# DRAFT VAPOR INTRUSION STUDY REPORT

**BUILDINGS 1405, 1422, AND 1424**
**SOLID WASTE MANAGEMENT UNIT 21**
**FORMER NAVAL AIR STATION DALLAS**
**DALLAS, TEXAS**

**Revision Number: 0**

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# 1.0 INTRODUCTION

Vapor intrusion (VI) involves the migration of volatile chemicals from subsurface soil and/or groundwater into the indoor air of overlying buildings. This VI study was conducted to evaluate the potential for VI from groundwater to impact indoor air at Buildings 1405, 1422, and 1424 within Solid Waste Management Unit (SWMU) 21 at the Former Naval Air Station (NAS) Dallas. Specifically, this study was performed to provide data to evaluate whether VI is occurring from the groundwater plume to indoor air at levels that may pose an unacceptable risk to workers.

This report describes the site background and discusses the sampling methodology, analytical results, and exceptions to the *Sampling and Analysis Plan* submitted by Resolution Consultants in September 2014 (herein after referred to as the SAP).

# 2.0 SITE BACKGROUND

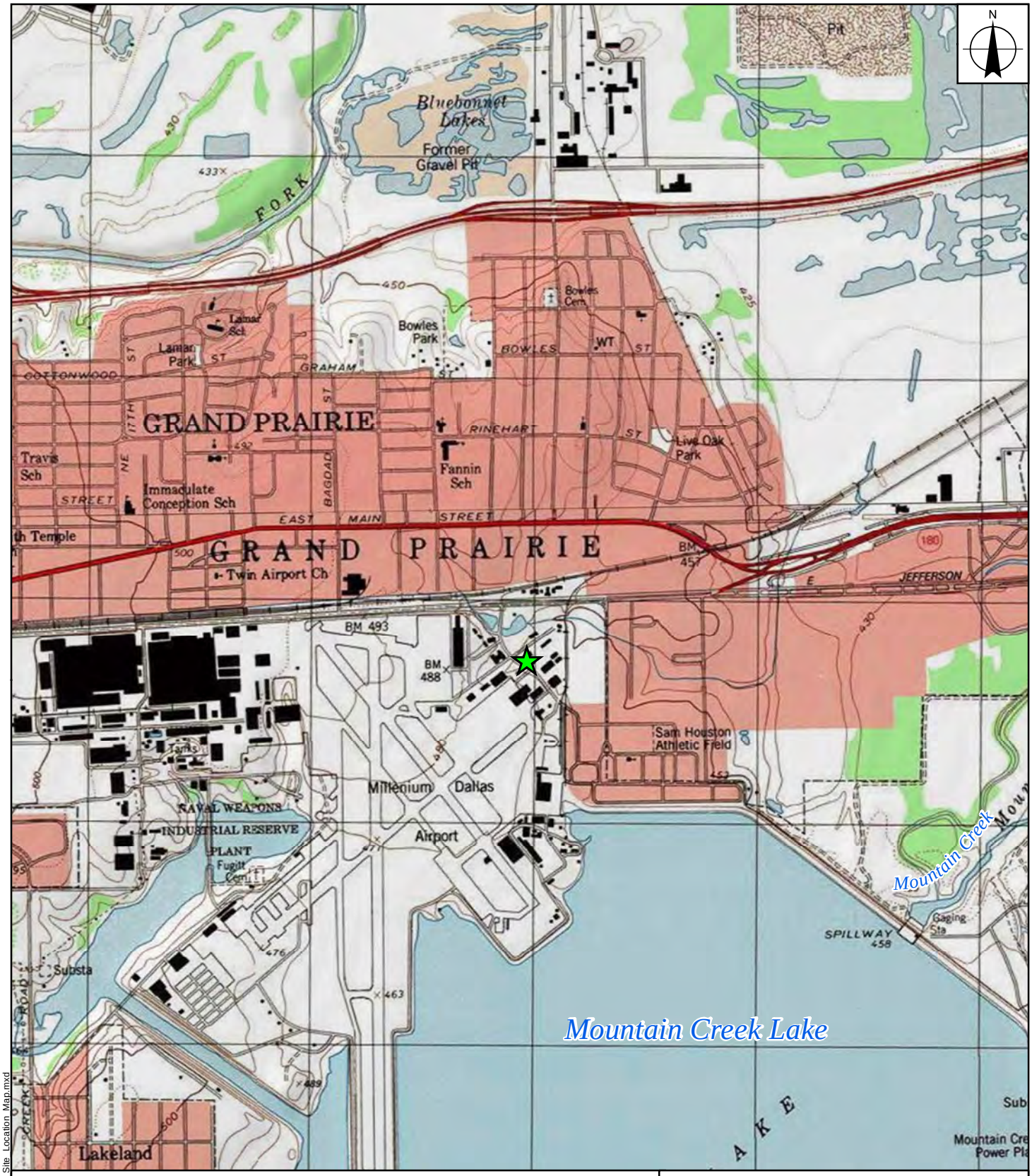
## 2.1 Site Location

The Former NAS Dallas, which consists of approximately 837 acres, is located 10 miles southwest of downtown Dallas, Texas. The property is bordered to the east by U.S. Army-owned and privately-owned property; to the south by Mountain Creek Lake; to the west by the Naval Weapons Industrial Reserve Plant; and to the north by Jefferson Boulevard and the city of Grand Prairie. A site location map is presented as Figure 1. SWMU 21 is situated in the northeast portion of the Former NAS Dallas. The locations of Buildings 1405, 1422, and 1424 are identified on Figure 2.

## 2.2 Site Description

Aviation operations have been conducted at NAS Dallas since Hensley Field opened in 1932 on property leased from the city of Dallas. The Army Air Corps maintained Hensley Field until 1940. In 1941, the field was commissioned as a Naval Air Reserve Base. The Navy took full command of the activity in 1946, and the Navy and reserve operations continued to expand into the 1990s. Military operations ceased at NAS Dallas in 1998, and in September 2002, ownership of the base was returned to the city of Dallas. Development includes administrative buildings, training facilities, recruit and family housing, building and vehicle maintenance shops, and community facilities. The projected future land use after 2017 at the Former NAS Dallas is residential; however, land use at SWMU 21 will continue to be commercial/industrial through at least 2017.

The majority of SWMU 21 consists of property leased by the Texas Air National Guard (TANG). The main chemical of concern at SWMU 21 is trichloroethene (TCE), which has a Texas Risk Reduction Program Tier 1 Residential groundwater ingestion ($^{GW}GW_{Ing}$) protective concentration level (PCL) of 5 micrograms per liter (µg/L). The groundwater PCL exceedance (PCLE) zone at SWMU 21 is defined by an outline encompassing 16 monitoring wells, which exceed the PCL for TCE. The centerline of the roughly oval-shaped plume is oriented southwest to northeast. The total length of the PCLE zone is approximately 770 feet. The estimated area of the gross PCLE zone is approximately 191,000 square feet. The site layout is shown in the Figure 2 sample location map.




## Legend

★ Site Location

0 2,000 4,000 Feet

FIGURE 1
SITE LOCATION MAP
FORMER NAS DALLAS, TEXAS

NAVFAC Naval Facilities Engineering Command

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| | |
|---|---|
| REQUESTED BY: C. DUCKWORTH | DATE: 4/6/2015 |
| DRAWN BY: B. LIPSCOMB | PROJECT NUMBER: 0888812796 |

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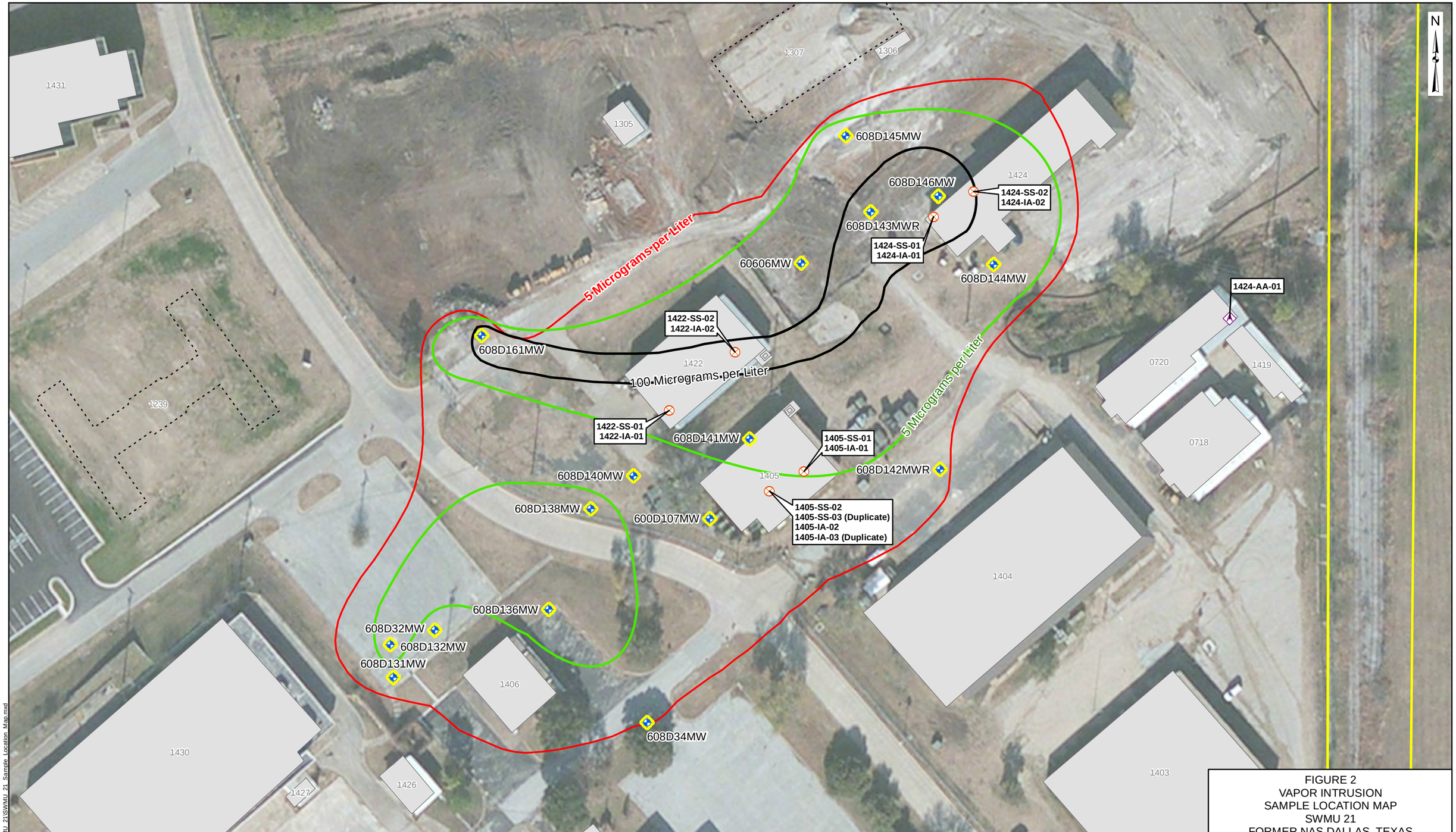



FIGURE 2
VAPOR INTRUSION
SAMPLE LOCATION MAP
SWMU 21
FORMER NAS DALLAS, TEXAS

Monitoring Well
Sample Location
Outdoor Ambient Air Sample Location

Historic Gross TCE PCLE Zone Outline (5 ug/L in groundwater)
Property Boundary 2012

TCE Isocontour Line (5 ug/L in groundwater) - January 2014

TCE Isocontour Line (100 ug/L in groundwater) - January 2014
Demolished Building
Existing Structure

- SS = Sub-slab
- IA = Indoor Air
- AA = Ambient Air

0 75 150 Feet

NAVFAC Naval Facilities Engineering Command
RESOLUTION CONSULTANTS

| | |
|---|---|
| REQUESTED BY: C. DUCKWORTH | DATE: 4/6/2015 |
| DRAWN BY: B. LIPSCOMB/ J. LONDON | PROJECT NUMBER: 0888812796 |

X:\Navy\NAS_Dallas\SWMU_21\SWMU_21_Sample_Location_Map.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; Some data are from Tetra Tech.

