessed value of an office building in example 3. For example, to test the age coefficient for statistical significance, divide -234.24 (age slope coefficient) by 13.268 (the estimated standard error of age coefficients in cell A15). The following is the t-observed value:

t = m4 ÷ se4 = -234.24 ÷ 13.268 = -17.7

If you consult a table in a statistics manual, you will find that t-critical, single tail, with 6 degrees of freedom and Alpha = 0.05 is 1.94. Because the absolute value of t, 17.7, is greater than 1.94, age is an important variable when estimating the assessed value of an office building. Each of

the other independent variables can be tested for statistical significance in a similar manner. The following are the t-observed values for each of the independent variables.

| Variable | t-observed value |
|---|---|
| Floor space | 5.1 |
| Number of offices | 31.3 |
| Number of entrances | 4.8 |
| Age | 17.7 |

These values all have an absolute value greater than 1.94; therefore, all the variables used in the regression equation are useful in predicting the assessed value of office buildings in this area.

## SLOPE OF BEST-FIT LINE

# SLOPE

See Also

Returns the slope of the linear regression line through data points in known_y's and known_x's. The slope is the vertical distance divided by the horizontal distance between any two points on the line, which is the rate of change along the regression line.

**Syntax**

**SLOPE(known_y's,known_x's)**

Known_y's is an array or cell range of numeric dependent data points.

Known_x's is the set of independent data points.

**Remarks**

- The arguments must be either numbers or names, arrays, or references that contain numbers.
- If an array or reference argument contains text, logical values, or empty cells, those values are ignored; however, cells with the value zero are included.
- If known_y's and known_x's are empty or have a different number of data points, SLOPE returns the #N/A error value.
- The equation for the slope of the regression line is:

$$b = \frac{n\sum xy - \left(\sum x\right)\left(\sum y\right)}{n\sum x^2 - \left(\sum x\right)^2}$$

**Example**

The example may be easier to understand if you copy it to a blank worksheet.

How?

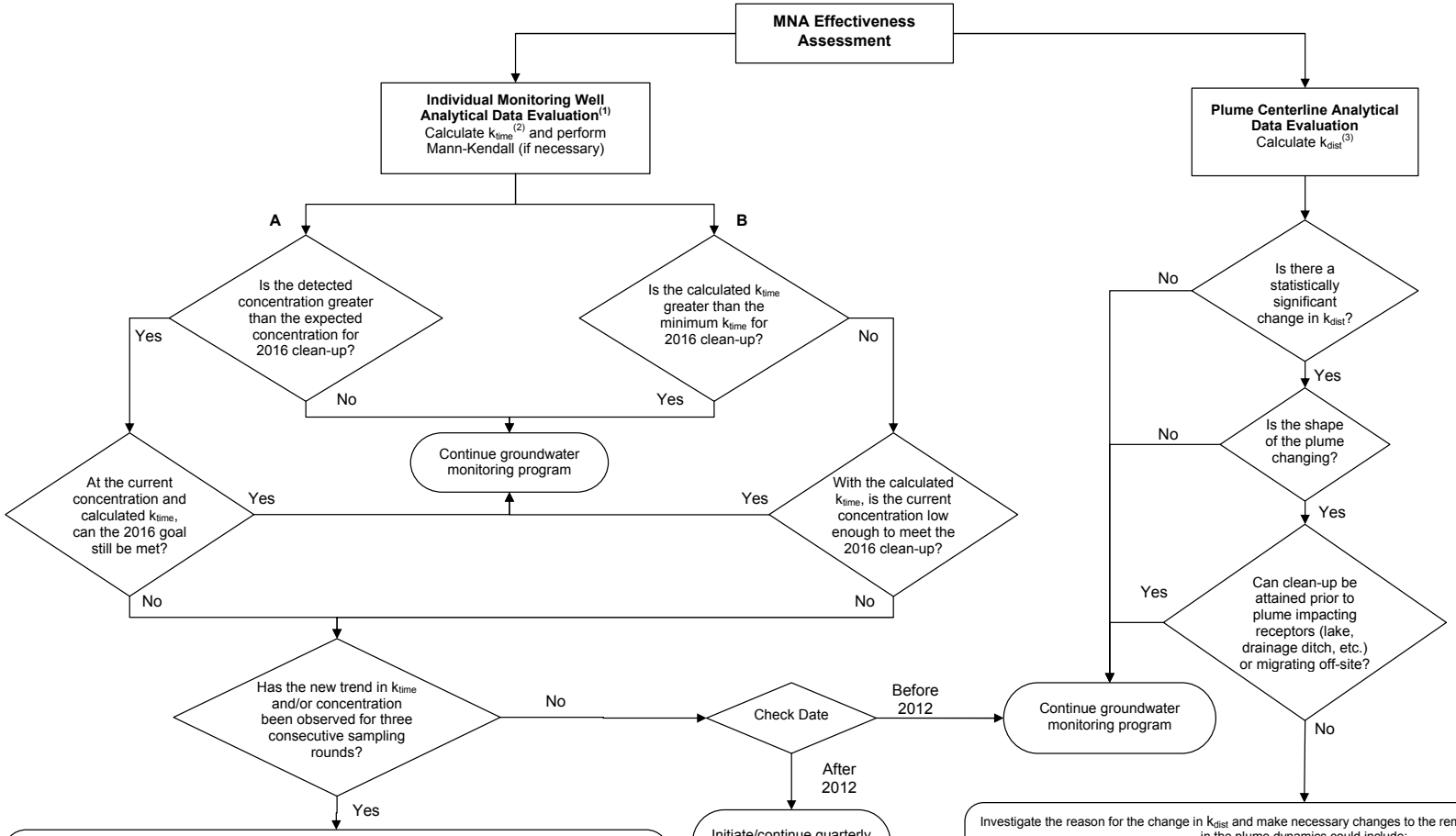
| | A | B |
|---|---|---|
| 1 | **Known y** | **Known x** |
| 2 | 2 | 6 |
| 3 | 3 | 5 |
| 4 | 9 | 11 |
| 5 | 1 | 7 |
| 6 | 8 | 5 |
| 7 | 7 | 4 |
| 8 | 5 | 4 |

| Formula | Description (Result) |
|---|---|
| =SLOPE(A2:A8,B2:B8) | Slope of the linear regression line through the data points above (0.305556) |

# MONITORED NATURAL ATTENUATION DATA EVALUATION

**DIAGRAM 3-1**
**MONITORED NATURAL ATTENUATION DATA EVALUATION**
**RESPONSE ACTION PLAN**

**NAS DALLAS, TEXAS**




Investigate the reason for the change in $k_{time}$ and make necessary changes to the remedial system. These changes in the plume dynamics could include:

| Reason for $k_{time}$ Change | Recommended Changes in Remediation |
|---|---|
| New source or new release | Identify new Responsible Party for continued remediation. |
| Geochemical change | Determine if chemical additives are necessary or technical impracticability of additional remediation. |
| Asymptotic degradation reached | Determine if active remediation or excavation are necessary or technical impracticability of additional remediation. |

Investigate the reason for the change in $k_{dist}$ and make necessary changes to the remedial system. These changes in the plume dynamics could include:

| Reason for $K_{dist}$ Change | Recommended Changes in Remediation |
|---|---|
| New source or new release | Identify new Responsible Party for continued remediation. |
| Migrating plume | Initiate abatement measures such as interceptor trench, slurry walls, pump recovery / capture system, etc. if receptors are threatened. |

Notes:
(1) Both pathways (A, B) must be evaluated for each of the chemicals of concern in each monitoring point along the plume's centerline.
(2) $k_{time}$ Concentration versus Time Attenuation Rate Constant
(3) $k_{dist}$ Concentration versus Distance Attenuation Rate Constant

# Assessment of MNA Performance Monitoring

## Introduction

The MNA monitoring well networks at the NAS Dallas groundwater plumes will provide the necessary analytical data to evaluate the dynamic behavior of the plumes over time, including contaminant and/or concentration reductions indicative of progress toward clean-up objectives, changes in plume boundaries, and changes in geochemistry. To this effect, these monitoring well networks include monitoring wells in areas hydraulically upgradient and sidegradient to the groundwater plume, in the historical source area, along the main body of the plume and immediately downgradient of the plume. The number and locations of monitoring points for each plume was selected based on the size of the plume, groundwater velocity, proximity to receptors (including cross-media transfer of COCs), and presence of preferential pathways for COC migration.

As required by the Compliance Plan for NAS Dallas (TCEQ, 2004), performance monitoring for MNA will be conducted in accordance with Response Action Plan (RAP) Worksheet 3.1 until all remedial action objectives have been met for the plume for at least two consecutive sampling events. Upon demonstration of the attainment of clean-up objectives, a three-year of post-remedial action monitoring will be implemented in accordance with the Compliance Plan for NAS Dallas (TCEQ, 2004) and as outlined on RAP Worksheet 4.1.

In addition to the COCs identified in the APAR (TtNUS, 2003) for each groundwater plume, daughter products that may be formed as a result of biotransformation or chemical processes will be monitored during the corrective action period at each plume. In order to ensure that there is a potential for continued transformation of the COCs within the groundwater plume, the geochemical environment will also be monitored (i.e., oxidation-reduction potential, dissolved oxygen, pH, etc.) every two years at a minimum. During the post-remedial action monitoring, the Compliance Plan requires that an expanded list of parameters be sampled including those COCs historically detected at the site. In order to minimize the chance of identifying constituent exceedances during the post-response action monitoring, the expanded list of parameters identified on RAP Worksheet 4.1 (Compliance Plan Table III) will be monitored every five years at a minimum.

Each new round of data will help develop a better understanding of the site and site processes and as a result, the conceptual site model for MNA will be continuously reevaluated from the standpoint of the observed plume shape, location, stability, and dynamics; attenuation rates; groundwater flow patterns; and geochemical regimes.

To evaluate progress towards achievement of clean-up objectives, data collected from the monitoring well network will be used to determine temporal and spatial trends in COC concentrations, comparisons of observed COC concentrations with benchmark concentrations, and, comparison of calculated attenuation rates with the rates required to meet remedial objectives within the required timeframe. Data will be interpreted with regard to variability so that attenuation-related changes and trends can be distinguished from other sources of variation in the data.

If a departure from a predicted trend is found, (i.e., exceeding benchmark concentration or unfavorable changes in attenuation rates), the deviation will be evaluated to determine how the changes may affect attainment of remedial goals for the individual monitoring wells, as well as, how the changes may affect the behavior of the entire plume (i.e., plume stability, reduction in COC concentrations, etc.). Departures from expected trends may not mean remedy failure, because there may be a range of attenuation rates that will achieve the desired remedial goals

in the allotted time; therefore their significance must be evaluated in the context of the site-related goals. If the potential impact on the remedy is negligible, revision of the conceptual site model may be the only outcome of such evaluation. However, if the potential for impact is significant, implementation of alternative remedies may be triggered or, at a minimum additional characterization to better define the factors limiting COC reduction and determine methods for mitigating the magnitude of their impact would be warranted. Other site-related data (i.e., geochemistry and potentiometric data) will continue to be evaluated to provide evidence of COC migration, fate, and attenuation processes. These data may be used to ascertain COC degradation and the continuation of appropriate conditions for attenuation at acceptable rates.

Following the individual monitoring well data analysis, plume behavior will be assessed to evaluate the continued effectiveness of the MNA remedy, as well as the adequacy of the monitoring program and conceptual site model for MNA. The ongoing monitoring program will provide the necessary data for continual refinement of the conceptual model and subsequently of the monitoring program itself. Upon completion of each sampling round, data analysis and determination of the effectiveness of the MNA remedy, plume-specific criteria will drive decisions affecting the continuity of the monitoring program.

At some plumes, source control and interim remedial activities have occurred between the original site characterization process and the implementation of performance monitoring. Because these activities are expected to change the site's characteristics and behavior, performance monitoring will require the continued refinement of the conceptual site model for MNA. This refinement of the conceptual site model may eventually be different from the original MNA conceptual site model based on the initial site characterization data. Development and implementation of the new conceptual site model for MNA will require the collection of additional data (i.e., quarterly monitoring for the first year after interim remedial activities and on a semi-annual basis thereafter) to establish baseline conditions, expediently depict new site characteristics and parameter variability, establish trends and estimate attenuation rates for COCs, determine if the plume characteristics have been altered, and assess the likelihood of meeting site remediation goals.

## Evaluation of New Data

Data interpretation will include the preliminary assessment of the COC concentration data collected for both the plume centerline (e.g., whole plume dynamics) as well as on individual COCs within each monitoring well. The interpretation will be conducted through graphs, tables, maps, statistics, and time-series plots. This will help in identifying patterns, relationships, and anomalies, such as possible "outliers" to the observed remedial trend of the plume. Scatter graphs (i.e., $k_{time}$ and $k_{dist}$ graphs) will show relationships between two variables that are not readily evident using purely numerical methods. Mapping the data in plan view and/or cross-section (i.e., isoconcentration maps, potentiometric maps, MNA parameter maps, etc.) will help understand patterns of COC distribution and migration, and relationships between geochemical zones and COC attenuation.

The initial data analysis and interpretation will focus on the detection of trends in the data for the COCs within individual monitoring wells and subsequently for the plume as a whole. First, the COC concentration data collected from each monitoring well will be used to determine the temporal trends that exist within the plume. The COC trends will also be evaluated at monitoring points located throughout the plume as a whole. In order to adequately interpret progress toward COC reduction goals for the plume, it is necessary to compare trends of individual monitoring wells to trends of other monitoring wells in the plume. Evaluating trends in data from all sampling locations in the plume will determine if the plume exhibits stability or reduction in COC concentrations. In addition, for each COC, spatial trends along the plume centerline [i.e., concentration vs. distance attenuation rate ($k_{dist}$)] will be evaluated. This analysis assists in evaluating the stability of the plume and its migration potential. Assessment of spatial plume behavior is necessary to ensure no unacceptable plume migration occurs.

Further evaluation will focus on the assessment of any departures from predicted trends and their impact on the potential for MNA to achieve plume-related goals. If the COC data points do not definitively indicate that the remedial goals are meeting the reasonable progress expectations, other data will be analyzed in order to properly interpret particular variances from the predicted performance (i.e., the site stratigraphy, groundwater chemistry, the groundwater flow field, the season of the year).

In addition, non-parametric statistical tests, such as the Mann-Kendall test, may be included in the data evaluation to establish the existence of a trend when the initial evaluation is inconclusive due to high data variability.

The process of MNA data evaluation is graphically depicted in Diagram 3-1.

### Individual Monitoring Well Analytical Data Evaluation

Evaluation of progress towards achievement of clean-up goals will focus primarily on temporal trends in COC concentration at individual attenuation monitoring point (AMP) wells within the plume. After each sampling event, temporal trends [i.e., concentration vs. time attenuation rate ($k_{time}$)], will be established for each AMP of the plume. Temporal trends ($k_{time}$) are particularly useful in evaluating if remedial goals can be met in the desired timeframe for the individual location. The analysis of temporal trends is useful for estimating the potential lifetime of the COC plume at the particular location.

The parameters to be evaluated in parallel to ensure reasonable progress is being made in the response action at the particular location are as follows:

- Direct comparison of detected concentrations to expected or benchmark concentration to meet remedial goals by the year 2016 for the monitoring wells along the centerline of the plume.

- Direct comparison of observed attenuation rate ($k_{time}$) from the chemical specific historical data available for the monitoring well versus the minimum attenuation rate ($k_{time}$) necessary to meet the 2016 clean-up date.

The following graph depicts the possible evaluation scenarios for the above parameters:

| | |
|---|---|
| **Measured COC Concentration < Expected COC Concentration**<br>**and**<br>**Observed $k_{time}$ > Minimum $k_{time}$**<br>Remedial goal is being met, continue performance monitoring | **Measured COC Concentration < Expected COC Concentration**<br>**and**<br>**Observed $k_{time}$ < Minimum $k_{time}$**<br>Evaluate further to ensure remedial goal is being met |
| **Measured COC Concentration > Expected COC Concentration**<br>**and**<br>**Observed $k_{time}$ > Minimum $k_{time}$**<br>Evaluate further to ensure remedial goal is being met | **Measured COC Concentration > Expected COC Concentration**<br>**and**<br>**Observed $k_{time}$ < Minimum $k_{time}$**<br>Remedial goal not being met, consider new response action |

1. Satisfactory progress is being made with the response action (top left quadrant) for an individual well location, if the detected concentration of the COC(s) is not greater than the 2016 clean-up curve expected concentration; and, the observed attenuation rate based on historical data available from the monitoring well is equal to or greater than the minimum attenuation rate necessary to meet clean-up by the year 2016 for the monitoring wells along the centerline of the plume.
2. Reasonable progress is not being made towards achieving the remedial goal (bottom right quadrant) if the detected concentration of the COC(s) exceeds the 2016 clean-up curve expected concentration; and the observed attenuation rate based on historical data available from the monitoring well is less than the minimum attenuation rate necessary to meet clean-up by the year 2016 for the monitoring wells along the centerline of the plume. A new response action may need to be implemented if this trend continues for at least three sampling rounds.
3. Further evaluation will be needed for the scenarios in the top right and bottom left quadrants before establishing if reasonable progress is being made towards achievement of the clean-up goals:
   - Reasonable progress is being made when the observed attenuation rate based on historical data is steep enough that clean-up can still be achieved by the year 2016, even though the detected concentration of a COC may be greater than the expected concentration during a particular sampling event (bottom left quadrant).
   - Reasonable progress is being made if the detected concentration of a COC in the sampling event is sufficiently below the expected concentration so that with an observed attenuation rate based on historical data greater than the calculated minimum attenuation rate necessary to meet PCLs by 2016, the remedial objectives can still be achieved by the year 2016 (top right quadrant).
   - Reasonable progress may not be made if either of the preceding two situations continues for at least three consecutive sampling rounds. At that point in the response action evaluation, a new response action may need to be implemented. In this case other statistical methods may be used to evaluate the data such as using non-parametric tests (i.e., Mann-Kendall) to determine if there has been a statistically significant change in degradation trends.

Plume Analytical Data Evaluation

Since a plume-wide trend implying progress toward restoration cannot be satisfactorily elucidated from monitoring only individual sampling locations, it will be necessary to compare trends among the AMP wells in the plume. Reduction in COC concentrations from all or most sampling locations within predicted ranges and/or at anticipated rates can be interpreted as a decrease in COC mass for the plume and will be indicative of effective remediation of the plume through MNA. Mixed trends in different portions of the plume may imply temporal changes in plume migration or may be simply attributed to the natural attenuation processes, and do not signify failure of MNA to achieve its goals in a timely manner. These variations will be evaluated in the context of the conceptual site model and sampling history before they are attributed to natural attenuation processes of other possible causes. To this effect, in cases of mixed trends it will be necessary to perform other comparisons in order to reach a conclusion of satisfactory progress. It will be particularly useful to evaluate trends in COC and daughter product concentrations (e.g., a decreasing trend in trichloroethene compared to an increasing trend in cis-1,2-dichloroethene in the same plume may indicate degradation of trichloroethene to cis-1,2-dichloroethene). Other trends of interest include changes in geochemistry that may indicate decrease in attenuation rates, such as changes in availability of electron donors and electron acceptors, changes in oxidation-reduction potential, or other primary geochemical indicators.

The complement to the evaluation of the behavior of the plume as a whole is the assessment of spatial trends. For each COC, spatial trends along the plume centerline [i.e., concentration vs. distance attenuation rate ($k_{dist}$)] will be evaluated. This analysis assists in evaluating the stability of the plume and its migration potential. $k_{dist}$ will be calculated for the monitoring wells along the plume centerline after each annual sampling round and will be depicted in centerline trend graphs ($k_{dist}$ graphs). Assessment of spatial plume behavior will be performed through visual interpretation of changes in plume shape over time as shown in the isoconcentration maps as well as centerline trend graphs.

**Assessment Conclusions and Recommendations**

As a result of the response action effectiveness evaluation, the MNA conceptual site model will be continuously refined/modified by incorporating any new data and data trends in COC and geochemistry values and changes in site hydrology. As new data is gathered there will be an ever-expanding database for the site that can be used for comparison with the changes in parameters noted between monitoring events as well as for comparison to predicted, acceptable trends. This continual evaluation of performance monitoring data will translate in better understanding of plume behavior and anticipated data variability and therefore assist in the proper interpretation of monitoring data.

Upon completion of each sampling round, data analysis and determination of the effectiveness of the MNA remedy, plume-specific criteria will drive decisions affecting the continuity of the monitoring program such as: the appropriateness of continuing the monitoring program without change, the need for modifications to the monitoring program (i.e., increased monitoring frequency, additional monitoring wells), need for additional characterization, implementation of a contingency or alternative remedy, or verification of attainment of remedial goals and termination of performance monitoring.

Site-related decisions regarding continuing, modifying, or terminating MNA performance monitoring will be made based on the analyses of spatial and temporal trends in COC concentration, as well as comparisons with predicted benchmarks and/or the specified concentration standard (i.e., COC PCLs). The following summarizes each potential decision

and why it may be chosen based on the perceived progress towards achievement of MNA remediation goals at the plume:

1. Continue Monitoring Program Without Change

   COC concentrations, including toxic transformation products and any mobilized by-products or secondary COCs must remain within the bounds of acceptable trends in order to continue the monitoring program without any change until all remedial action objectives have been met. Groundwater flow parameters must not have changed outside previously identified acceptable ranges. The geochemistry must not have changed in such a way as to indicate that the COC degradation or other natural attenuation processes would be significantly affected.

2. Modify the Monitoring Program

   Modification of the monitoring program may be needed to better reflect changing conditions or increased understanding of natural attenuation processes at the site. Changing conditions or the need to test key assumptions may require new sampling points or increases in monitoring parameters or frequency. Possible scenarios include:

   - Changes in groundwater flowrates or directions that indicate COCs may move farther downgradient, laterally or vertically into previously unimpacted areas, may warrant the need for additional monitoring wells.
   - Unfavorable changes in COC concentrations within the plume, or in the observed attenuation rate based on historic data, may warrant increased monitoring frequency. Sampling frequency may be increased if a sudden change in the trend of COC concentration reduction is noted in order to provide information to facilitate understanding of the change and provide earlier warning of further change. If the protectiveness of the remedy is in question (i.e., unfavorable observed attenuation rate change after 2012), a determination may be made to collect data on a more frequent schedule to properly interpret trends in time to implement contingency remedies, if necessary, to meet PCLs by 2016.
   - Detections of COCs outside the known plume, indicating potential plume expansion or plume migration, may warrant the need for additional monitoring wells.

3. Implement a Contingency or Alternative Remedy

   Alternative remedies can be considered for use in case MNA fails to perform at the desired effectiveness. Situations that may trigger the implementation of a contingency or other remedy modifications will depend on site conditions and include the following:

   - COC concentrations are not decreasing at the rate previously determined to be necessary to meet the remediation objectives by 2016. This assessment will involve the direct comparison of current analytical data with the expected plume clean-up benchmarks as well as evaluation of temporal trends (i.e., observed attenuation rates) in COC concentrations versus the minimum attenuation rates required to meet clean-up by the year 2016. If the protectiveness of the remedy is in question (i.e., more than three rounds of sampling fail to meet the criteria), implementation of a contingency or alternative remedy would generally be warranted.
   - COC concentrations at AMP wells exhibit an increasing trend not originally predicted during remedy selection. This situation would involve the identification and assessment of trends in COC concentration data, including transformation products, changes in geochemistry that may indicate decrease in attenuation rates explaining the lack of

progress toward clean-up objectives, and/or additional COC releases. For some locations in the plume, a detection of a significant change may not trigger immediate implementation of a contingency or alternative remedy. For instance, a low-level or otherwise limited COC concentration increase does not necessarily mean that remediation timeframes will be expanded, or that by the time the pulse moves downgradient to the boundary of the plume there will be a significant plume expansion. Or, in some cases, the detailed characterization and modeling of COC fate and migration may indicate that concentrations for certain COCs (i.e., daughter products) in some portions of the plume are expected to increase temporarily, yet MNA would still meet remedial objectives. If so, the temporary increase would not trigger the contingency or alternative remedy as long as the increase conformed to the predictions and MNA remained protective, allowing observation for several years to test model predictions, if time is available (i.e., before 2012). In situations where evaluation shows the observed COC concentration increases are expected to unacceptably increase the time for plume restoration beyond 2016, or cause unacceptable plume expansion, triggering the contingency or alternative remedy would generally be warranted.

- COCs are identified in monitoring wells located outside the original plume boundary indicating unacceptable plume expansion or migration. Detections of COCs outside of the predetermined plume boundaries may indicate unacceptable plume expansion. Implementation of an alternative or contingency remedy will depend on the locations of the new detections, and distance and possible COC migration rates between these monitoring points and receptors (i.e., surface water bodies, off-site property). Because the COC travel time from the location of the detections may be many years at some sites, there may be time for further monitoring and assessment before a contingency or alternative remedy would need to be implemented. In contrast, if the protectiveness of the remedy is in question (i.e., a significant trend of increasing COC concentration in downgradient wells was noted), there may be much less time available to assess the trend if there was only a short travel time to downgradient receptors. In this case, a contingency or alternative remedy may be triggered immediately.

4. Termination of Performance Monitoring

Once PCLs have been achieved at each of the AMP locations within a plume, showing that the MNA remedy goals have been met for two consecutive semi-annual sampling events for an individual PCLE zone, performance monitoring will be terminated and a period of verification monitoring will be initiated. Verification monitoring will include three years of semi-annual groundwater sampling in order to satisfy the requirements of the Compliance Plan for NAS Dallas (TCEQ, 2004). Sampling parameters for the verification of achieving the PCLs and locations will be in accordance with RAP Worksheet 4.0. This sampling will include all COCs that have been historically detected in the area of the former SWMU, not just the ones that were identified for remediation in the Response Action Plan. If no additional COC exceedances are identified during this three year period of post response action care monitoring, the monitoring system can be terminated, the monitoring wells will be abandoned, and the site will be removed from the permit.

**Effects of Data Variability on Data Interpretation**

Data interpretation is affected by data variability. This variability is sometimes associated with natural causes or may be simply attributed to the natural attenuation processes. Due to the dynamic nature of natural attenuation processes, data typically exhibit fluctuations of various magnitudes. For example, there is an expected degree of natural variability within a plume that may include small-scale expansion and shrinkage in response to changes in groundwater flowrates and biological degradation rates throughout the year. COC concentrations in individual monitoring wells may fluctuate with changes in plume configuration caused by oscillations in groundwater flow. Also, changes in groundwater elevations can cause changes in COC concentrations measured in monitoring wells.

It is essential that each data point be interpreted in the context of its derivation in time and space. For instance, monitoring wells produce data that should be interpreted with respect to COC sources, site stratigraphy, the groundwater flow field, the plume, possible receptors, season of the year, and other relevant factors. Variations in sampling methodology should also be considered, due to possible differences in COC concentrations derived from different sampling techniques or devices. The analytical methodology may be evaluated in terms of accuracy, precision, and detection limits. This list of data considerations is not exhaustive, but merely emphasizes that a number (i.e., a data point) should be placed in context to be interpreted. The better the understanding on the derivation and context of the data, the more likely it is that the appropriate decision can be made based on the data.

Examination of historical and spatial patterns may provide information useful in assessing the source and significance of variability in the measured parameters. For instance, if there are multiple monitoring wells in the same plume that show a consistent trend for a number of monitoring variables across several monitoring events, then one may suspect a natural variation, such as recharge differences or geochemical changes in the system, and investigate a correlation of recharge, indicator parameters, or other external hydrologic factors with concentration as indicative of the likely cause of the change. If, on the other hand, a specific monitoring well shows an unusually large change in concentration between monitoring events, relative to nearby monitoring wells, then one may suspect a measurement factor or additional release source is involved and look at sampling techniques or other such factors that may influence the concentration change. Because plume variability should be taken into account when interpreting monitoring data, it is important to have a good estimate of natural variability derived from the site investigation and ongoing MNA performance monitoring.

# APPENDIX 8
# WASTE DISPOSAL MANIFESTS

Project #: 0-0

Order #: 140398

EFFECTIVE ENVIRONMENTAL

Please print or type. (Form designed for use on elite (12-pitch) typewriter.)

**NON-HAZARDOUS WASTE MANIFEST**

1. Generator ID Number: TX8170022786 / 65033
2. Page 1 of 1
3. Emergency Response Phone: 877-577-2669
4. Waste Tracking Number: NHM140398

5. Generator's Name and Mailing Address
Naval Air Station Dallas (NAS)
c/o EnSafe Inc., 4545 Fuller Dr., Suite 342
Irving, TX 75038
Generator's Phone: 972.792.3222 ATTN: Tom Wiberg

Generator's Site Address (if different than mailing address)
8100 West Jefferson
Dallas, TX 75211
RB TVW

6. Transporter 1 Company Name
Stericycle Specialty Waste Solutions Inc
Phd: 972 329 1200
State ID#: 88032 / H-4695
U.S. EPA ID Number: MNS000110924

7. Transporter 2 Company Name
U.S. EPA ID Number

8. Designated Facility Name and Site Address
Itasca Landfill TX, LP
2559 FM 66
Itasca, Texas 76055
State ID#: H0241C
U.S. EPA ID Number: n/a
Facility's Phone: 254 897 2511

| 9a. HM | 9b. U.S. DOT Description (including Proper Shipping Name, Hazard Class, ID Number, and Packing Group (if any)) | 10. Containers No. | Type | 11. Total Quantity | 12. Unit Wt./Vol. | |
|---|---|---|---|---|---|---|
| ☐ | 1 Non-regulated material (soil cuttings Class 2 solids) | 01 ~~02~~ | DM | 55 ~~110~~ | G | CESQ3012 Non-RCRA |
| ☐ | 2. Non-regulated material (purged ground and decon water) | 02 | DM | 110 ~~55~~ | G | CESQ1012 Non-RCRA |
| | 3. | | | | | |
| | 4. | | | | | |

13. Special Handling Instructions and Additional Information
01:IDW Soil cuttings NR (PF:5110167655) 55G
02:IDW purge and decon waters NR (PF:5110167656) 55G
RB TVW
11-1) 0.72 ton 11-2) 0.47 tons

14. **GENERATOR'S CERTIFICATION:** I certify the materials described above on this manifest are not subject to federal regulations for reporting proper disposal of Hazardous Waste.

Generator's/Offeror's Printed/Typed Name: X DAVID BARNEY
Signature: X
Month 5 Day 31 Year 16

15. International Shipments ☐ Import to U.S. ☐ Export from U.S. Port of entry/exit:
Transporter signature (for exports only): Date leaving U.S.:

16. Transporter Acknowledgment of Receipt of Materials

Transporter 1 Printed/Typed Name: Rafael Blaze
Signature:
Month 5 Day 31 Year 16

Transporter 2 Printed/Typed Name: Steven Vansickle
Signature:
Month 6 Day 9 Year 16

17. Discrepancy

17a. Discrepancy Indication Space ☐ Quantity ☐ Type ☐ Residue ☐ Partial Rejection ☐ Full Rejection

Manifest Reference Number:

17b. Alternate Facility (or Generator) U.S. EPA ID Number
Facility's Phone

17c. Signature of Alternate Facility (or Generator) Month Day Year

01: H132 02: H132

18. Designated Facility Owner or Operator: Certification of receipt of materials covered by the manifest except as noted in Item 17a

Printed/Typed Name: Jessica Anderson
Signature:
Month 6 Day 9 Year 16

GENERATOR

INT'L

TRANSPORTER

DESIGNATED FACILITY

6-NHM-C-C-11

2-DESIGNATED FACILITY TO GENERATOR

Project #: 0-0 Order #: 140398

EFFECTIVE ENVIRONMENTAL

Please print or type. (Form designed for use on elite (12-pitch) typewriter.)

**NON-HAZARDOUS WASTE MANIFEST**

1. Generator ID Number: TX8170022786 / 65033
2. Page 1 of 1
3. Emergency Response Phone: 877-577-2669
4. Waste Tracking Number: NHM140398

5. Generator's Name and Mailing Address
Naval Air Station Dallas (NAS)
c/o EnSafe Inc., 4545 Fuller Dr., Suite 342
Irving, TX 75038
Generator's Phone: 972-292-3222 ATTN: Tom Wiberg

Generator's Site Address (if different than mailing address)
8100 West Jefferson
Dallas, TX 75211

RJ TWW

6. Transporter 1 Company Name: Stericycle Specialty Waste Solutions Inc
Phone: 972 329 1200
State ID#: S5627 / M-4565
U.S. EPA ID Number: MNS000110924

7. Transporter 2 Company Name
U.S. EPA ID Number

8. Designated Facility Name and Site Address
Itasca Landfill TX, LP
2559 FM 56
Itasca, Texas 76055
State ID#: H0241C
U.S. EPA ID Number: n/a
Facility's Phone: 254 687 2511

| 9a. HM | 9b. U.S. DOT Description (including Proper Shipping Name, Hazard Class, ID Number, and Packing Group (if any)) | 10. Containers No. | Type | 11. Total Quantity | 12. Unit Wt./Vol. | |
|---|---|---|---|---|---|---|
| ☐ | 1. Non-regulated material (soil cuttings Class 2 solids) | 01 ~~02~~ | DM | 55 ~~110~~ | G | CESQ3012 Non-RCRA |
| ☐ | 2. Non-regulated material (purged ground and decon water) | 02 | DM | 110 ~~55~~ | G | CESQ1012 Non-RCRA |
| | 3. | | | | | |
| | 4. | | | | | |

13. Special Handling Instructions and Additional Information
01:IDW Soil cuttings NR (PF:5110167655) 55G
02:IDW purge and decon waters NR (PF:5110167656) 55G

RJ TWW

11-1) 0.72 ton 11-2) 0.47 ton

14. **GENERATOR'S CERTIFICATION:** I certify the materials described above on this manifest are not subject to federal regulations for reporting proper disposal of Hazardous Waste.

Generator's/Offeror's Printed/Typed Name: X DAVID BARNEY
Signature: X
Month 5 Day 31 Year 16

15. International Shipments ☐ Import to U.S. ☐ Export from U.S. Port of entry/exit:
Transporter signature (for exports only): Date leaving U.S.:

16. Transporter Acknowledgment of Receipt of Materials

Transporter 1 Printed/Typed Name: Rafael Blayze
Signature:
Month 5 Day 31 Year 16

Transporter 2 Printed/Typed Name: Steven Vansickle
Signature:
Month 6 Day 9 Year 16

17. Discrepancy

17a. Discrepancy Indication Space ☐ Quantity ☐ Type ☐ Residue ☐ Partial Rejection ☐ Full Rejection

Manifest Reference Number:

17b. Alternate Facility (or Generator)
U.S. EPA ID Number
Facility's Phone:

17c. Signature of Alternate Facility (or Generator)
Month Day Year

01: H132 02: H132

18. Designated Facility Owner or Operator: Certification of receipt of materials covered by the manifest except as noted in Item 17a

Printed/Typed Name: Jessica Anderson
Signature:
Month 6 Day 14 Year 16

GENERATOR

INT'L

TRANSPORTER

DESIGNATED FACILITY

6-NHM-C-C-11

3-DESIGNATED FACILITY TO GENERATOR

Project #: 0-0

Order #: 145925

EFFECTIVE ENVIRONMENTAL

Please print or type. (Form designed for use on elite (12-pitch) typewriter.)

GENERATOR

**NON-HAZARDOUS WASTE MANIFEST**

1. Generator ID Number: TX8170022786 / 65033

2. Page 1 of 1

3. Emergency Response Phone: 877-577-2669

4. Waste Tracking Number: NHM-145925

5. Generator's Name and Mailing Address
Naval Air Station Dallas (NAS)
c/o EnSafe Inc., 4545 Fuller Dr., Suite 342
Irving, TX 75038
Generator's Phone: 972-792-3222 ATTN: Tom Wherg

Generator's Site Address (if different than mailing address)
8100 West Jefferson
Dallas, TX 75211

6. Transporter 1 Company Name
Stericycle Specialty Waste Solutions Inc
Ph#: 972 329 1200
State ID#: 88922 / H-1496
U.S. EPA ID Number: MNS000110924

7. Transporter 2 Company Name
U.S. EPA ID Number

8. Designated Facility Name and Site Address
Itasca Landfill TX. LP
2559 FM 66
Itasca, Texas 76055
State ID#: H0241C
U.S. EPA ID Number: n/a
Facility's Phone: 254 687 2511

| 9a. HM | 9b. U.S. DOT Description (including Proper Shipping Name, Hazard Class, ID Number, and Packing Group (if any)) | 10. Containers No. | 10. Containers Type | 11. Total Quantity | 12. Unit Wt./Vol. | |
|---|---|---|---|---|---|---|
| ☐ | 1. Non-regulated material (purged ground and decon water) | 04 | DM | 220 | G | CESQ1012 Non-RCRA |
| ☐ | 2. Non-regulated material (soil cuttings Class 2 solids) | 02 | DM | 110 | G | CESQ3012 Non-RCRA |
| | 3. | | | | | |
| | 4. | | | | | |

13. Special Handling Instructions and Additional Information
01:IDW purge and decon waters NR (PF:5110167856) 55G
02:IDW Soil cuttings NR (PF:5110167855) 55G

11.1) 0.94 tn
11.2) ~~0.29 tn~~ 0.35 tn

14. **GENERATOR'S CERTIFICATION:** I certify the materials described above on this manifest are not subject to federal regulations for reporting proper disposal of Hazardous Waste.

Generator's/Offeror's Printed/Typed Name: X DAVID BARNEY
Signature: X
Month 11 Day 8 Year 16

INT'L

15. International Shipments ☐ Import to U.S. ☐ Export from U.S. Port of entry/exit:
Transporter signature (for exports only): Date leaving U.S.:

TRANSPORTER

16. Transporter Acknowledgment of Receipt of Materials

Transporter 1 Printed/Typed Name: Jason L Boss
Signature:
Month 11 Day 8 Year 16

Transporter 2 Printed/Typed Name: Rafael Blanco
Signature:
Month 11 Day 14 Year 16

DESIGNATED FACILITY

17. Discrepancy

17a. Discrepancy Indication Space ☐ Quantity ☐ Type ☐ Residue ☐ Partial Rejection ☐ Full Rejection

Manifest Reference Number:

17b. Alternate Facility (or Generator) U.S. EPA ID Number

Facility's Phone:

17c. Signature of Alternate Facility (or Generator) Month Day Year

01: H132 02: H132

18. Designated Facility Owner or Operator: Certification of receipt of materials covered by the manifest except as noted in Item 17a

Printed/Typed Name: Cindy Reed
Signature: Cindy Reed
Month 11 Day 14 Year 16

6-NHM-C-C-11

2-DESIGNATED FACILITY TO GENERATOR

# SWMU 85 PLUME

# 2016 Response Action Effectiveness Report
## SWMU 85 Plume
## Former NAS Dallas, Texas

## Professional Signatures and Seals

**Professional Geoscientist**

| | | |
|---|---|---|
| *Thomas Wiberg* | *1619* | *30 November 2017* |
| Professional Geologist | Geologist License number | Expiration date |
| | *17 January 2017* | |
| Signature | Date | |
| *972-791-3222* | *972-791-0405* | *twiberg@ensafe.com* |
| Telephone number | FAX number | E-mail |

**Professional Engineer**

| | | |
|---|---|---|
| | | |
| Professional Engineer | P.E. License number | Expiration date |
| | | |
| Signature | Date | |
| | | |
| Telephone number | FAX number | E-mail |

**Registered Corrective Action Specialists (RCASs) and Corrective Action Project Managers (CAPMs)**
**For LPST sites only.**

| | | |
|---|---|---|
| | | |
| Registered Corrective Action Specialist | RCAS Registration number | Expiration date |
| | | |
| Signature | Date | |
| | | |
| Corrective Action Project Manager | CAPM Registration number | Expiration date |
| | | |
| Signature | Date | |
| | | |
| Telephone number | FAX number | E-mail |

**Seals, as applicable:**

# TEXAS COMMISSION ON ENVIRONMENTAL QUALITY
## Response Action Effectiveness Report

## Cover Page

**Regulatory ID number** (Solid waste registration number, VCP ID number, etc.) *Solid Waste Code #65033*

check one: ___ Initial RAER submittal for this onsite property X Subsequent RAER submittal

Report date: *January 2017* TCEQ Region No.: *4*

**TCEQ Program** (check one)

X Corrective Action (Mail Code 127)

___ Voluntary Cleanup Program (Mail Code 221)

___ Petroleum Storage Tank Program (Mail Code 137)

___ Superfund PRP Lead (Mail Code 143)

___ Municipal Solid Waste Permits (Mail Code 124)

**Onsite Property Information**

Onsite Property Name: *Former Naval Air Station Dallas (NAS Dallas) — SWMU 85 Plume*

Street no. *8100* Pre dir: *West* Street name: *Jefferson* Street type *Blvd* Post dir: ___

City: *Dallas* County: *Dallas* County Code: *57* Zip: *75211*

Nearest street intersection or location description: ___

Latitude: Degrees, Minutes, Seconds OR Decimal Degrees (circle one) North *32°44'01.0"*

Longitude: Degrees, Minutes, Seconds OR Decimal Degrees (circle one) West *96°58'00.5"*

**Offsite Affected Property Information**

Offsite Affected Property Name: *Not Applicable (N/A)*

Street no. ___ Pre dir: ___ Street name: ___ Street type: ___ Post dir: ___

City: ___ County: ___ County Code: ___ Zip: ___

[X] Check if no offsite properties affected

**Contact Person Information and Acknowledgement**

Person (or company) Name: *Navy BRAC PMO East*

Contact Person: *Mr. David Barney* Title: *BRAC Environmental Coordinator*

Mailing Address: *4911 S. Broad Street, Building 679*

City: *Philadelphia* State: *PA* Zip: *19112* E-mail address *david.a.barney@navy.mil*

Phone: *617-753-4656* Fax: ___

By my signature below, I acknowledge the requirement of §350.2(a) that no person shall submit information to the executive director or to parties who are required to be provided information under this chapter which they know or reasonably should have known to be false or intentionally misleading, or fail to submit available information which is critical to the understanding of the matter at hand or to the basis of critical decisions which reasonably would have been influenced by that information. Violation of this rule may subject a person to the imposition of civil, criminal, or administrative penalties.

Signature of Person BARNEY.DAVID.A.1228582553 Digitally signed by BARNEY.DAVID.A.1228582553 DN: c=US, o=U.S. Government, ou=DoD, ou=PKI, ou=USN, cn=BARNEY.DAVID.A.1228582553 Date: 2017.01.18 08:47:49 -05'00' Name, print: *David Barney* Date: ___

Check the reports/forms previously submitted:

**Remedy Standard A**

____Self-Implementation Notice Submittal date: _____

*X* Response Action Plan — Approval date: *December 2006*

**Remedy Standard B**

____Response Action Plan — Approval date: _____

List all media (surface soil, subsurface soil, groundwater, sediment, surface water, air) that contained or contains a PCLE zone and specify the response action that has been or will be taken for each media. Indicate the type of removal, decontamination, physical control, or institutional control action used in the response action.

| Media | COCs | Removal | Decontamination | Physical Control | Institutional Control | Modified Response Objective | | |
|---|---|---|---|---|---|---|---|---|
| | | | | | | PMZ | WCU | TI |
| *Soil* | *1,2-Dichloroethane Polychlorinated-biphenyls Silver* | *Excavation and offsite disposal (completed in 2003)* | *N/A* | *N/A* | *N/A* | *N/A* | *N/A* | *N/A* |
| *Groundwater* | *cis-1,2-Dichloroethene (cis-DCE) Trichloroethene (TCE) Vinyl Chloride (VC)* | *Excavation and offsite disposal (Completed in 2005)* | *MNA (after excavation if necessary)* | *N/A* | *N/A* | *N/A* | *N/A* | *N/A* |

Current land use of the onsite affected property: ____Residential *X* Commercial/industrial

Projected future land use of the onsite property (if known): *X* Residential ____Commercial/industrial

Briefly describe the affected property and PCLE zones, the conclusions from the assessment activities, identify any affected or threatened receptors, and describe any other major site conditions. If any portion of the response action is necessitated due to an aesthetic or nuisance condition, identify the nature of that condition and identify that portion of the response action conducted to address it. If any media that contains a PCLE zone is not being addressed in this response action, provide justification.

**Affected Property: SWMU 85 Plume**

**In 1989, a Resource Conservation and Recovery Act (RCRA) Facility Assessment (RFA) was performed at Naval Air Station (NAS) Dallas in accordance with the 1984 RCRA Hazardous and Solid Waste Amendments to evaluate potential releases at Solid Waste Management Units (SWMUs) and Areas of Concern (AOCs) and to make preliminary determinations regarding the need for further action. The RFA Report included data collected as part of a Preliminary Review, a Visual Site Inspection, and a Sampling Visit, as necessary, for 135 SWMUs and six AOCs at NAS Dallas (A.T. Kearney, 1989).**

**In 1993, NAS Dallas was identified for closure under the Base Realignment and Closure Act (BRAC). As part of the base closure activities, an Environmental Baseline Survey (EBS) was conducted at NAS Dallas to identify any potential environmental concerns related to historical operations at the base [EnSafe/Allen & Hoshall (E/A&H), 1994]. During this EBS, additional site concerns were identified at numerous buildings across the installation. In order to strategically investigate the permitted and non-permitted SWMUs, AOCs, and additional site concerns identified in the EBS, the facility was divided into six sections, called "categories", based on property use and ownership. In 1995, the Navy initiated RCRA Facility Investigation (RFI) activities at NAS Dallas at Categories A through F. Submittal of the Final RFI Reports (issued as a series of six reports — one report per category) occurred during the period from November 2000 to March 2001 [Tetra Tech NUS, Inc. (Tetra Tech), 2000a — 2001b]. The RFI was completed under the requirements of the Texas Risk Reduction Standards (RRS) [30 Texas Administrative Code (TAC) 335, Subchapter S], the regulatory framework in effect at the time,**

**and closure recommendations in the RFI Reports were based upon Risk Reduction Standard 2 — Industrial (RRS2-IND) criteria. The RFI Reports identified those areas that required further action based on the chemical constituents detected in the soil and/or groundwater at the base.**

**The RFI Reports received conditional approval by the Texas Natural Resource Conservation Commission (TNRCC) now the Texas Commission on Environmental Quality (TCEQ). Final approval of the RFI Reports by TCEQ was dependent upon landowner concurrence of the RRS2-IND clean-up standard.**

**In September of 1999, the Texas Risk Reduction Program (TRRP) (30 TAC 350) was promulgated. One of the major changes resulting from TRRP was eliminating site background as a closure criterion. The most stringent closure standard under TRRP is the Residential Remedy Standard A (RES A), which consists of closure for residential use with no engineering or institutional controls.**

**In March 2001, the Navy submitted a Notice of Intention to Switch to TRRP (30 TAC 350) for five of the six categories. The one category (Category C) that was not switched to TRRP, but remained under the RRS2-IND standards, was subsequently transferred to the Department of the Army.**

**In October 2002, an Affected Property Assessment Report (APAR) was produced based on evaluation of RFI data as well as data from follow-up investigations (Tetra Tech, 2002). The data included in the APAR were compared to TRRP RES A criteria to select those sites that may be closed with no land use encumbrances and to determine which sites required corrective action. The results of this comparison indicated that 23 SWMUs (1, 2, 6, 17, 18, 21, 31, 35, 36, 60, 79, 81, 83, 84, 85, 86, 92, 102, 108, 124, 136, 138, and 139) required further action.**

**SWMU 85 Plume**

**Building 188, the Small Craft Berthing and Crash/Rescue Boat Dock was constructed in 1973 and includes SWMU 85. SWMU 85 was an approximate 500-square-foot area near Building 188 where polychlorinated biphenyls (PCB) and non-PCB transformers were stored. Reports indicate that some of these transformers may have leaked into the soil. Additionally, drums containing soap, tar, toluene, methylene chloride, trichlorobenzene, and organic solvents were stored onsite, and construction debris, possibly including asbestos-containing materials, may have been buried onsite.**

**To address the shallow soil exceedances around SWMU 85, an Interim Corrective Action (ICA) was conducted by the Remedial Action Contractor (RAC) for the Navy. The PCB-contaminated soil was removed and disposed of offsite at permitted facilities, and the excavation was filled with clean soil. During the ICA excavation activities, monitoring well 421BX40MW was plugged and abandoned. Upon completion of the ICA, this monitoring well was replaced by 421B85MW to continue groundwater monitoring at this location. Even though groundwater samples collected from this site were analyzed for PCBs during the Rounds 1 through 6 sampling events, no PCBs were detected greater than their respective TRRP RES A Protective Concentration Limits (PCLs).**

**Soil**

**Based upon the data obtained during the RFI and subsequently evaluated in the APAR, further action was recommended at SWMU 85 due to exceedances of volatile organic compounds (VOC), PCBs, and inorganics in the soil. Consequently, excavation of impacted soil was recommended by the Navy and carried out by the Navy's RAC in 2003. The RACR for the soil removal activities was prepared and submitted to the TCEQ in March 2005. The RACR has undergone several review cycles by the city of Dallas, U.S. EPA, and TCEQ and the final replacement pages for the RACR were submitted to the TCEQ in May 2008 (CH2M Hill, 2008). The TCEQ granted final approval of the RACR in July 2008.**

**Groundwater**

**The results of the RFI for Category E, issued in December 2000, indicate that groundwater at the site has been impacted by chlorinated VOCs (CVOC). As described in the APAR, the groundwater of this SWMU is located within a Class 2 groundwater resource area. The high degree of heterogeneity associated with the shallow groundwater bearing unit (GWBU) onsite has resulted in a discrete groundwater Protective Concentration Level Exceedance (PCLE) zone associated with the SWMU 85 Plume that required a response action to reduce the concentration of chemicals of concern (COC) to less than the respective critical Protective Concentration Levels (PCL). Subsequent to the APAR, a Response Action Plan (RAP) was submitted for groundwater at the SWMU 85 Plume (Tetra Tech, 2006). The revised RAP received TCEQ approval in December 2006.**

**As determined in the RAP, groundwater excavation followed by monitored natural attenuation (MNA), if necessary, has been chosen as a removal and decontamination remedy to address the PCLE zone that has been identified at the SWMU 85 Plume. The 2017 remedial goal includes one year of groundwater sampling confirming that the PCLs have consistently been achieved and no rebound has occurred.**

**In April 2005, all groundwater monitoring wells associated with SWMU 85 were abandoned in preparation for the groundwater excavation activity, which was initiated in May 2005 by the Navy's Environmental Multiple Award Contractor (EMAC). The remaining groundwater within the excavated plume area has been sampled and the analytical results confirm that the COC concentrations remaining in the plume have been reduced to less than the TRRP RES A criteria. A RACR detailing the groundwater excavation activities was prepared and submitted to the TCEQ in March 2006 (Arcadis, 2006). After completion of the groundwater excavation and backfilling, six monitoring wells were installed within and around the former PCLE zone at SWMU 85 to confirm that TRRP RES A criteria had been consistently achieved. A residual trichloroethene (TCE) plume was detected, thus MNA was implemented in accordance with the RAP (Tetra Tech, 2006) to ensure that the groundwater is remediated to less than critical groundwater PCLs.**

**In accordance with the approved Groundwater RAP (Revision 2) (TtNUS, 2006), and as recommended by TCEQ in a letter dated May 26, 2015, failure of the response action triggers the implementation of contingency measures, which may include the selection of an appropriate alternate remedial measure such as enhanced MNA (EMNA). The Navy has proposed to implement EMNA in a pilot study as an alternate remedy at SWMU 18 groundwater plume in an effort to reduce COCs to below PCLs. This study will allow the Navy to make a determination as to whether the technology is viable. Depending upon the results of the EMNA spot treatment at SWMU 18, alternative remedial measures may be proposed in a comprehensive RAP for SWMU 17/Building 1429 Plume. MNA will be continued at the SWMU 85 Plume for the upcoming year in accordance with the procedures and protocols described in the Groundwater RAP (Revision 2) (TtNUS, 2006).**

**In October 2015, the Navy submitted a revised RAP (Revision 3) (Resolution Consultants, 2015) to TCEQ. The purpose of the revised RAP was to remove monitor wells with no history of COC detections, or with COC detections below the applicable GWPS for at least the previous five consecutive years, from the current monitoring and sampling plan and confirmation sampling plan. In accordance with the RAPs, Resolution Consultants conducted plug and abandonment (P&A) of select groundwater monitoring wells in April 2016. P&A actions were conducted by a state of Texas licensed driller (Strata Core Services, SCI). Monitor well 421B140MW was P&A'd at SWMU 85.**

**Potential receptors are onsite residents, onsite employees, and onsite construction workers. Since the groundwater PCLE zone is not projected to migrate offsite based on groundwater modeling results and other lines of evidence, it is not anticipated that offsite receptors will be affected. The possible routes of exposure to groundwater are inhalation (onsite residents, onsite employees, and onsite construction workers) and dermal contact (onsite construction workers). Ingestion is not a concern since during the implementation of the response actions as there is controlled access to the site, which limits potential exposures to contaminated groundwater (i.e., no potable or irrigation wells will be installed) through 2017. The potential for inhalation of vapor from groundwater through soil to outdoor air is insignificant because the maximum detected COC concentrations in groundwater are less than their respective inhalation of volatiles from groundwater ($^{Air}GW_{Inh-V}$) PCLs. Additionally, the indoor air sampling conducted in a sealed building at a similar plume at the base (Building 1406 within the SWMU 21 area)**

**indicated that no CVOCs were detected in the indoor air (TtNUS, 2004b). The recent Vapor Intrusion Study at SWMU 21 (Resolution Consultants, 2015) also concluded that sub-slab TCE and cis-1,2-DCE concentrations were well below VISLs for sub-slab vapor as well as RSLs for indoor air. Furthermore, the analytical results indicated that neither TCE nor cis-1,2-DCE were detected in indoor air samples. Therefore, vapor intrusion is not a current concern at NAS Dallas.**

## CHRONOLOGY OF MAJOR EVENTS

| | |
|---|---|
| Sep. 1985 | Initial Assessment Study was prepared and submitted. |
| Jan. 1987 | Confirmation Study and Verification Step Report was prepared and submitted. |
| Mar. 1989 | RFA was prepared and submitted. |
| 1993 — 1994 | EBS was prepared and submitted. |
| Mar. 1994 | BRAC Cleanup Plan was prepared and submitted. |
| 1995 — 1996 | Basewide Round 1 groundwater sampling event (Directed Phase RFI). |
| 1996 — 1997 | Interim Draft RFI Reports were prepared and submitted for each category identified at the air station. |
| Mar. — June 1998 | Basewide Round 2 groundwater sampling event (Chase Phase RFI). |
| May — Oct. 1998 | Main Fuel Farm (MFF) underground storage tanks (USTs) were removed by the Navy's Charleston Detachment, along with other tanks basewide. |
| June 1998 — Jan. 1999 | Release Determination Report was prepared and submitted covering the removal of the MFF tanks. |
| Aug. — Sep. 1998 | Basewide Round 3 groundwater sampling event. |
| Sep. 1998 | Most military operations on NAS Dallas ceased and the air station was placed into caretaker status. |
| Dec. 1998 — Jan. 2000 | Removal of oil/water separators (OWS) basewide. |
| Jan. — Oct. 1999 | Basewide removal of hot spot areas of contamination. |
| Feb. — Apr. 1999 | Basewide Round 4 groundwater sampling event. |
| Sep. — Oct. 1999 | Removal of the remaining USTs basewide. |
| Sep. — Nov. 1999 | Basewide Round 5 groundwater sampling event. |
| July 1999 — Feb. 2000 | Basewide pre-Corrective Measures Study monitoring well installation and sampling event. |
| June — July 2000 | Preliminary groundwater investigation at Advanced Science Incorporated Area-5 (ASA-5) site in the MFF/Main Fuel Farm Storm Sewer (MFF/MFFSS) area. |
| July — Aug. 2000 | Basewide Round 6 groundwater sampling event. |
| Aug. — Sep. 2000 | Aquifer tests were conducted at five sites across Former NAS Dallas to determine aquifer properties. |
| 2000 — 2001 | Final RFI Reports were prepared and submitted for each category. |

| | |
|---|---|
| June — July 2001 | Basewide Round 7 groundwater sampling event, including evaluation of alternate sampling methods [i.e., passive diffusion bag (PDB) and HydraSleeve™]. |
| Sep. 2001 | Enhanced Monitored Natural Attenuation (EMNA) pilot test initiated at ASA-5 site (SWMUs 79/136) involving the injection of potassium permanganate ($KMnO_4$). |
| Feb. 2002 | MNA Groundwater Modeling Report for MFF/MFFSS was prepared and submitted. |
| Mar. 2002 | Technical Memorandum Groundwater Sampling Procedure Comparison for selected monitoring wells was prepared and submitted. |
| Oct. 2002 | APAR was prepared and submitted. |
| Dec. 2002 — Mar. 2003 | Basewide Round 8 groundwater sampling event. |
| Jan. 2003 | Monitoring Well Abandonment Plan was prepared and submitted. |
| Jan. 2003 | Draft MNA Groundwater Modeling Report for Category D Sites was prepared and submitted. |
| Jan. 2003 | Corrective action (excavation and disposal) initiated on the Rubble Landfill (SWMU) 1). |
| Feb. 2003 | Draft RAP for MFF/MFFSS soils was prepared and submitted. |
| Apr. 2003 | Draft RAP for Category D Sites soils was prepared and submitted. |
| Apr. 2003 | Final Groundwater Report to satisfy Provision VIII.D.8 of the Former NAS Dallas RCRA Hazardous Waste Storage Permit (No. HW-50276) was prepared and submitted. |
| May 2003 | Self Implementation Notice (SIN) for TRRP RES A Soil Response Actions for SWMUs 2, 6, 18, 21, 31, 35, 36, 60, 79, 81, 83, 84, 85, 86, 102, 124, 138, and 139 was prepared and submitted. |
| June 2003 | Draft MNA Groundwater Modeling Report for Category B was prepared and submitted. |
| June 2003 | RCRA Permit renewal and Compliance Plan applications submitted to the TCEQ. |
| June 2003 | Corrective action (excavation, solidification, and disposal) initiated on the Texas Air National Guard (TANG) Ponds (SWMU 92). |
| July — Aug. 2003 | Basewide Round 9 groundwater sampling event. |
| Aug. 2003 | Corrective action (excavation, disposal, and backfill) initiated on the sites covered in the SIN submitted in May 2003. |

| | |
|---|---|
| Aug. 2003 | 2002 Annual Groundwater Monitoring Report was prepared and submitted. |
| Dec. 2003 — Jan. 2004 | Basewide Round 10 groundwater sampling event. |
| Jan. 2004 | Soil RACR was prepared and submitted for the Rubble Landfill (SWMU 1). |
| Jan. 2004 | Soil RACR was prepared and submitted for the TANG Ponds (SWMU 92). |
| Mar. 2004 | TCEQ produced and distributed the Draft RCRA Permit and Draft Compliance Plan. |
| Apr. 2004 | Final Addendum to MNA Groundwater Modeling Report for MFF/MFFSS was prepared and submitted. |
| May 2004 | 2003 Groundwater Response Action Effectiveness Reports (RAER) were prepared and submitted. |
| June 2004 | Indoor and Outdoor Air Sampling at Building 1406 Report was prepared and submitted. |
| July 2004 | Basewide Round 11 groundwater sampling event. |
| July 2004 | Final MNA Groundwater Modeling Report for Category D was prepared and submitted. |
| Sep. 2004 | Final MNA Groundwater Modeling Report for Category B was prepared and submitted. |
| Sep. 2004 | TCEQ approved final closure documentation for the Miscellaneous Sites Soil RACR. |
| Oct. 2004 | Basewide Round 12 groundwater sampling event. |
| Oct. 2004 | TCEQ approved Final MNA Groundwater Modeling Report for Category D Sites at Former NAS Dallas. |
| Oct. 2004 | TCEQ approved Final Addendum to the MNA Groundwater Modeling Report for MFF/MFFSS at Former NAS Dallas. |
| Oct. 2004 | TCEQ approved Final Groundwater Report for Former NAS Dallas. |
| Oct. 2004 | TCEQ approved the 2002 Annual Groundwater Monitoring Report. |
| Nov. 2004 | Final RAP (Basewide) for groundwater was prepared and submitted. |
| Dec. 2004 | 2004 Semi-annual Groundwater Monitoring Report was prepared and submitted. |
| Dec. 2004 | TCEQ issued comments on the 2003 Groundwater RAERs. |
| Jan. 2005 | 2004 Groundwater RAERs were prepared and submitted. |
| Mar. 2005 | Monitoring Well Installation and Abandonment Plan was prepared and submitted. |
| Mar. 2005 | Draft 84 Sites Soil RACR was prepared and submitted. |

| | |
|---|---|
| Apr. 2005 | 2004 Groundwater RAERs were prepared and submitted. |
| Apr. 2005 | Basewide Round 13 groundwater sampling event. |
| June 2005 | Corrective action for groundwater (excavation, disposal, and backfill) initiated at SWMU 85. |
| June 2005 | Corrective action for groundwater (excavation, disposal, and backfill) initiated at SWMU 18. |
| July 2005 | Basewide Round 13 groundwater sampling event. |
| Aug. 2005 | TCEQ issued comments on the Draft 84 Sites Soil RACR. |
| Aug. 2005 | 2005 Semi-annual Groundwater Monitoring Report was prepared and submitted. |
| Sep. 2005 | TCEQ issued comments on the 2004 Groundwater RAPs. |
| Oct. 2005 | TCEQ issued comments on the 2004 Groundwater RAERs. |
| Oct. 2005 | Basewide Round 14 groundwater sampling event. |
| Oct. — Dec. 2005 | City of Dallas issued comments on the Draft 84 Sites Soil RACR. |
| Dec. 2005 | TCEQ issued comments on the 2005 Semi-annual Groundwater Monitoring Report. |
| Jan. 2006 | 2005 Groundwater RAERs were prepared and submitted. |
| Jan. 2006 | Basewide Round 15 groundwater sampling event. |
| Feb. 2006 | Revised Groundwater RAPS (Revision 2) were prepared and submitted covering SWMUs 17/Building 1423, 17/Building 1429, 18, 35, 85, 86, 108, 136 North, 136 South, and 139. |
| Mar. 2006 | RACR for groundwater removed at SWMUs 18 and 85 were prepared and submitted. |
| May 2006 | Basewide Round 15B groundwater sampling event. |
| May 2006 | TCEQ issued comments on the 2005 Groundwater RAERs. |
| June 2006 | 85 Sites, Defense Reutilization and Marketing Office (DRMO), and Naval Weapons Industrial Reserve Plant (NWIRP) SWMU 18 Soil RACRs (Revision 1) were prepared and submitted. |
| July 2006 | TCEQ issued comments on the Groundwater RAPs (Revision 2). |
| July 2006 | EMNA Pilot Test initiated at SWMU 21 involving the injection of zero valent iron (ZVI). |
| Aug. 2006 | Basewide Round 16 groundwater sampling event. |
| Aug. 2006 | Responses to TCEQ comments on the Groundwater RAPs (Revision 3), including replacement pages, were prepared and submitted. |

| | |
|---|---|
| Nov. 2006 | Basewide Round 16B groundwater sampling event. |
| Dec. 2006 | RACR for groundwater PCL at SWMU 35 was prepared and submitted. |
| Dec. 2006 | TCEQ approves Groundwater RAP (Revision 3) covering SWMUs 17/Building 1423, 17/Building 1429, 18, 35, 85, 86, 108, 136 North, 136 South, and 139. |
| Jan. 2007 | 2006 Groundwater RAERs were prepared and submitted. |
| Apr. 2007 | Groundwater Sampling Work Plan Addendum, Slug Test Work Plan, and Monitoring Well Installation and Abandonment Work Plan were prepared and submitted. |
| Apr. — May 2007 | Basewide Round 17 groundwater sampling event. |
| Apr. — June 2007 | SWMU 18 OWS removal operations were conducted. |
| Apr. 2007 | Slug test operations conducted at SWMUs 18, 85, and 139. |
| Aug. — Sep. 2007 | Basewide Round 18 groundwater sampling event. |
| Nov. 2007 | Field Activities for SWMU 21 EMNA Pilot Study completed. |
| Jan. 2008 | 2007 Groundwater RAERs were prepared and submitted. |
| Feb. 2008 | TCEQ approves the Groundwater RACR for SWMU 35. |
| Apr. 2008 | Comments to the 85 Sites, DRMO, and NWIRP SWMU 18 Soil RACRs revisions were received from the TCEQ. |
| May 2008 | TCEQ issued comments on the 2007 Groundwater RAERs. |
| May 2008 | Response to the 85 Sites, DRMO, and NWIRP SWMU 18 Soil RACRs comments were submitted to the TCEQ. |
| July 2008 | Basewide Round 20 groundwater sampling event. |
| July 2008 | TCEQ grants final approval of the 85 Sites, DRMO, and NWIRP SWMU 18 Soil RACRs. |
| July 2008 | Response to TCEQ comments on 2007 Groundwater RAERs, replacement pages (Revision 1) to 2007 RAERs prepared and submitted. |
| Oct. 2008 | Technical Memorandum, ASA-5 East Site EMNA Pilot Study prepared and submitted. |
| Oct. 2008 | Technical Memorandum, Pilot Study at SWMU 21 prepared and submitted. |
| Oct. 2008 | SWMU 17/Building 1429 Pilot Test Work Plan prepared and submitted. |
| Dec. 2008 | SWMU 139 Groundwater RACR prepared and submitted. |
| Jan. 2009 | Basewide Round 21 groundwater sampling event. |
| Jan. 2009 | 2008 Groundwater RAERs prepared and submitted. |

| | |
|---|---|
| Jan. 2009 | Revised Groundwater RAPs for SWMU 21 (Revision 2) prepared and submitted. |
| Jan. 2009 | Revised Groundwater RAPs for SWMUs 79/136 Central (Revision 2) prepared and submitted. |
| Jan. 2009 | Revised Groundwater RAP for SWMU 136 South (Revision 4) prepared and submitted. |
| May 2009 | SWMU 21 Pilot Study additional groundwater sampling. |
| May 2009 | SWMU 79/136 Central non-compliant monitoring well groundwater sampling. |
| May 2009 | TCEQ grants conditional approval of the SWMU 139 Groundwater RACR. |
| June 2009 | ASA-5 Pilot Test injection points abandonment. |
| June 2009 | SWMU 35 monitoring well abandonment. |
| July 2009 | Basewide Round 22 groundwater sampling event. |
| Sep. 2009 | SWMU 21 Pilot Study monitoring wells abandonment. |
| Oct. 2009 | Revised Technical Memorandum, SWMU 21 Pilot Study prepared and submitted. |
| Oct. 2009 | SWMU 136 South non-compliant monitoring well groundwater sampling. |
| Nov. 2009 | Response to TCEQ comments on 2008 Groundwater RAERs prepared and submitted. |
| Jan. 2010 | Basewide Round 23 groundwater sampling event. |
| Jan. 2010 | 2009 Groundwater RAERs prepared and submitted. |
| July 2010 | Basewide Round 24 groundwater sampling event. |
| Aug. 2010 | Basewide monitoring well network inspection and five-year survey. |
| Nov. 2010 | Response to TCEQ comments on 2009 Groundwater RAERs prepared and submitted. |
| Dec. 2010 | Monitoring well general maintenance and minor repairs completed. |
| Jan. 2011 | Basewide Round 25 groundwater sampling event. |
| Jan. 2011 | 2010 Groundwater RAERs prepared and submitted. |
| March 2011 | Monitoring well inspection at SWMU 21/SWMU 18 on monitoring wells within the 20-acre area leased to the Air National Guard. |
| May 2011 | Addendum to Monitoring Well Installation and Abandonment Plan prepared and submitted. |
| June 2011 | SWMU 139 monitoring wells plugged and abandoned. |
| June 2011 | SWMU 81 monitoring wells plugged and abandoned. |

| | |
|---|---|
| June 2011 | Repairs, abandonment and replacement of damaged monitoring wells at SWMU 21 and SWMU18. |
| July 2011 | Basewide Round 26 groundwater sampling event. |
| Dec. 2011 | Response to TCEQ comments on 2010 Groundwater RAERs prepared and submitted. |
| Jan. 2012 | Basewide Round 27 groundwater sampling event. |
| March 2012 | 2011 Groundwater RAERs prepared and submitted. |
| July 2012 | Basewide Round 28 groundwater sampling event. |
| Aug. 2012 | U.S. EPA comments to the 2011 Groundwater RAER. |
| Oct. 2012 | TCEQ comments to the 2011 Groundwater RAER. |
| Jan. 2013 | Basewide Round 29 groundwater sampling event. |
| Jan. 2013 | 2012 Groundwater RAERs prepared and submitted. |
| Feb. 2013 | TCEQ comments to the 2012 Groundwater RAER. |
| June 2013 | U.S. EPA comments to the 2012 Groundwater RAER. |
| July 2013 | Basewide Round 30 groundwater sampling event. |
| July 2013 | Response to TCEQ comments on 2012 Groundwater RAERs prepared and submitted. |
| Jan. 2014 | Basewide Round 31 groundwater sampling event. |
| Jan. 2014 | 2013 Groundwater RAERs prepared and submitted. |
| Feb. 2014 | TCEQ comments to the 2013 Groundwater RAER. |
| June 2014 | U.S. EPA comments to the 2013 Groundwater RAER. |
| July 2014 | Basewide Round 32 groundwater sampling event. |
| July 2014 | Response to TCEQ comments on 2013 Groundwater RAERs prepared and submitted. |
| Nov. 2014 | RCRA Permit renewal and Compliance Plan (Number 50276) applications submitted to the TCEQ. |
| Jan. 2015 | Basewide Round 33 groundwater sampling event. |
| Jan. 2015 | 2014 Groundwater RAERs prepared and submitted. |
| May 2015 | TCEQ Permit Renewal Application Technical Notice of Deficiency (NOD) Letter, dated May 26, 2015. |
| June 2015 | Meeting with TCEQ, EPA, and City of Dallas |
| June 2015 | TCEQ comments letter to the 2014 Groundwater RAER, dated June 10, 2015. |
| June 2015 | Submittal of Draft revised RAP for SWMU 17/Building 1429, received June 23, 2015. |

| | |
|---|---|
| June 2015 | Response to TCEQ comments to the Response to Permit Renewal Application Technical NOD Letter for Former Dallas Naval Air Station (NAS), Dallas, Texas, dated June 26, 2015. |
| July 2015 | Basewide Round 34 groundwater sampling event. |
| July 2015 | TCEQ Permit Renewal Application Second Technical Notice of Deficiency Letter, dated July 24, 2015. |
| July 2015 | Response to TCEQ Comments on the Technical Memorandum Pilot Study for SWMU 21, Rev. 1, July 2009 submitted to the TCEQ, dated July 24, 2015. |
| Oct. 2015 | Basewide submittal of Revised and Interim Response Action Plans. |
| Dec. 2015 | Draft Final Enhanced Monitored Natural Attenuation (EMNA) Spot Treatment Workplan for SWMU 18 prepared and submitted to TCEQ. |
| Dec. 2015 | Amendment to the Approved Class V Underground Injection Control (UIC) Permit (5X2600432) prepared and submitted to TCEQ. |
| Jan. 2016 | Basewide Round 35 groundwater sampling event. |
| Jan. 2016 | TCEQ, U.S. EPA, and City of Dallas approve EMNA workplan. |
| Jan. 2016 | 2015 Groundwater RAERs prepared and submitted. |
| Jan. 2016 | EMNA Spot Treatment Design Verification Testing at SWMU 18 by Resolution Consultants and Regenesis Remediation Services. |
| March 2016 | Draft Tier II Sampling and Analysis Plan Addendum #1, Long-Term Monitoring Plan Enhanced Monitored Natural Attenuation Spot Treatment at SWMU 18 Former Naval Air Station Dallas, Dallas, Texas prepared and submitted to TCEQ. |
| March 2016 | Amendment to the Approved Class V UIC Permit (5X2600432) prepared and submitted to TCEQ. |
| Apr. 2016 | TCEQ approves UIC amendment request. |
| Apr. 2016 | Basewide plug and abandon and operation and maintenance actions, installation of monitor well 508F98MW in SWMU 79 |
| Apr. 2016 | EMNA Spot Treatment at SWMU 18 baseline groundwater sampling event. |
| May 2016 | EMNA Spot Treatment at SWMU 18 injections by Resolution Consultants and Regenesis Remediation Services. |
| Jul. 2016 | Basewide Round 36 groundwater sampling event. |
| Aug. 2016 | Deploy passive diffusion bags at EMNA Spot Treatment well 606D152MW. |
| Sep. 2016 | Basewide operations and maintenance activities completed. |
| Sep. 2016 | EMNA Spot Treatment at SWMU 18 performance of first quarterly groundwater monitoring event. |
| Sep. 2016 | Draft Tier II Sampling and Analysis Plan Addendum #2, Long-Term Monitoring Plan, Enhanced Monitored Natural Attenuation, Perfluoroalkyl |

Substances Groundwater Investigation, Former Naval Air Station Dallas, Dallas, Texas prepared and submitted to TCEQ.

# Checklist for Report Completeness

Use this checklist to determine the portions of the form that must be submitted for this report. Answer all questions by checking Yes or No. If the answer is Yes include that portion of the report. If the answer is No, do not complete or submit that portion of the report. All form contents that are marked "Required" must be submitted. Form contents marked with an asterisk (*) are not included in the blank form and are to be provided by the person.

| | | | | Report Contents |
|---|---|---|---|---|
| | | Required | **Cover Page** | ☒ |
| | | Required | **Executive Summary** | ☒ |
| | | Required | **Checklist for Report Completeness** | ☒ |
| | | Required | **Worksheet 1.0** Response Action Objectives | ☒ |
| | | Required | **Attachment 1A*** Maps and Cross Sections | ☒ |
| | | Required | **Attachment 1B*** Graphs | ☒ |
| | | Required | **Attachment 1C*** Response Action Diagrams | ☐ *N/A* |
| No ☒ | Is a plume management zone being used as part of the response action? | ☐ Yes | **Worksheet 2.0** Plume Management Zone | ☐ |
| | | | **Attachment 2A*** Map of Plume Management Zone | ☐ |
| No ☒ | Was an area of technical impracticability approved for use as part of the response action? | ☐ Yes | **Worksheet 3.0** Technical Impracticability | ☐ |
| | | | **Attachment 3A*** Map of Technical Impracticability | ☐ |
| No ☒ | Are institutional controls used or required as part of the response action? | ☐ Yes | **Worksheet 4.0** Institutional Controls | ☐ |
| | | Required | **Worksheet 5.0** Performance Measures and Problems | ☒ |
| No ☐ | Have any operation and maintenance activities been conducted? | ☒ Yes | **Worksheet 6.0** Operation and Maintenance | ☒ |
| No ☒ | Has there been any change to the plans for post-response action care from that submitted in the RAP? | ☐ Yes | **Worksheet 7.0** Post-Response Action Care | ☐ |
| No ☐ | Was any information for this report obtained from outside sources? | ☒ Yes | **Appendix 1*** References | ☒ |
| No ☒ | Is an ESA and/or Compensatory Restoration being used as part of the response action? | ☐ Yes | **Appendix 2*** ESA and Compensatory Restoration | ☐ |

| Checklist for Report Completeness | ID No. *SWR 65033 SWMU 85 Plume* | Report Date: *01/17/2017* |
|---|---|---|

| | | | | |
|---|---|---|---|---|
| No ☒ | Are institutional controls or landowner concurrence required in the response action? | ☐ Yes | **Appendix 3*** Institutional Controls and Landowner Concurrence | ☐ |
| No ☐ | Is there data or boring/monitor well information not previously submitted? | ☒ Yes → | **Appendix 4*** Data Tables, Boring Logs, and Well Completions | ☒ |
| No ☒ | Did sampling procedures differ from those described in the RAP? | ☐ Yes → | **Appendix 5*** Sampling Procedures | ☐ |
| No ☐ | Has any sampling been conducted for which the analytical results were not previously submitted? | ☒ Yes → | **Appendix 6*** Laboratory Data Packages | ☒[1] |
| No ☐ | Were statistics or geostatistics used in the response action? | ☒ Yes → | **Appendix 7*** Statistical Methodology | ☒[2] |
| No ☐ | Were any wastes generated that were not reported through STEERS? | ☒ Yes → | **Appendix 8*** Waste Disposition Statistical Methodology | ☒ |

***Notes:***

[1] Included with 2016 RAER in CD format.

[2] Included with 2016 RAER for SWMU 17/Building 1423.

Use this worksheet to describe the response action objectives in each media.

## Response Action Objectives — SWMU 85 Plume

What is the selected remedy standard for this affected property? *X* A ___ B

List the environmental media to which this applies *Soil*

Repeat this section for each medium that had a different response action objective.

Provide a detailed description of the response action. Describe the removal actions, decontamination actions, treatment system(s), and/or physical or institutional control actions that have been conducted in each media and indicate if there were any differences between the actions taken and the actions proposed in the SIN or RAP.

**Based upon the data obtained during the RFI and subsequently evaluated in the APAR, further action was recommended at SWMU 85 due to exceedances of PCBs, VOCs, and inorganics in the soil. Consequently, excavation of impacted soil was recommended by the Navy and carried out by the Navy's RAC in 2003. The RACR for the soil removal activities was prepared and submitted to the TCEQ in March 2005. The RACR has undergone several review cycles by the city of Dallas, U.S. EPA, and TCEQ, and the final replacement pages for the RACR were submitted to the TCEQ in May 2008 (CH2M Hill, 2008). The TCEQ granted final approval of the RACR in July 2008.**

List the environmental media to which this applies *Groundwater*

Repeat this section for each medium that had a different response action objective.

Provide a detailed description of the response action. Describe the removal actions, decontamination actions, treatment system(s), and/or physical or institutional control actions that have been conducted in each media and indicate if there were any differences between the actions taken and the actions proposed in the SIN or RAP.

**The groundwater response action for this site consists of groundwater excavation followed by MNA as a removal and decontamination remedy to reduce the concentration of COCs to less than their critical PCLs (Tetra Tech, 2006). Consequently, excavation of impacted groundwater was carried out by the Navy's EMAC in 2005. The RACR for the groundwater removal activities was prepared and submitted to the TCEQ in March 2006 and is currently under review.**

**Six monitoring wells were installed in May 2006 within and around the former PCLE zone. A residual TCE plume was detected, thus MNA was implemented in accordance with the RAP (Tetra Tech, 2006) to ensure the groundwater is remediated to less than critical groundwater PCLs. The results of the continued groundwater sampling and analysis from these monitoring wells is discussed on Worksheet 5.0 and presented in the maps and graphs in Attachment 1 and in the tables Appendix 4.**

**The following elements will be the basis for determining the successful implementation of the MNA remedy:**

- **Decontamination through the ongoing biological and chemical reductive dechlorination processes.**
- **A monitoring/confirmation sampling program to evaluate the progress of the decontamination.**

Describe how the response action has, or is working towards, achievement of the property-specific response objectives for the PCLE zone in each medium in the context of the response objectives set forth in §350.32 or §350.33, as applicable. Explain how the response action is appropriate based on the hydrogeologic and COC characteristics. Describe any unprotective conditions that continued or resulted from the remedial actions and the actions taken to mitigate unprotective conditions.

**The response action for the contaminated groundwater in the PCLE zones will meet groundwater response objectives of §350.32 by the use of excavation as a removal remedy and MNA as a decontamination remedy to reduce the concentration of COCs within the PCLE zones to less than their critical PCLs. The primary mechanisms for natural attenuation of COCs rely on the capacity of the groundwater system**

**to reduce COC concentrations. The attenuation process can include biodegradation, dispersion, dilution, and adsorption of contaminates in site groundwater. Specifically, the response action relies on in-situ biological reductive dechlorination of dissolved chlorinated solvents in groundwater. The Navy considers this response action appropriate based on the ongoing evaluation process that has demonstrated that MNA is capable of reducing the concentrations of COCs in the PCLE zone within a reasonable timeframe, while controlling plume expansion.**

**During the implementation of the response action activities, there has been controlled access to the site, which limits potential exposures to contaminated groundwater (i.e., no potable or irrigation wells will be installed) through 2017. As MNA is necessary, the fate and transport modeling results in the Final MNA Groundwater Monitoring Report for Category B (Tetra Tech, 2004) predict that there will be no expansion of the PCLE zones or offsite migration of COCs at concentrations greater than the respective critical groundwater PCLs. Because this decontaminating remedy is based on an in-situ technology, the potential short-term exposure normally associated with the implementation of ex-situ technologies (i.e., dermal and inhalation exposures) were not a concern.**

If different from the information provided in the RAP, explain how the COCs have been handled, treated, disposed, or transferred to another medium and document that the response action has not resulted in any additional exposure conditions due to response action activities.

*N/A*

Explain whether the response action is achieving, or will achieve, the objectives within the reasonable time frame.

**The strongest evidence for natural attention is the reduction of contaminant levels observed in samples from monitoring wells over the period of record and the apparent stability of the plume. Specifically, natural attenuation has reduced concentrations of TCE in monitoring wells located along the centerline of the plume (421B137MW and 421B141MW) to levels below respective critical groundwater PCLs. COC concentration data indicate decreasing or downward trends in concentration levels. However, fluctuations in TCE concentrations at 421B138MW and 421B139MW have produced levels slightly above the critical groundwater PCL. Nevertheless, decreasing COC trends in all monitor wells indicate that progress of the MNA response action is occurring. The Navy considers this response action appropriate based on the ongoing evaluation process that has demonstrated that MNA is capable of reducing the concentrations of COCs in the PCLE zone within a reasonable time frame, while controlling plume expansion.**

**Maps in Attachment 1A, data tables in Appendix 4, and graphs in Attachment 1B show a considerably smaller PCLE zone footprint than the historical PCLE zone presented in the RAP (Tetra Tech, 2006). At this time, the data provide indication that remediation via MNA is occurring throughout the residual TCE plume. Additionally, TCE rebound concentrations after excavation appear to have peaked in the center of the plume. Further sampling will continue at this plume area in accordance with the RAP (Tetra Tech, 2006) to ensure that MNA is successfully remediating the groundwater to less than critical groundwater PCLs.**

Are physical controls part of the response action? ____ Yes *X* No

If yes, describe the type and purpose of the physical control and discuss how the physical control has proven effective.

*N/A*

## Soil Response Action Objectives

When using removal and/or decontamination with controls or controls only, demonstrate that the physical control or combination of measures is reliably containing, and will continue to contain, COCs within and/or derived from the surface soil and subsurface soil PCLE zone materials over time.

*N/A*

Explain how the removal or decontamination action is reducing the concentration of COCs to the critical surface soil and subsurface soil PCL throughout the soil PCLE zone and preventing COC concentrations above the critical soil PCLs from migrating beyond the original boundary of the soil PCLE zone.

**The soils containing COC concentrations in excess of TRRP RES A were excavated by the Navy's RAC in 2003. Since no soils remain at the site in excess of TRRP RES A concentrations, there is no danger of COCs migrating beyond the original boundary of the PCLE zone. The RACR for the soil removal activities was prepared and submitted to the TCEQ in March 2005. The RACR has undergone several review cycles by the city of Dallas, U.S. EPA, and TCEQ and the final replacement pages for the RACR were submitted to the TCEQ in May 2008 (CH2M Hill, 2008). The TCEQ granted final approval of the RACR in July 2008.**

## Groundwater Response Action Objectives — SWMU 85 Plume

Name of groundwater-bearing unit to which this information applies *Upper Water Bearing Zone (Alluvial Overburden)*

Repeat this section for each groundwater-bearing unit for which a different response action is being conducted.

Groundwater Classification ____ 1 _X_ 2 ___ 3

Is a modified groundwater response action being used for any part of the groundwater PCLE zone (§350.33(f)(2), (3), or (4))? ___ Yes _X_ No

If yes, complete the appropriate portions of this report.

Explain how the removal or decontamination actions are reducing the concentration of COCs to the critical groundwater PCL throughout the groundwater PCLE zone and preventing COC concentrations above the critical groundwater PCL from migrating beyond the original boundary of the groundwater PCLE zone. If COC concentrations above the critical groundwater PCL have ever migrated beyond the original boundary of the groundwater PCLE zone, explain the actions taken to address the increase in the PCLE zone.

**The groundwater containing COC concentrations in excess of TRRP RES A was excavated by the Navy's EMAC in 2005. The RACR detailing the groundwater excavation activities was prepared and submitted to the TCEQ in March 2006.**

**Maps in Attachment 1A, data tables in Appendix 4, and graphs in Attachment 1B show a considerably smaller PCLE zone footprint than that presented in the RAP (Tetra Tech, 2006). At this time, the data provide indication that remediation via MNA is occurring throughout the residual TCE plume and groundwater exceedances have not migrated beyond the original PCLE zone boundary.**

Explain how the response actions are preventing COCs from migrating to air at concentrations above the PCLs for air if the groundwater-to-air PCLs ($^{Air}GW_{Inh-V}$) were exceeded.

*N/A*

Explain how the response actions are preventing COCs from migrating to surface water at concentrations above the PCLs for groundwater discharges to surface water if surface water was a factor.

**Mountain Creek Lake (surface water body) has limited use and is not classified as a drinking water source (see TCEQ approved Tier 1 exclusion criteria). In accordance with TRRP-24, section 350.75 (i)(4), it is required that PCLs be established for COCs in groundwater that discharge to surface water ($^{sw}GW$). The rule also requires that the $^{sw}GW$ PCL equal the risk-based exposure limit for surface water ($^{sw}RBEL$),**

**or as modified by a dilution factor where applicable. It is also appropriate to develop a list of $^{sw}$GW protective of ecological receptors using the dilution factor approach.**

**The lowest acceptable concentration for $^{sw}$RBEL, the critical surface water PCL, is 0.612 milligrams per liter (mg/L) for TCE, the primary COC. This value is based on the protection of human health using the ingestion of contaminated fresh water fish criteria. The maximum TCE concentration detected at the SWMU 85 Plume is 1.1 mg/L (421B106TW, June 2003). However, current TCE concentrations in monitoring wells located between former monitoring well 421B106TW and Mountain Creek Lake (421B137MW, 421B138MW, and 421B139MW) indicate that the TCE PCLE zone has not extended to the surface water. This is supported by the groundwater monitoring and sampling conducted to date that indicate that the plume is stable and not expanding toward the lake. In addition, The Navy's EMAC has completed the excavation and removal of the contaminated groundwater to the critical PCL (0.005 mg/L) in 2005. The excavation area has subsequently been backfilled with imported soil that meets TRRP RES A.**

Explain how the response actions are preventing human and ecological receptor exposure to the groundwater PCLE zone.

**The response action is based on an in-situ technology that will permanently degrade the COCs. During the implementation of the in-situ groundwater response action, access to the site will be controlled by not permitting any potable or irrigation wells in the PCLE zone during remedial activities. Additionally, the fate and transport modeling results (Tetra Tech, 2004) indicate that the PCLE zones will not migrate beyond the Former NAS Dallas property line; therefore, there will be no threat to offsite human or ecological receptors.**

## Waste Management

Describe the volume and final disposition or reuse location of waste or environmental media that has been removed from the affected property during the response action, if not previously reported under STEERS. Provide copies of all manifests, other documentation of disposition, and landowner consent for reuse of soil in Appendix 8.

**Excess groundwater recovered through the low-flow or PDB sampling method is placed into properly labeled 55-gallon capacity drums and stored at the site. Upon classification, waste disposal arrangements are made with a licensed waste disposal facility. Appendix 8 contains copies of the waste disposal manifests for groundwater generated during the 2016 sampling activities at Former NAS Dallas.**

# ATTACHMENT 1A
# MAPS AND CROSS SECTIONS

# AFFECTED PROPERTY MAP

Affected Property Map
Former NAS Dallas, Texas

January 2014 Isocontour
Gross PCLE Zone Outline
Demolished Building
Existing Structure
Owned by City of Dallas
Transferred from Exelon Corporation to City of Dallas
Transferred from Navy to City of Dallas
Transferred from Navy to City of Grand Prairie
Transferred from Navy to U.S. Army Reserve
Owned by Exelon Corporation

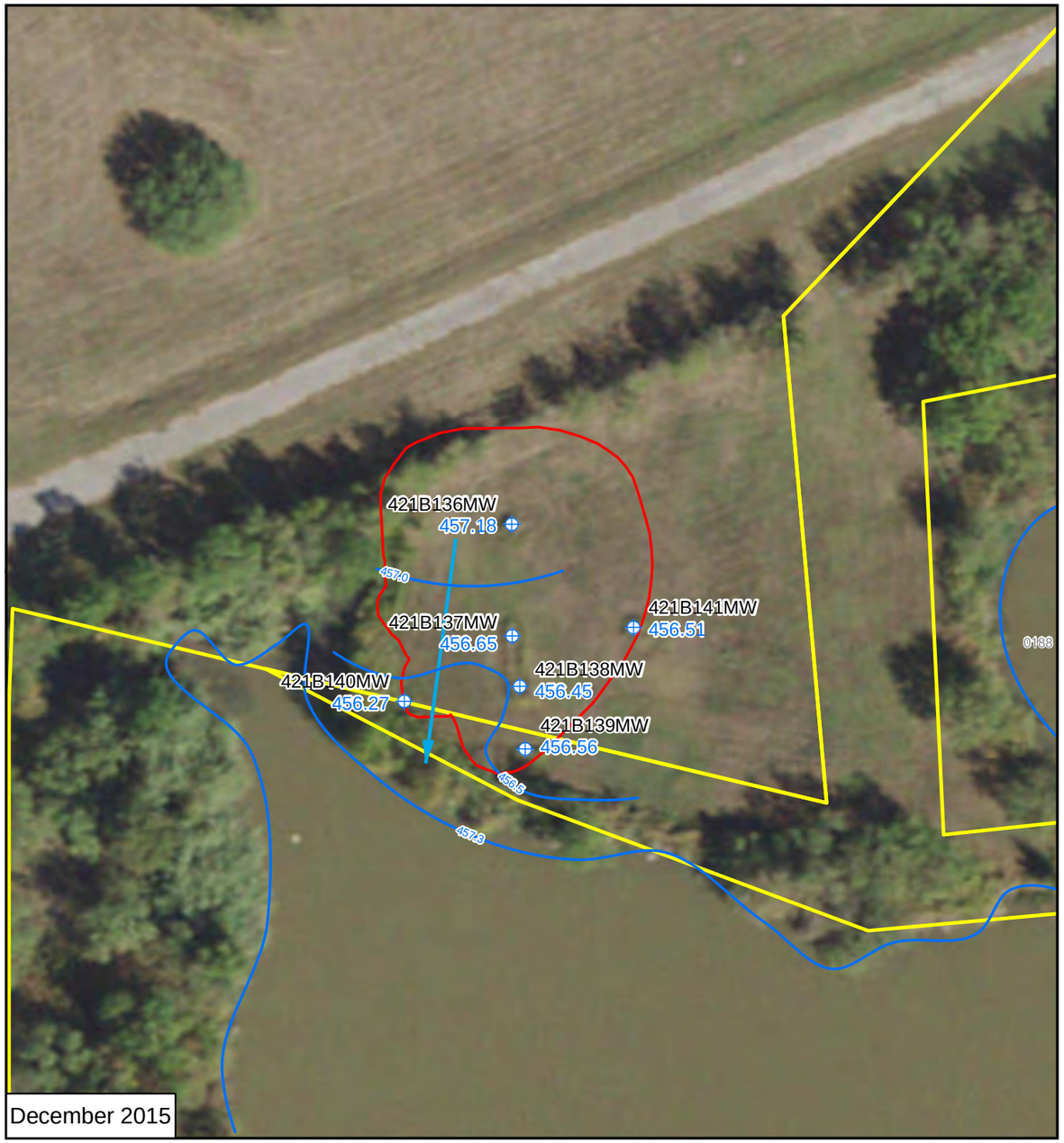
NAVFAC Naval Facilities Engineering Command

| | |
|---|---|
| REQUESTED BY: T. Wiberg | DATE: 9/21/2015 |
| DRAWN BY: A. Zimmerman | PROJECT NUMBER: 0888812796 |

X:\Navy\NAS_Dallas\NAS_Dallas_Jan14_AffectedPropMap.mxd

Service Layer Credits: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community; State boundary is from the United States Census Bureau; Some data are from TetraTech.

# POTENTIOMETRIC SURFACE MAPS



N

- Well Location
- Potentiometric Surface Contour
- Groundwater Flow Direction
- Gross PCLE Zone Outline
- Demolished Building
- Property Boundary 2014

Notes:
455.66 - Potentiometric Surface Contour (Feet above MSL)
* USGS Surface Water Elevation for Mountain Creek Lake (Site No.-08050050)

0 25 50 100 Feet

Figure 1A-3
Potentiometric Surface Map
SWMU 85
2016 RAER
Former NAS Dallas, Texas

NAVFAC Naval Facilities Engineering Command

| | |
|---|---|
| REQUESTED BY: E. Brickman | DATE: 11/1/2016 |
| DRAWN BY: M. Senne | PROJECT NUMBER: 0888812796 |

X:\Navy\NAS_Dallas\project\2016_RAER\2016_Jul_NAS_Dallas_Iso_POT_SWMU85.mxd

Service Layer Credits: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

# ISOCONCENTRATION CONTOUR MAPS

N

**TCE (mg/L)**

- Not Sampled
- ND - 0.005
- > 0.005 - 0.05

- Gross PCLE Zone Outline
- Property Boundary 2014
- Groundwater Flow Direction

**Isoconcentration Contours**

- 0.005 mg/L

Note: The PCL for TCE = 0.005 mg/L
J = Estimated value
L = Bais low
U = Non-detect

0 25 50 100 Feet

Figure 1A-2A
Trichloroethene Isoconcentration Contours
SWMU 85
2016 RAER
Former NAS Dallas, Texas

NAVFAC Naval Facilities Engineering Command

| | |
|---|---|
| REQUESTED BY: E. Brickman | DATE: 11/18/2016 |
| DRAWN BY: M. Senne | PROJECT NUMBER: 0888812796 |

X:\Navy\NAS_Dallas\project\2016_RAER\2016_Jul_NAS_Dallas_Iso_TCE_SWMU85.mxd

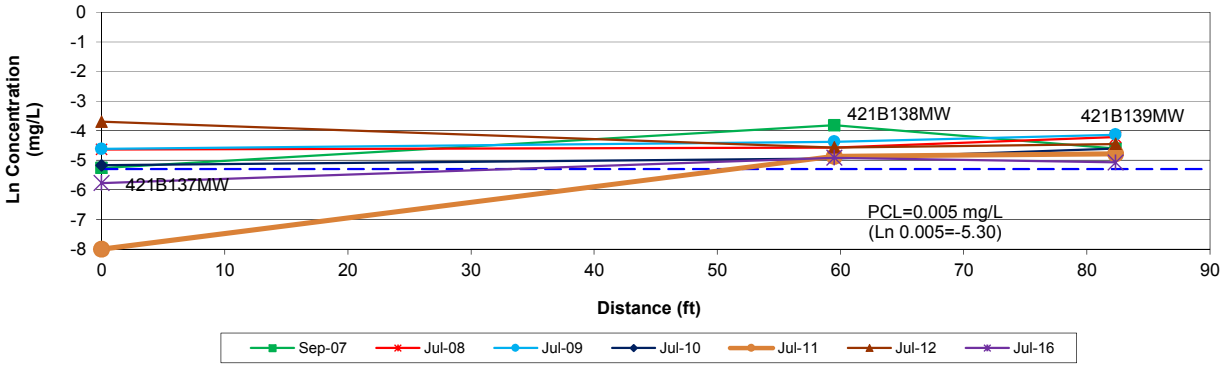
Service Layer Credits: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

# ATTACHMENT 1B
# GRAPHS

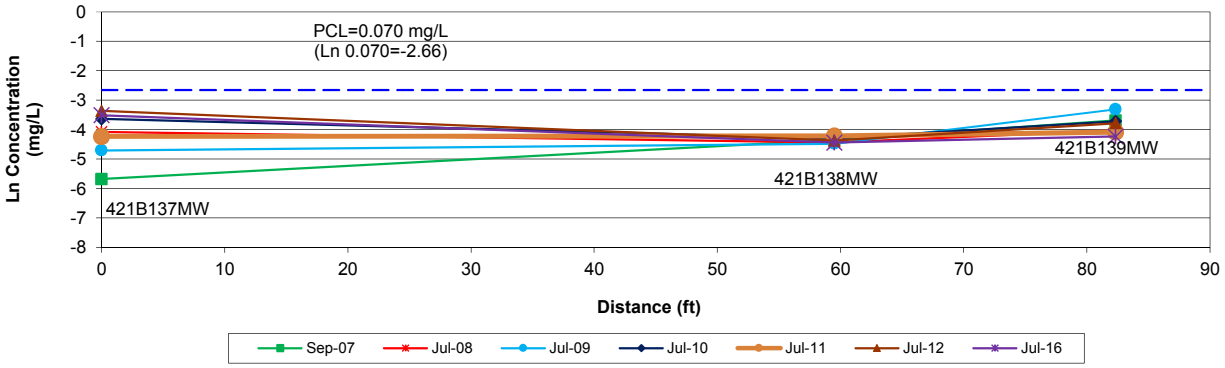
# CONCENTRATION VS. DISTANCE GRAPHS
# SWMU 85 PLUME
# 2016 RAER

## FORMER NAS DALLAS, TEXAS

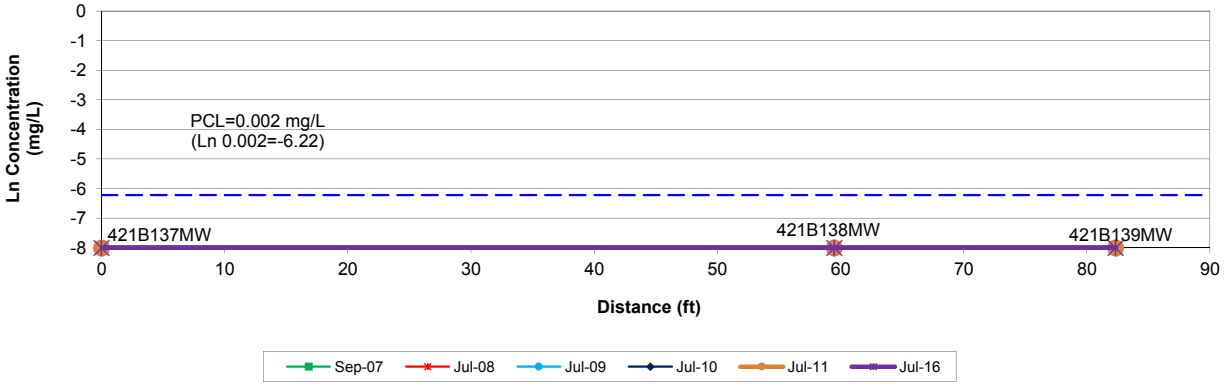
### TCE




### cis-1,2-DCE




### Vinyl Chloride

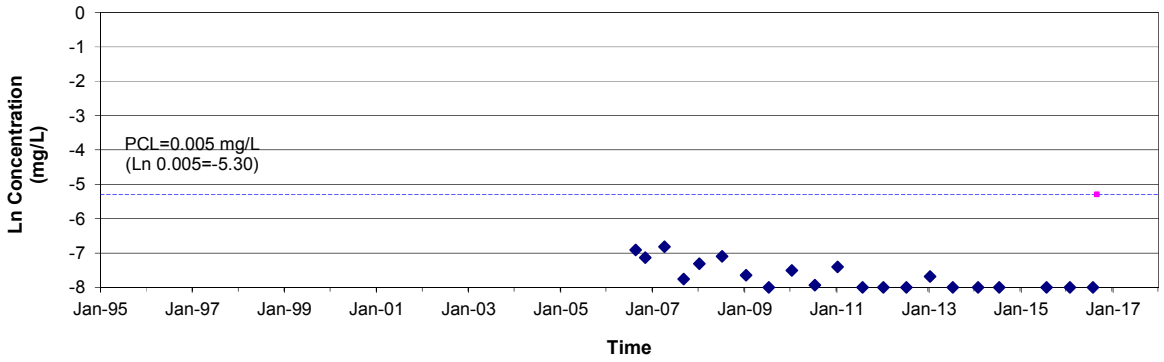



Notes: Graphed data points are taken from raw data.
Sample events using passive diffusion bag (PDB) samplers are listed on Tables 4-1A and 4-1B in Appendix 4.

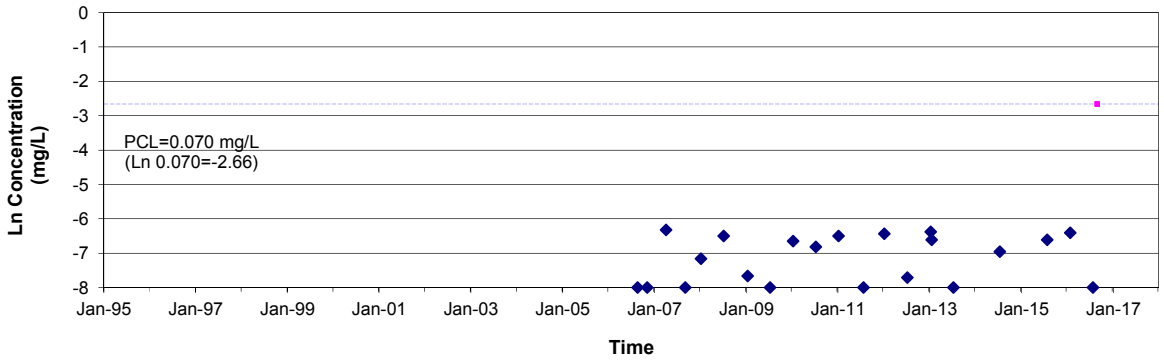
# CONCENTRATION VS. TIME GRAPHS
# WITH MINIMUM REQUIRED ATTENUATION RATES
# SWMU 85 PLUME
# 421B136MW
# 2016 RAER

## FORMER NAS DALLAS, TEXAS

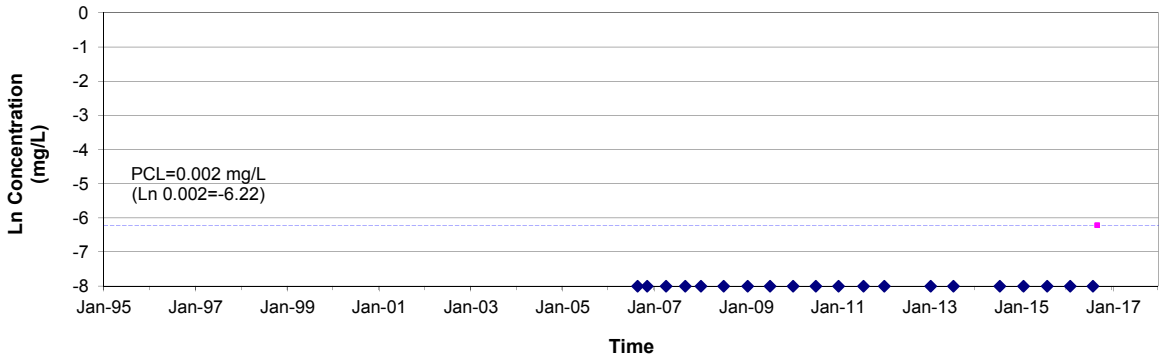
### TCE




### cis-1,2-DCE




### Vinyl Chloride

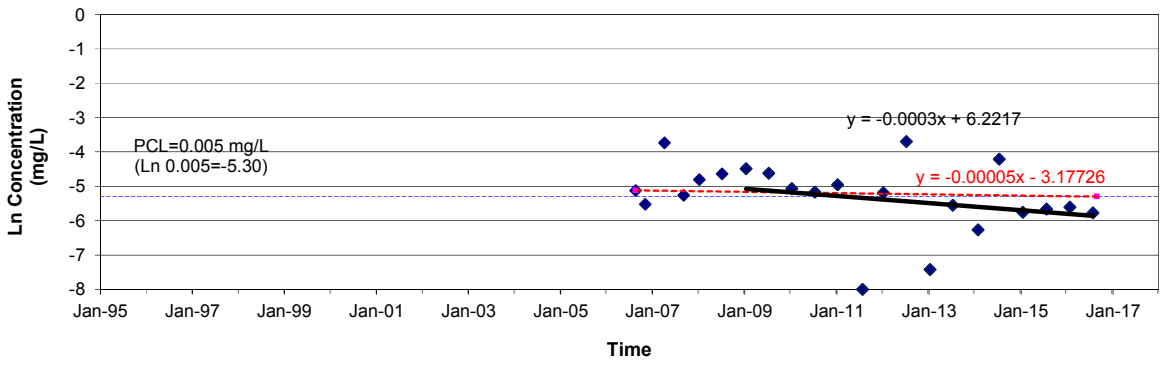



Notes: Red line and slope are based on minimum required attenuation rate (ktime) to meet PCL by 01 Sep 2016.
Black line and slope are based on linear regression of the raw data.
Sample events using permeable diffusion bag (PDB) samplers are listed on Tables 4-1A and 4-1B in Appendix 4.

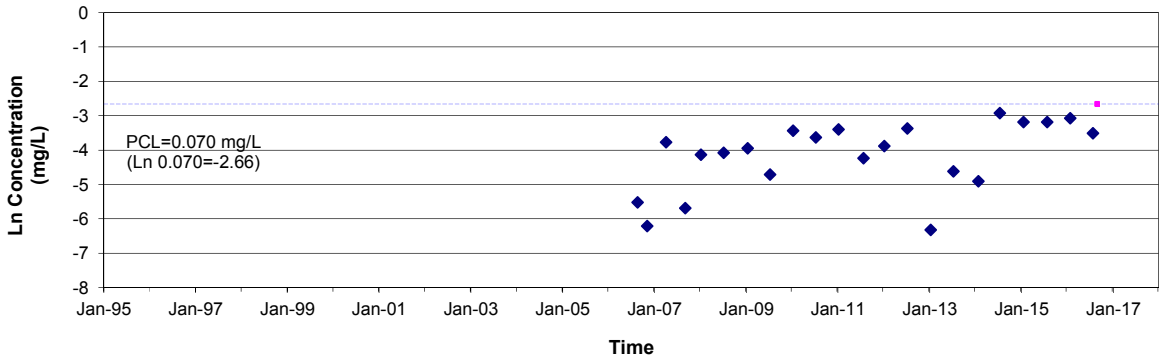
# CONCENTRATION VS. TIME GRAPHS
# WITH MINIMUM REQUIRED ATTENUATION RATES
# SWMU 85 PLUME
# 421B137MW
# 2016 RAER

## FORMER NAS DALLAS, TEXAS

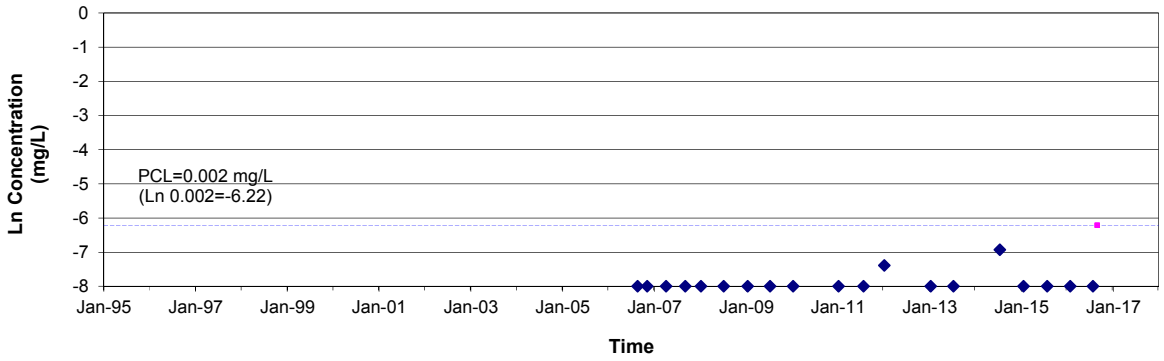
### TCE




### cis-1,2-DCE




### Vinyl Chloride

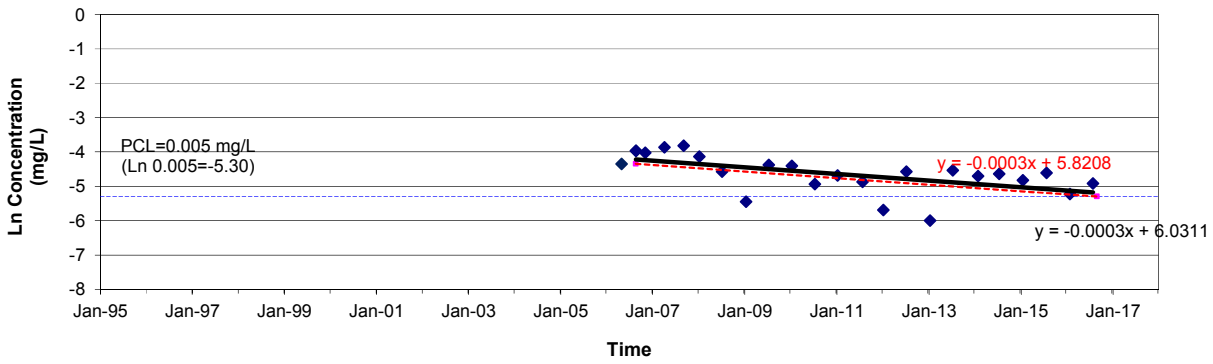



Notes: Red line and slope are based on minimum required attenuation rate (ktime) to meet PCL by 01 Sep 2016.
Black line and slope are based on linear regression of the raw data.
Sample events using permeable diffusion bag (PDB) samplers are listed on Tables 4-1A and 4-1B in Appendix 4.

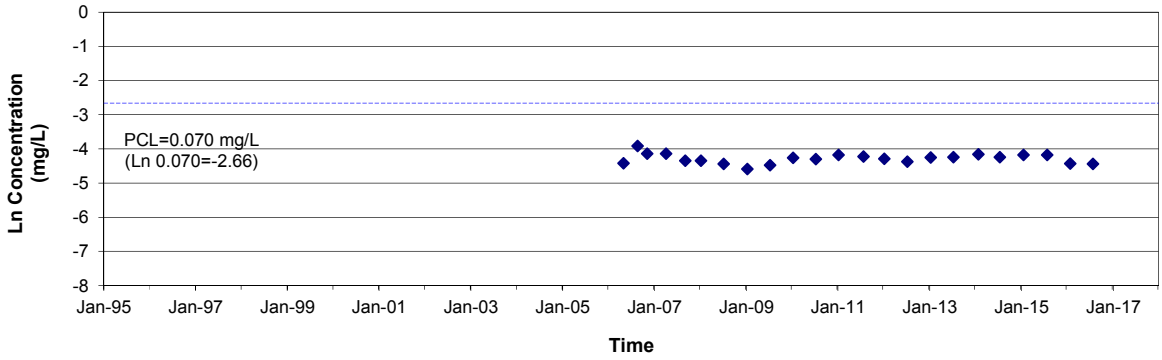
# CONCENTRATION VS. TIME GRAPHS
# WITH MINIMUM REQUIRED ATTENUATION RATES
# SWMU 85 PLUME
# 421B138MW
# 2016 RAER

## FORMER NAS DALLAS, TEXAS

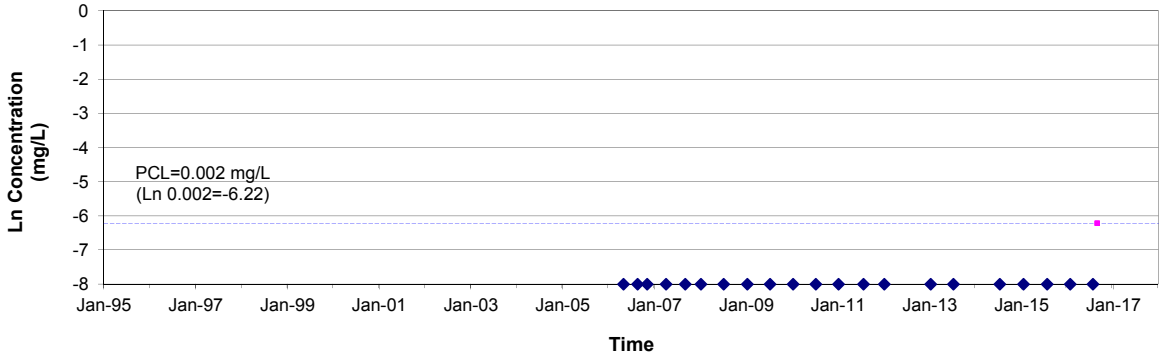
### TCE




### cis-1,2-DCE




### Vinyl Chloride

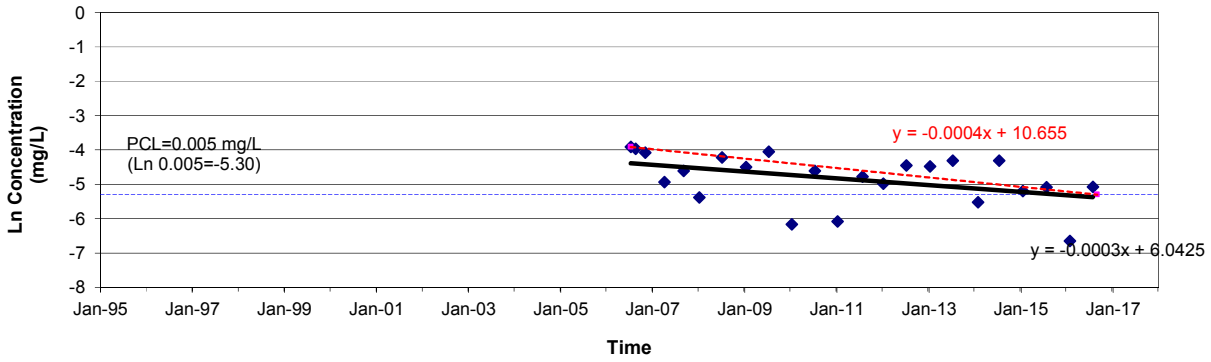



Notes: Red line and slope are based on minimum required attenuation rate (ktime) to meet PCL by 01 Sep 2016.
Black line and slope are based on linear regression of the raw data.
Sample events using permeable diffusion bag (PDB) samplers are listed on Tables 4-1A and 4-1B in Appendix 4.

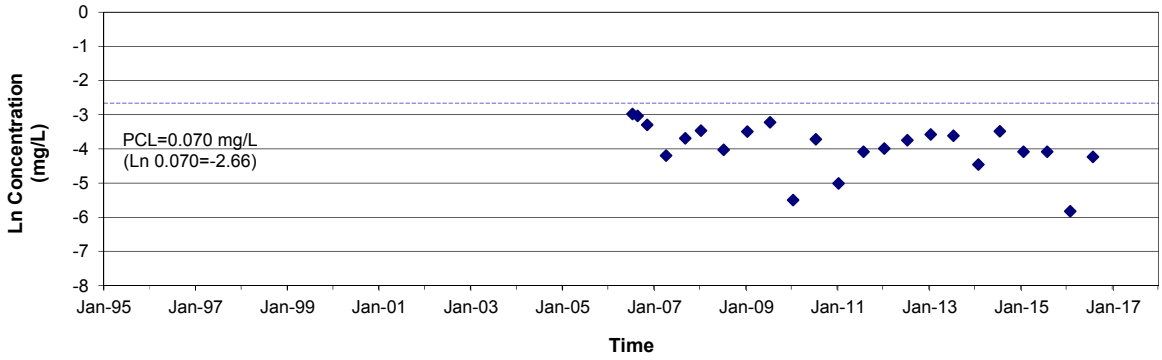
# CONCENTRATION VS. TIME GRAPHS
# WITH MINIMUM REQUIRED ATTENUATION RATES
# SWMU 85 PLUME
# 421B139MW
# 2016 RAER

## FORMER NAS DALLAS, TEXAS

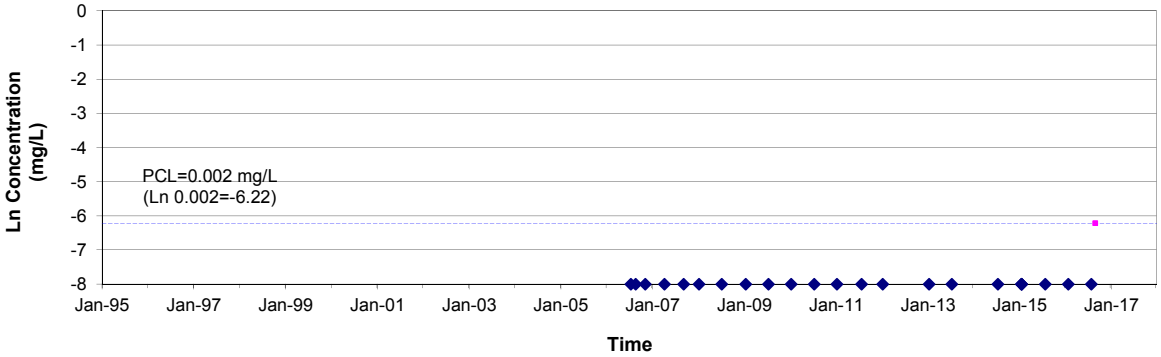
### TCE




### cis-1,2-DCE




### Vinyl Chloride

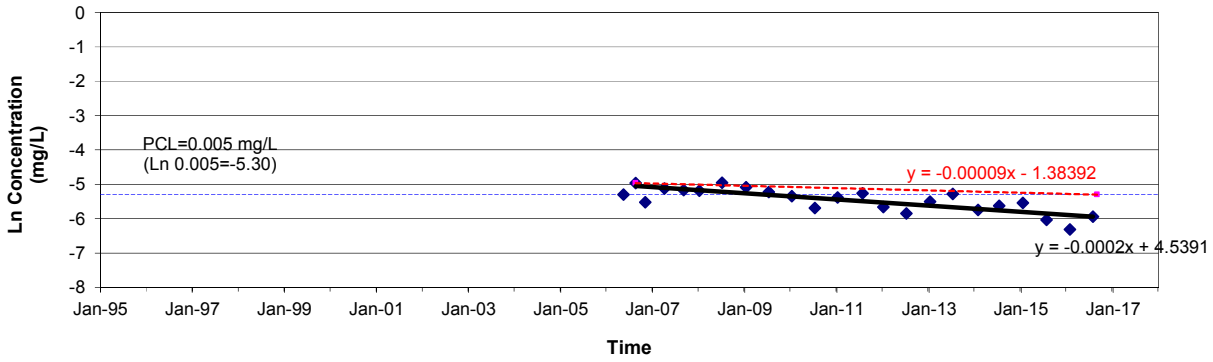



Notes: Red line and slope are based on minimum required attenuation rate (ktime) to meet PCL by 01 Sep 2016.
Black line and slope are based on linear regression of the raw data.
Sample events using permeable diffusion bag (PDB) samplers are listed on Tables 4-1A and 4-1B in Appendix 4.

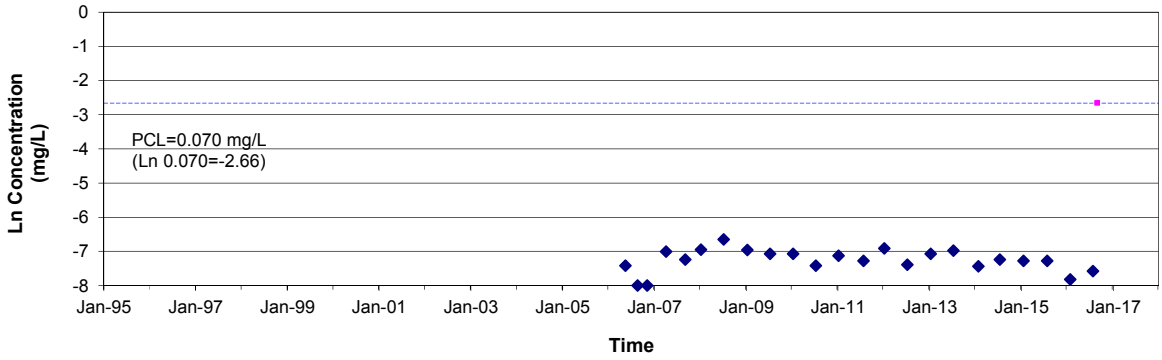
# CONCENTRATION VS. TIME GRAPHS
# WITH MINIMUM REQUIRED ATTENUATION RATES
# SWMU 85 PLUME
# 421B141MW
# 2016 RAER

## FORMER NAS DALLAS, TEXAS

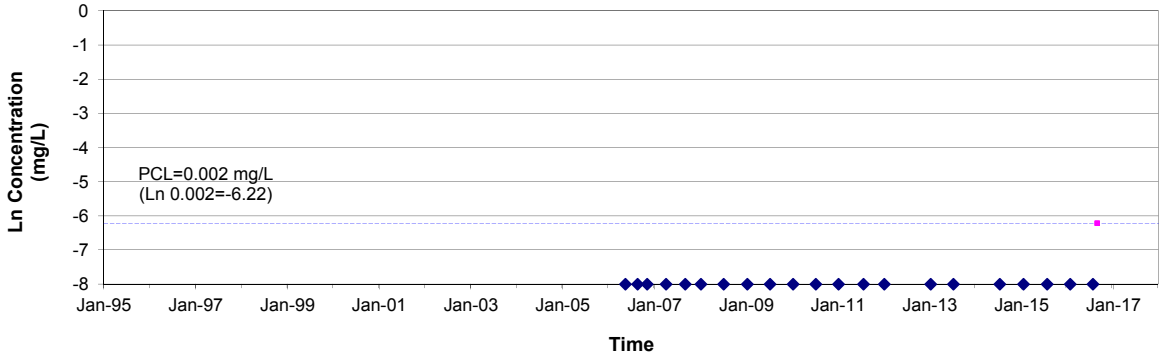
### TCE




### cis-1,2-DCE




### Vinyl Chloride




Notes: Red line and slope are based on minimum required attenuation rate (ktime) to meet PCL by 01 Sep 2016.
Black line and slope are based on linear regression of the raw data.
Sample events using permeable diffusion bag (PDB) samplers are listed on Tables 4-1A and 4-1B in Appendix 4.

## Performance Measures

List and describe the performance measures for each environmental medium containing a PCLE zone that are being used to determine if reasonable progress is being made by the response action in a timely manner. Provide documentation that these performance measures are being met. Attach additional information if necessary.

**Performance Measures for Groundwater Excavation**

**The approach used to determine if the excavation of the PCLE zone to expose and remove the impacted groundwater involved confirmation sampling of the groundwater entering the open excavation. To verify that the remedial objectives had been achieved, COC concentrations in groundwater samples collected from the excavation had to be less than TRRP RES A criteria, in accordance with guidance from the TCEQ during previous groundwater excavation activities at other plumes within Former NAS Dallas site. If the analytical results indicated that COCs were still present in groundwater at concentrations greater than TRRP RES A, additional soil excavation and/or groundwater removal was performed and the groundwater was sampled again. Once two consecutive analytical results indicated that the COC concentrations were less than TRRP RES A, the excavation area was backfilled, graded, and the site was restored to pre-excavation conditions.**

**After completion of the groundwater excavation activities, backfilling, and grading of the area, six monitoring wells (421B136MW, 421B137MW, 421B138MW 421B139MW, 421B140MW, and 421B141MW) were installed within and around the former PCLE zone to confirm that TRRP RES A criteria had been achieved in accordance with the RAP (Tetra Tech, 2006).**

**Post Response Action Monitoring Data Assessment**

**The removal of source areas (contaminated soils and groundwater) was completed in 2005. Two consecutive confirmation samples were obtained from the groundwater within the open excavation to verify that the groundwater PCLE zone had been removed.**

**Six replacement monitoring wells were installed in and around the historic PCLE zone as stated above. It was expected that no residual concentrations would be detected in the replacement monitoring wells during the post-response action period. However, seven consecutive post-excavation sampling events detected residual concentrations of TCE in the replacement wells. Therefore, as proposed in the RAP (Tetra Tech, 2006), MNA was implemented for the decontamination of any remaining COC exceedances until the remedial goals have been met.**

**MNA Performance Measures**

**The approach to determine if MNA is consistently achieving the clean-up goals by 2017 involves sequential sampling events to determine how the size and shape of the PCLE zones are changing over time. To this effect, a tiered sampling program incorporating performance, detection, and ambient monitoring is implemented.**
**This sampling program allows the collection of data on the COCs, groundwater flow, and geochemical parameters that may affect the progress of MNA and the likelihood of meeting site remediation goals. The design of the monitoring program allows a conclusion of success or failure to be drawn as early as possible during the response action while providing reasonable confidence in the conclusion.**

**Performance monitoring encompasses the sampling of the point of exposure (POE) wells (421B136MW, 421B137MW, and 421B138MW) within the plume, the background monitoring well (421B141MW) outside the PCLE zone, and the corrective action observation (CAO) well (421B139MW). Data collected from these monitoring wells serve to check the plume shape and determine if it is shrinking or expanding, stable or migrating, thus triggering programmatic adjustments, if necessary. COC analytical data collected from the monitoring wells located along the plume centerline are used to determine plume attenuation rates for individual COCs ($k_{time}$) and for the plume as a whole ($k_{dist}$). Data collected from the background monitoring wells serves to determine if ambient conditions are changing that may affect the effectiveness of MNA in achieving the clean-up goals in a timely manner. The COC analytical results are summarized in Table 4-1.**

**CAO well 421B140MW had COC detections below applicable GWPSs for at least the previous five consecutive years and was abandoned on April 6, 2016, in accordance with the RAP submitted to TCEQ in October 2015. Well plugging reports are located in Appendix 4, and historical COC analytical results for P&A wells are included in Table 4-1B.**

**Performance monitoring for 2016 also entailed sampling for MNA parameters (pH, ORP, dissolved oxygen, ferrous iron, alkalinity, hydrogen sulfide, carbon dioxide, nitrate, nitrite, orthophosphate, sulfate, sulfide, total organic carbon, chloride, ethene, ethane, and methane) during the July 2016 sampling event. MNA parameters are sampled on a biennial sampling schedule. The MNA parameters measured by field tests and laboratory analyses are presented in Table 4-2. MNA parameter data, as needed, serve as a secondary line of evidence to evaluate whether subsurface conditions continue to support natural attenuation.**

**The conceptual MNA site model for this plume is represented by the data tables in Appendix 4, the isoconcentration maps and potentiometric surface maps in Attachment 1A, and the concentration versus (vs.) time and concentration vs. distance graphs in Attachment 1B.**

**After each semi-annual groundwater monitoring event, the COC concentration data collected were evaluated for both the entire plume as well as on a monitoring well by monitoring well basis in accordance with the RAP (Tetra Tech, 2006). The initial data analysis and interpretation focused on the detection of trend changes in the data. Further evaluation focused on the impact the trend changes may have on the potential for MNA to achieve the remedial goals.**

**It was expected that the analytical data would indicate that the attenuation rates are sufficient to effectively remediate the plume on or before the year 2017. Reasonable progress of the response action is evaluated considering the following criteria:**

- **The monitoring well and COC specific $k_{time}$ attenuation rate based on the available sampling data is not more than the minimum attenuation rate necessary to meet the remedial goals by the year 2017.**
- **The monitoring well and COC specific concentration is less than the remedial benchmark concentration (calculated concentration goal based on the initial maximum concentration and the minimum rate necessary to achieve the remedial goals by 2017) for that sample date.**
- **The COC specific $k_{dist}$ attenuation rate based on the available sampling data indicates attenuation equal to or faster than the rate of COC migration from the suspected source area.**

**<u>Response Action Progress</u>**

**The removal of source areas (contaminated soils and groundwater) was completed in 2005. Two consecutive confirmation samples obtained from the groundwater within the open excavation indicated that the groundwater PCLE zone had been removed. However, TCE was detected at concentrations exceeding PCLs in the replacement monitoring wells; therefore, MNA was implemented for the decontamination of any remaining COC exceedances until the remedial goals have been met.**

**The potentiometric surface maps for the December 2015 and July 2016 gauging events, included in Figure 1A-3 (Attachment 1A), indicate that the shape of the groundwater elevation contours and the direction of groundwater flow is consistent with prior sampling events**

**The COC isoconcentration contour map, prepared using the data collected during the January and July 2016 sampling events, is included in Figure 1A-2A (Attachment 1A). A review of the 2016 data indicate that:**

- **TCE is the only COC at SWMU 85 currently exceeding PCLs.**
- **TCE exceeded its PCL in only two of the five monitor wells (421B138MW and 421B139MW).**

- **TCE slightly exceeded its PCL of 0.005 mg/L at monitoring well 421B138MW during both the January and July sampling events (0.00542 and 0.00735 mg/L, respectively); TCE was substantially below its PCL at monitoring well 421B139MW in January (0.0013 mg/L) and slightly exceeded its PCL in July (0.00628 mg/L).**

- **There was no expansion of the PCLE zone or offsite migration of COCs at concentrations greater than PCLs in 2016.**

**Tables 4-4 and 4-5 (Appendix 4) summarize the concentration vs. time and concentration vs. distance attenuation rate constants for the plume centerline. The graphs in Attachment 1B graphically depict the same attenuation rate constants summarized in Tables 4-4 and 4-5 and the minimum required attenuation rate to meet the remediation goals. Based on the data presented:**

  - **All SWMU 85 monitoring wells continue to show a decreasing trend for TCE concentrations in groundwater.**

  - **The calculated Ktime for TCE at 421B138MW is the only concentration vs. time attenuation rate greater than the minimum ktime for the 2017 clean-up goal.**

- **Considering that TCE concentrations have decreased to levels just slightly above the PCL for TCE in recent sampling events, it is expected that ongoing biological reductive dechlorination processes will continue to reduce the TCE concentrations within the existing groundwater PCLE zone and may attain levels less than their respective critical PCLs by 2017.**

**As discussed in the sections above and based on primary lines of evidence, excavation followed by MNA appears to be an appropriate remedial method to reduce COCs to less than their PCLs in a reasonable time frame. To ensure MNA is successfully remediating the groundwater to less than PCLs, groundwater sampling will be continued at the SWMU 85 Plume for the upcoming year in accordance with the procedures and protocols described in the RAP (Tetra Tech, 2006).**

## Problems

Complete the table for the response action. When the response action consists of several components or multiple actions, complete one table for each major component or action.

Response Action Name/Designation: *Groundwater Response Action*

List the problems that have been encountered during the response action, describe the impact of each problem, and the response to the problem.

| Description of the Problem | Impact | Did this cause a response action failure? | | Corrective Response |
|---|---|---|---|---|
| | | Yes | No | |
| **Excavation of the impacted soil and groundwater reduced COC concentrations to the respective PCLs in most, but not all of the monitoring wells located throughout the historical PCLE zone.** | **None** | | **X** | **Continue the use of MNA at this plume until COC concentrations in groundwater decrease to less than the TRRP RES A PCLs.** |

Use this worksheet to describe the operation and maintenance (O&M) activities conducted for each response action.

Response Action Name/Designation: Well maintenance

List all portions of the response action to which this information applies. Repeat this worksheet for each major component or operation.

Describe the O&M and inspection activities that have been conducted to operate and maintain response action components.

**CAO well 421B140MW had COC detections below applicable GWPSs for at least the previous five consecutive years and was plugged and abandoned (P&A) on April 6, 2016, in accordance with the RAP submitted to TCEQ in October 2015. Well plugging reports are located in Appendix 4, and historical COC analytical results for P&A'd wells are included in Table 4-1B. Monitor wells 421B136MW, 421B138MW, and 421B139MW (all stickup wells) had several bollards that were damaged by landscaping activities. All bollards were righted and secured with new concrete anchoring during the P&A event.**

**In September 2016 Resolution Consultants conducted a detailed evaluation of well maintenance needs for all NAS Dallas SMUs. All monitor wells in SWMU 85 were in good condition, all pads and bollards were stable, and the wells were locked.**

# APPENDIX 1
# REFERENCE LIST

# APPENDIX 1
## REFERENCES

Arcadis. *Response Action Completion Report for the Category D Northeast (SWMU 18) and Former Transformer Storage Area (SWMU 85).* 2006.

A.T. Kearney, Inc. *RCRA Facility Assessment Preliminary Review/Visual Site Inspection. Chicago, Illinois.* 1989.

CH2M Hill. *85 Sites, Defense Reutilization and Marketing Office, and Naval Weapons Industrial Reserve Plant SWMU 18 Response Action Completion Report, Revision 3, Naval Air Station Dallas, Dallas, Texas.* Atlanta, Georgia. 2008.

EnSafe/Allen & Hoshall. *Naval Air Station Dallas Environmental Baseline Survey, Dallas, Texas*. Memphis, Tennessee. 1994.

Tetra Tech NUS, Inc. *RCRA Facility Investigation Report for Category C*. *Pittsburgh, Pennsylvania.* 2000a.

— *RCRA Facility Investigation Report for Category E*. *Pittsburgh, Pennsylvania.* 2000b.

— *RCRA Facility Investigation Report for Category F. Pittsburgh, Pennsylvania.* 2000c.

— *RCRA Facility Investigation Report for Category D. Pittsburgh, Pennsylvania.* 2001a.

— *RCRA Facility Investigation Report for Category B. Pittsburgh, Pennsylvania.* 2001b.

— *Affected Property Assessment Report. Houston, Texas*. 2002.

— *Final Monitoring Natural Attenuation Groundwater Modeling Report for Category D. Pittsburgh, Pennsylvania.* 2004.

— *Response Action Plan, Revision 2. Pittsburgh, Pennsylvania.* 2006.

Resolution Consultants. *Draft Final Alternatives Evaluation Report, Former Naval Air Station, Dallas, Texas*. Norfolk, Virginia. August 2013.

— *Draft Vapor Intrusion Study Report, Buildings 1405, 1422, and 1424, Solid Waste Management Unit 21*. Norfolk, Virginia. September 2015.

— *Revised Groundwater Response Action Plan for SWMU 85 Plume (Revision 3).* Norfolk, Virginia. October 2015.

# APPENDIX 4
# DATA TABLES

**Table 4-1** Summary of Chemicals of Concern Detected in Groundwater
**Table 4-2A** Summary of Geochemical Parameters Measured in Groundwater (Long Term Monitoring Wells)
**Table 4-2B** Summary of Geochemical Parameters Measured in Groundwater (Historical Monitoring Wells)
**Table 4-3A** Summary of Groundwater Gauging Data (Long Term Monitoring Wells)
**Table 4-3B** Summary of Groundwater Gauging Data (Historical Monitoring Wells)
**Table 4-4** Summary of Concentration vs. Time Attenuation Rate Constants
**Table 4-5** Summary of Concentration vs. Distance Attenuation Rate Constants

# TABLE 4-1
# SUMMARY OF CHEMICALS OF CONCERN DETECTED IN GROUNDWATER

**Table 4-1A**

**Summary of Chemicals of Concern Detected in Groundwater**
**Long Term Monitoring Wells — SWMU 85 Plume**
**2016 RAER**
**Former NAS Dallas, Texas**
**Page 1 of 2**

| Monitoring Well | Sampling Date | Sampling Round | Chemicals of Concern (mg/L) | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | 1,1-Dichloroethene | cis-1,2-Dichloroethene | Tetrachloroethene | trans-1,2-Dichloroethene | Trichloroethene | Vinyl Chloride |
| **Protective Concentration Levels (mg/L)** | | | **0.00700** | **0.07000** | **0.00500** | **0.10000** | **0.00500** | **0.00200** |
| **Monitoring Wells Located Inside PCLE Zone** | | | | | | | | |
| **421B136MW** | 5/17/2006 | Well Installed | | | | | | |
| | 5/22/2006 | Round 15 | NS-D | NS-D | NS-D | NS-D | NS-D | NS-D |
| | 8/22/2006 | Round 16 | 0.00060 U | 0.00050 U | NA | 0.00060 U | 0.00100 | 0.00060 U |
| | 11/8/2006 | Round 16B | 0.00060 U | 0.00050 U | 0.00060 U | 0.00060 U | 0.00080 J | 0.00060 U |
| | 5/10/2007 | Round 17 (PDB) | 0.00028 U | 0.00180 | 0.00014 U | 0.00053 U | 0.00110 | 0.00012 U |
| | 9/11/2007 | Round 18 | 0.00042 U | 0.00044 U | 0.00014 U | 0.00040 U | 0.00043 J | 0.00019 U |
| | 1/30/2008 | Round 19 (PDB) | 0.00039 U | 0.00078 J | 0.00046 U | 0.00048 U | 0.00067 J | 0.00043 U |
| | 7/23/2008 | Round 20 (PDB) | 0.00054 U | 0.00150 | 0.00022 U | 0.00045 U | 0.00083 J | 0.00030 U |
| | 1/14/2009 | Round 21 | 0.00054 U | 0.00047 J | 0.00022 U | 0.00045 U | 0.00048 J | 0.00030 U |
| | 7/13/2009 | Round 22 | 0.00054 U | 0.00020 U | 0.00022 U | 0.00045 U | 0.00032 U | 0.00030 U |
| | 1/12/2010 | Round 23 (PDB) | 0.00029 U | 0.00130 | 0.00044 U | 0.00034 U | 0.00055 J | 0.00028 U |
| | 7/13/2010 | Round 24 (PDB) | 0.00029 U | 0.00110 | 0.00044 U | 0.00034 U | 0.00036 J | 0.00028 U |
| | 1/10/2011 | Round 25 (PDB) | 0.00023 U | 0.00150 | 0.00025 U | 0.00035 U | 0.00061 J | 0.00022 U |
| | 7/26/2011 | Round 26 | 0.00023 U | 0.00026 U | 0.00025 U | 0.00035 U | 0.00026 U | 0.00022 U |
| | 1/9/2012 | Round 27 (PDB) | 0.00023 U | 0.0016 | 0.00025 U | 0.00035 U | 0.00026 U | 0.00022 U |
| | 7/10/2012 | Round 28 | NS | 0.00045 J | NS | 0.00035 U | 0.00026 U | NS |
| | 1/7/2013 | Round 29 (PDB) | 0.00020 U | 0.0017 | 0.00032 U | 0.00023 U | 0.00046 J | 0.00044 U |
| | 7/15/2013 | Round 30 | 0.00020 U | 0.00024 U | 0.00032 U | 0.00023 U | 0.00031 U | 0.00044 U |
| | 1/28/2014 | Round 31 (PDB) | NS | 0.00033 U | NS | 0.00034 U | 0.00030 U | NS |
| | 7/16/2014 | Round 32 | 0.00025 U | 0.00095 J | 0.00025 U | 0.00025 U | 0.00025 U | 0.00025 U |
| | 1/20/2015 | Round 33 (PDB) | 0.00025 U | 0.00135 | 0.00025 U | 0.00025 U | 0.000264 J | 0.00025 U |
| | 7/28/2015 | Round 34 | 0.00025 U | 0.00033 U | 0.00025 U | 0.00025 U | 0.00025 U | 0.00025 U |
| | 1/21/2016 | Round 35 (PDB) | 0.00025 UJ | 0.00166 | 0.00025 U | 0.00064 J | 0.00025 UJ | 0.00025 UJ |
| | 7/20/2016 | Round 36 | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U |
| **421B137MW** | 5/17/2006 | Well Installed | | | | | | |
| | 5/22/2006 | Round 15 | NS-D | NS-D | NS-D | NS-D | NS-D | NS-D |
| | 8/22/2006 | Round 16 | 0.00060 U | 0.00400 | NA | 0.00060 U | 0.00600 | 0.00060 U |
| | 11/8/2006 | Round 16B | 0.00060 U | 0.00200 | 0.00060 U | 0.00060 U | 0.00400 | 0.00060 U |
| | 5/10/2007 | Round 17 (PDB) | 0.00028 U | 0.02300 | 0.00014 U | 0.00093 J | 0.02400 | 0.00034 J |
| | 9/11/2007 | Round 18 | 0.00042 U | 0.00340 J | 0.00014 U | 0.00040 U | 0.00520 J | 0.00019 U |
| | 1/30/2008 | Round 19 (PDB) | 0.00039 U | 0.01600 | 0.00046 U | 0.00048 U | 0.00820 | 0.00043 U |
| | 7/23/2008 | Round 20 (PDB) | 0.00054 U | 0.01700 | 0.00022 U | 0.00055 J | 0.00970 | 0.00030 U |
| | 1/14/2009 | Round 21 (PDB) | 0.00054 U | 0.01930 | 0.00022 U | 0.00062 J | 0.01130 | 0.00030 U |
| | 7/13/2009 | Round 22 | 0.00054 U | 0.00900 | 0.00022 U | 0.00045 U | 0.00990 | 0.00030 U |
| | 1/12/2010 | Round 23 (PDB) | 0.00029 U | 0.03230 | 0.00044 U | 0.00630 | 0.00630 J | 0.00028 U |
| | 7/13/2010 | Round 24 (PDB) | 0.00029 U | 0.02640 | 0.00044 U | 0.00360 | 0.00570 | 0.00030 J |
| | 1/10/2011 | Round 25 (PDB) | 0.00023 U | 0.03340 | 0.00025 U | 0.00660 | 0.00710 | 0.00022 U |
| | 7/26/2011 | Round 26 | 0.00023 U | 0.01450 | 0.00025 U | 0.00150 | 0.01200 U | 0.00022 U |
| | 1/9/2012 | Round 27 (PDB) | 0.00035 J | 0.0207 | 0.00025 U | 0.0014 | 0.0056 | 0.00062 J |
| | 7/10/2012 | Round 28 | NS | 0.0345 | NS | 0.0045 | 0.0248 | NS |
| | 1/7/2013 | Round 29 (PDB) | 0.00020 U | 0.0018 | 0.00032 U | 0.00023 U | 0.00060 J | 0.00044 U |
| | 7/15/2013 | Round 30 | 0.00020 U | 0.0099 | 0.00032 U | 0.0018 | 0.0039 | 0.00044 U |
| | 1/28/2014 | Round 31 (PDB) | NS | 0.0074 | NS | 0.00054 J | 0.0019 | NS |
| | 7/16/2014 | Round 32 | 0.0004 J | 0.0536 | 0.00025 U | 0.0119 | 0.01490 | 0.00098 J |
| | 1/20/2015 | Round 33 (PDB) | 0.000289 J | 0.0415 | 0.00025 U | 0.0096 | 0.0032 | 0.00025 U |
| | 7/28/2015 | Round 34 | 0.000272 J | 0.03040 | 0.00025 U | 0.00789 | 0.00347 | 0.00025 U |
| | 1/21/2016 | Round 35 (PDB) | 0.00025 UJ | 0.0464 J | 0.00025 UJ | 0.0117 J | 0.00367 J | 0.00025 UJ |
| | 7/20/2016 | Round 36 | 0.00025 U | 0.0298 | 0.00025 U | 0.00827 | 0.00313 | 0.00025 U |
| **421B138MW** | 5/16/2006 | Well Installed | | | | | | |
| | 5/22/2006 | Round 15 | 0.00060 U | 0.01200 J | NA | 0.00060 U | 0.01300 J | 0.00060 U |
| | 8/23/2006 | Round 16 | 0.00060 U | 0.02000 | NA | 0.00200 | 0.01900 | 0.00060 U |
| | 11/7/2006 | Round 16B | 0.00060 U | 0.01600 | 0.00060 U | 0.00200 | 0.01800 | 0.00060 U |
| | 5/10/2007 | Round 17 (PDB) | 0.00028 U | 0.01600 | 0.00014 U | 0.00210 | 0.02100 | 0.00012 U |
| | 9/11/2007 | Round 18 | 0.00042 U | 0.01300 J | 0.00014 U | 0.00130 J | 0.02200 J | 0.00019 U |
| | 1/30/2008 | Round 19 | 0.00039 U | 0.01300 | 0.00046 U | 0.00120 | 0.01600 | 0.00043 U |
| | 7/23/2008 | Round 20 | 0.00054 U | 0.01180 | 0.00022 U | 0.00150 | 0.01040 | 0.00030 U |
| | 1/13/2009 | Round 21 (PDB) | 0.00054 U | 0.01020 | 0.00022 U | 0.00100 | 0.00430 | 0.00030 U |
| | 7/14/2009 | Round 22 | 0.00054 U | 0.00140 | 0.00022 U | 0.00180 | 0.01260 | 0.00030 U |
| | 1/12/2010 | Round 23 (PDB) | 0.00029 U | 0.01410 | 0.00044 U | 0.00190 | 0.01220 | 0.00028 U |
| | 7/13/2010 | Round 24 (PDB) | 0.00029 U | 0.01360 | 0.00044 U | 0.00140 | 0.00720 | 0.00028 U |
| | 1/10/2011 | Round 25 (PDB) | 0.00023 U | 0.01530 | 0.00025 U | 0.00220 | 0.00930 | 0.00022 U |
| | 7/26/2011 | Round 26 | 0.00023 U | 0.01470 | 0.00025 U | 0.00260 | 0.00770 | 0.00022 U |
| | 1/9/2012 | Round 27 (PDB) | 0.00023 U | 0.0137 | 0.00025 U | 0.0028 | 0.0034 | 0.00022 U |
| | 7/10/2012 | Round 28 | NS | 0.0126 | NS | 0.0017 | 0.0104 | NS |
| | 1/7/2013 | Round 29 (PDB) | 0.00020 U | 0.0143 | 0.00032 U | 0.0024 | 0.0025 | 0.00044 U |
| | 7/15/2013 | Round 30 | 0.00020 U | 0.0144 | 0.00032 U | 0.0014 | 0.0107 | 0.00044 U |
| | 1/28/2014 | Round 31 (PDB) | NS | 0.0156 | NS | 0.0015 | 0.0091 | NS |
| | 7/16/2014 | Round 32 | 0.00025 U | 0.0144 | 0.00025 U | 0.00137 | 0.0097 | 0.00025 U |
| | 1/20/2015 | Round 33 (PDB) | 0.00025 U | 0.0153 | 0.00025 U | 0.0013 | 0.0081 | 0.00025 U |
| | 7/28/2015 | Round 34 | 0.00025 U | 0.01500 | 0.00025 U | 0.00123 | 0.0100 | 0.00025 U |
| | 1/21/2016 | Round 35 (PDB) | 0.00025 U | 0.0119 | 0.00025 U | 0.0011 | 0.00542 | 0.00025 UJ |
| | 7/20/2016 | Round 36 | 0.00025 U | 0.0118 | 0.00025 U | 0.00086 J | 0.00735 | 0.00025 U |

**Table 4-1A**

**Summary of Chemicals of Concern Detected in Groundwater**
**Long Term Monitoring Wells — SWMU 85 Plume**
**2016 RAER**
**Former NAS Dallas, Texas**
**Page 2 of 2**

| Monitoring Well | Sampling Date | Sampling Round | Chemicals of Concern (mg/L) | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | 1,1-Dichloroethene | cis-1,2-Dichloroethene | Tetrachloroethene | trans-1,2-Dichloroethene | Trichloroethene | Vinyl Chloride |
| **Protective Concentration Levels (mg/L)** | | | **0.00700** | **0.07000** | **0.00500** | **0.10000** | **0.00500** | **0.00200** |
| **421B139MW** | 5/17/2006 | | Well Installed | | | | | |
| | 5/22/2006 | Round 15 | 0.00060 U | 0.04200 | NA | 0.00070 J | 0.01800 | 0.00060 U |
| | 7/13/2006 | Round 15B | 0.00060 U | 0.05100 | NA | 0.00090 J | 0.02000 | 0.00060 U |
| | 8/23/2006 | Round 16 | 0.00060 U | 0.04800 | NA | 0.00090 J | 0.01900 | 0.00060 U |
| | 11/7/2006 | Round 16B | 0.00060 U | 0.03700 | 0.00060 U | 0.00080 J | 0.01700 | 0.00060 U |
| | 5/15/2007 | Round 17 | 0.00028 U | 0.01200 | 0.00014 U | 0.00053 U | 0.00510 | 0.00012 U |
| | 5/15/2007 | Round 17 (PDB) | 0.00028 U | 0.01500 | 0.00014 U | 0.00100 J | 0.00720 | 0.00033 J |
| | 9/11/2007 | Round 18 | 0.00042 U | 0.02500 J | 0.00014 U | 0.00065 J | 0.01000 | 0.00019 U |
| | 1/30/2008 | Round 19 | 0.00039 U | 0.00670 | 0.00046 U | 0.00048 U | 0.00270 | 0.00043 U |
| | 1/30/2008 | Round 19 (PDB) | 0.00039 U | 0.01000 | 0.00046 U | 0.00048 U | 0.00460 | 0.00043 U |
| | 7/23/2008 | Round 20 | 0.00054 U | 0.03130 | 0.00022 U | 0.00082 J | 0.01470 | 0.00030 U |
| | 7/23/2008 | Round 20 (PDB) | 0.00054 U | 0.01790 | 0.00022 U | 0.00054 J | 0.00660 | 0.00030 U |
| | 1/14/2009 | Round 21 | 0.00054 U | 0.03040 | 0.00022 U | 0.00075 J | 0.01120 | 0.00030 U |
| | 1/13/2009 | Round 21 (PDB) | 0.00054 U | 0.02420 | 0.00022 U | 0.00045 U | 0.00850 | 0.00030 U |
| | 7/13/2009 | Round 22 | 0.00054 U | 0.03990 | 0.00022 U | 0.00091 J | 0.01750 | 0.00030 U |
| | 1/12/2010 | Round 23 | 0.00029 U | 0.00360 | 0.00044 U | 0.00034 U | 0.00170 | 0.00028 U |
| | 1/12/2010 | Round 23 (PDB) | 0.00029 U | 0.00410 | 0.00044 U | 0.00034 U | 0.00210 | 0.00028 U |
| | 7/13/2010 | Round 24 | 0.00029 U | 0.02430 | 0.00044 U | 0.00034 U | 0.01000 | 0.00028 U |
| | 7/13/2010 | Round 24 (PDB) | 0.00029 U | 0.01080 | 0.00044 U | 0.00034 U | 0.00440 | 0.00028 U |
| | 1/10/2011 | Round 25 | 0.00023 U | 0.00410 | 0.00025 U | 0.00035 U | 0.00160 | 0.00022 U |
| | 1/10/2011 | Round 25 (PDB) | 0.00023 U | 0.00670 | 0.00025 U | 0.00035 U | 0.00230 | 0.00022 U |
| | 7/26/2011 | Round 26 | 0.00023 U | 0.01680 | 0.00025 U | 0.00037 J | 0.00840 | 0.00022 U |
| | 1/9/2012 | Round 27 (PDB) | 0.00023 U | 0.0185 | 0.00025 U | 0.00088 J | 0.0069 | 0.00022 U |
| | 1/9/2012 | Round 27 | 0.00023 U | 0.0164 | 0.00025 U | 0.00075 J | 0.0065 | 0.00022 U |
| | 7/10/2012 | Round 28 | NS | 0.0237 | NS | 0.00056 J | 0.0117 | NS |
| | 1/7/2013 | Round 29 (PDB) | 0.00020 U | 0.0288 | 0.00032 U | 0.00065 J | 0.0102 | 0.00044 U |
| | 1/7/2013 | Round 29 | 0.00020 U | 0.0279 | 0.00034 J | 0.00073 J | 0.0114 | 0.00044 U |
| | 7/15/2013 | Round 30 | 0.00020 U | 0.0269 | 0.00032 U | 0.00071 J | 0.0134 | 0.00044 U |
| | 1/28/2014 | Round 31 (PDB) | NS | 0.0116 | NS | 0.00071 J | 0.0040 | NS |
| | 7/16/2014 | Round 32 | 0.00025 U | 0.0307 | 0.00025 U | 0.0009 J | 0.0135 | 0.00025 U |
| | 1/20/2015 | Round 33 (PDB) | 0.00025 U | 0.0183 | 0.00025 U | 0.00146 | 0.00554 | 0.00025 U |
| | 7/28/2015 | Round 34 | 0.00025 U | 0.01450 | 0.00025 U | 0.000564 J | 0.0062 | 0.00025 U |
| | 1/21/2016 | Round 35 (PDB) | 0.00025 UJ | 0.00295 J | 0.00025 UJ | 0.00029 J | 0.0013 J | 0.00025 UJ |
| | 7/20/2016 | Round 36 | 0.00025 U | 0.0145 | 0.00025 U | 0.00034 J | 0.00628 | 0.00025 U |
| **421B141MW** | 5/16/2006 | | Well Installed | | | | | |
| | 5/22/2006 | Round 15 | 0.00060 U | 0.00060 J | NA | 0.00060 U | 0.00500 | 0.00060 U |
| | 8/23/2006 | Round 16 | 0.00060 U | 0.00050 U | NA | 0.00060 U | 0.00700 | 0.00060 U |
| | 11/8/2006 | Round 16B | 0.00060 U | 0.00050 U | 0.00060 U | 0.00060 U | 0.00400 | 0.00060 U |
| | 5/15/2007 | Round 17 (PDB) | 0.00028 U | 0.00091 J | 0.00014 U | 0.00053 U | 0.00600 | 0.00012 U |
| | 9/11/2007 | Round 18 | 0.00042 U | 0.00072 J | 0.00014 U | 0.00040 U | 0.00570 J | 0.00019 U |
| | 1/30/2008 | Round 19 (PDB) | 0.00039 U | 0.00096 J | 0.00046 U | 0.00048 U | 0.00560 | 0.00043 U |
| | 7/23/2008 | Round 20 (PDB) | 0.00054 U | 0.00130 | 0.00022 U | 0.00045 U | 0.00710 | 0.00030 U |
| | 1/13/2009 | Round 21 (PDB) | 0.00054 U | 0.00095 J | 0.00022 U | 0.00045 U | 0.00620 | 0.00030 U |
| | 7/13/2009 | Round 22 | 0.00054 U | 0.00085 J | 0.00022 U | 0.00045 U | 0.00540 | 0.00030 U |
| | 1/12/2010 | Round 23 (PDB) | 0.00029 U | 0.00085 J | 0.00044 U | 0.00034 U | 0.00480 | 0.00028 U |
| | 7/13/2010 | Round 24 (PDB) | 0.00029 U | 0.00060 J | 0.00044 U | 0.00034 U | 0.00340 | 0.00028 U |
| | 1/10/2011 | Round 25 (PDB) | 0.00023 U | 0.00080 J | 0.00025 U | 0.00035 U | 0.00460 | 0.00022 U |
| | 7/26/2011 | Round 26 | 0.00023 U | 0.00069 J | 0.00025 U | 0.00035 U | 0.00520 | 0.00022 U |
| | 1/9/2012 | Round 27 (PDB) | 0.00023 U | 0.0010 | 0.00025 U | 0.00045 J | 0.0035 | 0.00022 U |
| | 7/10/2012 | Round 28 | NS | 0.00062 J | NS | 0.00035 U | 0.0029 | NS |
| | 1/7/2013 | Round 29 (PDB) | 0.00020 U | 0.00085 J | 0.00032 U | 0.00023 U | 0.0041 | 0.00044 U |
| | 7/15/2013 | Round 30 | 0.00020 U | 0.00093 J | 0.00032 U | 0.00023 U | 0.0051 | 0.00044 U |
| | 1/28/2014 | Round 31 (PDB) | NS | 0.00059 J | NS | 0.00034 U | 0.0032 | NS |
| | 7/16/2014 | Round 32 | 0.00025 U | 0.00072 J | 0.00025 U | 0.00025 U | 0.0036 | 0.00025 U |
| | 1/20/2015 | Round 33 (PDB) | 0.00025 U | 0.000698 J | 0.00025 U | 0.00025 U | 0.00392 | 0.00025 U |
| | 7/28/2015 | Round 34 | 0.00025 U | 0.000636 J | 0.00025 U | 0.00025 U | 0.0024 | 0.00025 U |
| | 1/21/2016 | Round 35 (PDB) | 0.00025 UJL | 0.0004 JL | 0.00025 UJL | 0.00025 UJL | 0.00181 JL | 0.00025 UJL |
| | 7/20/2016 | Round 36 | 0.00025 U | 0.00051 J | 0.00025 U | 0.00025 U | 0.00263 | 0.00025 U |

Notes:
Shaded areas indicate an exceedance.
mg/L - milligrams per liter
NA - Not Applicable
NS - Not Sampled
NS-D - Not Sampled during this Round due to insufficient water in the monitoring well
PDB - Passive Diffusion Bag
SDG - Sample Delivery Group
PCLE - Protective Concentration Level Exceedance

Analytical Result Qualifiers:
J - Indicates that the chemical was detected. However, the associated numerical result may not be a precise representation of the amount that is actually present in the sample. The laboratory reported concentration is considered to be an estimate of the true concentration.

U - Indicates that the chemical was not detected at the numerical detection limit (sample-specific quantitation limit) noted. Nondetected results from the laboratory are reported in this manner. This qualifier is added to a positive result (reported by the laboratory) if the detected concentration is determined to be attributable to contamination introduced during field sampling or laboratory analysis.
UJ - Indicates that the chemical was not detected. However, the detection limit (sample-specific quantitation limit) is considered to be estimated based on problems encountered during laboratory analysis. The associated numerical detection limit is regarded as inaccurate or imprecise.

**Table 4-1B**

**Summary of Chemicals of Concern Detected in Groundwater**
**Historical Monitoring Wells — SWMU 85 Plume**
**2016 RAER**
**Former NAS Dallas, Texas**
**Page 1 of 5**

| Monitoring Well | Sampling Date | Chemicals of Concern (mg/L) | | | | | |
|---|---|---|---|---|---|---|---|
| | | 1,1-Dichloroethene | cis-1,2-Dichloroethene | Tetrachloroethene | trans-1,2-Dichloroethene | Trichloroethene | Vinyl Chloride |
| **Protective Concentration Level** | | **0.00700** | **0.07000** | **0.00500** | **0.10000** | **0.00500** | **0.00200** |
| **Monitoring Wells Located Inside PCLE Zone** | | | | | | | |
| **421B85MW** | 8/21/2000 | Well Installed | | | | | |
| | 8/21/2000 | 0.00840 U | 0.10000 | 0.00840 U | 0.00300 J | 0.19000 | 0.00840 U |
| | 6/22/2001 | 0.00500 U | 0.02900 | 0.00500 U | 0.00160 J | 0.03500 | 0.01000 U |
| | 1/26/2003 | 0.00100 U | 0.03200 | 0.00100 U | 0.00230 | 0.03100 | 0.00100 U |
| | 5/18/2003 | 0.00100 U | 0.02900 | 0.00100 U | 0.00220 | 0.02400 J | 0.00100 U |
| | 8/26/2003 | 0.00037 U | 0.03600 | 0.00020 U | 0.00290 | 0.02700 | 0.00043 U |
| | 1/9/2004 | 0.00021 U | 0.02700 | 0.00024 U | 0.00160 | 0.02200 | 0.00017 U |
| | 7/29/2004 | 0.00035 U | 0.02800 | 0.00021 U | 0.00190 | 0.01900 | 0.00017 U |
| | 10/12/2004 | 0.00035 U | 0.02700 | 0.00021 U | 0.00170 | 0.01500 | 0.00017 U |
| | 4/17/2005 | Well Abandoned | | | | | |
| **421B99TW** | 5/16/2003 | Well Installed | | | | | |
| | 6/12/2003 | 0.00500 U | 0.00520 | 0.00500 U | 0.00250 U | 0.13000 | 0.00500 U |
| | NA | Well Destroyed during site excavation | | | | | |
| **421B102TW** | 5/16/2003 | Well Installed | | | | | |
| | 6/2/2003 | 0.00250 U | 0.05400 | 0.00250 U | 0.00120 U | 0.03200 | 0.00250 U |
| | NA | Well Destroyed during site excavation | | | | | |
| **421B104TW** | 5/16/2003 | Well Installed | | | | | |
| | 5/18/2003 | 0.00100 U | 0.00630 | 0.00100 U | 0.00180 | 0.00100 U | 0.03900 |
| | -- | NS | NS | NS | NS | NS | NS |
| | 7/29/2004 | 0.00350 U | 0.29000 | 0.00210 U | 0.01200 | 0.04800 | 0.01500 |
| | 10/12/2004 | 0.00700 U | 0.53000 | 0.00420 U | 0.01600 J | 0.00940 J | 0.02100 |
| | 4/17/2005 | Well Abandoned | | | | | |
| **421B105TW** | 5/16/2003 | Well Installed | | | | | |
| | 5/31/2003 | 0.00670 U | 0.22000 | 0.00670 U | 0.00440 | 0.17000 | 0.00670 U |
| | -- | NS | NS | NS | NS | NS | NS |
| | 7/29/2004 | 0.00700 U | 0.56000 J | 0.00420 U | 0.01300 J | 0.28000 J | 0.00340 U |
| | 10/12/2004 | 0.01200 U | 0.44000 | 0.00730 U | 0.01100 J | 0.28000 | 0.00590 U |
| | 4/17/2005 | Well Abandoned | | | | | |

**Table 4-1B**

**Summary of Chemicals of Concern Detected in Groundwater**
**Historical Monitoring Wells — SWMU 85 Plume**
**2016 RAER**
**Former NAS Dallas, Texas**


| Monitoring Well | Sampling Date | Chemicals of Concern (mg/L) | | | | | |
|---|---|---|---|---|---|---|---|
| | | 1,1-Dichloroethene | cis-1,2-Dichloroethene | Tetrachloroethene | trans-1,2-Dichloroethene | Trichloroethene | Vinyl Chloride |
| Protective Concentration Level | | 0.00700 | 0.07000 | 0.00500 | 0.10000 | 0.00500 | 0.00200 |
| 421B106TW | 5/16/2003 | Well Installed | | | | | |
| | 6/12/2006 | 0.03300 U | 0.46000 | 0.03300 U | 0.01700 U | 1.1000 | 0.03300 U |
| | -- | NS | NS | NS | NS | NS | NS |
| | 7/29/2004 | 0.00700 U | 0.31000 J | 0.00420 U | 0.01200 J | 0.94000 J | 0.00340 U |
| | 10/13/2004 | 0.01800 U | 0.28000 | 0.01000 U | 0.01100 U | 0.84000 | 0.00840 U |
| | 10/13/2004 | 0.01800 U | 0.31000 | 0.01000 U | 0.01100 U | 0.95000 J | 0.00840 U |
| | 4/17/2005 | Well Abandoned | | | | | |
| 421B108TW | 5/16/2003 | Well Installed | | | | | |
| | 5/31/2003 | 0.00800 U | 0.09400 | 0.00800 U | 0.00400 U | 0.28000 | 0.00800 U |
| | -- | NS | NS | NS | NS | NS | NS |
| | 7/29/2004 | 0.00350 U | 0.05500 | 0.00210 U | 0.00230 U | 0.17000 | 0.00170 U |
| | 10/13/2004 | 0.00180 U | 0.07500 | 0.00100 U | 0.00170 J | 0.21000 | 0.00084 U |
| | 10/13/2004 | 0.00180 U | 0.13000 J | 0.00100 U | 0.00210 J | 0.21000 | 0.00084 U |
| | 4/17/2005 | Well Abandoned | | | | | |
| 421B113TW | 9/17/2003 | Well Installed | | | | | |
| | 7/29/2004 | 0.00036 J | 0.04100 | 0.00021 U | 0.0009 J | 0.04500 | 0.00034 J |
| | 10/12/2004 | 0.00110 U | 0.04600 | 0.00062 U | 0.00068 U | 0.03000 | 0.00051 U |
| | 4/17/2005 | Well Abandoned | | | | | |
| 421B114TW | 9/17/2003 | Well Installed | | | | | |
| | 10/7/2003 | 0.00022 U | 0.00170 | 0.00012 UJ | 0.00024 U | 0.00770 | 0.00026 U |
| | 7/29/2004 | 0.00035 U | 0.00058 J | 0.00021 U | 0.00023 U | 0.00410 | 0.00017 U |
| | 10/12/2004 | 0.00035 U | 0.00088 J | 0.00021 U | 0.00023 U | 0.00490 | 0.00017 U |
| | 4/17/2005 | Well Abandoned | | | | | |
| 421B115TW | 9/17/2003 | Well Installed | | | | | |
| | 10/31/2003 | 0.00210 U | 0.06100 | 0.00110 U | 0.00230 U | 0.25000 | 0.00250 U |
| | 7/29/2004 | 0.00350 U | 0.05900 | 0.00210 U | 0.00230 U | 0.21000 | 0.00170 U |
| | 10/12/2004 | 0.00180 U | 0.06600 | 0.00100 U | 0.00110 U | 0.23000 | 0.00084 U |
| | 4/17/2005 | Well Abandoned | | | | | |
| 421B116TW | 9/17/2003 | Well Installed | | | | | |
| | 10/31/2003 | 0.00063 U | 0.04400 | 0.00034 U | 0.00069 U | 0.08400 | 0.00074 U |
| | 7/29/2004 | 0.00088 U | 0.03400 | 0.00052 U | 0.00057 U | 0.04900 | 0.00042 U |
| | 10/12/2004 | 0.00088 U | 0.03800 J | 0.00052 U | 0.00061 J | 0.05800 J | 0.00042 U |
| | 4/17/2005 | Well Abandoned | | | | | |
| 421BX40MW | 3/30/1998 | Well Installed | | | | | |
| | 5/2/1998 | 0.00500 U | 0.00530 | 0.00500 U | 0.00065 J | 0.00580 | 0.00500 U |
| | 8/26/1998 | 0.00500 U | 0.03000 | 0.00500 U | 0.00210 J | 0.03400 | 0.00500 U |
| | 4/2/1999 | 0.00500 U | 0.01900 | 0.00500 U | 0.00220 J | 0.02200 | 0.00500 U |
| | 4/2/1999 | Well Abandoned and replaced by 421B85MW | | | | | |

**Table 4-1B**

**Summary of Chemicals of Concern Detected in Groundwater**
**Historical Monitoring Wells — SWMU 85 Plume**
**2016 RAER**
**Former NAS Dallas, Texas**
**Page 3 of 5**

| Monitoring Well | Sampling Date | Chemicals of Concern (mg/L) | | | | | |
|---|---|---|---|---|---|---|---|
| | | 1,1-Dichloroethene | cis-1,2-Dichloroethene | Tetrachloroethene | trans-1,2-Dichloroethene | Trichloroethene | Vinyl Chloride |
| Protective Concentration Level | | 0.00700 | 0.07000 | 0.00500 | 0.10000 | 0.00500 | 0.00200 |
| 421B140MW | 5/16/2006 | Well Installed | | | | | |
| | 5/22/2006 | 0.00060 U | 0.00060 J | NA | 0.00060 U | 0.00040 U | 0.00060 U |
| | 8/23/2006 | 0.00060 U | 0.00100 | NA | 0.00060 U | 0.00040 U | 0.00060 U |
| | 11/8/2006 | 0.00060 U | 0.00050 U | 0.00060 U | 0.00060 U | 0.00040 U | 0.00060 U |
| | 5/15/2007 | 0.00028 U | 0.00790 | 0.00014 U | 0.00053 U | 0.00240 | 0.00012 U |
| | 9/11/2007 | 0.00042 U | 0.00100 J | 0.00014 U | 0.00040 U | 0.00028 J | 0.00019 U |
| | 1/30/2008 | 0.00039 U | 0.00580 | 0.00046 U | 0.00048 U | 0.00160 | 0.00043 U |
| | 7/23/2008 | 0.00054 U | 0.00990 | 0.00022 U | 0.00059 J | 0.00230 | 0.00030 U |
| | 1/13/2009 | 0.00054 U | 0.00950 | 0.00022 U | 0.00045 U | 0.00270 | 0.00030 U |
| | 7/13/2009 | 0.00054 U | 0.00180 | 0.00022 U | 0.00045 U | 0.00032 | 0.00030 U |
| | 1/12/2010 | 0.00029 U | 0.00780 | 0.00044 U | 0.00041 J | 0.00170 | 0.00028 U |
| | 7/13/2010 | 0.00029 U | 0.00660 | 0.00044 U | 0.00034 U | 0.00130 | 0.00028 U |
| | 1/10/2011 | 0.00023 U | 0.00870 | 0.00025 U | 0.00061 J | 0.00180 | 0.00022 U |
| | 7/26/2011 | 0.00023 U | 0.00087 J | 0.00025 U | 0.00035 U | 0.00026 U | 0.00022 U |
| | 1/9/2012 | 0.00023 U | 0.0071 | 0.00025 U | 0.00067 J | 0.00068 J | 0.00022 U |
| | 7/10/2012 | NS | 0.0118 | NS | 0.00098 J | 0.0023 | NS |
| | 1/7/2013 | 0.00020 U | 0.0158 | 0.00032 U | 0.0015 | 0.0019 | 0.00044 U |
| | 7/15/2013 | 0.00020 U | 0.00067 J | 0.00032 U | 0.00023 U | 0.00031 U | 0.00044 U |
| | 1/28/2014 | NS | 0.00110 | NS | 0.00034 U | 0.00030 U | NS |
| | 7/16/2014 | 0.00025 U | 0.00056 J | 0.00025 U | 0.00025 U | 0.00025 U | 0.00025 U |
| | 1/20/2015 | 0.00025 U | 0.01240 | 0.00025 U | 0.00144 | 0.000452 J | 0.00025 U |
| | 7/28/2015 | 0.00025 U | 0.00273 | 0.00025 U | 0.00025 U | 0.00025 U | 0.00025 U |
| | 1/20/2016 | Well Abandoned | | | | | |

**Table 4-1B**

**Summary of Chemicals of Concern Detected in Groundwater**
**Historical Monitoring Wells — SWMU 85 Plume**
**2016 RAER**
**Former NAS Dallas, Texas**
**Page 4 of 5**

| Monitoring Well | Sampling Date | Chemicals of Concern (mg/L) | | | | | |
|---|---|---|---|---|---|---|---|
| | | 1,1-Dichloroethene | cis-1,2-Dichloroethene | Tetrachloroethene | trans-1,2-Dichloroethene | Trichloroethene | Vinyl Chloride |
| **Protective Concentration Level** | | **0.00700** | **0.07000** | **0.00500** | **0.10000** | **0.00500** | **0.00200** |
| **Monitoring Wells Located Outside PCLE Zone** | | | | | | | |
| **421B100TW** | 5/16/2003 | Well Installed | | | | | |
| | 5/19/2003 | 0.00100 U | 0.00045 J | 0.00100 U | 0.00050 U | 0.00100 U | 0.00100 U |
| | NA | Well Destroyed during site excavation | | | | | |
| **421B101TW** | 5/16/2003 | Well Installed | | | | | |
| | 5/18/2003 | 0.00100 U | 0.00050 U | 0.00100 U | 0.00050 U | 0.00100 U | 0.00100 U |
| | NA | Well Destroyed during site excavation | | | | | |
| **421B103TW** | 5/16/2003 | Well Installed | | | | | |
| | 5/18/2003 | 0.00100 U | 0.00084 | 0.00100 U | 0.00050 U | 0.00100 U | 0.00100 U |
| | 10/4/2003 | 0.00022 U | 0.00100 | 0.00012 U | 0.00024 U | 0.00022 U | 0.00026 U |
| | -- | NS | NS | NS | NS | NS | NS |
| | 10/15/2004 | 0.00035 U | 0.02100 | 0.00021 U | 0.00058 J | 0.00270 | 0.00050 J |
| | 4/17/2005 | Well Abandoned | | | | | |
| **421B107TW** | 5/16/2003 | Well Installed | | | | | |
| | 5/29/2003 | 0.00100 U | 0.00240 | 0.00100 U | 0.00050 U | 0.00110 | 0.00100 U |
| | NA | Well Abandoned | | | | | |
| **421B111TW** | 9/17/2003 | Well Installed | | | | | |
| | 10/18/2003 | 0.00022 U | 0.00025 U | 0.00012 U | 0.00024 U | 0.00022 U | 0.00026 U |
| | -- | NS | NS | NS | NS | NS | NS |
| | 10/15/2004 | 0.00035 U | 0.00430 | 0.00021 U | 0.00023 U | 0.00022 U | 0.00017 U |
| | 4/17/2005 | Well Abandoned | | | | | |

**Table 4-1B**

**Summary of Chemicals of Concern Detected in Groundwater**
**Historical Monitoring Wells — SWMU 85 Plume**
**2016 RAER**
**Former NAS Dallas, Texas**


| Monitoring Well | Sampling Date | Chemicals of Concern (mg/L) | | | | | |
|---|---|---|---|---|---|---|---|
| | | 1,1-Dichloroethene | cis-1,2-Dichloroethene | Tetrachloroethene | trans-1,2-Dichloroethene | Trichloroethene | Vinyl Chloride |
| **Protective Concentration Level** | | **0.00700** | **0.07000** | **0.00500** | **0.10000** | **0.00500** | **0.00200** |
| **421B112TW** | 9/17/2003 | Well Installed | | | | | |
| | 10/4/2003 | 0.00022 U | 0.00070 | 0.00012 U | 0.00024 U | 0.00022 U | 0.00026 U |
| | -- | NS | NS | NS | NS | NS | NS |
| | 10/15/2004 | 0.00035 U | 0.00027 U | 0.00021 U | 0.00023 U | 0.00022 U | 0.00017 U |
| | 4/17/2005 | Well Abandoned | | | | | |

mg/L - milligrams per liter
NA - Not Applicable
NS - Not Sampled
NS-D - Not Sampled during this Round due to insufficient water in the monitoring well
PDB - Passive Diffusion Bag
SDG - Sample Delivery Group
PCLE - Protective Concentration Level Exceedance

Notes:

Shaded areas indicate an exceedance.

Analytical Result Qualifiers:

J - Indicates that the chemical was detected. However, the associated numerical result may not be a precise representation of the amount that is actually present in the sample. The laboratory reported concentration is considered to be an estimate of the true concentration.

U - Indicates that the chemical was not detected at the numerical detection limit (sample-specific quantitation limit) noted. Nondetected results from the laboratory are reported in this manner. This qualifier is added to a positive result (reported by the laboratory) if the detected concentration is determined to be attributable to contamination introduced during field sampling or laboratory analysis.

UJ - Indicates that the chemical was not detected. However, the detection limit (sample-specific quantitation limit) is considered to be estimated based on problems encountered during laboratory analysis. The associated numerical detection limit is regarded as inaccurate or imprecise.