SWMU 21 primarily consists of several warehouse buildings, maintained grassy areas, paved streets, and parking areas. Surface topography at SWMU 21 slopes gently to the northeast. Surface water drainage is to unnamed ditches located approximately 400 feet to the northeast and 100 feet to the south of SWMU 21. These ditches join east of the site and eventually drain into Mountain Creek. One unoccupied warehouse building, Building 1406, and three occupied warehouse buildings are located within SWMU 21 — Buildings 1405, 1422, and 1424:

- Building 1405, the supply storage warehouse, is a 5,787-square foot building (slab-on-grade construction) occupied by TANG. It was renovated in 2005. It contains some office space, but is mostly used as a supply warehouse. Only the office portion of the building has a heating, ventilation, and air conditioning (HVAC) system.

- Building 1422, the power production building, is a 5,310-square foot building (slab-on-grade construction) occupied by TANG. It was renovated in 2005. It contains some office space, but is mostly used as a warehouse space. Only the office portion of the building has an HVAC system.

- Building 1424, the motor pool, is a 6,877-square foot building (slab-on-grade construction) occupied by TANG. It was renovated in 2008. It contains some office space, but mostly consists of vehicle/storage bays used for maintenance of the TANG vehicle fleet. Only the office portion of the building has an HVAC system.

## 2.3 Site Geology and Hydrogeology

The geology at SWMU 21 consists of Holocene and Pleistocene alluvial terrace deposits overlying the Cretaceous Eagle Ford Formation. The upper soil horizons and alluvium have been disturbed locally by surface industrial development and consequently contain fill materials. The alluvial deposits form a characteristic "fining-upward" sequence consisting of a basal "lag" deposit composed of varying percentages of silt, sand, gravel, and gravelly clay (referred to as the gravelly clay unit). At SWMU 21, the gravelly clay unit is approximately two feet thick and consists mainly of sandy clay. The gravelly clay unit then fines or grades upward into clayey silt and silty clay floodplain/overbank deposits (referred to as the silty clay unit) interspersed with discontinuous deposits of alluvial sand. The alluvial deposits range from 15 to 27 feet in thickness, directly overlying the erosional surface of the Eagle Ford Formation, the regional bedrock unit. The Eagle Ford Formation consists primarily of shale and is approximately 200 feet thick in the vicinity of NAS Dallas.

## 2.4 Site History

Former waste management activities associated with Building 1406 and a former 500-gallon underground storage tank (UST) are believed to be the source of the groundwater plume at SWMU 21.

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 TANG aircrafts; 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, 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 UST (No. 1406-1) was installed in 1972 at the base of the hill adjacent to the northwest side of Building 1406. The *Environmental Baseline Survey* (EnSafe, May 1994) reported that the UST stored liquid wastes from the NDI building's 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.

## 3.0 SAMPLING METHODOLOGY

The SAP was developed by Resolution Consultants and approved by the Texas Commission on Environmental Quality prior to field sampling. Field activities were conducted in accordance with the approved SAP. Exceptions or deviations to the SAP are presented in Section 6.0. The VI study was conducted during two separate sampling events (winter and summer) to determine if there were any seasonal variations in target compound concentrations or potential effects from the heating and cooling systems in the buildings.

A visual building inspection was performed on 10 December 2014, and did not identify obvious potential indoor air sources that may contribute to target compound (i.e., TCE and cis-1,2-dichloroethene [cis-1,2-DCE]) concentrations in the buildings. Field preparation and sampling activities were conducted from 16 through 18 December 2014, and 2 through 4 June 2015. The Resolution Consultants field technicians were accompanied by the Resolution Consultants project manager and the TANG building manager. Prior to sampling, Resolution Consultants verified the HVAC systems had been operating in each building for at least 48 hours. Resolution Consultants collected indoor air, sub-slab vapor, and outdoor ambient air samples. Six locations within Buildings 1405, 1422, and 1424 were identified for indoor air and sub-slab vapor sampling, and one outdoor ambient air sample location was identified at an upwind (background) location within close proximity to Buildings 1405, 1422, and 1424. Sample locations are shown on Figure 2. Grab indoor air and sub-slab vapor samples were collected at the six locations identified within the buildings and submitted for radon analysis. A grab outdoor ambient air sample was also collected from the upwind (background) location and submitted for radon analysis. Ancillary data was collected including pressure differences between the building interior and sub-slab at locations near one of the indoor sampling locations for each building. Barometric pressure was also monitored at the indoor ancillary data collection point. Ambient outdoor temperature and barometric pressure measurements were obtained from weather station KTXGRAND10 located three miles west of SWMU 21.

### 3.1 Indoor Air Sampling

As indicated on Figure 2, two indoor air samples were collected from each building. The indoor air sampling locations were positioned to provide data from areas that are typically occupied by workers based on observations made during the building evaluation. Indoor air samples were collected from the breathing zone three to six feet above ground surface. At each location, a six-liter Summa canister with a dedicated flow regulator was used to collect a 24-hour sample. Indoor air samples were submitted for laboratory analysis of TCE and cis-1,2-DCE by the United States Environmental Protection (U.S. EPA) Method TO-15.

## 3.2 Sub-Slab Vapor Sampling

As indicated on Figure 2, two sub-slab vapor samples were collected from each building. The sub-slab vapor sampling locations were positioned to provide data from areas that are typically occupied by workers based on observations made during the building evaluation. They were also co-located with the indoor air sample locations.

Sub-slab vapor samples were collected using temporary vapor sampling points, which were installed and then abandoned after each event so that sampling infrastructure was not left in the TANG buildings.

A rotary hammer drill was used to core a ½-inch diameter hole through the concrete slab and approximately three inches into the sub-slab material. The slab thickness was measured and results are shown in Table 1. Teflon tubing, approximately ¼-inch in outer diameter, was placed down each borehole to a depth of three inches into the concrete slab; however, the tubing did not contact sub-slab material. Volatile organic constituent-free modeling clay was used to provide a surface seal for the void space between the tubing and the borehole.

**Table 1**
**Building Slab Thickness**

| Sample Location | Slab Thickness (inches) |
|---|---|
| 1405-SS-01 | 5 |
| 1405-SS-02 | 4 |
| 1405-SS-03 | 4 |
| 1422-SS-01 | 7.25 |
| 1422-SS-02 | 7 |
| 1424-SS-01 | 7 |
| 1424-SS-02 | 7.5 |

The sampling manifold was assembled and checked for leaks in general accordance with Resolution Consultants Standard Operating Procedures (SOP)-DAL-VI-5. The sampling manifold was attached to a vacuum pump, and a minimum of three to five volumes of air were purged (at a flow rate of 200 milliliters per minute) to help ensure the sample represented subsurface conditions.

After purging, a six-liter Summa canister with a dedicated flow regulator was attached to the sampling manifold and used to collect a sample from each sub-slab vapor location. All Summa canisters used for this study were individually lab-certified clean for the constituents of

interest for this site. At each location, a six-liter Summa canister with a dedicated flow regulator was used to collect a 24-hour composite sample. Sub-slab vapor samples were submitted for laboratory analysis of TCE and cis-1,2-DCE by U.S. EPA Method TO-15. Following sampling activities (including collection of radon samples, described in Section 3.4, below), sample tubing was removed from temporary sampling locations and each borehole was filled to grade with mortar.

## 3.3 Outdoor Ambient Air Sampling

As depicted on Figure 2, one outdoor ambient air sample was collected over the same 24-hour duration at an upwind (background) location within close proximity to Buildings 1405, 1422, and 1424. The sample was collected using a six-liter Summa canister with dedicated flow regulator, and was submitted for the same U.S. EPA TO-15 analysis.

## 3.4 Radon Sampling

In conjunction with TCE and cis-1,2-DCE sampling, radon was evaluated through the collection of two sub-slab vapor and two indoor air grab samples at each building. Radon grab samples were collected from the same locations as the sub-slab vapor and indoor air samples immediately after completion of sub-slab and indoor air sampling. One radon outdoor ambient air grab sample was also collected at the same location as the outdoor ambient air sample.

Grab indoor air, outdoor ambient air, and sub-slab vapor radon samples were collected using 0.5-liter Tedlar bags and dedicated, disposable polypropylene syringes.

- For the indoor air and outdoor ambient air radon samples, a three-way valve was used to connect the syringe and the Tedlar bag. The syringe was used to collect air directly from the breathing zone, three to six feet above ground surface.

- For the sub-slab radon samples, a three-way valve was used to connect the Tedlar bag, the syringe, and the sub-slab vapor sample line. A minimum of three tubing volumes were purged from the sample tubing prior to sub-slab radon sampling to help ensure the sample represented subsurface conditions.

The radon samples were collected as grab samples for the duration necessary to fill the Tedlar bags, typically five minutes or less. Samples were submitted for laboratory analysis of radon using the McHugh et al. Method (McHugh T.E., D.E. Hammond, T. Nickels, and B. Hartman, 2008).

## 3.5 Ancillary Data Collection

Differential pressure between the building interior and sub-slab and indoor barometric pressure were measured in each building throughout the duration of the 24-hour indoor air and sub-slab vapor sampling. Specifically, the monitoring device was set up near one indoor air and sub-slab sampling location in each building. The monitoring device was programmed to log barometric pressure and differential pressure data at 15-minute intervals. Upon completion of the indoor air and sub-slab sampling, the data from the monitoring device was downloaded onto a personal computer in the field. Ambient outdoor temperature and barometric pressure data for the sampling period were obtained from weather station KTXGRAND10 located three miles west of SWMU 21.

## 3.6 Quality Assurance and Quality Control

For both sampling events, quality assurance/quality control samples consisted of the following:

- One sub-slab vapor field duplicate for TCE and cis-1,2-DCE (1405-SS-03, field duplicate of 1405-SS-02)
- One sub-slab vapor field duplicate for radon (1405-SS-03, field duplicate of 1405-SS-02)
- One indoor air field duplicate for TCE and cis-1,2-DCE (1405-IA-03, field duplicate of 1405-IA-02)
- One indoor air field duplicate for radon (1405-IA-03, field duplicate of 1405-IA-02)

Immediately following the collection of each sample, chain-of-custody procedures were followed according to Resolution Consultants' SOP-3-03A. The sample containers were placed in the original shipping boxes. At the conclusion of the sampling event, completed chain-of-custody forms were placed inside the shipping boxes, and signed custody seals were affixed to the shipping box lids. The shipping boxes were then bound with packaging tape and shipped overnight via FedEx to USC Earth Sciences in Los Angeles, California, and ALS Environmental in Simi Valley, California, for radon and TCE, and cis-1,2-DCE analysis, respectively. Field notes documenting the sampling events are presented in Appendix A.

## 4.0 ANALYTICAL RESULTS

Sub-slab vapor, indoor air, and outdoor ambient air samples were analyzed for the following parameters: TCE and cis-1,2-DCE (TO-15), and radon (McHugh et al. Method). Analytical results are discussed in the following sections. Analytical results for TCE and cis-1,2-DCE are shown in Figures 3 through 6 and presented in Appendix B: *Data Usability Summary Reports by Resolution Consultants, January 2015 and August 2015*.

### 4.1 TCE and cis-1,2-DCE

***December 2014 Sampling Event***

Neither TCE nor cis-1,2-DCE were detected above laboratory reporting limits in any of the indoor air samples. TCE was detected in two sub-slab vapor samples, 1422-SS-01 (8.4 micrograms per cubic meter [µg/m$^3$]) and 1422-SS-02 (1.5 µg/m$^3$). However, the TCE concentrations are considerably less than the sub-slab vapor intrusion screening level (VISL) for TCE of 293 µg/m$^3$ (calculated using an attenuation factor of 0.03; a generic attenuation factor of 0.03 is presented in the *Office of Solid Waste and Emergency Response [OSWER] Technical Guide for Assessing and Mitigating the Vapor Intrusion Pathway from Subsurface Vapor Sources to Indoor Air* [U.S. EPA, June 2015]).

***June 2015 Sampling Event***

Neither TCE nor cis-1,2-DCE were detected above laboratory reporting limits in any of the indoor air samples. TCE was detected in three sub-slab vapor samples, 1422-SS-01 (1.4 µg/m$^3$), 1422-SS-02 (0.69 µg/m$^3$), and 1424-SS-02 (0.37J µg/m$^3$). As with the December 2014 sampling event, the TCE concentrations are considerably less than the sub-slab VISL for TCE of 293 µg/m$^3$.

Site- and building-specific sub-slab screening levels were also calculated based on attenuation factors derived using the radon analytical data, which are presented in Table 2. TCE concentrations did not exceed the calculated site- and building-specific screening levels. Cis-1,2-DCE was below laboratory reporting limits in all indoor air samples collected during both sampling events of this study and thus was not used to evaluate TCE/cis-1,2-DCE ratios as part of the multiple lines of evidence approach listed in Section 11.3 of the SAP.

**Table 2**
**VI Study Screening Criteria**

| | **December 2014 Sampling Event** | |
|---|---|---|
| **Screening Level** | **Source** | **TCE ($\mu g/m^3$)** |
| Indoor Air | Industrial RSL[1] | 8.8 |
| Sub-Slab Vapor | Industrial RSL adjusted using attenuation factor of 0.03 [2] | 293 |
| | Industrial RSL adjusted using site average attenuation factor of 0.015 [3] | 587 |
| | Industrial RSL adjusted using Building 1405 average attenuation factor of 0.033 [3] | 267 |
| | Industrial RSL adjusted using Building 1422 average attenuation factor of 0.00058 [3] | 15,172 |
| | Industrial RSL adjusted using Building 1424 average attenuation factor of 0.00062 [3] | 14,194 |
| | **June 2015 Sampling Event** | |
| **Screening Level** | **Source** | **TCE ($\mu g/m^3$)** |
| Indoor Air | Industrial RSL[1] | 8.8 |
| Sub-Slab Vapor | Industrial RSL adjusted using attenuation factor of 0.03 [2] | 293 |
| | Industrial RSL adjusted using site average attenuation factor of 0.0034 [3] | 2,619 |
| | Industrial RSL adjusted using Building 1405 average attenuation factor of 0.0075 [3] | 1,179 |
| | Industrial RSL adjusted using Building 1422 average attenuation factor of 0.00025 [3] | 35,628 |
| | Industrial RSL adjusted using Building 1424 average attenuation factor of 0.00032 [3] | 27,689 |

***Notes:***

[1] U.S. EPA Industrial Air RSL for TCE (carcinogenic target risk of $10^{-5}$ and a non-carcinogenic target hazard quotient of 1); because default values were used in the Vapor Intrusion Screening Level (VISL) calculator to establish soil gas VISLs, the indoor air RSL divided by the same default attenuation factor of 0.03 results in the same calculated soil gas VISL.

[2] The screening criterion shown here is adjusted using the U.S. EPA's default attenuation factor of 0.03 (*Office of Solid Waste and Emergency Response [OSWER] Technical Guide for Assessing and Mitigating the Vapor Intrusion Pathway from Subsurface Vapor Sources to Indoor Air* (U.S. EPA, June 2015).

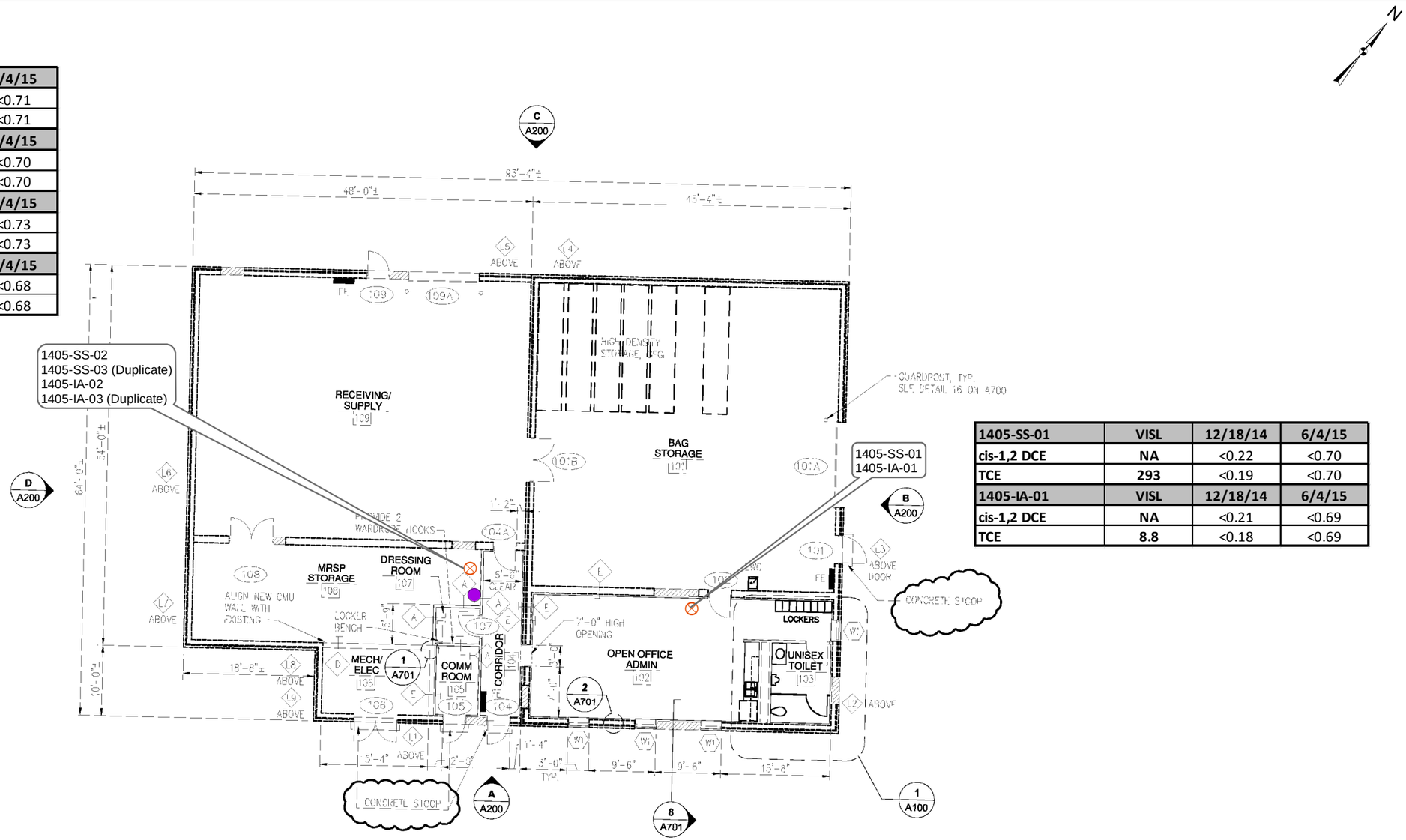
[3] Site and building specific screening criteria developed based on radon indoor air and sub-slab sampling results.

TCE = Trichloroethene

RSL = Regional Screening Level (June 2015); Retrieved from: http://www.epa.gov/earth1r6/6pd/rcra_c/pd-n/screen.htm

$\mu g/m^3$ = Micrograms per cubic meter

| 1405-SS-02 | VISL | 12/18/14 | 6/4/15 |
|---|---|---|---|
| cis-1,2 DCE | NA | <0.22 | <0.71 |
| TCE | 293 | <0.19 | <0.71 |
| **1405-SS-03(Duplicate)** | **VISL** | **12/18/14** | **6/4/15** |
| cis-1,2 DCE | NA | <0.22 | <0.70 |
| TCE | 293 | <0.19 | <0.70 |
| **1405-IA-02** | **VISL** | **12/18/14** | **6/4/15** |
| cis-1,2 DCE | NA | <0.21 | <0.73 |
| TCE | 8.8 | <0.18 | <0.73 |
| **1405-IA-03(Duplicate)** | **VISL** | **12/18/14** | **6/4/15** |
| cis-1,2 DCE | NA | <0.20 | <0.68 |
| TCE | 8.8 | <0.18 | <0.68 |




| 1405-SS-01 | VISL | 12/18/14 | 6/4/15 |
|---|---|---|---|
| cis-1,2 DCE | NA | <0.22 | <0.70 |
| TCE | 293 | <0.19 | <0.70 |
| **1405-IA-01** | **VISL** | **12/18/14** | **6/4/15** |
| cis-1,2 DCE | NA | <0.21 | <0.69 |
| TCE | 8.8 | <0.18 | <0.69 |

FIGURE 3
TCE & CIS 1,2 DCE SAMPLING RESULTS
BUILDING 1405
SWMU 21
FORMER NAS DALLAS, TEXAS

## Legend

- Ancillary Data Collection Point
- Sample Location

- SS = Sub-slab
- IA = Indoor Air
- cis 1,2 DCE = cis-1,2-Dichloroethene
- TCE = Trichloroethene
- VISL = Vapor Intrusion Screening Level

- NA = Not Applicable
- Trichloroethene and cis-1,2-Dichloroethene concentration µg/m$^3$
- ( ) Numbers in parenthesis indicate the detection limits. If the analyte concentration is in parenthesis, the analyte was not detected in the sample.

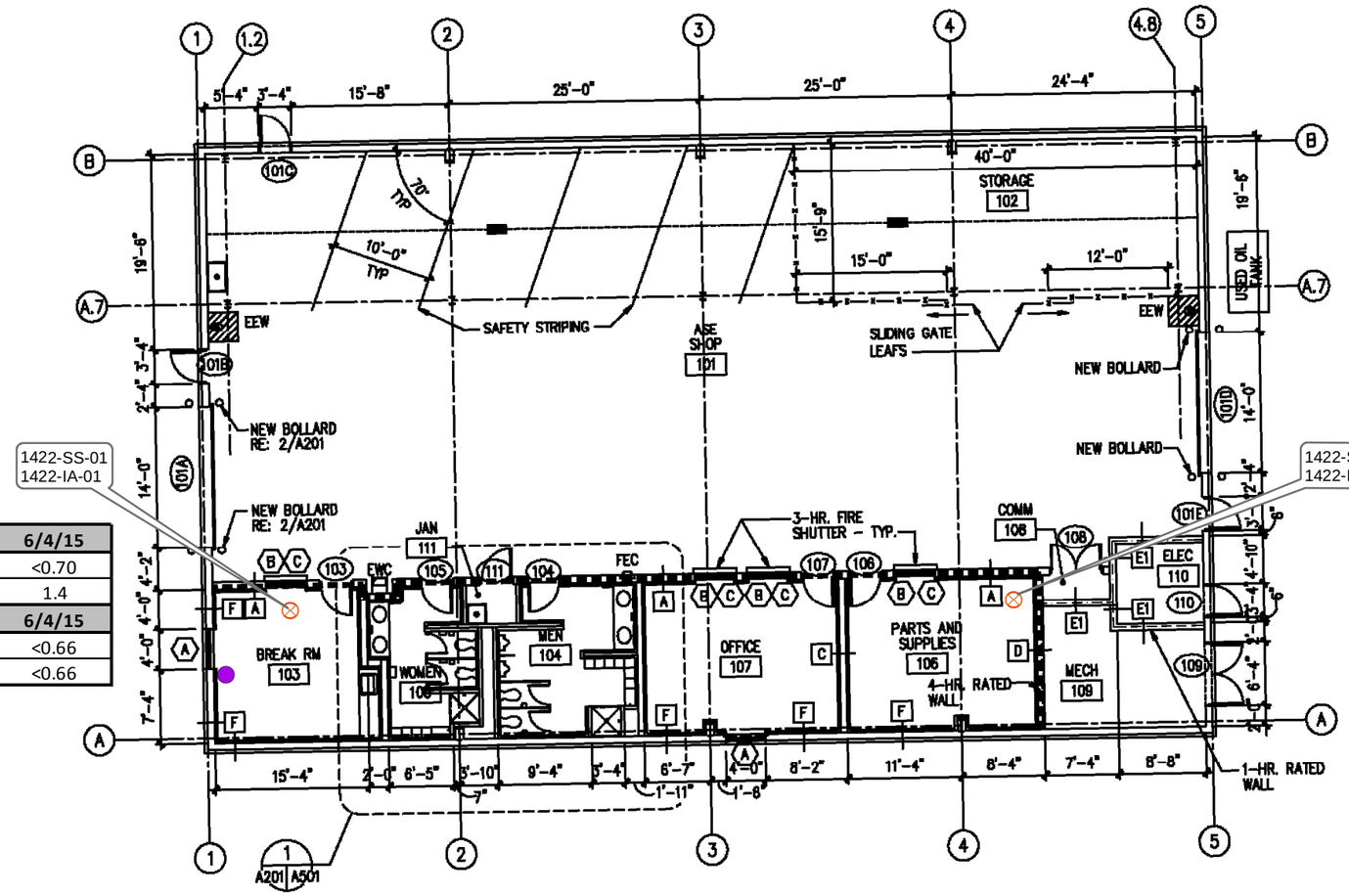
0 15 30 Feet

NAVFAC Naval Facilities Engineering Command
RESOLUTION CONSULTANTS

| REQUESTED BY: C. DUCKWORTH | DATE: 9/24/2015 |
|---|---|
| DRAWN BY: M. SENNE | PROJECT NUMBER: 0888812796 |

CAD Drawing is from Burns and McDonnell Engineering Company, Inc.