# TABLE 4-2A
# SUMMARY OF GEOCHEMICAL PARAMETERS MEASURED IN GROUNDWATER
# (LONG TERM MONITORING WELLS)

**Table 4-2A**

**Summary of Groundwater Gauging Data**
**Long Term Monitoring Wells - SWMU 85 Plume**
**2016 RAER**
**Former NAS Dallas, Texas**
**Page 1 of 3**

| Monitoring Well | Top of Casing [1] (ft msl) | Screened Interval (ft msl) | Date | Depth to Water [2] (ft bgs) | Groundwater Elevation (ft msl) |
|---|---|---|---|---|---|
| **Monitoring Wells Located Inside PCLE Zone** | | | | | |
| **421B136MW** | 463.34 | 450.64 to 440.64 | 5/17/2006 | Well Installed | |
| | | | 5/23/2006 | NA | NA |
| | | | 8/9/2006 | 17.06 | 446.28 |
| | | | 11/8/2006 | 10.54 | 452.80 |
| | | | 4/24/2007 | 9.89 | 453.45 |
| | | | 8/22/2007 | 6.30 | 457.04 |
| | | | 1/15/2008 | 7.23 | 456.11 |
| | | | 7/9/2008 | 7.58 | 455.76 |
| | | | 12/19/2008 | 10.41 | 452.93 |
| | | | 1/14/2009 | 10.41 | 452.93 |
| | | | 7/13/2009 | 8.73 | 454.61 |
| | 463.32 | 450.62 to 440.62 | 12/15/2009 | 6.31 | 457.01 |
| | | | 8/9/2010 | 7.25 | 456.07 |
| | | | 12/16/2010 | 6.75 | 456.57 |
| | | | 7/25/2011 | 7.37 | 455.95 |
| | | | 12/14/2011 | 9.55 | 453.77 |
| | | | 7/10/2012 | 7.95 | 455.37 |
| | | | 12/19/2012 | 9.96 | 453.36 |
| | | | 7/15/2013 | 7.19 | 456.13 |
| | | | 12/18/2013 | 9.56 | 453.76 |
| | | | 7/15/2014 | 9.48 | 453.84 |
| | | | 12/17/2014 | 10.25 | 453.07 |
| | | | 7/20/2015 | 7.30 | 456.02 |
| | | | 12/15/2015 | 6.14 | 457.18 |
| | | | 7/18/2016 | 7.66 | 455.66 |
| **421B137MW** | 463.06 | 450.30 to 440.30 | 5/17/2006 | Well Installed | |
| | | | 5/23/2006 | NA | NA |
| | | | 8/9/2006 | 9.31 | 453.75 |
| | | | 11/8/2006 | 7.59 | 455.47 |
| | | | 4/24/2007 | 6.94 | 456.12 |
| | | | 8/22/2007 | 6.31 | 456.75 |
| | | | 1/15/2008 | 6.58 | 456.48 |
| | | | 7/9/2008 | 7.32 | 455.74 |
| | | | 12/19/2008 | 8.64 | 454.42 |
| | | | 7/13/2009 | 7.10 | 455.96 |
| | 463.07 | 450.31 to 440.31 | 12/15/2009 | 6.55 | 456.52 |
| | | | 8/9/2010 | 6.71 | 456.36 |
| | | | 12/16/2010 | 6.49 | 456.58 |
| | | | 7/25/2011 | 7.33 | 455.74 |
| | | | 12/14/2011 | 8.45 | 454.62 |
| | | | 7/10/2012 | 7.00 | 456.07 |
| | | | 12/19/2012 | 8.12 | 454.95 |
| | | | 7/15/2013 | 7.11 | 455.96 |
| | | | 12/18/2013 | 6.80 | 456.27 |
| | | | 7/15/2014 | 7.49 | 455.58 |
| | | | 12/17/2014 | 7.30 | 455.77 |
| | | | 7/20/2015 | 6.77 | 456.30 |
| | | | 12/15/2015 | 6.42 | 456.65 |
| | | | 7/18/2016 | 7.01 | 456.06 |

**Table 4-2A**

**Summary of Groundwater Gauging Data**
**Long Term Monitoring Wells - SWMU 85 Plume**
**2016 RAER**
**Former NAS Dallas, Texas**
**Page 2 of 3**

| Monitoring Well | Top of Casing [1] (ft msl) | Screened Interval (ft msl) | Date | Depth to Water [2] (ft bgs) | Groundwater Elevation (ft msl) |
|---|---|---|---|---|---|
| 421B138MW | 463.07 | 449.87 to 439.87 | 5/16/2006 | Well Installed | |
| | | | 5/23/2006 | 12.50 | 450.57 |
| | | | 8/9/2006 | 7.97 | 455.10 |
| | | | 11/7/2006 | 7.26 | 455.81 |
| | | | 4/24/2007 | 6.56 | 456.51 |
| | | | 8/22/2007 | 6.50 | 456.57 |
| | | | 1/15/2008 | 6.57 | 456.50 |
| | | | 7/9/2008 | 7.51 | 455.56 |
| | | | 12/19/2008 | 8.28 | 454.79 |
| | | | 7/13/2009 | 7.27 | 455.80 |
| | 463.04 | 449.84 to 439.84 | 12/15/2009 | 6.68 | 456.36 |
| | | | 8/9/2010 | 6.73 | 456.31 |
| | | | 12/16/2010 | 6.60 | 456.44 |
| | | | 7/25/2011 | 7.58 | 455.46 |
| | | | 12/14/2011 | 7.30 | 455.74 |
| | | | 7/10/2012 | 9.47 | 453.57 |
| | | | 12/19/2012 | 7.87 | 455.17 |
| | | | 7/15/2013 | 8.62 | 454.42 |
| | | | 12/18/2013 | 6.57 | 456.47 |
| | | | 7/15/2014 | 7.70 | 455.34 |
| | | | 12/17/2014 | 7.12 | 455.92 |
| | | | 7/20/2015 | 6.55 | 456.49 |
| | | | 12/15/2015 | 6.59 | 456.45 |
| | | | 7/18/2016 | 6.91 | 456.13 |
| 421B139MW | 463.06 | 450.36 to 440.36 | 5/17/2006 | Well Installed | |
| | | | 5/22/2006 | 9.60 | 453.46 |
| | | | 8/9/2006 | 8.21 | 454.85 |
| | | | 11/7/2006 | 8.12 | 454.94 |
| | | | 4/24/2007 | 6.40 | 456.66 |
| | | | 8/22/2007 | 6.52 | 456.54 |
| | | | 1/15/2008 | 6.48 | 456.58 |
| | | | 7/9/2008 | 7.88 | 455.18 |
| | | | 12/19/2008 | 8.45 | 454.61 |
| | | | 7/13/2009 | 7.48 | 455.58 |
| | 463.04 | 450.34 to 440.34 | 12/15/2009 | 6.50 | 456.54 |
| | | | 8/9/2010 | 7.14 | 455.90 |
| | | | 12/16/2010 | 6.62 | 456.42 |
| | | | 7/25/2011 | 7.88 | 455.16 |
| | | | 12/14/2011 | 7.55 | 455.49 |
| | | | 7/10/2012 | 9.04 | 454.00 |
| | | | 12/19/2012 | 8.07 | 454.97 |
| | | | 7/15/2013 | 7.38 | 455.66 |
| | | | 12/18/2013 | 6.50 | 456.54 |
| | | | 7/15/2014 | 8.10 | 454.94 |
| | | | 12/17/2014 | 7.08 | 455.96 |
| | | | 7/20/2015 | 6.93 | 456.11 |
| | | | 12/15/2015 | 6.48 | 456.56 |
| | | | 7/18/2016 | 6.81 | 456.23 |

**Table 4-2A**

**Summary of Groundwater Gauging Data**
**Long Term Monitoring Wells - SWMU 85 Plume**
**2016 RAER**
**Former NAS Dallas, Texas**
**Page 3 of 3**

| Monitoring Well | Top of Casing [1] (ft msl) | Screened Interval (ft msl) | Date | Depth to Water [2] (ft bgs) | Groundwater Elevation (ft msl) |
|---|---|---|---|---|---|
| 421B141MW | 463.63 | 451.13 to 441.13 | 5/16/2006 | Well Installed | |
| | | | 5/22/2006 | 15.85 | 447.78 |
| | | | 8/9/2006 | 8.61 | 455.02 |
| | | | 11/8/2007 | 9.28 | 454.35 |
| | | | 4/24/2007 | 7.58 | 456.05 |
| | | | 8/22/2007 | 6.81 | 456.82 |
| | | | 1/15/2008 | 7.75 | 455.88 |
| | | | 7/9/2008 | 7.96 | 455.67 |
| | | | 12/19/2008 | 11.21 | 452.42 |
| | | | 7/13/2009 | 9.48 | 454.15 |
| | 463.70 | 451.20 to 441.20 | 12/15/2009 | 7.75 | 455.95 |
| | | | 8/9/2010 | 7.81 | 455.89 |
| | | | 12/16/2010 | 7.97 | 455.73 |
| | | | 7/25/2011 | 8.15 | 455.55 |
| | | | 12/14/2011 | 10.50 | 453.20 |
| | | | 7/10/2012 | 8.90 | 454.80 |
| | | | 12/19/2012 | 10.08 | 453.62 |
| | | | 7/15/2013 | 8.70 | 455.00 |
| | | | 12/18/2013 | 8.65 | 455.05 |
| | | | 7/15/2014 | 9.17 | 454.53 |
| | | | 12/17/2014 | 8.97 | 454.73 |
| | | | 7/20/2015 | 7.63 | 456.07 |
| | | | 12/15/2015 | 7.19 | 456.51 |
| | | | 7/18/2016 | 7.90 | 455.80 |

bgs - below ground surface
ft - feet
msl - mean sea level
NA - Not Available or Applicable (i.e., abandoned, not installed, not measured)
NM - Not Measured
PCLE - Protective Concentration Level Exceedance

Notes:
1 - All monitoring wells on-site were resurveyed in September 2010 in accordance with the Compliance Plan Requirements.
2 - Depth to water measurements taken from the top of the riser.

# TABLE 4-2B
# SUMMARY OF GEOCHEMICAL PARAMETERS MEASURED IN GROUNDWATER
# (HISTORICAL MONITORING WELLS)

**Table 4-2B**

**Summary of Groundwater Gauging Data**
**Historical Monitoring Wells — SWMU 85 Plume**
**2016 RAER**
**Former NAS Dallas, Texas**
**Page 1 of 2**

| Monitoring Well | Top of Casing [1] (ft msl) | Screened Interval (ft msl) | Date | Depth to Water [2] (ft bgs) | Groundwater Elevation (ft msl) |
|---|---|---|---|---|---|
| **Monitoring Wells Located Inside PCLE Zone** | | | | | |
| **421B85MW** | 463.77 | 458.77 to 448.77 | 6/1/2000 | | |
| | | | 6/1/2000 | NM | NM |
| | | | 6/1/2001 | NM | NM |
| | | | 12/2/2002 | 7.42 | 456.35 |
| | | | 8/1/2003 | 7.63 | 456.14 |
| | | | 12/23/2003 | 7.23 | 456.54 |
| | | | 7/4/2004 | 7.29 | 456.48 |
| | | | 9/27/2004 | 7.15 | 456.62 |
| | | | 4/17/2005 | | |
| **421B99TW** | 461.20 | 455.70 to 445.70 | 5/15/2003 | | |
| | | | 8/1/2003 | 9.11 | 452.09 |
| | | | NA | | |
| **421B102TW** | 459.93 | 454.43 to 444.43 | 5/15/2003 | | |
| | | | 8/1/2003 | 4.27 | 455.66 |
| | | | NA | | |
| **421B104TW** | 459.65 | 454.25 to 444.25 | 5/15/2003 | | |
| | | | 8/1/2003 | 3.78 | 455.87 |
| | | | 12/23/2003 | 2.85 | 456.80 |
| | | | 7/4/2004 | 2.84 | 456.81 |
| | | | 9/27/2004 | 3.01 | 456.64 |
| | | | 4/17/2005 | | |
| **421B105TW** | 459.86 | 454.46 to 444.46 | 5/15/2003 | | |
| | | | 8/1/2003 | 3.84 | 456.02 |
| | | | 12/23/2003 | 3.12 | 456.74 |
| | | | 7/4/2004 | 3.33 | 456.53 |
| | | | 9/27/2004 | 3.33 | 456.53 |
| | | | 4/17/2005 | | |
| **421B106TW** | 461.15 | 455.95 to 445.95 | 5/15/2003 | | |
| | | | 8/1/2003 | 5.29 | 455.86 |
| | | | 12/23/2003 | 4.73 | 456.42 |
| | | | 7/4/2004 | 4.61 | 456.54 |
| | | | 9/27/2004 | 4.52 | 456.63 |
| | | | 4/17/2005 | | |
| **421B108TW** | 461.27 | 455.77 to 445.77 | 5/15/2003 | | |
| | | | 8/1/2003 | 5.50 | 455.77 |
| | | | 12/23/2003 | 4.94 | 456.33 |
| | | | 7/4/2004 | 4.74 | 456.53 |
| | | | 9/27/2004 | 6.05 | 455.22 |
| | | | 4/17/2005 | | |
| **421B113TW** | 459.92 | 454.42 to 444.42 | 9/17/2003 | | |
| | | | 12/23/2003 | 3.27 | 456.65 |
| | | | 7/29/2004 | 3.48 | 456.44 |
| | | | 9/27/2004 | 3.33 | 456.59 |
| | | | 4/17/2005 | | |
| **421B114TW** | 461.79 | 456.29 to 446.29 | 9/17/2003 | | |
| | | | 12/23/2003 | 5.84 | 455.95 |
| | | | 7/4/2004 | 4.78 | 457.01 |
| | | | 9/27/2004 | 5.96 | 455.83 |
| | | | 4/17/2005 | | |
| **421B115TW** | 461.35 | 455.85 to 445.85 | 9/17/2003 | | |
| | | | 12/23/2003 | 6.32 | 455.03 |
| | | | 7/4/2004 | 5.55 | 455.80 |
| | | | 9/27/2004 | 6.75 | 454.60 |
| | | | 4/17/2005 | | |
| **421B116TW** | 461.11 | 455.61 to 445.61 | 9/17/2003 | | |
| | | | 12/23/2003 | 7.93 | 453.18 |
| | | | 7/4/2004 | Dry | Dry |
| | | | 9/27/2004 | 7.05 | 454.06 |
| | | | 4/17/2005 | | |
| **421BX40MW** | 462.80 | 456.80 to 446.80 | 3/30/1998 | | |
| | | | 5/28/1998 | 6.42 | 456.38 |
| | | | 8/18/1998 | 7.58 | 455.22 |
| | | | 2/16/1999 | 7.03 | 455.77 |
| | | | 9/2/1999 | | |

**Table 4-2B**

**Summary of Groundwater Gauging Data**
**Historical Monitoring Wells — SWMU 85 Plume**
**2016 RAER**
**Former NAS Dallas, Texas**
**Page 2 of 2**

| Monitoring Well | Top of Casing [1] (ft msl) | Screened Interval (ft msl) | Date | Depth to Water [2] (ft bgs) | Groundwater Elevation (ft msl) |
|---|---|---|---|---|---|
| **Monitoring Wells Located Outside PCLE Zone** | | | | | |
| **421B100TW** | 460.73 | 455.23 to 445.23 | 5/15/2003 | | |
| | | | 8/1/2003 | 4.82 | 455.91 |
| | | | NA | | |
| **421B101TW** | 460.62 | 455.12 to 445.12 | 5/15/2003 | | |
| | | | 8/1/2003 | 4.72 | 455.90 |
| | | | NA | | |
| **421B103TW** | 459.29 | 453.89 to 443.89 | 5/15/2003 | | |
| | | | 8/1/2003 | 3.40 | 455.89 |
| | | | 12/23/2003 | 2.54 | 456.75 |
| | | | 7/4/2004 | 2.58 | 456.71 |
| | | | 9/27/2004 | 2.68 | 456.61 |
| | | | 4/17/2005 | | |
| **421B107TW** | 460.86 | 455.56 to 445.56 | 5/15/2003 | | |
| | | | 8/1/2003 | 4.65 | 456.21 |
| | | | NA | | |
| **421B111TW** | 460.20 | 454.70 to 444.70 | 9/17/2003 | | |
| | | | 12/23/2003 | 3.43 | 456.77 |
| | | | 7/4/2004 | NM | NM |
| | | | 9/27/2004 | 3.51 | 456.69 |
| | | | 4/17/2005 | | |
| **421B112TW** | 459.14 | 453.64 to 443.64 | 9/17/2003 | | |
| | | | 12/23/2003 | 2.37 | 456.77 |
| | | | 7/4/2004 | 2.32 | 456.82 |
| | | | 9/27/2004 | 2.39 | 456.75 |
| | | | 4/17/2005 | | |
| **421B140MW** | 462.14 | 453.39 to 443.39 | 5/16/2006 | Well Installed | |
| | | | 5/22/2006 | 6.9 | 455.24 |
| | | | 8/9/2006 | 7.11 | 455.03 |
| | | | 11/8/2006 | 6.18 | 455.96 |
| | | | 4/24/2007 | 5.46 | 456.68 |
| | | | 8/22/2007 | 5.47 | 456.67 |
| | | | 1/15/2008 | 5.41 | 456.73 |
| | | | 7/9/2008 | 6.48 | 455.66 |
| | | | 12/19/2008 | 6.56 | 455.58 |
| | | | 7/13/2009 | 6.31 | 455.83 |
| | 462.15 | 453.402 to 443.402 | 12/15/2009 | 5.65 | 456.50 |
| | | | 8/9/2010 | 5.94 | 456.21 |
| | | | 12/16/2010 | 5.72 | 456.43 |
| | | | 7/25/2011 | 6.96 | 455.19 |
| | | | 12/14/2011 | 5.61 | 456.54 |
| | | | 7/10/2012 | 6.15 | 456.00 |
| | | | 12/19/2012 | 6.68 | 455.47 |
| | | | 7/15/2013 | 6.2 | 455.95 |
| | | | 12/18/2013 | 5.54 | 456.61 |
| | | | 7/15/2014 | 6.27 | 455.88 |
| | | | 12/17/2014 | 5.56 | 456.59 |
| | | | 7/20/2015 | 5.48 | 456.67 |
| | | | 12/15/2015 | 5.88 | 456.27 |
| | | | 4/6/2016 | Well Plugged and Abandoned | |

bgs - below ground surface
ft - feet
msl - mean sea level
NA - Not Available or Applicable (i.e., abandoned, not installed, not measured)
NM - Not Measured
PCLE - Protective Concentration Level Exceedance

Note:
Depth to water measurements taken from the top of the riser.

# TABLE 4-3A
# SUMMARY OF GROUNDWATER GAUGING DATA (LONG TERM MONITORING WELLS)

**Table 4-3A**

**Summary of Geochemical Parameters Measured in Groundwater**
**Long Term Monitoring Wells — SWMU 85 Plume**
**2016**

**Former NAS Dallas, Texas**


| Monitoring Well | Sampling Date | Sampling Round | SDG | Oxidation-Reduction Conditions | | | | | | | | Degradation Products | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Dissolved Oxygen[2] | Ferrous Iron[2] | Nitrate[3] | Nitrite[3] | ORP[1] | Phosphate[3] | Sulfate[3] | TOC[3] | Alkalinity[2] | Carbon Dioxide[2] | Chloride[3] | Ethane[3] | Ethene[3] | Methane[3] | pH[1] | Sulfide[3] |
| | | | Units | mg/L | mg/L | mg/L | mg/L | mV | mg/L | mg/L | mg/L | mg/L | mg/L | mg/L | ng/L | ng/L | µg/L | S.U. | mg/L |
| **Monitoring Wells Located Inside PCLE Zone** | | | | | | | | | | | | | | | | | | | |
| 421B136MW | 9/11/2007 | Round 18 | DALLASW004 | NA | NA | 0.05 U | 1.0 U | NA | 0.5 U | 1610 | 5.9 | NA | NA | 154 | 330 U | 330 U | 68 | NA | 0.82 |
| | 9/11/2007 | Round 18 | FIELD | 1 | 0 | NA | NA | -40 | NA | NA | NA | 350 | 40 | NA | NA | NA | NA | 6.45 | NA |
| | 7/13/2009 | Round 22 | F66613 | 1.5 | 0.8 | 0.05 U | 0.05 U | 13.7 | 0.02 U | 1360 | 6.6 | 500 | 90 | 143 | 320 U | 430 U | 152 | 6.64 | 0.6 U |
| | 7/26/2011 | Round 26 | F84621 | 0.8 | 3 | 0.5 U | 0.5 U | 3.9 | 0.02 U | 10 U | 6.8 | 500 | 180 | 134 | 320 U | 430 U | 976 | 6.5 | 0.3 U |
| | 7/10/2012 | Round 28 | F94831 | NA | NA | NA | NA | 16.4 | NA | NA | NA | NA | NA | NA | NA | NA | NA | 6.41 | NA |
| | 1/7/2013 | Round 29 | FA640 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| | 7/15/2013 | Round 30 | FA6427 | 0.3 | 20 | 0.50 U | 0.50 U | -39.9 | 0.020 U | 708 | 6.8 | 500 | 80 | 95.8 | 320 U | 430 U | 2070 | 6.64 | 0.22 U |
| | 1/28/2014 | Round 31 | FIELD | 0.24 | NA | NA | NA | 11.9 | NA | NA | NA | NA | NA | NA | NA | NA | NA | 6.67 | NA |
| | 7/16/2014 | Round 32 | 1407125 | 0.5 | 2.31 | 0.033 U | 0.66 U | 1 | 0.01 U | 1970 | 4.79 | NA | 100 | 155 | 0.001 UJ | 0.001 UJ | 0.178 | 6.6 | 0.07 |
| | 1/20/2015 | Round 33 | 1501071 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| | 7/28/2015 | Round 34 | 1507213 | 0.59 | 1.61 | 0.033 U | 0.66 U | -50.4 | 0.01 U | 1070 | 5.03 | 631 | 100 | 103 | 0.001 U | 0.001 U | 920 | 6.45 | 0.02 |
| | 1/20/2016 | Round 35 | 1601156 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| | 7/20/2016 | Round 36 | 1607138 | 0 | 3.01 | 0.033 U | 0.146 J | -127 | 0.01 U | 509 | 5.57 | 656 | | 77.1 | 0.001 U | 0.001 U | 3060 | 6.65 | NA |
| 421B137MW | 9/11/2007 | Round 18 | DALLASW004 | NA | NA | 0.05 U | 1.1 B | NA | 0.5 U | 1440 | 2.7 | NA | NA | 84.4 | 330 U | 330 U | 40 | NA | 0.82 U |
| | 9/11/2007 | Round 18 | FIELD | 1 | 0 | NA | NA | 40 | NA | NA | NA | 300 | 35 | NA | NA | NA | NA | 6.49 | NA |
| | 7/13/2009 | Round 22 | F66613 | 1.5 | 0 | 0.05 U | 0.05 U | 12.2 | 0.051 J | 1040 | 3.3 | 400 | 160 | 134 | 320 U | 430 U | 120 | 6.56 | 0.6 U |
| | 7/26/2011 | Round 26 | F84621 | 1 | 1 | 0.5 U | 0.5 U | -4.6 | 0.02 U | 1570 | 3.3 | 13 | 300 | 133 | 320 U | 430 U | 293 | 6.38 | 1.9 |
| | 7/10/2012 | Round 28 | F94831 | NA | NA | NA | NA | 57.1 | NA | NA | NA | NA | NA | NA | NA | NA | NA | 6.6 | NA |
| | 1/7/2013 | Round 29 | FA640 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| | 7/15/2013 | Round 30 | FA6427 | 0.4 | 0.1 | 0.50 U | 0.50 U | 47 | 0.020 U | 1210 | 4.2 | 500 | 70 | 118 JL | 320 U | 430 U | 1210 | 5.64 | 0.22 U |
| | 1/27/2014 | Round 31 | FIELD | 0.88 | NA | NA | NA | 20.5 | NA | NA | NA | NA | NA | NA | NA | NA | NA | 6.58 | NA |
| | 7/16/2014 | Round 32 | 1407125 | 0.56 | 0.6 | 0.033 U | 0.66 U | 11.9 | 0.01 U | 2410 | 2.56 J | NA | 100 | 155 | 0.001 UJ | 0.001 U | 0.0648 | 6.64 | 0.02 |
| | 1/20/2015 | Round 33 | 1501071 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| | 7/28/2015 | Round 34 | 1507213 | 0.55 | 1.18 | 0.033 U | 0.66 U | -9.8 | 0.01 U | 1800 | 2.97 J | 586 | 100 | 154 | 0.001 U | 0.001 U | 547 | 6.55 | 0.02 |
| | 1/20/2016 | Round 35 | 1601156 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| | 7/20/2016 | Round 36 | 1607138 | 0.49 | 0 | 0.033 U | 0.033 U | -86 | 0.01 U | 1590 | 3.56 | 619 | | 144 | 0.001 U | 0.001 U | 704 | 7.00 | NA |

**Table 4-3A**

**Summary of Geochemical Parameters Measured in Groundwater**
**Long Term Monitoring Wells — SWMU 85 Plume**
**2016**

**Former NAS Dallas, Texas**


| Monitoring Well | Sampling Date | Sampling Round | SDG | Oxidation-Reduction Conditions | | | | | | | | Degradation Products | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Dissolved Oxygen[2] | Ferrous Iron[2] | Nitrate[3] | Nitrite[3] | ORP[1] | Phosphate[3] | Sulfate[3] | TOC[3] | Alkalinity[2] | Carbon Dioxide[2] | Chloride[3] | Ethane[3] | Ethene[3] | Methane[3] | pH[1] | Sulfide[3] |
| | | | Units | mg/L | mg/L | mg/L | mg/L | mV | mg/L | mg/L | mg/L | mg/L | mg/L | mg/L | ng/L | ng/L | µg/L | S.U. | mg/L |
| **Monitoring Wells Located Inside PCLE Zone** | | | | | | | | | | | | | | | | | | | |
| 421B138MW | 9/11/2007 | Round 18 | DALLASW004 | NA | NA | 0.05 U | 1.0 U | NA | 0.5 U | 937 | 1.6 | NA | NA | 207 | 330 U | 330 U | 1.9 U | NA | 1.2 B |
| | 9/11/2007 | Round 18 | FIELD | 0.9 | 0 | NA | NA | -260 | NA | NA | NA | 250 | 30 | NA | NA | NA | NA | 6.7 | NA |
| | 7/13/2009 | Round 22 | F66613 | 1 | 0.1 | 0.05 U | 0.25 UR | 107.6 | 0.03 JH | 2740 | 1.9 | 250 | 50 | 220 | 320 U | 430 U | 0.56 | 6.76 | 0.6 U |
| | 7/26/2011 | Round 26 | F84621 | 0.4 | 0.2 | 6.4 | 0.25 UJL | -47.6 | 0.02 U | 2970 | 1.6 | 12 | 13 | 238 | 320 U | 430 U | 0.78 | 6.61 | 0.66 |
| | 7/10/2012 | Round 28 | F94831 | NA | NA | NA | NA | 23.4 | NA | NA | NA | NA | NA | NA | NA | NA | NA | 6.64 | NA |
| | 1/7/2013 | Round 29 | FA640 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| | 7/15/2013 | Round 30 | FA6427 | 0.5 | 0 | 1.3 U | 1.3 U | 130.4 | 0.020 U | 3150 | 2.1 | 700 | 70 | 182 JL | 320 U | 430 U | 0.39 J | 6.78 | 0.22 U |
| | 1/27/2014 | Round 31 | FIELD | 3.05 | NA | NA | NA | 140.2 | NA | NA | NA | NA | NA | NA | NA | NA | NA | 6.91 | NA |
| | 7/16/2014 | Round 32 | 1407125 | 0.49 | 0.21 | 0.033 U | 0.66 U | 78.3 | 0.01 U | 2970 | 1.99 J | NA | 25 | 172 | 0.001 UJ | 0.001 U | 0.001 U | 6.8 | 0.3 |
| | 1/20/2015 | Round 33 | 1501071 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| | 7/28/2015 | Round 34 | 1507213 | 1.35 | 0 | 0.033 U | 0.66 U | 35.6 | 0.01 U | 3150 | 1.49 J | 373 | 50 | 180 | 0.001 U | 0.001 U | 1.74 J | 6.38 | 0.06 |
| | 1/20/2016 | Round 35 | 1601156 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| | 7/20/2016 | Round 36 | 1607138 | 0.01 | 0.02 | 0.033 U | 0.033 U | 122 | 0.01 U | 2760 | 1.56 J | 403 | | 158 | 0.001 U | 0.001 U | 1 U | 5.92 | NA |
| 421B139MW | 9/11/2007 | Round 18 | DALLASW004 | NA | NA | 0.05 U | 1.0 U | NA | 0.5 U | 3090 | 2.8 | NA | NA | 184 | 330 U | 330 U | 5 U | NA | 0.73 U |
| | 9/11/2007 | Round 18 | FIELD | 0.6 | 0 | NA | NA | -246 | NA | NA | NA | 350 | 60 | NA | NA | NA | NA | 6.57 | NA |
| | 7/13/2009 | Round 22 | F66613 | 1 | 0.1 | 0.05 U | 0.05 U | 0.05 U | 0.047 J | 1820 | 1.9 | 250 | 90 | 177 JL | 320 U | 430 U | 2.67 | 6.79 | 0.6 U |
| | 1/12/2010 | Round 23 | F70767 | NA | NA | NA | NA | 273.2 | NA | NA | NA | NA | NA | NA | NA | NA | NA | 6.46 | NA |
| | 7/13/2010 | Round 24 | F75072 | NA | NA | NA | NA | -89.6 | NA | NA | NA | NA | NA | NA | NA | NA | NA | 6.83 | NA |
| | 1/10/2011 | Round 25 | FIELD | NA | NA | NA | NA | 90.1 | NA | NA | NA | NA | NA | NA | NA | NA | NA | 6.56 | NA |
| | 7/26/2011 | Round 26 | F84621 | 0.6 | 0.2 | 1.3 U | 0.25 UJL | -18.9 | 0.057 | 2660 | 1.8 | 400 | 70 | 105 | 320 U | 430 U | 1.34 | 6.52 | 0.3 U |
| | 1/9/2012 | Round 27 | F88817 | NA | NA | NA | NA | 125.6 | NA | NA | NA | NA | NA | NA | NA | NA | NA | 6.72 | NA |
| | 7/10/2012 | Round 28 | F94831 | NA | NA | NA | NA | 36.6 | NA | NA | NA | NA | NA | NA | NA | NA | NA | 6.44 | NA |
| | 1/7/2103 | Round 29 | FA640 | NA | NA | NA | NA | -6.9 | NA | NA | NA | NA | NA | NA | NA | NA | NA | 6.83 | NA |
| | 7/15/2013 | Round 30 | FA6427 | 0.4 | 0 | 1.3 U | 1.3 U | 59.6 | 0.020 U | 3010 | 2 | 300 | 35 | 130 | 320 U | 430 U | 1.1 | 6.76 | 0.31 J |
| | 1/27/2014 | Round 31 | FIELD | 1.19 | NA | NA | NA | 101 | NA | NA | NA | NA | NA | NA | NA | NA | NA | 6.86 | NA |
| | 7/16/2014 | Round 32 | 1407125 | 0.46 | 0.31 | 0.033 U | 0.165 U | 51 | 0.01 U | 729 JH | 1.92 J | NA | 31 | 136 | 0.001 UJ | 0.001 U | 0.00175 J | 6.73 | 0.19 |
| | 1/20/2015 | Round 33 | 1501071 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| | 7/28/2015 | Round 34 | 1507213 | 1.5 | 0 | 0.033 U | 0.165 U | 28.1 | 0.01 U | 3050 | 1.99 J | 410 | 100 | 148 | 0.001 U | 0.001 U | 2.51 J | 6.24 | 0.23 |
| | 1/20/2016 | Round 35 | 1601156 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| | 7/20/2016 | Round 36 | 1607138 | 0.01 | 0 | 0.033 U | 0.033 U | 112 | 0.01 U | 2250 | 1.7 J | 411 | | 82.2 | 0.001 U | 0.001 U | 1.91 J | 6.14 | NA |

**Table 4-3A**

**Summary of Geochemical Parameters Measured in Groundwater**
**Long Term Monitoring Wells — SWMU 85 Plume**
**2016**

**Former NAS Dallas, Texas**


| Monitoring Well | Sampling Date | Sampling Round | SDG | Oxidation-Reduction Conditions | | | | | | | | Degradation Products | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Dissolved Oxygen[2] | Ferrous Iron[2] | Nitrate[3] | Nitrite[3] | ORP[1] | Phosphate[3] | Sulfate[3] | TOC[3] | Alkalinity[2] | Carbon Dioxide[2] | Chloride[3] | Ethane[3] | Ethene[3] | Methane[3] | pH[1] | Sulfide[3] |
| | | | Units | mg/L | mg/L | mg/L | mg/L | mV | mg/L | mg/L | mg/L | mg/L | mg/L | mg/L | ng/L | ng/L | µg/L | S.U. | mg/L |
| **Monitoring Wells Located Inside PCLE Zone** | | | | | | | | | | | | | | | | | | | |
| **421B141MW** | 9/11/2007 | Round 18 | DALLASW004 | NA | NA | 0.5 U | 1.0 U | NA | 0.5 U | 3930 | 4.0 | NA | NA | 571 | 330 U | 330 U | 1.4 U | NA | 0.8 U |
| | 9/11/2007 | Round 18 | FIELD | 1 | 0 | NA | NA | -43 | NA | NA | NA | 350 | 50 | NA | NA | NA | NA | 6.7 | NA |
| | 7/13/2009 | Round 22 | F66613 | 1 | 0 | 0.05 U | 0.05 U | -170.1 | 0.083 J | 1220 | 2.4 | 400 | 100 | 151 | 320 U | 430 U | 1.17 | 7.02 | 0.6 U |
| | 7/26/2011 | Round 26 | F84621 | 0.3 | 0 | 5 U | 0.35 JL | 15 | 0.02 U | 2790 | 2.4 | 11 | 12 | 257 | 320 U | 430 U | 0.46 J | 6.51 | 0.94 |
| | 7/10/2012 | Round 28 | F94831 | NA | NA | NA | NA | 106.1 | NA | NA | NA | NA | NA | NA | NA | NA | NA | 6.61 | NA |
| | 1/7/2013 | Round 29 | FA640 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| | 7/15/2013 | Round 30 | FA6427 | 0.4 | 0 | 1.3 U | 1.3 U | 121.7 | 0.020 U | 2990 | 2.4 | 500 | 70 | 159 | 320 U | 430 U | 3.1 | 6.61 | 0.64 J |
| | 1/27/2014 | Round 31 | FIELD | 1.58 | NA | NA | NA | 104.6 | NA | NA | NA | NA | NA | NA | NA | NA | NA | 6.63 | NA |
| | 7/16/2014 | Round 32 | 1407125 | 0.47 | 1.56 | 0.033 U | 0.165 U | 398.9 | 0.01 U | 521 | 3.13 | NA | 100 | 54.6 | 0.001 UJ | 0.001 U | 0.0254 | 6.5 | 0.28 |
| | 1/20/2015 | Round 33 | 1501071 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| | 7/28/2015 | Round 34 | 1507213 | 1.08 | 0 | 0.033 U | 0.165 U | 71.3 | 0.01 U | 479 | 1.84 J | 450 | 100 | 8.02 | 0.001 U | 0.001 U | 1.68 J | 6.22 | 0.14 |
| | 1/20/2016 | Round 35 | 1601156 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| | 7/20/2016 | Round 36 | 1607138 | 0 | 0.23 | 0.033 U | 0.328 | 69 | 0.01 U | 2830 | 2.06 J | 467 | | 151 | 0.001 U | 0.001 U | 1 U | 6.81 | NA |

***Notes:***

mg/L - milligrams per liter
mV - millivolts
NA - Not Analyzed
ng/L - nanograms per liter
ORP - Oxidation/reduction potential

TOC - Total Organic Carbon
mg/L - micrograms per liter
S.U. - Standard Units
SDG - Sample Delivery Group
PCLE - Protective Concentration Level Exceedance

1. Field measurement, meter
2. Field measurement, test kit
3. Analytical laboratory result

Analytical Result Qualifiers:

J, K, L - Indicates that the chemical was detected; however, the associated numerical result may not be a precise representation of the amount that is actually present in the sample. The laboratory reported concentration is considered to be bias unknown (J), high (K), or low (L) estimate of the true concentration.

U - Indicates that the sample was not detected at the numerical detection limit (sample-specific quantitation limit) noted. Nondetected results from the laboratory are reported in this manner. This qualifier is added to a positive result (reported by the laboratory) if the detected concentration is determined to be attributable to contamination introduced during field sampling or laboratory analysis.

# TABLE 4-3B
# SUMMARY OF GROUNDWATER GAUGING DATA (HISTORICAL MONITORING WELLS)

**Table 4-3B**

**Summary of Geochemical Parameters Measured in Groundwater**
**Historical Monitoring Wells — SWMU 85 Plume**
**2016**

**Former NAS Dallas, Texas**


| Monitoring Well | Sampling Date | SDG | Oxidation-Reduction Conditions | | | | | | | | Degradation Products | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Dissolved Oxygen[2] | Ferrous Iron[2] | Nitrate[3] | Nitrite[3] | ORP[1] | Phosphate[3] | Sulfate[3] | TOC[3] | Alkalinity[2] | Carbon Dioxide[2] | Chloride[3] | Ethane[3] | Ethene[3] | Methane[3] | pH[1] | Sulfide[3] |
| | | Units | mg/L | mg/L | mg/L | mg/L | mV | mg/L | mg/L | mg/L | mg/L | mg/L | mg/L | mg/L | ng/L | mg/L | S.U. | mg/L |
| Monitoring Wells Located Outside PCLE Zone | | | | | | | | | | | | | | | | | | |
| 421B140MW | 9/11/2007 | DALLASW004 | NA | NA | 0.05 U | 1.0 U | NA | 0.5 U | 489 | 3.3 | NA | NA | 62.6 | 330 U | 330 U | 23 | NA | 0.67 U |
| | 9/11/2007 | FIELD | 0.3 | 0.4 | NA | NA | -130 | NA | NA | NA | 300 | 16 | NA | NA | NA | NA | 7.31 | NA |
| | 7/13/2009 | F66613 | 1 | 0.6 | 0.33 | 0.05 U | -16.4 | 0.033 J | 489 | 2.7 | 90 | 40 | 53.5 | 320 U | 430 U | 16.1 | 7.01 | 0.6 U |
| | 7/26/2011 | F84621 | 1 | 0 | 1.7 | 0.5 U | 1.1 | 0.02 U | 858 | 2.5 | 200 | 16 | 70.9 | 320 U | 430 U | 15.2 | 6.9 | 0.56 |
| | 7/10/2012 | F94831 | NA | NA | NA | NA | 44.9 | NA | NA | NA | NA | NA | NA | NA | NA | NA | 6.7 | NA |
| | 1/7/2013 | FA640 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| | 7/15/2013 | FA6427 | 0.5 | 0.8 | 0.25 U | 0.25 U | -58.4 | 0.020 U | 315 | 3.3 | 250 | 25 | 38.9 | 320 U | 430 U | 63.7 | 7.13 | 0.72 J |
| | 1/27/2014 | FIELD | 0.88 | NA | NA | NA | 99.4 | NA | NA | NA | NA | NA | NA | NA | NA | NA | 6.86 | NA |
| | 7/16/2014 | 1407125 | 0.43 | 0.46 | 0.033 U | 0.66 U | -20.7 | 0.01 U | 2880 | 2.54 J | NA | 20 | 143 | 0.001 UJ | 0.001 UJ | 0.00237 J | 7.09 | 0.04 |
| | 1/20/2015 | 1501071 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| | 7/28/2015 | 1507213 | 0.97 | 1.82 | 0.033 U | 0.66 U | -19.3 | 0.01 U | 1350 | 2.18 J | 399 | 10 | 88 | 0.001 U | 0.001 U | 16 | 6.42 | 0.02 |
| | 4/6/2016 | Well Plugged and Abandoned | | | | | | | | | | | | | | | | |
| 61802MW | | Well Installed | | | | | | | | | | | | | | | | |
| | 1/9/2004 | C4A100109 | 1.5 | 0 | NA | NA | 156 | NA | 3000 | NA | 200 | NA | 269 L | NA | NA | NA | 7.97 | 0 |
| | 6/27/1905 | Well Destroyed | | | | | | | | | | | | | | | | |

mg/L - milligrams per liter
mV - millivolts
NA - Not Analyzed
ng/L - nanograms per liter
ORP - Oxidation/reduction potential
TOC - Total Organic Carbon
mg/L - micrograms per liter
S.U. - Standard Units
SDG - Sample Delivery Group
PCLE - Protective Concentration Level Exceedance

Notes:
1. Field measurement, meter
2. Field measurement, test kit
3. Analytical laboratory result

Analytical Result Qualifiers:
J, K, L - Indicates that the chemical was detected; however, the associated numerical result may not be a precise representation of the amount that is actually present in the sample. The laboratory reported concentration is considered to be bias unknown (J), high (K), or low (L) estimate of the true concentratio
U - Indicates that the sample was not detected at the numerical detection limit (sample-specific quantitation limit) noted. Nondetected results from the laboratory are reported in this manner. This qualifier is added to a positive result (reported by the laboratory) if the detected concentration is determined to be attributable to contamination introduced durin

# TABLE 4-4
# SUMMARY OF CONCENTRATION VS. TIME ATTENUATION RATE CONSTANTS

**Table 4-4**

**Summary of Concentration vs. Time Attenuation Rate Constants**
**Long Term Monitoring Wells — SWMU 85 Plume**
**2016**
**Former NAS Dallas, Texas**
**Page 1 of 6**

| Monitoring Well ID | Sampling Date | Elapsed Time (Years) | Protective Concentration Level (mg/L) | Concentration Detected (mg/L) | Natural Log of Concentration (mg/L) | Degradation Rate from Natural Log ($K_{time}$) (mg/L per year) | Minimum Degradation Rate Required for Remedial Goals Natural Log ($K_{time}$) (mg/L per year) | Minimum Degradation Rate Met? (Yes/No) | Expected Remedial Goal Concentration (mg/L) | Expected Remedial Goal Concentration Met? (Yes/No) | Remedial Goals Being Met? (Yes/No) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Trichloroethene** | | | | | | | | | | | |
| 421B136MW | Aug-06 | 0.0 | 0.00500 | 0.00100 | -6.91 | -- | -- | -- | -- | -- | -- |
| | Nov-06 | 0.2 | 0.00500 | 0.00080 J | -7.13 | -- | -- | -- | -- | -- | -- |
| | Apr-07 | 0.6 | 0.00500 | 0.00110 | -6.81 | -- | -- | -- | -- | -- | -- |
| | Sep-07 | 1.0 | 0.00500 | 0.00043 J | -7.75 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-08 | 1.4 | 0.00500 | 0.00067 J | -7.31 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-08 | 1.9 | 0.00500 | 0.00083 J | -7.09 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-09 | 2.4 | 0.00500 | 0.00048 J | -7.64 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-09 | 2.9 | 0.00500 | 0.00032 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-10 | 3.4 | 0.00500 | 0.00055 J | -7.51 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-10 | 3.9 | 0.00500 | 0.00036 J | -7.93 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-11 | 4.4 | 0.00500 | 0.00061 J | -7.40 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-11 | 4.9 | 0.00500 | 0.00026 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-12 | 5.4 | 0.00500 | 0.00026 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-12 | 5.9 | 0.00500 | 0.00026 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-13 | 6.4 | 0.00500 | 0.00046 J | -7.68 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-13 | 6.9 | 0.00500 | 0.00031 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-14 | 7.4 | 0.00500 | 0.0003 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-14 | 7.9 | 0.00500 | 0.00025 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-15 | 8.4 | 0.00500 | 0.000264 J | -8.24 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-15 | 8.9 | 0.00500 | 0.00025 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-16 | 9.4 | 0.00500 | 0.00025 UJ | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-16 | 9.9 | 0.00500 | 0.0005 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| 421B137MW | Aug-06 | 0.0 | 0.00500 | 0.00600 | -5.12 | -- | -- | -- | -- | -- | -- |
| | Nov-06 | 0.2 | 0.00500 | 0.00400 | -5.52 | -- | -- | -- | -- | -- | -- |
| | Apr-07 | 0.6 | 0.00500 | 0.02400 | -3.73 | -- | -- | -- | -- | -- | -- |
| | Sep-07 | 1.0 | 0.00500 | 0.00520 J | -5.26 | 0.372 | -0.018 | No | 0.00589 | Yes | Evaluate Further |
| | Jan-08 | 1.4 | 0.00500 | 0.00820 | -4.80 | 0.240 | -0.018 | No | 0.00585 | No | No |
| | Jul-08 | 1.9 | 0.00500 | 0.00970 | -4.64 | 0.222 | -0.018 | No | 0.00580 | No | No |
| | Jan-09 | 2.4 | 0.00500 | 0.01130 | -4.48 | 0.228 | -0.018 | No | 0.00574 | No | No |
| | Jul-09 | 2.9 | 0.00500 | 0.00990 | -4.62 | 0.178 | -0.018 | No | 0.00569 | No | No |
| | Jan-10 | 3.4 | 0.00500 | 0.00630 J | -5.07 | 0.068 | -0.018 | No | 0.00564 | No | No |
| | Jul-10 | 3.9 | 0.00500 | 0.00570 | -5.17 | 0.000 | -0.018 | No | 0.00559 | No | No |
| | Jan-11 | 4.4 | 0.00500 | 0.00710 | -4.95 | -0.011 | -0.018 | No | 0.00554 | No | No |
| | Jul-11 | 4.9 | 0.00500 | 0.01200 U | -8.00 | -0.285 | -0.018 | Less Than PCL | 0.00549 | Less Than PCL | Less Than PCL |
| | Jan-12 | 5.4 | 0.00500 | 0.00560 | -5.18 | -0.225 | -0.018 | Yes | 0.00544 | No | Evaluate Further |
| | Jul-12 | 5.9 | 0.00500 | 0.02480 | -3.70 | -0.088 | -0.018 | Yes | 0.00539 | No | Evaluate Further |
| | Jan-13 | 6.4 | 0.00500 | 0.00060 J | -7.42 | -0.201 | -0.018 | Less Than PCL | 0.00534 | Less Than PCL | Less Than PCL |
| | Jul-13 | 6.9 | 0.00500 | 0.0039 | -5.55 | -0.181 | -0.018 | Less Than PCL | 0.00529 | Less Than PCL | Less Than PCL |
| | Jan-14 | 7.4 | 0.00500 | 0.0019 | -6.27 | -0.194 | -0.018 | Less Than PCL | 0.00524 | Less Than PCL | Less Than PCL |
| | Jul-14 | 7.9 | 0.00500 | 0.0149 | -4.21 | -0.123 | -0.018 | Yes | 0.00520 | No | Evaluate Further |
| | Jan-15 | 8.4 | 0.00500 | 0.0032 | -5.75 | -0.122 | -0.018 | Less Than PCL | 0.00515 | Less Than PCL | Less Than PCL |
| | Jul-15 | 8.9 | 0.00500 | 0.00347 | -5.66 | -0.117 | -0.018 | Less Than PCL | 0.00510 | Less Than PCL | Less Than PCL |
| | Jan-16 | 9.4 | 0.00500 | 0.00367 J | -5.61 | -0.110 | -0.018 | Less Than PCL | 0.00505 | Less Than PCL | Less Than PCL |
| | Jul-16 | 9.9 | 0.00500 | 0.00313 | -5.77 | -0.107 | -0.018 | Less Than PCL | 0.00501 | Less Than PCL | Less Than PCL |

**Table 4-4**

**Summary of Concentration vs. Time Attenuation Rate Constants**
**Long Term Monitoring Wells — SWMU 85 Plume**
**2016**
**Former NAS Dallas, Texas**
**Page 2 of 6**

| Monitoring Well ID | Sampling Date | Elapsed Time (Years) | Protective Concentration Level (mg/L) | Concentration Detected (mg/L) | Natural Log of Concentration (mg/L) | Degradation Rate from Natural Log ($K_{time}$) (mg/L per year) | Minimum Degradation Rate Required for Remedial Goals Natural Log ($K_{time}$) (mg/L per year) | Minimum Degradation Rate Met? (Yes/No) | Expected Remedial Goal Concentration (mg/L) | Expected Remedial Goal Concentration Met? (Yes/No) | Remedial Goals Being Met? (Yes/No) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 421B138MW | May-06 | 0.0 | 0.00500 | 0.01300 J | -4.34 | -- | -- | -- | -- | -- | -- |
| | Aug-06 | 0.3 | 0.00500 | 0.01900 | -3.96 | -- | -- | -- | -- | -- | -- |
| | Nov-06 | 0.5 | 0.00500 | 0.01800 | -4.02 | -- | -- | -- | -- | -- | -- |
| | Apr-07 | 0.9 | 0.00500 | 0.02100 | -3.86 | 0.462 | -0.095 | No | 0.01225 | No | No |
| | Sep-07 | 1.4 | 0.00500 | 0.02200 J | -3.82 | 0.338 | -0.095 | No | 0.01177 | No | No |
| | Jan-08 | 1.7 | 0.00500 | 0.01600 | -4.14 | 0.126 | -0.095 | No | 0.01140 | No | No |
| | Jul-08 | 2.2 | 0.00500 | 0.01040 | -4.57 | -0.103 | -0.095 | Yes | 0.01087 | Yes | Yes |
| | Jan-09 | 2.7 | 0.00500 | 0.00430 | -5.45 | -0.382 | -0.095 | Less Than PCL | 0.01035 | Less Than PCL | Less Than PCL |
| | Jul-09 | 3.2 | 0.00500 | 0.01260 | -4.37 | -0.264 | -0.095 | Yes | 0.00987 | No | Evaluate Further |
| | Jan-10 | 3.7 | 0.00500 | 0.01220 | -4.41 | -0.197 | -0.095 | Yes | 0.00941 | No | Evaluate Further |
| | Jul-10 | 4.2 | 0.00500 | 0.00720 | -4.93 | -0.213 | -0.095 | Yes | 0.00897 | Yes | Yes |
| | Jan-11 | 4.7 | 0.00500 | 0.00930 | -4.68 | -0.187 | -0.095 | Yes | 0.00856 | No | Evaluate Further |
| | Jul-11 | 5.2 | 0.00500 | 0.00770 | -4.87 | -0.180 | -0.095 | Yes | 0.00813 | Yes | Yes |
| | Jan-12 | 5.7 | 0.00500 | 0.00340 | -5.68 | -0.224 | -0.095 | Less Than PCL | 0.00779 | Less Than PCL | Less Than PCL |
| | Jul-12 | 6.2 | 0.00500 | 0.01040 | -4.57 | -0.182 | -0.095 | Yes | 0.00742 | No | Evaluate Further |
| | Jan-13 | 6.7 | 0.00500 | 0.0025 | -5.99 | -0.220 | -0.095 | Less Than PCL | 0.00707 | Less Than PCL | Less Than PCL |
| | Jul-13 | 7.2 | 0.00500 | 0.0107 | -4.54 | -0.178 | -0.095 | Yes | 0.00674 | No | Evaluate Further |
| | Jan-14 | 7.4 | 0.00500 | 0.0091 | -4.70 | -0.154 | -0.095 | Yes | 0.00640 | No | Evaluate Further |
| | Jul-14 | 7.9 | 0.00500 | 0.0097 | -4.64 | -0.133 | -0.095 | Yes | 0.00613 | No | Evaluate Further |
| | Jan-15 | 8.4 | 0.00500 | 0.0081 | -4.82 | -0.121 | -0.095 | Yes | 0.00583 | No | Evaluate Further |
| | Jul-15 | 8.9 | 0.00500 | 0.01 | -4.61 | -0.103 | -0.095 | Yes | 0.00555 | No | Evaluate Further |
| | Jan-16 | 9.4 | 0.00500 | 0.00542 | -5.22 | -0.105 | -0.095 | Yes | 0.00529 | No | Evaluate Further |
| | Jul-16 | 9.9 | 0.00500 | 0.00735 | -4.91 | -0.098 | -0.095 | Yes | 0.00505 | No | Evaluate Further |
| 421B139MW | Jul-06 | 0.0 | 0.00500 | 0.02000 | -3.91 | -- | -- | -- | -- | -- | -- |
| | Aug-06 | 0.1 | 0.00500 | 0.01900 | -3.96 | -- | -- | -- | -- | -- | -- |
| | Nov-06 | 0.3 | 0.00500 | 0.01700 | -4.07 | -- | -- | -- | -- | -- | -- |
| | Apr-07 | 0.7 | 0.00500 | 0.00720 | -4.93 | -1.425 | -0.137 | Yes | 0.01809 | Yes | Yes |
| | Sep-07 | 1.2 | 0.00500 | 0.01000 | -4.61 | -0.784 | -0.137 | Yes | 0.01708 | Yes | Yes |
| | Jan-08 | 1.5 | 0.00500 | 0.00460 | -5.38 | -0.917 | -0.137 | Less Than PCL | 0.01631 | Less Than PCL | Less Than PCL |
| | Jul-08 | 2.0 | 0.00500 | 0.01470 | -4.22 | -0.399 | -0.137 | Yes | 0.01524 | Yes | Yes |
| | Jan-09 | 2.5 | 0.00500 | 0.01120 | -4.49 | -0.243 | -0.137 | Yes | 0.01420 | Yes | Yes |
| | Jul-09 | 3.0 | 0.00500 | 0.01750 | -4.05 | -0.077 | -0.137 | No | 0.01327 | No | No |
| | Jan-10 | 3.5 | 0.00500 | 0.00210 | -6.17 | -0.310 | -0.137 | Less Than PCL | 0.01239 | Less Than PCL | Less Than PCL |
| | Jul-10 | 4.0 | 0.00500 | 0.01000 | -4.61 | -0.221 | -0.137 | Yes | 0.01157 | Yes | Yes |
| | Jan-11 | 4.5 | 0.00500 | 0.00230 | -6.07 | -0.305 | -0.137 | Less Than PCL | 0.01082 | Less Than PCL | Less Than PCL |
| | Jul-11 | 5.0 | 0.00500 | 0.00840 | -4.78 | -0.235 | -0.137 | Yes | 0.01005 | Yes | Yes |
| | Jan-12 | 5.5 | 0.00500 | 0.00690 | -4.98 | -0.201 | -0.137 | Yes | 0.00944 | Yes | Yes |
| | Jul-12 | 6.0 | 0.00500 | 0.01170 | -4.45 | -0.143 | -0.137 | Yes | 0.00881 | No | Evaluate Further |
| | Jan-13 | 6.5 | 0.00500 | 0.0114 | -4.47 | -0.103 | -0.137 | No | 0.00822 | No | No |
| | Jul-13 | 7.0 | 0.00500 | 0.0134 | -4.31 | -0.067 | -0.137 | No | 0.00768 | No | No |
| | Jan-14 | 7.4 | 0.00500 | 0.0040 | -5.52 | -0.089 | -0.137 | Less Than PCL | 0.00713 | Less Than PCL | Less Than PCL |
| | Jul-14 | 7.9 | 0.00500 | 0.0135 | -4.31 | -0.099 | -0.137 | No | 0.00669 | No | No |
| | Jan-15 | 8.4 | 0.00500 | 0.0055 | -5.20 | -0.067 | -0.137 | No | 0.00624 | Yes | Evaluate Further |
| | Jul-15 | 8.9 | 0.00500 | 0.00621 | -5.08 | -0.068 | -0.137 | No | 0.00581 | No | No |
| | Jan-16 | 9.4 | 0.00500 | 0.0013 J | -6.65 | -0.107 | -0.137 | Less Than PCL | 0.00542 | Less Than PCL | Less Than PCL |
| | Jul-16 | 9.9 | 0.00500 | 0.00628 | -5.07 | -0.099 | -0.137 | No | 0.00507 | No | No |
| 421B141MW | May-06 | 0.0 | 0.00500 | 0.00500 | -5.30 | -- | -- | -- | -- | -- | -- |
| | Aug-06 | 0.3 | 0.00500 | 0.00700 | -4.96 | -- | -- | -- | -- | -- | -- |
| | Nov-06 | 0.5 | 0.00500 | 0.00400 | -5.52 | -- | -- | -- | -- | -- | -- |
| | Apr-07 | 0.9 | 0.00500 | 0.00600 | -5.12 | 0.060 | -0.034 | No | 0.00685 | Yes | Evaluate Further |
| | Sep-07 | 1.3 | 0.00500 | 0.00570 J | -5.17 | 0.062 | -0.034 | No | 0.00676 | Yes | Evaluate Further |
| | Jan-08 | 1.6 | 0.00500 | 0.00560 | -5.18 | 0.046 | -0.034 | No | 0.00668 | Yes | Evaluate Further |
| | Jul-08 | 2.1 | 0.00500 | 0.00710 | -4.95 | 0.110 | -0.034 | No | 0.00657 | No | No |
| | Jan-09 | 2.7 | 0.00500 | 0.00620 | -5.08 | 0.086 | -0.034 | No | 0.00646 | Yes | Evaluate Further |
| | Jul-09 | 3.2 | 0.00500 | 0.00540 | -5.22 | 0.044 | -0.034 | No | 0.00635 | Yes | Evaluate Further |
| | Jan-10 | 3.7 | 0.00500 | 0.00480 | -5.34 | 0.005 | -0.034 | Less Than PCL | 0.00625 | Less Than PCL | Less Than PCL |
| | Jul-10 | 4.2 | 0.00500 | 0.00340 | -5.68 | -0.054 | -0.034 | Less Than PCL | 0.00614 | Less Than PCL | Less Than PCL |
| | Jan-11 | 4.7 | 0.00500 | 0.00460 | -5.38 | -0.054 | -0.034 | Less Than PCL | 0.00604 | Less Than PCL | Less Than PCL |
| | Jul-11 | 5.2 | 0.00500 | 0.00520 | -5.26 | -0.042 | -0.034 | Yes | 0.00593 | Yes | Yes |
| | Jan-12 | 5.7 | 0.00500 | 0.0035 | -5.65 | -0.060 | -0.034 | Less Than PCL | 0.00584 | Less Than PCL | Less Than PCL |
| | Jul-12 | 6.2 | 0.00500 | 0.0029 | -5.84 | -0.080 | -0.034 | Less Than PCL | 0.00575 | Less Than PCL | Less Than PCL |
| | Jan-13 | 6.7 | 0.00500 | 0.0041 | -5.50 | -0.074 | -0.034 | Less Than PCL | 0.00565 | Less Than PCL | Less Than PCL |
| | Jul-13 | 7.2 | 0.00500 | 0.0051 | -5.28 | -0.059 | -0.034 | Yes | 0.00556 | Yes | Yes |
| | Jan-14 | 7.4 | 0.00500 | 0.0032 | -5.74 | -0.066 | -0.034 | Less Than PCL | 0.00545 | Less Than PCL | Less Than PCL |
| | Jul-14 | 7.9 | 0.00500 | 0.00363 | -5.62 | -0.065 | -0.034 | Less Than PCL | 0.00537 | Less Than PCL | Less Than PCL |
| | Jan-15 | 8.4 | 0.00500 | 0.00392 | -5.54 | -0.061 | -0.034 | Less Than PCL | 0.00528 | Less Than PCL | Less Than PCL |
| | Jul-15 | 8.9 | 0.00500 | 0.0024 | -6.03 | -0.072 | -0.034 | Less Than PCL | 0.00519 | Less Than PCL | Less Than PCL |
| | Jan-16 | 9.4 | 0.00500 | 0.00181 JL | -6.31 | -0.086 | -0.034 | Less Than PCL | 0.00510 | Less Than PCL | Less Than PCL |
| | Jul-16 | 9.9 | 0.00500 | 0.00263 | -5.94 | -0.086 | -0.034 | Less Than PCL | 0.00502 | Less Than PCL | Less Than PCL |

**Table 4-4**

**Summary of Concentration vs. Time Attenuation Rate Constants**
**Long Term Monitoring Wells — SWMU 85 Plume**
**2016**
**Former NAS Dallas, Texas**
**Page 3 of 6**

| Monitoring Well ID | Sampling Date | Elapsed Time (Years) | Protective Concentration Level (mg/L) | Concentration Detected (mg/L) | Natural Log of Concentration (mg/L) | Degradation Rate from Natural Log ($K_{time}$) (mg/L per year) | Minimum Degradation Rate Required for Remedial Goals Natural Log ($K_{time}$) (mg/L per year) | Minimum Degradation Rate Met? (Yes/No) | Expected Remedial Goal Concentration (mg/L) | Expected Remedial Goal Concentration Met? (Yes/No) | Remedial Goals Being Met? (Yes/No) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **cis-1,2-Dichloroethene** | | | | | | | | | | | |
| 421B136MW | Aug-06 | 0.0 | 0.07000 | 0.00050 U | -8.00 | -- | -- | -- | -- | -- | -- |
| | Nov-06 | 0.2 | 0.07000 | 0.00050 U | -8.00 | -- | -- | -- | -- | -- | -- |
| | Apr-07 | 0.6 | 0.07000 | 0.00180 | -6.32 | -- | -- | -- | -- | -- | -- |
| | Sep-07 | 1.0 | 0.07000 | 0.00044 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-08 | 1.4 | 0.07000 | 0.00078 J | -7.16 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-08 | 1.9 | 0.07000 | 0.00150 | -6.50 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-09 | 2.4 | 0.07000 | 0.00047 J | -7.66 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-09 | 2.9 | 0.07000 | 0.00020 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-10 | 3.4 | 0.07000 | 0.00130 | -6.65 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-10 | 3.9 | 0.07000 | 0.00110 | -6.81 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-11 | 4.4 | 0.07000 | 0.00150 | -6.50 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-11 | 4.9 | 0.07000 | 0.00026 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-12 | 5.4 | 0.07000 | 0.0016 | -6.44 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-12 | 5.9 | 0.07000 | 0.00045 | -7.71 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-13 | 6.4 | 0.07000 | 0.0017 | -6.38 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-13 | 6.9 | 0.07000 | 0.00024 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-14 | 7.4 | 0.07000 | 0.00033 U | -8.02 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-14 | 7.9 | 0.07000 | 0.00095 J | -6.96 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-13 | 6.4 | 0.07000 | 0.00135 | -6.61 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-15 | 8.9 | 0.07000 | 0.00033 U | -6.61 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-16 | 9.4 | 0.07000 | 0.00166 | -6.40 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-16 | 9.9 | 0.07000 | 0.0005 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| 421B137MW | Aug-06 | 0.0 | 0.07000 | 0.00400 | -5.52 | -- | -- | -- | -- | -- | -- |
| | Nov-06 | 0.2 | 0.07000 | 0.00200 | -6.21 | -- | -- | -- | -- | -- | -- |
| | Apr-07 | 0.6 | 0.07000 | 0.02300 | -3.77 | -- | -- | -- | -- | -- | -- |
| | Sep-07 | 1.0 | 0.07000 | 0.00340 J | -5.68 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-08 | 1.4 | 0.07000 | 0.01600 | -4.14 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-08 | 1.9 | 0.07000 | 0.01700 | -4.07 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-09 | 2.4 | 0.07000 | 0.01930 | -3.95 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-09 | 2.9 | 0.07000 | 0.00900 | -4.71 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-10 | 3.4 | 0.07000 | 0.03230 | -3.43 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-10 | 3.9 | 0.07000 | 0.02640 | -3.63 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-11 | 4.4 | 0.07000 | 0.03340 | -3.40 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-11 | 4.9 | 0.07000 | 0.01450 | -4.23 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-12 | 5.4 | 0.07000 | 0.02070 | -3.88 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-12 | 5.9 | 0.07000 | 0.03450 | -3.37 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-13 | 6.4 | 0.07000 | 0.0018 | -6.32 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-13 | 6.9 | 0.07000 | 0.0099 | -4.62 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-14 | 7.4 | 0.07000 | 0.0074 | -4.91 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-14 | 7.9 | 0.07000 | 0.0536 | -2.93 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-15 | 8.4 | 0.07000 | 0.0415 | -3.18 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-15 | 8.9 | 0.07000 | 0.0304 | -3.18 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-16 | 9.4 | 0.07000 | 0.0464 J | -3.07 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-16 | 9.9 | 0.07000 | 0.0298 | -3.51 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| 421B138MW | May-06 | 0.0 | 0.07000 | 0.01200 J | -4.42 | -- | -- | -- | -- | -- | -- |
| | Aug-06 | 0.3 | 0.07000 | 0.02000 | -3.91 | ` | -- | -- | -- | -- | -- |
| | Nov-06 | 0.5 | 0.07000 | 0.01600 | -4.14 | -- | -- | -- | -- | -- | -- |
| | Apr-07 | 0.9 | 0.07000 | 0.01600 | -4.14 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Sep-07 | 1.4 | 0.07000 | 0.01300 J | -4.34 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-08 | 1.7 | 0.07000 | 0.01300 | -4.34 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-08 | 2.2 | 0.07000 | 0.01180 | -4.44 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-09 | 2.7 | 0.07000 | 0.01020 | -4.59 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-09 | 3.2 | 0.07000 | 0.01140 | -4.47 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-10 | 3.7 | 0.07000 | 0.01410 | -4.26 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-10 | 4.2 | 0.07000 | 0.01360 | -4.30 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-11 | 4.7 | 0.07000 | 0.01530 | -4.18 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-11 | 5.2 | 0.07000 | 0.01470 | -4.22 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-12 | 5.7 | 0.07000 | 0.01370 | -4.29 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-12 | 6.2 | 0.07000 | 0.01260 | -4.37 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-13 | 6.7 | 0.07000 | 0.0143 | -4.25 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-13 | 7.2 | 0.07000 | 0.0144 | -4.24 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-14 | 7.8 | 0.07000 | 0.0156 | -4.16 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-14 | 8.2 | 0.07000 | 0.0144 | -4.24 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-15 | 8.7 | 0.07000 | 0.0153 | -4.18 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-15 | 9.2 | 0.07000 | 0.015 | -4.18 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-16 | 9.8 | 0.07000 | 0.0119 | -4.43 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-16 | 10.2 | 0.07000 | 0.0118 | -4.44 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |

**Table 4-4**

**Summary of Concentration vs. Time Attenuation Rate Constants**
**Long Term Monitoring Wells — SWMU 85 Plume**
**2016**
**Former NAS Dallas, Texas**
**Page 4 of 6**

| Monitoring Well ID | Sampling Date | Elapsed Time (Years) | Protective Concentration Level (mg/L) | Concentration Detected (mg/L) | Natural Log of Concentration (mg/L) | Degradation Rate from Natural Log ($K_{time}$) (mg/L per year) | Minimum Degradation Rate Required for Remedial Goals Natural Log ($K_{time}$) (mg/L per year) | Minimum Degradation Rate Met? (Yes/No) | Expected Remedial Goal Concentration (mg/L) | Expected Remedial Goal Concentration Met? (Yes/No) | Remedial Goals Being Met? (Yes/No) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 421B139MW | Jul-06 | 0.0 | 0.07000 | 0.05100 | -2.98 | -- | -- | -- | -- | -- | -- |
| | Aug-06 | 0.1 | 0.07000 | 0.04800 | -3.04 | -- | -- | -- | -- | -- | -- |
| | Nov-06 | 0.3 | 0.07000 | 0.03700 | -3.30 | -- | -- | -- | -- | -- | -- |
| | Apr-07 | 0.7 | 0.07000 | 0.01500 | -4.20 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Sep-07 | 1.2 | 0.07000 | 0.02500 J | -3.69 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-08 | 1.5 | 0.07000 | 0.03130 | -3.46 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-08 | 2.0 | 0.07000 | 0.01790 | -4.02 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-09 | 2.5 | 0.07000 | 0.03040 | -3.49 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-09 | 3.0 | 0.07000 | 0.03990 | -3.22 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-10 | 3.5 | 0.07000 | 0.00410 | -5.50 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-10 | 4.0 | 0.07000 | 0.02430 | -3.72 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-11 | 4.5 | 0.07000 | 0.00670 | -5.01 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-11 | 5.0 | 0.07000 | 0.01680 | -4.09 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-12 | 5.5 | 0.07000 | 0.01850 | -3.99 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-12 | 6.0 | 0.07000 | 0.02370 | -3.74 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-13 | 6.5 | 0.07000 | 0.0279 | -3.58 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-13 | 7.0 | 0.07000 | 0.0269 | -3.62 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-14 | 7.6 | 0.07000 | 0.0116 | -4.46 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-14 | 8.0 | 0.07000 | 0.0307 | -3.48 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-15 | 8.5 | 0.07000 | 0.0168 | -4.09 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-15 | 9.0 | 0.07000 | 0.0145 | -4.09 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-16 | 9.6 | 0.07000 | 0.00295 J | -5.83 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-16 | 10.0 | 0.07000 | 0.0145 | -4.23 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| 421B141MW | May-06 | 0.0 | 0.07000 | 0.00060 J | -7.42 | -- | -- | -- | -- | -- | -- |
| | Aug-06 | 0.3 | 0.07000 | 0.00050 U | -8.00 | -- | -- | -- | -- | -- | -- |
| | Nov-06 | 0.5 | 0.07000 | 0.00050 U | -8.00 | -- | -- | -- | -- | -- | -- |
| | Apr-07 | 0.9 | 0.07000 | 0.00091 J | -7.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Sep-07 | 1.3 | 0.07000 | 0.00072 J | -7.24 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-08 | 1.6 | 0.07000 | 0.00096 J | -6.95 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-08 | 2.1 | 0.07000 | 0.00130 | -6.65 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-09 | 2.7 | 0.07000 | 0.00095 J | -6.96 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-09 | 3.2 | 0.07000 | 0.00085 J | -7.07 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-10 | 3.7 | 0.07000 | 0.00085 J | -7.07 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-10 | 4.2 | 0.07000 | 0.00060 J | -7.42 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-11 | 4.7 | 0.07000 | 0.00080 J | -7.13 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-11 | 5.2 | 0.07000 | 0.00069 J | -7.28 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-12 | 5.7 | 0.07000 | 0.00100 | -6.91 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-12 | 6.2 | 0.07000 | 0.00062 J | -7.39 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-13 | 6.7 | 0.07000 | 0.00085 J | -7.07 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-13 | 7.2 | 0.07000 | 0.00093 J | -6.98 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-14 | 7.7 | 0.07000 | 0.00059 J | -7.44 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-14 | 8.2 | 0.07000 | 0.00072 J | -7.24 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-15 | 8.7 | 0.07000 | 0.000689 J | -7.28 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-15 | 9.2 | 0.07000 | 0.000636 J | -7.28 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-16 | 9.7 | 0.07000 | 0.0004 JL | -7.82 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-16 | 10.2 | 0.07000 | 0.00051 J | -7.58 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |

**Table 4-4**

**Summary of Concentration vs. Time Attenuation Rate Constants**
**Long Term Monitoring Wells — SWMU 85 Plume**
**2016**
**Former NAS Dallas, Texas**
**Page 5 of 6**

| Monitoring Well ID | Sampling Date | Elapsed Time (Years) | Protective Concentration Level (mg/L) | Concentration Detected (mg/L) | Natural Log of Concentration (mg/L) | Degradation Rate from Natural Log ($K_{time}$) (mg/L per year) | Minimum Degradation Rate Required for Remedial Goals Natural Log ($K_{time}$) (mg/L per year) | Minimum Degradation Rate Met? (Yes/No) | Expected Remedial Goal Concentration (mg/L) | Expected Remedial Goal Concentration Met? (Yes/No) | Remedial Goals Being Met? (Yes/No) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Vinyl Chloride** | | | | | | | | | | | |
| **421B136MW** | Aug-06 | 0.0 | 0.00200 | 0.00060 U | -8.00 | -- | -- | -- | -- | -- | -- |
| | Nov-06 | 0.2 | 0.00200 | 0.00060 U | -8.00 | -- | -- | -- | -- | -- | -- |
| | Apr-07 | 0.6 | 0.00200 | 0.00012 U | -8.00 | -- | -- | -- | -- | -- | -- |
| | Sep-07 | 1.0 | 0.00200 | 0.00019 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-08 | 1.4 | 0.00200 | 0.00043 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-08 | 1.9 | 0.00200 | 0.00030 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-09 | 2.4 | 0.00200 | 0.00030 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-09 | 2.9 | 0.00200 | 0.00030 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-10 | 3.4 | 0.00200 | 0.00028 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-10 | 3.9 | 0.00200 | 0.00028 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-11 | 4.4 | 0.00200 | 0.00022 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-11 | 4.9 | 0.00200 | 0.00022 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-12 | 5.4 | 0.00200 | 0.00022 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-13 | 6.4 | 0.00200 | 0.00044 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-13 | 6.9 | 0.00200 | 0.00044 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-14 | 7.9 | 0.00200 | 0.00025 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-15 | 8.4 | 0.00200 | 0.00025 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-15 | 8.9 | 0.00200 | 0.00025 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-16 | 9.4 | 0.00200 | 0.00025 UJ | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-16 | 9.9 | 0.00200 | 0.0005 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| **421B137MW** | Aug-06 | 0.0 | 0.00200 | 0.00060 U | -8.00 | -- | -- | -- | -- | -- | -- |
| | Nov-06 | 0.2 | 0.00200 | 0.00060 U | -8.00 | -- | -- | -- | -- | -- | -- |
| | Apr-07 | 0.6 | 0.00200 | 0.00034 J | -8.00 | -- | -- | -- | -- | -- | -- |
| | Sep-07 | 1.0 | 0.00200 | 0.00019 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-08 | 1.4 | 0.00200 | 0.00043 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-08 | 1.9 | 0.00200 | 0.00030 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-09 | 2.4 | 0.00200 | 0.00030 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-09 | 2.9 | 0.00200 | 0.00030 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-10 | 3.4 | 0.00200 | 0.00028 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-10 | 3.9 | 0.00200 | 0.00030 J | -8.11 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-11 | 4.4 | 0.00200 | 0.00022 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-11 | 4.9 | 0.00200 | 0.00022 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-12 | 5.4 | 0.00200 | 0.00062 | -7.39 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-13 | 6.4 | 0.00200 | 0.00044 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-13 | 6.9 | 0.00200 | 0.00044 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-14 | 7.9 | 0.00200 | 0.00098 J | -6.93 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-15 | 8.4 | 0.00200 | 0.00025 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-15 | 8.9 | 0.00200 | 0.00025 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-16 | 9.4 | 0.00200 | 0.00025 UJ | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-16 | 9.9 | 0.00200 | 0.00025 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| **421B138MW** | May-06 | 0.0 | 0.00200 | 0.00060 U | -8.00 | -- | -- | -- | -- | -- | -- |
| | Aug-06 | 0.3 | 0.00200 | 0.00060 U | -8.00 | -- | -- | -- | -- | -- | -- |
| | Nov-06 | 0.5 | 0.00200 | 0.00060 U | -8.00 | -- | -- | -- | -- | -- | -- |
| | Apr-07 | 0.9 | 0.00200 | 0.00012 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Sep-07 | 1.4 | 0.00200 | 0.00019 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-08 | 1.7 | 0.00200 | 0.00043 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-08 | 2.2 | 0.00200 | 0.00030 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-09 | 2.7 | 0.00200 | 0.00030 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-09 | 3.2 | 0.00200 | 0.00030 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-10 | 3.7 | 0.00200 | 0.00028 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-10 | 4.2 | 0.00200 | 0.00028 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-11 | 4.7 | 0.00200 | 0.00022 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-11 | 5.2 | 0.00200 | 0.00022 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-12 | 5.7 | 0.00200 | 0.00022 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-13 | 6.7 | 0.00200 | 0.00044 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-13 | 7.2 | 0.00200 | 0.00044 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-14 | 8.2 | 0.00200 | 0.00025 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-15 | 8.7 | 0.00200 | 0.00025 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-15 | 9.2 | 0.00200 | 0.00025 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-16 | 9.8 | 0.00200 | 0.00025 UJ | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-16 | 10.2 | 0.00200 | 0.00025 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |

**Table 4-4**

**Summary of Concentration vs. Time Attenuation Rate Constants**
**Long Term Monitoring Wells — SWMU 85 Plume**
**2016**
**Former NAS Dallas, Texas**
**Page 6 of 6**

| Monitoring Well ID | Sampling Date | Elapsed Time (Years) | Protective Concentration Level (mg/L) | Concentration Detected (mg/L) | Natural Log of Concentration (mg/L) | Degradation Rate from Natural Log ($K_{time}$) (mg/L per year) | Minimum Degradation Rate Required for Remedial Goals Natural Log ($K_{time}$) (mg/L per year) | Minimum Degradation Rate Met? (Yes/No) | Expected Remedial Goal Concentration (mg/L) | Expected Remedial Goal Concentration Met? (Yes/No) | Remedial Goals Being Met? (Yes/No) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 421B139MW | Jul-06 | 0.0 | 0.00200 | 0.00060 U | -8.00 | -- | -- | -- | -- | -- | -- |
| | Aug-06 | 0.1 | 0.00200 | 0.00060 U | -8.00 | -- | -- | -- | -- | -- | -- |
| | Nov-06 | 0.3 | 0.00200 | 0.00060 U | -8.00 | -- | -- | -- | -- | -- | -- |
| | Apr-07 | 0.7 | 0.00200 | 0.00033 J | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Sep-07 | 1.2 | 0.00200 | 0.00019 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-08 | 1.5 | 0.00200 | 0.00030 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-08 | 2.0 | 0.00200 | 0.00030 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-09 | 2.5 | 0.00200 | 0.00030 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-09 | 3.0 | 0.00200 | 0.00030 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-10 | 3.5 | 0.00200 | 0.00028 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-10 | 4.0 | 0.00200 | 0.00028 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-11 | 4.5 | 0.00200 | 0.00022 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-11 | 5.0 | 0.00200 | 0.00022 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-12 | 5.5 | 0.00200 | 0.00022 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-13 | 6.5 | 0.00200 | 0.00044 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-13 | 7.0 | 0.00200 | 0.00044 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-14 | 8.0 | 0.00200 | 0.00025 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-15 | 8.5 | 0.00200 | 0.00025 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-15 | 8.5 | 0.00200 | 0.00025 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-15 | 8.5 | 0.00200 | 0.00025 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-15 | 9.0 | 0.00200 | 0.00025 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-16 | 9.6 | 0.00200 | 0.00025 UJ | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-16 | 10.0 | 0.00200 | 0.00025 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| 421B141MW | May-06 | 0.0 | 0.00200 | 0.00060 U | -8.00 | -- | -- | -- | -- | -- | -- |
| | Aug-06 | 0.3 | 0.00200 | 0.00060 U | -8.00 | -- | -- | -- | -- | -- | -- |
| | Nov-06 | 0.5 | 0.00200 | 0.00060 U | -8.00 | -- | -- | -- | -- | -- | -- |
| | Apr-07 | 0.9 | 0.00200 | 0.00012 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Sep-07 | 1.3 | 0.00200 | 0.00019 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-08 | 1.6 | 0.00200 | 0.00043 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-08 | 2.1 | 0.00200 | 0.00030 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-09 | 2.7 | 0.00200 | 0.00030 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-09 | 3.2 | 0.00200 | 0.00030 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-10 | 3.7 | 0.00200 | 0.00028 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-10 | 4.2 | 0.00200 | 0.00028 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-11 | 4.7 | 0.00200 | 0.00022 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-11 | 5.2 | 0.00200 | 0.00022 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-12 | 5.7 | 0.00200 | 0.00022 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-13 | 6.7 | 0.00200 | 0.00044 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-13 | 7.2 | 0.00200 | 0.00044 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-14 | 8.2 | 0.00200 | 0.00025 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-15 | 8.7 | 0.00200 | 0.00025 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-15 | 9.2 | 0.00200 | 0.00025 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-16 | 9.7 | 0.00200 | 0.00025 UJL | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-16 | 10.2 | 0.00200 | 0.00025 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |

mg/L - milligrams per liter
NA - Not Applicable
NS - Not Sampled
NS-D - Not Sampled due to Dry Well

Notes:
Shaded areas indicate an exceedance.
For graphing purposes non-detect concentrations have been assigned a natural log value of -8.

Analytical Result Qualifiers:
J - Indicates that the chemical was detected. However, the associated numerical result may not be a precise representation of the amount that is actually present in the sample. The laboratory reported concentration is considered to be an estimate of the true concentration.
U - Indicates that the chemical was not detected at the numerical detection limit (sample-specific quantitation limit) noted. Nondetected results from the laboratory are reported in this manner. This qualifier is added to a positive result (reported by the laboratory) if the detected concentration is determined to be attributable to contamination introduced during field sampling or laboratory analysis.

# TABLE 4-5
# SUMMARY OF CONCENTRATION VS. DISTANCE ATTENUATION RATE CONSTANTS

**Table 4-5**

**Summary of Concentration vs. Distance Attenuation Rate Constants**
**SWMU 85 Plume**
**2016**
**Former NAS Dallas, Texas**
**Page 1 of 2**

| Sampling Date | Protective Concentration Level (mg/L) | Detected Concentration (mg/L) | | | Natural Log of COC Concentration (mg/L) | | | $K_{dist}$ [(mg/L) per foot] |
|---|---|---|---|---|---|---|---|---|
| **Centerline Monitoring Wells** | | **421B137MW** | **421B138MW** | **421B139MW** | **421B137MW** | **421B138MW** | **421B139MW** | |
| **Distance from source (ft)** | | **0** | **59** | **82** | **0** | **59** | **82** | |
| **Trichloroethene** | | | | | | | | |
| May-06 | 0.00500 | NS | 0.01300 J | 0.01800 | -- | -4.34 | -4.02 | 0.01425 |
| Aug-06 | 0.00500 | 0.00600 | 0.01900 | 0.01900 | -5.12 | -3.96 | -3.96 | 0.00000 |
| Nov-06 | 0.00500 | 0.00400 | 0.01800 | 0.01700 | -5.52 | -4.02 | -4.07 | -0.00250 |
| Apr-07 | 0.00500 | 0.02400 | 0.02100 | 0.00720 | -3.73 | -3.86 | -4.93 | -0.04688 |
| Sep-07 | 0.00500 | 0.00520 J | 0.02200 J | 0.01000 | -5.26 | -3.82 | -4.61 | -0.03453 |
| Jan-08 | 0.00500 | 0.00820 | 0.01600 | 0.00460 | -4.80 | -4.14 | -5.38 | -0.05459 |
| Jul-08 | 0.00500 | 0.00970 | 0.01040 | 0.01470 | -4.64 | -4.57 | -4.22 | 0.01515 |
| Jan-09 | 0.00500 | 0.01130 | 0.00430 | 0.00850 | -4.48 | -5.45 | -4.77 | 0.02984 |
| Jul-09 | 0.00500 | 0.00990 | 0.01260 | 0.01600 | -4.62 | -4.37 | -4.14 | 0.01046 |
| Jan-10 | 0.00500 | 0.00630 | 0.01220 | 0.00210 | -5.07 | -4.41 | -6.17 | -0.07705 |
| Jul-10 | 0.00500 | 0.00570 | 0.00720 | 0.01000 | -5.17 | -4.93 | -4.61 | 0.01439 |
| Jan-11 | 0.00500 | 0.00710 | 0.00930 | 0.00230 | -4.95 | -4.68 | -6.07 | -0.06118 |
| Jul-11 | 0.00500 | 0.01200 U | 0.00770 | 0.00840 | -8.00 | -4.87 | -4.78 | 0.00381 |
| Jan-12 | 0.00500 | 0.00560 | 0.00340 | 0.00690 | -5.18 | -5.68 | -4.98 | 0.03099 |
| Jul-12 | 0.00500 | 0.02480 | 0.01040 | 0.01170 | -3.70 | -4.57 | -4.45 | 0.00516 |
| Jan-13 | 0.00500 | 0.00060 J | 0.0025 | 0.0114 | -7.42 | -5.99 | -4.47 | 0.06645 |
| Jul-13 | 0.00500 | 0.00390 | 0.01070 | 0.0134 | -5.55 | -4.54 | -4.31 | 0.00985 |
| Jan-14 | 0.00500 | 0.00190 | 0.00910 | 0.0040 | -6.27 | -4.70 | -5.52 | -0.03600 |
| Jul-14 | 0.00500 | 0.0149 | 0.0097 | 0.0135 | -4.21 | -4.64 | -4.31 | 0.01448 |
| Jan-15 | 0.00500 | 0.0032 | 0.0081 | 0.0055 | -5.75 | -4.82 | -5.20 | -0.01642 |
| Jul-15 | 0.00500 | 0.0035 | 0.0100 | 0.0062 | -5.66 | -4.61 | -5.08 | -0.02086 |
| Jan-16 | 0.00500 | 0.00367 J | 0.00542 | 0.0013 J | -5.61 | -5.22 | -6.65 | -0.06253 |
| Jul-16 | 0.00500 | 0.00313 | 0.00735 | 0.00628 | -5.77 | -4.91 | -5.07 | -0.00689 |
| **cis-1,2-Dichloroethene** | | | | | | | | |
| May-06 | 0.07000 | NS | 0.01200 J | 0.04200 | -- | -4.42 | -3.17 | 0.05486 |
| Aug-06 | 0.07000 | 0.00400 | 0.02000 | 0.04800 | -8.00 | -3.91 | -3.04 | 0.03834 |
| Nov-06 | 0.07000 | 0.00200 | 0.01600 | 0.03700 | -8.00 | -4.14 | -3.30 | 0.03671 |
| Apr-07 | 0.07000 | 0.02300 | 0.01600 | 0.01500 | -3.77 | -4.14 | -4.20 | -0.00283 |
| Sep-07 | 0.07000 | 0.00340 J | 0.01300 J | 0.02500 J | -5.68 | -4.34 | -3.69 | 0.02864 |
| Jan-08 | 0.07000 | 0.01600 | 0.01300 | 0.03130 | -4.14 | -4.34 | -3.46 | 0.03848 |
| Jul-08 | 0.07000 | 0.01700 | 0.01180 | 0.01790 | -4.07 | -4.44 | -4.02 | 0.01825 |
| Jan-09 | 0.07000 | 0.01930 | 0.01020 | 0.02420 | -3.95 | -4.59 | -3.72 | 0.03784 |
| Jul-09 | 0.07000 | 0.00900 | 0.01140 | 0.03640 | -4.71 | -4.47 | -3.31 | 0.05084 |
| Jan-10 | 0.07000 | 0.03230 | 0.01410 | 0.00410 | -3.43 | -4.26 | -5.50 | -0.05409 |
| Jul-10 | 0.07000 | 0.02640 | 0.01360 | 0.02430 | -3.63 | -4.30 | -3.72 | 0.02542 |
| Jan-11 | 0.07000 | 0.03340 | 0.01530 | 0.00670 | -3.40 | -4.18 | -5.01 | -0.03616 |
| Jul-11 | 0.07000 | 0.01450 | 0.01470 | 0.01680 | -4.23 | -4.22 | -4.09 | 0.00585 |
| Jan-12 | 0.07000 | 0.02070 | 0.01370 | 0.01850 | -3.88 | -4.29 | -3.99 | 0.01315 |
| Jul-12 | 0.07000 | 0.03450 | 0.01260 | 0.02280 | -3.37 | -4.37 | -3.78 | 0.02597 |
| Jan-13 | 0.07000 | 0.0018 | 0.0143 | 0.0279 | -6.32 | -4.25 | -3.58 | 0.02927 |
| Jul-13 | 0.07000 | 0.00990 | 0.0144 | 0.0269 | -4.62 | -4.24 | -3.62 | 0.02737 |
| Jan-14 | 0.07000 | 0.00740 | 0.0156 | 0.0116 | -4.91 | -4.16 | -4.46 | -0.01297 |
| Jul-14 | 0.07000 | 0.0536 | 0.0144 | 0.0307 | -2.93 | -4.24 | -3.48 | 0.03315 |
| Jan-15 | 0.07000 | 0.0415 | 0.01533 | 0.0183 | -3.18 | -4.18 | -4.00 | 0.00776 |
| Jul-15 | 0.07000 | 0.0304 | 0.015 | 0.0145 | -3.49 | -4.20 | -4.23 | -0.00148 |
| Jan-16 | 0.07000 | 0.0464 J | 0.0119 | 0.00295 J | -3.07 | -4.43 | -5.83 | -0.06108 |
| Jul-16 | 0.07000 | 0.0298 | 0.0118 | 0.0145 | -3.51 | -4.44 | -4.23 | 0.00902 |

**Table 4-5**

**Summary of Concentration vs. Distance Attenuation Rate Constants**
**SWMU 85 Plume**
**2016**
**Former NAS Dallas, Texas**
**Page 2 of 2**

| Sampling Date | Protective Concentration Level (mg/L) | Detected Concentration (mg/L) | | | Natural Log of COC Concentration (mg/L) | | | $K_{dist}$ [(mg/L) per foot] |
|---|---|---|---|---|---|---|---|---|
| **Centerline Monitoring Wells** | | **421B137MW** | **421B138MW** | **421B139MW** | **421B137MW** | **421B138MW** | **421B139MW** | |
| **Distance from source (ft)** | | **0** | **59** | **82** | **0** | **59** | **82** | |
| **Vinyl Chloride** | | | | | | | | |
| May-06 | 0.00200 | NS | 0.00060 U | 0.00060 U | -- | -8.00 | -8.00 | 0.00000 |
| Aug-06 | 0.00200 | 0.00060 U | 0.00060 U | 0.00060 U | -8.00 | -8.00 | -8.00 | 0.00000 |
| Nov-06 | 0.00200 | 0.00060 U | 0.00060 U | 0.00060 U | -8.00 | -8.00 | -8.00 | 0.00000 |
| Apr-07 | 0.00200 | 0.00034 J | 0.00012 U | 0.00033 J | -7.99 | -8.00 | -8.02 | -0.00072 |
| Sep-07 | 0.00200 | 0.00019 U | 0.00019 U | 0.00019 U | -8.00 | -8.00 | -8.00 | 0.00000 |
| Jan-08 | 0.00200 | 0.000430 U | 0.000430 U | 0.00030 U | -8.00 | -8.00 | -8.00 | 0.00000 |
| Jul-08 | 0.00200 | 0.00030 U | 0.00030 U | 0.00030 U | -8.00 | -8.00 | -8.00 | 0.00000 |
| Jan-09 | 0.00200 | 0.00030 U | 0.00030 U | 0.00030 U | -8.00 | -8.00 | -8.00 | 0.00000 |
| Jul-09 | 0.00200 | 0.00030 U | 0.00030 U | 0.00030 U | -8.00 | -8.00 | -8.00 | 0.00000 |
| Jan-10 | 0.00200 | 0.00028 U | 0.00028 U | 0.00028 U | -8.00 | -8.00 | -8.00 | 0.00000 |
| Jul-10 | 0.00200 | 0.00030 U | 0.00028 U | 0.00028 U | -8.00 | -8.00 | -8.00 | 0.00000 |
| Jan-11 | 0.00200 | 0.00022 U | 0.00022 U | 0.00022 U | -8.00 | -8.00 | -8.00 | 0.00000 |
| Jul-11 | 0.00200 | 0.00022 U | 0.00022 U | 0.00022 U | -8.00 | -8.00 | -8.00 | 0.00000 |
| Jan-12 | 0.00200 | 0.00062 J | 0.00022 U | 0.00022 U | -7.39 | -8.00 | -8.00 | 0.00000 |
| Jan-13 | 0.00200 | 0.00044 U | 0.00044 U | 0.00044 U | -8.00 | -8.00 | -8.00 | 0.00000 |
| Jul-13 | 0.00200 | 0.00044 U | 0.00044 U | 0.00044 U | -8.00 | -8.00 | -8.00 | 0.00000 |
| Jan-14 | 0.00200 | NS | NS | NS | -- | -- | -- | 0.00000 |
| Jul-14 | 0.00200 | 0.00098 J | 0.00025 U | 0.00025 U | -6.93 | -8.00 | -8.00 | 0.00000 |
| Jan-15 | 0.00200 | 0.00025 U | 0.00025 U | 0.00025 U | -6.93 | -8.00 | -8.00 | 0.00000 |
| Jul-15 | 0.00200 | 0.00025 U | 0.00025 U | 0.00025 U | -8.00 | -8.00 | -8.00 | 0.00000 |
| Jan-16 | 0.00200 | 0.00025 UJ | 0.00025 UJ | 0.00025 UJ | -8.00 | -8.00 | -8.00 | 0.00000 |
| Jul-16 | 0.00200 | 0.00025 U | 0.00025 U | 0.00025 U | -8.00 | -8.00 | -8.00 | 0.00000 |

ft - feet
mg/L - milligrams per liter
NA - Not Applicable
NS - Not Sampled

Notes:
Shaded areas indicate an exceedance.
For graphing purposes non-detect concentrations have been assigned a natural log value of -8.

Analytical Result Qualifiers:
J - Indicates that the chemical was detected. However, the associated numerical result may not be a precise representation of the amount that is actually present in the sample. The laboratory reported concentration is considered to be an estimate of the true concentration.
U - Indicates that the chemical was not detected at the numerical detection limit (sample-specific quantitation limit) noted. Nondetected results from the laboratory are reported in this manner. This qualifier is added to a positive result (reported by the laboratory) if the detected concentration is determined to be attributable to contamination introduced during field sampling or laboratory analysis.

# Plug and Abandonment Documentation

# STATE OF TEXAS PLUGGING REPORT for Tracking #158499

| | | | |
|---|---|---|---|
| Owner: | NAS Dallas | Owner Well #: | 421B140MW |
| Address: | 8100 West Jefferson<br>Grand Prairie, TX 75051 | Grid #: | 33-17-1 |
| Well Location: | 8100 West Jefferson<br>Grand Prairie, TX 75051 | Latitude: | 32° 44' 25.8" N |
| | | Longitude: | 096° 57' 46.3" W |
| Well County: | Dallas | Elevation: | No Data |
| Well Type: | Monitor | | |

*Drilling Information*

| | | | |
|---|---|---|---|
| Company: | No Data | Date Drilled: | No Data |
| Driller: | No Data | License Number: | No Data |

| | Diameter (in.) | Top Depth (ft.) | Bottom Depth (ft.) |
|---|---|---|---|
| Borehole: | | 0 | 18.8 |

*Plugging Information*

Date Plugged: **4/6/2016** Plugger:

Plug Method: **Pour in 3/8 bentonite chips when standing water in well is less than 100 feet depth, cement top 2 feet**

Casing Left in Well: **No Data**

Plug(s) Placed in Well:

| Top (ft.) | Bottom (ft.) | Description (number of sacks & material) |
|---|---|---|
| 0 | 2 | Cement 2 Bags/Sacks |
| 2 | 18.8 | Bentonite 2 Bags/Sacks |

Certification Data: The driller certified that the driller plugged this well (or the well was plugged under the driller's direct supervision) and that each and all of the statements herein are true and correct. The driller understood that failure to complete the required items will result in the reports(s) being returned for completion and resubmittal.

Company Information: **Strata Core Services, LLC**
**112 S. Norwood Drive**
**Hurst, TX 76053**

Driller Name: **Brad Eskue** License Number: **58164**

Comments: **No Data**

# APPENDIX 5
# SAMPLING PROCEDURES

Sampling collection and handling procedures were updated to follow Uniform Federal Policy (UFP) for Sample and Analysis Plans in the document titled, Tier II Sampling and Analysis Plan, Long Term Groundwater Monitoring Plan, Former Naval Air Station Dallas, Dallas, Texas, dated December 2014

# APPENDIX 6
# LABORATORY DATA PACKAGES AND DATA USABILITY SUMMARIES

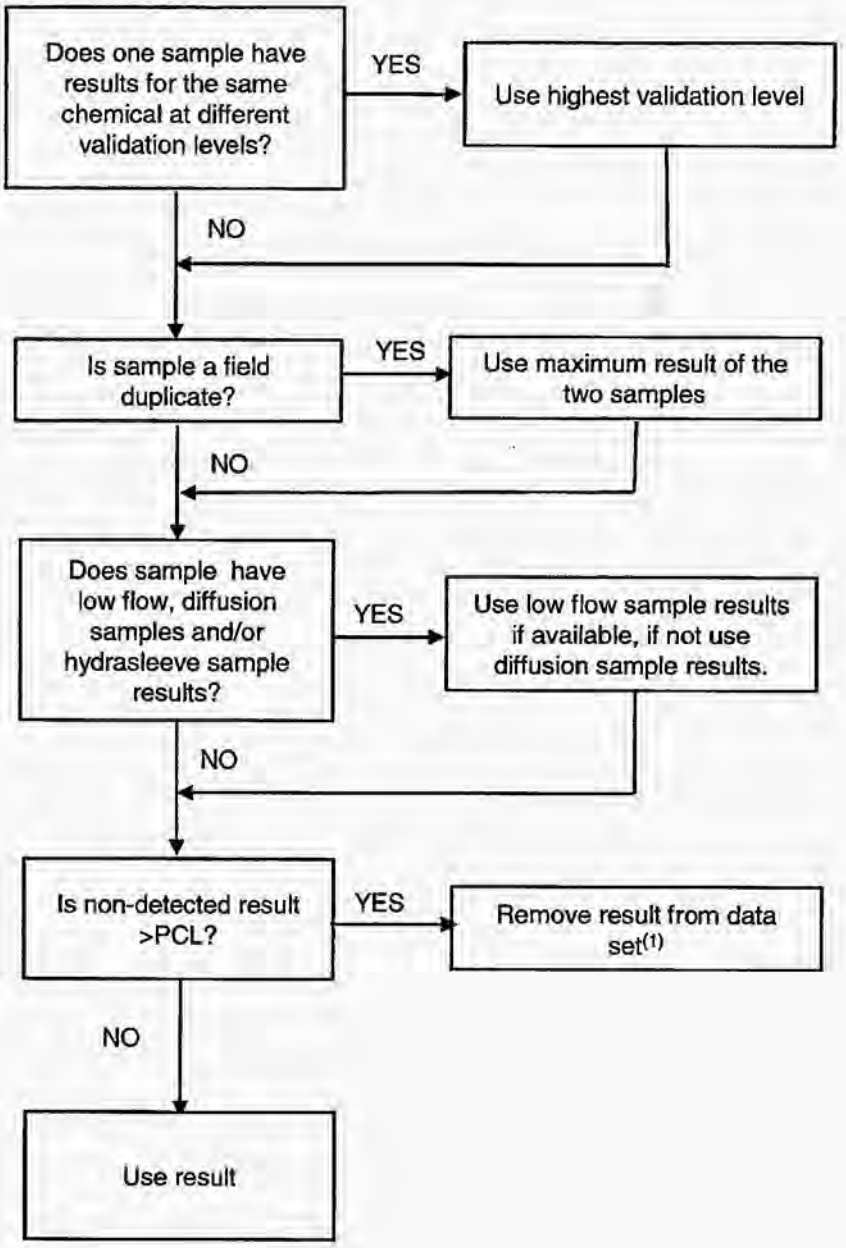
See the attached CD for the Laboratory Analytical Reports —
submitted with the 2016 RAER for SWMU 17/Building 1423
(sorted by Sample Delivery Group Number)

# APPENDIX 7
# STATISTICAL METHODOLOGY

Statistical Methodology has been submitted with the 2016 RAER for SWMU 17/Building 1423

GROUNDWATER DATABASE DEVELOPMENT FOR GRAPHING AND MANN KENDALL STATISTICAL EVALUATION

NAS DALLAS, TEXAS




NOTES:

(1) For 1,1,2,2-PCA and vinyl chloride the TRRP RES A limit < MDL of 5 U therefore only the non-detects > 5 U were removed from the data set.

# STDEV

See Also

Estimates standard deviation based on a sample. The standard deviation is a measure of how widely values are dispersed from the average value (the mean).

**Syntax**

**STDEV(number1**,number2,...)

Number1, number2, ... are 1 to 30 number arguments corresponding to a sample of a population. You can also use a single array or a reference to an array instead of arguments separated by commas.

**Remarks**

- STDEV assumes that its arguments are a sample of the population. If your data represents the entire population, then compute the standard deviation using STDEVP.
- The standard deviation is calculated using the "nonbiased" or "n-1" method.
- STDEV uses the following formula:
- $$\sqrt{\frac{n\sum x^2 - \left(\sum x\right)^2}{n(n-1)}}$$
  $$\sqrt{\frac{n\sum x^2 - \left(\sum x\right)^2}{n(n-1)}}$$
- Logical values such as TRUE and FALSE and text are ignored. If logical values and text must not be ignored, use the STDEVA worksheet function.

**Example**

Suppose 10 tools stamped from the same machine during a production run are collected as a random sample and measured for breaking strength.

The example may be easier to understand if you copy it to a blank worksheet.

How?

| | A |
|---|---|
| 1 | **Strength** |
| 2 | 1345 |
| 3 | 1301 |
| 4 | 1368 |
| 5 | 1322 |
| 6 | 1310 |
| 7 | 1370 |
| 8 | 1318 |
| 9 | 1350 |
| 10 | 1303 |
| 11 | 1299 |

| Formula | Description (Result) |
|---|---|
| =STDEV(A2:A11) | Standard deviation of breaking strength (27.46391572) |

# BEST-FIT LINE USING LINEAR REGRESSION

# LINEST

See Also

Calculates the statistics for a line by using the "least squares" method to calculate a straight line that best fits your data, and returns an array that describes the line. Because this function returns an array of values, it must be entered as an array formula.

The equation for the line is:

y = mx + b or

y = m1x1 + m2x2 + ... + b (if there are multiple ranges of x-values)

where the dependent y-value is a function of the independent x-values. The m-values are coefficients corresponding to each x-value, and b is a constant value. Note that y, x, and m can be vectors. The array that LINEST returns is {mn,mn-1,...,m1,b}. LINEST can also return additional regression statistics.

**Syntax**

**LINEST(known_y's**,known_x's,const,stats)

Known_y's is the set of y-values you already know in the relationship y = mx + b.

- If the array known_y's is in a single column, then each column of known_x's is interpreted as a separate variable.
- If the array known_y's is in a single row, then each row of known_x's is interpreted as a separate variable.

Known_x's is an optional set of x-values that you may already know in the relationship y = mx + b.

- The array known_x's can include one or more sets of variables. If only one variable is used, known_y's and known_x's can be ranges of any shape, as long as they have equal dimensions. If more than one variable is used, known_y's must be a vector (that is, a range with a height of one row or a width of one column).
- If known_x's is omitted, it is assumed to be the array {1,2,3,...} that is the same size as known_y's.

Const is a logical value specifying whether to force the constant b to equal 0.

- If const is TRUE or omitted, b is calculated normally.
- If const is FALSE, b is set equal to 0 and the m-values are adjusted to fit y = mx.

Stats is a logical value specifying whether to return additional regression statistics.

- If stats is TRUE, LINEST returns the additional regression statistics, so the returned array is {mn,mn-1,...,m1,b;sen,sen-1,...,se1,seb;r2,sey;F,df;ssreg,ssresid}.
- If stats is FALSE or omitted, LINEST returns only the m-coefficients and the constant b.

The additional regression statistics are as follows.

| Statistic | Description |
|---|---|
| se1,se2,...,sen | The standard error values for the coefficients m1,m2,...,mn. |
| Seb | The standard error value for the constant b (seb = #N/A when const is FALSE). |
| r2 | The coefficient of determination. Compares estimated and actual y-values, and ranges in value from 0 to 1. If it is 1, there is a perfect correlation in the sample — there is no difference between the estimated y-value and the actual y-value. At the other extreme, if the coefficient of determination is 0, the regression equation is not helpful in predicting a y-value. For information about how r2 is calculated, see "Remarks" later in this topic. |
| sey | The standard error for the y estimate. |
| F | The F statistic, or the F-observed value. Use the F statistic to determine whether the observed relationship between the dependent and independent variables occurs by chance. |
| df | The degrees of freedom. Use the degrees of freedom to help you find F-critical values in a statistical table. Compare the values you find in the table to the F statistic returned by LINEST to determine a confidence level for the model. |
| ssreg | The regression sum of squares. |
| ssresid | The residual sum of squares. |

The following illustration shows the order in which the additional regression statistics are returned.

| | A | B | C | D | E | F |
|---|---|---|---|---|---|---|
| 1 | $m_n$ | $m_{n-1}$ | ... | $m_2$ | $m_1$ | b |
| 2 | $se_n$ | $se_{n-1}$ | ... | $se_2$ | $se_1$ | $se_b$ |
| 3 | $r_2$ | $se_y$ | | | | |
| 4 | F | $d_f$ | | | | |
| 5 | $ss_{reg}$ | $ss_{resid}$ | | | | |

**Remarks**

- You can describe any straight line with the slope and the y-intercept:

  Slope (m):
  To find the slope of a line, often written as m, take two points on the line, (x1,y1) and (x2,y2); the slope is equal to (y2 - y1)/(x2 - x1).

  Y-intercept (b):
  The y-intercept of a line, often written as b, is the value of y at the point where the line crosses the y-axis.

  The equation of a straight line is y = mx + b. Once you know the values of m and b, you can calculate any point on the line by plugging the y- or x-value into that equation. You can also use the TREND function.

- When you have only one independent x-variable, you can obtain the slope and y-intercept values directly by using the following formulas:

  Slope:
  =INDEX(LINEST(known_y's,known_x's),1)

  Y-intercept:
  =INDEX(LINEST(known_y's,known_x's),2)

- The accuracy of the line calculated by LINEST depends on the degree of scatter in your data. The more linear the data, the more accurate the LINEST model. LINEST uses the method of least squares for determining the best fit for the data. When you have only one independent x-variable, the calculations for m and b are based on the following formulas:

$$m = \frac{n\left(\sum xy\right) - \left(\sum x\right)\left(\sum y\right)}{n\left(\sum\left(x^2\right)\right) - \left(\sum x\right)^2}$$

$$b = \frac{\left(\sum y\right)\left(\sum\left(x^2\right)\right) - \left(\sum x\right)\left(\sum xy\right)}{n\left(\sum\left(x^2\right)\right) - \left(\sum x\right)^2}$$

- The line- and curve-fitting functions LINEST and LOGEST can calculate the best straight line or exponential curve that fits your data. However, you have to decide which of the two results best fits your data. You can calculate TREND(known_y's,known_x's) for a straight line, or GROWTH(known_y's, known_x's) for an exponential curve. These functions, without the new_x's argument, return an array of y-values predicted along that line or curve at your actual data points. You can then compare the predicted values with the actual values. You may want to chart them both for a visual comparison.

- In regression analysis, Microsoft Excel calculates for each point the squared difference between the y-value estimated for that point and its actual y-value. The sum of these squared differences is called the residual sum of squares. Microsoft Excel then calculates the sum of the squared differences between the actual y-values and the average of the y-values, which is called the total sum of squares (regression sum of squares + residual sum of squares). The smaller the residual sum of squares is, compared with the total sum of squares, the larger the value of the coefficient of determination, r2, which is an indicator of how well the equation resulting from the regression analysis explains the relationship among the variables.

- Formulas that return arrays must be entered as array formulas.

- When entering an array constant such as known_x's as an argument, use commas to separate values in the same row and semicolons to separate rows. Separator characters may be different depending on your locale setting in **Regional Settings** or **Regional Options** in **Control Panel**.

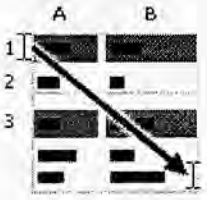
- Note that the y-values predicted by the regression equation may not be valid if they are outside the range of the y-values you used to determine the equation.

**Example 1 Slope and Y-Intercept**

The example may be easier to understand if you copy it to a blank worksheet.

How?

1. Create a blank workbook or worksheet.
2. Select the example in the Help topic. Do not select the row or column headers.




Selecting an example from Help

3. Press CTRL+C.
4. In the worksheet, select cell A1, and press CTRL+V.
5. To switch between viewing the results and viewing the formulas that return the results, press CTRL+` (grave accent), or on the **Tools** menu, point to **Formula Auditing**, and then click **Formula Auditing Mode**.

| | A | B |
|---|---|---|
| 1 | **Known y** | **Known x** |
| 2 | 1 | 0 |
| 3 | 9 | 4 |
| 4 | 5 | 2 |
| 5 | 7 | 3 |
| | **Formula** | **Formula** |
| | =LINEST(A2:A5,B2:B5,,FALSE) | |

**Note** The formula in the example must be entered as an array formula. After copying the example to a blank worksheet, select the range A7:B7 starting with the formula cell. Press F2, and then press CTRL+SHIFT+ENTER. If the formula is not entered as an array formula, the single result is 2.

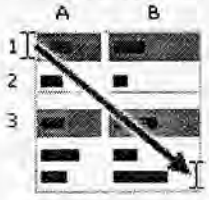
When entered as an array, the slope (2) and the y-intercept (1) are returned.

**Example 2 Simple Linear Regression**

The example may be easier to understand if you copy it to a blank worksheet.

How?

1. Create a blank workbook or worksheet.
2. Select the example in the Help topic. Do not select the row or column headers.




Selecting an example from Help

3. Press CTRL+C.
4. In the worksheet, select cell A1, and press CTRL+V.
5. To switch between viewing the results and viewing the formulas that return the results, press CTRL+` (grave accent), or on the **Tools** menu, point to **Formula Auditing**, and then click **Formula Auditing Mode**.

| | A | B |
|---|---|---|
| 1 | **Month** | **Sales** |
| 2 | 1 | 3100 |
| 3 | 2 | 4500 |
| 4 | 3 | 4400 |

| | | |
|---|---|---|
| **5** | 4 | 5400 |
| **6** | 5 | 7500 |
| **7** | 6 | 8100 |
| | **Formula** | **Description (Result)** |
| | =SUM(LINEST(B2:B7, A2:A7)*{9,1}) | Estimate sales for the ninth month (11000) |

In general, SUM({m,b}*{x,1}) equals mx + b, the estimated y-value for a given x-value. You can also use the TREND function.

**Example 3 Multiple Linear Regression**

Suppose a commercial developer is considering purchasing a group of small office buildings in an established business district.

The developer can use multiple linear regression analysis to estimate the value of an office building in a given area based on the following variables.

| Variable | Refers to the |
|---|---|
| y | Assessed value of the office building |
| x1 | Floor space in square feet |
| x2 | Number of offices |
| x3 | Number of entrances |
| x4 | Age of the office building in years |

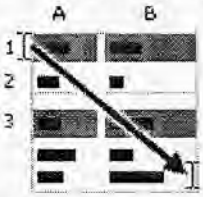
This example assumes that a straight-line relationship exists between each independent variable (x1, x2, x3, and x4) and the dependent variable (y), the value of office buildings in the area.

The developer randomly chooses a sample of 11 office buildings from a possible 1,500 office buildings and obtains the following data. "Half an entrance" means an entrance for deliveries only.

The example may be easier to understand if you copy it to a blank worksheet.

How?

1. Create a blank workbook or worksheet.
2. Select the example in the Help topic. Do not select the row or column headers.




Selecting an example from Help

3. Press CTRL+C.
4. In the worksheet, select cell A1, and press CTRL+V.
5. To switch between viewing the results and viewing the formulas that return the results, press CTRL+` (grave accent), or on the **Tools** menu, point to **Formula Auditing**, and then click **Formula Auditing Mode**.

| | A | B | C | D | E |
|---|---|---|---|---|---|
| **1** | **Floor space (x1)** | **Offices (x2)** | **Entrances (x3)** | **Age (x4)** | **Assessed value (y)** |
| **2** | 2310 | 2 | 2 | 20 | 142,000 |
| **3** | 2333 | 2 | 2 | 12 | 144,000 |
| **4** | 2356 | 3 | 1.5 | 33 | 151,000 |
| **5** | 2379 | 3 | 2 | 43 | 150,000 |

| | | | | | |
|---|---|---|---|---|---|
| **6** | 2402 | 2 | 3 | 53 | 139,000 |
| **7** | 2425 | 4 | 2 | 23 | 169,000 |
| **8** | 2448 | 2 | 1.5 | 99 | 126,000 |
| **9** | 2471 | 2 | 2 | 34 | 142,900 |
| **10** | 2494 | 3 | 3 | 23 | 163,000 |
| **11** | 2517 | 4 | 4 | 55 | 169,000 |
| **12** | 2540 | 2 | 3 | 22 | 149,000 |

**Formula**

=LINEST(E2:E12,A2:D12,TRUE,TRUE)

**Note** The formula in the example must be entered as an array formula. After copying the example to a blank worksheet, select the range A14:E18 starting with the formula cell. Press F2, and then press CTRL+SHIFT+ENTER. If the formula is not entered as an array formula, the single result is -234.2371645.

When entered as an array, the following regression statistics are returned. Use this key to identify the statistic you want.

| | A | B | C | D | E | F |
|---|---|---|---|---|---|---|
| 1 | $m_n$ | $m_{n-1}$ | ... | $m_2$ | $m_1$ | b |
| 2 | $se_n$ | $se_{n-1}$ | ... | $se_2$ | $se_1$ | $se_b$ |
| 3 | $r_2$ | $se_y$ | | | | |
| 4 | F | $d_f$ | | | | |
| 5 | $ss_{reg}$ | $ss_{resid}$ | | | | |

The multiple regression equation, y = m1*x1 + m2*x2 + m3*x3 + m4*x4 + b, can now be obtained using the values from row 14:

y = 27.64*x1 + 12,530*x2 + 2,553*x3+ 234.24*x4 + 52,318

The developer can now estimate the assessed value of an office building in the same area that has 2,500 square feet, three offices, and two entrances and is 25 years old, by using the following equation:

y = 27.64*2500 + 12530*3 + 2553*2 - 234.24*25 + 52318 = $158,261

Or you can copy the following table to cell A21 of the example workbook.

| Floor space (x1) | Offices (x2) | Entrances (x3) | Age (x4) | Assessed value (y) |
|---|---|---|---|---|
| 2500 | 3 | 2 | 25 | =D14*A22 + C14*B22 + B14*C22 + A14*D22 + E14 |

You can also use the TREND function to calculate this value.

**Example 4 Using The F And R2 Statistics**

In the previous example, the coefficient of determination, or r2, is 0.99675 (see cell A17 in the output for LINEST), which would indicate a strong relationship between the independent variables and the sale price. You can use the F statistic to determine whether these results, with such a high r2 value, occurred by chance.

Assume for the moment that in fact there is no relationship among the variables, but that you have drawn a rare sample of 11 office buildings that causes the statistical analysis to demonstrate a strong relationship. The term "Alpha" is used for the probability of erroneously concluding that there is a relationship.

There is a relationship among the variables if the F-observed statistic is greater than the F-critical value. The F-critical value can be obtained by referring to a table of F-critical values in many statistics textbooks. To read the table, assume a single-tailed test, use an Alpha value of 0.05, and for the degrees of freedom (abbreviated in most tables as v1 and v2), use v1 = k = 4 and v2 = n - (k + 1) = 11 - (4 + 1) = 6, where k is the number of variables in the regression analysis and n is the number of data points. The F-critical value is 4.53.

The F-observed value is 459.753674 (cell A18), which is substantially greater than the F-critical value of 4.53. Therefore, the regression equation is useful in predicting the assessed value of office buildings in this area.

**Example 5 Calculating The T-Statistics**

Another hypothesis test will determine whether each slope coefficient is useful in estimating the assessed value of an office building in example 3. For example, to test the age coefficient for statistical significance, divide -234.24 (age slope coefficient) by 13.268 (the estimated standard error of age coefficients in cell A15). The following is the t-observed value:

t = m4 ÷ se4 = -234.24 ÷ 13.268 = -17.7

If you consult a table in a statistics manual, you will find that t-critical, single tail, with 6 degrees of freedom and Alpha = 0.05 is 1.94. Because the absolute value of t, 17.7, is greater than 1.94, age is an important variable when estimating the assessed value of an office building. Each of

the other independent variables can be tested for statistical significance in a similar manner. The following are the t-observed values for each of the independent variables.

| Variable | t-observed value |
|---|---|
| Floor space | 5.1 |
| Number of offices | 31.3 |
| Number of entrances | 4.8 |
| Age | 17.7 |

These values all have an absolute value greater than 1.94; therefore, all the variables used in the regression equation are useful in predicting the assessed value of office buildings in this area.

## SLOPE OF BEST-FIT LINE

# SLOPE

See Also

Returns the slope of the linear regression line through data points in known_y's and known_x's. The slope is the vertical distance divided by the horizontal distance between any two points on the line, which is the rate of change along the regression line.

**Syntax**

**SLOPE(known_y's,known_x's)**

Known_y's is an array or cell range of numeric dependent data points.

Known_x's is the set of independent data points.

**Remarks**

- The arguments must be either numbers or names, arrays, or references that contain numbers.
- If an array or reference argument contains text, logical values, or empty cells, those values are ignored; however, cells with the value zero are included.
- If known_y's and known_x's are empty or have a different number of data points, SLOPE returns the #N/A error value.
- The equation for the slope of the regression line is:

$$b = \frac{n\sum xy - \left(\sum x\right)\left(\sum y\right)}{n\sum x^2 - \left(\sum x\right)^2}$$

**Example**

The example may be easier to understand if you copy it to a blank worksheet.

How?

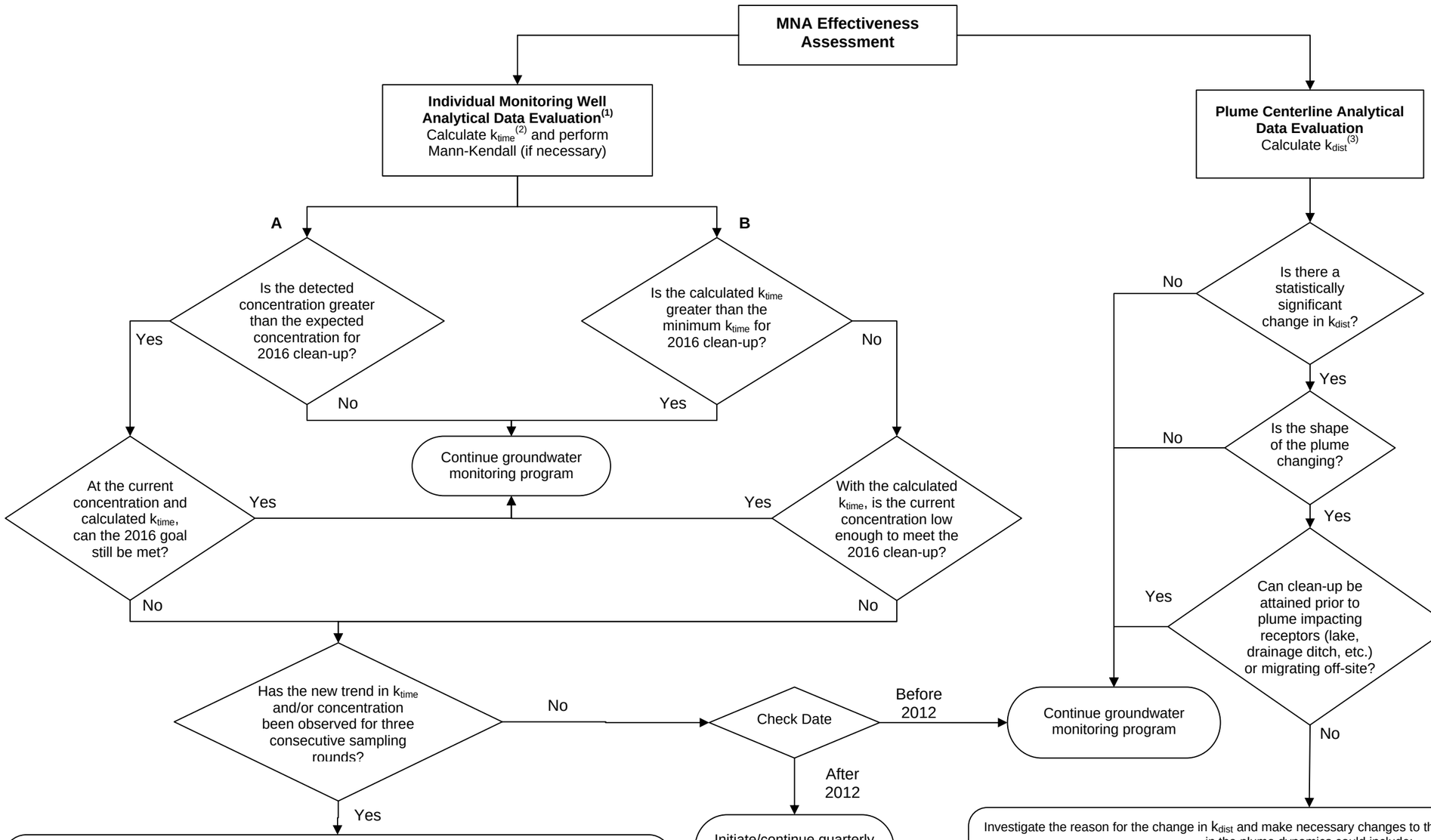
| | A | B |
|---|---|---|
| 1 | **Known y** | **Known x** |
| 2 | 2 | 6 |
| 3 | 3 | 5 |
| 4 | 9 | 11 |
| 5 | 1 | 7 |
| 6 | 8 | 5 |
| 7 | 7 | 4 |
| 8 | 5 | 4 |

| Formula | Description (Result) |
|---|---|
| =SLOPE(A2:A8,B2:B8) | Slope of the linear regression line through the data points above (0.305556) |

# MONITORED NATURAL ATTENUATION DATA EVALUATION

**DIAGRAM 3-1**
**MONITORED NATURAL ATTENUATION DATA EVALUATION**
**RESPONSE ACTION PLAN**

**NAS DALLAS, TEXAS**




Investigate the reason for the change in $k_{time}$ and make necessary changes to the remedial system. These changes in the plume dynamics could include:

| **Reason for $k_{time}$ Change** | **Recommended Changes in Remediation** |
|---|---|
| New source or new release | Identify new Responsible Party for continued remediation. |
| Geochemical change | Determine if chemical additives are necessary or technical impracticability of additional remediation. |
| Asymptotic degradation reached | Determine if active remediation or excavation are necessary or technical impracticability of additional remediation. |

Investigate the reason for the change in $k_{dist}$ and make necessary changes to the remedial system. These changes in the plume dynamics could include:

| **Reason for $K_{dist}$ Change** | **Recommended Changes in Remediation** |
|---|---|
| New source or new release | Identify new Responsible Party for continued remediation. |
| Migrating plume | Initiate abatement measures such as interceptor trench, slurry walls, pump recovery / capture system, etc. if receptors are threatened. |

Notes:
(1) Both pathways (A, B) must be evaluated for each of the chemicals of concern in each monitoring point along the plume's centerline.
(2) $k_{time}$ Concentration versus Time Attenuation Rate Constant
(3) $k_{dist}$ Concentration versus Distance Attenuation Rate Constant

# Assessment of MNA Performance Monitoring

## Introduction

The MNA monitoring well networks at the NAS Dallas groundwater plumes will provide the necessary analytical data to evaluate the dynamic behavior of the plumes over time, including contaminant and/or concentration reductions indicative of progress toward clean-up objectives, changes in plume boundaries, and changes in geochemistry. To this effect, these monitoring well networks include monitoring wells in areas hydraulically upgradient and sidegradient to the groundwater plume, in the historical source area, along the main body of the plume and immediately downgradient of the plume. The number and locations of monitoring points for each plume was selected based on the size of the plume, groundwater velocity, proximity to receptors (including cross-media transfer of COCs), and presence of preferential pathways for COC migration.

As required by the Compliance Plan for NAS Dallas (TCEQ, 2004), performance monitoring for MNA will be conducted in accordance with Response Action Plan (RAP) Worksheet 3.1 until all remedial action objectives have been met for the plume for at least two consecutive sampling events. Upon demonstration of the attainment of clean-up objectives, a three-year of post-remedial action monitoring will be implemented in accordance with the Compliance Plan for NAS Dallas (TCEQ, 2004) and as outlined on RAP Worksheet 4.1.

In addition to the COCs identified in the APAR (TtNUS, 2003) for each groundwater plume, daughter products that may be formed as a result of biotransformation or chemical processes will be monitored during the corrective action period at each plume. In order to ensure that there is a potential for continued transformation of the COCs within the groundwater plume, the geochemical environment will also be monitored (i.e., oxidation-reduction potential, dissolved oxygen, pH, etc.) every two years at a minimum. During the post-remedial action monitoring, the Compliance Plan requires that an expanded list of parameters be sampled including those COCs historically detected at the site. In order to minimize the chance of identifying constituent exceedances during the post-response action monitoring, the expanded list of parameters identified on RAP Worksheet 4.1 (Compliance Plan Table III) will be monitored every five years at a minimum.

Each new round of data will help develop a better understanding of the site and site processes and as a result, the conceptual site model for MNA will be continuously reevaluated from the standpoint of the observed plume shape, location, stability, and dynamics; attenuation rates; groundwater flow patterns; and geochemical regimes.

To evaluate progress towards achievement of clean-up objectives, data collected from the monitoring well network will be used to determine temporal and spatial trends in COC concentrations, comparisons of observed COC concentrations with benchmark concentrations, and, comparison of calculated attenuation rates with the rates required to meet remedial objectives within the required timeframe. Data will be interpreted with regard to variability so that attenuation-related changes and trends can be distinguished from other sources of variation in the data.

If a departure from a predicted trend is found, (i.e., exceeding benchmark concentration or unfavorable changes in attenuation rates), the deviation will be evaluated to determine how the changes may affect attainment of remedial goals for the individual monitoring wells, as well as, how the changes may affect the behavior of the entire plume (i.e., plume stability, reduction in COC concentrations, etc.). Departures from expected trends may not mean remedy failure, because there may be a range of attenuation rates that will achieve the desired remedial goals

in the allotted time; therefore their significance must be evaluated in the context of the site-related goals. If the potential impact on the remedy is negligible, revision of the conceptual site model may be the only outcome of such evaluation. However, if the potential for impact is significant, implementation of alternative remedies may be triggered or, at a minimum additional characterization to better define the factors limiting COC reduction and determine methods for mitigating the magnitude of their impact would be warranted. Other site-related data (i.e., geochemistry and potentiometric data) will continue to be evaluated to provide evidence of COC migration, fate, and attenuation processes. These data may be used to ascertain COC degradation and the continuation of appropriate conditions for attenuation at acceptable rates.

Following the individual monitoring well data analysis, plume behavior will be assessed to evaluate the continued effectiveness of the MNA remedy, as well as the adequacy of the monitoring program and conceptual site model for MNA. The ongoing monitoring program will provide the necessary data for continual refinement of the conceptual model and subsequently of the monitoring program itself. Upon completion of each sampling round, data analysis and determination of the effectiveness of the MNA remedy, plume-specific criteria will drive decisions affecting the continuity of the monitoring program.

At some plumes, source control and interim remedial activities have occurred between the original site characterization process and the implementation of performance monitoring. Because these activities are expected to change the site's characteristics and behavior, performance monitoring will require the continued refinement of the conceptual site model for MNA. This refinement of the conceptual site model may eventually be different from the original MNA conceptual site model based on the initial site characterization data. Development and implementation of the new conceptual site model for MNA will require the collection of additional data (i.e., quarterly monitoring for the first year after interim remedial activities and on a semi-annual basis thereafter) to establish baseline conditions, expediently depict new site characteristics and parameter variability, establish trends and estimate attenuation rates for COCs, determine if the plume characteristics have been altered, and assess the likelihood of meeting site remediation goals.

## Evaluation of New Data

Data interpretation will include the preliminary assessment of the COC concentration data collected for both the plume centerline (e.g., whole plume dynamics) as well as on individual COCs within each monitoring well. The interpretation will be conducted through graphs, tables, maps, statistics, and time-series plots. This will help in identifying patterns, relationships, and anomalies, such as possible "outliers" to the observed remedial trend of the plume. Scatter graphs (i.e., $k_{time}$ and $k_{dist}$ graphs) will show relationships between two variables that are not readily evident using purely numerical methods. Mapping the data in plan view and/or cross-section (i.e., isoconcentration maps, potentiometric maps, MNA parameter maps, etc.) will help understand patterns of COC distribution and migration, and relationships between geochemical zones and COC attenuation.

The initial data analysis and interpretation will focus on the detection of trends in the data for the COCs within individual monitoring wells and subsequently for the plume as a whole. First, the COC concentration data collected from each monitoring well will be used to determine the temporal trends that exist within the plume. The COC trends will also be evaluated at monitoring points located throughout the plume as a whole. In order to adequately interpret progress toward COC reduction goals for the plume, it is necessary to compare trends of individual monitoring wells to trends of other monitoring wells in the plume. Evaluating trends in data from all sampling locations in the plume will determine if the plume exhibits stability or reduction in COC concentrations. In addition, for each COC, spatial trends along the plume centerline [i.e., concentration vs. distance attenuation rate ($k_{dist}$)] will be evaluated. This analysis assists in evaluating the stability of the plume and its migration potential. Assessment of spatial plume behavior is necessary to ensure no unacceptable plume migration occurs.

Further evaluation will focus on the assessment of any departures from predicted trends and their impact on the potential for MNA to achieve plume-related goals. If the COC data points do not definitively indicate that the remedial goals are meeting the reasonable progress expectations, other data will be analyzed in order to properly interpret particular variances from the predicted performance (i.e., the site stratigraphy, groundwater chemistry, the groundwater flow field, the season of the year).

In addition, non-parametric statistical tests, such as the Mann-Kendall test, may be included in the data evaluation to establish the existence of a trend when the initial evaluation is inconclusive due to high data variability.

The process of MNA data evaluation is graphically depicted in Diagram 3-1.

### Individual Monitoring Well Analytical Data Evaluation

Evaluation of progress towards achievement of clean-up goals will focus primarily on temporal trends in COC concentration at individual attenuation monitoring point (AMP) wells within the plume. After each sampling event, temporal trends [i.e., concentration vs. time attenuation rate ($k_{time}$)], will be established for each AMP of the plume. Temporal trends ($k_{time}$) are particularly useful in evaluating if remedial goals can be met in the desired timeframe for the individual location. The analysis of temporal trends is useful for estimating the potential lifetime of the COC plume at the particular location.

The parameters to be evaluated in parallel to ensure reasonable progress is being made in the response action at the particular location are as follows:

- Direct comparison of detected concentrations to expected or benchmark concentration to meet remedial goals by the year 2016 for the monitoring wells along the centerline of the plume.

- Direct comparison of observed attenuation rate ($k_{time}$) from the chemical specific historical data available for the monitoring well versus the minimum attenuation rate ($k_{time}$) necessary to meet the 2016 clean-up date.

The following graph depicts the possible evaluation scenarios for the above parameters:

| | |
|---|---|
| **Measured COC Concentration < Expected COC Concentration**<br>**and**<br>**Observed $k_{time}$ > Minimum $k_{time}$**<br>Remedial goal is being met, continue performance monitoring | **Measured COC Concentration < Expected COC Concentration**<br>**and**<br>**Observed $k_{time}$ < Minimum $k_{time}$**<br>Evaluate further to ensure remedial goal is being met |
| **Measured COC Concentration > Expected COC Concentration**<br>**and**<br>**Observed $k_{time}$ > Minimum $k_{time}$**<br>Evaluate further to ensure remedial goal is being met | **Measured COC Concentration > Expected COC Concentration**<br>**and**<br>**Observed $k_{time}$ < Minimum $k_{time}$**<br>Remedial goal not being met, consider new response action |

1. Satisfactory progress is being made with the response action (top left quadrant) for an individual well location, if the detected concentration of the COC(s) is not greater than the 2016 clean-up curve expected concentration; and, the observed attenuation rate based on historical data available from the monitoring well is equal to or greater than the minimum attenuation rate necessary to meet clean-up by the year 2016 for the monitoring wells along the centerline of the plume.
2. Reasonable progress is not being made towards achieving the remedial goal (bottom right quadrant) if the detected concentration of the COC(s) exceeds the 2016 clean-up curve expected concentration; and the observed attenuation rate based on historical data available from the monitoring well is less than the minimum attenuation rate necessary to meet clean-up by the year 2016 for the monitoring wells along the centerline of the plume. A new response action may need to be implemented if this trend continues for at least three sampling rounds.
3. Further evaluation will be needed for the scenarios in the top right and bottom left quadrants before establishing if reasonable progress is being made towards achievement of the clean-up goals:
   - Reasonable progress is being made when the observed attenuation rate based on historical data is steep enough that clean-up can still be achieved by the year 2016, even though the detected concentration of a COC may be greater than the expected concentration during a particular sampling event (bottom left quadrant).
   - Reasonable progress is being made if the detected concentration of a COC in the sampling event is sufficiently below the expected concentration so that with an observed attenuation rate based on historical data greater than the calculated minimum attenuation rate necessary to meet PCLs by 2016, the remedial objectives can still be achieved by the year 2016 (top right quadrant).
   - Reasonable progress may not be made if either of the preceding two situations continues for at least three consecutive sampling rounds. At that point in the response action evaluation, a new response action may need to be implemented. In this case other statistical methods may be used to evaluate the data such as using non-parametric tests (i.e., Mann-Kendall) to determine if there has been a statistically significant change in degradation trends.

Plume Analytical Data Evaluation

Since a plume-wide trend implying progress toward restoration cannot be satisfactorily elucidated from monitoring only individual sampling locations, it will be necessary to compare trends among the AMP wells in the plume. Reduction in COC concentrations from all or most sampling locations within predicted ranges and/or at anticipated rates can be interpreted as a decrease in COC mass for the plume and will be indicative of effective remediation of the plume through MNA. Mixed trends in different portions of the plume may imply temporal changes in plume migration or may be simply attributed to the natural attenuation processes, and do not signify failure of MNA to achieve its goals in a timely manner. These variations will be evaluated in the context of the conceptual site model and sampling history before they are attributed to natural attenuation processes of other possible causes. To this effect, in cases of mixed trends it will be necessary to perform other comparisons in order to reach a conclusion of satisfactory progress. It will be particularly useful to evaluate trends in COC and daughter product concentrations (e.g., a decreasing trend in trichloroethene compared to an increasing trend in cis-1,2-dichloroethene in the same plume may indicate degradation of trichloroethene to cis-1,2-dichloroethene). Other trends of interest include changes in geochemistry that may indicate decrease in attenuation rates, such as changes in availability of electron donors and electron acceptors, changes in oxidation-reduction potential, or other primary geochemical indicators.

The complement to the evaluation of the behavior of the plume as a whole is the assessment of spatial trends. For each COC, spatial trends along the plume centerline [i.e., concentration vs. distance attenuation rate ($k_{dist}$)] will be evaluated. This analysis assists in evaluating the stability of the plume and its migration potential. $k_{dist}$ will be calculated for the monitoring wells along the plume centerline after each annual sampling round and will be depicted in centerline trend graphs ($k_{dist}$ graphs). Assessment of spatial plume behavior will be performed through visual interpretation of changes in plume shape over time as shown in the isoconcentration maps as well as centerline trend graphs.

**Assessment Conclusions and Recommendations**

As a result of the response action effectiveness evaluation, the MNA conceptual site model will be continuously refined/modified by incorporating any new data and data trends in COC and geochemistry values and changes in site hydrology. As new data is gathered there will be an ever-expanding database for the site that can be used for comparison with the changes in parameters noted between monitoring events as well as for comparison to predicted, acceptable trends. This continual evaluation of performance monitoring data will translate in better understanding of plume behavior and anticipated data variability and therefore assist in the proper interpretation of monitoring data.

Upon completion of each sampling round, data analysis and determination of the effectiveness of the MNA remedy, plume-specific criteria will drive decisions affecting the continuity of the monitoring program such as: the appropriateness of continuing the monitoring program without change, the need for modifications to the monitoring program (i.e., increased monitoring frequency, additional monitoring wells), need for additional characterization, implementation of a contingency or alternative remedy, or verification of attainment of remedial goals and termination of performance monitoring.

Site-related decisions regarding continuing, modifying, or terminating MNA performance monitoring will be made based on the analyses of spatial and temporal trends in COC concentration, as well as comparisons with predicted benchmarks and/or the specified concentration standard (i.e., COC PCLs). The following summarizes each potential decision

and why it may be chosen based on the perceived progress towards achievement of MNA remediation goals at the plume:

1. Continue Monitoring Program Without Change

   COC concentrations, including toxic transformation products and any mobilized by-products or secondary COCs must remain within the bounds of acceptable trends in order to continue the monitoring program without any change until all remedial action objectives have been met. Groundwater flow parameters must not have changed outside previously identified acceptable ranges. The geochemistry must not have changed in such a way as to indicate that the COC degradation or other natural attenuation processes would be significantly affected.

2. Modify the Monitoring Program

   Modification of the monitoring program may be needed to better reflect changing conditions or increased understanding of natural attenuation processes at the site. Changing conditions or the need to test key assumptions may require new sampling points or increases in monitoring parameters or frequency. Possible scenarios include:

   - Changes in groundwater flowrates or directions that indicate COCs may move farther downgradient, laterally or vertically into previously unimpacted areas, may warrant the need for additional monitoring wells.
   - Unfavorable changes in COC concentrations within the plume, or in the observed attenuation rate based on historic data, may warrant increased monitoring frequency. Sampling frequency may be increased if a sudden change in the trend of COC concentration reduction is noted in order to provide information to facilitate understanding of the change and provide earlier warning of further change. If the protectiveness of the remedy is in question (i.e., unfavorable observed attenuation rate change after 2012), a determination may be made to collect data on a more frequent schedule to properly interpret trends in time to implement contingency remedies, if necessary, to meet PCLs by 2016.
   - Detections of COCs outside the known plume, indicating potential plume expansion or plume migration, may warrant the need for additional monitoring wells.

3. Implement a Contingency or Alternative Remedy

   Alternative remedies can be considered for use in case MNA fails to perform at the desired effectiveness. Situations that may trigger the implementation of a contingency or other remedy modifications will depend on site conditions and include the following:

   - COC concentrations are not decreasing at the rate previously determined to be necessary to meet the remediation objectives by 2016. This assessment will involve the direct comparison of current analytical data with the expected plume clean-up benchmarks as well as evaluation of temporal trends (i.e., observed attenuation rates) in COC concentrations versus the minimum attenuation rates required to meet clean-up by the year 2016. If the protectiveness of the remedy is in question (i.e., more than three rounds of sampling fail to meet the criteria), implementation of a contingency or alternative remedy would generally be warranted.
   - COC concentrations at AMP wells exhibit an increasing trend not originally predicted during remedy selection. This situation would involve the identification and assessment of trends in COC concentration data, including transformation products, changes in geochemistry that may indicate decrease in attenuation rates explaining the lack of

progress toward clean-up objectives, and/or additional COC releases. For some locations in the plume, a detection of a significant change may not trigger immediate implementation of a contingency or alternative remedy. For instance, a low-level or otherwise limited COC concentration increase does not necessarily mean that remediation timeframes will be expanded, or that by the time the pulse moves downgradient to the boundary of the plume there will be a significant plume expansion. Or, in some cases, the detailed characterization and modeling of COC fate and migration may indicate that concentrations for certain COCs (i.e., daughter products) in some portions of the plume are expected to increase temporarily, yet MNA would still meet remedial objectives. If so, the temporary increase would not trigger the contingency or alternative remedy as long as the increase conformed to the predictions and MNA remained protective, allowing observation for several years to test model predictions, if time is available (i.e., before 2012). In situations where evaluation shows the observed COC concentration increases are expected to unacceptably increase the time for plume restoration beyond 2016, or cause unacceptable plume expansion, triggering the contingency or alternative remedy would generally be warranted.

- COCs are identified in monitoring wells located outside the original plume boundary indicating unacceptable plume expansion or migration. Detections of COCs outside of the predetermined plume boundaries may indicate unacceptable plume expansion. Implementation of an alternative or contingency remedy will depend on the locations of the new detections, and distance and possible COC migration rates between these monitoring points and receptors (i.e., surface water bodies, off-site property). Because the COC travel time from the location of the detections may be many years at some sites, there may be time for further monitoring and assessment before a contingency or alternative remedy would need to be implemented. In contrast, if the protectiveness of the remedy is in question (i.e., a significant trend of increasing COC concentration in downgradient wells was noted), there may be much less time available to assess the trend if there was only a short travel time to downgradient receptors. In this case, a contingency or alternative remedy may be triggered immediately.

4. Termination of Performance Monitoring

Once PCLs have been achieved at each of the AMP locations within a plume, showing that the MNA remedy goals have been met for two consecutive semi-annual sampling events for an individual PCLE zone, performance monitoring will be terminated and a period of verification monitoring will be initiated. Verification monitoring will include three years of semi-annual groundwater sampling in order to satisfy the requirements of the Compliance Plan for NAS Dallas (TCEQ, 2004). Sampling parameters for the verification of achieving the PCLs and locations will be in accordance with RAP Worksheet 4.0. This sampling will include all COCs that have been historically detected in the area of the former SWMU, not just the ones that were identified for remediation in the Response Action Plan. If no additional COC exceedances are identified during this three year period of post response action care monitoring, the monitoring system can be terminated, the monitoring wells will be abandoned, and the site will be removed from the permit.

### Effects of Data Variability on Data Interpretation

Data interpretation is affected by data variability. This variability is sometimes associated with natural causes or may be simply attributed to the natural attenuation processes. Due to the dynamic nature of natural attenuation processes, data typically exhibit fluctuations of various magnitudes. For example, there is an expected degree of natural variability within a plume that may include small-scale expansion and shrinkage in response to changes in groundwater flowrates and biological degradation rates throughout the year. COC concentrations in individual monitoring wells may fluctuate with changes in plume configuration caused by oscillations in groundwater flow. Also, changes in groundwater elevations can cause changes in COC concentrations measured in monitoring wells.

It is essential that each data point be interpreted in the context of its derivation in time and space. For instance, monitoring wells produce data that should be interpreted with respect to COC sources, site stratigraphy, the groundwater flow field, the plume, possible receptors, season of the year, and other relevant factors. Variations in sampling methodology should also be considered, due to possible differences in COC concentrations derived from different sampling techniques or devices. The analytical methodology may be evaluated in terms of accuracy, precision, and detection limits. This list of data considerations is not exhaustive, but merely emphasizes that a number (i.e., a data point) should be placed in context to be interpreted. The better the understanding on the derivation and context of the data, the more likely it is that the appropriate decision can be made based on the data.

Examination of historical and spatial patterns may provide information useful in assessing the source and significance of variability in the measured parameters. For instance, if there are multiple monitoring wells in the same plume that show a consistent trend for a number of monitoring variables across several monitoring events, then one may suspect a natural variation, such as recharge differences or geochemical changes in the system, and investigate a correlation of recharge, indicator parameters, or other external hydrologic factors with concentration as indicative of the likely cause of the change. If, on the other hand, a specific monitoring well shows an unusually large change in concentration between monitoring events, relative to nearby monitoring wells, then one may suspect a measurement factor or additional release source is involved and look at sampling techniques or other such factors that may influence the concentration change. Because plume variability should be taken into account when interpreting monitoring data, it is important to have a good estimate of natural variability derived from the site investigation and ongoing MNA performance monitoring.

# APPENDIX 8
# WASTE DISPOSAL MANIFESTS

Project #: 0-0

Order #: 140398

EFFECTIVE ENVIRONMENTAL

Please print or type. (Form designed for use on elite (12-pitch) typewriter.)

**NON-HAZARDOUS WASTE MANIFEST**

1. Generator ID Number: TX8170022786 / 65033
2. Page 1 of 1
3. Emergency Response Phone: 877-577-2669
4. Waste Tracking Number: NHM140398

5. Generator's Name and Mailing Address
Naval Air Station Dallas (NAS)
c/o EnSafe Inc., 4545 Fuller Dr., Suite 342
Irving, TX 75038
Generator's Phone: 972.792.3222 ATTN: Tom Wiberg

Generator's Site Address (if different than mailing address)
8100 West Jefferson
Dallas, TX 75211
RB TVW

6. Transporter 1 Company Name
Stericycle Specialty Waste Solutions Inc
Phd: 972 329 1200
State ID#: 98032 / H-4695
U.S. EPA ID Number: MNS000110924

7. Transporter 2 Company Name
U.S. EPA ID Number

8. Designated Facility Name and Site Address
Itasca Landfill TX, LP
2559 FM 66
Itasca, Texas 76055
State ID#: H0241C
U.S. EPA ID Number: n/a
Facility's Phone: 254 897 2511

| 9a. HM | 9b. U.S. DOT Description (including Proper Shipping Name, Hazard Class, ID Number, and Packing Group (if any)) | 10. Containers No. | Type | 11. Total Quantity | 12. Unit Wt./Vol. | |
|---|---|---|---|---|---|---|
| ☐ | 1 Non-regulated material (soil cuttings Class 2 solids) | 01 ~~02~~ | DM | 55 ~~110~~ | G | CESQ3012 Non-RCRA |
| ☐ | 2. Non-regulated material (purged ground and decon water) | 02 | DM | 110 ~~55~~ | G | CESQ1012 Non-RCRA |
| | 3. | | | | | |
| | 4. | | | | | |

13. Special Handling Instructions and Additional Information
01:IDW Soil cuttings NR (PF:5110167655) 55G
02:IDW purge and decon waters NR (PF:5110167656) 55G
RB TVW
11-1) 0.72 ton 11-2) 0.47 tons

14. **GENERATOR'S CERTIFICATION:** I certify the materials described above on this manifest are not subject to federal regulations for reporting proper disposal of Hazardous Waste.

Generator's/Offeror's Printed/Typed Name: X DAVID BARNEY
Signature: X
Month 5 Day 31 Year 16

15. International Shipments ☐ Import to U.S. ☐ Export from U.S. Port of entry/exit:
Transporter signature (for exports only): Date leaving U.S.:

16. Transporter Acknowledgment of Receipt of Materials

Transporter 1 Printed/Typed Name: Rafael Blaze
Signature:
Month 5 Day 31 Year 16

Transporter 2 Printed/Typed Name: Steven Vansickle
Signature:
Month 6 Day 9 Year 16

17. Discrepancy

17a. Discrepancy Indication Space ☐ Quantity ☐ Type ☐ Residue ☐ Partial Rejection ☐ Full Rejection

Manifest Reference Number:

17b. Alternate Facility (or Generator)
U.S. EPA ID Number
Facility's Phone

17c. Signature of Alternate Facility (or Generator)
Month Day Year

01: H132 02: H132

18. Designated Facility Owner or Operator: Certification of receipt of materials covered by the manifest except as noted in Item 17a

Printed/Typed Name: Jessica Anderson
Signature:
Month 6 Day 9 Year 16

GENERATOR

INT'L

TRANSPORTER

DESIGNATED FACILITY

6-NHM-C-C-11

2-DESIGNATED FACILITY TO GENERATOR

Project #: 0-0 Order #: 140398

EFFECTIVE ENVIRONMENTAL

Please print or type. (Form designed for use on elite (12-pitch) typewriter.)

**NON-HAZARDOUS WASTE MANIFEST**

1. Generator ID Number: TX8170022786 / 65033
2. Page 1 of 1
3. Emergency Response Phone: 877-577-2669
4. Waste Tracking Number: NHM140398

5. Generator's Name and Mailing Address
Naval Air Station Dallas (NAS)
c/o EnSafe Inc., 4545 Fuller Dr., Suite 342
Irving, TX 75038
Generator's Phone: 972-292-3222 ATTN: Tom Wiberg

Generator's Site Address (if different than mailing address)
8100 West Jefferson
Dallas, TX 75211

RJ TWW

6. Transporter 1 Company Name
Stericycle Specialty Waste Solutions Inc
Ph#: 972 329 1200
State ID#: S5627 / H-4565
U.S. EPA ID Number: MNS000110924

7. Transporter 2 Company Name
U.S. EPA ID Number:

8. Designated Facility Name and Site Address
Itasca Landfill TX, LP
2559 FM 56
Itasca, Texas 76055
State ID#: H0241C
U.S. EPA ID Number: n/a
Facility's Phone: 254 687 2511

| 9a. HM | 9b. U.S. DOT Description (including Proper Shipping Name, Hazard Class, ID Number, and Packing Group (if any)) | 10. Containers No. | Type | 11. Total Quantity | 12. Unit Wt./Vol. | |
|---|---|---|---|---|---|---|
| ☐ | 1. Non-regulated material (soil cuttings Class 2 solids) | 01 ~~02~~ | DM | 55 ~~110~~ | G | CESQ3012 Non-RCRA |
| ☐ | 2. Non-regulated material (purged ground and decon water) | 02 | DM | 110 ~~55~~ | G | CESQ1012 Non-RCRA |
| | 3. | | | | | |
| | 4. | | | | | |

13. Special Handling Instructions and Additional Information
01:IDW Soil cuttings NR (PF:5110167655) 55G
02:IDW purge and decon waters NR (PF:5110167656) 55G

RJ TWW

11-1) 0.72 ton 11-2) 0.47 ton

14. **GENERATOR'S CERTIFICATION:** I certify the materials described above on this manifest are not subject to federal regulations for reporting proper disposal of Hazardous Waste.

Generator's/Offeror's Printed/Typed Name: X DAVID BURNEY
Signature: X
Month 5 Day 31 Year 16

15. International Shipments ☐ Import to U.S. ☐ Export from U.S. Port of entry/exit:
Transporter signature (for exports only): Date leaving U.S.:

16. Transporter Acknowledgment of Receipt of Materials

Transporter 1 Printed/Typed Name: Rafael Blayze
Signature:
Month 5 Day 31 Year 16

Transporter 2 Printed/Typed Name: Steven Vansickle
Signature:
Month 6 Day 9 Year 16

17. Discrepancy

17a. Discrepancy Indication Space ☐ Quantity ☐ Type ☐ Residue ☐ Partial Rejection ☐ Full Rejection

Manifest Reference Number:

17b. Alternate Facility (or Generator) U.S. EPA ID Number
Facility's Phone:

17c. Signature of Alternate Facility (or Generator) Month Day Year

01: H132 02: H132

18. Designated Facility Owner or Operator: Certification of receipt of materials covered by the manifest except as noted in Item 17a

Printed/Typed Name: Jessica Anderson
Signature:
Month 6 Day 4 Year 16

GENERATOR

INT'L

TRANSPORTER

DESIGNATED FACILITY

6-NHM-C-C-11

3-DESIGNATED FACILITY TO GENERATOR

Project #: 0-0 Order #: 145925

E² EFFECTIVE ENVIRONMENTAL

Please print or type. (Form designed for use on elite (12-pitch) typewriter.)

**NON-HAZARDOUS WASTE MANIFEST**

1. Generator ID Number: TX8170022786 / 65033
2. Page 1 of 1
3. Emergency Response Phone: 877-577-2669
4. Waste Tracking Number: NHM-145925

5. Generator's Name and Mailing Address
Naval Air Station Dallas (NAS)
c/o EnSafe Inc., 4545 Fuller Dr., Suite 342
Irving, TX 75038
Generator's Phone: 972-792-3222 ATTN: Tom Wherg

Generator's Site Address (if different than mailing address)
8100 West Jefferson
Dallas, TX 75211

6. Transporter 1 Company Name
Stericycle Specialty Waste Solutions Inc
Ph#: 972 329 1200
State ID#: 88922 / H-1496
U.S. EPA ID Number: MNS000110924

7. Transporter 2 Company Name
U.S. EPA ID Number

8. Designated Facility Name and Site Address
Itasca Landfill TX. LP
2559 FM 66
Itasca, Texas 76055
State ID#: H0241C
U.S. EPA ID Number: n/a
Facility's Phone: 254 687 2511

| 9a. HM | 9b. U.S. DOT Description (including Proper Shipping Name, Hazard Class, ID Number, and Packing Group (if any)) | 10. Containers No. | 10. Containers Type | 11. Total Quantity | 12. Unit Wt./Vol. | |
|---|---|---|---|---|---|---|
| ☐ | 1. Non-regulated material (purged ground and decon water) | 04 | DM | 220 | G | CESQ1012 Non-RCRA |
| ☐ | 2. Non-regulated material (soil cuttings Class 2 solids) | 02 | DM | 110 | G | CESQ3012 Non-RCRA |
| | 3. | | | | | |
| | 4. | | | | | |

13. Special Handling Instructions and Additional Information
01:IDW purge and decon waters NR (PF:5110167856) 55G
02:IDW Soil cuttings NR (PF:5110167855) 55G

11.1) 0.94 tn
11.2) ~~0.29 tn~~ 0.35 tn

14. **GENERATOR'S CERTIFICATION:** I certify the materials described above on this manifest are not subject to federal regulations for reporting proper disposal of Hazardous Waste.

Generator's/Offeror's Printed/Typed Name: X DAVID BARNEY
Signature: X
Month 11 Day 8 Year 16

15. International Shipments ☐ Import to U.S. ☐ Export from U.S. Port of entry/exit:
Transporter signature (for exports only): Date leaving U.S.:

16. Transporter Acknowledgment of Receipt of Materials

Transporter 1 Printed/Typed Name: Jason L Boss
Signature:
Month 11 Day 8 Year 16

Transporter 2 Printed/Typed Name: Rafael Blanco
Signature:
Month 11 Day 14 Year 16

17. Discrepancy

17a. Discrepancy Indication Space ☐ Quantity ☐ Type ☐ Residue ☐ Partial Rejection ☐ Full Rejection

Manifest Reference Number:

17b. Alternate Facility (or Generator) U.S. EPA ID Number
Facility's Phone:

17c. Signature of Alternate Facility (or Generator) Month Day Year

01: H132 02: H132

18. Designated Facility Owner or Operator: Certification of receipt of materials covered by the manifest except as noted in Item 17a

Printed/Typed Name: Cindy Reed
Signature: Cindy Reed
Month 11 Day 14 Year 16

GENERATOR

INT'L

TRANSPORTER

DESIGNATED FACILITY

6-NHM-C-C-11

2-DESIGNATED FACILITY TO GENERATOR

# SWMU 86 PLUME

# 2016 Response Action Effectiveness Report
## SWMU 86 Plume
## Former NAS Dallas, Texas

## Professional Signatures and Seals

**Professional Geoscientist**

| | | |
|---|---|---|
| *Thomas Wiberg* | *1619* | *30 November 2017* |
| Professional Geoscientist | Geoscientist License number | Expiration date |
| | *17 Jan 2017* | |
| Signature | Date | |
| *972-791-3222* | *972-791-0405* | *twiberg@ensafe.com* |
| Telephone number | FAX number | E-mail |

**Professional Engineer**

| | | |
|---|---|---|
| | | |
| Professional Engineer | P.E. License number | Expiration date |
| | | |
| Signature | Date | |
| | | |
| Telephone number | FAX number | E-mail |

**Registered Corrective Action Specialists (RCASs) and Corrective Action Project Managers (CAPMs)**
**For LPST sites only.**

| | | |
|---|---|---|
| | | |
| Registered Corrective Action Specialist | RCAS Registration number | Expiration date |
| | | |
| Signature | Date | |
| | | |
| Corrective Action Project Manager | CAPM Registration number | Expiration date |
| | | |
| Signature | Date | |
| | | |
| Telephone number | FAX number | E-mail |

**Seals, as applicable:**

# TEXAS COMMISSION ON ENVIRONMENTAL QUALITY
## Response Action Effectiveness Report

## Cover Page

**Regulatory ID number** (Solid waste registration number, VCP ID number, etc) *Solid Waste Code #65033*

check one: ___ Initial RAER submittal for this onsite property X Subsequent RAER submittal

Report date: *January 2017* TCEQ Region No.: *4*

**TCEQ Program** (check one)

X Corrective Action (Mail Code 127)

___ Voluntary Cleanup Program (Mail Code 221)

___ Petroleum Storage Tank Program (Mail Code 137)

___ Superfund PRP Lead (Mail Code 143)

___ Municipal Solid Waste Permits (Mail Code 124)

**Onsite Property Information**

Onsite Property Name: *Former Naval Air Station Dallas (NAS Dallas) — SWMU 86 Plume*

Street no. *8100* Pre dir: *West* Street name: *Jefferson* Street type *Blvd* Post dir: ___

City: *Dallas* County: *Dallas* County Code: *57* Zip: *75211*

Nearest street intersection or location description: ___

Latitude: Degrees, Minutes, Seconds OR Decimal Degrees (circle one) North *32°44'06.5"*

Longitude: Degrees, Minutes, Seconds OR Decimal Degrees (circle one) West *96°57'38.5"*

**Offsite Affected Property Information**

Offsite Affected Property Name: *Not Applicable (N/A)*

Street no. ___ Pre dir: ___ Street name: ___ Street type: ___ Post dir: ___

City: ___ County: ___ County Code: ___ Zip: ___

[X] Check if no offsite properties affected

**Contact Person Information and Acknowledgement**

Person (or company) Name: *Navy BRAC PMO East*

Contact Person: *Mr. David Barney* Title: *BRAC Environmental Coordinator*

Mailing Address: *4911 S. Broad Street, Building 679*

City: *Philadelphia* State: *PA* Zip: *19112* E-mail address **david.a.barney@navy.mil**

Phone: *617-753-4656* Fax: ___

By my signature below, I acknowledge the requirement of §350.2(a) that no person shall submit information to the executive director or to parties who are required to be provided information under this chapter which they know or reasonably should have known to be false or intentionally misleading, or fail to submit available information which is critical to the understanding of the matter at hand or to the basis of critical decisions which reasonably would have been influenced by that information. Violation of this rule may subject a person to the imposition of civil, criminal, or administrative penalties.

Signature of Person BARNEY.DAVID.A.1228582553 Digitally signed by BARNEY.DAVID.A.1228582553 DN: c=US, o=U.S. Government, ou=DoD, ou=PKI, ou=USN, cn=BARNEY.DAVID.A.1228582553 Date: 2017.01.16 06:48:50 -05'00' Name, print: *David Barney* Date: ___

Check the reports/forms previously submitted:

**Remedy Standard A**

____ Self-Implementation Notice Submittal date: _____

*X* Response Action Plan — Approval date: *December 2006*

**Remedy Standard B**

____ Response Action Plan — Approval date: _____

List all media (surface soil, subsurface soil, groundwater, sediment, surface water, air) that contained or contains a PCLE zone and specify the response action that has been or will be taken for each media. Indicate the type of removal, decontamination, physical control, or institutional control action used in the response action.

| Media | COCs | Removal | Decontamination | Physical Control | Institutional Control | Modified Response Objective | | |
|---|---|---|---|---|---|---|---|---|
| | | | | | | PMZ | WCU | TI |
| Soil | cis-1,2-Dichloroethene (cis-1,2-DCE)<br>trans 1,2-Dichloroethene (trans-DCE)<br>Trichloroethene (TCE)<br>Vinyl Chloride (VC)<br>Benzo(b)fluoranthene<br>Benzo(a)pyrene<br>Dibenzo(a,h)anthracene<br>Chlordane<br>Lead | Excavation and offsite disposal (completed in 2004) | N/A | N/A | N/A | N/A | N/A | N/A |
| Groundwater | Alpha-BHC<br>Trichloroethene<br>cis-1,2-Dichloroethene<br>Vinyl Chloride<br>Carbon Tetrachloride<br>Chloroform<br>Tetrachloroethene<br>trans-1,2-Dichloroethene<br>1,1-Dichloroethene<br>1,2-Dichloroethane<br>1,1,2-Trichloroethane | Excavation and offsite disposal of source areas (completed in 2004) | MNA | N/A | N/A | N/A | N/A | N/A |

Current land use of the onsite affected property: ____ Residential *X* Commercial/industrial

Projected future land use of the onsite property (if known): *X* Residential ____ Commercial/industrial

Briefly describe the affected property and PCLE zones, the conclusions from the assessment activities, identify any affected or threatened receptors, and describe any other major site conditions. If any portion of the response action is necessitated due to an aesthetic or nuisance condition, identify the nature of that condition and identify that portion of the response action conducted to address it. If any media that contains a PCLE zone is not being addressed in this response action, provide justification.

**Affected Property: SWMU 86 Plume**

**In 1989, a Resource Conservation and Recovery Act (RCRA) Facility Assessment (RFA) was performed at Naval Air Station (NAS) Dallas in accordance with the 1984 RCRA Hazardous and Solid Waste Amendments to evaluate potential releases at Solid Waste Management Units (SWMUs) and Areas of Concern (AOCs) and to make preliminary determinations regarding the need for further action. The RFA Report included data collected as part of a Preliminary Review, a Visual Site Inspection, and a Sampling Visit, as necessary, for 135 SWMUs and six AOCs at NAS Dallas (A.T. Kearney 1989).**

**In 1993, NAS Dallas was identified for closure under the Base Realignment and Closure Act (BRAC). As part of the base closure activities, an Environmental Baseline Survey (EBS) was conducted at NAS Dallas to identify any potential environmental concerns related to historical operations at the base (EnSafe/Allen & Hoshall 1994). During this EBS, additional site concerns were identified at numerous buildings across the installation. In order to strategically investigate the permitted and non-permitted SWMUs, AOCs, and additional site concerns identified in the EBS, the facility was divided into six sections, called "categories", based on property use and ownership. In 1995, the Navy initiated RCRA Facility Investigation (RFI) activities at NAS Dallas at Categories A through F. Submittal of the Final RFI Reports (issued as a series of six reports — one report per category) occurred during the period from November 2000 to March 2001 (Tetra Tech NUS, Inc. [Tetra Tech] 2000a — 2001b). The RFI was completed under the requirements of the Texas Risk Reduction Standards (RRS) (30 Texas Administrative Code [TAC] 335, Subchapter S), the regulatory framework in effect at the time, and closure recommendations in the RFI Reports, which were based upon Risk Reduction Standard 2 — Industrial (RRS2-IND) criteria. The RFI Reports identified those areas that required further action based on the chemical constituents detected in the soil and/or groundwater at the base.**

**The RFI Reports received conditional approval by the Texas Natural Resource Conservation Commission, now the Texas Commission on Environmental Quality (TCEQ). Final approval of the RFI Reports by TCEQ was dependent upon landowner concurrence of the RRS2-IND clean-up standard.**

**In September of 1999, the Texas Risk Reduction Program (TRRP) (30 TAC 350) was promulgated. One of the major changes resulting from TRRP was eliminating site background as a closure criterion. The most stringent closure standard under TRRP is the Residential Remedy Standard A (RES A), which consists of closure for residential use with no engineering or institutional controls.**

**In March 2001, the Navy submitted a Notice of Intention to Switch to TRRP (30 TAC 350) for five of the six categories. The one category (Category C) that was not switched to TRRP, but remained under the RRS2-IND standards, was subsequently transferred to the Department of the Army.**

**In October 2002, an Affected Property Assessment Report (APAR) was produced based on evaluation of RFI data as well as data from follow-up investigations (Tetra Tech, 2002). The data included in the APAR was compared to TRRP RES A criteria to select those sites that may be closed with no land use encumbrances and to determine which sites required corrective action. The results of this comparison indicate that 23 SWMUs (1, 2, 6, 17, 18, 21, 31, 35, 36, 60, 79, 81, 83, 84, 85, 86, 92, 102, 108, 124, 136, 138, and 139) required further actions.**

**As a result of the numerous investigations at NAS Dallas, the facility has an established monitoring well network that provides monitoring for each of the above-listed sites. Groundwater monitoring has been conducted at SWMU 86 since 1995. As identified in the APAR, the groundwater at SWMU 86 is located within a Class 2 groundwater area.**

**SWMU 86 Plume**

**The Defense Reutilization and Marketing Office (DRMO) Storage Area (SWMU 86) is located east of Building 311, southeast of Building 27, and southwest of Building 35. Building 311 was a General Storage Shed and Open Storage Area. Prior to the construction of Building 311, the property was used as an open storage area for Building 27, the Supply General Warehouse. Prior to that, Buildings 44 and 29 (barracks) were present from 1942 until approximately 1960. Septic tank systems may have existed in the area of the former barracks. Although there are no documented releases, spills from this area could have contaminated adjacent soils and the nearby storm sewer catch basin. During the EBS, large stains were present on the asphalt storage area east of Building 311. The area was used to store salvageable equipment and furniture, including items such as old desks, wooden crates, aircraft engines, used tires, and used lead/acid batteries.**

**Possible contamination sources in the area include used equipment storage and storage of lubricants, cleaning solvents, and paint containers. During the site screening survey, several areas of elevated soil-gas concentrations were identified. A compromised storm sewer pipe was also identified.**

**To address the shallow soil exceedances of volatile organic compounds (VOCs) and total petroleum hydrocarbons (TPHs) around SWMU 86, Interim Corrective Actions (ICAs) were conducted by the Navy's Remedial Action Contractor (RAC) in 2001. The impacted shallow soil was excavated and disposed offsite at a licensed landfill. During the ICA excavation activities, monitoring wells 42401MW, 428B06MW, and 428B09MW were plugged and abandoned. Upon the completion of ICA activities, monitoring well**

**42401MW was replaced by monitoring well 428B93MW to continue groundwater monitoring at this location. A Response Action Completion Report (RACR) detailing the removal activities and results of closure conformation sampling was prepared and submitted to the TCEQ for review and approved in 2001. Final regulatory approval of the RACR was received from the TCEQ in a letter dated September 9, 2004.**

**Soil**

**Based upon the data obtained during the RFI, further action was recommended at SWMU 86 due to exceedances of chlorinated VOCs, polynuclear aromatic hydrocarbons (PAHs), pesticides, and inorganics in soil. Consequently, excavation of impacted soil was recommended by the Navy and carried out by the Navy's RAC in 2004. The RACR for the soil removal activities was prepared and submitted to the TCEQ in March 2005. The RACR has undergone several review cycles by the City of Dallas, U.S. Environmental Protection Agency (U.S. EPA), and TCEQ and the final replacement pages for the RACR were submitted to the TCEQ in May 2008 (CH2M Hill, 2008). The TCEQ granted final approval of the RACR in July 2008.**

**Groundwater**

**The results of the RFI for Category B (TtNUS 2001) indicate that groundwater at the site has been impacted by chlorinated VOCs and pesticides. As described in the APAR, the groundwater of this SWMU is located within a Class 2 groundwater bearing unit (GWBU). The high degree of heterogeneity associated with the shallow GWBU onsite has resulted in a discrete groundwater Protective Concentration Level Exceedance (PCLE) zone associated with the SWMU 86 Plume that required a response action to reduce the concentration of chemicals of concern (COCs) to less than the respective critical Protective Concentration Level (PCL). Subsequent to the APAR, a Response Action Plan (RAP) was submitted to the TCEQ for groundwater at the SWMU 86 Plume. The revised RAP received TCEQ approval in December 2006.**

**As determined in the RAP, excavation followed by Monitored Natural Attenuation (MNA) was chosen as a decontamination remedy to address the PCLE zone that has been identified at the SWMU 86 Plume by 2017 (Tetra Tech 2006). A re-evaluation of plume dynamics was presented in an Alternatives Evaluation Report (AER) (Resolution Consultants, 2013), and a determination was made that MNA alone would not effectively reduce the concentrations of COCs in groundwater at SWMU 86 to achieve remedial goals by the year 2017.**

**Given that the remedy for the 2006 Groundwater RAP (Revision 2) at SWMU 86 Plume will not achieve the critical PCLs within the timeframe specified, and as recommended by TCEQ in a letter dated May 26, 2015, failure of the response action triggers the implementation of contingency measures, which may include the selection of an appropriate alternate remedial measure such as enhanced MNA (EMNA). The Navy has proposed to implement EMNA as an alternate remedy in a pilot study at the affected area of SWMU 18 groundwater plume in an effort to reduce COCs to below PCLs. This study will allow the Navy to make a determination as to whether the technology is viable. Depending on the results of the EMNA spot treatment at SWMU 18, alternative remedial measures may be proposed in a comprehensive RAP for SWMU 86 Plume to follow. MNA will be continued for the upcoming year at SWMU 108 in accordance with the procedures and protocols described in the Groundwater RAP (Revision 2), dated February 2006.**

**In October 2015, the Navy submitted a revised RAP (Revision 3) (Resolution Consultants, 2015) to TCEQ. The purpose of the revised RAP was to remove monitor wells from the current monitoring and sampling plan and confirmation sampling plan. In accordance with the RAPs, Resolution Consultants conducted plugging and abandonment (P&A) of select groundwater monitoring wells in April 2016. P&A actions were conducted by a state of Texas licensed driller (Strata Core Services, SCI). Monitoring well 428B129MW was abandoned at SWMU 86.**

**Potential receptors are onsite residents, onsite employees, and onsite construction workers. Because the groundwater PCLE zone is not projected to migrate offsite based on groundwater modeling results and other lines of evidence, it is not anticipated that offsite receptors will are affected. The possible routes of exposure to groundwater are inhalation (onsite residents, onsite employees, and onsite construction workers) and dermal contact (onsite construction workers). Ingestion is not a concern since during the implementation of the response actions as there is controlled access to the site, which limits potential exposures to contaminated groundwater (i.e., no potable or irrigation wells will be installed) through 2017. The potential for inhalation of vapor from groundwater through soil to outdoor air is insignificant because the maximum detected COC concentrations in groundwater are less than their respective inhalation of**

**volatiles from groundwater ($^{Air}GW_{Inh-V}$) PCLs. Additionally, the indoor air sampling conducted in a sealed building at a similar plume at the base (Building 1406 within the SWMU 21 area) indicated that no CVOCs were detected in the indoor air (Tetra Tech, 2004). The recent Vapor Intrusion Study at SWMU 21 (Resolution Consultants, 2015) also concluded that sub-slab TCE and cis-1,2-DCE concentrations were well below VISLs for sub-slab vapor as well as RSLs for indoor air. Furthermore, the analytical results indicated that neither TCE nor cis-1,2-DCE were detected in indoor air samples. Therefore, vapor intrusion is not a current concern at NAS Dallas.**

## CHRONOLOGY OF MAJOR EVENTS

| | |
|---|---|
| Sep. 1985 | Initial Assessment Study was prepared and submitted. |
| Jan. 1987 | Confirmation Study and Verification Step Report was prepared and submitted. |
| Mar. 1989 | RFA was prepared and submitted. |
| 1993 — 1994 | EBS was prepared and submitted. |
| Mar. 1994 | BRAC Cleanup Plan was prepared and submitted. |
| 1995 — 1996 | Basewide Round 1 groundwater sampling event (Directed Phase RFI). |
| 1996 — 1997 | Interim Draft RFI Reports were prepared and submitted for each category identified at the air station. |
| Mar. — June 1998 | Basewide Round 2 groundwater sampling event (Chase Phase RFI). |
| May — Oct. 1998 | Main Fuel Farm (MFF) USTs were removed by the Navy's Charleston Detachment, along with other tanks basewide. |
| June 1998 — Jan. 1999 | Release Determination Report was prepared and submitted covering the removal of the MFF tanks. |
| Aug. — Sep. 1998 | Basewide Round 3 groundwater sampling event. |
| Sep. 1998 | Most military operations on NAS Dallas ceased and the air station was placed into caretaker status. |
| Dec. 1998 — Jan. 2000 | Removal of oil/water separators (OWS) basewide. |
| Jan. — Oct. 1999 | Basewide removal of hot spot areas of contamination. |
| Feb. — Apr. 1999 | Basewide Round 4 groundwater sampling event. |
| Sep. — Oct. 1999 | Removal of the remaining USTs basewide. |
| Sep. — Nov. 1999 | Basewide Round 5 groundwater sampling event. |
| July 1999 — Feb. 2000 | Basewide pre-Corrective Measures Study monitoring well installation and sampling event. |
| June — July 2000 | Preliminary groundwater investigation at Advanced Science Incorporated Area-5 (ASA-5) site in the MFF/Main Fuel Farm Storm Sewer (MFF/MFFSS) area. |
| July — Aug. 2000 | Basewide Round 6 groundwater sampling event. |
| Aug. — Sep. 2000 | Aquifer tests were conducted at five sites across Former NAS Dallas to determine aquifer properties. |
| 2000 — 2001 | Final RFI Reports were prepared and submitted for each category. |
| June — July 2001 | Basewide Round 7 groundwater sampling event, including evaluation of alternate sampling methods (i.e., passive diffusion bag [PDB] and HydraSleeve). |
| Sep. 2001 | Enhanced Monitored Natural Attenuation (EMNA) pilot test initiated at ASA-5 site (SWMUs 79/136) involving the injection of potassium permanganate ($KMnO_4$). |

| | |
|---|---|
| Feb. 2002 | MNA Groundwater Modeling Report for MFF/MFFSS was prepared and submitted. |
| Mar. 2002 | Technical Memorandum Groundwater Sampling Procedure Comparison for selected monitoring wells was prepared and submitted. |
| Oct. 2002 | APAR was prepared and submitted. |
| Dec. 2002 — Mar. 2003 | Basewide Round 8 groundwater sampling event. |
| Jan. 2003 | Monitoring Well Abandonment Plan was prepared and submitted. |
| Jan. 2003 | Draft MNA Groundwater Modeling Report for Category D Sites was prepared and submitted. |
| Jan. 2003 | Corrective action (excavation and disposal) initiated on the Rubble Landfill (SWMU 1). |
| Feb. 2003 | Draft RAP for MFF/MFFSS soils was prepared and submitted. |
| Apr. 2003 | Draft RAP for Category D Sites soils was prepared and submitted. |
| Apr. 2003 | Final Groundwater Report to satisfy Provision VIII.D.8 of the Former NAS Dallas RCRA Hazardous Waste Storage Permit (No. HW-50276) was prepared and submitted. |
| May 2003 | Self Implementation Notice (SIN) for TRRP RES A Soil Response Actions for SWMUs 2, 6, 18, 21, 31, 35, 36, 60, 79, 81, 83, 84, 85, 86, 102, 124, 138, and 139 was prepared and submitted. |
| June 2003 | Draft MNA Groundwater Modeling Report for Category B was prepared and submitted. |
| June 2003 | RCRA Permit renewal and Compliance Plan applications submitted to the TCEQ. |
| June 2003 | Corrective action (excavation, solidification, and disposal) initiated on the Texas Air National Guard (TANG) Ponds (SWMU 92). |
| July — Aug. 2003 | Basewide Round 9 groundwater sampling event. |
| Aug. 2003 | Corrective action (excavation, disposal, and backfill) initiated on the sites covered in the SIN submitted in May 2003. |
| Aug. 2003 | 2002 Annual Groundwater Monitoring Report was prepared and submitted. |
| Dec. 2003 — Jan. 2004 | Basewide Round 10 groundwater sampling event. |
| Jan. 2004 | Soil RACR was prepared and submitted for the Rubble Landfill (SWMU 1). |
| Jan. 2004 | Soil RACR was prepared and submitted for the TANG Ponds (SWMU 92). |
| Mar. 2004 | TCEQ produced and distributed the Draft RCRA Permit and Draft Compliance Plan. |
| Apr. 2004 | Final Addendum to MNA Groundwater Modeling Report for MFF/MFFSS was prepared and submitted. |
| May 2004 | 2003 Groundwater Response Action Effectiveness Reports (RAER) were prepared and submitted. |

| | |
|---|---|
| June 2004 | Indoor and Outdoor Air Sampling at Building 1406 Report was prepared and submitted. |
| July 2004 | Basewide Round 11 groundwater sampling event. |
| July 2004 | Final MNA Groundwater Modeling Report for Category D was prepared and submitted. |
| Sep. 2004 | Final MNA Groundwater Modeling Report for Category B was prepared and submitted. |
| Sep. 2004 | TCEQ approved final closure documentation for the Miscellaneous Sites Soil RACR. |
| Oct. 2004 | Basewide Round 12 groundwater sampling event. |
| Oct. 2004 | TCEQ approved Final MNA Groundwater Modeling Report for Category D Sites at Former NAS Dallas. |
| Oct. 2004 | TCEQ approved Final Addendum to the MNA Groundwater Modeling Report for MFF/MFFSS at Former NAS Dallas. |
| Oct. 2004 | TCEQ approved Final Groundwater Report for Former NAS Dallas. |
| Oct. 2004 | TCEQ approved the 2002 Annual Groundwater Monitoring Report. |
| Nov. 2004 | Final RAP (Basewide) for groundwater was prepared and submitted. |
| Dec. 2004 | 2004 Semi-annual Groundwater Monitoring Report was prepared and submitted. |
| Dec. 2004 | TCEQ issued comments on the 2003 Groundwater RAERs. |
| Jan. 2005 | 2004 Groundwater RAERs were prepared and submitted. |
| Mar. 2005 | Monitoring Well Installation and Abandonment Plan was prepared and submitted. |
| Mar. 2005 | Draft 84 Sites Soil RACR was prepared and submitted. |
| Apr. 2005 | 2004 Groundwater RAERs were prepared and submitted. |
| Apr. 2005 | Basewide Round 13 groundwater sampling event. |
| June 2005 | Corrective action for groundwater (excavation, disposal, and backfill) initiated at SWMU 85. |
| June 2005 | Corrective action for groundwater (excavation, disposal, and backfill) initiated at SWMU 18. |
| July 2005 | Basewide Round 13 groundwater sampling event. |
| Aug. 2005 | TCEQ issued comments on the Draft 84 Sites Soil RACR. |
| Aug. 2005 | 2005 Semi-annual Groundwater Monitoring Report was prepared and submitted. |
| Sep. 2005 | TCEQ issued comments on the 2004 Groundwater RAPs. |
| Oct. 2005 | TCEQ issued comments on the 2004 Groundwater RAERs. |
| Oct. 2005 | Basewide Round 14 groundwater sampling event. |
| Oct. — Dec. 2005 | City of Dallas issued comments on the Draft 84 Sites Soil RACR. |

| | |
|---|---|
| Dec. 2005 | TCEQ issued comments on the 2005 Semi-annual Groundwater Monitoring Report. |
| Jan. 2006 | 2005 Groundwater RAERs were prepared and submitted. |
| Jan. 2006 | Basewide Round 15 groundwater sampling event. |
| Feb. 2006 | Revised Groundwater RAPS (Revision 2) were prepared and submitted covering SWMUs 17/Building 1423, 17/Building 1429, 18, 35, 85, 86, 108, 136 North, 136 South, and 139. |
| Mar. 2006 | RACR for groundwater removed at SWMUs 18 and 85 were prepared and submitted. |
| May 2006 | Basewide Round 15B groundwater sampling event. |
| May 2006 | TCEQ issued comments on the 2005 Groundwater RAERs. |
| June 2006 | 85 Sites, DRMO, and Naval Weapons Industrial Reserve Plant (NWIRP) SWMU 18 Soil RACRs (Revision 1) were prepared and submitted. |
| July 2006 | TCEQ issued comments on the Groundwater RAPs (Revision 2). |
| July 2006 | EMNA Pilot Test initiated at SWMU 21 involving the injection of Zero Valent Iron. |
| Aug. 2006 | Basewide Round 16 groundwater sampling event. |
| Aug. 2006 | Responses to TCEQ comments on the Groundwater RAPs (Revision 2), including replacement pages, were prepared and submitted. |
| Nov. 2006 | Basewide Round 16B groundwater sampling event. |
| Dec. 2006 | RACR for groundwater PCL at SWMU 35 was prepared and submitted. |
| Dec. 2006 | TCEQ approves Groundwater RAP (Revision 2) covering SWMUs 17/Building 1423, 17/Building 1429, 18, 35, 85, 86, 108, 136 North, 136 South, and 139. |
| Jan. 2007 | 2006 Groundwater RAERs were prepared and submitted. |
| Apr. 2007 | Groundwater Sampling Work Plan Addendum, Slug Test Work Plan, and Monitoring Well Installation and Abandonment Work Plan were prepared and submitted. |
| Apr. — May 2007 | Basewide Round 17 groundwater sampling event. |
| Apr. — June 2007 | SWMU 18 OWS removal operations were conducted. |
| Apr. 2007 | Slug test operations conducted at SWMUs 18, 85, and 139. |
| Aug. — Sep. 2007 | Basewide Round 18 groundwater sampling event. |
| Nov. 2007 | Field Activities for SWMU 21 EMNA Pilot Study completed. |
| Jan. 2008 | Basewide Round 19 groundwater sampling event. |
| Jan. 2008 | 2007 Groundwater RAERs were prepared and submitted. |
| Feb. 2008 | TCEQ approves the Groundwater RACR for SWMU 35. |
| Apr. 2008 | Comments to the 85 Sites, DRMO, and NWIRP SWMU 18 Soil RACRs revisions were received from the TCEQ. |
| May 2008 | TCEQ issued comments on the 2007 Groundwater RAERs. |

| | |
|---|---|
| May 2008 | Response to the 85 Sites, DRMO, and NWIRP SWMU 18 Soil RACRs comments were submitted to the TCEQ. |
| July 2008 | Basewide Round 20 groundwater sampling event. |
| July 2008 | TCEQ grants final approval of the 85 Sites, DRMO, and NWIRP SWMU 18 Soil RACRs. |
| July 2008 | Response to TCEQ comments on 2007 Groundwater RAERs, replacement pages (Revision 1) to 2007 RAERs prepared and submitted. |
| Oct. 2008 | Technical Memorandum, ASA-5 East Site EMNA Pilot Study prepared and submitted. |
| Oct. 2008 | Technical Memorandum, Pilot Study at SWMU 21 prepared and submitted. |
| Oct. 2008 | SWMU 17/Building 1429 Pilot Test Work Plan prepared and submitted. |
| Dec. 2008 | SWMU 139 Groundwater RACR prepared and submitted. |
| Jan. 2009 | Basewide Round 21 groundwater sampling event. |
| Jan. 2009 | 2008 Groundwater RAERs prepared and submitted. |
| Jan. 2009 | Revised Groundwater RAPs for SWMU 21 (Revision 2) prepared and submitted. |
| Jan. 2009 | Revised Groundwater RAPs for SWMUs 79/136 Central (Revision 2) prepared and submitted. |
| Jan. 2009 | Revised Groundwater RAP for SWMU 136 South (Revision 4) prepared and submitted. |
| May 2009 | SWMU 21 Pilot Study additional groundwater sampling. |
| May 2009 | SWMU 79/136 Central non-compliant monitoring well groundwater sampling. |
| May 2009 | TCEQ grants conditional approval of the SWMU 139 Groundwater RACR. |
| June 2009 | ASA-5 Pilot Test injection points abandonment. |
| June 2009 | SWMU 35 monitoring well abandonment. |
| July 2009 | Basewide Round 22 groundwater sampling event. |
| Sep. 2009 | SWMU 21 Pilot Study monitoring wells abandonment. |
| Oct. 2009 | Revised Technical Memorandum, SWMU 21 Pilot Study prepared and submitted. |
| Oct. 2009 | SWMU 136 South non-compliant monitoring well groundwater sampling. |
| Nov. 2009 | Response to TCEQ comments on 2008 Groundwater RAERs prepared and submitted. |
| Jan. 2010 | Basewide Round 23 groundwater sampling event. |
| Jan. 2010 | 2009 Groundwater RAERs prepared and submitted. |
| July 2010 | Basewide Round 24 groundwater sampling event. |
| Aug. 2010 | Basewide monitoring well network inspection and five-year survey. |
| Nov. 2010 | Response to TCEQ comments on 2009 Groundwater RAERs prepared and submitted. |

| | |
|---|---|
| Dec. 2010 | Monitoring well general maintenance and minor repairs completed. |
| Jan. 2011 | Basewide Round 25 groundwater sampling event. |
| Jan. 2011 | 2010 Groundwater RAERs prepared and submitted. |
| March 2011 | Monitoring well inspection at SWMU 21/SWMU 18 on monitoring wells within the 20-acre area leased to the Air National Guard. |
| May 2011 | Addendum to Monitoring Well Installation and Abandonment Plan prepared and submitted. |
| June 2011 | SWMU 139 monitoring wells plugged and abandoned. |
| June 2011 | SWMU 81 monitoring wells plugged and abandoned. |
| June 2011 | Repairs, abandonment and replacement of damaged monitoring wells at SWMU 21 and SWMU 18. |
| July. 2011 | Basewide Round 26 groundwater sampling event. |
| Dec. 2011 | Response to TCEQ comments on 2010 Groundwater RAERs prepared and submitted. |
| Jan. 2012 | Basewide Round 27 groundwater sampling event. |
| March 2012 | 2011 Groundwater RAERs prepared and submitted. |
| July 2012 | Basewide Round 28 groundwater sampling event. |
| Aug. 2012 | EPA comments to the 2011 Groundwater RAER. |
| Oct. 2012 | TCEQ comments to the 2011 Groundwater RAER. |
| Jan. 2013 | Basewide Round 29 groundwater sampling event. |
| Jan. 2013 | 2012 Groundwater RAERs prepared and submitted |
| Feb. 2013 | EPA comments to the 2012 Groundwater RAER. |
| Feb. 2013 | TCEQ comments to the 2012 Groundwater RAER. |
| July 2013 | Basewide Round 30 groundwater sampling event. |
| July 2013 | Response to TCEQ comments on 2012 Groundwater RAERs prepared and submitted |
| Jan. 2014 | Basewide Round 31 groundwater sampling event. |
| Jan. 2014 | 2013 Groundwater RAERs prepared and submitted |
| Feb. 2014 | TCEQ comments to the 2013 Groundwater RAER. |
| June 2014 | EPA comments to the 2013 Groundwater RAER. |
| July 2014 | Basewide Round 32 groundwater sampling event. |
| July 2014 | Response to TCEQ comments on 2013 Groundwater RAERs prepared and submitted. |
| Jan. 2014 | Basewide Round 31 groundwater sampling event. |
| Jan. 2014 | 2013 Groundwater RAERs prepared and submitted. |
| Feb. 2014 | TCEQ comments to the 2013 Groundwater RAER. |
| June 2014 | EPA comments to the 2013 Groundwater RAER. |
| July 2014 | Basewide Round 32 groundwater sampling event. |

| | |
|---|---|
| July 2014 | Response to TCEQ comments on 2013 Groundwater RAERs prepared and submitted. |
| Nov. 2014 | RCRA Permit renewal and Compliance Plan (Number 50276) applications submitted to the TCEQ. |
| Jan. 2015 | Basewide Round 33 groundwater sampling event. |
| Jan. 2015 | 2014 Groundwater RAERs prepared and submitted. |
| May 2015 | TCEQ Permit Renewal Application Technical Notice of Deficiency (NOD) Letter, dated May 26, 2015. |
| June 2015 | Meeting with TCEQ, EPA, and City of Dallas |
| June 2015 | TCEQ comments letter to the 2014 Groundwater RAER, dated June 10, 2015. |
| June 2015 | Submittal of Draft revised RAP for SWMU 17/Building 1429, received June 23, 2015. |
| June 2015 | Response to TCEQ comments to the Response to Permit Renewal Application Technical NOD Letter for Former Dallas Naval Air Station (NAS), Dallas, Texas, dated June 26, 2015. |
| July 2015 | Basewide Round 34 groundwater sampling event. |
| July 2015 | TCEQ Permit Renewal Application Second Technical Notice of Deficiency Letter, dated July 24, 2015. |
| July 2015 | Response to TCEQ Comments on the Technical Memorandum Pilot Study for SWMU 21, Rev. 1, July 2009 submitted to the TCEQ, dated July 24, 2015. |
| Oct. 2015 | Basewide submittal of Revised and Interim Response Action Plans. |
| Dec. 2015 | Draft Final Enhanced Monitored Natural Attenuation (EMNA) Spot Treatment Workplan for SWMU 18 prepared and submitted to TCEQ. |
| Dec. 2015 | Amendment to the Approved Class V Underground Injection Control (UIC) Permit (5X2600432) prepared and submitted to TCEQ. |
| Jan. 2016 | Basewide Round 35 groundwater sampling event. |
| Jan. 2016 | TCEQ, U.S. EPA, and City of Dallas approve EMNA workplan. |
| Jan. 2016 | 2015 Groundwater RAERs prepared and submitted. |
| Jan. 2016 | EMNA Spot Treatment Design Verification Testing at SWMU 18 by Resolution Consultants and Regenesis Remediation Services. |
| March 2016 | Draft Tier II Sampling and Analysis Plan Addendum #1, Long-Term Monitoring Plan Enhanced Monitored Natural Attenuation Spot Treatment at SWMU 18 Former Naval Air Station Dallas, Dallas, Texas prepared and submitted to TCEQ. |
| March 2016 | Amendment to the Approved Class V UIC Permit (5X2600432) prepared and submitted to TCEQ. |
| Apr. 2016 | TCEQ approves UIC amendment request. |

| | |
|---|---|
| Apr. 2016 | Basewide plug and abandon and operation and maintenance actions, installation of monitor well 508F98MW in SWMU 79 |
| Apr. 2016 | EMNA Spot Treatment at SWMU 18 baseline groundwater sampling event. |
| May 2016 | EMNA Spot Treatment at SWMU 18 injections by Resolution Consultants and Regenesis Remediation Services. |
| Jul. 2016 | Basewide Round 36 groundwater sampling event. |
| Aug. 2016 | Deploy passive diffusion bags at EMNA Spot Treatment well 606D152MW. |
| Sep. 2016 | Basewide operations and maintenance activities completed. |
| Sep. 2016 | EMNA Spot Treatment at SWMU 18 first quarterly performance groundwater monitoring event. |
| Sep. 2016 | Draft Tier II Sampling and Analysis Plan Addendum #2, Long-Term Monitoring Plan, Enhanced Monitored Natural Attenuation, Perfluoroalkyl Substances Groundwater Investigation, Former Naval Air Station Dallas, Dallas, Texas prepared and submitted to TCEQ. |

# Checklist for Report Completeness

Use this checklist to determine the portions of the form that must be submitted for this report. Answer all questions by checking Yes or No. If the answer is Yes include that portion of the report. If the answer is No, do not complete or submit that portion of the report. All form contents that are marked "Required" must be submitted. Form contents marked with an asterisk (*) are not included in the blank form and are to be provided by the person.

| | | | | Report Contents |
|---|---|---|---|---|
| | | Required | **Cover Page** | ☒ |
| | | Required | **Executive Summary** | ☒ |
| | | Required | **Checklist for Report Completeness** | ☒ |
| | | Required | **Worksheet 1.0** Response Action Objectives | ☒ |
| | | Required | **Attachment 1A*** Maps and Cross Sections | ☒ |
| | | Required | **Attachment 1B*** Graphs | ☒ |
| | | Required | **Attachment 1C*** Response Action Diagrams | ☐ *N/A* |
| No ☒ | Is a plume management zone being used as part of the response action? | ☐ Yes | **Worksheet 2.0** Plume Management Zone | ☐ |
| | | | **Attachment 2A*** Map of Plume Management Zone | ☐ |
| No ☒ | Was an area of technical impracticability approved for use as part of the response action? | ☐ Yes | **Worksheet 3.0** Technical Impracticability | ☐ |
| | | | **Attachment 3A*** Map of Technical Impracticability | ☐ |
| No ☒ | Are institutional controls used or required as part of the response action? | ☐ Yes | **Worksheet 4.0** Institutional Controls | ☐ |
| | | Required | **Worksheet 5.0** Performance Measures and Problems | ☒ |
| No ☐ | Have any operation and maintenance activities been conducted? | ☒ Yes | **Worksheet 6.0** Operation and Maintenance | ☒ |
| No ☒ | Has there been any change to the plans for post-response action care from that submitted in the RAP? | ☐ Yes | **Worksheet 7.0** Post-Response Action Care | ☐ |
| No ☐ | Was any information for this report obtained from outside sources? | ☒ Yes | **Appendix 1*** References | ☒ |
| No ☒ | Is an ESA and/or Compensatory Restoration being used as art of the response action? | ☐ Yes | **Appendix 2*** ESA and Compensatory Restoration | ☐ |

| Checklist for Report Completeness | ID No. *SWR 65033 SWMU 86 Plume* | Report Date: *01/17/2016* |
|---|---|---|

| | | | | |
|---|---|---|---|---|
| No ☒ | Are institutional controls or landowner concurrence required in the response action? | ☐ Yes | **Appendix 3*** Institutional Controls and Landowner Concurrence | ☐ |
| No ☐ | Is there data or boring/monitor well information not previously submitted? | ☒ Yes | **Appendix 4*** Data Tables, Boring Logs, and Well Completions | ☒ |
| No ☒ | Did sampling procedures differ from those described in the AP? | ☐ Yes → | **Appendix 5*** Sampling Procedures | ☐ |
| No ☐ | Has any sampling been conducted for which the analytical results were not previously submitted? | ☒ Yes → | **Appendix 6*** Laboratory Data Packages | ☒[1] |
| No ☐ | Were statistics or geostatistics used in the response action? | ☒ Yes → | **Appendix 7*** Statistical Methodology | ☒[2] |
| No ☐ | Were any wastes generated that were not reported through STEERS? | ☒ Yes → | **Appendix 8*** Waste Disposition | ☒ |

***Notes:***

[1] Included with 2016 RAER in CD format.

[2] Included with 2016 RAER for SWMU 17/Building 1423.

Use this worksheet to describe the response action objectives in each media.

## Response Action Objectives — SWMU 86 Plume

What is the selected remedy standard for this affected property? *X* A ____ B

List the environmental media to which this applies *Soil*

Repeat this section for each medium that had a different response action objective.

Provide a detailed description of the response action. Describe the removal actions, decontamination actions, treatment system(s), and/or physical or institutional control actions that have been conducted in each media and indicate if there were any differences between the actions taken and the actions proposed in the SIN or RAP.

**Based upon the data obtained during the RFI and subsequently evaluated in the APAR, further action was recommended at SWMU 86 due to exceedances of VOCs, PAHs, pesticides, and inorganics in the soil. Consequently, excavation of impacted soil was recommended by the Navy and carried out by the Navy's RAC in 2004. The goal of the excavation activities as presented in the SIN (Tetra Tech 2003a) was to remove soils containing COC concentrations greater than TRRP RES A. Due to physical limitations of the excavation area and encountering bedrock (Eagle Ford Shale) prior to reaching the soil remedial goals, only those soils containing concentrations greater than $^{Tot}Soil_{Comb}$ were excavated and removed. A decision was agreed by the Former NAS Dallas BRAC Closure Team (BCT) (TCEQ, U.S. EPA, and Navy) to backfill the excavation area and allow MNA to address the remaining chlorinated VOC concentrations on City of Dallas and Exelon property.**

**The RACR for the soil removal activities was prepared and submitted to the TCEQ in March 2005. The RACR has undergone several review cycles by the City of Dallas, U.S. EPA, and TCEQ, and the final replacement pages for the RACR were submitted to the TCEQ in May 2008 (CH2M Hill 2008). The TCEQ granted final approval of the RACR in July 2008.**

List the environmental media to which this applies *Groundwater*

Repeat this section for each medium that had a different response action objective.

Provide a detailed description of the response action. Describe the removal actions, decontamination actions, treatment system(s), and/or physical or institutional control actions that have been conducted in each media and indicate if there were any differences between the actions taken and the actions proposed in the SIN or RAP.

**Based upon the data obtained during the RFI and subsequently evaluated in the APAR, further action was recommended at SWMU 86 due to exceedances of VOCs in the groundwater. The groundwater response action for the site consisted of soil excavation as a source removal remedy followed by MNA as a decontamination remedy to reduce the concentration of COCs to less than their critical PCLs. The excavation of impacted soil was implemented by the Navy's RAC in 2004.**

**MNA at the SWMU 86 Plume includes the following elements:**

- **Decontamination through the ongoing biological and chemical reductive dechlorination processes.**
- **A monitoring/confirmation sampling program to evaluate the progress of the decontamination.**

**The fate and transport modeling results (Tetra Tech 2004) indicate that there will be no expansion of the PCLE zone or offsite migration of COCs at concentrations greater than the respective critical groundwater PCLs.**

Describe how the response action has, or is working towards, achievement of the property-specific response objectives for the PCLE zone in each medium in the context of the response objectives set forth in §350.32 or §350.33, as applicable. Explain how the response action is appropriate based on the hydrogeologic and COC characteristics. Describe any unprotective conditions that continued or resulted from the remedial actions and the actions taken to mitigate unprotective conditions.

**The response action for the contaminated groundwater in the PCLE zone was expected to meet groundwater response objectives of §350.32 by the use of groundwater excavation as a removal remedy followed by MNA as a decontamination remedy to reduce the concentration of COCs within the PCLE zone to less than their critical PCLs. The fate and transport modeling results in the Final MNA Groundwater Monitoring Report for Category B (Tetra Tech 2004) predict that there will be no expansion of the PCLE zone or offsite migration of COCs at concentrations greater than the respective critical groundwater PCLs.**

**Based on the work conducted to date, it can be concluded that COCs degradation, specifically for the COCs TCE, cis-1,2-DCE, and VC, has not been enhanced sufficiently at the SWMU 86 groundwater plume to satisfy critical PCL concentrations on or before the year 2017.**

**Therefore, in accordance with the Groundwater RAP (Revision 2), dated February 2006, and as recommended by TCEQ in a letter dated May 26, 2015, failure of the response action triggers the implementation of contingency measures, which may include the selection of an appropriate alternate remedial measure. The Navy has proposed to implement EMNA as an alternate remedy at the affected area of SWMU 18 groundwater plume in an effort to reduce COCs to below PCLs. This will allow the Navy to make a determination as to whether the technology is viable. Depending upon the results of the EMNA spot treatment at SWMU 18, alternative remedial measures may be proposed in a comprehensive RAP for SWMU 86 Plume. An Interim RAP (Revision 3) for SWMU 86 was submitted by the Navy in October of 2015 to remove monitor wells from the current monitoring and sampling plan and confirmation sampling plan. MNA will be continued for the upcoming year in accordance with the procedures and protocols described in the Groundwater RAP (Revision 2), dated February 2006.**

**During the implementation of the response action activities, there has been controlled access to the site and limited potential exposure to contaminated groundwater due to site restrictions on potable or irrigation well installation through 2017. Because this decontaminating remedy is based on an in-situ technology, the potential short-term exposures normally associated with the implementation of ex-situ technologies (i.e., dermal and inhalation exposures) are not a concern.**

If different from the information provided in the RAP, explain how the COCs have been handled, treated, disposed, or transferred to another medium and document that the response action has not resulted in any additional exposure conditions due to response action activities.

*N/A*

Explain whether the response action is achieving, or will achieve, the objectives within the reasonable time frame.

**Significant reduction in COC mass was achieved by the excavation of contaminated soil and groundwater removal in the plume area. At this time, the data suggest that remediation of the plume through MNA is occurring, but at rates that indicate remedial goals are not being met for TCE and its daughter compounds cis-1,2-DCE and VC. Therefore, the originally proposed response action (the combined use of excavation and MNA) as a decontamination remedy will not reduce the concentration of the COCs TCE, cis-1,2-DCE and VC in groundwater will not achieve remedial goals by 2017.**

**As previously stated, failure of the response action triggers implementation of contingency measures, which may include the selection of an appropriate alternate remedial measure. Further sampling will continue at this plume area in accordance with the RAP (Tetra Tech 2006).**

Are physical controls part of the response action? ____ Yes *X* No

If yes, describe the type and purpose of the physical control and discuss how the physical control has proven effective.

*N/A*

## Soil Response Action Objectives

When using removal and/or decontamination with controls or controls only, demonstrate that the physical control or combination of measures is reliably containing, and will continue to contain, COCs within and/or derived from the surface soil and subsurface soil PCLE zone materials over time.

*N/A*

Explain how the removal or decontamination action is reducing the concentration of COCs to the critical surface soil and subsurface soil PCL throughout the soil PCLE zone and preventing COC concentrations above the critical soil PCLs from migrating beyond the original boundary of the soil PCLE zone.

**The soils containing elevated COC concentrations were excavated by the Navy's RAC in 2004. The goal of the excavation activities as presented in the SIN (Tetra Tech 2003a) was to remove soils containing COC concentrations greater than TRRP RES A. Due to physical limitations of the excavation area and encountering bedrock (Eagle Ford Shale) prior to reaching the soil remedial goals, only those soils containing concentrations greater than $^{Tot}Soil_{Comb}$ were excavated and removed. The site currently contains soil concentrations that exceed the default TRRP RES A $^{GW}Soil_{Ing}$ concentrations. A decision was agreed to by the Former NAS Dallas BCT to backfill the excavation area and allow MNA to address the remaining chlorinated VOC concentrations on City of Dallas and Exelon property.**

**The RACR for the soil removal activities was prepared and submitted to the TCEQ in March 2005. The RACR has undergone several review cycles by the City of Dallas, U.S. EPA, and TCEQ, and the final replacement pages for the RACR were submitted to the TCEQ in May 2008 (CH2M Hill 2008). The TCEQ granted final approval of the RACR in July 2008 (TCEQ 2008).**

## Groundwater Response Action Objectives — SWMU 86 Plume

Name of groundwater-bearing unit to which this information applies *Upper Water Bearing Zone (Alluvial Overburden)*

Repeat this section for each groundwater-bearing unit for which a different response action is being conducted.

Groundwater Classification ____ **1** *X* **2** ____ **3**

Is a modified groundwater response action being used for any part of the groundwater PCLE zone (§350.33(f)(2), (3), or (4))? ___ Yes *X* No

If yes, complete the appropriate portions of this report.

Explain how the removal or decontamination actions are reducing the concentration of COCs to the critical groundwater PCL throughout the groundwater PCLE zone and preventing COC concentrations above the critical groundwater PCL from migrating beyond the original boundary of the groundwater PCLE zone. If COC concentrations above the critical groundwater PCL have ever migrated beyond the original boundary of the groundwater PCLE zone, explain the actions taken to address the increase in the PCLE zone.

**The fate and transport modeling results (Tetra Tech 2004) based on the pre-excavation COC concentrations in the plume area soil and groundwater indicate that within the range of sensitivity runs for the calibrated model utilized to simulate the reductive dechlorination process, the ongoing biological reductive dechlorination process would not reduce the COC concentrations within the existing groundwater PCLE zone to levels less than their respective critical PCLs by year 2016. However, the**

**results did indicate that there will be no expansion of the PCLE zone or offsite migration of COCs at concentrations greater than the respective critical groundwater PCLs.**

**Because of the elevated soil concentrations at the site and the modeling results that indicated that the groundwater PCLs would not be met by 2017, the Navy decided to conduct a soil and groundwater removal action throughout the PCLE zone. The goal of the excavation activities as presented in the SIN (Tetra Tech 2003a) was to remove soils containing COCs greater than TRRP RES A and thereby reduce the residual groundwater concentrations. Due to physical limitations of the excavation area and encountering bedrock (Eagle Ford Shale) prior to reaching the soil remedial goals, only those soils containing concentrations greater than $^{Tot}Soil_{Comb}$ were excavated and removed. A decision was agreed by the Former NAS Dallas BCT to backfill the excavation area and allow MNA to address the remaining chlorinated VOC concentrations on City of Dallas and Exelon property.**

**Currently, maps in Attachment 1A, data tables in Appendix 4, and graphs in Attachment 1B show a smaller PCLE zone footprint than that presented in the RAP (Tetra Tech 2006). At this time, the data provide indication that remedial goals will not be achieved within the expected time frame, as the plume continues to show a lack of significant progress towards clean-up. Further sampling will continue at this plume area in accordance with the RAP (Tetra Tech 2006).**

Explain how the response actions are preventing COCs from migrating to air at concentrations above the PCLs for air if the groundwater-to-air PCLs ($^{Air}GW_{Inh-V}$) were exceeded.

*The maximum observed concentrations of the detected groundwater COCs in the PCLE zone are less than their respective $^{Air}GW_{Inh-V}$ PCLs.*

Explain how the response actions are preventing COCs from migrating to surface water at concentrations above the PCLs for groundwater discharges to surface water if surface water was a factor.

**The fate and transport modeling results based on the pre-excavation COC concentrations in the plume area soil and groundwater indicate that COC discharges to Mountain Creek Lake would by 2009 be primarily between Building 150, along the northern shore, and Building 217, along the southern shore, of Category B. Some groundwater within the southwestern portion of Category B may also be flowing southward under the runways and discharging to the lake along the Category E shoreline. A determination of the $^{sw}GW$ PCLs for the COCs in Category B has been performed for Mountain Creek Lake and the results indicate that the projected discharges to the lake will not negatively impact surface water quality. The calculations and basis for approach are presented in Appendix E of the Draft Groundwater Modeling Report for Category B (Tetra Tech 2003b).**

**In 2004, contaminated soils and groundwater were excavated and removed from the PCLE zone. This action removed the primary and secondary contributing source of COCs to the groundwater. It is expected that any residual COCs that may remain in the groundwater will be sufficiently degraded by MNA processes by the year 2017.**

**In addition, Mountain Creek Lake is identified as a non-drinking water reservoir by the TCEQ. Therefore the potential receptors of a groundwater discharge to the surface water include acute levels for aquatic life, chronic levels for aquatic life, and human health protection for freshwater fish consumption. The surface water risk-based exposure level ($^{sw}RBEL$) for each COC was evaluated for each of these pathways. Potential impacts to aquatic and human life were principally evaluated using Texas Surface Water Quality Standards or Federal criteria.**

**Groundwater releases to the surface water were evaluated using the dilution factor approach as described in TRRP-24, Determining PCLs for Surface Water and Sediment. A groundwater PCL protective of surface water ($^{sw}GW$ PCL) was derived by using the lowest $^{sw}RBEL$ divided by the default dilution factor of 0.15. Generally, the lowest calculated $^{sw}GW$ PCL was based on the $^{sw}RBEL$ for human health protective concentration of fish consumption since the lake is not considered to be the drinking water supply source. Calculated $^{sw}GW$ PCLs for the COCs (TCE, 1,1-Dichloroethene [DCE], trans-1,2-DCE, cis-1,2-DCE, and vinyl chloride) are presented in Table 7-1, Appendix 7 of the RAP (Tetra Tech 2006).**

**Monitoring well 428B134MW is located approximately 25 feet from the edge of Mountain Creek Lake; therefore, the COCs detected in this monitoring well are considered representative of the groundwater concentrations discharging to the lake. The highest concentrations detected in monitoring well 428B134MW are 0.2800 mg/L TCE (April 2005), 0.0040 mg/L 1,1-DCE (August 2006), 0.0090 mg/L trans-1,2-DCE (August 2006), 0.9800 mg/L cis-1,2-DCE (August 2006), and 0.0010J mg/L vinyl chloride (August 2006). These concentrations are less than the $^{sw}$GW PCLs of 4.08 mg/L (TCE), 0.039 mg/L (1,1-DCE), 66.67 mg/L (trans-1,2-DCE), 66.67 mg/L (cis-1,2-DCE), and 2.767 mg/L (vinyl chloride). Therefore, the groundwater from this plume is protective of the Mountain Creek Lake surface water.**

Explain how the response actions are preventing human and ecological receptor exposure to the groundwater PCLE zone.

**The response action is based on an in-situ technology that will permanently degrade the COCs. During the implementation of the in-situ groundwater response action, access to the site will be controlled by not permitting any potable or irrigation wells in the PCLE zone during remedial activities. Additionally, the fate and transport modeling results (Tetra Tech 2004) indicate that the PCLE zone will not migrate beyond the Former NAS Dallas property line; therefore, there will be no threat to offsite human or ecological receptors.**

## Waste Management

Describe the volume and final disposition or reuse location of waste or environmental media that has been removed from the affected property during the response action, if not previously reported under STEERS. Provide copies of all manifests, other documentation of disposition, and landowner consent for reuse of soil in Appendix 8.

**Excess groundwater recovered through the low-flow or PDB sampling method is placed into properly labeled 55-gallon capacity drums and stored at the site. Upon classification, waste disposal arrangements are made with a licensed waste disposal facility. Appendix 8 contains copies of the waste disposal manifests for groundwater generated during the 2016 sampling activities at Former NAS Dallas.**

# ATTACHMENT 1A
# MAPS AND CROSS SECTIONS

# AFFECTED PROPERTY MAP

Affected Property Map
Former NAS Dallas, Texas

January 2014 Isocontour
Gross PCLE Zone Outline
Demolished Building
Existing Structure
Owned by City of Dallas
Transferred from Exelon Corporation to City of Dallas
Transferred from Navy to City of Dallas
Transferred from Navy to City of Grand Prairie
Transferred from Navy to U.S. Army Reserve
Owned by Exelon Corporation

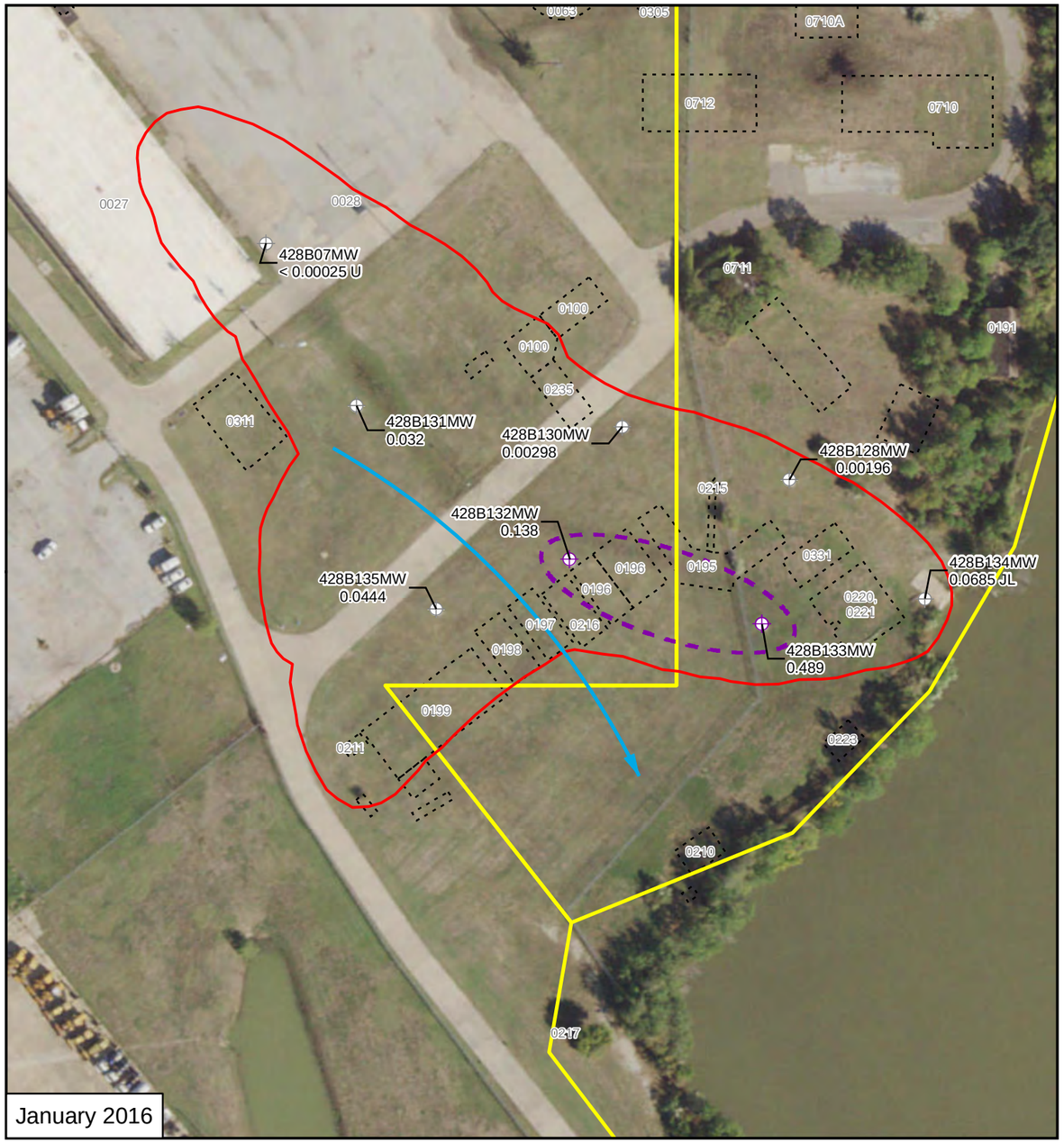
NAVFAC Naval Facilities Engineering Command

| | |
|---|---|
| REQUESTED BY: T. Wiberg | DATE: 9/21/2015 |
| DRAWN BY: A. Zimmerman | PROJECT NUMBER: 0888812796 |

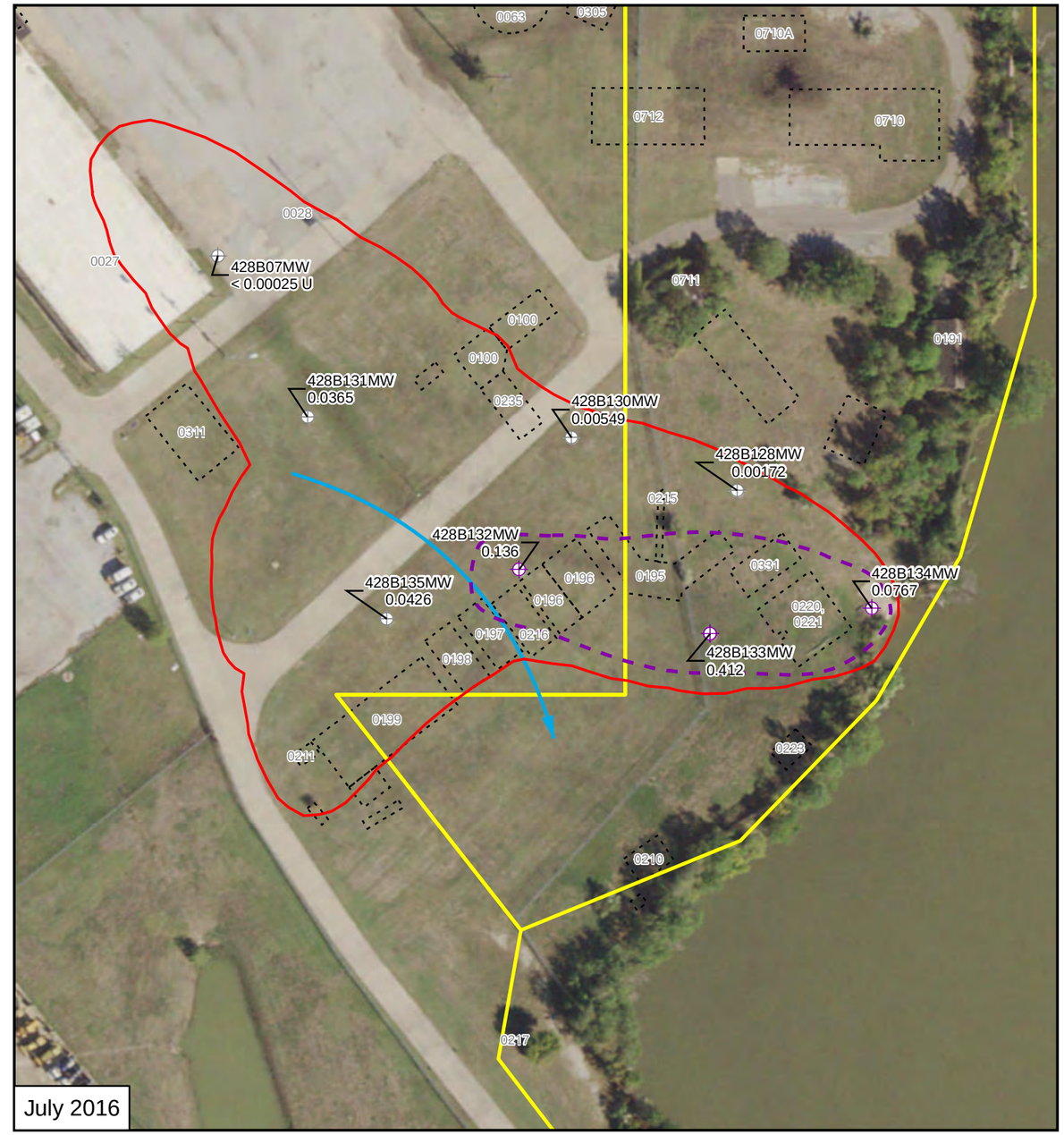
X:\Navy\NAS_Dallas\NAS_Dallas_Jan14_AffectedPropMap.mxd

Service Layer Credits: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community; State boundary is from the United States Census Bureau; Some data are from TetraTech.

# ISOCONCENTRATION CONTOUR MAPS




January 2016




July 2016

N

**cis-1,2-DCE (mg/L)**
- ND - 0.07
- > 0.07 - 0.7

Gross PCLE Zone Outline
Property Boundary 2014
Groundwater Flow Direction

**Isoconcentration Contours**
0.07 mg/L

Demolished Building

Note: The PCL for cis-1,2-DCE = 0.07 mg/L
J = Estimated value
L = Bais low
U = Non-detect

0 50 100 150 200 Feet

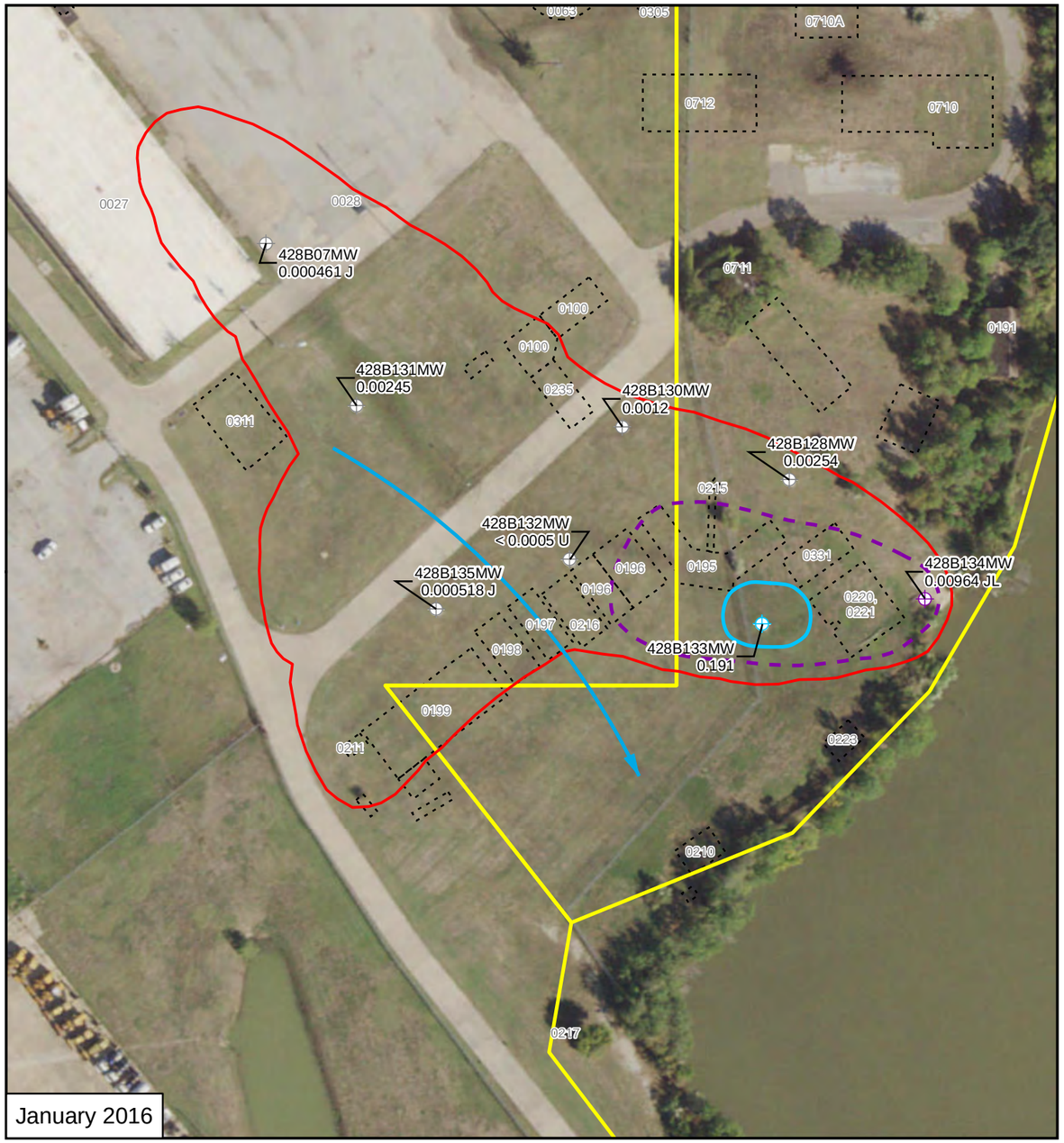
Figure 1A-2A
cis-1,2-Dichloroethene Isoconcentration Contours
SWMU 86
2016 RAER
Former NAS Dallas, Texas

NAVFAC Naval Facilities Engineering Command

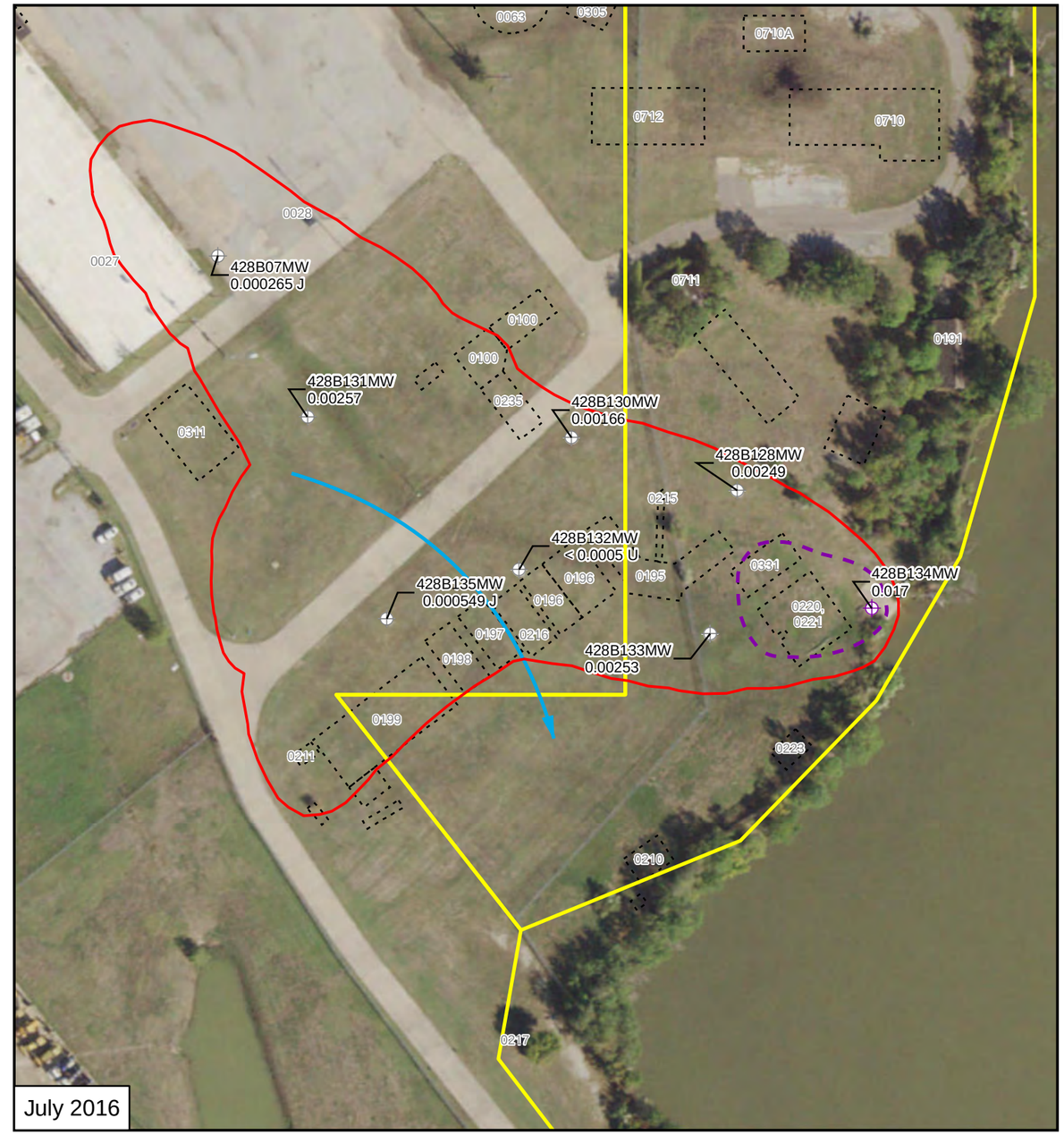
| | |
|---|---|
| REQUESTED BY: W. Ward | DATE: 11/18/2016 |
| DRAWN BY: A. Zimmerman | PROJECT NUMBER: 0888812796 |

X:\Navy\NAS_Dallas\project\2016_RAER\2016_NAS_Dallas_iso_cis12DCE_SWMU86.mxd

Service Layer Credits: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community




January 2016




July 2016

N

**TCE Concentration (mg/L)**
- ND - 0.005
- >0.005 - 0.05
- >0.05 - 0.5

- Gross PCLE Zone Outline
- Property Boundary 2014
- Groundwater Flow Direction

**Isoconcentration Contours**
- 0.005 mg/L
- 0.05 mg/L

Demolished Building

Note: The PCL for TCE = 0.005 mg/L
J = Estimated value
L = Bais low
U = Non-detect

0 50 100 150 200 Feet

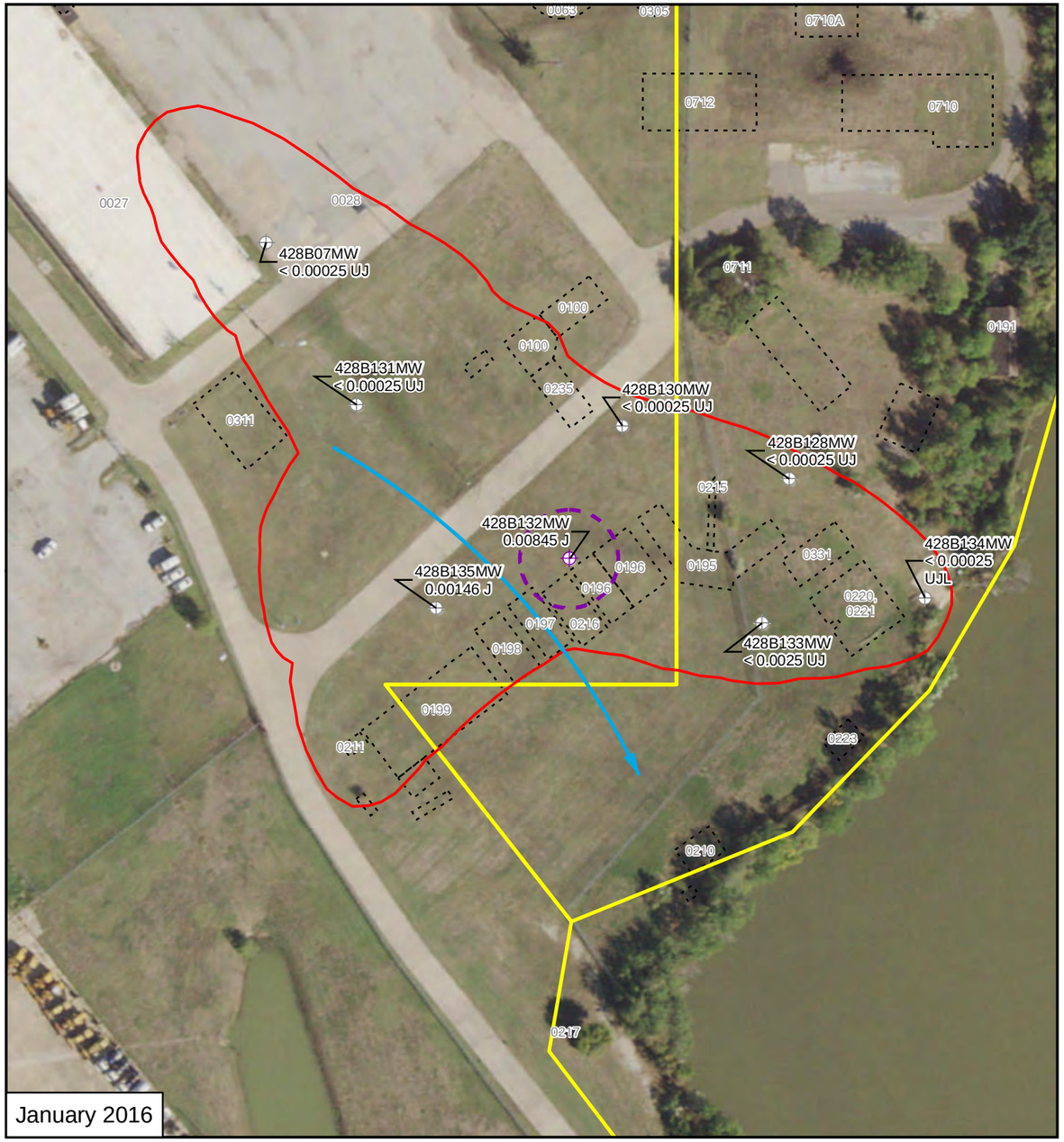
Figure 1A-2A
Trichloroethene Isoconcentration Contours
SWMU 86
2016 RAER
Former NAS Dallas, Texas

NAVFAC Naval Facilities Engineering Command

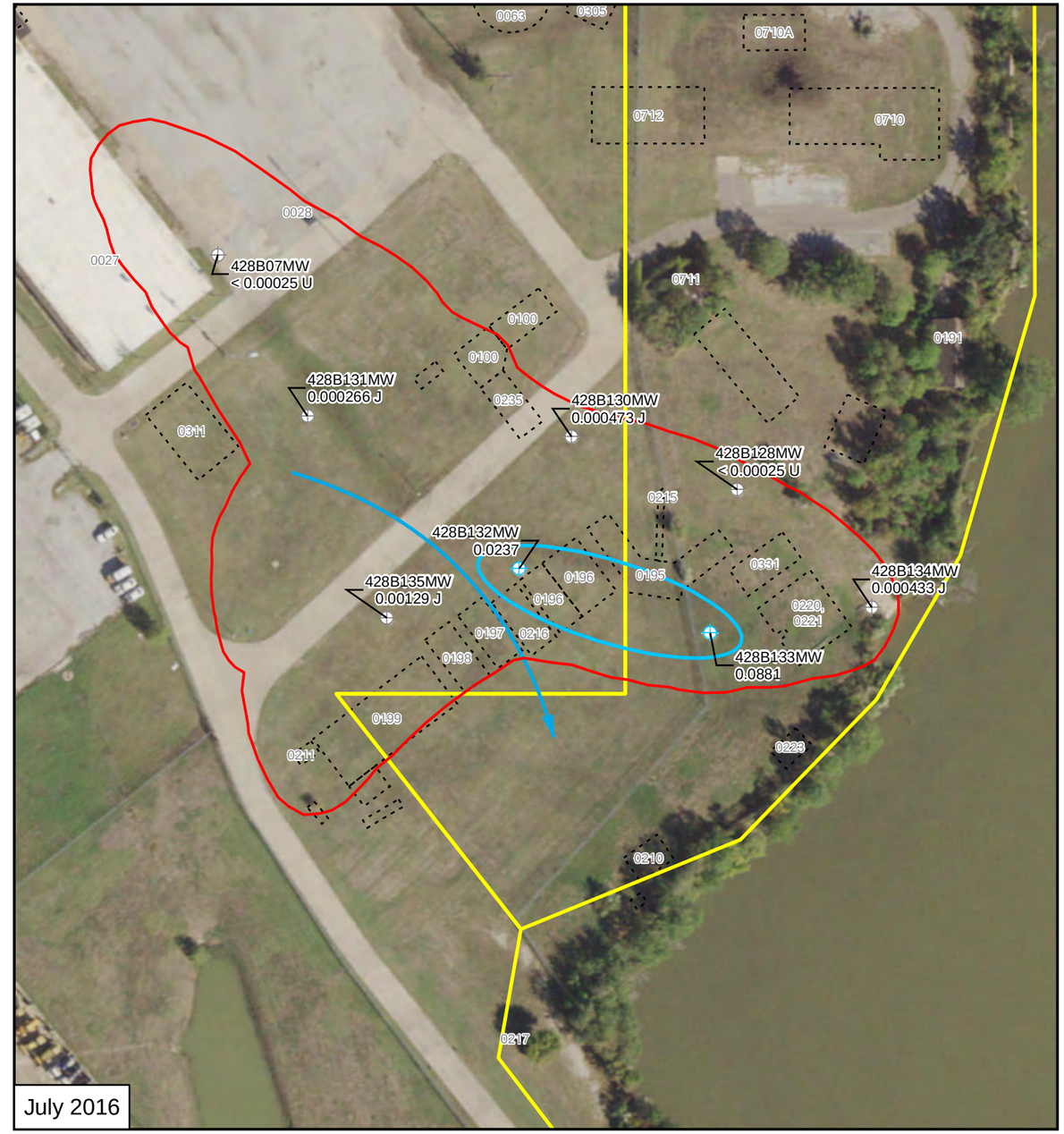
| | |
|---|---|
| REQUESTED BY: W. Ward | DATE: 11/18/2016 |
| DRAWN BY: A. Zimmerman | PROJECT NUMBER: 0888812796 |

X:\Navy\NAS_Dallas\project\2016_RAER\2016_NAS_Dallas_iso_TCE_SWMU86.mxd

Service Layer Credits: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community




January 2016




July 2016

N

**VC (mg/L)**

- ND - 0.002
- > 0.002 -0.02
- > 0.02 - 0.2

- Gross PCLE Zone Outline
- Property Boundary 2014
- Groundwater Flow Direction

**Isoconcentration Contours**

- 0.002 mg/L
- 0.02 mg/L

- Demolished Building

Note: The PCL for VC = 0.002 mg/L
J = Estimated value
L = Bais low
U = Non-detect

0 50 100 150 200 Feet

Figure 1A-2A
Vinyl Chloride Isoconcentration Contours
SWMU 86
2016 RAER
Former NAS Dallas, Texas

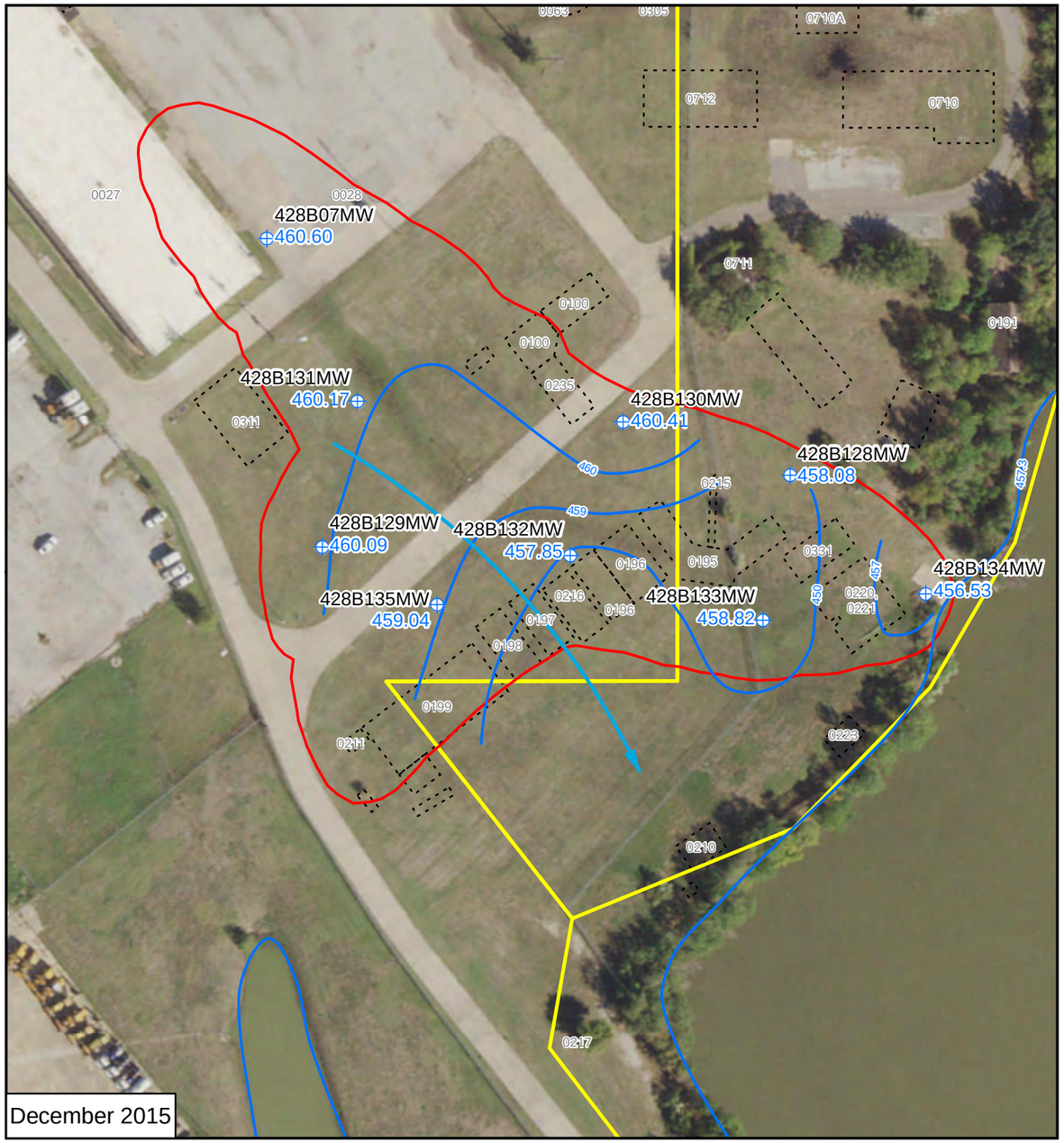
NAVFAC Naval Facilities Engineering Command

| | |
|---|---|
| REQUESTED BY: W. Ward | DATE: 11/18/2016 |
| DRAWN BY: A. Zimmerman | PROJECT NUMBER: 0888812796 |

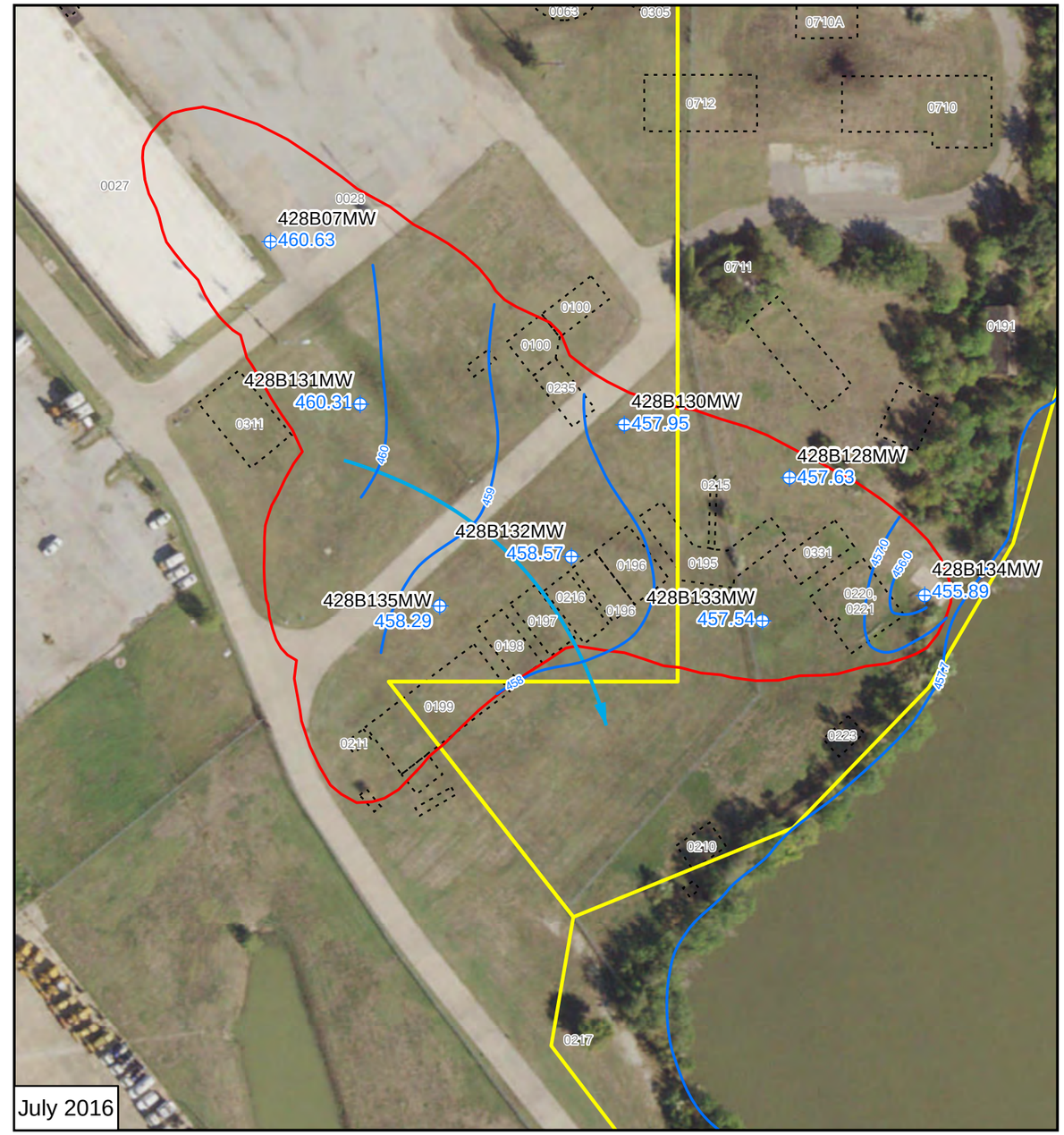
X:\Navy\NAS_Dallas\project\2016_RAER\2016_NAS_Dallas_Iso_VC_SWMU86.mxd

Service Layer Credits: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

# POTENTIOMETRIC SURFACE MAPS




December 2015




July 2016

N

- Well Location
- Potentiometric Surface Contour
- Groundwater Flow Direction
- Gross PCLE Zone Outline
- Demolished Building
- Property Boundary 2014

Notes:
460.63 - Potentiometric Surface Contour (Feet above MSL)
* USGS Surface Water Elevation for Mountain Creek Lake (Site No.-08050050)

0 50 100 150 200 Feet

Figure 1A-3
Potentiometric Surface Map
SWMU 86
2016 RAER
Former NAS Dallas, Texas

NAVFAC Naval Facilities Engineering Command

| | |
|---|---|
| REQUESTED BY: L. Foss | DATE: 10/13/2016 |
| DRAWN BY: K. Burnum | PROJECT NUMBER: 0888812796 |

X:\Navy\NAS_Dallas\2016_Jul_NAS_Dallas_Iso_POT_SWMU86.mxd

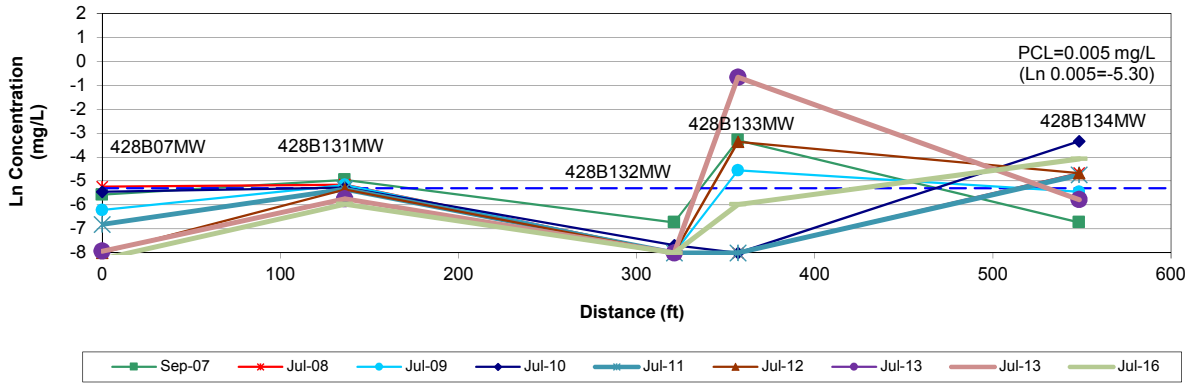
Service Layer Credits: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community

# ATTACHMENT 1B
# GRAPHS

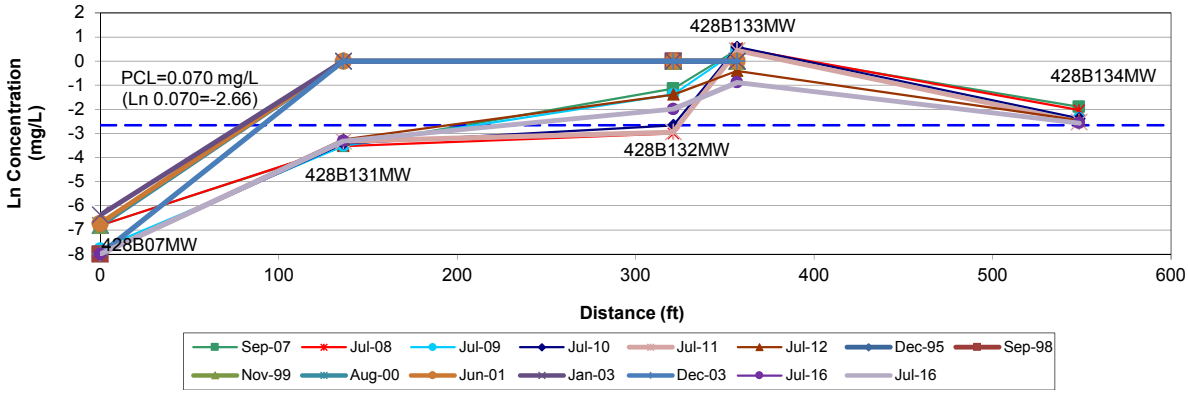
# CONCENTRATION VS. DISTANCE GRAPHS
# SWMU 86 PLUME
# 2016 RAER

## FORMER NAS DALLAS, TEXAS

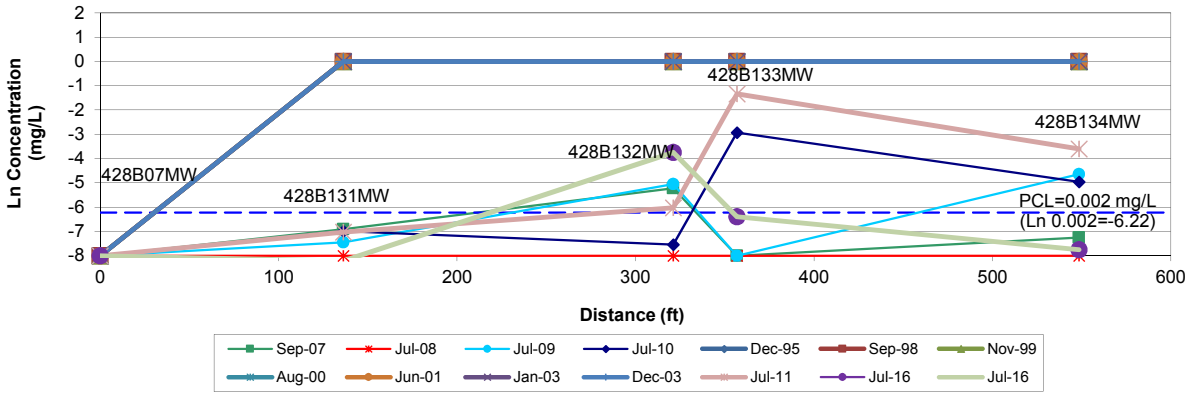
### TCE




### cis-1,2-DCE




### Vinyl Chloride

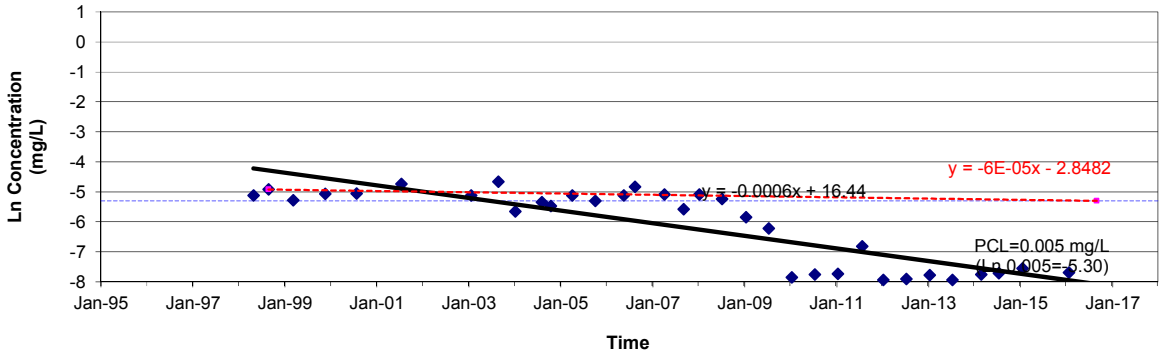



Notes: Graphed data points are taken from raw data.
Sample events using passive diffusion bag (PDB) samplers are listed on Tables 4-1A and 4-1B in Appendix 4.

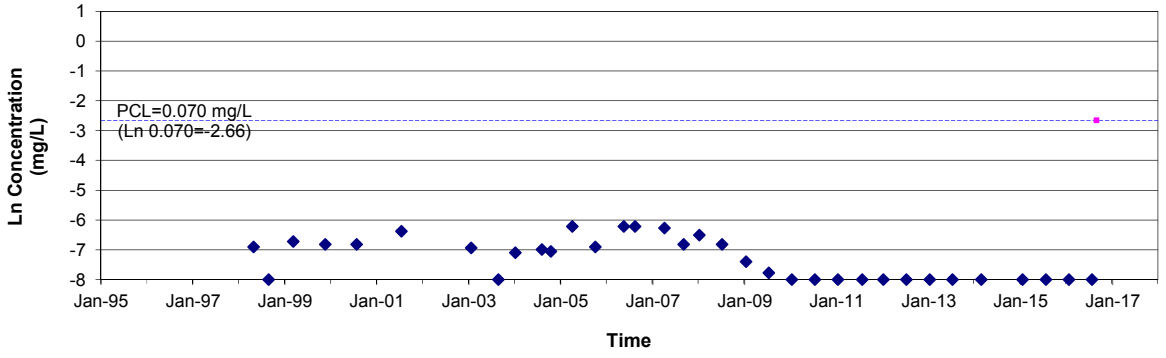
# CONCENTRATION VS. TIME GRAPHS
# WITH MINIMUM REQUIRED ATTENUATION RATES
# SWMU 86 PLUME
# 428B07MW
# 2016 RAER

## FORMER NAS DALLAS, TEXAS

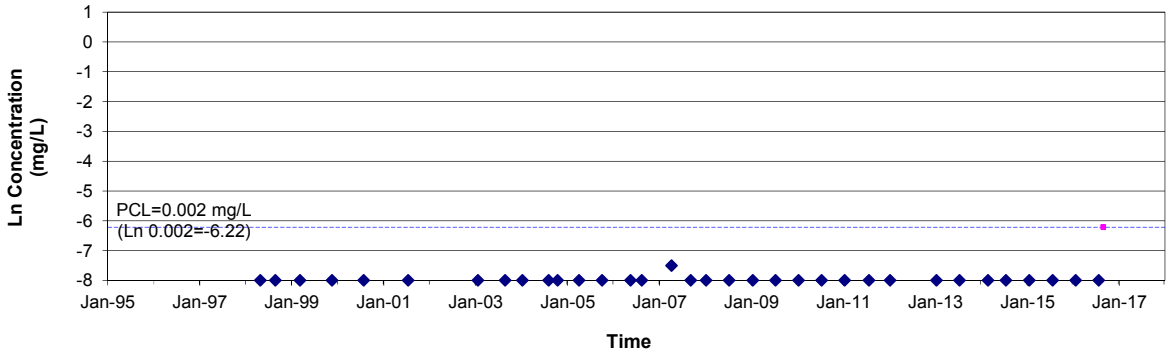
### TCE




### cis-1,2-DCE




### Vinyl Chloride

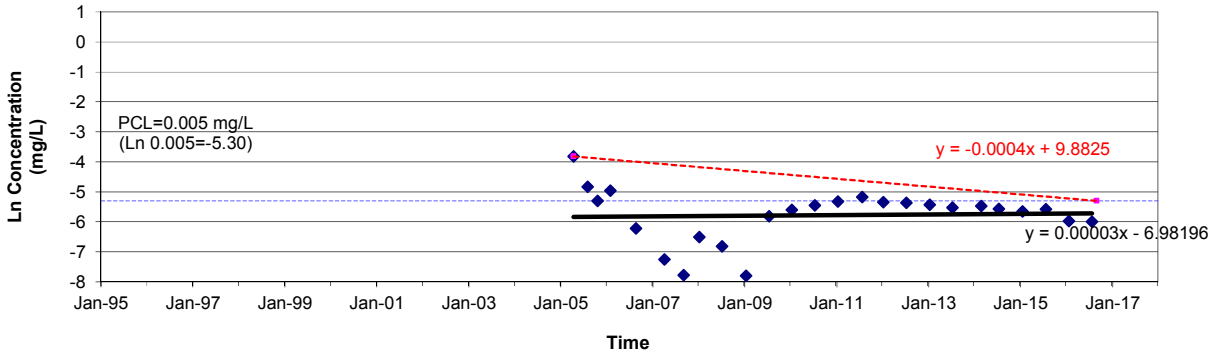



Notes: Red line and slope are based on minimum required attenuation rate (ktime) to meet PCL by 01 Sep 2016.
Black line and slope are based on linear regression of the raw data.
Sample events using permeable diffusion bag (PDB) samplers are listed on Tables 4-1A and 4-1B in Appendix 4.

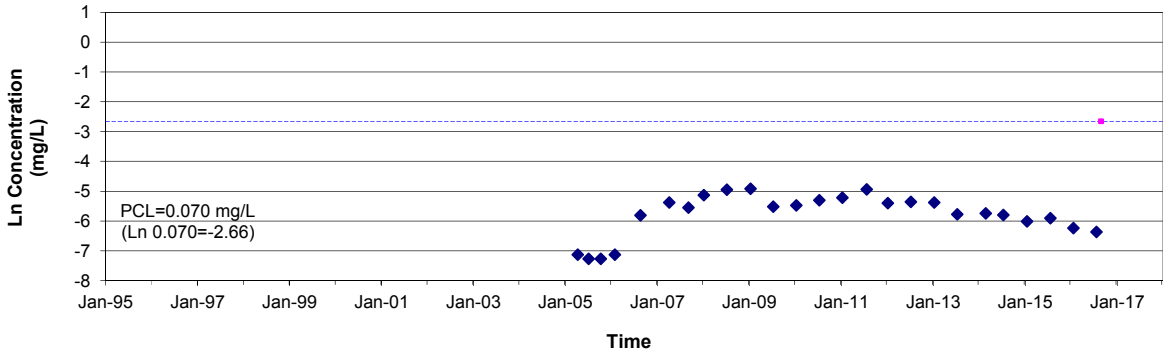
# CONCENTRATION VS. TIME GRAPHS
# WITH MINIMUM REQUIRED ATTENUATION RATES
# SWMU 86 PLUME
# 428B128MW
# 2016 RAER

## FORMER NAS DALLAS, TEXAS

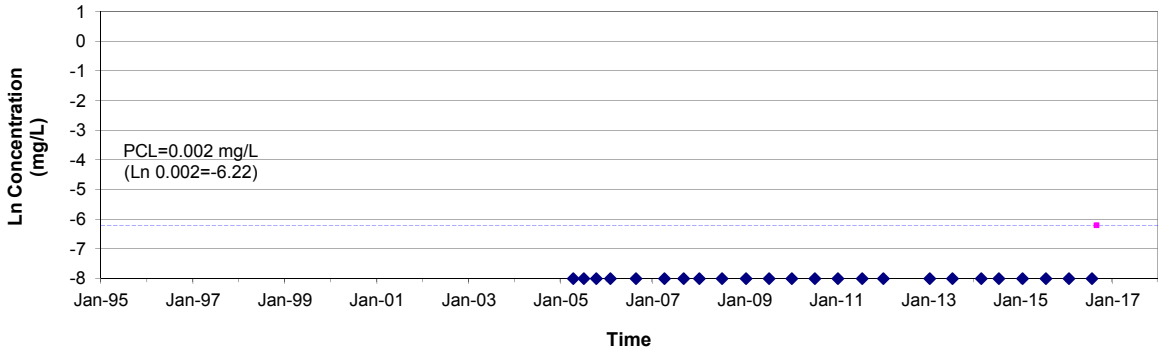
### TCE




### cis-1,2-DCE




### Vinyl Chloride

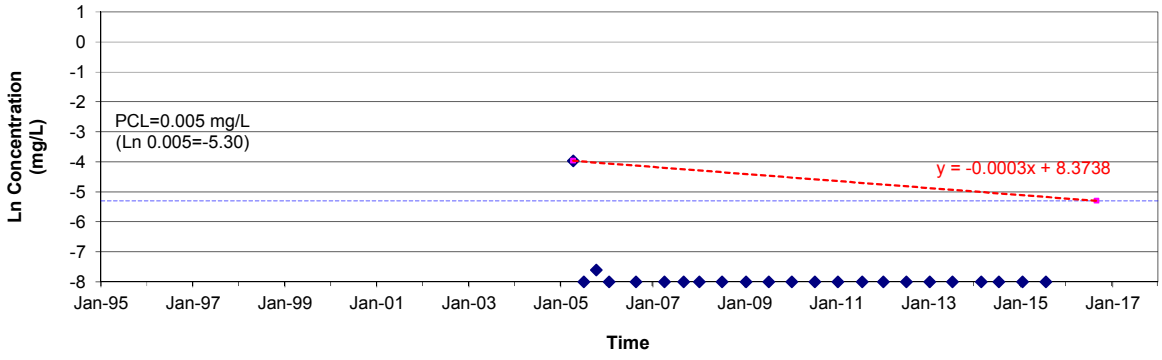



Notes: Red line and slope are based on minimum required attenuation rate (ktime) to meet PCL by 01 Sep 2016.
Black line and slope are based on linear regression of the raw data.
Sample events using permeable diffusion bag (PDB) samplers are listed on Tables 4-1A and 4-1B in Appendix 4.

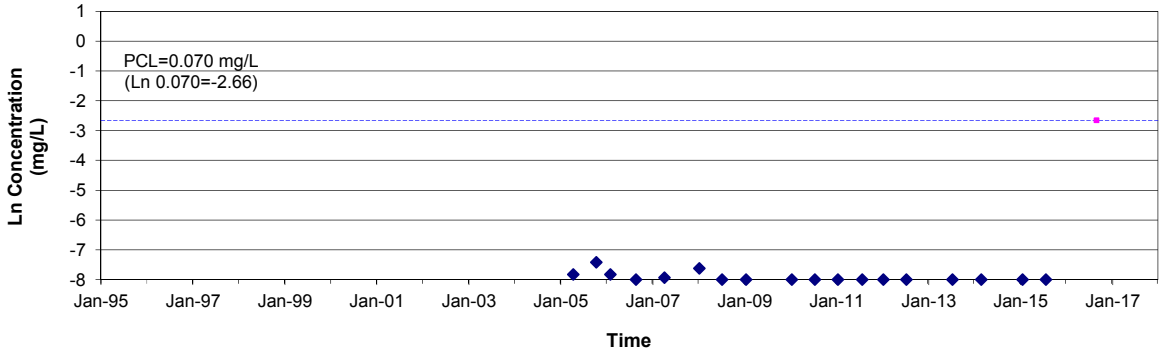
# CONCENTRATION VS. TIME GRAPHS
# WITH MINIMUM REQUIRED ATTENUATION RATES
# SWMU 86 PLUME
# 428B129MW
# 2016 RAER

## FORMER NAS DALLAS, TEXAS

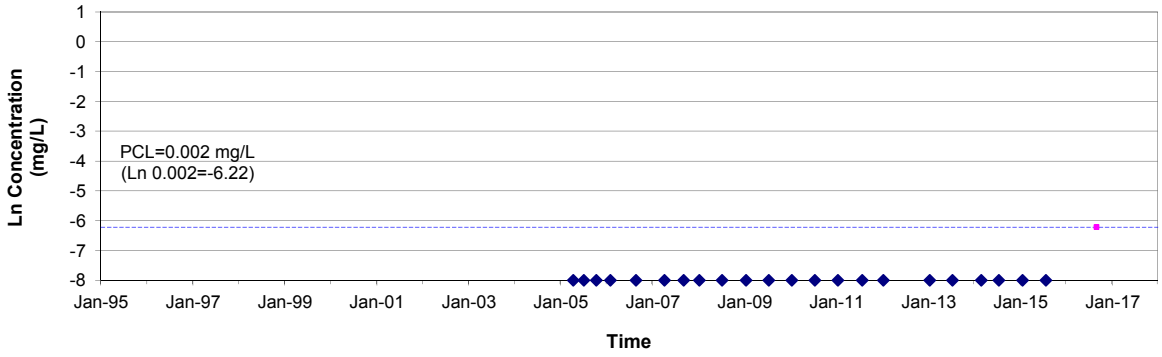
### TCE




### cis-1,2-DCE




### Vinyl Chloride

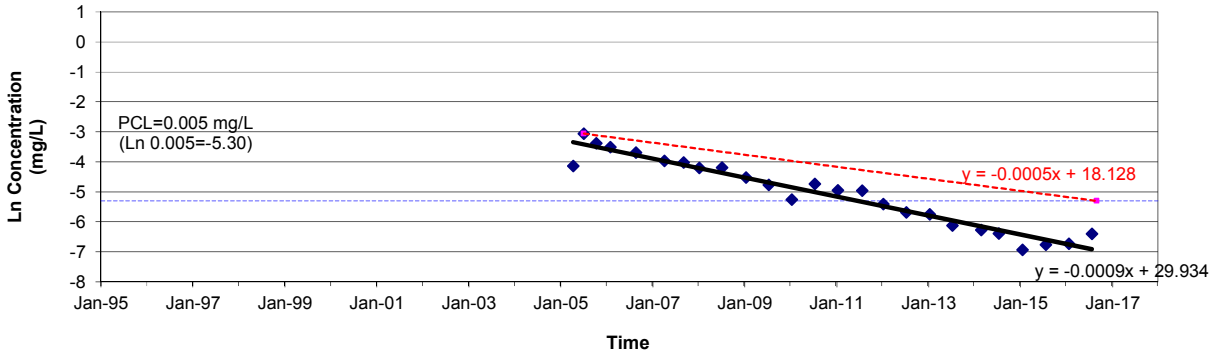



Notes: Red line and slope are based on minimum required attenuation rate (ktime) to meet PCL by 01 Sep 2016.
Black line and slope are based on linear regression of the raw data.
Sample events using permeable diffusion bag (PDB) samplers are listed on Tables 4-1A and 4-1B in Appendix 4.

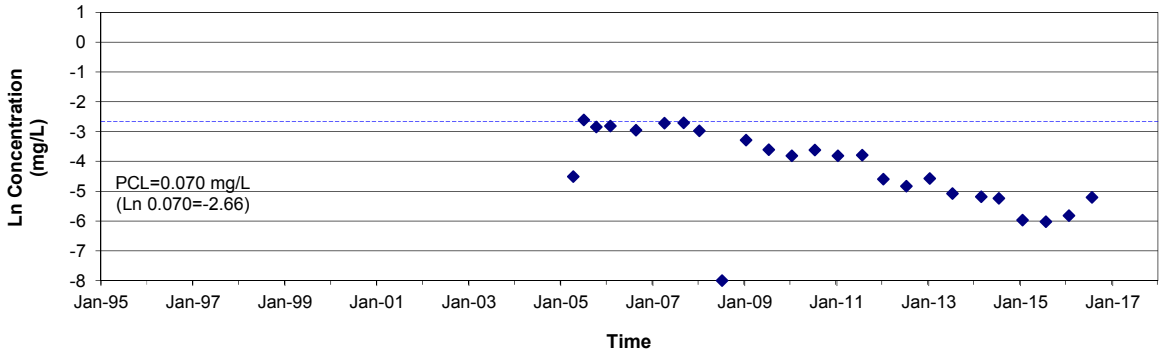
# CONCENTRATION VS. TIME GRAPHS
# WITH MINIMUM REQUIRED ATTENUATION RATES
# SWMU 86 PLUME
# 428B130MW
# 2016 RAER

## FORMER NAS DALLAS, TEXAS

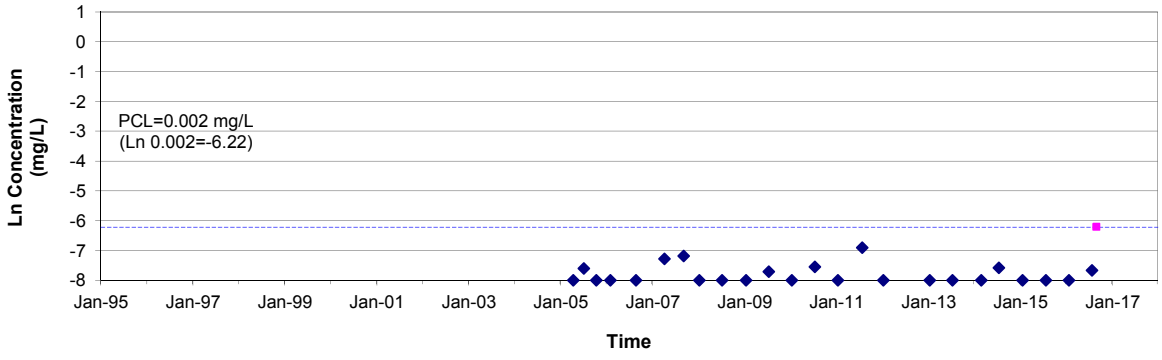
### TCE




### cis-1,2-DCE




### Vinyl Chloride

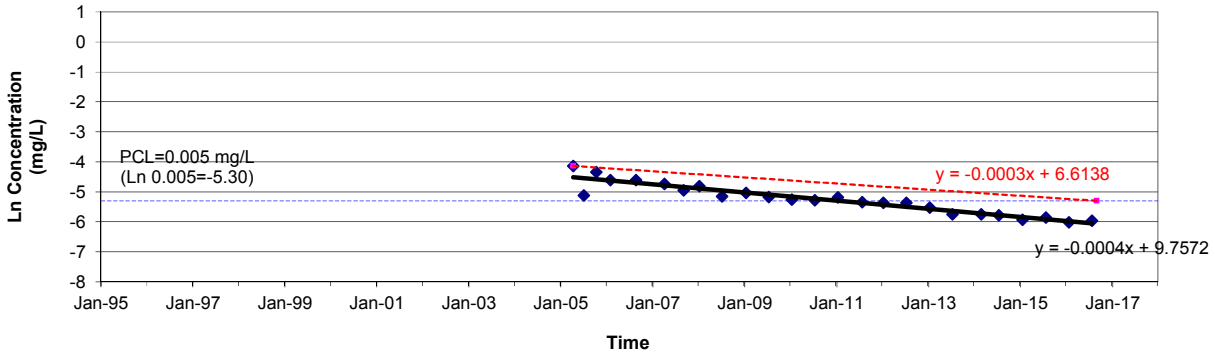



Notes: Red line and slope are based on minimum required attenuation rate (ktime) to meet PCL by 01 Sep 2016.
Black line and slope are based on linear regression of the raw data.
Sample events using permeable diffusion bag (PDB) samplers are listed on Tables 4-1A and 4-1B in Appendix 4.

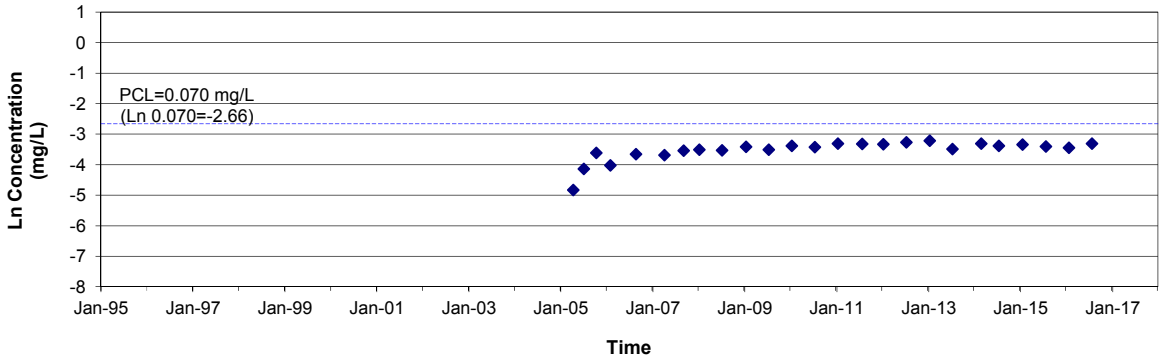
# CONCENTRATION VS. TIME GRAPHS
# WITH MINIMUM REQUIRED ATTENUATION RATES
# SWMU 86 PLUME
# 428B131MW
# 2016 RAER

## FORMER NAS DALLAS, TEXAS

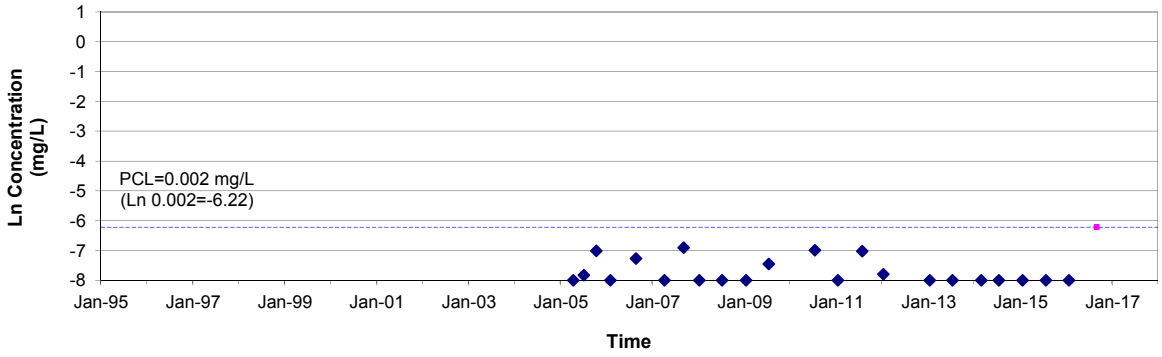
### TCE




### cis-1,2-DCE




### Vinyl Chloride

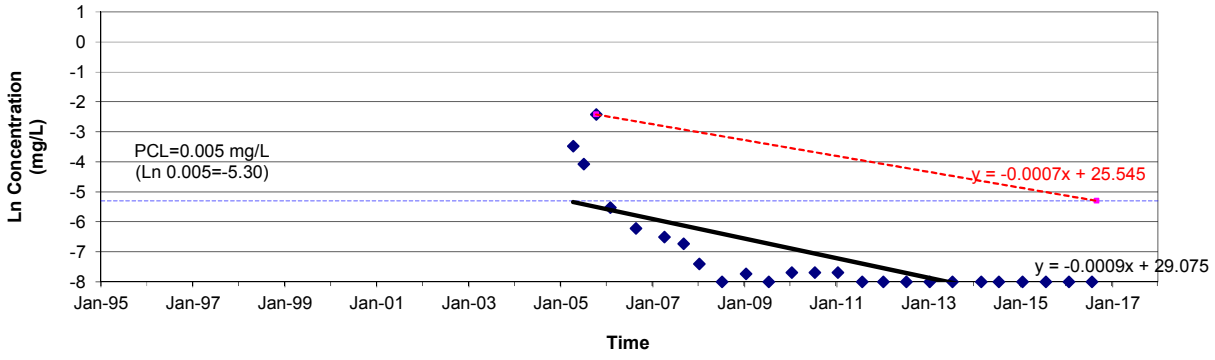



Notes: Red line and slope are based on minimum required attenuation rate (ktime) to meet PCL by 01 Sep 2016.
Black line and slope are based on linear regression of the raw data.
Sample events using permeable diffusion bag (PDB) samplers are listed on Tables 4-1A and 4-1B in Appendix 4.

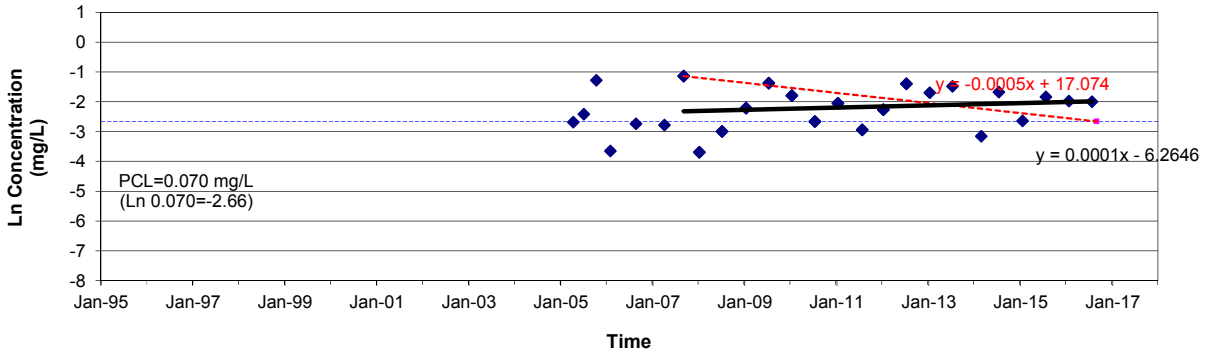
# CONCENTRATION VS. TIME GRAPHS
# WITH MINIMUM REQUIRED ATTENUATION RATES
# SWMU 86 PLUME
# 428B132MW
# 2016 RAER

## FORMER NAS DALLAS, TEXAS

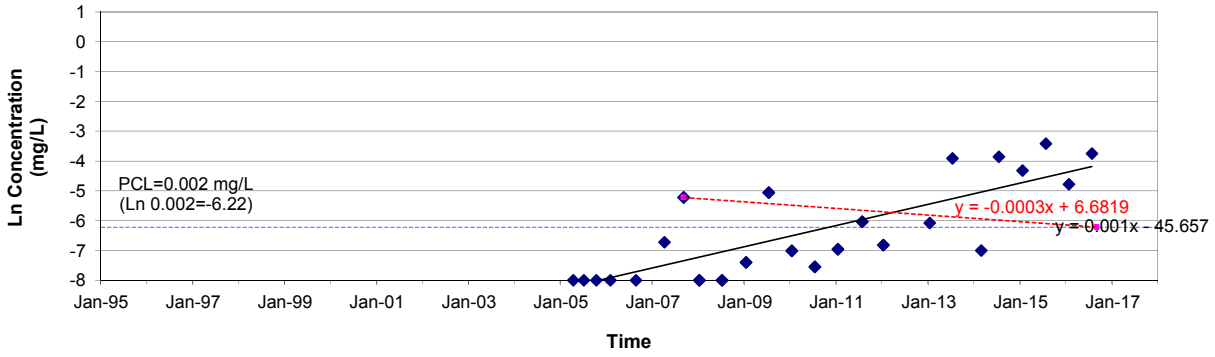
### TCE




### cis-1,2-DCE




### Vinyl Chloride

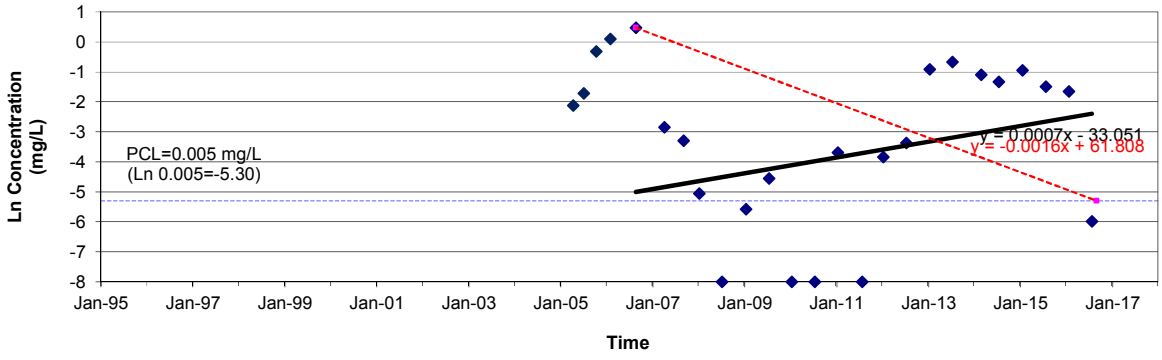



Notes: Red line and slope are based on minimum required attenuation rate (ktime) to meet PCL by 01 Sep 2016.
Black line and slope are based on linear regression of the raw data.
Sample events using permeable diffusion bag (PDB) samplers are listed on Tables 4-1A and 4-1B in Appendix 4.

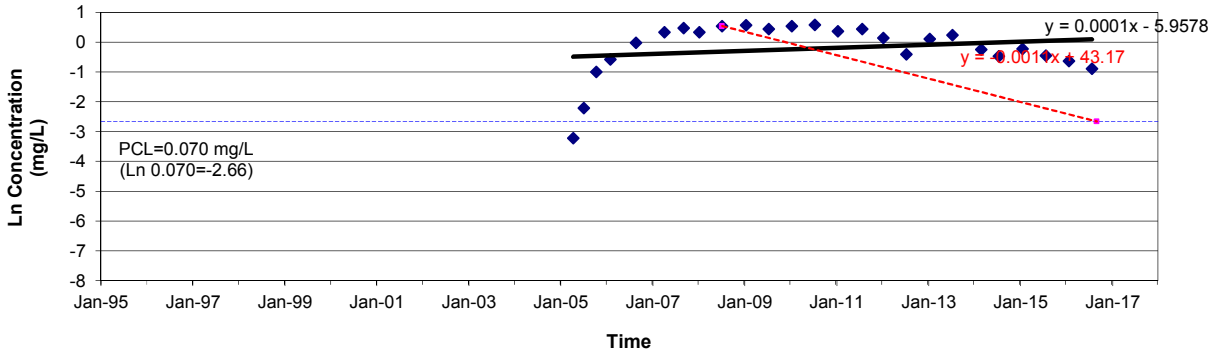
# CONCENTRATION VS. TIME GRAPHS
# WITH MINIMUM REQUIRED ATTENUATION RATES
# SWMU 86 PLUME
# 428B133MW
# 2016 RAER

## FORMER NAS DALLAS, TEXAS

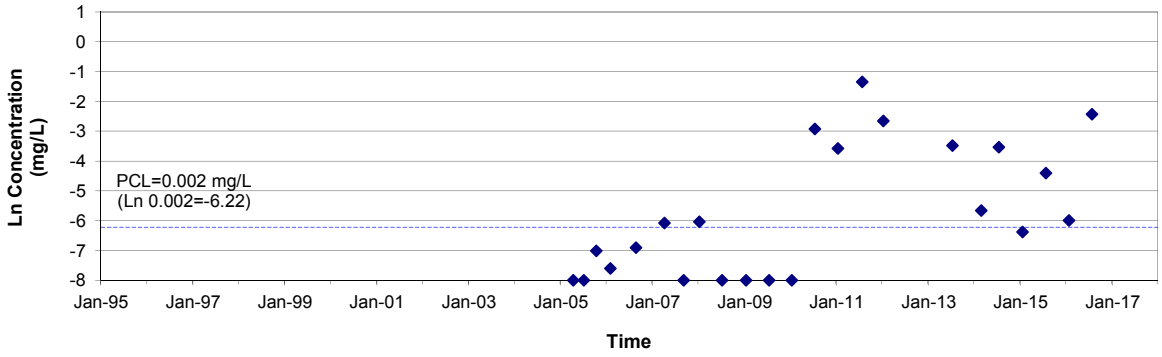
### TCE




### cis-1,2-DCE




### Vinyl Chloride

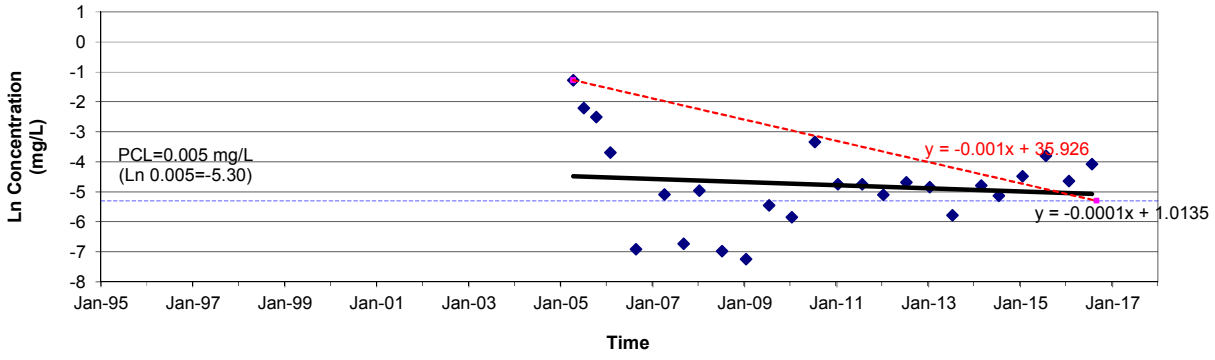



Notes: Red line and slope are based on minimum required attenuation rate (ktime) to meet PCL by 01 Sep 2016.
Black line and slope are based on linear regression of the raw data.
Sample events using permeable diffusion bag (PDB) samplers are listed on Tables 4-1A and 4-1B in Appendix 4.

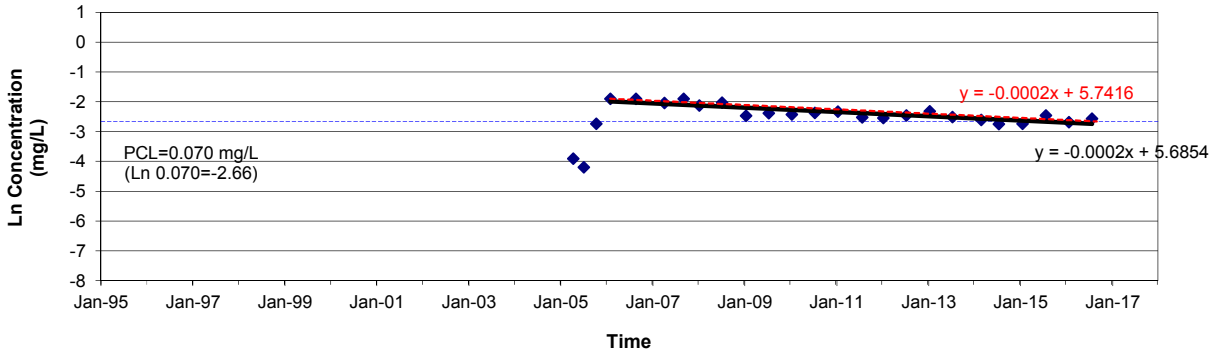
# CONCENTRATION VS. TIME GRAPHS
# WITH MINIMUM REQUIRED ATTENUATION RATES
# SWMU 86 PLUME
# 428B134MW
# 2016 RAER

## FORMER NAS DALLAS, TEXAS

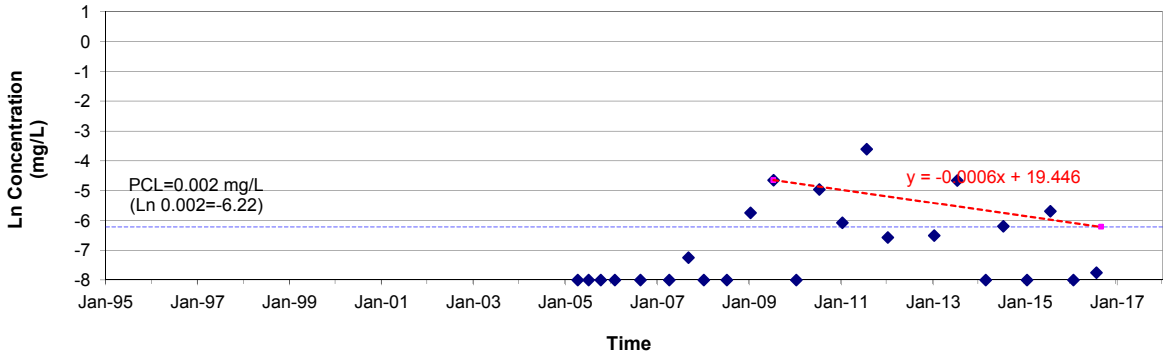
### TCE




### cis-1,2-DCE



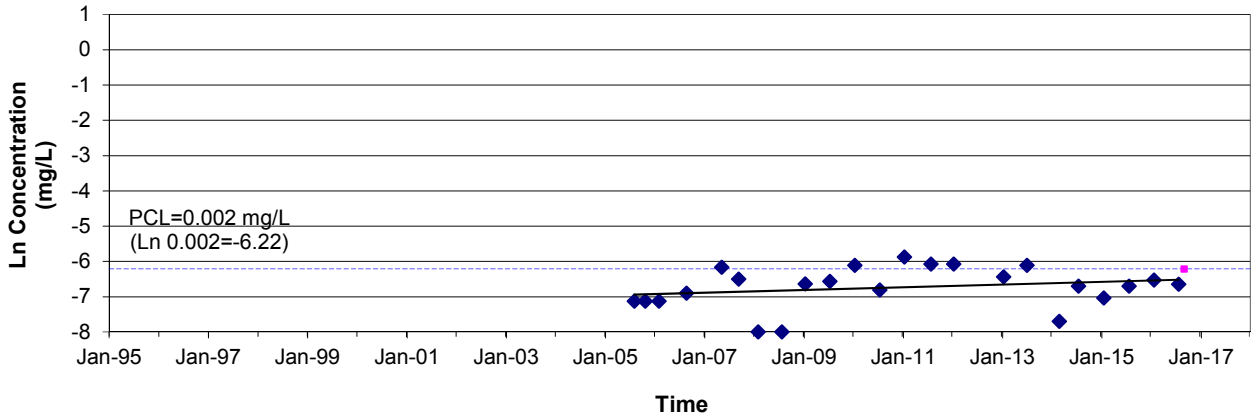

### Vinyl Chloride




Notes: Red line and slope are based on minimum required attenuation rate (ktime) to meet PCL by 01 Sep 2016.
Black line and slope are based on linear regression of the raw data.
Sample events using permeable diffusion bag (PDB) samplers are listed on Tables 4-1A and 4-1B in Appendix 4.

# CONCENTRATION VS. TIME GRAPHS
# WITH MINIMUM REQUIRED ATTENUATION RATES
# SWMU 86 PLUME
# 428B135MW
# 2016 RAER
# FORMER NAS DALLAS, TX

## Vinyl Chloride




Black line and slope are based on linear regression of the raw data.

Sample events using permeable diffusion bag (PDB) samplers are listed on Tables 4-1A and 4-1B in Appendix 4.

## Performance Measures

List and describe the performance measures for each environmental medium containing a PCLE zone that are being used to determine if reasonable progress is being made by the response action in a timely manner. Provide documentation that these performance measures are being met. Attach additional information if necessary.

**MNA Performance Measures**

**After the soil excavation and groundwater removal in the plume area, the approach to determine if MNA is consistently achieving the clean-up goals by 2017 involves sequential sampling events to monitor the size and shape of the PCLE zone over time. To this effect, a tiered sampling program incorporating performance, detection, and ambient monitoring was implemented. This sampling program allows collection of analytical data on the COCs, groundwater flow, and geochemical parameters that may affect the progress of MNA and the likelihood of meeting site remediation goals. The design of the monitoring program allows a conclusion of success or failure to be drawn as early as possible during the response action implementation while providing reasonable confidence in the conclusion.**

**Performance monitoring encompasses the sampling of the point of exposure wells (428B07MW, 428B128MW, 428B130MW, 428B131MW, 428B132MW, 428B133MW, 428B134MW, and 428B135MW) within the original groundwater plume. Data collected from these monitoring wells serves to check the plume shape and determine if it is shrinking or expanding, stable or migrating, thus triggering programmatic adjustments if necessary. COC analytical data collected from the monitoring wells located along the plume centerline were used to determine plume attenuation rates for individual chemical constituents ($k_{time}$) and for the plume as a whole ($k_{dist}$). The COC analytical results are summarized in Table 4-1.**

**Monitoring well 428B129MW has had COC detections below applicable GWPSs for at least the previous five consecutive years. This well was abandoned on April 7, 2016, in accordance with the RAP submitted to TCEQ in October 2015. Well plugging reports are located in Appendix 4 and historical COC analytical results for P&A'd wells are included in Table 4-1B.**

**Performance monitoring for 2016 also entailed sampling for MNA parameters (pH, ORP, dissolved oxygen, iron, nitrate, nitrite, phosphate, sulfate, total organic carbon, chloride, ethene, ethane, and methane) during the July 2016 sampling event. MNA parameters are sampled on a biennial sampling schedule. The MNA parameters measured by field tests and laboratory analyses are presented in Table 4-2. MNA parameter data, as needed, serve as a secondary line of evidence to evaluate whether subsurface conditions continue to support natural attenuation.**

**The conceptual MNA site model for this plume is represented in the data tables in Appendix 4, isoconcentration maps and potentiometric surface maps included in Attachment 1A, and the concentration versus (vs.) time and concentration vs. distance graphs in Attachment 1B.**

**After each semi-annual groundwater monitoring event, the COC concentration data collected have been evaluated for both the entire plume and monitoring well by monitoring well basis in accordance with the RAP (Tetra Tech 2006). The initial data analysis and interpretation focused on the detection of trend changes in the data. Further evaluation focused on the assessment of the changes or trends and their impact on MNA in achieving the site related goals. The evaluation of the analytical data was also used to identify any outlier monitoring wells that indicated conditions contrary to the expected remedial performance in the plume.**

**It was expected that the analytical data would indicate that the attenuation rates are sufficient to effectively remediate the plume on or before the year 2017. Reasonable progress of the response action is evaluated considering the following criteria:**

- **The monitoring well's COC specific $k_{time}$ attenuation rate based on the available sampling data is not more than the minimum attenuation rate necessary to meet the remedial goals by the year 2017.**

- **The monitoring well's COC specific concentration is less than the remedial benchmark concentration (calculated concentration goal based on the initial maximum concentration and the minimum rate necessary to achieve the remedial goals by 2017) for that sample date.**

- **The COC specific $k_{dist}$ attenuation rate based on the available sampling data indicates an actual attenuation equal to or faster than the rate of COC migration from the suspected source area.**

**Response Action Progress**

**Table 4-3 summarizes the groundwater gauging data. The potentiometric surface maps for the December 2015 and July 2016 gauging events, included in Figure 1A-3 (Attachment 1A), indicate that the shape of the groundwater elevation contours and direction of groundwater flow remain consistent with previous sampling events.**

**The COC isoconcentration contour maps, prepared using the data collected during the January and July 2016 sampling events, are included in Figures 1A-2A through 1A-2C (Attachment 1A). A review of the 2016 data indicate the following:**

- **TCE, cis-1,2-DCE, and VC are the only COCs at SWMU 86 currently exceeding PCLs.**

- **TCE exceeded its PCL in only two of the four monitor wells (428B133MW and 428B134MW).**

- **TCE exceeded its PCL of 0.005 mg/L in monitoring wells 428B133MW (0.191 mg/L) and 428B134MW (0.0094 mg/L) during the January sampling event only, and in 428B134MW (0.017 mg/L) during the July sampling event only.**

- **Cis-1,2-DCE exceeded its PCL in only three of the eight monitor wells (428B132MW, 428B133MW, and 428B134MW).**

- **Cis-1,2-DCE exceeded its PCL of 0.070 mg/L in monitoring wells 428B132MW (0.138 and 0.136 mg/L) and 428B133MW (0.53 and 0.412 mg/L) during both the January and July sampling events, and monitoring well 428B134MW (0.767 mg/L) during the July sampling event only.**

- **VC exceeded its PCL in only two of the eight monitor wells (428B132MW and 428B133MW).**

- **Vinyl chloride exceeded its PCL of 0.002 mg/L in monitoring well 428B132MW (0.00845 and 0.237 mg/L) during both the January and July sampling events, and in monitoring well 428B133W (0.0881 mg/L) during the July sampling event only.**

- **There was no expansion of the PCLE zone or offsite migration of COCs at concentrations greater than PCLs in 2016.**

**Tables 4-4 and 4-5 (Appendix 4) summarize the concentration vs. time and concentration vs. distance attenuation rate constants for the plume centerline. The graphs in Attachment 1B graphically depict the same attenuation rate constants summarized in Tables 4-4 and 4-5 and the minimum required attenuation rate to meet the remediation goals. Based on the data presented:**

- **TCE concentrations in monitoring wells, with the exception of 428B133MW, continue to display decreasing trends.**

- **The TCE concentration trend for monitoring well 428B133MW is increasing to stable, indicating remedial goals will not be achieved by 2017.**

- **Cis-1,2-DCE concentration trends for monitoring wells 428B132MW and 428B133MW are increasing to stable, indicating remedial goals will not be achieved by 2017.**

- **VC concentration trends for monitoring wells 428B132MW, 428B133MW, and 428B134MW are increasing, indicating that remedial goals will not be achieved by 2017.**

- **As TCE concentrations have decreased, cis-1,2-DCE concentrations have been stable or show decreasing trends. Cis-1,2-DCE concentrations are anticipated to decline as it degrades into VC. As expected for natural reductive dechlorination process, VC concentrations show an overall increasing trend for some monitoring wells, and VC concentrations are not expected to decline to less than its PCL until cis-1,2-DCE concentrations decline to less than its PCL.**

- **At this time the data suggest that remediation of the plume through MNA is occurring, but at rates that indicate remedial goals are not being met for TCE and its daughter compounds cis-1,2-DCE and VC. Therefore, concentrations for the COCs TCE, cis-1,2-DCE, and VC in groundwater will not achieve remedial goals by 2017.**

**As discussed in the sections above, and based on primary lines of evidence, excavation followed by MNA has not appeared to be an appropriate remedial method to reduce the COCs to their critical PCLs in a reasonable time frame (i.e., on or before 2017). Monitoring wells 428B132MW, 428B133MW, and 428B134MW show a lack of progress towards clean-up, with indications that MNA has slowed or ceased to the point that the remedial goals will not be achieved at these locations of the plume. Therefore, in accordance with the Groundwater RAP (Revision 2), and as recommended by TCEQ in a letter dated May 26, 2015, failure of the response action triggers the implementation of contingency measures, which may include the selection of an appropriate alternate remedial measure such as enhanced MNA (EMNA). The Navy has proposed to implement EMNA at the affected area of SWMU 18 groundwater plume in an effort to reduce COCs to below PCLs and evaluate an alternate remedy in a pilot study. This study will allow the Navy to make a determination as to whether the technology is viable. Depending upon the results of the EMNA spot treatment at SWMU 18, alternative remedial measures may be proposed in a comprehensive RAP for SWMU 86 Plume. MNA will be continued for the upcoming year in accordance with the procedures and protocols described in the Groundwater RAP on record.**

**In October 2015, the Navy submitted a revised RAP (Revision 3) (Resolution Consultants, 2015) to TCEQ. The purpose of the revised RAP was to remove monitor wells from the current monitoring and sampling plan and confirmation sampling plan. In accordance with the RAPs, Resolution Consultants conducted P&A of select groundwater monitoring wells in April 2016. P&A actions were conducted by a state of Texas licensed driller (Strata Core Services, SCI). Monitoring well 428B129MW was abandoned on April 7, 2016.**

## Problems

Complete the table for the response action. When the response action consists of several components or multiple actions, complete one table for each major component or action.

Response Action Name/Designation: *Groundwater Response Action*

List the problems that have been encountered during the response action, describe the impact of each problem, and the response to the problem.

| Description of the Problem | Impact | Did this cause a response action failure? | | Corrective Response |
|---|---|---|---|---|
| | | Yes | No | |
| **The soil removal action conducted in 2004 failed to remove the TRRP RES A exceedances due to encountering the Eagle Ford Shale.** | **To be determined** | | **X** | **Continue to monitor the natural attenuation of the dissolved-phase chlorinated VOCs to determine if the remedial goals for 2016 will be achieved.** |
| **The current remedy, soil removal followed by MNA, does not appear to be capable of reducing concentrations of COCs at monitoring wells 428B132MW, 428B133MW, and 428B134MW by the cleanup goal of 2017.** | **In accordance with the Groundwater RAP on record, failure of the approved response action to meet critical PCLs triggers the implementation of contingency measures, which includes the selection of an appropriate alternate remedial measure.** | **X** | | **An Alternatives Evaluation Report (AER) was submitted to TCEQ. The Navy has proposed to implement EMNA as an alternate remedy at the affected area of SWMU 18 groundwater plume in an effort to reduce COCs to below PCLs. Depending on the results of the EMNA spot treatment at SWMU 18, alternative remedial measures may be proposed in a comprehensive RAP for SWMU 86 Plume. MNA will be continued at the SWMU 86 Plume for the upcoming year in accordance with the procedures and protocols described in the Groundwater RAP (Revision 2), dated February 2006.** |

Use this worksheet to describe the operation and maintenance (O&M) activities conducted for each response action.

Response Action Name/Designation: Well maintenance

List all portions of the response action to which this information applies. Repeat this worksheet for each major component or operation.

Describe the O&M and inspection activities that have been conducted to operate and maintain response action components.

**Monitoring well 428B129MW had COC detections below applicable GWPSs for at least the previous five consecutive years. This well was abandoned on April 7, 2016, in accordance with the RAP submitted to TCEQ in October 2015. Well plugging reports are located in Appendix 4, and historical COC analytical results for P&A'd wells are included in Table 4-1B. During this same time, monitor wells 428B128MW, 428B130MW, 428B131MW, 428B132MW, 428B133MW, 428B134MW, and 428B135MW (all stickup wells) were checked, and any bollards that had been damaged by landscaping activities were righted and secured with new concrete anchoring.**

**In September 2016, Resolution Consultants conducted a detailed evaluation of well maintenance needs for NAS Dallas SWMUs. The surface completion at monitoring well 428B07MW was re-fitted by tapping the rim eyelets and replacing bolts and washers in order to secure the lids. The stickup wells were checked and all were in good condition, all pads and bollards were stable and the wells were locked.**

# APPENDIX 1
# REFERENCE LIST

# APPENDIX 1
# REFERENCES

A.T. Kearney, Inc. *RCRA Facility Assessment Preliminary Review/Visual Site Inspection. Chicago, Illinois*. 1989.

CH2M Hill. *85 Sites, Defense Reutilization and Marketing Office, and Naval Weapons Industrial Reserve Plant SWMU 18 Response Action Completion Report, Revision 2, Naval Air Station Dallas, Dallas, Texas*. Atlanta, Georgia. 2008.

EnSafe/Allen & Hoshall. *Naval Air Station Dallas Environmental Baseline Survey, Dallas, Texas.* Memphis, Tennessee. 1994.

Texas Commission on Environmental Quality. *Approval of Response Action Effectiveness Reports for Defense Reutilization and Marketing Office and 85 Sites (Revision 2) and Response Action Effectiveness Reports for Naval Weapons Industrial Reserve Plant SWMU 18 (Revision 2), Former Naval Air Station Dallas, Texas.* Austin, Texas. *2008.*

Tetra Tech NUS, Inc. *RCRA Facility Investigation Report for Category C. Pittsburgh, Pennsylvania.* 2000a.

— *RCRA Facility Investigation Report for Category E. Pittsburgh, Pennsylvania.* 2000b.

— *RCRA Facility Investigation Report for Category F. Pittsburgh, Pennsylvania.* 2000c.

— *RCRA Facility Investigation Report for Category D. Pittsburgh, Pennsylvania.* 2001a.

— *RCRA Facility Investigation Report for Category B. Pittsburgh, Pennsylvania.* 2001b.

— *Affected Property Assessment Report. Houston, Texas*. 2002.

— *Self Implementation Notice for Texas Risk Reduction Program, Residential Remedy Standard A Soil, Response Actions*. Pittsburgh, Pennsylvania. 2003a.

— *Draft Groundwater Modeling Report for Category B.* Pittsburgh, Pennsylvania. 2003b.

— *Final Monitoring Natural Attenuation Groundwater Modeling Report for Category B*. Pittsburgh, Pennsylvania. 2004.

— *Response Action Plan, Revision 2*. Pittsburgh, Pennsylvania. 2006.

Resolution Consultants. *Draft Final Alternatives Evaluation Report, Former Naval Air Station, Dallas, Texas*. Norfolk, Virginia. August 2013.

— *Draft Vapor Intrusion Study Report, Buildings 1405, 1422, and 1424, Solid Waste Management Unit 21*. Norfolk, Virginia. September 2015.

— *Revised Groundwater Response Action Plan for SWMU 86 Plume (Revision 3).* Norfolk, Virginia. October 2015.

# APPENDIX 4
# DATA TABLES

**Table 4-1 Summary of Chemicals of Concern Detected in Groundwater**
**Table 4-2 Summary of Geochemical Parameters Measured in Groundwater**
**Table 4-3 Summary of Groundwater Gauging Data**
**Table 4-4 Summary of Concentration vs. Time Attenuation Rate Constants**
**Table 4-5 Summary of Concentration vs. Distance Attenuation Rate Constants**

# TABLE 4-1
# SUMMARY OF CHEMICALS OF CONCERN DETECTED IN GROUNDWATER

**Table 4-1A**

**Summary of Chemicals of Concern Detected in Groundwater**
**Long Term Monitoring Wells — SWMU 86 Plume**
**2016 RAER**
**Former NAS Dallas, Texas**
**Page 1 of 4**

| Monitoring Well | Sampling Date | Sampling Round | Chemicals of Concern (mg/L) | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | 1,1,2,2-Tetrachloroethane | 1,1,2-Trichloroethane | 1,1-Dichloroethene | 1,2-Dichloroethane | Alpha-BHC | Carbon Tetrachloride | Chloroethane | Chloroform | Chloromethane | cis-1,2-Dichloroethene | Methylene Chloride | Tetrachloroethene | trans-1,2-Dichloroethene | Trichloroethene | Vinyl Chloride |
| Protective Concentration Levels (mg/L) | | | 0.00460 | 0.00500 | 0.00700 | 0.00500 | 0.00014 | 0.00500 | 9.80000 | 0.24000 | 0.07000 | 0.07000 | 0.00500 | 0.00500 | 0.10000 | 0.00500 | 0.00200 |
| Monitoring Wells Located Inside PCLE Zone | | | | | | | | | | | | | | | | | |
| 428B07MW | 3/19/1998 | | Well Installed | | | | | | | | | | | | | | |
| | 3/19/1998 | -- | 0.00640 U | 0.00640 U | 0.00640 U | 0.00640 U | 0.00220 U | 0.00640 U | 0.00640 U | 0.00640 U | 0.00640 U | 0.00640 U | 0.00210 J | 0.00640 U | 0.00640 U | 0.00640 U | 0.00640 U |
| | 3/19/1998 | -- | 0.79000 U | 0.79000 U | 0.79000 U | 0.79000 U | 0.00210 U | 0.79000 U | 0.79000 U | 0.79000 U | 0.79000 U | 0.79000 U | 0.79000 U | 0.79000 U | 0.79000 U | 0.79000 U | 0.79000 U |
| | 3/19/1998 | -- | 0.00630 U | 0.00630 U | 0.00630 U | 0.00630 U | 0.00210 U | 0.00630 U | 0.00630 U | 0.00630 U | 0.00630 U | 0.00630 U | 0.00630 U | 0.00630 U | 0.00630 U | 0.00630 U | 0.00630 U |
| | 4/27/1998 | Round 2 | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00005 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00100 J | 0.00500 U | 0.00500 U | 0.00500 U | 0.00600 | 0.00500 U |
| | 8/25/1998 | Round 3 | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00005 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00730 | 0.00500 U |
| | 3/9/1999 | Round 4 | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | NA | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00120 J | 0.00110 U | 0.00500 U | 0.00500 U | 0.00510 | 0.00500 U |
| | 11/17/1999 | Round 5 | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | NA | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00110 J | 0.00500 U | 0.00500 U | 0.00500 U | 0.00630 | 0.00500 U |
| | 7/25/2000 | Round 6 | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | NA | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 UJ | 0.00110 J | 0.00500 U | 0.00500 U | 0.00500 U | 0.00640 | 0.00500 U |
| | 7/15/2001 | Round 7 | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | NA | 0.00500 U | 0.01000 U | 0.00500 U | 0.01000 U | 0.00120 J | 0.00500 U | 0.00500 U | 0.00250 U | 0.00710 | 0.01000 U |
| | 7/15/2001 | Round 7 (PDB) | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | NA | 0.00500 U | 0.01000 U | 0.00500 U | 0.01000 U | 0.00170 J | 0.00140 J | 0.00500 U | 0.00250 U | 0.00880 | 0.01000 U |
| | 1/20/2003 | Round 8 (PDB) | 0.00100 U | 0.00100 U | 0.00100 U | 0.00100 U | NA | 0.00100 U | 0.00100 U | 0.00100 U | 0.00100 U | 0.00097 J | 0.00200 U | 0.00100 U | 0.00100 U | 0.00600 | 0.00100 U |
| | 8/25/2003 | Round 9 (PDB) | 0.00180 U | 0.00170 U | 0.00180 U | 0.00180 U | NA | 0.00140 U | 0.00180 U | 0.00170 U | 0.00210 U | 0.00200 U | 0.00220 U | 0.00096 U | 0.00190 U | 0.00950 | 0.00210 U |
| | 1/8/2004 | Round 10 | 0.00016 U | 0.00012 U | 0.00021 U | 0.00009 U | NA | 0.00020 U | 0.00018 U | 0.00014 U | 0.00008 U | 0.00083 J | 0.00016 U | 0.00024 U | 0.00019 U | 0.00350 | 0.00017 U |
| | 8/5/2004 | Round 11 (PDB) | 0.00042 U | 0.00022 U | 0.00054 J | 0.00010 U | NA | 0.00025 U | 0.00041 U | 0.00010 U | 0.00017 U | 0.00092 J | 0.00040 U | 0.00021 U | 0.00029 J | 0.00480 | 0.00017 U |
| | 10/14/2004 | Round 12 (PDB) | 0.00042 U | 0.00022 U | 0.00035 U | 0.00010 U | NA | 0.00025 U | 0.00041 U | 0.00010 U | 0.00017 U | 0.00086 J | 0.00040 U | 0.00021 U | 0.00023 U | 0.00420 J | 0.00017 U |
| | 4/3/2005 | Round 13 (PDB) | 0.00050 U | 0.00030 U | 0.00040 U | 0.00030 U | NA | 0.00030 U | 0.00030 U | 0.00040 U | 0.00030 U | 0.00200 | 0.00200 U | 0.00040 U | 0.00060 J | 0.00600 | 0.00030 U |
| | 10/18/2005 | Round 14 | 0.00050 U | 0.00030 U | 0.00040 U | 0.00030 U | NA | 0.00030 U | 0.00030 U | 0.00040 U | 0.00030 U | 0.00100 J | 0.00200 U | 0.00040 U | 0.00060 J | 0.00500 J | 0.00030 U |
| | 5/18/2006 | Round 15 | 0.00060 U | 0.00050 U | 0.00060 U | 0.00040 U | NA | 0.00050 U | 0.00050 U | 0.00040 U | 0.00060 U | 0.00200 | 0.00200 U | 0.00060 U | 0.00070 J | 0.00600 | 0.00060 U |
| | 8/15/2006 | Round 16 | 0.00060 U | 0.00050 U | 0.00060 U | 0.00040 UJ | NA | 0.00050 U | 0.00050 U | 0.00040 U | 0.00060 U | 0.00200 | 0.00200 U | 0.00060 U | 0.00070 J | 0.00800 | 0.00060 U |
| | 5/9/2007 | Round 17 (PDB) | 0.00013 U | 0.00010 U | 0.00013 U | 0.00013 U | NA | 0.00011 U | 0.00014 U | 0.00013 U | 0.00028 U | 0.00190 | 0.00023 U | 0.00010 U | 0.00059 J | 0.00620 | 0.00055 J |
| | 9/12/2007 | Round 18 | 0.00013 U | 0.00010 U | 0.00013 U | 0.00013 U | 0.00000 U | 0.00011 U | 0.00014 U | 0.00013 U | 0.00140 U | 0.00110 | 0.02000 | 0.00010 U | 0.00037 J | 0.00380 | 0.00020 U |
| | 1/31/2008 | Round 19 (PDB) | 0.00047 U | 0.00042 U | 0.00039 U | 0.00026 U | NA | 0.00044 U | 0.00051 U | 0.00036 U | 0.00060 U | 0.00150 | 0.00040 U | 0.00046 U | 0.00048 U | 0.00620 | 0.00043 U |
| | 7/23/2008 | Round 20 (PDB) | 0.00021 U | 0.00026 U | 0.00038 J | 0.00034 U | NA | 0.00040 U | 0.00048 U | 0.00028 U | 0.00061 U | 0.00110 | 0.00100 UJ | 0.00022 U | 0.00045 U | 0.00530 | 0.00030 U |
| | 1/13/2009 | Round 21 (PDB) | 0.00021 U | 0.00026 U | 0.00094 J | 0.00034 U | NA | 0.00022 U | 0.00048 UJL | 0.00028 U | 0.00061 U | 0.00061 J | 0.00100 U | 0.00022 U | 0.00045 U | 0.00290 | 0.00030 U |
| | 7/13/2009 | Round 22 | 0.00021 U | 0.00026 U | 0.00054 U | 0.00034 U | NA | 0.00022 U | 0.00048 U | 0.00028 U | 0.00061 U | 0.00042 J | 0.00100 U | 0.00022 U | 0.00045 U | 0.00200 | 0.00030 U |
| | 1/12/2010 | Round 23 (PDB) | 0.00029 U | 0.00029 U | 0.00029 U | 0.00033 U | NA | 0.00034 U | 0.00051 U | 0.00025 U | 0.00050 U | 0.00032 U | 0.00200 U | 0.00044 U | 0.00034 U | 0.00039 J | 0.00028 U |
| | 7/14/2010 | Round 24 (PDB) | 0.00029 U | 0.00029 U | 0.00029 U | 0.00033 U | NA | 0.00034 U | 0.00051 U | 0.00025 U | 0.00053 J | 0.00032 U | 0.00200 U | 0.00044 U | 0.00034 U | 0.00043 J | 0.00028 U |
| | 1/13/2011 | Round 25 (PDB) | 0.00023 U | 0.00022 U | 0.00023 U | 0.00020 U | NA | 0.00025 U | 0.00050 U | 0.00022 U | 0.00050 U | 0.00026 U | 0.00200 U | 0.00025 U | 0.00035 U | 0.00044 J | 0.00022 U |
| | 7/26/2011 | Round 26 | 0.00023 U | 0.00022 U | 0.00023 U | 0.00020 U | NA | 0.00025 U | 0.00050 U | 0.00022 U | 0.00050 U | 0.00026 U | 0.00200 U | 0.00025 U | 0.00035 U | 0.00110 | 0.00022 U |
| | 1/10/2012 | Round 27 (PDB) | 0.00023 U | 0.00022 U | 0.00023 U | 0.00020 U | NA | 0.00025 U | 0.00050 U | 0.0043 | 0.00050 U | 0.00026 U | 0.0020 U | 0.00025 U | 0.00035 U | 0.00036 J | 0.00022 U |
| | 7/10/2012 | Round 28 | 0.00023 U | NS | NS | NS | 0.0000049 U | 0.00025 U | NS | 0.0050 | NS | 0.00026 U | NS | 0.00025 U | 0.00035 U | 0.00037 J | NS |
| | 1/8/2013 | Round 29 (PDB) | 0.00024 U | 0.00020 U | 0.00020 U | 0.00022 U | NA | 0.00031 U | 0.00050 U | 0.0041 | 0.00050 U | 0.00024 U | 0.0020 U | 0.00032 U | 0.00023 U | 0.00042 J | 0.00044 U |
| | 7/18/2013 | Round 30 | 0.00024 U | 0.00020 U | 0.00020 U | 0.00022 U | NA | 0.00031 U | 0.00050 U | 0.0025 | 0.00050 U | 0.00024 U | 0.0020 U | 0.00032 U | 0.00023 U | 0.00036 J | 0.00044 U |
| | 2/24/2014 | Round 31 (PDB) | 0.00027 U | 0.00032 U | 0.00025 U | 0.00024 U | NA | 0.0004 U | 0.0005 U | 0.0018 | 0.00053 U | 0.00033 U | 0.002 U | 0.00026 U | 0.00034 U | 0.00043 J | 0.00033 U |
| | 7/17/2014 | Round 32 | 0.00025 U | 0.00025 U | 0.00025 U | 0.00025 U | NA | 0.00025 U | 0.0005 U | 0.0014 | 0.00025 U | 0.00029 J | 0.0005 U | 0.00025 U | 0.00025 U | 0.00045 J | 0.00025 U |
| | 1/20/2015 | Round 33 (PDB) | 0.00025 U | 0.00025 U | 0.00025 U | 0.00477 | NA | 0.00025 U | 0.0005 U | 0.0013 | 0.00025 U | 0.00025 U | 0.0005 U | 0.00025 U | 0.00025 U | 0.000524 J | 0.00025 U |
| | 7/24/2015 | Round 34 | 0.00025 U | 0.00025 U | 0.00025 U | 0.00477 | NA | 0.00025 U | 0.0005 U | 0.0013 | 0.00025 U | 0.00025 U | 0.0005 U | 0.00025 U | 0.00025 U | 0.00032 J | 0.00025 U |
| | 1/21/2016 | Round 35 (PDB) | 0.00025 UJ | 0.00025 U | 0.00025 U | 0.00025 U | NA | 0.00025 U | 0.0005 UJ | 0.00062 J | 0.00025 UJ | 0.00025 U | 0.0005 UJ | 0.00025 U | 0.00025 U | 0.00046 J | 0.00025 UJ |
| | 7/19/2016 | Round 36 | 0.00025 U | 0.00025 U | 0.00025 UJ | 0.00025 U | NA | 0.00025 U | 0.0005 U | 0.00047 J | 0.00025 U | 0.00025 U | 0.0005 U | 0.00025 U | 0.00025 U | 0.00026 J | 0.00025 U |
| 428B128MW | 4/3/2005 | | Well Installed | | | | | | | | | | | | | | |
| | 4/13/2005 | Round 13 | 0.00050 U | 0.00030 U | 0.00040 U | 0.00030 U | NA | 0.00030 U | 0.00030 U | 0.00200 | 0.00030 U | 0.00080 J | 0.00200 U | 0.00100 UJ | 0.00030 U | 0.02200 | 0.00030 U |
| | 8/4/2005 | Round 13 (PDB) | 0.00050 U | 0.00030 U | 0.00040 U | 0.00030 U | NA | 0.00030 U | 0.00030 U | 0.00050 J | 0.00030 UJ | 0.00070 J | 0.00200 U | 0.00040 U | 0.00030 U | 0.00800 | 0.00030 U |
| | 10/21/2005 | Round 14 (PDB) | 0.00050 U | 0.00030 U | 0.00040 U | 0.00030 U | NA | 0.00030 U | 0.00030 U | 0.00040 U | 0.00030 U | 0.00070 J | 0.00200 U | 0.00040 U | 0.00030 U | 0.00500 | 0.00030 U |
| | 1/31/2006 | Round 15 (PDB) | 0.00050 U | 0.00030 U | 0.00040 U | 0.00030 U | NA | 0.00030 U | 0.00030 U | 0.00040 U | 0.00030 U | 0.00080 J | 0.00200 U | 0.00040 U | 0.00030 U | 0.00700 | 0.00030 U |
| | 8/22/2006 | Round 16 | 0.00060 U | 0.00050 U | 0.00060 U | 0.00040 UJ | NA | 0.00050 U | 0.00050 U | 0.00040 U | 0.00060 U | 0.00300 | 0.00200 U | 0.00060 U | 0.00060 U | 0.00200 | 0.00060 U |
| | 5/9/2007 | Round 17 (PDB) | 0.00012 U | 0.00026 U | 0.00028 U | 0.00021 U | NA | 0.00020 U | 0.00025 U | 0.00023 U | 0.00017 U | 0.00460 | 0.00029 J | 0.00014 U | 0.00053 U | 0.00071 J | 0.00012 U |
| | 9/13/2007 | Round 18 | 0.00013 U | 0.00010 U | 0.00013 U | 0.00013 U | 0.00000 U | 0.00011 U | 0.00014 U | 0.00013 U | 0.00028 U | 0.00390 J | 0.00160 J | 0.00010 U | 0.00015 U | 0.00042 J | 0.00020 U |
| | 1/31/2008 | Round 19 (PDB) | 0.00047 U | 0.00042 U | 0.00039 U | 0.00026 U | NA | 0.00044 U | 0.00051 U | 0.00036 U | 0.00060 U | 0.00590 | 0.00040 U | 0.00046 U | 0.00048 U | 0.00150 | 0.00043 U |
| | 7/23/2008 | Round 20 (PDB) | 0.00021 U | 0.00026 U | 0.00054 U | 0.00034 U | NA | 0.00022 U | 0.00048 U | 0.00028 U | 0.00061 U | 0.00710 | 0.00100 U | 0.00022 U | 0.00045 U | 0.00110 | 0.00030 U |
| | 1/13/2009 | Round 21 (PDB) | 0.00021 U | 0.00026 U | 0.00054 U | 0.00034 U | NA | 0.00022 U | 0.00048 UJL | 0.00028 U | 0.00061 U | 0.00730 | 0.00100 U | 0.00022 U | 0.00045 U | 0.00041 J | 0.00030 U |
| | 7/15/2009 | Round 22 | 0.00021 U | 0.00026 U | 0.00054 U | 0.00034 U | NA | 0.00022 U | 0.00048 U | 0.00028 U | 0.00061 U | 0.00400 | 0.00100 U | 0.00022 U | 0.00045 U | 0.00300 | 0.00030 U |
| | 1/12/2010 | Round 23 (PDB) | 0.00029 U | 0.00029 U | 0.00029 U | 0.00033 U | NA | 0.00034 U | 0.00051 U | 0.00025 U | 0.00050 U | 0.00420 | 0.00200 U | 0.00044 U | 0.00034 U | 0.00370 | 0.00028 U |
| | 7/14/2010 | Round 24 (PDB) | 0.00029 U | 0.00029 U | 0.00029 U | 0.00033 U | NA | 0.00034 U | 0.00051 U | 0.00025 U | 0.00050 U | 0.00500 | 0.00200 U | 0.00044 U | 0.00034 U | 0.00430 | 0.00028 U |
| | 1/13/2011 | Round 25 (PDB) | 0.00023 U | 0.00022 U | 0.00023 U | 0.00020 U | NA | 0.00025 U | 0.00050 U | 0.00022 U | 0.00050 U | 0.00540 | 0.00200 U | 0.00025 U | 0.00035 U | 0.00490 | 0.00022 U |
| | 7/26/2011 | Round 26 | 0.00023 U | 0.00022 U | 0.00023 U | 0.00020 U | NA | 0.00025 U | 0.00050 U | 0.00022 U | 0.00050 U | 0.00720 | 0.00200 U | 0.00025 U | 0.00035 U | 0.00570 | 0.00022 U |
| | 1/10/2012 | Round 27 (PDB) | 0.00023 U | 0.00022 U | 0.00023 U | 0.00020 U | NA | 0.00025 U | 0.00050 U | 0.00022 U | 0.00050 U | 0.0045 | 0.0020 U | 0.00025 U | 0.00035 U | 0.0048 | 0.00022 U |
| | 7/10/2012 | Round 28 | 0.00023 U | NS | NS | NS | 0.0000049 U | 0.00025 U | NS | 0.00022 U | NS | 0.0047 | NS | 0.00025 U | 0.00035 U | 0.0047 | NS |
| | 1/8/2013 | Round 29 (PDB) | 0.00024 U | 0.00020 U | 0.00020 U | 0.00022 U | NA | 0.00031 U | 0.00050 U | 0.00026 U | 0.00050 U | 0.0046 | 0.0020 U | 0.00032 U | 0.00023 U | 0.0044 | 0.00044 U |
| | 7/18/2013 | Round 30 | 0.00024 U | 0.00020 U | 0.00020 U | 0.00022 U | NA | 0.00031 U | 0.00050 U | 0.00026 U | 0.00050 U | 0.0031 | 0.0020 U | 0.00032 U | 0.00023 U | 0.0040 | 0.00044 U |
| | 2/24/2014 | Round 31 (PDB) | 0.00027 U | 0.00032 U | 0.00025 U | 0.00024 U | NA | 0.0004 U | 0.0005 U | 0.00031 U | 0.00053 U | 0.0032 | 0.002 U | 0.00026 U | 0.00034 U | 0.00420 | 0.00033 U |
| | 7/16/2014 | Round 32 | 0.00025 U | 0.00025 U | 0.00025 U | 0.00025 U | NA | 0.00025 U | 0.0005 U | 0.00025 U | 0.00025 U | 0.00305 | 0.0005 U | 0.00025 U | 0.00025 U | 0.00383 | 0.00025 U |
| | 1/20/2015 | Round 33 (PDB) | 0.00025 U | 0.00025 U | 0.00025 U | 0.00025 U | NA | 0.00025 U | 0.0005 U | 0.00025 U | 0.00025 U | 0.00246 | 0.0005 U | 0.00025 U | 0.00025 U | 0.00351 | 0.00025 U |
| | 7/24/2015 | Round 34 | 0.00025 U | 0.00025 U | 0.00025 U | 0.00025 U | NA | 0.00025 U | 0.0005 U | 0.00025 U | 0.00025 U | 0.00274 | 0.0005 U | 0.00025 U | 0.00025 U | 0.00379 | 0.00025 U |
| | 1/21/2016 | Round 35 (PDB) | 0.00025 UJ | 0.00025 U | 0.00025 U | 0.00025 U | NA | 0.00025 U | 0.0005 UJ | 0.00025 U | 0.00025 UJ | 0.00196 | 0.0005 UJ | 0.00025 U | 0.00025 U | 0.00254 | 0.00025 UJ |
| | 7/19/2016 | Round 36 | 0.00025 UJ | 0.00025 U | 0.00025 U | 0.00025 U | NA | 0.00025 U | 0.0005 U | 0.00025 U | 0.00025 U | 0.00172 | 0.0005 U | 0.00025 U | 0.00025 U | 0.00249 | 0.00025 U |

**Table 4-1A**

**Summary of Chemicals of Concern Detected in Groundwater**
**Long Term Monitoring Wells — SWMU 86 Plume**
**2016 RAER**
**Former NAS Dallas, Texas**
**Page 2 of 4**

| Monitoring Well | Sampling Date | Sampling Round | Chemicals of Concern (mg/L) | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | 1,1,2,2-Tetrachloroethane | 1,1,2-Trichloroethane | 1,1-Dichloroethene | 1,2-Dichloroethane | Alpha-BHC | Carbon Tetrachloride | Chloroethane | Chloroform | Chloromethane | cis-1,2-Dichloroethene | Methylene Chloride | Tetrachloroethene | trans-1,2-Dichloroethene | Trichloroethene | Vinyl Chloride |
| **Protective Concentration Levels (mg/L)** | | | **0.00460** | **0.00500** | **0.00700** | **0.00500** | **0.00014** | **0.00500** | **9.80000** | **0.24000** | **0.07000** | **0.07000** | **0.00500** | **0.00500** | **0.10000** | **0.00500** | **0.00200** |
| **428B130MW** | 4/3/2005 | | Well Installed | | | | | | | | | | | | | | |
| | 4/13/2005 | Round 13 | 0.00050 U | 0.00030 U | 0.00040 U | 0.00030 U | NA | 0.00030 U | 0.00030 U | 0.00040 U | 0.00030 U | 0.01100 | 0.00200 U | 0.00100 UJ | 0.00070 J | 0.01600 | 0.00030 U |
| | 8/4/2005 | Round 13 (PDB) | 0.00050 U | 0.00030 U | 0.00040 U | 0.00030 U | NA | 0.00030 U | 0.00030 U | 0.00040 U | 0.00030 UJ | 0.07400 | 0.00200 U | 0.00040 U | 0.00200 | 0.04700 | 0.00050 J |
| | 10/21/2005 | Round 14 (PDB) | 0.00050 U | 0.00030 U | 0.00040 U | 0.00030 U | NA | 0.00030 U | 0.00030 U | 0.00040 U | 0.00030 U | 0.05800 | 0.00200 U | 0.00040 U | 0.00100 | 0.03400 | 0.00030 U |
| | 1/31/2006 | Round 15 (PDB) | 0.00050 U | 0.00030 U | 0.00040 U | 0.00030 U | NA | 0.00030 U | 0.00030 U | 0.00040 U | 0.00030 U | 0.06000 | 0.00200 U | 0.00040 U | 0.00100 | 0.03000 | 0.00030 U |
| | 8/22/2006 | Round 16 (PDB) | 0.00060 U | 0.00050 U | 0.00060 U | 0.00040 UJ | NA | 0.00050 U | 0.00050 U | 0.00040 U | 0.00060 U | 0.05200 | 0.00200 U | 0.00060 U | 0.00100 J | 0.02500 | 0.00060 U |
| | 5/9/2007 | Round 17 (PDB) | 0.00013 U | 0.00010 U | 0.00013 U | 0.00013 U | NA | 0.00011 U | 0.00014 U | 0.00028 J | 0.00028 U | 0.06600 | 0.00023 U | 0.00010 U | 0.00160 | 0.01900 | 0.00069 J |
| | 9/12/2007 | Round 18 | 0.00013 U | 0.00010 U | 0.00013 U | 0.00013 U | 0.00000 U | 0.00011 U | 0.00014 U | 0.00021 U | 0.00028 UJ | 0.06700 | 0.00023 U | 0.00010 U | 0.00100 | 0.01800 | 0.00076 J |
| | 1/31/2008 | Round 19 (PDB) | 0.00047 U | 0.00042 U | 0.00039 U | 0.00026 U | NA | 0.00044 U | 0.00051 U | 0.00036 U | 0.00060 U | 0.05100 | 0.00040 U | 0.00046 U | 0.00080 J | 0.01500 | 0.00043 U |
| | 7/23/2008 | Round 20 (PDB) | 0.00021 U | 0.00026 U | 0.00054 U | 0.00034 U | NA | 0.00022 U | 0.00048 U | 0.00028 U | 0.00061 U | 0.05050 | 0.00100 U | 0.00022 U | 0.00045 U | 0.01510 | 0.00030 U |
| | 1/13/2009 | Round 21 (PDB) | 0.00021 U | 0.00026 U | 0.00054 U | 0.00034 U | NA | 0.00022 U | 0.00048 UJL | 0.00028 U | 0.00061 U | 0.03760 | 0.00100 U | 0.00022 U | 0.00078 J | 0.01090 | 0.00030 U |
| | 7/13/2009 | Round 22 | 0.00021 U | 0.00026 U | 0.00054 U | 0.00034 U | NA | 0.00022 U | 0.00048 U | 0.00028 U | 0.00061 U | 0.02720 | 0.00100 U | 0.00022 U | 0.00050 J | 0.00850 | 0.00045 J |
| | 1/12/2010 | Round 23 (PDB) | 0.00029 U | 0.00029 U | 0.00029 U | 0.00033 U | NA | 0.00034 U | 0.00051 U | 0.00025 U | 0.00050 U | 0.02220 | 0.00200 U | 0.00044 U | 0.00041 J | 0.00520 | 0.00028 U |
| | 7/14/2010 | Round 24 (PDB) | 0.00029 U | 0.00029 U | 0.00029 U | 0.00033 U | NA | 0.00034 U | 0.00051 U | 0.00025 U | 0.00050 J | 0.02680 | 0.00200 U | 0.00044 U | 0.00050 J | 0.00880 | 0.00053 J |
| | 1/13/2011 | Round 25 (PDB) | 0.00023 U | 0.00022 U | 0.00023 U | 0.00020 U | NA | 0.00025 U | 0.00050 U | 0.00022 U | 0.00050 U | 0.02220 | 0.00200 U | 0.00025 U | 0.00046 J | 0.00710 | 0.00022 U |
| | 7/26/2011 | Round 26 | 0.00023 U | 0.00022 U | 0.00023 U | 0.00020 U | NA | 0.00025 U | 0.00050 U | 0.00022 U | 0.00050 U | 0.02270 | 0.00200 U | 0.00025 U | 0.00048 J | 0.00700 | 0.00100 |
| | 1/10/2012 | Round 27 (PDB) | 0.00023 U | 0.00022 U | 0.00023 U | 0.00020 U | NA | 0.00025 U | 0.00050 U | 0.0030 | 0.00050 U | 0.0101 | 0.0020 U | 0.00025 U | 0.00035 U | 0.0045 | 0.00022 U |
| | 7/10/2012 | Round 28 | 0.00023 U | NS | NS | NS | 0.0000049 U | 0.00025 U | NS | 0.0019 | NS | 0.0080 | NS | 0.00025 U | 0.00035 U | 0.0034 | NS |
| | 1/8/2013 | Round 29 (PDB) | 0.00024 U | 0.00020 U | 0.00020 U | 0.00022 U | NA | 0.00031 U | 0.00050 U | 0.00048 J | 0.00050 U | 0.0103 | 0.0020 U | 0.00032 U | 0.00023 U | 0.0032 | 0.00044 U |
| | 7/18/2013 | Round 30 | 0.00024 U | 0.00020 U | 0.00020 U | 0.00022 U | NA | 0.00031 U | 0.00050 U | 0.00047 J | 0.00050 U | 0.0062 | 0.0020 U | 0.00032 U | 0.00023 U | 0.0022 | 0.00044 U |
| | 2/24/2014 | Round 31 (PDB) | 0.00027 U | 0.00032 U | 0.00025 U | 0.00024 U | NA | 0.0004 U | 0.0005 U | 0.00031 U | 0.00053 U | 0.0056 | 0.002 U | 0.00026 U | 0.00034 U | 0.00190 | 0.00033 U |
| | 7/17/2014 | Round 32 | 0.00025 U | 0.00025 U | 0.00025 U | 0.00025 U | NA | 0.00025 U | 0.0005 U | 0.00025 J | 0.00025 U | 0.00533 | 0.0005 U | 0.00025 U | 0.00025 U | 0.00168 | 0.00051 J |
| | 1/20/2015 | Round 33 (PDB) | 0.00025 U | 0.00025 U | 0.00025 U | 0.00025 U | NA | 0.00025 U | 0.0005 U | 0.00025 U | 0.00025 U | 0.00256 | 0.0005 U | 0.00025 U | 0.00025 U | 0.000972 | 0.00025 U |
| | 7/24/2015 | Round 34 | 0.00025 U | 0.00025 U | 0.00025 U | 0.00025 U | NA | 0.00025 U | 0.0005 U | 0.00025 U | 0.00025 U | 0.00243 | 0.0005 U | 0.00025 U | 0.00025 U | 0.00116 | 0.00025 U |
| | 1/21/2016 | Round 35 (PDB) | 0.00025 UJ | 0.00025 U | 0.00025 U | 0.00025 U | NA | 0.00025 U | 0.0005 UJ | 0.00025 U | 0.00025 UJ | 0.00298 | 0.0005 U | 0.00025 U | 0.00025 U | 0.0012 | 0.00025 UJ |
| | 7/19/2016 | Round 36 | 0.00025 UJ | 0.00025 U | 0.00025 U | 0.00025 U | NA | 0.00025 U | 0.0005 U | 0.00025 U | 0.00025 U | 0.00549 | 0.0005 U | 0.00025 U | 0.00025 U | 0.00166 | 0.00047 J |
| **428B131MW** | 4/5/2005 | | Well Installed | | | | | | | | | | | | | | |
| | 4/13/2005 | Round 13 | 0.00050 U | 0.00030 U | 0.00040 U | 0.00030 U | NA | 0.00030 U | 0.00030 U | 0.00040 U | 0.00030 U | 0.00800 | 0.00200 U | 0.00100 UJ | 0.00030 U | 0.01600 | 0.00030 U |
| | 8/4/2005 | Round 13 (PDB) | 0.00050 U | 0.00030 U | 0.00040 U | 0.00030 U | NA | 0.00030 U | 0.00030 U | 0.00040 U | 0.00030 UJ | 0.01600 | 0.00200 U | 0.00040 U | 0.00060 J | 0.00600 | 0.00040 J |
| | 10/10/2005 | Round 14 | 0.00050 U | 0.00030 U | 0.00040 J | 0.00030 U | NA | 0.00030 U | 0.00030 U | 0.00040 U | 0.00030 U | 0.02700 | 0.00200 U | 0.00040 U | 0.00100 | 0.01300 | 0.00090 J |
| | 1/31/2006 | Round 15 (PDB) | 0.00050 U | 0.00030 U | 0.00040 U | 0.00030 U | NA | 0.00030 U | 0.00030 U | 0.00040 U | 0.00030 U | 0.01800 | 0.00200 U | 0.00040 U | 0.00030 U | 0.01000 | 0.00030 U |
| | 8/22/2006 | Round 16 (PDB) | 0.00060 U | 0.00050 U | 0.00060 U | 0.00040 UJ | NA | 0.00050 U | 0.00050 U | 0.00040 U | 0.00060 U | 0.02600 | 0.00200 U | 0.00060 U | 0.00080 J | 0.01000 | 0.00070 J |
| | 5/9/2007 | Round 17 (PDB) | 0.00013 U | 0.00010 U | 0.00035 J | 0.00013 U | NA | 0.00011 U | 0.00014 U | 0.00013 U | 0.00028 U | 0.02500 | 0.00023 U | 0.00010 U | 0.00025 J | 0.00880 | 0.00020 U |
| | 9/12/2007 | Round 18 | 0.00013 U | 0.00010 U | 0.00038 J | 0.00013 U | 0.00000 U | 0.00011 U | 0.00014 U | 0.00013 U | 0.00086 U | 0.02900 | 0.00023 U | 0.00010 U | 0.00073 J | 0.00710 | 0.00100 J |
| | 1/31/2008 | Round 19 (PDB) | 0.00047 U | 0.00042 U | 0.00040 J | 0.00026 U | NA | 0.00044 U | 0.00051 U | 0.00036 U | 0.00060 U | 0.03000 | 0.00040 U | 0.00046 U | 0.00048 U | 0.00820 | 0.00043 U |
| | 7/23/2008 | Round 20 (PDB) | 0.00021 U | 0.00026 U | 0.00054 U | 0.00034 U | NA | 0.00022 U | 0.00048 U | 0.00028 U | 0.00061 U | 0.02940 | 0.00100 U | 0.00022 U | 0.00045 U | 0.00580 | 0.00030 U |
| | 1/13/2009 | Round 21 (PDB) | 0.00021 U | 0.00026 U | 0.00054 U | 0.00034 U | NA | 0.00022 U | 0.00048 UJL | 0.00028 U | 0.00061 U | 0.03290 | 0.00100 U | 0.00022 U | 0.00045 U | 0.00650 | 0.00030 U |
| | 7/13/2009 | Round 22 | 0.00021 U | 0.00026 U | 0.00054 U | 0.00034 U | NA | 0.00022 U | 0.00048 U | 0.00028 U | 0.00061 U | 0.02990 | 0.00100 U | 0.00022 U | 0.00060 J | 0.00570 | 0.00058 J |
| | 1/12/2010 | Round 23 (PDB) | 0.00029 U | 0.00029 U | 0.00038 J | 0.00033 U | NA | 0.00034 U | 0.00051 U | 0.00025 U | 0.00050 U | 0.03390 | 0.00200 U | 0.00044 U | 0.00059 J | 0.00520 | 0.00033 J |
| | 7/14/2010 | Round 24 (PDB) | 0.00029 U | 0.00029 U | 0.00039 J | 0.00033 U | NA | 0.00034 U | 0.00051 U | 0.00025 U | 0.00050 U | 0.03270 | 0.00200 U | 0.00044 U | 0.00077 J | 0.00510 | 0.00092 J |
| | 1/13/2011 | Round 25 (PDB) | 0.00023 U | 0.00022 U | 0.00033 J | 0.00020 U | NA | 0.00025 U | 0.00050 U | 0.00022 U | 0.00050 U | 0.03650 | 0.00200 U | 0.00025 U | 0.00082 J | 0.00560 | 0.00022 U |
| | 7/26/2011 | Round 26 | 0.00023 U | 0.00022 U | 0.00034 J | 0.00020 U | NA | 0.00025 U | 0.00050 U | 0.00022 U | 0.00050 U | 0.03620 | 0.00200 U | 0.00025 U | 0.00090 J | 0.00480 | 0.00089 J |
| | 1/10/2012 | Round 27 (PDB) | 0.00023 U | 0.00022 U | 0.00028 J | 0.00020 U | NA | 0.00025 U | 0.00050 U | 0.00022 U | 0.00050 U | 0.0358 | 0.00020 U | 0.00025 U | 0.00060 J | 0.0047 | 0.00041 J |
| | 7/10/2012 | Round 28 | 0.00023 U | NS | NS | NS | 0.0000049 U | 0.00025 U | NS | 0.00022 U | NS | 0.0383 | NS | 0.00025 U | 0.00096 J | 0.0047 | NS |
| | 1/8/2013 | Round 29 (PDB) | 0.00024 U | 0.00020 U | 0.00029 J | 0.00022 U | NA | 0.00031 U | 0.00050 U | 0.00026 U | 0.00050 U | 0.0401 | 0.0020 U | 0.00032 U | 0.00079 J | 0.0040 | 0.00044 U |
| | 7/18/2013 | Round 30 | 0.00024 U | 0.00020 U | 0.00020 U | 0.00022 U | NA | 0.00031 U | 0.00050 U | 0.00026 U | 0.00050 U | 0.0306 | 0.0020 U | 0.00032 U | 0.00058 J | 0.0032 | 0.00044 U |
| | 2/24/2014 | Round 31 (PDB) | 0.00027 U | 0.00032 U | 0.00025 U | 0.00024 U | NA | 0.0004 U | 0.0005 U | 0.00031 U | 0.00053 U | 0.0367 | 0.002 U | 0.00026 U | 0.00068 J | 0.00320 | 0.00033 U |
| | 7/17/2014 | Round 32 | 0.00025 U | 0.00025 U | 0.0003 J | 0.00025 U | NA | 0.00025 U | 0.0005 U | 0.00025 U | 0.00025 U | 0.0341 | 0.0005 U | 0.00025 U | 0.00086 J | 0.00309 | 0.00025 U |
| | 1/20/2015 | Round 33 (PDB) | 0.00025 U | 0.00025 U | 0.00025 U | 0.00025 U | NA | 0.00025 U | 0.0005 U | 0.00025 U | 0.00025 U | 0.0355 | 0.0005 U | 0.00025 U | 0.000717 J | 0.00266 | 0.00025 U |
| | 7/24/2015 | Round 34 | 0.00025 U | 0.00025 U | 0.00025 U | 0.00025 U | NA | 0.00025 U | 0.0005 U | 0.00025 U | 0.00025 U | 0.0332 | 0.00058 J | 0.00025 U | 0.00073 J | 0.00286 | 0.00025 U |
| | 1/21/2016 | Round 35 (PDB) | 0.00025 UJ | 0.00025 U | 0.00034 J | 0.00025 UJ | NA | 0.00025 U | 0.0005 UJ | 0.00025 U | 0.00025 UJ | 0.032 | 0.0005 U | 0.00025 U | 0.00062 J | 0.00245 | 0.00025 UJ |
| | 7/19/2016 | Round 36 | 0.00025 U | 0.00025 U | 0.00025 U | 0.00025 U | NA | 0.00025 U | 0.0005 U | 0.00025 U | 0.00025 U | 0.0365 | 0.0005 U | 0.00025 U | 0.00081 J | 0.00257 | 0.00027 J |

**Table 4-1A**

**Summary of Chemicals of Concern Detected in Groundwater**
**Long Term Monitoring Wells — SWMU 86 Plume**
**2016 RAER**
**Former NAS Dallas, Texas**
**Page 3 of 4**

| Monitoring Well | Sampling Date | Sampling Round | Chemicals of Concern (mg/L) | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | 1,1,2,2-Tetrachloroethane | 1,1,2-Trichloroethane | 1,1-Dichloroethene | 1,2-Dichloroethane | Alpha-BHC | Carbon Tetrachloride | Chloroethane | Chloroform | Chloromethane | cis-1,2-Dichloroethene | Methylene Chloride | Tetrachloroethene | trans-1,2-Dichloroethene | Trichloroethene | Vinyl Chloride |
| **Protective Concentration Levels (mg/L)** | | | **0.00460** | **0.00500** | **0.00700** | **0.00500** | **0.00014** | **0.00500** | **9.80000** | **0.24000** | **0.07000** | **0.07000** | **0.00500** | **0.00500** | **0.10000** | **0.00500** | **0.00200** |
| **428B132MW** | 4/4/2005 | | Well Installed | | | | | | | | | | | | | | |
| | 4/13/2005 | Round 13 | 0.00050 U | 0.00030 U | 0.00040 U | 0.00030 U | NA | 0.00030 U | 0.00030 U | 0.00100 | 0.00030 U | 0.06800 | 0.00200 U | 0.00100 UJ | 0.00100 | 0.03100 | 0.00030 U |
| | 8/4/2005 | Round 13 (PDB) | 0.00050 U | 0.00030 U | 0.00040 U | 0.00030 U | NA | 0.00030 U | 0.00030 U | 0.00040 U | 0.00030 UJ | 0.08900 | 0.00200 U | 0.00040 U | 0.00200 | 0.01700 | 0.00030 U |
| | 10/17/2005 | Round 14 | 0.00050 U | 0.00030 U | 0.00200 | 0.00030 U | NA | 0.00030 U | 0.00030 U | 0.00040 U | 0.00030 U | 0.28000 | 0.00200 U | 0.00040 U | 0.00700 | 0.08900 | 0.00030 U |
| | 10/17/2005 | Round 14 (PDB) | 0.00050 U | 0.00030 U | 0.00040 U | 0.00030 U | NA | 0.00030 U | 0.00030 U | 0.00040 U | 0.00030 U | 0.04800 | 0.00200 U | 0.00040 U | 0.00100 | 0.00800 | 0.00030 U |
| | 1/31/2006 | Round 15 (PDB) | 0.00050 U | 0.00030 U | 0.00040 U | 0.00030 U | NA | 0.00030 U | 0.00030 U | 0.00040 U | 0.00030 U | 0.02600 | 0.00200 U | 0.00040 U | 0.00070 J | 0.00400 | 0.00030 U |
| | 8/22/2006 | Round 16 (PDB) | 0.00060 U | 0.00050 U | 0.00060 U | 0.00040 UJ | NA | 0.00050 U | 0.00050 U | 0.00040 U | 0.00060 U | 0.06500 | 0.00200 U | 0.00060 U | 0.00090 J | 0.00200 | 0.00060 U |
| | 5/9/2007 | Round 17 (PDB) | 0.00013 U | 0.00010 U | 0.00013 U | 0.00013 U | NA | 0.00011 U | 0.00014 U | 0.00013 U | 0.00028 U | 0.06200 | 0.00023 U | 0.00010 U | 0.00110 | 0.00150 | 0.00120 J |
| | 9/12/2007 | Round 18 | 0.00026 U | 0.00020 U | 0.00061 J | 0.00026 U | 0.00000 U | 0.00022 U | 0.00028 U | 0.00026 U | 0.00056 U | 0.32000 | 0.00046 U | 0.00020 U | 0.00370 | 0.00120 J | 0.00540 |
| | 1/31/2008 | Round 19 (PDB) | 0.00047 U | 0.00042 U | 0.00039 U | 0.00026 U | NA | 0.00044 U | 0.00051 U | 0.00036 U | 0.00060 U | 0.02500 | 0.00040 U | 0.00046 U | 0.00048 U | 0.00061 J | 0.00043 U |
| | 7/23/2008 | Round 20 (PDB) | 0.00021 U | 0.00026 U | 0.00054 U | 0.00034 U | NA | 0.00022 U | 0.00048 U | 0.00028 U | 0.00061 U | 0.04980 | 0.00100 U | 0.00022 U | 0.00045 U | 0.00032 U | 0.00030 U |
| | 1/13/2009 | Round 21 (PDB) | 0.00021 U | 0.00026 U | 0.00054 U | 0.00034 U | NA | 0.00022 U | 0.00048 UJL | 0.00028 J | 0.00061 U | 0.11000 | 0.00100 U | 0.00022 U | 0.00160 | 0.00044 J | 0.00061 J |
| | 7/13/2009 | Round 22 | 0.00021 U | 0.00026 U | 0.00054 U | 0.00034 U | NA | 0.00022 U | 0.00048 U | 0.00028 U | 0.00061 U | 0.25200 | 0.00100 U | 0.00022 U | 0.00310 | 0.00032 U | 0.00640 |
| | 1/12/2010 | Round 23 (PDB) | 0.00029 U | 0.00029 U | 0.00072 J | 0.00033 U | NA | 0.00034 U | 0.00051 U | 0.00025 U | 0.00050 U | 0.16600 | 0.00200 U | 0.00044 U | 0.00250 | 0.00046 J | 0.00090 J |
| | 7/14/2010 | Round 24 (PDB) | 0.00029 U | 0.00029 U | 0.00029 U | 0.00033 U | NA | 0.00034 U | 0.00051 U | 0.00025 U | 0.00050 U | 0.06990 | 0.00200 U | 0.00044 U | 0.00100 | 0.00046 J | 0.00053 J |
| | 1/13/2011 | Round 25 (PDB) | 0.00023 U | 0.00022 U | 0.00032 J | 0.00020 U | NA | 0.00025 U | 0.00050 U | 0.00022 U | 0.00050 U | 0.12900 | 0.00200 U | 0.00025 U | 0.00180 | 0.00046 J | 0.00095 J |
| | 7/26/2011 | Round 26 | 0.00023 U | 0.00022 U | 0.00023 U | 0.00020 U | NA | 0.00025 U | 0.00050 U | 0.00022 U | 0.00050 U | 0.05290 | 0.00200 U | 0.00025 U | 0.00049 J | 0.00026 U | 0.00240 |
| | 1/10/2012 | Round 27 (PDB) | 0.00023 U | 0.00022 U | 0.00028 J | 0.00020 U | NA | 0.00025 U | 0.00050 U | 0.00022 U | 0.00050 U | 0.104 | 0.0020 U | 0.00025 U | 0.0021 | 0.00026 U | 0.0011 |
| | 7/10/2012 | Round 28 | 0.0012 U | NS | NS | NS | 0.0000049 U | 0.0013 U | NS | 0.0011 U | NS | 0.249 | NS | 0.0013 U | 0.0028 J | 0.0013 U | NS |
| | 1/8/2013 | Round 29 (PDB) | 0.00024 U | 0.00020 U | 0.00054 J | 0.00022 U | NA | 0.00031 U | 0.00050 U | 0.00026 U | 0.00050 U | 0.183 | 0.0020 U | 0.00032 U | 0.0036 | 0.00031 U | 0.0023 |
| | 7/18/2013 | Round 30 | 0.00060 U | 0.00050 U | 0.00050 U | 0.00056 U | NA | 0.00078 U | 0.0013 U | 0.00066 U | 0.00050 U | 0.228 | 0.0089 J | 0.00080 U | 0.0014 J | 0.00079 U | 0.0200 |
| | 2/24/2014 | Round 31 (PDB) | 0.00027 U | 0.00032 U | 0.00025 U | 0.00024 U | NA | 0.0004 U | 0.0005 U | 0.00031 U | 0.00053 U | 0.0427 | 0.002 U | 0.00026 U | 0.00072 J | 0.0003 U | 0.00091 J |
| | 7/17/2014 | Round 32 | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | NA | 0.0005 U | 0.001 U | 0.0005 U | 0.0005 U | 0.187 | 0.00121 J | 0.0005 U | 0.00142 J | 0.0005 U | 0.02120 |
| | 1/20/2015 | Round 33 (PDB) | 0.00025 U | 0.00025 U | 0.00025 U | 0.00025 U | NA | 0.00025 U | 0.0005 U | 0.00025 U | 0.00025 U | 0.0714 | 0.0005 U | 0.00025 U | 0.000463 J | 0.00025 U | 0.01340 |
| | 7/24/2015 | Round 34 | 0.00025 U | 0.00025 U | 0.00025 U | 0.00025 U | NA | 0.00025 U | 0.0005 U | 0.00025 U | 0.00025 U | 0.159 | 0.0005 U | 0.00025 U | 0.00111 J | 0.00025 U | 0.03300 |
| | 1/21/2016 | Round 35 (PDB) | 0.0005 UJ | 0.0005 U | 0.0005 U | 0.0005 U | NA | 0.0005 U | 0.001 UJ | 0.0005 U | 0.0005 UJ | 0.138 | 0.001 U | 0.0005 U | 0.00174 J | 0.0005 U | 0.00845 J |
| | 7/19/2016 | Round 36 | 0.0005 U | 0.0005 U | 0.0005 UJ | 0.0005 U | NA | 0.0005 U | 0.001 U | 0.0005 U | 0.0005 U | 0.136 | 0.00124 J | 0.0005 U | 0.00085 J | 0.0005 U | 0.02370 |
| **428B133MW** | 4/3/2005 | | Well Installed | | | | | | | | | | | | | | |
| | 4/13/2005 | Round 13 | 0.00050 U | 0.00030 U | 0.00040 U | 0.00030 U | NA | 0.00030 U | 0.00030 U | 0.00200 | 0.00030 U | 0.04000 | 0.00200 U | 0.00100 UJ | 0.00070 J | 0.12000 | 0.00030 U |
| | 8/4/2005 | Round 13 (PDB) | 0.00050 U | 0.00030 U | 0.00040 U | 0.00030 U | NA | 0.00030 U | 0.00030 U | 0.00100 | 0.00030 UJ | 0.11000 | 0.00200 U | 0.00040 U | 0.00200 | 0.18000 | 0.00030 U |
| | 10/10/2005 | Round 14 | 0.00050 U | 0.00030 U | 0.00100 J | 0.00030 U | NA | 0.00030 U | 0.00030 U | 0.00100 J | 0.00030 U | 0.37000 | 0.00200 U | 0.00040 U | 0.00400 J | 0.73000 | 0.00090 J |
| | 1/31/2006 | Round 15 | 0.00050 U | 0.00030 U | 0.00100 | 0.00030 U | NA | 0.00030 U | 0.00030 U | 0.00300 | 0.00030 U | 0.56000 | 0.00200 U | 0.00040 U | 0.00600 | 1.10000 | 0.00050 J |
| | 8/22/2006 | Round 16 | 0.00100 U | 0.00100 U | 0.00300 | 0.00080 UJ | NA | 0.00100 U | 0.00090 U | 0.00200 | 0.00100 UJ | 0.79000 | 0.00500 U | 0.00100 U | 0.00600 | 1.60000 | 0.00100 J |
| | 8/22/2006 | Round 16 (PDB) | 0.00060 U | 0.00050 U | 0.00400 | 0.00040 UJ | NA | 0.00050 U | 0.00050 U | 0.00100 | 0.00060 U | 0.98000 | 0.00200 U | 0.00060 U | 0.00900 | 0.70000 | 0.00100 J |
| | 5/9/2007 | Round 17 | 0.00130 U | 0.00100 U | 0.00130 U | 0.00130 U | NA | 0.00110 U | 0.00140 U | 0.00130 U | 0.00280 U | 1.40000 | 0.00900 J | 0.00100 U | 0.00890 J | 0.05800 | 0.00200 U |
| | 5/9/2007 | Round 17 (PDB) | 0.00060 U | 0.00130 U | 0.00450 J | 0.00100 U | NA | 0.00100 U | 0.00120 U | 0.00120 U | 0.00085 U | 0.99000 | 0.00590 J | 0.00070 U | 0.01200 | 0.00530 | 0.00230 J |
| | 9/12/2007 | Round 18 | 0.00260 U | 0.00200 U | 0.00220 U | 0.00260 U | 0.00000 U | 0.00220 U | 0.00280 U | 0.00420 U | 0.00560 U | 1.60000 | 0.00660 J | 0.00200 U | 0.01000 J | 0.03700 | 0.00400 U |
| | 1/31/2008 | Round 19 | 0.00047 U | 0.00042 U | 0.00560 | 0.00026 U | NA | 0.00044 U | 0.00051 U | 0.00036 U | 0.00060 U | 1.40000 | 0.00040 U | 0.00046 U | 0.01300 | 0.00640 | 0.00240 |
| | 1/31/2008 | Round 19 (PDB) | 0.00047 U | 0.00042 U | 0.00530 | 0.00026 U | NA | 0.00044 U | 0.00051 U | 0.00036 U | 0.00060 U | 1.40000 | 0.00040 U | 0.00046 U | 0.01500 | 0.00500 | 0.00180 J |
| | 7/23/2008 | Round 20 | 0.00420 U | 0.00520 U | 0.01100 U | 0.00680 U | NA | 0.00440 U | 0.00960 U | 0.00560 U | 0.01200 U | 1.72000 | 0.02000 U | 0.00440 U | 0.01410 J | 0.00640 U | 0.00600 U |
| | 7/23/2008 | Round 20 (PDB) | 0.00210 U | 0.00260 U | 0.00540 U | 0.00340 U | NA | 0.00220 U | 0.00480 U | 0.00280 U | 0.00610 U | 0.93300 | 0.01000 U | 0.00220 U | 0.00900 J | 0.00320 U | 0.00300 U |
| | 1/13/2009 | Round 21 | 0.00420 U | 0.00520 U | 0.01100 U | 0.00680 U | NA | 0.00440 U | 0.00960 UJL | 0.00560 U | 0.01200 U | 1.47000 | 0.04610 J | 0.00440 U | 0.00920 J | 0.00640 U | 0.00600 U |
| | 1/13/2009 | Round 21 (PDB) | 0.00210 U | 0.00260 U | 0.00540 U | 0.00340 U | NA | 0.00220 U | 0.00480 UJL | 0.00280 U | 0.00610 U | 1.76000 | 0.01590 JH | 0.00220 U | 0.01200 | 0.00380 J | 0.00300 U |
| | 7/15/2009 | Round 22 | 0.00420 U | 0.00520 U | 0.01100 U | 0.00680 U | NA | 0.00440 U | 0.00960 U | 0.00560 U | 0.01200 U | 1.55000 | 0.03910 J | 0.00440 U | 0.01770 J | 0.01050 J | 0.00600 U |
| | 1/12/2010 | Round 23 | 0.00580 U | 0.00580 U | 0.00630 J | 0.00660 U | NA | 0.00680 U | 0.01000 U | 0.00500 U | 0.01000 U | 1.57000 | 0.04000 U | 0.00880 U | 0.01200 J | 0.00480 U | 0.00560 U |
| | 1/12/2010 | Round 23 (PDB) | 0.00580 U | 0.00580 U | 0.00580 U | 0.00660 U | NA | 0.00680 U | 0.01000 U | 0.0089 J | 0.01000 U | 1.72000 | 0.05430 J | 0.00880 U | 0.01440 J | 0.00480 U | 0.00560 U |
| | 7/14/2010 | Round 24 | 0.00660 U | 0.00580 U | 0.00580 U | 0.00660 U | NA | 0.00680 U | 0.01000 U | 0.00500 U | 0.01000 U | 1.79000 | 0.04000 U | 0.00880 U | 0.01830 J | 0.00480 U | 0.05370 |
| | 7/14/2010 | Round 24 (PDB) | 0.00580 U | 0.00580 U | 0.00580 U | 0.00660 U | NA | 0.00680 U | 0.01000 U | 0.00500 U | 0.01000 U | 1.47000 | 0.04000 U | 0.00880 U | 0.01270 J | 0.00480 U | 0.03770 |
| | 1/13/2011 | Round 25 (PDB) | 0.00460 U | 0.00440 U | 0.00460 U | 0.00400 U | NA | 0.00500 U | 0.01000 U | 0.00440 U | 0.01000 U | 1.44000 | 0.04000 U | 0.00500 U | 0.01330 J | 0.02510 | 0.01110 J |
| | 1/13/2011 | Round 25 | 0.00460 U | 0.00440 U | 0.00460 U | 0.00400 U | NA | 0.00500 U | 0.01000 U | 0.00440 U | 0.01000 U | 1.35000 | 0.05770 J | 0.00500 U | 0.01250 J | 0.02340 | 0.02790 |
| | 7/26/2011 | Round 26 | 0.00120 U | 0.00110 U | 0.00530 J | 0.00100 U | NA | 0.00130 U | 0.00250 U | 0.00110 U | 0.00250 U | 1.55000 J | 0.01000 U | 0.00130 U | 0.01510 J | 0.00130 U | 0.26200 J |
| | 1/10/2012 | Round 27 (PDB) | 0.00023 U | 0.00022 U | 0.00023 U | 0.00020 U | NA | 0.00025 U | 0.00050 U | 0.00022 U | 0.00050 U | 0.0502 | 0.0020 U | 0.00025 U | 0.00042 J | 0.00084 J | 0.00029 J |
| | 1/10/2012 | Round 27 | 0.00023 U | 0.00022 U | 0.0042 | 0.00020 U | NA | 0.00025 U | 0.00050 U | 0.00022 U | 0.00050 U | 1.150 | 0.0021 J | 0.00025 U | 0.0125 | 0.0216 | 0.0704 |
| | 7/10/2012 | Round 28 | 0.0023 U | NS | NS | NS | 0.0000049 U | 0.0025 U | NS | 0.00220 U | NS | 0.667 | NS | 0.00250 U | 0.0079 J | 0.0344 | NS |
| | 1/8/2013 | Round 29 (PDB) | 0.0048 U | 0.0040 U | 0.0040 U | 0.0044 U | NA | 0.0063 U | 0.010 U | 0.0053 U | 0.010 U | 1.130 | 0.040 U | 0.0064 U | 0.0106 J | 0.406 | 0.00880 U |
| | 1/8/2013 | Round 29 | 0.0048 U | 0.0040 U | 0.0040 U | 0.0044 U | NA | 0.0063 U | 0.010 U | 0.0053 U | 0.010 U | 1.110 | 0.040 U | 0.0064 U | 0.0119 J | 0.399 | 0.00880 U |
| | 7/18/2013 | Round 30 | 0.0048 U | 0.0040 U | 0.0053 J | 0.0044 U | NA | 0.0063 U | 0.010 U | 0.0053 U | 0.010 U | 1.260 | 0.0575 J | 0.0064 U | 0.0131 | 0.512 | 0.0310 |
| | 2/24/2014 | Round 31 (PDB) | 0.0027 U | 0.0032 U | 0.0025 U | 0.0024 U | NA | 0.00400 U | 0.005 U | 0.0031 U | 0.0053 U | 0.781 | 0.02 U | 0.0026 U | 0.0074 J | 0.33400 | 0.0035 J |
| | 7/16/2014 | Round 32 | 0.00125 U | 0.00125 U | 0.00235 J | 0.00125 U | NA | 0.00125 U | 0.0025 U | 0.00125 U | 0.00125 U | 0.622 | 0.00542 J | 0.00125 U | 0.00683 | 0.265 J | 0.0294 J |
| | 1/20/2015 | Round 33 (PDB) | 0.00025 U | 0.00025 U | 0.0025 U | 0.00025 U | NA | 0.0025 U | 0.0005 U | 0.0025 U | 0.0025 U | 0.800 | 0.005 U | 0.0025 U | 0.00842 | 0.387 | 0.00166 |
| | 7/24/2015 | Round 34 | 0.0025 U | 0.0025 U | 0.00253 | 0.0025 U | NA | 0.0025 U | 0.005 U | 0.0025 U | 0.0025 U | 0.635 | 0.005 U | 0.0025 U | 0.00673 | 0.226 | 0.0123 |
| | 1/21/2016 | Round 35 (PDB) | 0.0025 UJ | 0.0025 U | 0.0025 U | 0.0025 UJ | NA | 0.0025 U | 0.005 UJ | 0.0025 U | 0.0025 UJ | 0.53 J | 0.005 U | 0.0025 UJ | 0.00638 J | 0.191 | 0.0025 UJ |
| | 7/19/2016 | Round 36 | 0.0005 U | 0.0005 U | 0.00091 J | 0.0005 U | NA | 0.0005 U | 0.001 U | 0.0005 U | 0.0005 U | 0.412 | 0.00134 J | 0.0005 U | 0.00493 | 0.00253 | 0.0881 |

**Table 4-1A**

**Summary of Chemicals of Concern Detected in Groundwater**
**Long Term Monitoring Wells — SWMU 86 Plume**
**2016 RAER**
**Former NAS Dallas, Texas**
**Page 4 of 4**

| Monitoring Well | Sampling Date | Sampling Round | Chemicals of Concern (mg/L) | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | 1,1,2,2-Tetrachloroethane | 1,1,2-Trichloroethane | 1,1-Dichloroethene | 1,2-Dichloroethane | Alpha-BHC | Carbon Tetrachloride | Chloroethane | Chloroform | Chloromethane | cis-1,2-Dichloroethene | Methylene Chloride | Tetrachloroethene | trans-1,2-Dichloroethene | Trichloroethene | Vinyl Chloride |
| **Protective Concentration Levels (mg/L)** | | | **0.00460** | **0.00500** | **0.00700** | **0.00500** | **0.00014** | **0.00500** | **9.80000** | **0.24000** | **0.07000** | **0.07000** | **0.00500** | **0.00500** | **0.10000** | **0.00500** | **0.00200** |
| **428B134MW** | 4/3/2005 | | Well Installed | | | | | | | | | | | | | | |
| | 4/13/2005 | Round 13 | 0.00050 U | 0.00030 U | 0.00040 U | 0.00030 U | NA | 0.00030 U | 0.00030 U | 0.00070 J | 0.00030 U | 0.02000 | 0.00200 U | 0.00040 U | 0.00030 J | 0.28000 | 0.00030 U |
| | 8/4/2005 | Round 13 (PDB) | 0.00050 U | 0.00030 U | 0.00040 U | 0.00030 U | NA | 0.00030 U | 0.00030 U | 0.00040 U | 0.00030 UJ | 0.01500 | 0.00200 U | 0.00040 U | 0.00030 U | 0.11000 | 0.00030 U |
| | 10/10/2005 | Round 14 | 0.00050 U | 0.00030 U | 0.00040 J | 0.00030 U | NA | 0.00030 U | 0.00030 U | 0.00040 U | 0.00030 U | 0.06500 | 0.00200 U | 0.00040 U | 0.00080 J | 0.08200 | 0.00030 U |
| | 1/31/2006 | Round 15 (PDB) | 0.00050 U | 0.00030 U | 0.00050 J | 0.00030 U | NA | 0.00030 U | 0.00030 U | 0.00040 U | 0.00030 U | 0.15000 | 0.00200 U | 0.00040 U | 0.00100 | 0.02500 | 0.00030 U |
| | 8/22/2006 | Round 16 (PDB) | 0.00060 U | 0.00050 U | 0.00060 U | 0.00040 UJ | NA | 0.00050 U | 0.00050 U | 0.00040 U | 0.00060 U | 0.15000 | 0.00200 U | 0.00060 U | 0.00100 | 0.00100 | 0.00060 U |
| | 5/9/2007 | Round 17 (PDB) | 0.00013 U | 0.00010 U | 0.00013 U | 0.00013 U | NA | 0.00011 U | 0.00014 U | 0.00013 U | 0.00028 U | 0.13000 | 0.00023 U | 0.00010 U | 0.00120 | 0.00620 | 0.00020 U |
| | 9/12/2007 | Round 18 | 0.00013 U | 0.00010 U | 0.00040 J | 0.00013 U | 0.00000 U | 0.00011 U | 0.00014 U | 0.00013 U | 0.00120 U | 0.15000 | 0.00023 U | 0.00010 U | 0.00120 | 0.00120 | 0.00071 J |
| | 1/31/2008 | Round 19 (PDB) | 0.00047 U | 0.00042 U | 0.00039 U | 0.00026 U | NA | 0.00044 U | 0.00051 U | 0.00036 U | 0.00060 U | 0.12000 | 0.00040 U | 0.00046 U | 0.00120 | 0.00700 | 0.00043 U |
| | 7/23/2008 | Round 20 (PDB) | 0.00021 U | 0.00026 U | 0.00054 U | 0.00034 U | NA | 0.00022 U | 0.00048 U | 0.00028 U | 0.00061 U | 0.13100 | 0.00100 U | 0.00022 U | 0.00110 | 0.00094 J | 0.00030 U |
| | 1/13/2009 | Round 21 | 0.00021 U | 0.00026 U | 0.00054 U | 0.00034 U | NA | 0.00022 U | 0.00048 UJL | 0.00028 U | 0.00061 U | 0.08480 | 0.00100 U | 0.00022 U | 0.00090 J | 0.00089 J | 0.00320 |
| | 7/15/2009 | Round 22 | 0.00210 U | 0.00026 U | 0.00054 U | 0.00034 U | NA | 0.00022 U | 0.00048 U | 0.00028 U | 0.00061 U | 0.09220 | 0.00100 U | 0.00022 U | 0.00150 | 0.00430 | 0.00960 |
| | 1/12/2010 | Round 23 (PDB) | 0.00029 U | 0.00029 U | 0.00029 U | 0.00033 U | NA | 0.00034 U | 0.00051 U | 0.00025 U | 0.00050 U | 0.08870 | 0.00200 U | 0.00044 U | 0.00089 J | 0.00290 | 0.00028 U |
| | 7/14/2010 | Round 24 (PDB) | 0.00029 U | 0.00029 U | 0.00033 J | 0.00033 U | NA | 0.00034 U | 0.00051 U | 0.00025 U | 0.00050 U | 0.09280 | 0.00200 U | 0.00044 U | 0.00120 | 0.03540 | 0.00700 |
| | 1/13/2011 | Round 25 (PDB) | 0.00023 U | 0.00022 U | 0.00023 U | 0.00020 U | NA | 0.00025 U | 0.00050 U | 0.00022 U | 0.00050 U | 0.09780 | 0.00200 U | 0.00025 U | 0.00110 | 0.00870 | 0.00230 |
| | 7/26/2011 | Round 26 | 0.00023 U | 0.00022 U | 0.00023 U | 0.00020 U | NA | 0.00025 U | 0.00050 U | 0.00022 U | 0.00050 U | 0.08010 | 0.00200 U | 0.00025 U | 0.00100 | 0.00870 | 0.02720 |
| | 1/10/2012 | Round 27 (PDB) | 0.00023 U | 0.00022 U | 0.00023 U | 0.00020 U | NA | 0.00025 U | 0.00050 U | 0.00022 U | 0.00050 U | 0.0788 | 0.0020 U | 0.00025 U | 0.00079 J | 0.0061 | 0.0014 |
| | 7/10/2012 | Round 28 | 0.00023 U | NS | NS | NS | 0.0000048 U | 0.00025 U | NS | 0.00022 U | NS | 0.0859 | NS | 0.00025 U | 0.0011 | 0.0093 | NS |
| | 1/8/2013 | Round 29 (PDB) | 0.00024 U | 0.00020 U | 0.00026 J | 0.00022 U | NA | 0.00031 U | 0.00050 U | 0.00026 U | 0.00050 U | 0.0979 | 0.0020 U | 0.00032 U | 0.0011 | 0.0079 | 0.0015 |
| | 7/18/2013 | Round 30 | 0.00024 U | 0.00020 U | 0.00020 U | 0.00022 U | NA | 0.00031 U | 0.00050 U | 0.00026 U | 0.00050 U | 0.0815 | 0.0020 U | 0.00032 U | 0.00078 J | 0.0031 | 0.0095 |
| | 2/24/2014 | Round 31 (PDB) | 0.00027 U | 0.00032 U | 0.00025 U | 0.00024 U | NA | 0.0004 U | 0.0005 U | 0.00031 U | 0.00053 U | 0.0738 | 0.002 U | 0.00026 U | 0.00072 J | 0.00830 | 0.00033 U |
| | 7/16/2014 | Round 32 | 0.00025 U | 0.00025 U | 0.00025 U | 0.00025 U | NA | 0.00025 U | 0.0005 U | 0.00025 U | 0.00025 U | 0.064 | 0.0005 U | 0.00025 U | 0.00085 J | 0.00591 | 0.00205 |
| | 1/20/2015 | Round 33 (PDB) | 0.0025 U | 0.0025 U | 0.0025 U | 0.0025 U | NA | 0.0025 U | 0.005 U | 0.0025 U | 0.0025 U | 0.065 | 0.005 U | 0.0025 U | 0.000505 J | 0.01130 | 0.00025 U |
| | 7/24/2015 | Round 34 | 0.0025 U | 0.0025 U | 0.0025 U | 0.0025 U | NA | 0.0025 U | 0.005 U | 0.0025 U | 0.0025 U | 0.0859 | 0.005 U | 0.0025 U | 0.000825 J | 0.0224 | 0.00338 |
| | 1/21/2016 | Round 35 (PDB) | 0.00025 UJL | 0.00025 UJL | 0.00025 UJL | 0.00025 UJL | NA | 0.00025 UJL | 0.0005 UJL | 0.00025 UJL | 0.00025 UJL | 0.0685 JL | 0.0005 UJL | 0.00025 UJL | 0.00062 JL | 0.00964 JL | 0.00025 UJL |
| | 7/19/2016 | Round 36 | 0.00025 U | 0.00025 U | 0.00025 U | 0.00025 U | NA | 0.00025 U | 0.0005 U | 0.00025 U | 0.00025 U | 0.0767 | 0.0005 U | 0.00025 U | 0.0007 J | 0.017 | 0.00043 J |
| **428B135MW** | 4/4/2005 | | Well Installed | | | | | | | | | | | | | | |
| | -- | Round 13 | NS-D | NS-D | NS-D | NS-D | NS-D | NS-D | NS-D | NS-D | NS-D | NS-D | NS-D | NS-D | NS-D | NS-D | NS-D |
| | 8/2/2005 | Round 13 (PDB) | 0.00050 U | 0.00030 U | 0.00040 J | 0.00030 U | NA | 0.00030 U | 0.00030 U | 0.00040 U | 0.00030 U | 0.01300 | 0.00200 U | 0.00040 U | 0.00040 J | 0.00400 | 0.00080 J |
| | 10/21/2005 | Round 14 (PDB) | 0.00050 U | 0.00030 U | 0.00040 J | 0.00030 U | NA | 0.00030 U | 0.00030 U | 0.00040 U | 0.00030 U | 0.01600 | 0.00200 U | 0.00040 U | 0.00090 J | 0.00400 | 0.00080 J |
| | 1/31/2006 | Round 15 (PDB) | 0.00050 U | 0.00030 U | 0.00040 J | 0.00030 U | NA | 0.00030 U | 0.00030 U | 0.00040 U | 0.00030 U | 0.02000 | 0.00200 U | 0.00040 U | 0.00300 | 0.00100 | 0.00080 J |
| | 8/22/2006 | Round 16 (PDB) | 0.00060 U | 0.00050 U | 0.00060 J | 0.00040 UJ | NA | 0.00050 U | 0.00050 U | 0.00040 U | 0.00060 U | 0.02300 | 0.00200 U | 0.00060 U | 0.00300 | 0.00200 | 0.00100 J |
| | 5/9/2007 | Round 17 (PDB) | 0.00013 U | 0.00010 U | 0.00057 J | 0.00013 U | NA | 0.00011 U | 0.00014 U | 0.00013 U | 0.00028 U | 0.02900 | 0.00023 U | 0.00010 U | 0.00300 | 0.00090 J | 0.00210 J |
| | 9/11/2007 | Round 18 | 0.00007 U | 0.00017 U | 0.00064 J | 0.00015 U | 0.00000 U | 0.00014 U | 0.00038 U | 0.00010 U | 0.00040 U | 0.04400 J | 0.00026 U | 0.00014 U | 0.00490 J | 0.00160 J | 0.00150 J |
| | 1/31/2008 | Round 19 (PDB) | 0.00047 U | 0.00042 U | 0.00039 U | 0.00026 U | NA | 0.00044 U | 0.00051 U | 0.00036 U | 0.00060 U | 0.01400 | 0.00040 U | 0.00046 U | 0.00120 | 0.00053 U | 0.00043 U |
| | 7/23/2008 | Round 20 (PDB) | 0.00021 U | 0.00026 U | 0.00054 U | 0.00034 U | NA | 0.00022 U | 0.00048 U | 0.00028 U | 0.00061 U | 0.02420 | 0.00100 U | 0.00022 U | 0.00220 | 0.00032 U | 0.00030 U |
| | 1/13/2009 | Round 21 (PDB) | 0.00021 U | 0.00026 U | 0.00054 U | 0.00034 U | NA | 0.00022 U | 0.00048 UJL | 0.00028 U | 0.00061 U | 0.03220 | 0.00100 U | 0.00022 U | 0.00310 | 0.00063 J | 0.00130 |
| | 7/13/2009 | Round 22 | 0.00210 U | 0.00026 U | 0.00085 J | 0.00034 U | NA | 0.00022 U | 0.00048 U | 0.00028 U | 0.00061 U | 0.04000 | 0.00100 U | 0.00022 U | 0.00540 | 0.00040 J | 0.00140 |
| | 1/12/2010 | Round 23 (PDB) | 0.00029 U | 0.00029 U | 0.00110 | 0.00033 U | NA | 0.00034 U | 0.00051 U | 0.00025 U | 0.00050 U | 0.05040 | 0.00200 U | 0.00044 U | 0.00720 | 0.00025 J | 0.00220 |
| | 7/14/2010 | Round 24 (PDB) | 0.00029 U | 0.00029 U | 0.00110 | 0.00033 U | NA | 0.00034 U | 0.00051 U | 0.00025 U | 0.00050 U | 0.04680 | 0.00200 U | 0.00044 U | 0.00560 | 0.00024 U | 0.00110 |
| | 1/13/2011 | Round 25 (PDB) | 0.00023 U | 0.00022 U | 0.00083 J | 0.00020 U | NA | 0.00025 U | 0.00050 U | 0.00022 U | 0.00050 U | 0.04810 | 0.00200 U | 0.00025 U | 0.00730 | 0.00026 U | 0.00280 |
| | 7/26/2011 | Round 26 | 0.00023 U | 0.00022 U | 0.00100 | 0.00020 U | NA | 0.00025 U | 0.00050 U | 0.00022 U | 0.00050 U | 0.04620 | 0.00200 U | 0.00025 U | 0.00630 | 0.00026 U | 0.00230 |
| | 1/10/2012 | Round 27 (PDB) | 0.00023 U | 0.00022 U | 0.00050 J | 0.00020 U | NA | 0.00025 U | 0.00050 U | 0.00022 U | 0.00050 U | 0.0401 | 0.0020 U | 0.00025 U | 0.0038 | 0.00026 U | 0.0023 |
| | 7/10/2012 | Round 28 | 0.00023 U | NS | NS | NS | 0.0000049 U | 0.00025 U | NS | 0.00022 U | NS | 0.0525 | NS | 0.00025 U | 0.0066 | 0.00035 J | NS |
| | 1/8/2013 | Round 29 (PDB) | 0.00024 U | 0.00020 U | 0.00020 U | 0.00022 U | NA | 0.00031 U | 0.00050 U | 0.00026 U | 0.00050 U | 0.0371 JH | 0.0020 U | 0.00032 U | 0.0027 | 0.00031 U | 0.0016 |
| | 7/18/2013 | Round 30 | 0.00024 U | 0.00020 U | 0.00081 J | 0.00022 U | NA | 0.00031 U | 0.00050 U | 0.00026 U | 0.00050 U | 0.0419 | 0.0020 U | 0.00032 U | 0.0035 | 0.00031 U | 0.0022 |
| | 2/24/2014 | Round 31 (PDB) | 0.00027 U | 0.00032 U | 0.00046 J | 0.00024 U | NA | 0.0004 U | 0.0005 U | 0.00031 U | 0.00053 U | 0.0399 | 0.002 U | 0.00026 U | 0.0016 | 0.0003 U | 0.00045 J |
| | 7/17/2014 | Round 32 | 0.00025 U | 0.00025 U | 0.00092 J | 0.00025 U | NA | 0.00025 U | 0.0005 U | 0.00025 U | 0.00025 U | 0.0445 | 0.0005 U | 0.00025 U | 0.00281 | 0.00025 U | 0.00122 |
| | 1/20/2015 | Round 33 (PDB) | 0.0025 U | 0.0025 U | 0.000863 J | 0.0025 U | NA | 0.00025 U | 0.005 U | 0.00025 U | 0.00025 U | 0.0483 | 0.0005 U | 0.00025 U | 0.00197 | 0.00025 U | 0.000877 J |
| | 7/24/2015 | Round 34 | 0.0025 U | 0.0025 U | 0.000863 J | 0.0025 U | NA | 0.00025 U | 0.005 U | 0.00025 U | 0.00025 U | 0.0381 | 0.00192 J | 0.00025 U | 0.00217 | 0.000799 J | 0.00122 J |
| | 1/21/2016 | Round 35 (PDB) | 0.0005 UJ | 0.0005 U | 0.00085 J | 0.0005 U | NA | 0.0005 U | 0.001 UJ | 0.0005 U | 0.0005 UJ | 0.0444 | 0.001 U | 0.0005 U | 0.00326 | 0.00052 J | 0.00146 J |
| | 7/19/2016 | Round 36 | 0.0005 U | 0.0005 U | 0.00067 J | 0.0005 U | NA | 0.0005 U | 0.001 U | 0.0005 U | 0.0005 U | 0.0426 | 0.001 U | 0.0005 U | 0.00231 | 0.00055 J | 0.00129 J |

mg/L - milligrams per liter
NA - Not Applicable
NS - Not Sampled
PDB - Passive Diffusion Bag
SDG - Sample Delivery Group
PCLE - Protective Concentration Level Exceedance

Note:
Shaded areas indicate an exceedance.