X:\Navy\NAS Dallas\SWMU 21\Fig. 3 Building 1405 SWMU 21 CIS 1 2 and TCE 092315.mxd




| 1422-SS-01 | VISL | 12/18/14 | 6/4/15 |
|---|---|---|---|
| cis-1,2 DCE | NA | <0.22 | <0.70 |
| TCE | 293 | 8.4 | 1.4 |
| **1422-IA-01** | **VISL** | **12/18/14** | **6/4/15** |
| cis-1,2 DCE | NA | <0.24 | <0.66 |
| TCE | 8.8 | <0.21 | <0.66 |

| 1422-SS-02 | VISL | 12/18/14 | 6/4/15 |
|---|---|---|---|
| cis-1,2 DCE | NA | <0.22 | <0.69 |
| TCE | 293 | 1.5 | 0.69 |
| **1422-IA-02** | **VISL** | **12/18/14** | **6/4/15** |
| cis-1,2 DCE | NA | <0.20 | <0.71 |
| TCE | 8.8 | <0.17 | <0.71 |

FIGURE 4
TCE & CIS 1,2 DCE SAMPLING RESULTS
BUILDING 1422
SWMU 21
FORMER NAS DALLAS, TEXAS

## Legend

- Ancillary Data Collection Point
- Sample Location

- SS = Sub-slab
- IA = Indoor Air
- cis 1,2 DCE = cis-1,2-Dichloroethene
- TCE = Trichloroethene
- VISL = Vapor Intrusion Screening Level

- NA = Not Applicable
- Trichloroethene and cis-1,2-Dichloroethene concentration µg/m$^3$
- ( ) Numbers in parenthesis indicate the detection limits. If the analyte concentration is in parenthesis, the analyte was not detected in the sample.

0 10 20 30 Feet

Naval Facilities Engineering Command

RESOLUTION CONSULTANTS

| | |
|---|---|
| REQUESTED BY: C. DUCKWORTH | DATE: 9/24/2015 |
| DRAWN BY: M. SENNE | PROJECT NUMBER: 0888812796 |

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| 1424-SS-01 | VISL | 12/18/14 | 6/4/15 |
|---|---|---|---|
| cis-1,2 DCE | NA | <0.22 | <0.71 |
| TCE | 293 | <0.19 | <0.71 |
| **1424-IA-01** | **VISL** | **12/18/14** | **6/4/15** |
| cis-1,2 DCE | NA | <0.23 | <0.67 |
| TCE | 8.8 | <0.20 | <0.67 |

| 1424-SS-02 | VISL | 12/18/14 | 6/4/15 |
|---|---|---|---|
| cis-1,2 DCE | NA | <0.54 | <0.70 |
| TCE | 293 | <0.48 | 0.37J |
| **1424-IA-02** | **VISL** | **12/18/14** | **6/4/15** |
| cis-1,2 DCE | NA | <0.23 | <0.70 |
| TCE | 8.8 | <0.20 | <0.70 |

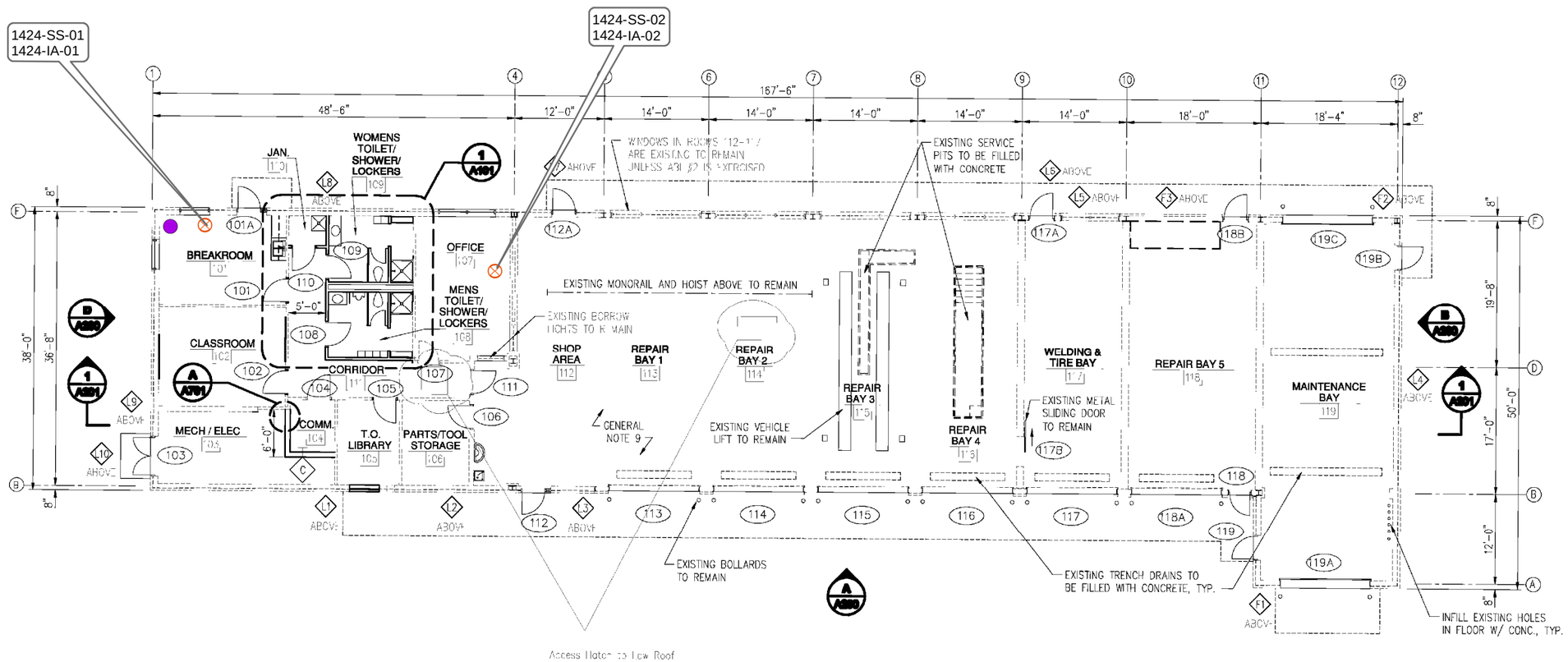


FIGURE 5
TCE & CIS 1,2 DCE SAMPLING RESULTS
BUILDING 1424
SWMU 21
FORMER NAS DALLAS, TEXAS

## Legend

- Ancillary Data Collection Point
- Sample Location

- SS = Sub-slab
- IA = Indoor Air
- cis 1,2 DCE = cis-1,2-Dichloroethene
- TCE = Trichloroethene
- VISL = Vapor Intrusion Screening Level

- NA = Not Applicable
- Trichloroethene and cis-1,2-Dichloroethene concentration µg/m$^3$
- ( ) Numbers in parenthesis indicate the detection limits. If the analyte concentration is in parenthesis, the analyte was not detected in the sample.
- J = Estimated value.

0 15 30 Feet

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RESOLUTION CONSULTANTS

| | |
|---|---|
| REQUESTED BY: C. DUCKWORTH | DATE: 9/24/2015 |
| DRAWN BY: M. SENNE | PROJECT NUMBER: 0888812796 |

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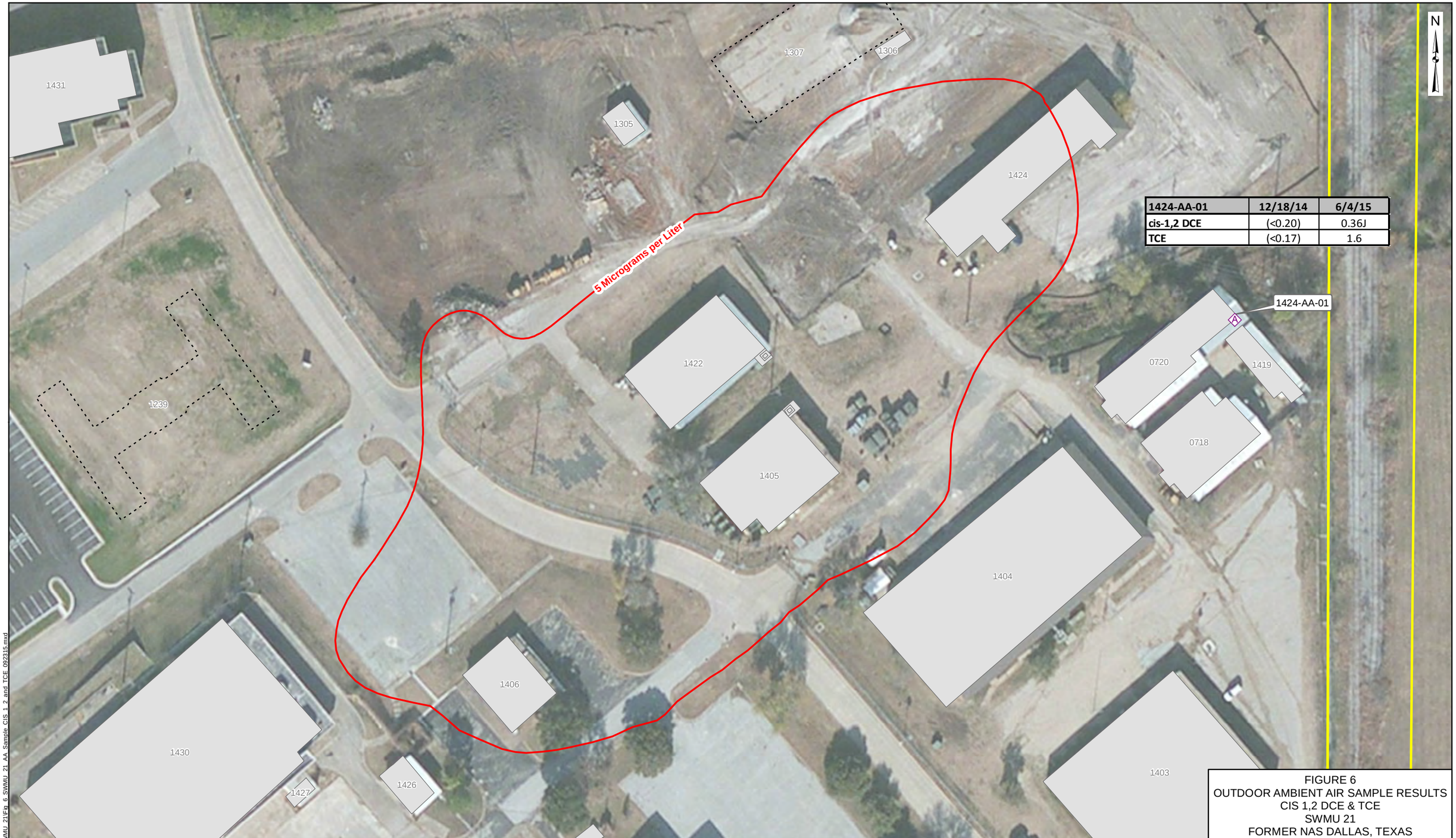


| 1424-AA-01 | 12/18/14 | 6/4/15 |
|---|---|---|
| cis-1,2 DCE | (<0.20) | 0.36J |
| TCE | (<0.17) | 1.6 |

FIGURE 6
OUTDOOR AMBIENT AIR SAMPLE RESULTS
CIS 1,2 DCE & TCE
SWMU 21
FORMER NAS DALLAS, TEXAS

**Legend**

- Outdoor Ambient Air Sample Location
- Gross TCE PCLE Zone Outline (5 Micrograms per Liter in Groundwater)
- Property Boundary 2012
- Demolished Building
- Existing Structure

- AA = Ambient Air
- cis 1,2 DCE = cis-1,2-Dichloroethene
- TCE = Trichloroethene
- Trichloroethene and cis-1,2-Dichloroethene concentration µg/m$^3$

- ( ) Numbers in parenthesis indicate the detection limits. If the analyte concentration is in parenthesis, the analyte was not detected in the sample.
- J = Estimated Value.