Analytical Result Qualifiers:
J,H - Indicates that the chemical was detected. However, the associated numerical result may not be a precise representation of the amount that is actually present in the sample. The laboratory reported concentration is considered to be bias unknown (J), high ( H) estimate of the true concentration.
of the true concentration.
U - Indicates that the chemical was not detected at the numerical detection limit (sample-specific quantitation limit) noted. Nondetected results from the laboratory are reported in this manner. This qualifier is added to a positive result (reported by
the laboratory) if the detected concentration is determined to be attributable to contamination introduced during field sampling or laboratory analysis.
UJ - Indicates that the chemical was not detected. However, the detection limit (sample-specific quantitation limit) is considered to be estimated based on problems encountered during laboratory analysis. The associated numerical detection
limit is regarded as inaccurate or imprecise.

**Table 4-1B**

**Summary of Chemicals of Concern Detected in Groundwater**
**Historical Monitoring Wells — SWMU 86 Plume**
**2016 RAER**
**Former NAS Dallas, Texas**
**Page 1 of 6**

| Monitoring Well | Sampling Date | Chemicals of Concern (mg/L) | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 1,1,2,2-Tetrachloroethane | 1,1,2-Trichloroethane | 1,1-Dichloroethene | 1,2-Dichloroethane | Alpha-BHC | Carbon Tetrachloride | Chloroethane | Chloroform | Chloromethane | cis-1,2-Dichloroethene | Methylene Chloride | Tetrachloroethene | trans-1,2-Dichloroethene | Trichloroethene | Vinyl Chloride |
| **Protective Concentration Leve** | | **0.00460** | **0.00500** | **0.00700** | **0.00500** | **0.00014** | **0.00500** | **9.80000** | **0.24000** | **0.07000** | **0.07000** | **0.00500** | **0.00500** | **0.10000** | **0.00500** | **0.00200** |
| **Monitoring Wells Located Inside PCLE Zone** | | | | | | | | | | | | | | | | |
| **42401MW** | 7/23/1995 | 2.5000 U | 2.5000 U | 2.5000 U | 2.5000 U | 0.00005 U | 2.5000 U | 5.0000 U | 2.5000 U | 5.0000 U | NA | 2.5000 U | 2.5000 U | NA | 14.000 | 5.0000 U |
| | 3/24/1998 | 3.1000 U | 3.1000 U | 3.1000 U | 3.1000 U | 0.00005 U | 3.1000 U | 3.1000 U | 3.1000 U | 3.1000 U | 93.000 | 3.1000 U | 3.1000 U | 3.1000 U | 17.000 | 3.1000 U |
| | 9/11/1998 | 31.000 U | 31.000 U | 31.000 U | 31.000 U | 0.00005 U | 31.000 U | 31.000 U | 31.000 U | 31.000 U | 85.000 | 31.000 U | 31.000 U | 31.000 U | 8.9000 J | 31.000 U |
| | 3/27/1999 | 10.000 U | 10.000 U | 10.000 U | 10.000 U | NA | 10.000 U | 10.000 U | 10.000 U | 10.000 U | 150.00 | 10.000 U | 10.000 U | 10.000 U | 11.000 | 10.000 U |
| | 11/2/1999 | 5.6000 U | 5.6000 U | 5.6000 U | 5.6000 U | NA | 5.6000 U | 5.6000 U | 5.6000 U | 5.6000 U | 120.00 | 5.6000 U | 5.6000 U | 5.6000 U | 9.6000 | 5.6000 U |
| | 7/20/2000 | 4.2000 U | 4.2000 U | 4.2000 U | 4.2000 U | NA | 4.2000 U | 4.2000 U | 4.2000 U | 4.2000 U | 110.00 | 4.2000 U | 4.2000 U | 4.2000 U | 6.9000 | 4.2000 U |
| | 9/1/2003 | Well Abandoned and replaced by 428B93MW | | | | | | | | | | | | | | |
| **42801MW** | 7/21/1995 | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00003 U | 0.00500 U | 0.01000 U | 0.00500 U | 0.01000 U | 0.03880 | 0.01000 U | 0.00500 U | 0.00500 U | 1.0500 | 0.01000 U |
| | 3/23/1998 | 0.06200 U | 0.06200 U | 0.06200 U | 0.06200 U | 0.00005 U | 0.06200 U | 0.06200 U | 0.06200 U | 0.06200 U | 0.10000 | 0.06200 U | 0.06200 U | 0.06200 U | 1.9000 | 0.06200 U |
| | 9/11/1998 | 0.62000 U | 0.62000 U | 0.62000 U | 0.62000 U | NA | 0.62000 U | 0.62000 U | 0.62000 U | 0.62000 U | 0.22000 J | 0.62000 U | 0.62000 U | 0.62000 U | 5.0000 | 0.62000 U |
| | 3/14/1999 | 0.12000 U | 0.12000 U | 0.12000 U | 0.12000 U | NA | 0.12000 U | 0.12000 U | 0.12000 U | 0.12000 U | 0.24000 | 0.12000 U | 0.12000 U | 0.12000 U | 4.4000 | 0.12000 U |
| | 11/17/1999 | 1.20000 U | 1.20000 U | 1.20000 U | 1.20000 U | NA | 1.20000 U | 1.20000 U | 1.20000 U | 1.20000 U | 0.24000 J | 1.20000 U | 1.20000 U | 1.20000 U | 4.6000 | 1.20000 U |
| | 7/25/2000 | 0.17000 U | 0.17000 U | 0.17000 U | 0.17000 U | NA | 0.17000 U | 0.17000 U | 0.17000 U | 0.17000 UJ | 0.37000 | 0.17000 U | 0.17000 U | 0.17000 U | 5.0000 | 0.17000 U |
| | 7/14/2001 | 0.50000 U | 0.50000 U | 0.50000 U | 0.50000 U | NA | 0.50000 U | 1.00000 U | 0.50000 U | 1.00000 U | 1.0000 | 0.50000 U | 0.50000 U | 0.25000 U | 13.000 | 1.00000 U |
| | 1/7/2003 | 0.10000 U | 0.10000 U | 0.10000 U | 0.02800 J | NA | 0.10000 U | 0.10000 U | 0.10000 U | 0.10000 U | 0.13000 | 0.20000 U | 0.10000 U | 0.10000 U | 2.0000 | 0.10000 U |
| | 1/7/2003 | 0.25000 U | 0.25000 U | 0.25000 U | 0.25000 U | NA | 0.25000 U | 0.25000 U | 0.25000 U | 0.25000 U | 0.48000 | 0.50000 U | 0.25000 U | 0.25000 U | 5.8000 | 0.25000 U |
| | 9/4/2003 | 0.03300 U | 0.03000 U | 0.03100 U | 0.03100 U | NA | 0.02600 U | 0.03100 U | 0.03000 U | 0.03700 U | 1.0000 | 0.04000 U | 0.01700 U | 0.03400 U | 4.3000 | 0.08100 J |
| | 9/4/2003 | 0.23000 U | 0.21000 U | 0.22000 U | 0.22000 U | NA | 0.18000 U | 0.22000 U | 0.21000 U | 0.26000 U | 12.000 | 0.28000 U | 0.12000 U | 0.24000 U | 31.000 | 1.1000 |
| | 9/4/2003 | 0.07700 U | 0.07000 U | 0.07300 U | 0.07300 U | NA | 0.06000 U | 0.07300 U | 0.07000 U | 0.08700 U | 2.0000 | 0.09300 U | 0.04000 U | 0.08000 U | 12.000 | 0.18000 J |
| | -- | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS |
| | -- | Well Destroyed | | | | | | | | | | | | | | |
| **428B06MW** | -- | Well Installed | | | | | | | | | | | | | | |
| | 4/29/1998 | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00005 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00510 | 0.00500 U | 0.00500 U | 0.00500 U | 0.05300 | 0.00500 U |
| | 8/24/1998 | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00005 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.04800 | 0.00500 U | 0.00500 U | 0.00220 J | 0.80000 | 0.00500 U |
| | 1/9/1999 | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00005 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.01900 | 0.00500 U | 0.00500 U | 0.00150 J | 0.13000 | 0.00500 U |
| | 1/13/1999 | Well Abandoned | | | | | | | | | | | | | | |
| **428B69MW** | 12/15/1999 | Well Installed | | | | | | | | | | | | | | |
| | 1/11/2000 | 0.01200 U | 0.01200 U | 0.01200 U | 0.01200 U | NA | 0.01200 U | 0.01200 U | 0.01200 U | 0.01200 U | 0.01200 U | 0.01200 U | 0.01200 U | 0.01200 U | 0.00720 J | 0.01200 U |
| | 7/25/2000 | 0.02500 U | 0.02500 U | 0.02500 U | 0.02500 U | NA | 0.02500 U | 0.02500 U | 0.02500 U | 0.02500 UJ | 0.02500 U | 0.02500 U | 0.02500 U | 0.02500 U | 0.02500 U | 0.02500 U |
| | 7/14/2001 | 0.06200 U | 0.06200 U | 0.06200 U | 0.06200 U | NA | 0.06200 U | 0.12000 U | 0.06200 U | 0.12000 U | 0.03100 U | 0.06200 U | 0.06200 U | 0.03100 U | 0.06200 U | 0.12000 U |
| | 7/14/2001 | 0.05000 U | 0.05000 U | 0.05000 U | 0.05000 U | NA | 0.05000 U | 0.10000 U | 0.05000 U | 0.10000 U | 0.02500 U | 0.05000 U | 0.05000 U | 0.02500 U | 0.01100 J | 0.10000 U |
| | 1/20/2003 | 0.00100 U | 0.00100 U | 0.00100 U | 0.00100 U | NA | 0.00100 U | 0.00100 U | 0.00100 U | 0.00100 U | 0.00037 J | 0.00200 U | 0.00100 U | 0.00100 U | 0.00170 | 0.00100 U |
| | 1/20/2003 | 0.00100 U | 0.00100 U | 0.00100 U | 0.00100 U | NA | 0.00100 U | 0.00100 U | 0.00100 U | 0.00100 U | 0.00041 J | 0.00200 U | 0.00100 U | 0.00100 U | 0.00190 | 0.00100 U |
| | -- | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS |
| | 1/8/2004 | 0.00016 U | 0.00012 U | 0.00021 U | 0.00009 U | NA | 0.00020 U | 0.00018 U | 0.00014 U | 0.00008 U | 0.00074 J | 0.00016 U | 0.00024 U | 0.00019 U | 0.00210 | 0.00017 U |
| | 8/5/2004 | 0.00042 U | 0.00022 U | 0.00035 U | 0.00010 U | NA | 0.00025 U | 0.00041 U | 0.00010 U | 0.00017 U | 0.00065 J | 0.00040 U | 0.00021 U | 0.00023 U | 0.00120 | 0.00017 U |
| | 10/14/2004 | 0.00042 U | 0.00022 U | 0.00035 U | 0.00010 U | NA | 0.00025 U | 0.00041 U | 0.00010 U | 0.00017 U | 0.00055 J | 0.00040 U | 0.00021 U | 0.00023 U | 0.00072 J | 0.00017 U |
| | 4/19/2005 | Well Abandoned | | | | | | | | | | | | | | |
| **428B73MW** | 12/14/1999 | Well Installed | | | | | | | | | | | | | | |
| | 1/25/2000 | 0.62000 U | 0.62000 U | 0.62000 U | 0.62000 U | NA | 0.62000 U | 0.62000 U | 0.62000 U | 0.62000 U | 0.90000 | 0.62000 U | 0.62000 U | 0.62000 U | 18.000 | 0.62000 U |
| | 7/24/2000 | 0.50000 U | 0.50000 U | 0.50000 U | 0.50000 U | NA | 0.50000 U | 0.50000 U | 0.50000 U | 0.50000 U | 0.62000 | 0.50000 U | 0.50000 U | 0.50000 U | 10.000 | 0.50000 U |
| | 7/16/2001 | 0.25000 U | 0.25000 U | 0.25000 U | 0.25000 U | NA | 0.25000 U | 0.50000 U | 0.25000 U | 0.50000 U | 4.10000 | 0.25000 U | 0.25000 U | 0.12000 U | 7.1000 | 0.20000 J |
| | 7/16/2001 | 0.71000 U | 0.71000 U | 0.71000 U | 0.71000 U | NA | 0.71000 U | 1.40000 U | 0.71000 U | 1.40000 U | 22.00000 | 0.71000 U | 0.71000 U | 0.36000 U | 4.0000 | 1.40000 U |
| | 7/16/2001 | 0.38000 U | 0.38000 U | 0.38000 U | 0.38000 U | NA | 0.38000 U | 0.77000 U | 0.38000 U | 0.77000 U | 12.00000 | 0.38000 U | 0.38000 U | 0.19000 U | 2.1000 | 0.77000 U |
| | 1/6/2003 | 0.01000 U | 0.01000 U | 0.01000 U | 0.01000 U | NA | 0.01000 U | 0.01000 U | 0.01000 U | 0.01000 U | 0.21000 | 0.02000 U | 0.01000 U | 0.01000 U | 0.29000 | 0.04000 |
| | 1/6/2003 | 0.00100 U | 0.00100 U | 0.00170 | 0.00100 U | NA | 0.00100 U | 0.00100 U | 0.00100 U | 0.00100 U | 0.36000 | 0.00200 U | 0.00100 U | 0.00230 | 0.35000 | 0.02900 |
| | -- | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS |
| | -- | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS |
| | -- | Well Destroyed | | | | | | | | | | | | | | |

**Table 4-1B**

**Summary of Chemicals of Concern Detected in Groundwater**
**Historical Monitoring Wells — SWMU 86 Plume**
**2016 RAER**
**Former NAS Dallas, Texas**
**Page 2 of 6**

| Monitoring Well | Sampling Date | Chemicals of Concern (mg/L) | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 1,1,2,2-Tetrachloroethane | 1,1,2-Trichloroethane | 1,1-Dichloroethene | 1,2-Dichloroethane | Alpha-BHC | Carbon Tetrachloride | Chloroethane | Chloroform | Chloromethane | cis-1,2-Dichloroethene | Methylene Chloride | Tetrachloroethene | trans-1,2-Dichloroethene | Trichloroethene | Vinyl Chloride |
| **Protective Concentration Leve** | | **0.00460** | **0.00500** | **0.00700** | **0.00500** | **0.00014** | **0.00500** | **9.80000** | **0.24000** | **0.07000** | **0.07000** | **0.00500** | **0.00500** | **0.10000** | **0.00500** | **0.00200** |
| **428B80MW** | 8/2/2000 | Well Installed | | | | | | | | | | | | | | |
| | 8/9/2000 | 0.01200 U | 0.01200 U | 0.01200 U | 0.01200 U | NA | 0.01200 U | 0.01200 U | 0.01200 U | 0.01200 U | 0.01500 | 0.01200 U | 0.01200 U | 0.00310 J | 0.33000 | 0.01200 U |
| | 7/16/2001 | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | NA | 0.00500 U | 0.01000 U | 0.00500 U | 0.01000 U | 0.00460 | 0.00500 U | 0.00500 U | 0.00074 J | 0.04300 | 0.01000 U |
| | 7/16/2001 | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | NA | 0.00500 U | 0.01000 U | 0.00500 U | 0.01000 U | 0.00830 | 0.00500 U | 0.00500 U | 0.00130 J | 0.11000 | 0.01000 U |
| | 1/6/2003 | 0.00100 U | 0.00100 U | 0.00100 U | 0.00100 U | NA | 0.00100 U | 0.00100 U | 0.00100 U | 0.00100 U | 0.00290 | 0.00200 U | 0.00100 U | 0.00100 U | 0.01800 | 0.00100 U |
| | 1/6/2003 | 0.00100 U | 0.00100 U | 0.00100 U | 0.00100 U | NA | 0.00100 U | 0.00100 U | 0.00025 J | 0.00100 U | 0.00270 | 0.00200 U | 0.00100 U | 0.00100 U | 0.02800 | 0.00100 U |
| | -- | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS |
| | -- | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS |
| | -- | Well Destroyed | | | | | | | | | | | | | | |
| **428B84MW** | 8/5/2000 | Well Installed | | | | | | | | | | | | | | |
| | 8/9/2000 | 0.00500 U | 0.00500 U | 0.00089 J | 0.00500 U | NA | 0.00500 U | 0.00500 U | 0.00440 J | 0.00500 U | 0.02600 | 0.00500 U | 0.00500 U | 0.00098 J | 0.01700 | 0.00500 U |
| | 7/16/2001 | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | NA | 0.00500 U | 0.01000 U | 0.00500 U | 0.01000 U | 0.05700 | 0.00500 U | 0.00500 U | 0.00220 J | 0.03600 | 0.01000 U |
| | 7/16/2001 | 0.01200 U | 0.01200 U | 0.01200 U | 0.01200 U | NA | 0.01200 U | 0.02500 U | 0.01200 U | 0.02500 U | 0.06800 | 0.00360 J | 0.01200 U | 0.00220 J | 0.01800 | 0.02500 U |
| | 7/16/2001 | 0.01200 U | 0.01200 U | 0.01200 U | 0.01200 U | NA | 0.01200 U | 0.02500 U | 0.01200 U | 0.02500 U | 0.05400 | 0.01200 U | 0.01200 U | 0.00620 U | 0.01700 | 0.02500 U |
| | 1/6/2003 | 0.00100 U | 0.00100 U | 0.00100 U | 0.00100 U | NA | 0.00100 U | 0.00100 U | 0.00100 U | 0.00100 U | 0.00041 J | 0.00200 U | 0.00100 U | 0.00100 U | 0.00150 | 0.00100 U |
| | 1/6/2003 | 0.00100 U | 0.00100 U | 0.00100 U | 0.00100 U | NA | 0.00100 U | 0.00100 U | 0.00100 U | 0.00100 U | 0.00660 | 0.00200 U | 0.00100 U | 0.00100 U | 0.00920 | 0.00100 U |
| | -- | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS |
| | -- | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS |
| | -- | Well Destroyed | | | | | | | | | | | | | | |
| **428B92MW** | -- | Well Installed | | | | | | | | | | | | | | |
| | 5/1/2001 | 0.00110 J | 0.01600 | 0.28000 | NA | NA | 0.02100 | NA | 3.70000 J | NA | 47.000 | 0.05700 | 0.01300 | 2.0000 | 36.000 | 0.00720 |
| | -- | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS |
| | 8/26/2003 | 0.00660 U | 0.00600 U | 0.00630 U | 0.00630 U | NA | 0.00510 U | 0.00630 U | 0.00600 U | 0.00740 U | 0.70000 | 0.00800 U | 0.00340 U | 0.00690 U | 0.00750 J | 0.00740 U |
| | -- | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS |
| | -- | Well Destroyed | | | | | | | | | | | | | | |
| **428B93MW** | 5/1/2001 | Well Installed as replacement 42401MW | | | | | | | | | | | | | | |
| | 5/1/2001 | 0.00610 | 0.00520 | 0.18000 | NA | NA | 0.02700 | NA | 1.30000 J | NA | 45.000 | 0.03300 | 0.00280 J | 0.66000 | 13.000 | 0.02300 |
| | 7/16/2001 | 2.5000 U | 2.5000 U | 2.5000 U | 2.5000 U | NA | 2.5000 U | 5.0000 U | 1.40000 J | 5.0000 U | 57.000 | 2.5000 U | 2.5000 U | 1.2000 U | 6.4000 | 5.0000 U |
| | 7/16/2001 | 2.5000 U | 2.5000 U | 2.5000 U | 2.5000 U | NA | 2.5000 U | 5.0000 U | 0.52000 J | 5.0000 U | 45.000 | 2.5000 U | 2.5000 U | 1.2000 U | 6.3000 | 5.0000 U |
| | 1/6/2003 | 2.5000 U | 2.5000 U | 2.5000 U | 2.5000 U | NA | 2.5000 U | 2.5000 U | 2.50000 U | 2.50000 U | 64.000 | 5.0000 U | 2.5000 U | 2.5000 U | 5.7000 | 2.5000 U |
| | 1/6/2003 | 0.00100 U | 0.00600 | 0.07400 J | 0.00200 | NA | 0.00100 U | 0.00100 U | 0.20000 J | 0.00100 U | 63.000 | 0.00200 U | 0.00480 | 0.19000 J | 6.5000 | 0.00910 |
| | 8/25/2003 | 0.33000 U | 0.30000 U | 0.31000 U | 0.31000 U | NA | 0.26000 U | 0.31000 U | 0.30000 U | 0.37000 U | 41.000 | 0.40000 U | 0.17000 U | 0.34000 U | 3.8000 | 0.37000 U |
| | -- | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS |
| | -- | Well Destroyed | | | | | | | | | | | | | | |
| **428B94MW** | -- | Well Installed | | | | | | | | | | | | | | |
| | 5/1/2001 | 0.09600 U | 0.08600 U | 0.05100 U | NA | NA | 0.04500 U | NA | 3.1000 | NA | 100.00 J | 0.11000 U | 0.06800 U | 0.09200 U | 900.00 | 0.10000 U |
| | -- | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS |
| | 8/26/2003 | 0.77000 U | 0.70000 U | 0.73000 U | 0.73000 U | NA | 0.60000 U | 0.73000 U | 1.5000 | 0.87000 U | 31.000 | 0.93000 U | 2.0000 U | 0.80000 U | 110.00 | 0.87000 U |
| | -- | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS |
| | -- | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS |
| | -- | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS |
| | -- | Well Destroyed | | | | | | | | | | | | | | |
| **428B95MW** | -- | Well Installed | | | | | | | | | | | | | | |
| | 5/1/2001 | 0.50000 U | 0.50000 U | 0.50000 U | NA | NA | 0.50000 U | NA | 0.86000 | NA | 2.3000 | 0.50000 U | 0.50000 U | 0.03600 J | 430.00 | 0.20000 U |
| | -- | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS |
| | 8/26/2003 | 3.8000 U | 3.5000 U | 3.7000 U | 3.7000 U | NA | 3.0000 U | 3.7000 U | 3.5000 U | 4.3000 U | 8.0000 J | 4.7000 U | 9.3000 U | 4.0000 U | 450.00 | 4.3000 U |
| | -- | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS |
| | -- | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS |
| | -- | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS |
| | -- | Well Destroyed | | | | | | | | | | | | | | |

**Table 4-1B**

**Summary of Chemicals of Concern Detected in Groundwater**
**Historical Monitoring Wells — SWMU 86 Plume**
**2016 RAER**
**Former NAS Dallas, Texas**


| Monitoring Well | Sampling Date | Chemicals of Concern (mg/L) | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 1,1,2,2-Tetrachloroethane | 1,1,2-Trichloroethane | 1,1-Dichloroethene | 1,2-Dichloroethane | Alpha-BHC | Carbon Tetrachloride | Chloroethane | Chloroform | Chloromethane | cis-1,2-Dichloroethene | Methylene Chloride | Tetrachloroethene | trans-1,2-Dichloroethene | Trichloroethene | Vinyl Chloride |
| **Protective Concentration Leve** | | **0.00460** | **0.00500** | **0.00700** | **0.00500** | **0.00014** | **0.00500** | **9.80000** | **0.24000** | **0.07000** | **0.07000** | **0.00500** | **0.00500** | **0.10000** | **0.00500** | **0.00200** |
| **428B96TW** | 7/29/2003 | Well Installed | | | | | | | | | | | | | | |
| | 8/5/2003 | 0.00023 U | 0.00021 U | 0.00022 U | 0.00022 U | NA | 0.00018 U | 0.00022 U | 0.00021 U | 0.00026 U | 0.00800 | 0.00028 U | 0.00012 U | 0.00024 U | 0.01900 | 0.00026 U |
| | 11/3/2003 | Well Abandoned | | | | | | | | | | | | | | |
| **428B98TW** | 7/29/2003 | Well Installed | | | | | | | | | | | | | | |
| | 8/6/2003 | 0.00023 U | 0.00021 U | 0.00022 U | 0.00022 U | NA | 0.00018 U | 0.00022 U | 0.00021 U | 0.00026 U | 0.00370 | 0.00028 U | 0.00012 U | 0.00058 | 0.02000 | 0.00026 U |
| | 11/3/2003 | Well Abandoned | | | | | | | | | | | | | | |
| **428B99TW** | 7/29/2003 | Well Installed | | | | | | | | | | | | | | |
| | 8/7/2003 | 0.04600 U | 0.04200 U | 0.04400 U | 0.04400 U | NA | 0.03600 U | 0.04400 U | 0.04200 U | 0.05200 U | 6.7000 | 0.06600 U | 0.02400 U | 0.04800 U | 7.0000 | 0.05200 U |
| | 11/3/2003 | Well Abandoned | | | | | | | | | | | | | | |
| **428BX32MW** | 3/18/1998 | Well Installed | | | | | | | | | | | | | | |
| | 4/27/1998 | 0.10000 U | 0.10000 U | 0.10000 U | 0.10000 U | 0.00005 U | 0.04800 J | 0.10000 U | 2.2000 | 0.10000 U | 0.10000 U | 0.10000 U | 0.01800 J | 0.10000 U | 0.01800 J | 0.10000 U |
| | 8/24/1998 | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00100 | 0.02900 | 0.00500 U | 2.5000 | 0.00500 U | 0.00500 U | 0.00180 J | 0.01500 | 0.00500 U | 0.01600 | 0.00500 U |
| | 3/8/1999 | 0.05000 U | 0.05000 U | 0.05000 U | 0.05000 U | 0.00005 U | 0.00830 J | 0.05000 U | 1.6000 | 0.05000 U | 0.05000 U | 0.01900 U | 0.01000 J | 0.05000 U | 0.01400 J | 0.05000 U |
| | 11/18/1999 | 0.05000 U | 0.05000 U | 0.05000 U | 0.05000 U | NA | 0.05000 U | 0.05000 U | 1.2000 | 0.05000 U | 0.05000 U | 0.05000 U | 0.05000 U | 0.05000 U | 0.01100 J | 0.05000 U |
| | 7/25/2000 | 0.05000 U | 0.05000 U | 0.05000 U | 0.05000 U | NA | 0.05000 U | 0.05000 U | 1.1000 | 0.05000 UJ | 0.05000 U | 0.05000 U | 0.01500 J | 0.05000 U | 0.01200 J | 0.05000 U |
| | 7/14/2001 | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | NA | 0.00500 U | 0.01000 U | 0.00300 J | 0.01000 U | 0.00250 U | 0.00500 U | 0.00160 J | 0.00250 U | 0.00250 J | 0.01000 U |
| | 1/6/2003 | 0.00100 U | 0.00100 U | 0.00100 U | 0.00100 U | NA | 0.00100 U | 0.00100 U | 0.00059 J | 0.00100 U | 0.00100 U | 0.00200 U | 0.00290 | 0.00100 U | 0.00140 | 0.00100 U |
| | 1/6/2003 | 0.00100 U | 0.00100 U | 0.00100 U | 0.00100 U | NA | 0.00100 U | 0.00100 U | 0.00160 | 0.00100 U | 0.00100 U | 0.00200 U | 0.00220 | 0.00100 U | 0.00170 | 0.00100 U |
| | -- | Well Destroyed | | | | | | | | | | | | | | |
| **428B129MW** | 4/5/2005 | Well Installed | | | | | | | | | | | | | | |
| | 4/13/2005 | 0.00050 U | 0.00030 U | 0.00040 U | 0.00030 U | NA | 0.00030 U | 0.00030 U | 0.00060 J | 0.00030 U | 0.00040 J | 0.00200 U | 0.00100 UJ | 0.00030 U | 0.01900 | 0.00030 U |
| | 8/4/2005 | 0.00050 U | 0.00030 U | 0.00040 U | 0.00030 U | NA | 0.00030 U | 0.00030 U | 0.00040 U | 0.00030 UJ | 0.00030 J | 0.00200 U | 0.00040 U | 0.00030 U | 0.00030 U | 0.00030 U |
| | 10/10/2005 | 0.00050 U | 0.00030 U | 0.00040 U | 0.00030 U | 0.00002 U | 0.00030 U | 0.00030 U | 0.00040 U | 0.00030 U | 0.00060 J | 0.00200 U | 0.00040 U | 0.00030 U | 0.00050 J | 0.00030 U |
| | 1/20/2006 | 0.00050 U | 0.00030 U | 0.00040 U | 0.00030 U | 0.00006 U | 0.00030 U | 0.00030 U | 0.00040 U | 0.00030 U | 0.00040 J | 0.00200 U | 0.00040 U | 0.00030 U | 0.00030 U | 0.00030 U |
| | 8/22/2006 | 0.00060 U | 0.00050 U | 0.00060 U | 0.00040 UJ | 0.00002 UJ | 0.00050 U | 0.00050 U | 0.00040 U | 0.00060 U | 0.00050 U | 0.00200 U | 0.00060 U | 0.00060 U | 0.00040 U | 0.00060 U |
| | 5/9/2007 | 0.00013 U | 0.00010 U | 0.00013 U | 0.00013 U | 0.00000 U | 0.00011 U | 0.00014 U | 0.00013 U | 0.00028 U | 0.00036 J | 0.00023 U | 0.00010 U | 0.00015 U | 0.00023 U | 0.00020 U |
| | 9/12/2007 | 0.00013 U | 0.00010 U | 0.00013 U | 0.00013 U | 0.00000 U | 0.00011 U | 0.00014 U | 0.00013 U | 0.00028 U | 0.00033 J | 0.00023 U | 0.00010 U | 0.00015 U | 0.00023 U | 0.00020 U |
| | 1/21/2008 | 0.00047 U | 0.00042 U | 0.00039 U | 0.00026 U | 0.00005 U | 0.00044 U | 0.00051 U | 0.00036 U | 0.00060 U | 0.00049 J | 0.00040 U | 0.00046 U | 0.00048 U | 0.00053 U | 0.00043 U |
| | 7/23/2008 | 0.00021 U | 0.00026 U | 0.00054 U | 0.00034 U | 0.00001 U | 0.00022 U | 0.00048 U | 0.00028 U | 0.00061 U | 0.00020 U | 0.00100 U | 0.00022 U | 0.00045 U | 0.00032 U | 0.00030 U |
| | 1/13/2009 | 0.00021 U | 0.00026 U | 0.00054 U | 0.00034 U | NA | 0.00022 U | 0.00048 UJL | 0.00028 U | 0.00061 U | 0.00020 U | 0.00100 U | 0.00022 U | 0.00045 U | 0.00032 U | 0.00030 U |
| | 7/13/2009 | 0.00021 U | 0.00026 U | 0.00054 U | 0.00034 U | NA | 0.00022 U | 0.00048 U | 0.00028 U | 0.00061 U | 0.00023 J | 0.00100 U | 0.00022 U | 0.00045 U | 0.00032 U | 0.00030 U |
| | 1/12/2010 | 0.00029 U | 0.00029 U | 0.00029 U | 0.00033 U | NA | 0.00034 U | 0.00051 U | 0.00025 U | 0.00050 U | 0.00032 U | 0.00200 U | 0.00044 U | 0.00034 U | 0.00024 U | 0.00028 U |
| | 7/14/2010 | 0.00029 U | 0.00029 U | 0.00029 U | 0.00033 U | NA | 0.00034 U | 0.00051 U | 0.00025 U | 0.00052 J | 0.00032 U | 0.00200 U | 0.00044 U | 0.00034 U | 0.00024 U | 0.00028 U |
| | 1/13/2011 | 0.00023 U | 0.00022 U | 0.00023 U | 0.00020 U | NA | 0.00025 U | 0.00050 U | 0.00022 U | 0.0011 J | 0.00026 U | 0.00200 U | 0.00025 U | 0.00035 U | 0.00026 U | 0.00022 U |
| | 7/26/2011 | 0.00023 U | 0.00022 U | 0.00023 U | 0.00020 U | NA | 0.00025 U | 0.00050 U | 0.00022 U | 0.00050 U | 0.00026 U | 0.00200 U | 0.00025 U | 0.00035 U | 0.00026 U | 0.00022 U |
| | 1/10/2012 | 0.00023 U | 0.00022 U | 0.00023 U | 0.00020 U | NA | 0.00025 U | 0.00050 U | 0.00022 U | 0.00050 U | 0.00026 U | 0.0020 U | 0.00025 U | 0.00035 U | 0.00026 U | 0.00022 U |
| | 7/10/2012 | 0.00023 U | NS | NS | NS | 0.0000049 U | 0.00025 U | NS | 0.00022 U | NS | 0.00026 U | NS | 0.00025 U | 0.00035 U | 0.00026 U | NS |
| | 1/8/2013 | 0.00024 U | 0.00020 U | 0.00020 U | 0.00022 U | NA | 0.00031 U | 0.00050 U | 0.00026 U | 0.00050 U | 0.00033 J | 0.0020 U | 0.00032 U | 0.00023 U | 0.00031 U | 0.00044 U |
| | 7/18/2013 | 0.00024 U | 0.00020 U | 0.00020 U | 0.00022 U | NA | 0.00031 U | 0.00050 U | 0.00026 U | 0.00050 U | 0.00024 U | 0.0020 U | 0.00032 U | 0.00023 U | 0.00031 U | 0.00044 U |
| | 2/24/2014 | 0.00027 U | 0.00032 U | 0.00025 U | 0.00024 U | NA | 0.0004 U | 0.0005 U | 0.00031 U | 0.00053 U | 0.00033 U | 0.002 U | 0.00026 U | 0.00034 U | 0.0003 U | 0.00033 U |
| | 7/17/2014 | 0.00025 U | 0.00025 U | 0.00025 U | 0.00025 U | NA | 0.00025 U | 0.0005 U | 0.00025 U | 0.00025 U | 0.00025 J | 0.0005 U | 0.00025 U | 0.00025 U | 0.00025 U | 0.00025 U |
| | 7/24/2015 | 0.00025 U | 0.00025 U | 0.00025 U | 0.00025 U | NS | 0.00025 U | 0.0005 U | 0.00025 U | 0.00025 U | 0.00025 U | 0.0005 U | 0.00025 U | 0.00025 U | 0.00025 U | 0.00025 U |
| | 1/20/2016 | Well Abandoned | | | | | | | | | | | | | | |

**Table 4-1B**

**Summary of Chemicals of Concern Detected in Groundwater**
**Historical Monitoring Wells — SWMU 86 Plume**
**2016 RAER**
**Former NAS Dallas, Texas**


| Monitoring Well | Sampling Date | Chemicals of Concern (mg/L) | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 1,1,2,2-Tetrachloroethane | 1,1,2-Trichloroethane | 1,1-Dichloroethene | 1,2-Dichloroethane | Alpha-BHC | Carbon Tetrachloride | Chloroethane | Chloroform | Chloromethane | cis-1,2-Dichloroethene | Methylene Chloride | Tetrachloroethene | trans-1,2-Dichloroethene | Trichloroethene | Vinyl Chloride |
| **Protective Concentration Leve** | | **0.00460** | **0.00500** | **0.00700** | **0.00500** | **0.00014** | **0.00500** | **9.80000** | **0.24000** | **0.07000** | **0.07000** | **0.00500** | **0.00500** | **0.10000** | **0.00500** | **0.00200** |
| **Monitoring Wells Located Outside PCLE Zone** | | | | | | | | | | | | | | | | |
| **405BN1MW** | 3/22/1991 | Well Installed | | | | | | | | | | | | | | |
| | 4/28/1998 | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00005 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00170 J | 0.00500 U | 0.00500 U | 0.00500 U |
| | 8/24/1998 | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00005 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U |
| | -- | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS |
| | 10/25/1999 | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | NA | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U |
| | 7/25/2000 | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | NA | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 UJ | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U |
| | -- | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS |
| | -- | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS |
| | -- | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS |
| | 1/8/2004 | 0.00016 U | 0.00012 U | 0.00021 U | 0.00009 U | NA | 0.00020 U | 0.00018 U | 0.00014 U | 0.00008 U | 0.00016 U | 0.00016 U | 0.00024 U | 0.00019 U | 0.00010 U | 0.00017 U |
| | -- | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS |
| | -- | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS |
| | 4/17/2005 | Well Abandoned | | | | | | | | | | | | | | |
| **424BX35MW** | 3/20/1998 | Well Installed | | | | | | | | | | | | | | |
| | 5/1/1998 | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00005 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U |
| | 8/26/1998 | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00005 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U |
| | 3/23/1999 | NA | NA | NA | NA | 0.00005 U | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| | 11/18/1999 | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | NA | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00510 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U |
| | 7/24/2000 | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | NA | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U |
| | -- | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS |
| | -- | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS |
| | -- | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS |
| | -- | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS |
| | -- | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS |
| | 10/15/2004 | 0.00042 U | 0.00022 U | 0.00035 U | 0.00010 U | NA | 0.00025 U | 0.00041 U | 0.00010 U | 0.00017 U | 0.00027 U | 0.00040 U | 0.00021 U | 0.00023 U | 0.00022 U | 0.00017 U |
| | 4/18/2005 | Well Abandoned | | | | | | | | | | | | | | |
| **428B08MW** | 3/18/1998 | Well Installed | | | | | | | | | | | | | | |
| | 4/28/1998 | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00005 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00420 J | 0.00500 U | 0.00500 U | 0.00500 U | 0.00270 J | 0.00500 U |
| | 8/25/1998 | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00005 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00200 J | 0.00500 U |
| | 3/15/1999 | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | NA | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00210 J | 0.00500 U | 0.00500 U | 0.00500 U | 0.00160 J | 0.00500 U |
| | 11/19/1999 | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | NA | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00580 | 0.00500 U | 0.00500 U | 0.00500 U | 0.00120 J | 0.00500 U |
| | 7/24/2000 | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | NA | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00620 | 0.00500 U | 0.00500 U | 0.00500 U | 0.00160 J | 0.00500 U |
| | 7/16/2001 | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | NA | 0.00500 U | 0.01000 U | 0.00500 U | 0.01000 U | 0.00280 | 0.00500 U | 0.00500 U | 0.00250 U | 0.00120 J | 0.01000 U |
| | 7/16/2001 | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | NA | 0.00500 U | 0.01000 U | 0.00500 U | 0.01000 U | 0.00300 | 0.00500 U | 0.00500 U | 0.00250 U | 0.00500 U | 0.01000 U |
| | 1/20/2003 | 0.00100 U | 0.00100 U | 0.00100 U | 0.00100 U | NA | 0.00100 U | 0.00100 U | 0.00100 U | 0.00100 U | 0.00130 | 0.00200 U | 0.00100 U | 0.00100 U | 0.00087 J | 0.00100 U |
| | 6/3/2003 | Well Abandoned | | | | | | | | | | | | | | |
| **428B09MW** | 3/19/1998 | Well Installed | | | | | | | | | | | | | | |
| | 4/30/1998 | 0.00067 J | 0.00500 U | 0.00500 U | 0.00500 U | 0.00005 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U |
| | 8/25/1998 | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00005 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U |
| | 3/13/1999 | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | NA | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U |
| | 11/18/1999 | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | NA | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00590 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U |
| | 7/25/2000 | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | NA | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 UJ | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U |
| | 7/15/2001 | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | NA | 0.00500 U | 0.01000 U | 0.00500 U | 0.01000 U | 0.00250 U | 0.00500 U | 0.00500 U | 0.00250 U | 0.00500 U | 0.01000 U |
| | 7/15/2001 | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | NA | 0.00500 U | 0.01000 U | 0.00500 U | 0.01000 U | 0.00250 U | 0.00500 U | 0.00500 U | 0.00250 U | 0.00500 U | 0.01000 U |
| | -- | Well Abandoned | | | | | | | | | | | | | | |
| **428B66MW** | 12/15/1999 | Well Installed | | | | | | | | | | | | | | |
| | 1/12/2000 | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | NA | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U |
| | 7/25/2000 | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | NA | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 UJ | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U |
| | 7/15/2001 | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | NA | 0.00500 U | 0.01000 U | 0.00500 U | 0.01000 U | 0.00250 U | 0.00500 U | 0.00500 U | 0.00250 U | 0.00500 U | 0.01000 U |
| | 7/15/2001 | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | NA | 0.00500 U | 0.01000 U | 0.00500 U | 0.01000 U | 0.00250 U | 0.00500 U | 0.00500 U | 0.00250 U | 0.00500 U | 0.01000 U |
| | 1/7/2003 | 0.00100 U | 0.00100 U | 0.00100 U | 0.00100 U | NA | 0.00100 U | 0.00100 U | 0.00100 U | 0.00100 U | 0.00047 J | 0.00200 U | 0.00100 U | 0.00100 U | 0.00110 | 0.00100 U |
| | -- | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS |
| | -- | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS |
| | -- | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS |
| | -- | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS |
| | -- | Well Destroyed | | | | | | | | | | | | | | |

**Table 4-1B**

**Summary of Chemicals of Concern Detected in Groundwater**
**Historical Monitoring Wells — SWMU 86 Plume**
**2016 RAER**
**Former NAS Dallas, Texas**


| Monitoring Well | Sampling Date | Chemicals of Concern (mg/L) | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 1,1,2,2-Tetrachloroethane | 1,1,2-Trichloroethane | 1,1-Dichloroethene | 1,2-Dichloroethane | Alpha-BHC | Carbon Tetrachloride | Chloroethane | Chloroform | Chloromethane | cis-1,2-Dichloroethene | Methylene Chloride | Tetrachloroethene | trans-1,2-Dichloroethene | Trichloroethene | Vinyl Chloride |
| **Protective Concentration Leve** | | **0.00460** | **0.00500** | **0.00700** | **0.00500** | **0.00014** | **0.00500** | **9.80000** | **0.24000** | **0.07000** | **0.07000** | **0.00500** | **0.00500** | **0.10000** | **0.00500** | **0.00200** |
| **428B67MW** | -- | Well Installed | | | | | | | | | | | | | | |
| | 1/18/2000 | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | NA | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U |
| | 7/25/2000 | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | NA | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 UJ | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U |
| | -- | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS |
| | -- | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS |
| | -- | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS |
| | 1/9/2004 | 0.00016 U | 0.00012 U | 0.00021 U | 0.00009 U | NA | 0.00020 U | 0.00018 U | 0.00014 U | 0.00008 U | 0.00016 U | 0.00016 U | 0.00024 U | 0.00019 U | 0.00010 U | 0.00017 U |
| | -- | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS |
| | 10/15/2004 | 0.00042 U | 0.00022 U | 0.00035 U | 0.00010 U | NA | 0.00025 U | 0.00041 U | 0.00010 U | 0.00017 U | 0.00027 U | 0.00040 U | 0.00021 U | 0.00023 U | 0.00022 U | 0.00017 U |
| | 4/17/2005 | Well Abandoned | | | | | | | | | | | | | | |
| **428B68MW** | 12/14/1999 | Well Installed | | | | | | | | | | | | | | |
| | 1/19/2000 | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | NA | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00120 J | 0.00500 U |
| | 7/24/2000 | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | NA | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00110 J | 0.00500 U |
| | 7/15/2001 | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | NA | 0.00500 U | 0.01000 U | 0.00500 U | 0.01000 U | 0.00250 U | 0.00500 U | 0.00500 U | 0.00250 U | 0.00160 J | 0.01000 U |
| | 7/15/2001 | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | NA | 0.00500 U | 0.01000 U | 0.00500 U | 0.01000 U | 0.00250 U | 0.00500 U | 0.00500 U | 0.00250 U | 0.00500 U | 0.01000 U |
| | 1/26/2003 | 0.00100 U | 0.00100 U | 0.00100 U | 0.00100 U | NA | 0.00100 U | 0.00100 U | 0.00100 U | 0.00100 U | 0.00100 U | 0.00200 U | 0.00100 U | 0.00100 U | 0.00120 | 0.00100 U |
| | -- | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS |
| | 1/8/2004 | 0.00016 U | 0.00012 U | 0.00021 U | 0.00009 U | NA | 0.00020 U | 0.00018 U | 0.00014 U | 0.00008 U | 0.00016 U | 0.00016 U | 0.00048 J | 0.00019 U | 0.00390 | 0.00017 U |
| | -- | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS |
| | 10/15/2004 | 0.00042 U | 0.00022 U | 0.00035 U | 0.00010 U | NA | 0.00025 U | 0.00041 U | 0.00010 U | 0.00017 U | 0.00027 U | 0.00040 U | 0.00021 U | 0.00023 U | 0.00440 | 0.00017 U |
| | 4/17/2005 | Well Abandoned | | | | | | | | | | | | | | |
| **428B97TW** | 7/29/2003 | Well Installed | | | | | | | | | | | | | | |
| | 8/7/2003 | 0.00023 U | 0.00021 U | 0.00022 U | 0.00022 U | NA | 0.00018 U | 0.00022 U | 0.00063 J | 0.00026 U | 0.00036 J | 0.00028 U | 0.00012 U | 0.00024 U | 0.00072 J | 0.00026 U |
| | 11/3/2003 | Well Abandoned | | | | | | | | | | | | | | |
| **43101MW** | 7/18/1995 | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | NA | 0.00500 U | 0.01000 U | 0.00500 U | 0.01000 U | 0.00500 U | 0.01000 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.01000 U |
| | 3/18/1998 | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00005 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U |
| | -- | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS |
| | -- | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS |
| | 11/19/1999 | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | NA | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U |
| | 7/25/2000 | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | NA | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 UJ | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U |
| | -- | | | | | | | | | | | | | | | |
| | 12/2/2002 | Well Destroyed | | | | | | | | | | | | | | |
| **428B79MW** | 8/5/2000 | Well Installed | | | | | | | | | | | | | | |
| | 8/9/2000 | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | NA | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U |
| | 7/15/2001 | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | NA | 0.00500 U | 0.01000 U | 0.00500 U | 0.01000 U | 0.00250 U | 0.00500 U | 0.00500 U | 0.00250 U | 0.00500 U | 0.01000 U |
| | 7/15/2001 | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | NA | 0.00500 U | 0.01000 U | 0.00500 U | 0.01000 U | 0.00250 U | 0.00500 U | 0.00500 U | 0.00250 U | 0.00500 U | 0.01000 U |
| | 1/7/2003 | 0.00100 U | 0.00100 U | 0.00100 U | 0.00100 U | NA | 0.00100 U | 0.00100 U | 0.00100 U | 0.00100 U | 0.00100 U | 0.00200 U | 0.00100 U | 0.00100 U | 0.00072 J | 0.00100 U |
| | -- | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS |
| | -- | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS |
| | -- | Well Destroyed | | | | | | | | | | | | | | |
| **428B81MW** | 8/2/2000 | Well Installed | | | | | | | | | | | | | | |
| | 8/9/2000 | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | NA | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U |
| | -- | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS |
| | -- | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS |
| | 6/3/2003 | Well Abandoned | | | | | | | | | | | | | | |

**Table 4-1B**

**Summary of Chemicals of Concern Detected in Groundwater**
**Historical Monitoring Wells — SWMU 86 Plume**
**2016 RAER**
**Former NAS Dallas, Texas**
**Page 6 of 6**

| Monitoring Well | Sampling Date | Chemicals of Concern (mg/L) | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 1,1,2,2-Tetrachloroethane | 1,1,2-Trichloroethane | 1,1-Dichloroethene | 1,2-Dichloroethane | Alpha-BHC | Carbon Tetrachloride | Chloroethane | Chloroform | Chloromethane | cis-1,2-Dichloroethene | Methylene Chloride | Tetrachloroethene | trans-1,2-Dichloroethene | Trichloroethene | Vinyl Chloride |
| **Protective Concentration Leve** | | **0.00460** | **0.00500** | **0.00700** | **0.00500** | **0.00014** | **0.00500** | **9.80000** | **0.24000** | **0.07000** | **0.07000** | **0.00500** | **0.00500** | **0.10000** | **0.00500** | **0.00200** |
| **428B82MW** | 8/4/2000 | Well Installed | | | | | | | | | | | | | | |
| | 8/9/2000 | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | NA | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U |
| | -- | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS |
| | -- | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS |
| | 6/3/2003 | Well Abandoned | | | | | | | | | | | | | | |
| **428B83MW** | 8/4/2000 | Well Installed | | | | | | | | | | | | | | |
| | 8/9/2000 | 0.00500 U | 0.00500 U | 0.00090 J | 0.00500 U | NA | 0.00500 U | 0.00500 U | 0.00160 J | 0.00500 U | 0.00095 J | 0.00500 U | 0.00500 U | 0.00500 U | 0.00290 J | 0.00500 U |
| | 7/16/2001 | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | NA | 0.00500 U | 0.01000 U | 0.00500 U | 0.01000 U | 0.00250 U | 0.00500 U | 0.00500 U | 0.00250 U | 0.00150 J | 0.01000 U |
| | 7/16/2001 | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | NA | 0.00500 U | 0.01000 U | 0.00500 U | 0.01000 U | 0.00110 J | 0.00500 U | 0.00500 U | 0.00250 U | 0.00200 J | 0.01000 U |
| | 7/16/2001 | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | NA | 0.00500 U | 0.01000 U | 0.00500 U | 0.01000 U | 0.00093 J | 0.00500 U | 0.00500 U | 0.00250 U | 0.00170 J | 0.01000 U |
| | 1/7/2003 | 0.00100 U | 0.00100 U | 0.00100 U | 0.00100 U | NA | 0.00100 U | 0.00100 U | 0.00100 U | 0.00100 U | 0.00071 J | 0.00200 U | 0.00100 U | 0.00100 U | 0.00280 | 0.00100 U |
| | -- | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS |
| | -- | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS |
| | 10/20/2000 | Well Destroyed | | | | | | | | | | | | | | |
| **428B85MW** | 8/5/2000 | Well Installed | | | | | | | | | | | | | | |
| | 7/15/2001 | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | NA | 0.00500 U | 0.01000 U | 0.00250 J | 0.01000 U | 0.00720 | 0.00500 U | 0.00500 U | 0.00250 U | 0.00500 U | 0.01000 U |
| | 7/15/2001 | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | NA | 0.00500 U | 0.01000 U | 0.00500 U | 0.01000 U | 0.01100 | 0.00500 U | 0.00500 U | 0.00250 U | 0.00500 U | 0.01000 U |
| | 1/7/2003 | 0.00100 U | 0.00100 U | 0.00100 U | 0.00100 U | NA | 0.00100 U | 0.00100 U | 0.00100 U | 0.00100 U | 0.01100 | 0.00200 U | 0.00100 U | 0.00040 J | 0.00042 J | 0.00077 J |
| | -- | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS |
| | -- | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS |
| | -- | Well Destroyed | | | | | | | | | | | | | | |
| **428B100TW** | 7/1/2003 | Well Installed | | | | | | | | | | | | | | |
| | 11/13/2003 | Well Abandoned | | | | | | | | | | | | | | |

HS - Hydrasleeve
mg/L - milligrams per liter
NA - Not Applicable
NS - Not Sampled
PDB - Passive Diffusion Bag
SDG - Sample Delivery Group
PCLE - Protective Concentration Level Exceedance
Notes:
Shaded areas indicate an exceedance.

Analytical Result Qualifiers:
J - Indicates that the chemical was detected. However, the associated numerical result may not be a precise representation of the amount that is actually present in the sample. The laboratory reported concentration is considered to be an estimate of the true concentration.
U - Indicates that the chemical was not detected at the numerical detection limit (sample-specific quantitation limit) noted. Nondetected results from the laboratory are reported in this manner. This qualifier is added to a positive result (reported by the laboratory) if the detected concentration is determined to be attributable to contamination introduced during field sampling or laboratory analysis.
UJ - Indicates that the chemical was not detected. However, the detection limit (sample-specific quantitation limit) is considered to be estimated based on problems encountered during laboratory analysis. The associated numerical detection limit is regarded as inaccurate or imprecise.

# TABLE 4-2
# SUMMARY OF GEOCHEMICAL PARAMETERS MEASURED IN GROUNDWATER

**Table 4-2A**

**Summary of Geochemical Parameters Measured in Groundwater**
**Long Term Monitoring5Wells — SWMU 86 Plume**
**2016 RAER**
**Former NAS Dallas, Texas**
**Page 1 of 4**

| Monitoring Well | Sampling Date | Sampling Date | SDG | Oxidation-Reduction Conditions | | | | | | | | Degradation Products | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Dissolved Oxygen[2] | Ferrous Iron[2] | Nitrate[3] | Nitrite[3] | ORP[1] | Phosphate[3] | Sulfate[3] | TOC[3] | Alkalinity[2] | Carbon Dioxide[2] | Chloride[3] | Ethane[3] | Ethene[3] | Methane[3] | pH[1] | Sulfide[3] |
| | | | Units | mg/L | mg/L | mg/L | mg/L | mV | mg/L | mg/L | mg/L | mg/L | mg/L | mg/L | ng/L | ng/L | µg/L | S.U. | mg/L |
| **Monitoring Wells Located Inside PCLE Zone** | | | | | | | | | | | | | | | | | | | |
| **428B07MW** | 11/17/1999 | Round 5 | DL334,TTE16 | 0.4 | 0 | 10 U | 10 U | 311 | 10 U | 3090 | NA | 290 | 136 | 289 | 39 | 947 | 3.087 | 6.83 | 0 U |
| | 7/25/2000 | Round 6 | DL352 | 1 | 0.2 | 0.5 U | 0.5 U | 185 | 5 U | 3200 J | NA | 310 | 45 | 311 | NA | NA | NA | 6.88 | 0.01 U |
| | 1/8/2004 | Round 10 | C4A090143 | 1.5 | 0 | NA | NA | 257 | NA | 2600 | NA | 40 | NA | 227 | NA | NA | NA | 7.87 | 0 |
| | 10/18/2005 | Round 14 | CTO260-21, 22 | 1 | 0 | NA | NA | 24 | 0.05 U | 3200 | 1.6 | 350 | 50 | 170 | 10,000 U | 10,000 U | 66 | 6.84 | 1.4 |
| | 9/12/2007 | Round 18 | DALLASW005 | NA | NA | 0.12 U | 1.0 UL | NA | 0.5 UL | 2240 | NA | NA | NA | 162 | 390 J | 330 U | 45 J | NA | 0.85 U |
| | 9/12/2007 | Round 18 | FIELD | 1 | 0 | NA | NA | 27 | NA | NA | NA | 250 | 18 | NA | NA | NA | NA | 7.08 | NA |
| | 7/13/2009 | Round 22 | F66614 | 0.6 | 0 | 0.05 U | 0.05 U | 2.1 | 0.033 J | 1860 | 1.5 | 275 | 0 | 223 | 320 U | 430 U | 65.1 | 6.6 | 0.6 U |
| | 7/26/2011 | Round 26 | F84620 | 0.6 | 0 | 0.25 UJL | 0.25 UJL | 105.6 | 0.16 | 2550 | 1.6 | 300 | 45 | 189 | 320 U | 430 U | 23.8 | 6.51 | 0.3 U |
| | 7/10/2012 | Round 28 | F94831 | NA | NA | NA | NA | 1.6 | NA | NA | NA | NA | NA | NA | NA | NA | NA | 7.04 | NA |
| | 1/8/2013 | Round 29 | FA607 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| | 7/18/2013 | Round 30 | FA6576 | 0.2 | 0 | 0.50 U | 0.50 U | 71.2 | 0.54 | 1120 | 1.3 U | 400 | 28 | 102 | 320 U | 430 U | 1.8 | 7.11 | 0.22 U |
| | 1/30/2014 | Round 31 | FA12872 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| | 7/17/2014 | Round 32 | 1407130 | 0.29 | 0.42 | 0.052 J | 0.33 UJL | 31.7 | 0.01 U | 1670 | 1.34 J | NA | 65 | 168 | 0.001 U | 0.001 U | 0.00111 J | 6.96 | 0.02 |
| | 1/20/2015 | Round 33 | 1501071 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| | 7/24/2015 | Round 34 | 1507195 | 0.77 | 0 | 0.50 U | 0.50 U | 40.4 | 0.01 U | 1810 | 1.3 U | 362 | 55 | 102 | 0.001 U | 0.001 U | 5.3 | 6.65 | 0.03 |
| | 1/20/2016 | Round 35 | 1601156 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| | 7/19/2016 | Round 36 | 1607138 | 0.9 | 0.13 | 0.033 U | 0.033 U | 89 | 0.0125 J | 1650 | 1.25 U | 360 | 0 | 114 | 0.001 U | 0.001 U | 10.9 | 7.07 | NA |
| **428B128MW** | 9/12/2007 | Round 18 | DALLASW005 | NA | NA | 0.062 L | 1.0 UL | NA | 0.63 L | 2180 | NA | NA | NA | 190 | 330 U | 410 J | 1.6 U | NA | 0.75 U |
| | 9/12/2007 | Round 18 | FIELD | 1 | 0.8 | NA | NA | -408 | NA | NA | NA | 250 | 30 | NA | NA | NA | NA | 6.72 | NA |
| | 7/15/2009 | Round 22 | F66673 | 2 | 0 | 1.6 | 0.25 UR | 71.0 | 0.02 UJL | 1570 | 7.9 | 200 | 35 | 194 | 320 U | 430 U | 0.31 J | 6.93 | 0.6 U |
| | 7/26/2011 | Round 26 | F84620 | 0.9 | 0.1 | 1.5 | 0.25 UJL | -78.2 | 0.036 | 2350 | 7.9 | 18 | 14 | 212 | 320 U | 430 U | 0.6 | 7.08 | 0.3 U |
| | 7/10/2012 | Round 28 | F94831 | NA | NA | NA | NA | 39.7 | NA | NA | NA | NA | NA | NA | NA | NA | NA | 6.89 | NA |
| | 1/8/2013 | Round 29 | FA607 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| | 7/18/2013 | Ruond 30 | FA6576 | 0.6 | 0.1 | 0.50 U | 0.50 U | 54.6 | 0.079 J | 6.0 U | 5.2 | 250 | 30 | 229 | 320 U | 430 U | 0.16 U | 6.45 | NA |
| | 1/30/2014 | Round 31 | FA12872 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| | 7/16/2014 | Round 32 | 1407125 | 0.7 | 0 | 0.063 J | 0.66 U | 40.6 | 0.01 U | 2440 | 3.83 | NA | 21 | 191 | 0.001 UJ | 0.001 U | 0.001 U | 6.95 | 0 |
| | 1/20/2015 | Round 33 | 1501071 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| | 7/24/2015 | Round 34 | 1507195 | 0.77 | 0 | 0.50 U | 0.50 U | -1 | 0.01 U | 2250 | 3.56 | 279 | 45 | 189 | 0.001 UJ | 0.001 U | 0.001 U | 6.49 | 0 |
| | 1/20/2016 | Round 35 | 1601156 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| | 7/20/2016 | Round 36 | 1607138 | 0 | 0.11 | 0.033 U | 0.033 U | -76 | 0.01 U | 1830 | 5.18 | 352 | 0 | 213 | 0.001 U | 0.001 U | 1 U | 7.27 | NA |

**Table 4-2A**

**Summary of Geochemical Parameters Measured in Groundwater**
**Long Term Monitoring5Wells — SWMU 86 Plume**
**2016 RAER**
**Former NAS Dallas, Texas**


| Monitoring Well | Sampling Date | Sampling Date | SDG | Oxidation-Reduction Conditions | | | | | | | | Degradation Products | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Dissolved Oxygen[2] | Ferrous Iron[2] | Nitrate[3] | Nitrite[3] | ORP[1] | Phosphate[3] | Sulfate[3] | TOC[3] | Alkalinity[2] | Carbon Dioxide[2] | Chloride[3] | Ethane[3] | Ethene[3] | Methane[3] | pH[1] | Sulfide[3] |
| | | | Units | mg/L | mg/L | mg/L | mg/L | mV | mg/L | mg/L | mg/L | mg/L | mg/L | mg/L | ng/L | ng/L | µg/L | S.U. | mg/L |
| 428B130MW | 9/12/2007 | Round 18 | DALLASW005 | NA | NA | 0.05 UL | 1.0 UL | NA | 0.5 UL | 2020 | NA | NA | NA | 205 | 330 U | 330 U | 22 J | NA | 0.74 U |
| | 9/12/2007 | Round 18 | FIELD | 1 | 0 | NA | NA | 32 | NA | NA | NA | 250 | 30 | NA | NA | NA | NA | 6.84 | NA |
| | 7/13/2009 | Round 22 | F66614 | 1 | 0 | 0.05 U | 0.05 U | 0.05 U | 0.12 | 1150 | 1.2 | 275 | 40 | 234 | 320 U | 430 U | 6.83 | 7.02 | 0.6 U |
| | 7/26/2011 | Round 26 | F84620 | 0.4 | 0.1 | 1.3 U | 0.1 UJL | 29.3 | 0.04 | 1920 | 1.3 | 250 | 13 | 185 | 320 U | 430 U | 12.7 | 6.87 | 0.3 U |
| | 7/10/2012 | Round 28 | F94831 | NA | NA | NA | NA | 4.3 | NA | NA | NA | NA | NA | NA | NA | NA | NA | 6.85 | NA |
| | 1/8/2013 | Round 29 | FA607 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| | 7/18/2013 | Round 30 | FA6576 | 0.4 | 0 | 0.79 J | 0.50 U | 50.7 | 0.083 J | 843 | 1.2 U | 350 | 35 | 78.4 | 320 U | 430 U | 3.7 | 6.80 | 0.22 U |
| | 1/30/2014 | Round 31 | FA12872 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| | 7/17/2014 | Round 32 | 1407130 | 0.49 | 0.15 | 0.083 J | 0.165 U | 420.6 | 0.01 U | 707 | 1.4 J | NA | 30 | 154 | 0.001 U | 0.001 U | 0.00342 J | 6.97 | 0.02 |
| | 1/20/2015 | Round 33 | 1501071 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| | 7/24/2015 | Round 34 | 1507195 | 0.58 | 0 | 0.05 U | 0.05 U | -11.5 | 0.01 U | 1030 | 1.2 U | 287 | 60 | 154 | 0.001 U | 0.001 U | 5.01 | 7.07 | NA |
| | 1/20/2016 | Round 35 | 1601156 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| | 7/20/2016 | Round 36 | 1607138 | 0 | 1.45 | 0.033 U | 0.033 U | 65 | 0.01 U | 1030 | 1.25 U | 296 | 0 | 149 | 1 U | 1 U | 9.16 | 7.18 | NA |
| 428B131MW | 10/10/2005 | Round 14 | CTO260-18,20 | 0.8 | 1.1 | NA | NA | -57 | 0.017 J | 2100 | 2.9 | 225 | 50 | 270 | 10,000 U | 10,000 U | 200 | 6.62 | 0.35 J |
| | 9/12/2007 | Round 18 | DALLASW005 | NA | NA | 0.05 U | 1.0 UL | NA | 0.5 UL | 2160 | NA | NA | NA | 84.7 | 330 U | 830 J | 150 J | NA | 0.82 U |
| | 9/12/2007 | Round 18 | FIELD | 1 | 0 | NA | NA | -21 | NA | NA | NA | 250 | 20 | NA | NA | NA | NA | 6.65 | NA |
| | 7/13/2009 | Round 22 | F66614 | 2 | 1.5 | 0.05 U | 0.05 U | -80.9 | 0.39 | 902 | 3.1 | 375 | 500 | 324 | 320 U | 430 U | 21.8 | 6.62 | 0.6 U |
| | 7/26/2011 | Round 26 | F84620 | 0.6 | 0 | 1.4 | 0.25 UJL | 15.8 | 0.034 | 2230 | 2.5 | 12 | 1000 | 327 | 320 U | 430 U | 14.3 | 6.45 | 0.3 U |
| | 7/10/2012 | Round 28 | F94831 | NA | NA | NA | NA | 84.2 | NA | NA | NA | NA | NA | NA | NA | NA | NA | 6.45 | NA |
| | 1/8/2013 | Round 29 | FA607 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| | 7/18/2013 | Round 30 | FA6576 | 0.3 | 0 | 1.3 U | 1.3 U | 94.0 | 0.49 | 2370 | 2.4 | 350 | 50 | 307 | 320 U | 430 U | 4.5 | 6.50 | 0.22 U |
| | 1/30/2014 | Round 31 | FA12872 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| | 7/17/2014 | Round 32 | 1407130 | 0.52 | 0.35 | 0.033 U | 0.66 U | 63.9 | 0.01 U | 2290 | 2.46 J | NA | 100 | 309 | 0.001 U | 0.001 U | 0.00631 | 6.58 | 0.01 |
| | 1/20/2015 | Round 33 | 1501071 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| | 7/24/2015 | Round 34 | 1507195 | 1.4 | 0 | 0.033 U | 0.66 U | 67.8 | 0.01 U | 2530 | 2.19 J | 468 | 85 | 315 | 0.001 U | 0.001 U | 11.6 | 6.24 | 0.02 |
| | 1/20/2016 | Round 35 | 1601156 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| | 7/19/2016 | Round 36 | 1607138 | 0 | 0.11 | 0.033 U | 0.033 U | 145 | 0.01 U | 2300 | 2.28 J | 446 | 0 | 313 | 0.001 U | 0.001 U | 8.8 | 6.77 | NA |
| 428B132MW | 10/17/2005 | Round 14 | CTO260-19,20 | 1 | 3.2 | 0.004 U | 0.003 U | -167 | 0.051 | 2800 | 120 | 350 | 50 | 10 U | 1,400 J | 10,000 U | 370 | 6.95 | 0.14 U |
| | 9/12/2007 | Round 18 | DALLASW005 | NA | NA | 0.05 UL | 1.0 UL | NA | 0.98 L | 2420 | NA | NA | NA | 415 | 1,800 | 1,500 | 1,300 | NA | 0.71 U |
| | 9/12/2007 | Round 18 | FIELD | 1 | 3.2 | NA | NA | -322 | NA | NA | NA | 500 | 40 | NA | NA | NA | NA | 6.63 | NA |
| | 7/13/2009 | Round 22 | F66614 | 4 | 10 | 0.05 U | 0.5 U | -79.7 | 0.02 U | 1950 | 26.9 | 350 | 70 | 451 | 0.79 J | 0.66 J | 560 | 6.99 | 0.6 U |
| | 7/26/2011 | Round 26 | F84620 | 0.4 | 18 | 9.8 | 0.25 UJL | -66.1 | 0.061 | 2260 | 18.9 | 300 | 60 | 407 | 1400 | 840 J | 524 | 6.61 | 0.3 U |
| | 7/10/2012 | Round 28 | F94831 | NA | NA | NA | NA | -128.3 | NA | NA | NA | NA | NA | NA | NA | NA | NA | 6.83 | NA |
| | 1/8/2013 | Round 29 | FA607 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| | 7/18/2013 | Rond 30 | FA6576 | 0.6 | 7.0 | 1.3 U | 1.3 U | -92.0 | 0.26 | 2400 | 11.0 | 400 | 70 | 377 | 600 J | 1200 | 300 | 6.81 | 0.22 U |
| | 1/30/2014 | Round 31 | FA12872 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| | 7/17/2014 | Round 32 | 1407130 | 0.68 | 2.16 | 0.033 U | 0.66 UJL | -10.1 | 0.01 U | 2370 | 8.83 | NA | 55 | 391 | 0.001 U | 0.00323 J | 0.358 | 7.03 | 0 |
| | 1/20/2015 | Round 33 | 1501071 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| | 7/24/2015 | Round 34 | 1507195 | 1 | 0.83 | 1.3 U | 1.3 U | -88.9 | 0.01 U | 2540 | 9.76 | 485 | 160 | 426 | 0.001 U | 6.56 | 606 | 6.87 | 0 |
| | 1/20/2016 | Round 35 | 1601156 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| | 7/19/2016 | Round 36 | 1607138 | 0 | 2.89 | 0.033 U | 0.033 U | -104 | 0.01 U | 2260 | 10.5 | 474 | 0 | 430 | 0.001 U | 0.001 U | 624 | 7.05 | NA |

**Table 4-2A**

**Summary of Geochemical Parameters Measured in Groundwater**
**Long Term Monitoring5Wells — SWMU 86 Plume**
**2016 RAER**
**Former NAS Dallas, Texas**


| Monitoring Well | Sampling Date | Sampling Date | SDG | Oxidation-Reduction Conditions | | | | | | | | Degradation Products | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Dissolved Oxygen[2] | Ferrous Iron[2] | Nitrate[3] | Nitrite[3] | ORP[1] | Phosphate[3] | Sulfate[3] | TOC[3] | Alkalinity[2] | Carbon Dioxide[2] | Chloride[3] | Ethane[3] | Ethene[3] | Methane[3] | pH[1] | Sulfide[3] |
| | | | Units | mg/L | mg/L | mg/L | mg/L | mV | mg/L | mg/L | mg/L | mg/L | mg/L | mg/L | ng/L | ng/L | µg/L | S.U. | mg/L |
| 428B133MW | 10/10/2005 | Round 14 | CTO260-18,20 | 0.8 | 2.1 | NA | NA | -109 | 0.029 J | 2000 | 4.3 | 180 | 40 | 360 | 10,000 U | 10,000 U | 13 U | 6.9 | 0.8 J |
| | 9/12/2007 | Round 18 | DALLASW005 | NA | NA | 0.064 U | 1.0 UL | NA | 0.82 L | 2190 | NA | NA | NA | 341 | 330 U | 1,000 J | 2.1 U | NA | 0.67 U |
| | 9/12/2007 | Round 18 | FIELD | 0.3 | 4.2 | NA | NA | -357 | NA | NA | NA | 250 | 70 | NA | NA | NA | NA | 6.51 | NA |
| | 7/15/2009 | Round 22 | F66673 | 0.8 | 10 | 0.05 U | 0.25 UR | -88.4 | 0.024 JL | 1760 J | 22.8 JL | 300 | 40 | 357 | 450 J | 750 J | 23.9 | 6.82 | 0.6 U |
| | 1/12/2010 | Round 23 | F70770 | NA | NA | NA | NA | 227.1 | NA | NA | NA | NA | NA | NA | NA | NA | NA | 6.59 | NA |
| | 7/14/2010 | Round 24 | F75197 | NA | NA | NA | NA | -74.8 | NA | NA | NA | NA | NA | NA | NA | NA | NA | 6.81 | NA |
| | 1/13/2011 | Round 25 | FIELD | NA | NA | NA | NA | 16.9 | NA | NA | NA | NA | NA | NA | NA | NA | NA | 7.14 | NA |
| | 7/26/2011 | Round 26 | F84620 | 1 | 2 | 1.3 UJL | 0.25 UJL | -86.6 | 0.024 | 1870 | 82.7 | 0 | 0 | 356 | 940 J | 2300 | 20.7 | 6.97 | 0.3 U |
| | 1/10/2012 | Round 27 | F88817 | NA | NA | NA | NA | 20.6 | NA | NA | NA | NA | NA | NA | NA | NA | NA | 7.01 | NA |
| | 7/10/2012 | Round 28 | F94831 | NA | NA | NA | NA | 8.3 | NA | NA | NA | NA | NA | NA | NA | NA | NA | 6.64 | NA |
| | 1/8/2013 | Round 29 | FA607 | NA | NA | NA | NA | 30.7 | NA | NA | NA | NA | NA | NA | NA | NA | NA | 7.06 | NA |
| | 7/18/2013 | Round 30 | FA6576 | 0.4 | 0.6 | 1.3 U | 1.3 U | 25.4 | 0.55 | 2520 | 10.4 | 350 | 40 | 313 | 330 J | 430 U | 6.1 J | 6.70 | 0.22 U |
| | 1/30/2014 | Round 31 | FA12872 | 0.69 | NA | NA | NA | 93.1 | NA | NA | NA | NA | NA | NA | NA | NA | NA | 6.98 | NA |
| | 7/16/2014 | Round 32 | 1407125 | 0.58 | 0.25 | 0.033 U | 0.66 U | 26.9 | 0.01 U | 2410 | 8.98 | NA | 75 | 290 | 0.001 UJ | 0.001 U | 0.00264 J | 6.92 | 0.01 |
| | 1/20/2015 | Round 33 | 1501071 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| | 7/24/2015 | Round 34 | 1507195 | 0.77 | 0.05 | 0.033 U | 0.66 U | -2.2 | 0.01 U | 2550 | 12.5 | 398 | 60 | 287 | 0.001 U | 0.001 U | 9.26 | 6.71 | 0 |
| | 1/20/2016 | Round 35 | 1601156 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| | 7/19/2016 | Round 36 | 1607138 | 1.29 | 0.01 | 0.033 U | 0.033 U | -126 | 0.01 U | 2120 | 9.65 | 440 | 0 | 230 | 0.001 U | 6.11 | 23.3 | 7.17 | NA |
| 428B134MW | 10/10/2005 | Round 14 | CTO260-18,20 | 1.5 | 1.2 | NA | NA | -111 | 0.024 J | 780 | 4.9 | 225 | 45 | 90 | 10,000 U | 10,000 U | 5.4 U | 6.83 | 1.8 |
| | 9/12/2007 | Round 18 | DALLASW005 | NA | NA | 0.05 U | 1.0 UL | NA | 0.5 UL | 922 | NA | NA | NA | 102 | 330 U | 330 U | 2.1 U | NA | 0.77 U |
| | 9/12/2007 | Round 18 | FIELD | 1 | 1.5 | NA | NA | -334 | NA | NA | NA | 300 | 35 | NA | NA | NA | NA | 6.69 | NA |
| | 7/15/2009 | Round 22 | F66673 | 1.5 | 10 | 0.05 U | 0.05 U | -3.3 | 0.02 UJL | 989 | 3.7 JL | 300 | 40 | 103 | 320 U | 430 U | 4.72 | 6.92 | 0.6 U |
| | 7/26/2011 | Round 26 | F84620 | 0.3 | 0.4 | 0.5 U | 0.5 U | 23.9 | 0.02 U | 901 | 2.3 | 350 | 65 | 96.2 | 320 U | 430 U | 5.74 | 6.73 | 0.3 U |
| | 7/10/2012 | Round 28 | F94831 | NA | NA | NA | NA | -4.2 | NA | NA | NA | NA | NA | NA | NA | NA | NA | 6.74 | NA |
| | 1/8/2013 | Round 29 | FA607 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| | 7/18/2013 | Round 30 | FA6576 | 0.2 | 0.2 | 0.50 U | 0.50 U | 18.2 | 0.37 | 968 | 2.2 | 300 | 40 | 101 | 320 U | 430 U | 4.3 | 6.37 | 0.23 U |
| | 1/30/2014 | Round 31 | FA12872 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| | 7/16/2014 | Round 32 | 1407125 | 0.38 | 0.03 | 0.033 U | 0.165 U | -69.3 | 0.01 U | 859 | 2.2 J | NA | 100 | 96.1 | 0.001 UJ | 0.001 UJ | 0.00219 J | 6.73 | 0.04 |
| | 1/20/2015 | Round 33 | 1501071 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| | 7/24/2015 | Round 34 | 1507195 | 1.89 | 0 | 0.033 U | 0.165 U | -45.2 | 0.01 U | 1030 | 1.59 J | 363 | 100 | 104 | 0.001 U | 0.001 U | 4.19 | 6.45 | 0.07 |
| | 1/20/2016 | Round 35 | 1601156 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| | 7/20/2016 | Round 36 | 1607138 | 0.02 | 0.01 | 0.033 U | 0.033 U | 29 | 0.01 U | 852 | 1.47 J | 317 | 0 | 96.2 | 0.001 U | 0.001 U | 1.51 J | 7.01 | NA |

**Table 4-2A**

**Summary of Geochemical Parameters Measured in Groundwater**
**Long Term Monitoring5Wells — SWMU 86 Plume**
**2016 RAER**
**Former NAS Dallas, Texas**


| Monitoring Well | Sampling Date | Sampling Date | SDG | Oxidation-Reduction Conditions | | | | | | | | Degradation Products | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Dissolved Oxygen[2] | Ferrous Iron[2] | Nitrate[3] | Nitrite[3] | ORP[1] | Phosphate[3] | Sulfate[3] | TOC[3] | Alkalinity[2] | Carbon Dioxide[2] | Chloride[3] | Ethane[3] | Ethene[3] | Methane[3] | pH[1] | Sulfide[3] |
| | | | Units | mg/L | mg/L | mg/L | mg/L | mV | mg/L | mg/L | mg/L | mg/L | mg/L | mg/L | ng/L | ng/L | µg/L | S.U. | mg/L |
| 428B135MW | 9/12/2007 | Round 18 | DALLASW005 | NA | NA | 0.46 | 1.0 U | NA | 0.5 UN | 2470 | NA | NA | NA | 452 | 330 U | 330 U | 86 J | NA | 0.73 |
| | 9/12/2007 | Round 18 | FIELD | 0.8 | 2.8 | NA | NA | -267 | NA | NA | NA | 500 | 30 | NA | NA | NA | NA | 6.47 | NA |
| | 7/13/2009 | Round 22 | F66614 | 2 | 10 | 0.14 | 0.5 U | -65.3 | 0.02 U | 2270 | 7.6 | 500 | 100 | 505 | 320 U | 430 U | 430 | 6.74 | 0.6 U |
| | 7/26/2011 | Round 26 | F84620 | 2 | 12 | 1.7 JL | 0.5 R | -75.1 | 0.02 U | 2230 | 7.6 | 12 | 12 | 530 | 320 U | 430 U | 455 | 6.5 | 0.3 U |
| | 7/10/2012 | Round 28 | F94831 | NA | NA | NA | NA | -93.1 | NA | NA | NA | NA | NA | NA | NA | NA | NA | 6.64 | NA |
| | 1/8/2013 | Round 29 | FA607 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| | 7/18/2013 | Round 30 | FA6576 | 0.4 | > 10 | 2.5 U | 2.5 U | -81.8 | 0.020 U | 2550 | 7.9 | 400 | 100 | 526 | 320 U | 430 U | 284 | 6.66 | 0.23 U |
| | 1/30/2014 | Round 31 | FA12872 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| | 7/17/2014 | Round 32 | 1407130 | 0.51 | 0.76 | 0.033 U | 0.33 UJL | -39.3 | 0.01 U | 2540 | 6.26 | NA | 100 | 476 | 0.001 U | 0.001 U | 0.139 | 6.64 | 0.02 |
| | 1/20/2015 | Round 33 | 1501071 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| | 7/24/2015 | Round 34 | 1507195 | 1.25 | 1.29 | 2.5 U | 2.5 U | -32.1 | 0.01 U | 2550 | 6.24 | 609 | 100 | 492 | 0.001 U | 0.001 U | 185 | 6.24 | 0.02 |
| | 1/20/2016 | Round 35 | 1601156 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| | 7/19/2016 | Round 36 | 1607138 | 0 | 2.91 | 0.033 U | 0.033 U | -68 | 0.01 U | 2360 | 6.22 | 625 | 0 | 515 | 0.001 U | 0.001 U | 178 | 6.83 | NA |

mg/L - milligrams per liter
mV - millivolts
NA - Not Analyzed
ng/L - nanograms per liter
ORP - Oxidation/reduction potential

TOC - Total Organic Carbon
mg/L - micrograms per liter
S.U. - Standard Units
SDG - Sample Delivery Group
PCLE - Protective Concentration Level Exceedance

Notes:
1. Field measurement, Meter
2. Field measurement, Test Kit
3. Analytical Laboratory result

Analytical Result Qualifiers:
J, K (or H), L - Indicates that the chemical was detected; however, the associated numerical result may not be a precise representation of the amount that is actually present in the sample. The laboratory reported concentration is considered to be bias unknown (J), high (K or H),

U - Indicates that the sample was not detected at the numerical detection limit (sample-specific quantitation limit) noted. Nondetected results from the laboratory are reported in this manner. This qualifier is added to a positive result (reported by the laboratory) if the detected concentration is determined to be attributable to contamination introduced during field sampling or laboratory analysis.

**Table 4-2B**

**Summary of Geochemical Parameters in Groundwater**
**Historical Monitoring Wells — SWMU 86 Plume**
**2016 RAER**
**Former NAS Dallas, Texas**
**Page 1 of 2**

| Monitoring Well | Sampling Date | SDG | Oxidation-Reduction Conditions | | | | | | | | Degradation Products | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Dissolved Oxygen[2] | Ferrous Iron[2] | Nitrate[3] | Nitrite[3] | ORP[1] | Phosphate[3] | Sulfate[3] | TOC[3] | Alkalinity[2] | Carbon Dioxide[2] | Chloride[3] | Ethane[3] | Ethene[3] | Methane[3] | pH[1] | Sulfide[3] |
| | | Units | mg/L | mg/L | mg/L | mg/L | mV | mg/L | mg/L | mg/L | mg/L | mg/L | mg/L | mg/L | ng/L | mg/L | S.U. | mg/L |
| Monitoring Wells Located Inside PCLE Zone | | | | | | | | | | | | | | | | | | |
| 42401MW | 11/2/1999 | DL330,TTE14 | 0.8 | 0 | 10 U | 10 U | 282 | 10 U | 2500 | NA | 664 | 578 | 439 | 0.431 | 1.355 | 151.9 | 6.47 | NA |
| | 7/20/2000 | DL350 | 0.6 | 0.2 | 0.5 U | 0.5 U | 156.6 | 2.5 U | 2550 | NA | 875 | 110 | 508 | NA | NA | NA | 6.5 | 0.01 U |
| | 9/1/2003 | Well Abandoned and replaced by 428B93MW | | | | | | | | | | | | | | | | |
| 42801MW | 11/17/1999 | DL334,TTE16 | 0.4 | 0 | 10 U | 10 U | 291 | 10 U | 2610 | NA | 320 | 193 | 209 | 1.154 | 0.391 | 27.79 | 6.96 | NA |
| | 7/25/2000 | DL352 | 1.5 | 0.2 | 0.22 | 0.5 U | 216.3 | 0.5 U | 2690 J | NA | 300 | 62 | 266 | NA | NA | NA | 6.79 | 0.01 U |
| | -- | Well Destroyed | | | | | | | | | | | | | | | | |
| 428B69MW | 12/15/1999 | Well Installed | | | | | | | | | | | | | | | | |
| | 1/11/2000 | DL339 | 1 | 0 | 10 U | 10 U | 255.2 | 10 U | 2840 | NA | 294 | 160 | 261 | NA | NA | 6.4 | 7.35 | 0 U |
| | 7/25/2000 | DL352 | 0.4 | 0.2 | 0.5 U | 0.5 U | 195.9 | 5 U | 4290 J | NA | 275 | 97.4 | 518 | NA | NA | NA | 6.85 | 0.01 U |
| | 1/8/2004 | C4A090143 | 0.9 | 0 | NA | NA | 110 | NA | 4160 | NA | 125 | NA | 440 | NA | NA | NA | 7.81 | 0 |
| | 4/19/2005 | Well Abandoned | | | | | | | | | | | | | | | | |
| 428B73MW | 12/14/1999 | Well Installed | | | | | | | | | | | | | | | | |
| | 1/25/2000 | DL340 | 5 | 0.2 | 0.09 | 2.5 U | 281.3 | 2.5 U | 922 | NA | 264 | 176 | 182 | NA | NA | 28 | 7.04 | 0.01 U |
| | 7/24/2000 | DL352 | 4 | 0.2 | 0.4 | 0.5 U | 210.3 | 0.5 U | 524 J | NA | 235 | 42 | 103 | NA | NA | NA | 6.95 | 0.01 U |
| | 7/16/2001 | DL373 | NA | NA | 0.10 U | 0.10 U | NA | 0.50 U | 610 | NA | NA | NA | 85.9 | 1.3 | 4.4 | 110 | NA | NA |
| | 7/16/2001 | FIELD | 0.6 | NA | NA | NA | NA | NA | NA | NA | 275 | 40 | NA | NA | NA | NA | 6.85 | NA |
| | 7/16/2001 | DL373 | NA | NA | 0.02 | 0.10 U | NA | 0.017 U | 830 | NA | NA | NA | 113 | 0.25 J | 2.2 | 9.6 | NA | NA |
| | 7/16/2001 | FIELD | 1.5 | NA | NA | NA | NA | NA | NA | NA | 300 | 43 | NA | NA | NA | NA | NA | NA |
| | -- | Well Destroyed | | | | | | | | | | | | | | | | |
| 428B80MW | 8/2/2000 | Well Installed | | | | | | | | | | | | | | | | |
| | 8/9/2000 | DL355 | 2.5 | 0.2 | 0.63 | 0.5 U | 203.8 | 0.5 U | 2630 | NA | 360 | 70 | 401 | NA | NA | NA | 6.82 | 0.01 U |
| | -- | Well Destroyed | | | | | | | | | | | | | | | | |
| 428B84MW | 8/5/2000 | Well Installed | | | | | | | | | | | | | | | | |
| | 8/9/2000 | DL355 | 1 | 0.2 | 0.05 | 0.5 U | 112.2 | 2.1 | 2540 | NA | 410 | 45 | 255 | NA | NA | NA | 6.79 | 0.01 U |
| | 7/16/2001 | DL373 | NA | NA | 0.055 | 0.10 U | NA | 0.043 U | 2520 | NA | NA | NA | 257 | 0.32 J | 0.5 U | 4.1 | NA | NA |
| | 7/16/2001 | FIELD | 0.6 | 0.2 | NA | NA | -211 | NA | | NA | 270 | 43 | NA | NA | NA | NA | 6.77 | 0.01 U |
| | 7/16/2001 | DL372 | NA | NA | 0.034 | 0.10 U | NA | 0.043 U | 1880 | NA | NA | NA | 232 | 0.43 J | 0.93 | 6.6 | NA | NA |
| | 7/16/2001 | FIELD | 2 | NA | NA | NA | NA | NA | | NA | 1000 | 100 | NA | NA | NA | NA | NA | NA |
| | -- | Well Destroyed | | | | | | | | | | | | | | | | |
| 428B96TW | 7/28/2003 | Well Installed | | | | | | | | | | | | | | | | |
| | 8/5/2003 | 06288,TTN52 | 2 | 0.2 | NA | NA | 71 | NA | 590 | NA | 300 | 50 | 23.2 | 0.08 | 0.21 | 1.8 | 6.92 | 0.25 U |
| | 11/13/2003 | Well Abandoned | | | | | | | | | | | | | | | | |
| 428B98TW | 7/28/2003 | Well Installed | | | | | | | | | | | | | | | | |
| | 8/6/2003 | 70133,TTN52 | 1.5 | 0.2 | NA | NA | 42 | NA | 961 | NA | 325 | 30 | 47.2 | 0.15 | 0.11 | 2.1 | 7.32 | 0.25 U |
| | 11/13/2003 | Well Abandoned | | | | | | | | | | | | | | | | |
| 428B99TW | 7/28/2003 | Well Installed | | | | | | | | | | | | | | | | |
| | 8/7/2003 | 80145,TTN52 | 1.5 | 0.2 | NA | NA | 58 | NA | 1470 | NA | 240 | 35 | 164 | 0.49 | 1.21 | 35.1 | 6.76 | 0.32 J |
| | 11/13/2003 | Well Abandoned | | | | | | | | | | | | | | | | |
| 428BX32MW | 3/18/1998 | Well Installed | | | | | | | | | | | | | | | | |
| | 11/18/1999 | DL334,TTE16 | 0.3 | 0 | 10 U | 10 U | 312.6 | 10 U | 2490 | NA | 418 | 392 | 385 | 0.137 | 0.799 | 0.803 | 6.64 | NA |
| | 7/25/2000 | DL352 | 0.5 | 0.2 | 0.5 U | 0.5 U | 210.3 | 0.5 U | 2470 J | NA | 400 | 500 | 452 | NA | NA | NA | 6.4 | 0.01 U |
| | -- | Well Destroyed | | | | | | | | | | | | | | | | |
| 428B129MW | 10/10/2005 | FIELD_R14 | NA | NA | NA | NA | -140 | NA | NA | NA | NA | NA | NA | NA | NA | NA | 6.9 | NA |
| | 9/12/2007 | DALLASW005 | NA | NA | 0.089 U | 1.0 UL | NA | 0.5 UL | 2640 | NA | NA | NA | 318 | 330 U | 330 U | 35 J | NA | 0.83 U |
| | 9/12/2007 | FIELD | 1 | 0 | NA | NA | -3 | NA | NA | NA | 250 | 15 | NA | NA | NA | NA | 6.81 | NA |
| | 7/13/2009 | F66614 | 1 | 0 | 0.14 | 0.05 U | 53.7 | 0.02 U | 1290 | 2.4 | 275 | 50 | 321 | 0.5 J | 430 U | 8.7 | 6.84 | 0.6 U |
| | 1/12/2010 | F70770 | NA | NA | NA | NA | 429.7 | NA | NA | NA | NA | NA | NA | NA | NA | NA | 6.67 | NA |
| | 7/14/2010 | F75197 | NA | NA | NA | NA | 9.2 | NA | NA | NA | NA | NA | NA | NA | NA | NA | 6.89 | NA |
| | 1/13/2011 | FIELD | NA | NA | NA | NA | -77.6 | NA | NA | NA | NA | NA | NA | NA | NA | NA | 7.32 | NA |
| | 7/26/2011 | F84620 | 1 | 24 | 5 U | 0.25 UJL | -171.3 | 0.02 U | 2660 | 2.4 | 1 | 18 | 335 | 1600 | 710 | 34.9 | 6.94 | 0.86 |
| | 7/10/2012 | F94831 | NA | NA | NA | NA | -189.9 | NA | NA | NA | NA | NA | NA | NA | NA | NA | 7.27 | NA |
| | 1/8/2013 | FA607 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| | 7/18/2013 | FA6576 | 0.3 | 0.4 | 2.5 U | 2.5 U | -14.7 | 0.33 | 2920 | 2.2 | 225 | 25 | 229 | 430 J | 430 U | 7.2 | 6.86 | 0.22 U |
| | 1/30/2014 | FA12872 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| | 7/17/2014 | 1407130 | 0.56 | 0.02 | 0.037 J | 0.66 U | 35.2 | 0.01 U | 2880 | 2.37 J | NA | 20 | 327 | 0.001 U | 0.001 U | 0.00465 | 6.78 | 0 |
| | 1/20/2015 | 1501071 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| | 7/24/2015 | 1507195 | 1.15 | 0 | 2.5 U | 2.5 U | -22.8 | .016 J | 3210 | 1.68 J | 353 | 60 | 343 | 0.001 U | 0.001 U | 7.72 | 6.44 | 0.03 |
| | 4/7/2016 | Well Plugged and Abandoned | | | | | | | | | | | | | | | | |

**Table 4-2B**

**Summary of Geochemical Parameters in Groundwater**
**Historical Monitoring Wells — SWMU 86 Plume**
**2016 RAER**
**Former NAS Dallas, Texas**
**Page 2 of 2**

| Monitoring Well | Sampling Date | SDG | Oxidation-Reduction Conditions | | | | | | | | Degradation Products | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Dissolved Oxygen[2] | Ferrous Iron[2] | Nitrate[3] | Nitrite[3] | ORP[1] | Phosphate[3] | Sulfate[3] | TOC[3] | Alkalinity[2] | Carbon Dioxide[2] | Chloride[3] | Ethane[3] | Ethene[3] | Methane[3] | pH[1] | Sulfide[3] |
| | | Units | mg/L | mg/L | mg/L | mg/L | mV | mg/L | mg/L | mg/L | mg/L | mg/L | mg/L | mg/L | ng/L | mg/L | S.U. | mg/L |
| **Monitoring Wells Located Outside PCLE Zone** | | | | | | | | | | | | | | | | | | |
| **405BN1MW** | 3/22/1998 | Well Installed | | | | | | | | | | | | | | | | |
| | 10/25/1999 | DL329 | 0.3 | 0 | 10 U | 10 U | 334.7 | 10 U | 2110 | NA | 362 | 241 | 174 | 0.009 | 0.031 | 0.856 | 6.82 | 0 U |
| | 7/25/2000 | DL352 | 0.9 | 0.2 | 0.5 U | 0.5 U | 161.2 | 0.5 U | 2590 J | NA | 340 | 60 | 191 | NA | NA | NA | 6.87 | 0.01 U |
| | 1/8/2004 | C4A090143 | 0.3 | 0 | NA | NA | 149 | NA | 2170 | NA | 250 | NA | 224 | NA | NA | NA | 7.18 | 0 |
| | 4/17/2005 | Well Abandoned | | | | | | | | | | | | | | | | |
| **424BX35MW** | 3/20/1998 | Well Installed | | | | | | | | | | | | | | | | |
| | 11/18/1999 | DL334,TTE16 | 1 | 0 | 1.8 | 10 U | 297.8 | 10 U | 3920 | NA | 400 | 189 | 275 | 0.005 | 0.02 | 0.275 | 6.82 | 0 U |
| | 7/24/2000 | DL352 | 2.5 | 0.2 | 2.1 | 0.5 U | 205 | 0.5 U | 3980 J | NA | 355 | 70 | 274 | NA | NA | NA | 6.86 | 0.01 U |
| | 4/18/2005 | Well Abandoned | | | | | | | | | | | | | | | | |
| **428B08MW** | 3/18/1998 | Well Installed | | | | | | | | | | | | | | | | |
| | 11/19/1999 | DL334,TTE16 | 1 | 0.3 | 0.5 U | 0.5 U | 74.1 | 0.5 U | 179 | NA | 324 | 130 | 57.6 | 0.033 | 0.322 | 219.9 | 6.98 | 0 U |
| | 7/24/2000 | DL352 | 0.8 | 1 | 0.5 U | 0.5 U | 38.5 | 0.5 U | 191 J | NA | 350 | 43 | 63 | NA | NA | NA | 6.96 | 0.01 U |
| | 6/3/2003 | Well Abandoned | | | | | | | | | | | | | | | | |
| **428B09MW** | 3/19/1998 | Well Installed | | | | | | | | | | | | | | | | |
| | 11/18/1999 | DL334,TTE16 | 1 | 0 | 3.4 | 10 U | 338.7 | 10 U | 3440 | NA | 272 | 159 | 1260 | 0.005 | 0.02 | 0.1 | 6.83 | 0 U |
| | 7/25/2000 | DL352 | 1.5 | 0.2 | 3.3 | 0.5 U | 224.4 | 5 U | 3450 J | NA | 220 | 40 | 1340 | NA | NA | NA | 6.98 | 0.01 U |
| | 1/23/2003 | Well Abandoned | | | | | | | | | | | | | | | | |
| **428B66MW** | 12/15/1999 | Well Installed | | | | | | | | | | | | | | | | |
| | 1/12/2000 | DL339 | 2 | 0 | 0.11 | 2.5 U | 545.3 | 2.5 U | 491 | NA | 312 | 184 | 21.9 | NA | NA | 0.34 U | 7.19 | 0 U |
| | 7/25/2000 | DL352 | 2.25 | 0.2 | 0.18 | 0.5 U | 163 | 0.18 | 719 J | NA | 280 | 83 | 40.8 | NA | NA | NA | 7.04 | 0.01 U |
| | -- | Well Destroyed | | | | | | | | | | | | | | | | |
| **428B67MW** | 12/14/1999 | Well Installed | | | | | | | | | | | | | | | | |
| | 1/18/2000 | DL339 | 1 | 2 | 0.2 | 1 U | 27.6 | 1 U | 473 | NA | 492 | 357 | 25.2 | NA | NA | 13 | 6.8 | 0.01 U |
| | 7/25/2000 | DL352 | 0.6 | 5 | 0.5 U | 0.5 U | -5.6 | 0.5 U | 1370 J | NA | 400 | 112 | 84.4 | NA | NA | NA | 6.77 | 0.01 U |
| | 1/9/2004 | C4A100109 | 1 | 0.6 | NA | NA | 124 | NA | 901 | NA | 350 | NA | 303 L | NA | NA | NA | 7.58 | 0 |
| | 4/17/2005 | Well Abandoned | | | | | | | | | | | | | | | | |
| **428B68MW** | 12/14/1999 | Well Installed | | | | | | | | | | | | | | | | |
| | 1/19/2000 | DL339 | 2 | 0.2 | 10 U | 10 U | 282.8 | 10 U | 2510 | NA | 300 | 184 | 420 | NA | NA | 0.15 U | 7.07 | 0.01 U |
| | 7/24/2000 | DL352 | 1 | 0.2 | 0.15 | 0.5 U | 234.3 | 0.5 U | 2490 J | NA | 240 | 50 | 608 | NA | NA | NA | 7.12 | 0.01 U |
| | 1/8/2004 | C4A090143 | 1 | 0 | NA | NA | 149 | NA | 2780 | NA | 250 | NA | 785 | NA | NA | NA | 7.15 | 0 |
| | 4/17/2005 | Well Abandoned | | | | | | | | | | | | | | | | |
| **428B79MW** | 8/5/2000 | Well Installed | | | | | | | | | | | | | | | | |
| | 8/9/2000 | DL355 | 1 | 0.2 | 0.29 | 0.5 U | 144.9 | 0.5 U | 2780 | NA | 300 | 55 | 222 | NA | NA | NA | 6.96 | 0.01 U |
| | -- | Well Destroyed | | | | | | | | | | | | | | | | |
| **428B81MW** | 8/3/2000 | Well Installed | | | | | | | | | | | | | | | | |
| | 8/9/2000 | DL355 | 1 | 0.2 | 0.31 | 0.5 U | 120.9 | 0.5 U | 2870 | NA | 415 | 50 | 215 | NA | NA | NA | 6.98 | 0.01 U |
| | 6/3/2003 | Well Abandoned | | | | | | | | | | | | | | | | |
| **428B82MW** | 8/4/2000 | Well Installed | | | | | | | | | | | | | | | | |
| | 8/9/2000 | DL355 | 1 | 0.2 | 0.24 | 0.5 U | 144.1 | 0.5 U | 2860 | NA | 325 | 50 | 225 | NA | NA | NA | 6.95 | 0.01 U |
| | 6/3/2003 | Well Abandoned | | | | | | | | | | | | | | | | |
| **428B83MW** | 8/4/2000 | Well Installed | | | | | | | | | | | | | | | | |
| | 8/9/2000 | DL355 | 4 | 0.2 | 0.21 | 0.5 U | 157.3 | 0.5 U | 2880 | NA | 330 | 42 | 265 | NA | NA | NA | 6.82 | 0.01 U |
| | 7/16/2001 | DL373 | | NA | 0.12 | 0.10 U | NA | 0.038 U | 3010 | NA | NA | NA | 248 | 0.44 J | 0.11 J | 1.9 U | NA | NA |
| | 7/16/2001 | FIELD | 1 | 0.2 | NA | NA | -110.5 | NA | NA | NA | 215 | 23 | NA | NA | NA | NA | 6.92 | 0.01 U |
| | 7/16/2001 | DL373 | | NA | 0.10 U | 0.10 U | NA | 0.11 U | 2720 | NA | | NA | 218 | 0.1 J | 0.42 J | 1.9 U | NA | NA |
| | 7/16/2001 | FIELD | 1 | NA | NA | NA | NA | NA | NA | NA | 400 | 50 | NA | NA | NA | NA | NA | NA |
| | 10/20/2000 | Well Destroyed | | | | | | | | | | | | | | | | |
| **428B97TW** | 7/29/2003 | Well Installed | | | | | | | | | | | | | | | | |
| | 8/7/2003 | 80145,TTN52 | 2.5 | 0.2 | NA | NA | 78 | NA | 2280 | NA | 250 | 60 | 233 | 0.07 | 0.17 | 0.8 | 6.46 | 0.25 U |
| | 11/13/2003 | Well Abandoned | | | | | | | | | | | | | | | | |
| **43101MW** | 6/17/1995 | Well Installed | | | | | | | | | | | | | | | | |
| | 11/19/1999 | DL334,TTE16 | 0.4 | 0 | 2.5 U | 2.5 U | 284.9 | 2.5 U | 325 | | 440 | 194 | 12 | 0.033 | 0.016 | 19.76 | 6.9 | 0 U |
| | 7/25/2000 | DL352 | 0.35 | 0.2 | 0.5 U | 0.5 U | 168.8 | 0.5 U | 317 J | NA | 300 | 94.6 | 23.5 | NA | NA | NA | 6.94 | 0.01 U |
| | -- | Well Destroyed | | | | | | | | | | | | | | | | |

mg/L - milligrams per liter
mV - millivolts
NA - Not Analyzed
ng/L - nanograms per liter
ORP - Oxidation/reduction potential
TOC - Total Organic Carbon
mg/L - micrograms per liter
S.U. - Standard Units
SDG - Sample Delivery Group
PCLE - Protective Concentration Level Exceedance

Notes:
1. Field measurement, Meter
2. Field measurement, Test Kit
3. Analytical Laboratory result

Analytical Result Qualifiers:
J, K, L - Indicates that the chemical was detected; however, the associated numerical result may not be a precise representation of the amount that is actually present in the sample. The laboratory reported concentration is considered to be bias unknown (J), high (K), or low (L) estimate of the true concentratio
U - Indicates that the sample was not detected at the numerical detection limit (sample-specific quantitation limit) noted. Nondetected results from the laboratory are reported in this manner. This qualifier is added to a positive result (reported by the laboratory) if the detected concentration is determined to be attributable to contamination introduced durin

# TABLE 4-3
# SUMMARY OF GROUNDWATER GAUGING DATA

**Table 4-3A**

**Summary of Groundwater Gauging Data**
**Long Term Monitoring Wells — SWMU 86 Plume**
**2016 RAER**
**Former NAS Dallas, Texas**
**Page 1 of 5**

| Monitoring Well | Top of Casing [1] (ft msl) | Screened Interval (ft msl) | Date | Depth to Water [2] (ft bgs) | Groundwater Elevation (ft msl) |
|---|---|---|---|---|---|
| **Monitoring Wells Located Inside PCLE Zone** | | | | | |
| **428B07MW** | 464.40 | 459.00 to 449.00 | 3/19/1998 | Well Installed | |
| | | | 5/1/1998 | 4.68 | 459.72 |
| | | | 8/1/1998 | 5.89 | 458.51 |
| | | | 2/1/1999 | 4.74 | 459.66 |
| | | | 9/1/1999 | 5.46 | 458.94 |
| | | | 6/1/2000 | 4.30 | 460.10 |
| | | | 6/1/2001 | 4.45 | 459.95 |
| | | | 12/2/2002 | 3.78 | 460.62 |
| | | | 8/1/2003 | 4.83 | 459.57 |
| | | | 12/23/2003 | 5.56 | 458.84 |
| | | | 7/4/2004 | 11.08 | 453.32 |
| | | | 9/29/2004 | 6.00 | 458.40 |
| | 464.28 | 458.88 to 448.88 | 4/17/2005 | 3.22 | 461.06 |
| | | | 7/22/2005 | 4.06 | 460.22 |
| | | | 10/4/2005 | 5.71 | 458.57 |
| | | | 1/21/2006 | 7.46 | 456.82 |
| | | | 5/3/2006 | 6.04 | 458.24 |
| | | | 8/8/2006 | 6.62 | 457.66 |
| | | | 4/25/2007 | 3.14 | 461.14 |
| | | | 8/22/2007 | 2.76 | 461.52 |
| | | | 1/16/2008 | 4.61 | 459.67 |
| | | | 7/9/2008 | 4.37 | 459.91 |
| | | | 12/17/2008 | 6.89 | 457.39 |
| | | | 7/13/2009 | 5.81 | 458.47 |
| | 464.39 | 458.99 to 448.99 | 12/15/2009 | 3.08 | 461.31 |
| | | | 8/9/2010 | 3.52 | 460.87 |
| | | | 12/16/2010 | 4.46 | 459.93 |
| | | | 7/25/2011 | 2.90 | 461.49 |
| | | | 12/14/2011 | 2.91 | 461.48 |
| | | | 7/10/2012 | 3.48 | 460.91 |
| | | | 12/19/2012 | 6.41 | 457.98 |
| | | | 7/15/2013 | 5.13 | 459.26 |
| | | | 12/18/2013 | 5.66 | 458.73 |
| | | | 7/15/2014 | 5.34 | 459.05 |
| | | | 12/17/2014 | 5.21 | 459.18 |
| | | | 7/20/2015 | 3.35 | 461.04 |
| | | | 12/15/2015 | 3.79 | 460.60 |
| | | | 7/18/2016 | 3.76 | 460.63 |

**Table 4-3A**

**Summary of Groundwater Gauging Data**
**Long Term Monitoring Wells — SWMU 86 Plume**
**2016 RAER**
**Former NAS Dallas, Texas**
**Page 2 of 5**

| Monitoring Well | Top of Casing [1] (ft msl) | Screened Interval (ft msl) | Date | Depth to Water [2] (ft bgs) | Groundwater Elevation (ft msl) |
|---|---|---|---|---|---|
| 428B128MW | 466.64 | 453.84 to 443.84 | 4/3/2005 | Well Installed | |
| | | | 4/17/2005 | 16.06 | 450.58 |
| | | | 7/21/2005 | 10.37 | 456.27 |
| | | | 10/4/2005 | 11.80 | 454.84 |
| | | | 1/17/2006 | 11.98 | 454.66 |
| | | | 5/3/2006 | 10.14 | 456.50 |
| | | | 8/8/2006 | 12.92 | 453.72 |
| | | | 4/25/2007 | 8.21 | 458.43 |
| | | | 8/22/2007 | 7.65 | 458.99 |
| | | | 1/15/2008 | 9.39 | 457.25 |
| | | | 7/9/2008 | 9.20 | 457.44 |
| | | | 12/17/2008 | 13.78 | 452.86 |
| | | | 7/15/2009 | 11.35 | 455.29 |
| | 466.53 | 453.73 to 443.73 | 12/14/2009 | 6.17 | 460.36 |
| | | | 8/10/2010 | 9.54 | 456.99 |
| | | | 12/16/2010 | 9.36 | 457.17 |
| | | | 7/25/2011 | 9.22 | 457.31 |
| | | | 12/14/2011 | 9.31 | 457.22 |
| | | | 7/10/2012 | 9.11 | 457.42 |
| | | | 12/19/2012 | 11.81 | 454.72 |
| | | | 7/15/2013 | 10.79 | 455.74 |
| | | | 12/18/2013 | 11.57 | 454.96 |
| | | | 7/15/2014 | 11.40 | 455.13 |
| | | | 12/17/2014 | 11.57 | 454.96 |
| | | | 7/20/2015 | 9.05 | 457.48 |
| | | | 12/15/2015 | 8.45 | 458.08 |
| | | | 7/18/2016 | 8.90 | 457.63 |
| 428B130MW | 466.49 | 455.81 to 445.81 | 4/3/2005 | Well Installed | |
| | | | 4/17/2005 | 5.84 | 460.65 |
| | | | 7/21/2005 | 7.41 | 459.08 |
| | | | 10/4/2005 | 8.71 | 457.78 |
| | | | 1/17/2006 | 9.80 | 456.69 |
| | | | 5/3/2006 | 8.00 | 458.49 |
| | | | 8/8/2006 | 9.79 | 456.70 |
| | | | 4/25/2007 | 5.69 | 460.80 |
| | | | 8/23/2007 | 5.52 | 460.97 |
| | | | 1/16/2008 | 7.11 | 459.38 |
| | | | 7/9/2008 | 7.20 | 459.29 |
| | | | 12/17/2008 | 11.38 | 455.11 |
| | | | 7/13/2009 | 8.31 | 458.18 |
| | 466.51 | 455.83 to 445.83 | 12/15/2009 | 5.28 | 461.23 |
| | | | 8/9/2010 | 6.54 | 459.97 |
| | | | 12/16/2010 | 6.96 | 459.55 |
| | | | 7/25/2011 | 6.11 | 460.40 |
| | | | 12/14/2011 | 5.25 | 461.26 |
| | | | 7/10/2012 | 6.21 | 460.30 |
| | | | 12/19/2012 | 9.19 | 457.32 |
| | | | 7/15/2013 | 8.07 | 458.44 |
| | | | 12/18/2013 | 8.18 | 458.33 |
| | | | 7/15/2014 | 8.24 | 458.27 |
| | | | 12/17/2014 | 7.56 | 458.95 |
| | | | 7/20/2015 | 6.11 | 460.40 |
| | | | 12/15/2015 | 6.10 | 460.41 |
| | | | 7/18/2016 | 8.56 | 457.95 |

**Table 4-3A**

**Summary of Groundwater Gauging Data**
**Long Term Monitoring Wells — SWMU 86 Plume**
**2016 RAER**
**Former NAS Dallas, Texas**
**Page 3 of 5**

| Monitoring Well | Top of Casing [1] (ft msl) | Screened Interval (ft msl) | Date | Depth to Water [2] (ft bgs) | Groundwater Elevation (ft msl) |
|---|---|---|---|---|---|
| 428B131MW | 467.12 | 455.42 to 445.42 | 4/5/2005 | Well Installed | |
| | | | 4/17/2005 | 9.68 | 457.44 |
| | | | 7/21/2005 | 6.74 | 460.38 |
| | | | 10/4/2005 | 8.41 | 458.71 |
| | | | 1/17/2006 | 9.91 | 457.21 |
| | | | 5/3/2006 | 8.38 | 458.74 |
| | | | 8/8/2006 | 9.05 | 458.07 |
| | | | 4/25/2007 | 6.13 | 460.99 |
| | | | 8/23/2007 | 5.54 | 461.58 |
| | | | 1/16/2008 | 7.56 | 459.56 |
| | | | 7/9/2008 | 7.21 | 459.91 |
| | | | 12/17/2008 | 10.56 | 456.56 |
| | | | 7/13/2009 | 8.18 | 458.94 |
| | 467.14 | 455.44 to 445.44 | 12/15/2009 | 6.08 | 461.06 |
| | | | 8/9/2010 | 6.18 | 460.96 |
| | | | 12/16/2010 | 6.96 | 460.18 |
| | | | 7/25/2011 | 5.51 | 461.63 |
| | | | 12/14/2011 | 5.35 | 461.79 |
| | | | 9/10/2012 | 6.05 | 461.09 |
| | | | 12/19/2012 | 9.44 | 457.70 |
| | | | 7/15/2013 | 7.92 | 459.22 |
| | | | 12/18/2013 | 8.38 | 458.76 |
| | | | 7/15/2014 | 8.48 | 458.66 |
| | | | 12/17/2014 | 8.36 | 458.78 |
| | | | 7/20/2015 | 6.41 | 460.73 |
| | | | 12/15/2015 | 6.97 | 460.17 |
| | | | 7/18/2016 | 6.83 | 460.31 |
| 428B132MW | 466.89 | 450.77 to 440.77 | 4/4/2005 | Well Installed | |
| | | | 4/17/2005 | 24.25 | 442.64 |
| | | | 7/21/2005 | 11.65 | 455.24 |
| | | | 10/3/2005 | 11.36 | 455.53 |
| | | | 1/17/2006 | 12.10 | 454.79 |
| | | | 5/3/2006 | 12.30 | 454.59 |
| | | | 8/8/2006 | 11.18 | 455.71 |
| | | | 4/25/2007 | 10.54 | 456.35 |
| | | | 8/23/2007 | 8.59 | 458.30 |
| | | | 1/16/2008 | 9.79 | 457.10 |
| | | | 7/9/2008 | 9.32 | 457.57 |
| | | | 12/17/2008 | 11.18 | 455.71 |
| | | | 7/13/2009 | 11.31 | 455.58 |
| | 466.95 | 450.83 to 440.83 | 12/15/2009 | 8.72 | 458.23 |
| | | | 8/9/2010 | 7.21 | 459.74 |
| | | | 12/16/2010 | 7.59 | 459.36 |
| | | | 7/25/2011 | 6.56 | 460.39 |
| | | | 12/14/2011 | 8.60 | 458.35 |
| | | | 7/10/2012 | 8.20 | 458.75 |
| | | | 12/19/2012 | 11.30 | 455.65 |
| | | | 7/15/2013 | 10.84 | 456.11 |
| | | | 12/18/2013 | 11.62 | 455.33 |
| | | | 7/15/2014 | 12.03 | 454.92 |
| | | | 12/17/2014 | 12.16 | 454.79 |
| | | | 7/20/2015 | 9.48 | 457.47 |
| | | | 12/15/2015 | 9.10 | 457.85 |
| | | | 7/18/2016 | 8.38 | 458.57 |

**Table 4-3A**

**Summary of Groundwater Gauging Data**
**Long Term Monitoring Wells — SWMU 86 Plume**
**2016 RAER**
**Former NAS Dallas, Texas**
**Page 4 of 5**

| Monitoring Well | Top of Casing [1] (ft msl) | Screened Interval (ft msl) | Date | Depth to Water [2] (ft bgs) | Groundwater Elevation (ft msl) |
|---|---|---|---|---|---|
| 428B133MW | 464.62 | 451.86 to 441.86 | 4/3/2005 | Well Installed | |
| | | | 4/17/2005 | 21.10 | 443.52 |
| | | | 7/21/2005 | 12.30 | 452.32 |
| | | | 10/4/2005 | 10.06 | 454.56 |
| | | | 1/17/2006 | 10.58 | 454.04 |
| | | | 5/3/2006 | 8.08 | 456.54 |
| | | | 8/8/2006 | 8.62 | 456.00 |
| | | | 4/25/2007 | 6.73 | 457.89 |
| | | | 8/22/2007 | 6.75 | 457.87 |
| | | | 1/15/2008 | 7.16 | 457.46 |
| | | | 7/9/2008 | 8.40 | 456.22 |
| | | | 12/17/2008 | 10.02 | 454.60 |
| | | | 7/15/2009 | 9.75 | 454.87 |
| | 464.64 | 451.88 to 441.88 | 12/14/2009 | 6.30 | 458.32 |
| | | | 8/10/2010 | 8.31 | 456.31 |
| | | | 12/16/2010 | 7.32 | 457.32 |
| | | | 7/25/2011 | 6.23 | 458.41 |
| | | | 12/14/2011 | 7.85 | 456.79 |
| | | | 7/10/2012 | 7.29 | 457.35 |
| | | | 12/19/2012 | 10.87 | 453.77 |
| | | | 7/15/2013 | 10.65 | 453.99 |
| | | | 12/18/2013 | 8.00 | 456.64 |
| | | | 7/15/2014 | 11.02 | 453.62 |
| | | | 12/17/2014 | 9.32 | 455.32 |
| | | | 7/20/2015 | 8.16 | 456.48 |
| | | | 12/15/2015 | 5.82 | 458.82 |
| | | | 7/18/2016 | 7.10 | 457.54 |
| 428B134MW | 461.37 | 450.45 to 440.45 | 4/3/2005 | Well Installed | |
| | | | 4/17/2005 | 8.38 | 452.99 |
| | | | 7/21/2005 | 5.91 | 455.46 |
| | | | 10/4/2005 | 7.51 | 453.86 |
| | | | 1/17/2006 | 7.42 | 453.95 |
| | | | 5/3/2006 | 4.78 | 456.59 |
| | | | 8/8/2006 | 7.49 | 453.88 |
| | | | 4/25/2007 | 4.61 | 456.76 |
| | | | 8/22/2007 | 4.69 | 456.68 |
| | | | 1/15/2008 | 4.82 | 456.55 |
| | | | 7/9/2008 | 7.82 | 453.55 |
| | | | 12/17/2008 | 9.86 | 451.51 |
| | | | 7/15/2009 | 6.28 | 455.09 |
| | 461.39 | 450.47 to 440.47 | 12/14/2009 | 4.49 | 456.90 |
| | | | 8/10/2010 | 5.56 | 455.83 |
| | | | 12/16/2010 | 5.09 | 456.30 |
| | | | 7/25/2011 | 6.34 | 455.05 |
| | | | 12/14/2011 | 4.65 | 456.74 |
| | | | 7/10/2012 | 5.78 | 455.61 |
| | | | 12/19/2012 | 6.71 | 454.68 |
| | | | 7/15/2013 | 6.09 | 455.30 |
| | | | 12/18/2013 | 4.89 | 456.50 |
| | | | 7/15/2014 | 6.41 | 454.98 |
| | | | 12/17/2014 | 5.21 | 456.18 |
| | | | 7/20/2015 | 6.22 | 455.17 |
| | | | 12/15/2015 | 4.86 | 456.53 |
| | | | 7/18/2016 | 5.50 | 455.89 |

**Table 4-3A**

**Summary of Groundwater Gauging Data**
**Long Term Monitoring Wells — SWMU 86 Plume**
**2016 RAER**
**Former NAS Dallas, Texas**
**Page 5 of 5**

| Monitoring Well | Top of Casing [1] (ft msl) | Screened Interval (ft msl) | Date | Depth to Water [2] (ft bgs) | Groundwater Elevation (ft msl) |
|---|---|---|---|---|---|
| 428B135MW | 466.68 | 450.44 to 440.44 | 4/4/2005 | Well Installed | |
| | | | 4/17/2005 | 24.82 | 441.86 |
| | | | 7/18/2005 | 16.10 | 450.58 |
| | | | 10/4/2005 | 15.61 | 451.07 |
| | | | 1/17/2006 | 13.70 | 452.98 |
| | | | 5/3/2006 | 13.61 | 453.07 |
| | | | 8/8/2006 | 13.75 | 452.93 |
| | | | 4/25/2007 | 12.93 | 453.75 |
| | | | 8/23/2007 | 12.84 | 453.84 |
| | | | 1/16/2008 | 12.92 | 453.76 |
| | | | 7/9/2008 | 10.98 | 455.70 |
| | | | 12/17/2008 | 10.41 | 456.27 |
| | | | 7/13/2009 | 11.40 | 455.28 |
| | 466.72 | 450.48 to 440.48 | 12/14/2009 | 5.58 | 461.14 |
| | | | 8/9/2010 | 7.91 | 458.81 |
| | | | 12/16/2010 | 6.92 | 459.80 |
| | | | 7/25/2011 | 6.93 | 459.79 |
| | | | 12/14/2011 | 7.55 | 459.17 |
| | | | 7/10/2012 | 8.14 | 458.58 |
| | | | 12/19/2012 | 8.70 | 458.02 |
| | | | 7/15/2013 | 10.30 | 456.42 |
| | | | 12/18/2013 | 12.07 | 454.65 |
| | | | 7/15/2014 | 11.61 | 455.11 |
| | | | 12/17/2014 | 10.17 | 456.55 |
| | | | 7/20/2015 | 9.87 | 456.85 |
| | | | 12/15/2015 | 7.68 | 459.04 |
| | | | 7/18/2016 | 8.43 | 458.29 |

bgs - below ground surface
ft - feet
msl - mean sea level
NM - Not Measured
PCLE - Protective Concentration Level Exceedance

Notes:
1 - All monitoring wells on-site were resurveyed in May 2005 and September 2010 in accordance with the Compliance Plan Requirements
2 - Depth to water measurements taken from the top of the riser.

**TABLE 4-3B**

**Summary of Groundwater Gauging Data**
**Monitoring Wells — SWMU 86 Plume**
**2016 RAER**
**Former NAS Dallas, Texas**
**PAGE 1 OF 4**

| Monitoring Well | Top of Casing [1] (ft msl) | Screened Interval (ft msl) | Date | Depth to Water [2] (ft bgs) | Groundwater Elevation (ft msl) |
|---|---|---|---|---|---|
| **Monitoring Wells Located Inside PCLE Zone** | | | | | |
| **42401MW** | 464.60 | 455.20 to 445.20 | 2/1/1998 | 4.89 | 459.71 |
| | | | 5/1/1998 | 5.15 | 459.45 |
| | | | 8/1/1998 | 6.50 | 458.10 |
| | | | 2/1/1999 | 5.22 | 459.38 |
| | | | 9/1/1999 | 5.58 | 459.02 |
| | | | 6/1/2000 | 4.76 | 459.84 |
| | | | 6/1/2001 | 5.13 | 459.47 |
| | | | 12/2/2002 | 4.28 | 460.32 |
| | | | 8/1/2003 | 4.99 | 459.61 |
| | | | 9/1/2003 | Well Plugged and Abandoned and replaced by 428B93 MW | |
| **42801MW** | 465.06 | 460.06 to 450.06 | 6/15/1995 | Well Installed | |
| | | | 5/1/1998 | 5.30 | 459.76 |
| | | | 8/1/1998 | 6.57 | 458.49 |
| | | | 2/1/1999 | 5.41 | 459.65 |
| | | | 9/1/1999 | 6.20 | 458.86 |
| | | | 6/1/2000 | 5.24 | 459.82 |
| | | | 6/1/2001 | 5.58 | 459.48 |
| | | | 12/2/2002 | 4.15 | 460.91 |
| | | | 8/1/2003 | 5.45 | 459.61 |
| | | | 12/23/2003 | 6.26 | 458.80 |
| | | | NA | Well Destroyed during DRMO Excavation | |
| **428B06MW** | 465.09 | 460.79 to 450.79 | 35872.00 | Well Installed | |
| | | | 5/1/1998 | 5.38 | 459.71 |
| | | | 8/1/1999 | 6.89 | 458.20 |
| | | | 2/1/1999 | NA | NA |
| | | | 9/1/1999 | NA | NA |
| | | | 1/13/1999 | Well Plugged and Abandoned | |
| **428B69MW** | 464.56 | 458.16 to 448.16 | 12/15/1999 | Well Installed | |
| | | | 6/1/2000 | 4.01 | 460.55 |
| | | | 6/1/2001 | 4.60 | 459.96 |
| | | | 12/2/2002 | 3.65 | 460.91 |
| | | | 8/1/2003 | 4.81 | 459.75 |
| | | | 12/23/2003 | 5.53 | 459.03 |
| | | | 7/4/2004 | 10.45 | 454.11 |
| | | | 9/29/2004 | 5.91 | 458.65 |
| | | | 4/19/2005 | Well Plugged and Abandoned | |
| **428B73MW** | 464.99 | 458.49 to 448.49 | 12/14/1999 | Well Installed | |
| | | | 6/1/2000 | 4.87 | 460.12 |
| | | | 6/1/2001 | 6.02 | 458.97 |
| | | | 12/2/2002 | 4.63 | 460.36 |
| | | | 8/1/2003 | 4.23 | 460.76 |
| | | | 12/23/2003 | NM | NM |
| | | | NA | Well Destroyed during DRMO Excavation | |
| **428B80MW** | 466.93 | 460.14 to 450.14 | 8/2/2000 | Well Installed | |
| | | | 6/1/2001 | 5.33 | 461.60 |
| | | | 12/2/2002 | 5.12 | 461.81 |
| | | | 8/1/2003 | NM | NM |
| | | | 12/23/2003 | NM | NM |
| | | | NA | Well Destroyed during DRMO Excavation | |
| **428B84MW** | 465.05 | 459.05 to 449.05 | 8/5/2000 | Well Installed | |
| | | | 6/1/2001 | 5.43 | 459.62 |
| | | | 12/2/2002 | 4.37 | 460.68 |
| | | | 8/1/2003 | NM | NM |
| | | | 12/23/2003 | NM | NM |
| | | | NA | Well Destroyed during DRMO Excavation | |

**TABLE 4-3B**

**Summary of Groundwater Gauging Data**
**Monitoring Wells — SWMU 86 Plume**
**2016 RAER**
**Former NAS Dallas, Texas**
**PAGE 2 OF 4**

| Monitoring Well | Top of Casing [1] (ft msl) | Screened Interval (ft msl) | Date | Depth to Water [2] (ft bgs) | Groundwater Elevation (ft msl) |
|---|---|---|---|---|---|
| 428B92MW | 464.42 | 449.42 to 439.42 | 5/1/2001 | Well Installed | |
| | | | 6/1/2001 | NM | NM |
| | | | 12/2/2002 | NM | NM |
| | | | 8/1/2003 | 5.21 | 459.21 |
| | | | 12/23/2003 | NM | NM |
| | | | NA | Well Destroyed during DRMO Excavation | |
| 428B93MW | 464.76 | 449.76 to 439.76 | 5/1/2001 | Well Installed | |
| | | | 6/1/2001 | NM | NM |
| | | | 12/2/2002 | NM | NM |
| | | | 8/1/2003 | NM | NM |
| | | | 12/23/2003 | NM | NM |
| | | | NA | Well Destroyed during DRMO Excavation | |
| 428B94MW | 464.43 | 449.43 to 439.43 | 5/1/2001 | Well Installed | |
| | | | 6/1/2001 | NM | NM |
| | | | 12/2/2002 | NM | NM |
| | | | 8/1/2003 | 5.38 | 459.05 |
| | | | 12/23/2003 | NM | NM |
| | | | NA | Well Destroyed during DRMO Excavation | |
| 428B95MW | 464.50 | 439.50 to 449.50 | 5/1/2001 | Well Installed | |
| | | | NA | Well Plugged and Abandoned | |
| 428B96TW | 460.79 | 451.56 to 432.33 | 7/1/2003 | Well Installed | |
| | | | 8/1/2003 | 4.39 | 456.40 |
| | | | 11/3/2003 | Well Plugged and Abandoned | |
| 428B98TW | 467.93 | 455.07 to 445.07 | 7/1/2003 | Well Installed | |
| | | | 8/1/2003 | 10.40 | 457.53 |
| | | | 11/3/2003 | Well Plugged and Abandoned | |
| 428B99TW | 466.05 | 453.95 to 443.95 | 7/1/2003 | Well Installed | |
| | | | 8/1/2003 | 8.63 | 457.42 |
| | | | 11/3/2003 | Well Plugged and Abandoned | |
| 428BX32MW | 465.54 | 460.24 to 450.24 | 3/18/1998 | Well Installed | |
| | | | 6/1/2001 | 5.46 | 460.08 |
| | | | 12/2/2002 | 5.00 | 460.54 |
| | | | NA | Well Plugged and Abandoned | |
| 428B129MW | 467.42 | 453.921 to 443.921 | 4/5/2005 | Well Installed | |
| | | | 4/17/2005 | 18.4 | 449.02 |
| | | | 7/21/2005 | 7.2 | 460.22 |
| | | | 10/4/2005 | 8.49 | 458.93 |
| | | | 1/17/2006 | 9.9 | 457.52 |
| | | | 5/3/2006 | 9.07 | 458.35 |
| | | | 8/8/2006 | 9.19 | 458.23 |
| | | | 4/25/2007 | 6.97 | 460.45 |
| | | | 8/23/2007 | 6.08 | 461.34 |
| | | | 1/16/2008 | 7.7 | 459.72 |
| | | | 7/22/2008 | 7.41 | 460.01 |
| | | | 12/17/2008 | 10.21 | 457.21 |
| | | | 7/13/2009 | 8.45 | 458.97 |
| | 467.43 | 453.927 to 443.927 | 12/15/2009 | 6.1 | 461.33 |
| | | | 8/9/2010 | 6.44 | 460.99 |
| | | | 12/16/2010 | 7.07 | 460.36 |
| | | | 7/25/2011 | 5.7 | 461.73 |
| | | | 12/14/2011 | 5.0 | 462.43 |
| | | | 7/10/2012 | 6.43 | 461.00 |
| | | | 12/19/2012 | 9.2 | 458.23 |
| | | | 7/15/2013 | 8.1 | 459.33 |
| | | | 12/18/2013 | 8.6 | 458.83 |
| | | | 7/15/2014 | 8.43 | 459.00 |
| | | | 12/17/2014 | 8.67 | 458.76 |
| | | | 7/20/2015 | 6.73 | 460.70 |
| | | | 12/15/2015 | 7.34 | 460.09 |
| | | | 4/7/2016 | Well Plugged and Abandoned | |

**TABLE 4-3B**

**Summary of Groundwater Gauging Data**
**Monitoring Wells — SWMU 86 Plume**
**2016 RAER**
**Former NAS Dallas, Texas**
**PAGE 3 OF 4**

| Monitoring Well | Top of Casing [1] (ft msl) | Screened Interval (ft msl) | Date | Depth to Water [2] (ft bgs) | Groundwater Elevation (ft msl) |
|---|---|---|---|---|---|
| **Monitoring Wells Located Outside PCLE Zone** | | | | | |
| **405BN1MW** | 466.23 | 461.03 to 451.03 | 3/22/1998 | Well Installed | |
| | | | 5/1/1998 | 5.75 | 460.48 |
| | | | 8/1/1998 | 6.38 | 459.85 |
| | | | 2/1/1999 | 5.78 | 460.45 |
| | | | 9/1/1999 | 6.06 | 460.17 |
| | | | 6/1/2000 | 6.06 | 460.17 |
| | | | 6/1/2001 | 6.00 | 460.23 |
| | | | 12/2/2002 | 5.15 | 461.08 |
| | | | 8/1/2003 | 5.93 | 460.30 |
| | | | 12/23/2003 | 5.95 | 460.28 |
| | | | 7/4/2004 | 9.15 | 457.08 |
| | | | 9/29/2004 | 6.49 | 459.74 |
| | | | 4/17/2005 | Well Plugged and Abandoned | |
| **424BX35MW** | 463.46 | 449.76 to 439.76 | 3/20/1998 | Well Installed | |
| | | | 5/1/1998 | 5.80 | 457.66 |
| | | | 8/1/1998 | 6.70 | 456.76 |
| | | | 2/1/1999 | 6.31 | 457.15 |
| | | | 9/1/1999 | 6.06 | 457.40 |
| | | | 6/1/2000 | 4.96 | 458.50 |
| | | | 6/1/2001 | 5.38 | 458.08 |
| | | | 12/2/2002 | 5.60 | 457.86 |
| | | | 8/1/2003 | 5.82 | 457.64 |
| | | | 12/23/2003 | 6.40 | 457.06 |
| | | | 7/4/2004 | 8.95 | 454.51 |
| | | | 9/29/2004 | 6.64 | 456.82 |
| | | | 4/18/2005 | Well Plugged and Abandoned | |
| **428B08MW** | 465.90 | 456.30 to 436.70 | 3/18/1998 | Well Installed | |
| | | | 5/1/1998 | 6.98 | 458.92 |
| | | | 8/1/1998 | 7.94 | 457.96 |
| | | | 2/1/1999 | 6.83 | 459.07 |
| | | | 9/1/1999 | 7.84 | 458.06 |
| | | | 6/1/2000 | 9.02 | 456.88 |
| | | | 6/1/2001 | 7.17 | 458.73 |
| | | | 12/2/2002 | 5.63 | 460.27 |
| | | | 6/3/2003 | Well Plugged and Abandoned | |
| **428B09MW** | 464.40 | 454.00 to 444.00 | 3/19/1998 | Well Installed | |
| | | | 5/1/1998 | 6.54 | 457.86 |
| | | | 8/1/1998 | 6.82 | 457.58 |
| | | | 2/1/1999 | 6.21 | 458.19 |
| | | | 9/1/1999 | 6.28 | 458.12 |
| | | | 6/1/2000 | 9.14 | 455.26 |
| | | | 6/1/2001 | 6.21 | 458.19 |
| | | | 12/2/2002 | 6.00 | 458.40 |
| | | | 6/3/2003 | Well Plugged and Abandoned | |
| **428B66MW** | 464.80 | 458.31 to 448.31 | 12/15/1999 | Well Installed | |
| | | | 6/1/2000 | 4.56 | 460.24 |
| | | | 6/1/2001 | 5.70 | 459.10 |
| | | | 12/2/2002 | 4.34 | 460.46 |
| | | | 8/1/2003 | NM | NM |
| | | | 12/23/2003 | NM | NM |
| | | | NA | Well Destroyed during DRMO Excavation | |
| **428B67MW** | 465.98 | 456.59 to 446.59 | 12/14/1999 | Well Installed | |
| | | | 6/1/2000 | 5.64 | 460.34 |
| | | | 6/1/2001 | 8.80 | 457.18 |
| | | | 12/2/2002 | 6.48 | 459.50 |
| | | | 8/1/2003 | 8.70 | 457.28 |
| | | | 12/23/2003 | 8.97 | 457.01 |
| | | | 7/4/2004 | 7.92 | 458.06 |
| | | | 9/29/2004 | 7.95 | 458.03 |
| | | | 4/17/2005 | Well Plugged and Abandoned | |

**TABLE 4-3B**

**Summary of Groundwater Gauging Data**
**Monitoring Wells — SWMU 86 Plume**
**2016 RAER**
**Former NAS Dallas, Texas**
**PAGE 4 OF 4**

| Monitoring Well | Top of Casing [1] (ft msl) | Screened Interval (ft msl) | Date | Depth to Water [2] (ft bgs) | Groundwater Elevation (ft msl) |
|---|---|---|---|---|---|
| **428B68MW** | 465.40 | 458.71 to 448.71 | 12/14/1999 | Well Installed | |
| | | | 6/1/2000 | 6.80 | 458.60 |
| | | | 6/1/2001 | 6.08 | 459.32 |
| | | | 12/2/2002 | 4.21 | 461.19 |
| | | | 8/1/2003 | 5.54 | 459.86 |
| | | | 12/23/2003 | 6.18 | 459.22 |
| | | | 7/4/2004 | 9.56 | 455.84 |
| | | | 9/29/2004 | 6.35 | 459.05 |
| | | | 4/17/2005 | Well Plugged and Abandoned | |
| **428B79MW** | 465.47 | 462.02 to 452.02 | 8/5/2000 | Well Installed | |
| | | | 6/1/2001 | 5.82 | 459.65 |
| | | | 12/2/2002 | 4.59 | 460.88 |
| | | | 8/1/2003 | 6.05 | 459.42 |
| | | | 12/23/2003 | 6.84 | 458.63 |
| | | | NA | Well Destroyed during DRMO Excavation | |
| **428B81MW** | 465.61 | 461.35 to 451.35 | 8/3/2000 | Well Installed | |
| | | | 6/1/2001 | NM | NM |
| | | | 12/2/2002 | NM | NM |
| | | | 6/3/2003 | Well Plugged and Abandoned | |
| **428B82MW** | 465.31 | 461.47 to 451.47 | 8/4/2000 | Well Installed | |
| | | | 6/1/2001 | NM | NM |
| | | | 12/2/2002 | NM | NM |
| | | | 6/3/2003 | Well Destroyed during DRMO Excavation | |
| **428B83MW** | 465.73 | 455.88 to 445.88 | 8/4/2000 | Well Installed | |
| | | | 6/1/2001 | 6.31 | 459.42 |
| | | | 12/2/2002 | 6.58 | 459.15 |
| | | | 8/1/2003 | NM | NM |
| | | | 12/23/2003 | 6.65 | 459.08 |
| | | | NA | Well Destroyed during DRMO Excavation | |
| **428B85MW** | 465.83 | 460.83 to 457.83 | 8/5/2000 | Well Installed | |
| | | | 6/1/2000 | NM | NM |
| | | | 6/1/2001 | 1.30 | 464.53 |
| | | | 12/2/2002 | 3.34 | 462.49 |
| | | | 8/1/2003 | 4.23 | 461.60 |
| | | | 12/23/2003 | 5.38 | 460.45 |
| | | | NA | Well Destroyed during DRMO Excavation | |
| **428B97TW** | 463.74 | 443.64 to 440.99 | 7/1/2003 | Well Installed | |
| | | | 8/1/2003 | 20.1 | 443.6 |
| | | | 11/3/2003 | Well Plugged and Abandoned | |
| **428B100TW** | 464.50 | 454.50 to 444.50 | 7/1/2003 | Well Installed | |
| | | | 8/8/2003 | Well Plugged and Abandoned | |
| **43101MW** | 464.79 | 460.36 to 460.36 | 2/1/1998 | 3.43 | 461.36 |
| | | | 5/1/1998 | 4.93 | 459.86 |
| | | | 8/1/1998 | 6.44 | 458.35 |
| | | | 2/1/1999 | 5.07 | 459.72 |
| | | | 9/1/1999 | 5.77 | 459.02 |
| | | | 6/1/2000 | 4.02 | 460.77 |
| | | | 6/1/2001 | 5.25 | 459.54 |
| | | | 12/2/2002 | Well Plugged and Abandoned | |

bgs - below ground surface
ft - feet
msl - mean sea level
NA - Not Available or Applicable (i.e., abandoned, not installed, not measured)
NM - Not Measured
PCLE - Protective Concentration Level Exceedance

Note:
Depth to water measurements taken from the top of the riser.

# TABLE 4-4
# SUMMARY OF CONCENTRATION VS. TIME ATTENUATION RATE CONSTANTS

**Table 4-4**

**Summary of Concentration vs. Time Attenuation Rate Constants**
**SWMU 86 Plume**
**2016 RAER**
**Former NAS Dallas, Texas**
**Page 1 of 9**

| Monitoring Well ID | Sampling Date | Elapsed Time (Years) | Protective Concentration Level (mg/L) | Concentration Detected (mg/L) | Natural Log of Concentration (mg/L) | Degradation Rate from Natural Log ($K_{time}$) (mg/L per year) | Minimum Degradation Rate Required for Remedial Goals Natural Log ($K_{time}$) (mg/L per year) | Minimum Degradation Rate Met? (Yes/No) | Expected Remedial Goal Concentration (mg/L) | Expected Remedial Goal Concentration Met? (Yes/No) | Remedial Goals Being Met? (Yes/No) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Trichloroethene** | | | | | | | | | | | |
| 428B07MW | Apr-98 | 0.0 | 0.00500 | 0.00600 | -5.12 | -- | -- | -- | -- | -- | -- |
| | Aug-98 | 0.3 | 0.00500 | 0.00730 | -4.92 | -- | -- | -- | -- | -- | -- |
| | Mar-99 | 0.9 | 0.00500 | 0.00510 | -5.28 | -- | -- | -- | -- | -- | -- |
| | Nov-99 | 1.6 | 0.00500 | 0.00630 | -5.07 | -- | -- | -- | -- | -- | -- |
| | Jul-00 | 2.2 | 0.00500 | 0.00640 | -5.05 | -0.019 | -0.021 | No | 0.00701 | Yes | Evaluate Further |
| | Jul-01 | 3.2 | 0.00500 | 0.00880 | -4.73 | 0.098 | -0.021 | No | 0.00687 | No | No |
| | Jan-03 | 4.7 | 0.00500 | 0.00600 | -5.12 | 0.018 | -0.021 | No | 0.00665 | Yes | Evaluate Further |
| | Aug-03 | 5.3 | 0.00500 | 0.00950 | -4.66 | 0.057 | -0.021 | No | 0.00657 | No | No |
| | Jan-04 | 5.7 | 0.00500 | 0.00350 | -5.65 | -0.020 | -0.021 | Less Than PCL | 0.00652 | Less Than PCL | Less Than PCL |
| | Aug-04 | 6.3 | 0.00500 | 0.00480 | -5.34 | -0.036 | -0.021 | Less Than PCL | 0.00644 | Less Than PCL | Less Than PCL |
| | Oct-04 | 6.5 | 0.00500 | 0.00420 J | -5.47 | -0.051 | -0.021 | Less Than PCL | 0.00642 | Less Than PCL | Less Than PCL |
| | Apr-05 | 6.9 | 0.00500 | 0.00600 | -5.12 | -0.042 | -0.021 | Yes | 0.00635 | Yes | Yes |
| | Oct-05 | 7.4 | 0.00500 | 0.00500 J | -5.30 | -0.043 | -0.021 | Less Than PCL | 0.00629 | Less Than PCL | Less Than PCL |
| | May-06 | 8.1 | 0.00500 | 0.00600 | -5.12 | -0.035 | -0.021 | Yes | 0.00621 | Yes | Yes |
| | Aug-06 | 8.3 | 0.00500 | 0.00800 | -4.83 | -0.019 | -0.021 | No | 0.00617 | No | No |
| | Apr-07 | 9.0 | 0.00500 | 0.00620 | -5.08 | -0.015 | -0.021 | No | 0.00609 | No | No |
| | Sep-07 | 9.4 | 0.00500 | 0.00380 | -5.57 | -0.027 | -0.021 | Less Than PCL | 0.00604 | Less Than PCL | Less Than PCL |
| | Jan-08 | 9.7 | 0.00500 | 0.00620 | -5.08 | -0.022 | -0.021 | Yes | 0.00600 | No | Evaluate Further |
| | Jul-08 | 10.2 | 0.00500 | 0.00530 | -5.24 | -0.022 | -0.021 | Yes | 0.00593 | Yes | Yes |
| | Jan-09 | 10.7 | 0.00500 | 0.00290 | -5.84 | -0.037 | -0.021 | Less Than PCL | 0.00587 | Less Than PCL | Less Than PCL |
| | Jul-09 | 11.2 | 0.00500 | 0.00200 | -6.21 | -0.056 | -0.021 | Less Than PCL | 0.00581 | Less Than PCL | Less Than PCL |
| | Jan-10 | 11.7 | 0.00500 | 0.00039 J | -7.85 | -0.105 | -0.021 | Less Than PCL | 0.00575 | Less Than PCL | Less Than PCL |
| | Jul-10 | 12.2 | 0.00500 | 0.00043 J | -7.75 | -0.140 | -0.021 | Less Than PCL | 0.00569 | Less Than PCL | Less Than PCL |
| | Jan-11 | 12.7 | 0.00500 | 0.00044 J | -7.73 | -0.167 | -0.021 | Less Than PCL | 0.00563 | Less Than PCL | Less Than PCL |
| | Jul-11 | 13.3 | 0.00500 | 0.00110 | -6.81 | -0.171 | -0.021 | Less Than PCL | 0.00557 | Less Than PCL | Less Than PCL |
| | Jan-12 | 13.7 | 0.00500 | 0.00036 J | -7.93 | -0.191 | -0.021 | Less Than PCL | 0.00551 | Less Than PCL | Less Than PCL |
| | Jul-12 | 14.2 | 0.00500 | 0.00037 J | -7.90 | -0.205 | -0.021 | Less Than PCL | 0.00545 | Less Than PCL | Less Than PCL |
| | Jan-13 | 14.7 | 0.00500 | 0.00042 J | -7.78 | -0.213 | -0.021 | Less Than PCL | 0.00540 | Less Than PCL | Less Than PCL |
| | Jul-13 | 15.2 | 0.00500 | 0.00036 J | -7.93 | -0.221 | -0.021 | Less Than PCL | 0.00534 | Less Than PCL | Less Than PCL |
| | Feb-14 | 15.8 | 0.00500 | 0.00043 J | -7.75 | -0.223 | -0.021 | Less Than PCL | 0.00527 | Less Than PCL | Less Than PCL |
| | Jul-14 | 16.2 | 0.00500 | 0.00045 J | -7.71 | -0.223 | -0.021 | Less Than PCL | 0.00523 | Less Than PCL | Less Than PCL |
| | Jan-15 | 16.7 | 0.00500 | 0.00052 | -7.55 | -0.220 | -0.021 | Less Than PCL | 0.00517 | Less Than PCL | Less Than PCL |
| | Jul-15 | 17.3 | 0.00500 | 0.00032 J | -8.05 | -0.222 | -0.021 | Less Than PCL | 0.00512 | Less Than PCL | Less Than PCL |
| | Jan-16 | 17.8 | 0.00500 | 0.00046 J | -7.68 | -0.219 | -0.021 | Less Than PCL | 0.00506 | Less Than PCL | Less Than PCL |
| | Jul-16 | 18.3 | 0.00500 | 0.00026 J | -8.25 | -0.220 | -0.021 | Less Than PCL | 0.00501 | Less Than PCL | Less Than PCL |
| 428B128MW | Apr-05 | 0.0 | 0.00500 | 0.02200 | -3.82 | -- | -- | -- | -- | -- | -- |
| | Aug-05 | 0.3 | 0.00500 | 0.00800 | -4.83 | -- | -- | -- | -- | -- | -- |
| | Oct-05 | 0.5 | 0.00500 | 0.00500 | -5.30 | -- | -- | -- | -- | -- | -- |
| | Jan-06 | 0.8 | 0.00500 | 0.00700 | -4.96 | -1.506 | -0.130 | Yes | 0.01982 | Yes | Yes |
| | Aug-06 | 1.4 | 0.00500 | 0.00200 | -6.21 | -1.547 | -0.130 | Less Than PCL | 0.01844 | Less Than PCL | Less Than PCL |
| | Apr-07 | 2.0 | 0.00500 | 0.00071 J | -7.25 | -1.583 | -0.130 | Less Than PCL | 0.01700 | Less Than PCL | Less Than PCL |
| | Sep-07 | 2.4 | 0.00500 | 0.00042 J | -7.78 | -1.552 | -0.130 | Less Than PCL | 0.01610 | Less Than PCL | Less Than PCL |
| | Jan-08 | 2.7 | 0.00500 | 0.00150 | -6.50 | -1.177 | -0.130 | Less Than PCL | 0.01541 | Less Than PCL | Less Than PCL |
| | Jul-08 | 3.2 | 0.00500 | 0.00110 | -6.81 | -0.958 | -0.130 | Less Than PCL | 0.01444 | Less Than PCL | Less Than PCL |
| | Jan-09 | 3.8 | 0.00500 | 0.00041 J | -7.80 | -0.916 | -0.130 | Less Than PCL | 0.01350 | Less Than PCL | Less Than PCL |
| | Jul-09 | 4.3 | 0.00500 | 0.00300 | -5.81 | -0.628 | -0.130 | Less Than PCL | 0.01265 | Less Than PCL | Less Than PCL |
| | Jan-10 | 4.8 | 0.00500 | 0.00370 | -5.60 | -0.423 | -0.130 | Less Than PCL | 0.01186 | Less Than PCL | Less Than PCL |
| | Jul-10 | 5.3 | 0.00500 | 0.00430 | -5.45 | -0.278 | -0.130 | Less Than PCL | 0.01111 | Less Than PCL | Less Than PCL |
| | Jan-11 | 5.8 | 0.00500 | 0.00490 | -5.32 | -0.172 | -0.130 | Less Than PCL | 0.01041 | Less Than PCL | Less Than PCL |
| | Jul-11 | 6.3 | 0.00500 | 0.00570 | -5.17 | -0.092 | -0.130 | No | 0.00971 | Yes | Evaluate Further |
| | Jan-12 | 6.7 | 0.00500 | 0.00480 | -5.34 | -0.047 | -0.130 | Less Than PCL | 0.00915 | Less Than PCL | Less Than PCL |
| | Jul-12 | 7.2 | 0.00500 | 0.00470 | -5.36 | -0.017 | -0.130 | Less Than PCL | 0.00857 | Less Than PCL | Less Than PCL |
| | Jan-13 | 7.8 | 0.00500 | 0.00440 | -5.43 | 0.002 | -0.130 | Less Than PCL | 0.00802 | Less Than PCL | Less Than PCL |
| | Jul-13 | 8.3 | 0.00500 | 0.00400 | -5.52 | 0.012 | -0.130 | Less Than PCL | 0.00752 | Less Than PCL | Less Than PCL |
| | Feb-14 | 8.9 | 0.00500 | 0.00420 | -5.47 | 0.020 | -0.130 | Less Than PCL | 0.00694 | Less Than PCL | Less Than PCL |
| | Jul-14 | 9.3 | 0.00500 | 0.00383 | -5.56 | 0.024 | -0.130 | Less Than PCL | 0.00660 | Less Than PCL | Less Than PCL |
| | Jan-15 | 9.8 | 0.00500 | 0.00351 | -5.65 | 0.024 | -0.130 | Less Than PCL | 0.00617 | Less Than PCL | Less Than PCL |
| | Jul-15 | 10.3 | 0.00500 | 0.00379 | -5.58 | 0.025 | -0.130 | Less Than PCL | 0.00578 | Less Than PCL | Less Than PCL |
| | Jan-16 | 10.8 | 0.00500 | 0.00254 | -5.98 | 0.017 | -0.130 | Less Than PCL | 0.00541 | Less Than PCL | Less Than PCL |
| | Jul-16 | 11.3 | 0.00500 | 0.00249 | -6.00 | 0.011 | -0.130 | Less Than PCL | 0.00507 | Less Than PCL | Less Than PCL |
| 428B129MW | Apr-05 | 0.0 | 0.00500 | 0.01900 | -3.96 | -- | -- | -- | -- | -- | -- |
| | Jul-05 | 0.2 | 0.00500 | 0.00030 U | -8.00 | -- | -- | -- | -- | -- | -- |
| | Oct-05 | 0.5 | 0.00500 | 0.00050 J | -7.60 | -- | -- | -- | -- | -- | -- |
| | Jan-06 | 0.8 | 0.00500 | 0.00030 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Aug-06 | 1.4 | 0.00500 | 0.00040 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Apr-07 | 2.0 | 0.00500 | 0.00023 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Sep-07 | 2.4 | 0.00500 | 0.00023 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-08 | 2.7 | 0.00500 | 0.00053 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-08 | 3.2 | 0.00500 | 0.00032 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-09 | 3.8 | 0.00500 | 0.00032 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-09 | 4.3 | 0.00500 | 0.00032 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-10 | 4.8 | 0.00500 | 0.00024 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-10 | 5.3 | 0.00500 | 0.00024 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-11 | 5.8 | 0.00500 | 0.00026 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-11 | 6.3 | 0.00500 | 0.00026 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-12 | 6.8 | 0.00500 | 0.00026 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-12 | 7.3 | 0.00500 | 0.00026 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-13 | 7.8 | 0.00500 | 0.00031 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-13 | 8.3 | 0.00500 | 0.00031 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Feb-14 | 8.9 | 0.00500 | 0.0003 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-14 | 9.3 | 0.00500 | 0.00025 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-15 | 9.8 | 0.00500 | 0.00025 U | -8.00 | -- | -0.117 | Less Than PCL | 0.00604 | Less Than PCL | Less Than PCL |
| | Jul-15 | 10.3 | 0.00500 | 0.00025 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-16 | Well Abandoned | | | | | | | | | |

**Table 4-4**

**Summary of Concentration vs. Time Attenuation Rate Constants**
**SWMU 86 Plume**
**2016 RAER**
**Former NAS Dallas, Texas**
**Page 2 of 9**

| Monitoring Well ID | Sampling Date | Elapsed Time (Years) | Protective Concentration Level (mg/L) | Concentration Detected (mg/L) | Natural Log of Concentration (mg/L) | Degradation Rate from Natural Log ($K_{time}$) (mg/L per year) | Minimum Degradation Rate Required for Remedial Goals Natural Log ($K_{time}$) (mg/L per year) | Minimum Degradation Rate Met? (Yes/No) | Expected Remedial Goal Concentration (mg/L) | Expected Remedial Goal Concentration Met? (Yes/No) | Remedial Goals Being Met? (Yes/No) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 428B130MW | Apr-05 | 0.0 | 0.00500 | 0.01600 | -4.14 | -- | -- | -- | -- | -- | -- |
| | Jul-05 | 0.2 | 0.00500 | 0.04700 | -3.06 | -- | -- | -- | -- | -- | -- |
| | Oct-05 | 0.5 | 0.00500 | 0.03400 | -3.38 | -- | -- | -- | -- | -- | -- |
| | Jan-06 | 0.8 | 0.00500 | 0.03000 | -3.51 | -- | -- | -- | -- | -- | -- |
| | Aug-06 | 1.4 | 0.00500 | 0.02500 | -3.69 | -0.517 | -0.201 | Yes | 0.03745 | Yes | Yes |
| | Apr-07 | 2.0 | 0.00500 | 0.01900 | -3.96 | -0.467 | -0.201 | Yes | 0.03304 | Yes | Yes |
| | Sep-07 | 2.4 | 0.00500 | 0.01800 | -4.02 | -0.412 | -0.201 | Yes | 0.03038 | Yes | Yes |
| | Jan-08 | 2.7 | 0.00500 | 0.01500 | -4.20 | -0.405 | -0.201 | Yes | 0.02839 | Yes | Yes |
| | Jul-08 | 3.2 | 0.00500 | 0.01510 | -4.19 | -0.363 | -0.201 | Yes | 0.02569 | Yes | Yes |
| | Jan-09 | 3.8 | 0.00500 | 0.01090 | -4.52 | -0.364 | -0.201 | Yes | 0.02315 | Yes | Yes |
| | Jul-09 | 4.3 | 0.00500 | 0.00850 | -4.77 | -0.372 | -0.201 | Yes | 0.02096 | Yes | Yes |
| | Jan-10 | 4.8 | 0.00500 | 0.00520 | -5.26 | -0.408 | -0.201 | Yes | 0.01895 | Yes | Yes |
| | Jul-10 | 5.3 | 0.00500 | 0.00880 | -4.73 | -0.366 | -0.201 | Yes | 0.01714 | Yes | Yes |
| | Jan-11 | 5.8 | 0.00500 | 0.00710 | -4.95 | -0.344 | -0.201 | Yes | 0.01550 | Yes | Yes |
| | Jul-11 | 6.3 | 0.00500 | 0.00700 | -4.96 | -0.319 | -0.201 | Yes | 0.01393 | Yes | Yes |
| | Jan-12 | 6.8 | 0.00500 | 0.00450 | -5.40 | -0.320 | -0.201 | Less Than PCL | 0.01270 | Less Than PCL | Less Than PCL |
| | Jul-12 | 7.3 | 0.00500 | 0.00340 | -5.68 | -0.326 | -0.201 | Less Than PCL | 0.01149 | Less Than PCL | Less Than PCL |
| | Jan-13 | 7.8 | 0.00500 | 0.00320 | -5.74 | -0.325 | -0.201 | Less Than PCL | 0.01037 | Less Than PCL | Less Than PCL |
| | Jul-13 | 8.3 | 0.00500 | 0.00220 | -6.12 | -0.333 | -0.201 | Less Than PCL | 0.00939 | Less Than PCL | Less Than PCL |
| | Feb-14 | 8.9 | 0.00500 | 0.00190 | -6.27 | -0.337 | -0.201 | Less Than PCL | 0.00829 | Less Than PCL | Less Than PCL |
| | Jul-14 | 9.3 | 0.00500 | 0.00168 | -6.39 | -0.339 | -0.201 | Less Than PCL | 0.00766 | Less Than PCL | Less Than PCL |
| | Jan-15 | 9.8 | 0.00500 | 0.000972 | -6.94 | -0.350 | -0.201 | Less Than PCL | 0.00692 | Less Than PCL | Less Than PCL |
| | Jul-15 | 10.3 | 0.00500 | 0.00116 | -6.76 | -0.351 | -0.201 | Less Than PCL | 0.00625 | Less Than PCL | Less Than PCL |
| | Jan-16 | 10.8 | 0.00500 | 0.0012 | -6.73 | -0.346 | -0.201 | Less Than PCL | 0.00565 | Less Than PCL | Less Than PCL |
| | Jul-16 | 11.3 | 0.00500 | 0.00166 | -6.40 | -0.332 | -0.201 | Less Than PCL | 0.00511 | Less Than PCL | Less Than PCL |
| 428B131MW | Apr-05 | 0.0 | 0.00500 | 0.01600 | -4.14 | -- | -- | -- | -- | -- | -- |
| | Jul-05 | 0.2 | 0.00500 | 0.00600 | -5.12 | -- | -- | -- | -- | -- | -- |
| | Oct-05 | 0.5 | 0.00500 | 0.01300 | -4.34 | -- | -- | -- | -- | -- | -- |
| | Jan-06 | 0.8 | 0.00500 | 0.01000 | -4.61 | -0.200 | -0.102 | Yes | 0.01473 | Yes | Yes |
| | Aug-06 | 1.4 | 0.00500 | 0.01000 | -4.61 | -0.103 | -0.102 | Yes | 0.01392 | Yes | Yes |
| | Apr-07 | 2.0 | 0.00500 | 0.00880 | -4.73 | -0.114 | -0.102 | Yes | 0.01306 | Yes | Yes |
| | Sep-07 | 2.4 | 0.00500 | 0.00710 | -4.95 | -0.163 | -0.102 | Yes | 0.01251 | Yes | Yes |
| | Jan-08 | 2.7 | 0.00500 | 0.00820 | -4.80 | -0.140 | -0.102 | Yes | 0.01209 | Yes | Yes |
| | Jul-08 | 3.2 | 0.00500 | 0.00580 | -5.15 | -0.174 | -0.102 | Yes | 0.01149 | Yes | Yes |
| | Jan-09 | 3.8 | 0.00500 | 0.00650 | -5.04 | -0.164 | -0.102 | Yes | 0.01090 | Yes | Yes |
| | Jul-09 | 4.3 | 0.00500 | 0.00570 | -5.17 | -0.164 | -0.102 | Yes | 0.01036 | Yes | Yes |
| | Jan-10 | 4.8 | 0.00500 | 0.00520 | -5.26 | -0.165 | -0.102 | Yes | 0.00985 | Yes | Yes |
| | Jul-10 | 5.3 | 0.00500 | 0.00510 | -5.28 | -0.161 | -0.102 | Yes | 0.00935 | Yes | Yes |
| | Jan-11 | 5.8 | 0.00500 | 0.00560 | -5.18 | -0.147 | -0.102 | Yes | 0.00889 | Yes | Yes |
| | Jul-11 | 6.3 | 0.00500 | 0.00480 | -5.34 | -0.142 | -0.102 | Less Than PCL | 0.00842 | Less Than PCL | Less Than PCL |
| | Jan-12 | 6.8 | 0.00500 | 0.00470 | -5.36 | -0.137 | -0.102 | Less Than PCL | 0.00803 | Less Than PCL | Less Than PCL |
| | Jul-12 | 7.3 | 0.00500 | 0.00470 | -5.36 | -0.131 | -0.102 | Less Than PCL | 0.00763 | Less Than PCL | Less Than PCL |
| | Jan-13 | 7.8 | 0.00500 | 0.00400 | -5.52 | -0.130 | -0.102 | Less Than PCL | 0.00725 | Less Than PCL | Less Than PCL |
| | Jul-13 | 8.3 | 0.00500 | 0.00320 | -5.74 | -0.135 | -0.102 | Less Than PCL | 0.00689 | Less Than PCL | Less Than PCL |
| | Feb-14 | 8.9 | 0.00500 | 0.00320 | -5.74 | -0.136 | -0.102 | Less Than PCL | 0.00646 | Less Than PCL | Less Than PCL |
| | Jul-14 | 9.3 | 0.00500 | 0.00309 | -5.78 | -0.136 | -0.102 | Less Than PCL | 0.00621 | Less Than PCL | Less Than PCL |
| | Jan-15 | 9.8 | 0.00500 | 0.00266 | -5.93 | -0.139 | -0.102 | Less Than PCL | 0.00590 | Less Than PCL | Less Than PCL |
| | Jul-15 | 10.3 | 0.00500 | 0.00286 | -5.86 | -0.137 | -0.102 | Less Than PCL | 0.00560 | Less Than PCL | Less Than PCL |
| | Jan-16 | 10.8 | 0.00500 | 0.00245 | -6.01 | -0.137 | -0.102 | Less Than PCL | 0.00532 | Less Than PCL | Less Than PCL |
| | Jul-16 | 11.3 | 0.00500 | 0.00257 | -5.96 | -0.136 | -0.102 | Less Than PCL | 0.00505 | Less Than PCL | Less Than PCL |
| 428B132MW | Apr-05 | 0.0 | 0.00500 | 0.03100 | -3.47 | -- | -- | -- | -- | -- | -- |
| | Jul-05 | 0.2 | 0.00500 | 0.01700 | -4.07 | -- | -- | -- | -- | -- | -- |
| | Oct-05 | 0.5 | 0.00500 | 0.08900 | -2.42 | -- | -- | -- | -- | -- | -- |
| | Jan-06 | 0.8 | 0.00500 | 0.00400 | -5.52 | -- | -- | -- | -- | -- | -- |
| | Aug-06 | 1.4 | 0.00500 | 0.00200 | -6.21 | -- | -- | -- | -- | -- | -- |
| | Apr-07 | 2.0 | 0.00500 | 0.00150 | -6.50 | -- | -- | -- | -- | -- | -- |
| | Sep-07 | 2.4 | 0.00500 | 0.00120 J | -6.73 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-08 | 2.7 | 0.00500 | 0.00061 J | -7.40 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-08 | 3.2 | 0.00500 | 0.00032 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-09 | 3.8 | 0.00500 | 0.00044 J | -7.73 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-09 | 4.3 | 0.00500 | 0.00032 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-10 | 4.8 | 0.00500 | 0.00046 J | -7.68 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-10 | 5.3 | 0.00500 | 0.00046 J | -7.68 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-11 | 5.8 | 0.00500 | 0.00046 J | -7.68 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-11 | 6.3 | 0.00500 | 0.00026 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-12 | 6.8 | 0.00500 | 0.00026 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-12 | 7.3 | 0.00500 | 0.0013 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-13 | 7.8 | 0.00500 | 0.00031 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-13 | 8.3 | 0.00500 | 0.00079 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Feb-14 | 8.9 | 0.00500 | 0.0003 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-14 | 9.3 | 0.00500 | 0.0005 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-15 | 9.8 | 0.00500 | 0.00025 U | -8.00 | -- | -0.264 | Less Than PCL | 0.00766 | Less Than PCL | Less Than PCL |
| | Jul-15 | 10.3 | 0.00500 | 0.00025 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-16 | 10.8 | 0.00500 | 0.0005 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-16 | 11.3 | 0.00500 | 0.0005 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |

**Table 4-4**

**Summary of Concentration vs. Time Attenuation Rate Constants**
**SWMU 86 Plume**
**2016 RAER**
**Former NAS Dallas, Texas**
**Page 3 of 9**

| Monitoring Well ID | Sampling Date | Elapsed Time (Years) | Protective Concentration Level (mg/L) | Concentration Detected (mg/L) | Natural Log of Concentration (mg/L) | Degradation Rate from Natural Log ($K_{time}$) (mg/L per year) | Minimum Degradation Rate Required for Remedial Goals Natural Log ($K_{time}$) (mg/L per year) | Minimum Degradation Rate Met? (Yes/No) | Expected Remedial Goal Concentration (mg/L) | Expected Remedial Goal Concentration Met? (Yes/No) | Remedial Goals Being Met? (Yes/No) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 428B133MW | Apr-05 | 0.0 | 0.00500 | 0.12000 | -2.12 | -- | -- | -- | -- | -- | -- |
| | Jul-05 | 0.2 | 0.00500 | 0.18000 | -1.71 | -- | -- | -- | -- | -- | -- |
| | Oct-05 | 0.5 | 0.00500 | 0.73000 | -0.31 | -- | -- | -- | -- | -- | -- |
| | Jan-06 | 0.8 | 0.00500 | 1.10000 | 0.10 | -- | -- | -- | -- | -- | -- |
| | Aug-06 | 1.4 | 0.00500 | 1.60000 | 0.47 | -- | -- | -- | -- | -- | -- |
| | Apr-07 | 2.0 | 0.00500 | 0.05800 | -2.85 | -- | -- | -- | -- | -- | -- |
| | Sep-07 | 2.4 | 0.00500 | 0.03700 | -3.30 | -- | -- | -- | -- | -- | -- |
| | Jan-08 | 2.7 | 0.00500 | 0.00640 | -5.05 | -3.784 | -0.575 | Yes | 0.72349 | Yes | Yes |
| | Jul-08 | 3.2 | 0.00500 | 0.00640 U | -8.00 | -4.258 | -0.575 | Less Than PCL | 0.54320 | Less Than PCL | Less Than PCL |
| | Jan-09 | 3.8 | 0.00500 | 0.00380 | -5.57 | -2.936 | -0.575 | Less Than PCL | 0.40337 | Less Than PCL | Less Than PCL |
| | Jul-09 | 4.3 | 0.00500 | 0.01050 J | -4.56 | -1.900 | -0.575 | Yes | 0.30238 | Yes | Yes |
| | Jan-10 | 4.8 | 0.00500 | 0.00480 U | -8.00 | -1.936 | -0.575 | Less Than PCL | 0.22738 | Less Than PCL | Less Than PCL |
| | Jul-10 | 5.3 | 0.00500 | 0.00480 U | -8.00 | -1.815 | -0.575 | Less Than PCL | 0.17045 | Less Than PCL | Less Than PCL |
| | Jan-11 | 5.8 | 0.00500 | 0.02510 | -3.68 | -1.151 | -0.575 | Yes | 0.12778 | Yes | Yes |
| | Jul-11 | 6.3 | 0.00500 | 0.00130 U | -8.00 | -1.150 | -0.575 | Less Than PCL | 0.09414 | Less Than PCL | Less Than PCL |
| | Jan-12 | 6.8 | 0.00500 | 0.02160 | -3.84 | -0.775 | -0.575 | Yes | 0.07226 | Yes | Yes |
| | Jul-12 | 7.3 | 0.00500 | 0.03440 | -3.37 | -0.493 | -0.575 | No | 0.05425 | Yes | Evaluate Further |
| | Jan-13 | 7.8 | 0.00500 | 0.39900 | -0.92 | -0.156 | -0.575 | No | 0.04041 | No | No |
| | Jul-13 | 8.3 | 0.00500 | 0.51200 | -0.67 | 0.077 | -0.575 | No | 0.03039 | No | No |
| | Feb-14 | 8.9 | 0.00500 | 0.33400 | -1.10 | 0.213 | -0.575 | No | 0.02126 | No | No |
| | Jul-14 | 9.3 | 0.00500 | 0.265 J | -1.33 | 0.289 | -0.575 | No | 0.01702 | No | No |
| | Jan-15 | 9.8 | 0.00500 | 0.327 | -0.95 | 0.351 | -0.575 | No | 0.01266 | No | No |
| | Jul-15 | 10.3 | 0.00500 | 0.226 | -1.49 | 0.373 | -0.575 | No | 0.00946 | No | No |
| | Jan-16 | 10.8 | 0.00500 | 0.191 | -1.66 | 0.378 | -0.575 | No | 0.00708 | No | No |
| | Jul-16 | 11.3 | 0.00500 | 0.00253 | -5.98 | 0.263 | -0.575 | Less Than PCL | 0.00532 | Less Than PCL | Less Than PCL |
| 428B134MW | Apr-05 | 0.0 | 0.00500 | 0.28000 | -1.27 | -- | -- | -- | -- | -- | -- |
| | Jul-05 | 0.2 | 0.00500 | 0.11000 | -2.21 | -- | -- | -- | -- | -- | -- |
| | Oct-05 | 0.5 | 0.00500 | 0.08200 | -2.50 | -- | -- | -- | -- | -- | -- |
| | Jan-06 | 0.8 | 0.00500 | 0.02500 | -3.69 | -2.803 | -0.353 | Yes | 0.21048 | Yes | Yes |
| | Aug-06 | 1.4 | 0.00500 | 0.00100 | -6.91 | -4.013 | -0.353 | Less Than PCL | 0.17295 | Less Than PCL | Less Than PCL |
| | Apr-07 | 2.0 | 0.00500 | 0.00620 | -5.08 | -2.376 | -0.353 | Yes | 0.13872 | Yes | Yes |
| | Sep-07 | 2.4 | 0.00500 | 0.00120 | -6.73 | -2.192 | -0.353 | Less Than PCL | 0.11963 | Less Than PCL | Less Than PCL |
| | Jan-08 | 2.7 | 0.00500 | 0.00700 | -4.96 | -1.631 | -0.353 | Yes | 0.10621 | Yes | Yes |
| | Jul-08 | 3.2 | 0.00500 | 0.00094 J | -6.97 | -1.560 | -0.353 | Less Than PCL | 0.08907 | Less Than PCL | Less Than PCL |
| | Jan-09 | 3.8 | 0.00500 | 0.00072 J | -7.24 | -1.454 | -0.353 | Less Than PCL | 0.07418 | Less Than PCL | Less Than PCL |
| | Jul-09 | 4.3 | 0.00500 | 0.00430 | -5.45 | -1.129 | -0.353 | Less Than PCL | 0.06215 | Less Than PCL | Less Than PCL |
| | Jan-10 | 4.8 | 0.00500 | 0.00290 | -5.84 | -0.936 | -0.353 | Less Than PCL | 0.05217 | Less Than PCL | Less Than PCL |
| | Jul-10 | 5.3 | 0.00500 | 0.03540 | -3.34 | -0.600 | -0.353 | Yes | 0.04370 | Yes | Yes |
| | Jan-11 | 5.8 | 0.00500 | 0.00870 | -4.74 | -0.467 | -0.353 | Yes | 0.03661 | Yes | Yes |
| | Jul-11 | 6.3 | 0.00500 | 0.00870 | -4.74 | -0.370 | -0.353 | Yes | 0.03035 | Yes | Yes |
| | Jan-12 | 6.8 | 0.00500 | 0.00610 | -5.10 | -0.316 | -0.353 | No | 0.02579 | Yes | Evaluate Further |
| | Jul-12 | 7.3 | 0.00500 | 0.00930 | -4.68 | -0.255 | -0.353 | No | 0.02163 | Yes | Evaluate Further |
| | Jan-13 | 7.8 | 0.00500 | 0.00790 | -4.84 | -0.214 | -0.353 | No | 0.01805 | Yes | Evaluate Further |
| | Jul-13 | 8.3 | 0.00500 | 0.00310 | -5.78 | -0.214 | -0.353 | Less Than PCL | 0.01515 | Less Than PCL | Less Than PCL |
| | Feb-14 | 8.9 | 0.00500 | 0.00830 | -4.79 | -0.179 | -0.353 | No | 0.01216 | Yes | Evaluate Further |
| | Jul-14 | 9.3 | 0.00500 | 0.00591 | -5.13 | -0.161 | -0.353 | No | 0.01061 | Yes | Evaluate Further |
| | Jan-15 | 9.8 | 0.00500 | 0.01130 | -4.48 | -0.130 | -0.353 | No | 0.00885 | No | No |
| | Jul-15 | 10.3 | 0.00500 | 0.02240 | -3.80 | -0.089 | -0.353 | No | 0.00740 | No | No |
| | Jan-16 | 10.8 | 0.00500 | 0.00964 JL | -4.64 | -0.075 | -0.353 | No | 0.00619 | No | No |
| | Jul-16 | 11.3 | 0.00500 | 0.017 | -4.07 | -0.052 | -0.353 | No | 0.00519 | No | No |

**Table 4-4**

**Summary of Concentration vs. Time Attenuation Rate Constants**
**SWMU 86 Plume**
**2016 RAER**
**Former NAS Dallas, Texas**
**Page 4 of 9**

| Monitoring Well ID | Sampling Date | Elapsed Time (Years) | Protective Concentration Level (mg/L) | Concentration Detected (mg/L) | Natural Log of Concentration (mg/L) | Degradation Rate from Natural Log ($K_{time}$) (mg/L per year) | Minimum Degradation Rate Required for Remedial Goals Natural Log ($K_{time}$) (mg/L per year) | Minimum Degradation Rate Met? (Yes/No) | Expected Remedial Goal Concentration (mg/L) | Expected Remedial Goal Concentration Met? (Yes/No) | Remedial Goals Being Met? (Yes/No) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **cis-1,2-Dichloroethene** | | | | | | | | | | | |
| 428B07MW | Apr-98 | 0.0 | 0.07000 | 0.00100 J | -6.91 | -- | -- | -- | -- | -- | -- |
| | Aug-98 | 0.3 | 0.07000 | 0.00500 U | -8.00 | -- | -- | -- | -- | -- | -- |
| | Mar-99 | 0.9 | 0.07000 | 0.00120 J | -6.73 | -- | -- | -- | -- | -- | -- |
| | Nov-99 | 1.6 | 0.07000 | 0.00110 J | -6.81 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-00 | 2.2 | 0.07000 | 0.00110 J | -6.81 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-01 | 3.2 | 0.07000 | 0.00170 J | -6.38 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-03 | 4.7 | 0.07000 | 0.00097 J | -6.94 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Aug-03 | 5.3 | 0.07000 | 0.00200 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-04 | 5.7 | 0.07000 | 0.00083 J | -7.09 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Aug-04 | 6.3 | 0.07000 | 0.00092 J | -6.99 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Oct-04 | 6.5 | 0.07000 | 0.00086 J | -7.06 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Apr-05 | 6.9 | 0.07000 | 0.00200 | -6.21 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Oct-05 | 7.4 | 0.07000 | 0.00100 J | -6.91 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | May-06 | 8.1 | 0.07000 | 0.00200 | -6.21 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Aug-06 | 8.3 | 0.07000 | 0.00200 | -6.21 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Apr-07 | 9.0 | 0.07000 | 0.00190 | -6.27 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Sep-07 | 9.4 | 0.07000 | 0.00110 | -6.81 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-08 | 9.7 | 0.07000 | 0.00150 | -6.50 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-08 | 10.2 | 0.07000 | 0.00110 | -6.81 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-09 | 10.7 | 0.07000 | 0.00061 J | -7.40 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-09 | 11.2 | 0.07000 | 0.00042 J | -7.78 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-10 | 11.7 | 0.07000 | 0.00032 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-10 | 12.2 | 0.07000 | 0.00032 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-11 | 12.7 | 0.07000 | 0.00026 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-11 | 13.3 | 0.07000 | 0.00026 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-12 | 13.7 | 0.07000 | 0.00026 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-12 | 14.2 | 0.07000 | 0.00026 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-13 | 14.7 | 0.07000 | 0.00024 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-13 | 15.2 | 0.07000 | 0.00024 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Feb-14 | 15.8 | 0.07000 | 0.00033 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-14 | 16.2 | 0.07000 | 0.00029 J | -8.15 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-15 | 16.7 | 0.07000 | 0.00025 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-15 | 17.3 | 0.07000 | 0.00025 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-16 | 17.8 | 0.07000 | 0.00025 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-16 | 18.3 | 0.07000 | 0.00025 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| 428B128MW | Apr-05 | 0.0 | 0.07000 | 0.00080 J | -7.13 | -- | -- | -- | -- | -- | -- |
| | Jul-05 | 0.2 | 0.07000 | 0.00070 J | -7.26 | -- | -- | -- | -- | -- | -- |
| | Oct-05 | 0.5 | 0.07000 | 0.00070 J | -7.26 | -- | -- | -- | -- | -- | -- |
| | Jan-06 | 0.8 | 0.07000 | 0.00080 J | -7.13 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Aug-06 | 1.4 | 0.07000 | 0.00300 | -5.81 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Apr-07 | 2.0 | 0.07000 | 0.00460 | -5.38 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Sep-07 | 2.4 | 0.07000 | 0.00390 J | -5.55 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-08 | 2.7 | 0.07000 | 0.00590 | -5.13 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-08 | 3.2 | 0.07000 | 0.00710 | -4.95 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-09 | 3.8 | 0.07000 | 0.00730 | -4.92 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-09 | 4.3 | 0.07000 | 0.00400 | -5.52 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-10 | 4.8 | 0.07000 | 0.00420 | -5.47 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-10 | 5.3 | 0.07000 | 0.00500 | -5.30 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-11 | 5.8 | 0.07000 | 0.00540 | -5.22 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-11 | 6.3 | 0.07000 | 0.00720 | -4.93 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-12 | 6.8 | 0.07000 | 0.00450 | -5.40 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-12 | 7.3 | 0.07000 | 0.00470 | -5.36 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-13 | 14.7 | 0.07000 | 0.0046 | -5.38 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-13 | 15.2 | 0.07000 | 0.0031 | -5.78 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Feb-14 | 15.8 | 0.07000 | 0.0032 | -5.74 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-14 | 16.2 | 0.07000 | 0.00305 | -5.79 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-15 | 16.7 | 0.07000 | 0.00246 | -6.01 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-15 | 17.3 | 0.07000 | 0.00274 | -5.90 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-16 | 17.8 | 0.07000 | 0.00196 | -6.23 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-16 | 18.3 | 0.07000 | 0.00172 | -6.37 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| 428B129MW | Apr-05 | 0.0 | 0.07000 | 0.00040 J | -7.82 | -- | -- | -- | -- | -- | -- |
| | Jul-05 | 0.2 | 0.07000 | 0.00030 J | -8.11 | -- | -- | -- | -- | -- | -- |
| | Oct-05 | 0.5 | 0.07000 | 0.00060 J | -7.42 | -- | -- | -- | -- | -- | -- |
| | Jan-06 | 0.8 | 0.07000 | 0.00040 J | -7.82 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Aug-06 | 1.4 | 0.07000 | 0.00050 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Apr-07 | 2.0 | 0.07000 | 0.00036 J | -7.93 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Sep-07 | 2.4 | 0.07000 | 0.00033 J | -8.02 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-08 | 2.7 | 0.07000 | 0.00049 J | -7.62 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-08 | 3.2 | 0.07000 | 0.00020 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-09 | 3.8 | 0.07000 | 0.00020 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-09 | 4.3 | 0.07000 | 0.00023 J | -8.38 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-10 | 4.8 | 0.07000 | 0.00032 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-10 | 5.3 | 0.07000 | 0.00032 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-11 | 5.8 | 0.07000 | 0.00026 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-11 | 6.3 | 0.07000 | 0.00026 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-12 | 6.8 | 0.07000 | 0.00026 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-12 | 7.3 | 0.07000 | 0.00026 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-13 | 14.7 | 0.07000 | 0.00033 J | -8.02 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-13 | 15.2 | 0.07000 | 0.00024 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Feb-14 | 15.8 | 0.07000 | 0.00033 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-14 | 16.2 | 0.07000 | 0.00025 J | -8.29 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-15 | 16.7 | 0.07000 | 0.00025 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-15 | 17.3 | 0.07000 | 0.00025 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-16 | Well Abandoned | | | | | | | | | |

**Table 4-4**

**Summary of Concentration vs. Time Attenuation Rate Constants**
**SWMU 86 Plume**
**2016 RAER**
**Former NAS Dallas, Texas**
**Page 5 of 9**

| Monitoring Well ID | Sampling Date | Elapsed Time (Years) | Protective Concentration Level (mg/L) | Concentration Detected (mg/L) | Natural Log of Concentration (mg/L) | Degradation Rate from Natural Log ($K_{time}$) (mg/L per year) | Minimum Degradation Rate Required for Remedial Goals Natural Log ($K_{time}$) (mg/L per year) | Minimum Degradation Rate Met? (Yes/No) | Expected Remedial Goal Concentration (mg/L) | Expected Remedial Goal Concentration Met? (Yes/No) | Remedial Goals Being Met? (Yes/No) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 428B130MW | Apr-05 | 0.0 | 0.07000 | 0.01100 | -4.51 | -- | -- | -- | -- | -- | -- |
| | Jul-05 | 0.2 | 0.07000 | 0.07400 | -2.60 | -- | -- | -- | -- | -- | -- |
| | Oct-05 | 0.5 | 0.07000 | 0.05800 | -2.85 | -- | -- | -- | -- | -- | -- |
| | Jan-06 | 0.8 | 0.07000 | 0.06000 | -2.81 | -- | -- | -- | -- | -- | -- |
| | Aug-06 | 1.4 | 0.07000 | 0.05200 | -2.96 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Apr-07 | 2.0 | 0.07000 | 0.06600 | -2.72 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Sep-07 | 2.4 | 0.07000 | 0.06700 | -2.70 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-08 | 2.7 | 0.07000 | 0.05100 | -2.98 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-08 | 3.2 | 0.07000 | 0.0505 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-09 | 3.8 | 0.07000 | 0.03750 | -3.28 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-09 | 4.3 | 0.07000 | 0.02720 | -3.60 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-10 | 4.8 | 0.07000 | 0.02220 | -3.81 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-10 | 5.3 | 0.07000 | 0.02680 | -3.62 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-11 | 5.8 | 0.07000 | 0.02220 | -3.81 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-11 | 6.3 | 0.07000 | 0.02270 | -3.79 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-12 | 6.8 | 0.07000 | 0.01010 | -4.60 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-12 | 7.3 | 0.07000 | 0.00800 | -4.83 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-13 | 14.7 | 0.07000 | 0.0103 | -4.58 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-13 | 15.2 | 0.07000 | 0.0062 | -5.08 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Feb-14 | 15.8 | 0.07000 | 0.0056 | -5.18 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-14 | 16.2 | 0.07000 | 0.00533 | -5.23 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-15 | 16.7 | 0.07000 | 0.00256 | -5.97 | -- | -0.005 | Less Than PCL | 0.07057 | Less Than PCL | Less Than PCL |
| | Jul-15 | 17.3 | 0.07000 | 0.00243 | -6.02 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-16 | 17.8 | 0.07000 | 0.00298 | -5.82 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-16 | 18.3 | 0.07000 | 0.00549 | -5.20 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| 428B131MW | Apr-05 | 0.0 | 0.07000 | 0.00800 | -4.83 | -- | -- | -- | -- | -- | -- |
| | Jul-05 | 0.2 | 0.07000 | 0.01600 | -4.14 | -- | -- | -- | -- | -- | -- |
| | Oct-05 | 0.5 | 0.07000 | 0.02700 | -3.61 | -- | -- | -- | -- | -- | -- |
| | Jan-06 | 0.8 | 0.07000 | 0.01800 | -4.02 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Aug-06 | 1.4 | 0.07000 | 0.02600 | -3.65 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Apr-07 | 2.0 | 0.07000 | 0.02500 | -3.69 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Sep-07 | 2.4 | 0.07000 | 0.02900 | -3.54 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-08 | 2.7 | 0.07000 | 0.03000 | -3.51 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-08 | 3.2 | 0.07000 | 0.02940 | -3.53 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-09 | 3.8 | 0.07000 | 0.03290 | -3.41 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-09 | 4.3 | 0.07000 | 0.02990 | -3.51 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-10 | 4.8 | 0.07000 | 0.03390 | -3.38 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-10 | 5.3 | 0.07000 | 0.03270 | -3.42 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-11 | 5.8 | 0.07000 | 0.03650 | -3.31 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-11 | 6.3 | 0.07000 | 0.03620 | -3.32 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-12 | 6.8 | 0.07000 | 0.03580 | -3.33 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-12 | 7.3 | 0.07000 | 0.03830 | -3.26 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-13 | 14.7 | 0.07000 | 0.04010 | -3.22 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-13 | 15.2 | 0.07000 | 0.03060 | -3.49 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Feb-14 | 15.8 | 0.07000 | 0.03670 | -3.30 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-14 | 16.2 | 0.07000 | 0.03410 | -3.38 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-15 | 16.7 | 0.07000 | 0.03550 | -3.34 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-15 | 17.3 | 0.07000 | 0.03320 | -3.41 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-16 | 17.8 | 0.07000 | 0.032 | -3.44 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-16 | 18.3 | 0.07000 | 0.0365 | -3.31 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| 428B132MW | Apr-05 | 0.0 | 0.07000 | 0.06800 | -2.69 | -- | -- | -- | -- | -- | -- |
| | Jul-05 | 0.2 | 0.07000 | 0.08900 | -2.42 | -- | -- | -- | -- | -- | -- |
| | Oct-05 | 0.5 | 0.07000 | 0.28000 | -1.27 | -- | -- | -- | -- | -- | -- |
| | Jan-06 | 0.8 | 0.07000 | 0.02600 | -3.65 | -- | -- | -- | -- | -- | -- |
| | Aug-06 | 1.4 | 0.07000 | 0.06500 | -2.73 | -- | -- | -- | -- | -- | -- |
| | Apr-07 | 2.0 | 0.07000 | 0.06200 | -2.78 | -- | -- | -- | -- | -- | -- |
| | Sep-07 | 2.4 | 0.07000 | 0.32000 | -1.14 | -- | -- | -- | -- | -- | -- |
| | Jan-08 | 2.7 | 0.07000 | 0.02500 | -3.69 | -- | -- | -- | -- | -- | -- |
| | Jul-08 | 3.2 | 0.07000 | 0.04980 | -3.00 | -- | -- | -- | -- | -- | -- |
| | Jan-09 | 3.8 | 0.07000 | 0.11000 | -2.21 | -0.381 | -0.169 | Yes | 0.25457 | Yes | Yes |
| | Jul-09 | 4.3 | 0.07000 | 0.25200 | -1.38 | 0.314 | -0.169 | No | 0.23410 | No | No |
| | Jan-10 | 4.8 | 0.07000 | 0.16600 | -1.80 | 0.321 | -0.169 | No | 0.21508 | Yes | Evaluate Further |
| | Jul-10 | 5.3 | 0.07000 | 0.06990 | -2.66 | 0.094 | -0.169 | Less Than PCL | 0.19760 | Less Than PCL | Less Than PCL |
| | Jan-11 | 5.8 | 0.07000 | 0.12900 | -2.05 | 0.099 | -0.169 | No | 0.18155 | Yes | Evaluate Further |
| | Jul-11 | 6.3 | 0.07000 | 0.05290 | -2.94 | -0.028 | -0.169 | Less Than PCL | 0.16595 | Less Than PCL | Less Than PCL |
| | Jan-12 | 6.8 | 0.07000 | 0.10400 | -2.26 | -0.014 | -0.169 | No | 0.15353 | Yes | Evaluate Further |
| | Jul-12 | 7.3 | 0.07000 | 0.24900 | -1.39 | 0.074 | -0.169 | No | 0.14112 | No | No |
| | Jan-13 | 14.7 | 0.07000 | 0.18300 | -1.70 | 0.058 | -0.169 | No | 0.12941 | No | No |
| | Jul-13 | 15.2 | 0.07000 | 0.22800 | -1.48 | 0.064 | -0.169 | No | 0.11901 | No | No |
| | Feb-14 | 15.8 | 0.07000 | 0.04270 | -3.15 | 0.014 | -0.169 | Less Than PCL | 0.10713 | Less Than PCL | Less Than PCL |
| | Jul-14 | 16.2 | 0.07000 | 0.18700 | -1.68 | 0.023 | -0.169 | No | 0.10031 | No | No |
| | Jan-15 | 16.7 | 0.07000 | 0.07140 | -2.64 | 0.010 | -0.169 | No | 0.09199 | Yes | Evaluate Further |
| | Jul-15 | 17.3 | 0.07000 | 0.15900 | -1.84 | 0.015 | -0.169 | No | 0.08444 | No | No |
| | Jan-16 | 17.8 | 0.07000 | 0.13800 | -1.98 | 0.016 | -0.169 | No | 0.07754 | No | No |
| | Jul-16 | 18.3 | 0.07000 | 0.136 | -2.00 | 0.016 | -0.169 | No | 0.07128 | No | No |

**Table 4-4**

**Summary of Concentration vs. Time Attenuation Rate Constants**
**SWMU 86 Plume**
**2016 RAER**
**Former NAS Dallas, Texas**
**Page 6 of 9**

| Monitoring Well ID | Sampling Date | Elapsed Time (Years) | Protective Concentration Level (mg/L) | Concentration Detected (mg/L) | Natural Log of Concentration (mg/L) | Degradation Rate from Natural Log ($K_{time}$) (mg/L per year) | Minimum Degradation Rate Required for Remedial Goals Natural Log ($K_{time}$) (mg/L per year) | Minimum Degradation Rate Met? (Yes/No) | Expected Remedial Goal Concentration (mg/L) | Expected Remedial Goal Concentration Met? (Yes/No) | Remedial Goals Being Met? (Yes/No) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 428B133MW | Apr-05 | 0.0 | 0.07000 | 0.04000 | -3.22 | -- | -- | -- | -- | -- | -- |
| | Jul-05 | 0.2 | 0.07000 | 0.11000 | -2.21 | -- | -- | -- | -- | -- | -- |
| | Oct-05 | 0.5 | 0.07000 | 0.37000 | -0.99 | -- | -- | -- | -- | -- | -- |
| | Jan-06 | 0.8 | 0.07000 | 0.56000 | -0.58 | -- | -- | -- | -- | -- | -- |
| | Aug-06 | 1.4 | 0.07000 | 0.98000 | -0.02 | -- | -- | -- | -- | -- | -- |
| | Apr-07 | 2.0 | 0.07000 | 1.40000 | 0.34 | -- | -- | -- | -- | -- | -- |
| | Sep-07 | 2.4 | 0.07000 | 1.60000 | 0.47 | -- | -- | -- | -- | -- | -- |
| | Jan-08 | 2.7 | 0.07000 | 1.40000 | 0.34 | -- | -- | -- | -- | -- | -- |
| | Jul-08 | 3.2 | 0.07000 | 1.72000 | 0.54 | -- | -- | -- | -- | -- | -- |
| | Jan-09 | 3.8 | 0.07000 | 1.76000 | 0.57 | -- | -- | -- | -- | -- | -- |
| | Jul-09 | 4.3 | 0.07000 | 1.55000 | 0.44 | -- | -- | -- | -- | -- | -- |
| | Jan-10 | 4.8 | 0.07000 | 1.72000 | 0.54 | -0.025 | -0.393 | No | 0.94895 | No | No |
| | Jul-10 | 5.3 | 0.07000 | 1.79000 | 0.58 | 0.011 | -0.393 | No | 0.77942 | No | No |
| | Jan-11 | 5.8 | 0.07000 | 1.44000 | 0.36 | -0.042 | -0.393 | No | 0.64018 | No | No |
| | Jul-11 | 6.3 | 0.07000 | 1.55000 J | 0.44 | -0.040 | -0.393 | No | 0.51963 | No | No |
| | Jan-12 | 6.8 | 0.07000 | 1.15000 | 0.14 | -0.086 | -0.393 | No | 0.43374 | No | No |
| | Jul-12 | 7.3 | 0.07000 | 0.66700 | -0.40 | -0.173 | -0.393 | No | 0.35663 | No | No |
| | Jan-13 | 7.8 | 0.07000 | 1.11000 | 0.10 | -0.154 | -0.393 | No | 0.29166 | No | No |
| | Jul-13 | 8.3 | 0.07000 | 1.26000 | 0.23 | -0.124 | -0.393 | No | 0.24007 | No | No |
| | Feb-14 | 8.9 | 0.07000 | 0.78100 | -0.25 | -0.139 | -0.393 | No | 0.18807 | No | No |
| | Jul-14 | 9.3 | 0.07000 | 0.62200 | -0.47 | -0.158 | -0.393 | No | 0.16161 | No | No |
| | Jan-15 | 9.8 | 0.07000 | 0.73800 | -0.22 | -0.151 | -0.393 | No | 0.13203 | No | No |
| | Jul-15 | 10.3 | 0.07000 | 0.63500 | -0.45 | -0.155 | -0.393 | No | 0.10821 | No | No |
| | Jan-16 | 10.8 | 0.07000 | 0.53 J | -0.63 | -0.162 | -0.393 | No | 0.08878 | No | No |
| | Jul-16 | 11.3 | 0.07000 | 0.412 | -0.89 | -0.173 | -0.393 | No | 0.07300 | No | No |
| 428B134MW | Apr-05 | 0.0 | 0.07000 | 0.02000 | -3.91 | -- | -- | -- | -- | -- | -- |
| | Jul-05 | 0.2 | 0.07000 | 0.01500 | -4.20 | -- | -- | -- | -- | -- | -- |
| | Oct-05 | 0.5 | 0.07000 | 0.06500 | -2.73 | -- | -- | -- | -- | -- | -- |
| | Jan-06 | 0.8 | 0.07000 | 0.15000 | -1.90 | -- | -- | -- | -- | -- | -- |
| | Aug-06 | 1.4 | 0.07000 | 0.15000 | -1.90 | -- | -- | -- | -- | -- | -- |
| | Apr-07 | 2.0 | 0.07000 | 0.13000 | -2.04 | -- | -- | -- | -- | -- | -- |
| | Sep-07 | 2.4 | 0.07000 | 0.15000 | -1.90 | -0.034 | -0.072 | No | 0.13369 | No | No |
| | Jan-08 | 2.7 | 0.07000 | 0.12000 | -2.12 | -0.088 | -0.072 | Yes | 0.13048 | Yes | Yes |
| | Jul-08 | 3.2 | 0.07000 | 0.13100 | -2.03 | -0.071 | -0.072 | No | 0.12589 | No | No |
| | Jan-09 | 3.8 | 0.07000 | 0.08480 | -2.47 | -0.153 | -0.072 | Yes | 0.12128 | Yes | Yes |
| | Jul-09 | 4.3 | 0.07000 | 0.09220 | -2.38 | -0.160 | -0.072 | Yes | 0.11703 | Yes | Yes |
| | Jan-10 | 4.8 | 0.07000 | 0.08870 | -2.42 | -0.157 | -0.072 | Yes | 0.11288 | Yes | Yes |
| | Jul-10 | 5.3 | 0.07000 | 0.09280 | -2.38 | -0.142 | -0.072 | Yes | 0.10888 | Yes | Yes |
| | Jan-11 | 5.8 | 0.07000 | 0.09780 | -2.32 | -0.122 | -0.072 | Yes | 0.10503 | Yes | Yes |
| | Jul-11 | 6.3 | 0.07000 | 0.08010 | -2.52 | -0.121 | -0.072 | Yes | 0.10109 | Yes | Yes |
| | Jan-12 | 6.8 | 0.07000 | 0.07880 | -2.54 | -0.118 | -0.072 | Yes | 0.09779 | Yes | Yes |
| | Jul-12 | 7.3 | 0.07000 | 0.08590 | -2.45 | -0.108 | -0.072 | Yes | 0.09435 | Yes | Yes |
| | Jan-13 | 7.8 | 0.07000 | 0.09790 | -2.32 | -0.091 | -0.072 | Yes | 0.09093 | No | Evaluate Further |
| | Jul-13 | 8.3 | 0.07000 | 0.08150 | -2.51 | -0.087 | -0.072 | Yes | 0.08774 | Yes | Yes |
| | Feb-14 | 8.9 | 0.07000 | 0.07380 | -2.61 | -0.085 | -0.072 | Yes | 0.08390 | Yes | Yes |
| | Jul-14 | 9.3 | 0.07000 | 0.06400 | -2.75 | -0.088 | -0.072 | Less Than PCL | 0.08160 | Less Than PCL | Less Than PCL |
| | Jan-15 | 9.8 | 0.07000 | 0.06500 | -2.73 | -0.088 | -0.072 | Less Than PCL | 0.07863 | Less Than PCL | Less Than PCL |
| | Jul-15 | 10.3 | 0.07000 | 0.08590 | -2.45 | -0.079 | -0.072 | Yes | 0.07582 | No | Evaluate Further |
| | Jan-16 | 10.8 | 0.07000 | 0.0685 JL | -2.68 | -0.077 | -0.072 | Less Than PCL | 0.07312 | Less Than PCL | Less Than PCL |
| | Jul-16 | 11.3 | 0.07000 | 0.0767 | -2.57 | -0.072 | -0.072 | Yes | 0.07054 | No | Evaluate Further |

**Table 4-4**

**Summary of Concentration vs. Time Attenuation Rate Constants**
**SWMU 86 Plume**
**2016 RAER**
**Former NAS Dallas, Texas**
**Page 7 of 9**

| Monitoring Well ID | Sampling Date | Elapsed Time (Years) | Protective Concentration Level (mg/L) | Concentration Detected (mg/L) | Natural Log of Concentration (mg/L) | Degradation Rate from Natural Log ($K_{time}$) (mg/L per year) | Minimum Degradation Rate Required for Remedial Goals Natural Log ($K_{time}$) (mg/L per year) | Minimum Degradation Rate Met? (Yes/No) | Expected Remedial Goal Concentration (mg/L) | Expected Remedial Goal Concentration Met? (Yes/No) | Remedial Goals Being Met? (Yes/No) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Vinyl Chloride** | | | | | | | | | | | |
| 428B07MW | Apr-98 | 0.0 | 0.00200 | 0.00500 U | -8.00 | -- | -- | -- | -- | -- | -- |
| | Aug-98 | 0.3 | 0.00200 | 0.00500 U | -8.00 | -- | -- | -- | -- | -- | -- |
| | Mar-99 | 0.9 | 0.00200 | 0.00500 U | -8.00 | -- | -- | -- | -- | -- | -- |
| | Nov-99 | 1.6 | 0.00200 | 0.00500 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-00 | 2.2 | 0.00200 | 0.00500 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-01 | 3.2 | 0.00200 | 0.01000 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-03 | 4.7 | 0.00200 | 0.00100 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Aug-03 | 5.3 | 0.00200 | 0.00210 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-04 | 5.7 | 0.00200 | 0.00017 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Aug-04 | 6.3 | 0.00200 | 0.00017 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Oct-04 | 6.5 | 0.00200 | 0.00017 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Apr-05 | 6.9 | 0.00200 | 0.00030 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Oct-05 | 7.4 | 0.00200 | 0.00030 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | May-06 | 8.1 | 0.00200 | 0.00060 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Aug-06 | 8.3 | 0.00200 | 0.00060 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Apr-07 | 9.0 | 0.00200 | 0.00055 J | -7.51 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Sep-07 | 9.4 | 0.00200 | 0.00020 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-08 | 9.7 | 0.00200 | 0.00043 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-08 | 10.2 | 0.00200 | 0.00030 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-09 | 10.7 | 0.00200 | 0.00030 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-09 | 11.2 | 0.00200 | 0.00030 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-10 | 11.7 | 0.00200 | 0.00028 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-10 | 12.2 | 0.00200 | 0.00028 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-11 | 12.7 | 0.00200 | 0.00022 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-11 | 13.3 | 0.00200 | 0.00022 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-12 | 13.7 | 0.00200 | 0.00022 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-13 | 14.7 | 0.00200 | 0.00044 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-13 | 15.2 | 0.00200 | 0.00044 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Feb-14 | 15.8 | 0.00200 | 0.00033 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-14 | 16.2 | 0.00200 | 0.00025 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-15 | 16.7 | 0.00200 | 0.00025 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-15 | 17.3 | 0.00200 | 0.00025 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-16 | 17.8 | 0.00200 | 0.00025 UJ | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-16 | 18.3 | 0.00200 | 0.00025 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| 428B128MW | Apr-05 | 0.0 | 0.00200 | 0.00030 U | -8.00 | -- | -- | -- | -- | -- | -- |
| | Jul-05 | 0.2 | 0.00200 | 0.00030 U | -8.00 | -- | -- | -- | -- | -- | -- |
| | Oct-05 | 0.5 | 0.00200 | 0.00030 U | -8.00 | -- | -- | -- | -- | -- | -- |
| | Jan-06 | 0.8 | 0.00200 | 0.00030 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Aug-06 | 1.4 | 0.00200 | 0.00060 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Apr-07 | 2.0 | 0.00200 | 0.00012 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Sep-07 | 2.4 | 0.00200 | 0.00020 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-08 | 2.7 | 0.00200 | 0.00043 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-08 | 3.2 | 0.00200 | 0.00030 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-09 | 3.8 | 0.00200 | 0.00030 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-09 | 4.3 | 0.00200 | 0.00030 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-10 | 4.8 | 0.00200 | 0.00028 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-10 | 5.3 | 0.00200 | 0.00028 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-11 | 5.8 | 0.00200 | 0.00022 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-11 | 6.3 | 0.00200 | 0.00022 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-12 | 6.8 | 0.00200 | 0.00022 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-13 | 14.7 | 0.00200 | 0.00044 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-13 | 15.2 | 0.00200 | 0.00044 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Feb-14 | 15.8 | 0.00200 | 0.00033 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-14 | 16.2 | 0.00200 | 0.00025 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-15 | 16.7 | 0.00200 | 0.00025 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-15 | 17.3 | 0.00200 | 0.00025 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-16 | 17.8 | 0.00200 | 0.00025 UJ | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-16 | 18.3 | 0.00200 | 0.00025 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| 428B129MW | Apr-05 | 0.0 | 0.00200 | 0.00030 U | -8.00 | -- | -- | -- | -- | -- | -- |
| | Jul-05 | 0.2 | 0.00200 | 0.00030 U | -8.00 | -- | -- | -- | -- | -- | -- |
| | Oct-05 | 0.5 | 0.00200 | 0.00030 U | -8.00 | -- | -- | -- | -- | -- | -- |
| | Jan-06 | 0.8 | 0.00200 | 0.00030 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Aug-06 | 1.4 | 0.00200 | 0.00060 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Apr-07 | 2.0 | 0.00200 | 0.00020 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Sep-07 | 2.4 | 0.00200 | 0.00020 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-08 | 2.7 | 0.00200 | 0.00043 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-08 | 3.2 | 0.00200 | 0.00030 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-09 | 3.8 | 0.00200 | 0.00030 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-09 | 4.3 | 0.00200 | 0.00030 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-10 | 4.8 | 0.00200 | 0.00028 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-10 | 5.3 | 0.00200 | 0.00028 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-11 | 5.8 | 0.00200 | 0.00022 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-11 | 6.3 | 0.00200 | 0.00022 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-12 | 6.8 | 0.00200 | 0.00022 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-13 | 14.7 | 0.00200 | 0.00044 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-13 | 15.2 | 0.00200 | 0.00044 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Feb-14 | 15.8 | 0.00200 | 0.00033 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-14 | 16.2 | 0.00200 | 0.00025 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-15 | 16.7 | 0.00200 | 0.00025 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-15 | 17.3 | 0.00200 | 0.00025 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-16 | Well Abandoned | | | | | | | | | |

**Table 4-4**

**Summary of Concentration vs. Time Attenuation Rate Constants**
**SWMU 86 Plume**
**2016 RAER**
**Former NAS Dallas, Texas**
**Page 8 of 9**

| Monitoring Well ID | Sampling Date | Elapsed Time (Years) | Protective Concentration Level (mg/L) | Concentration Detected (mg/L) | Natural Log of Concentration (mg/L) | Degradation Rate from Natural Log ($K_{time}$) (mg/L per year) | Minimum Degradation Rate Required for Remedial Goals Natural Log ($K_{time}$) (mg/L per year) | Minimum Degradation Rate Met? (Yes/No) | Expected Remedial Goal Concentration (mg/L) | Expected Remedial Goal Concentration Met? (Yes/No) | Remedial Goals Being Met? (Yes/No) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 428B130MW | Apr-05 | 0.0 | 0.00200 | 0.00030 U | -8.00 | -- | -- | -- | -- | -- | -- |
| | Jul-05 | 0.2 | 0.00200 | 0.00050 J | -7.60 | -- | -- | -- | -- | -- | -- |
| | Oct-05 | 0.5 | 0.00200 | 0.00030 U | -8.00 | -- | -- | -- | -- | -- | -- |
| | Jan-06 | 0.8 | 0.00200 | 0.00030 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Aug-06 | 1.4 | 0.00200 | 0.00060 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Apr-07 | 2.0 | 0.00200 | 0.00069 J | -7.28 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Sep-07 | 2.4 | 0.00200 | 0.00076 J | -7.18 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-08 | 2.7 | 0.00200 | 0.00043 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-08 | 3.2 | 0.00200 | 0.00030 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-09 | 3.8 | 0.00200 | 0.00030 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-09 | 4.3 | 0.00200 | 0.00045 J | -7.71 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-10 | 4.8 | 0.00200 | 0.00028 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-10 | 5.3 | 0.00200 | 0.00053 J | -7.54 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-11 | 5.8 | 0.00200 | 0.00022 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-11 | 6.3 | 0.00200 | 0.00100 | -6.91 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-12 | 6.8 | 0.00200 | 0.00022 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-13 | 14.7 | 0.00200 | 0.00044 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-13 | 15.2 | 0.00200 | 0.00044 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Feb-14 | 15.8 | 0.00200 | 0.00033 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-14 | 16.2 | 0.00200 | 0.00051 J | -7.58 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-15 | 16.7 | 0.00200 | 0.00025 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-15 | 17.3 | 0.00200 | 0.00025 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-16 | 17.8 | 0.00200 | 0.00025 UJ | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-16 | 18.3 | 0.00200 | 0.00047 J | -7.66 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| 428B131MW | Apr-05 | 0.0 | 0.00200 | 0.00030 U | -8.00 | -- | -- | -- | -- | -- | -- |
| | Jul-05 | 0.2 | 0.00200 | 0.00040 J | -7.82 | -- | -- | -- | -- | -- | -- |
| | Oct-05 | 0.5 | 0.00200 | 0.00090 J | -7.01 | -- | -- | -- | -- | -- | -- |
| | Jan-06 | 0.8 | 0.00200 | 0.00030 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Aug-06 | 1.4 | 0.00200 | 0.00070 J | -7.26 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Apr-07 | 2.0 | 0.00200 | 0.00020 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Sep-07 | 2.4 | 0.00200 | 0.00100 J | -6.91 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-08 | 2.7 | 0.00200 | 0.00043 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-08 | 3.2 | 0.00200 | 0.00030 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-09 | 3.8 | 0.00200 | 0.00030 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-09 | 4.3 | 0.00200 | 0.00058 J | -7.45 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-10 | 4.8 | 0.00200 | 0.00033 J | -8.02 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-10 | 5.3 | 0.00200 | 0.00092 J | -6.99 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-11 | 5.8 | 0.00200 | 0.00022 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-11 | 6.3 | 0.00200 | 0.00089 J | -7.02 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-12 | 6.8 | 0.00200 | 0.00041 J | -7.80 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-13 | 14.7 | 0.00200 | 0.00044 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-13 | 15.2 | 0.00200 | 0.00044 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Feb-14 | 15.8 | 0.00200 | 0.00033 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-14 | 16.2 | 0.00200 | 0.00025 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-15 | 16.7 | 0.00200 | 0.00025 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-15 | 17.3 | 0.00200 | 0.00025 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-16 | 17.8 | 0.00200 | 0.00025 UJ | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-16 | 18.3 | 0.00200 | 0.00027 J | -8.22 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| 428B132MW | Apr-05 | 0.0 | 0.00200 | 0.00030 U | -8.00 | -- | -- | -- | -- | -- | -- |
| | Jul-05 | 0.2 | 0.00200 | 0.00030 U | -8.00 | -- | -- | -- | -- | -- | -- |
| | Oct-05 | 0.5 | 0.00200 | 0.00030 U | -8.00 | -- | -- | -- | -- | -- | -- |
| | Jan-06 | 0.8 | 0.00200 | 0.00030 U | -8.00 | -- | -- | -- | -- | -- | -- |
| | Aug-06 | 1.4 | 0.00200 | 0.00060 U | -8.00 | -- | -- | -- | -- | -- | -- |
| | Apr-07 | 2.0 | 0.00200 | 0.00120 J | -6.73 | -- | -- | -- | -- | -- | -- |
| | Sep-07 | 2.4 | 0.00200 | 0.00540 | -5.22 | -- | -- | -- | -- | -- | -- |
| | Jan-08 | 2.7 | 0.00200 | 0.00043 U | -8.00 | -- | -- | -- | -- | -- | -- |
| | Jul-08 | 3.2 | 0.00200 | 0.00030 U | -8.00 | -- | -- | -- | -- | -- | -- |
| | Jan-09 | 3.8 | 0.00200 | 0.00061 J | -7.40 | -1.262 | -0.110 | Less Than PCL | 0.00465 | Less Than PCL | Less Than PCL |
| | Jul-09 | 4.3 | 0.00200 | 0.00640 | -5.05 | 0.325 | -0.110 | No | 0.00440 | No | No |
| | Jan-10 | 4.8 | 0.00200 | 0.00090 J | -7.01 | 0.095 | -0.110 | Less Than PCL | 0.00417 | Less Than PCL | Less Than PCL |
| | Jul-10 | 5.3 | 0.00200 | 0.00053 J | -7.54 | -0.112 | -0.110 | Less Than PCL | 0.00394 | Less Than PCL | Less Than PCL |
| | Jan-11 | 5.8 | 0.00200 | 0.00095 J | -6.96 | -0.086 | -0.110 | Less Than PCL | 0.00373 | Less Than PCL | Less Than PCL |
| | Jul-11 | 6.3 | 0.00200 | 0.00240 | -6.03 | 0.060 | -0.110 | No | 0.00352 | Yes | Evaluate Further |
| | Jan-12 | 6.8 | 0.00200 | 0.00110 | -6.81 | 0.043 | -0.110 | Less Than PCL | 0.00334 | Less Than PCL | Less Than PCL |
| | Jan-13 | 14.7 | 0.00200 | 0.0023 | -6.07 | 0.066 | -0.110 | No | 0.00299 | Yes | Evaluate Further |
| | Jul-13 | 15.2 | 0.00200 | 0.0200 | -3.91 | 0.163 | -0.110 | No | 0.00283 | No | No |
| | Feb-14 | 15.8 | 0.00200 | 0.00091 J | -7.00 | 0.099 | -0.110 | Less Than PCL | 0.00264 | Less Than PCL | Less Than PCL |
| | Jul-14 | 16.2 | 0.00200 | 0.0212 | -3.85 | 0.141 | -0.110 | No | 0.00253 | No | No |
| | Jan-15 | 16.7 | 0.00200 | 0.0134 | -4.31 | 0.155 | -0.110 | No | 0.00239 | No | No |
| | Jul-15 | 17.3 | 0.00200 | 0.0330 | -3.41 | 0.178 | -0.110 | No | 0.00226 | No | No |
| | Jan-16 | 17.8 | 0.00200 | 0.00845 J | -4.77 | 0.173 | -0.110 | No | 0.00214 | No | No |
| | Jul-16 | 18.3 | 0.00200 | 0.0237 | -3.74 | 0.182 | -0.110 | No | 0.00202 | No | No |

**Table 4-4**

**Summary of Concentration vs. Time Attenuation Rate Constants**
**SWMU 86 Plume**
**2016 RAER**
**Former NAS Dallas, Texas**
**Page 9 of 9**

| Monitoring Well ID | Sampling Date | Elapsed Time (Years) | Protective Concentration Level (mg/L) | Concentration Detected (mg/L) | Natural Log of Concentration (mg/L) | Degradation Rate from Natural Log ($K_{time}$) (mg/L per year) | Minimum Degradation Rate Required for Remedial Goals Natural Log ($K_{time}$) (mg/L per year) | Minimum Degradation Rate Met? (Yes/No) | Expected Remedial Goal Concentration (mg/L) | Expected Remedial Goal Concentration Met? (Yes/No) | Remedial Goals Being Met? (Yes/No) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 428B133MW | Apr-05 | 0.0 | 0.00200 | 0.00030 U | -8.00 | -- | -- | -- | -- | -- | -- |
| | Jul-05 | 0.2 | 0.00200 | 0.00030 U | -8.00 | -- | -- | -- | -- | -- | -- |
| | Oct-05 | 0.5 | 0.00200 | 0.00090 J | -7.01 | -- | -- | -- | -- | -- | -- |
| | Jan-06 | 0.8 | 0.00200 | 0.00050 J | -7.60 | -- | -- | -- | -- | -- | -- |
| | Aug-06 | 1.4 | 0.00200 | 0.00100 J | -6.91 | -- | -- | -- | -- | -- | -- |
| | Apr-07 | 2.0 | 0.00200 | 0.00230 J | -6.07 | -- | -- | -- | -- | -- | -- |
| | Sep-07 | 2.4 | 0.00200 | 0.00400 U | -8.00 | -- | -- | -- | -- | -- | -- |
| | Jan-08 | 2.7 | 0.00200 | 0.00240 | -6.03 | -- | -- | -- | -- | -- | -- |
| | Jul-08 | 3.2 | 0.00200 | 0.00600 U | -8.00 | -- | -- | -- | -- | -- | -- |
| | Jan-09 | 3.8 | 0.00200 | 0.00030 U | -8.00 | -- | -- | -- | -- | -- | -- |
| | Jul-09 | 4.3 | 0.00200 | 0.00600 U | -8.00 | -- | -- | -- | -- | -- | -- |
| | Jan-10 | 4.8 | 0.00200 | 0.00560 U | -8.00 | -- | -- | -- | -- | -- | -- |
| | Jul-10 | 5.3 | 0.00200 | 0.05370 | -2.92 | -- | -- | -- | -- | -- | -- |
| | Jan-11 | 5.8 | 0.00200 | 0.02790 | -3.58 | -- | -- | -- | -- | -- | -- |
| | Jul-11 | 6.3 | 0.00200 | 0.26200 J | -1.34 | 1.561 | -0.536 | No | 0.031 | No | No |
| | Jan-12 | 6.8 | 0.00200 | 0.07040 | -2.65 | 0.640 | -0.536 | No | 0.024 | No | No |
| | Jul-13 | 8.3 | 0.00200 | 0.0310 | -3.47 | -0.136 | -0.536 | No | 0.011 | No | No |
| | Feb-14 | 8.9 | 0.00200 | 0.0035 J | -5.65 | -0.639 | -0.536 | Yes | 0.008 | Yes | Yes |
| | Jul-14 | 9.3 | 0.00200 | 0.0294 J | -3.53 | -0.465 | -0.536 | No | 0.006 | No | No |
| | Jan-15 | 9.8 | 0.00200 | 0.0025 U | -6.38 | -0.667 | -0.536 | Less Than PCL | 0.005 | Less Than PCL | Less Than PCL |
| | Jul-15 | 10.3 | 0.00200 | 0.01230 | -4.40 | -0.566 | -0.536 | Yes | 0.00362 | No | Evaluate Further |
| | Jan-16 | 10.8 | 0.00200 | 0.0025 UJ | -5.99 | -0.607 | -0.536 | Yes | 0.00277 | Yes | Yes |
| | Jul-16 | 11.3 | 0.00200 | 0.0881 | -2.43 | -0.383 | -0.536 | No | 0.002 | No | No |
| 428B134MW | Apr-05 | 0.0 | 0.00200 | 0.00030 U | -8.00 | -- | -- | -- | -- | -- | -- |
| | Jul-05 | 0.2 | 0.00200 | 0.00030 U | -8.00 | -- | -- | -- | -- | -- | -- |
| | Oct-05 | 0.5 | 0.00200 | 0.00030 U | -8.00 | -- | -- | -- | -- | -- | -- |
| | Jan-06 | 0.8 | 0.00200 | 0.00030 U | -8.00 | -- | -- | -- | -- | -- | -- |
| | Aug-06 | 1.4 | 0.00200 | 0.00060 U | -8.00 | -- | -- | -- | -- | -- | -- |
| | Apr-07 | 2.0 | 0.00200 | 0.00020 U | -8.00 | -- | -- | -- | -- | -- | -- |
| | Sep-07 | 2.4 | 0.00200 | 0.00071 J | -7.25 | -- | -- | -- | -- | -- | -- |
| | Jan-08 | 2.7 | 0.00200 | 0.00043 U | -8.00 | -- | -- | -- | -- | -- | -- |
| | Jul-08 | 3.2 | 0.00200 | 0.00030 U | -8.00 | -- | -- | -- | -- | -- | -- |
| | Jan-09 | 3.8 | 0.00200 | 0.00320 | -5.74 | -- | -- | -- | -- | -- | -- |
| | Jul-09 | 4.3 | 0.00200 | 0.00960 | -4.65 | -- | -- | -- | -- | -- | -- |
| | Jan-10 | 4.8 | 0.00200 | 0.00028 U | -8.00 | -- | -- | -- | -- | -- | -- |
| | Jul-10 | 5.3 | 0.00200 | 0.00700 | -4.96 | -- | -- | -- | -- | -- | -- |
| | Jan-11 | 5.8 | 0.00200 | 0.00230 | -6.07 | -0.245 | -0.220 | Yes | 0.00691 | Yes | Yes |
| | Jul-11 | 6.3 | 0.00200 | 0.02720 | -3.60 | 0.807 | -0.220 | No | 0.00614 | No | No |
| | Jan-12 | 6.8 | 0.00200 | 0.00140 | -6.57 | 0.157 | -0.220 | Less Than PCL | 0.00555 | Less Than PCL | Less Than PCL |
| | Jan-13 | 7.8 | 0.00200 | 0.0015 | -6.50 | -0.111 | -0.220 | Less Than PCL | 0.00445 | Less Than PCL | Less Than PCL |
| | Jul-13 | 8.3 | 0.00200 | 0.0095 | -4.66 | 0.100 | -0.220 | No | 0.00399 | No | No |
| | Feb-14 | 8.9 | 0.00200 | 0.00033 U | -8.00 | -0.214 | -0.220 | Less Than PCL | 0.00348 | Less Than PCL | Less Than PCL |
| | Jul-14 | 9.3 | 0.00200 | 0.0021 | -6.19 | -0.186 | -0.220 | No | 0.00320 | Yes | Evaluate Further |
| | Jan-15 | 9.8 | 0.00200 | 0.0025 U | -8.00 | -0.302 | -0.220 | Less Than PCL | 0.00285 | Less Than PCL | Less Than PCL |
| | Jul-15 | 10.3 | 0.00200 | 0.0034 | -5.69 | -0.210 | -0.220 | No | 0.00255 | No | No |
| | Jan-16 | 10.8 | 0.00200 | 0.00025 UJL | -8.00 | -0.277 | -0.220 | Less Than PCL | 0.00228 | Less Than PCL | Less Than PCL |
| | Jul-16 | 11.3 | 0.00200 | 0.00043 J | -7.75 | -0.301 | -0.220 | Less Than PCL | 0.00205 | Less Than PCL | Less Than PCL |
| 428B135MW | Aug-05 | 0.0 | 0.00200 | 0.00080 J | -7.13 | -- | -- | -- | -- | -- | -- |
| | Oct-05 | 0.2 | 0.00200 | 0.00080 J | -7.13 | -- | -- | -- | -- | -- | -- |
| | Jan-06 | 0.5 | 0.00200 | 0.00080 J | -7.13 | -- | -- | -- | -- | -- | -- |
| | Aug-06 | 1.1 | 0.00200 | 0.00100 J | -6.91 | -- | -- | -- | -- | -- | -- |
| | May-07 | 1.8 | 0.00200 | 0.00210 J | -6.17 | -- | -- | -- | -- | -- | -- |
| | Sep-07 | 2.1 | 0.00200 | 0.00150 J | -6.50 | -- | -- | -- | -- | -- | -- |
| | Jan-08 | 2.5 | 0.00200 | 0.00043 U | -8.00 | -- | -- | -- | -- | -- | -- |
| | Jul-08 | 3.0 | 0.00200 | 0.00030 U | -8.00 | -- | -- | -- | -- | -- | -- |
| | Jan-09 | 3.5 | 0.00200 | 0.00130 | -6.65 | -- | -- | -- | -- | -- | -- |
| | Jul-09 | 3.9 | 0.00200 | 0.00140 | -6.57 | -- | -- | -- | -- | -- | -- |
| | Jan-10 | 4.4 | 0.00200 | 0.00220 | -6.12 | -- | -- | -- | -- | -- | -- |
| | Jul-10 | 5.0 | 0.00200 | 0.00110 | -6.81 | -- | -- | -- | -- | -- | -- |
| | Jan-11 | 5.5 | 0.00200 | 0.00280 | -5.88 | 0.277 | -0.220 | No | 0.00142 | No | No |
| | Jul-11 | 6.0 | 0.00200 | 0.00230 | -6.07 | 0.010 | -0.220 | No | 0.00147 | No | No |
| | Jan-12 | 6.4 | 0.00200 | 0.00230 | -6.07 | 0.012 | -0.220 | No | 0.00151 | No | No |
| | Jan-13 | 7.5 | 0.00200 | 0.0016 | -6.44 | 0.013 | -0.220 | Less Than PCL | 0.00161 | Less Than PCL | Less Than PCL |
| | Jul-13 | 7.9 | 0.00200 | 0.0022 | -6.12 | 0.016 | -0.220 | No | 0.00165 | No | No |
| | Feb-14 | 8.6 | 0.00200 | 0.00045 J | -7.71 | 0.004 | -0.220 | Less Than PCL | 0.00172 | Less Than PCL | Less Than PCL |
| | Jul-14 | 9.0 | 0.00200 | 0.00122 | -6.71 | 0.003 | -0.220 | Less Than PCL | 0.00176 | Less Than PCL | Less Than PCL |
| | Jan-15 | 9.5 | 0.00200 | 0.000877 J | -7.04 | 0.036 | -0.220 | Less Than PCL | 0.00181 | Less Than PCL | Less Than PCL |
| | Jul-15 | 10.0 | 0.00200 | 0.00122 J | -6.71 | -0.004 | -0.220 | Less Than PCL | 0.00187 | Less Than PCL | Less Than PCL |
| | Jan-16 | 10.5 | 0.00200 | 0.00146 J | -6.53 | -0.003 | -0.220 | Less Than PCL | 0.00193 | Less Than PCL | Less Than PCL |
| | Jul-16 | 11.0 | 0.00200 | 0.00129 J | -6.65 | -0.004 | -0.220 | Less Than PCL | 0.00199 | Less Than PCL | Less Than PCL |

mg/L - milligrams per liter
NA - Not Applicable
NS - Not Sampled
NS-D - Not Sampled due to Dry Well

Notes:
Shaded areas indicate an exceedance.
For graphing purposes non-detect concentrations have been assigned a natural log value of -8.
Monitoring Well 428B129MW was plugged and abandoned in April 2016.

Analytical Result Qualifiers:

J - Indicates that the chemical was detected. However, the associated numerical result may not be a precise representation of the amount that is actually present in the sample. The laboratory reported concentration is considered to be an estimate of the true concentration.

U - Indicates that the chemical was not detected at the numerical detection limit (sample-specific quantitation limit) noted. Nondetected results from the laboratory are reported in this manner. This qualifier is added to a positive result (reported by the laboratory) if the detected concentration is determined to be attributable to contamination introduced during field sampling or laboratory analysis.

# TABLE 4-5
# SUMMARY OF CONCENTRATION VS. DISTANCE ATTENUATION RATE CONSTANTS

**Table 4-5**

**Summary of Concentration vs. Distance Attenuation Rate Constants**
**SWMU 86 Plume**
**2016 RAER**
**Former NAS Dallas, Texas**
**Page 1 of 2**

| Sampling Date | Protective Concentration Level (mg/L) | Detected Concentration (mg/L) | | | | | Natural Log of COC Concentration (mg/L) | | | | | $K_{dist}$ [(mg/L) per foot] |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Centerline Monitoring Wells** | | **428B07MW** | **428B131MW** | **428B132MW** | **428B133MW** | **428B134MW** | **428B07MW** | **428B131MW** | **428B132MW** | **428B133MW** | **428B134MW** | |
| **Distance from source area (ft)** | | **0** | **136** | **321** | **357** | **548** | 0 | 136 | 321 | 357 | 548 | |
| **Trichloroethene** | | | | | | | | | | | | |
| Apr-05 | 0.00500 | 0.00600 | 0.01600 | 0.03100 | 0.12000 | 0.28000 | -5.12 | -4.14 | -3.47 | -2.12 | -1.27 | 0.0072 |
| Jul-05 | 0.00500 | NS | 0.00600 | 0.017 | 0.18000 | 0.11000 | -- | -5.12 | -4.07 | -1.71 | -2.21 | 0.0075 |
| Oct-05 | 0.00500 | 0.00500 J | 0.01300 | 0.089 | 0.73000 | 0.08200 | -5.30 | -4.34 | -2.42 | -0.31 | -2.50 | 0.0048 |
| Jan-06 | 0.00500 | 0.00600 | 0.01000 | 0.00400 | 1.10000 | 0.02500 | -5.12 | -4.61 | -5.52 | 0.10 | -3.69 | 0.0033 |
| Aug-06 | 0.00500 | 0.00800 | 0.01000 | 0.00200 | 1.60000 | 0.00100 | -4.83 | -4.61 | -6.21 | 0.47 | -6.91 | -0.0043 |
| Apr-07 | 0.00500 | 0.00620 | 0.00880 | 0.00150 | 0.05800 | 0.00620 | -5.08 | -4.73 | -6.50 | -2.85 | -5.08 | -0.0001 |
| Sep-07 | 0.00500 | 0.00380 | 0.00710 | 0.00120 J | 0.03700 | 0.00120 | -5.57 | -4.95 | -6.73 | -3.30 | -6.73 | -0.0036 |
| Jan-08 | 0.00500 | 0.00620 | 0.00820 | 0.00061 J | 0.00640 | 0.00700 | -5.08 | -4.80 | -5.10 | -5.05 | -4.96 | -0.0004 |
| Jul-08 | 0.00500 | 0.00530 | 0.00580 | 0.00032 U | 0.00640 U | 0.00094 J | -5.24 | -5.15 | -8.00 | -8.00 | -4.67 | 0.0013 |
| Jan-09 | 0.00500 | 0.00290 | 0.00650 | 0.00044 J | 0.00380 J | 0.00072 J | -5.84 | -5.04 | -7.73 | -5.57 | -4.93 | 0.0008 |
| Jul-09 | 0.00500 | 0.00200 | 0.00570 | 0.00032 U | 0.01050 J | 0.00430 | -6.21 | -5.17 | -8.00 | -4.56 | -5.45 | 0.0001 |
| Jan-10 | 0.00500 | 0.00039 J | 0.00520 | 0.00046 J | 0.00480 U | 0.00290 | -7.85 | -5.26 | -7.68 | -8.00 | -5.84 | -0.0014 |
| Jul-10 | 0.00500 | 0.00430 J | 0.00510 | 0.00046 J | 0.00480 U | 0.03540 | -5.45 | -5.28 | -7.68 | -8.00 | -3.34 | 0.0047 |
| Jan-11 | 0.00500 | 0.00044 J | 0.00560 | 0.00046 J | 0.02510 | 0.00870 | -7.73 | -5.18 | -7.68 | -3.68 | -4.74 | 0.0019 |
| Jul-11 | 0.00500 | 0.00110 | 0.00480 | 0.00026 U | 0.00130 U | 0.00870 | -6.81 | -5.34 | -8.00 | -8.00 | -4.74 | 0.0015 |
| Jan-12 | 0.00500 | 0.00036 J | 0.00470 | 0.00026 U | 0.02160 | 0.00610 | -7.93 | -5.36 | -8.00 | -3.84 | -5.10 | 0.0015 |
| Jul-12 | 0.00500 | 0.00037 J | 0.00470 | 0.0013 U | 0.03440 | 0.00930 | -8.00 | -5.36 | -8.00 | -3.37 | -4.68 | 0.0026 |
| Jan-13 | 0.00500 | 0.00042 J | 0.0040 | 0.00031 U | 0.399 | 0.00790 | -7.78 | -5.52 | -8.00 | -0.92 | -4.84 | 0.0031 |
| Jul-13 | 0.00500 | 0.00036 J | 0.0032 | 0.00079 U | 0.512 | 0.00310 | -7.93 | -5.74 | -8.00 | -0.67 | -5.78 | 0.0014 |
| Feb-14 | 0.00500 | 0.00043 J | 0.0032 | 0.0003 U | 0.334 | 0.00830 | -7.75 | -5.74 | -8.00 | -1.10 | -4.79 | 0.0037 |
| Jul-14 | 0.00500 | 0.00045 J | 0.00309 | 0.0005 U | 0.265 J | 0.00591 | -7.71 | -5.78 | -8.00 | -1.36 | -5.13 | 0.0029 |
| Jan-15 | 0.00500 | 0.000524 J | 0.00266 | 0.00025 U | 0.387 | 0.01130 | -7.55 | -5.93 | -8.00 | -0.95 | -4.48 | 0.0049 |
| Jul-15 | 0.00500 | 0.00032 J | 0.00286 | 0.00025 U | 0.226 | 0.02240 | -7.55 | -5.86 | -8.00 | -1.49 | -3.80 | 0.0063 |
| Jan-16 | 0.00500 | 0.00046 J | 0.00245 | 0.0005 U | 0.191 | 0.00964 JL | -7.68 | -6.01 | -8.00 | -1.66 | -4.64 | 0.0046 |
| Jul-16 | 0.00500 | 0.00026 J | 0.00257 | 0.0005 U | 0.00253 | 0.017 | -8.25 | -5.96 | -8.00 | -5.98 | -4.07 | 0.0050 |
| **cis-1,2-Dichloroethene** | | | | | | | | | | | | |
| Apr-05 | 0.07000 | 0.00200 | 0.00800 | 0.06800 | 0.04000 | 0.02000 | -6.21 | -4.83 | -2.69 | -3.22 | -3.91 | 0.0020 |
| Jul-05 | 0.07000 | NS | 0.01600 | 0.08900 | 0.11000 | 0.01500 | -- | -4.14 | -2.42 | -2.21 | -4.20 | -0.0002 |
| Oct-05 | 0.07000 | 0.00100 J | 0.02700 | 0.28000 | 0.37000 | 0.06500 | -6.91 | -3.61 | -1.27 | -0.99 | -2.73 | 0.0021 |
| Jan-06 | 0.07000 | 0.00200 | 0.01800 | 0.02600 | 0.56000 | 0.15000 | -6.21 | -4.02 | -3.65 | -0.58 | -1.90 | 0.0057 |
| Aug-06 | 0.07000 | 0.00200 | 0.02600 | 0.06500 | 0.98000 | 0.15000 | -6.21 | -3.65 | -2.73 | -0.02 | -1.90 | 0.0047 |
| Apr-07 | 0.07000 | 0.00190 | 0.02500 | 0.06200 | 1.40000 | 0.13000 | -6.27 | -3.69 | -2.78 | 0.34 | -2.04 | 0.0046 |
| Sep-07 | 0.07000 | 0.00110 | 0.02900 | 0.32000 | 1.60000 | 0.15000 | -6.81 | -3.54 | -1.14 | 0.47 | -1.90 | 0.0042 |
| Jan-08 | 0.07000 | 0.00150 | 0.03000 | 0.02500 | 1.40000 | 0.12000 | -6.50 | -3.51 | -3.69 | 0.34 | -2.12 | 0.0041 |
| Jul-08 | 0.07000 | 0.00110 | 0.02940 | 0.04980 | 1.72000 | 0.13100 | -6.81 | -3.53 | -3.00 | 0.54 | -2.03 | 0.0043 |
| Jan-09 | 0.07000 | 0.00061 J | 0.03290 | 0.11000 | 1.76000 | 0.0831 J | -7.40 | -3.41 | -2.21 | 0.57 | -2.49 | 0.0027 |
| Jul-09 | 0.07000 | 0.00042 J | 0.02990 | 0.25200 | 1.55000 | 0.09220 | -7.78 | -3.51 | -1.38 | 0.44 | -2.38 | 0.0030 |
| Jan-10 | 0.07000 | 0.00032 U | 0.03390 | 0.16600 | 1.72000 | 0.08870 | -8.00 | -3.38 | -1.80 | 0.54 | -2.42 | 0.0027 |
| Jul-10 | 0.07000 | 0.00032 U | 0.03270 | 0.06990 | 1.79000 | 0.09280 | -8.00 | -3.42 | -2.66 | 0.58 | -2.38 | 0.0031 |
| Jan-11 | 0.07000 | 0.00026 U | 0.03650 | 0.12900 | 1.44000 | 0.09780 | -8.00 | -3.31 | -2.05 | 0.36 | -2.32 | 0.0028 |
| Jul-11 | 0.07000 | 0.00026 U | 0.03620 | 0.05290 | 1.55000 J | 0.08010 | -8.00 | -3.32 | -2.94 | 0.44 | -2.52 | 0.0026 |
| Jan-12 | 0.07000 | 0.00026 U | 0.03580 | 0.10400 | 1.15000 | 0.07880 | -8.00 | -3.33 | -2.26 | 0.14 | -2.54 | 0.0023 |
| Jul-12 | 0.07000 | 0.00026 U | 0.03880 | 0.24900 | 0.66700 | 0.08590 | -8.00 | -3.25 | -1.39 | -0.40 | -2.45 | 0.0020 |
| Jan-13 | 0.07000 | 0.00024 U | 0.0401 | 0.1830 | 1.110 | 0.09790 | -8.00 | -3.22 | -1.70 | 0.10 | -2.32 | 0.0024 |
| Jul-13 | 0.07000 | 0.00024 U | 0.0306 | 0.2280 | 1.260 | 0.08150 | -8.00 | -3.49 | -1.48 | 0.23 | -2.51 | 0.0026 |
| Jul-14 | 0.07000 | 0.00029 J | 0.0341 | 0.1870 | 0.622 | 0.06400 | -8.15 | -3.38 | -1.68 | -0.47 | -2.75 | 0.0017 |
| Jan-15 | 0.07000 | 0.00025 U | 0.0355 | 0.0714 | 0.800 | 0.06500 | -8.00 | -3.34 | -2.64 | -0.22 | -2.73 | 0.0019 |
| Jul-15 | 0.07000 | 0.00025 U | 0.0332 | 0.1590 | 0.635 | 0.08590 | -8.00 | -3.41 | -1.84 | -0.45 | -2.45 | 0.0025 |
| Jan-16 | 0.07000 | 0.00025 U | 0.00196 | 0.1380 | 0.53 J | 0.0685 JL | -8.00 | -6.23 | -1.98 | -0.63 | -2.68 | 0.0087 |
| Jul-16 | 0.07000 | 0.00025 U | 0.0365 | 0.1360 | 0.412 | 0.0767 | -8.00 | -3.31 | -2.00 | -0.89 | -2.57 | 0.0020 |

**Table 4-5**

**Summary of Concentration vs. Distance Attenuation Rate Constants**
**SWMU 86 Plume**
**2016 RAER**
**Former NAS Dallas, Texas**
**Page 2 of 2**

| Sampling Date | Protective Concentration Level (mg/L) | Detected Concentration (mg/L) | | | | | Natural Log of COC Concentration (mg/L) | | | | | $K_{dist}$ [(mg/L) per foot] |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Centerline Monitoring Wells** | | **428B07MW** | **428B131MW** | **428B132MW** | **428B133MW** | **428B134MW** | **428B07MW** | **428B131MW** | **428B132MW** | **428B133MW** | **428B134MW** | |
| **Distance from source area (ft)** | | **0** | **136** | **321** | **357** | **548** | 0 | 136 | 321 | 357 | 548 | |
| **Vinyl Chloride** | | | | | | | | | | | | |
| Apr-05 | 0.00200 | 0.00030 U | 0.00030 U | 0.00030 U | 0.00030 U | 0.00030 U | -8.00 | -8.00 | -8.00 | -8.00 | -8.00 | 0.0000 |
| Jul-05 | 0.00200 | NS | 0.00040 J | 0.00030 U | 0.00030 U | 0.00030 U | -- | -7.82 | -8.00 | -8.00 | -8.00 | -0.0004 |
| Oct-05 | 0.00200 | 0.00030 U | 0.00090 J | 0.00030 U | 0.00090 J | 0.00030 U | -8.00 | -7.01 | -8.00 | -7.01 | -8.00 | -0.0022 |
| Jan-06 | 0.00200 | 0.00060 U | 0.00030 U | 0.00030 U | 0.00050 J | 0.00030 U | -8.00 | -8.00 | -8.00 | -7.60 | -8.00 | 0.0001 |
| Aug-06 | 0.00200 | 0.00060 U | 0.00070 J | 0.00060 U | 0.00100 J | 0.00060 U | -8.00 | -7.26 | -8.00 | -6.91 | -8.00 | -0.0015 |
| Apr-07 | 0.00200 | 0.00055 J | 0.00020 U | 0.00120 J | 0.00230 J | 0.00020 U | -7.51 | -8.00 | -6.73 | -6.07 | -8.00 | 0.0001 |
| Sep-07 | 0.00200 | 0.00020 U | 0.00100 J | 0.00540 | 0.00400 U | 0.00071 J | -8.00 | -6.91 | -5.22 | -8.00 | -7.25 | -0.0014 |
| Jan-08 | 0.00200 | 0.00043 U | 0.00043 U | 0.00043 U | 0.00240 | 0.00043 U | -8.00 | -8.00 | -8.00 | -6.03 | -8.00 | 0.0004 |
| Jul-08 | 0.00200 | 0.00030 U | 0.00030 U | 0.00030 U | 0.00600 U | 0.00030 U | -8.00 | -8.00 | -8.00 | -8.00 | -8.00 | 0.0000 |
| Jan-09 | 0.00200 | 0.00030 U | 0.00030 U | 0.00061 J | 0.00300 U | 0.00290 | -8.00 | -8.00 | -7.40 | -8.00 | -5.84 | 0.0051 |
| Jul-09 | 0.00200 | 0.00030 U | 0.00058 J | 0.00640 | 0.00600 U | 0.00960 | -8.00 | -7.45 | -5.05 | -8.00 | -4.65 | 0.0062 |
| Jan-10 | 0.00200 | 0.00028 U | 0.00033 J | 0.00090 J | 0.00560 U | 0.00028 U | -8.00 | -8.02 | -7.01 | -8.00 | -8.00 | -0.0002 |
| Jul-10 | 0.00200 | 0.00028 U | 0.00092 J | 0.00053 J | 0.05370 | 0.00700 | -8.00 | -6.99 | -7.54 | -2.92 | -4.96 | 0.0058 |
| Jan-11 | 0.00200 | 0.00022 U | 0.00022 U | 0.00095 J | 0.02790 | 0.00230 | -8.00 | -8.00 | -6.96 | -3.58 | -6.07 | 0.0053 |
| Jul-11 | 0.00200 | 0.00022 U | 0.00089 J | 0.0024 | 0.26200 J | 0.02720 | -8.00 | -7.02 | -6.03 | -1.34 | -3.60 | 0.0091 |
| Jan-12 | 0.00200 | 0.00022 U | 0.00041 J | 0.0011 | 0.07040 | 0.00140 | -8.00 | -7.80 | -6.81 | -2.65 | -6.57 | 0.0037 |
| Jan-13 | 0.00200 | 0.00044 U | 0.00044 U | 0.0023 | 0.00880 U | 0.00150 | -8.00 | -8.00 | -6.07 | NA | -6.50 | 0.0034 |
| Jul-13 | 0.00200 | 0.00044 U | 0.00044 U | 0.0200 | 0.0310 | 0.00950 | -8.00 | -8.00 | -3.91 | -3.47 | -4.66 | 0.0080 |
| Jul-14 | 0.00200 | 0.00025 U | 0.00025 U | 0.0212 | 0.0294 J | 0.00205 | -8.00 | -8.00 | -3.85 | -3.53 | -6.19 | 0.0043 |
| Jan-15 | 0.00200 | 0.00025 U | 0.00025 U | 0.0134 | 0.0017 | 0.00025 U | -8.00 | -8.00 | -4.31 | -6.40 | -8.00 | -0.0005 |
| Jul-15 | 0.00200 | 0.00025 U | 0.00025 U | 0.0330 | 0.012 | 0.00338 | -8.00 | -8.00 | -3.41 | -6.40 | -8.00 | -0.0007 |
| Jan-16 | 0.00200 | 0.00025 UJ | 0.00025 UJ | 0.00845 J | 0.0025 UJ | 0.00025 UJL | -8.00 | -8.00 | -4.77 | -6.40 | -8.00 | -0.0004 |
| Jul-16 | 0.00200 | 0.00025 U | 0.00027 J | 0.0237 | 0.0881 | 0.00043 J | -8.00 | -8.22 | -3.74 | -6.40 | -7.75 | 0.0005 |

ft - feet
mg/L - milligrams per liter
NA - Not Applicable
NS - Not Sampled

Notes:
Shaded areas indicate an exceedance.
For graphing purposes non-detect concentrations and estimated concentrations below 0.0004 mg/L have been assigned a natural log value of -8

Analytical Result Qualifiers:

J - Indicates that the chemical was detected. However, the associated numerical result may not be a precise representation of the amount that is actually present in the sample. The laboratory reported concentration is considered to be an estimate of the true concentration.

U - Indicates that the chemical was not detected at the numerical detection limit (sample-specific quantitation limit) noted. Nondetected results from the laboratory are reported in this manner. This qualifier is added to a positive result (reported by the laboratory) if the detected concentration is determined to be attributable to contamination introduced during field sampling or laboratory analysis.

# Plug and Abandonment Documentation

# STATE OF TEXAS PLUGGING REPORT for Tracking #158500

| | | | |
|---|---|---|---|
| Owner: | **NAS Dallas** | Owner Well #: | **428B129MW** |
| Address: | **8100 West Jefferson<br>Grand Prairie, TX 75051** | Grid #: | **33-17-1** |
| Well Location: | **8100 West Jefferson<br>Grand Prairie, TX 75051** | Latitude: | **32° 44' 25.8" N** |
| | | Longitude: | **096° 57' 46.3" W** |
| Well County: | **Dallas** | Elevation: | **No Data** |
| Well Type: | **Monitor** | | |

*Drilling Information*

| | | | |
|---|---|---|---|
| Company: | **No Data** | Date Drilled: | **No Data** |
| Driller: | **No Data** | License Number: | **No Data** |

| | *Diameter (in.)* | *Top Depth (ft.)* | *Bottom Depth (ft.)* |
|---|---|---|---|
| Borehole: | | **0** | **23.5** |

*Plugging Information*

Date Plugged: **4/7/2016** Plugger:

Plug Method: **Pour in 3/8 bentonite chips when standing water in well is less than 100 feet depth, cement top 2 feet**

Casing Left in Well:

**No Data**

Plug(s) Placed in Well:

| *Top (ft.)* | *Bottom (ft.)* | *Description (number of sacks & material)* |
|---|---|---|
| **0** | **2** | **Cement 2 Bags/Sacks** |
| **2** | **23.5** | **Bentonite 2 Bags/Sacks** |

Certification Data: The driller certified that the driller plugged this well (or the well was plugged under the driller's direct supervision) and that each and all of the statements herein are true and correct. The driller understood that failure to complete the required items will result in the reports(s) being returned for completion and resubmittal.

Company Information: **Strata Core Services, LLC**

**112 S. Norwood Drive**
**Hurst, TX 76053**

Driller Name: **Brad Eskue** License Number: **58164**

Comments: **No Data**

# APPENDIX 5
# SAMPLING PROCEDURES

Sampling collection and handling procedures were updated to follow Uniform Federal Policy (UFP) for Sample and Analysis Plans in the document titled, Tier II Sampling and Analysis Plan, Long Term Groundwater Monitoring Plan, Former Naval Air Station Dallas, Dallas, Texas, dated December 2014.

# APPENDIX 6
# LABORATORY DATA PACKAGES AND DATA USABILITY SUMMARIES

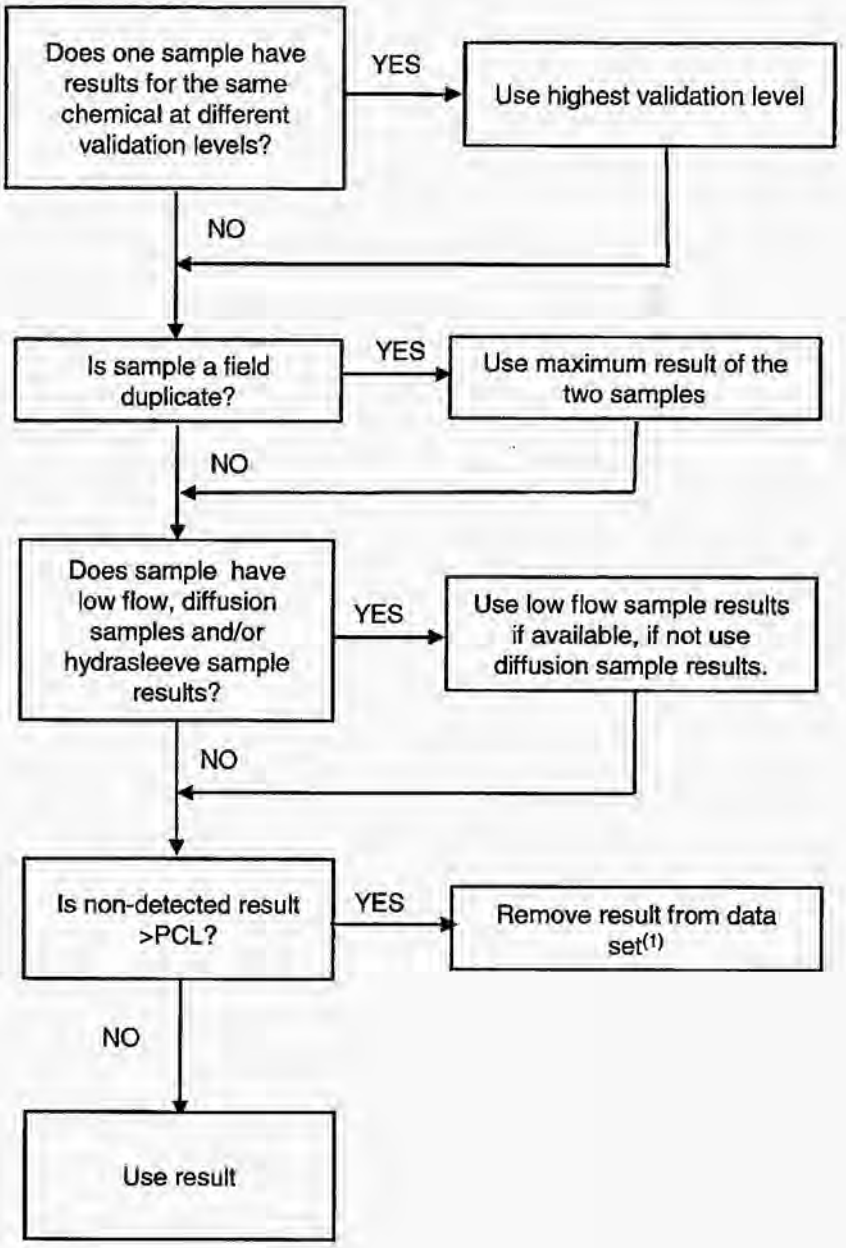
See the attached CD for the Laboratory Analytical Reports —
submitted with the 2016 RAER for SWMU 17/Building 1423
(sorted by Sample Delivery Group Number)

# APPENDIX 7
# STATISTICAL METHODOLOGY

Statistical Methodology has been submitted with the 2016 RAER for SWMU 17/Building 1423

GROUNDWATER DATABASE DEVELOPMENT FOR GRAPHING AND MANN KENDALL STATISTICAL EVALUATION

NAS DALLAS, TEXAS




NOTES:

(1) For 1,1,2,2-PCA and vinyl chloride the TRRP RES A limit < MDL of 5 U therefore only the non-detects > 5 U were removed from the data set.

# STDEV

See Also

Estimates standard deviation based on a sample. The standard deviation is a measure of how widely values are dispersed from the average value (the mean).

**Syntax**

**STDEV(number1**,number2,...)

Number1, number2, ... are 1 to 30 number arguments corresponding to a sample of a population. You can also use a single array or a reference to an array instead of arguments separated by commas.

**Remarks**

- STDEV assumes that its arguments are a sample of the population. If your data represents the entire population, then compute the standard deviation using STDEVP.
- The standard deviation is calculated using the "nonbiased" or "n-1" method.
- STDEV uses the following formula:
- $$\sqrt{\frac{n\sum x^2 - \left(\sum x\right)^2}{n(n-1)}}$$
  $$\sqrt{\frac{n\sum x^2 - \left(\sum x\right)^2}{n(n-1)}}$$
- Logical values such as TRUE and FALSE and text are ignored. If logical values and text must not be ignored, use the STDEVA worksheet function.

**Example**

Suppose 10 tools stamped from the same machine during a production run are collected as a random sample and measured for breaking strength.

The example may be easier to understand if you copy it to a blank worksheet.

How?

| | A |
|---|---|
| 1 | **Strength** |
| 2 | 1345 |
| 3 | 1301 |
| 4 | 1368 |
| 5 | 1322 |
| 6 | 1310 |
| 7 | 1370 |
| 8 | 1318 |
| 9 | 1350 |
| 10 | 1303 |
| 11 | 1299 |

| Formula | Description (Result) |
|---|---|
| =STDEV(A2:A11) | Standard deviation of breaking strength (27.46391572) |

# BEST-FIT LINE USING LINEAR REGRESSION

# LINEST

See Also

Calculates the statistics for a line by using the "least squares" method to calculate a straight line that best fits your data, and returns an array that describes the line. Because this function returns an array of values, it must be entered as an array formula.

The equation for the line is:

y = mx + b or

y = m1x1 + m2x2 + ... + b (if there are multiple ranges of x-values)

where the dependent y-value is a function of the independent x-values. The m-values are coefficients corresponding to each x-value, and b is a constant value. Note that y, x, and m can be vectors. The array that LINEST returns is {mn,mn-1,...,m1,b}. LINEST can also return additional regression statistics.

**Syntax**

**LINEST(known_y's**,known_x's,const,stats)

Known_y's is the set of y-values you already know in the relationship y = mx + b.

- If the array known_y's is in a single column, then each column of known_x's is interpreted as a separate variable.
- If the array known_y's is in a single row, then each row of known_x's is interpreted as a separate variable.

Known_x's is an optional set of x-values that you may already know in the relationship y = mx + b.

- The array known_x's can include one or more sets of variables. If only one variable is used, known_y's and known_x's can be ranges of any shape, as long as they have equal dimensions. If more than one variable is used, known_y's must be a vector (that is, a range with a height of one row or a width of one column).
- If known_x's is omitted, it is assumed to be the array {1,2,3,...} that is the same size as known_y's.

Const is a logical value specifying whether to force the constant b to equal 0.

- If const is TRUE or omitted, b is calculated normally.
- If const is FALSE, b is set equal to 0 and the m-values are adjusted to fit y = mx.

Stats is a logical value specifying whether to return additional regression statistics.

- If stats is TRUE, LINEST returns the additional regression statistics, so the returned array is {mn,mn-1,...,m1,b;sen,sen-1,...,se1,seb;r2,sey;F,df;ssreg,ssresid}.
- If stats is FALSE or omitted, LINEST returns only the m-coefficients and the constant b.

The additional regression statistics are as follows.

| Statistic | Description |
|---|---|
| se1,se2,...,sen | The standard error values for the coefficients m1,m2,...,mn. |
| Seb | The standard error value for the constant b (seb = #N/A when const is FALSE). |
| r2 | The coefficient of determination. Compares estimated and actual y-values, and ranges in value from 0 to 1. If it is 1, there is a perfect correlation in the sample — there is no difference between the estimated y-value and the actual y-value. At the other extreme, if the coefficient of determination is 0, the regression equation is not helpful in predicting a y-value. For information about how r2 is calculated, see "Remarks" later in this topic. |
| sey | The standard error for the y estimate. |
| F | The F statistic, or the F-observed value. Use the F statistic to determine whether the observed relationship between the dependent and independent variables occurs by chance. |
| df | The degrees of freedom. Use the degrees of freedom to help you find F-critical values in a statistical table. Compare the values you find in the table to the F statistic returned by LINEST to determine a confidence level for the model. |
| ssreg | The regression sum of squares. |
| ssresid | The residual sum of squares. |

The following illustration shows the order in which the additional regression statistics are returned.

| | A | B | C | D | E | F |
|---|---|---|---|---|---|---|
| 1 | $m_n$ | $m_{n-1}$ | ... | $m_2$ | $m_1$ | b |
| 2 | $se_n$ | $se_{n-1}$ | ... | $se_2$ | $se_1$ | $se_b$ |
| 3 | $r_2$ | $se_y$ | | | | |
| 4 | F | $d_f$ | | | | |
| 5 | $ss_{reg}$ | $ss_{resid}$ | | | | |

**Remarks**

- You can describe any straight line with the slope and the y-intercept:

  Slope (m):
  To find the slope of a line, often written as m, take two points on the line, (x1,y1) and (x2,y2); the slope is equal to (y2 - y1)/(x2 - x1).

  Y-intercept (b):
  The y-intercept of a line, often written as b, is the value of y at the point where the line crosses the y-axis.

  The equation of a straight line is y = mx + b. Once you know the values of m and b, you can calculate any point on the line by plugging the y- or x-value into that equation. You can also use the TREND function.

- When you have only one independent x-variable, you can obtain the slope and y-intercept values directly by using the following formulas:

  Slope:
  =INDEX(LINEST(known_y's,known_x's),1)

  Y-intercept:
  =INDEX(LINEST(known_y's,known_x's),2)

- The accuracy of the line calculated by LINEST depends on the degree of scatter in your data. The more linear the data, the more accurate the LINEST model. LINEST uses the method of least squares for determining the best fit for the data. When you have only one independent x-variable, the calculations for m and b are based on the following formulas:

$$m = \frac{n\left(\sum xy\right) - \left(\sum x\right)\left(\sum y\right)}{n\left(\sum\left(x^2\right)\right) - \left(\sum x\right)^2}$$

$$b = \frac{\left(\sum y\right)\left(\sum\left(x^2\right)\right) - \left(\sum x\right)\left(\sum xy\right)}{n\left(\sum\left(x^2\right)\right) - \left(\sum x\right)^2}$$

- The line- and curve-fitting functions LINEST and LOGEST can calculate the best straight line or exponential curve that fits your data. However, you have to decide which of the two results best fits your data. You can calculate TREND(known_y's,known_x's) for a straight line, or GROWTH(known_y's, known_x's) for an exponential curve. These functions, without the new_x's argument, return an array of y-values predicted along that line or curve at your actual data points. You can then compare the predicted values with the actual values. You may want to chart them both for a visual comparison.

- In regression analysis, Microsoft Excel calculates for each point the squared difference between the y-value estimated for that point and its actual y-value. The sum of these squared differences is called the residual sum of squares. Microsoft Excel then calculates the sum of the squared differences between the actual y-values and the average of the y-values, which is called the total sum of squares (regression sum of squares + residual sum of squares). The smaller the residual sum of squares is, compared with the total sum of squares, the larger the value of the coefficient of determination, r2, which is an indicator of how well the equation resulting from the regression analysis explains the relationship among the variables.

- Formulas that return arrays must be entered as array formulas.

- When entering an array constant such as known_x's as an argument, use commas to separate values in the same row and semicolons to separate rows. Separator characters may be different depending on your locale setting in **Regional Settings** or **Regional Options** in **Control Panel**.

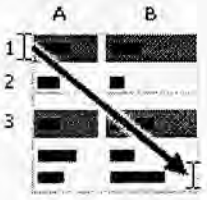
- Note that the y-values predicted by the regression equation may not be valid if they are outside the range of the y-values you used to determine the equation.

**Example 1 Slope and Y-Intercept**

The example may be easier to understand if you copy it to a blank worksheet.

How?

1. Create a blank workbook or worksheet.
2. Select the example in the Help topic. Do not select the row or column headers.




Selecting an example from Help

3. Press CTRL+C.
4. In the worksheet, select cell A1, and press CTRL+V.
5. To switch between viewing the results and viewing the formulas that return the results, press CTRL+` (grave accent), or on the **Tools** menu, point to **Formula Auditing**, and then click **Formula Auditing Mode**.

| | A | B |
|---|---|---|
| 1 | **Known y** | **Known x** |
| 2 | 1 | 0 |
| 3 | 9 | 4 |
| 4 | 5 | 2 |
| 5 | 7 | 3 |
| | **Formula** | **Formula** |
| | =LINEST(A2:A5,B2:B5,,FALSE) | |

**Note** The formula in the example must be entered as an array formula. After copying the example to a blank worksheet, select the range A7:B7 starting with the formula cell. Press F2, and then press CTRL+SHIFT+ENTER. If the formula is not entered as an array formula, the single result is 2.

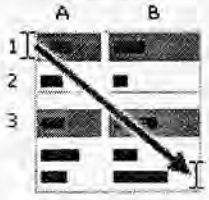
When entered as an array, the slope (2) and the y-intercept (1) are returned.

**Example 2 Simple Linear Regression**

The example may be easier to understand if you copy it to a blank worksheet.

How?

1. Create a blank workbook or worksheet.
2. Select the example in the Help topic. Do not select the row or column headers.




Selecting an example from Help

3. Press CTRL+C.
4. In the worksheet, select cell A1, and press CTRL+V.
5. To switch between viewing the results and viewing the formulas that return the results, press CTRL+` (grave accent), or on the **Tools** menu, point to **Formula Auditing**, and then click **Formula Auditing Mode**.

| | A | B |
|---|---|---|
| 1 | **Month** | **Sales** |
| 2 | 1 | 3100 |
| 3 | 2 | 4500 |
| 4 | 3 | 4400 |

| | | |
|---|---|---|
| **5** | 4 | 5400 |
| **6** | 5 | 7500 |
| **7** | 6 | 8100 |
| | **Formula** | **Description (Result)** |
| | =SUM(LINEST(B2:B7, A2:A7)*{9,1}) | Estimate sales for the ninth month (11000) |

In general, SUM({m,b}*{x,1}) equals mx + b, the estimated y-value for a given x-value. You can also use the TREND function.

**Example 3 Multiple Linear Regression**

Suppose a commercial developer is considering purchasing a group of small office buildings in an established business district.

The developer can use multiple linear regression analysis to estimate the value of an office building in a given area based on the following variables.

| Variable | Refers to the |
|---|---|
| y | Assessed value of the office building |
| x1 | Floor space in square feet |
| x2 | Number of offices |
| x3 | Number of entrances |
| x4 | Age of the office building in years |

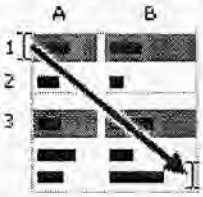
This example assumes that a straight-line relationship exists between each independent variable (x1, x2, x3, and x4) and the dependent variable (y), the value of office buildings in the area.

The developer randomly chooses a sample of 11 office buildings from a possible 1,500 office buildings and obtains the following data. "Half an entrance" means an entrance for deliveries only.

The example may be easier to understand if you copy it to a blank worksheet.

How?

1. Create a blank workbook or worksheet.
2. Select the example in the Help topic. Do not select the row or column headers.




Selecting an example from Help

3. Press CTRL+C.
4. In the worksheet, select cell A1, and press CTRL+V.
5. To switch between viewing the results and viewing the formulas that return the results, press CTRL+` (grave accent), or on the **Tools** menu, point to **Formula Auditing**, and then click **Formula Auditing Mode**.

| | A | B | C | D | E |
|---|---|---|---|---|---|
| **1** | **Floor space (x1)** | **Offices (x2)** | **Entrances (x3)** | **Age (x4)** | **Assessed value (y)** |
| **2** | 2310 | 2 | 2 | 20 | 142,000 |
| **3** | 2333 | 2 | 2 | 12 | 144,000 |
| **4** | 2356 | 3 | 1.5 | 33 | 151,000 |
| **5** | 2379 | 3 | 2 | 43 | 150,000 |

| | | | | | |
|---|---|---|---|---|---|
| **6** | 2402 | 2 | 3 | 53 | 139,000 |
| **7** | 2425 | 4 | 2 | 23 | 169,000 |
| **8** | 2448 | 2 | 1.5 | 99 | 126,000 |
| **9** | 2471 | 2 | 2 | 34 | 142,900 |
| **10** | 2494 | 3 | 3 | 23 | 163,000 |
| **11** | 2517 | 4 | 4 | 55 | 169,000 |
| **12** | 2540 | 2 | 3 | 22 | 149,000 |

**Formula**

=LINEST(E2:E12,A2:D12,TRUE,TRUE)

**Note** The formula in the example must be entered as an array formula. After copying the example to a blank worksheet, select the range A14:E18 starting with the formula cell. Press F2, and then press CTRL+SHIFT+ENTER. If the formula is not entered as an array formula, the single result is -234.2371645.

When entered as an array, the following regression statistics are returned. Use this key to identify the statistic you want.

| | A | B | C | D | E | F |
|---|---|---|---|---|---|---|
| 1 | $m_n$ | $m_{n-1}$ | ... | $m_2$ | $m_1$ | b |
| 2 | $se_n$ | $se_{n-1}$ | ... | $se_2$ | $se_1$ | $se_b$ |
| 3 | $r_2$ | $se_y$ | | | | |
| 4 | F | $d_f$ | | | | |
| 5 | $ss_{reg}$ | $ss_{resid}$ | | | | |

The multiple regression equation, y = m1*x1 + m2*x2 + m3*x3 + m4*x4 + b, can now be obtained using the values from row 14:

y = 27.64*x1 + 12,530*x2 + 2,553*x3+ 234.24*x4 + 52,318

The developer can now estimate the assessed value of an office building in the same area that has 2,500 square feet, three offices, and two entrances and is 25 years old, by using the following equation:

y = 27.64*2500 + 12530*3 + 2553*2 - 234.24*25 + 52318 = $158,261

Or you can copy the following table to cell A21 of the example workbook.

| Floor space (x1) | Offices (x2) | Entrances (x3) | Age (x4) | Assessed value (y) |
|---|---|---|---|---|
| 2500 | 3 | 2 | 25 | =D14*A22 + C14*B22 + B14*C22 + A14*D22 + E14 |

You can also use the TREND function to calculate this value.

**Example 4 Using The F And R2 Statistics**

In the previous example, the coefficient of determination, or r2, is 0.99675 (see cell A17 in the output for LINEST), which would indicate a strong relationship between the independent variables and the sale price. You can use the F statistic to determine whether these results, with such a high r2 value, occurred by chance.

Assume for the moment that in fact there is no relationship among the variables, but that you have drawn a rare sample of 11 office buildings that causes the statistical analysis to demonstrate a strong relationship. The term "Alpha" is used for the probability of erroneously concluding that there is a relationship.

There is a relationship among the variables if the F-observed statistic is greater than the F-critical value. The F-critical value can be obtained by referring to a table of F-critical values in many statistics textbooks. To read the table, assume a single-tailed test, use an Alpha value of 0.05, and for the degrees of freedom (abbreviated in most tables as v1 and v2), use v1 = k = 4 and v2 = n - (k + 1) = 11 - (4 + 1) = 6, where k is the number of variables in the regression analysis and n is the number of data points. The F-critical value is 4.53.

The F-observed value is 459.753674 (cell A18), which is substantially greater than the F-critical value of 4.53. Therefore, the regression equation is useful in predicting the assessed value of office buildings in this area.

**Example 5 Calculating The T-Statistics**

Another hypothesis test will determine whether each slope coefficient is useful in estimating the assessed value of an office building in example 3. For example, to test the age coefficient for statistical significance, divide -234.24 (age slope coefficient) by 13.268 (the estimated standard error of age coefficients in cell A15). The following is the t-observed value:

t = m4 ÷ se4 = -234.24 ÷ 13.268 = -17.7

If you consult a table in a statistics manual, you will find that t-critical, single tail, with 6 degrees of freedom and Alpha = 0.05 is 1.94. Because the absolute value of t, 17.7, is greater than 1.94, age is an important variable when estimating the assessed value of an office building. Each of

the other independent variables can be tested for statistical significance in a similar manner. The following are the t-observed values for each of the independent variables.

| Variable | t-observed value |
|---|---|
| Floor space | 5.1 |
| Number of offices | 31.3 |
| Number of entrances | 4.8 |
| Age | 17.7 |

These values all have an absolute value greater than 1.94; therefore, all the variables used in the regression equation are useful in predicting the assessed value of office buildings in this area.

## SLOPE OF BEST-FIT LINE

# SLOPE

See Also

Returns the slope of the linear regression line through data points in known_y's and known_x's. The slope is the vertical distance divided by the horizontal distance between any two points on the line, which is the rate of change along the regression line.

**Syntax**

**SLOPE(known_y's,known_x's)**

Known_y's is an array or cell range of numeric dependent data points.

Known_x's is the set of independent data points.

**Remarks**

- The arguments must be either numbers or names, arrays, or references that contain numbers.
- If an array or reference argument contains text, logical values, or empty cells, those values are ignored; however, cells with the value zero are included.
- If known_y's and known_x's are empty or have a different number of data points, SLOPE returns the #N/A error value.
- The equation for the slope of the regression line is:

$$b = \frac{n\sum xy - \left(\sum x\right)\left(\sum y\right)}{n\sum x^2 - \left(\sum x\right)^2}$$

**Example**

The example may be easier to understand if you copy it to a blank worksheet.

How?

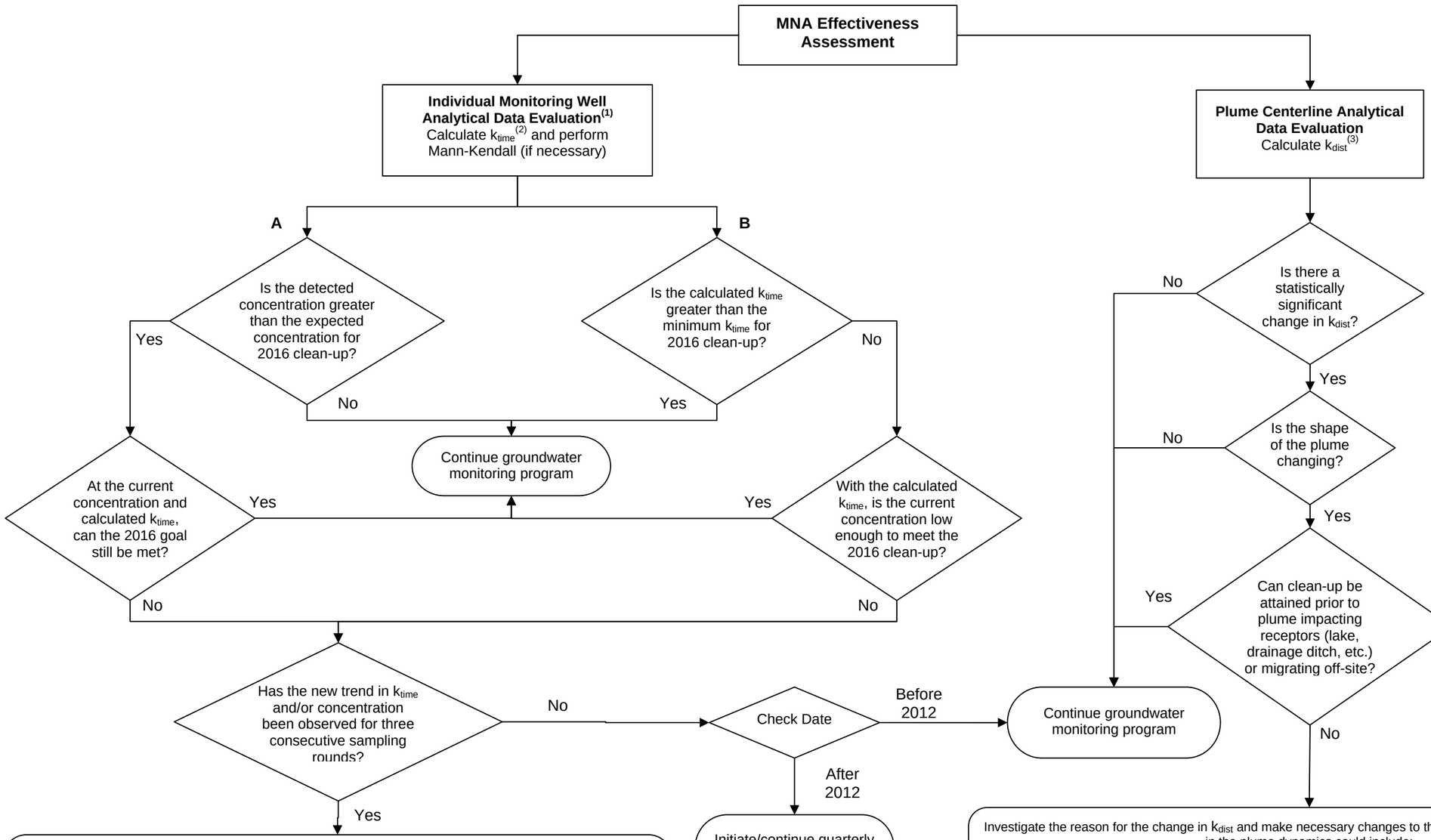
| | A | B |
|---|---|---|
| 1 | **Known y** | **Known x** |
| 2 | 2 | 6 |
| 3 | 3 | 5 |
| 4 | 9 | 11 |
| 5 | 1 | 7 |
| 6 | 8 | 5 |
| 7 | 7 | 4 |
| 8 | 5 | 4 |

| Formula | Description (Result) |
|---|---|
| =SLOPE(A2:A8,B2:B8) | Slope of the linear regression line through the data points above (0.305556) |

# MONITORED NATURAL ATTENUATION DATA EVALUATION

**DIAGRAM 3-1**
**MONITORED NATURAL ATTENUATION DATA EVALUATION**
**RESPONSE ACTION PLAN**

**NAS DALLAS, TEXAS**




Investigate the reason for the change in $k_{time}$ and make necessary changes to the remedial system. These changes in the plume dynamics could include:

| **Reason for $k_{time}$ Change** | **Recommended Changes in Remediation** |
|---|---|
| New source or new release | Identify new Responsible Party for continued remediation. |
| Geochemical change | Determine if chemical additives are necessary or technical impracticability of additional remediation. |
| Asymptotic degradation reached | Determine if active remediation or excavation are necessary or technical impracticability of additional remediation. |

Investigate the reason for the change in $k_{dist}$ and make necessary changes to the remedial system. These changes in the plume dynamics could include:

| **Reason for $K_{dist}$ Change** | **Recommended Changes in Remediation** |
|---|---|
| New source or new release | Identify new Responsible Party for continued remediation. |
| Migrating plume | Initiate abatement measures such as interceptor trench, slurry walls, pump recovery / capture system, etc. if receptors are threatened. |

Notes:
(1) Both pathways (A, B) must be evaluated for each of the chemicals of concern in each monitoring point along the plume's centerline.
(2) $k_{time}$ Concentration versus Time Attenuation Rate Constant
(3) $k_{dist}$ Concentration versus Distance Attenuation Rate Constant

# Assessment of MNA Performance Monitoring

## Introduction

The MNA monitoring well networks at the NAS Dallas groundwater plumes will provide the necessary analytical data to evaluate the dynamic behavior of the plumes over time, including contaminant and/or concentration reductions indicative of progress toward clean-up objectives, changes in plume boundaries, and changes in geochemistry. To this effect, these monitoring well networks include monitoring wells in areas hydraulically upgradient and sidegradient to the groundwater plume, in the historical source area, along the main body of the plume and immediately downgradient of the plume. The number and locations of monitoring points for each plume was selected based on the size of the plume, groundwater velocity, proximity to receptors (including cross-media transfer of COCs), and presence of preferential pathways for COC migration.

As required by the Compliance Plan for NAS Dallas (TCEQ, 2004), performance monitoring for MNA will be conducted in accordance with Response Action Plan (RAP) Worksheet 3.1 until all remedial action objectives have been met for the plume for at least two consecutive sampling events. Upon demonstration of the attainment of clean-up objectives, a three-year of post-remedial action monitoring will be implemented in accordance with the Compliance Plan for NAS Dallas (TCEQ, 2004) and as outlined on RAP Worksheet 4.1.

In addition to the COCs identified in the APAR (TtNUS, 2003) for each groundwater plume, daughter products that may be formed as a result of biotransformation or chemical processes will be monitored during the corrective action period at each plume. In order to ensure that there is a potential for continued transformation of the COCs within the groundwater plume, the geochemical environment will also be monitored (i.e., oxidation-reduction potential, dissolved oxygen, pH, etc.) every two years at a minimum. During the post-remedial action monitoring, the Compliance Plan requires that an expanded list of parameters be sampled including those COCs historically detected at the site. In order to minimize the chance of identifying constituent exceedances during the post-response action monitoring, the expanded list of parameters identified on RAP Worksheet 4.1 (Compliance Plan Table III) will be monitored every five years at a minimum.

Each new round of data will help develop a better understanding of the site and site processes and as a result, the conceptual site model for MNA will be continuously reevaluated from the standpoint of the observed plume shape, location, stability, and dynamics; attenuation rates; groundwater flow patterns; and geochemical regimes.

To evaluate progress towards achievement of clean-up objectives, data collected from the monitoring well network will be used to determine temporal and spatial trends in COC concentrations, comparisons of observed COC concentrations with benchmark concentrations, and, comparison of calculated attenuation rates with the rates required to meet remedial objectives within the required timeframe. Data will be interpreted with regard to variability so that attenuation-related changes and trends can be distinguished from other sources of variation in the data.

If a departure from a predicted trend is found, (i.e., exceeding benchmark concentration or unfavorable changes in attenuation rates), the deviation will be evaluated to determine how the changes may affect attainment of remedial goals for the individual monitoring wells, as well as, how the changes may affect the behavior of the entire plume (i.e., plume stability, reduction in COC concentrations, etc.). Departures from expected trends may not mean remedy failure, because there may be a range of attenuation rates that will achieve the desired remedial goals

in the allotted time; therefore their significance must be evaluated in the context of the site-related goals. If the potential impact on the remedy is negligible, revision of the conceptual site model may be the only outcome of such evaluation. However, if the potential for impact is significant, implementation of alternative remedies may be triggered or, at a minimum additional characterization to better define the factors limiting COC reduction and determine methods for mitigating the magnitude of their impact would be warranted. Other site-related data (i.e., geochemistry and potentiometric data) will continue to be evaluated to provide evidence of COC migration, fate, and attenuation processes. These data may be used to ascertain COC degradation and the continuation of appropriate conditions for attenuation at acceptable rates.

Following the individual monitoring well data analysis, plume behavior will be assessed to evaluate the continued effectiveness of the MNA remedy, as well as the adequacy of the monitoring program and conceptual site model for MNA. The ongoing monitoring program will provide the necessary data for continual refinement of the conceptual model and subsequently of the monitoring program itself. Upon completion of each sampling round, data analysis and determination of the effectiveness of the MNA remedy, plume-specific criteria will drive decisions affecting the continuity of the monitoring program.

At some plumes, source control and interim remedial activities have occurred between the original site characterization process and the implementation of performance monitoring. Because these activities are expected to change the site's characteristics and behavior, performance monitoring will require the continued refinement of the conceptual site model for MNA. This refinement of the conceptual site model may eventually be different from the original MNA conceptual site model based on the initial site characterization data. Development and implementation of the new conceptual site model for MNA will require the collection of additional data (i.e., quarterly monitoring for the first year after interim remedial activities and on a semi-annual basis thereafter) to establish baseline conditions, expediently depict new site characteristics and parameter variability, establish trends and estimate attenuation rates for COCs, determine if the plume characteristics have been altered, and assess the likelihood of meeting site remediation goals.

## Evaluation of New Data

Data interpretation will include the preliminary assessment of the COC concentration data collected for both the plume centerline (e.g., whole plume dynamics) as well as on individual COCs within each monitoring well. The interpretation will be conducted through graphs, tables, maps, statistics, and time-series plots. This will help in identifying patterns, relationships, and anomalies, such as possible "outliers" to the observed remedial trend of the plume. Scatter graphs (i.e., $k_{time}$ and $k_{dist}$ graphs) will show relationships between two variables that are not readily evident using purely numerical methods. Mapping the data in plan view and/or cross-section (i.e., isoconcentration maps, potentiometric maps, MNA parameter maps, etc.) will help understand patterns of COC distribution and migration, and relationships between geochemical zones and COC attenuation.

The initial data analysis and interpretation will focus on the detection of trends in the data for the COCs within individual monitoring wells and subsequently for the plume as a whole. First, the COC concentration data collected from each monitoring well will be used to determine the temporal trends that exist within the plume. The COC trends will also be evaluated at monitoring points located throughout the plume as a whole. In order to adequately interpret progress toward COC reduction goals for the plume, it is necessary to compare trends of individual monitoring wells to trends of other monitoring wells in the plume. Evaluating trends in data from all sampling locations in the plume will determine if the plume exhibits stability or reduction in COC concentrations. In addition, for each COC, spatial trends along the plume centerline [i.e., concentration vs. distance attenuation rate ($k_{dist}$)] will be evaluated. This analysis assists in evaluating the stability of the plume and its migration potential. Assessment of spatial plume behavior is necessary to ensure no unacceptable plume migration occurs.

Further evaluation will focus on the assessment of any departures from predicted trends and their impact on the potential for MNA to achieve plume-related goals. If the COC data points do not definitively indicate that the remedial goals are meeting the reasonable progress expectations, other data will be analyzed in order to properly interpret particular variances from the predicted performance (i.e., the site stratigraphy, groundwater chemistry, the groundwater flow field, the season of the year).

In addition, non-parametric statistical tests, such as the Mann-Kendall test, may be included in the data evaluation to establish the existence of a trend when the initial evaluation is inconclusive due to high data variability.

The process of MNA data evaluation is graphically depicted in Diagram 3-1.

### Individual Monitoring Well Analytical Data Evaluation

Evaluation of progress towards achievement of clean-up goals will focus primarily on temporal trends in COC concentration at individual attenuation monitoring point (AMP) wells within the plume. After each sampling event, temporal trends [i.e., concentration vs. time attenuation rate ($k_{time}$)], will be established for each AMP of the plume. Temporal trends ($k_{time}$) are particularly useful in evaluating if remedial goals can be met in the desired timeframe for the individual location. The analysis of temporal trends is useful for estimating the potential lifetime of the COC plume at the particular location.

The parameters to be evaluated in parallel to ensure reasonable progress is being made in the response action at the particular location are as follows:

- Direct comparison of detected concentrations to expected or benchmark concentration to meet remedial goals by the year 2016 for the monitoring wells along the centerline of the plume.

- Direct comparison of observed attenuation rate ($k_{time}$) from the chemical specific historical data available for the monitoring well versus the minimum attenuation rate ($k_{time}$) necessary to meet the 2016 clean-up date.

The following graph depicts the possible evaluation scenarios for the above parameters:

| | |
|---|---|
| **Measured COC Concentration < Expected COC Concentration**<br>**and**<br>**Observed $k_{time}$ > Minimum $k_{time}$**<br>Remedial goal is being met, continue performance monitoring | **Measured COC Concentration < Expected COC Concentration**<br>**and**<br>**Observed $k_{time}$ < Minimum $k_{time}$**<br>Evaluate further to ensure remedial goal is being met |
| **Measured COC Concentration > Expected COC Concentration**<br>**and**<br>**Observed $k_{time}$ > Minimum $k_{time}$**<br>Evaluate further to ensure remedial goal is being met | **Measured COC Concentration > Expected COC Concentration**<br>**and**<br>**Observed $k_{time}$ < Minimum $k_{time}$**<br>Remedial goal not being met, consider new response action |

1. Satisfactory progress is being made with the response action (top left quadrant) for an individual well location, if the detected concentration of the COC(s) is not greater than the 2016 clean-up curve expected concentration; and, the observed attenuation rate based on historical data available from the monitoring well is equal to or greater than the minimum attenuation rate necessary to meet clean-up by the year 2016 for the monitoring wells along the centerline of the plume.
2. Reasonable progress is not being made towards achieving the remedial goal (bottom right quadrant) if the detected concentration of the COC(s) exceeds the 2016 clean-up curve expected concentration; and the observed attenuation rate based on historical data available from the monitoring well is less than the minimum attenuation rate necessary to meet clean-up by the year 2016 for the monitoring wells along the centerline of the plume. A new response action may need to be implemented if this trend continues for at least three sampling rounds.
3. Further evaluation will be needed for the scenarios in the top right and bottom left quadrants before establishing if reasonable progress is being made towards achievement of the clean-up goals:
   - Reasonable progress is being made when the observed attenuation rate based on historical data is steep enough that clean-up can still be achieved by the year 2016, even though the detected concentration of a COC may be greater than the expected concentration during a particular sampling event (bottom left quadrant).
   - Reasonable progress is being made if the detected concentration of a COC in the sampling event is sufficiently below the expected concentration so that with an observed attenuation rate based on historical data greater than the calculated minimum attenuation rate necessary to meet PCLs by 2016, the remedial objectives can still be achieved by the year 2016 (top right quadrant).
   - Reasonable progress may not be made if either of the preceding two situations continues for at least three consecutive sampling rounds. At that point in the response action evaluation, a new response action may need to be implemented. In this case other statistical methods may be used to evaluate the data such as using non-parametric tests (i.e., Mann-Kendall) to determine if there has been a statistically significant change in degradation trends.

Plume Analytical Data Evaluation

Since a plume-wide trend implying progress toward restoration cannot be satisfactorily elucidated from monitoring only individual sampling locations, it will be necessary to compare trends among the AMP wells in the plume. Reduction in COC concentrations from all or most sampling locations within predicted ranges and/or at anticipated rates can be interpreted as a decrease in COC mass for the plume and will be indicative of effective remediation of the plume through MNA. Mixed trends in different portions of the plume may imply temporal changes in plume migration or may be simply attributed to the natural attenuation processes, and do not signify failure of MNA to achieve its goals in a timely manner. These variations will be evaluated in the context of the conceptual site model and sampling history before they are attributed to natural attenuation processes of other possible causes. To this effect, in cases of mixed trends it will be necessary to perform other comparisons in order to reach a conclusion of satisfactory progress. It will be particularly useful to evaluate trends in COC and daughter product concentrations (e.g., a decreasing trend in trichloroethene compared to an increasing trend in cis-1,2-dichloroethene in the same plume may indicate degradation of trichloroethene to cis-1,2-dichloroethene). Other trends of interest include changes in geochemistry that may indicate decrease in attenuation rates, such as changes in availability of electron donors and electron acceptors, changes in oxidation-reduction potential, or other primary geochemical indicators.

The complement to the evaluation of the behavior of the plume as a whole is the assessment of spatial trends. For each COC, spatial trends along the plume centerline [i.e., concentration vs. distance attenuation rate ($k_{dist}$)] will be evaluated. This analysis assists in evaluating the stability of the plume and its migration potential. $k_{dist}$ will be calculated for the monitoring wells along the plume centerline after each annual sampling round and will be depicted in centerline trend graphs ($k_{dist}$ graphs). Assessment of spatial plume behavior will be performed through visual interpretation of changes in plume shape over time as shown in the isoconcentration maps as well as centerline trend graphs.

**Assessment Conclusions and Recommendations**

As a result of the response action effectiveness evaluation, the MNA conceptual site model will be continuously refined/modified by incorporating any new data and data trends in COC and geochemistry values and changes in site hydrology. As new data is gathered there will be an ever-expanding database for the site that can be used for comparison with the changes in parameters noted between monitoring events as well as for comparison to predicted, acceptable trends. This continual evaluation of performance monitoring data will translate in better understanding of plume behavior and anticipated data variability and therefore assist in the proper interpretation of monitoring data.

Upon completion of each sampling round, data analysis and determination of the effectiveness of the MNA remedy, plume-specific criteria will drive decisions affecting the continuity of the monitoring program such as: the appropriateness of continuing the monitoring program without change, the need for modifications to the monitoring program (i.e., increased monitoring frequency, additional monitoring wells), need for additional characterization, implementation of a contingency or alternative remedy, or verification of attainment of remedial goals and termination of performance monitoring.

Site-related decisions regarding continuing, modifying, or terminating MNA performance monitoring will be made based on the analyses of spatial and temporal trends in COC concentration, as well as comparisons with predicted benchmarks and/or the specified concentration standard (i.e., COC PCLs). The following summarizes each potential decision

and why it may be chosen based on the perceived progress towards achievement of MNA remediation goals at the plume:

1. Continue Monitoring Program Without Change

   COC concentrations, including toxic transformation products and any mobilized by-products or secondary COCs must remain within the bounds of acceptable trends in order to continue the monitoring program without any change until all remedial action objectives have been met. Groundwater flow parameters must not have changed outside previously identified acceptable ranges. The geochemistry must not have changed in such a way as to indicate that the COC degradation or other natural attenuation processes would be significantly affected.

2. Modify the Monitoring Program

   Modification of the monitoring program may be needed to better reflect changing conditions or increased understanding of natural attenuation processes at the site. Changing conditions or the need to test key assumptions may require new sampling points or increases in monitoring parameters or frequency. Possible scenarios include:

   - Changes in groundwater flowrates or directions that indicate COCs may move farther downgradient, laterally or vertically into previously unimpacted areas, may warrant the need for additional monitoring wells.
   - Unfavorable changes in COC concentrations within the plume, or in the observed attenuation rate based on historic data, may warrant increased monitoring frequency. Sampling frequency may be increased if a sudden change in the trend of COC concentration reduction is noted in order to provide information to facilitate understanding of the change and provide earlier warning of further change. If the protectiveness of the remedy is in question (i.e., unfavorable observed attenuation rate change after 2012), a determination may be made to collect data on a more frequent schedule to properly interpret trends in time to implement contingency remedies, if necessary, to meet PCLs by 2016.
   - Detections of COCs outside the known plume, indicating potential plume expansion or plume migration, may warrant the need for additional monitoring wells.

3. Implement a Contingency or Alternative Remedy

   Alternative remedies can be considered for use in case MNA fails to perform at the desired effectiveness. Situations that may trigger the implementation of a contingency or other remedy modifications will depend on site conditions and include the following:

   - COC concentrations are not decreasing at the rate previously determined to be necessary to meet the remediation objectives by 2016. This assessment will involve the direct comparison of current analytical data with the expected plume clean-up benchmarks as well as evaluation of temporal trends (i.e., observed attenuation rates) in COC concentrations versus the minimum attenuation rates required to meet clean-up by the year 2016. If the protectiveness of the remedy is in question (i.e., more than three rounds of sampling fail to meet the criteria), implementation of a contingency or alternative remedy would generally be warranted.
   - COC concentrations at AMP wells exhibit an increasing trend not originally predicted during remedy selection. This situation would involve the identification and assessment of trends in COC concentration data, including transformation products, changes in geochemistry that may indicate decrease in attenuation rates explaining the lack of

progress toward clean-up objectives, and/or additional COC releases. For some locations in the plume, a detection of a significant change may not trigger immediate implementation of a contingency or alternative remedy. For instance, a low-level or otherwise limited COC concentration increase does not necessarily mean that remediation timeframes will be expanded, or that by the time the pulse moves downgradient to the boundary of the plume there will be a significant plume expansion. Or, in some cases, the detailed characterization and modeling of COC fate and migration may indicate that concentrations for certain COCs (i.e., daughter products) in some portions of the plume are expected to increase temporarily, yet MNA would still meet remedial objectives. If so, the temporary increase would not trigger the contingency or alternative remedy as long as the increase conformed to the predictions and MNA remained protective, allowing observation for several years to test model predictions, if time is available (i.e., before 2012). In situations where evaluation shows the observed COC concentration increases are expected to unacceptably increase the time for plume restoration beyond 2016, or cause unacceptable plume expansion, triggering the contingency or alternative remedy would generally be warranted.

- COCs are identified in monitoring wells located outside the original plume boundary indicating unacceptable plume expansion or migration. Detections of COCs outside of the predetermined plume boundaries may indicate unacceptable plume expansion. Implementation of an alternative or contingency remedy will depend on the locations of the new detections, and distance and possible COC migration rates between these monitoring points and receptors (i.e., surface water bodies, off-site property). Because the COC travel time from the location of the detections may be many years at some sites, there may be time for further monitoring and assessment before a contingency or alternative remedy would need to be implemented. In contrast, if the protectiveness of the remedy is in question (i.e., a significant trend of increasing COC concentration in downgradient wells was noted), there may be much less time available to assess the trend if there was only a short travel time to downgradient receptors. In this case, a contingency or alternative remedy may be triggered immediately.

4. Termination of Performance Monitoring

Once PCLs have been achieved at each of the AMP locations within a plume, showing that the MNA remedy goals have been met for two consecutive semi-annual sampling events for an individual PCLE zone, performance monitoring will be terminated and a period of verification monitoring will be initiated. Verification monitoring will include three years of semi-annual groundwater sampling in order to satisfy the requirements of the Compliance Plan for NAS Dallas (TCEQ, 2004). Sampling parameters for the verification of achieving the PCLs and locations will be in accordance with RAP Worksheet 4.0. This sampling will include all COCs that have been historically detected in the area of the former SWMU, not just the ones that were identified for remediation in the Response Action Plan. If no additional COC exceedances are identified during this three year period of post response action care monitoring, the monitoring system can be terminated, the monitoring wells will be abandoned, and the site will be removed from the permit.

### Effects of Data Variability on Data Interpretation

Data interpretation is affected by data variability. This variability is sometimes associated with natural causes or may be simply attributed to the natural attenuation processes. Due to the dynamic nature of natural attenuation processes, data typically exhibit fluctuations of various magnitudes. For example, there is an expected degree of natural variability within a plume that may include small-scale expansion and shrinkage in response to changes in groundwater flowrates and biological degradation rates throughout the year. COC concentrations in individual monitoring wells may fluctuate with changes in plume configuration caused by oscillations in groundwater flow. Also, changes in groundwater elevations can cause changes in COC concentrations measured in monitoring wells.

It is essential that each data point be interpreted in the context of its derivation in time and space. For instance, monitoring wells produce data that should be interpreted with respect to COC sources, site stratigraphy, the groundwater flow field, the plume, possible receptors, season of the year, and other relevant factors. Variations in sampling methodology should also be considered, due to possible differences in COC concentrations derived from different sampling techniques or devices. The analytical methodology may be evaluated in terms of accuracy, precision, and detection limits. This list of data considerations is not exhaustive, but merely emphasizes that a number (i.e., a data point) should be placed in context to be interpreted. The better the understanding on the derivation and context of the data, the more likely it is that the appropriate decision can be made based on the data.

Examination of historical and spatial patterns may provide information useful in assessing the source and significance of variability in the measured parameters. For instance, if there are multiple monitoring wells in the same plume that show a consistent trend for a number of monitoring variables across several monitoring events, then one may suspect a natural variation, such as recharge differences or geochemical changes in the system, and investigate a correlation of recharge, indicator parameters, or other external hydrologic factors with concentration as indicative of the likely cause of the change. If, on the other hand, a specific monitoring well shows an unusually large change in concentration between monitoring events, relative to nearby monitoring wells, then one may suspect a measurement factor or additional release source is involved and look at sampling techniques or other such factors that may influence the concentration change. Because plume variability should be taken into account when interpreting monitoring data, it is important to have a good estimate of natural variability derived from the site investigation and ongoing MNA performance monitoring.

# APPENDIX 8
# WASTE DISPOSAL MANIFESTS

Project #: 0-0

Order #: 140398

EFFECTIVE ENVIRONMENTAL

Please print or type. (Form designed for use on elite (12-pitch) typewriter.)

**NON-HAZARDOUS WASTE MANIFEST**

1. Generator ID Number: TX8170022786 / 65033
2. Page 1 of 1
3. Emergency Response Phone: 877-577-2669
4. Waste Tracking Number: NHM140398

5. Generator's Name and Mailing Address
Naval Air Station Dallas (NAS)
c/o EnSafe Inc., 4545 Fuller Dr., Suite 342
Irving, TX 75038
Generator's Phone: 972.792.3222 ATTN: Tom Wiberg

Generator's Site Address (if different than mailing address)
8100 West Jefferson
Dallas, TX 75211
RB TVW

6. Transporter 1 Company Name
Stericycle Specialty Waste Solutions Inc
Phd: 972 329 1200
State ID#: 98032 / H-4695
U.S. EPA ID Number: MNS000110924

7. Transporter 2 Company Name
U.S. EPA ID Number

8. Designated Facility Name and Site Address
Itasca Landfill TX, LP
2559 FM 66
Itasca, Texas 76055
State ID#: H0241C
U.S. EPA ID Number: n/a
Facility's Phone: 254 897 2511

| 9a. HM | 9b. U.S. DOT Description (including Proper Shipping Name, Hazard Class, ID Number, and Packing Group (if any)) | 10. Containers No. | Type | 11. Total Quantity | 12. Unit Wt./Vol. | |
|---|---|---|---|---|---|---|
| ☐ | 1 Non-regulated material (soil cuttings Class 2 solids) | 01 ~~02~~ | DM | 55 ~~110~~ | G | CESQ3012 Non-RCRA |
| ☐ | 2. Non-regulated material (purged ground and decon water) | 02 | DM | 110 ~~55~~ | G | CESQ1012 Non-RCRA |
| | 3. | | | | | |
| | 4. | | | | | |

13. Special Handling Instructions and Additional Information
01:IDW Soil cuttings NR (PF:5110167655) 55G
02:IDW purge and decon waters NR (PF:5110167656) 55G
RB TVW
11-1) 0.72 ton 11-2) 0.47 tons

14. **GENERATOR'S CERTIFICATION:** I certify the materials described above on this manifest are not subject to federal regulations for reporting proper disposal of Hazardous Waste.

Generator's/Offeror's Printed/Typed Name: X DAVID BARNEY
Signature: X
Month 5 Day 31 Year 16

15. International Shipments ☐ Import to U.S. ☐ Export from U.S. Port of entry/exit:
Transporter signature (for exports only): Date leaving U.S.:

16. Transporter Acknowledgment of Receipt of Materials

Transporter 1 Printed/Typed Name: Rafael Blaze
Signature:
Month 5 Day 31 Year 16

Transporter 2 Printed/Typed Name: Steven Vansickle
Signature:
Month 6 Day 9 Year 16

17. Discrepancy

17a. Discrepancy Indication Space ☐ Quantity ☐ Type ☐ Residue ☐ Partial Rejection ☐ Full Rejection

Manifest Reference Number:

17b. Alternate Facility (or Generator)
U.S. EPA ID Number
Facility's Phone

17c. Signature of Alternate Facility (or Generator)
Month Day Year

01: H132 02: H132

18. Designated Facility Owner or Operator: Certification of receipt of materials covered by the manifest except as noted in Item 17a

Printed/Typed Name: Jessica Anderson
Signature:
Month 6 Day 9 Year 16

GENERATOR

INT'L

TRANSPORTER

DESIGNATED FACILITY

6-NHM-C-C-11

2-DESIGNATED FACILITY TO GENERATOR

Project #: 0-0 Order #: 140398

EFFECTIVE ENVIRONMENTAL

Please print or type. (Form designed for use on elite (12-pitch) typewriter.)

**NON-HAZARDOUS WASTE MANIFEST**

1. Generator ID Number: TX8170022786 / 65033
2. Page 1 of 1
3. Emergency Response Phone: 877-577-2669
4. Waste Tracking Number: NHM140398

5. Generator's Name and Mailing Address
Naval Air Station Dallas (NAS)
c/o EnSafe Inc., 4545 Fuller Dr., Suite 342
Irving, TX 75038
Generator's Phone: 972-292-3222 ATTN: Tom Wiberg

Generator's Site Address (if different than mailing address)
8100 West Jefferson
Dallas, TX 75211

RJ TWW

6. Transporter 1 Company Name
Stericycle Specialty Waste Solutions Inc
Ph#: 972 329 1200
State ID#: S5627 / H-4565
U.S. EPA ID Number: MNS000110924

7. Transporter 2 Company Name
U.S. EPA ID Number:

8. Designated Facility Name and Site Address
Itasca Landfill TX, LP
2559 FM 56
Itasca, Texas 76055
State ID#: H0241C
U.S. EPA ID Number: n/a
Facility's Phone: 254 687 2511

| 9a. HM | 9b. U.S. DOT Description (including Proper Shipping Name, Hazard Class, ID Number, and Packing Group (if any)) | 10. Containers No. | Type | 11. Total Quantity | 12. Unit Wt./Vol. | |
|---|---|---|---|---|---|---|
| ☐ | 1. Non-regulated material (soil cuttings Class 2 solids) | 01 ~~02~~ | DM | 55 ~~110~~ | G | CESQ3012 Non-RCRA |
| ☐ | 2. Non-regulated material (purged ground and decon water) | 02 | DM | 110 ~~55~~ | G | CESQ1012 Non-RCRA |
| | 3. | | | | | |
| | 4. | | | | | |

13. Special Handling Instructions and Additional Information
01:IDW Soil cuttings NR (PF:5110167655) 55G
02:IDW purge and decon waters NR (PF:5110167656) 55G

RJ TWW

11-1) 0.72 ton 11-2) 0.47 ton

14. **GENERATOR'S CERTIFICATION:** I certify the materials described above on this manifest are not subject to federal regulations for reporting proper disposal of Hazardous Waste.

Generator's/Offeror's Printed/Typed Name: X DAVID BURNEY
Signature: X
Month 5 Day 31 Year 16

15. International Shipments ☐ Import to U.S. ☐ Export from U.S. Port of entry/exit:
Transporter signature (for exports only): Date leaving U.S.:

16. Transporter Acknowledgment of Receipt of Materials

Transporter 1 Printed/Typed Name: Rafael Blayze
Signature:
Month 5 Day 31 Year 16

Transporter 2 Printed/Typed Name: Steven Vansickle
Signature:
Month 6 Day 9 Year 16

17. Discrepancy

17a. Discrepancy Indication Space ☐ Quantity ☐ Type ☐ Residue ☐ Partial Rejection ☐ Full Rejection

Manifest Reference Number:

17b. Alternate Facility (or Generator) U.S. EPA ID Number
Facility's Phone:

17c. Signature of Alternate Facility (or Generator) Month Day Year

01: H132 02: H132

18. Designated Facility Owner or Operator: Certification of receipt of materials covered by the manifest except as noted in Item 17a

Printed/Typed Name: Jessica Anderson
Signature:
Month 6 Day 4 Year 16

GENERATOR

INT'L

TRANSPORTER

DESIGNATED FACILITY

6-NHM-C-C-11

3-DESIGNATED FACILITY TO GENERATOR

Project #: 0-0 Order #: 145925

E² EFFECTIVE ENVIRONMENTAL

Please print or type. (Form designed for use on elite (12-pitch) typewriter.)

**NON-HAZARDOUS WASTE MANIFEST**

1. Generator ID Number: TX8170022786 / 65033
2. Page 1 of 1
3. Emergency Response Phone: 877-577-2669
4. Waste Tracking Number: NHM-145925

5. Generator's Name and Mailing Address
Naval Air Station Dallas (NAS)
c/o EnSafe Inc., 4545 Fuller Dr., Suite 342
Irving, TX 75038
Generator's Phone: 972-792-3222 ATTN: Tom Wherg

Generator's Site Address (if different than mailing address)
8100 West Jefferson
Dallas, TX 75211

6. Transporter 1 Company Name
Stericycle Specialty Waste Solutions Inc
Ph#: 972 329 1200
State ID#: 88922 / H-1496
U.S. EPA ID Number: MNS000110924

7. Transporter 2 Company Name
U.S. EPA ID Number

8. Designated Facility Name and Site Address
Itasca Landfill TX. LP
2559 FM 66
Itasca, Texas 76055
State ID#: H0241C
U.S. EPA ID Number: n/a
Facility's Phone: 254 687 2511

| 9a. HM | 9b. U.S. DOT Description (including Proper Shipping Name, Hazard Class, ID Number, and Packing Group (if any)) | 10. Containers No. | 10. Containers Type | 11. Total Quantity | 12. Unit Wt./Vol. | |
|---|---|---|---|---|---|---|
| ☐ | 1. Non-regulated material (purged ground and decon water) | 04 | DM | 220 | G | CESQ1012 Non-RCRA |
| ☐ | 2. Non-regulated material (soil cuttings Class 2 solids) | 02 | DM | 110 | G | CESQ3012 Non-RCRA |
| | 3. | | | | | |
| | 4. | | | | | |

13. Special Handling Instructions and Additional Information
01:IDW purge and decon waters NR (PF:5110167856) 55G
02:IDW Soil cuttings NR (PF:5110167855) 55G

11.1) 0.94 tn
11.2) ~~0.29 tn~~ 0.35 tn

14. **GENERATOR'S CERTIFICATION:** I certify the materials described above on this manifest are not subject to federal regulations for reporting proper disposal of Hazardous Waste.

Generator's/Offeror's Printed/Typed Name: X DAVID BARNEY
Signature: X
Month 11 Day 8 Year 16

15. International Shipments ☐ Import to U.S. ☐ Export from U.S. Port of entry/exit:
Transporter signature (for exports only): Date leaving U.S.:

16. Transporter Acknowledgment of Receipt of Materials

Transporter 1 Printed/Typed Name: Jason L Boss
Signature:
Month 11 Day 8 Year 16

Transporter 2 Printed/Typed Name: Rafael Blanco
Signature:
Month 11 Day 14 Year 16

17. Discrepancy

17a. Discrepancy Indication Space ☐ Quantity ☐ Type ☐ Residue ☐ Partial Rejection ☐ Full Rejection

Manifest Reference Number:

17b. Alternate Facility (or Generator) U.S. EPA ID Number
Facility's Phone:

17c. Signature of Alternate Facility (or Generator) Month Day Year

01: H132 02: H132

18. Designated Facility Owner or Operator: Certification of receipt of materials covered by the manifest except as noted in Item 17a

Printed/Typed Name: Cindy Reed
Signature: Cindy Reed
Month 11 Day 14 Year 16

GENERATOR

INT'L

TRANSPORTER

DESIGNATED FACILITY

6-NHM-C-C-11

2-DESIGNATED FACILITY TO GENERATOR

# SWMU 108 PLUME

# 2016 Response Action Effectiveness Report
# SWMU 108 Plume
# Former NAS Dallas, Texas

## Professional Signatures and Seals

**Professional Geoscientist**

| | | |
|---|---|---|
| *Thomas Wiberg* | *1619* | *30 November 2017* |
| Professional Geoscientist | Geoscientist License number | Expiration date |
| | *17 Jan 2017* | |
| Signature | Date | |
| *972-791-3222* | *972-791-0405* | *twiberg@ensafe.com* |
| Telephone number | FAX number | E-mail |

**Professional Engineer**

| | | |
|---|---|---|
| | | |
| Professional Engineer | P.E. License number | Expiration date |
| | | |
| Signature | Date | |
| | | |
| Telephone number | FAX number | E-mail |

**Registered Corrective Action Specialists (RCASs) and Corrective Action Project Managers (CAPMs)**
**For LPST sites only.**

| | | |
|---|---|---|
| | | |
| Registered Corrective Action Specialist | RCAS Registration number | Expiration date |
| | | |
| Signature | Date | |
| | | |
| Corrective Action Project Manager | CAPM Registration number | Expiration date |
| | | |
| Signature | Date | |
| | | |
| Telephone number | FAX number | E-mail |

**Seals, as applicable:**

# TEXAS COMMISSION ON ENVIRONMENTAL QUALITY
## Response Action Effectiveness Report

### Cover Page

**Regulatory ID number** (Solid waste registration number, VCP ID number, etc.) *Solid Waste Code #65033*
check one: ___ Initial RAER submittal for this onsite property X Subsequent RAER submittal
Report date: *January 2017* TCEQ Region No.: *4*

**TCEQ Program** (check one)
X Corrective Action (Mail Code 127)
___ Voluntary Cleanup Program (Mail Code 221)
___ Petroleum Storage Tank Program (Mail Code 137)
___ Superfund PRP Lead (Mail Code 143)
___ Municipal Solid Waste Permits (Mail Code 124)

**Onsite Property Information**
Onsite Property Name: *Former Naval Air Station Dallas (NAS Dallas) — SWMU 108 Plume*
Street no. *8100* Pre dir: *West* Street name: *Jefferson* Street type *Blvd* Post dir: ___
City: *Dallas* County: *Dallas* County Code: *57* Zip: *75211*
Nearest street intersection or location description: ___

Latitude: Degrees, Minutes, Seconds OR Decimal Degrees (circle one) North *32°44'18.5"*
Longitude: Degrees, Minutes, Seconds OR Decimal Degrees (circle one) West *96°57'40.0"*

**Offsite Affected Property Information**
Offsite Affected Property Name: *Not Applicable (N/A)*
Street no. ___ Pre dir: ___ Street name: ___ Street type: ___ Post dir: ___
City: ___ County: ___ County Code: ___ Zip: ___

[X] Check if no offsite properties affected

**Contact Person Information and Acknowledgement**
Person (or company) Name: *Navy BRAC PMO East*
Contact Person: *Mr. David Barney* Title: *BRAC Environmental Coordinator*
Mailing Address: *4911 S. Broad Street, Building 679*
City: *Philadelphia* State: *PA* Zip: *19112* E-mail address **david.a.barney@navy.mil**
Phone: *617-753-4656* Fax: ___

By my signature below, I acknowledge the requirement of §350.2(a) that no person shall submit information to the executive director or to parties who are required to be provided information under this chapter which they know or reasonably should have known to be false or intentionally misleading, or fail to submit available information which is critical to the understanding of the matter at hand or to the basis of critical decisions which reasonably would have been influenced by that information. Violation of this rule may subject a person to the imposition of civil, criminal, or administrative penalties.

Signature of Person BARNEY.DAVID.A.1228582553 Digitally signed by BARNEY.DAVID.A.1228582553 DN: c=US, o=U.S. Government, ou=DoD, ou=PKI, ou=USN, cn=BARNEY.DAVID.A.1228582553 Date: 2017.01.18 08:50:10 -05'00' Name, print: *David Barney* Date: ___

Check the reports/forms previously submitted:

**Remedy Standard A**

____ Self-Implementation Notice Submittal date: _____

_X_ Response Action Plan — Approval date: *December 2006*

**Remedy Standard B**

____ Response Action Plan — Approval date: _____

List all media (surface soil, subsurface soil, groundwater, sediment, surface water, air) that contained or contains a PCLE zone and specify the response action that has been or will be taken for each media. Indicate the type of removal, decontamination, physical control, or institutional control action used in the response action.

| Media | COCs | Removal | Decontamination | Physical Control | Institutional Control | Modified Response Objective | | |
|---|---|---|---|---|---|---|---|---|
| | | | | | | PMZ | WCU | TI |
| Groundwater | 1,1-Dichloroethene (DCE)<br>1,2-Dichloroethane (DCA) | N/A | MNA | N/A | N/A | N/A | N/A | N/A |

Current land use of the onsite affected property: ____ Residential _X_ Commercial/industrial

Projected future land use of the onsite property (if known): _X_ Residential ____ Commercial/industrial

Briefly describe the affected property and PCLE zones, the conclusions from the assessment activities, identify any affected or threatened receptors, and describe any other major site conditions. If any portion of the response action is necessitated due to an aesthetic or nuisance condition, identify the nature of that condition and identify that portion of the response action conducted to address it. If any media that contains a PCLE zone is not being addressed in this response action, provide justification.

**Affected Property: SWMU 108 Plume**

**In 1989, a Resource Conservation and Recovery Act (RCRA) Facility Assessment (RFA) was performed at NAS Dallas in accordance with the 1984 RCRA Hazardous and Solid Waste Amendments to evaluate potential releases at Solid Waste Management Units (SWMUs) and Areas of Concern (AOCs) and to make preliminary determinations regarding the need for further action. The RFA Report included data collected as part of a Preliminary Review, a Visual Site Inspection, and a Sampling Visit, as necessary, for 135 SWMUs and six AOCs at NAS Dallas (A.T. Kearney 1989).**

**In 1993, NAS Dallas was identified for closure under the Base Realignment and Closure Act (BRAC). As part of the base closure activities, an Environmental Baseline Survey (EBS) was conducted at NAS Dallas to identify any potential environmental concerns related to historical operations at the base (EnSafe/Allen & Hoshall 1994). During this EBS, additional site concerns were identified at numerous buildings across the installation. In order to strategically investigate the permitted and non-permitted SWMUs, AOCs, and additional site concerns identified in the EBS, the facility was divided into six sections, called "categories", based on property use and ownership. In 1995, the Navy initiated RCRA Facility Investigation (RFI) activities at NAS Dallas at Categories A through F. Submittal of the Final RFI Reports (issued as a series of six reports - one report per category) occurred during the period from November 2000 to March 2001 (Tetra Tech NUS, Inc. [Tetra Tech] 2000a — 2001b). The RFI was completed under the requirements of the Texas Risk Reduction Standards (RRS) (30 Texas Administrative Code [TAC] 335, Subchapter S), the regulatory framework in effect at the time, and closure recommendations in the RFI Reports were based upon Risk Reduction Standard 2 — Industrial (RRS2-IND) criteria. The RFI Reports identified those areas that required further action based on the chemical constituents detected in the soil and/or groundwater at the base.**

**The RFI Reports received conditional approval by the Texas Natural Resource Conservation Commission now the Texas Commission on Environmental Quality (TCEQ). Final approval of the RFI Reports by TCEQ was dependent upon landowner concurrence of the RRS2-IND clean-up standard.**

**In September of 1999, the Texas Risk Reduction Program (TRRP) (30 TAC 350) was promulgated. One of the major changes resulting from TRRP was eliminating site background as a closure criterion. The most stringent closure standard under TRRP is the Residential Remedy Standard A (RES A), which consists of closure for residential use with no engineering or institutional controls.**

**In March 2001, the Navy submitted a Notice of Intention to Switch to TRRP (30 TAC 350) for five of the six categories. The one category (Category C) that was not switched to TRRP, but remained under the RRS2-IND standards, was subsequently transferred to the Department of the Army.**

**In October 2002, an Affected Property Assessment Report (APAR) was produced based on evaluation of RFI data as well as data from follow-up investigations (Tetra Tech 2002). The data included in the APAR was compared to TRRP RES A criteria to select those sites that may be closed with no land use encumbrances and to determine which sites required corrective action. The results of this comparison indicate that 23 SWMUs (1, 2, 6, 17, 18, 21, 31, 35, 36, 60, 79, 81, 83, 84, 85, 86, 92, 102, 108, 124, 136, 138, and 139) required further actions.**

**SWMU 108 Plume**

**Building 20, the Maintenance Hangar, was a large aircraft hangar area constructed in 1941 in which various aircraft maintenance, repair, and upgrades took place. The hangar bay had two main shop areas at the north and south ends of the hangar. A terminal operations and weather office were located in the northwest section of the building. In 1993, the concrete floor within the hangar was excavated, removed, and replaced because the floor had cracked from the weight of aircraft. Soil samples were not collected from beneath the hangar floor prior to installation of the new floor to determine whether fuel spills had impacted the soils. At the bottom of the stairs to the boiler and electric rooms, water had been seeping out of the concrete wall in two places for over twenty years. According to the EBS, investigations to find the source of flow were conducted, but the origin remains unknown. The water flowed into a floor drain, and standing water in the boiler room drained to a sump pump.**

**The Building 20 drain system (SWMU 108) includes six floor drains located in the hangar, three on the east side and three on the west side, a 100-foot long drain on the west side, a 15-foot long drain on the north side, one drain at the bottom of the stairs leading to the boiler and electrical rooms, and one sump located in the boiler room. These drains collected spills and wash water from the building. Discharges from the drains were conveyed to the storm sewer system (SWMU 80) that flows south to the fenced area southeast of Building 20, then east into Mountain Creek Lake.**

**Soil**

**No soil exceedances were reported.**

**Groundwater**

**The results of the RFI Report for Category B (Tetra Tech 2001b) indicate that groundwater at the site has been impacted by chlorinated volatile organic compounds (CVOCs). As described in the APAR, the groundwater of this SWMU is located within a Class 2 groundwater resource area. The groundwater impacts are probably due to solvent use associated with aircraft maintenance activities at Building 20. Subsequent to the APAR, a Response Action Plan (RAP) was submitted to the TCEQ for groundwater at the SWMU 108 Plume. The revised RAP received TCEQ approval in December 2006.**

**The high degree of heterogeneity associated with the shallow groundwater bearing unit (GWBU) onsite has resulted in a discrete groundwater Protective Concentration Level Exceedance (PCLE) zone associated with the SWMU 108 Plume that required a response action to reduce the concentration of chemicals of concern (COCs) to less than the respective critical PCLs.**

**As determined in the RAP, monitored natural attenuation (MNA) was chosen as a decontamination remedy to address the PCLE zone identified at the SWMU 108 Plume (Tetra Tech 2006). The 2017 remedial goal includes one year of groundwater sampling confirming that the PCLs have consistently been achieved and no rebound has occurred. A re-evaluation of plume dynamics was presented in an Alternatives Evaluation Report (AER) (Resolution Consultants, 2013), and a determination was made that MNA alone would not**

**effectively reduce the concentrations of COCs in groundwater at SWMU 108 to achieve remedial goals by the year 2017.**

**Given that the remedy for the 2006 Groundwater RAP (Revision 2) at SWMU 108 Plume will not achieve the critical PCLs within the timeframe specified and as recommended by TCEQ in a letter dated May 26, 2015, failure of the response action triggers the implementation of contingency measures, which may include the selection of an appropriate alternate remedial measure such as enhanced MNA (EMNA). The Navy has proposed to implement EMNA as an alternate remedy in a pilot study at the affected area of SWMU 18 groundwater plume in an effort to reduce COCs to below PCLs. This study will allow the Navy to make a determination as to whether the technology is viable. Depending on the results of the EMNA spot treatment at SWMU 18, alternative remedial measures may be proposed in a comprehensive RAP for SWMU 108 Plume to follow. MNA will be continued for the upcoming year at SWMU 108 in accordance with the procedures and protocols described in the Groundwater RAP (Revision 2), dated February 2006.**

**In October 2015, the Navy submitted a revised RAP (Revision 3) (Resolution Consultants, 2015) to TCEQ. The purpose of the revised RAP was to remove monitor wells from the current monitoring and sampling plan and confirmation sampling plan. In accordance with the RAPs, Resolution Consultants conducted plugging and abandonment (P&A) of select groundwater monitoring wells in April 2016. P&A actions were conducted by a state of Texas licensed driller (Strata Core Services, SCI). Monitor wells 400B01MW, 400B02MW, and 400B61MW were abandoned at SWMU 108.**

**Potential receptors are onsite residents, onsite employees, and onsite construction workers. Since the groundwater PCLE zone is not projected to migrate offsite based on groundwater modeling results and other lines of evidence, it is not anticipated that offsite receptors will be affected. The possible routes of exposure to groundwater are inhalation (onsite residents, onsite employees, and onsite construction workers) and dermal contact (onsite construction workers). Ingestion is not a concern since during the implementation of the response actions as there is controlled access to the site, which limits potential exposures to contaminated groundwater (i.e., no potable or irrigation wells will be installed) through 2017. The potential for inhalation of vapor from groundwater through soil to outdoor air is insignificant because the maximum detected COC concentrations in groundwater are less than their respective inhalation of volatiles from groundwater ($^{Air}GW_{Inh\text{-}V}$) PCLs. Additionally, the indoor air sampling conducted in a sealed building at a similar plume at the base (Building 1406 within the SWMU 21 area) indicated that no CVOCs were detected in the indoor air. The recent Vapor Intrusion Study at SWMU 21 (Resolution Consultants, 2015) also concluded that sub-slab TCE and cis-1,2-DCE concentrations were well below VISLs for sub-slab vapor as well as RSLs for indoor air. Furthermore, the analytical results indicated that neither TCE nor cis-1,2-DCE were detected in indoor air samples. Therefore, vapor intrusion is not a current concern at NAS Dallas.**

## CHRONOLOGY OF MAJOR EVENTS

| | |
|---|---|
| Sep. 1985 | Initial Assessment Study was prepared and submitted. |
| Jan. 1987 | Confirmation Study and Verification Step Report was prepared and submitted. |
| Mar. 1989 | RFA was prepared and submitted. |
| 1993 — 1994 | EBS was prepared and submitted. |
| Mar. 1994 | BRAC Cleanup Plan was prepared and submitted. |
| 1995 — 1996 | Basewide Round 1 groundwater sampling event (Directed Phase RFI). |
| 1996 — 1997 | Interim Draft RFI Reports were prepared and submitted for each category identified at the air station. |
| Mar. — June 1998 | Basewide Round 2 groundwater sampling event (Chase Phase RFI). |
| May — Oct. 1998 | Main Fuel Farm (MFF) underground storage tanks (USTs) were removed by the Navy's Charleston Detachment, along with other tanks basewide. |
| June 1998 — Jan. 1999 | Release Determination Report was prepared and submitted covering the removal of the MFF tanks. |
| Aug. — Sep. 1998 | Basewide Round 3 groundwater sampling event. |
| Sep. 1998 | Most military operations on NAS Dallas ceased and the air station was placed into caretaker status. |
| Dec. 1998 — Jan. 2000 | Removal of oil/water separators (OWS) basewide. |
| Jan. — Oct. 1999 | Basewide removal of hot spot areas of contamination. |
| Feb. — Apr. 1999 | Basewide Round 4 groundwater sampling event. |
| Sep. — Oct. 1999 | Removal of the remaining USTs basewide. |
| Sep. — Nov. 1999 | Basewide Round 5 groundwater sampling event. |
| July 1999 — Feb. 2000 | Basewide pre-Corrective Measures Study monitoring well installation and sampling event. |
| June — July 2000 | Preliminary groundwater investigation at Advanced Science Incorporated Area-5 (ASA-5) site in the MFF/Main Fuel Farm Storm Sewer (MFF/MFFSS) area. |
| July — Aug. 2000 | Basewide Round 6 groundwater sampling event. |
| Aug. — Sep. 2000 | Aquifer tests were conducted at five sites across Former NAS Dallas to determine aquifer properties. |
| 2000 — 2001 | Final RFI Reports were prepared and submitted for each category. |
| June — July 2001 | Basewide Round 7 groundwater sampling event, including evaluation of alternate sampling methods (i.e., passive diffusion bag [PDB] and HydraSleeve). |
| Sep. 2001 | Enhanced Monitored Natural Attenuation (EMNA) pilot test initiated at ASA-5 site (SWMUs 79/136) involving the injection of $KMnO_4$. |
| Feb. 2002 | MNA Groundwater Modeling Report for MFF/MFFSS was prepared and submitted. |

| | |
|---|---|
| Mar. 2002 | Technical Memorandum Groundwater Sampling Procedure Comparison for selected monitoring wells was prepared and submitted. |
| Oct. 2002 | APAR was prepared and submitted. |
| Dec. 2002 — Mar. 2003 | Basewide Round 8 groundwater sampling event. |
| Jan. 2003 | Monitoring Well Abandonment Plan was prepared and submitted. |
| Jan. 2003 | Draft MNA Groundwater Modeling Report for Category D Sites was prepared and submitted. |
| Jan. 2003 | Corrective action (excavation and disposal) initiated on the Rubble Landfill (SWMU) 1). |
| Feb. 2003 | Draft RAP for MFF/MFFSS soils was prepared and submitted. |
| Apr. 2003 | Draft RAP for Category D Sites soils was prepared and submitted. |
| Apr. 2003 | Final Groundwater Report to satisfy Provision VIII.D.8 of the Former NAS Dallas RCRA Hazardous Waste Storage Permit (No. HW-50276) was prepared and submitted. |
| May 2003 | Self Implementation Notice (SIN) for TRRP RES A Soil Response Actions for SWMUs 2, 6, 18, 21, 31, 35, 36, 60, 79, 81, 83, 84, 85, 86, 102, 124, 138, and 139 was prepared and submitted. |
| June 2003 | Draft MNA Groundwater Modeling Report for Category B was prepared and submitted. |
| June 2003 | RCRA Permit renewal and Compliance Plan applications submitted to the TCEQ. |
| June 2003 | Corrective action (excavation, solidification, and disposal) initiated on the Texas Air National Guard (TANG) Ponds (SWMU 92). |
| July — Aug. 2003 | Basewide Round 9 groundwater sampling event. |
| Aug. 2003 | Corrective action (excavation, disposal, and backfill) initiated on the sites covered in the SIN submitted in May 2003. |
| Aug. 2003 | 2002 Annual Groundwater Monitoring Report was prepared and submitted. |
| Dec. 2003 — Jan. 2004 | Basewide Round 10 groundwater sampling event. |
| Jan. 2004 | Soil Response Action Completion Report (RACR) was prepared and submitted for the Rubble Landfill (SWMU 1). |
| Jan. 2004 | Soil RACR was prepared and submitted for the TANG Ponds (SWMU 92). |
| Mar. 2004 | TCEQ produced and distributed the Draft RCRA Permit and Draft Compliance Plan. |
| Apr. 2004 | Final Addendum to MNA Groundwater Modeling Report for MFF/MFFSS was prepared and submitted. |
| May 2004 | 2003 Groundwater Response Action Effectiveness Reports (RAER) were prepared and submitted. |
| June 2004 | Indoor and Outdoor Air Sampling at Building 1406 Report was prepared and submitted. |

| | |
|---|---|
| July 2004 | Basewide Round 11 groundwater sampling event. |
| July 2004 | Final MNA Groundwater Modeling Report for Category D was prepared and submitted. |
| Sep. 2004 | Final MNA Groundwater Modeling Report for Category B was prepared and submitted. |
| Sep. 2004 | TCEQ approved final closure documentation for the Miscellaneous Sites Soil RACR. |
| Oct. 2004 | Basewide Round 12 groundwater sampling event. |
| Oct. 2004 | TCEQ approved Final MNA Groundwater Modeling Report for Category D Sites at Former NAS Dallas. |
| Oct. 2004 | TCEQ approved Final Addendum to the MNA Groundwater Modeling Report for MFF/MFFSS at Former NAS Dallas. |
| Oct. 2004 | TCEQ approved Final Groundwater Report for Former NAS Dallas. |
| Oct. 2004 | TCEQ approved the 2002 Annual Groundwater Monitoring Report. |
| Nov. 2004 | Final RAP (Basewide) for groundwater was prepared and submitted. |
| Dec. 2004 | 2004 Semi-annual Groundwater Monitoring Report was prepared and submitted. |
| Dec. 2004 | TCEQ issued comments on the 2003 Groundwater RAERs. |
| Jan. 2005 | 2004 Groundwater RAERs were prepared and submitted. |
| Mar. 2005 | Monitoring Well Installation and Abandonment Plan was prepared and submitted. |
| Mar. 2005 | Draft 84 Sites Soil RACR was prepared and submitted. |
| Apr. 2005 | 2004 Groundwater RAERs were prepared and submitted. |
| Apr. 2005 | Basewide Round 13 groundwater sampling event. |
| June 2005 | Corrective action for groundwater (excavation, disposal, and backfill) initiated at SWMU 85. |
| June 2005 | Corrective action for groundwater (excavation, disposal, and backfill) initiated at SWMU 18. |
| July 2005 | Basewide Round 13 groundwater sampling event. |
| Aug. 2005 | TCEQ issued comments on the Draft 84 Sites Soil RACR. |
| Aug. 2005 | 2005 Semi-annual Groundwater Monitoring Report was prepared and submitted. |
| Sep. 2005 | TCEQ issued comments on the 2004 Groundwater RAPs. |
| Oct. 2005 | TCEQ issued comments on the 2004 Groundwater RAERs. |
| Oct. 2005 | Basewide Round 14 groundwater sampling event. |
| Oct. — Dec. 2005 | City of Dallas issued comments on the Draft 84 Sites Soil RACR. |
| Dec. 2005 | TCEQ issued comments on the 2005 Semi-annual Groundwater Monitoring Report. |
| Jan. 2006 | 2005 Groundwater RAERs were prepared and submitted. |

| | |
|---|---|
| Jan. 2006 | Basewide Round 15 groundwater sampling event. |
| Feb. 2006 | Revised Groundwater RAPS (Revision 2) were prepared and submitted covering SWMUs 17/Building 1423, 17/Building 1429, 18, 35, 85, 86, 108, 136 North, 136 South, and 139. |
| Mar. 2006 | RACR for groundwater removed at SWMUs 18 and 85 were prepared and submitted. |
| May 2006 | Basewide Round 15B groundwater sampling event. |
| May 2006 | TCEQ issued comments on the 2005 Groundwater RAERs. |
| June 2006 | 85 Sites, (DRMO), and Naval Weapons Industrial Reserve Plant (NWIRP) SWMU 18 Soil RACRs (Revision 1) were prepared and submitted. |
| July 2006 | TCEQ issued comments on the Groundwater RAPs (Revision 2). |
| July 2006 | EMNA Pilot Test initiated at SWMU 21 involving the injection of zero valent iron. |
| Aug. 2006 | Basewide Round 16 groundwater sampling event. |
| Aug. 2006 | Responses to TCEQ comments on the Groundwater RAPs (Revision 2), including replacement pages, were prepared and submitted. |
| Nov. 2006 | Basewide Round 16B groundwater sampling event. |
| Dec. 2006 | RACR for groundwater PCL at SWMU 35 was prepared and submitted. |
| Dec. 2006 | TCEQ approves Groundwater RAP (Revision 2) covering SWMUs 17/Building 1423, 17/Building 1429, 18, 35, 85, 86, 108, 136 North, 136 South, and 139. |
| Jan. 2007 | 2006 Groundwater RAERs were prepared and submitted. |
| Apr. 2007 | Groundwater Sampling Work Plan Addendum, Slug Test Work Plan, and Monitoring Well Installation and Abandonment Work Plan were prepared and submitted. |
| Apr. — May 2007 | Basewide Round 17 groundwater sampling event. |
| Apr. — June 2007 | SWMU 18 OWS removal operations were conducted. |
| Apr. 2007 | Slug test operations conducted at SWMUs 18, 85, and 139. |
| Aug. — Sep. 2007 | Basewide Round 18 groundwater sampling event. |
| Nov. 2007 | Field Activities for SWMU 21 EMNA Pilot Study completed. |
| Jan. 2008 | 2007 Groundwater RAERs were prepared and submitted. |
| Feb. 2008 | TCEQ approves the Groundwater RACR for SWMU 35. |
| Apr. 2008 | Comments to the 85 Sites, DRMO, and NWIRP SWMU 18 Soil RACRs revisions were received from the TCEQ. |
| May 2008 | TCEQ issued comments on the 2007 Groundwater RAERs. |
| May 2008 | Response to the 85 Sites, DRMO, and NWIRP SWMU 18 Soil RACRs comments were submitted to the TCEQ. |
| July 2008 | Basewide Round 20 groundwater sampling event. |

| | |
|---|---|
| July 2008 | TCEQ grants final approval of the 85 Sites, DRMO, and NWIRP SWMU 18 Soil RACRs. |
| July 2008 | Response to TCEQ comments on 2007 Groundwater RAERs, replacement pages (Revision 1) to 2007 RAERs prepared and submitted. |
| Oct. 2008 | Technical Memorandum, ASA-5 East Site EMNA Pilot Study prepared and submitted. |
| Oct. 2008 | Technical Memorandum, Pilot Study at SWMU 21 prepared and submitted. |
| Oct. 2008 | SWMU 17/Building 1429 Pilot Test Work Plan prepared and submitted. |
| Dec. 2008 | SWMU 139 Groundwater RACR prepared and submitted. |
| Jan. 2009 | Basewide Round 21 groundwater sampling event. |
| Jan. 2009 | 2008 Groundwater RAERs prepared and submitted. |
| Jan. 2009 | Revised Groundwater RAPs for SWMU 21 (Revision 2) prepared and submitted. |
| Jan. 2009 | Revised Groundwater RAPs for SWMUs 79/136 Central (Revision 2) prepared and submitted. |
| Jan. 2009 | Revised Groundwater RAP for SWMU 136 South (Revision 4) prepared and submitted. |
| May 2009 | SWMU 21 Pilot Study additional groundwater sampling. |
| May 2009 | SWMU 79/136 Central non-compliant monitoring well groundwater sampling. |
| May 2009 | TCEQ grants conditional approval of the SWMU 139 Groundwater RACR. |
| June 2009 | ASA-5 Pilot Test injection points abandonment. |
| June 2009 | SWMU 35 monitoring well abandonment. |
| July 2009 | Basewide Round 22 groundwater sampling event. |
| Sep. 2009 | SWMU 21 Pilot Study monitoring wells abandonment. |
| Oct. 2009 | Revised Technical Memorandum, SWMU 21 Pilot Study prepared and submitted. |
| Oct. 2009 | SWMU 136 South non-compliant monitoring well groundwater sampling. |
| Nov. 2009 | Response to TCEQ comments on 2008 Groundwater RAERs prepared and submitted. |
| Jan. 2010 | Basewide Round 23 groundwater sampling event. |
| Jan. 2010 | 2009 Groundwater RAERs prepared and submitted. |
| July 2010 | Basewide Round 24 groundwater sampling event. |
| Aug. 2010 | Basewide monitoring well network inspection and five-year survey. |
| Nov. 2010 | Response to TCEQ comments on 2009 Groundwater RAERs prepared and submitted. |
| Dec. 2010 | Monitoring wells general maintenance and minor repairs completed. |
| Jan. 2011 | Basewide Round 25 groundwater sampling event. |
| Jan. 2011 | 2010 Groundwater RAERs prepared and submitted. |

| | |
|---|---|
| March 2011 | Monitoring well inspection at SWMU 21/SWMU 18 on monitoring wells within the 20-acre area leased to the Air National Guard. |
| May 2011 | Addendum to Monitoring Well Installation and Abandonment Plan prepared and submitted. |
| June 2011 | SWMU 139 monitoring wells plugged and abandoned. |
| June 2011 | SWMU 81 monitoring wells plugged and abandoned. |
| June 2011 | Repairs, abandonment and replacement of damaged monitoring wells at SWMU 21 and SWMU 18. |
| July. 2011 | Basewide Round 26 groundwater sampling event. |
| Dec. 2011 | Response to TCEQ comments on 2010 Groundwater RAERs prepared and submitted. |
| Jan. 2012 | Basewide Round 27 groundwater sampling event. |
| March 2012 | 2011 Groundwater RAERs prepared and submitted. |
| July 2012 | Basewide Round 28 groundwater sampling event. |
| Aug. 2012 | EPA comments to the 2011 Groundwater RAER. |
| Oct. 2012 | TCEQ comments to the 2011 Groundwater RAER. |
| Jan. 2013 | Basewide Round 29 groundwater sampling event. |
| Jan. 2013 | 2012 Groundwater RAERs prepared and submitted |
| Feb. 2013 | TCEQ comments to the 2012 Groundwater RAER. |
| June 2013 | EPA comments to the 2012 Groundwater RAER. |
| July 2013 | Basewide Round 30 groundwater sampling event. |
| July 2013 | Response to TCEQ comments on 2012 Groundwater RAERs prepared and submitted |
| Jan. 2014 | Basewide Round 31 groundwater sampling event. |
| Jan. 2014 | 2013 Groundwater RAERs prepared and submitted |
| Feb. 2014 | TCEQ comments to the 2013 Groundwater RAER. |
| June 2014 | EPA comments to the 2013 Groundwater RAER. |
| July 2014 | Basewide Round 32 groundwater sampling event. |
| July 2014 | Response to TCEQ comments on 2013 Groundwater RAERs prepared and submitted. |
| Jan. 2014 | Basewide Round 31 groundwater sampling event. |
| Jan. 2014 | 2013 Groundwater RAERs prepared and submitted. |
| Feb. 2014 | TCEQ comments to the 2013 Groundwater RAER. |
| June 2014 | EPA comments to the 2013 Groundwater RAER. |
| July 2014 | Basewide Round 32 groundwater sampling event. |
| July 2014 | Response to TCEQ comments on 2013 Groundwater RAERs prepared and submitted. |
| Nov. 2014 | RCRA Permit renewal and Compliance Plan (Number 50276) applications submitted to the TCEQ. |

| | |
|---|---|
| Jan. 2015 | Basewide Round 33 groundwater sampling event. |
| Jan. 2015 | 2014 Groundwater RAERs prepared and submitted. |
| May 2015 | TCEQ Permit Renewal Application Technical Notice of Deficiency (NOD) Letter, dated May 26, 2015. |
| June 2015 | Meeting with TCEQ, EPA, and City of Dallas |
| June 2015 | TCEQ comments letter to the 2014 Groundwater RAER, dated June 10, 2015. |
| June 2015 | Submittal of Draft revised RAP for SWMU 17/Building 1429, received June 23, 2015. |
| June 2015 | Response to TCEQ comments to the Response to Permit Renewal Application Technical NOD Letter for Former Dallas Naval Air Station (NAS), Dallas, Texas, dated June 26, 2015. |
| July 2015 | Basewide Round 34 groundwater sampling event. |
| July 2015 | TCEQ Permit Renewal Application Second Technical Notice of Deficiency Letter, dated July 24, 2015. |
| July 2015 | Response to TCEQ Comments on the Technical Memorandum Pilot Study for SWMU 21, Rev. 1, July 2009 submitted to the TCEQ, dated July 24, 2015. |
| Oct. 2015 | Basewide submittal of Revised and Interim Response Action Plans. |
| Dec. 2015 | Draft Final Enhanced Monitored Natural Attenuation (EMNA) Spot Treatment Workplan for SWMU 18 prepared and submitted to TCEQ. |
| Dec. 2015 | Amendment to the Approved Class V Underground Injection Control (UIC) Permit (5X2600432) prepared and submitted to TCEQ. |
| Jan. 2016 | Basewide Round 35 groundwater sampling event. |
| Jan. 2016 | TCEQ, U.S. EPA, and City of Dallas approve EMNA workplan. |
| Jan. 2016 | 2015 Groundwater RAERs prepared and submitted. |
| Jan. 2016 | EMNA Spot Treatment Design Verification Testing at SWMU 18 by Resolution Consultants and Regenesis Remediation Services. |
| March 2016 | Draft Tier II Sampling and Analysis Plan Addendum #1, Long-Term Monitoring Plan Enhanced Monitored Natural Attenuation Spot Treatment at SWMU 18 Former Naval Air Station Dallas, Dallas, Texas prepared and submitted to TCEQ. |
| March 2016 | Amendment to the Approved Class V UIC Permit (5X2600432) prepared and submitted to TCEQ. |
| Apr. 2016 | TCEQ approves UIC amendment request. |
| Apr. 2016 | Basewide plug and abandon and operation and maintenance actions, installation of monitor well 508F98MW in SWMU 79 |
| Apr. 2016 | EMNA Spot Treatment at SWMU 18 baseline groundwater sampling event. |

| | |
|---|---|
| May 2016 | EMNA Spot Treatment at SWMU 18 injections by Resolution Consultants and Regenesis Remediation Services. |
| Jul. 2016 | Basewide Round 36 groundwater sampling event. |
| Aug. 2016 | Deploy passive diffusion bags at EMNA Spot Treatment well 606D152MW. |
| Sep. 2016 | Basewide operations and maintenance activities completed. |
| Sep. 2016 | EMNA Spot Treatment at SWMU 18 first quarterly performance groundwater monitoring event. |
| Sep. 2016 | Draft Tier II Sampling and Analysis Plan Addendum #2, Long-Term Monitoring Plan, Enhanced Monitored Natural Attenuation, Perfluoroalkyl Substances Groundwater Investigation, Former Naval Air Station Dallas, Dallas, Texas prepared and submitted to TCEQ. |

# Checklist for Report Completeness

Use this checklist to determine the portions of the form that must be submitted for this report. Answer all questions by checking Yes or No. If the answer is Yes include that portion of the report. If the answer is No, do not complete or submit that portion of the report. All form contents that are marked "Required" must be submitted. Form contents marked with an asterisk (*) are not included in the blank form and are to be provided by the person.

| | | | | Report Contents |
|---|---|---|---|---|
| | | Required | **Cover Page** | ☒ |
| | | Required | **Executive Summary** | ☒ |
| | | Required | **Checklist for Report Completeness** | ☒ |
| | | Required | **Worksheet 1.0** Response Action Objectives | ☒ |
| | | Required | **Attachment 1A*** Maps and Cross Sections | ☒ |
| | | Required | **Attachment 1B*** Graphs | ☒ |
| | | Required | **Attachment 1C*** Response Action Diagrams | ☐ *N/A* |
| No ☒ | Is a plume management zone being used as part of the response action? | ☐ Yes | **Worksheet 2.0** Plume Management Zone | ☐ |
| | | | **Attachment 2A*** Map of Plume Management Zone | ☐ |
| No ☒ | Was an area of technical impracticability approved for use as part of the response action? | ☐ Yes | **Worksheet 3.0** Technical Impracticability | ☐ |
| | | | **Attachment 3A*** Map of Technical Impracticability | ☐ |
| No ☒ | Are institutional controls used or required as part of the response action? | ☐ Yes | **Worksheet 4.0** Institutional Controls | ☐ |
| | | Required | **Worksheet 5.0** Performance Measures and Problems | ☒ |
| No ☐ | Have any operation and maintenance activities been conducted? | ☒ Yes | **Worksheet 6.0** Operation and Maintenance | ☒ |
| No ☒ | Has there been any change to the plans for post-response action care from that submitted in the RAP? | ☐ Yes | **Worksheet 7.0** Post-Response Action Care | ☐ |
| No ☐ | Was any information for this report obtained from outside sources? | ☒ Yes | **Appendix 1*** References | ☒ |
| No ☒ | Is an ESA and/or Compensatory Restoration being used as part of the response action? | ☐ Yes | **Appendix 2*** ESA and Compensatory Restoration | ☐ |

| Checklist for Report Completeness | ID No. *SWR 65033 SWMU 108 Plume* | Report Date: *01/17/2017* |
|---|---|---|

| | | | | |
|---|---|---|---|---|
| No ☒ | Are institutional controls or landowner concurrence required in the response action? | ☐ Yes → | **Appendix 3*** Institutional Controls and Landowner Concurrence | ☐ |
| No ☐ | Is there data or boring/monitor well information not previously submitted? | ☒ Yes → | **Appendix 4*** Data Tables, Boring Logs, and Well Completions | ☒ |
| No ☒ | Did sampling procedures differ from those described in the RAP? | ☐ Yes → | **Appendix 5*** Sampling Procedures | ☐ |
| No ☐ | Has any sampling been conducted for which the analytical results were not previously submitted? | ☒ Yes → | **Appendix 6*** Laboratory Data Packages | ☒[1] |
| No ☐ | Were statistics or geostatistics used in the response action? | ☒ Yes | **Appendix 7*** Statistical Methodology | ☒[2] |
| No ☐ | Were any wastes generated that were not reported through STEERS? | ☒ Yes → | **Appendix 8*** Waste Disposition | ☒ |

***Notes:***

[1] Included with 2016 RAER in CD format.