0 75 150 Feet

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| | |
|---|---|
| REQUESTED BY: C. DUCKWORTH | DATE: 9/23/2015 |
| DRAWN BY: M. SENNE | PROJECT NUMBER: 0888812796 |

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### Radon

Site-specific attenuation factors were derived using the radon analytical data. The attenuation factor is calculated by dividing the indoor air radon concentration by the sub-slab radon concentration. For the December 2014 sampling event, attenuation factors for the three buildings ranged from 0.00013 to 0.067, and averaged 0.015. The average attenuation factor for Buildings 1405, 1422, and 1424 was 0.033, 0.00058, and 0.00062, respectively. For the June 2015 sampling event, attenuation factors for the three buildings ranged from 0.000076 to 0.012, and averaged 0.0034. The average attenuation factor for Buildings 1405, 1422, and 1424 was 0.0075, 0.00025, and 0.00032, respectively. Higher subsurface radon results increase the reliability of the attenuation factor calculation by decreasing the range of inherent sampling and analysis variability; therefore, radon attenuation factors on the order of 0.0002 to 0.0006, as shown in Buildings 1422 and 1424, are more likely representative of site-specific attenuation factors. Site-specific attenuation factors average at or below 0.03, which was used to determine the VI study screening criteria as described in the TCE and cis-1,2-DCE analytical results section above.

Analytical results for radon are shown in Figures 7 through 10.

## 4.2 Ancillary Data Results

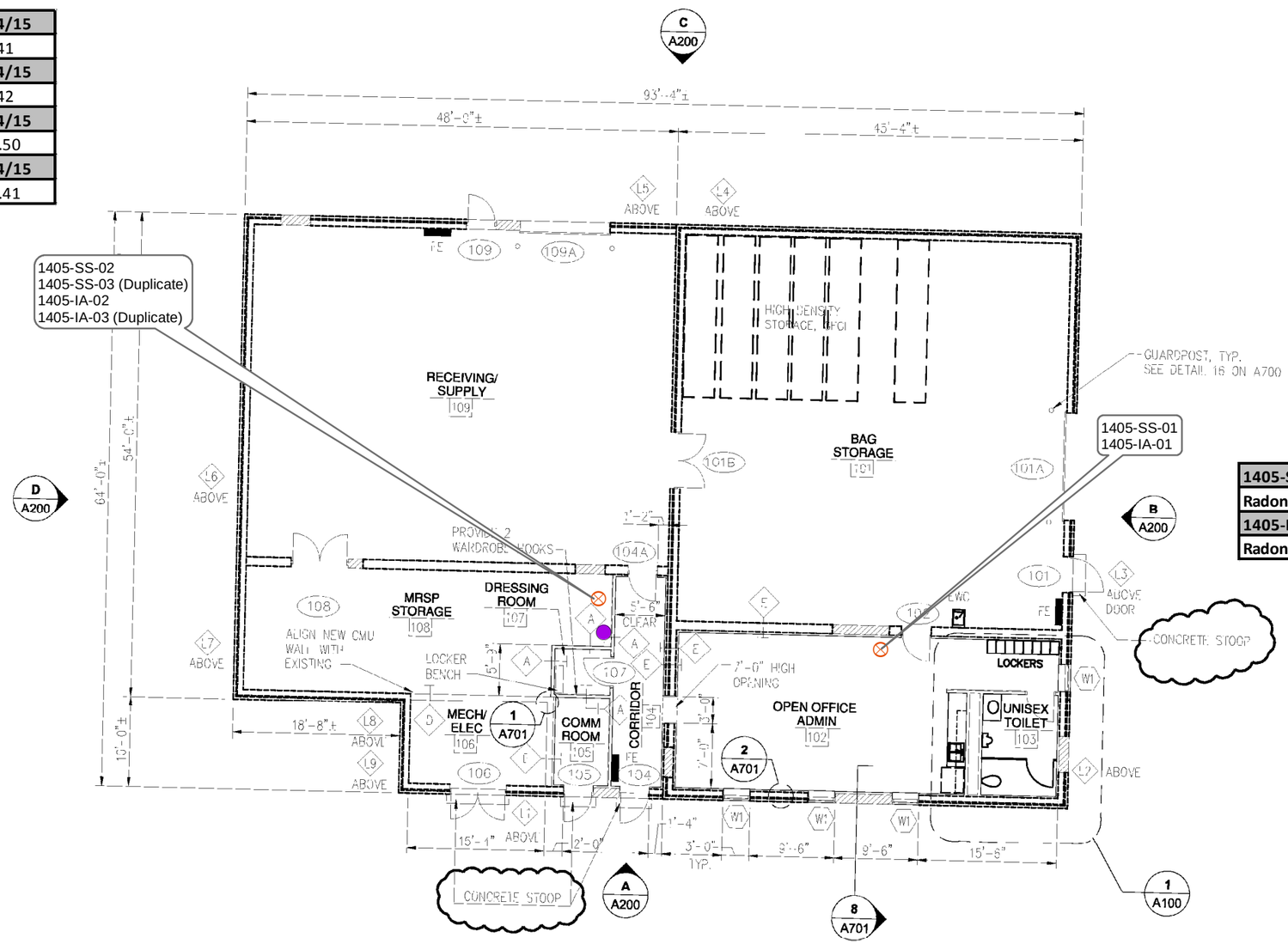
The differential pressure between the sub-slab and indoor air was nearly neutral to slightly positive in the three buildings tested during both sampling events. Differential pressure measurements for the December 2014 sampling event were very low and typically at or near the resolution limit of the instrument, 0.001 inches water, as shown in Figures 11 through 13. For example, in Building 1405, the differential pressure ranged from 0.002 inches water to 0.002 inches water, which is a difference of 0.004 inches water or 0.0003 inches mercury (Hg). The differential pressure measurements for the June 2015 sampling event were slightly higher, as shown in Figures 18 through 20. Since the pressure logging instruments were set up to reference the sub-slab, a negative differential pressure indicates that the indoor air pressure is lower than the sub-slab pressure, and a positive differential pressure indicates that the indoor air pressure is higher than the sub-slab pressure. Though the three buildings showed very low differential pressures, each trended towards a higher pressure in the indoor air, indicating that the pressure gradient measured during the sampling event was not favorable for vapor intrusion.

The HVAC systems were in operation in all three buildings throughout the duration of the study for both sampling events. During the December 2014 sampling event, heated air was supplied, and during the June 2015 sampling event, cooled air was supplied. The differential pressure data suggests that HVAC operations were not contributing to a negative pressure gradient during the sampling period.

For the December 2014 sampling event, the barometric pressure inside each building ranged from 29.62 inches Hg to 29.84 inches Hg as shown in Figures 14 through 16. The outdoor ambient barometric pressure ranged from 30.07 inches Hg to 30.29 inches Hg as shown in Figure 17. The outdoor ambient temperature ranged from 42 to 48 degrees Fahrenheit, also shown in Figure 17, and indoor air temperatures ranged from 65 to 71 degrees Fahrenheit as monitored from each building's thermostat.

For the June 2015 sampling event, the barometric pressure inside each building ranged from 29.40 inches Hg to 29.60 inches Hg as shown in Figures 21 through 23. The outdoor ambient barometric pressure meter showed a constant reading of 31.52 inches Hg as shown in Figure 24. Ambient barometric data from another weather station nearby were evaluated and showed stable barometric conditions, with slight variations in the recorded values. The outdoor ambient temperature ranged from 71 to 97 degrees Fahrenheit, also shown in Figure 24, and indoor air temperatures ranged from 72 to 84 degrees Fahrenheit as monitored from each building's thermostat.

| 1405-SS-02 | 12/18/14 | 6/4/15 |
|---|---|---|
| Radon | 23JL | 41 |
| 1405-SS-03(Duplicate) | 12/18/14 | 6/4/15 |
| Radon | 41J | 42 |
| 1405-IA-02 | 12/18/14 | 6/4/15 |
| Radon | 1.52 | 0.50 |
| 1405-IA-03(Duplicate) | 12/18/14 | 6/4/15 |
| Radon | 1.31 | 0.41 |




| 1405-SS-01 | 12/18/14 | 6/4/15 |
|---|---|---|
| Radon | 1558 | 1631 |
| 1405-IA-01 | 12/18/14 | 6/4/15 |
| Radon | 1.41 | 0.47 |

FIGURE 7
RADON SAMPLING RESULTS
BUILDING 1405
SWMU 21
FORMER NAS DALLAS, TEXAS

## Legend

- Ancillary Data Collection Point
- Sample Location

- SS = Sub-slab
- IA = Indoor Air
- Radon concentration pCi/L
- J = Estimated value
- JL = Estimated value potentially biased low

0 15 30 Feet

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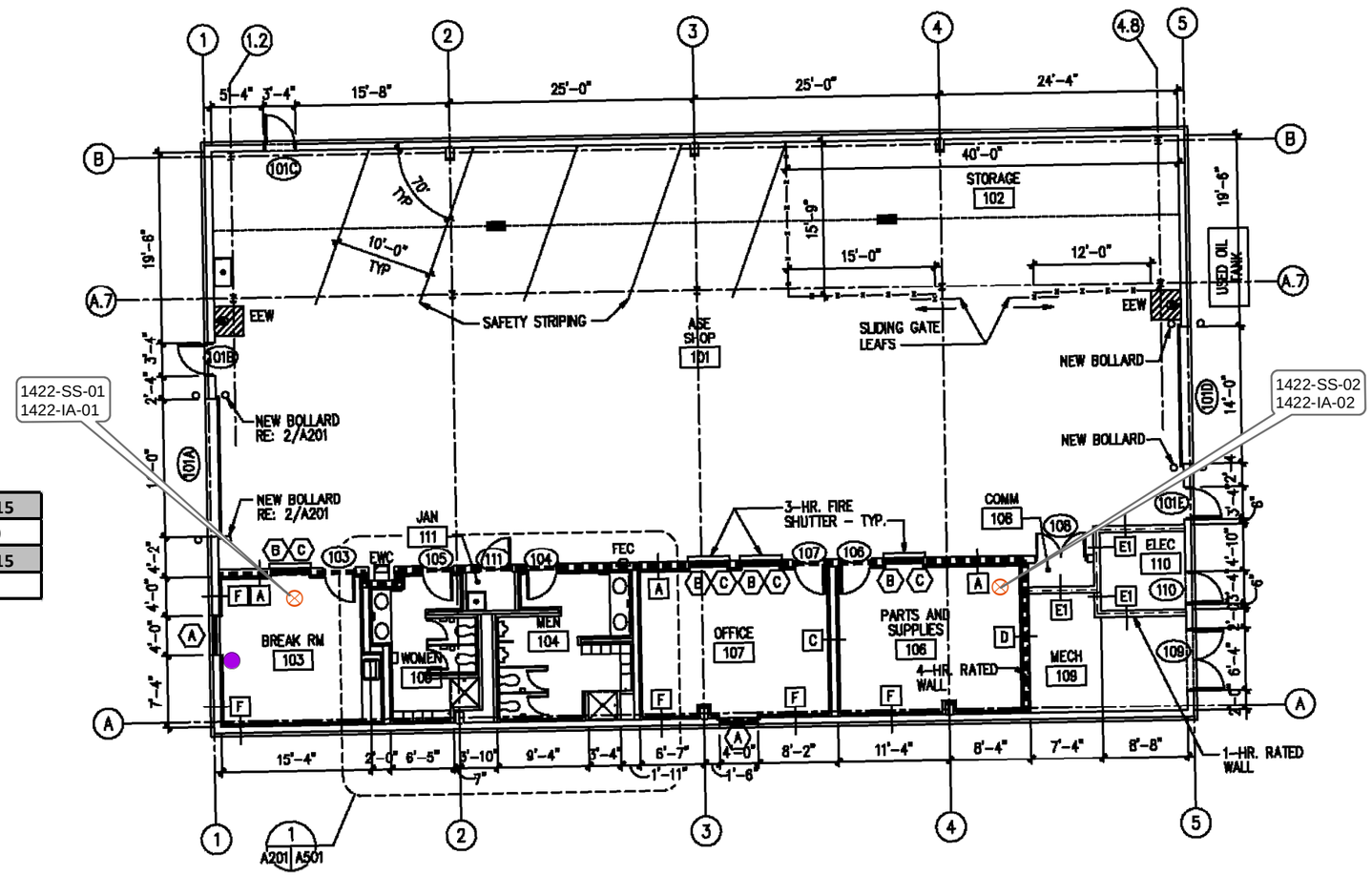