[2] Included with 2016 RAER for SWMU 17/Building 1423.

Use this worksheet to describe the response action objectives in each media.

## Response Action Objectives — SWMU 108 Plume

What is the selected remedy standard for this affected property? *X* A ___ B

List the environmental media to which this applies *Groundwater*

Repeat this section for each medium that had a different response action objective.

Provide a detailed description of the response action. Describe the removal actions, decontamination actions, treatment system(s), and/or physical or institutional control actions that have been conducted in each media and indicate if there were any differences between the actions taken and the actions proposed in the SIN or RAP.

**The groundwater response action for the site consists of MNA as a decontamination remedy to reduce the concentrations of COCs to less than their critical PCLs. MNA includes the following elements:**

- **Decontamination through the ongoing biological and chemical reductive dechlorination process.**
- **A monitoring/confirmation sampling program to evaluate the progress of the decontamination.**

**The fate and transport modeling results (Tetra Tech 2004) indicate that there will be no expansion of the PCLE zone or offsite migration of COCs at concentrations greater than the respective critical groundwater PCLs.**

Describe how the response action has, or is working towards, achievement of the property-specific response objectives for the PCLE zone in each medium in the context of the response objectives set forth in §350.32 or §350.33, as applicable. Explain how the response action is appropriate based on the hydrogeologic and COC characteristics. Describe any unprotective conditions that continued or resulted from the remedial actions and the actions taken to mitigate unprotective conditions.

**The strongest evidence for natural attention is the reduction of COC concentrations observed in monitoring wells over the period of record and the apparent stability of the plume. Specifically, natural attenuation has reduced concentrations of 1,1-DCE in 40003MW to below its PCL. Concentrations of 1,2-DCA in monitoring well 40001MW remain slightly above its PCL during the last several rounds of sampling. In addition, there has been no expansion of the PCLE zone or offsite migration of COCs. However, the response action for the contaminated groundwater in the PCLE zone will not meet groundwater response objectives of §350.32 by the use of MNA as a decontamination remedy to reduce the concentration of COCs within the PCLE zone to less than PCLs on or before the timeframe specified in the Groundwater RAP on record.**

**Therefore, in accordance with the Groundwater RAP (Revision 2), dated February 2006, and as recommended by TCEQ in a letter dated May 26, 2015, failure of the response action triggers the implementation of contingency measures, which may include the selection of an appropriate alternate remedial measure. The Navy has proposed to implement EMNA as an alternate remedy at the affected area of SWMU 18 groundwater plume in an effort to reduce COCs to below PCLs. This will allow the Navy to make a determination as to whether the technology is viable. Depending on the results of the EMNA spot treatment at SWMU 18, alternative remedial measures may be proposed in a comprehensive RAP for SWMU 86 Plume. MNA will be continued for the upcoming year in accordance with the procedures and protocols described in the Groundwater RAP (Revision 2), dated February 2006. An Interim Groundwater RAP (Revision 3) for SWMU 108 was submitted by the Navy in October of 2015 to remove monitor wells from the current monitoring and sampling plan and confirmation sampling plan.**

**During the implementation of the response action activities, there has been controlled access to the site and limited potential exposure to contaminated groundwater due to restrictions on potable or irrigation well installation through 2017. Additionally, the fate and transport modeling results in the Final MNA Groundwater Monitoring Report for Category B (Tetra Tech 2004) predict that there will be no expansion of the PCLE zone or offsite migration of COCs at concentrations greater than the respective critical groundwater PCLs. Because this decontaminating remedy is based on an in-situ**

**technology, the potential short-term exposures normally associated with the implementation of ex-situ technologies (i.e., dermal and inhalation exposures) are not a concern.**

If different from the information provided in the RAP, explain how the COCs have been handled, treated, disposed, or transferred to another medium and document that the response action has not resulted in any additional exposure conditions due to response action activities.

**N/A**

Explain whether the response action is achieving, or will achieve, the objectives within the reasonable time frame.

**Reduction of COC mass by the ongoing biological reductive dechlorination process (MNA) and control of plume expansion is currently being achieved by the ongoing response action. In addition, concentrations of COCs within the existing groundwater PCLE zones have been reduced to levels slightly above to below respective PCLs. This conclusion has been substantiated through the maps in Attachment 1A, data tables in Appendix 4, and graphs in Attachment 1B which show a smaller PCLE zone footprint than that presented in the RAP (Tetra Tech NUS, 2006). However, the response action will not reduce the concentration of all COCs to levels less than PCLs by the year 2017 time frame.**

Are physical controls part of the response action? ____ Yes *X* No

If yes, describe the type and purpose of the physical control and discuss how the physical control has proven effective.

**N/A**

## Soil Response Action Objectives

When using removal and/or decontamination with controls or controls only, demonstrate that the physical control or combination of measures is reliably containing, and will continue to contain, COCs within and/or derived from the surface soil and subsurface soil PCLE zone materials over time.

**N/A**

Explain how the removal or decontamination action is reducing the concentration of COCs to the critical surface soil and subsurface soil PCL throughout the soil PCLE zone and preventing COC concentrations above the critical soil PCLs from migrating beyond the original boundary of the soil PCLE zone.

**N/A**

## Groundwater Response Action Objectives — SWMU 108 Plume

Name of groundwater-bearing unit to which this information applies **Upper Water Bearing Zone (Alluvial Overburden)**

Repeat this section for each groundwater-bearing unit for which a different response action is being conducted.

Groundwater Classification ____ 1 *X* 2 ____ 3

Is a modified groundwater response action being used for any part of the groundwater PCLE zone (§350.33(f)(2), (3), or (4))? ____ Yes *X* No

If yes, complete the appropriate portions of this report.

Explain how the removal or decontamination actions are reducing the concentration of COCs to the critical groundwater PCL throughout the groundwater PCLE zone and preventing COC concentrations above the critical groundwater PCL from migrating beyond the original boundary of the groundwater PCLE zone. If COC concentrations above the critical groundwater PCL have ever migrated beyond the original boundary of the groundwater PCLE zone, explain the actions taken to address the increase in the PCLE zone.

**The current conceptual MNA model for the site indicates that the ongoing biological reductive dechlorination process can control plume expansion, and in time (beyond 2017), reduce the COC concentrations within the existing groundwater PCLE zones to levels less than PCLs.**

**Maps in Attachment 1A, data tables in Appendix 4, and graphs in Attachment 1B show stable 1,2-DCA at concentrations slightly above its PCL, providing indications that MNA is effective and the plume remains stable. The PCLE zone footprints are similar to those presented in the RAP (Tetra Tech 2006), providing indications that there is no plume expansion or offsite migration of COCs at concentrations greater than the respective critical groundwater PCLs.**

Explain how the response actions are preventing COCs from migrating to air at concentrations above the PCLs for air if the groundwater-to-air PCLs ($^{Air}GW_{Inh\text{-}V}$) were exceeded.

**The maximum observed concentrations of the detected groundwater COCs in the PCLE zone are less than their respective $^{Air}GW_{Inh\text{-}V}$ PCLs.**

Explain how the response actions are preventing COCs from migrating to surface water at concentrations above the PCLs for groundwater discharges to surface water if surface water was a factor.

**Mountain Creek Lake has limited use and is not classified as a drinking water source (see TCEQ approved Tier 1 exclusion criteria). Therefore, the potential receptors of a groundwater discharge to the surface water include acute levels for aquatic life, chronic levels for aquatic life, and human health protection for freshwater fish consumption.**

**In accordance with TRRP-24, Section 350.75(i)(4), it is required that PCLs be established for COCs in groundwater that discharge to surface water ($^{sw}GW$). The rule also requires that the $^{sw}GW$ PCL equal the risk-based exposure limit for surface water ($^{sw}RBEL$), or as modified by a dilution factor where applicable. It is also appropriate to develop a $^{sw}GW$ protective of ecological receptors using the dilution factor approach.**

**A determination of the $^{SW}GW$ PCLs for the COCs in Category B has been performed for Mountain Creek Lake and the results indicate that the projected discharges to the lake will not negatively impact surface water quality. The calculations and basis for this approach are presented in Appendix E of the Draft MNA Groundwater Modeling Report for Category B (Tetra Tech 2003). Additionally, there are no longer any primary sources (storage units) or secondary sources (elevated soil concentrations) of COCs that could increase the dissolved phase concentrations in the future.**

Explain how the response actions are preventing human and ecological receptor exposure to the groundwater PCLE zone.

**The response action is based on an in-situ technology that will permanently degrade the COCs. During the implementation of the in-situ groundwater response action, access to the site will be controlled by not permitting any potable or irrigation wells in the PCLE zone during remedial activities. Additionally, the fate and transport modeling results (Tetra Tech 2004) indicate that the PCLE zone will not migrate beyond the Former NAS Dallas property line; therefore, there will be no threat to offsite human or ecological receptors.**

## Waste Management

Describe the volume and final disposition or reuse location of waste or environmental media that has been removed from the affected property during the response action, if not previously reported under STEERS. Provide copies of all manifests, other documentation of disposition, and landowner consent for reuse of soil in Appendix 8.

**Excess groundwater recovered through the low-flow and PDB sampling method is placed into properly labeled 55-gallon capacity drums and stored at the site. Upon classification, waste disposal arrangements are made with a licensed waste disposal facility. Appendix 8 contains copies of the waste disposal manifests for groundwater generated during the 2016 sampling activities at Former NAS Dallas.**

# ATTACHMENT 1A
# MAPS AND CROSS SECTIONS

# AFFECTED PROPERTY MAP

Affected Property Map
Former NAS Dallas, Texas

January 2014 Isocontour
Gross PCLE Zone Outline
Demolished Building
Existing Structure
Owned by City of Dallas
Transferred from Exelon Corporation to City of Dallas
Transferred from Navy to City of Dallas
Transferred from Navy to City of Grand Prairie
Transferred from Navy to U.S. Army Reserve
Owned by Exelon Corporation

NAVFAC Naval Facilities Engineering Command

| | |
|---|---|
| REQUESTED BY: T. Wiberg | DATE: 9/21/2015 |
| DRAWN BY: A. Zimmerman | PROJECT NUMBER: 0888812796 |

X:\Navy\NAS_Dallas\NAS_Dallas_Jan14_AffectedPropMap.mxd

Service Layer Credits: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community; State boundary is from the United States Census Bureau; Some data are from TetraTech.

# ISOCONCENTRATION CONTOUR MAPS

N

**1,2-DCA Concentration (mg/L)**

- ND - 0.005
- >0.005 - 0.05
- Gross PCLE Zone Outline
- Groundwater Flow Direction

**Isoconcentration Contour**

- 0.005 mg/L

Demolished Building

Note: The PCL for 1,2-DCA = 0.005 mg/L

0 30 60 90 120 Feet

Figure 1A-2B
1,2 Dichloroethane Isoconcentration Contours
SWMU 108
2016 RAER
Former NAS Dallas, Texas

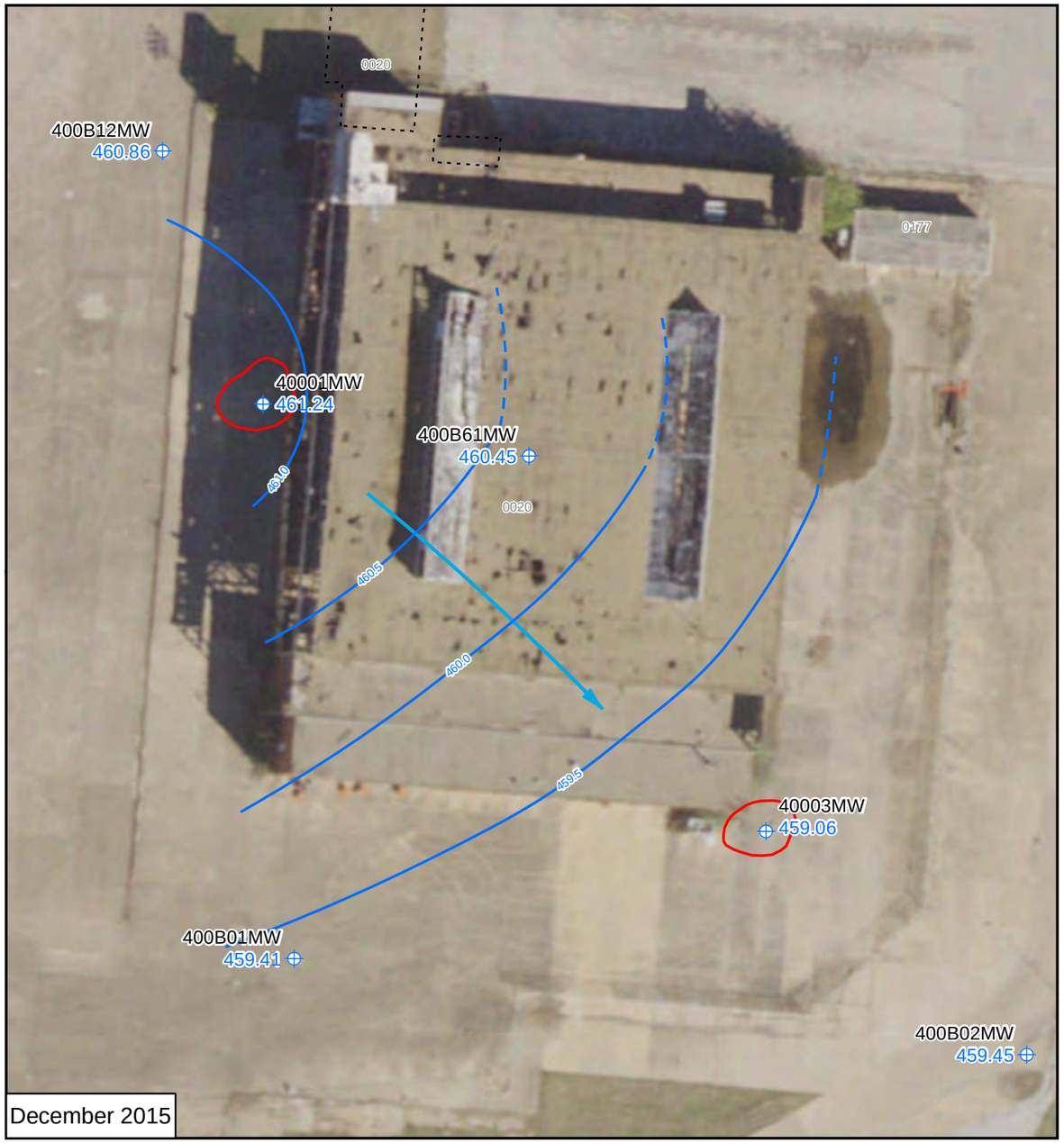
NAVFAC Naval Facilities Engineering Command

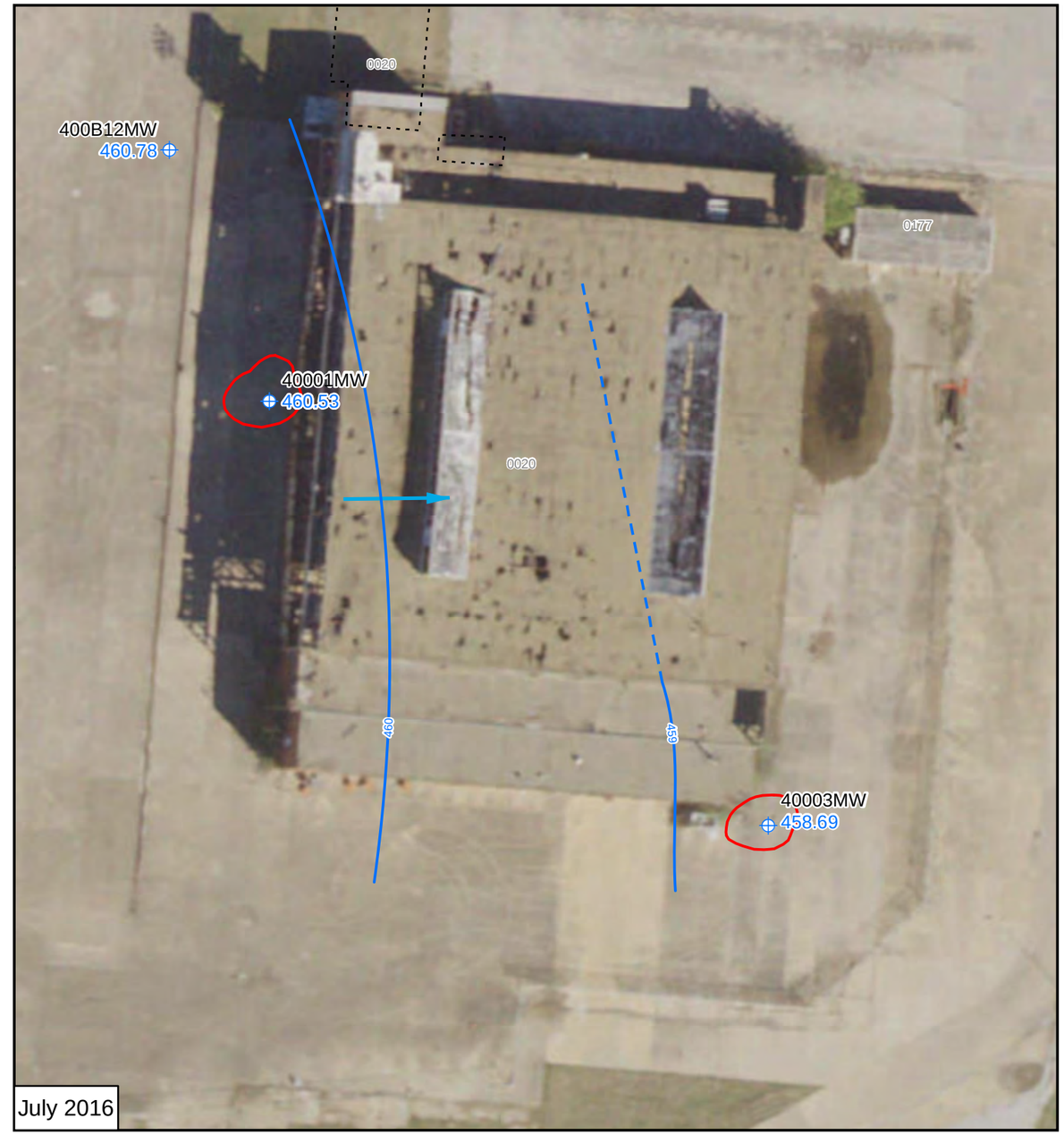
| | |
|---|---|
| REQUESTED BY: E. Brickman | DATE: 11/17/2016 |
| DRAWN BY: M. Senne | PROJECT NUMBER: 0888812796 |

X:\Navy\NAS_Dallas\project\2016_RAER\2016_Jul_NAS_Dallas_Iso_DCA_SWMU108.mxd

Source: Esri, DigitalGlobe, GeoEye, i-cubed, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community

# POTENTIOMETRIC SURFACE MAPS




N

Well Location

Potentiometric Surface Contour, Dashed Where Inferred

Groundwater Flow Direction

Gross PCLE Zone Outline

Demolished Building

Notes:
455.44 - Potentiometric Surface Contour (Feet above MSL)

0 30 60 90 120 Feet

Figure 1A-3
Potentiometric Surface Map
SWMU 108
2016 RAER
Former NAS Dallas, Texas

NAVFAC Naval Facilities Engineering Command

| | |
|---|---|
| REQUESTED BY: E. Brickman | DATE: 10/14/2016 |
| DRAWN BY: M. Senne | PROJECT NUMBER: 0888812796 |

X:\Navy\NAS_Dallas\2016_Jul_NAS_Dallas_Iso_POT_SWMU108.mxd

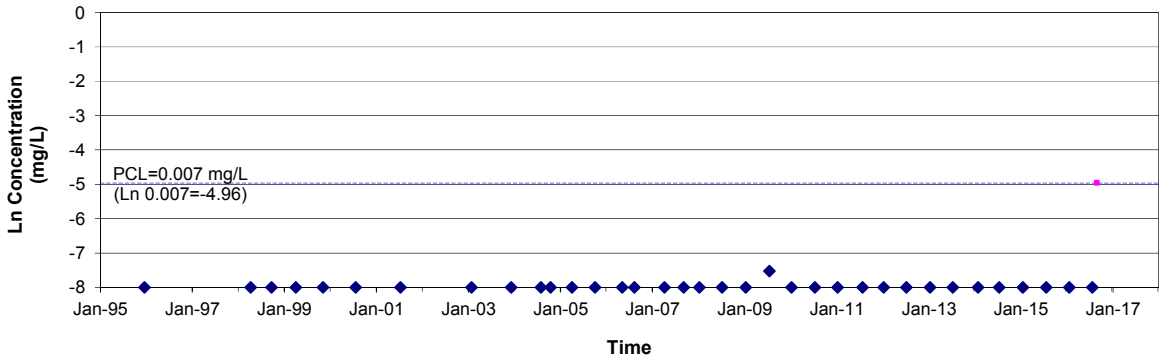
Service Layer Credits: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community

# ATTACHMENT 1B
# GRAPHS

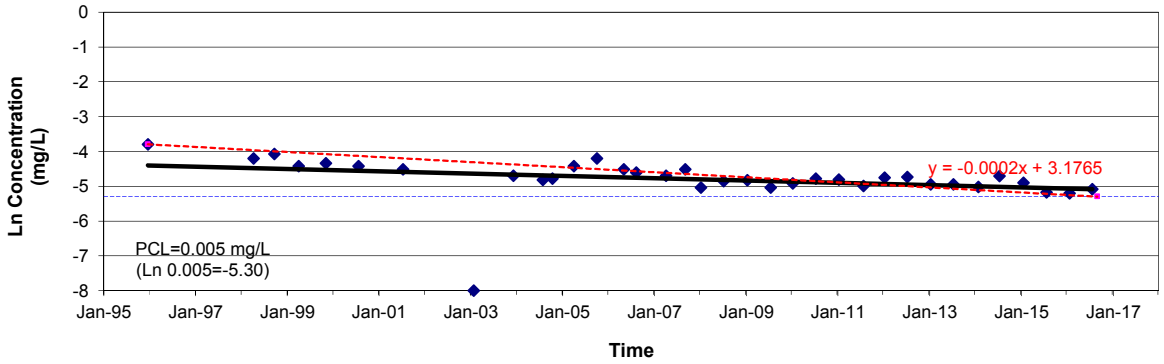
# CONCENTRATION VS. TIME GRAPHS
# WITH MINIMUM REQUIRED ATTENUATION RATE
# SWMU 108 PLUME
# 40001MW
# 2016 RAER

## FORMER NAS DALLAS, TEXAS

### 1,1- Dichloroethene (DCE)




### 1,2- Dichloroethane (DCA)

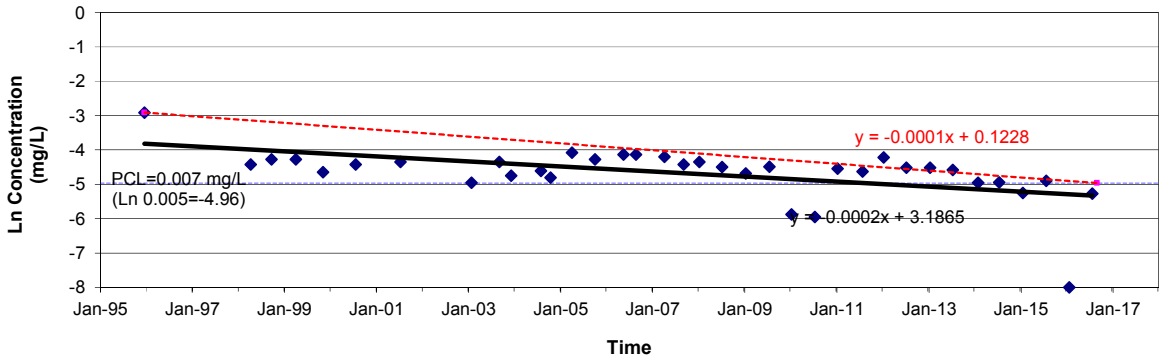



Notes: Red line and slope are based on minimum required attenuation rate (ktime) to meet PCL by 01 Sep 2016.
Black line and slope are based on linear regression of the raw data.
Sample events using permeable diffusion bag (PDB) samplers are listed on Tables 4-1A and 4-1B in Appendix 2.

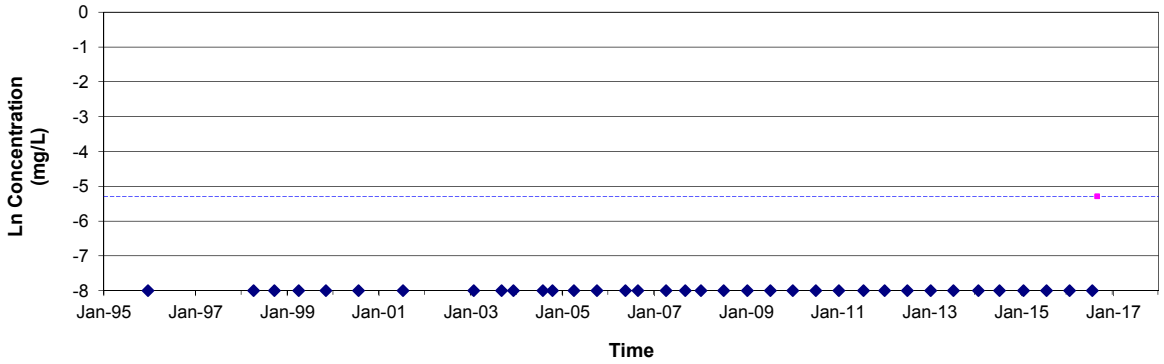
# CONCENTRATION VS. TIME GRAPHS
# WITH MINIMUM REQUIRED ATTENUATION RATE
# SWMU 108 PLUME
# 40003MW
# 2016 RAER

## FORMER NAS DALLAS, TEXAS

### 1,1- Dichloroethene (DCE)




### 1,2-Dichloroethane (DCA)




Notes: Red line and slope are based on minimum required attenuation rate (ktime) to meet PCL by 01 Sep 2016.
Black line and slope are based on linear regression of the raw data.
Sample events using permeable diffusion bag (PDB) samplers are listed on Tables 4-1A and 4-1B in Appendix 2.

## Performance Measures

List and describe the performance measures for each environmental medium containing a PCLE zone that are being used to determine if reasonable progress is being made by the response action in a timely manner. Provide documentation that these performance measures are being met. Attach additional information if necessary.

**MNA Performance Measures**

**The approach to determine if MNA is consistently achieving the clean-up goals by 2017 involves sequential sampling events to monitor the size and shape of the PCLE zone changes over time. To this effect, a tiered sampling program incorporating performance, detection, and ambient monitoring was implemented. This sampling program allows the collection of data on the COCs, groundwater flow, and geochemical parameters that may affect the progress of MNA and the likelihood of meeting site remediation goals. The design of the monitoring program allows a conclusion of success or failure to be drawn as early as possible during the response action implementation while providing reasonable confidence in the conclusion.**

**Performance monitoring encompasses the sampling of the point of exposure (POE) wells (40001MW and 40003MW) within the individual plumes and the background monitoring well (400B12MW) outside the PCLE zone. Data collected from these monitoring wells serve to check the plume shape and determine if it is shrinking or expanding, stable or migrating, thus triggering programmatic adjustments if necessary. COC analytical data collected from the monitoring wells located along the plume centerline were used to determine plume attenuation rates for individual chemical constituents ($k_{time}$) and for the plume as a whole ($k_{dist}$). Data collected from the background monitoring well serves to monitor any changes in the ambient conditions that may impact the effectiveness of MNA in achieving the clean-up goal in a timely manner. The COC analytical results are summarized in Table 4-1.**

**Corrective Action Observation (CAO) wells 400B01MW, 400B02MW, and 400B61MW had either no history of COC detections, or the COC detections have been below applicable GWPSs for at least the previous five consecutive years. These wells were abandoned on April 4-5, 2016, in accordance with the RAP submitted to TCEQ in October 2015. Well plugging reports are located in Appendix 4, and historical COC analytical results for P&A'd wells are included in Table 4-1B.**

**Performance monitoring for 2016 also entailed sampling for MNA parameters (pH, ORP, dissolved oxygen, iron, nitrate, nitrite, phosphate, sulfate, total organic carbon, chloride, ethene, ethane, and methane) during the July 2016 sampling event. MNA parameters are sampled on a biennial sampling schedule. The MNA parameters measured by field tests and laboratory analyses are presented in Table 4-2. MNA parameter data, as needed, serve as a secondary line of evidence to evaluate whether subsurface conditions continue to support natural attenuation.**

**The conceptual MNA site model for this plume is represented in the data tables in Appendix 4, the isoconcentration maps and potentiometric surface maps included in Attachment 1A, and the concentration versus (vs.) time graphs in Attachment 1B.**

**After each semi-annual groundwater monitoring event, the COC concentration data collected were evaluated for both the entire plume and monitoring well by monitoring well basis in accordance with the RAP (Tetra Tech 2006). The initial data analysis and interpretation focused on the detection of trend changes in the data. Further evaluation focused on the assessment of the changes or trends and their impact on MNA in achieving the site-related goals.**

**It was expected that the analytical data would indicate that the attenuation rates are sufficient to effectively remediate the plume on or before the year 2017. Reasonable progress of the response action was evaluated considering the following criteria:**

- **The monitoring well's COC specific $k_{time}$ attenuation rate based on the available sampling data is not more than the minimum attenuation rate necessary to meet the remedial goals by the year 2017.**

- **The monitoring well's COC specific concentration is less than the remedial benchmark concentration (calculated concentration goal based on the initial maximum concentration and the minimum rate necessary to meet the remedial goals by 2017) for that sample date.**

**Response Action Progress**

**Table 4-3 summarizes the groundwater gauging data. The potentiometric surface maps for the December 2015 and July 2016 gauging events, included in Figure 1A-3 (Attachment 1A), indicate that the shape of the groundwater elevation contours and direction of groundwater flow remain consistent with previous sampling events.**

**The COC isoconcentration contour maps, prepared using the data collected during the January and July 2016 sampling events, are included in Figures 1A-2A and 1A-2B (Attachment 1A). A review of the 2016 data indicate that:**

- **1,2 DCA is the only COC at SWMU 108 currently exceeding PCLs.**
- **1,2-DCA slightly exceeded its PCL of 0.005 mg/L in monitoring well 4001MW (0.00551 and 0.00617 mg/L) during the January and July sampling events.**
- **There has been no expansion of the PCLE zone or offsite migration of COCs at concentrations greater than the respective groundwater PCLs.**

**Table 4-4 (Appendix 4) summarizes the concentration vs. time attenuation rate constants for the discrete plumes. The graphs in Attachment 1B graphically depict the same attenuation rate constants summarized in Table 4-4 and the minimum required attenuation rate to meet the remediation goals. The data presented show decreasing trends for 1,2-DCA at monitoring well 40001MW.**

**Based on lines of evidence, the MNA process does appear to be the appropriate remedial method to reduce the COC mass and concentrations throughout the existing groundwater PCLE zone to levels less than their respective critical PCLs; however, it is anticipated that these levels will be consistently achieved after the year 2017. Therefore, in accordance with the Groundwater RAP (Revision 2), and as recommended by TCEQ in a letter dated May 26, 2015, failure of the response action triggers the implementation of contingency measures, which may include the selection of an appropriate alternate remedial measure, such as EMNA. The Navy has proposed to implement EMNA at the affected area of SWMU 18 groundwater plume in an effort to reduce COCs to below PCLs and evaluate an alternate remedy in a pilot study. This study will allow the Navy to make a determination as to whether the technology is viable. Depending upon the results of the EMNA spot treatment at SWMU 18, alternative remedial measures may be proposed in a comprehensive RAP for SWMU 108 Plume. MNA will be continued for the upcoming year in accordance with the procedures and protocols described in the Groundwater RAP on record.**

## *Problems*

Complete the table for the response action. When the response action consists of several components or multiple actions, complete one table for each major component or action.

Response Action Name/Designation: **Groundwater Response Action**

List the problems that have been encountered during the response action, describe the impact of each problem, and the response to the problem.

| Description of the Problem | Impact | Did this cause a response action failure? Yes | No | Corrective Response |
|---|---|---|---|---|
| The current remedy, MNA, does not appear to be capable of reducing concentrations of COCs at monitoring well 4001MW by the cleanup goal of 2017. | In accordance with the Groundwater RAP on record, failure of the approved response action to meet critical PCLs triggers the implementation of contingency measures, which includes the selection of an appropriate alternate remedial measure. | X | | An Alternatives Evaluation Report (AER) was submitted to TCEQ. The Navy has proposed to implement EMNA as an alternate remedy at the affected area of SWMU 18 groundwater plume in an effort to reduce COCs to below PCLs. Depending on the results of the EMNA spot treatment at SWMU 18, alternative remedial measures may be proposed in a comprehensive RAP for SWMU 108 Plume, to follow. MNA will be continued at the SWMU 108 Plume for the upcoming year in accordance with the procedures and protocols described in the Groundwater RAP (Revision 2), dated February 2006. |

Use this worksheet to describe the operation and maintenance (O&M) activities conducted for each response action.

Response Action Name/Designation: Well maintenance

List all portions of the response action to which this information applies. Repeat this worksheet for each major component or operation.

Describe the O&M and inspection activities that have been conducted to operate and maintain response action components.

**(CAO wells 400B01MW, 400B02MW, and 400B61MW had either no history of COC detections, or the COC detections have been below applicable GWPSs for at least the previous five consecutive years. These wells were abandoned on April 4-5, 2016, in accordance with the RAP submitted to TCEQ in October 2015. Well plugging reports are located in Appendix 4, and historical COC analytical results for P&A'd wells are included in Table 4-1B.**

**In September 2016 Resolution Consultants conducted a detailed evaluation of well maintenance needs for NAS Dallas SWMUs. Surface completions at wells 40003MW and 400B12MW were re-fitted by tapping the rim eyelets and replacing bolts and washers in order to secure the lids. Monitor well 40001MW could not be re-fitted, and additional well maintenance actions were completed October 12-13, 2016, that included coring and removal of the existing flush mount well completion, and re-installation of flush-mount well skirt, rim, and lid.**

# APPENDIX 1
# REFERENCE LIST

# APPENDIX 1
# REFERENCES

A.T. Kearney, Inc. *RCRA Facility Assessment Preliminary Review/Visual Site Inspection. Chicago, Illinois.* 1989.

EnSafe/Allen & Hoshall. *Naval Air Station Dallas Environmental Baseline Survey, Dallas, Texas*. Memphis, Tennessee. 1994.

Texas Commission of Environmental Quality. *Compliance Plan No. 50276, EPA ID. No. TX8170022786, ISWR No. 65033, Naval Air Station Dallas.* 2004.

Tetra Tech NUS, Inc. *RCRA Facility Investigation Report for Category C. Pittsburgh, Pennsylvania.* 2000a.

— *RCRA Facility Investigation Report for Category E. Pittsburgh, Pennsylvania.* 2000b.

— *RCRA Facility Investigation Report for Category F. Pittsburgh, Pennsylvania.* 2000c.

— *RCRA Facility Investigation Report for Category D. Pittsburgh, Pennsylvania.* 2001a.

— *RCRA Facility Investigation Report for Category B. Pittsburgh, Pennsylvania.* 2001b.

— *Affected Property Assessment Report. Houston, Texas*. 2002.

— *Draft Groundwater Modeling Report for Category B. Pittsburgh, Pennsylvania*. 2003.

— *Final MNA Groundwater Modeling Report for Category D. Pittsburgh, Pennsylvania.* 2004.

— *Response Action Plan, Revision 2. Pittsburgh, Pennsylvania.* 2006.

Resolution Consultants. *Draft Final Alternatives Evaluation Report, Former Naval Air Station, Dallas, Texas*. Norfolk, Virginia. August 2013.

— *Draft Vapor Intrusion Study Report, Buildings 1405, 1422, and 1424, Solid Waste Management Unit 21*. Norfolk, Virginia. September 2015.

— *Interim Revised Groundwater Response Action Plan for SWMU 108 Plume (Revision 3).* Norfolk, Virginia. October 2015.

# APPENDIX 4
# DATA TABLES

**Table 4-1 Summary of Chemicals of Concern Detected in Groundwater**
**Table 4-2 Summary of Geochemical Parameters Measured in Groundwater**
**Table 4-3 Summary of Groundwater Gauging Data**
**Table 4-4 Summary of Concentration vs. Time Attenuation Rate Constants**
**Table 4-5 Summary of Concentration vs. Distance Attenuation Rate Constants**

# TABLE 4-1
# SUMMARY OF CHEMICALS OF CONCERN DETECTED IN GROUNDWATER

**Table 4-1A**

**Summary of Chemical Concern Detected in Groundwater**
**Long Term Monitoring Wells — SWMU 108 Plume**
**2016 RAER**
**Former NAS Dallas, Texas**


| Monitoring Well | Sampling Date | Sample Round | Chemicals of Concern (mg/L) | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | 1,1,2,2-Tetrachloroethane | 1,1,2-Trichloroethane | 1,1-Dichloroethene | 1,2-Dichloroethane | Chloroethane | cis-1,2-Dichloroethene | Tetrachloroethene | Trans-1,2-Dichloroethene | Trichloroethene | Vinyl Chloride |
| **Protective Concentration Levels (mg/L)** | | | **0.00460** | **0.00500** | **0.00700** | **0.00500** | **9.80000** | **0.07000** | **0.00500** | **0.10000** | **0.00500** | **0.00200** |
| **Monitoring Wells Inside PCLE Zone** | | | | | | | | | | | | |
| **40001MW** | 7/16/1995 | Round 1 | 0.00500 U | 0.00500 U | 0.00500 U | 0.02250 | 0.01000 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.01000 U |
| | 3/24/1998 | Round 2 | 0.00500 U | 0.00500 U | 0.00500 U | 0.01500 | 0.00500 U | 0.00110 J | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U |
| | 9/8/1998 | Round 3 | 0.00500 U | 0.00500 U | 0.00500 U | 0.01700 | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U |
| | 2/21/1999 | Round 4 | 0.00500 U | 0.00500 U | 0.00500 U | 0.01200 | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U |
| | 10/20/1999 | Round 5 | 0.00500 U | 0.00500 U | 0.00500 U | 0.01300 | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U |
| | 7/6/2000 | Round 6 | 0.00500 U | 0.00500 U | 0.00500 U | 0.01200 | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U |
| | 7/11/2001 | Round 7 (PDB) | 0.00500 U | 0.00500 U | 0.00500 U | 0.01100 | 0.01000 U | 0.00250 U | 0.00500 U | 0.00250 U | 0.00500 U | 0.01000 U |
| | 1/23/2003 | Round 8 (PDB) | 0.00100 U | 0.00100 U | 0.00100 U | 0.00100 U | 0.00100 U | 0.00100 U | 0.00100 U | 0.00100 U | 0.00100 U | 0.00100 U |
| | 1/8/2004 | Round 10 | 0.00016 U | 0.00012 U | 0.00021 U | 0.00910 | 0.00018 U | 0.00016 U | 0.00024 U | 0.00019 U | 0.00010 U | 0.00017 U |
| | 7/29/2004 | Round 11 (PDB) | 0.00042 U | 0.00022 U | 0.00035 U | 0.00810 | 0.00041 U | 0.00027 U | 0.00021 U | 0.00023 U | 0.00022 U | 0.00017 U |
| | 10/13/2004 | Round 12 (PDB) | 0.00042 U | 0.00022 U | 0.00035 U | 0.00840 | 0.00041 U | 0.00027 U | 0.00021 U | 0.00023 U | 0.00022 U | 0.00017 U |
| | 4/3/2005 | Round 13 (PDB) | 0.00050 U | 0.00030 U | 0.00040 U | 0.01200 | 0.00030 U | 0.00030 U | 0.00040 U | 0.00030 U | 0.00030 U | 0.00030 U |
| | 10/10/2005 | Round 14 | 0.00050 U | 0.00030 U | 0.00040 U | 0.01500 J | 0.00030 U | 0.00030 U | 0.00040 U | 0.00030 U | 0.00060 J | 0.00030 U |
| | 5/5/2006 | Round 15 | 0.00060 U | 0.00050 U | 0.00060 U | 0.01100 | 0.00050 U | 0.00050 U | 0.00060 U | 0.00060 U | 0.00040 U | 0.00060 U |
| | 8/11/2006 | Round 16 | 0.00060 U | 0.00050 U | 0.00060 U | 0.01000 | 0.00050 U | 0.00050 U | 0.00060 U | 0.00060 U | 0.00040 U | 0.00060 U |
| | 5/9/2007 | Round 17 | 0.00012 U | 0.00026 U | 0.00028 U | 0.00910 | 0.00025 U | 0.00045 U | 0.00014 U | 0.00053 U | 0.00014 U | 0.00012 U |
| | 9/14/2007 | Round 18 | 0.00013 U | 0.00010 U | 0.00013 U | 0.01100 | 0.00014 UJ | 0.00014 U | 0.00010 U | 0.00015 U | 0.00023 U | 0.00020 U |
| | 1/22/2008 | Round 19 | 0.00100 U | 0.00042 U | 0.00039 U | 0.00650 | 0.00051 U | 0.00032 U | 0.00046 U | 0.00048 U | 0.00053 U | 0.00043 U |
| | 7/24/2008 | Round 20 | 0.00021 U | 0.00026 U | 0.00054 U | 0.00780 | 0.00048 U | 0.00051 J | 0.00022 U | 0.00045 U | 0.00032 U | 0.00030 U |
| | 1/12/2009 | Round 21 | 0.00021 U | 0.00026 U | 0.00054 U | 0.00800 | 0.00048 U | 0.00020 U | 0.00022 U | 0.00045 U | 0.00073 J | 0.00030 U |
| | 7/17/2009 | Round 22 | 0.00021 U | 0.00026 U | 0.00054 U | 0.00650 | 0.00048 U | 0.00020 U | 0.00022 U | 0.00045 U | 0.00032 U | 0.00030 U |
| | 1/11/2010 | Round 23 | 0.00029 U | 0.00029 U | 0.00029 U | 0.00730 | 0.00051 U | 0.00032 U | 0.00044 U | 0.00034 U | 0.00024 U | 0.00028 U |
| | 7/13/2010 | Round 24 | 0.00029 U | 0.00029 U | 0.00029 U | 0.00840 | 0.00051 U | 0.00032 U | 0.00044 U | 0.00034 U | 0.00024 U | 0.00028 U |
| | 7/26/2011 | Round 25 (PDB) | 0.00023 U | 0.00022 U | 0.00023 U | 0.00680 | 0.00050 U | 0.00026 U | 0.00025 U | 0.00035 U | 0.00026 U | 0.00022 U |
| | 1/11/2011 | Round 26 | 0.00023 U | 0.00022 U | 0.00023 U | 0.00820 | 0.00050 U | 0.00026 U | 0.00025 U | 0.00035 U | 0.00026 U | 0.00022 U |
| | 1/10/2012 | Round 27 | 0.00023 U | 0.00022 U | 0.00023 U | 0.0086 | 0.00050 U | 0.00026 U | 0.00025 U | 0.00035 U | 0.00026 U | 0.00022 U |
| | 7/10/0212 | Round 28 | NS | NS | 0.00023 U | 0.0088 | NS | 0.00026 U | 0.00025 U | NS | 0.00026 U | 0.00022 U |
| | 1/7/2013 | Round 29 (PDB) | 0.00024 U | 0.00020 U | 0.00020 U | 0.0083 | 0.00050 U | 0.00024 U | 0.00032 U | 0.00023 U | 0.00031 U | 0.00044 U |
| | 1/7/2013 | Round 29 | 0.00024 U | 0.00020 U | 0.00020 U | 0.0071 | 0.00050 U | 0.00024 U | 0.00032 U | 0.00023 U | 0.00031 U | 0.00044 U |
| | 7/16/2013 | Round 30 | 0.00024 U | 0.00020 U | 0.00020 U | 0.0071 | 0.00050 U | 0.00024 U | 0.00032 U | 0.00023 U | 0.00031 U | 0.00044 U |
| | 1/28/2014 | Round 31 (PDB) | 0.00027 U | 0.00032 U | 0.00025 U | 0.0066 | 0.0005 U | 0.00033 U | 0.00026 U | 0.00034 U | 0.00030 U | 0.00033 U |
| | 7/18/2014 | Round 32 | 0.00025 U | 0.00025 U | 0.00025 U | 0.0090 | 0.0005 U | 0.00025 U | 0.00025 U | 0.00025 U | 0.00025 U | 0.00025 U |
| | 1/20/2015 | Round 33 (PDB) | NS | NS | 0.00025 U | 0.00744 | NS | 0.00025 U | 0.00025 U | NS | 0.00025 U | 0.00025 U |
| | 7/24/2015 | Round 34 | 0.00025 U | NS | 0.00025 U | 0.00567 | NS | 0.00025 U | 0.00025 U | NS | 0.00025 U | 0.00025 U |
| | 1/20/2016 | Round 35 (PDB) | NS | NS | 0.0005 U | 0.00551 | NS | 0.0005 U | 0.0005 U | NS | 0.0005 U | 0.0005 U |
| | 7/22/2016 | Round 36 | 0.0005 UJ | 0.0005 U | 0.0005 U | 0.00617 | 0.001 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U |

**Table 4-1A**

**Summary of Chemical Concern Detected in Groundwater**
**Long Term Monitoring Wells — SWMU 108 Plume**
**2016 RAER**
**Former NAS Dallas, Texas**


| Monitoring Well | Sampling Date | Sample Round | Chemicals of Concern (mg/L) | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | 1,1,2,2-Tetrachloroethane | 1,1,2-Trichloroethane | 1,1-Dichloroethene | 1,2-Dichloroethane | Chloroethane | cis-1,2-Dichloroethene | Tetrachloroethene | Trans-1,2-Dichloroethene | Trichloroethene | Vinyl Chloride |
| Protective Concentration Levels (mg/L) | | | 0.00460 | 0.00500 | 0.00700 | 0.00500 | 9.80000 | 0.07000 | 0.00500 | 0.10000 | 0.00500 | 0.00200 |
| 40003MW | 7/16/1995 | Round 1 | 0.00500 U | 0.00500 U | 0.05440 | 0.00500 U | 0.01000 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.01000 U |
| | 3/22/1998 | Round 2 | 0.00500 U | 0.00500 U | 0.01200 | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U |
| | 9/10/1998 | Round 3 | 0.00500 U | 0.00500 U | 0.01400 | 0.00500 U | 0.00500 U | 0.00050 J | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U |
| | 2/21/1999 | Round 4 | 0.00500 U | 0.00500 U | 0.01400 | 0.00500 U | 0.00500 U | 0.00061 J | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U |
| | 10/21/1999 | Round 5 | 0.00500 U | 0.00500 U | 0.00960 | 0.00500 U | 0.00500 U | 0.00072 J | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U |
| | 7/6/2000 | Round 6 | 0.00500 U | 0.00500 U | 0.01200 | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U |
| | 7/11/2001 | Round 7 (PDB) | 0.00500 U | 0.00500 U | 0.01300 | 0.00500 U | 0.01000 U | 0.00250 U | 0.00500 U | 0.00250 U | 0.00500 U | 0.01000 U |
| | 1/23/2003 | Round 8 (PDB) | 0.00100 U | 0.00100 U | 0.00710 | 0.00100 U | 0.00100 U | 0.00049 J | 0.00100 U | 0.00100 U | 0.00100 U | 0.00100 U |
| | 8/25/2003 | Round 9 (PDB) | 0.00023 U | 0.00021 U | 0.01300 | 0.00022 U | 0.00022 U | 0.00081 | 0.00012 U | 0.00024 U | 0.00022 U | 0.00026 U |
| | 12/22/2003 | Round 10 | 0.00016 U | 0.00012 U | 0.00870 | 0.00009 U | 0.00018 U | 0.00054 J | 0.00024 U | 0.00019 U | 0.00010 U | 0.00017 U |
| | 7/29/2004 | Round 11 (PDB) | 0.00042 U | 0.00022 U | 0.01000 | 0.00010 U | 0.00041 U | 0.00069 J | 0.00021 U | 0.00023 U | 0.00022 U | 0.00017 U |
| | 10/13/2004 | Round 12 (PDB) | 0.00042 U | 0.00022 U | 0.00820 | 0.00010 U | 0.00041 U | 0.00056 J | 0.00021 U | 0.00023 U | 0.00022 U | 0.00017 U |
| | 4/3/2005 | Round 13 (PDB) | 0.00050 U | 0.00030 U | 0.01700 | 0.00030 U | 0.00030 U | 0.00100 | 0.00040 U | 0.00030 U | 0.00030 U | 0.00030 U |
| | 10/18/2005 | Round 14 | 0.00050 U | 0.00030 U | 0.01400 J | 0.00030 U | 0.00030 U | 0.00100 J | 0.00040 U | 0.00030 U | 0.00030 U | 0.00030 U |
| | 5/17/2006 | Round 15 | 0.00100 U | 0.00100 U | 0.01500 | 0.00100 U | 0.00200 U | 0.00100 | 0.00100 U | 0.00100 U | 0.00100 U | 0.00200 U |
| | 5/17/2006 | Round 15 (PDB) | 0.00100 U | 0.00100 U | 0.01600 | 0.00100 U | 0.00200 U | 0.00100 | 0.00100 U | 0.00100 U | 0.00100 U | 0.00200 U |
| | 8/24/2006 | Round 16 | 0.00060 U | 0.00050 U | 0.01600 | 0.00040 U | 0.00050 U | 0.00100 | 0.00060 U | 0.00060 U | 0.00040 U | 0.00060 U |
| | 8/26/2006 | Round 16 (PDB) | 0.00060 U | 0.00050 U | 0.01400 | 0.00040 U | 0.00050 U | 0.00100 J | 0.00060 U | 0.00060 U | 0.00040 U | 0.00060 U |
| | 5/9/2007 | Round 17 | 0.00012 U | 0.00026 U | 0.01400 | 0.00021 U | 0.00025 U | 0.00120 | 0.00014 U | 0.00053 U | 0.00033 J | 0.00020 J |
| | 5/9/2007 | Round 17 (PDB) | 0.00012 U | 0.00026 U | 0.01500 | 0.00021 U | 0.00025 U | 0.00110 | 0.00014 U | 0.00053 U | 0.00014 U | 0.00027 J |
| | 9/14/2007 | Round 18 | 0.00013 U | 0.00021 J | 0.01200 | 0.00013 U | 0.00014 UJ | 0.00086 J | 0.00010 U | 0.00019 J | 0.00023 U | 0.00020 U |
| | 1/30/2008 | Round 19 | 0.00047 U | 0.00042 U | 0.01300 | 0.00026 U | 0.00051 U | 0.00110 | 0.00046 U | 0.00048 U | 0.00053 U | 0.00043 U |
| | 1/30/2008 | Round 19 (PDB) | 0.00047 U | 0.00042 U | 0.01100 | 0.00026 U | 0.00051 U | 0.00100 | 0.00046 U | 0.00048 U | 0.00053 U | 0.00043 U |
| | 7/24/2008 | Round 20 | 0.00021 U | 0.00026 U | 0.01040 | 0.00034 U | 0.00048 U | 0.00093 J | 0.00022 U | 0.00045 U | 0.00032 U | 0.00030 U |
| | 7/24/2008 | Round 20 (PDB) | 0.00021 U | 0.00026 U | 0.01120 | 0.00034 U | 0.00048 U | 0.00096 J | 0.00022 U | 0.00045 U | 0.00032 U | 0.00030 U |
| | 1/12/2009 | Round 21 | 0.00021 U | 0.00026 U | 0.00930 | 0.00034 U | 0.00048 U | 0.00079 J | 0.00022 U | 0.00045 U | 0.00032 U | 0.00030 U |
| | 1/12/2009 | Round 21 (PDB) | 0.00021 U | 0.00026 U | 0.00620 | 0.00034 U | 0.00048 U | 0.00056 J | 0.00022 U | 0.00045 U | 0.00032 U | 0.00030 U |
| | 7/16/2009 | Round 22 | 0.00021 U | 0.00026 U | 0.01140 | 0.00034 U | 0.00048 U | 0.00097 J | 0.00022 U | 0.00045 U | 0.00032 U | 0.00030 U |
| | 1/11/2010 | Round 23 | 0.00029 U | 0.00029 U | 0.01240 | 0.00033 U | 0.00051 U | 0.00082 J | 0.00044 U | 0.00034 U | 0.00024 U | 0.00028 U |
| | 1/11/2010 | Round 23 (PDB) | 0.00029 U | 0.00029 U | 0.00052 J | 0.00033 U | 0.00051 U | 0.00032 U | 0.00044 U | 0.00034 U | 0.00024 U | 0.00028 U |
| | 7/13/2010 | Round 24 | 0.00029 U | 0.00029 U | 0.01130 | 0.00033 U | 0.00051 U | 0.00088 J | 0.00044 U | 0.00034 U | 0.00024 U | 0.00028 U |
| | 7/13/2010 | Round 24 (PDB) | 0.00029 U | 0.00029 U | 0.00280 | 0.00033 U | 0.00051 U | 0.00038 J | 0.00044 U | 0.00034 U | 0.00024 U | 0.00028 U |
| | 1/11/2011 | Round 25 (PDB) | 0.00023 U | 0.00022 U | 0.00260 | 0.00020 U | 0.00050 U | 0.00051 J | 0.00025 U | 0.00035 U | 0.00026 U | 0.00022 U |
| | 1/11/2011 | Round 25 | 0.00023 U | 0.00022 U | 0.00980 | 0.00020 U | 0.00050 U | 0.00120 | 0.00025 U | 0.00035 U | 0.00026 U | 0.00022 U |
| | 7/26/2011 | Round 26 | 0.00023 U | 0.00022 U | 0.01060 | 0.00020 U | 0.00050 U | 0.00097 J | 0.00025 U | 0.00035 U | 0.00026 U | 0.00022 U |
| | 1/10/2012 | Round 27 (PDB) | 0.00023 U | 0.00022 U | 0.0035 | 0.00020 U | 0.00050 U | 0.00043 J | 0.00025 U | 0.00035 U | 0.00026 U | 0.00022 U |
| | 1/10/2012 | Round 27 | 0.00023 U | 0.00022 U | 0.0148 | 0.00020 U | 0.00050 U | 0.0014 | 0.00025 U | 0.00035 U | 0.00026 U | 0.00022 U |
| | 7/10/2012 | Round 28 | NS | NS | 0.0109 | 0.00020 U | NS | 0.0010 | 0.00025 U | NS | 0.00026 U | 0.00022 U |
| | 1/7/2013 | Round 29 (PDB) | 0.00024 U | 0.00020 U | 0.0109 | 0.00022 U | 0.00050 U | 0.0011 | 0.00032 U | 0.00023 U | 0.00031 U | 0.00044 U |
| | 7/16/2013 | Round 30 | 0.00024 U | 0.00020 U | 0.0103 | 0.00022 U | 0.00050 U | 0.00022 U | 0.00032 U | 0.00023 U | 0.00031 U | 0.00044 U |
| | 1/28/2014 | Round 31 (PDB) | 0.00027 U | 0.00032 U | 0.0071 | 0.00024 U | 0.00050 U | 0.00099 J | 0.00026 U | 0.00034 U | 0.00030 U | 0.00033 U |
| | 7/15/2014 | Round 32 | 0.00025 U | 0.00025 U | 0.0072 | 0.00025 U | 0.0005 U | 0.00094 J | 0.00025 U | 0.00028 J | 0.00025 U | 0.00025 U |
| | 1/20/2015 | Round 33 (PDB) | NS | NS | 0.0053 | 0.00025 U | NS | 0.000866 J | 0.00025 U | NS | 0.00025 U | 0.00025 U |
| | 7/23/2015 | Round 34 | 0.00025 U | NS | 0.00745 | 0.00025 U | NS | 0.000939 J | 0.00025 U | NS | 0.00025 U | 0.00025 U |
| | 1/20/2016 | Round 35 (PDB) | NS | NS | 0.00025 U | 0.00025 U | NS | 0.00025 U | 0.00025 U | NS | 0.00025 U | 0.00025 U |
| | 7/22/2016 | Round 36 | 0.0005 U | 0.0005 U | 0.00513 | 0.0005 U | 0.001 U | 0.00094 J | 0.0005 U | 0.0005 U | 0.0005 U | 0.0005 U |

**Table 4-1A**

**Summary of Chemical Concern Detected in Groundwater**
**Long Term Monitoring Wells — SWMU 108 Plume**
**2016 RAER**
**Former NAS Dallas, Texas**


| Monitoring Well | Sampling Date | Sample Round | Chemicals of Concern (mg/L) | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | 1,1,2,2-Tetrachloroethane | 1,1,2-Trichloroethane | 1,1-Dichloroethene | 1,2-Dichloroethane | Chloroethane | cis-1,2-Dichloroethene | Tetrachloroethene | Trans-1,2-Dichloroethene | Trichloroethene | Vinyl Chloride |
| **Protective Concentration Levels (mg/L)** | | | **0.00460** | **0.00500** | **0.00700** | **0.00500** | **9.80000** | **0.07000** | **0.00500** | **0.10000** | **0.00500** | **0.00200** |
| **Monitoring Wells Outside PCLE Zone** | | | | | | | | | | | | |
| **400B12MW** | 3/20/1998 | | Well Installed | | | | | | | | | |
| | 4/29/1998 | Round 2 | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U |
| | 8/26/1998 | Round 3 | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U |
| | 10/22/1999 | Round 5 | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U |
| | 7/7/2000 | Round 6 | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U |
| | 7/11/2001 | Round 7 (PDB) | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.01000 U | 0.00250 U | 0.00500 U | 0.00250 U | 0.00500 U | 0.01000 U |
| | 1/23/2003 | Round 8 (PDB) | 0.00100 U | 0.00100 U | 0.00100 U | 0.00100 U | 0.00100 U | 0.00100 U | 0.00100 U | 0.00100 U | 0.00100 U | 0.00100 U |
| | 1/8/2004 | Round 10 | 0.00016 U | 0.00012 U | 0.00021 U | 0.00009 U | 0.00018 U | 0.00016 U | 0.00024 U | 0.00019 U | 0.00010 U | 0.00017 U |
| | 10/15/2004 | Round 12 (PDB) | 0.00042 U | 0.00022 U | 0.00035 U | 0.00010 U | 0.00041 U | 0.00027 U | 0.00021 U | 0.00023 U | 0.00022 U | 0.00017 U |
| | 10/21/2005 | Round 14 (PDB) | 0.00050 U | 0.00030 U | 0.00040 U | 0.00030 U | 0.00030 U | 0.00030 U | 0.00040 U | 0.00030 U | 0.00030 U | 0.00030 U |
| | 5/17/2006 | Round 15 (PDB) | 0.00100 U | 0.00100 U | 0.00100 U | 0.00100 U | 0.00200 U | 0.00100 U | 0.00100 U | 0.00100 U | 0.00100 U | 0.00200 U |
| | 8/24/2006 | Round 16 (PDB) | 0.00060 U | 0.00050 U | 0.00060 U | 0.00040 U | 0.00050 U | 0.00050 U | 0.00060 U | 0.00060 U | 0.00040 U | 0.00060 U |
| | 5/9/2007 | Round 17 (PDB) | 0.00012 U | 0.00026 U | 0.00028 U | 0.00021 U | 0.00025 U | 0.00045 U | 0.00014 U | 0.00053 U | 0.00014 U | 0.00012 U |
| | 9/14/2007 | Round 18 | 0.00013 U | 0.00010 U | 0.00013 U | 0.00013 U | 0.00014 UJ | 0.00014 U | 0.00010 U | 0.00015 U | 0.00023 U | 0.00020 U |
| | 1/30/2008 | Round 19 (PDB) | 0.00047 U | 0.00042 U | 0.00039 U | 0.00026 U | 0.00051 U | 0.00032 U | 0.00046 U | 0.00048 U | 0.00053 U | 0.00043 U |
| | 7/24/2008 | Round 20 (PDB) | 0.00021 U | 0.00026 U | 0.00054 U | 0.00034 U | 0.00048 U | 0.00020 U | 0.00022 U | 0.00045 U | 0.00032 U | 0.00030 U |
| | 1/12/2009 | Round 21 (PDB) | 0.00021 U | 0.00026 U | 0.00054 U | 0.00034 U | 0.00048 U | 0.00020 U | 0.00022 U | 0.00045 U | 0.00032 U | 0.00030 U |
| | 7/16/2009 | Round 22 | 0.00021 U | 0.00026 U | 0.00054 U | 0.00034 U | 0.00048 U | 0.00020 U | 0.00022 U | 0.00045 U | 0.00032 U | 0.00030 U |
| | 1/11/2010 | Round 23 (PDB) | 0.00029 U | 0.00029 U | 0.00029 U | 0.00033 U | 0.00051 U | 0.00032 U | 0.00044 U | 0.00034 U | 0.00024 U | 0.00028 U |
| | 7/13/2010 | Round 24 (PDB) | 0.00029 U | 0.00029 U | 0.00029 U | 0.00033 U | 0.00051 U | 0.00032 U | 0.00044 U | 0.00034 U | 0.00024 U | 0.00028 U |
| | 1/11/2011 | Round 25 (PDB) | 0.00023 U | 0.00022 U | 0.00023 U | 0.00020 U | 0.00050 U | 0.00026 U | 0.00025 U | 0.00035 U | 0.00026 U | 0.00022 U |
| | 7/26/2011 | Round 26 | 0.00023 U | 0.00022 U | 0.00023 U | 0.00020 U | 0.00050 U | 0.00026 U | 0.00025 U | 0.00035 U | 0.00026 U | 0.00022 U |
| | 1/10/2012 | Round 27 (PDB) | 0.00023 U | 0.00022 U | 0.00023 U | 0.00020 U | 0.00050 U | 0.00026 U | 0.00025 U | 0.00035 U | 0.00026 U | 0.00022 U |
| | 7/10/2012 | Round 28 | NS | NS | 0.00023 U | 0.00020 U | NS | 0.00026 U | 0.00025 U | NS | 0.00026 U | 0.00022 U |
| | 1/7/2013 | Round 29 (PDB) | 0.00024 U | 0.00020 U | 0.00020 U | 0.00022 U | 0.00050 U | 0.00024 U | 0.00032 U | 0.00023 U | 0.00031 U | 0.00044 U |
| | 7/16/2013 | Round 30 | 0.00024 U | 0.00020 U | 0.00020 U | 0.00022 U | 0.00050 U | 0.00024 U | 0.00032 U | 0.00023 U | 0.00031 U | 0.00044 U |
| | 1/28/2014 | Round 31 (PDB) | 0.00027 U | 0.00032 U | 0.00025 U | 0.00024 U | 0.00050 U | 0.00033 U | 0.00026 U | 0.00034 U | 0.00030 U | 0.00033 U |
| | 7/15/2014 | Round 32 | 0.00025 U | 0.00025 U | 0.00025 U | 0.00025 U | 0.0005 U | 0.00025 U | 0.00025 U | 0.00025 U | 0.00025 U | 0.00025 U |
| | 1/20/2015 | Round 33 (PDB) | NS | NS | 0.00025 U | 0.0025 U | NS | 0.00025 U | 0.00025 U | NS | 0.00025 U | 0.00025 U |
| | 7/23/2015 | Round 34 | 0.00025 U | NS | 0.00025 U | 0.0025 U | NS | 0.00025 U | 0.00025 U | NS | 0.00025 U | 0.00025 U |
| | 1/20/2016 | Round 35 (PDB) | NS | NS | 0.0005 U | 0.0005 U | NS | 0.0005 U | 0.0005 U | NS | 0.0005 U | 0.0005 U |
| | 7/22/2016 | Round 36 | 0.00025 UJ | 0.00025 U | 0.00025 U | 0.00025 U | 0.0005 U | 0.00025 U | 0.00025 U | 0.00025 U | 0.00025 U | 0.00025 U |

mg/L - milligrams per liter
NA - Not Applicable
NS - Not Sampled
NS-D - Not Sampled during this round due to insufficient water in the monitoring well
PDB - Passive Diffusion Bag
SDG - Sample Delivery Group
PCLE - Protective Concentration Level Exceedance

Note:
Shaded areas indicate an exceedance.

Analytical Result Qualifiers:
J - Indicates that the chemical was detected. However, the associated numerical result may not be a precise representation of the amount that is actually present in the sample. The laboratory reported concentration is considered to be an estimate of the true concentration.
U - Indicates that the chemical was not detected at the numerical detection limit (sample-specific quantitation limit) noted. Nondetected results from the laboratory are reported in this manner. This qualifier is added to a positive result (reported by the laboratory) if the detected concentration is determined to be attributable to contamination introduced during field sampling or laboratory analysis.
UJ - Indicates that the chemical was not detected. However, the detection limit (sample-specific quantitation limit) is considered to be estimated based on problems encountered during laboratory analysis. The associated numerical detection limit is regarded as inaccurate or imprecise.

**Table 4-1B**

**Summary of Chemicals of Concern Detecred in Groundwater**
**Historical Monitoring Wells — SWMU 108 Plume**
**2016 RAER**
**Former NAS Dallas, Texas**


| Monitoring Well | Sampling Date | Chemicals of Concern (mg/L) | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 1,1,2,2-Tetrachloroethane | 1,1,2-Trichloroethane | 1,1-Dichloroethene | 1,2-Dichloroethane | Chloroethane | cis-1,2-Dichloroethene | Tetrachloroethene | Trans-1,2-Dichloroethene | Trichloroethene | Vinyl Chloride |
| **Protective Concentration Levels** | | **0.00460** | **0.00500** | **0.00700** | **0.00500** | **9.80000** | **0.07000** | **0.00500** | **0.10000** | **0.00500** | **0.00200** |
| **Monitoring Wells Outside PCLE Zone** | | | | | | | | | | | |
| **40002MW** | 7/16/1995 | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.01000 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.01000 U |
| | 3/22/1998 | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00190 J | 0.00500 U | 0.00500 U | 0.00089 J | 0.00500 U |
| | 9/9/1998 | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00130 J | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U |
| | 2/20/1999 | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00150 J | 0.00500 U | 0.00500 U | 0.00056 J | 0.00500 U |
| | 10/20/1999 | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00200 J | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U |
| | 7/6/2000 | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00230 J | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U |
| | 7/11/2001 | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.01000 U | 0.00240 J | 0.00500 U | 0.00250 U | 0.00110 J | 0.01000 U |
| | 1/26/2003 | 0.00100 U | 0.00100 U | 0.00100 U | 0.00100 U | 0.00130 | 0.00220 | 0.00100 U | 0.00100 U | 0.00140 | 0.00100 U |
| | -- | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS |
| | 12/22/2003 | 0.00016 U | 0.00012 U | 0.00021 U | 0.00009 U | 0.00018 U | 0.00120 | 0.00024 U | 0.00019 U | 0.00060 J | 0.00017 U |
| | -- | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS |
| | 10/15/2004 | 0.00042 U | 0.00022 U | 0.00035 U | 0.00010 U | 0.00041 U | 0.00280 | 0.00021 U | 0.00023 U | 0.00120 | 0.00017 U |
| | 4/19/2005 | Well Abandoned | | | | | | | | | |
| **400B01MW** | 4/6/1998 | Well Installed | | | | | | | | | |
| | 4/28/1998 | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U |
| | 8/25/1998 | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00560 | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U |
| | 2/20/1999 | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00840 | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U |
| | 10/21/1999 | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00880 | 0.00500 U | 0.00500 U | 0.00500 U | 0.00130 J |
| | 7/6/2000 | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00770 | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U |
| | 7/11/2001 | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.01000 U | 0.00840 | 0.00500 U | 0.00250 U | 0.00500 U | 0.01000 U |
| | 1/23/2003 | 0.00100 U | 0.00100 U | 0.00100 U | 0.00100 U | 0.00100 U | 0.00430 | 0.00100 U | 0.00100 U | 0.00033 J | 0.00100 U |
| | 1/14/2004 | 0.00016 U | 0.00012 U | 0.00021 U | 0.00009 U | 0.00018 U | 0.00420 | 0.00024 U | 0.00019 U | 0.00023 J | 0.00017 U |
| | 10/15/2004 | 0.00042 U | 0.00022 U | 0.00035 U | 0.00010 U | 0.00041 U | 0.00710 | 0.00021 U | 0.00023 U | 0.00048 J | 0.00028 J |
| | 10/21/2005 | 0.00050 U | 0.00030 U | 0.00040 U | 0.00030 U | 0.00030 U | 0.00900 | 0.00040 U | 0.00050 J | 0.00060 J | 0.00030 U |
| | 5/17/2006 | 0.00100 U | 0.00100 U | 0.00100 U | 0.00100 U | 0.00200 U | 0.00600 | 0.00100 U | 0.00100 U | 0.00050 J | 0.00200 U |
| | 8/24/2006 | 0.00060 U | 0.00050 U | 0.00060 U | 0.00040 U | 0.00050 U | 0.00800 | 0.00060 U | 0.00060 U | 0.00060 J | 0.00060 U |
| | 5/9/2007 | 0.00012 U | 0.00026 U | 0.00028 U | 0.00021 U | 0.00025 U | 0.00740 | 0.00014 U | 0.00053 U | 0.00059 J | 0.00063 J |
| | 9/14/2007 | 0.00013 U | 0.00010 U | 0.00013 U | 0.00013 U | 0.00014 UJ | 0.00260 | 0.00010 U | 0.00015 U | 0.00023 J | 0.00049 J |
| | 1/30/2008 | 0.00047 U | 0.00042 U | 0.00039 U | 0.00026 U | 0.00051 U | 0.00660 | 0.00046 U | 0.00048 U | 0.00065 J | 0.00043 U |
| | 7/24/2008 | 0.00021 U | 0.00026 U | 0.00054 U | 0.00034 U | 0.00048 U | 0.00580 | 0.00022 U | 0.00045 U | 0.00032 U | 0.00030 U |
| | 1/12/2009 | 0.00021 U | 0.00026 U | 0.00054 U | 0.00034 U | 0.00048 U | 0.00690 | 0.00022 U | 0.00045 U | 0.00065 J | 0.00043 J |
| | 7/16/2009 | 0.00021 U | 0.00026 U | 0.00054 U | 0.00034 U | 0.00048 U | 0.00490 | 0.00022 J | 0.00045 U | 0.00049 J | 0.00030 U |
| | 1/11/2010 | 0.00029 U | 0.00029 U | 0.00029 U | 0.00033 U | 0.00051 U | 0.00660 | 0.00044 U | 0.00034 U | 0.00062 J | 0.00028 U |
| | 7/13/2010 | 0.00029 U | 0.00029 U | 0.00029 U | 0.00033 U | 0.00051 U | 0.00350 | 0.00044 U | 0.00034 U | 0.00028 J | 0.00028 U |
| | 1/11/2011 | 0.00023 U | 0.00022 U | 0.00023 U | 0.00020 U | 0.00050 U | 0.00650 | 0.00025 U | 0.00035 U | 0.00071 J | 0.00022 U |
| | 7/26/2011 | 0.00023 U | 0.00022 U | 0.00023 U | 0.00020 U | 0.00050 U | 0.00590 | 0.00025 U | 0.00037 J | 0.00053 J | 0.00024 J |
| | 1/10/2012 | 0.00023 U | 0.00022 U | 0.00023 U | 0.00020 U | 0.00050 U | 0.0063 | 0.00025 U | 0.00035 U | 0.00070 J | 0.00022 U |
| | 7/10/2012 | NS | NS | 0.00023 U | 0.00020 U | NS | 0.0056 | 0.00025 U | NS | 0.00053 J | 0.00022 U |
| | 1/7/2013 | 0.00024 U | 0.00020 U | 0.00020 U | 0.00022 U | 0.00050 U | 0.0050 | 0.00032 U | 0.00028 J | 0.00065 J | 0.00044 U |
| | 7/16/2013 | 0.00024 U | 0.00020 U | 0.00020 U | 0.00022 U | 0.00050 U | 0.0052 | 0.00032 U | 0.00023 U | 0.00031 U | 0.00044 U |
| | 1/28/2014 | 0.00027 U | 0.00032 U | 0.00025 U | 0.00024 U | 0.00050 U | 0.0058 | 0.00026 U | 0.00034 U | 0.00069 J | 0.00033 U |
| | 7/15/2014 | 0.00025 U | 0.00025 U | 0.00025 U | 0.00025 U | 0.0005 U | 0.00566 | 0.00025 U | 0.00043 J | 0.00053 J | 0.00033 J |
| | 1/20/2015 | NS | NS | 0.00025 U | 0.00025 U | NS | 0.0058 | 0.00025 U | NS | 0.000583 J | 0.00025 U |
| | 7/23/2015 | 0.00025 U | NS | 0.00025 U | 0.00025 U | NS | 0.00169 | 0.00025 U | NS | 0.00025 U | 0.00025 U |
| | 7/23/2015 | Well Abandoned | | | | | | | | | |

**Table 4-1B**

**Summary of Chemicals of Concern Detecred in Groundwater**
**Historical Monitoring Wells — SWMU 108 Plume**
**2016 RAER**
**Former NAS Dallas, Texas**


| Monitoring Well | Sampling Date | Chemicals of Concern (mg/L) | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 1,1,2,2-Tetrachloroethane | 1,1,2-Trichloroethane | 1,1-Dichloroethene | 1,2-Dichloroethane | Chloroethane | cis-1,2-Dichloroethene | Tetrachloroethene | Trans-1,2-Dichloroethene | Trichloroethene | Vinyl Chloride |
| **Protective Concentration Levels** | | **0.00460** | **0.00500** | **0.00700** | **0.00500** | **9.80000** | **0.07000** | **0.00500** | **0.10000** | **0.00500** | **0.00200** |
| **400B02MW** | 3/21/1998 | Well Installed | | | | | | | | | |
| | 4/29/1998 | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U |
| | 8/25/1998 | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U |
| | 2/21/1999 | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U |
| | 10/22/1999 | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U |
| | 7/7/2000 | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U |
| | 7/11/2001 | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.01 000 U | 0.00250 U | 0.00500 U | 0.00250 U | 0.00500 U | 0.01000 U |
| | 1/23/2003 | 0.00100 U | 0.00100 U | 0.00100 U | 0.00100 U | 0.00100 U | 0.00100 U | 0.00100 U | 0.00100 U | 0.00100 U | 0.00100 U |
| | 1/9/2004 | 0.00016 U | 0.00012 U | 0.00021 U | 0.00009 U | 0.00018 U | 0.00016 U | 0.00024 U | 0.00019 U | 0.000095 U | 0.00017 U |
| | 10/15/2004 | 0.00042 U | 0.00022 U | 0.00035 U | 0.00010 U | 0.00041 U | 0.00027 U | 0.00021 U | 0.00023 U | 0.00022 U | 0.00017 U |
| | 10/21/2005 | 0.00050 U | 0.00030 U | 0.00040 U | 0.00030 U | 0.00030 U | 0.00030 U | 0.00040 U | 0.00030 U | 0.00030 U | 0.00030 U |
| | 5/10/2007 | NS | NS | NS | 0.00021 U | NS | 0.00045 U | 0.00014 U | 0.00053 U | 0.00014 U | 0.00012 U |
| | 9/7/2007 | NS | NS | NS | 0.00013 U | NS | 0.00014 U | 0.00010 U | 0.00015 U | 0.00023 U | 0.00020 U |
| | 1/18/2008 | NS | NS | NS | 0.00026 U | NS | 0.00032 U | 0.00046 U | 0.00048 U | 0.00053 U | 0.00043 U |
| | 7/24/2008 | 0.00021 | 0.00026 | 0.00054 | 0.00034 | 0.00048 | 0.00020 | 0.00022 | 0.00045 | 0.00032 | 0.00030 |
| | 7/17/2009 | 0.00021 U | 0.00026 U | 0.00054 U | 0.00034 U | 0.00048 U | 0.00020 U | 0.00022 U | 0.00045 U | 0.00032 U | 0.00030 U |
| | 1/11/2010 | 0.00029 U | 0.00029 U | 0.00029 U | 0.00033 U | 0.00051 U | 0.00032 U | 0.00044 U | 0.00034 U | 0.00024 U | 0.00028 U |
| | 7/13/2010 | 0.00029 U | 0.00029 U | 0.00029 U | 0.00033 U | 0.00051 U | 0.00032 U | 0.00044 U | 0.00034 U | 0.00024 U | 0.00028 U |
| | 1/11/2011 | 0.00023 U | 0.00022 U | 0.00023 U | 0.00020 U | 0.00050 U | 0.00026 U | 0.00025 U | 0.00035 U | 0.00026 U | 0.00022 U |
| | 7/26/2011 | 0.00023 U | 0.00022 U | 0.00023 U | 0.00020 U | 0.00050 U | 0.00026 U | 0.00025 U | 0.00035 U | 0.00026 U | 0.00022 U |
| | 1/10/2012 | 0.00023 U | 0.00022 U | 0.00023 U | 0.00020 U | 0.00050 U | 0.00026 U | 0.00025 U | 0.00035 U | 0.00026 U | 0.00022 U |
| | 7/10/2012 | NS | NS | 0.00023 U | 0.00020 U | NS | 0.00026 U | 0.00025 U | NS | 0.00026 U | 0.00022 U |
| | 1/7/2013 | 0.00024 U | 0.00020 U | 0.00020 U | 0.00022 U | 0.00050 U | 0.00024 U | 0.00032 U | 0.00023 U | 0.00031 U | 0.00044 U |
| | 7/16/2013 | 0.00024 U | 0.00020 U | 0.00020 U | 0.00022 U | 0.00050 U | 0.00024 U | 0.00032 U | 0.00023 U | 0.00031 U | 0.00044 U |
| | 1/28/2014 | 0.00027 U | 0.00032 U | 0.00025 U | 0.00024 U | 0.00050 U | 0.00033 U | 0.00026 U | 0.00034 U | 0.00030 U | 0.00033 U |
| | 7/16/2014 | 0.00025 U | 0.00025 U | 0.00025 U | 0.00025 U | 0.0005 U | 0.00025 U | 0.00025 U | 0.00025 U | 0.00025 U | 0.00025 U |
| | 1/20/2015 | NS | NS | 0.00025 U | 0.00025 U | NS | 0.00025 U | 0.00025 U | NS | 0.00025 U | 0.00025 U |
| | 7/24/2015 | 0.00025 U | NS | 0.00025 U | 0.00025 U | NS | 0.00025 U | 0.00025 U | NS | 0.00025 U | 0.00025 U |
| | 1/20/2016 | Well Abandoned | | | | | | | | | |

**Table 4-1B**

**Summary of Chemicals of Concern Detecred in Groundwater**
**Historical Monitoring Wells — SWMU 108 Plume**
**2016 RAER**
**Former NAS Dallas, Texas**


| Monitoring Well | Sampling Date | Chemicals of Concern (mg/L) | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 1,1,2,2-Tetrachloroethane | 1,1,2-Trichloroethane | 1,1-Dichloroethene | 1,2-Dichloroethane | Chloroethane | cis-1,2-Dichloroethene | Tetrachloroethene | Trans-1,2-Dichloroethene | Trichloroethene | Vinyl Chloride |
| **Protective Concentration Levels** | | **0.00460** | **0.00500** | **0.00700** | **0.00500** | **9.80000** | **0.07000** | **0.00500** | **0.10000** | **0.00500** | **0.00200** |
| **400B61MW** | 12/16/1999 | | | | | | | | | | |
| | 1/10/2000 | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00140 J | 0.00230 J | 0.00500 U | 0.00170 J | 0.00500 U |
| | 7/6/2000 | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00180 J | 0.00500 U | 0.00190 J | 0.00500 U |
| | 7/11/2001 | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.01000 U | 0.00250 U | 0.00120 J | 0.00250 U | 0.00130 J | 0.01000 U |
| | 1/23/2003 | 0.00100 U | 0.00100 U | 0.00100 U | 0.00100 U | 0.00100 U | 0.00053 J | 0.00120 | 0.00100 U | 0.00120 | 0.00100 U |
| | -- | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS |
| | 12/21/2003 | 0.00016 U | 0.00012 U | 0.00021 U | 0.00009 U | 0.00018 U | 0.00190 | 0.00064 J | 0.00019 U | 0.00140 | 0.00017 U |
| | -- | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS |
| | 10/15/2004 | 0.00042 U | 0.00022 U | 0.00041 J | 0.00033 J | 0.00041 U | 0.00510 | 0.00054 J | 0.00023 U | 0.00310 | 0.00040 J |
| | -- | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS |
| | 10/21/2005 | 0.00050 U | 0.00030 U | 0.00040 U | 0.00030 U | 0.00030 U | 0.00500 | 0.00060 J | 0.00030 U | 0.00300 | 0.00060 J |
| | 5/17/2006 | 0.00100 U | 0.00100 U | 0.00100 U | 0.00100 U | 0.00200 U | 0.00500 | 0.00100 U | 0.00100 U | 0.00300 | 0.00200 U |
| | 8/24/2006 | 0.00060 U | 0.00050 U | 0.00060 U | 0.00040 U | 0.00050 U | 0.00400 | 0.00060 U | 0.00060 U | 0.00400 | 0.00060 U |
| | 5/9/2007 | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS |
| | 9/14/2007 | 0.00013 U | 0.00010 U | 0.00013 U | 0.00013 U | 0.00014 UJ | 0.00160 | 0.00095 J | 0.00015 U | 0.00140 | 0.00034 J |
| | 1/18/2008 | 0.00047 U | 0.00042 U | 0.00039 U | 0.00026 U | 0.00051 U | 0.00110 | 0.00046 U | 0.00048 U | 0.00110 | 0.00043 U |
| | 7/24/2008 | 0.00021 U | 0.00026 U | 0.00140 | 0.00034 U | 0.00048 U | 0.00083 J | 0.00044 J | 0.00045 U | 0.00032 U | 0.00030 U |
| | 1/12/2009 | 0.00021 U | 0.00026 U | 0.00054 U | 0.00034 U | 0.00048 U | 0.00057 J | 0.00069 J | 0.00045 U | 0.00090 J | 0.00030 U |
| | 7/16/2009 | 0.00021 U | 0.00026 U | 0.00054 U | 0.00034 U | 0.00048 U | 0.00057 J | 0.00086 J | 0.00045 U | 0.00086 J | 0.00030 U |
| | 1/11/2010 | 0.00029 U | 0.00029 U | 0.00029 U | 0.00033 U | 0.00051 U | 0.00032 U | 0.00082 J | 0.00034 U | 0.00061 J | 0.00028 U |
| | 7/13/2010 | 0.00029 U | 0.00029 U | 0.00029 U | 0.00033 U | 0.00051 U | 0.00032 U | 0.00061 J | 0.00034 U | 0.00051 J | 0.00028 U |
| | 1/11/2011 | 0.00023 U | 0.00022 U | 0.00023 U | 0.00020 U | 0.00050 U | 0.00026 U | 0.00075 J | 0.00035 U | 0.00051 J | 0.00022 U |
| | 7/26/2011 | 0.00023 U | 0.00022 U | 0.00023 U | 0.00020 U | 0.00050 U | 0.00026 U | 0.00049 J | 0.00035 U | 0.0003 J | 0.00022 U |
| | 1/10/2012 | 0.00023 U | 0.00022 U | 0.0012 | 0.00023 U | 0.00050 U | 0.00026 U | 0.00056 J | 0.00035 U | 0.00040 J | 0.00022 U |
| | 7/10/2012 | NS | NS | 0.00023 U | 0.00020 U | NS | 0.00026 U | 0.00053 J | NS | 0.00026 U | 0.00022 U |
| | 1/7/2013 | 0.00024 U | 0.00020 U | 0.00020 U | 0.00022 U | 0.00050 U | 0.00024 U | 0.00032 U | 0.00023 U | 0.00031 U | 0.00044 U |
| | 7/16/2013 | 0.00024 U | 0.00020 U | 0.00020 U | 0.00022 U | 0.00050 U | 0.00024 U | 0.00032 U | 0.00023 U | 0.00031 U | 0.00044 U |
| | 1/28/2014 | 0.00027 U | 0.00032 U | 0.00025 U | 0.00024 U | 0.00050 U | 0.00033 U | 0.00026 U | 0.00034 U | 0.00030 U | 0.00033 U |
| | 7/15/2014 | 0.00025 U | 0.00025 U | 0.00025 U | 0.00025 U | 0.0005 U | 0.00025 U | 0.00042 J | 0.00025 U | 0.00025 U | 0.00025 U |
| | 1/20/2015 | NS | NS | 0.00025 U | 0.00025 U | NS | 0.00025 U | 0.000256 J | NS | 0.00025 U | 0.00025 U |
| | 7/23/2015 | 0.00025 U | NS | 0.00025 U | 0.00025 U | NS | 0.00025 U | 0.000328 J | NS | 0.00025 U | 0.00025 U |
| | 1/20/2016 | Well Abandoned | | | | | | | | | |
| **400B62MW** | -- | Well Installed | | | | | | | | | |
| | 2/1/2000 | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U |
| | 7/6/2000 | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U |
| | 7/11/2001 | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.01000 U | 0.00250 U | 0.00500 U | 0.00250 U | 0.00500 U | 0.01000 U |
| | -- | Well Destroyed | | | | | | | | | |

mg/L - milligrams per liter
NA - Not Applicable
NS - Not Sampled
NS-D - Not Sampled during this round due to insufficient water in the monitoring well
PDB - Passive Diffusion Bag
SDG - Sample Delivery Group
PCLE - Protective Concentration Level Exceedance

Note:
Shaded areas indicate an exceedance.

Analytical Result Qualifiers:
J - Indicates that the chemical was detected. However, the associated numerical result may not be a precise representation of the amount that is actually present in the sample. The laboratory reported concentration is considered to be an estimate of the true concentration.
U - Indicates that the chemical was not detected at the numerical detection limit (sample-specific quantitation limit) noted. Nondetected results from the laboratory are reported in this manner. This qualifier is added to a positive result (reported by the laboratory) if the detected concentration is determined to be attributable to contamination introduced during field sampling or laboratory analysis.
UJ - Indicates that the chemical was not detected. However, the detection limit (sample-specific quantitation limit) is considered to be estimated based on problems encountered during laboratory analysis. The associated numerical detection limit is regarded as inaccurate or imprecise.

# TABLE 4-2
# SUMMARY OF GEOCHEMICAL PARAMETERS MEASURED IN GROUNDWATER

**Table 4-2A**

**Summary of Groundwater Gauging Data**
**Long Term Monitoring Wells — SWMU 108 Plume**
**2016 RAER**
**Former NAS Dallas, Texas**
**Page 1 of 3**

| Monitoring Well | Top of Casing [1] (ft msl) | Screened Interval (ft msl) | Date | Depth to Water [2] (ft bgs) | Groundwater Elevation (ft msl) |
|---|---|---|---|---|---|
| **Monitoring Wells Located Inside PCLE Zone** | | | | | |
| **40001MW** | 466.02 | 456.54 to 446.54 | 7/10/1995 | Well Installed | |
| | | | 2/1/1998 | 5.15 | 460.87 |
| | | | 5/1/1998 | 6.81 | 459.21 |
| | | | 8/1/1998 | 6.62 | 459.40 |
| | | | 2/1/1999 | 5.07 | 460.95 |
| | | | 9/1/1999 | 6.82 | 459.20 |
| | | | 6/1/2000 | 5.02 | 461.00 |
| | | | 6/1/2001 | 4.88 | 461.14 |
| | | | 12/2/2002 | 4.92 | 461.10 |
| | | | 8/1/2003 | 5.13 | 460.89 |
| | | | 12/3/2003 | 5.20 | 460.82 |
| | | | 7/4/2004 | 5.38 | 460.64 |
| | | | 9/28/2004 | 4.31 | 461.71 |
| | 465.79 | 456.31 to 446.31 | 4/17/2005 | 4.62 | 461.17 |
| | | | 7/22/2005 | 4.78 | 461.01 |
| | | | 10/4/2005 | 5.06 | 460.73 |
| | | | 1/21/2006 | 6.24 | 459.55 |
| | | | 5/2/2006 | 6.29 | 459.50 |
| | | | 8/9/2006 | 6.71 | 459.08 |
| | | | 4/25/2007 | 5.63 | 460.16 |
| | | | 8/22/2007 | 6.61 | 459.18 |
| | | | 1/15/2008 | 4.84 | 460.95 |
| | | | 7/24/2008 | 4.09 | 461.70 |
| | | | 12/17/2008 | 6.21 | 459.58 |
| | | | 7/14/2009 | 6.24 | 459.55 |
| | 465.84 | 456.36 to 446.36 | 12/15/2009 | 4.78 | 461.06 |
| | | | 8/9/2010 | 5.81 | 460.03 |
| | | | 12/17/2010 | 5.01 | 460.83 |
| | | | 7/25/2011 | 5.71 | 460.13 |
| | | | 12/14/2011 | 5.02 | 460.82 |
| | | | 7/10/2012 | 5.53 | 460.31 |
| | | | 12/19/2012 | 6.38 | 459.46 |
| | | | 7/15/2013 | 6.71 | 459.13 |
| | | | 12/18/2013 | 6.30 | 459.54 |
| | | | 7/15/2014 | 6.10 | 459.74 |
| | | | 12/17/2014 | 5.94 | 459.90 |
| | | | 7/20/2015 | 7.34 | 458.50 |
| | | | 12/14/2015 | 4.60 | 461.24 |
| | | | 7/18/2016 | 5.31 | 460.53 |

**Table 4-2A**

**Summary of Groundwater Gauging Data**
**Long Term Monitoring Wells — SWMU 108 Plume**
**2016 RAER**
**Former NAS Dallas, Texas**
**Page 2 of 3**

| Monitoring Well | Top of Casing [1] (ft msl) | Screened Interval (ft msl) | Date | Depth to Water [2] (ft bgs) | Groundwater Elevation (ft msl) |
|---|---|---|---|---|---|
| 40003MW | 465.98 | 451.37 to 441.37 | 6/29/1995 | Well Installed | |
| | | | 2/1/1998 | 6.34 | 459.64 |
| | | | 5/1/1998 | 8.72 | 457.26 |
| | | | 8/1/1998 | 6.09 | 459.89 |
| | | | 2/1/1999 | 7.41 | 458.57 |
| | | | 9/1/1999 | 9.95 | 456.03 |
| | | | 6/1/2000 | 6.91 | 459.07 |
| | | | 6/1/2001 | 5.62 | 460.36 |
| | | | 12/2/2002 | 5.88 | 460.10 |
| | | | 8/1/2003 | 6.73 | 459.25 |
| | | | 12/23/2003 | 6.73 | 459.25 |
| | | | 7/4/2004 | 8.87 | 457.11 |
| | | | 9/29/2004 | 6.39 | 459.59 |
| | 465.76 | 451.15 to 441.15 | 4/17/2005 | 6.82 | 458.94 |
| | | | 7/22/2005 | 6.87 | 458.89 |
| | | | 10/3/2005 | 6.98 | 458.78 |
| | | | 1/21/2006 | 9.41 | 456.35 |
| | | | 5/2/2006 | 9.26 | 456.50 |
| | | | 8/9/2006 | 10.28 | 455.48 |
| | | | 4/25/2007 | 9.20 | 456.56 |
| | | | 8/22/2007 | 9.16 | 456.60 |
| | | | 1/15/2008 | 9.49 | 456.27 |
| | | | 7/9/2008 | 7.33 | 458.43 |
| | | | 12/17/2008 | 7.35 | 458.41 |
| | | | 7/14/2009 | 8.58 | 457.18 |
| | 465.80 | 451.19 to 441.19 | 12/15/2009 | 6.34 | 459.46 |
| | | | 8/9/2010 | 6.23 | 459.57 |
| | | | 12/17/2010 | 6.35 | 459.45 |
| | | | 7/25/2011 | 6.67 | 459.13 |
| | | | 12/14/2011 | 6.60 | 459.20 |
| | | | 7/10/2012 | 7.76 | 458.04 |
| | | | 12/19/2012 | 7.20 | 458.60 |
| | | | 7/15/2013 | 7.60 | 458.20 |
| | | | 12/18/2013 | 6.99 | 458.81 |
| | | | 7/15/2014 | 8.21 | 457.59 |
| | | | 12/17/2014 | 7.69 | 458.11 |
| | | | 7/20/2015 | 14.58 | 451.22 |
| | | | 12/14/2015 | 6.74 | 459.06 |
| | | | 7/18/2016 | 7.11 | 458.69 |

**Table 4-2A**

**Summary of Groundwater Gauging Data**
**Long Term Monitoring Wells — SWMU 108 Plume**
**2016 RAER**
**Former NAS Dallas, Texas**
**Page 3 of 3**

| Monitoring Well | Top of Casing [1] (ft msl) | Screened Interval (ft msl) | Date | Depth to Water [2] (ft bgs) | Groundwater Elevation (ft msl) |
|---|---|---|---|---|---|
| **Monitoring Wells Located Outside PCLE Zone** | | | | | |
| **400B12MW** | 465.83 | 461.13 to 451.13 | 3/20/1998 | Well Installed | |
| | | | 5/1/1998 | 4.73 | 461.10 |
| | | | 8/1/1998 | 5.40 | 460.43 |
| | | | 2/1/1999 | 4.77 | 461.06 |
| | | | 9/1/1999 | 4.79 | 461.04 |
| | | | 6/1/2000 | 3.99 | 461.84 |
| | | | 6/1/2001 | 4.39 | 461.44 |
| | | | 12/2/2002 | 4.48 | 461.35 |
| | | | 8/1/2003 | 4.90 | 460.93 |
| | | | 12/23/2003 | 5.35 | 460.48 |
| | | | 7/4/2004 | 3.75 | 462.08 |
| | | | 9/28/2004 | 4.54 | 461.29 |
| | 465.67 | 460.97 to 450.97 | 4/17/2005 | 4.08 | 461.59 |
| | | | 7/22/2005 | 4.58 | 461.09 |
| | | | 10/4/2005 | 5.68 | 459.99 |
| | | | 1/21/2006 | 6.89 | 458.78 |
| | | | 5/2/2006 | 5.39 | 460.28 |
| | | | 8/9/2006 | 7.91 | 457.76 |
| | | | 4/25/2007 | 4.36 | 461.31 |
| | | | 8/22/2007 | 4.31 | 461.36 |
| | | | 1/15/2008 | 5.03 | 460.64 |
| | | | 7/24/2008 | 4.75 | 460.92 |
| | | | 12/17/2008 | 4.51 | 461.16 |
| | | | 7/14/2009 | 4.93 | 460.74 |
| | 465.70 | 461.00 to 451.00 | 12/15/2009 | 4.57 | 461.13 |
| | | | 8/9/2010 | dry | N/A |
| | | | 12/17/2010 | 5.72 | 459.98 |
| | | | 7/25/2011 | 5.06 | 460.64 |
| | | | 12/14/2011 | 5.40 | 460.30 |
| | | | 7/10/2012 | 6.20 | 459.50 |
| | | | 12/19/2012 | 6.85 | 458.85 |
| | | | 7/15/2013 | 5.23 | 460.47 |
| | | | 12/18/2013 | 5.23 | 460.47 |
| | | | 7/15/2014 | NA | NA |
| | | | 12/17/2014 | 6.54 | 459.16 |
| | | | 7/20/2015 | 4.80 | 460.90 |
| | | | 12/14/2015 | 4.84 | 460.86 |
| | | | 7/18/2016 | 4.92 | 460.78 |

bgs - below ground surface
ft - feet
msl - mean sea level
NA - Not Available or Applicable (i.e., abandoned, not installed, not measured)
PCLE - Protective Concentration Level Exceedance

Notes:
1 - All monitoring wells on-site were resurveyed in May 2005 and September 2010 in accordance with the Compliance Plan Requirements.
2 - Depth to water measurements taken from the top of the riser.

**Table 4-2B**

**Summary of Groundwater Gauging Data**
**Historical Monitoring Wells — SWMU 108 Plume**
**2016 RAER**
**Former NAS Dallas, Texas**
**Page 1 of 4**

| Monitoring Well | Top of Casing [1] (ft msl) | Screened Interval (ft msl) | Date | Depth to Water [2] (ft bgs) | Groundwater Elevation (ft msl) |
|---|---|---|---|---|---|
| **Monitoring Wells Located Outside PCLE Zone** | | | | | |
| **40002MW** | 465.99 | 461.39 to 451.39 | 2/1/1998 | 5.67 | 460.32 |
| | | | 5/1/1998 | 5.81 | 460.18 |
| | | | 8/1/1998 | 5.94 | 460.05 |
| | | | 2/1/1999 | 5.96 | 460.03 |
| | | | 9/1/1999 | 6.38 | 459.61 |
| | | | 6/1/2000 | 5.28 | 460.71 |
| | | | 6/1/2001 | 5.43 | 460.56 |
| | | | 12/2/2002 | 5.00 | 460.99 |
| | | | 8/1/2003 | 5.51 | 460.48 |
| | | | 12/23/2003 | 5.27 | 460.72 |
| | | | 7/4/2004 | 5.86 | 460.13 |
| | | | 9/28/2004 | 5.10 | 460.89 |
| | | | 4/19/2005 | Well Pluged and Abandoned | |
| **400B01MW** | 465.45 | 458.15 to 443.15 | 4/6/2003 | Well Installed | |
| | | | 5/1/1998 | 8.32 | 457.13 |
| | | | 8/1/1998 | 5.95 | 459.5 |
| | | | 2/1/1999 | 5.98 | 459.47 |
| | | | 9/1/1999 | 4.48 | 460.97 |
| | | | 6/1/2000 | 6.44 | 459.01 |
| | | | 6/1/2001 | 7.36 | 458.09 |
| | | | 12/2/2002 | 5.73 | 459.72 |
| | | | 8/1/2003 | 6.54 | 458.91 |
| | | | 12/23/2003 | 4.77 | 460.68 |
| | | | 7/4/2004 | 6.39 | 459.06 |
| | | | 9/28/2004 | 4.99 | 460.46 |
| | 465.16 | 457.858 to 442.858 | 4/17/2005 | 5.15 | 460.01 |
| | | | 7/22/2005 | 5.52 | 459.64 |
| | | | 10/4/2005 | 5.25 | 459.91 |
| | | | 1/21/2006 | 5.45 | 459.71 |
| | | | 5/2/2006 | 7.41 | 457.75 |
| | | | 8/9/2006 | 6.81 | 458.35 |
| | | | 4/25/2007 | 7.28 | 457.88 |
| | | | 8/22/2007 | 6.81 | 458.35 |
| | | | 1/15/2008 | 6.58 | 458.58 |
| | | | 7/24/2008 | 6.32 | 458.84 |
| | | | 12/17/2008 | 5.28 | 459.88 |
| | | | 7/14/2009 | 5.88 | 459.28 |
| | 465.19 | 457.885 to 442.885 | 12/15/2009 | 5.55 | 459.64 |
| | | | 8/9/2010 | 5.73 | 459.46 |
| | | | 12/17/2010 | 4.75 | 460.44 |
| | | | 7/25/2011 | 5.9 | 459.29 |
| | | | 12/14/2011 | 6.07 | 459.12 |
| | | | 7/10/2012 | 6.25 | 458.94 |
| | | | 12/19/2012 | 5.73 | 459.46 |
| | | | 7/15/2013 | 6.99 | 458.20 |
| | | | 12/18/2013 | 6.21 | 458.98 |
| | | | 7/15/2014 | 7.31 | 457.88 |
| | | | 12/17/2014 | 6.58 | 458.61 |
| | | | 7/20/2015 | 6.88 | 458.31 |
| | | | 12/17/2015 | 5.78 | 459.41 |
| | | | 4/4/2016 | Well Plugged and Abandoned | |

**Table 4-2B**

**Summary of Groundwater Gauging Data**
**Historical Monitoring Wells — SWMU 108 Plume**
**2016 RAER**
**Former NAS Dallas, Texas**


| | | | | | |
|---|---|---|---|---|---|
| **400B02MW** | 465.83 | 450.33 to 440.33 | 3/21/1998 | Well Installed | |
| | | | 5/1/1998 | 5.94 | 458.09 |
| | | | 8/1/1998 | 5.3 | 458.73 |
| | | | 2/1/1999 | 6.29 | 457.74 |
| | | | 9/1/1999 | 5.78 | 458.25 |
| | | | 6/1/2000 | 5.65 | 458.38 |
| | | | 6/1/2001 | 6.72 | 457.31 |
| | | | 12/2/2002 | 7.57 | 456.46 |
| | | | 8/1/2003 | 6.48 | 457.55 |
| | | | 12/23/2003 | 6.81 | 457.22 |
| | | | 7/4/2004 | 5.87 | 458.16 |
| | | | 9/28/2004 | 6.45 | 457.58 |
| | 465.67 | 450.148 to 440.148 | 4/17/2005 | 6.42 | 457.43 |
| | | | 7/20/2005 | 6.25 | 457.60 |
| | | | 10/4/2005 | 7.26 | 456.59 |
| | | | 1/21/2006 | 9.35 | 454.50 |
| | | | 5/2/2006 | 8.32 | 455.53 |
| | | | 8/8/2006 | 7.49 | 456.36 |
| | | | 4/25/2007 | 6.11 | 457.74 |
| | | | 8/20/2007 | 6.78 | 457.07 |
| | | | 1/15/2008 | 6.58 | 457.27 |
| | | | 7/21/2008 | 3.65 | 460.20 |
| | | | 12/18/2008 | NA | NA |
| | | | 7/13/2009 | 6.4 | 457.45 |
| | 465.70 | 450.189 to 440.189 | 12/15/2009 | 6.28 | 457.61 |
| | | | 8/10/2010 | 4.53 | 459.36 |
| | | | 12/17/2010 | 6.48 | 457.41 |
| | | | 7/25/2011 | 6.62 | 457.27 |
| | | | 12/14/2011 | 6.72 | 457.17 |
| | | | 7/10/2012 | 6.41 | 457.48 |
| | | | 12/19/2012 | 7.8 | 456.09 |
| | | | 7/15/2013 | 6.02 | 457.87 |
| | | | 12/18/2013 | 6.78 | 457.11 |
| | | | 7/15/2014 | 7.01 | 456.88 |
| | | | 12/17/2014 | 6.97 | 456.92 |
| | | | 7/20/2015 | 12.82 | 451.07 |
| | | | 12/17/2015 | 6.25 | 459.45 |
| | | | 4/4/2016 | Well Plugged and Abandoned | |

**Table 4-2B**

**Summary of Groundwater Gauging Data**
**Historical Monitoring Wells — SWMU 108 Plume**
**2016 RAER**
**Former NAS Dallas, Texas**


| | | | | | |
|---|---|---|---|---|---|
| **400B61MW** | 466.62 | 460.95 to 450.95 | 12/16/1999 | Well Installed | |
| | | | 6/1/2000 | 5.26 | 461.36 |
| | | | 6/1/2001 | 5.61 | 461.01 |
| | | | 12/2/2002 | 5.74 | 460.88 |
| | | | 8/1/2003 | 6.22 | 460.4 |
| | | | 12/23/2003 | 6.45 | 460.17 |
| | | | 7/4/2004 | 5.25 | 461.37 |
| | | | 9/28/2004 | 5.91 | 460.71 |
| | 466.47 | 460.798 to 450.798 | 4/17/2005 | 5.52 | 460.95 |
| | | | 7/22/2005 | 6.01 | 460.46 |
| | | | 10/4/2005 | 6.87 | 459.60 |
| | | | 1/21/2006 | 8.01 | 458.46 |
| | | | 5/2/2006 | 6.45 | 460.02 |
| | | | 8/9/2006 | 7.09 | 459.38 |
| | | | 4/25/2007 | NA | NA |
| | | | 8/22/2007 | 5.5 | 460.97 |
| | | | 1/15/2008 | 6.15 | 460.32 |
| | | | 7/24/2008 | 5.92 | 460.55 |
| | | | 12/17/2008 | 7.39 | 459.08 |
| | | | 7/14/2009 | 6.17 | 460.30 |
| | 466.51 | 460.842 to 450.842 | 12/15/2009 | 5.8 | 460.71 |
| | | | 8/9/2010 | 5.64 | 460.87 |
| | | | 12/17/2010 | 6.89 | 459.62 |
| | | | 7/25/2011 | 6.31 | 460.20 |
| | | | 12/14/2011 | 6.5 | 460.01 |
| | | | 7/10/2012 | 6.53 | 459.98 |
| | | | 12/19/2012 | 7.71 | 458.80 |
| | | | 7/15/2013 | 6.84 | 459.67 |
| | | | 12/18/2013 | 6.21 | 460.30 |
| | | | 7/15/2014 | 6.8 | 459.71 |
| | | | 12/17/2014 | 7.68 | 458.83 |
| | | | 7/20/2015 | 6.78 | 459.73 |
| | | | 12/17/2015 | 6.06 | 460.45 |
| | | | 4/5/2016 | Well Plugged and Abandoned | |

**Table 4-2B**

**Summary of Groundwater Gauging Data**
**Historical Monitoring Wells — SWMU 108 Plume**
**2016 RAER**
**Former NAS Dallas, Texas**


| | | | | | |
|---|---|---|---|---|---|
| **400B62MW** | 464.74 | 458.35 to 448.35 | 12/16/1999 | Well Installed | |
| | | | 6/1/2000 | 8.13 | 456.61 |
| | | | 6/1/2001 | 8.93 | 455.81 |
| | | | 12/2/2002 | Well Pluged and Abandoned | |
| **40301MW** | 465.87 | 456.26 to 446.26 | Feb-98 | Well Installed | |
| | | | May-98 | 4.96 | 460.91 |
| | | | Aug-98 | 4.79 | 461.08 |
| | | | Feb-99 | 5.39 | 460.48 |
| | | | Sep-99 | 4.95 | 460.92 |
| | | | Jun-00 | 5.41 | 460.46 |
| | | | Jun-01 | 5.26 | 460.61 |
| | | | Dec-02 | 5.25 | 460.62 |
| | | | -- | Well Destroyed | |
| **40401MW** | 465.55 | 455.89 to 445.89 | Feb-98 | 4.17 | 461.38 |
| | | | May-98 | 9.93 | 455.62 |
| | | | Aug-98 | 4.00 | 461.55 |
| | | | Feb-99 | 4.03 | 461.52 |
| | | | Sep-99 | 3.64 | 461.91 |
| | | | Jun-00 | 3.13 | 462.42 |
| | | | Jun-01 | 3.73 | 461.82 |
| | | | Dec-02 | 5.09 | 460.46 |
| | | | -- | Well Destroyed | |

bgs - below ground surface
ft - feet
msl - mean sea level
NA - Not Available or Applicable (i.e., abandoned, not installed, not measured)
PCLE - Protective Concentration Level Exceedance

Note:
Depth to water measurements taken from the top of the riser.

# TABLE 4-3
# SUMMARY OF GROUNDWATER GAUGING DATA

**Table 4-3A**

**Summary of Geochemical Parameters Measured in Groundwater**
**Long Term Monitoring Wells — SWMU 108 Plume**
**2016 RAER**
**Former NAS Dallas, Texas**


| Monitoring Well | Sampling Date | Sampling Round | SDG | Oxidation-Reduction Conditions | | | | | | | | Degradation Products | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Dissolved Oxygen[2] | Ferrous Iron[2] | Nitrate[3] | Nitrite[3] | ORP[1] | Phosphate[3] | Sulfate[3] | TOC[3] | Alkalinity[2] | Carbon Dioxide[2] | Chloride[3] | Ethane[3] | Ethene[3] | Methane[3] | pH[1] | Sulfide[3] |
| | | | Units | mg/L | mg/L | mg/L | mg/L | mV | mg/L | mg/L | mg/L | mg/L | mg/L | mg/L | ng/L | ng/L | µg/L | S.U. | mg/L |
| **Monitoring Wells Located Inside PCLE Zone** | | | | | | | | | | | | | | | | | | | |
| **40001MW** | 1/11/2010 | Round 23 | F70739 | NA | NA | NA | NA | 73.2 | NA | NA | NA | NA | NA | NA | NA | NA | NA | 6.91 | NA |
| | 7/13/2010 | Round 24 | F75071 | NA | NA | NA | NA | 44.5 | NA | NA | NA | NA | NA | NA | NA | NA | NA | 6.76 | NA |
| | 1/11/2011 | Round 25 | FIELD | NA | NA | NA | NA | 123.3 | NA | NA | NA | NA | NA | NA | NA | NA | NA | 6.83 | NA |
| | 7/26/2011 | Round 26 | F84623 | NA | NA | NA | NA | 27.5 | NA | NA | NA | NA | NA | NA | NA | NA | NA | 6.82 | NA |
| | 1/10/2012 | Round 27 | F88817 | NA | NA | NA | NA | 99.2 | NA | NA | NA | NA | NA | NA | NA | NA | NA | 6.74 | NA |
| | 7/10/2012 | Round 28 | F94831 | NA | NA | NA | NA | -2.4 | NA | NA | NA | NA | NA | NA | NA | NA | NA | 6.7 | NA |
| | 1/7/2013 | Round 29 | FA642 | NA | NA | NA | NA | -73.3 | NA | NA | NA | NA | NA | NA | NA | NA | NA | 6.77 | NA |
| | 7/16/2013 | Round 30 | FA6471 | 0.4 | 0 | 2.5 U | 2.5 U | 84.9 | 0.21 | 3780 | 2.0 | 400 | 35 | 740 | 320 U | 430 U | 0.68 | 6.22 | 0.64 J |
| | 1/28/2014 | Round 31 | FIELD | 0.37 | NA | NA | NA | 111.7 | NA | NA | NA | NA | NA | NA | NA | NA | NA | 6.81 | NA |
| | 7/15/2014 | Round 32 | 1407111 | 0.54 | 0.42 | 0.033 U | 0.66 U | 165.6 | 0.01 U | 3560 | 1.78 J | NA | 100 | 700 | 0.001 U | 0.001 U | 0.00359 J | 6.65 | 0 |
| | 1/20/2015 | Round 33 | 1501071 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| | 7/23/2015 | Round 34 | 1507195 | 0.99 | 0.15 | 0.033 U | 0.66 U | 63.5 | .018 J | 4100 | 1.3 | 442 | 110 | 694 | 0.001 U | 0.001 U | 1.78 | 6.71 | 0.06 |
| | 1/20/2016 | Round 35 | 1601140 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| | 7/22/2016 | Round 36 | 1607175 | 0 | 0.2 | 0.033 U | 0.033 U | 38 | 0.0242 J | 3680 | 1.44 J | 356 | 0 | 732 | 0.001 U | 0.001 U | 1.47 | 6.96 | NA |
| **40003MW** | 10/21/1999 | Round 5 | DL329,TTE13 | 0.8 | 0 | 10 U | 10 U | 310.8 | 10 U | 3500 | NA | 324 | 199 | 1080 | 189 | 227 | 2.338 | 6.95 | 0 U |
| | 7/6/2000 | Round 6 | DL347 | 1 | 0.2 | 0.5 U | 0.5 U | 155.6 | 2.5 U | 3400 | NA | 320 | 65 | 1070 | NA | NA | NA | 6.68 | 0.01 U |
| | 12/22/2003 | Round 10 | C3L230193 | 0.8 | 0 | NA | NA | 199 | NA | 3300 | NA | 350 | NA | 1040 J | NA | NA | NA | 6.75 | 0 |
| | 10/18/2005 | Round 14 | CTO260-22 | 0.6 | 0 | NA | NA | 41 | 0.05 U | 3800 | 1.4 | 250 | 100 | 940 | 10,000 U | 10,000 U | 4.4 U | 6.65 | 1 U |
| | 9/14/2007 | Round 18 | DALLASW006 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | 330 U | 330 U | 3.5 U | NA | NA |
| | 9/14/2007 | Round 18 | Field | 1 | 0 | NA | NA | 147.0 | NA | NA | NA | 300 | 30 | NA | NA | NA | NA | 6.63 | NA |
| | 7/16/2009 | Round 22 | F66709 | 0.8 | 0 | 0.05 U | 2.5 UR | -18.2 | 0.024 J | 2340 | 1.4 | 325 | 105 | 772 | 320 U | 430 U | 0.26 J | 6.9 | 0.6 U |
| | 1/11/2010 | Round 23 | F70739 | NA | NA | NA | NA | 63.2 | NA | NA | NA | NA | NA | NA | NA | NA | NA | 6.93 | NA |
| | 7/13/2010 | Round 24 | F75071 | NA | NA | NA | NA | 9.3 | NA | NA | NA | NA | NA | NA | NA | NA | NA | 6.71 | NA |
| | 1/11/2011 | Round 25 | FIELD | NA | NA | NA | NA | 92.9 | NA | NA | NA | NA | NA | NA | NA | NA | NA | 6.87 | NA |
| | 7/26/2011 | Round 26 | F84623 | NA | NA | NA | NA | 15.5 | NA | NA | NA | NA | NA | NA | NA | NA | NA | 6.97 | NA |
| | 1/10/2012 | Round 27 | F88817 | NA | NA | NA | NA | 38.8 | NA | NA | NA | NA | NA | NA | NA | NA | NA | 6.73 | NA |
| | 7/10/2012 | Round 28 | F94831 | NA | NA | NA | NA | 53.9 | NA | NA | NA | NA | NA | NA | NA | NA | NA | 6.68 | NA |
| | 1/7/2013 | Round 29 | FA642 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| | 7/16/2013 | Round 30 | FA6471 | 0.3 | 0.1 | 2.5 U | 2.5 U | 74.9 | 0.42 | 3280 | 1.4 | 350 | 40 | 928 | 320 U | 430 U | 0.20 J | 6.73 | 0.54 J |
| | 1/28/2014 | Round 31 | FIELD | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| | 7/15/2014 | Round 32 | 1407111 | 0.46 | 0.35 | 0.033 U | 0.66 U | 255.1 | 0.01 U | 3120 | 1.72 J | NA | 95 | 921 | 0.001 U | 0.001 U | 0.001 U | 6.67 | 0.02 |
| | 1/20/2015 | Round 33 | 1501071 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| | 7/23/2015 | Round 34 | 1507195 | 0.65 | 0.17 | 0.033 U | 0.66 U | 50.5 | 0.01 U | 3460 | 1.38 | 387 | 95 | 971 | 0.001 U | 0.001 U | 1.53 J | 6.69 | 0.03 |
| | 1/20/2016 | Round 35 | 1601140 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| | 7/27/2016 | Round 36 | 1607216 | 0 | 0.24 | 0.033 U | 0.033 U | 9 | 0.01 U | 3110 | 1.38 J | 413 | 0 | 979 | .001 UJL | .001 UJL | 4.81 JL | 6.89 | NA |

**Table 4-3A**

**Summary of Geochemical Parameters Measured in Groundwater**
**Long Term Monitoring Wells — SWMU 108 Plume**
**2016 RAER**
**Former NAS Dallas, Texas**


| Monitoring Well | Sampling Date | Sampling Round | SDG | Oxidation-Reduction Conditions | | | | | | | | Degradation Products | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Dissolved Oxygen[2] | Ferrous Iron[2] | Nitrate[3] | Nitrite[3] | ORP[1] | Phosphate[3] | Sulfate[3] | TOC[3] | Alkalinity[2] | Carbon Dioxide[2] | Chloride[3] | Ethane[3] | Ethene[3] | Methane[3] | pH[1] | Sulfide[3] |
| | | | Units | mg/L | mg/L | mg/L | mg/L | mV | mg/L | mg/L | mg/L | mg/L | mg/L | mg/L | ng/L | ng/L | µg/L | S.U. | mg/L |
| **Monitoring Wells Located Outside PCLE Zone** | | | | | | | | | | | | | | | | | | | |
| **400B12MW** | 3/20/1998 | Well Installed | | | | | | | | | | | | | | | | | |
| | 10/22/1999 | Round 5 | DL329,TTE13 | 0.6 | 0 | 5 U | 5 U | 277.8 | 5 U | 1700 | NA | 414 | 221 | 305 | 10 | 128 | 10.46 | 6.82 | 0 U |
| | 7/7/2000 | Round 6 | DL347 | 0.8 | 0.2 | 0.5 U | 0.5 U | 221.6 | 0.5 U | 1370 | NA | 370 | 55 | 170 | NA | NA | NA | 6.75 | 0.01 U |
| | 1/8/2004 | Round 10 | C4A090143 | 1 | 0 | NA | NA | 264 | NA | 1430 | NA | 70 | NA | 182 | NA | NA | NA | 7.7 | 0 |
| | 9/14/2007 | Round 18 | DALLASW006 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | 330 U | 330 U | 9.3 U | NA | NA |
| | 9/14/2007 | Round 18 | Field | 0.8 | 0 | NA | NA | -426 | NA | NA | NA | 50 | 500 | NA | NA | NA | NA | 6.62 | NA |
| | 7/16/2009 | Round 22 | F66709 | 0.4 | 0 | 0.05 U | 0.05 U | 68.9 | 0.02 U | 1430 | 1 | 375 | 60 | 177 | 320 U | 430 U | 1.58 | 6.65 | 0.6 U |
| | 1/11/2010 | Round 23 | F70739 | NA | NA | NA | NA | 47.8 | NA | NA | NA | NA | NA | NA | NA | NA | NA | 6.94 | NA |
| | 7/13/2010 | Round 24 | F75071 | NA | NA | NA | NA | 41.1 | NA | NA | NA | NA | NA | NA | NA | NA | NA | 6.79 | NA |
| | 7/26/2011 | Round 26 | F84623 | NA | NA | NA | NA | -114.6 | NA | NA | NA | NA | NA | NA | NA | NA | NA | 7.08 | NA |
| | 7/10/2012 | Round 28 | F94831 | NA | NA | NA | NA | -153.7 | NA | NA | NA | NA | NA | NA | NA | NA | NA | 7.36 | NA |
| | 1/7/2013 | Round 29 | FA642 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| | 7/16/2013 | Round 30 | FA6471 | 0.5 | 0 | 0.57 U | 0.12 U | 86.7 | 0.030 J | 57.1 | 4.5 | 70 | 0 | 4.8 | 320 U | 430 U | 0.16 U | 10.57 | 1.3 JH |
| | 1/28/2014 | Round 31 | FIELD | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| | 7/15/2014 | Round 32 | 1407111 | 0.34 | 0.85 | 0.106 J | 0.165 U | -65.8 | 0.01 U | 920 | 1.66 J | NA | 30 | 114 | 0.001 U | 0.001 U | 0.00273 J | 6.85 | 0.05 |
| | 1/20/2015 | Round 33 | 1501071 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| | 7/23/2015 | Round 34 | 1507195 | 0.6 | 0.55 | 0.033 U | 0.66 U | 454.1 | 0.01 U | 1540 | 1.25 J | 442 | 125 | 142 | 0.001 U | 0.001 U | 1.29 J | 6.88 | 0 |
| | 1/20/2016 | Round 35 | 1601140 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| | 7/22/2016 | Round 36 | 1607175 | 0 | 0.33 | 0.447 | 0.0821 J | -36 | 0.0259 J | 623 | 1.25 U | 385 | 0 | 53.5 | 0.001 U | 0.001 U | 1 U | 7.35 | NA |

mg/L - milligrams per liter
mV - millivolts
NA - Not Analyzed
ng/L - nanograms per liter
ORP - Oxidation/reduction potential

TOC - Total Organic Carbon
mg/L - micrograms per liter
S.U. - Standard Units
SDG - Sample Delivery Group
PCLE - Protective Concentration Level Exceedance

Notes:
1. Field measurement, Meter
2. Field measurement, Test Kit
3. Analytical Laboratory result

Analytical Result Qualifiers:
J, K (or H), L - Indicates that the chemical was detected; however, the associated numerical result may not be a precise representation of the amount that is actually present in the sample. The laboratory reported concentration is considered to be bias unknown (J), high
U - Indicates that the sample was not detected at the numerical detection limit (sample-specific quantitation limit) noted. Nondetected results from the laboratory are reported in this manner. This qualifier is added to a positive result (reported by the laboratory) if the detected concentration is determined to be attributable to contamination introduced during field sampling or laboratory analysis.

**Table 4-3B**

**Summary of Geochemical Parameters Measured in Groundwater**
**Historical Monitoring Wells — SWMU 108 Plume**
**2016 RAER**
**Former NAS Dallas, Texas**
**Page 1 of 2**

| Monitoring Well | Sampling Date | SDG | Oxidation-Reduction Conditions | | | | | | | | Degradation Products | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Dissolved Oxygen[2] | Ferrous Iron[2] | Nitrate[3] | Nitrite[3] | ORP[1] | Phosphate[3] | Sulfate[3] | TOC[3] | Alkalinity[2] | Carbon Dioxide[2] | Chloride[3] | Ethane[3] | Ethene[3] | Methane[3] | pH[1] | Sulfide[3] |
| | | Units | mg/L | mg/L | mg/L | mg/L | mV | mg/L | mg/L | mg/L | mg/L | mg/L | mg/L | mg/L | ng/L | mg/L | S.U. | mg/L |
| **Monitoring Wells Located Outside PCLE Zone** | | | | | | | | | | | | | | | | | | |
| **40002MW** | 10/20/1999 | DL329,TTE13 | 0.6 | 0 | 10 U | 10 U | 262.4 | 10 U | 2800 | | 278 | 160 | 617 | 0.065 | 0.079 | 41.89 | 6.97 | 0 U |
| | 7/6/2000 | DL347 | 1 | 0.2 | 0.5 U | 0.5 U | 169.5 | 0.5 U | 2660 | NA | 300 | 30 | 640 | NA | NA | NA | 6.65 | 0.01 U |
| | 12/22/2003 | C3L230193 | 0.8 | 0 | NA | NA | 80 | NA | 2550 | NA | 260 | NA | 565 J | NA | NA | NA | 6.4 | 0 |
| | 4/19/2005 | Well Abandoned | | | | | | | | | | | | | | | | |
| **400B01MW** | 4/6/1998 | Well Installed | | | | | | | | | | | | | | | | |
| | 10/21/1999 | DL329,TTE13 | 0.8 | 0 | 10 U | 10 U | 209.9 | 10 U | 3390 | NA | 390 | 221 | 594 | NA | NA | NA | 6.84 | 0 U |
| | 7/6/2000 | DL347 | 0.6 | 0.2 | 0.5 U | 0.5 U | 123.7 | 0.5 U | 3290 | NA | 360 | 70 | 598 | NA | NA | NA | 6.63 | 0.01 U |
| | 1/14/2004 | C4A150174 | 1.5 | 0 | NA | NA | 507 | NA | 3150 | NA | 325 | NA | 540 L | NA | NA | NA | 6.06 | 0 |
| | 9/14/2007 | DALLASW006 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | 330 U | 330 U | 17 | NA | NA |
| | 9/14/2007 | Field | 1 | 0 | NA | NA | 127 | NA | NA | NA | 350 | 18 | NA | NA | NA | NA | 6.56 | NA |
| | 7/16/2009 | F66709 | 2 | 0 | 0.05 U | 0.5 UR | 52.4 | 0.02 U | 2930 | 3 | 375 | 150 | 656 | 320 U | 430 U | 2.97 | 6.47 | 0.6 UJL |
| | 7/26/2011 | F84623 | NA | NA | NA | NA | -20.3 | NA | NA | NA | NA | NA | NA | NA | NA | NA | 6.94 | NA |
| | 7/10/2012 | F94831 | NA | NA | NA | NA | 47.7 | NA | NA | NA | NA | NA | NA | NA | NA | NA | 6.57 | NA |
| | 1/7/2013 | FA642 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| | 7/16/2013 | FA6471 | 0.3 | 0 | 2.5 U | 2.5 U | 151.6 | 0.026 J | 2880 | 3.0 | 500 | 100 | 539 | 320 U | 430 U | 4.6 | 6.60 | 0.23 U |
| | 1/28/2014 | FIELD | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| | 7/15/2014 | 1407111 | 0.29 | 0.03 | 0.033 U | 0.66 U | -38.5 | 0.01 U | 2840 | 3.12 | NA | 43 | 520 | 0.001 U | 0.001 U | 0.00466 | 6.53 | 0.05 |
| | 1/20/2015 | 1501071 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| | 7/23/2015 | 1507195 | 0.86 | 0.01 | 0.033 U | 0.66 U | 78.6 | 0.01 U | 2590 | 2.1 | 321 | 100 | 189 | 0.001 U | 0.001 U | 2.61 J | 6.65 | 0 |
| | 4/4/2016 | Well Plugged and Abandoned | | | | | | | | | | | | | | | | |
| **400B02MW** | 3/21/1998 | Well Installed | | | | | | | | | | | | | | | | |
| | 10/22/1999 | DL329,TTE13 | 0.6 | 0 | 20 U | 20 U | 301.9 | 20 U | 4700 | NA | 366 | 225 | 1840 | 5 U | 56 | 3.341 | 6.98 | 0 U |
| | 7/7/2000 | DL347 | 0.4 | 0.2 | 0.5 U | 0.5 U | 220.4 | 2.5 U | 4800 | NA | 450 | 52 | 1720 | NA | NA | NA | 6.76 | 0.01 U |
| | 1/9/2004 | C4A100109 | 1 | 0.2 | NA | NA | 48 | NA | 4540 | NA | 300 | NA | 1780 L | NA | NA | NA | 7.16 | 0 |
| | 9/14/2007 | DALLASW006 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| | 9/14/2007 | Field | 1 | 0 | NA | NA | -180 | NA | NA | NA | 300 | 60 | NA | NA | NA | NA | 6.69 | NA |
| | 7/17/2009 | F66750 | 0.5 | 0.2 | 0.13 | 2.5 UR | 19.1 | 0.02 U | 3610 | 1.6 | 375 | 100 | 801 | 320 U | 430 U | 0.4 J | 6.81 | 0.6 UR |
| | 7/26/2011 | F84623 | NA | NA | NA | NA | 14.2 | NA | NA | NA | NA | NA | NA | NA | NA | NA | 7.09 | NA |
| | 7/10/2012 | F94831 | NA | NA | NA | NA | 51.5 | NA | NA | NA | NA | NA | NA | NA | NA | NA | 6.78 | NA |
| | 1/7/2013 | FA642 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| | 7/16/2013 | FA6471 | 0.3 | 0.6 | 5.0 U | 5.0 U | 15.4 | 0.17 | 4540 | 1.6 | 400 | 40 | 1580 | 320 U | 430 U | 1.9 | 6.82 | 0.24 JH |
| | 1/28/2014 | FIELD | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| | 7/16/2014 | 1407125 | 0.41 | 0.27 | 0.033 U | 0.825 UJL | 119.1 | 0.01 U | 4090 | 2.35 J | NA | 55 | 899 | 0.001 UJ | 0.001 U | 0.001 U | 6.96 | 0.02 |
| | 1/20/2015 | 1501071 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| | 7/23/2015 | 1507195 | 0.62 | 0.15 | 0.033 U | 0.825 U | 58.4 | 0.01 U | 1540 | 1.25 | 442 | 90 | 142 | 0.001 U | 0.001 U | 1.29 J | 6.79 | 0.01 |
| | 4/4/2016 | Well Plugged and Abandoned | | | | | | | | | | | | | | | | |

**Table 4-3B**

**Summary of Geochemical Parameters Measured in Groundwater**
**Historical Monitoring Wells — SWMU 108 Plume**
**2016 RAER**
**Former NAS Dallas, Texas**
**Page 2 of 2**

| Monitoring Well | Sampling Date | SDG | Oxidation-Reduction Conditions | | | | | | | | Degradation Products | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Dissolved Oxygen[2] | Ferrous Iron[2] | Nitrate[3] | Nitrite[3] | ORP[1] | Phosphate[3] | Sulfate[3] | TOC[3] | Alkalinity[2] | Carbon Dioxide[2] | Chloride[3] | Ethane[3] | Ethene[3] | Methane[3] | pH[1] | Sulfide[3] |
| | | Units | mg/L | mg/L | mg/L | mg/L | mV | mg/L | mg/L | mg/L | mg/L | mg/L | mg/L | mg/L | ng/L | mg/L | S.U. | mg/L |
| 400B61MW | 12/16/1999 | Well Installed | | | | | | | | | | | | | | | | |
| | 1/10/2000 | DL339 | 1 | 0 | 1 | 20 U | 521.2 | 20 U | 2710 | NA | 416 | 288 | 636 | NA | NA | 3.5 | 6.78 | 0 U |
| | 7/6/2000 | DL347 | 1 | 0.2 | 2.7 | 0.5 U | 179.3 | 0.5 U | 2540 | NA | 450 | 60 | 614 | NA | NA | NA | 6.57 | 0.01 U |
| | 12/21/2003 | C3L230193 | 0.8 | 0 | NA | NA | 183 | NA | 2670 | NA | 250 | NA | 623 J | NA | NA | NA | 7.63 | 0 |
| | 9/14/2007 | DALLASW006 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | 330 U | 330 U | 3.6 U | NA | NA |
| | 9/14/2007 | Field | 0.3 | 0 | NA | NA | 220 | NA | NA | NA | 350 | 35 | NA | NA | NA | NA | 7.06 | NA |
| | 7/16/2009 | F66709 | 2 | 0.5 | 1.2 | 0.05 U | 18.0 | 0.021 J | 820 | 1.3 | 350 | 40 | 135 | 320 U | 430 U | 0.33 J | 6.94 | 0.6 U |
| | 7/26/2011 | F84623 | NA | NA | NA | NA | 25.7 | NA | NA | NA | NA | NA | NA | NA | NA | NA | 7.22 | NA |
| | 7/10/2012 | F94831 | NA | NA | NA | NA | 13.8 | NA | NA | NA | NA | NA | NA | NA | NA | NA | 6.85 | NA |
| | 1/7/2013 | FA642 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| | 7/16/2103 | FA6471 | 0.6 | 0.1 | 1.5 | 0.25 U | 67.8 | 0.032 J | 639 | 1.2 U | 500 | 20 | 49.0 | 320 U | 430 U | 0.23 J | 7.09 | 0.55 U |
| | 1/28/2014 | FIELD | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| | 7/15/2014 | 1407111 | 1.03 | 0.76 | 1.18 | 0.165 U | 304.9 | 0.01 U | 680 | 1.42 J | NA | 45 | 75.7 | 0.001 U | 0.001 U | 0.001 U | 7.04 | 0.06 |
| | 1/20/2015 | 1501071 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| | 7/23/2015 | 1507195 | 0.51 | 0.25 | 1.13 J | 0.165 U | 199.4 | 0.01 U | 578 | 1.2 U | 317 | 55 | 63.6 | 0.001 U | 0.001 U | 0.001 U | 7.19 | 0.03 |
| | 4/5/2016 | Well Plugged and Abandoned | | | | | | | | | | | | | | | | |
| 400B62MW | -- | Well Installed | | | | | | | | | | | | | | | | |
| | 2/1/2000 | DL341 | 3 | 0.2 | 0.96 | 10 U | 2.7 | 10 U | 3480 | NA | 274 | 221 | 1810 | NA | NA | 5 U | 6.96 | 0.01 U |
| | 7/6/2000 | DL347 | 2 | 0.2 | 0.82 | 2.5 U | 153.8 | 2.5 U | 3810 | NA | 310 | 32 | 1390 | NA | NA | NA | 6.85 | 0.01 U |
| | -- | Well Destroyed | | | | | | | | | | | | | | | | |

mg/L - milligrams per liter
mV - millivolts
NA - Not Analyzed
ng/L - nanograms per liter
ORP - Oxidation/reduction potential

TOC - Total Organic Carbon
mg/L - micrograms per liter
S.U. - Standard Units
SDG - Sample Delivery Group
PCLE - Protective Concentration Level Exceedance

Notes:
1. Field measurement, Meter
2. Field measurement, Test Kit
3. Analytical Laboratory result

Analytical Result Qualifiers:
J, K, L - Indicates that the chemical was detected; however, the associated numerical result may not be a precise representation of the amount that is actually present in the sample. The laboratory reported concentration is considered to be bias unknown (J), high (K), or low (L) estimate of the true concentratio
U - Indicates that the sample was not detected at the numerical detection limit (sample-specific quantitation limit) noted. Nondetected results from the laboratory are reported in this manner. This qualifier is added to a positive result (reported by the laboratory) if the detected concentration is determined to be attributable to contamination introduced during field samplin

# TABLE 4-4
# SUMMARY OF CONCENTRATION VS. TIME ATTENUATION RATE CONSTANTS

**Table 4-4**

**Summary of Concentration vs. Time Attenuation Rate Constants**
**SWMU 108 Plume**
**2016 RAER**
**Former NAS Dallas, Texas**
**Page 1 of 2**

| Monitoring Well ID | Sampling Date | Elapsed Time (Years) | Protective Concentration Level (mg/L) | Concentration Detected (mg/L) | Natural Log of Concentration (mg/L) | Degradation Rate from Natural Log ($K_{time}$) (mg/L per year) | Minimum Degradation Rate Required for Remedial Goals Natural Log ($K_{time}$) (mg/L per year) | Minimum Degradation Rate Met? (Yes/No) | Expected Remedial Goal Concentration (mg/L) | Expected Remedial Goal Concentration Met? (Yes/No) | Remedial Goals Being Met? (Yes/No) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **1,1-Dichloroethene** | | | | | | | | | | | |
| 40001MW | Dec-95 | 0.0 | 0.00700 | 0.00500 U | -8.00 | -- | -- | -- | -- | -- | -- |
| | Apr-98 | 2.3 | 0.00700 | 0.00500 U | -8.00 | -- | -- | -- | -- | -- | -- |
| | Sep-98 | 2.8 | 0.00700 | 0.00500 U | -8.00 | -- | -- | -- | -- | -- | -- |
| | Apr-99 | 3.3 | 0.00700 | 0.00500 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Nov-99 | 3.9 | 0.00700 | 0.00500 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-00 | 4.6 | 0.00700 | 0.00500 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-01 | 5.6 | 0.00700 | 0.00500 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-03 | 7.1 | 0.00700 | 0.00100 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Dec-03 | 8.0 | 0.00700 | 0.00021 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-04 | 8.6 | 0.00700 | 0.00035 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Oct-04 | 8.8 | 0.00700 | 0.00035 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Apr-05 | 9.3 | 0.00700 | 0.00040 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Oct-05 | 9.8 | 0.00700 | 0.00040 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | May-06 | 10.4 | 0.00700 | 0.00060 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Aug-06 | 10.7 | 0.00700 | 0.00060 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Apr-07 | 11.3 | 0.00700 | 0.00028 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Sep-07 | 11.7 | 0.00700 | 0.00013 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-08 | 12.1 | 0.00700 | 0.00039 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-08 | 12.6 | 0.00700 | 0.00054 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-09 | 13.1 | 0.00700 | 0.00054 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-09 | 13.6 | 0.00700 | 0.00054 U | -7.52 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-10 | 14.1 | 0.00700 | 0.00029 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-10 | 14.6 | 0.00700 | 0.00029 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-11 | 15.6 | 0.00700 | 0.00023 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-11 | 15.1 | 0.00700 | 0.00023 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-12 | 16.1 | 0.00700 | 0.00023 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-12 | 16.6 | 0.00700 | 0.00023 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-13 | 17.1 | 0.00700 | 0.00020 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-13 | 17.6 | 0.00700 | 0.00020 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-14 | 18.1 | 0.00700 | 0.00025 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-14 | 18.6 | 0.00700 | 0.00025 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-15 | 19.1 | 0.00700 | 0.00025 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-15 | 19.6 | 0.00700 | 0.00025 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-16 | 20.1 | 0.00700 | 0.0005 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-16 | 20.6 | 0.00700 | 0.0005 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| 40003MW | Dec-95 | 0.0 | 0.00700 | 0.05440 | -2.91 | -- | -- | -- | -- | -- | -- |
| | Apr-98 | 2.3 | 0.00700 | 0.01200 | -4.42 | -- | -- | -- | -- | -- | -- |
| | Sep-98 | 2.8 | 0.00700 | 0.01400 | -4.27 | -- | -- | -- | -- | -- | -- |
| | Apr-99 | 3.3 | 0.00700 | 0.01400 | -4.27 | -0.455 | -0.099 | Yes | 0.03928 | Yes | Yes |
| | Nov-99 | 3.9 | 0.00700 | 0.00960 | -4.65 | -0.433 | -0.099 | Yes | 0.03705 | Yes | Yes |
| | Jul-00 | 4.6 | 0.00700 | 0.01200 | -4.42 | -0.347 | -0.099 | Yes | 0.03453 | Yes | Yes |
| | Jul-01 | 5.6 | 0.00700 | 0.01300 | -4.34 | -0.252 | -0.099 | Yes | 0.03136 | Yes | Yes |
| | Jan-03 | 7.1 | 0.00700 | 0.00710 | -4.95 | -0.229 | -0.099 | Yes | 0.02691 | Yes | Yes |
| | Sep-03 | 7.7 | 0.00700 | 0.01300 | -4.34 | -0.164 | -0.099 | Yes | 0.02535 | Yes | Yes |
| | Dec-03 | 8.0 | 0.00700 | 0.00870 | -4.74 | -0.154 | -0.099 | Yes | 0.02471 | Yes | Yes |
| | Jul-04 | 8.6 | 0.00700 | 0.01000 | -4.61 | -0.136 | -0.099 | Yes | 0.02318 | Yes | Yes |
| | Oct-04 | 8.8 | 0.00700 | 0.00820 | -4.80 | -0.133 | -0.099 | Yes | 0.02271 | Yes | Yes |
| | Apr-05 | 9.3 | 0.00700 | 0.01700 | -4.07 | -0.102 | -0.099 | Yes | 0.02168 | Yes | Yes |
| | Oct-05 | 9.8 | 0.00700 | 0.01400 J | -4.27 | -0.085 | -0.099 | No | 0.02063 | Yes | Evaluate Further |
| | May-06 | 10.4 | 0.00700 | 0.01600 | -4.14 | -0.066 | -0.099 | No | 0.01940 | Yes | Evaluate Further |
| | Aug-06 | 10.7 | 0.00700 | 0.01600 | -4.14 | -0.052 | -0.099 | No | 0.01889 | No | No |
| | Apr-07 | 11.3 | 0.00700 | 0.01500 | -4.20 | -0.043 | -0.099 | No | 0.01776 | Yes | Evaluate Further |
| | Sep-07 | 11.7 | 0.00700 | 0.01200 | -4.42 | -0.040 | -0.099 | No | 0.01704 | Yes | Evaluate Further |
| | Jan-08 | 12.1 | 0.00700 | 0.01300 | -4.34 | -0.036 | -0.099 | No | 0.01648 | Yes | Evaluate Further |
| | Jul-08 | 12.6 | 0.00700 | 0.01120 | -4.49 | -0.035 | -0.099 | No | 0.01569 | Yes | Evaluate Further |
| | Jan-09 | 13.1 | 0.00700 | 0.00930 | -4.68 | -0.038 | -0.099 | No | 0.01491 | Yes | Evaluate Further |
| | Jul-09 | 13.6 | 0.00700 | 0.01130 | -4.48 | -0.036 | -0.099 | No | 0.01418 | Yes | Evaluate Further |
| | Jan-10 | 14.1 | 0.00700 | 0.00280 | -5.88 | -0.057 | -0.099 | Less Than PCL | 0.01351 | Less Than PCL | Less Than PCL |
| | Jul-10 | 14.6 | 0.00700 | 0.00260 | -5.95 | -0.075 | -0.099 | Less Than PCL | 0.01286 | Less Than PCL | Less Than PCL |
| | Jul-11 | 15.6 | 0.00700 | 0.00980 | -4.63 | -0.069 | -0.099 | No | 0.01160 | Yes | Evaluate Further |
| | Jan-11 | 15.1 | 0.00700 | 0.01060 | -4.55 | -0.064 | -0.099 | No | 0.01224 | Yes | Evaluate Further |
| | Jan-12 | 16.1 | 0.00700 | 0.01480 | -4.21 | -0.055 | -0.099 | No | 0.01109 | No | No |
| | Jul-12 | 16.6 | 0.00700 | 0.01090 | -4.52 | -0.051 | -0.099 | No | 0.01055 | No | No |
| | Jan-13 | 17.1 | 0.00700 | 0.0109 | -4.52 | -0.047 | -0.099 | No | 0.01003 | No | No |
| | Jul-13 | 17.6 | 0.00700 | 0.0103 | -4.58 | -0.044 | -0.099 | No | 0.00955 | No | No |
| | Jan-14 | 18.1 | 0.00700 | 0.0071 | -4.95 | -0.045 | -0.099 | No | 0.00905 | Yes | Evaluate Further |
| | Jul-14 | 18.6 | 0.00700 | 0.0072 | -4.94 | -0.045 | -0.099 | No | 0.00865 | Yes | Evaluate Further |
| | Jan-15 | 19.1 | 0.00700 | 0.0053 | -5.25 | -0.049 | -0.099 | Less Than PCL | 0.00821 | Less Than PCL | Less Than PCL |
| | Jul-15 | 19.6 | 0.00700 | 0.0075 | -4.90 | -0.048 | -0.099 | No | 0.00781 | Yes | Evaluate Further |
| | Jan-16 | 20.1 | 0.00700 | 0.00025 U | -8.00 | -0.073 | -0.099 | Less Than PCL | 0.00743 | Less Than PCL | Less Than PCL |
| | Jul-16 | 20.6 | 0.00700 | 0.00513 | -5.27 | -0.073 | -0.099 | Less Than PCL | 0.00708 | Less Than PCL | Less Than PCL |

**Table 4-4**

**Summary of Concentration vs. Time Attenuation Rate Constants**
**SWMU 108 Plume**
**2016 RAER**
**Former NAS Dallas, Texas**
**Page 2 of 2**

| Monitoring Well ID | Sampling Date | Elapsed Time (Years) | Protective Concentration Level (mg/L) | Concentration Detected (mg/L) | Natural Log of Concentration (mg/L) | Degradation Rate from Natural Log ($K_{time}$) (mg/L per year) | Minimum Degradation Rate Required for Remedial Goals Natural Log ($K_{time}$) (mg/L per year) | Minimum Degradation Rate Met? (Yes/No) | Expected Remedial Goal Concentration (mg/L) | Expected Remedial Goal Concentration Met? (Yes/No) | Remedial Goals Being Met? (Yes/No) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **1,2-Dichloroethane** | | | | | | | | | | | |
| 40001MW | Dec-95 | 0.0 | 0.00500 | 0.02250 | -3.79 | -- | -- | -- | -- | -- | -- |
| | Apr-98 | 2.3 | 0.00500 | 0.01500 | -4.20 | -- | -- | -- | -- | -- | -- |
| | Sep-98 | 2.8 | 0.00500 | 0.01700 | -4.07 | -- | -- | -- | -- | -- | -- |
| | Apr-99 | 3.3 | 0.00500 | 0.01200 | -4.42 | -0.163 | -0.073 | Yes | 0.01772 | Yes | Yes |
| | Nov-99 | 3.9 | 0.00500 | 0.01300 | -4.34 | -0.152 | -0.073 | Yes | 0.01697 | Yes | Yes |
| | Jul-00 | 4.6 | 0.00500 | 0.01200 | -4.42 | -0.142 | -0.073 | Yes | 0.01612 | Yes | Yes |
| | Jul-01 | 5.6 | 0.00500 | 0.01100 | -4.51 | -0.131 | -0.073 | Yes | 0.01502 | Yes | Yes |
| | Jan-03 | 7.1 | 0.00500 | 0.00100 U | -8.00 | -0.470 | -0.073 | Less Than PCL | 0.01343 | Less Than PCL | Less Than PCL |
| | Dec-03 | 8.0 | 0.00500 | 0.00910 | -4.70 | -0.312 | -0.073 | Yes | 0.01261 | Yes | Yes |
| | Jul-04 | 8.6 | 0.00500 | 0.00810 | -4.82 | -0.234 | -0.073 | Yes | 0.01204 | Yes | Yes |
| | Oct-04 | 8.8 | 0.00500 | 0.00840 | -4.78 | -0.191 | -0.073 | Yes | 0.01185 | Yes | Yes |
| | Apr-05 | 9.3 | 0.00500 | 0.01200 | -4.42 | -0.146 | -0.073 | Yes | 0.01146 | No | Evaluate Further |
| | Oct-05 | 9.8 | 0.00500 | 0.01500 J | -4.20 | -0.106 | -0.073 | Yes | 0.01105 | No | Evaluate Further |
| | May-06 | 10.4 | 0.00500 | 0.01100 | -4.51 | -0.085 | -0.073 | Yes | 0.01059 | No | Evaluate Further |
| | Aug-06 | 10.7 | 0.00500 | 0.01000 | -4.61 | -0.073 | -0.073 | Yes | 0.01038 | Yes | Yes |
| | Apr-07 | 11.3 | 0.00500 | 0.00910 | -4.70 | -0.065 | -0.073 | No | 0.00990 | Yes | Evaluate Further |
| | Sep-07 | 11.7 | 0.00500 | 0.01100 | -4.51 | -0.054 | -0.073 | No | 0.00960 | No | No |
| | Jan-08 | 12.1 | 0.00500 | 0.00650 | -5.04 | -0.056 | -0.073 | No | 0.00937 | Yes | Evaluate Further |
| | Jul-08 | 12.6 | 0.00500 | 0.00780 | -4.85 | -0.054 | -0.073 | No | 0.00904 | Yes | Evaluate Further |
| | Jan-09 | 13.1 | 0.00500 | 0.00800 | -4.83 | -0.051 | -0.073 | No | 0.00871 | Yes | Evaluate Further |
| | Jul-09 | 13.6 | 0.00500 | 0.00650 | -5.04 | -0.051 | -0.073 | No | 0.00839 | Yes | Evaluate Further |
| | Jan-10 | 14.1 | 0.00500 | 0.00730 | -4.92 | -0.037 | -0.073 | No | 0.00810 | Yes | Evaluate Further |
| | Jul-10 | 14.6 | 0.00500 | 0.00840 | -4.78 | 0.000 | -0.073 | No | 0.00781 | No | No |
| | Jul-11 | 15.6 | 0.00500 | 0.00680 | -4.99 | 0.021 | -0.073 | No | 0.00724 | Yes | Evaluate Further |
| | Jan-11 | 15.1 | 0.00500 | 0.00820 | -4.80 | 0.000 | -0.073 | No | 0.00753 | No | No |
| | Jan-12 | 16.1 | 0.00500 | 0.00860 | -4.76 | 0.021 | -0.073 | No | 0.00701 | No | No |
| | Jul-12 | 16.6 | 0.00500 | 0.00880 | -4.73 | 0.038 | -0.073 | No | 0.00676 | No | No |
| | Jan-13 | 17.1 | 0.00500 | 0.00710 | -4.95 | 0.052 | -0.073 | No | 0.00651 | No | No |
| | Jul-13 | 17.6 | 0.00500 | 0.00710 | -4.95 | 0.063 | -0.073 | No | 0.00628 | No | No |
| | Jan-14 | 18.1 | 0.00500 | 0.00660 | -5.02 | 0.073 | -0.073 | No | 0.00604 | No | No |
| | Jul-14 | 18.6 | 0.00500 | 0.00904 | -4.71 | 0.073 | -0.073 | No | 0.00584 | No | No |
| | Jan-15 | 19.1 | 0.00500 | 0.00744 | -4.90 | 0.095 | -0.073 | No | 0.00562 | No | No |
| | Jul-15 | 19.6 | 0.00500 | 0.00567 | -5.17 | 0.063 | -0.073 | No | 0.00542 | No | No |
| | Jan-16 | 20.1 | 0.00500 | 0.00551 | -5.20 | 0.073 | -0.073 | No | 0.00523 | No | No |
| | Jul-16 | 20.6 | 0.00500 | 0.00617 | -5.09 | 0.080 | -0.073 | No | 0.00504 | No | No |
| 40003MW | Dec-95 | 0.0 | 0.00500 | 0.00500 U | -8.00 | -- | -- | -- | -- | -- | -- |
| | Apr-98 | 2.3 | 0.00500 | 0.00500 U | -8.00 | -- | -- | -- | -- | -- | -- |
| | Sep-98 | 2.8 | 0.00500 | 0.00500 U | -8.00 | -- | -- | -- | -- | -- | -- |
| | Apr-99 | 3.3 | 0.00500 | 0.00500 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Nov-99 | 3.9 | 0.00500 | 0.00500 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-00 | 4.6 | 0.00500 | 0.00500 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-01 | 5.6 | 0.00500 | 0.00500 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-03 | 7.1 | 0.00500 | 0.00100 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Sep-03 | 7.7 | 0.00500 | 0.00022 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Dec-03 | 8.0 | 0.00500 | 0.00009 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-04 | 8.6 | 0.00500 | 0.00010 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Oct-04 | 8.8 | 0.00500 | 0.00010 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Apr-05 | 9.3 | 0.00500 | 0.00030 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Oct-05 | 9.8 | 0.00500 | 0.00030 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | May-06 | 10.4 | 0.00500 | 0.00100 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Aug-06 | 10.7 | 0.00500 | 0.00040 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Apr-07 | 11.3 | 0.00500 | 0.00021 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Sep-07 | 11.7 | 0.00500 | 0.00013 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-08 | 12.1 | 0.00500 | 0.00026 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-08 | 12.6 | 0.00500 | 0.00034 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-09 | 13.1 | 0.00500 | 0.00034 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-09 | 13.6 | 0.00500 | 0.00034 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-10 | 14.1 | 0.00500 | 0.00033 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-10 | 14.6 | 0.00500 | 0.00020 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-11 | 15.6 | 0.00500 | 0.00020 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-11 | 15.1 | 0.00500 | 0.00020 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-12 | 16.1 | 0.00500 | 0.00020 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-12 | 16.6 | 0.00500 | 0.00020 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-13 | 17.1 | 0.00500 | 0.00022 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-13 | 17.6 | 0.00500 | 0.00022 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-14 | 18.1 | 0.00500 | 0.00024 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-14 | 18.6 | 0.00500 | 0.00025 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-15 | 19.1 | 0.00500 | 0.00025 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-15 | 19.6 | 0.00500 | 0.00025 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jan-16 | 20.1 | 0.00500 | 0.00025 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |
| | Jul-16 | 20.6 | 0.00500 | 0.0005 U | -8.00 | -- | NA | Less Than PCL | NA | Less Than PCL | Less Than PCL |

mg/L - milligrams per liter
NA - Not Applicable
NS - Not Sampled

Notes:
Shaded areas indicate an exceedance.
For graphing purposes non-detect concentrations have been assigned a natural log value of -8.

Analytical Result Qualifiers:

J - Indicates that the chemical was detected. However, the associated numerical result may not be a precise representation of the amount that is actually present in the sample. The laboratory reported concentration is considered to be an estimate of the true concentration.

U - Indicates that the chemical was not detected at the numerical detection limit (sample-specific quantitation limit) noted. Nondetected results from the laboratory are reported in this manner. This qualifier is added to a positive result (reported by the laboratory) if the detected concentration is determined to be attributable to contamination introduced during field sampling or laboratory analysis.

# Plug and Abandonment Documentation

# STATE OF TEXAS PLUGGING REPORT for Tracking #158503

| | | | |
|---|---|---|---|
| Owner: | **NAS Dallas** | Owner Well #: | **400B61MW** |
| Address: | **8100 West Jefferson<br>Grand Prairie, TX 75051** | Grid #: | **33-17-1** |
| Well Location: | **8100 West Jefferson<br>Grand Prairie, TX 75051** | Latitude: | **32° 44' 25.8" N** |
| | | Longitude: | **096° 57' 46.3" W** |
| Well County: | **Dallas** | Elevation: | **No Data** |
| Well Type: | **Monitor** | | |

*Drilling Information*

| | | | |
|---|---|---|---|
| Company: | **No Data** | Date Drilled: | **No Data** |
| Driller: | **No Data** | License Number: | **No Data** |

| | *Diameter (in.)* | *Top Depth (ft.)* | *Bottom Depth (ft.)* |
|---|---|---|---|
| Borehole: | | **0** | **15.7** |

*Plugging Information*

Date Plugged: **4/5/2016** Plugger:

Plug Method: **Pour in 3/8 bentonite chips when standing water in well is less than 100 feet depth, cement top 2 feet**

Casing Left in Well:

**No Data**

Plug(s) Placed in Well:

| *Top (ft.)* | *Bottom (ft.)* | *Description (number of sacks & material)* |
|---|---|---|
| **0** | **2** | **Cement 2 Bags/Sacks** |
| **2** | **15.7** | **Bentonite 2 Bags/Sacks** |

Certification Data: The driller certified that the driller plugged this well (or the well was plugged under the driller's direct supervision) and that each and all of the statements herein are true and correct. The driller understood that failure to complete the required items will result in the reports(s) being returned for completion and resubmittal.

Company Information: **Strata Core Services, LLC**

**112 S. Norwood Drive**
**Hurst, TX 76053**

Driller Name: **Brad Eskue** License Number: **58164**

Comments: **No Data**

# STATE OF TEXAS PLUGGING REPORT for Tracking #158502

| | | | |
|---|---|---|---|
| Owner: | **NAS Dallas** | Owner Well #: | **400B02MW** |
| Address: | **8100 West Jefferson<br>Grand Prairie, TX 75051** | Grid #: | **33-17-1** |
| Well Location: | **8100 West Jefferson<br>Grand Prairie, TX 75051** | Latitude: | **32° 44' 25.8" N** |
| | | Longitude: | **096° 57' 46.3" W** |
| Well County: | **Dallas** | Elevation: | **No Data** |
| Well Type: | **Monitor** | | |

*Drilling Information*

| | | | |
|---|---|---|---|
| Company: | **No Data** | Date Drilled: | **No Data** |
| Driller: | **No Data** | License Number: | **No Data** |

| | *Diameter (in.)* | *Top Depth (ft.)* | *Bottom Depth (ft.)* |
|---|---|---|---|
| Borehole: | | **0** | **23.7** |

*Plugging Information*

Date Plugged: **4/4/2016** Plugger:

Plug Method: **Pour in 3/8 bentonite chips when standing water in well is less than 100 feet depth, cement top 2 feet**

Casing Left in Well:

**No Data**

Plug(s) Placed in Well:

| *Top (ft.)* | *Bottom (ft.)* | *Description (number of sacks & material)* |
|---|---|---|
| **0** | **2** | **Cement 2 Bags/Sacks** |
| **2** | **23.7** | **Bentonite 2 Bags/Sacks** |

Certification Data: The driller certified that the driller plugged this well (or the well was plugged under the driller's direct supervision) and that each and all of the statements herein are true and correct. The driller understood that failure to complete the required items will result in the reports(s) being returned for completion and resubmittal.

Company Information: **Strata Core Services, LLC**

**112 S. Norwood Drive**
**Hurst, TX 76053**

Driller Name: **Brad Eskue** License Number: **58164**

Comments: **No Data**

# STATE OF TEXAS PLUGGING REPORT for Tracking #158501

| | | | |
|---|---|---|---|
| Owner: | **NAS Dallas** | Owner Well #: | **400B01MW** |
| Address: | **8100 West Jefferson<br>Grand Prairie, TX 75051** | Grid #: | **33-17-1** |
| Well Location: | **8100 West Jefferson<br>Grand Prairie, TX 75051** | Latitude: | **32° 44' 25.8" N** |
| | | Longitude: | **096° 57' 46.3" W** |
| Well County: | **Dallas** | Elevation: | **No Data** |
| Well Type: | **Monitor** | | |

*Drilling Information*

| | | | |
|---|---|---|---|
| Company: | **No Data** | Date Drilled: | **No Data** |
| Driller: | **No Data** | License Number: | **No Data** |

Borehole: **No Data**

*Plugging Information*

Date Plugged: **4/4/2016** Plugger:

Plug Method: **Pour in 3/8 bentonite chips when standing water in well is less than 100 feet depth, cement top 2 feet**

Casing Left in Well: **No Data**

Plug(s) Placed in Well:

| *Top (ft.)* | *Bottom (ft.)* | *Description (number of sacks & material)* |
|---|---|---|
| **0** | **2** | **Cement 2 Bags/Sacks** |
| **2** | **22.3** | **Bentonite 2 Bags/Sacks** |

Certification Data: The driller certified that the driller plugged this well (or the well was plugged under the driller's direct supervision) and that each and all of the statements herein are true and correct. The driller understood that failure to complete the required items will result in the reports(s) being returned for completion and resubmittal.

Company Information: **Strata Core Services, LLC**

**112 S. Norwood Drive**
**Hurst, TX 76053**

Driller Name: **Brad Eskue** License Number: **58164**

Comments: **No Data**

# APPENDIX 5
# SAMPLING PROCEDURES

Sampling collection and handling procedures were updated to follow Uniform Federal Policy (UFP) for Sample and Analysis Plans in the document titled, Tier II Sampling and Analysis Plan, Long Term Groundwater Monitoring Plan, Former Naval Air Station Dallas, Dallas, Texas, dated December 2014.

# APPENDIX 6
# LABORATORY DATA PACKAGES AND DATA USABILITY SUMMARIES

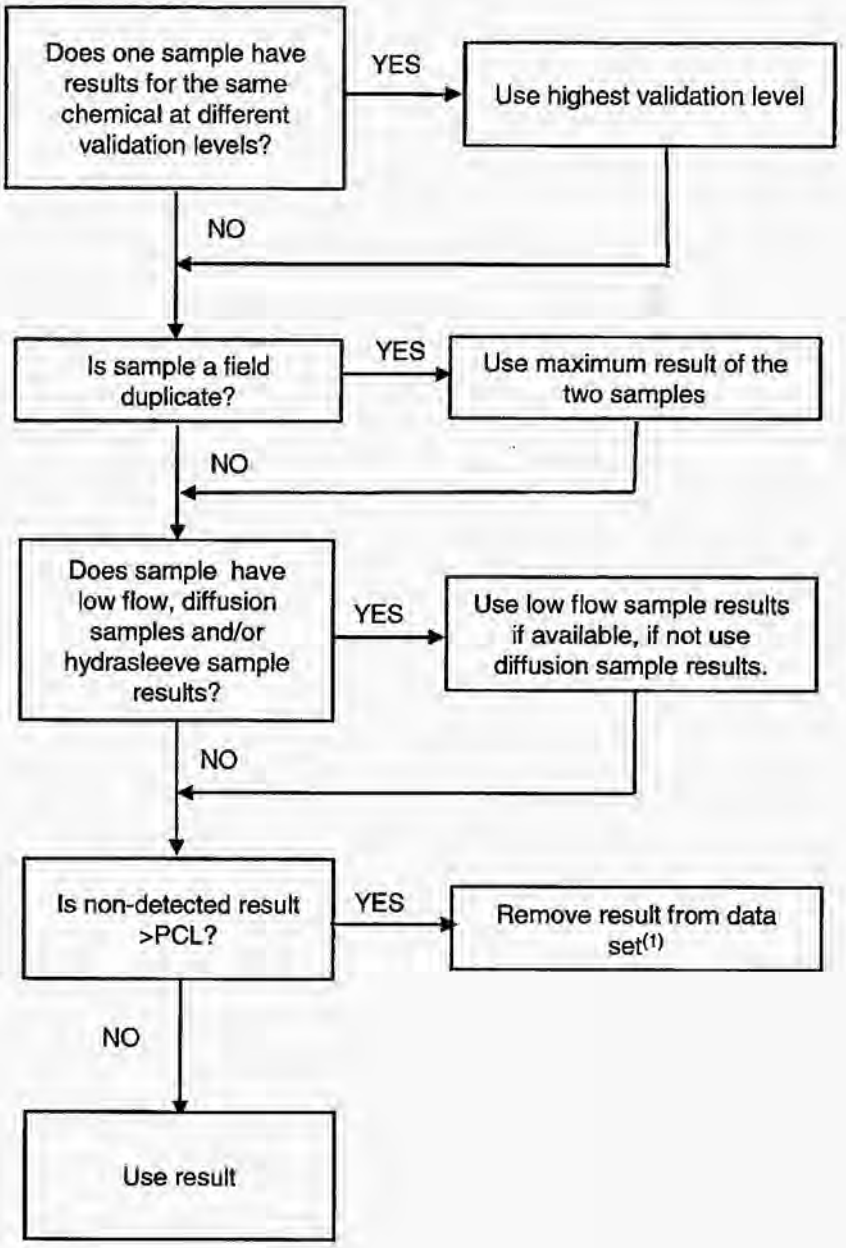
See the attached CD for the Laboratory Analytical Reports —
submitted with the 2016 RAER for SWMU 17/Building 1423
(sorted by Sample Delivery Group Number)

# APPENDIX 7
# STATISTICAL METHODOLOGY

Statistical Methodology has been submitted with the 2016 RAER for SWMU 17/Building 1423

GROUNDWATER DATABASE DEVELOPMENT FOR GRAPHING AND MANN KENDALL STATISTICAL EVALUATION

NAS DALLAS, TEXAS




NOTES:

(1) For 1,1,2,2-PCA and vinyl chloride the TRRP RES A limit < MDL of 5 U therefore only the non-detects > 5 U were removed from the data set.

# STDEV

See Also

Estimates standard deviation based on a sample. The standard deviation is a measure of how widely values are dispersed from the average value (the mean).

**Syntax**

**STDEV(number1**,number2,...)

Number1, number2, ... are 1 to 30 number arguments corresponding to a sample of a population. You can also use a single array or a reference to an array instead of arguments separated by commas.

**Remarks**

- STDEV assumes that its arguments are a sample of the population. If your data represents the entire population, then compute the standard deviation using STDEVP.
- The standard deviation is calculated using the "nonbiased" or "n-1" method.
- STDEV uses the following formula:
- $$\sqrt{\frac{n\sum x^2 - \left(\sum x\right)^2}{n(n-1)}}$$
  $$\sqrt{\frac{n\sum x^2 - \left(\sum x\right)^2}{n(n-1)}}$$
- Logical values such as TRUE and FALSE and text are ignored. If logical values and text must not be ignored, use the STDEVA worksheet function.

**Example**

Suppose 10 tools stamped from the same machine during a production run are collected as a random sample and measured for breaking strength.

The example may be easier to understand if you copy it to a blank worksheet.

How?

| | A |
|---|---|
| 1 | **Strength** |
| 2 | 1345 |
| 3 | 1301 |
| 4 | 1368 |
| 5 | 1322 |
| 6 | 1310 |
| 7 | 1370 |
| 8 | 1318 |
| 9 | 1350 |
| 10 | 1303 |
| 11 | 1299 |

| Formula | Description (Result) |
|---|---|
| =STDEV(A2:A11) | Standard deviation of breaking strength (27.46391572) |

# BEST-FIT LINE USING LINEAR REGRESSION

# LINEST

See Also

Calculates the statistics for a line by using the "least squares" method to calculate a straight line that best fits your data, and returns an array that describes the line. Because this function returns an array of values, it must be entered as an array formula.

The equation for the line is:

y = mx + b or

y = m1x1 + m2x2 + ... + b (if there are multiple ranges of x-values)

where the dependent y-value is a function of the independent x-values. The m-values are coefficients corresponding to each x-value, and b is a constant value. Note that y, x, and m can be vectors. The array that LINEST returns is {mn,mn-1,...,m1,b}. LINEST can also return additional regression statistics.

**Syntax**

**LINEST(known_y's**,known_x's,const,stats)

Known_y's is the set of y-values you already know in the relationship y = mx + b.

- If the array known_y's is in a single column, then each column of known_x's is interpreted as a separate variable.
- If the array known_y's is in a single row, then each row of known_x's is interpreted as a separate variable.

Known_x's is an optional set of x-values that you may already know in the relationship y = mx + b.

- The array known_x's can include one or more sets of variables. If only one variable is used, known_y's and known_x's can be ranges of any shape, as long as they have equal dimensions. If more than one variable is used, known_y's must be a vector (that is, a range with a height of one row or a width of one column).
- If known_x's is omitted, it is assumed to be the array {1,2,3,...} that is the same size as known_y's.

Const is a logical value specifying whether to force the constant b to equal 0.

- If const is TRUE or omitted, b is calculated normally.
- If const is FALSE, b is set equal to 0 and the m-values are adjusted to fit y = mx.

Stats is a logical value specifying whether to return additional regression statistics.

- If stats is TRUE, LINEST returns the additional regression statistics, so the returned array is {mn,mn-1,...,m1,b;sen,sen-1,...,se1,seb;r2,sey;F,df;ssreg,ssresid}.
- If stats is FALSE or omitted, LINEST returns only the m-coefficients and the constant b.

The additional regression statistics are as follows.

| Statistic | Description |
|---|---|
| se1,se2,...,sen | The standard error values for the coefficients m1,m2,...,mn. |
| Seb | The standard error value for the constant b (seb = #N/A when const is FALSE). |
| r2 | The coefficient of determination. Compares estimated and actual y-values, and ranges in value from 0 to 1. If it is 1, there is a perfect correlation in the sample — there is no difference between the estimated y-value and the actual y-value. At the other extreme, if the coefficient of determination is 0, the regression equation is not helpful in predicting a y-value. For information about how r2 is calculated, see "Remarks" later in this topic. |
| sey | The standard error for the y estimate. |
| F | The F statistic, or the F-observed value. Use the F statistic to determine whether the observed relationship between the dependent and independent variables occurs by chance. |
| df | The degrees of freedom. Use the degrees of freedom to help you find F-critical values in a statistical table. Compare the values you find in the table to the F statistic returned by LINEST to determine a confidence level for the model. |
| ssreg | The regression sum of squares. |
| ssresid | The residual sum of squares. |

The following illustration shows the order in which the additional regression statistics are returned.

| | A | B | C | D | E | F |
|---|---|---|---|---|---|---|
| 1 | $m_n$ | $m_{n-1}$ | ... | $m_2$ | $m_1$ | b |
| 2 | $se_n$ | $se_{n-1}$ | ... | $se_2$ | $se_1$ | $se_b$ |
| 3 | $r_2$ | $se_y$ | | | | |
| 4 | F | $d_f$ | | | | |
| 5 | $ss_{reg}$ | $ss_{resid}$ | | | | |

**Remarks**

- You can describe any straight line with the slope and the y-intercept:

  Slope (m):
  To find the slope of a line, often written as m, take two points on the line, (x1,y1) and (x2,y2); the slope is equal to (y2 - y1)/(x2 - x1).