| 1422-SS-01 | 12/18/14 | 6/4/15 |
|---|---|---|
| Radon | 1075 | 670 |
| 1422-IA-01 | 12/18/14 | 6/4/15 |
| Radon | 0.8 | 0.2 |

| 1422-SS-02 | 12/18/14 | 6/4/15 |
|---|---|---|
| Radon | 1335 | 1260 |
| 1422-IA-02 | 12/18/14 | 6/4/15 |
| Radon | 0.55 | 0.24 |

FIGURE 8
RADON SAMPLING RESULTS
BUILDING 1422
SWMU 21
FORMER NAS DALLAS, TEXAS

## Legend

● Ancillary Data Collection Point

⊗ Sample Location

- SS = Sub-slab
- IA = Indoor Air
- Radon concentration pCi/L

0 10 20 30 Feet

NAVFAC Naval Facilities Engineering Command

RESOLUTION CONSULTANTS

| | |
|---|---|
| REQUESTED BY: C. DUCKWORTH | DATE: 9/23/2015 |
| DRAWN BY: B. LIPSCOMB | PROJECT NUMBER: 0888812796 |

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| 1424-SS-01 | 12/18/14 | 6/4/15 |
|---|---|---|
| Radon | 246 | 342 |
| 1424-IA-01 | 12/18/14 | 6/4/15 |
| Radon | 0.27 | 0.19 |

| 1424-SS-02 | 12/18/14 | 6/4/15 |
|---|---|---|
| Radon | 1790 | 1874 |
| 1424-IA-02 | 12/18/14 | 6/4/15 |
| Radon | 0.24 | 0.14 |

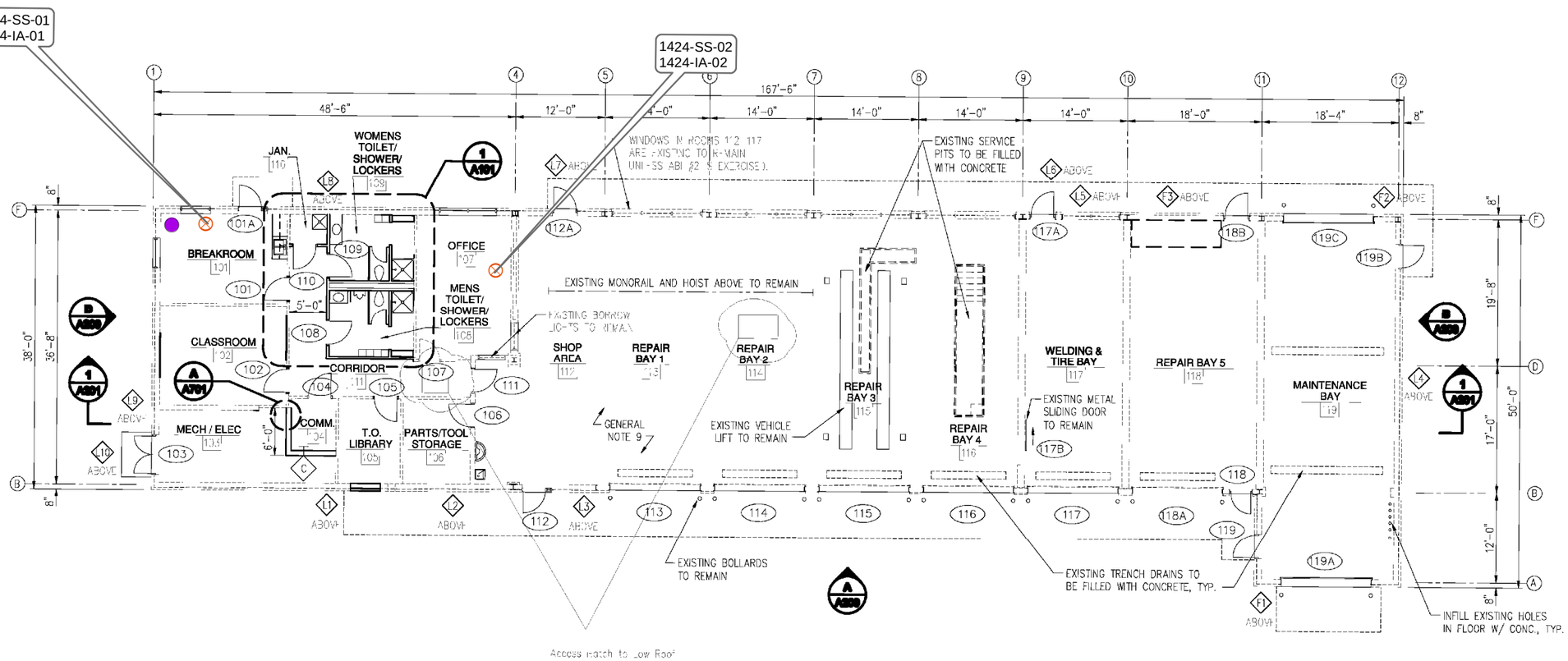


FIGURE 9
RADON SAMPLING RESULTS
BUILDING 1424
SWMU 21
FORMER NAS DALLAS, TEXAS

## Legend

- Ancillary Data Collection Point
- Sample Location

- SS = Sub-slab
- IA = Indoor Air
- Radon concentration pCi/L

0 15 30 Feet

NAVFAC Naval Facilities Engineering Command
RESOLUTION CONSULTANTS

| | |
|---|---|
| REQUESTED BY: C. DUCKWORTH | DATE: 9/23/2015 |
| DRAWN BY: B. LIPSCOMB | PROJECT NUMBER: 0888812796 |

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| 1424-AA-01 | 12/18/14 | 6/4/15 |
|---|---|---|
| Radon | 0.28 | 0.03 |

**Legend**

- Outdoor Ambient Air Sample Location
- Gross TCE PCLE Zone Outline (5 Micrograms per Liter in Groundwater)
- Property Boundary 2012
- Demolished Building
- Existing Structure

- AA = Ambient Air
- Radon concentration pCi/L

0 75 150 Feet

FIGURE 10
OUTDOOR AMBIENT AIR SAMPLE RESULTS
RADON
SWMU 21
FORMER NAS DALLAS, TEXAS

NAVFAC Naval Facilities Engineering Command
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| | |
|---|---|
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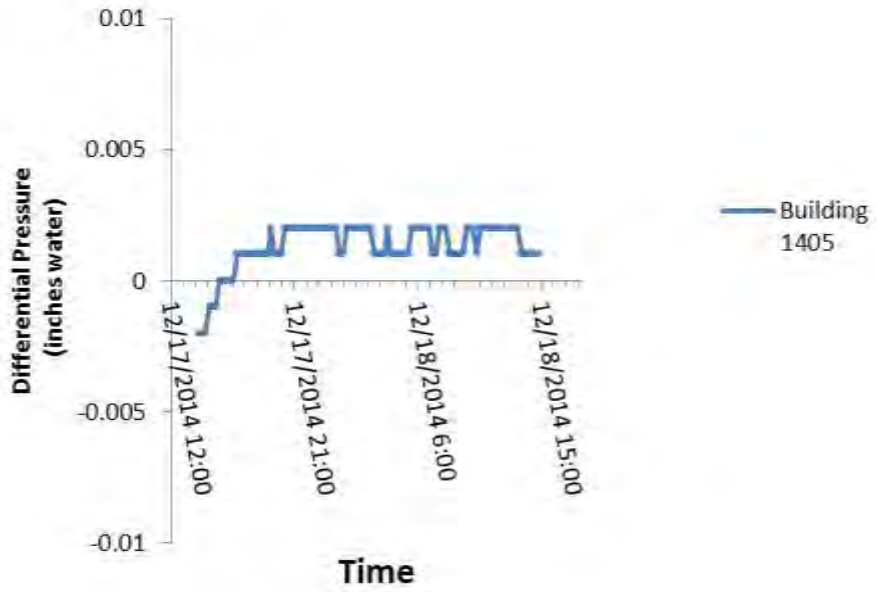