  Y-intercept (b):
  The y-intercept of a line, often written as b, is the value of y at the point where the line crosses the y-axis.

  The equation of a straight line is y = mx + b. Once you know the values of m and b, you can calculate any point on the line by plugging the y- or x-value into that equation. You can also use the TREND function.

- When you have only one independent x-variable, you can obtain the slope and y-intercept values directly by using the following formulas:

  Slope:
  =INDEX(LINEST(known_y's,known_x's),1)

  Y-intercept:
  =INDEX(LINEST(known_y's,known_x's),2)

- The accuracy of the line calculated by LINEST depends on the degree of scatter in your data. The more linear the data, the more accurate the LINEST model. LINEST uses the method of least squares for determining the best fit for the data. When you have only one independent x-variable, the calculations for m and b are based on the following formulas:

$$m = \frac{n\left(\sum xy\right) - \left(\sum x\right)\left(\sum y\right)}{n\left(\sum\left(x^2\right)\right) - \left(\sum x\right)^2}$$

$$b = \frac{\left(\sum y\right)\left(\sum\left(x^2\right)\right) - \left(\sum x\right)\left(\sum xy\right)}{n\left(\sum\left(x^2\right)\right) - \left(\sum x\right)^2}$$

- The line- and curve-fitting functions LINEST and LOGEST can calculate the best straight line or exponential curve that fits your data. However, you have to decide which of the two results best fits your data. You can calculate TREND(known_y's,known_x's) for a straight line, or GROWTH(known_y's, known_x's) for an exponential curve. These functions, without the new_x's argument, return an array of y-values predicted along that line or curve at your actual data points. You can then compare the predicted values with the actual values. You may want to chart them both for a visual comparison.

- In regression analysis, Microsoft Excel calculates for each point the squared difference between the y-value estimated for that point and its actual y-value. The sum of these squared differences is called the residual sum of squares. Microsoft Excel then calculates the sum of the squared differences between the actual y-values and the average of the y-values, which is called the total sum of squares (regression sum of squares + residual sum of squares). The smaller the residual sum of squares is, compared with the total sum of squares, the larger the value of the coefficient of determination, r2, which is an indicator of how well the equation resulting from the regression analysis explains the relationship among the variables.

- Formulas that return arrays must be entered as array formulas.

- When entering an array constant such as known_x's as an argument, use commas to separate values in the same row and semicolons to separate rows. Separator characters may be different depending on your locale setting in **Regional Settings** or **Regional Options** in **Control Panel**.

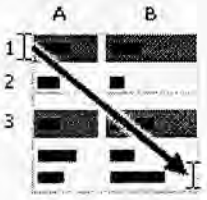
- Note that the y-values predicted by the regression equation may not be valid if they are outside the range of the y-values you used to determine the equation.

**Example 1 Slope and Y-Intercept**

The example may be easier to understand if you copy it to a blank worksheet.

How?

1. Create a blank workbook or worksheet.
2. Select the example in the Help topic. Do not select the row or column headers.




Selecting an example from Help

3. Press CTRL+C.
4. In the worksheet, select cell A1, and press CTRL+V.
5. To switch between viewing the results and viewing the formulas that return the results, press CTRL+` (grave accent), or on the **Tools** menu, point to **Formula Auditing**, and then click **Formula Auditing Mode**.

| | A | B |
|---|---|---|
| 1 | **Known y** | **Known x** |
| 2 | 1 | 0 |
| 3 | 9 | 4 |
| 4 | 5 | 2 |
| 5 | 7 | 3 |
| | **Formula** | **Formula** |
| | =LINEST(A2:A5,B2:B5,,FALSE) | |

**Note** The formula in the example must be entered as an array formula. After copying the example to a blank worksheet, select the range A7:B7 starting with the formula cell. Press F2, and then press CTRL+SHIFT+ENTER. If the formula is not entered as an array formula, the single result is 2.

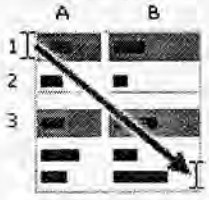
When entered as an array, the slope (2) and the y-intercept (1) are returned.

**Example 2 Simple Linear Regression**

The example may be easier to understand if you copy it to a blank worksheet.

How?

1. Create a blank workbook or worksheet.
2. Select the example in the Help topic. Do not select the row or column headers.




Selecting an example from Help

3. Press CTRL+C.
4. In the worksheet, select cell A1, and press CTRL+V.
5. To switch between viewing the results and viewing the formulas that return the results, press CTRL+` (grave accent), or on the **Tools** menu, point to **Formula Auditing**, and then click **Formula Auditing Mode**.

| | A | B |
|---|---|---|
| 1 | **Month** | **Sales** |
| 2 | 1 | 3100 |
| 3 | 2 | 4500 |
| 4 | 3 | 4400 |

| | | |
|---|---|---|
| **5** | 4 | 5400 |
| **6** | 5 | 7500 |
| **7** | 6 | 8100 |
| | **Formula** | **Description (Result)** |
| | =SUM(LINEST(B2:B7, A2:A7)*{9,1}) | Estimate sales for the ninth month (11000) |

In general, SUM({m,b}*{x,1}) equals mx + b, the estimated y-value for a given x-value. You can also use the TREND function.

**Example 3 Multiple Linear Regression**

Suppose a commercial developer is considering purchasing a group of small office buildings in an established business district.

The developer can use multiple linear regression analysis to estimate the value of an office building in a given area based on the following variables.

| Variable | Refers to the |
|---|---|
| y | Assessed value of the office building |
| x1 | Floor space in square feet |
| x2 | Number of offices |
| x3 | Number of entrances |
| x4 | Age of the office building in years |

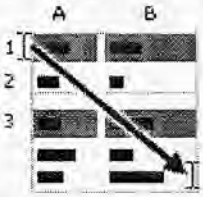
This example assumes that a straight-line relationship exists between each independent variable (x1, x2, x3, and x4) and the dependent variable (y), the value of office buildings in the area.

The developer randomly chooses a sample of 11 office buildings from a possible 1,500 office buildings and obtains the following data. "Half an entrance" means an entrance for deliveries only.

The example may be easier to understand if you copy it to a blank worksheet.

How?

1. Create a blank workbook or worksheet.
2. Select the example in the Help topic. Do not select the row or column headers.




Selecting an example from Help

3. Press CTRL+C.
4. In the worksheet, select cell A1, and press CTRL+V.
5. To switch between viewing the results and viewing the formulas that return the results, press CTRL+` (grave accent), or on the **Tools** menu, point to **Formula Auditing**, and then click **Formula Auditing Mode**.

| | A | B | C | D | E |
|---|---|---|---|---|---|
| **1** | **Floor space (x1)** | **Offices (x2)** | **Entrances (x3)** | **Age (x4)** | **Assessed value (y)** |
| **2** | 2310 | 2 | 2 | 20 | 142,000 |
| **3** | 2333 | 2 | 2 | 12 | 144,000 |
| **4** | 2356 | 3 | 1.5 | 33 | 151,000 |
| **5** | 2379 | 3 | 2 | 43 | 150,000 |

| | | | | | |
|---|---|---|---|---|---|
| **6** | 2402 | 2 | 3 | 53 | 139,000 |
| **7** | 2425 | 4 | 2 | 23 | 169,000 |
| **8** | 2448 | 2 | 1.5 | 99 | 126,000 |
| **9** | 2471 | 2 | 2 | 34 | 142,900 |
| **10** | 2494 | 3 | 3 | 23 | 163,000 |
| **11** | 2517 | 4 | 4 | 55 | 169,000 |
| **12** | 2540 | 2 | 3 | 22 | 149,000 |

**Formula**

=LINEST(E2:E12,A2:D12,TRUE,TRUE)

**Note** The formula in the example must be entered as an array formula. After copying the example to a blank worksheet, select the range A14:E18 starting with the formula cell. Press F2, and then press CTRL+SHIFT+ENTER. If the formula is not entered as an array formula, the single result is -234.2371645.

When entered as an array, the following regression statistics are returned. Use this key to identify the statistic you want.

| | A | B | C | D | E | F |
|---|---|---|---|---|---|---|
| 1 | $m_n$ | $m_{n-1}$ | ... | $m_2$ | $m_1$ | b |
| 2 | $se_n$ | $se_{n-1}$ | ... | $se_2$ | $se_1$ | $se_b$ |
| 3 | $r_2$ | $se_y$ | | | | |
| 4 | F | $d_f$ | | | | |
| 5 | $ss_{reg}$ | $ss_{resid}$ | | | | |

The multiple regression equation, y = m1*x1 + m2*x2 + m3*x3 + m4*x4 + b, can now be obtained using the values from row 14:

y = 27.64*x1 + 12,530*x2 + 2,553*x3+ 234.24*x4 + 52,318

The developer can now estimate the assessed value of an office building in the same area that has 2,500 square feet, three offices, and two entrances and is 25 years old, by using the following equation:

y = 27.64*2500 + 12530*3 + 2553*2 - 234.24*25 + 52318 = $158,261

Or you can copy the following table to cell A21 of the example workbook.

| Floor space (x1) | Offices (x2) | Entrances (x3) | Age (x4) | Assessed value (y) |
|---|---|---|---|---|
| 2500 | 3 | 2 | 25 | =D14*A22 + C14*B22 + B14*C22 + A14*D22 + E14 |

You can also use the TREND function to calculate this value.

**Example 4 Using The F And R2 Statistics**

In the previous example, the coefficient of determination, or r2, is 0.99675 (see cell A17 in the output for LINEST), which would indicate a strong relationship between the independent variables and the sale price. You can use the F statistic to determine whether these results, with such a high r2 value, occurred by chance.

Assume for the moment that in fact there is no relationship among the variables, but that you have drawn a rare sample of 11 office buildings that causes the statistical analysis to demonstrate a strong relationship. The term "Alpha" is used for the probability of erroneously concluding that there is a relationship.

There is a relationship among the variables if the F-observed statistic is greater than the F-critical value. The F-critical value can be obtained by referring to a table of F-critical values in many statistics textbooks. To read the table, assume a single-tailed test, use an Alpha value of 0.05, and for the degrees of freedom (abbreviated in most tables as v1 and v2), use v1 = k = 4 and v2 = n - (k + 1) = 11 - (4 + 1) = 6, where k is the number of variables in the regression analysis and n is the number of data points. The F-critical value is 4.53.

The F-observed value is 459.753674 (cell A18), which is substantially greater than the F-critical value of 4.53. Therefore, the regression equation is useful in predicting the assessed value of office buildings in this area.

**Example 5 Calculating The T-Statistics**

Another hypothesis test will determine whether each slope coefficient is useful in estimating the assessed value of an office building in example 3. For example, to test the age coefficient for statistical significance, divide -234.24 (age slope coefficient) by 13.268 (the estimated standard error of age coefficients in cell A15). The following is the t-observed value:

t = m4 ÷ se4 = -234.24 ÷ 13.268 = -17.7

If you consult a table in a statistics manual, you will find that t-critical, single tail, with 6 degrees of freedom and Alpha = 0.05 is 1.94. Because the absolute value of t, 17.7, is greater than 1.94, age is an important variable when estimating the assessed value of an office building. Each of

the other independent variables can be tested for statistical significance in a similar manner. The following are the t-observed values for each of the independent variables.

| Variable | t-observed value |
|---|---|
| Floor space | 5.1 |
| Number of offices | 31.3 |
| Number of entrances | 4.8 |
| Age | 17.7 |

These values all have an absolute value greater than 1.94; therefore, all the variables used in the regression equation are useful in predicting the assessed value of office buildings in this area.

## SLOPE OF BEST-FIT LINE

# SLOPE

See Also

Returns the slope of the linear regression line through data points in known_y's and known_x's. The slope is the vertical distance divided by the horizontal distance between any two points on the line, which is the rate of change along the regression line.

**Syntax**

**SLOPE(known_y's,known_x's)**

Known_y's is an array or cell range of numeric dependent data points.

Known_x's is the set of independent data points.

**Remarks**

- The arguments must be either numbers or names, arrays, or references that contain numbers.
- If an array or reference argument contains text, logical values, or empty cells, those values are ignored; however, cells with the value zero are included.
- If known_y's and known_x's are empty or have a different number of data points, SLOPE returns the #N/A error value.
- The equation for the slope of the regression line is:

$$b = \frac{n\sum xy - \left(\sum x\right)\left(\sum y\right)}{n\sum x^2 - \left(\sum x\right)^2}$$

**Example**

The example may be easier to understand if you copy it to a blank worksheet.

How?

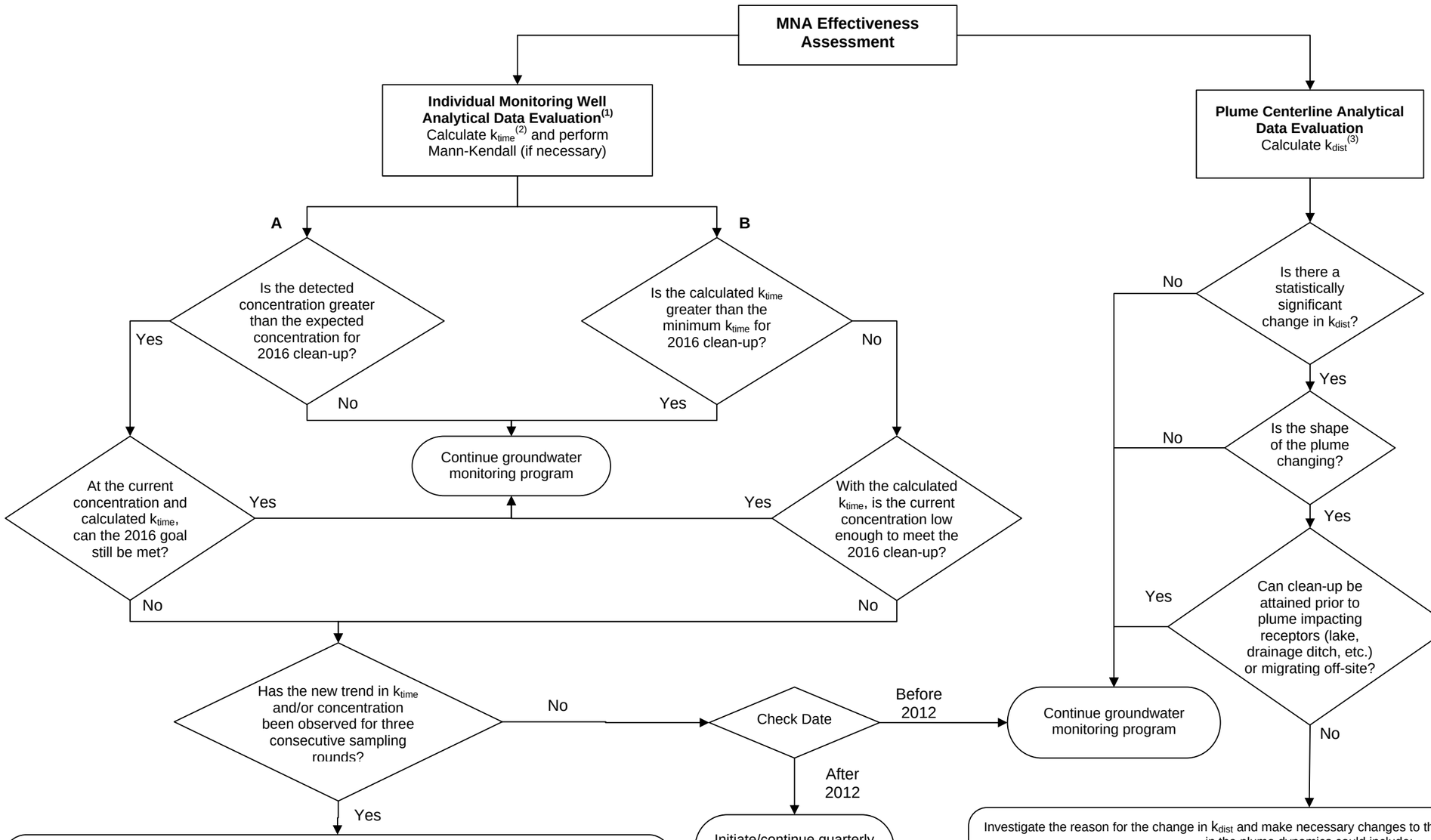
| | A | B |
|---|---|---|
| 1 | **Known y** | **Known x** |
| 2 | 2 | 6 |
| 3 | 3 | 5 |
| 4 | 9 | 11 |
| 5 | 1 | 7 |
| 6 | 8 | 5 |
| 7 | 7 | 4 |
| 8 | 5 | 4 |

| Formula | Description (Result) |
|---|---|
| =SLOPE(A2:A8,B2:B8) | Slope of the linear regression line through the data points above (0.305556) |

# MONITORED NATURAL ATTENUATION DATA EVALUATION

**DIAGRAM 3-1**
**MONITORED NATURAL ATTENUATION DATA EVALUATION**
**RESPONSE ACTION PLAN**

**NAS DALLAS, TEXAS**




Investigate the reason for the change in $k_{time}$ and make necessary changes to the remedial system. These changes in the plume dynamics could include:

| **Reason for $k_{time}$ Change** | **Recommended Changes in Remediation** |
|---|---|
| New source or new release | Identify new Responsible Party for continued remediation. |
| Geochemical change | Determine if chemical additives are necessary or technical impracticability of additional remediation. |
| Asymptotic degradation reached | Determine if active remediation or excavation are necessary or technical impracticability of additional remediation. |

Investigate the reason for the change in $k_{dist}$ and make necessary changes to the remedial system. These changes in the plume dynamics could include:

| **Reason for $K_{dist}$ Change** | **Recommended Changes in Remediation** |
|---|---|
| New source or new release | Identify new Responsible Party for continued remediation. |
| Migrating plume | Initiate abatement measures such as interceptor trench, slurry walls, pump recovery / capture system, etc. if receptors are threatened. |

Notes:
(1) Both pathways (A, B) must be evaluated for each of the chemicals of concern in each monitoring point along the plume's centerline.
(2) $k_{time}$ Concentration versus Time Attenuation Rate Constant
(3) $k_{dist}$ Concentration versus Distance Attenuation Rate Constant

# Assessment of MNA Performance Monitoring

## Introduction

The MNA monitoring well networks at the NAS Dallas groundwater plumes will provide the necessary analytical data to evaluate the dynamic behavior of the plumes over time, including contaminant and/or concentration reductions indicative of progress toward clean-up objectives, changes in plume boundaries, and changes in geochemistry. To this effect, these monitoring well networks include monitoring wells in areas hydraulically upgradient and sidegradient to the groundwater plume, in the historical source area, along the main body of the plume and immediately downgradient of the plume. The number and locations of monitoring points for each plume was selected based on the size of the plume, groundwater velocity, proximity to receptors (including cross-media transfer of COCs), and presence of preferential pathways for COC migration.

As required by the Compliance Plan for NAS Dallas (TCEQ, 2004), performance monitoring for MNA will be conducted in accordance with Response Action Plan (RAP) Worksheet 3.1 until all remedial action objectives have been met for the plume for at least two consecutive sampling events. Upon demonstration of the attainment of clean-up objectives, a three-year of post-remedial action monitoring will be implemented in accordance with the Compliance Plan for NAS Dallas (TCEQ, 2004) and as outlined on RAP Worksheet 4.1.

In addition to the COCs identified in the APAR (TtNUS, 2003) for each groundwater plume, daughter products that may be formed as a result of biotransformation or chemical processes will be monitored during the corrective action period at each plume. In order to ensure that there is a potential for continued transformation of the COCs within the groundwater plume, the geochemical environment will also be monitored (i.e., oxidation-reduction potential, dissolved oxygen, pH, etc.) every two years at a minimum. During the post-remedial action monitoring, the Compliance Plan requires that an expanded list of parameters be sampled including those COCs historically detected at the site. In order to minimize the chance of identifying constituent exceedances during the post-response action monitoring, the expanded list of parameters identified on RAP Worksheet 4.1 (Compliance Plan Table III) will be monitored every five years at a minimum.

Each new round of data will help develop a better understanding of the site and site processes and as a result, the conceptual site model for MNA will be continuously reevaluated from the standpoint of the observed plume shape, location, stability, and dynamics; attenuation rates; groundwater flow patterns; and geochemical regimes.

To evaluate progress towards achievement of clean-up objectives, data collected from the monitoring well network will be used to determine temporal and spatial trends in COC concentrations, comparisons of observed COC concentrations with benchmark concentrations, and, comparison of calculated attenuation rates with the rates required to meet remedial objectives within the required timeframe. Data will be interpreted with regard to variability so that attenuation-related changes and trends can be distinguished from other sources of variation in the data.

If a departure from a predicted trend is found, (i.e., exceeding benchmark concentration or unfavorable changes in attenuation rates), the deviation will be evaluated to determine how the changes may affect attainment of remedial goals for the individual monitoring wells, as well as, how the changes may affect the behavior of the entire plume (i.e., plume stability, reduction in COC concentrations, etc.). Departures from expected trends may not mean remedy failure, because there may be a range of attenuation rates that will achieve the desired remedial goals

in the allotted time; therefore their significance must be evaluated in the context of the site-related goals. If the potential impact on the remedy is negligible, revision of the conceptual site model may be the only outcome of such evaluation. However, if the potential for impact is significant, implementation of alternative remedies may be triggered or, at a minimum additional characterization to better define the factors limiting COC reduction and determine methods for mitigating the magnitude of their impact would be warranted. Other site-related data (i.e., geochemistry and potentiometric data) will continue to be evaluated to provide evidence of COC migration, fate, and attenuation processes. These data may be used to ascertain COC degradation and the continuation of appropriate conditions for attenuation at acceptable rates.

Following the individual monitoring well data analysis, plume behavior will be assessed to evaluate the continued effectiveness of the MNA remedy, as well as the adequacy of the monitoring program and conceptual site model for MNA. The ongoing monitoring program will provide the necessary data for continual refinement of the conceptual model and subsequently of the monitoring program itself. Upon completion of each sampling round, data analysis and determination of the effectiveness of the MNA remedy, plume-specific criteria will drive decisions affecting the continuity of the monitoring program.

At some plumes, source control and interim remedial activities have occurred between the original site characterization process and the implementation of performance monitoring. Because these activities are expected to change the site's characteristics and behavior, performance monitoring will require the continued refinement of the conceptual site model for MNA. This refinement of the conceptual site model may eventually be different from the original MNA conceptual site model based on the initial site characterization data. Development and implementation of the new conceptual site model for MNA will require the collection of additional data (i.e., quarterly monitoring for the first year after interim remedial activities and on a semi-annual basis thereafter) to establish baseline conditions, expediently depict new site characteristics and parameter variability, establish trends and estimate attenuation rates for COCs, determine if the plume characteristics have been altered, and assess the likelihood of meeting site remediation goals.

## Evaluation of New Data

Data interpretation will include the preliminary assessment of the COC concentration data collected for both the plume centerline (e.g., whole plume dynamics) as well as on individual COCs within each monitoring well. The interpretation will be conducted through graphs, tables, maps, statistics, and time-series plots. This will help in identifying patterns, relationships, and anomalies, such as possible "outliers" to the observed remedial trend of the plume. Scatter graphs (i.e., $k_{time}$ and $k_{dist}$ graphs) will show relationships between two variables that are not readily evident using purely numerical methods. Mapping the data in plan view and/or cross-section (i.e., isoconcentration maps, potentiometric maps, MNA parameter maps, etc.) will help understand patterns of COC distribution and migration, and relationships between geochemical zones and COC attenuation.

The initial data analysis and interpretation will focus on the detection of trends in the data for the COCs within individual monitoring wells and subsequently for the plume as a whole. First, the COC concentration data collected from each monitoring well will be used to determine the temporal trends that exist within the plume. The COC trends will also be evaluated at monitoring points located throughout the plume as a whole. In order to adequately interpret progress toward COC reduction goals for the plume, it is necessary to compare trends of individual monitoring wells to trends of other monitoring wells in the plume. Evaluating trends in data from all sampling locations in the plume will determine if the plume exhibits stability or reduction in COC concentrations. In addition, for each COC, spatial trends along the plume centerline [i.e., concentration vs. distance attenuation rate ($k_{dist}$)] will be evaluated. This analysis assists in evaluating the stability of the plume and its migration potential. Assessment of spatial plume behavior is necessary to ensure no unacceptable plume migration occurs.

Further evaluation will focus on the assessment of any departures from predicted trends and their impact on the potential for MNA to achieve plume-related goals. If the COC data points do not definitively indicate that the remedial goals are meeting the reasonable progress expectations, other data will be analyzed in order to properly interpret particular variances from the predicted performance (i.e., the site stratigraphy, groundwater chemistry, the groundwater flow field, the season of the year).

In addition, non-parametric statistical tests, such as the Mann-Kendall test, may be included in the data evaluation to establish the existence of a trend when the initial evaluation is inconclusive due to high data variability.

The process of MNA data evaluation is graphically depicted in Diagram 3-1.

### Individual Monitoring Well Analytical Data Evaluation

Evaluation of progress towards achievement of clean-up goals will focus primarily on temporal trends in COC concentration at individual attenuation monitoring point (AMP) wells within the plume. After each sampling event, temporal trends [i.e., concentration vs. time attenuation rate ($k_{time}$)], will be established for each AMP of the plume. Temporal trends ($k_{time}$) are particularly useful in evaluating if remedial goals can be met in the desired timeframe for the individual location. The analysis of temporal trends is useful for estimating the potential lifetime of the COC plume at the particular location.

The parameters to be evaluated in parallel to ensure reasonable progress is being made in the response action at the particular location are as follows:

- Direct comparison of detected concentrations to expected or benchmark concentration to meet remedial goals by the year 2016 for the monitoring wells along the centerline of the plume.

- Direct comparison of observed attenuation rate ($k_{time}$) from the chemical specific historical data available for the monitoring well versus the minimum attenuation rate ($k_{time}$) necessary to meet the 2016 clean-up date.

The following graph depicts the possible evaluation scenarios for the above parameters:

| | |
|---|---|
| **Measured COC Concentration < Expected COC Concentration**<br>**and**<br>**Observed $k_{time}$ > Minimum $k_{time}$**<br>Remedial goal is being met, continue performance monitoring | **Measured COC Concentration < Expected COC Concentration**<br>**and**<br>**Observed $k_{time}$ < Minimum $k_{time}$**<br>Evaluate further to ensure remedial goal is being met |
| **Measured COC Concentration > Expected COC Concentration**<br>**and**<br>**Observed $k_{time}$ > Minimum $k_{time}$**<br>Evaluate further to ensure remedial goal is being met | **Measured COC Concentration > Expected COC Concentration**<br>**and**<br>**Observed $k_{time}$ < Minimum $k_{time}$**<br>Remedial goal not being met, consider new response action |

1. Satisfactory progress is being made with the response action (top left quadrant) for an individual well location, if the detected concentration of the COC(s) is not greater than the 2016 clean-up curve expected concentration; and, the observed attenuation rate based on historical data available from the monitoring well is equal to or greater than the minimum attenuation rate necessary to meet clean-up by the year 2016 for the monitoring wells along the centerline of the plume.
2. Reasonable progress is not being made towards achieving the remedial goal (bottom right quadrant) if the detected concentration of the COC(s) exceeds the 2016 clean-up curve expected concentration; and the observed attenuation rate based on historical data available from the monitoring well is less than the minimum attenuation rate necessary to meet clean-up by the year 2016 for the monitoring wells along the centerline of the plume. A new response action may need to be implemented if this trend continues for at least three sampling rounds.
3. Further evaluation will be needed for the scenarios in the top right and bottom left quadrants before establishing if reasonable progress is being made towards achievement of the clean-up goals:
   - Reasonable progress is being made when the observed attenuation rate based on historical data is steep enough that clean-up can still be achieved by the year 2016, even though the detected concentration of a COC may be greater than the expected concentration during a particular sampling event (bottom left quadrant).
   - Reasonable progress is being made if the detected concentration of a COC in the sampling event is sufficiently below the expected concentration so that with an observed attenuation rate based on historical data greater than the calculated minimum attenuation rate necessary to meet PCLs by 2016, the remedial objectives can still be achieved by the year 2016 (top right quadrant).
   - Reasonable progress may not be made if either of the preceding two situations continues for at least three consecutive sampling rounds. At that point in the response action evaluation, a new response action may need to be implemented. In this case other statistical methods may be used to evaluate the data such as using non-parametric tests (i.e., Mann-Kendall) to determine if there has been a statistically significant change in degradation trends.

Plume Analytical Data Evaluation

Since a plume-wide trend implying progress toward restoration cannot be satisfactorily elucidated from monitoring only individual sampling locations, it will be necessary to compare trends among the AMP wells in the plume. Reduction in COC concentrations from all or most sampling locations within predicted ranges and/or at anticipated rates can be interpreted as a decrease in COC mass for the plume and will be indicative of effective remediation of the plume through MNA. Mixed trends in different portions of the plume may imply temporal changes in plume migration or may be simply attributed to the natural attenuation processes, and do not signify failure of MNA to achieve its goals in a timely manner. These variations will be evaluated in the context of the conceptual site model and sampling history before they are attributed to natural attenuation processes of other possible causes. To this effect, in cases of mixed trends it will be necessary to perform other comparisons in order to reach a conclusion of satisfactory progress. It will be particularly useful to evaluate trends in COC and daughter product concentrations (e.g., a decreasing trend in trichloroethene compared to an increasing trend in cis-1,2-dichloroethene in the same plume may indicate degradation of trichloroethene to cis-1,2-dichloroethene). Other trends of interest include changes in geochemistry that may indicate decrease in attenuation rates, such as changes in availability of electron donors and electron acceptors, changes in oxidation-reduction potential, or other primary geochemical indicators.

The complement to the evaluation of the behavior of the plume as a whole is the assessment of spatial trends. For each COC, spatial trends along the plume centerline [i.e., concentration vs. distance attenuation rate ($k_{dist}$)] will be evaluated. This analysis assists in evaluating the stability of the plume and its migration potential. $k_{dist}$ will be calculated for the monitoring wells along the plume centerline after each annual sampling round and will be depicted in centerline trend graphs ($k_{dist}$ graphs). Assessment of spatial plume behavior will be performed through visual interpretation of changes in plume shape over time as shown in the isoconcentration maps as well as centerline trend graphs.

**Assessment Conclusions and Recommendations**

As a result of the response action effectiveness evaluation, the MNA conceptual site model will be continuously refined/modified by incorporating any new data and data trends in COC and geochemistry values and changes in site hydrology. As new data is gathered there will be an ever-expanding database for the site that can be used for comparison with the changes in parameters noted between monitoring events as well as for comparison to predicted, acceptable trends. This continual evaluation of performance monitoring data will translate in better understanding of plume behavior and anticipated data variability and therefore assist in the proper interpretation of monitoring data.

Upon completion of each sampling round, data analysis and determination of the effectiveness of the MNA remedy, plume-specific criteria will drive decisions affecting the continuity of the monitoring program such as: the appropriateness of continuing the monitoring program without change, the need for modifications to the monitoring program (i.e., increased monitoring frequency, additional monitoring wells), need for additional characterization, implementation of a contingency or alternative remedy, or verification of attainment of remedial goals and termination of performance monitoring.

Site-related decisions regarding continuing, modifying, or terminating MNA performance monitoring will be made based on the analyses of spatial and temporal trends in COC concentration, as well as comparisons with predicted benchmarks and/or the specified concentration standard (i.e., COC PCLs). The following summarizes each potential decision

and why it may be chosen based on the perceived progress towards achievement of MNA remediation goals at the plume:

1. Continue Monitoring Program Without Change

   COC concentrations, including toxic transformation products and any mobilized by-products or secondary COCs must remain within the bounds of acceptable trends in order to continue the monitoring program without any change until all remedial action objectives have been met. Groundwater flow parameters must not have changed outside previously identified acceptable ranges. The geochemistry must not have changed in such a way as to indicate that the COC degradation or other natural attenuation processes would be significantly affected.

2. Modify the Monitoring Program

   Modification of the monitoring program may be needed to better reflect changing conditions or increased understanding of natural attenuation processes at the site. Changing conditions or the need to test key assumptions may require new sampling points or increases in monitoring parameters or frequency. Possible scenarios include:

   - Changes in groundwater flowrates or directions that indicate COCs may move farther downgradient, laterally or vertically into previously unimpacted areas, may warrant the need for additional monitoring wells.
   - Unfavorable changes in COC concentrations within the plume, or in the observed attenuation rate based on historic data, may warrant increased monitoring frequency. Sampling frequency may be increased if a sudden change in the trend of COC concentration reduction is noted in order to provide information to facilitate understanding of the change and provide earlier warning of further change. If the protectiveness of the remedy is in question (i.e., unfavorable observed attenuation rate change after 2012), a determination may be made to collect data on a more frequent schedule to properly interpret trends in time to implement contingency remedies, if necessary, to meet PCLs by 2016.
   - Detections of COCs outside the known plume, indicating potential plume expansion or plume migration, may warrant the need for additional monitoring wells.

3. Implement a Contingency or Alternative Remedy

   Alternative remedies can be considered for use in case MNA fails to perform at the desired effectiveness. Situations that may trigger the implementation of a contingency or other remedy modifications will depend on site conditions and include the following:

   - COC concentrations are not decreasing at the rate previously determined to be necessary to meet the remediation objectives by 2016. This assessment will involve the direct comparison of current analytical data with the expected plume clean-up benchmarks as well as evaluation of temporal trends (i.e., observed attenuation rates) in COC concentrations versus the minimum attenuation rates required to meet clean-up by the year 2016. If the protectiveness of the remedy is in question (i.e., more than three rounds of sampling fail to meet the criteria), implementation of a contingency or alternative remedy would generally be warranted.
   - COC concentrations at AMP wells exhibit an increasing trend not originally predicted during remedy selection. This situation would involve the identification and assessment of trends in COC concentration data, including transformation products, changes in geochemistry that may indicate decrease in attenuation rates explaining the lack of

progress toward clean-up objectives, and/or additional COC releases. For some locations in the plume, a detection of a significant change may not trigger immediate implementation of a contingency or alternative remedy. For instance, a low-level or otherwise limited COC concentration increase does not necessarily mean that remediation timeframes will be expanded, or that by the time the pulse moves downgradient to the boundary of the plume there will be a significant plume expansion. Or, in some cases, the detailed characterization and modeling of COC fate and migration may indicate that concentrations for certain COCs (i.e., daughter products) in some portions of the plume are expected to increase temporarily, yet MNA would still meet remedial objectives. If so, the temporary increase would not trigger the contingency or alternative remedy as long as the increase conformed to the predictions and MNA remained protective, allowing observation for several years to test model predictions, if time is available (i.e., before 2012). In situations where evaluation shows the observed COC concentration increases are expected to unacceptably increase the time for plume restoration beyond 2016, or cause unacceptable plume expansion, triggering the contingency or alternative remedy would generally be warranted.

- COCs are identified in monitoring wells located outside the original plume boundary indicating unacceptable plume expansion or migration. Detections of COCs outside of the predetermined plume boundaries may indicate unacceptable plume expansion. Implementation of an alternative or contingency remedy will depend on the locations of the new detections, and distance and possible COC migration rates between these monitoring points and receptors (i.e., surface water bodies, off-site property). Because the COC travel time from the location of the detections may be many years at some sites, there may be time for further monitoring and assessment before a contingency or alternative remedy would need to be implemented. In contrast, if the protectiveness of the remedy is in question (i.e., a significant trend of increasing COC concentration in downgradient wells was noted), there may be much less time available to assess the trend if there was only a short travel time to downgradient receptors. In this case, a contingency or alternative remedy may be triggered immediately.

4. Termination of Performance Monitoring

Once PCLs have been achieved at each of the AMP locations within a plume, showing that the MNA remedy goals have been met for two consecutive semi-annual sampling events for an individual PCLE zone, performance monitoring will be terminated and a period of verification monitoring will be initiated. Verification monitoring will include three years of semi-annual groundwater sampling in order to satisfy the requirements of the Compliance Plan for NAS Dallas (TCEQ, 2004). Sampling parameters for the verification of achieving the PCLs and locations will be in accordance with RAP Worksheet 4.0. This sampling will include all COCs that have been historically detected in the area of the former SWMU, not just the ones that were identified for remediation in the Response Action Plan. If no additional COC exceedances are identified during this three year period of post response action care monitoring, the monitoring system can be terminated, the monitoring wells will be abandoned, and the site will be removed from the permit.

### Effects of Data Variability on Data Interpretation

Data interpretation is affected by data variability. This variability is sometimes associated with natural causes or may be simply attributed to the natural attenuation processes. Due to the dynamic nature of natural attenuation processes, data typically exhibit fluctuations of various magnitudes. For example, there is an expected degree of natural variability within a plume that may include small-scale expansion and shrinkage in response to changes in groundwater flowrates and biological degradation rates throughout the year. COC concentrations in individual monitoring wells may fluctuate with changes in plume configuration caused by oscillations in groundwater flow. Also, changes in groundwater elevations can cause changes in COC concentrations measured in monitoring wells.

It is essential that each data point be interpreted in the context of its derivation in time and space. For instance, monitoring wells produce data that should be interpreted with respect to COC sources, site stratigraphy, the groundwater flow field, the plume, possible receptors, season of the year, and other relevant factors. Variations in sampling methodology should also be considered, due to possible differences in COC concentrations derived from different sampling techniques or devices. The analytical methodology may be evaluated in terms of accuracy, precision, and detection limits. This list of data considerations is not exhaustive, but merely emphasizes that a number (i.e., a data point) should be placed in context to be interpreted. The better the understanding on the derivation and context of the data, the more likely it is that the appropriate decision can be made based on the data.

Examination of historical and spatial patterns may provide information useful in assessing the source and significance of variability in the measured parameters. For instance, if there are multiple monitoring wells in the same plume that show a consistent trend for a number of monitoring variables across several monitoring events, then one may suspect a natural variation, such as recharge differences or geochemical changes in the system, and investigate a correlation of recharge, indicator parameters, or other external hydrologic factors with concentration as indicative of the likely cause of the change. If, on the other hand, a specific monitoring well shows an unusually large change in concentration between monitoring events, relative to nearby monitoring wells, then one may suspect a measurement factor or additional release source is involved and look at sampling techniques or other such factors that may influence the concentration change. Because plume variability should be taken into account when interpreting monitoring data, it is important to have a good estimate of natural variability derived from the site investigation and ongoing MNA performance monitoring.

# APPENDIX 8
# WASTE DISPOSAL MANIFESTS

Project #: 0-0

Order #: 140398

EFFECTIVE ENVIRONMENTAL

Please print or type. (Form designed for use on elite (12-pitch) typewriter.)

**NON-HAZARDOUS WASTE MANIFEST**

1. Generator ID Number: TX8170022786 / 65033
2. Page 1 of 1
3. Emergency Response Phone: 877-577-2669
4. Waste Tracking Number: NHM140398

5. Generator's Name and Mailing Address
Naval Air Station Dallas (NAS)
c/o EnSafe Inc., 4545 Fuller Dr., Suite 342
Irving, TX 75038
Generator's Phone: 972.792.3222 ATTN: Tom Wiberg

Generator's Site Address (if different than mailing address)
8100 West Jefferson
Dallas, TX 75211
RB TVW

6. Transporter 1 Company Name
Stericycle Specialty Waste Solutions Inc
Phd: 972 329 1200
State ID#: 98032 / H-4695
U.S. EPA ID Number: MNS000110924

7. Transporter 2 Company Name
U.S. EPA ID Number

8. Designated Facility Name and Site Address
Itasca Landfill TX, LP
2559 FM 66
Itasca, Texas 76055
State ID#: H0241C
U.S. EPA ID Number: n/a
Facility's Phone: 254 897 2511

| 9a. HM | 9b. U.S. DOT Description (including Proper Shipping Name, Hazard Class, ID Number, and Packing Group (if any)) | 10. Containers No. | Type | 11. Total Quantity | 12. Unit Wt./Vol. | |
|---|---|---|---|---|---|---|
| ☐ | 1 Non-regulated material (soil cuttings Class 2 solids) | 01 ~~02~~ | DM | 55 ~~110~~ | G | CESQ3012 Non-RCRA |
| ☐ | 2. Non-regulated material (purged ground and decon water) | 02 | DM | 110 ~~55~~ | G | CESQ1012 Non-RCRA |
| | 3. | | | | | |
| | 4. | | | | | |

13. Special Handling Instructions and Additional Information
01:IDW Soil cuttings NR (PF:5110167655) 55G
02:IDW purge and decon waters NR (PF:5110167656) 55G
RB TVW
11-1) 0.72 ton 11-2) 0.47 tons

14. **GENERATOR'S CERTIFICATION:** I certify the materials described above on this manifest are not subject to federal regulations for reporting proper disposal of Hazardous Waste.

Generator's/Offeror's Printed/Typed Name: X DAVID BARNEY
Signature: X
Month 5 Day 31 Year 16

15. International Shipments ☐ Import to U.S. ☐ Export from U.S. Port of entry/exit:
Transporter signature (for exports only): Date leaving U.S.:

16. Transporter Acknowledgment of Receipt of Materials

Transporter 1 Printed/Typed Name: Rafael Blaze
Signature:
Month 5 Day 31 Year 16

Transporter 2 Printed/Typed Name: Steven Vansickle
Signature:
Month 6 Day 9 Year 16

17. Discrepancy

17a. Discrepancy Indication Space ☐ Quantity ☐ Type ☐ Residue ☐ Partial Rejection ☐ Full Rejection

Manifest Reference Number:

17b. Alternate Facility (or Generator)
U.S. EPA ID Number
Facility's Phone

17c. Signature of Alternate Facility (or Generator)
Month Day Year

01: H132 02: H132

18. Designated Facility Owner or Operator: Certification of receipt of materials covered by the manifest except as noted in Item 17a

Printed/Typed Name: Jessica Anderson
Signature:
Month 6 Day 9 Year 16

GENERATOR

INT'L

TRANSPORTER

DESIGNATED FACILITY

6-NHM-C-C-11

2-DESIGNATED FACILITY TO GENERATOR

Project #: 0-0 Order #: 140398

EFFECTIVE ENVIRONMENTAL

Please print or type. (Form designed for use on elite (12-pitch) typewriter.)

**NON-HAZARDOUS WASTE MANIFEST**

1. Generator ID Number: TX8170022786 / 65033
2. Page 1 of 1
3. Emergency Response Phone: 877-577-2669
4. Waste Tracking Number: NHM140398

5. Generator's Name and Mailing Address
Naval Air Station Dallas (NAS)
c/o EnSafe Inc., 4545 Fuller Dr., Suite 342
Irving, TX 75038
Generator's Phone: 972-292-3222 ATTN: Tom Wiberg

Generator's Site Address (if different than mailing address)
8100 West Jefferson
Dallas, TX 75211

RJ TWW

6. Transporter 1 Company Name
Stericycle Specialty Waste Solutions Inc
Ph#: 972 329 1200
State ID#: S5627 / H-4565
U.S. EPA ID Number: MNS000110924

7. Transporter 2 Company Name
U.S. EPA ID Number:

8. Designated Facility Name and Site Address
Itasca Landfill TX, LP
2559 FM 56
Itasca, Texas 76055
State ID#: H0241C
U.S. EPA ID Number: n/a
Facility's Phone: 254 687 2511

| 9a. HM | 9b. U.S. DOT Description (including Proper Shipping Name, Hazard Class, ID Number, and Packing Group (if any)) | 10. Containers No. | Type | 11. Total Quantity | 12. Unit Wt./Vol. | |
|---|---|---|---|---|---|---|
| ☐ | 1. Non-regulated material (soil cuttings Class 2 solids) | 01 ~~02~~ | DM | 55 ~~110~~ | G | CESQ3012 Non-RCRA |
| ☐ | 2. Non-regulated material (purged ground and decon water) | 02 | DM | 110 ~~55~~ | G | CESQ1012 Non-RCRA |
| | 3. | | | | | |
| | 4. | | | | | |

13. Special Handling Instructions and Additional Information
01:IDW Soil cuttings NR (PF:5110167655) 55G
02:IDW purge and decon waters NR (PF:5110167656) 55G

RJ TWW

11-1) 0.72 ton 11-2) 0.47 ton

14. **GENERATOR'S CERTIFICATION:** I certify the materials described above on this manifest are not subject to federal regulations for reporting proper disposal of Hazardous Waste.

Generator's/Offeror's Printed/Typed Name: X DAVID BURNEY
Signature: X
Month 5 Day 31 Year 16

15. International Shipments ☐ Import to U.S. ☐ Export from U.S. Port of entry/exit:
Transporter signature (for exports only): Date leaving U.S.:

16. Transporter Acknowledgment of Receipt of Materials

Transporter 1 Printed/Typed Name: Rafael Blayze
Signature:
Month 5 Day 31 Year 16

Transporter 2 Printed/Typed Name: Steven Vansickle
Signature:
Month 6 Day 9 Year 16

17. Discrepancy

17a. Discrepancy Indication Space ☐ Quantity ☐ Type ☐ Residue ☐ Partial Rejection ☐ Full Rejection

Manifest Reference Number:

17b. Alternate Facility (or Generator) U.S. EPA ID Number
Facility's Phone:

17c. Signature of Alternate Facility (or Generator) Month Day Year

01: H132 02: H132

18. Designated Facility Owner or Operator: Certification of receipt of materials covered by the manifest except as noted in Item 17a

Printed/Typed Name: Jessica Anderson
Signature:
Month 6 Day 4 Year 16

GENERATOR

INT'L

TRANSPORTER

DESIGNATED FACILITY

6-NHM-C-C-11

3-DESIGNATED FACILITY TO GENERATOR

Project #: 0-0 Order #: 145925

E² EFFECTIVE ENVIRONMENTAL

Please print or type. (Form designed for use on elite (12-pitch) typewriter.)

**NON-HAZARDOUS WASTE MANIFEST**

1. Generator ID Number: TX8170022786 / 65033
2. Page 1 of 1
3. Emergency Response Phone: 877-577-2669
4. Waste Tracking Number: NHM-145925

5. Generator's Name and Mailing Address
Naval Air Station Dallas (NAS)
c/o EnSafe Inc., 4545 Fuller Dr., Suite 342
Irving, TX 75038
Generator's Phone: 972-792-3222 ATTN: Tom Wherg

Generator's Site Address (if different than mailing address)
8100 West Jefferson
Dallas, TX 75211

6. Transporter 1 Company Name
Stericycle Specialty Waste Solutions Inc
Ph#: 972 329 1200
State ID#: 88922 / H-1496
U.S. EPA ID Number: MNS000110924

7. Transporter 2 Company Name
U.S. EPA ID Number

8. Designated Facility Name and Site Address
Itasca Landfill TX. LP
2559 FM 66
Itasca, Texas 76055
State ID#: H0241C
U.S. EPA ID Number: n/a
Facility's Phone: 254 687 2511

| 9a. HM | 9b. U.S. DOT Description (including Proper Shipping Name, Hazard Class, ID Number, and Packing Group (if any)) | 10. Containers No. | 10. Containers Type | 11. Total Quantity | 12. Unit Wt./Vol. | |
|---|---|---|---|---|---|---|
| ☐ | 1. Non-regulated material (purged ground and decon water) | 04 | DM | 220 | G | CESQ1012 Non-RCRA |
| ☐ | 2. Non-regulated material (soil cuttings Class 2 solids) | 02 | DM | 110 | G | CESQ3012 Non-RCRA |
| | 3. | | | | | |
| | 4. | | | | | |

13. Special Handling Instructions and Additional Information
01:IDW purge and decon waters NR (PF:5110167856) 55G
02:IDW Soil cuttings NR (PF:5110167855) 55G

11.1) 0.94 tn
11.2) ~~0.29 tn~~ 0.35 tn

14. **GENERATOR'S CERTIFICATION:** I certify the materials described above on this manifest are not subject to federal regulations for reporting proper disposal of Hazardous Waste.

Generator's/Offeror's Printed/Typed Name: X DAVID BARNEY
Signature: X
Month 11 Day 8 Year 16

15. International Shipments ☐ Import to U.S. ☐ Export from U.S. Port of entry/exit:
Transporter signature (for exports only): Date leaving U.S.:

16. Transporter Acknowledgment of Receipt of Materials

Transporter 1 Printed/Typed Name: Jason L Boss
Signature:
Month 11 Day 8 Year 16

Transporter 2 Printed/Typed Name: Rafael Blanco
Signature:
Month 11 Day 14 Year 16

17. Discrepancy

17a. Discrepancy Indication Space ☐ Quantity ☐ Type ☐ Residue ☐ Partial Rejection ☐ Full Rejection

Manifest Reference Number:

17b. Alternate Facility (or Generator) U.S. EPA ID Number
Facility's Phone:

17c. Signature of Alternate Facility (or Generator) Month Day Year

01: H132 02: H132

18. Designated Facility Owner or Operator: Certification of receipt of materials covered by the manifest except as noted in Item 17a

Printed/Typed Name: Cindy Reed
Signature: Cindy Reed
Month 11 Day 14 Year 16

GENERATOR

INT'L

TRANSPORTER

DESIGNATED FACILITY

6-NHM-C-C-11

2-DESIGNATED FACILITY TO GENERATOR

# SWMU 138 PLUME

# 2016 Response Action Effectiveness Report
# SWMU 138 Plume
# Former NAS Dallas, Texas

## Professional Signatures and Seals

**Professional Geologist**

| | | |
|---|---|---|
| *Thomas Wiberg* | *1619* | *30 November 2017* |
| Professional Geologist | Geologist License number | Expiration date |
| | *17 Jan 2017* | |
| Signature | Date | |
| *972-791-3222* | *972-791-0405* | *twiberg@ensafe.com* |
| Telephone number | FAX number | E-mail |

**Professional Engineer**

| | | |
|---|---|---|
| | | |
| Professional Engineer | P.E. License number | Expiration date |
| | | |
| Signature | Date | |
| | | |
| Telephone number | FAX number | E-mail |

**Registered Corrective Action Specialists (RCASs) and Corrective Action Project Managers (CAPMs)**
**For LPST sites only.**

| | | |
|---|---|---|
| | | |
| Registered Corrective Action Specialist | RCAS Registration number | Expiration date |
| | | |
| Signature | Date | |
| | | |
| Corrective Action Project Manager | CAPM Registration number | Expiration date |
| | | |
| Signature | Date | |
| | | |
| Telephone number | FAX number | E-mail |

**Seals, as applicable:**

# TEXAS COMMISSION ON ENVIRONMENTAL QUALITY
## Response Action Effectiveness Report

## Cover Page

**Regulatory ID number** (Solid waste registration number, VCP ID number, etc.) *Solid Waste Code #65033*
check one: ___ Initial RAER submittal for this onsite property X Subsequent RAER submittal
Report date: *January 2017* TCEQ Region No.: *4*

**TCEQ Program** (check one)
X Corrective Action (Mail Code 127)
___ Voluntary Cleanup Program (Mail Code 221)
___ Petroleum Storage Tank Program (Mail Code 137)
___ Superfund PRP Lead (Mail Code 143)
___ Municipal Solid Waste Permits (Mail Code 124)

**Onsite Property Information**
Onsite Property Name: *Former Naval Air Station Dallas (NAS Dallas) — SWMU 138 Plume*
Street no. *8100* Pre dir: *West* Street name: *Jefferson* Street type *Blvd* Post dir: ___
City: *Dallas* County: *Dallas* County Code: *57* Zip: *75211*
Nearest street intersection or location description: ___

Latitude: Degrees, Minutes, Seconds OR Decimal Degrees (circle one) North *32°44'11.0"*
Longitude: Degrees, Minutes, Seconds OR Decimal Degrees (circle one) West *96°57'34.0"*

**Offsite Affected Property Information**
Offsite Affected Property Name: *Not Applicable (N/A)*
Street no. ___ Pre dir: ___ Street name: ___ Street type: ___ Post dir: ___
City: ___ County: ___ County Code: ___ Zip: ___

[X] Check if no offsite properties affected

**Contact Person Information and Acknowledgement**
Person (or company) Name: *Navy BRAC PMO East*
Contact Person: *Mr. David Barney* Title: *BRAC Environmental Coordinator*
Mailing Address: *4911 S. Broad Street, Building 679*
City: *Philadelphia* State: *PA* Zip: *19112* E-mail address *david.a.barney@navy.mil*
Phone: *617-753-4656* Fax: ___

By my signature below, I acknowledge the requirement of §350.2(a) that no person shall submit information to the executive director or to parties who are required to be provided information under this chapter which they know or reasonably should have known to be false or intentionally misleading, or fail to submit available information which is critical to the understanding of the matter at hand or to the basis of critical decisions which reasonably would have been influenced by that information. Violation of this rule may subject a person to the imposition of civil, criminal, or administrative penalties.

Signature of Person BARNEY.DAVID.A.1228582553 Digitally signed by BARNEY.DAVID.A.1228582553 DN: c=US, o=U.S. Government, ou=DoD, ou=PKI, ou=USN, cn=BARNEY.DAVID.A.1228582553 Date: 2017.01.18 00:53:48 -05'00' Name, print: *David Barney* Date: ___

Check the reports/forms previously submitted:

**Remedy Standard A**

___ Self-Implementation Notice Submittal date: _____

*X* Response Action Plan — Approval date: *Draft RAP submitted November 2004.*

**Remedy Standard B**

____ Response Action Plan — Approval date: _____

List all media (surface soil, subsurface soil, groundwater, sediment, surface water, air) that contained or contains a PCLE zone and specify the response action that has been or will be taken for each media. Indicate the type of removal, decontamination, physical control, or institutional control action used in the response action.

| Media | COCs | Removal | Decontamination | Physical Control | Institutional Control | Modified Response Objective | | |
|---|---|---|---|---|---|---|---|---|
| | | | | | | PMZ | WCU | TI |
| *Soil* | *Lead* | *Excavation and offsite disposal (completed in 2003)* | *N/A* | *N/A* | *N/A* | *N/A* | *N/A* | *N/A* |
| *Ground-water* | *Tetrachloroethene (PCE)*<br>*Trichloroethene (TCE)*<br>*cis-1,2-Dichloroethene (cis-DCE)* | *N/A* | *MNA* | *N/A* | *N/A* | *N/A* | *N/A* | *N/A* |

Current land use of the onsite affected property: ____ Residential *X* Commercial/industrial

Projected future land use of the onsite property (if known): *X* Residential __ Commercial/industrial

Briefly describe the affected property and PCLE zones, the conclusions from the assessment activities, identify any affected or threatened receptors, and describe any other major site conditions. If any portion of the response action is necessitated due to an aesthetic or nuisance condition, identify the nature of that condition and identify that portion of the response action conducted to address it. If any media that contains a PCLE zone is not being addressed in this response action, provide justification.

**Affected Property: SWMU 138 Plume**

**In 1989, a Resource Conservation and Recovery Act (RCRA) Facility Assessment (RFA) was performed at Naval Air Station (NAS) Dallas in accordance with the 1984 RCRA Hazardous and Solid Waste Amendments to evaluate potential releases at Solid Waste Management Units (SWMUs) and Areas of Concern (AOCs) and to make preliminary determinations regarding the need for further action. The RFA Report included data collected as part of a Preliminary Review, a Visual Site Inspection, and a Sampling Visit, as necessary, for 135 SWMUs and six AOCs at NAS Dallas (A.T. Kearney 1989).**

**In 1993, NAS Dallas was identified for closure under the Base Realignment and Closure Act (BRAC). As part of the base closure activities, an Environmental Baseline Survey (EBS) was conducted at NAS Dallas to identify any potential environmental concerns related to historical operations at the base (EnSafe/Allen & Hoshall [E/A&H] 1994). During this EBS, additional site concerns were identified at numerous buildings across the installation. In order to strategically investigate the permitted and non-permitted SWMUs, AOCs, and additional site concerns identified in the EBS, the facility was divided into six sections, called "categories", based on property use and ownership. In 1995, the Navy initiated RCRA Facility Investigation (RFI) activities at NAS Dallas at Categories A through F. Submittal of the Final RFI Reports (issued as a series of six reports — one report per category) occurred during the period from November 2000 to March 2001 (Tetra Tech NUS, Inc. [Tetra Tech] 2000a — 2001b). The RFI was completed under the requirements of the Texas Risk Reduction Standards (RRS) (30 Texas Administrative Code [TAC] 335, Subchapter S), the regulatory framework in effect at the time, and closure recommendations in the RFI Reports were based upon Risk Reduction Standard 2 — Industrial (RRS2-IND) criteria. The RFI Reports identified those areas that required further action based on the chemical constituents detected in the soil and/or groundwater at the base.**

**The RFI Reports received conditional approval by the Texas Natural Resource Conservation Commission, now the Texas Commission on Environmental Quality (TCEQ). Final approval of the RFI Reports by TCEQ was dependent upon landowner concurrence of the RRS2-IND clean-up standard.**

**In September of 1999, the Texas Risk Reduction Program (TRRP) (30 TAC 350) was promulgated. One of the major changes resulting from TRRP was eliminating site background as a closure criterion. The most stringent closure standard under TRRP is the Residential Remedy Standard A (RES A), which consists of closure for residential use with no engineering or institutional controls (IC).**

**In March 2001, the Navy submitted a Notice of Intention to Switch to TRRP (30 TAC 350) for five of the six categories. The one category (Category C) that was not switched to TRRP, but remained under the RRS2-IND standards, was subsequently transferred to the Department of the Army.**

**In October 2002, an Affected Property Assessment Report (APAR) was produced based on evaluation of RFI data as well as data from follow-up investigations (Tetra Tech 2002). The data included in the APAR was compared to TRRP RES A criteria to select those sites that may be closed with no land use encumbrances and to determine which sites required corrective action. The results of this comparison indicate that 23 SWMUs (1, 2, 6, 17, 18, 21, 31, 35, 36, 60, 79, 81, 83, 84, 85, 86, 92, 102, 108, 124, 136, 138, and 139) required further actions.**

**In early 2010, the property owned by Exelon Corporation was reportedly transferred to the City of Dallas.**

**SWMU 138 Plume**

**The area around the fishing pier, boat shed, and fenced area near Building 141 in Category B was designated as SWMU 138 following the Interim RFI Report for Category B (E/A&H, 1997). Building 141 was originally constructed as a boat ramp in 1957, but subsequent modifications in 1987 and 1992 have resulted in a modified fishing pier, a boat shed, and a fenced storage area. Prior to 1941, the area of Building 141 was undeveloped and had a different topographical configuration. During the early 1940s, portions of Mountain Creek Lake were reclaimed and the area of Building 141 was modified. Chlorinated volatile organic compounds (VOC) were detected in groundwater in this area, possibly attributed to chemical storage associated with boat and small engine maintenance activities.**

**Soil**

**Based upon the data obtained during the RFI, further action was recommended at SWMU 138 due to exceedances of inorganics in soil. Consequently, excavation of impacted soils was recommended and carried out by the Navy's Remedial Action Contractor (RAC) in late 2003. The Response Action Completion Report (RACR) for the soil removal activities was prepared and submitted to the TCEQ in March 2005. The RACR has undergone several review cycles by the City of Dallas, U.S. Environmental Protection Agency (U.S. EPA), and TCEQ and the final replacement pages for the RACR were submitted to the TCEQ in May 2008 (CH2M Hill 2008). The TCEQ granted final approval of the RACR in July 2008 (TCEQ 2008).**

**Groundwater**

**The results of the RFI for Category B (Tetra Tech 2001b) indicate that groundwater at the site has been impacted by chlorinated VOCs. As described in the APAR, the groundwater of this SWMU is located within a Class 2 groundwater resource area. The high degree of heterogeneity associated with the shallow groundwater bearing unit (GWBU) onsite has resulted in a discrete groundwater Protective Concentration Level Exceedance (PCLE) zone associated with the SWMU 138 Plume that required a response action to reduce the concentration of chemicals of concern (COC) to less than the respective critical Protective Concentration Levels (PCL).**

**Subsequent to the APAR, a Draft RAP, dated November 2004, was submitted to the TCEQ for groundwater at the SWMU 138 Plume (Tetra Tech 2004), which proposed to implement a groundwater response action by implementing institutional controls in the form of a PMZ. The Draft 2004 RAP was not approved by the TCEQ. As such, the response action has consisted of groundwater monitoring for evaluation of monitored natural attenuation (MNA) of contaminated groundwater. This effort has consisted of semi-annual groundwater monitoring conducted at the three groundwater monitoring wells (41401MW, 414B70MW, and 414B70MW) located in SWMU 138. Annual Response Action Effectiveness Reports (RAERs) for the**

**SWMU 138 Plume Protective Concentration Level Exceedance (PCLE) zone have been submitted to the TCEQ which document the progress of MNA and the stability of the plume.**

**A re-evaluation of plume dynamics was presented in an Alternatives Evaluation Report (AER) (Resolution Consultants, 2013), and a determination was made that MNA alone would not effectively reduce the concentrations of COCs in groundwater at SWMU 138 to achieve remedial goals by the year 2017.**

**Given that MNA of contaminants in groundwater at SWMU 138 is not likely to achieve the critical PCLs by the year 2017, as recommended by TCEQ in a letter dated May 26, 2015, failure of the response action triggers the implementation of contingency measures, which may include the selection of an appropriate alternate remedial measure such as enhanced MNA (EMNA). The Navy has proposed to implement EMNA as an alternate remedy at the affected area of SWMU 18 groundwater plume as a pilot study in an effort to reduce COCs to below PCLs. This study will allow the Navy to make a determination as to whether the technology is viable. Depending on the results of the EMNA spot treatment at SWMU 18, alternative remedial measures may be proposed in a comprehensive RAP for SWMU 138 Plume. MNA will be continued for the upcoming year.**

**In October 2015, the Navy submitted a revised RAP (Revision 3) (Resolution Consultants, 2015) to TCEQ. The purpose of the revised RAP was to remove monitor wells, with no history of COC detections or with COC detections below the applicable GWPS for at least the previous five consecutive years, from the current monitoring and sampling plan and confirmation sampling plan. In accordance with the RAPs, Resolution Consultants conducted plugging and abandonment (P&A) of select groundwater monitoring wells in April 2016. P&A actions were conducted by a state of Texas licensed driller (Strata Core Services, SCI). Monitor well 414B70MW at SWMU 138 was abandoned.**

**Potential receptors are onsite residents, onsite employees, and onsite construction workers. Since the groundwater PCLE zone is not projected to migrate offsite based on groundwater modeling results and other lines of evidence, it is not anticipated that offsite receptors will be affected. The possible routes of exposure to groundwater are inhalation (onsite employees, and onsite construction workers) and dermal contact (onsite construction workers). Ingestion is not a concern since during the implementation of the response actions as there is controlled access to the site, which limits potential exposures to contaminated groundwater (i.e., no potable or irrigation wells will be installed) through 2017. The potential for inhalation of vapor from groundwater through soil to outdoor air is insignificant because the maximum detected COC concentrations in groundwater are less than their respective inhalation of volatiles from groundwater ($^{Air}GW_{Inh\text{-}V}$) PCLs. Additionally, the indoor air sampling conducted in a sealed building at a similar plume at the base (Building 1406 within the SWMU 21 area) indicated that no CVOCs were detected in the indoor air (TtNUS, 2004b). The recent Vapor Intrusion Study at SWMU 21 (Resolution Consultants, 2015) also concluded that sub-slab TCE and cis-1,2-DCE concentrations were well below VISLs for sub-slab vapor as well as RSLs for indoor air. Furthermore, the analytical results indicated that neither TCE nor cis-1,2-DCE were detected in indoor air samples. Therefore, vapor intrusion is not a current concern at NAS Dallas.**

## CHRONOLOGY OF MAJOR EVENTS

| | |
|---|---|
| Sep. 1985 | Initial Assessment Study was prepared and submitted. |
| Jan. 1987 | Confirmation Study and Verification Step Report was prepared and submitted. |
| Mar. 1989 | RFA was prepared and submitted. |
| 1993 — 1994 | EBS was prepared and submitted. |
| Mar. 1994 | BRAC Cleanup Plan was prepared and submitted. |
| 1995 — 1996 | Basewide Round 1 groundwater sampling event (Directed Phase RFI). |
| 1996 — 1997 | Interim Draft RFI Reports were prepared and submitted for each category identified at the air station. |
| Mar. — June 1998 | Basewide Round 2 groundwater sampling event (Chase Phase RFI). |
| May — Oct. 1998 | Main Fuel Farm (MFF) underground storage tanks were removed by the Navy's Charleston Detachment, along with other tanks basewide. |
| June 1998 — Jan. 1999 | Release Determination Report was prepared and submitted covering the removal of the MFF tanks. |
| Aug. — Sep. 1998 | Basewide Round 3 groundwater sampling event. |
| Sep. 1998 | Most military operations on NAS Dallas ceased and the air station was placed into caretaker status. |
| Dec. 1998 — Jan. 2000 | Removal of oil/water separators (OWS) basewide. |
| Jan. — Oct. 1999 | Basewide removal of hot spot areas of contamination. |
| Feb. — Apr. 1999 | Basewide Round 4 groundwater sampling event. |
| Sep. — Oct. 1999 | Removal of the remaining USTs basewide. |
| Sep. — Nov. 1999 | Basewide Round 5 groundwater sampling event. |
| July 1999 — Feb. 2000 | Basewide pre-Corrective Measures Study monitoring well installation and sampling event. |
| June — July 2000 | Preliminary groundwater investigation at Advanced Science Incorporated Area-5 (ASA-5) site in the MFF/Main Fuel Farm Storm Sewer (MFF/MFFSS) area. |
| July — Aug. 2000 | Basewide Round 6 groundwater sampling event. |
| Aug. — Sep. 2000 | Aquifer tests were conducted at five sites across Former NAS Dallas to determine aquifer properties. |
| 2000 — 2001 | Final RFI Reports were prepared and submitted for each category. |
| June — July 2001 | Basewide Round 7 groundwater sampling event, including evaluation of alternate sampling methods (i.e., passive diffusion bag [PDB] and HydraSleeve). |
| Sep. 2001 | Enhanced Monitored Natural Attenuation (EMNA) pilot test initiated at ASA-5 site (SWMUs 79/136) involving the injection of potassium permanganate ($KMnO_4$). |
| Feb. 2002 | Monitored Natural Attenuation (MNA) Groundwater Modeling Report for MFF/MFFSS was prepared and submitted. |

| | |
|---|---|
| Mar. 2002 | Technical Memorandum Groundwater Sampling Procedure Comparison for selected monitoring wells was prepared and submitted. |
| Oct. 2002 | APAR was prepared and submitted. |
| Dec. 2002 — Mar. 2003 | Basewide Round 8 groundwater sampling event. |
| Jan. 2003 | Monitoring Well Abandonment Plan was prepared and submitted. |
| Jan. 2003 | Draft MNA Groundwater Modeling Report for Category D Sites was prepared and submitted. |
| Jan. 2003 | Corrective action (excavation and disposal) initiated on the Rubble Landfill (SWMU 1). |
| Feb. 2003 | Draft RAP for MFF/MFFSS soils was prepared and submitted. |
| Apr. 2003 | Draft RAP for Category D Sites soils was prepared and submitted. |
| Apr. 2003 | Final Groundwater Report to satisfy Provision VIII.D.8 of the Former NAS Dallas RCRA Hazardous Waste Storage Permit (No. HW-50276) was prepared and submitted. |
| May 2003 | Self Implementation Notice (SIN) for TRRP RES A Soil Response Actions for SWMUs 2, 6, 18, 21, 31, 35, 36, 60, 79, 81, 83, 84, 85, 86, 102, 124, 138, and 139 was prepared and submitted. |
| Jun. 2003 | Draft MNA Groundwater Modeling Report for Category B was prepared and submitted. |
| Jun. 2003 | RCRA Permit renewal and Compliance Plan applications submitted to the TCEQ. |
| Jun. 2003 | Corrective action (excavation, solidification, and disposal) initiated on the Texas Air National Guard (TANG) Ponds (SWMU 92). |
| July — Aug. 2003 | Basewide Round 9 groundwater sampling event. |
| Aug. 2003 | Corrective action (excavation, disposal, and backfill) initiated on the sites covered in the SIN submitted in May 2003. |
| Aug. 2003 | 2002 Annual Groundwater Monitoring Report was prepared and submitted. |
| Dec. 2003 — Jan. 2004 | Basewide Round 10 groundwater sampling event. |
| Jan. 2004 | Soil RACR was prepared and submitted for the Rubble Landfill (SWMU 1). |
| Jan. 2004 | Soil RACR was prepared and submitted for the TANG Ponds (SWMU 92). |
| Mar. 2004 | TCEQ produced and distributed the Draft RCRA Permit and Draft Compliance Plan. |
| Apr. 2004 | Final Addendum to MNA Groundwater Modeling Report for MFF/MFFSS was prepared and submitted. |
| May 2004 | 2003 Groundwater Response Action Effectiveness Reports (RAER) were prepared and submitted. |
| Jun. 2004 | Indoor and Outdoor Air Sampling at Building 1406 Report was prepared and submitted. |
| July 2004 | Basewide Round 11 groundwater sampling event. |

| | |
|---|---|
| July 2004 | Final MNA Groundwater Modeling Report for Category D was prepared and submitted. |
| Sep. 2004 | Final MNA Groundwater Modeling Report for Category B was prepared and submitted. |
| Sep. 2004 | TCEQ approved final closure documentation for the Miscellaneous Sites Soil RACR. |
| Oct. 2004 | Basewide Round 12 groundwater sampling event. |
| Oct. 2004 | TCEQ approved Final MNA Groundwater Modeling Report for Category D Sites at Former NAS Dallas. |
| Oct. 2004 | TCEQ approved Final Addendum to the MNA Groundwater Modeling Report for MFF/MFFSS at Former NAS Dallas. |
| Oct. 2004 | TCEQ approved Final Groundwater Report for Former NAS Dallas. |
| Oct. 2004 | TCEQ approved the 2002 Annual Groundwater Monitoring Report. |
| Nov. 2004 | Final RAP (Basewide) for groundwater was prepared and submitted. |
| Dec. 2004 | 2004 Semi-annual Groundwater Monitoring Report was prepared and submitted. |
| Dec. 2004 | TCEQ issued comments on the 2003 Groundwater RAERs. |
| Jan. 2005 | 2004 Groundwater RAERs were prepared and submitted. |
| Mar. 2005 | Monitoring Well Installation and Abandonment Plan was prepared and submitted. |
| Mar. 2005 | Draft 84 Sites Soil RACR was prepared and submitted. |
| Apr. 2005 | 2004 Groundwater RAERs were prepared and submitted. |
| Apr. 2005 | Basewide Round 13 groundwater sampling event. |
| Jun. 2005 | Corrective action for groundwater (excavation, disposal, and backfill) initiated at SWMU 85. |
| Jun. 2005 | Corrective action for groundwater (excavation, disposal, and backfill) initiated at SWMU 18. |
| July 2005 | Basewide Round 13 groundwater sampling event. |
| Aug. 2005 | TCEQ issued comments on the Draft 84 Sites Soil RACR. |
| Aug. 2005 | 2005 Semi-annual Groundwater Monitoring Report was prepared and submitted. |
| Sep. 2005 | TCEQ issued comments on the 2004 Groundwater RAPs. |
| Oct. 2005 | TCEQ issued comments on the 2004 Groundwater RAERs. |
| Oct. 2005 | Basewide Round 14 groundwater sampling event. |
| Oct. — Dec. 2005 | City of Dallas issued comments on the Draft 84 Sites Soil RACR. |
| Dec. 2005 | TCEQ issued comments on the 2005 Semi-annual Groundwater Monitoring Report. |
| Jan. 2006 | 2005 Groundwater RAERs were prepared and submitted. |
| Jan. 2006 | Basewide Round 15 groundwater sampling event. |

| | |
|---|---|
| Feb. 2006 | Revised Groundwater RAPS (Revision 2) were prepared and submitted covering SWMUs 17/Building 1423, 17/Building 1429, 18, 35, 85, 86, 108, 136 North, 136 South, and 139. |
| Mar. 2006 | RACR for groundwater removed at SWMUs 18 and 85 were prepared and submitted. |
| May 2006 | Basewide Round 15B groundwater sampling event. |
| May 2006 | TCEQ issued comments on the 2005 Groundwater RAERs. |
| Jun. 2006 | 85 Sites, Defense Reutilization and Marketing Office (DRMO), and Naval Weapons Industrial Reserve Plant (NWIRP) SWMU 18 Soil RACRs (Revision 1) were prepared and submitted. |
| Jul. 2006 | TCEQ issued comments on the Groundwater RAPs (Revision 2). |
| Jul. 2006 | EMNA Pilot Test initiated at SWMU 21 involving the injection of zero valent iron (ZVI). |
| Aug. 2006 | Basewide Round 16 groundwater sampling event. |
| Aug. 2006 | Responses to TCEQ comments on the Groundwater RAPs (Revision 2), including replacement pages, were prepared and submitted. |
| Nov. 2006 | Basewide Round 16B groundwater sampling event. |
| Dec. 2006 | RACR for groundwater PCL at SWMU 35 was prepared and submitted. |
| Dec. 2006 | TCEQ approves Groundwater RAP (Revision 2) covering SWMUs 17/Building 1423, 17/Building 1429, 18, 35, 85, 86, 108, 136 North, 136 South, and 139. |
| Jan. 2007 | 2006 Groundwater RAERs were prepared and submitted. |
| Apr. 2007 | Groundwater Sampling Work Plan Addendum, Slug Test Work Plan, and Monitoring Well Installation and Abandonment Work Plan were prepared and submitted. |
| Apr. – May 2007 | Basewide Round 17 groundwater sampling event. |
| Apr. – June 2007 | SWMU 18 OWS removal operations were conducted. |
| Apr. 2007 | Slug test operations conducted at SWMUs 18, 85, and 139. |
| Aug. – Sep. 2007 | Basewide Round 18 groundwater sampling event. |
| Nov. 2007 | Field Activities for SWMU 21 EMNA Pilot Study completed. |
| Jan. 2008 | Basewide Round 19 groundwater sampling event. |
| Jan. 2008 | 2007 Groundwater RAERs were prepared and submitted. |
| Feb. 2008 | TCEQ approves the Groundwater RACR for SWMU 35. |
| Apr. 2008 | Comments to the 85 Sites, DRMO, and NWIRP SWMU 18 Soil RACRs revisions were received from the TCEQ. |
| May 2008 | TCEQ issued comments on the 2007 Groundwater RAERs. |
| May 2008 | Response to the 85 Sites, DRMO, and NWIRP SWMU 18 Soil RACRs comments were submitted to the TCEQ. |
| July 2008 | Basewide Round 20 groundwater sampling event. |

| | |
|---|---|
| July 2008 | TCEQ grants final approval of the 85 Sites, DRMO, and NWIRP SWMU 18 Soil RACRs. |
| July 2008 | Response to TCEQ comments on 2007 Groundwater RAERs, replacement pages (Revision 1) to 2007 RAERs prepared and submitted. |
| Oct. 2008 | Technical Memorandum, ASA-5 East Site EMNA Pilot Study prepared and submitted. |
| Oct. 2008 | Technical Memorandum, Pilot Study at SWMU 21 prepared and submitted. |
| Oct. 2008 | SWMU 17/Building 1429 Pilot Test Work Plan prepared and submitted. |
| Dec. 2008 | SWMU 139 Groundwater RACR prepared and submitted. |
| Jan. 2009 | Basewide Round 21 groundwater sampling event. |
| Jan. 2009 | 2008 Groundwater RAERs prepared and submitted. |
| Jan. 2009 | Revised Groundwater RAPs for SWMU 21 (Revision 2) prepared and submitted. |
| Jan. 2009 | Revised Groundwater RAPs for SWMUs 79/136 Central (Revision 2) prepared and submitted. |
| Jan. 2009 | Revised Groundwater RAP for SWMU 136 South (Revision 4) prepared and submitted. |
| May 2009 | SWMU 21 Pilot Study additional groundwater sampling. |
| May 2009 | SWMU 79/136 Central non-compliant monitoring well groundwater sampling. |
| May. 2009 | TCEQ grants conditional approval of the SWMU 139 Groundwater RACR. |
| June 2009 | ASA-5 Pilot Test injection points abandonment. |
| June 2009 | SWMU 35 monitoring well abandonment. |
| July 2009 | Basewide Round 22 groundwater sampling event. |
| Sep. 2009 | SWMU 21 Pilot Study monitoring wells abandonment. |
| Oct. 2009 | Revised Technical Memorandum, SWMU 21 Pilot Study prepared and submitted. |
| Oct. 2009 | SWMU 136 South non-compliant monitoring well groundwater sampling. |
| Nov. 2009 | Response to TCEQ comments on 2008 Groundwater RAERs prepared and submitted. |
| Jan. 2010 | Basewide Round 23 groundwater sampling event. |
| Jan. 2010 | 2009 Groundwater RAERs prepared and submitted. |
| July 2010 | Basewide Round 24 groundwater sampling event. |
| Aug. 2010 | Basewide monitoring well network inspection and five-year survey. |
| Nov. 2010 | Response to TCEQ comments on 2009 Groundwater RAERs prepared and submitted. |
| Dec. 2010 | Monitoring wells general maintenance and minor repairs completed. |
| Jan. 2011 | Basewide Round 25 groundwater sampling event. |
| Jan. 2011 | 2010 Groundwater RAERs prepared and submitted. |

| | |
|---|---|
| March 2011 | Monitoring well inspection at SWMU 21/SWMU 18 on monitoring wells within the 20-acre area leased to the Air National Guard. |
| May 2011 | Addendum to Monitoring Well Installation and Abandonment Plan prepared and submitted. |
| June 2011 | SWMU 139 monitoring wells plugged and abandoned. |
| June 2011 | SWMU 81 monitoring wells plugged and abandoned. |
| June 2011 | Repairs, abandonment and replacement of damaged monitoring wells at SWMU 21 and SWMU 18. |
| July. 2011 | Basewide Round 26 groundwater sampling event. |
| Dec. 2011 | Response to TCEQ comments on 2010 Groundwater RAERs prepared and submitted. |
| Jan. 2012 | Basewide Round 27 groundwater sampling event. |
| March 2012 | 2011 Groundwater RAERs prepared and submitted. |
| July 2012 | Basewide Round 28 groundwater sampling event. |
| Aug. 2012 | EPA comments to the 2011 Groundwater RAER. |
| Oct. 2012 | TCEQ comments to the 2011 Groundwater RAER. |
| Jan. 2013 | Basewide Round 29 groundwater sampling event. |
| Jan. 2013 | 2012 Groundwater RAERs prepared and submitted |
| Feb. 2013 | TCEQ comments to the 2012 Groundwater RAER. |
| June 2013 | EPA comments to the 2012 Groundwater RAER. |
| July 2013 | Basewide Round 30 groundwater sampling event. |
| July 2013 | Response to TCEQ comments on 2012 Groundwater RAERs prepared and submitted |
| Jan. 2014 | Basewide Round 31 groundwater sampling event. |
| Jan. 2014 | 2013 Groundwater RAERs prepared and submitted |
| Feb. 2014 | TCEQ comments to the 2013 Groundwater RAER. |
| June 2014 | EPA comments to the 2013 Groundwater RAER. |
| July 2014 | Basewide Round 32 groundwater sampling event. |
| July 2014 | Response to TCEQ comments on 2013 Groundwater RAERs prepared and submitted. |
| Nov. 2014 | RCRA Permit renewal and Compliance Plan (Number 50276) applications submitted to the TCEQ. |
| Jan. 2015 | Basewide Round 33 groundwater sampling event. |
| Jan. 2015 | 2014 Groundwater RAERs prepared and submitted. |
| May 2015 | TCEQ Permit Renewal Application Technical Notice of Deficiency (NOD) Letter, dated May 26, 2015. |
| June 2015 | City of Dallas meeting |
| June 2015 | TCEQ comments letter to the 2014 Groundwater RAER, dated 10 June 2015. |

| | |
|---|---|
| June 2015 | Submittal of Drat revised RAP for SWMU 17/Building 1429, received 23 June 2015. |
| June 2015 | Response to TCEQ comments to the Response to Permit Renewal Application Technical NOD Letter for Former Dallas Naval Air Station (NAS), Dallas, Texas, dated 26 June 2015. |
| July 2015 | Basewide Round 34 groundwater sampling event. |
| Oct. 2015 | Basewide submittal of Revised and Interim Response Action Plans. |
| Dec. 2015 | Draft Final Enhanced Monitored Natural Attenuation (EMNA) Spot Treatment Workplan for SWMU 18 prepared and submitted to TCEQ. |
| Dec. 2015 | Amendment to the Approved Class V Underground Injection Control (UIC) Permit (5X2600432) prepared and submitted to TCEQ. |
| Jan. 2016 | Basewide Round 35 groundwater sampling event. |
| Jan. 2016 | TCEQ, U.S. EPA, and City of Dallas approve EMNA workplan. |
| Jan. 2016 | 2015 Groundwater RAERs prepared and submitted. |
| Jan. 2016 | EMNA Spot Treatment Design Verification Testing at SWMU 18 by Resolution Consultants and Regenesis Remediation Services. |
| March 2016 | Draft Tier II Sampling and Analysis Plan Addendum #1, Long-Term Monitoring Plan Enhanced Monitored Natural Attenuation Spot Treatment at SWMU 18 Former Naval Air Station Dallas, Dallas, Texas prepared and submitted to TCEQ. |
| March 2016 | Amendment to the Approved Class V UIC Permit (5X2600432) prepared and submitted to TCEQ. |
| Apr. 2016 | TCEQ approves UIC amendment request. |
| Apr. 2016 | Basewide plug and abandon and operation and maintenance actions, installation of monitor well 508F98MW in SWMU 79 |
| Apr. 2016 | EMNA Spot Treatment at SWMU 18 baseline groundwater sampling event. |
| May 2016 | EMNA Spot Treatment at SWMU 18 injections by Resolution Consultants and Regenesis Remediation Services. |
| Jul. 2016 | Basewide Round 36 groundwater sampling event. |
| Aug. 2016 | Deploy passive diffusion bags at EMNA Spot Treatment well 606D152MW. |
| Sep. 2016 | Basewide operations and maintenance activities completed. |
| Sep. 2016 | EMNA Spot Treatment at SWMU 18 first quarterly performance groundwater monitoring event. |
| Sep. 2016 | Draft Tier II Sampling and Analysis Plan Addendum #2, Long-Term Monitoring Plan, Enhanced Monitored Natural Attenuation, Perfluoroalkyl Substances Groundwater Investigation, Former Naval Air Station Dallas, Dallas, Texas prepared and submitted to TCEQ. |

# Checklist for Report Completeness

Use this checklist to determine the portions of the form that must be submitted for this report. Answer all questions by checking Yes or No. If the answer is Yes include that portion of the report. If the answer is No, do not complete or submit that portion of the report. All form contents that are marked "Required" must be submitted. Form contents marked with an asterisk (*) are not included in the blank form and are to be provided by the person.

| | | | | Report Contents |
|---|---|---|---|---|
| | | Required | **Cover Page** | ☒ |
| | | Required | **Executive Summary** | ☒ |
| | | Required | **Checklist for Report Completeness** | ☒ |
| | | Required | **Worksheet 1.0** Response Action Objectives | ☒ |
| | | Required | **Attachment 1A*** Maps and Cross Sections | ☒ |
| | | Required | **Attachment 1B*** Graphs | ☒ |
| | | Required | **Attachment 1C*** Response Action Diagrams | ☐ *N/A* |
| No ☒ | Is a plume management zone being used as part of the response action? | ☐ Yes | **Worksheet 2.0** Plume Management Zone | ☐ |
| | | | **Attachment 2A*** Map of Plume Management Zone | ☐ |
| No ☒ | Was an area of technical impracticability approved for use as part of the response action? | ☐ Yes | **Worksheet 3.0** Technical Impracticability | ☐ |
| | | | **Attachment 3A*** Map of Technical Impracticability | ☐ |
| No ☒ | Are institutional controls used or required as part of the response action? | ☐ Yes | **Worksheet 4.0** Institutional Controls | ☐ |
| | | Required | **Worksheet 5.0** Performance Measures and Problems | ☒ |
| No ☐ | Have any operation and maintenance activities been conducted? | ☒ Yes | **Worksheet 6.0** Operation and Maintenance | ☒ |
| No ☒ | Has there been any change to the plans for post-response action care from that submitted in the RAP? | ☐ Yes | **Worksheet 7.0** Post-Response Action Care | ☐ |
| No ☐ | Was any information for this report obtained from outside sources? | ☒ Yes | **Appendix 1*** References | ☒ |
| No ☒ | Is an ESA and/or Compensatory Restoration being used as part of the response action? | ☐ Yes | **Appendix 2*** ESA and Compensatory Restoration | ☐ |

| Checklist for Report Completeness | ID No. *SWR 65033 SWMU 138 Plume* | Report Date: *01/17/2017* |
|---|---|---|

| | | | | |
|---|---|---|---|---|
| No ☒ | Are institutional controls or landowner concurrence required in the response action? | ☐ Yes | **Appendix 3*** Institutional Controls and Landowner Concurrence | ☐ |
| No ☐ | Is there data or boring/monitor well information not previously submitted? | ☒ Yes → | **Appendix 4*** Data Tables, Boring Logs, and Well Completions | ☒ |
| No ☒ | Did sampling procedures differ from those described in the RAP? | ☐ Yes → | **Appendix 5*** Sampling Procedures | ☐ |
| No ☐ | Has any sampling been conducted for which the analytical results were not previously submitted? | ☒ Yes → | **Appendix 6*** Laboratory Data Packages | ☒[1] |
| No ☐ | Were statistics or geostatistics used in the response action? | ☒ Yes → | **Appendix 7*** Statistical Methodology | ☒[2] |
| No ☐ | Were any wastes generated that were not reported through STEERS? | ☒ Yes | **Appendix 8*** Waste Disposition | ☒ |

***Note:***

[1] Included with 2015 RAER in CD format.

[2] Included with 2015 RAER for SWMU 17/Building 1423.

Use this worksheet to describe the response action objectives in each media.

## Response Action Objectives — SWMU 138 Plume

What is the selected remedy standard for this affected property? *X* A ___ B

List the environmental media to which this applies **Soil**

Repeat this section for each medium that had a different response action objective.

Provide a detailed description of the response action. Describe the removal actions, decontamination actions, treatment system(s), and/or physical or institutional control actions that have been conducted in each media and indicate if there were any differences between the actions taken and the actions proposed in the SIN or RAP.

**Based upon the data obtained during the RFI and subsequently evaluated in the APAR, further action was recommended at SWMU 138 due to exceedances of inorganics in the soil. Consequently, excavation of impacted soil was recommended by the Navy and carried out by the Navy's RAC in 2003. The RACR for the soil removal activities was prepared and submitted to the TCEQ in March 2005. The RACR has undergone several review cycles by the City of Dallas, U.S. EPA, and TCEQ and the final replacement pages for the RACR were submitted to the TCEQ in May 2008 (CH2M Hill 2008). The TCEQ granted final approval of the RACR in July 2008 (TCEQ 2008).**

List the environmental media to which this applies *Groundwater*

Repeat this section for each medium that had a different response action objective.

Provide a detailed description of the response action. Describe the removal actions, decontamination actions, treatment system(s), and/or physical or institutional control actions that have been conducted in each media and indicate if there were any differences between the actions taken and the actions proposed in the SIN or RAP.

**The groundwater response action for the site consists of MNA as a decontamination remedy to reduce the concentration of COCs to less than their critical PCLs. MNA includes the following elements:**

- **Decontamination through the ongoing biological and chemical reductive dechlorination process.**
- **A monitoring sampling program to evaluate the progress of the decontamination.**

**The groundwater modeling in the Final MNA Groundwater Modeling Report for Category B (Tetra Tech 2004a) determined that the PCLE zone was stable and not expanding in size or concentration.**

**Three monitoring wells were installed in May 2006 within and around the former PCLE zone, after the conclusion of soil excavation. The results of the continued groundwater sampling and analysis from these monitoring wells is discussed on Worksheet 5.0 and presented in the maps and graphs in Attachment 1 and in the tables Appendix 4.**

Describe how the response action has, or is working towards, achievement of the property-specific response objectives for the PCLE zone in each medium in the context of the response objectives set forth in §350.32 or §350.33, as applicable. Explain how the response action is appropriate based on the hydrogeologic and COC characteristics. Describe any unprotective conditions that continued or resulted from the remedial actions and the actions taken to mitigate unprotective conditions.

**The response action for the contaminated groundwater in the PCLE zone has met groundwater response objectives of §350.33 through the mechanical removal of source areas (contaminated soils).**

**The response action for the contaminated groundwater in the PCLE zone was expected to meet groundwater response objectives of §350.32 by the use of MNA as a decontamination remedy to reduce**

**the concentration of COCs within the PCLE zone to less than critical PCLs. The fate and transport modeling results in the Final MNA Groundwater Monitoring Report for Category B (Tetra Tech 2004) predicted that there would be no expansion of the PCLE zone or offsite migration of COCs at concentrations greater than the respective critical groundwater PCLs.**

**Based on the work conducted to date, it can be concluded that COC degradation, specifically for the COCs PCE and TCE, has not been enhanced sufficiently at the SWMU 138 groundwater plume to meet critical PCL concentrations on or before the year 2017.**

**Failure of the response action triggers implementation of contingency measures, which may include the selection of an appropriate alternate remedial measure. The Navy has proposed to implement EMNA as an alternate remedy at the affected area of SWMU 18 groundwater plume in an effort to reduce COCs to below PCLs. This will allow the Navy to make a determination as to whether the technology is viable. Depending upon the results of the EMNA spot treatment at SWMU 18, alternative remedial measures may be proposed in a comprehensive RAP for SWMU 138 Plume. MNA will be continued for the upcoming year in accordance with the procedures and protocols described in the Groundwater RAP (Revision 2), dated February 2006.**

**The current COC concentrations detected in the groundwater at this site are less than the TCEQ default onsite employee or construction worker exposure criteria (i.e., dermal and inhalation exposures); therefore, these exposure pathways will not be a concern. The only PCL exceeded at this site is through groundwater ingestion ($^{GW}GW_{Ing}$). This response action includes controlled access to the site, which is being maintained, thereby limiting potential exposures to contaminated groundwater (i.e., no potable or irrigation wells will be installed). Finally, the COC concentrations present at the site are less than the TCEQ default groundwater to surface water interaction with the lake surface water (Mountain Creek Lake).**

If different from the information provided in the RAP, explain how the COCs have been handled, treated, disposed, or transferred to another medium and document that the response action has not resulted in any additional exposure conditions due to response action activities.

*N/A*

Explain whether the response action is achieving, or will achieve, the objectives within the reasonable time frame.

**The groundwater PCLE zone was originally identified for cis-1,2-DCE, PCE, and TCE. The strongest evidence for MNA is the reduction of contaminant levels observed in samples from monitoring wells over the period of record. Specifically, soil removal combined with MNA has reduced concentrations of PCE and TCE, although concentrations remain above respective PCLs. In addition, maps in Attachment 1A, data tables in Appendix 4, and graphs in Attachment 1B show a considerably smaller PCLE zone footprint than the historical PCLE zone presented in the RAP (Tetra Tech, NUS 2004).**

**However, concentration data for both PCE and TCE at monitoring wells 414B75MW and 41401MW persist at levels above PCLs, indicating that the ongoing biological reductive dechlorination process and MNA response action will not achieve remedial goals within the expected time frame. TCE and PCE concentration versus (vs.) time attenuation rate ($K_{time}$) data (Table 4-4) for 414B75MW and 41401MW do not indicate that remedial clean-up goals will be achieved in the specified timeframe.**

**As previously stated, failure of the response action triggers implementation of contingency measures, which may include the selection of an appropriate alternate remedial measure. The Navy has proposed to implement EMNA as an alternate remedy at the affected area of SWMU 18 groundwater plume in an effort to reduce COCs to below PCLs. This will allow the Navy to make a determination as to whether the technology is viable. Depending upon the results of the EMNA spot treatment at SWMU 18, alternative remedial measures may be proposed in a comprehensive RAP for SWMU 138 Plume. MNA will be continued for the upcoming year in accordance with the procedures and protocols described in the Groundwater RAP (Revision 2), dated February 2006.**

Are physical controls part of the response action? ____ Yes *X* No

If yes, describe the type and purpose of the physical control and discuss how the physical control has proven effective.

| |
|---|
| *N/A* |

## Soil Response Action Objectives

When using removal and/or decontamination with controls or controls only, demonstrate that the physical control or combination of measures is reliably containing, and will continue to contain, COCs within and/or derived from the surface soil and subsurface soil PCLE zone materials over time.

*N/A*

Explain how the removal or decontamination action is reducing the concentration of COCs to the critical surface soil and subsurface soil PCL throughout the soil PCLE zone and preventing COC concentrations above the critical soil PCLs from migrating beyond the original boundary of the soil PCLE zone.

**The soils containing COC concentrations in excess of TRRP RES A were excavated by the Navy's RAC in 2003. Since no soils remain at the site in excess of TRRP RES A concentrations, there is no danger of COCs migrating beyond the original boundary of the PCLE zone. The RACR for the soil removal activities was prepared and submitted to the TCEQ in March 2005. The RACR has undergone several review cycles by the City of Dallas, U.S. EPA, and TCEQ and the final replacement pages for the RACR were submitted to the TCEQ in May 2008 (CH2M Hill 2008). The TCEQ granted final approval of the RACR in July 2008 (TCEQ 2008).**

## Groundwater Response Action Objectives — SWMU 138 Plume

Name of groundwater-bearing unit to which this information applies *Upper Water Bearing Zone (Alluvial Overburden)*

Repeat this section for each groundwater-bearing unit for which a different response action is being conducted.

Groundwater Classification ____ 1 _X_ 2 ___ 3

Is a modified groundwater response action being used for any part of the groundwater PCLE zone (§350.33(f)(2), (3), or (4))? _X_ Yes ___ No

If yes, complete the appropriate portions of this report.

Explain how the removal or decontamination actions are reducing the concentration of COCs to the critical groundwater PCL throughout the groundwater PCLE zone and preventing COC concentrations above the critical groundwater PCL from migrating beyond the original boundary of the groundwater PCLE zone. If COC concentrations above the critical groundwater PCL have ever migrated beyond the original boundary of the groundwater PCLE zone, explain the actions taken to address the increase in the PCLE zone.

**Maps in Attachment 1A, graphs in Attachment 1B, and data tables in Appendix 4 show decreasing trends in PCE and TCE concentrations and a considerably smaller PCLE zone footprint than what the historical PCLE presented in the draft RAP (Tetra Tech 2004b).**

**Concentration data for both PCE and TCE at monitoring wells 414B75MW and 41401MW persist at levels above PCLs, indicating that the ongoing biological reductive dechlorination process and MNA response action will not achieve remedial goals within the expected time frame. TCE and PCE concentration versus (vs.) time attenuation rate ($K_{time}$) data (Table 4-4) for 414B75MW and 41401MW do not indicate that remedial clean-up goals will be achieved in the specified timeframe and may provide indications that MNA has slowed or ceased.**

**As previously stated, failure of the response action triggers implementation of contingency measures, which may include the selection of an appropriate alternate remedial measure. The Navy has proposed to implement EMNA as an alternate remedy at the affected area of SWMU 18 groundwater plume in an effort to reduce COCs to below PCLs. This will allow the Navy to make a determination as to whether the technology is viable. Depending upon the results of the EMNA spot treatment at SWMU 18, alternative remedial measures may be proposed in a comprehensive RAP for SWMU 138 Plume. MNA will be continued for the upcoming year in accordance with the procedures and protocols described in the Groundwater RAP (Revision 2), dated February 2006.**

Explain how the response actions are preventing COCs from migrating to air at concentrations above the PCLs for air if the groundwater-to-air PCLs ($^{Air}GW_{Inh-v}$) were exceeded.

**The maximum observed concentrations of all the detected groundwater COCs in the PCLE zone are less than their respective $^{Air}GW_{Inh-v}$ PCLs. Additionally, there are currently no buildings over the PCLE zone.**

Explain how the response actions are preventing COCs from migrating to surface water at concentrations above the PCLs for groundwater discharges to surface water if surface water was a factor.

**Mountain Creek Lake, an adjacent surface water body, has limited use and is not classified as a drinking water source (see TCEQ approved Tier 1 exclusion criteria). In accordance with TRRP-24, Section 350.75(i)(4) it is required that PCLs be established for COCs in groundwater that discharge to surface water ($^{sw}GW$). The rule also requires that the $^{sw}GW$ PCL equal the risk-based exposure limit for surface water ($^{sw}RBEL$), or as modified by a dilution factor where applicable. It is also appropriate to develop a $^{sw}GW$ protective of ecological receptors using the dilution factor approach.**

**The lowest acceptable concentrations for $^{sw}RBEL$, the critical surface water PCL, are 0.612 mg/L for Trichloroethene (TCE) and 0.323 mg/L for Tetrachloroethene (PCE). These values are based on the protection of human health using the ingestion of contaminated fresh water fish criteria. The maximum concentration detected at the SWMU 138 Plume are 0.062 mg/L of TCE (41401MW, Jan. 2003) and 0.110 mg/L of PCE (41401MW, March 1998). Additionally, sampling of monitoring well 414B70MW located between 41401MW and Mountain Creek Lake indicates that the PCLE zone has not extended to the surface water. This is supported by the groundwater monitoring conducted to date that indicates that the plume is stable and not expanding toward the lake.**

**As shown in the Final MNA Groundwater Modeling Report for Category B (Tetra Tech 2004a), the plume is stable and not expanding or increasing in concentration. Additionally, there are no longer any sources (storage units) or secondary sources (elevated soil concentrations) in the area that could increase the dissolved-phase COC concentrations in the future.**

Explain how the response actions are preventing human and ecological receptor exposure to the groundwater PCLE zone.

**The COC concentrations at the site are less than the TCEQ default $^{Air}GW_{Inh-v}$ and $^{SW}GW$ exposure pathways.**

## Waste Management

Describe the volume and final disposition or reuse location of waste or environmental media that has been removed from the affected property during the response action, if not previously reported under STEERS. Provide copies of all manifests, other documentation of disposition, and landowner consent for reuse of soil in Appendix 8.

**Groundwater recovered through the low-flow or passive diffusion bag (PDB) sampling methods is placed into properly labeled 55-gallon capacity drums and stored at the site. Upon classification, waste disposal arrangements are made with a licensed waste disposal facility. Appendix 8 contains copies of the waste disposal manifests for groundwater generated during the 2016 sampling activities at Former NAS Dallas.**

# ATTACHMENT 1A
# MAPS AND CROSS SECTIONS

# AFFECTED PROPERTY MAP

Affected Property Map
Former NAS Dallas, Texas

January 2014 Isocontour
Gross PCLE Zone Outline
Demolished Building
Existing Structure
Owned by City of Dallas
Transferred from Exelon Corporation to City of Dallas
Transferred from Navy to City of Dallas
Transferred from Navy to City of Grand Prairie
Transferred from Navy to U.S. Army Reserve
Owned by Exelon Corporation

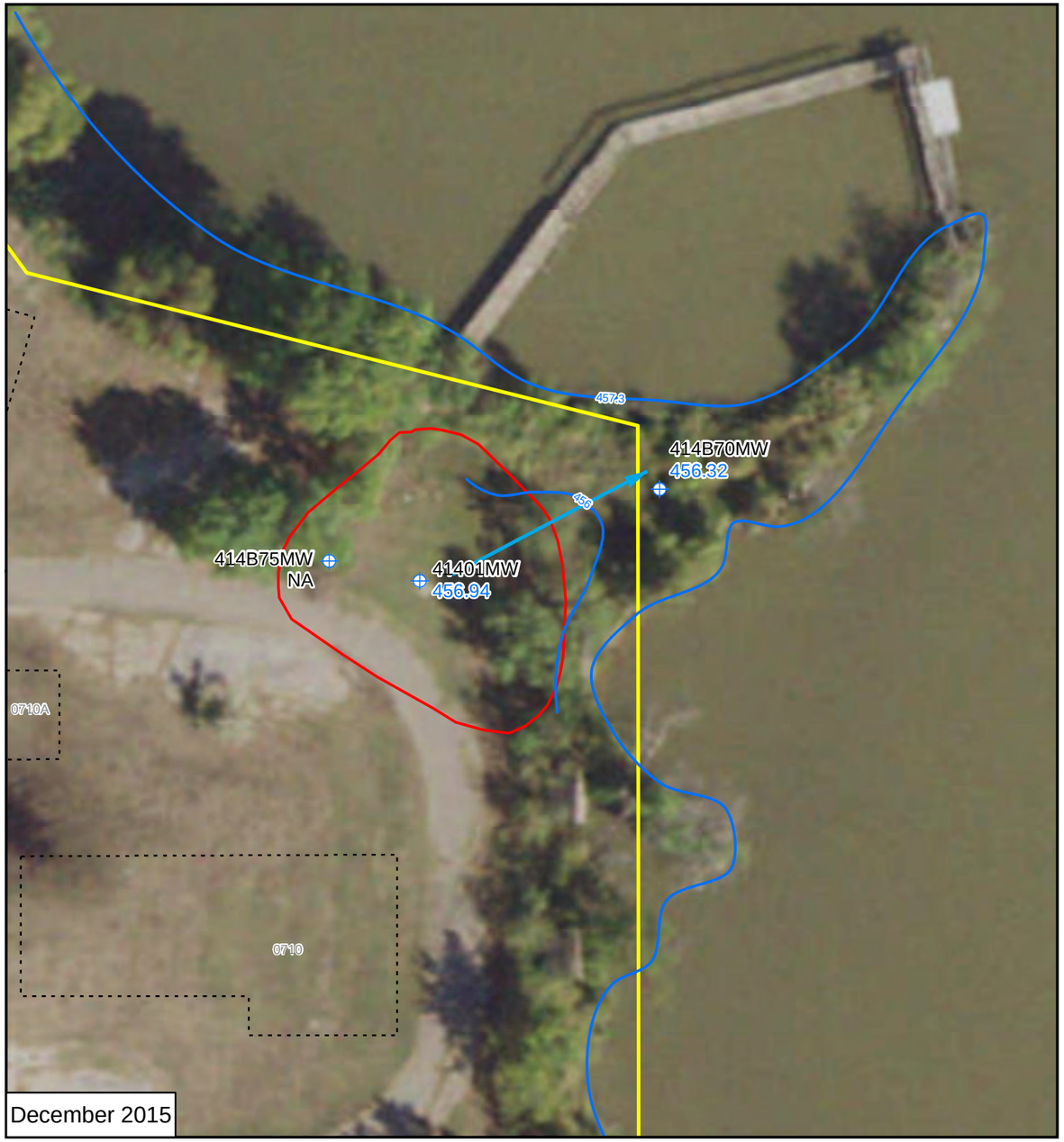
NAVFAC Naval Facilities Engineering Command

| | |
|---|---|
| REQUESTED BY: T. Wiberg | DATE: 9/21/2015 |
| DRAWN BY: A. Zimmerman | PROJECT NUMBER: 0888812796 |

X:\Navy\NAS_Dallas\NAS_Dallas_Jan14_AffectedPropMap.mxd

Service Layer Credits: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community; State boundary is from the United States Census Bureau; Some data are from TetraTech.

# POTENTIOMETRIC SURFACE MAPS




December 2015

July 2016

N

Monitoring Well
Gross PCLE Zone Outline
Property Boundary 2012
Potentiometric Surface Contour
Groundwater Flow Direction
Demolished Building

Notes:
456.72 - Potentiometric Surface Contour (Feet above MSL)
* USGS Surface Water Elevation for Mountain Creek Lake (Site No.-08050050)

0 20 40 60 80 Feet

Figure 1A-3
Potentiometric Surface Map
SWMU 138
2016 RAER
Former NAS Dallas, Texas

NAVFAC Naval Facilities Engineering Command

| | |
|---|---|
| REQUESTED BY: E. Brickman | DATE: 10/14/2016 |
| DRAWN BY: M. Senne | PROJECT NUMBER: 0888812796 |

X:\Navy\NAS_Dallas\2016_Jul_NAS_Dallas_Iso_POT_SWMU138.mxd

Service Layer Credits: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community

# ISOCONCENTRATION CONTOUR MAPS

N

**PCE Concentration (mg/L)**

- ND - 0.005
- >0.005 - 0.05
- Gross PCLE Zone Outline
- Property Boundary 2014
- Groundwater Flow Direction

**Isoconcentration Contours**

- 0.005 mg/L

Demolished Building

Note: The PCL for PCE = 0.005 mg/L

0 20 40 60 80 Feet

Figure 1A-2A
Tetrachloroethene Isoconcentration Contours
SWMU 138
2016 RAER
Former NAS Dallas, Texas

NAVFAC Naval Facilities Engineering Command

| | |
|---|---|
| REQUESTED BY: W. Ward | DATE: 11/18/2016 |
| DRAWN BY: M. Senne | PROJECT NUMBER: 0888812796 |

X:\Navy\NAS_Dallas\project\2016_RAER\2016_NAS_Dallas_Iso_PCE_SWMU138.mxd

Service Layer Credits: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

N

**TCE (mg/L)**

- >0.005 - 0.05
- Gross PCLE Zone Outline
- Property Boundary 2014
- Groundwater Flow Direction

**Isoconcentration Contours**

- 0.005 mg/L

Demolished Building

Note: The PCL for TCE = 0.005 mg/L

0 20 40 60 80 Feet

Figure 1A-2B
Trichloroethene Isoconcentration Contours
SWMU 138
2016 RAER
Former NAS Dallas, Texas

NAVFAC Naval Facilities Engineering Command

| | |
|---|---|
| REQUESTED BY: W. Ward | DATE: 11/18/2016 |
| DRAWN BY: A. Zimmerman | PROJECT NUMBER: 0888812796 |

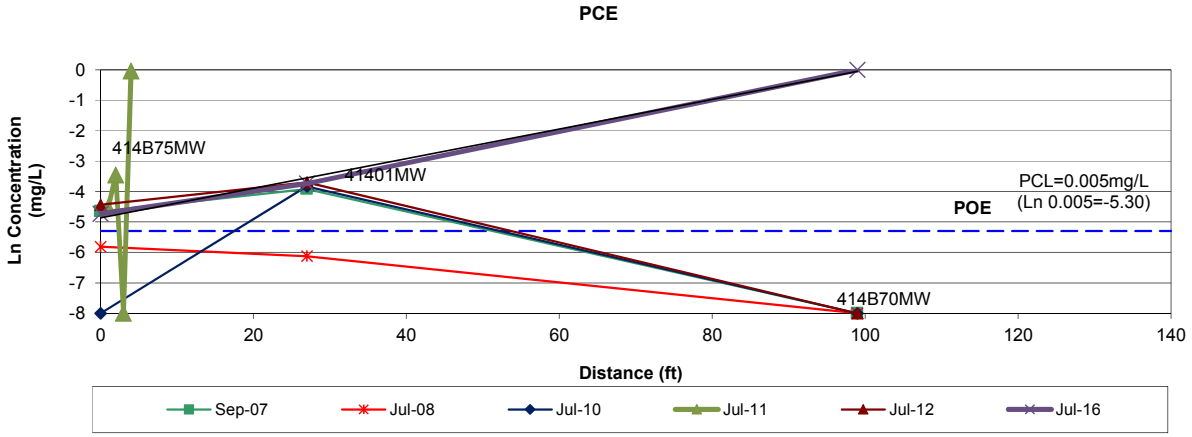
X:\Navy\NAS_Dallas\project\2016_RAER\2016_NAS_Dallas_Iso_TCE_SWMU138.mxd

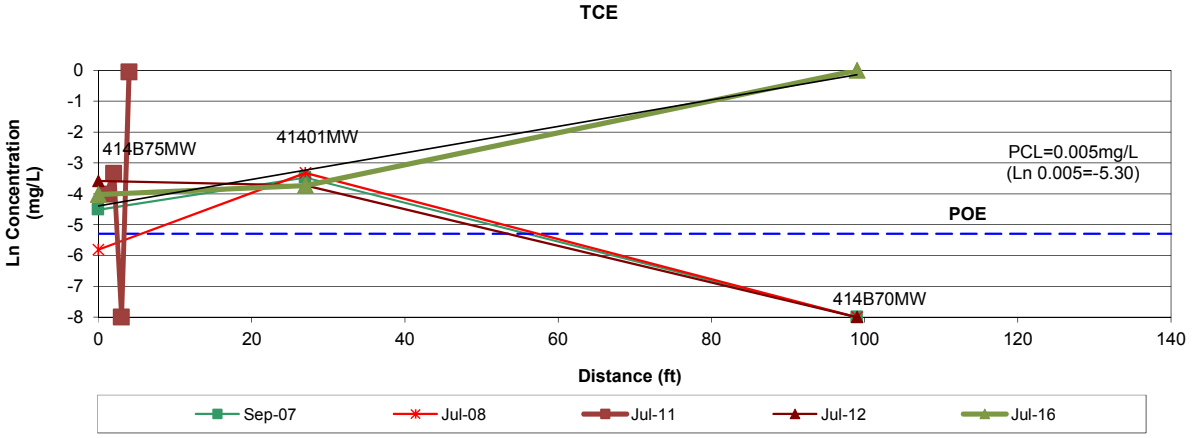
Service Layer Credits: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

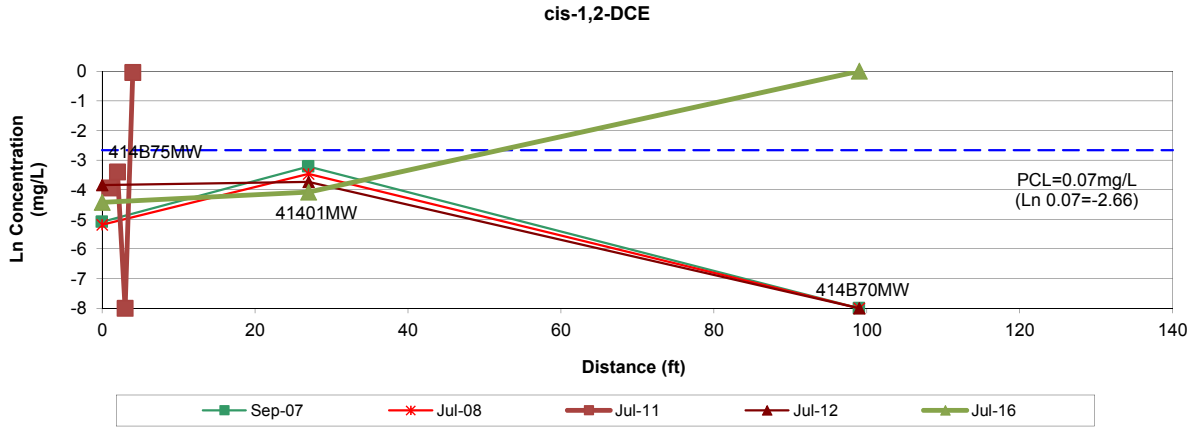
# ATTACHMENT 1B
# GRAPHS

# CONCENTRATION VS. DISTANCE GRAPHS
# SWMU 138 PLUME
# 2016

## FORMER NAS DALLAS, TEXAS



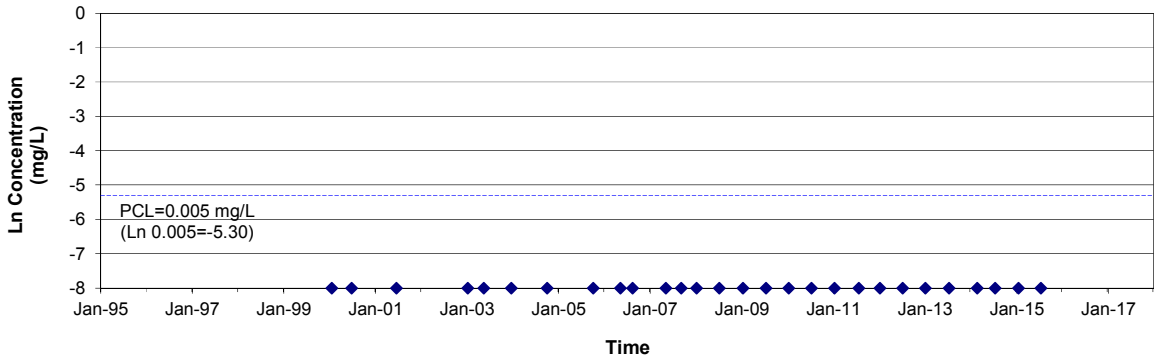




Notes: Graphed data points are taken from raw data.

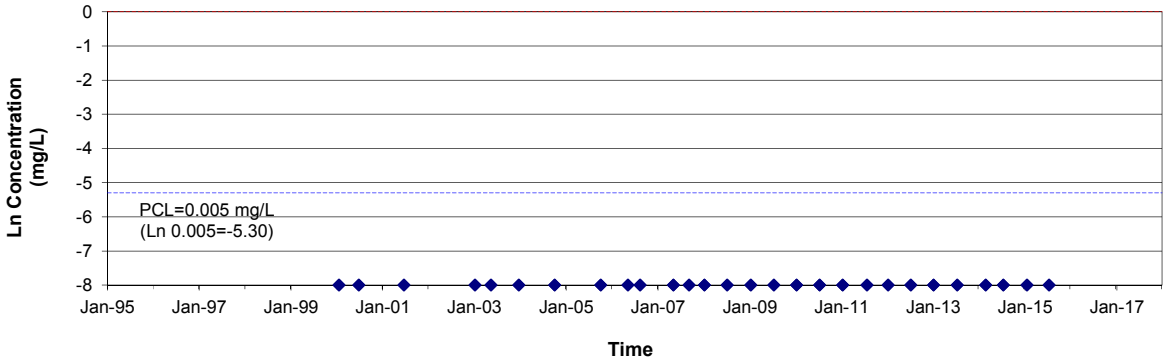
# CONCENTRATION VS. TIME GRAPHS
# SWMU 138 PLUME
# 414B70MW
# 2016

## FORMER NAS DALLAS, TEXAS

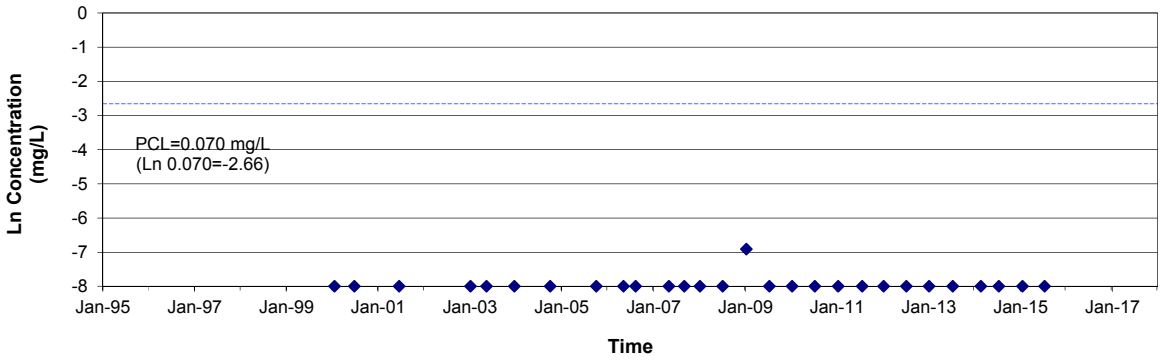
### PCE




### TCE




### cis-1,2-DCE



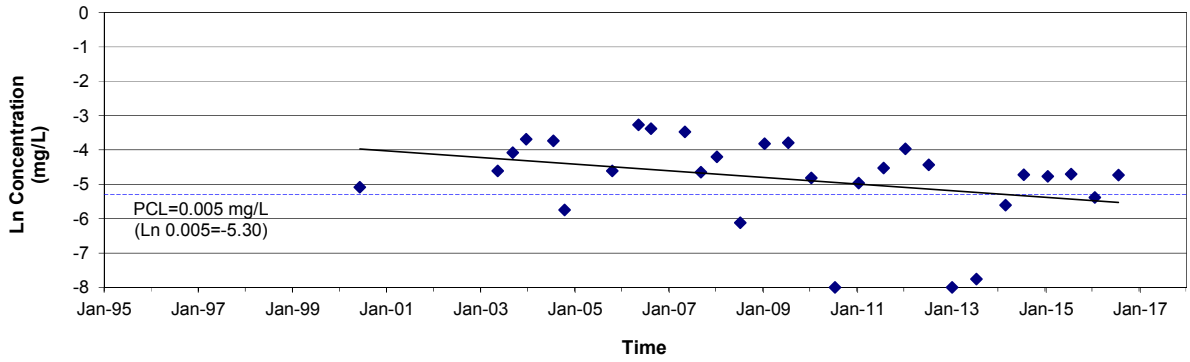

Notes:

Black line and slope are based on linear regression of the raw data.
Sample events using permeable diffusion bag (PDB) samplers are listed on Tables 4-1A and 4-1B in Appendix 4.

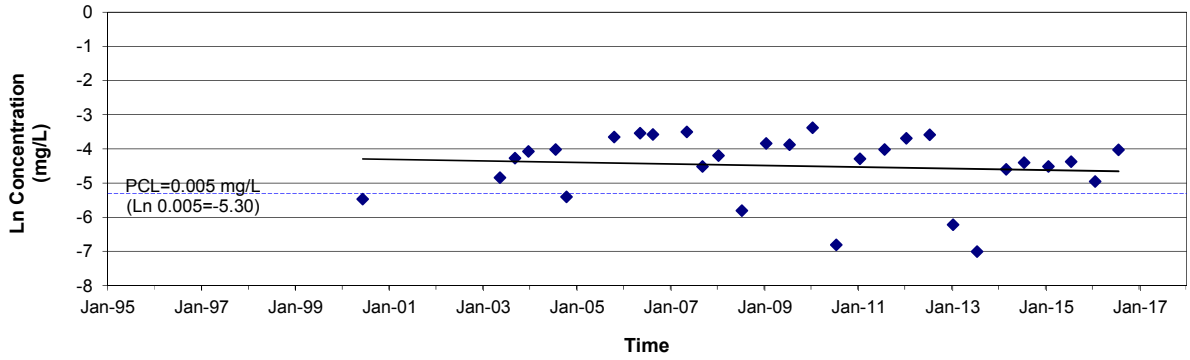
# CONCENTRATION VS. TIME GRAPHS
# SWMU 138 PLUME
# 414B75MW
# 2016

## FORMER NAS DALLAS, TEXAS

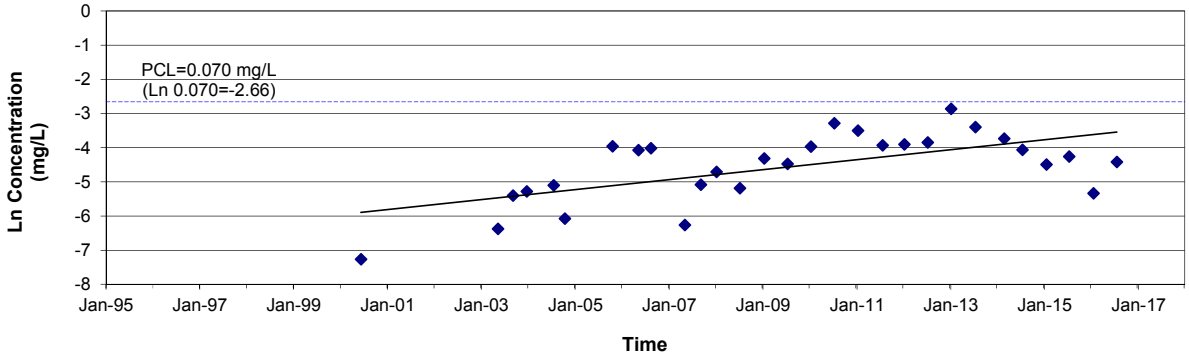
### PCE




### TCE




### cis-1,2-DCE



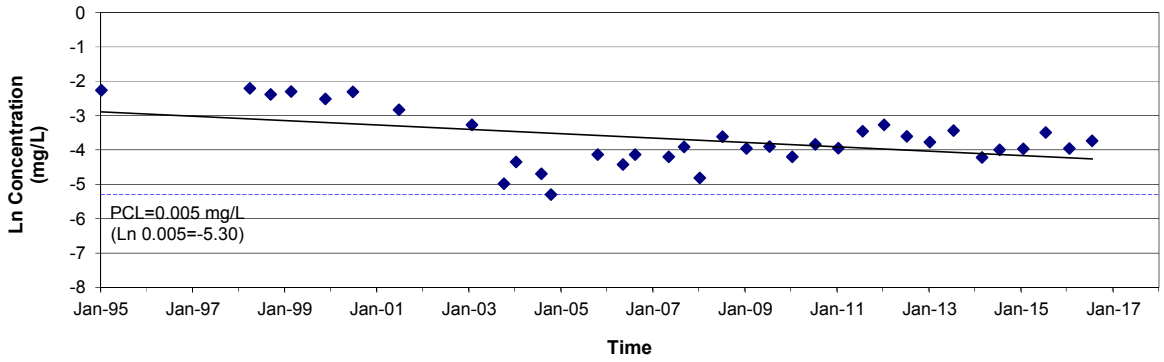

Notes:

Black line and slope are based on linear regression of the raw data.
Sample events using permeable diffusion bag (PDB) samplers are listed on Tables 4-1A and 4-1B in Appendix 4.

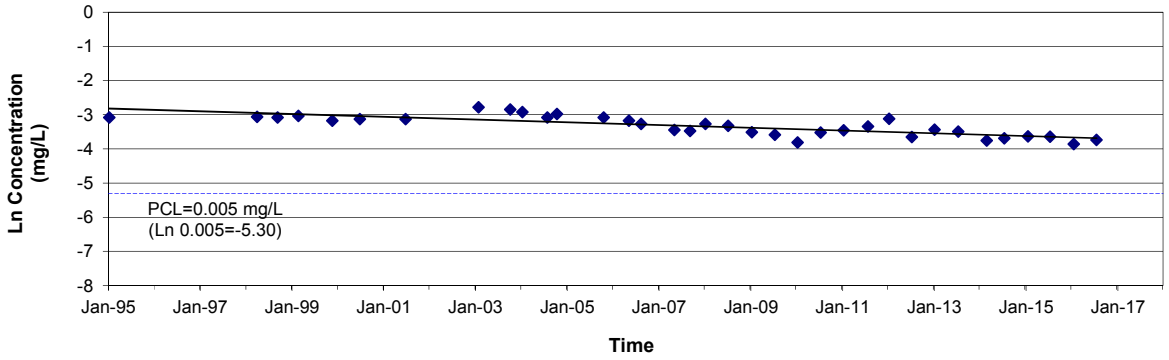
# CONCENTRATION VS. TIME GRAPHS
# SWMU 138 PLUME
# 41401MW
# 2016

## FORMER NAS DALLAS, TEXAS

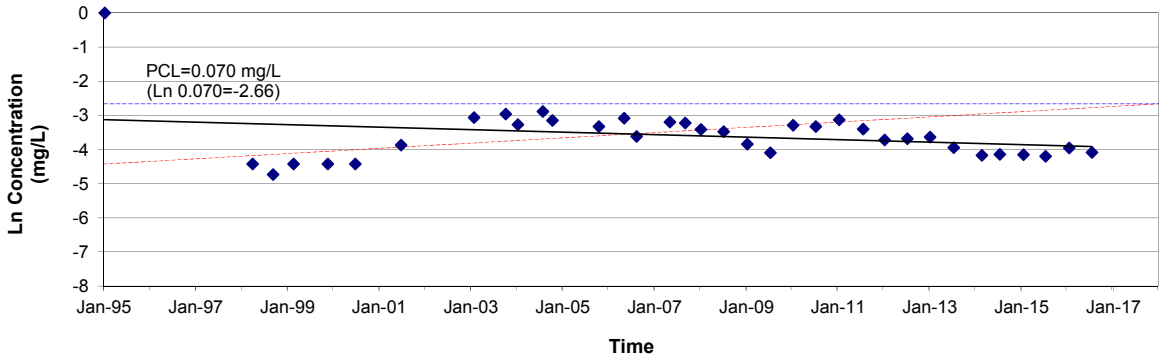
### PCE




### TCE




### cis-1,2-DCE




Notes:

Black line and slope are based on linear regression of the raw data.
Sample events using permeable diffusion bag (PDB) samplers are listed on Tables 4-1A and 4-1B in Appendix 4.

## Performance Measures

List and describe the performance measures for each environmental medium containing a PCLE zone that are being used to determine if reasonable progress is being made by the response action in a timely manner. Provide documentation that these performance measures are being met. Attach additional information if necessary.

**Post Response Action Monitoring Data Assessment**

**The approach to determine if MNA is consistently achieving the clean-up goals by 2017 involves sequential sampling events to monitor the size and shape of the PCLE zone over time. To this effect, a tiered sampling program incorporating performance, detection, and ambient monitoring was implemented. This sampling program allows collection of analytical data on the COCs, groundwater flow, and geochemical parameters that may affect the progress of MNA and the likelihood of meeting the site remediation goals. The design of the monitoring program allows a conclusion of success or failure to be drawn as early as possible during the response action implementation while providing reasonable confidence in the conclusion.**

**Performance monitoring encompasses the sampling of the monitoring wells 41401MW and 414B75MW. Data collected from these monitoring wells serves to check the plume shape and determine if it is shrinking or expanding, stable or migrating, thus triggering programmatic adjustments if necessary.**

**Groundwater samples collected for each semi-annual groundwater monitoring event were analyzed for the COCs identified in Worksheet 4.0 of the RAP (Tetra Tech 2004b) in accordance with Table III of the Compliance Plan No. 50276 for Former NAS Dallas (TCEQ 2004). The COC analytical results are summarized in Table 4-1.**

**Monitoring well 414B70MW had COC detections below applicable GWPSs for at least the previous five consecutive years and were abandoned on April 6, 2016, in accordance with the RAP submitted to TCEQ in October 2015. Well plug reports are located in Appendix 4, and historical COC analytical results for P&A'd wells are included in Table 4-1B.**

**Performance monitoring for 2016 also involved sampling for MNA parameters (ferrous iron, alkalinity, hydrogen sulfide, dissolved oxygen, carbon dioxide, nitrate, nitrite, orthophosphate, sulfate, sulfide, total organic carbon, chloride, ethene, ethane, and methane) during the July 2016 sampling event The MNA parameters measured by field tests and laboratory analyses are presented in Table 4-2. MNA parameter data serves as a secondary line of information to evaluate whether subsurface conditions continue to support natural attenuation.**

**The conceptual MNA site model for this plume is represented in the isoconcentration maps and potentiometric surface maps included in Attachment 1A, and the concentration vs. time and concentration vs. distance graphs in Attachment 1B.**

**Response Action Progress**

**Table 4-3 summarizes the groundwater gauging data. Potentiometric surface maps for the December 2015 and July 2016 sampling events, included in Figure 1A-3 (Attachment 1A), indicate that the shape of the groundwater elevation contours and direction of groundwater flow is inconsistent with previous sampling events. Groundwater elevation contours and flow direction depict a relatively flat gradient across the site and a seasonal discharge/recharge effect from the shoreline of Mountain Creek Lake, indicating that slight changes in groundwater elevations could cause significant changes in groundwater condition.**

**The COC isoconcentration contour maps, prepared using the data collected during the January and July 2016 sampling events, are included in Figures 1A-2A and 1A-2B (Attachment 1A). A review of the 2016 data indicate:**

- **PCE and TCE are the only COCs at SWMU 138 currently exceeding PCLs.**
- **PCE exceeded its PCL in the two monitor wells (41401MW and 414B75MW) at SWMU 138.**

- **PCE exceeded its PCL of 0.005 mg/L in monitoring well 41401MW (0.0191 and 0.0239 mg/L) during the January and July sampling events, and monitoring well 414B75MW (0.00884 mg/L) during the July sampling event.**

- **TCE exceeded its PCL in the two monitor wells (41401MW and 414B75MW) at SWMU 138.**

- **TCE exceeded its PCL of 0.005 mg/L in monitoring wells 41401MW (0.0212 and 0.0239 mg/L) and 414B75MW (0.00704 and 0.0179 mg/L) during the January and July sampling events.**

- **There is no expansion of the PCLE zone or offsite migration of COCs at concentrations greater than respective critical groundwater PCLs.**

**Tables 4-4 and 4-5 (Appendix 4) summarize the concentration vs. time and concentration vs. distance data for the plume centerline. The graphs in Attachment 1B graphically depict the data summarized in Tables 4-4 and 4-5. Based on the data presented:**

- **PCE and TCE concentrations continue to show a decreasing trend in site monitor wells.**

- **Cis-1,2-DCE concentrations at 414B75MW show a slightly increasing trend which may be an indication of reductive dechlorination of TCE. Concentrations for cis-1,2-DCE remain less than its critical PCL.**

**As discussed in the sections above, and based on primary lines of evidence, MNA does not appear to be an appropriate remedial method to reduce the COCs to below their critical PCLs before 2017). Monitoring wells 414B75MW and 41401MW show a lack of progress towards clean-up, with indications that MNA has slowed or ceased to the point that the remedial goals will not be achieved at these locations of the plume.**

**As previously stated, failure of the response action triggers implementation of contingency measures, which may include the selection of an appropriate alternate remedial measure. The Navy has proposed to implement EMNA as an alternate remedy at the affected area of SWMU 18 groundwater plume in an effort to reduce COCs to below PCLs. This will allow the Navy to make a determination as to whether the technology is viable. Depending upon the results of the EMNA spot treatment at SWMU 18, alternative remedial measures may be proposed in a comprehensive RAP for SWMU 138 Plume, to follow. MNA will be continued for the upcoming year in accordance with the procedures and protocols described in the Groundwater RAP (Revision 2), dated February 2006.**

## Problems

Complete the table for the response action. When the response action consists of several components or multiple actions, complete one table for each major component or action.

Response Action Name/Designation: *Groundwater Response Action*

List the problems that have been encountered during the response action, describe the impact of each problem, and the response to the problem.

| Description of the Problem | Impact | Did this cause a response action failure? Yes | No | Corrective Response |
|---|---|---|---|---|
| The current remedy, soil removal followed by MNA, does not appear to be capable of reducing concentrations of the COCs, PCE, and TCE at monitoring wells 414B75MW and 41401MW by the cleanup goal of 2017. | In accordance with the Groundwater RAP on record, failure of the approved response action to meet critical PCLs triggers the implementation of contingency measures, which includes the selection of an appropriate alternate remedial measure. | X | | An Alternatives Evaluation Report (AER) was submitted to TCEQ. The Navy has proposed to implement EMNA as an alternate remedy at the affected area of SWMU 18 groundwater plume in an effort to reduce COCs to below PCLs. Depending on the results of the EMNA spot treatment at SWMU 18, alternative remedial measures may be proposed in a comprehensive RAP for SWMU 138 Plume. MNA will be continued at the SWMU 138 Plume for the upcoming year. |

Response Action Name/Designation: Well maintenance

List all portions of the response action to which this information applies. Repeat this worksheet for each major component or operation.

Describe the O&M and inspection activities that have been conducted to operate and maintain response action components.

**Monitoring well 414B70MW had COC detections below applicable GWPSs for at least the previous five consecutive years and were abandoned on April 6, 2016, in accordance with the RAP submitted to TCEQ in October 2015. Well plugging reports are located in Appendix 4, and historical COC analytical results for P&A'd wells are included in Table 4-1B.**

**In September 2016, Resolution Consultants conducted a detailed evaluation of well maintenance needs for NAS Dallas SWMUs. The surface completion at monitoring wells 41401MW and 414B75MW could not be re-fitted by tapping the rim eyelets so additional well maintenance actions were completed October 12-13, 2016, that included coring and removal of existing flush mount well completions, and re-installation of flush-mount well skirts, rims, and lids.**

# APPENDIX 1
# REFERENCE LIST

# APPENDIX 1
# REFERENCES

A.T. Kearney, Inc. *RCRA Facility Assessment Preliminary Review/Visual Site Inspection. Chicago, Illinois.* 1989.

CH2M Hill. *85 Sites, Defense Reutilization and Marketing Office, and Naval Weapons Industrial Reserve Plant SWMU 18 Response Action Completion Report, Revision 2, Naval Air Station Dallas, Dallas, Texas*. Atlanta, Georgia. 2008.

EnSafe/Allen & Hoshall. *Naval Air Station Dallas Environmental Baseline Survey, Dallas, Texas*. Memphis, Tennessee. 1994.

— *Interim RCRA Facility Investigation, Naval Weapons Industrial Reserve Plant Dallas, Memphis, Tennessee*. 1997.

Texas Commission of Environmental Quality. *Compliance Plan for Industrial Solid Waste Management Site. Compliance Plan No. 50276, EPA ID. No. TX8170022786, ISWR No. 65033. Austin, Texas*. 2004.

— *Approval of RACR for Defense Reutilization and Marketing Office and 85 Sites (Revision 2) and* Response Action Effectiveness Reports *for Naval Weapons Industrial Reserve Plant SWMU 18 (Revision 2), Former Naval Air Station Dallas, Texas*. Austin, Texas. 2008.

Tetra Tech NUS, Inc. *RCRA Facility Investigation Report for Category C. Pittsburgh, Pennsylvania*. 2000a.

— *RCRA Facility Investigation Report for Category E. Pittsburgh, Pennsylvania.* 2000b.

— *RCRA Facility Investigation Report for Category F. Pittsburgh, Pennsylvania.* 2000c.

— *RCRA Facility Investigation Report for Category D. Pittsburgh, Pennsylvania.* 2001a.

— *RCRA Facility Investigation Report for Category B. Pittsburgh, Pennsylvania.* 2001b.

— *Affected Property Assessment Report. Houston, Texas*. 2002.

— *Final Monitored Natural Attenuation Groundwater Modeling Report for Category B. Pittsburgh, Pennsylvania*. 2004a.

— *Response Action Plan. Pittsburgh, Pennsylvania.* 2004b.

Resolution Consultants. *Draft Final Alternatives Evaluation Report, Former Naval Air Station, Dallas, Texas*. Norfolk, Virginia. August 2013.

— *Draft Vapor Intrusion Study Report, Buildings 1405, 1422, and 1424, Solid Waste Management Unit 21. Norfolk, Virginia. September 2015.*

— *Interim Revised Groundwater Response Action Plan for SWMU 138 Plume (Revision 1). Norfolk, Virginia. October 2015.*

# APPENDIX 4
# DATA TABLES

**Table 4-1 Summary of Chemicals of Concern Detected in Groundwater**
**Table 4-2 Summary of Geochemical Parameters Measured in Groundwater**
**Table 4-3 Summary of Groundwater Gauging Data**
**Table 4-4 Summary of Concentration vs. Time Attenuation Action Levels**
**Table 4-5 Summary of Concentration vs. Distance Attenuation Rate Constants**

# TABLE 4-1
# SUMMARY OF CHEMICALS OF CONCERN DETECTED IN GROUNDWATER

**Table 4-1A**

**Summary of Chemicals of Concern Detected in Groundwater**
**SWMU 138 Plume**
**2016 RAER**
**Former NAS Dallas, Texas**
**Page 1 of 2**

| Monitoring Well | Sampling Date | Sampling Round | Chemicals of Concern (mg/L) | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | 1,1-Dichloroethene | cis-1,2-Dichloroethene | Tetrachloroethene | trans-1,2-Dichloroethene | Trichloroethene | Vinyl Chloride |
| **Protective Concentration Levels (mg/L)** | | | **0.00700** | **0.07000** | **0.00500** | **0.10000** | **0.00500** | **0.00200** |
| **Monitoring Wells Located Inside PCLE Zone** | | | | | | | | |
| **41401MW** | 1/7/1995 | Round 1 | 0.00500 U | NA | 0.10400 | NA | 0.04600 | 0.01000 U |
| | 3/30/1998 | Round 2 | 0.00500 U | 0.01200 | 0.11000 | 0.00240 J | 0.04700 | 0.00500 U |
| | 9/10/1998 | Round 3 | 0.01700 U | 0.00880 J | 0.09200 | 0.00190 J | 0.04600 | 0.01700 U |
| | 2/21/1999 | Round 4 | 0.00500 U | 0.01200 | 0.10000 | 0.00270 J | 0.04800 | 0.00500 U |
| | 11/19/1999 | Round 5 | 0.00500 U | 0.01200 | 0.08100 | 0.00260 J | 0.04200 | 0.00500 U |
| | 6/8/2000 | CCI | 0.00050 U | 0.01100 | 0.09900 | 0.00300 | 0.04400 | 0.00050 U |
| | 6/26/2000 | Round 6 | 0.00500 U | 0.01200 | 0.08400 | 0.00270 J | 0.04200 | 0.00500 U |
| | 8/24/2000 | CCI | 0.00050 U | 0.01100 | 0.09100 | 0.00290 | 0.04500 | 0.00050 U |
| | 10/20/2000 | CCI | 0.00050 U | 0.01300 | 0.11000 | 0.00300 | 0.04600 | 0.00050 U |
| | 6/25/2001 | Round 7 | 0.00500 U | 0.02100 | 0.05900 | 0.00290 | 0.04400 | 0.01000 U |
| | 1/27/2003 | Round 8 | 0.00250 U | 0.04700 | 0.03800 | 0.00490 | 0.06200 | 0.00250 U |
| | 5/14/2003 | Round 9 | 0.00200 U | 0.05600 | 0.01300 | 0.00410 | 0.06000 | 0.00200 U |
| | 10/6/2003 | Round 9 (PDB) | 0.00044 U | 0.05200 | 0.00690 | 0.00500 | 0.05800 | 0.00052 U |
| | 1/12/2004 | Round 10 | 0.00041 U | 0.03800 | 0.01300 | 0.00380 | 0.05400 | 0.00033 U |
| | 7/29/2004 | Round 11 | 0.00070 U | 0.05600 | 0.00920 | 0.00430 | 0.04200 | 0.00034 U |
| | 7/29/2004 | Round 11 (PDB) | 0.00140 U | 0.05000 | 0.00350 J | 0.00430 | 0.04600 | 0.00067 U |
| | 10/13/2004 | Round 12 | 0.00070 U | 0.02600 | 0.00500 | 0.00370 | 0.04300 | 0.00034 U |
| | 10/13/2004 | Round 12 (PDB) | 0.00070 U | 0.04300 | 0.00480 | 0.00400 | 0.05100 | 0.00034 U |
| | 10/4/2005 | Round 14 | 0.00040 U | 0.03600 | 0.01600 | 0.00500 | 0.04600 | 0.00030 U |
| | 5/8/2006 | Round 15 | NA | 0.04600 | 0.01200 | 0.00400 | 0.04200 | 0.00060 U |
| | 8/14/2006 | Round 16 | NA | 0.02700 | 0.01600 | 0.00300 | 0.03800 | 0.00060 U |
| | 5/10/2007 | Round 17 | NA | 0.04100 | 0.01500 | 0.00450 | 0.03200 | NS |
| | 9/13/2007 | Round 18 | 0.00019 J | 0.04000 | 0.02000 | 0.00380 | 0.03100 | 0.00025 J |
| | 1/18/2008 | Round 19 | NA | 0.03300 | 0.01600 | 0.00370 | 0.03800 | 0.00043 U |
| | 7/21/2008 | Round 20 | 0.00054 U | 0.03110 | 0.02690 | 0.00390 | 0.03610 | 0.00030 U |
| | 1/13/2009 | Round 21 | 0.00054 U | 0.02150 | 0.01920 | 0.00240 | 0.02990 | 0.00030 U |
| | 7/15/2009 | Round 22 | 0.00054 U | 0.01670 | 0.02030 | 0.00210 | 0.02780 | 0.00030 U |
| | 1/12/2010 | Round 23 | 0.00054 U | 0.03750 | 0.01500 | 0.00380 | 0.02220 | 0.00030 U |
| | 7/13/2010 | Round 24 | 0.00029 U | 0.03590 | 0.02170 | 0.00390 | 0.02960 | 0.00028 U |
| | 1/13/2011 | Round 25 | 0.00023 U | 0.04380 | 0.01930 | 0.00470 | 0.03150 | 0.00022 U |
| | 7/25/2011 | Round 26 | 0.00023 U | 0.03350 | 0.03160 JL | 0.00410 | 0.03540 | 0.00022 U |
| | 1/10/2012 | Round 27 | 0.00029 J | 0.02150 | 0.03300 | 0.00220 | 0.03860 | 0.00022 U |
| | 7/9/2012 | Round 28 | NS | 0.02380 | 0.02480 | 0.00280 | 0.02410 | NS |
| | 1/7/2013 | Round 29 | 0.00020 J | 0.0265 | 0.0231 | 0.0029 | 0.0321 JH | 0.00044 U |
| | 7/15/2013 | Round 30 | 0.00020 U | 0.0194 | 0.0321 | 0.0024 | 0.0305 | 0.00044 U |
| | 1/28/2014 | Round 31 | 0.00025 U | 0.01550 | 0.0147 | 0.0011 | 0.0233 | 0.00033 U |
| | 7/16/2014 | Round 32 | 0.00025 U | 0.0159 | 0.01840 | 0.00198 | 0.0251 | 0.00025 U |
| | 1/20/2015 | Round 33 | 0.00025 U | 0.0151 | 0.0189 | 0.00155 | 0.0264 | 0.00025 U |
| | 7/21/2015 | Round 34 | 0.00025 U | 0.0151 | 0.0306 | 0.00193 | 0.0263 | 0.00025 U |
| | 1/20/2016 | Round 35 | 0.00025 U | 0.0192 | 0.0191 | 0.00206 | 0.0212 | 0.00025 U |
| | 7/19/2016 | Round 36 | 0.00025 U | 0.0168 | 0.0239 | 0.00202 | 0.0239 | 0.00025 U |

**Table 4-1A**

**Summary of Chemicals of Concern Detected in Groundwater**
**SWMU 138 Plume**
**2016 RAER**
**Former NAS Dallas, Texas**
**Page 2 of 2**

| Monitoring Well | Sampling Date | Sampling Round | Chemicals of Concern (mg/L) | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | 1,1-Dichloroethene | cis-1,2-Dichloroethene | Tetrachloroethene | trans-1,2-Dichloroethene | Trichloroethene | Vinyl Chloride |
| **Protective Concentration Levels (mg/L)** | | | **0.00700** | **0.07000** | **0.00500** | **0.10000** | **0.00500** | **0.00200** |
| **414B75MW** | 12/20/1999 | Well Installed | | | | | | |
| | 6/8/2000 | CCI | 0.00050 U | 0.00070 | 0.00620 | 0.00050 U | 0.00420 | 0.00050 U |
| | 8/24/2000 | CCI | 0.00050 U | 0.00050 U | 0.00090 | 0.00050 U | 0.00090 | 0.00050 U |
| | 10/20/2000 | CCI | 0.00050 U | 0.00060 | 0.00170 | 0.00050 U | 0.00160 | 0.00050 U |
| | 5/13/2003 | Round 8 | 0.00100 U | 0.00170 | 0.01000 | 0.00050 U | 0.00790 | 0.00100 U |
| | 9/6/2003 | Round 9 | 0.00022 U | 0.00450 J | 0.01700 J | 0.00045 J | 0.01400 J | 0.00026 U |
| | 12/21/2003 | Round 10 | 0.00021 U | 0.00510 | 0.02500 | 0.00048 J | 0.01700 | 0.00017 U |
| | 7/19/2004 | Round 11 | 0.00035 UJ | 0.00610 J | 0.02400 J | 0.00079 J | 0.01800 J | 0.00017 UJ |
| | 10/2/2004 | Round 12 | 0.00035 U | 0.00230 | 0.00320 | 0.00023 U | 0.00450 | 0.00017 U |
| | 10/9/2005 | Round 14 | 0.00040 U | 0.01900 | 0.01000 | 0.00200 | 0.02600 | 0.00030 U |
| | 5/9/2006 | Round 15 | NA | 0.01700 | 0.03800 | 0.00200 | 0.02900 | 0.00060 U |
| | 8/15/2006 | Round 16 | NA | 0.01800 | 0.03400 | 0.00200 | 0.02800 | 0.00060 U |
| | 5/15/2007 | Round 17 | NA | 0.00190 | 0.03100 | 0.00230 | 0.03000 | NS |
| | 9/13/2007 | Round 18 | 0.00013 U | 0.00620 | 0.00960 | 0.00031 J | 0.01100 | 0.00200 U |
| | 1/18/2008 | Round 19 | NA | 0.00900 | 0.00810 | 0.00048 U | 0.01500 | 0.00043 U |
| | 7/21/2008 | Round 20 | 0.00054 U | 0.00560 | 0.00220 | 0.00050 J | 0.00300 | 0.00030 U |
| | 1/13/2009 | Round 21 | 0.00054 U | 0.01340 | 0.02200 | 0.00087 J | 0.02160 | 0.00030 U |
| | 7/15/2009 | Round 22 | 0.00054 U | 0.01140 | 0.02270 | 0.00045 U | 0.02070 | 0.00030 U |
| | 1/12/2010 | Round 23 | 0.00054 U | 0.01890 | 0.00810 | 0.00260 | 0.03390 | 0.00030 U |
| | 7/13/2010 | Round 24 | 0.00029 U | 0.03730 | 0.00044 U | 0.00890 | 0.00110 | 0.00028 U |
| | 1/13/2011 | Round 25 | 0.00023 U | 0.03000 | 0.00700 | 0.004 | 0.01370 | 0.00022 U |
| | 7/25/2011 | Round 26 | 0.00023 U | 0.01950 | 0.01080 | 0.0022 | 0.01800 | 0.00022 U |
| | 1/10/2012 | Round 27 | 0.00025 U | 0.02020 | 0.01890 | 0.00160 | 0.02490 | 0.00022 U |
| | 7/9/2012 | Round 28 | NS | 0.02130 | 0.01190 | 0.00200 | 0.02780 | NS |
| | 1/7/2013 | Round 29 | 0.00020 U | 0.0568 | 0.00032 U | 0.0089 | 0.0020 | 0.00044 U |
| | 7/15/2013 | Round 30 | 0.00020 U | 0.03350 | 0.00043 J | 0.0061 | 0.00091 J | 0.00044 U |
| | 1/28/2014 | Round 31 | 0.00025 U | 0.02380 | 0.00370 | 0.00190 | 0.01010 | 0.00033 U |
| | 7/16/2014 | Round 32 | 0.00025 U | 0.0172 | 0.00895 | 0.00138 | 0.01230 | 0.00025 U |
| | 1/20/2015 | Round 33 | 0.000500 U | 0.01120 | 0.00853 | 0.00050 U | 0.01100 | 0.00025 U |
| | 7/21/2015 | Round 34 | 0.000500 U | 0.0141 | 0.00905 | 0.00103 | 0.0126 | 0.00025 U |
| | 1/20/2016 | Round 35 | 0.0005 U | 0.00482 | 0.00459 | 0.0005 U | 0.00704 | 0.0005 U |
| | 7/19/2016 | Round 36 | 0.00025 U | 0.012 | 0.00884 | 0.00048 J | 0.0179 | 0.00025 U |

Note:
Shaded areas indicate an exceedance.
AAL - Alternate Action Level
CCI - Navy's Remedial Action Contractor (RAC) collected groundwater samples
mg/L - milligrams per liter
NA - Not Applicable
NS - Not Sampled
NS-D - Not Sampled during this Round due to insufficient water in the monitoring well
PCLE - Protective Concentration Level Exceedance
PDB - Passive Diffusion Bag
SDG - Sample Delivery Group

Analytical Result Qualifiers:
J - Indicates that the chemical was detected. However, the associated numerical result may not be a precise representation of the amount that is actually present in the sample. The laboratory reported concentration is considered to be an estimate of the true concentration.
J - Analyte flagged as an estimated value after data validation
U - Indicates that the chemical was not detected at the numerical detection limit (sample-specific quantitation limit) noted. Nondetected results from the laboratory are reported in this manner. This qualifier is added to a positive result (reported by the laboratory) if the detected concentration is determined to be attributable to contamination introduced during field sampling or laboratory analysis.
UJ - Indicates that the chemical was not detected. However, the detection limit (sample-specific quantitation limit) is considered to be estimated based on problems encountered during laboratory analysis. The associated numerical detection limit is regarded as inaccurate or imprecise.
UR - Indicates that the chemical may or may not be present. The nondetected analytical result reported by the laboratory is considered to be unreliable and unusable. This qualifier is applied in cases of gross technical deficiencies (i.e., holding times missed by a factor of two the specified time limit, severe calibration noncompliances, and extremely low quality control recoveries.

**Table 4-1B**

**Summary of Chemicals of Concern Detected in Groundwater**
**Historical Monitoring Wells — SWMU 138 Plume**
**2015 RAER**
**Former NAS Dallas, Texas**


| Monitoring Well | Sampling Date | Sampling Round | Chemicals of Concern (mg/L) | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | 1,1-Dichloroethene | cis-1,2-Dichloroethene | Tetrachloroethene | trans-1,2-Dichloroethene | Trichloroethene | Vinyl Chloride |
| **Protective Concentration Levels (mg/L)** | | | **0.00700** | **0.07000** | **0.00500** | **0.10000** | **0.00500** | **0.00200** |
| **Monitoring Wells Located Inside PCLE Zone** | | | | | | | | |
| **414B76MW** | 12/20/1999 | Well Installed | | | | | | |
| | 6/8/2000 | CCI | 0.00050 U | 0.00070 | 0.00160 | 0.00050 U | 0.00280 | 0.00050 U |
| | 5/14/2003 | Round 8 | 0.00100 U | 0.00160 | 0.00870 | 0.00050 U | 0.01500 | 0.00100 U |
| | 9/7/2003 | Round 9 | 0.00022 U | 0.00053 J | 0.00210 J | 0.00024 U | 0.00360 J | 0.00026 U |
| | 12/21/2003 | Round 10 | 0.00021 U | 0.00120 | 0.00780 | 0.00019 U | 0.00790 | 0.00017 U |
| | 7/19/2004 | Round 11 | 0.00035 U | 0.00053 J | 0.00230 | 0.00023 U | 0.00370 | 0.00017 U |
| | 10/2/2004 | Round 12 | 0.00035 U | 0.00096 J | 0.00590 | 0.00023 U | 0.00960 | 0.00017 U |
| | 4/18/2005 | Well Abandoned | | | | | | |
| **414B77MW** | 12/20/1999 | Well Installed | | | | | | |
| | 6/8/2000 | CCI | 0.00050 U | 0.00050 U | 0.00050 U | 0.00050 U | 0.00050 U | 0.00050 U |
| | 8/24/2000 | CCI | 0.00050 U | 0.00050 U | 0.00050 U | 0.00050 U | 0.00050 U | 0.00050 U |
| | 10/20/2000 | CCI | 0.00050 U | 0.00050 U | 0.00200 | 0.00050 U | 0.00130 | 0.00050 U |
| | 5/15/2003 | Round 8 | 0.00100 U | 0.00077 | 0.00250 | 0.00050 U | 0.00250 | 0.00100 U |
| | 9/7/2003 | Round 9 | 0.00022 U | 0.00740 J | 0.03400 J | 0.00130 J | 0.03100 J | 0.00026 U |
| | 1/13/2004 | Round 10 | 0.00021 U | 0.00520 | 0.01600 | 0.00110 | 0.01700 | 0.00017 U |
| | 7/19/2004 | Round 11 | 0.00035 U | 0.00490 | 0.03900 | 0.00140 | 0.03100 | 0.00017 U |
| | 10/1/2004 | Round 12 | 0.00035 U | 0.00340 | 0.00950 | 0.00035 J | 0.01000 | 0.00017 U |
| | 4/18/2005 | Well Abandoned | | | | | | |
| **414B78MW** | 12/20/1999 | Well Installed | | | | | | |
| | 6/30/2000 | CCI | 0.00050 U | 0.00500 | 0.04000 | 0.00100 | 0.02100 | 0.00050 U |
| | 8/24/2000 | CCI | 0.00050 U | 0.00120 | 0.00350 | 0.00050 U | 0.00270 | 0.00050 U |
| | 10/20/2000 | CCI | 0.00050 U | 0.00150 | 0.00150 | 0.00050 U | 0.00150 | 0.00050 U |
| | 5/14/2003 | Round 8 | 0.00100 U | 0.02800 | 0.00410 | 0.00073 | 0.01100 | 0.00100 U |
| | 9/5/2003 | Round 9 | 0.00055 U | 0.08200 | 0.00920 | 0.00410 | 0.02000 | 0.00065 U |
| | 1/12/2004 | Round 10 | 0.00021 U | 0.06200 | 0.00750 | 0.00290 | 0.01700 | 0.00042 U |
| | 7/18/2004 | Round 11 | 0.00070 U | 0.08100 | 0.00550 | 0.00340 | 0.01300 | 0.00034 U |
| | 9/30/2004 | Round 12 | 0.00140 U | 0.06400 | 0.00570 | 0.00250 J | 0.01300 | 0.00067 U |
| | 4/18/2005 | Well Abandoned | | | | | | |

**Table 4-1B**

**Summary of Chemicals of Concern Detected in Groundwater**
**Historical Monitoring Wells — SWMU 138 Plume**
**2015 RAER**
**Former NAS Dallas, Texas**
**Page 2 of 5**

| Monitoring Well | Sampling Date | Sampling Round | Chemicals of Concern (mg/L) | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | 1,1-Dichloroethene | cis-1,2-Dichloroethene | Tetrachloroethene | trans-1,2-Dichloroethene | Trichloroethene | Vinyl Chloride |
| **Protective Concentration Levels (mg/L)** | | | **0.00700** | **0.07000** | **0.00500** | **0.10000** | **0.00500** | **0.00200** |
| **Monitoring Wells Located Outside PCLE Zone** | | | | | | | | |
| **414B04MW** | 3/18/1998 | Well Installed | | | | | | |
| | 4/27/1998 | Round 2 | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U |
| | 8/24/1998 | Round 3 | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U |
| | 11/16/1999 | Round 5 | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U |
| | 6/26/2000 | Round 6 | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U |
| | 6/19/2001 | Round 7 | 0.00500 U | 0.00250 U | 0.00500 U | 0.00250 U | 0.00500 U | 0.01000 U |
| | 1/8/2003 | Round 8 | 0.00100 U | 0.00100 U | 0.00100 U | 0.00100 U | 0.00100 U | 0.00100 U |
| | 12/19/2003 | Round 10 | 0.00021 U | 0.00016 U | 0.00024 U | 0.00019 U | 0.00010 U | 0.00017 U |
| | 4/18/2005 | Well Abandoned | | | | | | |
| **414B05MW** | 3/19/1998 | Well Installed | | | | | | |
| | 4/27/1998 | Round 2 | 0.00500 U | 0.00500 U | 0.00150 J | 0.00500 U | 0.00120 J | 0.00500 U |
| | 8/24/1998 | Round 3 | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U |
| | 3/5/1999 | Round 4 | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U |
| | 12/20/1999 | Round 5 | 0.00500 U | 0.00500 U | 0.00081 J | 0.00500 U | 0.00089 J | 0.00500 U |
| | 6/26/2000 | Round 6 | 0.00500 U | 0.00500 U | 0.00110 J | 0.00500 U | 0.00140 J | 0.00500 U |
| | 6/19/2001 | Round 7 | 0.00500 U | 0.00250 U | 0.00140 J | 0.00250 U | 0.00130 J | 0.01000 U |
| | 1/8/2003 | Round 8 | 0.00100 U | 0.00100 U | 0.00100 | 0.00100 U | 0.00130 | 0.00100 U |
| | 4/18/2005 | Well Abandoned | | | | | | |

**Table 4-1B**

**Summary of Chemicals of Concern Detected in Groundwater**
**Historical Monitoring Wells — SWMU 138 Plume**
**2015 RAER**
**Former NAS Dallas, Texas**


| Monitoring Well | Sampling Date | Sampling Round | Chemicals of Concern (mg/L) | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | 1,1-Dichloroethene | cis-1,2-Dichloroethene | Tetrachloroethene | trans-1,2-Dichloroethene | Trichloroethene | Vinyl Chloride |
| **Protective Concentration Levels (mg/L)** | | | **0.00700** | **0.07000** | **0.00500** | **0.10000** | **0.00500** | **0.00200** |
| **414B70MW** | 12/20/1999 | Well Installed | | | | | | |
| | 1/20/2000 | Round 5 | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U |
| | 6/26/2000 | Round 6 | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U |
| | 6/19/2001 | Round 7 | 0.00500 U | 0.00250 U | 0.00500 U | 0.00250 U | 0.00500 U | 0.01000 U |
| | 1/8/2003 | Round 8 | 0.00100 U | 0.00100 U | 0.00100 U | 0.00100 U | 0.00100 U | 0.00100 U |
| | 5/15/2003 | Round 9 | 0.00100 U | 0.00050 U | 0.00100 U | 0.00050 U | 0.00100 U | 0.00100 U |
| | 12/22/2003 | Round 10 | 0.00021 U | 0.00016 U | 0.00024 U | 0.00019 U | 0.00010 U | 0.00017 U |
| | 10/2/2004 | Round 12 | 0.00035 U | 0.00027 U | 0.00021 U | 0.00023 U | 0.00022 U | 0.00017 U |
| | 10/4/2005 | Round 14 | 0.00040 U | 0.00030 U | 0.00040 U | 0.00030 U | 0.00030 U | 0.00030 U |
| | 5/9/2006 | Round 15 | NA | 0.00050 U | 0.00060 U | 0.00060 U | 0.00040 U | 0.00060 U |
| | 8/14/2006 | Round 16 | NA | 0.00050 U | 0.00060 U | 0.00060 U | 0.00040 U | 0.00060 U |
| | 5/10/2007 | Round 17 | NA | 0.00045 U | 0.00014 U | 0.00053 U | 0.00014 U | NS |
| | 9/13/2007 | Round 18 | 0.00013 U | 0.00014 U | 0.00010 U | 0.00015 U | 0.00023 U | 0.00020 U |
| | 1/18/2008 | Round 19 | NA | 0.00032 U | 0.00046 U | 0.00048 U | 0.00053 U | 0.00043 U |
| | 7/21/2008 | Round 20 | 0.00054 U | 0.00020 U | 0.00022 U | 0.00045 U | 0.00032 U | 0.00030 U |
| | 1/13/2009 | Round 21 | 0.00054 U | 0.00100 | 0.00022 U | 0.00045 U | 0.00032 U | 0.00030 U |
| | 7/15/2009 | Round 22 | 0.00054 U | 0.00020 U | 0.00022 U | 0.00045 U | 0.00032 U | 0.00030 U |
| | 1/12/2010 | Round 23 | 0.00054 U | 0.00020 U | 0.00022 U | 0.00045 U | 0.00032 U | 0.00030 U |
| | 7/13/2010 | Round 24 | 0.00029 U | 0.00032 U | 0.00044 U | 0.00034 U | 0.00024 U | 0.00028 U |
| | 1/13/2011 | Round 25 | 0.00023 U | 0.00026 U | 0.00025 U | 0.00035 U | 0.00026 U | 0.00022 U |
| | 7/25/2011 | Round 26 | 0.00023 U | 0.00026 U | 0.00025 U | 0.00035 U | 0.00026 U | 0.00022 U |
| | 1/10/2012 | Round 27 | 0.00023 U | 0.00026 U | 0.00025 U | 0.00035 U | 0.00026 U | 0.00022 U |
| | 7/9/2012 | Round 28 | NS | 0.00026 U | 0.00025 U | 0.00035 U | 0.00026 U | NS |
| | 1/7/2013 | Round 29 | 0.00020 U | 0.00024 U | 0.00032 U | 0.00023 U | 0.00031 U | 0.00044 U |
| | 7/15/2013 | Round 30 | 0.00020 U | 0.00024 U | 0.00032 U | 0.00023 U | 0.00031 U | 0.00044 U |
| | 1/28/2014 | Round 31 | 0.00025 U | 0.00033 U | 0.00026 U | 0.00034 U | 0.00030 U | 0.00033 U |
| | 7/16/2014 | Round 32 | 0.00025 U | 0.00025 U | 0.00025 U | 0.00025 U | 0.00025 U | 0.00025 U |
| | 1/20/2015 | Round 33 | 0.00025 U | 0.00025 U | 0.00025 U | 0.00025 U | 0.00025 U | 0.00025 U |
| | 7/21/2015 | Round 34 | 0.00025 U | 0.00025 U | 0.00025 U | 0.00025 U | 0.00025 U | 0.00025 U |
| | 1/20/2016 | Well Abandonded | | | | | | |

**Table 4-1B**

**Summary of Chemicals of Concern Detected in Groundwater**
**Historical Monitoring Wells — SWMU 138 Plume**
**2015 RAER**
**Former NAS Dallas, Texas**


| Monitoring Well | Sampling Date | Sampling Round | Chemicals of Concern (mg/L) | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | 1,1-Dichloroethene | cis-1,2-Dichloroethene | Tetrachloroethene | trans-1,2-Dichloroethene | Trichloroethene | Vinyl Chloride |
| **Protective Concentration Levels (mg/L)** | | | **0.00700** | **0.07000** | **0.00500** | **0.10000** | **0.00500** | **0.00200** |
| **414B71MW** | 12/15/1999 | Well Installed | | | | | | |
| | 1/21/2000 | Round 5 | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00140 J | 0.00500 U |
| | 6/26/2000 | Round 6 | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U |
| | 6/18/2001 | Round 7 | 0.00500 U | 0.00250 U | 0.00500 U | 0.00250 U | 0.00500 U | 0.01000 U |
| | 1/8/2003 | Round 8 | 0.00100 U | 0.00100 U | 0.00021 J | 0.00100 U | 0.00037 J | 0.00100 U |
| | 5/13/2003 | Round 9 | 0.00100 U | 0.00050 U | 0.00100 U | 0.00050 U | 0.00055 J | 0.00100 U |
| | 12/19/2003 | Round 10 | 0.00021 U | 0.00016 U | 0.00024 U | 0.00019 U | 0.00038 J | 0.00017 U |
| | 10/12/2004 | Round 12 | 0.00035 U | 0.00027 U | 0.00026 J | 0.00023 U | 0.00059 J | 0.00017 U |
| | 4/18/2005 | Well Abandoned | | | | | | |
| **414B72MW** | 12/20/1999 | Well Installed | | | | | | |
| | 1/24/2000 | Round 5 | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U |
| | 6/26/2000 | Round 6 | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U |
| | 6/18/2001 | Round 7 | 0.00500 U | 0.00250 U | 0.00500 U | 0.00250 U | 0.00500 U | 0.01000 U |
| | 1/8/2003 | Round 8 | 0.00100 U | 0.00100 U | 0.00100 U | 0.00100 U | 0.00100 U | 0.00100 U |
| | 5/13/2003 | Round 9 | 0.00100 U | 0.00050 U | 0.00100 U | 0.00050 U | 0.00100 U | 0.00100 U |
| | 12/19/2003 | Round 10 | 0.00021 U | 0.00050 J | 0.00330 | 0.00019 U | 0.00150 | 0.00017 U |
| | 10/13/2004 | Round 12 | 0.00035 U | 0.00027 U | 0.00086 J | 0.00023 U | 0.00046 J | 0.00017 U |
| | 4/18/2005 | Well Abandoned | | | | | | |
| **414B74MW** | 12/20/1999 | Well Installed | | | | | | |
| | 6/8/2000 | CCI | 0.00050 U | 0.00050 U | 0.00050 U | 0.00050 U | 0.00050 U | 0.00050 U |
| | 5/13/2003 | Round 8 | 0.00100 U | 0.00050 U | 0.00100 U | 0.00050 U | 0.00100 U | 0.00100 U |
| | 9/5/2003 | Round 9 | 0.00022 U | 0.00025 U | 0.00012 U | 0.00024 U | 0.00022 U | 0.00026 U |
| | 12/21/2003 | Round 10 | 0.00021 U | 0.00016 U | 0.00024 U | 0.00019 U | 0.00010 U | 0.00017 U |
| | 10/13/2004 | Round 12 | 0.00035 U | 0.00027 U | 0.00021 U | 0.00023 U | 0.00022 U | 0.00017 U |
| | 4/18/2005 | Well Abandoned | | | | | | |

**Table 4-1B**

**Summary of Chemicals of Concern Detected in Groundwater**
**Historical Monitoring Wells — SWMU 138 Plume**
**2015 RAER**
**Former NAS Dallas, Texas**


| Monitoring Well | Sampling Date | Sampling Round | Chemicals of Concern (mg/L) | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | 1,1-Dichloroethene | cis-1,2-Dichloroethene | Tetrachloroethene | trans-1,2-Dichloroethene | Trichloroethene | Vinyl Chloride |
| **Protective Concentration Levels (mg/L)** | | | **0.00700** | **0.07000** | **0.00500** | **0.10000** | **0.00500** | **0.00200** |
| **43001MW** | 7/18/1995 | Round 1 | 0.00500 UR | NA | 0.00500 UR | NA | 0.00500 UR | 0.01000 UR |
| | 3/18/1998 | Round 2 | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U |
| | 9/12/1998 | Round 3 | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U |
| | 3/27/1999 | Round 4 | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U |
| | 11/16/1999 | Round 5 | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U |
| | 6/26/2000 | Round 6 | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U |
| | 6/3/2003 | Well Destroyed | | | | | | |
| **43002MW** | 7/18/1995 | Round 1 | 0.00500 U | NA | 0.00500 U | NA | 0.00500 U | 0.01000 U |
| | 3/18/1998 | Round 2 | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U |
| | 10/26/1998 | Round 3 | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U |
| | 11/15/1999 | Round 5 | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U |
| | 6/26/2000 | Round 6 | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U | 0.00500 U |
| | 6/3/2003 | Well Abandoned | | | | | | |

CCI - Navy's Remedial Action Contractor (RAC) collected groundwater samples
mg/L - milligrams per liter
NA - Not Applicable
NS - Not Sampled
NS-D - Not Sampled during this round due to insufficient water in the monitoring well
PCLE - Protective Concentration Level Exceedance
PDB - Passive Diffusion Bag
SDG - Sample Delivery Group
Shaded areas indicate an exceedance.
Analytical Result Qualifiers:
J - Indicates that the chemical was detected. However, the associated numerical result may not be a precise representation of the amount that is actually present in the sample. The laboratory reported concentration is considered to be an estimate of the true concentration.
U - Indicates that the chemical was not detected at the numerical detection limit (sample-specific quantitation limit) noted. Nondetected results from the laboratory are reported in this manner. This qualifier is added to a positive result (reported by the laboratory) if the detected concentration is determined to be attributable to contamination introduced during field sampling or laboratory analysis.
UJ - Indicates that the chemical was not detected. However, the detection limit (sample-specific quantitation limit) is considered to be estimated based on problems encountered during laboratory analysis. The associated numerical detection limit is regarded as inaccurate or imprecise.
UR - Indicates that the chemical may or may not be present. The nondetected analytical result reported by the laboratory is considered to be unreliable and unusable. This qualifier is applied in cases of gross technical deficiencies (i.e., holding times missed by a factor of two the specified time limit, severe calibration noncompliances, and extremely low quality control recoveries.

# TABLE 4-2
# SUMMARY OF GEOCHEMICAL PARAMETERS MEASURED IN GROUNDWATER

**Table 4-2A**

**Summary of Groundwater Gauging Data**
**SWMU 138 Plume**
**2016 RAER**
**Former NAS Dallas, Texas**
**Page 1 of 2**

| Monitoring Well | Top of Casing [1] (ft msl) | Screened Interval (ft msl) | Date | Depth to Water [2] (ft bgs) | Groundwater Elevation (ft msl) |
|---|---|---|---|---|---|
| **Monitoring Wells Located Inside PCLE Zone** | | | | | |
| **41401MW** | 460.31 | 446.02 to 436.02 | 9/1/1995 | | |
| | | | 2/1/1998 | 2.54 | 457.77 |
| | | | 5/1/1998 | 2.74 | 457.57 |
| | | | 8/1/1998 | 4.02 | 456.29 |
| | | | 2/1/1999 | 2.51 | 457.80 |
| | | | 9/1/1999 | 3.38 | 456.93 |
| | | | 6/1/2000 | 1.64 | 458.67 |
| | | | 6/1/2001 | 2.55 | 457.76 |
| | | | 12/2/2001 | 1.94 | 458.37 |
| | | | 8/1/2003 | 3.37 | 456.94 |
| | | | 12/23/2003 | 3.36 | 456.95 |
| | | | 7/4/2004 | 3.05 | 457.26 |
| | | | 9/27/2004 | 4.04 | 456.27 |
| | 460.12 | 445.83 to 435.83 | 4/17/2005 | 2.75 | 457.37 |
| | | | 7/22/2005 | 4.54 | 455.58 |
| | | | 10/4/2005 | 5.23 | 454.89 |
| | | | 1/21/2006 | 6.01 | 454.11 |
| | | | 5/3/2006 | 3.88 | 456.24 |
| | | | 8/8/2006 | 5.71 | 454.41 |
| | | | 4/25/2007 | 4.74 | 455.38 |
| | | | 8/22/2007 | 2.91 | 457.21 |
| | | | 1/15/2008 | 3.31 | 456.81 |
| | | | 7/21/2008 | 4.51 | 455.61 |
| | | | 1/13/2009 | 5.71 | 454.41 |
| | | | 7/15/2009 | 5.09 | 455.03 |
| | 460.11 | 445.82 to 435.82 | 12/14/2009 | 3.24 | 456.87 |
| | | | 8/10/2010 | 3.56 | 456.55 |
| | | | 12/16/2010 | 3.28 | 456.83 |
| | | | 7/25/2011 | 3.80 | 456.31 |
| | | | 12/14/2011 | 3.90 | 456.21 |
| | | | 7/9/2012 | 3.18 | 456.93 |
| | | | 12/19/2012 | 5.22 | 454.89 |
| | | | 7/15/2013 | 4.53 | 455.58 |
| | | | 12/18/2013 | 4.31 | 455.80 |
| | | | 7/15/2014 | 4.45 | 455.66 |
| | | | 12/17/2014 | 4.67 | 455.44 |
| | | | 7/20/2015 | 3.41 | 456.70 |
| | | | 12/15/2015 | 3.17 | 456.94 |
| | | | 7/18/2016 | 3.39 | 456.72 |

**Table 4-2A**

**Summary of Groundwater Gauging Data**
**SWMU 138 Plume**
**2016 RAER**
**Former NAS Dallas, Texas**
**Page 2 of 2**

| Monitoring Well | Top of Casing [1] (ft msl) | Screened Interval (ft msl) | Date | Depth to Water [2] (ft bgs) | Groundwater Elevation (ft msl) |
|---|---|---|---|---|---|
| 414B75MW | 459.98 | 445.98 to 435.98 | 12/20/1999 | | |
| | | | 6/1/2000 | NA | NA |
| | | | 6/1/2001 | NA | NA |
| | | | 12/2/2001 | NA | NA |
| | | | 8/1/2003 | 3.29 | 456.69 |
| | | | 12/23/2003 | 4.44 | 455.54 |
| | | | 7/4/2004 | 3.32 | 456.66 |
| | | | 9/27/2004 | 3.85 | 456.13 |
| | 459.91 | 445.91 to 435.91 | 4/17/2005 | 2.78 | 457.13 |
| | | | 7/22/2005 | 4.39 | 455.52 |
| | | | 10/4/2005 | 5.11 | 454.80 |
| | | | 1/21/2006 | 6.06 | 453.85 |
| | | | 5/3/2006 | 3.73 | 456.18 |
| | | | 8/8/2006 | 6.11 | 453.80 |
| | | | 4/25/2007 | 2.99 | 456.92 |
| | | | 8/22/2007 | 2.73 | 457.18 |
| | | | 1/15/2008 | 3.32 | 456.59 |
| | | | 7/21/2008 | 4.41 | 455.50 |
| | | | 1/13/2009 | 6.12 | 453.79 |
| | | | 7/15/2009 | 4.60 | 455.31 |
| | 460.00 | 446.00 to 436.00 | 12/14/2009 | 3.30 | 456.70 |
| | | | 8/10/2010 | 3.53 | 456.47 |
| | | | 12/16/2010 | 3.13 | 456.87 |
| | | | 7/25/2011 | 3.58 | 456.42 |
| | | | 12/14/2011 | 3.81 | 456.19 |
| | | | 7/9/2012 | 3.20 | 456.80 |
| | | | 12/19/2012 | 5.17 | 454.83 |
| | | | 7/15/2013 | 4.34 | 455.66 |
| | | | 12/18/2013 | 4.17 | 455.83 |
| | | | 7/15/2014 | 4.78 | 455.22 |
| | | | 12/17/2014 | 4.45 | 455.55 |
| | | | 7/20/2015 | 3.77 | 456.23 |
| | | | 12/15/2015 | NA | NA |
| | | | 7/18/2016 | 3.74 | 456.26 |

bgs - below ground surface
NA - Not Available or Applicable (i.e., abandoned, not installed, not measured)
ft - feet
msl - mean sea level
PCLE - Protective Concentration Level Exceedance

***Notes:***
1 - All monitoring wells on-site were resurveyed in May 2005 and September 2010 in accordance with the Compliance Plan Requirements.
2 - Depth to water measurements taken from the top of the riser.