**Figure 11**- Differential pressure logged during December 2014 VI sampling in Building 1405

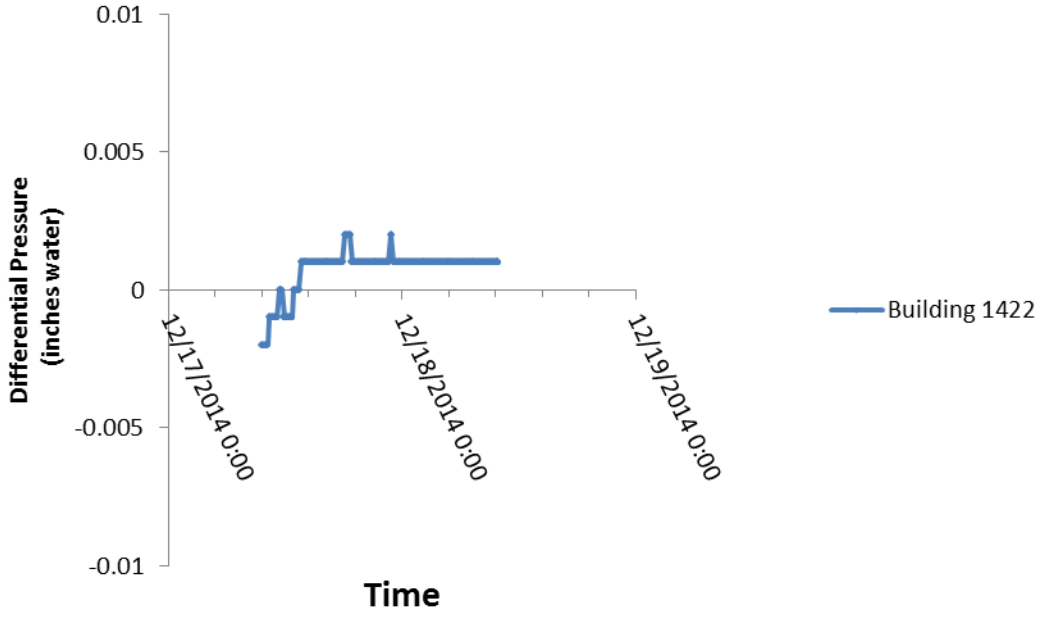



**Figure 12**- Differential pressure logged during December 2014 VI sampling in Building 1422

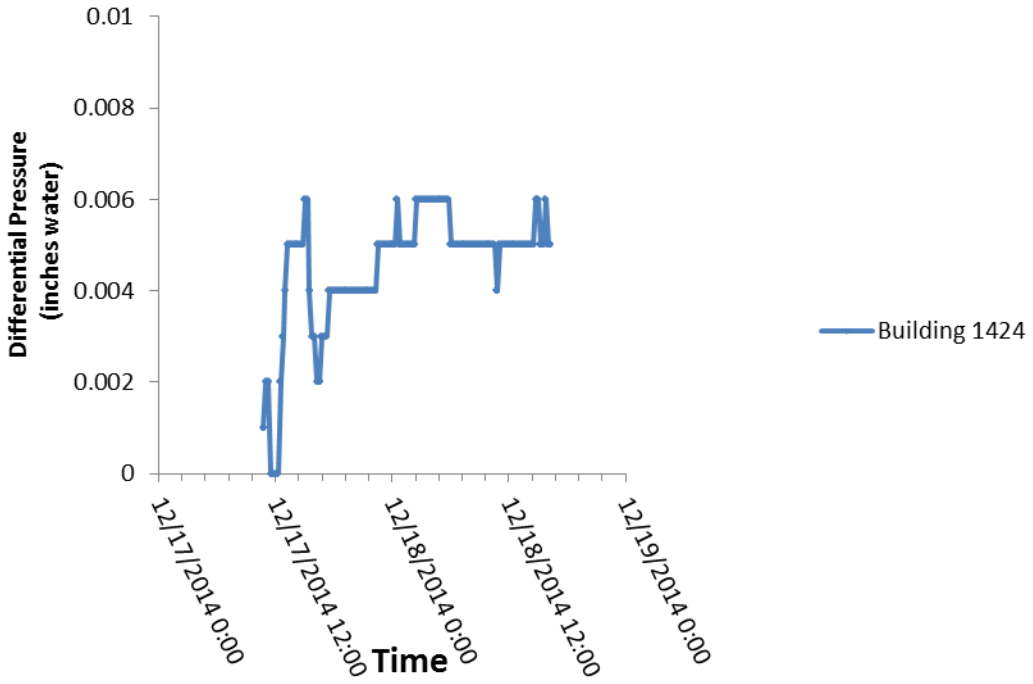



**Figure 13**- Differential pressure logged during December 2014 VI sampling in Building 1424

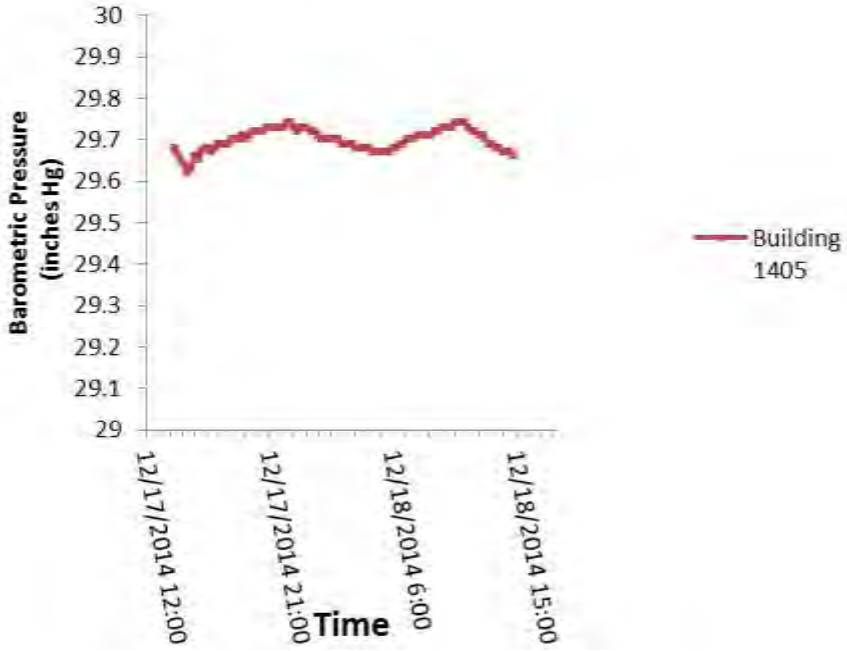



**Figure 14**- Barometric pressure logged during December 2014 VI sampling in Building 1405

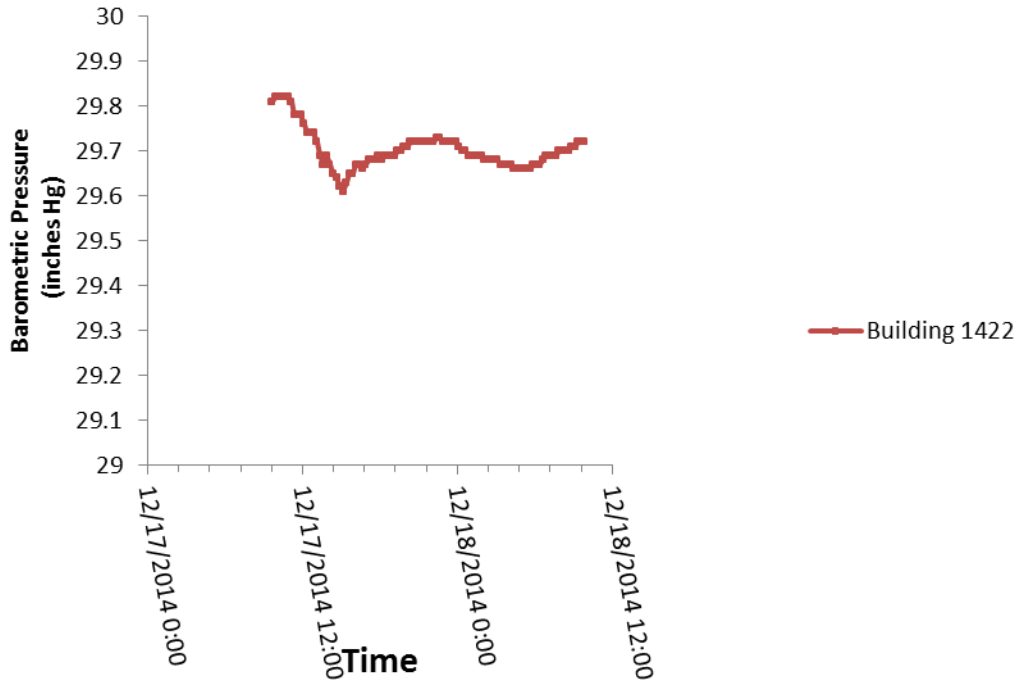



**Figure 15**- Barometric pressure logged during December 2014 VI sampling in Building 1422

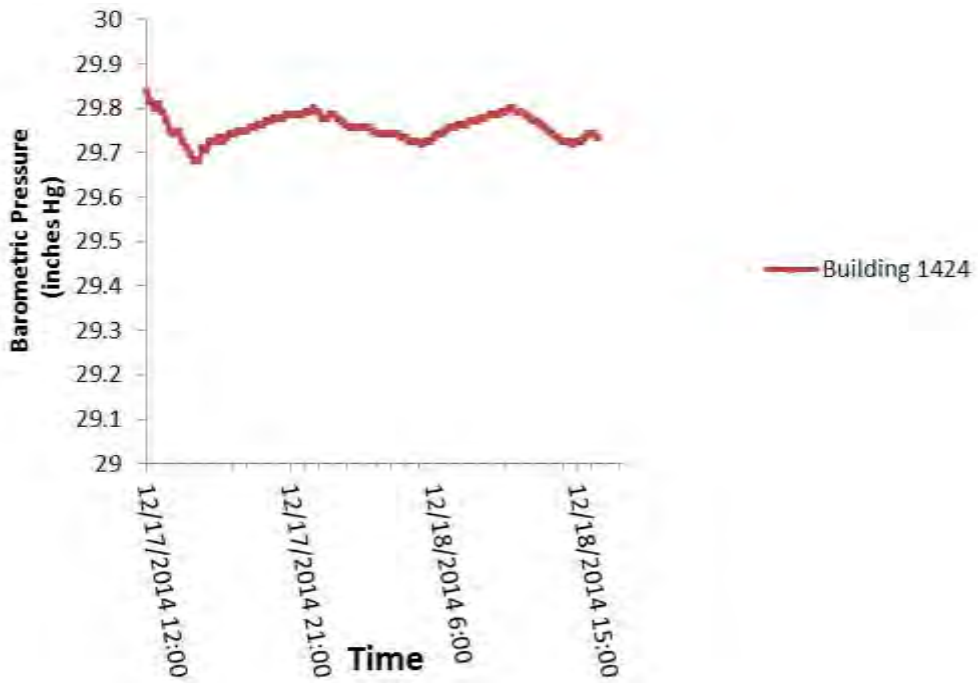



**Figure 16**- Barometric pressure logged during December VI sampling in Building 1424

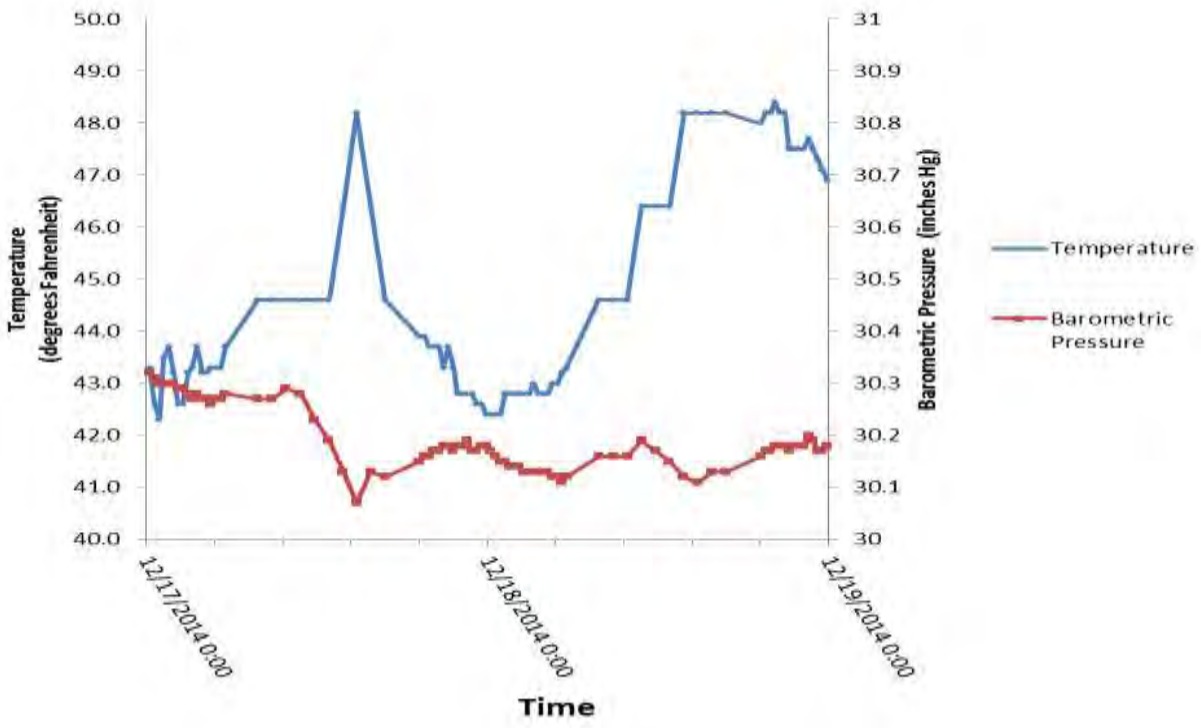