**Table 4-2B**

**Summary of Groundwater Gauging Data**
**Long Term Monitoring Wells — SWMU 138 Plume**
**2016 RAER**

**Former NAS Dallas, Texas**
**Page 1 of 3**

| Monitoring Well | Top of Casing [1] (ft msl) | Screened Interval (ft msl) | | | Date | Depth to Water [2] (ft bgs) | Groundwater Elevation (ft msl) |
|---|---|---|---|---|---|---|---|
| **Monitoring Wells Located Inside PCLE Zone** | | | | | | | |
| **414B76MW** | 459.27 | 443.27 | to | 433.27 | 6/1/2000 | NA | NA |
| | | | | | 6/1/2001 | NA | NA |
| | | | | | 12/2/2001 | NA | NA |
| | | | | | 8/1/2003 | NA | NA |
| | | | | | 12/23/2003 | 2.81 | 456.46 |
| | | | | | 7/4/2004 | 2.54 | 456.73 |
| | | | | | 9/27/2004 | 3.11 | 456.16 |
| | | | | | 4/17/2005 | Well Plugged and Abandoned | |
| **414B77MW** | 459.81 | 439.81 | to | 429.81 | 6/1/2000 | NA | NA |
| | | | | | 6/1/2001 | NA | NA |
| | | | | | 12/2/2001 | NA | NA |
| | | | | | 8/1/2003 | NA | NA |
| | | | | | 12/23/2003 | 2.97 | 456.84 |
| | | | | | 7/4/2004 | 2.88 | 456.93 |
| | | | | | 9/27/2004 | 3.65 | 456.16 |
| | | | | | 4/17/2005 | Well Plugged and Abandoned | |
| **414B78MW** | 460.23 | 446.23 | to | 436.23 | 6/1/2000 | NA | NA |
| | | | | | 6/1/2001 | NA | NA |
| | | | | | 12/2/2001 | NA | NA |
| | | | | | 8/1/2003 | NA | NA |
| | | | | | 12/23/2003 | 3.11 | 457.12 |
| | | | | | 7/4/2004 | 2.95 | 457.28 |
| | | | | | 9/27/2004 | 3.79 | 456.44 |
| | | | | | 4/17/2005 | Well Plugged and Abandoned | |

**Table 4-2B**

**Summary of Groundwater Gauging Data**
**Long Term Monitoring Wells — SWMU 138 Plume**
**2016 RAER**

**Former NAS Dallas, Texas**
**Page 2 of 3**

| Monitoring Well | Top of Casing [1] (ft msl) | Screened Interval (ft msl) | | | Date | Depth to Water [2] (ft bgs) | Groundwater Elevation (ft msl) |
|---|---|---|---|---|---|---|---|
| **Monitoring Wells Located Outside PCLE Zone** | | | | | | | |
| **43001MW** | 462.80 | 458.00 | to | 448.00 | 2/1/1998 | 3.08 | 459.72 |
| | | | | | 5/1/1998 | 4.44 | 458.36 |
| | | | | | 8/1/1998 | 4.34 | 458.46 |
| | | | | | 2/1/1999 | 3.21 | 459.59 |
| | | | | | 9/1/1999 | 3.79 | 459.01 |
| | | | | | 6/1/2000 | 2.55 | 460.25 |
| | | | | | 6/1/2001 | 3.13 | 459.67 |
| | | | | | 12/2/2001 | 1.78 | 461.02 |
| | | | | | 8/1/2003 | 4.63 | 458.17 |
| | | | | | 10/31/2003 | Well Plugged and Abandoned | |
| **43002MW** | 464.26 | 449.70 | to | 439.70 | 2/1/1998 | 5.33 | 458.93 |
| | | | | | 5/1/1998 | 5.74 | 458.52 |
| | | | | | 8/1/1998 | 6.95 | 457.31 |
| | | | | | 2/1/1999 | 5.42 | 458.84 |
| | | | | | 9/1/1999 | 6.45 | 457.81 |
| | | | | | 6/1/2000 | 4.60 | 459.66 |
| | | | | | 6/1/2001 | 5.31 | 458.95 |
| | | | | | 12/2/2001 | 4.92 | 459.34 |
| | | | | | 6/3/2003 | Well Plugged and Abandoned | |
| **414B04MW** | 462.82 | 445.02 | to | 435.02 | 3/18/1998 | | |
| | | | | | 5/1/1998 | 5.03 | 457.79 |
| | | | | | 8/1/1998 | 6.05 | 456.77 |
| | | | | | 2/1/1999 | 4.51 | 458.31 |
| | | | | | 9/1/1999 | 5.47 | 457.35 |
| | | | | | 6/1/2000 | 3.73 | 459.09 |
| | | | | | 6/1/2001 | 11.48 | 451.34 |
| | | | | | 12/2/2001 | 4.18 | 458.64 |
| | | | | | 8/1/2003 | 5.63 | 457.19 |
| | | | | | 12/23/2003 | 5.80 | 457.02 |
| | | | | | 7/4/2004 | 5.42 | 457.40 |
| | | | | | 9/27/2004 | 6.28 | 456.54 |
| | | | | | 4/18/2005 | Well Plugged and Abandoned | |
| **414B05MW** | 460.99 | 443.49 | to | 433.49 | 3/19/1998 | | |
| | | | | | 5/1/1998 | 3.62 | 457.37 |
| | | | | | 8/1/1998 | 4.74 | 456.25 |
| | | | | | 2/1/1999 | 3.37 | 457.62 |
| | | | | | 9/1/1999 | 4.18 | 456.81 |
| | | | | | 6/1/2000 | 2.43 | 458.56 |
| | | | | | 6/1/2001 | 3.27 | 457.72 |
| | | | | | 12/2/2001 | 2.89 | 458.10 |
| | | | | | 8/1/2003 | 4.20 | 456.79 |
| | | | | | 12/23/2003 | 4.00 | 456.99 |
| | | | | | 7/4/2004 | 3.96 | 457.03 |
| | | | | | 9/27/2004 | 4.52 | 456.47 |
| | | | | | 4/18/2005 | Well Plugged and Abandoned | |

**Table 4-2B**

**Summary of Groundwater Gauging Data**
**Long Term Monitoring Wells — SWMU 138 Plume**
**2016 RAER**

**Former NAS Dallas, Texas**
**Page 3 of 3**

| Monitoring Well | Top of Casing [1] (ft msl) | Screened Interval (ft msl) | | | Date | Depth to Water [2] (ft bgs) | Groundwater Elevation (ft msl) |
|---|---|---|---|---|---|---|---|
| 414B70MW | 461.52 | 4.90 | to | 442.29 | 12/20/1999 | | |
| | | | | | 6/1/2000 | 4.90 | 456.62 |
| | | | | | 6/1/2001 | 5.39 | 456.13 |
| | | | | | 12/2/2001 | 4.87 | 456.65 |
| | | | | | 8/1/2003 | 8.58 | 452.94 |
| | | | | | 12/23/2003 | 4.81 | 456.71 |
| | | | | | 7/4/2004 | 4.87 | 456.65 |
| | | | | | 9/27/2004 | 4.89 | 456.63 |
| | 461.37 | 4.75 | to | 442.14 | 4/17/2005 | 4.92 | 456.45 |
| | | | | | 7/22/2005 | 5.55 | 455.82 |
| | | | | | 10/4/2005 | 6.80 | 454.57 |
| | | | | | 1/21/2006 | 7.46 | 453.91 |
| | | | | | 5/3/2006 | 4.86 | 456.51 |
| | | | | | 8/8/2006 | 6.70 | 454.67 |
| | | | | | 4/25/2007 | 4.73 | 456.64 |
| | | | | | 8/22/2007 | 4.80 | 456.57 |
| | | | | | 1/15/2008 | 3.36 | 458.01 |
| | | | | | 7/21/2008 | 5.57 | 455.80 |
| | | | | | 1/13/2009 | 5.61 | 455.76 |
| | | | | | 7/15/2009 | 5.58 | 455.79 |
| | 461.42 | 4.80 | to | 442.19 | 12/14/2009 | 4.86 | 456.56 |
| | | | | | 8/10/2010 | 5.15 | 456.27 |
| | | | | | 12/16/2010 | 4.98 | 456.44 |
| | | | | | 7/25/2011 | 6.32 | 455.10 |
| | | | | | 12/14/2011 | 6.34 | 455.08 |
| | | | | | 7/9/2012 | 5.40 | 456.02 |
| | | | | | 12/19/2012 | 7.12 | 454.30 |
| | | | | | 7/15/2013 | 5.52 | 455.90 |
| | | | | | 12/18/2013 | 4.95 | 456.47 |
| | | | | | 7/15/2014 | 5.43 | 455.99 |
| | | | | | 12/17/2014 | 4.97 | 456.45 |
| | | | | | 7/20/2015 | 4.77 | 456.65 |
| | | | | | 12/15/2015 | 5.10 | 456.32 |
| | | | | | 4/6/2016 | Well Plugged and Abandoned | |
| 414B71MW | 459.87 | 454.93 | to | 444.93 | 12/15/1999 | | |
| | | | | | 6/1/2000 | 8.04 | 451.83 |
| | | | | | 6/1/2001 | 3.46 | 456.41 |
| | | | | | 12/2/2001 | 5.79 | 454.08 |
| | | | | | 8/1/2003 | 3.47 | 456.40 |
| | | | | | 12/23/2003 | 3.63 | 456.24 |
| | | | | | 7/4/2004 | 5.79 | 454.08 |
| | | | | | 9/27/2004 | 4.05 | 455.82 |
| | | | | | 4/18/2005 | Well Plugged and Abandoned | |
| 414B72MW | 460.38 | 454.79 | to | 444.79 | 12/20/1999 | | |
| | | | | | 6/1/2000 | 3.18 | 457.20 |
| | | | | | 6/1/2001 | 3.06 | 457.32 |
| | | | | | 12/2/2001 | 2.37 | 458.01 |
| | | | | | 8/1/2003 | 6.25 | 454.13 |
| | | | | | 12/23/2003 | 3.30 | 457.08 |
| | | | | | 7/4/2004 | 6.12 | 454.26 |
| | | | | | 9/27/2004 | 4.51 | 455.87 |
| | | | | | 4/18/2005 | Well Plugged and Abandoned | |
| 414B74MW | 460.19 | 443.19 | to | 433.19 | 6/1/2000 | NA | NA |
| | | | | | 6/1/2001 | NA | NA |
| | | | | | 12/2/2001 | NA | NA |
| | | | | | 8/1/2003 | NA | NA |
| | | | | | 12/23/2003 | 3.14 | 457.05 |
| | | | | | 7/4/2004 | 3.26 | 456.93 |
| | | | | | 9/27/2004 | 3.82 | 456.37 |
| | | | | | 4/17/2005 | Well Plugged and Abandoned | |

bgs - below ground surface
ft - feet
msl - mean sea level
NA - Not Available or Applicable (i.e., abandoned, not installed, not measured)
NM - Not Measured
PCLE - Protective Concentration Level Exceedance

***Note:***
1 - All monitoring wells on-site were resurveyed in May 2005 and September 2010 in accordance with the Compliance Plan Requirements.
2 - Depth to water measurements taken from the top of the riser.

# TABLE 4-3
# SUMMARY OF GROUNDWATER GAUGING DATA

**Table 4-3A**

**Summary of Geochemical Parameters Measured in Groundwater**
**Long Term Monitoring Wells — SWMU 138 Plume**
**2016 RAER**

**Former NAS Dallas, Texas**
**Page 1 of 2**

| Monitoring Well | Sampling Date | Sampling Round | SDG | Oxidation-Reduction Conditions | | | | | | | | Degradation Products | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Dissolved Oxygen[2] | Ferrous Iron[2] | Nitrate[3] | Nitrite[3] | ORP[1] | Phosphate[3] | Sulfate[3] | TOC[3] | Alkalinity[2] | Carbon Dioxide[2] | Chloride[3] | Ethane[3] | Ethene[3] | Methane[3] | pH[1] | Sulfide[3] |
| | | | Units | mg/L | mg/L | mg/L | mg/L | mV | mg/L | mg/L | mg/L | mg/L | mg/L | mg/L | ng/L | ng/L | µg/L | S.U. | mg/L |
| Monitoring Wells Located Inside PCLE Zone | | | | | | | | | | | | | | | | | | | |
| 41401MW | 11/19/1999 | Round 5 | DL334 | NA | NA | 5 U | 5 U | NA | 5 U | 2,560 | NA | NA | NA | 101 | NA | NA | NA | NA | NA |
| | 11/19/1999 | Round 5 | LGCY | 0.3 | 0.0 | NA | NA | 257.3 | NA | NA | NA | 296 | 170 | NA | NA | NA | NA | 6.85 | NA |
| | 11/19/1999 | Round 5 | TTE16 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | 93 | 30 | 2.303 | NA | NA |
| | 6/26/2000 | Round 6 | DL344 | NA | NA | 0.5 U | 0.5 U | NA | 0.5 U | 2,390 J | NA | NA | NA | 118 | NA | NA | NA | NA | NA |
| | 6/26/2000 | Round 6 | LGCY | 0.6 | 0.2 | NA | NA | 162.1 | NA | NA | NA | 275 | 35 | NA | NA | NA | NA | 6.68 | 0.01 U |
| | 10/20/2000 | Round 6 | UNKNOWN | NA | NA | NA | NA | NA | NA | 2550 | 1.5 | NA | NA | 112 | 30 U | 30 U | 10 U | NA | 0.1 U |
| | 6/25/2001 | Round 7 | 608MWD32-7 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | 120 J | 130 J | 720 J | NA | NA |
| | 6/25/2001 | Round 7 | DL366 | NA | NA | 0.10 U | 0.10 U | NA | 0.50 U | 2530 | NA | NA | NA | 127 | NA | NA | NA | NA | NA |
| | 6/25/2001 | Round 7 | FIELD | 0.4 | 0.2 | NA | NA | 271.4 | NA | NA | NA | 375 | 40 | NA | NA | NA | NA | 6.65 | 0.01 U |
| | 1/27/2003 | Round 8 | 280195 | NA | NA | 0.05 U | 0.05 U | NA | 0.5 U | 2,300 | 3 | NA | NA | 113 | NA | NA | NA | NA | NA |
| | 1/27/2003 | Round 8 | FIELD | 1.0 | 0.6 | NA | NA | 48 | NA | NA | NA | 300 | 32 | NA | NA | NA | NA | 6.6 | 0.01 U |
| | 1/27/2003 | Round 8 | TTN44 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | 80 | 20 | 1,371.8 | NA | NA |
| | 1/12/2004 | Round 10 | C4A130231 | NA | NA | NA | NA | NA | NA | 2,620 | NA | NA | NA | 125 | NA | NA | NA | NA | NA |
| | 1/12/2004 | Round 10 | FIELD | 1.0 | 0.5 | NA | NA | 55 | NA | NA | NA | 312.5 | NA | NA | NA | NA | NA | 7.57 | 0 |
| | 10/4/2005 | Round 14 | FIELD | NA | NA | NA | NA | 4 | NA | NA | NA | NA | NA | NA | NA | NA | NA | 6.51 | NA |
| | 9/13/2007 | Round 18 | DALLASW005 | NA | NA | 0.15 | 1.0 UL | NA | 0.5 UL | 2,240 | 1.3 | NA | NA | 134 | 330 U | 330 U | 340 | NA | 1.0 U |
| | 9/13/2007 | Round 18 | FIELD | 1 | 0.0 | NA | NA | -4 | NA | NA | NA | 250 | 18 | NA | NA | NA | NA | 6.46 | NA |
| | 7/15/2009 | Round 22 | F66672 | 0.9 | 0.0 | 0.05 U | 0.05 U | 46.2 | 0.081JL | 2,730 | 1.2 | 350 | 70 | 130 | 320 U | 430 U | 149 | 6.65 | 0.6 U |
| | 1/11/2010 | Round 23 | F70738 | NA | NA | NA | NA | -141.4 | NA | NA | NA | NA | NA | NA | NA | NA | NA | 6.76 | NA |
| | 7/13/2010 | Round 24 | F75070 | NA | NA | NA | NA | -25.3 | NA | NA | NA | NA | NA | NA | NA | NA | NA | 6.58 | NA |
| | 1/13/2011 | Round 25 | FIELD | NA | NA | NA | NA | 33.5 | NA | NA | NA | NA | NA | NA | NA | NA | NA | 6.29 | NA |
| | 7/25/2011 | Round 26 | F84573 | 0.3 | 0.2 | 0.25 UJL | 0.25 UJL | -61.8 | 0.098 | 2380 | 1.2 | 325 | 50 | 145 | 320 U | 430 U | 115 J | 6.49 | 0.3 U |
| | 1/10/2012 | Round 27 | F88817 | NA | NA | NA | NA | -23.8 | NA | NA | NA | NA | NA | NA | NA | NA | NA | 7.06 | NA |
| | 7/9/2012 | Round 28 | F94831 | NA | NA | NA | NA | 63.5 | NA | NA | NA | NA | NA | NA | NA | NA | NA | 6.74 | NA |
| | 1/7/2013 | Round 29 | - | NA | NA | NA | NA | 64.9 | NA | NA | NA | NA | NA | NA | NA | NA | NA | 6.68 | NA |
| | 7/15/2013 | Round 30 | FA6426 | 0.4 | 0 | 1.3 U | 1.3 U | 97.4 | 0.10 | 2950 | 1.6 | 350 | 70 | 138 | 320 U | 430 U | 122 | 6.62 | 0.67 J |
| | 1/30/2014 | Round 31 | FA12818 | 0.31 | NA | NA | NA | 62.7 | NA | NA | NA | NA | NA | NA | NA | NA | NA | 6.76 | NA |
| | 7/16/2014 | Round 32 | 1407125 | 0.1 | 0.31 | 0.033 U | 0.66 U | 41.5 | 0.01 U | 2970 | 1.53 J | NA | 100 | 139 | 0.001 UJ | 0.001 UJ | 0.0682 | 6.66 | 0.02 |
| | 1/20/2015 | Round 33 | 1501071 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| | 7/21/2015 | Round 34 | 1507171 | 0.96 | 0.07 | 0.033 U | 0.66 U | 73.7 | 0.01 U | 3000 | 1.27 | 400 | 40 | 153 | 320 U | 430 U | 38.5 | 6.88 | 0 |
| | 1/20/2016 | Round 35 | 1601140 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| | 7/19/2016 | Round 36 | 1607138 | 3.61 | 0.02 | 0.033 U | 0.033 U | 40 | 0.0175 J | 2650 | 1.31 J | 463 | | 151 | 0.001 U | 0.001 U | 56.2 | 7.0 | NA |

**Table 4-3A**

**Summary of Geochemical Parameters Measured in Groundwater**
**Long Term Monitoring Wells — SWMU 138 Plume**
**2016 RAER**

**Former NAS Dallas, Texas**


| Monitoring Well | Sampling Date | Sampling Round | SDG | Oxidation-Reduction Conditions | | | | | | | | Degradation Products | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Dissolved Oxygen[2] | Ferrous Iron[2] | Nitrate[3] | Nitrite[3] | ORP[1] | Phosphate[3] | Sulfate[3] | TOC[3] | Alkalinity[2] | Carbon Dioxide[2] | Chloride[3] | Ethane[3] | Ethene[3] | Methane[3] | pH[1] | Sulfide[3] |
| | | | Units | mg/L | mg/L | mg/L | mg/L | mV | mg/L | mg/L | mg/L | mg/L | mg/L | mg/L | ng/L | ng/L | µg/L | S.U. | mg/L |
| 414B75MW | 12/20/1999 | Well Installed | | | | | | | | | | | | | | | | | |
| | 8/24/2000 | Round 6 | UNKNOWN | NA | NA | NA | NA | NA | NA | 2,690 | 6.6 | NA | 0.97 | 218 | 20 U | 20 U | 10 U | NA | 0.1 U |
| | 12/21/2003 | Round 10 | C3L230193 | NA | NA | NA | NA | NA | NA | 2,830 | NA | NA | NA | 214 J | NA | NA | NA | NA | NA |
| | 12/21/2003 | Round 10 | FIELD | 2.0 | 0.0 | NA | NA | 182 | NA | NA | NA | 200 | NA | NA | NA | NA | NA | 7.81 | 0 |
| | 10/9/2005 | Round 14 | FIELD | NA | NA | NA | NA | -53 | NA | NA | NA | NA | NA | NA | NA | NA | NA | 6.82 | NA |
| | 9/13/2007 | Round 18 | DALLASW005 | NA | NA | 0.05 U | 1.0 UL | NA | 0.83 | 2,600 | 3.5 | NA | NA | 204 | 330 U | 330 U | 8.4 | NA | 0.87 |
| | 9/13/2007 | Round 18 | FIELD | 1.0 | 0.0 | NA | NA | 61 | NA | NA | NA | 250 | 18 | NA | NA | NA | NA | 6.71 | NA |
| | 7/15/2009 | Round 22 | F66672 | 1.5 | 9.0 | 0.23 | 0.25 UR | -19.6 | 0.024 JL | 1,680 | 1.7 | 300 | 40 | 180 | 320 U | 430 U | 10.1 | 6.90 | 0.6 U |
| | 1/11/2010 | Round 23 | F70738 | NA | NA | NA | NA | -214.7 | NA | NA | NA | NA | NA | NA | NA | NA | NA | 7.00 | NA |
| | 7/13/2010 | Round 24 | F75070 | NA | NA | NA | NA | -112.3 | NA | NA | NA | NA | NA | NA | NA | NA | NA | 6.88 | NA |
| | 1/13/2011 | Round 25 | FIELD | NA | NA | NA | NA | 9.9 | NA | NA | NA | NA | NA | NA | NA | NA | NA | 6.97 | NA |
| | 7/25/2011 | Round 26 | F84573 | 0.3 | 0.2 | 3.2 | 0.05 R | -75.1 | 0.15 | 2700 | 2 | 250 | 50 | 180 | 320 U | 430 U | 32.7 | 6.70 | 0.3 U |
| | 1/10/2012 | Round 27 | F88817 | NA | NA | NA | NA | 14.2 | NA | NA | NA | NA | NA | NA | NA | NA | NA | 7.09 | NA |
| | 7/9/2012 | Round 28 | F94831 | NA | NA | NA | NA | -3.5 | NA | NA | NA | NA | NA | NA | NA | NA | NA | 6.96 | NA |
| | 1/7/2013 | Round 29 | - | NA | NA | NA | NA | -5.1 | NA | NA | NA | NA | NA | NA | NA | NA | NA | 6.94 | NA |
| | 1/15/2013 | Round 30 | FA6426 | 0.5 | 0.1 | 1.3 U | 1.3 U | 33.8 | 0.18 | 2250 | 11.6 | 300 | 40 | 158 | 320 U | 430 U | 71.3 | 6.94 | 0.31 J |
| | 1/30/2014 | Round 31 | FA12818 | 2.77 | NA | NA | NA | -3 | NA | NA | NA | NA | NA | NA | NA | NA | NA | 6.91 | NA |
| | 7/16/2014 | Round 32 | 1407125 | 0.52 | 0.07 | 0.033 U | 0.825 UJL | 72.4 | 0.01 U | 3380 | 1.77 J | NA | 25 | 168 | 0.001 UJ | 0.001 U | 0.0123 | 6.85 | 0.06 |
| | 1/20/2015 | Round 33 | 1501071 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| | 7/21/2015 | Round 34 | 1507171 | 1.22 | 0.13 | 1.3 U | 1.3 U | 114.4 | 0.01 U | 3040 | 2.09 | 374 | 130 | 180 | 320 U | 430 U | 6.74 | 6.75 | 0.01 |
| | 1/20/2016 | Round 35 | 1601140 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| | 7/16/2016 | Round 36 | 1607138 | 0.69 | 0.01 | 0.033 U | 0.033 U | 153 | 0.01 U | 2760 | 3.23 | 389 | | 198 | 0.001 U | 0.001 U | 1 U | 6.9 | NA |

***Notes:***

mg/L - milligrams per liter
mV - millivolts
NA - Not Analyzed
ng/L - nanograms per liter
ORP - Oxidation/reduction potential

TOC - Total Organic Carbon
mg/L - micrograms per liter
S.U. - Standard Units
SDG - Sample Delivery Group
PCLE - Protective Concentration Level Exceedance

1. Field measurement, Meter
2. Field measurement, Test Kit
3. Analytical Laboratory result

Analytical Result Qualifiers:
J, K, L - Indicates that the chemical was detected; however, the associated numerical result may not be a precise representation of the amount that is actually present in the sample. The laboratory reported concentration is considered to be bias unknown (J), high (K), or low (L)
U - Indicates that the sample was not detected at the numerical detection limit (sample-specific quantitation limit) noted. Nondetected results from the laboratory are reported in this manner. This qualifier is added to a positive result (reported by the laboratory) if the detected concentration is determined to be attributable to contamination introduced during field sampling or laboratory analysis.

**Table 4-3B**

**Summary of Geochemical Parameters Measured in Groundwater**
**Historical Monitoring Wells — SWMU 138 Plume**
**2016 RAER**

**Former NAS Dallas, Texas**
**Page 1 of 3**

| Monitoring Well | Sampling Date | Sampling Round | Oxidation-Reduction Conditions | | | | | | | | Degradation Products | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Dissolved Oxygen[2] | Ferrous Iron[2] | Nitrate[3] | Nitrite[3] | ORP[1] | Phosphate[3] | Sulfate[3] | TOC[3] | Alkalinity[2] | Carbon Dioxide[2] | Chloride[3] | Ethane[3] | Ethene[3] | Methane[3] | pH[1] | Sulfide[3] |
| | | Units | mg/L | mg/L | mg/L | mg/L | mV | mg/L | mg/L | mg/L | mg/L | mg/L | mg/L | mg/L | ng/L | mg/L | S.U. | mg/L |
| **Monitoring Wells Located Outside PCLE Zone** | | | | | | | | | | | | | | | | | | |
| **414B76MW** | 12/20/1999 | Well Installed | | | | | | | | | | | | | | | | |
| | 12/21/03 | Round 10 | NA | NA | NA | NA | NA | NA | 3890 | NA | NA | NA | 187 J | NA | NA | NA | NA | NA |
| | 12/21/03 | Round 10 | 2 | 0.4 | NA | NA | 250 | NA | NA | NA | 200 | NA | NA | NA | NA | NA | 7.23 | 0.01 |
| | 4/18/2005 | Well Abandoned | | | | | | | | | | | | | | | | |
| **414B77MW** | 12/20/1999 | Well Installed | | | | | | | | | | | | | | | | |
| | 08/24/00 | Round 6 | NA | NA | NA | NA | NA | NA | 4720 | 20.9 | NA | NA | 208 | NA | NA | NA | NA | 0.1 U |
| | 01/13/04 | Round 10 | NA | NA | NA | NA | NA | NA | 3760 | NA | NA | NA | 155 | NA | NA | NA | NA | NA |
| | 01/13/04 | Round 10 | 2 | 0 | NA | NA | 187 | NA | NA | NA | 150 | NA | NA | NA | NA | NA | 7.78 | 0 |
| | 4/18/2005 | Well Abandoned | | | | | | | | | | | | | | | | |
| **414B78MW** | 12/20/1999 | Well Installed | | | | | | | | | | | | | | | | |
| | 08/24/00 | Round 6 | NA | NA | NA | NA | NA | NA | 2626 | 7 | NA | 0.2 | 380 | 0.02 U | 0.02 U | 10 U | NA | 0.1 U |
| | 01/12/04 | Round 10 | NA | NA | NA | NA | NA | NA | 2420 | NA | NA | NA | 129 | NA | NA | NA | NA | NA |
| | 01/12/04 | Round 10 | 1 | 0 | NA | NA | 170 | NA | NA | NA | 275 | NA | NA | NA | NA | NA | 7.55 | 0 |
| | 4/18/2005 | Well Abandoned | | | | | | | | | | | | | | | | |
| **Monitoring Wells Located Inside the PCLE Zone** | | | | | | | | | | | | | | | | | | |
| **414B04MW** | 3/18/1998 | Well Installed | | | | | | | | | | | | | | | | |
| | 11/16/99 | Round 5 | NA | NA | 1 | 5 U | NA | 5 U | 2540 | NA | NA | NA | 44 | NA | NA | NA | NA | NA |
| | 11/16/99 | Round 5 | 0.6 | 0 | NA | NA | 335.8 | NA | NA | NA | 306 | 209 | NA | NA | NA | NA | 6.95 | NA |
| | 11/16/99 | Round 5 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | 0.033 | 0.161 | 0.758 | NA | NA |
| | 06/26/00 | Round 6 | NA | NA | 1.4 | 0.5 U | NA | 0.5 U | 2730 J | NA | NA | NA | 56.2 | NA | NA | NA | NA | NA |
| | 06/26/00 | Round 6 | 0.6 | 1 | NA | NA | 42.6 | NA | NA | NA | 240 | 45 | NA | NA | NA | NA | 6.74 | 0.01 U |
| | 06/19/01 | Round 7 | NA | NA | 0.91 | 0.10 U | NA | 2.5 U | 2220 | NA | NA | NA | 55.8 | NA | NA | NA | NA | NA |
| | 06/19/01 | Round 7 | 1 | 0.2 | NA | NA | -22.7 | NA | NA | NA | 200 | 25 | NA | NA | NA | NA | 6.9 | 0.01 U |
| | 01/08/03 | Round 8 | NA | NA | 1.0 | 0.039 J | NA | 0.5 U | 2000 | NA | NA | NA | 56.4 | NA | NA | NA | NA | NA |
| | 01/08/03 | Round 8 | 1 | 0.2 | NA | NA | 65 | NA | NA | NA | 225 | 32 | NA | NA | NA | NA | 6.92 | 0.01 U |
| | 12/19/03 | Round 10 | NA | NA | NA | NA | NA | NA | 2770 | NA | NA | NA | 61.9 | NA | NA | NA | NA | NA |
| | 12/19/03 | Round 10 | 0.8 | 0 | NA | NA | 46 | NA | NA | NA | 350 | NA | NA | NA | NA | NA | 6.78 | 0 |
| | 4/18/2005 | Well Abandoned | | | | | | | | | | | | | | | | |
| **414B05MW** | 3/19/1998 | Well Installed | | | | | | | | | | | | | | | | |
| | 11/17/99 | 3-Feb | NA | NA | 10 U | 10 U | NA | 10 U | 2890 | NA | NA | NA | 140 | NA | NA | NA | NA | NA |
| | 11/17/99 | Round 5 | 0.6 | 0 | NA | NA | 289 | NA | NA | NA | 270 | 181 | NA | NA | NA | NA | 7.03 | NA |
| | 11/17/99 | Round 5 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | 0.02 | 0.046 | 0.445 | NA | NA |
| | 06/26/00 | Round 6 | NA | NA | 0.5 U | 0.5 U | NA | 0.5 U | 2920 | NA | NA | NA | 184 | NA | NA | NA | NA | NA |
| | 06/26/00 | Round 6 | 0.8 | 0.2 | NA | NA | 152.2 | NA | NA | NA | 240 | 35 | NA | NA | NA | NA | 6.73 | 0.01 U |
| | 06/19/01 | Round 7 | NA | NA | 0.34 | 0.10 U | NA | 0.054 U | 2900 | NA | NA | NA | 167 | NA | NA | NA | NA | NA |
| | 06/19/01 | Round 7 | 3 | 0.2 | NA | NA | 107 | NA | NA | NA | 210 | 37 | NA | NA | NA | NA | 7 | 0.02 |
| | 01/08/03 | Round 8 | NA | NA | 0.27 | 0.05 U | NA | 0.5 U | 2720 | NA | NA | NA | 170 | NA | NA | NA | NA | NA |
| | 01/08/03 | Round 8 | 1 | 0.2 | NA | NA | 192 | NA | NA | NA | 225 | 35 | NA | NA | NA | NA | 7 | 0.01 U |
| | 4/18/2005 | Well Abandoned | | | | | | | | | | | | | | | | |
| | -- | Well Installed | | | | | | | | | | | | | | | | |
| | 1/20/2000 | DL339 | NA | NA | 0.46 | 25 U | NA | 25 U | 3,940 | NA | NA | NA | 2,970 | NA | NA | 0.95 U | NA | NA |
| | 1/20/2000 | LGCY | 8.0 | 0.2 | NA | NA | 521.4 | NA | NA | NA | 180 | 249 | NA | NA | NA | NA | 7.18 | 0.01 U |
| | 6/26/2000 | DL344 | NA | NA | 0.86 | 2.5 U | NA | 2.5 U | 4,260 J | NA | NA | NA | 1,660 | NA | NA | NA | NA | NA |
| | 6/26/2000 | LGCY | 3.0 | 0.2 | NA | NA | 149.6 | NA | NA | NA | 300 | 35 | NA | NA | NA | NA | 6.90 | 0.01 U |
| | 6/19/2001 | DL363 | NA | NA | 0.28 | 1.0 U | NA | 0.028 U | 3,820 | NA | NA | NA | 1,620 | NA | NA | NA | NA | NA |
| | 6/19/2001 | FIELD | 1.0 | 0.2 | NA | NA | 88.9 | NA | NA | NA | 250 | 16 | NA | NA | NA | NA | 7.11 | 0.01 U |
| | 1/8/2003 | 90226 | NA | NA | 0.045 J | 0.5 U | NA | 0.5 U | 4,040 | NA | NA | NA | 1,490 | NA | NA | NA | NA | NA |
| | 1/8/2003 | FIELD | 1.0 | 0.2 | NA | NA | 152 | NA | NA | NA | 250 | 35 | NA | NA | NA | NA | 7.03 | 0.01 U |
| | 12/22/2003 | C3L230193 | NA | NA | NA | NA | NA | NA | 4,010 | NA | NA | NA | 1,540 J | NA | NA | NA | NA | NA |
| | 12/22/2003 | FIELD | 1.5 | 0.0 | NA | NA | 154 | NA | NA | NA | 275 | NA | NA | NA | NA | NA | 6.86 | 0 |
| | 10/4/2005 | FIELD | NA | NA | NA | NA | 83 | NA | NA | NA | NA | NA | NA | NA | NA | NA | 6.59 | NA |

**Table 4-3B**

**Summary of Geochemical Parameters Measured in Groundwater**
**Historical Monitoring Wells — SWMU 138 Plume**
**2016 RAER**

**Former NAS Dallas, Texas**


| Monitoring Well | Sampling Date | Sampling Round | Oxidation-Reduction Conditions | | | | | | | | Degradation Products | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Dissolved Oxygen[2] | Ferrous Iron[2] | Nitrate[3] | Nitrite[3] | ORP[1] | Phosphate[3] | Sulfate[3] | TOC[3] | Alkalinity[2] | Carbon Dioxide[2] | Chloride[3] | Ethane[3] | Ethene[3] | Methane[3] | pH[1] | Sulfide[3] |
| | | Units | mg/L | mg/L | mg/L | mg/L | mV | mg/L | mg/L | mg/L | mg/L | mg/L | mg/L | mg/L | ng/L | mg/L | S.U. | mg/L |
| 414B70MW | 9/13/2007 | DALLASW005 | NA | NA | 0.060 | 20 UL | NA | 0.5 UL | 3,710 | 2.4 | NA | NA | 1,470 | 330 U | 330 U | 2.2 U | NA | 0.94 U |
| | 9/13/2007 | FIELD | 0.8 | 0.0 | NA | NA | 399 | NA | NA | NA | 400 | 40 | NA | NA | NA | NA | 6.80 | NA |
| | 7/15/2009 | F66672 | 3.0 | 0.0 | 0.14 | 2.5 UR | -1.6 | 0.02 UJL | 3,390 | 2.2 | 275 | 70 | 1,300 | 320 U | 430 U | 0.16 U | 7.00 | 0.6 U |
| | 1/11/2010 | F70738 | NA | NA | NA | NA | 8.90 | NA | NA | NA | NA | NA | NA | NA | NA | NA | 6.94 | NA |
| | 7/13/2010 | F75070 | NA | NA | NA | NA | 60.8 | NA | NA | NA | NA | NA | NA | NA | NA | NA | 6.84 | NA |
| | 1/13/2011 | FIELD | NA | NA | NA | NA | 68.6 | NA | NA | NA | NA | NA | NA | NA | NA | NA | 6.94 | NA |
| | 7/25/2011 | F84573 | 0.3 | 0 | 0.25 UJL | 0.25 UJL | -71.4 | 0.087 | 4100 | 1.8 | 300 | 50 | 1570 | 320 U | 430 U | 0.21 J | 6.87 | 0.3 U |
| | 1/10/2012 | F88817 | NA | NA | NA | NA | -63.7 | NA | NA | NA | NA | NA | NA | NA | NA | NA | 7.05 | NA |
| | 7/9/2012 | F94831 | NA | NA | NA | NA | 58.3 | NA | NA | NA | NA | NA | NA | NA | NA | NA | 7.12 | NA |
| | 1/7/2013 | - | NA | NA | NA | NA | 479.6 | NA | NA | NA | NA | NA | NA | NA | NA | NA | 6.83 | NA |
| | 7/15/2013 | FA6426 | 0.4 | 0 | 5.0 U | 5.0 U | 72.6 | 0.042 J | 3810 | 2.4 | 300 | 50 | 1280 | 320 U | 430 U | 0.16 U | 6.97 | .32 J |
| | 1/30/2014 | FA12818 | 2.91 | NA | NA | NA | 361.7 | NA | NA | NA | NA | NA | NA | NA | NA | NA | 6.88 | NA |
| | 7/16/2014 | 1407125 | 0.41 | 0.04 | 0.033 U | 0.825 U | -55.8 | 0.01 U | 3960 | 2.25 J | NA | 100 | 1400 | 0.001 UJ | 0.001 U | 0.001 U | 6.5 | 0.02 |
| | 1/20/2015 | 1501071 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| | 7/21/2015 | 1507171 | 2.99 | 0.14 | 0.033 U | 0.825 U | 71.1 | 0.01 U | 4430 | 1.96 | 397 | 95 | 1490 | 0.001 UJ | 0.001 U | 0.001 U | 6.79 | 0.01 |
| | 4/6/2016 | Well Plugged and Abandoned | | | | | | | | | | | | | | | | |
| 414B71MW | 12/15/1999 | Well Installed | | | | | | | | | | | | | | | | |
| | 01/21/01 | Round 5 | NA | NA | 5.7 | 10 U | NA | 10 U | 2640 | NA | NA | NA | 189 | NA | NA | 1 | NA | NA |
| | 01/21/01 | Round 5 | 4 | 0.2 | NA | NA | 328.3 | NA | NA | NA | 198 | 132 | NA | NA | NA | NA | 7.22 | 0.01 U |
| | 06/26/00 | Round 6 | NA | NA | 5.3 | 0.5 U | NA | 0.5 U | 2890 | NA | NA | NA | 249 | NA | NA | NA | NA | NA |
| | 06/26/00 | Round 6 | 4 | 0.2 | NA | NA | 141.8 | NA | NA | NA | 175 | 25 | NA | NA | NA | NA | 6.97 | 0.01 U |
| | 06/18/01 | Round 7 | NA | NA | 2.0 | 0.10 U | NA | 0.04 U | 2380 | NA | NA | NA | 165 | NA | NA | NA | NA | NA |
| | 06/18/01 | Round 7 | 1 | 0.2 | NA | NA | 127.8 | NA | NA | NA | 275 | 35 | NA | NA | NA | NA | 6.82 | 0.01 U |
| | 01/08/03 | Round 8 | NA | NA | 3.8 | 0.05 U | NA | 0.5 U | 2550 | NA | NA | NA | 189 | NA | NA | NA | NA | NA |
| | 01/08/03 | Round 8 | 1 | 0.2 | NA | NA | 186 | NA | NA | NA | 250 | 35 | NA | NA | NA | NA | 6.83 | 0.01 U |
| | 12/19/03 | Round 10 | NA | NA | NA | NA | NA | NA | 2470 | NA | NA | NA | 182 | NA | NA | NA | NA | NA |
| | 12/19/03 | Round 10 | 3 | 0 | NA | NA | 236 | NA | NA | NA | 275 | NA | NA | NA | NA | NA | 6.77 | 0 |
| | 4/18/2005 | Well Abandoned | | | | | | | | | | | | | | | | |
| 414B72MW | 12/20/1999 | Well Installed | | | | | | | | | | | | | | | | |
| | 01/24/00 | Round 5 | NA | NA | 1.3 | 5 U | NA | 5 U | 2440 | NA | NA | NA | 268 | NA | NA | 1.5 | NA | NA |
| | 01/24/00 | Round 5 | 5 | 0.2 | NA | NA | 543.6 | NA | NA | NA | 334 | 241 | NA | NA | NA | NA | 6.99 | 0.01 U |
| | 06/26/00 | Round 6 | NA | NA | 1.5 | 0.5 U | NA | 0.5 U | 2580 J | NA | NA | NA | 296 | NA | NA | NA | NA | NA |
| | 06/26/00 | Round 6 | 5 | 0.2 | NA | NA | 185.9 | NA | NA | NA | 225 | 25 | NA | NA | NA | NA | 6.92 | 0.01 U |
| | 06/18/01 | Round 7 | NA | NA | 1.2 | 0.10 U | NA | 0.50 U | 2800 | NA | NA | NA | 321 | NA | NA | NA | NA | NA |
| | 06/18/01 | Round 7 | 1.5 | 0.2 | NA | NA | 157.8 | NA | NA | NA | 350 | 32 | NA | NA | NA | NA | 6.92 | 0.01 U |
| | 01/08/03 | Round 8 | NA | NA | 1.8 | 0.05 U | NA | 0.5 U | 2840 | NA | NA | NA | 365 | NA | NA | NA | NA | NA |
| | 01/08/03 | Round 8 | 1 | 0.2 | NA | NA | 492 | NA | NA | NA | 225 | 45 | NA | NA | NA | NA | 6.88 | 0.01 U |
| | 12/19/03 | Round 10 | NA | NA | NA | NA | NA | NA | 2800 | NA | NA | NA | 298 | NA | NA | NA | NA | NA |
| | 12/19/03 | Round 10 | 2 | 0 | NA | NA | 208 | NA | NA | NA | 250 | NA | NA | NA | NA | NA | 8.01 | 0 |
| | 4/18/2005 | Well Abandoned | | | | | | | | | | | | | | | | |

**Table 4-3B**

**Summary of Geochemical Parameters Measured in Groundwater**
**Historical Monitoring Wells — SWMU 138 Plume**
**2016 RAER**

**Former NAS Dallas, Texas**


| Monitoring Well | Sampling Date | Sampling Round | Oxidation-Reduction Conditions | | | | | | | | Degradation Products | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Dissolved Oxygen[2] | Ferrous Iron[2] | Nitrate[3] | Nitrite[3] | ORP[1] | Phosphate[3] | Sulfate[3] | TOC[3] | Alkalinity[2] | Carbon Dioxide[2] | Chloride[3] | Ethane[3] | Ethene[3] | Methane[3] | pH[1] | Sulfide[3] |
| | | Units | mg/L | mg/L | mg/L | mg/L | mV | mg/L | mg/L | mg/L | mg/L | mg/L | mg/L | mg/L | ng/L | mg/L | S.U. | mg/L |
| 414B74MW | 12/20/1999 | Well Installed | | | | | | | | | | | | | | | | |
| | 12/21/03 | Round 10 | NA | NA | NA | NA | NA | NA | 2660 | NA | NA | NA | 286 J | NA | NA | NA | NA | NA |
| | 12/21/03 | Round 10 | 2.5 | 0 | NA | NA | 210 | NA | NA | NA | 175 | NA | NA | NA | NA | NA | 8.02 | 0 |
| | 4/18/2005 | N | | | | | | | | | | | | | | | | |
| 43001MW | 11/16/99 | Round 5 | NA | NA | 0.5 U | 0.5 U | NA | 0.5 U | 57.9 | NA | NA | NA | 16 | NA | NA | NA | NA | NA |
| | 11/16/99 | Round 5 | 0.8 | 0 | NA | NA | 306.7 | NA | NA | NA | 280 | 111 | NA | NA | NA | NA | 6.96 | 0 U |
| | 11/16/99 | Round 5 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | 0.005 U | 0.005 U | 0.695 | NA | NA |
| | 06/26/00 | Round 6 | NA | NA | 0.5 U | 0.5 U | NA | 0.5 U | 48.8 | NA | NA | NA | 12 | NA | NA | NA | NA | NA |
| | 06/26/00 | Round 6 | 1 | 0.2 | NA | NA | 160.1 | NA | NA | NA | 270 | 37 | NA | NA | NA | NA | 6.98 | 0.01 U |
| | -- | Well Destroyed | | | | | | | | | | | | | | | | |
| 43002MW | 11/15/99 | Round 5 | NA | NA | 5 U | 5 U | NA | 5 U | 1840 | NA | NA | NA | 60.2 | NA | NA | NA | NA | NA |
| | 11/15/99 | Round 5 | 1 | 0 | NA | NA | 273.1 | NA | NA | NA | 288 | 195 | NA | NA | NA | NA | 7 | NA |
| | 11/15/99 | Round 5 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | 0.008 | 0.023 | 6.141 | NA | NA |
| | 06/26/00 | Round 6 | NA | NA | 0.5 U | 0.5 U | NA | 0.5 U | 2030 J | NA | NA | NA | 75.1 | NA | NA | NA | NA | NA |
| | 06/26/00 | Round 6 | 0.4 | 0.2 | NA | NA | 145.3 | NA | NA | NA | 220 | 35 | NA | NA | NA | NA | 6.75 | 0.01 U |
| | 6/3/2003 | Well Abandoned | | | | | | | | | | | | | | | | |

mg/L - milligrams per liter
mV - millivolts
NA - Not Analyzed
ng/L - nanograms per liter
ORP - Oxidation/reduction potential

TOC - Total Organic Carbon
mg/L - micrograms per liter
S.U. - Standard Units
SDG - Sample Delivery Group
PCLE - Protective Concentration Level Exceedance

***Notes:***
1. Field measurement, Meter
2. Field measurement, Test Kit
3. Analytical Laboratory result

Analytical Result Qualifiers:
J, K, L - Indicates that the chemical was detected; however, the associated numerical result may not be a precise representation of the amount that is actually present in the sample. The laboratory reported concentration is considered to be bias unknown (J), high (K), or low (L) estimate of the true concentration.
U - Indicates that the sample was not detected at the numerical detection limit (sample-specific quantitation limit) noted. Nondetected results from the laboratory are reported in this manner. This qualifier is added to a positive result (reported by the laboratory) if the detected concentration is determined to be attributable to contamination introduced during

# TABLE 4-4
# SUMMARY OF CONCENTRATION VS. TIME ATTENUATION ACTION LEVELS

**Table 4-4**

**Concentration vs. Time with Attenuation Action Levels**
**SWMU 138 Plume**
**2016 RAER**

**Former NAS Dallas, Texas**


| Monitoring Well ID | Sampling Date | Elapsed Time (Years) | Protective Concentration Level (mg/L) | Conc. Detected (mg/L) | Natural Log of Conc. (mg/L) | Degradation Rate from Natural Log ($K_{time}$) (mg/L per year) | Below Protective Conc. Level? (Yes/No) | Minimum Degradation Rate Required for Remedial Goals Natural Log ($K_{time}$) (mg/L per year) | Minimum Degradation Rate Met? (Yes/No) | Expected Remedial Goal Conc. (mg/L) | Expected Remedial Goal Conc. Met? (Yes/No) | Remedial Goals Being Met? (Yes/No) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Tetrachloroethene** | | | | | | | | | | | | |
| 414B75MW | Jun-00 | 0.0 | 0.00500 | 0.00620 | -5.08 | -- | -- | -- | -- | -- | -- | -- |
| | May-03 | 2.9 | 0.00500 | 0.01000 | -4.61 | -- | -- | -- | -- | -- | -- | -- |
| | Sep-03 | 3.2 | 0.00500 | 0.01700 J | -4.07 | -- | -- | -- | -- | -- | -- | -- |
| | Dec-03 | 3.5 | 0.00500 | 0.02500 | -3.69 | -- | -- | -- | -- | -- | -- | -- |
| | Jul-04 | 4.1 | 0.00500 | 0.02400 J | -3.73 | 0.336 | No | -0.009 | No | 0.00567 | No | No |
| | Oct-04 | 4.4 | 0.00500 | 0.00320 | -5.74 | 0.119 | Yes | -0.009 | No | 0.00566 | Less Than PCL | Less Than PCL |
| | Oct-05 | 5.4 | 0.00500 | 0.01000 | -4.61 | 0.072 | No | -0.009 | No | 0.00560 | No | No |
| | May-06 | 5.9 | 0.00500 | 0.03800 | -3.27 | 0.175 | No | -0.009 | No | 0.00558 | No | No |
| | Aug-06 | 6.2 | 0.00500 | 0.03400 | -3.38 | 0.217 | No | -0.009 | No | 0.00556 | No | No |
| | May-07 | 6.9 | 0.00500 | 0.03100 | -3.47 | 0.226 | No | -0.009 | No | 0.00552 | No | No |
| | Sep-07 | 7.3 | 0.00500 | 0.00960 | -4.65 | 0.155 | No | -0.009 | No | 0.00551 | No | No |
| | Jan-08 | 7.6 | 0.00500 | 0.01500 | -4.20 | 0.131 | No | -0.009 | No | 0.00549 | No | No |
| | Jul-08 | 8.1 | 0.00500 | 0.00220 | -6.12 | 0.017 | Yes | -0.009 | No | 0.00546 | Less Than PCL | Less Than PCL |
| | Jan-09 | 8.6 | 0.00500 | 0.02200 | -3.82 | 0.038 | No | -0.009 | No | 0.00544 | No | No |
| | Jul-09 | 9.1 | 0.00500 | 0.02270 | -3.79 | 0.054 | No | -0.009 | No | 0.00541 | No | No |
| | Jan-10 | 9.6 | 0.00500 | 0.00810 | -4.82 | 0.026 | No | -0.009 | No | 0.00539 | No | No |
| | Jul-10 | 10.1 | 0.00500 | 0.00044 U | -8.00 | -0.100 | Yes | -0.009 | Yes | 0.00536 | Less Than PCL | Less Than PCL |
| | Jan-11 | 10.6 | 0.00500 | 0.00700 | -4.96 | -0.100 | No | -0.009 | Yes | 0.00534 | No | Evaluate Further |
| | Jul-11 | 11.1 | 0.00500 | 0.01080 | -4.53 | -0.085 | No | -0.009 | Yes | 0.00531 | No | Evaluate Further |
| | Jan-12 | 11.6 | 0.00500 | 0.01890 | -3.97 | -0.059 | No | -0.009 | Yes | 0.00529 | No | Evaluate Further |
| | Jul-12 | 12.1 | 0.00500 | 0.01190 | -4.43 | -0.050 | No | -0.009 | Yes | 0.00526 | No | Evaluate Further |
| | Jan-13 | 12.6 | 0.00500 | 0.00032 U | -8.00 | -0.119 | Yes | -0.009 | Yes | 0.00524 | Less Than PCL | Less Than PCL |
| | Jul-13 | 13.1 | 0.00500 | 0.00043 J | -7.75 | -0.167 | Yes | 0.000 | Yes | 0.00521 | Less Than PCL | Less Than PCL |
| | Feb-14 | 13.7 | 0.00500 | 0.00370 | -5.60 | -0.163 | Yes | 0.000 | Yes | 0.00518 | Less Than PCL | Less Than PCL |
| | Jul-14 | 14.1 | 0.00500 | 0.00895 | -4.72 | -0.143 | No | -0.009 | Yes | 0.00516 | No | Evaluate Further |
| | Jan-15 | 14.6 | 0.00500 | 0.00853 | -4.76 | -0.127 | No | -0.009 | Yes | 0.00514 | No | Evaluate Further |
| | Jul-15 | 14.6 | 0.00500 | 0.00905 | -4.70 | -0.113 | No | -0.009 | Yes | 0.00512 | No | Evaluate Further |
| | Jan-16 | 16.0 | 0.00500 | 0.00459 | -5.38 | -0.109 | Yes | -0.009 | Yes | 0.00509 | Less Than PCL | Less Than PCL |
| | Jul-16 | 16.5 | 0.00500 | 0.00884 | -4.73 | -0.096 | No | -0.009 | Yes | 0.00507 | No | Evaluate Further |

**Table 4-4**

**Concentration vs. Time with Attenuation Action Levels**
**SWMU 138 Plume**
**2016 RAER**

**Former NAS Dallas, Texas**


| Monitoring Well ID | Sampling Date | Elapsed Time (Years) | Protective Concentration Level (mg/L) | Conc. Detected (mg/L) | Natural Log of Conc. (mg/L) | Degradation Rate from Natural Log ($K_{time}$) (mg/L per year) | Below Protective Conc. Level? (Yes/No) | Minimum Degradation Rate Required for Remedial Goals Natural Log ($K_{time}$) (mg/L per year) | Minimum Degradation Rate Met? (Yes/No) | Expected Remedial Goal Conc. (mg/L) | Expected Remedial Goal Conc. Met? (Yes/No) | Remedial Goals Being Met? (Yes/No) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 41401MW | Jan-95 | 0.0 | 0.00500 | 0.10400 | -2.26 | -- | -- | -- | -- | -- | -- | -- |
| | Mar-98 | 3.2 | 0.00500 | 0.11000 | -2.21 | -- | -- | -- | -- | -- | -- | -- |
| | Sep-98 | 3.7 | 0.00500 | 0.09200 | -2.39 | -- | -- | -- | -- | -- | -- | -- |
| | Feb-99 | 4.1 | 0.00500 | 0.10000 | -2.30 | -- | -- | -- | -- | -- | -- | -- |
| | Nov-99 | 4.9 | 0.00500 | 0.08100 | -2.51 | -0.037 | No | -0.132 | No | 0.05461 | No | No |
| | Jun-00 | 5.5 | 0.00500 | 0.09900 | -2.31 | -0.026 | No | -0.132 | No | 0.05044 | No | No |
| | Jun-01 | 6.5 | 0.00500 | 0.05900 | -2.83 | -0.067 | No | -0.132 | No | 0.04422 | No | No |
| | Jan-03 | 8.1 | 0.00500 | 0.03800 | -3.27 | -0.120 | No | -0.132 | No | 0.03585 | No | No |
| | Oct-03 | 8.8 | 0.00500 | 0.00690 | -4.98 | -0.251 | No | -0.132 | Yes | 0.03273 | Yes | Yes |
| | Jan-04 | 9.0 | 0.00500 | 0.01300 | -4.34 | -0.279 | No | -0.132 | Yes | 0.03159 | Yes | Yes |
| | Jul-04 | 9.6 | 0.00500 | 0.00920 | -4.69 | -0.304 | No | -0.132 | Yes | 0.02940 | Yes | Yes |
| | Oct-04 | 9.8 | 0.00500 | 0.00500 | -5.30 | -0.339 | No | -0.132 | Yes | 0.02861 | Less Than PCL | Less Than PCL |
| | Oct-05 | 10.8 | 0.00500 | 0.01600 | -4.14 | -0.313 | No | -0.132 | Yes | 0.02502 | Yes | Yes |
| | May-06 | 11.3 | 0.00500 | 0.01200 | -4.42 | -0.298 | No | -0.132 | Yes | 0.02327 | Yes | Yes |
| | Aug-06 | 11.6 | 0.00500 | 0.01600 | -4.14 | -0.279 | No | -0.132 | Yes | 0.02246 | Yes | Yes |
| | May-07 | 12.3 | 0.00500 | 0.01500 | -4.20 | -0.260 | No | -0.132 | Yes | 0.02040 | Yes | Yes |
| | Sep-07 | 12.7 | 0.00500 | 0.02000 | -3.91 | -0.238 | No | -0.132 | Yes | 0.01951 | No | Evaluate Further |
| | Jan-08 | 13.0 | 0.00500 | 0.00810 | -4.82 | -0.239 | No | -0.132 | Yes | 0.01866 | Yes | Yes |
| | Jul-08 | 13.5 | 0.00500 | 0.02690 | -3.62 | -0.214 | No | -0.132 | Yes | 0.01748 | No | Evaluate Further |
| | Jan-09 | 14.0 | 0.00500 | 0.01920 | -3.95 | -0.198 | No | -0.132 | Yes | 0.01632 | No | Evaluate Further |
| | Jul-09 | 14.5 | 0.00500 | 0.02030 | -3.90 | -0.183 | No | -0.132 | Yes | 0.01528 | No | Evaluate Further |
| | Jan-10 | 15.0 | 0.00500 | 0.01500 | -4.20 | -0.174 | No | -0.132 | Yes | 0.01432 | No | Evaluate Further |
| | Jul-10 | 15.5 | 0.00500 | 0.02170 | -3.83 | -0.160 | No | -0.132 | Yes | 0.01340 | No | Evaluate Further |
| | Jan-11 | 16.0 | 0.00500 | 0.01930 | -3.95 | -0.150 | No | -0.132 | Yes | 0.01254 | No | Evaluate Further |
| | Jul-11 | 16.6 | 0.00500 | 0.03160 JL | -3.45 | -0.133 | No | -0.132 | Yes | 0.01169 | No | Evaluate Further |
| | Jan-12 | 17.0 | 0.00500 | 0.03820 | -3.26 | -0.116 | No | -0.132 | No | 0.01100 | No | No |
| | Jul-12 | 17.5 | 0.00500 | 0.02730 | -3.60 | -0.106 | No | -0.132 | No | 0.01031 | No | No |
| | Jan-13 | 18.0 | 0.00500 | 0.0231 | -3.77 | -0.098 | No | -0.132 | No | 0.00965 | No | No |
| | Jul-13 | 18.5 | 0.00500 | 0.0321 | -3.44 | -0.088 | No | -0.132 | No | 0.00901 | No | No |
| | Feb-14 | 19.1 | 0.00500 | 0.0147 | -4.22 | -0.086 | No | -0.132 | No | 0.00831 | No | No |
| | Jul-14 | 19.5 | 0.00500 | 0.0184 | -4.00 | -0.083 | No | -0.132 | No | 0.00790 | No | No |
| | Jan-15 | 20.0 | 0.00500 | 0.0189 | -3.97 | -0.079 | No | -0.132 | No | 0.00738 | No | No |
| | Jul-15 | 15.5 | 0.00500 | 0.0306 | -3.49 | -0.077 | No | -0.132 | No | 0.00692 | No | No |
| | Jan-16 | 16.0 | 0.00500 | 0.0191 | -3.96 | -0.077 | No | -0.132 | No | 0.00647 | No | No |
| | Jul-16 | 16.5 | 0.00500 | 0.02390 | -3.73 | -0.076 | No | -0.132 | No | 0.00606 | No | No |

**Table 4-4**

**Concentration vs. Time with Attenuation Action Levels**
**SWMU 138 Plume**
**2016 RAER**

**Former NAS Dallas, Texas**


| Monitoring Well ID | Sampling Date | Elapsed Time (Years) | Protective Concentration Level (mg/L) | Conc. Detected (mg/L) | Natural Log of Conc. (mg/L) | Degradation Rate from Natural Log ($K_{time}$) (mg/L per year) | Below Protective Conc. Level? (Yes/No) | Minimum Degradation Rate Required for Remedial Goals Natural Log ($K_{time}$) (mg/L per year) | Minimum Degradation Rate Met? (Yes/No) | Expected Remedial Goal Conc. (mg/L) | Expected Remedial Goal Conc. Met? (Yes/No) | Remedial Goals Being Met? (Yes/No) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 414B70MW | Jan-00 | 0.0 | 0.00500 | 0.00500 U | -8.00 | -- | -- | -- | -- | -- | -- | -- |
| | Jun-00 | 0.4 | 0.00500 | 0.00500 U | -8.00 | -- | -- | -- | -- | -- | -- | -- |
| | Jun-01 | 1.4 | 0.00500 | 0.00500 U | -8.00 | -- | -- | -- | -- | -- | -- | -- |
| | Jan-03 | 3.0 | 0.00500 | 0.00100 U | -8.00 | -- | -- | -- | -- | -- | -- | -- |
| | May-03 | 3.3 | 0.00500 | 0.00100 U | -8.00 | -- | Yes | NA | NA | NA | Less Than PCL | Less Than PCL |
| | Dec-03 | 3.9 | 0.00500 | 0.00024 U | -8.00 | -- | Yes | NA | NA | NA | Less Than PCL | Less Than PCL |
| | Oct-04 | 4.7 | 0.00500 | 0.00021 U | -8.00 | -- | Yes | NA | NA | NA | Less Than PCL | Less Than PCL |
| | Oct-05 | 5.7 | 0.00500 | 0.00040 U | -8.00 | -- | Yes | NA | NA | NA | Less Than PCL | Less Than PCL |
| | May-06 | 6.3 | 0.00500 | 0.00060 U | -8.00 | -- | Yes | NA | NA | NA | Less Than PCL | Less Than PCL |
| | Aug-06 | 6.6 | 0.00500 | 0.00060 U | -8.00 | -- | Yes | NA | NA | NA | Less Than PCL | Less Than PCL |
| | May-07 | 7.3 | 0.00500 | 0.00014 U | -8.00 | -- | Yes | NA | NA | NA | Less Than PCL | Less Than PCL |
| | Sep-07 | 7.6 | 0.00500 | 0.00010 U | -8.00 | -- | Yes | NA | NA | NA | Less Than PCL | Less Than PCL |
| | Jan-08 | 8.0 | 0.00500 | 0.00460 U | -8.00 | -- | Yes | NA | NA | NA | Less Than PCL | Less Than PCL |
| | Jul-08 | 8.5 | 0.00500 | 0.00022 U | -8.00 | -- | Yes | NA | NA | NA | Less Than PCL | Less Than PCL |
| | Jan-09 | 9.0 | 0.00500 | 0.00022 U | -8.00 | -- | Yes | NA | NA | NA | Less Than PCL | Less Than PCL |
| | Jul-09 | 9.5 | 0.00500 | 0.00022 U | -8.00 | -- | Yes | NA | NA | NA | Less Than PCL | Less Than PCL |
| | Jan-10 | 10.0 | 0.00500 | 0.00022 U | -8.00 | -- | Yes | NA | NA | NA | Less Than PCL | Less Than PCL |
| | Jul-10 | 10.5 | 0.00500 | 0.00044 U | -8.00 | -- | Yes | NA | NA | NA | Less Than PCL | Less Than PCL |
| | Jan-11 | 11.0 | 0.00500 | 0.00025 U | -8.00 | -- | Yes | NA | NA | NA | Less Than PCL | Less Than PCL |
| | Jul-11 | 11.5 | 0.00500 | 0.00025 U | -8.00 | -- | Yes | NA | NA | NA | Less Than PCL | Less Than PCL |
| | Jan-12 | 12.0 | 0.00500 | 0.00025 U | -8.00 | -- | Yes | NA | NA | NA | Less Than PCL | Less Than PCL |
| | Jul-12 | 12.5 | 0.00500 | 0.00025 U | -8.00 | -- | Yes | NA | NA | NA | Less Than PCL | Less Than PCL |
| | Jan-13 | 13.0 | 0.00500 | 0.00032 U | -8.00 | -- | Yes | NA | NA | NA | Less Than PCL | Less Than PCL |
| | Jul-13 | 13.5 | 0.00500 | 0.00032 U | -8.00 | -- | Yes | NA | NA | NA | Less Than PCL | Less Than PCL |
| | Feb-14 | 14.1 | 0.00500 | 0.00026 U | -8.00 | -- | Yes | NA | NA | NA | Less Than PCL | Less Than PCL |
| | Jul-14 | 14.5 | 0.00500 | 0.00025 U | -8.00 | -- | Yes | NA | NA | NA | Less Than PCL | Less Than PCL |
| | Jan-15 | 15.0 | 0.00500 | 0.00025 U | -8.00 | -- | Yes | NA | NA | NA | Less Than PCL | Less Than PCL |
| | Jul-15 | 15.5 | 0.00500 | 0.00025 U | -8.00 | -- | Yes | NA | NA | NA | Less Than PCL | Less Than PCL |
| | Jan-16 | Well Abandoned | | | | | | | | | | |

**Table 4-4**

**Concentration vs. Time with Attenuation Action Levels**
**SWMU 138 Plume**
**2016 RAER**

**Former NAS Dallas, Texas**


| Monitoring Well ID | Sampling Date | Elapsed Time (Years) | Protective Concentration Level (mg/L) | Conc. Detected (mg/L) | Natural Log of Conc. (mg/L) | Degradation Rate from Natural Log ($K_{time}$) (mg/L per year) | Below Protective Conc. Level? (Yes/No) | Minimum Degradation Rate Required for Remedial Goals Natural Log ($K_{time}$) (mg/L per year) | Minimum Degradation Rate Met? (Yes/No) | Expected Remedial Goal Conc. (mg/L) | Expected Remedial Goal Conc. Met? (Yes/No) | Remedial Goals Being Met? (Yes/No) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Trichloroethene** | | | | | | | | | | | | |
| 414B75MW | Jun-00 | 0.0 | 0.00500 | 0.00420 | -5.47 | -- | -- | -- | -- | -- | -- | -- |
| | May-03 | 2.9 | 0.00500 | 0.00790 | -4.84 | -- | -- | -- | -- | -- | -- | -- |
| | Sep-03 | 3.2 | 0.00500 | 0.01400 J | -4.27 | -- | -- | -- | -- | -- | -- | -- |
| | Dec-03 | 3.5 | 0.00500 | 0.01700 | -4.07 | -- | -- | -- | -- | -- | -- | -- |
| | Jul-04 | 4.1 | 0.00500 | 0.01800 J | -4.02 | 0.361 | No | 0.008 | No | 0.00452 | No | No |
| | Oct-04 | 4.4 | 0.00500 | 0.00450 | -5.40 | 0.208 | Yes | 0.008 | No | 0.00452 | Less Than PCL | Less Than PCL |
| | Oct-05 | 5.4 | 0.00500 | 0.02600 | -3.65 | 0.271 | No | 0.008 | No | 0.00456 | No | No |
| | May-06 | 5.9 | 0.00500 | 0.02900 | -3.54 | 0.301 | No | 0.008 | No | 0.00458 | No | No |
| | Aug-06 | 6.2 | 0.00500 | 0.02800 | -3.58 | 0.307 | No | 0.008 | No | 0.00459 | No | No |
| | May-07 | 6.9 | 0.00500 | 0.03000 | -3.51 | 0.300 | No | 0.008 | No | 0.00461 | No | No |
| | Sep-07 | 7.3 | 0.00500 | 0.01100 | -4.51 | 0.228 | No | 0.008 | No | 0.00462 | No | No |
| | Jan-08 | 7.6 | 0.00500 | 0.01500 | -4.20 | 0.194 | No | 0.008 | No | 0.00464 | No | No |
| | Jul-08 | 8.1 | 0.00500 | 0.00300 | -5.81 | 0.088 | Yes | 0.008 | No | 0.00465 | Less Than PCL | Less Than PCL |
| | Jan-09 | 8.6 | 0.00500 | 0.02160 | -3.84 | 0.098 | No | 0.008 | No | 0.00467 | No | No |
| | Jul-09 | 9.1 | 0.00500 | 0.02070 | -3.88 | 0.101 | No | 0.008 | No | 0.00469 | No | No |
| | Jan-10 | 9.6 | 0.00500 | 0.03390 | -3.38 | 0.120 | No | 0.008 | No | 0.00471 | No | No |
| | Jul-10 | 10.1 | 0.00500 | 0.00110 | -6.81 | 0.017 | Yes | 0.008 | No | 0.00472 | Less Than PCL | Less Than PCL |
| | Jan-11 | 10.6 | 0.00500 | 0.01370 | -4.29 | 0.018 | No | 0.008 | No | 0.00474 | No | No |
| | Jul-11 | 11.1 | 0.00500 | 0.01800 | -4.02 | 0.026 | No | 0.008 | No | 0.00476 | No | No |
| | Jan-12 | 11.6 | 0.00500 | 0.02490 | -3.69 | 0.040 | No | 0.008 | No | 0.00478 | No | No |
| | Jul-12 | 12.1 | 0.00500 | 0.02780 | -3.58 | 0.053 | No | 0.008 | No | 0.00480 | No | No |
| | Jan-13 | 12.6 | 0.00500 | 0.0020 | -6.21 | 0.005 | Yes | 0.008 | Yes | 0.00481 | Less Than PCL | Less Than PCL |
| | Jul-13 | 13.1 | 0.00500 | 0.00091 J | -7.00 | -0.048 | Yes | 0.008 | Yes | 0.00483 | Less Than PCL | Less Than PCL |
| | Feb-14 | 13.7 | 0.00500 | 0.01010 | -4.60 | -0.044 | No | 0.008 | Yes | 0.00486 | No | Evaluate Further |
| | Jul-14 | 14.1 | 0.00500 | 0.01230 | -4.40 | -0.038 | No | 0.008 | Yes | 0.00487 | No | Evaluate Further |
| | Jan-15 | 14.6 | 0.00500 | 0.01100 | -4.51 | -0.034 | No | 0.008 | Yes | 0.00489 | No | Evaluate Further |
| | Jul-15 | 15.5 | 0.00500 | 0.01260 | -4.37 | -0.028 | No | 0.008 | Yes | 0.00491 | No | Evaluate Further |
| | Jan-16 | 16.0 | 0.00500 | 0.00704 | -4.96 | -0.032 | No | 0.008 | Yes | 0.00493 | No | Evaluate Further |
| | Jul-16 | 16.5 | 0.00500 | 0.01790 | -4.02 | -0.022 | No | 0.008 | Yes | 0.00495 | No | Evaluate Further |

**Table 4-4**

**Concentration vs. Time with Attenuation Action Levels**
**SWMU 138 Plume**
**2016 RAER**

**Former NAS Dallas, Texas**


| Monitoring Well ID | Sampling Date | Elapsed Time (Years) | Protective Concentration Level (mg/L) | Conc. Detected (mg/L) | Natural Log of Conc. (mg/L) | Degradation Rate from Natural Log ($K_{time}$) (mg/L per year) | Below Protective Conc. Level? (Yes/No) | Minimum Degradation Rate Required for Remedial Goals Natural Log ($K_{time}$) (mg/L per year) | Minimum Degradation Rate Met? (Yes/No) | Expected Remedial Goal Conc. (mg/L) | Expected Remedial Goal Conc. Met? (Yes/No) | Remedial Goals Being Met? (Yes/No) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 41401MW | Jan-95 | 0.0 | 0.00500 | 0.04600 | -3.08 | -- | -- | -- | -- | -- | -- | -- |
| | Mar-98 | 3.2 | 0.00500 | 0.04700 | -3.06 | -- | -- | -- | -- | -- | -- | -- |
| | Sep-98 | 3.7 | 0.00500 | 0.04600 | -3.08 | -- | -- | -- | -- | -- | -- | -- |
| | Feb-99 | 4.1 | 0.00500 | 0.04800 | -3.04 | -- | -- | -- | -- | -- | -- | -- |
| | Nov-99 | 4.9 | 0.00500 | 0.04200 | -3.17 | -0.008 | No | -0.096 | No | 0.02872 | No | No |
| | Jun-00 | 5.5 | 0.00500 | 0.04400 | -3.12 | -0.010 | No | -0.096 | No | 0.02710 | No | No |
| | Jun-01 | 6.5 | 0.00500 | 0.04400 | -3.12 | -0.010 | No | -0.096 | No | 0.02462 | No | No |
| | Jan-03 | 8.1 | 0.00500 | 0.06200 | -2.78 | 0.021 | No | -0.096 | No | 0.02111 | No | No |
| | Oct-03 | 8.8 | 0.00500 | 0.05800 | -2.85 | 0.029 | No | -0.096 | No | 0.01975 | No | No |
| | Jan-04 | 9.0 | 0.00500 | 0.05400 | -2.92 | 0.029 | No | -0.096 | No | 0.01925 | No | No |
| | Jul-04 | 9.6 | 0.00500 | 0.04600 | -3.08 | 0.021 | No | -0.096 | No | 0.01826 | No | No |
| | Oct-04 | 9.8 | 0.00500 | 0.05100 | -2.98 | 0.020 | No | -0.096 | No | 0.01790 | No | No |
| | Oct-05 | 10.8 | 0.00500 | 0.04600 | -3.08 | 0.015 | No | -0.096 | No | 0.01623 | No | No |
| | May-06 | 11.3 | 0.00500 | 0.04200 | -3.17 | 0.008 | No | -0.096 | No | 0.01539 | No | No |
| | Aug-06 | 11.6 | 0.00500 | 0.03800 | -3.27 | 0.001 | No | -0.096 | No | 0.01500 | No | No |
| | May-07 | 12.3 | 0.00500 | 0.03200 | -3.44 | -0.009 | No | -0.096 | No | 0.01398 | No | No |
| | Sep-07 | 12.7 | 0.00500 | 0.03100 | -3.47 | -0.017 | No | -0.096 | No | 0.01353 | No | No |
| | Jan-08 | 13.0 | 0.00500 | 0.03800 | -3.27 | -0.019 | No | -0.096 | No | 0.01310 | No | No |
| | Jul-08 | 13.5 | 0.00500 | 0.03610 | -3.32 | -0.021 | No | -0.096 | No | 0.01248 | No | No |
| | Jan-09 | 14.0 | 0.00500 | 0.02990 | -3.51 | -0.026 | No | -0.096 | No | 0.01188 | No | No |
| | Jul-09 | 14.5 | 0.00500 | 0.02780 | -3.58 | -0.031 | No | -0.096 | No | 0.01132 | No | No |
| | Jan-10 | 15.0 | 0.00500 | 0.02220 | -3.81 | -0.038 | No | -0.096 | No | 0.01079 | No | No |
| | Jul-10 | 15.5 | 0.00500 | 0.02960 | -3.52 | -0.039 | No | -0.096 | No | 0.01028 | No | No |
| | Jan-11 | 16.0 | 0.00500 | 0.03150 | -3.46 | -0.039 | No | -0.096 | No | 0.00979 | No | No |
| | Jul-11 | 16.6 | 0.00500 | 0.03540 | -3.34 | -0.037 | No | -0.096 | No | 0.00931 | No | No |
| | Jan-12 | 17.0 | 0.00500 | 0.04420 | -3.12 | -0.033 | No | -0.096 | No | 0.00890 | No | No |
| | Jul-12 | 17.5 | 0.00500 | 0.02600 | -3.65 | -0.035 | No | -0.096 | No | 0.00848 | No | No |
| | Jan-13 | 18.0 | 0.00500 | 0.0321 JH | -3.44 | -0.034 | No | -0.096 | No | 0.00809 | No | No |
| | Jul-13 | 18.5 | 0.00500 | 0.03050 | -3.49 | -0.034 | No | -0.096 | No | 0.00769 | No | No |
| | Feb-14 | 19.1 | 0.00500 | 0.02330 | -3.76 | -0.037 | No | -0.096 | No | 0.00725 | No | No |
| | Jul-14 | 19.5 | 0.00500 | 0.02510 | -3.68 | -0.038 | No | -0.096 | No | 0.00698 | No | No |
| | Jan-15 | 20.0 | 0.00500 | 0.02640 | -3.63 | -0.038 | No | -0.096 | No | 0.00665 | No | No |
| | Jul-15 | 15.5 | 0.00500 | 0.02630 | -3.64 | -0.039 | No | -0.096 | No | 0.00634 | No | No |
| | Jan-16 | 16.0 | 0.00500 | 0.02120 | -3.85 | -0.041 | No | -0.096 | No | 0.00603 | No | No |
| | Jul-16 | 16.5 | 0.00500 | 0.0239 | -3.73 | -0.042 | No | -0.096 | No | 0.00575 | No | No |

**Table 4-4**

**Concentration vs. Time with Attenuation Action Levels**
**SWMU 138 Plume**
**2016 RAER**

**Former NAS Dallas, Texas**


| Monitoring Well ID | Sampling Date | Elapsed Time (Years) | Protective Concentration Level (mg/L) | Conc. Detected (mg/L) | Natural Log of Conc. (mg/L) | Degradation Rate from Natural Log ($K_{time}$) (mg/L per year) | Below Protective Conc. Level? (Yes/No) | Minimum Degradation Rate Required for Remedial Goals Natural Log ($K_{time}$) (mg/L per year) | Minimum Degradation Rate Met? (Yes/No) | Expected Remedial Goal Conc. (mg/L) | Expected Remedial Goal Conc. Met? (Yes/No) | Remedial Goals Being Met? (Yes/No) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 414B70MW | Jan-00 | 0.0 | 0.00500 | 0.00500 U | -8.00 | -- | Yes | -- | No | -- | Less Than PCL | Less Than PCL |
| | Jun-00 | 0.4 | 0.00500 | 0.00500 U | -8.00 | -- | Yes | -- | No | -- | Less Than PCL | Less Than PCL |
| | Jun-01 | 1.4 | 0.00500 | 0.00500 U | -8.00 | -- | Yes | -- | No | -- | Less Than PCL | Less Than PCL |
| | Jan-03 | 3.0 | 0.00500 | 0.00100 U | -8.00 | -- | Yes | NA | NA | NA | Less Than PCL | Less Than PCL |
| | May-03 | 3.3 | 0.00500 | 0.00100 U | -8.00 | -- | Yes | NA | NA | NA | Less Than PCL | Less Than PCL |
| | Dec-03 | 3.9 | 0.00500 | 0.00010 U | -8.00 | -- | Yes | NA | NA | NA | Less Than PCL | Less Than PCL |
| | Oct-04 | 4.7 | 0.00500 | 0.00022 U | -8.00 | -- | Yes | NA | NA | NA | Less Than PCL | Less Than PCL |
| | Oct-05 | 5.7 | 0.00500 | 0.00030 U | -8.00 | -- | Yes | NA | NA | NA | Less Than PCL | Less Than PCL |
| | May-06 | 6.3 | 0.00500 | 0.00040 U | -8.00 | -- | Yes | NA | NA | NA | Less Than PCL | Less Than PCL |
| | Aug-06 | 6.6 | 0.00500 | 0.00040 U | -8.00 | -- | Yes | NA | NA | NA | Less Than PCL | Less Than PCL |
| | May-07 | 7.3 | 0.00500 | 0.00014 U | -8.00 | -- | Yes | NA | NA | NA | Less Than PCL | Less Than PCL |
| | Sep-07 | 7.6 | 0.00500 | 0.00023 U | -8.00 | -- | Yes | NA | NA | NA | Less Than PCL | Less Than PCL |
| | Jan-08 | 8.0 | 0.00500 | 0.00530 U | -8.00 | -- | Yes | NA | NA | NA | Less Than PCL | Less Than PCL |
| | Jul-08 | 8.5 | 0.00500 | 0.00032 U | -8.00 | -- | Yes | NA | NA | NA | Less Than PCL | Less Than PCL |
| | Jan-09 | 9.0 | 0.00500 | 0.00032 U | -8.00 | -- | Yes | NA | NA | NA | Less Than PCL | Less Than PCL |
| | Jul-09 | 9.5 | 0.00500 | 0.00032 U | -8.00 | -- | Yes | NA | NA | NA | Less Than PCL | Less Than PCL |
| | Jan-10 | 10.0 | 0.00500 | 0.00032 U | -8.00 | -- | Yes | NA | NA | NA | Less Than PCL | Less Than PCL |
| | Jul-10 | 10.5 | 0.00500 | 0.00024 U | -8.00 | -- | Yes | NA | NA | NA | Less Than PCL | Less Than PCL |
| | Jan-11 | 11.0 | 0.00500 | 0.00026 U | -8.00 | -- | Yes | NA | NA | NA | Less Than PCL | Less Than PCL |
| | Jul-11 | 11.5 | 0.00500 | 0.00026 U | -8.00 | -- | Yes | NA | NA | NA | Less Than PCL | Less Than PCL |
| | Jan-12 | 12.0 | 0.00500 | 0.00026 U | -8.00 | -- | Yes | NA | NA | NA | Less Than PCL | Less Than PCL |
| | Jul-12 | 12.5 | 0.00500 | 0.00026 U | -8.00 | -- | Yes | NA | NA | NA | Less Than PCL | Less Than PCL |
| | Jan-13 | 13.0 | 0.00500 | 0.00031 U | -8.00 | -- | Yes | NA | NA | NA | Less Than PCL | Less Than PCL |
| | Jul-13 | 13.5 | 0.00500 | 0.00031 U | -8.00 | -- | Yes | NA | NA | NA | Less Than PCL | Less Than PCL |
| | Feb-14 | 14.1 | 0.00500 | 0.0003 U | -8.00 | -- | Yes | NA | NA | NA | Less Than PCL | Less Than PCL |
| | Jul-14 | 14.5 | 0.00500 | 0.00025 U | -8.00 | -- | Yes | NA | NA | NA | Less Than PCL | Less Than PCL |
| | Jan-15 | 15.0 | 0.00500 | 0.00025 U | -8.00 | -- | Yes | NA | NA | NA | Less Than PCL | Less Than PCL |
| | Jul-15 | 15.5 | 0.00500 | 0.00025 U | -8.00 | -- | Yes | NA | NA | NA | Less Than PCL | Less Than PCL |
| | Jan-16 | Well Abandoned | | | | | | | | | | |

**Table 4-4**

**Concentration vs. Time with Attenuation Action Levels**
**SWMU 138 Plume**
**2016 RAER**

**Former NAS Dallas, Texas**


| Monitoring Well ID | Sampling Date | Elapsed Time (Years) | Protective Concentration Level (mg/L) | Conc. Detected (mg/L) | Natural Log of Conc. (mg/L) | Degradation Rate from Natural Log ($K_{time}$) (mg/L per year) | Below Protective Conc. Level? (Yes/No) | Minimum Degradation Rate Required for Remedial Goals Natural Log ($K_{time}$) (mg/L per year) | Minimum Degradation Rate Met? (Yes/No) | Expected Remedial Goal Conc. (mg/L) | Expected Remedial Goal Conc. Met? (Yes/No) | Remedial Goals Being Met? (Yes/No) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **cis-1,2-Dichloroethene** | | | | | | | | | | | | |
| 414B75MW | Jun-00 | 0.0 | 0.07000 | 0.00070 | -7.26 | -- | -- | -- | -- | -- | -- | -- |
| | May-03 | 2.9 | 0.07000 | 0.00170 | -6.38 | -- | -- | -- | -- | -- | -- | -- |
| | Sep-03 | 3.2 | 0.07000 | 0.00450 J | -5.40 | -- | -- | -- | -- | -- | -- | -- |
| | Dec-03 | 3.5 | 0.07000 | 0.00510 | -5.28 | -- | -- | -- | -- | -- | -- | -- |
| | Jul-04 | 4.1 | 0.07000 | 0.00610 J | -5.10 | -- | Yes | NA | NA | NA | Less Than PCL | Less Than PCL |
| | Oct-04 | 4.4 | 0.07000 | 0.00230 | -6.07 | -- | Yes | NA | NA | NA | Less Than PCL | Less Than PCL |
| | Oct-05 | 5.4 | 0.07000 | 0.01900 | -3.96 | -- | Yes | NA | NA | NA | Less Than PCL | Less Than PCL |
| | May-06 | 5.9 | 0.07000 | 0.01700 | -4.07 | -- | Yes | NA | NA | NA | Less Than PCL | Less Than PCL |
| | Aug-06 | 6.2 | 0.07000 | 0.01800 | -4.02 | -- | Yes | NA | NA | NA | Less Than PCL | Less Than PCL |
| | May-07 | 6.9 | 0.07000 | 0.00190 | -6.27 | -- | Yes | NA | NA | NA | Less Than PCL | Less Than PCL |
| | Sep-07 | 7.3 | 0.07000 | 0.00620 | -5.08 | -- | Yes | NA | NA | NA | Less Than PCL | Less Than PCL |
| | Jan-08 | 7.6 | 0.07000 | 0.00900 | -4.71 | -- | Yes | NA | NA | NA | Less Than PCL | Less Than PCL |
| | Jul-08 | 8.1 | 0.07000 | 0.00560 | -5.18 | -- | Yes | NA | NA | NA | Less Than PCL | Less Than PCL |
| | Jan-09 | 8.6 | 0.07000 | 0.01340 | -4.31 | -- | Yes | NA | NA | NA | Less Than PCL | Less Than PCL |
| | Jul-09 | 9.1 | 0.07000 | 0.01140 | -4.47 | -- | Yes | NA | NA | NA | Less Than PCL | Less Than PCL |
| | Jan-10 | 9.6 | 0.07000 | 0.01890 | -3.97 | -- | Yes | NA | NA | NA | Less Than PCL | Less Than PCL |
| | Jul-10 | 10.1 | 0.07000 | 0.03730 | -3.29 | -- | Yes | NA | NA | NA | Less Than PCL | Less Than PCL |
| | Jan-11 | 10.6 | 0.07000 | 0.03000 | -3.51 | -- | Yes | NA | NA | NA | Less Than PCL | Less Than PCL |
| | Jul-11 | 11.1 | 0.07000 | 0.01950 | -3.94 | -- | Yes | NA | NA | NA | Less Than PCL | Less Than PCL |
| | Jan-12 | 11.6 | 0.07000 | 0.02020 | -3.90 | -- | Yes | NA | NA | NA | Less Than PCL | Less Than PCL |
| | Jul-12 | 12.1 | 0.07000 | 0.02130 | -3.85 | -- | Yes | NA | NA | NA | Less Than PCL | Less Than PCL |
| | Jan-13 | 12.6 | 0.07000 | 0.0568 | -2.87 | -- | Yes | NA | NA | NA | Less Than PCL | Less Than PCL |
| | Jul-13 | 13.1 | 0.07000 | 0.03350 | -3.40 | -- | Yes | NA | NA | NA | Less Than PCL | Less Than PCL |
| | Feb-14 | 13.7 | 0.07000 | 0.02380 | -3.74 | -- | Yes | NA | NA | NA | Less Than PCL | Less Than PCL |
| | Jul-14 | 14.1 | 0.07000 | 0.0172 | -4.06 | -- | Yes | NA | NA | NA | Less Than PCL | Less Than PCL |
| | Jan-15 | 14.6 | 0.07000 | 0.01120 | -4.49 | -- | Yes | NA | NA | NA | Less Than PCL | Less Than PCL |
| | Jul-15 | 15.5 | 0.07000 | 0.01410 | -4.26 | -- | Yes | NA | NA | NA | Less Than PCL | Less Than PCL |
| | Jan-16 | 16.0 | 0.07000 | 0.00482 | -5.33 | -- | Yes | NA | NA | NA | Less Than PCL | Less Than PCL |
| | Jul-16 | 16.5 | 0.07000 | 0.012 | -4.42 | -- | Yes | NA | NA | NA | Less Than PCL | Less Than PCL |

**Table 4-4**

**Concentration vs. Time with Attenuation Action Levels**
**SWMU 138 Plume**
**2016 RAER**

**Former NAS Dallas, Texas**


| Monitoring Well ID | Sampling Date | Elapsed Time (Years) | Protective Concentration Level (mg/L) | Conc. Detected (mg/L) | Natural Log of Conc. (mg/L) | Degradation Rate from Natural Log ($K_{time}$) (mg/L per year) | Below Protective Conc. Level? (Yes/No) | Minimum Degradation Rate Required for Remedial Goals Natural Log ($K_{time}$) (mg/L per year) | Minimum Degradation Rate Met? (Yes/No) | Expected Remedial Goal Conc. (mg/L) | Expected Remedial Goal Conc. Met? (Yes/No) | Remedial Goals Being Met? (Yes/No) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 41401MW | Jan-95 | 0.0 | 0.07000 | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| | Mar-98 | 3.2 | 0.07000 | 0.01200 | -4.42 | -- | -- | -- | -- | -- | -- | -- |
| | Sep-98 | 3.7 | 0.07000 | 0.00880 J | -4.73 | -- | -- | -- | -- | -- | -- | -- |
| | Feb-99 | 4.1 | 0.07000 | 0.01200 | -4.42 | -- | -- | -- | -- | -- | -- | -- |
| | Nov-99 | 4.9 | 0.07000 | 0.01200 | -4.42 | -- | Yes | NA | NA | NA | Less Than PCL | Less Than PCL |
| | Jun-00 | 5.5 | 0.07000 | 0.01200 | -4.42 | -- | Yes | NA | NA | NA | Less Than PCL | Less Than PCL |
| | Jun-01 | 6.5 | 0.07000 | 0.02100 | -3.86 | -- | Yes | NA | NA | NA | Less Than PCL | Less Than PCL |
| | Jan-03 | 8.1 | 0.07000 | 0.04700 | -3.06 | -- | Yes | NA | NA | NA | Less Than PCL | Less Than PCL |
| | Oct-03 | 8.8 | 0.07000 | 0.05200 | -2.96 | -- | Yes | NA | NA | NA | Less Than PCL | Less Than PCL |
| | Jan-04 | 9.0 | 0.07000 | 0.03800 | -3.27 | -- | Yes | NA | NA | NA | Less Than PCL | Less Than PCL |
| | Jul-04 | 9.6 | 0.07000 | 0.05600 | -2.88 | -- | Yes | NA | NA | NA | Less Than PCL | Less Than PCL |
| | Oct-04 | 9.8 | 0.07000 | 0.04300 | -3.15 | -- | Yes | NA | NA | NA | Less Than PCL | Less Than PCL |
| | Oct-05 | 10.8 | 0.07000 | 0.03600 | -3.32 | -- | Yes | NA | NA | NA | Less Than PCL | Less Than PCL |
| | May-06 | 11.3 | 0.07000 | 0.04600 | -3.08 | -- | Yes | NA | NA | NA | Less Than PCL | Less Than PCL |
| | Aug-06 | 11.6 | 0.07000 | 0.02700 | -3.61 | -- | Yes | NA | NA | NA | Less Than PCL | Less Than PCL |
| | May-07 | 12.3 | 0.07000 | 0.04100 | -3.19 | -- | Yes | NA | NA | NA | Less Than PCL | Less Than PCL |
| | Sep-07 | 12.7 | 0.07000 | 0.04000 | -3.22 | -- | Yes | NA | NA | NA | Less Than PCL | Less Than PCL |
| | Jan-08 | 13.0 | 0.07000 | 0.03300 | -3.41 | -- | Yes | NA | NA | NA | Less Than PCL | Less Than PCL |
| | Jul-08 | 13.5 | 0.07000 | 0.03110 | -3.47 | -- | Yes | NA | NA | NA | Less Than PCL | Less Than PCL |
| | Jan-09 | 14.0 | 0.07000 | 0.02150 | -3.84 | -- | Yes | NA | NA | NA | Less Than PCL | Less Than PCL |
| | Jul-09 | 14.5 | 0.07000 | 0.01670 | -4.09 | -- | Yes | NA | NA | NA | Less Than PCL | Less Than PCL |
| | Jan-10 | 15.0 | 0.07000 | 0.03750 | -3.28 | -- | Yes | NA | NA | NA | Less Than PCL | Less Than PCL |
| | Jul-10 | 15.5 | 0.07000 | 0.03590 | -3.33 | -- | Yes | NA | NA | NA | Less Than PCL | Less Than PCL |
| | Jan-11 | 16.0 | 0.07000 | 0.04380 | -3.13 | -- | Yes | NA | NA | NA | Less Than PCL | Less Than PCL |
| | Jul-11 | 16.6 | 0.07000 | 0.03350 | -3.40 | -- | Yes | NA | NA | NA | Less Than PCL | Less Than PCL |
| | Jan-12 | 17.0 | 0.07000 | 0.02440 | -3.71 | -- | Yes | NA | NA | NA | Less Than PCL | Less Than PCL |
| | Jul-12 | 17.5 | 0.07000 | 0.02530 | -3.68 | -- | Yes | NA | NA | NA | Less Than PCL | Less Than PCL |
| | Jan-13 | 18.0 | 0.07000 | 0.0265 | -3.63 | -- | Yes | NA | NA | NA | Less Than PCL | Less Than PCL |
| | Jul-13 | 18.5 | 0.07000 | 0.01940 | -3.94 | -- | Yes | NA | NA | NA | Less Than PCL | Less Than PCL |
| | Feb-14 | 19.1 | 0.07000 | 0.01550 | -4.17 | -- | Yes | NA | NA | NA | Less Than PCL | Less Than PCL |
| | Jul-14 | 19.5 | 0.07000 | 0.0159 | -4.14 | -- | Yes | NA | NA | NA | Less Than PCL | Less Than PCL |
| | Jan-15 | 20.0 | 0.07000 | 0.01580 | -4.15 | -- | Yes | NA | NA | NA | Less Than PCL | Less Than PCL |
| | Jul-15 | 15.5 | 0.07000 | 0.01510 | -4.19 | -- | Yes | NA | NA | NA | Less Than PCL | Less Than PCL |
| | Jan-16 | 16.0 | 0.07000 | 0.01920 | -3.95 | -- | Yes | NA | NA | NA | Less Than PCL | Less Than PCL |
| | Jul-16 | 16.5 | 0.07000 | 0.0168 | -4.09 | -- | Yes | NA | NA | NA | Less Than PCL | Less Than PCL |

**Table 4-4**

**Concentration vs. Time with Attenuation Action Levels**
**SWMU 138 Plume**
**2016 RAER**

**Former NAS Dallas, Texas**


| Monitoring Well ID | Sampling Date | Elapsed Time (Years) | Protective Concentration Level (mg/L) | Conc. Detected (mg/L) | Natural Log of Conc. (mg/L) | Degradation Rate from Natural Log ($K_{time}$) (mg/L per year) | Below Protective Conc. Level? (Yes/No) | Minimum Degradation Rate Required for Remedial Goals Natural Log ($K_{time}$) (mg/L per year) | Minimum Degradation Rate Met? (Yes/No) | Expected Remedial Goal Conc. (mg/L) | Expected Remedial Goal Conc. Met? (Yes/No) | Remedial Goals Being Met? (Yes/No) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 414B70MW | Jan-00 | 0.0 | 0.07000 | 0.00500 U | -8.00 | -- | -- | -- | -- | -- | -- | -- |
| | Jun-00 | 0.4 | 0.07000 | 0.00500 U | -8.00 | -- | -- | -- | -- | -- | -- | -- |
| | Jun-01 | 1.4 | 0.07000 | 0.00250 U | -8.00 | -- | -- | -- | -- | -- | -- | -- |
| | Jan-03 | 3.0 | 0.07000 | 0.00100 U | -8.00 | -- | Yes | NA | NA | NA | Less Than PCL | Less Than PCL |
| | May-03 | 3.3 | 0.07000 | 0.00050 U | -8.00 | -- | Yes | NA | NA | NA | Less Than PCL | Less Than PCL |
| | Dec-03 | 3.9 | 0.07000 | 0.00016 U | -8.00 | -- | Yes | NA | NA | NA | Less Than PCL | Less Than PCL |
| | Oct-04 | 4.7 | 0.07000 | 0.00027 U | -8.00 | -- | Yes | NA | NA | NA | Less Than PCL | Less Than PCL |
| | Oct-05 | 5.7 | 0.07000 | 0.00030 U | -8.00 | -- | Yes | NA | NA | NA | Less Than PCL | Less Than PCL |
| | May-06 | 6.3 | 0.07000 | 0.00050 U | -8.00 | -- | Yes | NA | NA | NA | Less Than PCL | Less Than PCL |
| | Aug-06 | 6.6 | 0.07000 | 0.00050 U | -8.00 | -- | Yes | NA | NA | NA | Less Than PCL | Less Than PCL |
| | May-07 | 7.3 | 0.07000 | 0.00045 U | -8.00 | -- | Yes | NA | NA | NA | Less Than PCL | Less Than PCL |
| | Sep-07 | 7.6 | 0.07000 | 0.00014 U | -8.00 | -- | Yes | NA | NA | NA | Less Than PCL | Less Than PCL |
| | Jan-08 | 8.0 | 0.07000 | 0.00320 U | -8.00 | -- | Yes | NA | NA | NA | Less Than PCL | Less Than PCL |
| | Jul-08 | 8.5 | 0.07000 | 0.00020 U | -8.00 | -- | Yes | NA | NA | NA | Less Than PCL | Less Than PCL |
| | Jan-09 | 9.0 | 0.07000 | 0.00100 | -6.91 | -- | Yes | NA | NA | NA | Less Than PCL | Less Than PCL |
| | Jul-09 | 9.5 | 0.07000 | 0.00020 U | -8.00 | -- | Yes | NA | NA | NA | Less Than PCL | Less Than PCL |
| | Jan-10 | 10.0 | 0.07000 | 0.00020 U | -8.00 | -- | Yes | NA | NA | NA | Less Than PCL | Less Than PCL |
| | Jul-10 | 10.5 | 0.07000 | 0.00032 U | -8.00 | -- | Yes | NA | NA | NA | Less Than PCL | Less Than PCL |
| | Jan-11 | 11.0 | 0.07000 | 0.00026 U | -8.00 | -- | Yes | NA | NA | NA | Less Than PCL | Less Than PCL |
| | Jul-11 | 11.5 | 0.07000 | 0.00026 U | -8.00 | -- | Yes | NA | NA | NA | Less Than PCL | Less Than PCL |
| | Jan-12 | 12.0 | 0.07000 | 0.00026 U | -8.00 | -- | Yes | NA | NA | NA | Less Than PCL | Less Than PCL |
| | Jul-12 | 12.5 | 0.07000 | 0.00026 U | -8.00 | -- | Yes | NA | NA | NA | Less Than PCL | Less Than PCL |
| | Jan-13 | 13.0 | 0.07000 | 0.00024 U | -8.00 | -- | Yes | NA | NA | NA | Less Than PCL | Less Than PCL |
| | Jul-13 | 13.5 | 0.07000 | 0.00024 U | -8.00 | -- | Yes | NA | NA | NA | Less Than PCL | Less Than PCL |
| | Feb-14 | 14.1 | 0.07000 | 0.00033 U | -8.00 | -- | Yes | NA | NA | NA | Less Than PCL | Less Than PCL |
| | Jul-14 | 14.5 | 0.07000 | 0.00025 U | -8.00 | -- | Yes | NA | NA | NA | Less Than PCL | Less Than PCL |
| | Jan-15 | 15.0 | 0.07000 | 0.00025 U | -8.00 | -- | Yes | NA | NA | NA | Less Than PCL | Less Than PCL |
| | Jul-15 | 15.5 | 0.07000 | 0.00025 U | -8.00 | -- | Yes | NA | NA | NA | Less Than PCL | Less Than PCL |
| | Jan-16 | Well Abandoned | | | | | | | | | | |

mg/L - milligrams per liter
NA - Not Applicable
NS - Not Sampled

***Notes:***

Shaded areas indicate an exceedance of the $^{GW}GW_{Ing}$ PCL.

For graphing purposes non-detect concentrations have been assigned a natural log value of -8.

Refer to Appendix 2E for calculation of Alternate Attenuation Levels

Monitoring Well 414B70MW was plugged and abandoned in April 2016.

Analytical Result Qualifiers:

J - Indicates that the chemical was detected. However, the associated numerical result may not be a precise representation of the amount that is actually present in the sample. The laboratory reported concentration is considered to be an estimate of the true concentration.

U - Indicates that the chemical was not detected at the numerical detection limit (sample-specific quantitation limit) noted. Nondetected results from the laboratory are reported in this manner. This qualifier is added to a positive result (reported by the laboratory) if the detected concentration is determined to be attributable to contamination introduced during field sampling or laboratory analysis.

# TABLE 4-5
# SUMMARY OF CONCENTRATION VS. DISTANCE ATTENUATION RATE CONSTANTS

**Table 4-5**

**Summary of Concentration vs. Distance Attenuation Rate Constants**
**SWMU 138 Plume**
**2016 RAER**

**Former NAS Dallas, Texas**
**Page 1 of 3**

| Sampling Date | Protective Concentration Levels (mg/L) | Detected Concentration (mg/L) | | | Natural Log of COC Concentration (mg/L) | | | $K_{dist}$ [(mg/L) per foot] |
|---|---|---|---|---|---|---|---|---|
| **Centerline Monitoring Wells** | | **414B75MW** | **41401MW** | **414B70MW** | **414B75MW** | **41401MW** | **414B70MW** | |
| **Distance from source (ft)** | | **0** | **27** | **99** | **0** | **27** | **99** | |
| **Tetrachloroethene** | | | | | | | | |
| Alternate Concentration Levels (mg/L) | | 0.28400 | 0.11000 | 0.00880 | -1.26 | -2.21 | -4.73 | -0.0351 |
| Jan-95 | 0.00500 | -- | 0.10400 | -- | -- | -2.26 | -- | -- |
| Mar-98 | 0.00500 | -- | 0.11000 | -- | -- | -2.21 | -- | -- |
| Sep-98 | 0.00500 | -- | 0.09200 | -- | -- | -2.39 | -- | -- |
| Feb-99 | 0.00500 | -- | 0.10000 | -- | -- | -2.30 | -- | -- |
| Nov-99 | 0.00500 | -- | 0.08100 | 0.00500 U | -- | -2.51 | -8.00 | -0.0762 |
| Jun-00 | 0.00500 | 0.00620 | 0.09900 | 0.00500 U | -5.08 | -2.31 | -8.00 | -0.0397 |
| Jun-01 | 0.00500 | NS | 0.05900 | 0.00500 U | -- | -2.83 | -8.00 | -0.0718 |
| Jan-03 | 0.00500 | 0.01000 | 0.03800 | 0.00100 U | -4.61 | -3.27 | -8.00 | -0.0408 |
| Oct-03 | 0.00500 | 0.01700 J | 0.00690 | 0.00100 U | -4.07 | -4.98 | -8.00 | -0.0401 |
| Jan-04 | 0.00500 | 0.02500 | 0.01300 | 0.00024 U | -3.69 | -4.34 | -8.00 | -0.0450 |
| Jul-04 | 0.00500 | 0.02400 J | 0.00920 | NS | -3.73 | -4.69 | -8.00 | -0.0437 |
| Oct-05 | 0.00500 | 0.01000 | 0.01600 | 0.00040 U | -4.61 | -4.14 | -8.00 | -0.0383 |
| May-06 | 0.00500 | 0.03800 | 0.01200 | 0.00060 U | -3.27 | -4.42 | -8.00 | -0.0482 |
| Aug-06 | 0.00500 | 0.03400 | 0.01600 | 0.00060 U | -3.38 | -4.14 | -8.00 | -0.0481 |
| May-07 | 0.00500 | 0.03100 | 0.01500 | 0.00014 U | -3.47 | -4.20 | -8.00 | -0.0472 |
| Sep-07 | 0.00500 | 0.00960 | 0.02000 | 0.00010 U | -4.65 | -3.91 | -8.00 | -0.0386 |
| Jan-08 | 0.00500 | 0.01500 | 0.00810 | 0.00460 U | -4.20 | -4.82 | -8.00 | -0.0396 |
| Jul-08 | 0.00500 | 0.00300 | 0.00220 | 0.00022 U | -5.81 | -6.12 | -8.00 | -0.0230 |
| Jan-09 | 0.00500 | 0.02200 | 0.01800 | 0.00022 U | -3.82 | -4.02 | -8.00 | -0.0449 |
| Jul-09 | 0.00500 | 0.02270 | 0.01950 | 0.00022 U | -3.79 | -3.94 | -8.00 | -0.0454 |
| Jan-10 | 0.00500 | 0.00810 | 0.01500 | 0.00022 U | -4.82 | -4.20 | -8.00 | -0.0364 |
| Jul-10 | 0.00500 | 0.00044 U | 0.02170 | 0.00044 U | -8.00 | -3.83 | -8.00 | -0.0119 |
| Jan-11 | 0.00500 | 0.00700 | 0.01930 | 0.00025 U | -4.96 | -3.95 | -8.00 | -0.0360 |
| Jul-11 | 0.00500 | 0.01080 | 0.03160 JL | 0.00025 U | -4.53 | -3.45 | -8.00 | -0.0409 |
| Jan-12 | 0.00500 | 0.01890 | 0.03300 | 0.00025 U | -3.97 | -3.41 | -8.00 | -0.0455 |
| Jul-12 | 0.00500 | 0.01190 | 0.02480 | 0.00025 U | -4.43 | -3.70 | -8.00 | -0.0409 |
| Jan-13 | 0.00500 | 0.00032 U | 0.0231 | 0.00032 U | -8.00 | -3.77 | -8.00 | -0.0121 |
| Jul-13 | 0.00500 | 0.00043 J | 0.0321 | 0.00032 U | -7.75 | -3.44 | -8.00 | -0.0151 |
| Jan-14 | 0.00500 | 0.00370 | 0.0147 | 0.00026 U | -5.60 | -4.22 | -8.00 | -0.0301 |
| Jul-14 | 0.00500 | 0.00895 | 0.0184 | 0.00025 U | -4.72 | -4.00 | -8.00 | -0.0378 |
| Jan-15 | 0.00500 | 0.00853 | 0.0189 | 0.00025 U | -4.76 | -3.97 | -8.00 | -0.0375 |
| Jul-15 | 0.00500 | 0.00905 | 0.0306 | 0.00025 U | -4.70 | -3.49 | -8.00 | -0.0393 |
| Jan-16 | 0.00500 | 0.00459 | 0.0191 | -- | -5.38 | -3.96 | -- | 0.0528 |
| Jul-16 | 0.00500 | 0.00884 | 0.0239 | -- | -4.73 | -3.73 | -- | 0.0368 |

**Table 4-5**

**Summary of Concentration vs. Distance Attenuation Rate Constants**
**SWMU 138 Plume**
**2016 RAER**

**Former NAS Dallas, Texas**
**Page 2 of 3**

| Sampling Date | Protective Concentration Levels (mg/L) | Detected Concentration (mg/L) | | | Natural Log of COC Concentration (mg/L) | | | $K_{dist}$ [(mg/L) per foot] |
|---|---|---|---|---|---|---|---|---|
| **Centerline Monitoring Wells** | | **414B75MW** | **41401MW** | **414B70MW** | **414B75MW** | **41401MW** | **414B70MW** | |
| **Distance from source (ft)** | | **0** | **27** | **99** | **0** | **27** | **99** | |
| **Trichloroethene** | | | | | | | | |
| Alternate Concentration Levels (mg/L) | | 0.13400 | 0.06200 | 0.00790 | -2.01 | -2.78 | -4.84 | -0.0286 |
| Jan-95 | 0.00500 | -- | 0.04600 | -- | -- | -3.08 | -- | -- |
| Mar-98 | 0.00500 | -- | 0.04700 | -- | -- | -3.06 | -- | -- |
| Sep-98 | 0.00500 | -- | 0.04600 | -- | -- | -3.08 | -- | -- |
| Feb-99 | 0.00500 | -- | 0.04800 | -- | -- | -3.04 | -- | -- |
| Nov-99 | 0.00500 | -- | 0.04200 | 0.00500 U | -- | -3.17 | -8.00 | -0.0671 |
| Jun-00 | 0.00500 | 0.00420 | 0.04400 | 0.00500 U | -5.47 | -3.12 | -8.00 | -0.0342 |
| Jun-01 | 0.00500 | NS | 0.04400 | 0.00500 U | -- | -3.12 | -8.00 | -0.0677 |
| Jan-03 | 0.00500 | 0.00790 | 0.06200 | 0.00100 U | -4.84 | -2.78 | -8.00 | -0.0403 |
| Oct-03 | 0.00500 | 0.01400 J | 0.05800 | 0.00100 U | -4.27 | -2.85 | -8.00 | -0.0447 |
| Jan-04 | 0.00500 | 0.01700 | 0.05400 | 0.00010 U | -4.07 | -2.92 | -8.00 | -0.0460 |
| Jul-04 | 0.00500 | 0.01800 J | 0.04600 | NS | -4.02 | -3.08 | -8.00 | -0.0460 |
| Oct-05 | 0.00500 | 0.02600 | 0.04600 | 0.00030 U | -3.65 | -3.08 | -8.00 | -0.0490 |
| May-06 | 0.00500 | 0.02900 | 0.04200 | 0.00040 U | -3.54 | -3.17 | -8.00 | -0.0496 |
| Aug-06 | 0.00500 | 0.02800 | 0.03800 | 0.00040 U | -3.58 | -3.27 | -8.00 | -0.0490 |
| May-07 | 0.00500 | 0.03000 | 0.03200 | 0.00014 U | -3.51 | -3.44 | -8.00 | -0.0491 |
| Sep-07 | 0.00500 | 0.01100 | 0.03100 | 0.00023 U | -4.51 | -3.47 | -8.00 | -0.0409 |
| Jan-08 | 0.00500 | 0.01500 | 0.03800 | 0.00053 U | -4.20 | -3.27 | -8.00 | -0.0440 |
| Jul-08 | 0.00500 | 0.00300 | 0.03610 | 0.00032 U | -5.81 | -3.32 | -8.00 | -0.0310 |
| Jan-09 | 0.00500 | 0.02160 | 0.02850 | 0.00032 U | -3.84 | -3.56 | -8.00 | -0.0461 |
| Jul-09 | 0.00500 | 0.02070 | 0.02710 | 0.00032 U | -3.88 | -3.61 | -8.00 | -0.0456 |
| Jan-10 | 0.00500 | 0.03390 | 0.02220 | 0.00032 U | -3.38 | -3.81 | -8.00 | -0.0490 |
| Jul-10 | 0.00500 | 0.00110 | 0.02960 | 0.00024 U | -6.81 | -3.52 | -8.00 | -0.0224 |
| Jan-11 | 0.00500 | 0.01370 | 0.03150 | 0.00026 U | -4.29 | -3.46 | -8.00 | -0.0428 |
| Jul-11 | 0.00500 | 0.01800 | 0.03540 | 0.00026 U | -4.02 | -3.34 | -8.00 | -0.0453 |
| Jan-12 | 0.00500 | 0.02490 | 0.03860 | 0.00026 U | -3.69 | -3.25 | -8.00 | -0.0481 |
| Jul-12 | 0.00500 | 0.02780 | 0.02410 | 0.00026 U | -3.58 | -3.73 | -8.00 | -0.0477 |
| Jan-13 | 0.00500 | 0.00200 | 0.0321 JH | 0.00031 U | -6.21 | -3.44 | -8.00 | -0.0274 |
| Jul-13 | 0.00500 | 0.00091 J | 0.0305 | 0.00031 U | -7.00 | -3.49 | -8.00 | -0.0209 |
| Jan-14 | 0.00500 | 0.01010 | 0.0233 | 0.00030 U | -4.60 | -3.76 | -8.00 | -0.0394 |
| Jul-14 | 0.00500 | 0.01230 | 0.0251 | 0.00025 U | -4.40 | -3.68 | -8.00 | -0.0412 |
| Jan-15 | 0.00500 | 0.01100 | 0.0264 | 0.00025 U | -4.51 | -3.63 | -8.00 | -0.0405 |
| Jul-15 | 0.00500 | 0.01260 | 0.0263 | 0.00025 U | -4.37 | -3.64 | -8.00 | -0.0416 |
| Jan-16 | 0.00500 | 0.00704 | 0.0212 | -- | -4.96 | -3.85 | -- | 0.0408 |
| Jul-16 | 0.00500 | 0.0179 | 0.0239 | -- | -4.02 | -3.73 | -- | 0.0107 |

**Table 4-5**

**Summary of Concentration vs. Distance Attenuation Rate Constants**
**SWMU 138 Plume**
**2016 RAER**

**Former NAS Dallas, Texas**
**Page 3 of 3**

| Sampling Date | Protective Concentration Levels (mg/L) | Detected Concentration (mg/L) | | | Natural Log of COC Concentration (mg/L) | | | $K_{dist}$ [(mg/L) per foot] |
|---|---|---|---|---|---|---|---|---|
| **Centerline Monitoring Wells** | | **414B75MW** | **41401MW** | **414B70MW** | **414B75MW** | **41401MW** | **414B70MW** | |
| **Distance from source (ft)** | | **0** | **27** | **99** | **0** | **27** | **99** | |
| **cis-1,2-Dichloroethene** | | | | | | | | |
| Alternate Concentration Levels (mg/L) | | 0.07000 | 0.07000 | 0.07000 | -2.66 | -2.66 | -2.66 | 0.0000 |
| Jan-95 | 0.07000 | -- | -- | -- | -- | -- | -- | -- |
| Mar-98 | 0.07000 | -- | 0.01200 | -- | -- | -4.42 | -- | -- |
| Sep-98 | 0.07000 | -- | 0.00880 J | -- | -- | -4.73 | -- | -- |
| Feb-99 | 0.07000 | -- | 0.01200 | -- | -- | -4.42 | -- | -- |
| Nov-99 | 0.07000 | -- | 0.01200 | 0.00500 U | -- | -4.42 | -8.00 | -0.0497 |
| Jun-00 | 0.07000 | 0.00070 | 0.01200 | 0.00500 U | -7.26 | -4.42 | -8.00 | -0.0161 |
| Jun-01 | 0.07000 | NS | 0.02100 | 0.00250 U | -- | -3.86 | -8.00 | -0.0575 |
| Jan-03 | 0.07000 | 0.00170 | 0.04700 | 0.00100 U | -6.38 | -3.06 | -8.00 | -0.0272 |
| Oct-03 | 0.07000 | 0.00450 J | 0.05200 | 0.00050 U | -5.40 | -2.96 | -8.00 | -0.0353 |
| Jan-04 | 0.07000 | 0.00510 | 0.03800 | 0.00016 U | -5.28 | -3.27 | -8.00 | -0.0354 |
| Jul-04 | 0.07000 | 0.00610 J | 0.05600 | NS | -5.10 | -2.88 | -8.00 | -0.0379 |
| Oct-05 | 0.07000 | 0.01900 | 0.03600 | 0.00030 U | -3.96 | -3.32 | -8.00 | -0.0458 |
| May-06 | 0.07000 | 0.01700 | 0.04600 | 0.00050 U | -4.07 | -3.08 | -8.00 | -0.0456 |
| Aug-06 | 0.07000 | 0.01800 | 0.02700 | 0.00050 U | -4.02 | -3.61 | -8.00 | -0.0445 |
| May-07 | 0.07000 | 0.00190 | 0.04100 | 0.00045 U | -6.27 | -3.19 | -8.00 | -0.0277 |
| Sep-07 | 0.07000 | 0.00620 | 0.04000 | 0.00014 U | -5.08 | -3.22 | -8.00 | -0.0371 |
| Jan-08 | 0.07000 | 0.00900 | 0.03300 | 0.00032 U | -4.71 | -3.41 | -8.00 | -0.0395 |
| Jul-08 | 0.07000 | 0.00560 | 0.03110 | 0.00020 U | -5.18 | -3.47 | -8.00 | -0.0355 |
| Jan-09 | 0.07000 | 0.01340 | 0.02050 | 0.001 | -4.31 | -3.89 | -6.91 | -0.0295 |
| Jul-09 | 0.07000 | 0.01140 | 0.01650 | 0.00020 U | -4.47 | -4.10 | -8.00 | -0.0394 |
| Jan-10 | 0.07000 | 0.01890 | 0.03750 | 0.00020 U | -3.97 | -3.28 | -8.00 | -0.0458 |
| Jul-10 | 0.07000 | 0.03730 | 0.03590 | 0.00032 U | -3.29 | -3.33 | -8.00 | -0.0512 |
| Jan-11 | 0.07000 | 0.03000 | 0.04380 | 0.00026 U | -3.51 | -3.13 | -8.00 | -0.0500 |
| Jul-11 | 0.07000 | 0.01950 | 0.03350 | 0.00026 U | -3.94 | -3.40 | -8.00 | -0.0458 |
| Jan-12 | 0.07000 | 0.02020 | 0.02150 | 0.00026 U | -3.90 | -3.84 | -8.00 | -0.0448 |
| Jul-12 | 0.07000 | 0.02130 | 0.02380 | 0.00026 U | -3.85 | -3.74 | -8.00 | -0.0455 |
| Jan-13 | 0.70000 | 0.05680 | 0.02650 | 0.00024 U | -2.87 | -3.63 | -8.00 | -0.0537 |
| Jul-13 | 0.70000 | 0.03350 | 0.0194 | 0.00024 U | -3.40 | -3.94 | -8.00 | -0.0485 |
| Jan-14 | 0.70000 | 0.02380 | 0.0155 | 0.00033 U | -3.74 | -4.17 | -8.00 | -0.0452 |
| Jul-14 | 0.70000 | 0.0172 | 0.0159 | 0.00025 U | -4.06 | -4.14 | -8.00 | -0.0426 |
| Jan-15 | 0.70000 | 0.0112 | 0.0158 | 0.00025 U | -4.49 | -4.15 | -8.00 | -0.0392 |
| Jul-15 | 0.70000 | 0.01410 | 0.0151 | 0.00025 U | -4.26 | -4.19 | -8.00 | -0.0409 |
| Jan-16 | 0.70000 | 0.00482 | 0.0192 | -- | -5.33 | -3.95 | -- | 0.0512 |
| Jul-16 | 0.70000 | 0.012 | 0.0168 | -- | -4.42 | -4.09 | -- | 0.0125 |

mg/L - milligrams per liter
NA - Not Applicable
NS - Not Sampled

***Note:***
Shaded areas indicate an exceedance of the $^{GW}GW_{Ing}$ PCL.
Monitoring Well 414B70MW was plugged and abandoned in April 2016.

Analytical Result Qualifiers:
J - Indicates that the chemical was detected. However, the associated numerical result may not be a precise representation of the amount that is actually present in the sample. The laboratory reported concentration is considered to be an estimate of the true concentration.

U - Indicates that the chemical was not detected at the numerical detection limit (sample-specific quantitation limit) noted. Nondetected results from the laboratory are reported in this manner. This qualifier is added to a positive result (reported by the laboratory) if the detected concentration is determined to be attributable to contamination introduced during field sampling or laboratory analysis.

# Plug and Abandonment Documentation

# STATE OF TEXAS PLUGGING REPORT for Tracking #158504

| | | | |
|---|---|---|---|
| Owner: | **NAS Dallas** | Owner Well #: | **414B70MW** |
| Address: | **8100 West Jefferson<br>Grand Prairie, TX 75051** | Grid #: | **33-17-1** |
| Well Location: | **8100 West Jefferson<br>Grand Prairie, TX 75051** | Latitude: | **32° 44' 25.8" N** |
| | | Longitude: | **096° 57' 46.3" W** |
| Well County: | **Dallas** | Elevation: | **No Data** |
| Well Type: | **Monitor** | | |

*Drilling Information*

| | | | |
|---|---|---|---|
| Company: | **No Data** | Date Drilled: | **No Data** |
| Driller: | **No Data** | License Number: | **No Data** |

| | *Diameter (in.)* | *Top Depth (ft.)* | *Bottom Depth (ft.)* |
|---|---|---|---|
| Borehole: | | **0** | **19.2** |

*Plugging Information*

Date Plugged: **4/6/2016** Plugger:

Plug Method: **Pour in 3/8 bentonite chips when standing water in well is less than 100 feet depth, cement top 2 feet**

Casing Left in Well:

**No Data**

Plug(s) Placed in Well:

| *Top (ft.)* | *Bottom (ft.)* | *Description (number of sacks & material)* |
|---|---|---|
| **0** | **2** | **Cement 2 Bags/Sacks** |
| **2** | **19.2** | **Bentonite 2 Bags/Sacks** |

Certification Data: The driller certified that the driller plugged this well (or the well was plugged under the driller's direct supervision) and that each and all of the statements herein are true and correct. The driller understood that failure to complete the required items will result in the reports(s) being returned for completion and resubmittal.

Company Information: **Strata Core Services, LLC**

**112 S. Norwood Drive**
**Hurst, TX 76053**

Driller Name: **Brad Eskue** License Number: **58164**

Comments: **No Data**

# APPENDIX 5
# SAMPLING PROCEDURES

Sampling collection and handling procedures were updated to follow Uniform Federal Policy (UFP) for Sample and Analysis Plans in the document titled, Tier II Sampling and Analysis Plan, Long Term Groundwater Monitoring Plan, Former Naval Air Station Dallas, Dallas, Texas, dated December 2014.

# APPENDIX 6
# LABORATORY DATA PACKAGES AND DATA USABILITY SUMMARIES

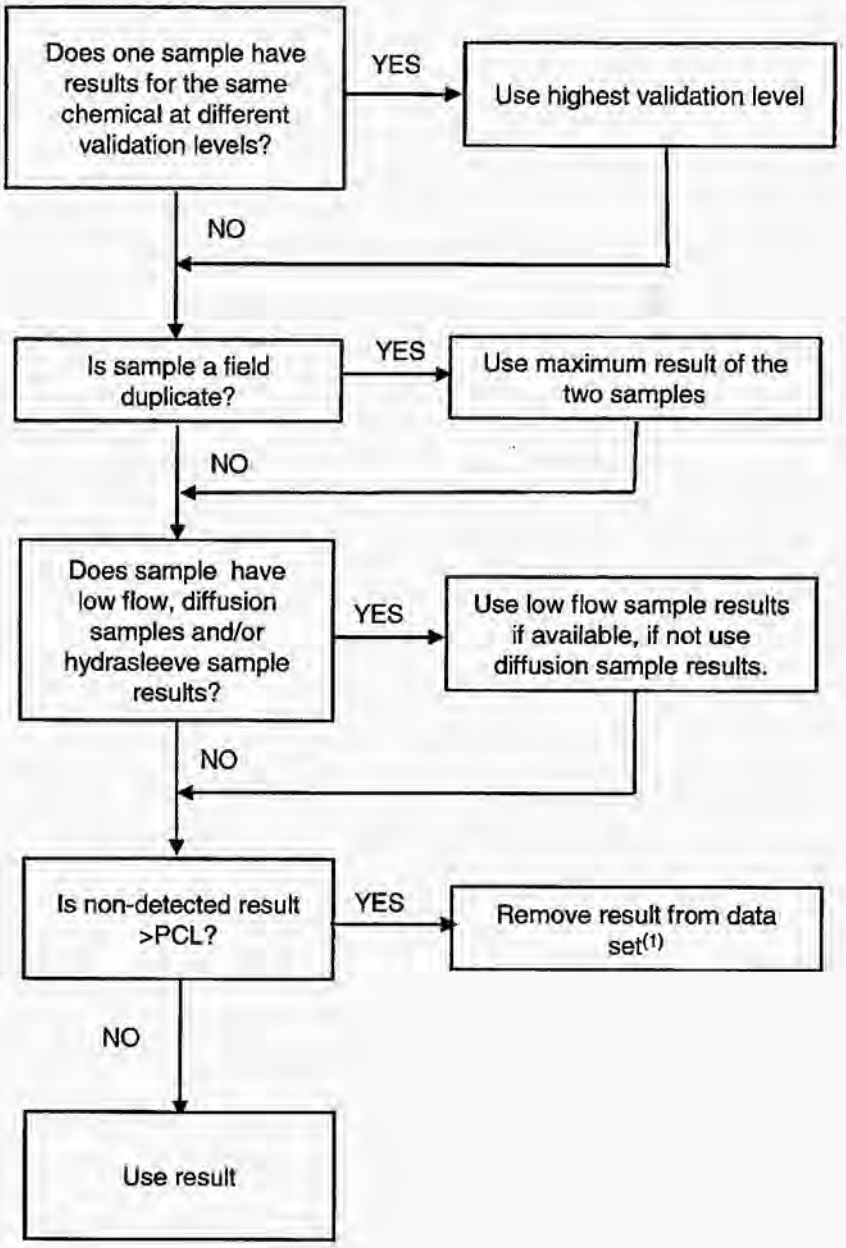
See the attached CD for the Laboratory Analytical Reports —
submitted with the 2016 RAER for SWMU 17/Building 1423
(sorted by Sample Delivery Group Number)

# APPENDIX 7
# STATISTICAL METHODOLOGY

Statistical Methodology has been submitted with the 2016 RAER for SWMU 17/Building 1423

GROUNDWATER DATABASE DEVELOPMENT FOR GRAPHING AND MANN KENDALL STATISTICAL EVALUATION

NAS DALLAS, TEXAS




NOTES:

(1) For 1,1,2,2-PCA and vinyl chloride the TRRP RES A limit < MDL of 5 U therefore only the non-detects > 5 U were removed from the data set.

# STDEV

See Also

Estimates standard deviation based on a sample. The standard deviation is a measure of how widely values are dispersed from the average value (the mean).

**Syntax**

**STDEV(number1**,number2,...)

Number1, number2, ... are 1 to 30 number arguments corresponding to a sample of a population. You can also use a single array or a reference to an array instead of arguments separated by commas.

**Remarks**

- STDEV assumes that its arguments are a sample of the population. If your data represents the entire population, then compute the standard deviation using STDEVP.
- The standard deviation is calculated using the "nonbiased" or "n-1" method.
- STDEV uses the following formula:
- $$\sqrt{\frac{n\sum x^2 - \left(\sum x\right)^2}{n(n-1)}}$$
  $$\sqrt{\frac{n\sum x^2 - \left(\sum x\right)^2}{n(n-1)}}$$
- Logical values such as TRUE and FALSE and text are ignored. If logical values and text must not be ignored, use the STDEVA worksheet function.

**Example**

Suppose 10 tools stamped from the same machine during a production run are collected as a random sample and measured for breaking strength.

The example may be easier to understand if you copy it to a blank worksheet.

How?

| | A |
|---|---|
| 1 | **Strength** |
| 2 | 1345 |
| 3 | 1301 |
| 4 | 1368 |
| 5 | 1322 |
| 6 | 1310 |
| 7 | 1370 |
| 8 | 1318 |
| 9 | 1350 |
| 10 | 1303 |
| 11 | 1299 |

| Formula | Description (Result) |
|---|---|
| =STDEV(A2:A11) | Standard deviation of breaking strength (27.46391572) |

# BEST-FIT LINE USING LINEAR REGRESSION

# LINEST

See Also

Calculates the statistics for a line by using the "least squares" method to calculate a straight line that best fits your data, and returns an array that describes the line. Because this function returns an array of values, it must be entered as an array formula.

The equation for the line is:

y = mx + b or

y = m1x1 + m2x2 + ... + b (if there are multiple ranges of x-values)

where the dependent y-value is a function of the independent x-values. The m-values are coefficients corresponding to each x-value, and b is a constant value. Note that y, x, and m can be vectors. The array that LINEST returns is {mn,mn-1,...,m1,b}. LINEST can also return additional regression statistics.

**Syntax**

**LINEST(known_y's**,known_x's,const,stats)

Known_y's is the set of y-values you already know in the relationship y = mx + b.

- If the array known_y's is in a single column, then each column of known_x's is interpreted as a separate variable.
- If the array known_y's is in a single row, then each row of known_x's is interpreted as a separate variable.

Known_x's is an optional set of x-values that you may already know in the relationship y = mx + b.

- The array known_x's can include one or more sets of variables. If only one variable is used, known_y's and known_x's can be ranges of any shape, as long as they have equal dimensions. If more than one variable is used, known_y's must be a vector (that is, a range with a height of one row or a width of one column).
- If known_x's is omitted, it is assumed to be the array {1,2,3,...} that is the same size as known_y's.

Const is a logical value specifying whether to force the constant b to equal 0.

- If const is TRUE or omitted, b is calculated normally.
- If const is FALSE, b is set equal to 0 and the m-values are adjusted to fit y = mx.

Stats is a logical value specifying whether to return additional regression statistics.

- If stats is TRUE, LINEST returns the additional regression statistics, so the returned array is {mn,mn-1,...,m1,b;sen,sen-1,...,se1,seb;r2,sey;F,df;ssreg,ssresid}.
- If stats is FALSE or omitted, LINEST returns only the m-coefficients and the constant b.

The additional regression statistics are as follows.

| Statistic | Description |
|---|---|
| se1,se2,...,sen | The standard error values for the coefficients m1,m2,...,mn. |
| Seb | The standard error value for the constant b (seb = #N/A when const is FALSE). |
| r2 | The coefficient of determination. Compares estimated and actual y-values, and ranges in value from 0 to 1. If it is 1, there is a perfect correlation in the sample — there is no difference between the estimated y-value and the actual y-value. At the other extreme, if the coefficient of determination is 0, the regression equation is not helpful in predicting a y-value. For information about how r2 is calculated, see "Remarks" later in this topic. |
| sey | The standard error for the y estimate. |
| F | The F statistic, or the F-observed value. Use the F statistic to determine whether the observed relationship between the dependent and independent variables occurs by chance. |
| df | The degrees of freedom. Use the degrees of freedom to help you find F-critical values in a statistical table. Compare the values you find in the table to the F statistic returned by LINEST to determine a confidence level for the model. |
| ssreg | The regression sum of squares. |
| ssresid | The residual sum of squares. |

The following illustration shows the order in which the additional regression statistics are returned.

| | A | B | C | D | E | F |
|---|---|---|---|---|---|---|
| 1 | $m_n$ | $m_{n-1}$ | ... | $m_2$ | $m_1$ | b |
| 2 | $se_n$ | $se_{n-1}$ | ... | $se_2$ | $se_1$ | $se_b$ |
| 3 | $r_2$ | $se_y$ | | | | |
| 4 | F | $d_f$ | | | | |
| 5 | $ss_{reg}$ | $ss_{resid}$ | | | | |

**Remarks**

- You can describe any straight line with the slope and the y-intercept:

  Slope (m):
  To find the slope of a line, often written as m, take two points on the line, (x1,y1) and (x2,y2); the slope is equal to (y2 - y1)/(x2 - x1).

  Y-intercept (b):
  The y-intercept of a line, often written as b, is the value of y at the point where the line crosses the y-axis.

  The equation of a straight line is y = mx + b. Once you know the values of m and b, you can calculate any point on the line by plugging the y- or x-value into that equation. You can also use the TREND function.

- When you have only one independent x-variable, you can obtain the slope and y-intercept values directly by using the following formulas:

  Slope:
  =INDEX(LINEST(known_y's,known_x's),1)

  Y-intercept:
  =INDEX(LINEST(known_y's,known_x's),2)

- The accuracy of the line calculated by LINEST depends on the degree of scatter in your data. The more linear the data, the more accurate the LINEST model. LINEST uses the method of least squares for determining the best fit for the data. When you have only one independent x-variable, the calculations for m and b are based on the following formulas:

$$m = \frac{n\left(\sum xy\right) - \left(\sum x\right)\left(\sum y\right)}{n\left(\sum\left(x^2\right)\right) - \left(\sum x\right)^2}$$

$$b = \frac{\left(\sum y\right)\left(\sum\left(x^2\right)\right) - \left(\sum x\right)\left(\sum xy\right)}{n\left(\sum\left(x^2\right)\right) - \left(\sum x\right)^2}$$

- The line- and curve-fitting functions LINEST and LOGEST can calculate the best straight line or exponential curve that fits your data. However, you have to decide which of the two results best fits your data. You can calculate TREND(known_y's,known_x's) for a straight line, or GROWTH(known_y's, known_x's) for an exponential curve. These functions, without the new_x's argument, return an array of y-values predicted along that line or curve at your actual data points. You can then compare the predicted values with the actual values. You may want to chart them both for a visual comparison.

- In regression analysis, Microsoft Excel calculates for each point the squared difference between the y-value estimated for that point and its actual y-value. The sum of these squared differences is called the residual sum of squares. Microsoft Excel then calculates the sum of the squared differences between the actual y-values and the average of the y-values, which is called the total sum of squares (regression sum of squares + residual sum of squares). The smaller the residual sum of squares is, compared with the total sum of squares, the larger the value of the coefficient of determination, r2, which is an indicator of how well the equation resulting from the regression analysis explains the relationship among the variables.

- Formulas that return arrays must be entered as array formulas.

- When entering an array constant such as known_x's as an argument, use commas to separate values in the same row and semicolons to separate rows. Separator characters may be different depending on your locale setting in **Regional Settings** or **Regional Options** in **Control Panel**.

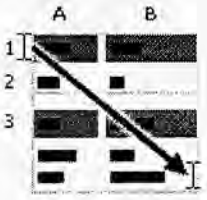
- Note that the y-values predicted by the regression equation may not be valid if they are outside the range of the y-values you used to determine the equation.

**Example 1 Slope and Y-Intercept**

The example may be easier to understand if you copy it to a blank worksheet.

How?

1. Create a blank workbook or worksheet.
2. Select the example in the Help topic. Do not select the row or column headers.




Selecting an example from Help

3. Press CTRL+C.
4. In the worksheet, select cell A1, and press CTRL+V.
5. To switch between viewing the results and viewing the formulas that return the results, press CTRL+` (grave accent), or on the **Tools** menu, point to **Formula Auditing**, and then click **Formula Auditing Mode**.

| | A | B |
|---|---|---|
| 1 | **Known y** | **Known x** |
| 2 | 1 | 0 |
| 3 | 9 | 4 |
| 4 | 5 | 2 |
| 5 | 7 | 3 |
| | **Formula** | **Formula** |
| | =LINEST(A2:A5,B2:B5,,FALSE) | |

**Note** The formula in the example must be entered as an array formula. After copying the example to a blank worksheet, select the range A7:B7 starting with the formula cell. Press F2, and then press CTRL+SHIFT+ENTER. If the formula is not entered as an array formula, the single result is 2.

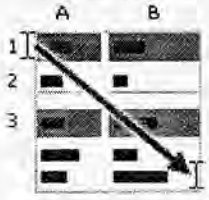
When entered as an array, the slope (2) and the y-intercept (1) are returned.

**Example 2 Simple Linear Regression**

The example may be easier to understand if you copy it to a blank worksheet.

How?

1. Create a blank workbook or worksheet.
2. Select the example in the Help topic. Do not select the row or column headers.




Selecting an example from Help

3. Press CTRL+C.
4. In the worksheet, select cell A1, and press CTRL+V.
5. To switch between viewing the results and viewing the formulas that return the results, press CTRL+` (grave accent), or on the **Tools** menu, point to **Formula Auditing**, and then click **Formula Auditing Mode**.

| | A | B |
|---|---|---|
| 1 | **Month** | **Sales** |
| 2 | 1 | 3100 |
| 3 | 2 | 4500 |
| 4 | 3 | 4400 |

| | | |
|---|---|---|
| **5** | 4 | 5400 |
| **6** | 5 | 7500 |
| **7** | 6 | 8100 |
| | **Formula** | **Description (Result)** |
| | =SUM(LINEST(B2:B7, A2:A7)*{9,1}) | Estimate sales for the ninth month (11000) |

In general, SUM({m,b}*{x,1}) equals mx + b, the estimated y-value for a given x-value. You can also use the TREND function.

**Example 3 Multiple Linear Regression**

Suppose a commercial developer is considering purchasing a group of small office buildings in an established business district.

The developer can use multiple linear regression analysis to estimate the value of an office building in a given area based on the following variables.

| Variable | Refers to the |
|---|---|
| y | Assessed value of the office building |
| x1 | Floor space in square feet |
| x2 | Number of offices |
| x3 | Number of entrances |
| x4 | Age of the office building in years |

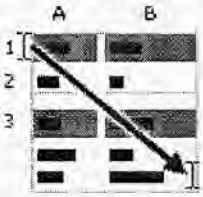
This example assumes that a straight-line relationship exists between each independent variable (x1, x2, x3, and x4) and the dependent variable (y), the value of office buildings in the area.

The developer randomly chooses a sample of 11 office buildings from a possible 1,500 office buildings and obtains the following data. "Half an entrance" means an entrance for deliveries only.

The example may be easier to understand if you copy it to a blank worksheet.

How?

1. Create a blank workbook or worksheet.
2. Select the example in the Help topic. Do not select the row or column headers.




Selecting an example from Help

3. Press CTRL+C.
4. In the worksheet, select cell A1, and press CTRL+V.
5. To switch between viewing the results and viewing the formulas that return the results, press CTRL+` (grave accent), or on the **Tools** menu, point to **Formula Auditing**, and then click **Formula Auditing Mode**.

| | A | B | C | D | E |
|---|---|---|---|---|---|
| **1** | **Floor space (x1)** | **Offices (x2)** | **Entrances (x3)** | **Age (x4)** | **Assessed value (y)** |
| **2** | 2310 | 2 | 2 | 20 | 142,000 |
| **3** | 2333 | 2 | 2 | 12 | 144,000 |
| **4** | 2356 | 3 | 1.5 | 33 | 151,000 |
| **5** | 2379 | 3 | 2 | 43 | 150,000 |

| | | | | | |
|---|---|---|---|---|---|
| **6** | 2402 | 2 | 3 | 53 | 139,000 |
| **7** | 2425 | 4 | 2 | 23 | 169,000 |
| **8** | 2448 | 2 | 1.5 | 99 | 126,000 |
| **9** | 2471 | 2 | 2 | 34 | 142,900 |
| **10** | 2494 | 3 | 3 | 23 | 163,000 |
| **11** | 2517 | 4 | 4 | 55 | 169,000 |
| **12** | 2540 | 2 | 3 | 22 | 149,000 |

**Formula**

=LINEST(E2:E12,A2:D12,TRUE,TRUE)

**Note** The formula in the example must be entered as an array formula. After copying the example to a blank worksheet, select the range A14:E18 starting with the formula cell. Press F2, and then press CTRL+SHIFT+ENTER. If the formula is not entered as an array formula, the single result is -234.2371645.

When entered as an array, the following regression statistics are returned. Use this key to identify the statistic you want.

| | A | B | C | D | E | F |
|---|---|---|---|---|---|---|
| 1 | $m_n$ | $m_{n-1}$ | ... | $m_2$ | $m_1$ | b |
| 2 | $se_n$ | $se_{n-1}$ | ... | $se_2$ | $se_1$ | $se_b$ |
| 3 | $r_2$ | $se_y$ | | | | |
| 4 | F | $d_f$ | | | | |
| 5 | $ss_{reg}$ | $ss_{resid}$ | | | | |

The multiple regression equation, y = m1*x1 + m2*x2 + m3*x3 + m4*x4 + b, can now be obtained using the values from row 14:

y = 27.64*x1 + 12,530*x2 + 2,553*x3+ 234.24*x4 + 52,318

The developer can now estimate the assessed value of an office building in the same area that has 2,500 square feet, three offices, and two entrances and is 25 years old, by using the following equation:

y = 27.64*2500 + 12530*3 + 2553*2 - 234.24*25 + 52318 = $158,261

Or you can copy the following table to cell A21 of the example workbook.

| Floor space (x1) | Offices (x2) | Entrances (x3) | Age (x4) | Assessed value (y) |
|---|---|---|---|---|
| 2500 | 3 | 2 | 25 | =D14*A22 + C14*B22 + B14*C22 + A14*D22 + E14 |

You can also use the TREND function to calculate this value.

**Example 4 Using The F And R2 Statistics**

In the previous example, the coefficient of determination, or r2, is 0.99675 (see cell A17 in the output for LINEST), which would indicate a strong relationship between the independent variables and the sale price. You can use the F statistic to determine whether these results, with such a high r2 value, occurred by chance.

Assume for the moment that in fact there is no relationship among the variables, but that you have drawn a rare sample of 11 office buildings that causes the statistical analysis to demonstrate a strong relationship. The term "Alpha" is used for the probability of erroneously concluding that there is a relationship.

There is a relationship among the variables if the F-observed statistic is greater than the F-critical value. The F-critical value can be obtained by referring to a table of F-critical values in many statistics textbooks. To read the table, assume a single-tailed test, use an Alpha value of 0.05, and for the degrees of freedom (abbreviated in most tables as v1 and v2), use v1 = k = 4 and v2 = n - (k + 1) = 11 - (4 + 1) = 6, where k is the number of variables in the regression analysis and n is the number of data points. The F-critical value is 4.53.

The F-observed value is 459.753674 (cell A18), which is substantially greater than the F-critical value of 4.53. Therefore, the regression equation is useful in predicting the assessed value of office buildings in this area.

**Example 5 Calculating The T-Statistics**

Another hypothesis test will determine whether each slope coefficient is useful in estimating the assessed value of an office building in example 3. For example, to test the age coefficient for statistical significance, divide -234.24 (age slope coefficient) by 13.268 (the estimated standard error of age coefficients in cell A15). The following is the t-observed value:

t = m4 ÷ se4 = -234.24 ÷ 13.268 = -17.7

If you consult a table in a statistics manual, you will find that t-critical, single tail, with 6 degrees of freedom and Alpha = 0.05 is 1.94. Because the absolute value of t, 17.7, is greater than 1.94, age is an important variable when estimating the assessed value of an office building. Each of

the other independent variables can be tested for statistical significance in a similar manner. The following are the t-observed values for each of the independent variables.

| Variable | t-observed value |
|---|---|
| Floor space | 5.1 |
| Number of offices | 31.3 |
| Number of entrances | 4.8 |
| Age | 17.7 |

These values all have an absolute value greater than 1.94; therefore, all the variables used in the regression equation are useful in predicting the assessed value of office buildings in this area.

## SLOPE OF BEST-FIT LINE

# SLOPE

See Also

Returns the slope of the linear regression line through data points in known_y's and known_x's. The slope is the vertical distance divided by the horizontal distance between any two points on the line, which is the rate of change along the regression line.

**Syntax**

**SLOPE(known_y's,known_x's)**

Known_y's is an array or cell range of numeric dependent data points.

Known_x's is the set of independent data points.

**Remarks**

- The arguments must be either numbers or names, arrays, or references that contain numbers.
- If an array or reference argument contains text, logical values, or empty cells, those values are ignored; however, cells with the value zero are included.
- If known_y's and known_x's are empty or have a different number of data points, SLOPE returns the #N/A error value.
- The equation for the slope of the regression line is:

$$b = \frac{n\sum xy - \left(\sum x\right)\left(\sum y\right)}{n\sum x^2 - \left(\sum x\right)^2}$$

**Example**

The example may be easier to understand if you copy it to a blank worksheet.

How?

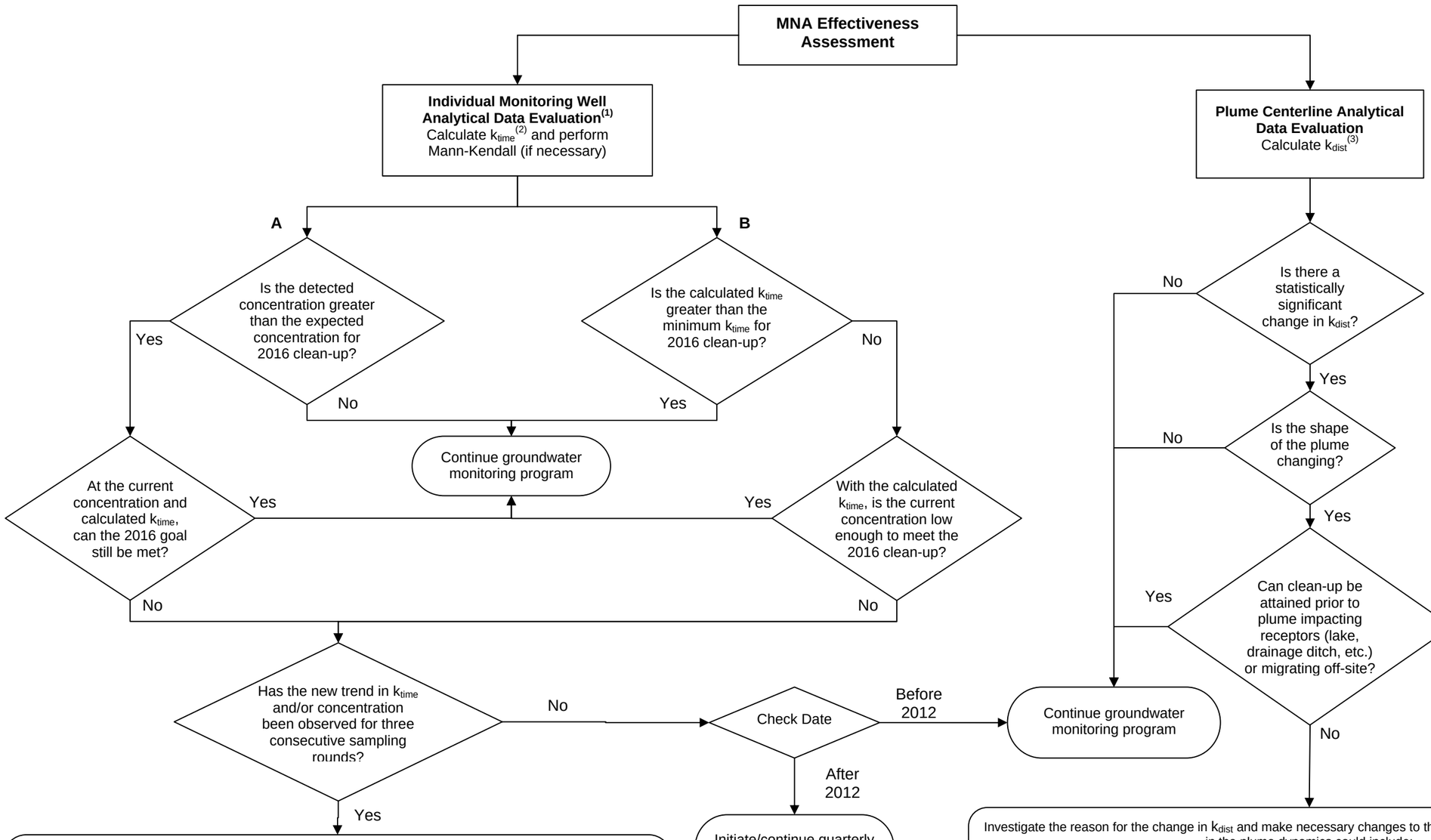
| | A | B |
|---|---|---|
| 1 | **Known y** | **Known x** |
| 2 | 2 | 6 |
| 3 | 3 | 5 |
| 4 | 9 | 11 |
| 5 | 1 | 7 |
| 6 | 8 | 5 |
| 7 | 7 | 4 |
| 8 | 5 | 4 |

| Formula | Description (Result) |
|---|---|
| =SLOPE(A2:A8,B2:B8) | Slope of the linear regression line through the data points above (0.305556) |

# MONITORED NATURAL ATTENUATION DATA EVALUATION

**DIAGRAM 3-1**
**MONITORED NATURAL ATTENUATION DATA EVALUATION**
**RESPONSE ACTION PLAN**

**NAS DALLAS, TEXAS**




Investigate the reason for the change in $k_{time}$ and make necessary changes to the remedial system. These changes in the plume dynamics could include:

| **Reason for $k_{time}$ Change** | **Recommended Changes in Remediation** |
|---|---|
| New source or new release | Identify new Responsible Party for continued remediation. |
| Geochemical change | Determine if chemical additives are necessary or technical impracticability of additional remediation. |
| Asymptotic degradation reached | Determine if active remediation or excavation are necessary or technical impracticability of additional remediation. |

Investigate the reason for the change in $k_{dist}$ and make necessary changes to the remedial system. These changes in the plume dynamics could include:

| **Reason for $K_{dist}$ Change** | **Recommended Changes in Remediation** |
|---|---|
| New source or new release | Identify new Responsible Party for continued remediation. |
| Migrating plume | Initiate abatement measures such as interceptor trench, slurry walls, pump recovery / capture system, etc. if receptors are threatened. |

Notes:
(1) Both pathways (A, B) must be evaluated for each of the chemicals of concern in each monitoring point along the plume's centerline.
(2) $k_{time}$ Concentration versus Time Attenuation Rate Constant
(3) $k_{dist}$ Concentration versus Distance Attenuation Rate Constant

# Assessment of MNA Performance Monitoring

## Introduction

The MNA monitoring well networks at the NAS Dallas groundwater plumes will provide the necessary analytical data to evaluate the dynamic behavior of the plumes over time, including contaminant and/or concentration reductions indicative of progress toward clean-up objectives, changes in plume boundaries, and changes in geochemistry. To this effect, these monitoring well networks include monitoring wells in areas hydraulically upgradient and sidegradient to the groundwater plume, in the historical source area, along the main body of the plume and immediately downgradient of the plume. The number and locations of monitoring points for each plume was selected based on the size of the plume, groundwater velocity, proximity to receptors (including cross-media transfer of COCs), and presence of preferential pathways for COC migration.

As required by the Compliance Plan for NAS Dallas (TCEQ, 2004), performance monitoring for MNA will be conducted in accordance with Response Action Plan (RAP) Worksheet 3.1 until all remedial action objectives have been met for the plume for at least two consecutive sampling events. Upon demonstration of the attainment of clean-up objectives, a three-year of post-remedial action monitoring will be implemented in accordance with the Compliance Plan for NAS Dallas (TCEQ, 2004) and as outlined on RAP Worksheet 4.1.

In addition to the COCs identified in the APAR (TtNUS, 2003) for each groundwater plume, daughter products that may be formed as a result of biotransformation or chemical processes will be monitored during the corrective action period at each plume. In order to ensure that there is a potential for continued transformation of the COCs within the groundwater plume, the geochemical environment will also be monitored (i.e., oxidation-reduction potential, dissolved oxygen, pH, etc.) every two years at a minimum. During the post-remedial action monitoring, the Compliance Plan requires that an expanded list of parameters be sampled including those COCs historically detected at the site. In order to minimize the chance of identifying constituent exceedances during the post-response action monitoring, the expanded list of parameters identified on RAP Worksheet 4.1 (Compliance Plan Table III) will be monitored every five years at a minimum.

Each new round of data will help develop a better understanding of the site and site processes and as a result, the conceptual site model for MNA will be continuously reevaluated from the standpoint of the observed plume shape, location, stability, and dynamics; attenuation rates; groundwater flow patterns; and geochemical regimes.

To evaluate progress towards achievement of clean-up objectives, data collected from the monitoring well network will be used to determine temporal and spatial trends in COC concentrations, comparisons of observed COC concentrations with benchmark concentrations, and, comparison of calculated attenuation rates with the rates required to meet remedial objectives within the required timeframe. Data will be interpreted with regard to variability so that attenuation-related changes and trends can be distinguished from other sources of variation in the data.

If a departure from a predicted trend is found, (i.e., exceeding benchmark concentration or unfavorable changes in attenuation rates), the deviation will be evaluated to determine how the changes may affect attainment of remedial goals for the individual monitoring wells, as well as, how the changes may affect the behavior of the entire plume (i.e., plume stability, reduction in COC concentrations, etc.). Departures from expected trends may not mean remedy failure, because there may be a range of attenuation rates that will achieve the desired remedial goals

in the allotted time; therefore their significance must be evaluated in the context of the site-related goals. If the potential impact on the remedy is negligible, revision of the conceptual site model may be the only outcome of such evaluation. However, if the potential for impact is significant, implementation of alternative remedies may be triggered or, at a minimum additional characterization to better define the factors limiting COC reduction and determine methods for mitigating the magnitude of their impact would be warranted. Other site-related data (i.e., geochemistry and potentiometric data) will continue to be evaluated to provide evidence of COC migration, fate, and attenuation processes. These data may be used to ascertain COC degradation and the continuation of appropriate conditions for attenuation at acceptable rates.

Following the individual monitoring well data analysis, plume behavior will be assessed to evaluate the continued effectiveness of the MNA remedy, as well as the adequacy of the monitoring program and conceptual site model for MNA. The ongoing monitoring program will provide the necessary data for continual refinement of the conceptual model and subsequently of the monitoring program itself. Upon completion of each sampling round, data analysis and determination of the effectiveness of the MNA remedy, plume-specific criteria will drive decisions affecting the continuity of the monitoring program.

At some plumes, source control and interim remedial activities have occurred between the original site characterization process and the implementation of performance monitoring. Because these activities are expected to change the site's characteristics and behavior, performance monitoring will require the continued refinement of the conceptual site model for MNA. This refinement of the conceptual site model may eventually be different from the original MNA conceptual site model based on the initial site characterization data. Development and implementation of the new conceptual site model for MNA will require the collection of additional data (i.e., quarterly monitoring for the first year after interim remedial activities and on a semi-annual basis thereafter) to establish baseline conditions, expediently depict new site characteristics and parameter variability, establish trends and estimate attenuation rates for COCs, determine if the plume characteristics have been altered, and assess the likelihood of meeting site remediation goals.

## Evaluation of New Data

Data interpretation will include the preliminary assessment of the COC concentration data collected for both the plume centerline (e.g., whole plume dynamics) as well as on individual COCs within each monitoring well. The interpretation will be conducted through graphs, tables, maps, statistics, and time-series plots. This will help in identifying patterns, relationships, and anomalies, such as possible "outliers" to the observed remedial trend of the plume. Scatter graphs (i.e., $k_{time}$ and $k_{dist}$ graphs) will show relationships between two variables that are not readily evident using purely numerical methods. Mapping the data in plan view and/or cross-section (i.e., isoconcentration maps, potentiometric maps, MNA parameter maps, etc.) will help understand patterns of COC distribution and migration, and relationships between geochemical zones and COC attenuation.

The initial data analysis and interpretation will focus on the detection of trends in the data for the COCs within individual monitoring wells and subsequently for the plume as a whole. First, the COC concentration data collected from each monitoring well will be used to determine the temporal trends that exist within the plume. The COC trends will also be evaluated at monitoring points located throughout the plume as a whole. In order to adequately interpret progress toward COC reduction goals for the plume, it is necessary to compare trends of individual monitoring wells to trends of other monitoring wells in the plume. Evaluating trends in data from all sampling locations in the plume will determine if the plume exhibits stability or reduction in COC concentrations. In addition, for each COC, spatial trends along the plume centerline [i.e., concentration vs. distance attenuation rate ($k_{dist}$)] will be evaluated. This analysis assists in evaluating the stability of the plume and its migration potential. Assessment of spatial plume behavior is necessary to ensure no unacceptable plume migration occurs.

Further evaluation will focus on the assessment of any departures from predicted trends and their impact on the potential for MNA to achieve plume-related goals. If the COC data points do not definitively indicate that the remedial goals are meeting the reasonable progress expectations, other data will be analyzed in order to properly interpret particular variances from the predicted performance (i.e., the site stratigraphy, groundwater chemistry, the groundwater flow field, the season of the year).

In addition, non-parametric statistical tests, such as the Mann-Kendall test, may be included in the data evaluation to establish the existence of a trend when the initial evaluation is inconclusive due to high data variability.

The process of MNA data evaluation is graphically depicted in Diagram 3-1.

### Individual Monitoring Well Analytical Data Evaluation

Evaluation of progress towards achievement of clean-up goals will focus primarily on temporal trends in COC concentration at individual attenuation monitoring point (AMP) wells within the plume. After each sampling event, temporal trends [i.e., concentration vs. time attenuation rate ($k_{time}$)], will be established for each AMP of the plume. Temporal trends ($k_{time}$) are particularly useful in evaluating if remedial goals can be met in the desired timeframe for the individual location. The analysis of temporal trends is useful for estimating the potential lifetime of the COC plume at the particular location.

The parameters to be evaluated in parallel to ensure reasonable progress is being made in the response action at the particular location are as follows:

- Direct comparison of detected concentrations to expected or benchmark concentration to meet remedial goals by the year 2016 for the monitoring wells along the centerline of the plume.

- Direct comparison of observed attenuation rate ($k_{time}$) from the chemical specific historical data available for the monitoring well versus the minimum attenuation rate ($k_{time}$) necessary to meet the 2016 clean-up date.

The following graph depicts the possible evaluation scenarios for the above parameters:

| | |
|---|---|
| **Measured COC Concentration < Expected COC Concentration**<br>**and**<br>**Observed $k_{time}$ > Minimum $k_{time}$**<br>Remedial goal is being met, continue performance monitoring | **Measured COC Concentration < Expected COC Concentration**<br>**and**<br>**Observed $k_{time}$ < Minimum $k_{time}$**<br>Evaluate further to ensure remedial goal is being met |
| **Measured COC Concentration > Expected COC Concentration**<br>**and**<br>**Observed $k_{time}$ > Minimum $k_{time}$**<br>Evaluate further to ensure remedial goal is being met | **Measured COC Concentration > Expected COC Concentration**<br>**and**<br>**Observed $k_{time}$ < Minimum $k_{time}$**<br>Remedial goal not being met, consider new response action |

1. Satisfactory progress is being made with the response action (top left quadrant) for an individual well location, if the detected concentration of the COC(s) is not greater than the 2016 clean-up curve expected concentration; and, the observed attenuation rate based on historical data available from the monitoring well is equal to or greater than the minimum attenuation rate necessary to meet clean-up by the year 2016 for the monitoring wells along the centerline of the plume.
2. Reasonable progress is not being made towards achieving the remedial goal (bottom right quadrant) if the detected concentration of the COC(s) exceeds the 2016 clean-up curve expected concentration; and the observed attenuation rate based on historical data available from the monitoring well is less than the minimum attenuation rate necessary to meet clean-up by the year 2016 for the monitoring wells along the centerline of the plume. A new response action may need to be implemented if this trend continues for at least three sampling rounds.
3. Further evaluation will be needed for the scenarios in the top right and bottom left quadrants before establishing if reasonable progress is being made towards achievement of the clean-up goals:
   - Reasonable progress is being made when the observed attenuation rate based on historical data is steep enough that clean-up can still be achieved by the year 2016, even though the detected concentration of a COC may be greater than the expected concentration during a particular sampling event (bottom left quadrant).
   - Reasonable progress is being made if the detected concentration of a COC in the sampling event is sufficiently below the expected concentration so that with an observed attenuation rate based on historical data greater than the calculated minimum attenuation rate necessary to meet PCLs by 2016, the remedial objectives can still be achieved by the year 2016 (top right quadrant).
   - Reasonable progress may not be made if either of the preceding two situations continues for at least three consecutive sampling rounds. At that point in the response action evaluation, a new response action may need to be implemented. In this case other statistical methods may be used to evaluate the data such as using non-parametric tests (i.e., Mann-Kendall) to determine if there has been a statistically significant change in degradation trends.

Plume Analytical Data Evaluation

Since a plume-wide trend implying progress toward restoration cannot be satisfactorily elucidated from monitoring only individual sampling locations, it will be necessary to compare trends among the AMP wells in the plume. Reduction in COC concentrations from all or most sampling locations within predicted ranges and/or at anticipated rates can be interpreted as a decrease in COC mass for the plume and will be indicative of effective remediation of the plume through MNA. Mixed trends in different portions of the plume may imply temporal changes in plume migration or may be simply attributed to the natural attenuation processes, and do not signify failure of MNA to achieve its goals in a timely manner. These variations will be evaluated in the context of the conceptual site model and sampling history before they are attributed to natural attenuation processes of other possible causes. To this effect, in cases of mixed trends it will be necessary to perform other comparisons in order to reach a conclusion of satisfactory progress. It will be particularly useful to evaluate trends in COC and daughter product concentrations (e.g., a decreasing trend in trichloroethene compared to an increasing trend in cis-1,2-dichloroethene in the same plume may indicate degradation of trichloroethene to cis-1,2-dichloroethene). Other trends of interest include changes in geochemistry that may indicate decrease in attenuation rates, such as changes in availability of electron donors and electron acceptors, changes in oxidation-reduction potential, or other primary geochemical indicators.

The complement to the evaluation of the behavior of the plume as a whole is the assessment of spatial trends. For each COC, spatial trends along the plume centerline [i.e., concentration vs. distance attenuation rate ($k_{dist}$)] will be evaluated. This analysis assists in evaluating the stability of the plume and its migration potential. $k_{dist}$ will be calculated for the monitoring wells along the plume centerline after each annual sampling round and will be depicted in centerline trend graphs ($k_{dist}$ graphs). Assessment of spatial plume behavior will be performed through visual interpretation of changes in plume shape over time as shown in the isoconcentration maps as well as centerline trend graphs.

**Assessment Conclusions and Recommendations**

As a result of the response action effectiveness evaluation, the MNA conceptual site model will be continuously refined/modified by incorporating any new data and data trends in COC and geochemistry values and changes in site hydrology. As new data is gathered there will be an ever-expanding database for the site that can be used for comparison with the changes in parameters noted between monitoring events as well as for comparison to predicted, acceptable trends. This continual evaluation of performance monitoring data will translate in better understanding of plume behavior and anticipated data variability and therefore assist in the proper interpretation of monitoring data.

Upon completion of each sampling round, data analysis and determination of the effectiveness of the MNA remedy, plume-specific criteria will drive decisions affecting the continuity of the monitoring program such as: the appropriateness of continuing the monitoring program without change, the need for modifications to the monitoring program (i.e., increased monitoring frequency, additional monitoring wells), need for additional characterization, implementation of a contingency or alternative remedy, or verification of attainment of remedial goals and termination of performance monitoring.

Site-related decisions regarding continuing, modifying, or terminating MNA performance monitoring will be made based on the analyses of spatial and temporal trends in COC concentration, as well as comparisons with predicted benchmarks and/or the specified concentration standard (i.e., COC PCLs). The following summarizes each potential decision

and why it may be chosen based on the perceived progress towards achievement of MNA remediation goals at the plume:

1. Continue Monitoring Program Without Change

   COC concentrations, including toxic transformation products and any mobilized by-products or secondary COCs must remain within the bounds of acceptable trends in order to continue the monitoring program without any change until all remedial action objectives have been met. Groundwater flow parameters must not have changed outside previously identified acceptable ranges. The geochemistry must not have changed in such a way as to indicate that the COC degradation or other natural attenuation processes would be significantly affected.

2. Modify the Monitoring Program

   Modification of the monitoring program may be needed to better reflect changing conditions or increased understanding of natural attenuation processes at the site. Changing conditions or the need to test key assumptions may require new sampling points or increases in monitoring parameters or frequency. Possible scenarios include:

   - Changes in groundwater flowrates or directions that indicate COCs may move farther downgradient, laterally or vertically into previously unimpacted areas, may warrant the need for additional monitoring wells.
   - Unfavorable changes in COC concentrations within the plume, or in the observed attenuation rate based on historic data, may warrant increased monitoring frequency. Sampling frequency may be increased if a sudden change in the trend of COC concentration reduction is noted in order to provide information to facilitate understanding of the change and provide earlier warning of further change. If the protectiveness of the remedy is in question (i.e., unfavorable observed attenuation rate change after 2012), a determination may be made to collect data on a more frequent schedule to properly interpret trends in time to implement contingency remedies, if necessary, to meet PCLs by 2016.
   - Detections of COCs outside the known plume, indicating potential plume expansion or plume migration, may warrant the need for additional monitoring wells.

3. Implement a Contingency or Alternative Remedy

   Alternative remedies can be considered for use in case MNA fails to perform at the desired effectiveness. Situations that may trigger the implementation of a contingency or other remedy modifications will depend on site conditions and include the following:

   - COC concentrations are not decreasing at the rate previously determined to be necessary to meet the remediation objectives by 2016. This assessment will involve the direct comparison of current analytical data with the expected plume clean-up benchmarks as well as evaluation of temporal trends (i.e., observed attenuation rates) in COC concentrations versus the minimum attenuation rates required to meet clean-up by the year 2016. If the protectiveness of the remedy is in question (i.e., more than three rounds of sampling fail to meet the criteria), implementation of a contingency or alternative remedy would generally be warranted.
   - COC concentrations at AMP wells exhibit an increasing trend not originally predicted during remedy selection. This situation would involve the identification and assessment of trends in COC concentration data, including transformation products, changes in geochemistry that may indicate decrease in attenuation rates explaining the lack of

progress toward clean-up objectives, and/or additional COC releases. For some locations in the plume, a detection of a significant change may not trigger immediate implementation of a contingency or alternative remedy. For instance, a low-level or otherwise limited COC concentration increase does not necessarily mean that remediation timeframes will be expanded, or that by the time the pulse moves downgradient to the boundary of the plume there will be a significant plume expansion. Or, in some cases, the detailed characterization and modeling of COC fate and migration may indicate that concentrations for certain COCs (i.e., daughter products) in some portions of the plume are expected to increase temporarily, yet MNA would still meet remedial objectives. If so, the temporary increase would not trigger the contingency or alternative remedy as long as the increase conformed to the predictions and MNA remained protective, allowing observation for several years to test model predictions, if time is available (i.e., before 2012). In situations where evaluation shows the observed COC concentration increases are expected to unacceptably increase the time for plume restoration beyond 2016, or cause unacceptable plume expansion, triggering the contingency or alternative remedy would generally be warranted.

- COCs are identified in monitoring wells located outside the original plume boundary indicating unacceptable plume expansion or migration. Detections of COCs outside of the predetermined plume boundaries may indicate unacceptable plume expansion. Implementation of an alternative or contingency remedy will depend on the locations of the new detections, and distance and possible COC migration rates between these monitoring points and receptors (i.e., surface water bodies, off-site property). Because the COC travel time from the location of the detections may be many years at some sites, there may be time for further monitoring and assessment before a contingency or alternative remedy would need to be implemented. In contrast, if the protectiveness of the remedy is in question (i.e., a significant trend of increasing COC concentration in downgradient wells was noted), there may be much less time available to assess the trend if there was only a short travel time to downgradient receptors. In this case, a contingency or alternative remedy may be triggered immediately.

4. Termination of Performance Monitoring

Once PCLs have been achieved at each of the AMP locations within a plume, showing that the MNA remedy goals have been met for two consecutive semi-annual sampling events for an individual PCLE zone, performance monitoring will be terminated and a period of verification monitoring will be initiated. Verification monitoring will include three years of semi-annual groundwater sampling in order to satisfy the requirements of the Compliance Plan for NAS Dallas (TCEQ, 2004). Sampling parameters for the verification of achieving the PCLs and locations will be in accordance with RAP Worksheet 4.0. This sampling will include all COCs that have been historically detected in the area of the former SWMU, not just the ones that were identified for remediation in the Response Action Plan. If no additional COC exceedances are identified during this three year period of post response action care monitoring, the monitoring system can be terminated, the monitoring wells will be abandoned, and the site will be removed from the permit.

### Effects of Data Variability on Data Interpretation

Data interpretation is affected by data variability. This variability is sometimes associated with natural causes or may be simply attributed to the natural attenuation processes. Due to the dynamic nature of natural attenuation processes, data typically exhibit fluctuations of various magnitudes. For example, there is an expected degree of natural variability within a plume that may include small-scale expansion and shrinkage in response to changes in groundwater flowrates and biological degradation rates throughout the year. COC concentrations in individual monitoring wells may fluctuate with changes in plume configuration caused by oscillations in groundwater flow. Also, changes in groundwater elevations can cause changes in COC concentrations measured in monitoring wells.

It is essential that each data point be interpreted in the context of its derivation in time and space. For instance, monitoring wells produce data that should be interpreted with respect to COC sources, site stratigraphy, the groundwater flow field, the plume, possible receptors, season of the year, and other relevant factors. Variations in sampling methodology should also be considered, due to possible differences in COC concentrations derived from different sampling techniques or devices. The analytical methodology may be evaluated in terms of accuracy, precision, and detection limits. This list of data considerations is not exhaustive, but merely emphasizes that a number (i.e., a data point) should be placed in context to be interpreted. The better the understanding on the derivation and context of the data, the more likely it is that the appropriate decision can be made based on the data.

Examination of historical and spatial patterns may provide information useful in assessing the source and significance of variability in the measured parameters. For instance, if there are multiple monitoring wells in the same plume that show a consistent trend for a number of monitoring variables across several monitoring events, then one may suspect a natural variation, such as recharge differences or geochemical changes in the system, and investigate a correlation of recharge, indicator parameters, or other external hydrologic factors with concentration as indicative of the likely cause of the change. If, on the other hand, a specific monitoring well shows an unusually large change in concentration between monitoring events, relative to nearby monitoring wells, then one may suspect a measurement factor or additional release source is involved and look at sampling techniques or other such factors that may influence the concentration change. Because plume variability should be taken into account when interpreting monitoring data, it is important to have a good estimate of natural variability derived from the site investigation and ongoing MNA performance monitoring.

# APPENDIX 8
# WASTE DISPOSAL MANIFESTS

Project #: 0-0

Order #: 140398

EFFECTIVE ENVIRONMENTAL

Please print or type. (Form designed for use on elite (12-pitch) typewriter.)

**NON-HAZARDOUS WASTE MANIFEST**

1. Generator ID Number: TX8170022786 / 65033
2. Page 1 of 1
3. Emergency Response Phone: 877-577-2669
4. Waste Tracking Number: NHM140398

5. Generator's Name and Mailing Address
Naval Air Station Dallas (NAS)
c/o EnSafe Inc., 4545 Fuller Dr., Suite 342
Irving, TX 75038
Generator's Phone: 972.792.3222 ATTN: Tom Wiberg

Generator's Site Address (if different than mailing address)
8100 West Jefferson
Dallas, TX 75211
RB TVW

6. Transporter 1 Company Name
Stericycle Specialty Waste Solutions Inc
Phd: 972 329 1200
State ID#: 98032 / H-4695
U.S. EPA ID Number: MNS000110924

7. Transporter 2 Company Name
U.S. EPA ID Number

8. Designated Facility Name and Site Address
Itasca Landfill TX, LP
2559 FM 66
Itasca, Texas 76055
State ID#: H0241C
U.S. EPA ID Number: n/a
Facility's Phone: 254 897 2511

| 9a. HM | 9b. U.S. DOT Description (including Proper Shipping Name, Hazard Class, ID Number, and Packing Group (if any)) | 10. Containers No. | Type | 11. Total Quantity | 12. Unit Wt./Vol. | |
|---|---|---|---|---|---|---|
| ☐ | 1 Non-regulated material (soil cuttings Class 2 solids) | 01 ~~02~~ | DM | 55 ~~110~~ | G | CESQ3012 Non-RCRA |
| ☐ | 2. Non-regulated material (purged ground and decon water) | 02 | DM | 110 ~~55~~ | G | CESQ1012 Non-RCRA |
| | 3. | | | | | |
| | 4. | | | | | |

13. Special Handling Instructions and Additional Information
01:IDW Soil cuttings NR (PF:5110167655) 55G
02:IDW purge and decon waters NR (PF:5110167656) 55G
RB TVW
11-1) 0.72 ton 11-2) 0.47 tons

14. **GENERATOR'S CERTIFICATION:** I certify the materials described above on this manifest are not subject to federal regulations for reporting proper disposal of Hazardous Waste.

Generator's/Offeror's Printed/Typed Name: X DAVID BARNEY
Signature: X
Month 5 Day 31 Year 16

15. International Shipments ☐ Import to U.S. ☐ Export from U.S. Port of entry/exit:
Transporter signature (for exports only): Date leaving U.S.:

16. Transporter Acknowledgment of Receipt of Materials

Transporter 1 Printed/Typed Name: Rafael Blaze
Signature:
Month 5 Day 31 Year 16

Transporter 2 Printed/Typed Name: Steven Vansickle
Signature:
Month 6 Day 9 Year 16

17. Discrepancy

17a. Discrepancy Indication Space ☐ Quantity ☐ Type ☐ Residue ☐ Partial Rejection ☐ Full Rejection

Manifest Reference Number:

17b. Alternate Facility (or Generator)
U.S. EPA ID Number
Facility's Phone

17c. Signature of Alternate Facility (or Generator)
Month Day Year

01: H132 02: H132

18. Designated Facility Owner or Operator: Certification of receipt of materials covered by the manifest except as noted in Item 17a

Printed/Typed Name: Jessica Anderson
Signature:
Month 6 Day 9 Year 16

GENERATOR

INT'L

TRANSPORTER

DESIGNATED FACILITY

6-NHM-C-C-11

2-DESIGNATED FACILITY TO GENERATOR

Project #: 0-0 Order #: 140398

EFFECTIVE ENVIRONMENTAL

Please print or type. (Form designed for use on elite (12-pitch) typewriter.)

**NON-HAZARDOUS WASTE MANIFEST**

1. Generator ID Number: TX8170022786 / 65033
2. Page 1 of 1
3. Emergency Response Phone: 877-577-2669
4. Waste Tracking Number: NHM140398

5. Generator's Name and Mailing Address
Naval Air Station Dallas (NAS)
c/o EnSafe Inc., 4545 Fuller Dr., Suite 342
Irving, TX 75038
Generator's Phone: 972-292-3222 ATTN: Tom Wiberg

Generator's Site Address (if different than mailing address)
8100 West Jefferson
Dallas, TX 75211

RJ TWW

6. Transporter 1 Company Name
Stericycle Specialty Waste Solutions Inc
Ph#: 972 329 1200
State ID#: S5627 / H-4565
U.S. EPA ID Number: MNS000110924

7. Transporter 2 Company Name
U.S. EPA ID Number:

8. Designated Facility Name and Site Address
Itasca Landfill TX, LP
2559 FM 56
Itasca, Texas 76055
State ID#: H0241C
U.S. EPA ID Number: n/a
Facility's Phone: 254 687 2511

| 9a. HM | 9b. U.S. DOT Description (including Proper Shipping Name, Hazard Class, ID Number, and Packing Group (if any)) | 10. Containers No. | Type | 11. Total Quantity | 12. Unit Wt./Vol. | |
|---|---|---|---|---|---|---|
| ☐ | 1. Non-regulated material (soil cuttings Class 2 solids) | 01 ~~02~~ | DM | 55 ~~110~~ | G | CESQ3012 Non-RCRA |
| ☐ | 2. Non-regulated material (purged ground and decon water) | 02 | DM | 110 ~~55~~ | G | CESQ1012 Non-RCRA |
| | 3. | | | | | |
| | 4. | | | | | |

13. Special Handling Instructions and Additional Information
01:IDW Soil cuttings NR (PF:5110167655) 55G
02:IDW purge and decon waters NR (PF:5110167656) 55G

RJ TWW

11-1) 0.72 ton 11-2) 0.47 ton

14. **GENERATOR'S CERTIFICATION:** I certify the materials described above on this manifest are not subject to federal regulations for reporting proper disposal of Hazardous Waste.

Generator's/Offeror's Printed/Typed Name: X DAVID BURNEY
Signature: X
Month 5 Day 31 Year 16

15. International Shipments ☐ Import to U.S. ☐ Export from U.S. Port of entry/exit:
Transporter signature (for exports only): Date leaving U.S.:

16. Transporter Acknowledgment of Receipt of Materials

Transporter 1 Printed/Typed Name: Rafael Blayze
Signature:
Month 5 Day 31 Year 16

Transporter 2 Printed/Typed Name: Steven Vansickle
Signature:
Month 6 Day 9 Year 16

17. Discrepancy

17a. Discrepancy Indication Space ☐ Quantity ☐ Type ☐ Residue ☐ Partial Rejection ☐ Full Rejection

Manifest Reference Number:

17b. Alternate Facility (or Generator) U.S. EPA ID Number
Facility's Phone:

17c. Signature of Alternate Facility (or Generator) Month Day Year

01: H132 02: H132

18. Designated Facility Owner or Operator: Certification of receipt of materials covered by the manifest except as noted in Item 17a

Printed/Typed Name: Jessica Anderson
Signature:
Month 6 Day 4 Year 16

GENERATOR

INT'L

TRANSPORTER

DESIGNATED FACILITY

6-NHM-C-C-11

3-DESIGNATED FACILITY TO GENERATOR

Project #: 0-0 Order #: 145925

E² EFFECTIVE ENVIRONMENTAL

Please print or type. (Form designed for use on elite (12-pitch) typewriter.)

**NON-HAZARDOUS WASTE MANIFEST**

1. Generator ID Number: TX8170022786 / 65033
2. Page 1 of 1
3. Emergency Response Phone: 877-577-2669
4. Waste Tracking Number: NHM-145925

5. Generator's Name and Mailing Address
Naval Air Station Dallas (NAS)
c/o EnSafe Inc., 4545 Fuller Dr., Suite 342
Irving, TX 75038
Generator's Phone: 972-792-3222 ATTN: Tom Wherg

Generator's Site Address (if different than mailing address)
8100 West Jefferson
Dallas, TX 75211

6. Transporter 1 Company Name
Stericycle Specialty Waste Solutions Inc
Ph#: 972 329 1200
State ID#: 88922 / H-1496
U.S. EPA ID Number: MNS000110924

7. Transporter 2 Company Name
U.S. EPA ID Number

8. Designated Facility Name and Site Address
Itasca Landfill TX. LP
2559 FM 66
Itasca, Texas 76055
State ID#: H0241C
U.S. EPA ID Number: n/a
Facility's Phone: 254 687 2511

| 9a. HM | 9b. U.S. DOT Description (including Proper Shipping Name, Hazard Class, ID Number, and Packing Group (if any)) | 10. Containers No. | 10. Containers Type | 11. Total Quantity | 12. Unit Wt./Vol. | |
|---|---|---|---|---|---|---|
| ☐ | 1. Non-regulated material (purged ground and decon water) | 04 | DM | 220 | G | CESQ1012 Non-RCRA |
| ☐ | 2. Non-regulated material (soil cuttings Class 2 solids) | 02 | DM | 110 | G | CESQ3012 Non-RCRA |
| | 3. | | | | | |
| | 4. | | | | | |

13. Special Handling Instructions and Additional Information
01:IDW purge and decon waters NR (PF:5110167856) 55G
02:IDW Soil cuttings NR (PF:5110167855) 55G

11.1) 0.94 tn
11.2) ~~0.29 tn~~ 0.35 tn

14. **GENERATOR'S CERTIFICATION:** I certify the materials described above on this manifest are not subject to federal regulations for reporting proper disposal of Hazardous Waste.

Generator's/Offeror's Printed/Typed Name: X DAVID BARNEY
Signature: X
Month 11 Day 8 Year 16

15. International Shipments ☐ Import to U.S. ☐ Export from U.S. Port of entry/exit:
Transporter signature (for exports only): Date leaving U.S.:

16. Transporter Acknowledgment of Receipt of Materials

Transporter 1 Printed/Typed Name: Jason L Boss
Signature:
Month 11 Day 8 Year 16

Transporter 2 Printed/Typed Name: Rafael Blanco
Signature:
Month 11 Day 14 Year 16

17. Discrepancy

17a. Discrepancy Indication Space ☐ Quantity ☐ Type ☐ Residue ☐ Partial Rejection ☐ Full Rejection

Manifest Reference Number:

17b. Alternate Facility (or Generator) U.S. EPA ID Number
Facility's Phone:

17c. Signature of Alternate Facility (or Generator) Month Day Year

01: H132 02: H132

18. Designated Facility Owner or Operator: Certification of receipt of materials covered by the manifest except as noted in Item 17a

Printed/Typed Name: Cindy Reed
Signature: Cindy Reed
Month 11 Day 14 Year 16

GENERATOR

INT'L

TRANSPORTER

DESIGNATED FACILITY

6-NHM-C-C-11

2-DESIGNATED FACILITY TO GENERATOR