**Figure 17**-Outdoor ambient temperature and barometric pressure during December 2015 VI sampling

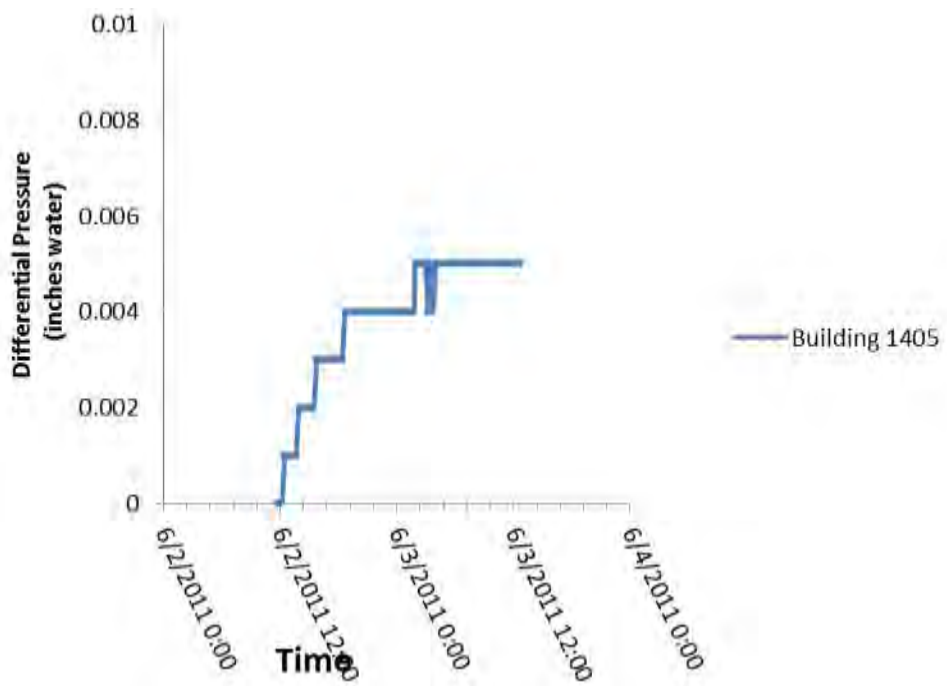



**Figure 18**- Differential pressure logged during June 2015 VI sampling in Building 1405

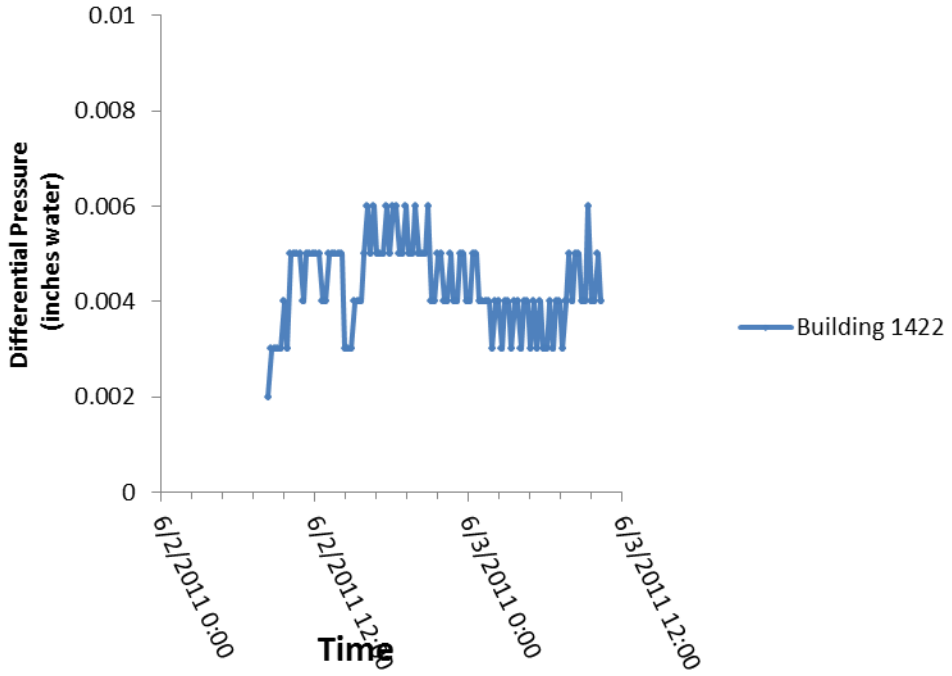



**Figure 19**- Differential pressure logged during June 2015 VI sampling in Building 1422

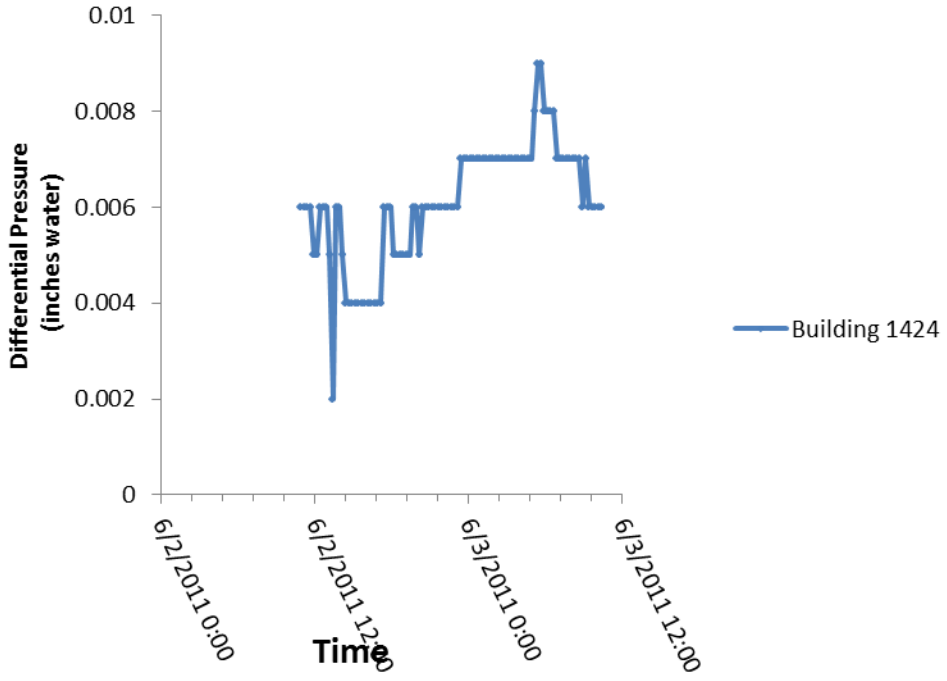



**Figure 20**- Differential pressure logged during June 2015 VI sampling in Building 1424

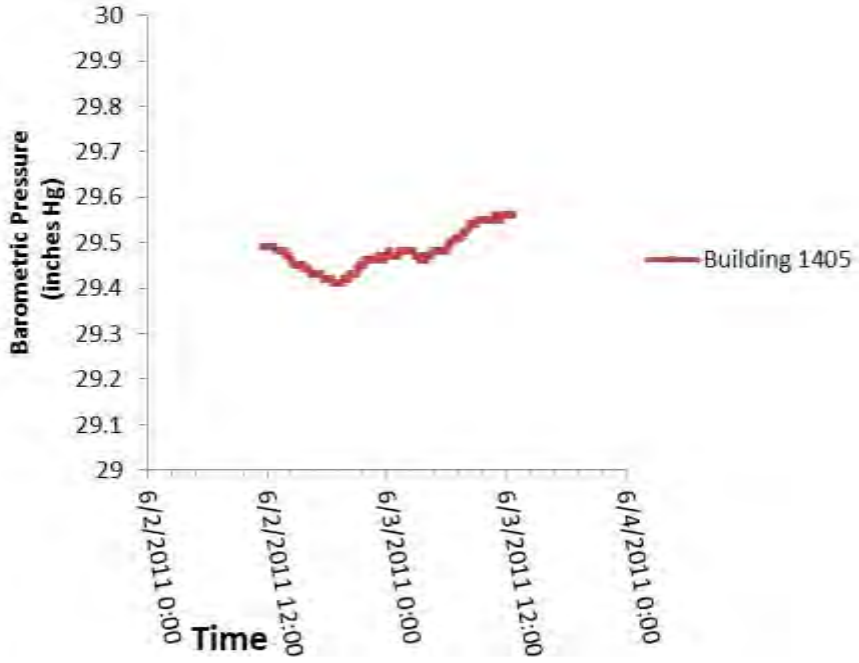



**Figure 21**- Barometric pressure logged during June 2015 VI sampling in Building 1405

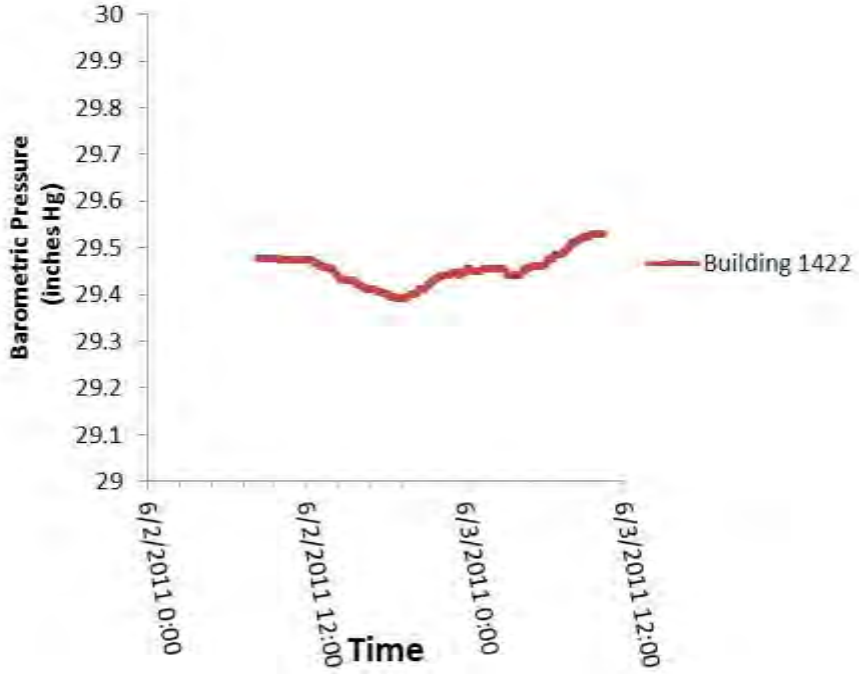



**Figure 22**- Barometric pressure logged during June 2015 VI sampling in Building 1422

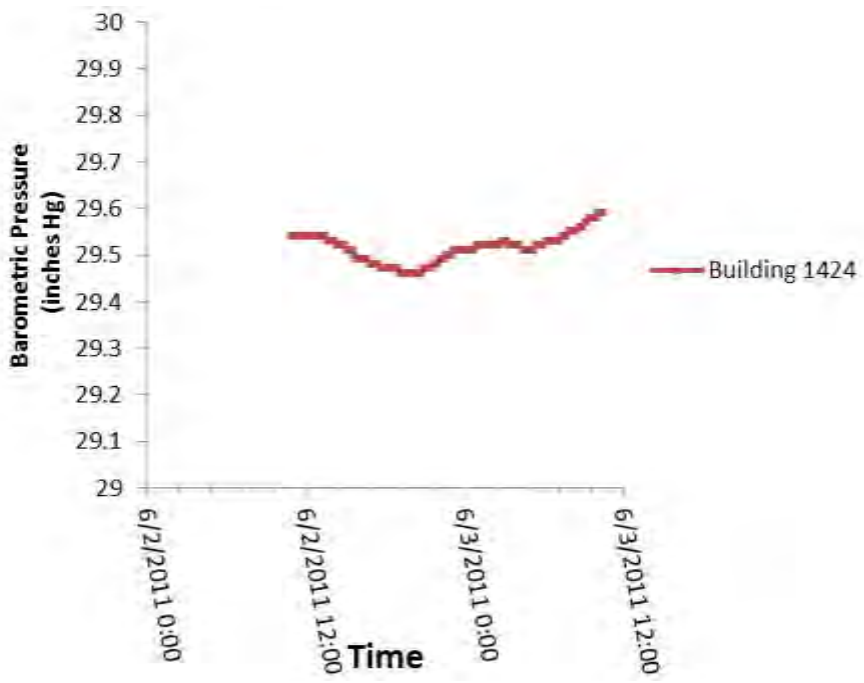



**Figure 23**- Barometric pressure logged during June 2015 VI sampling in Building 1424

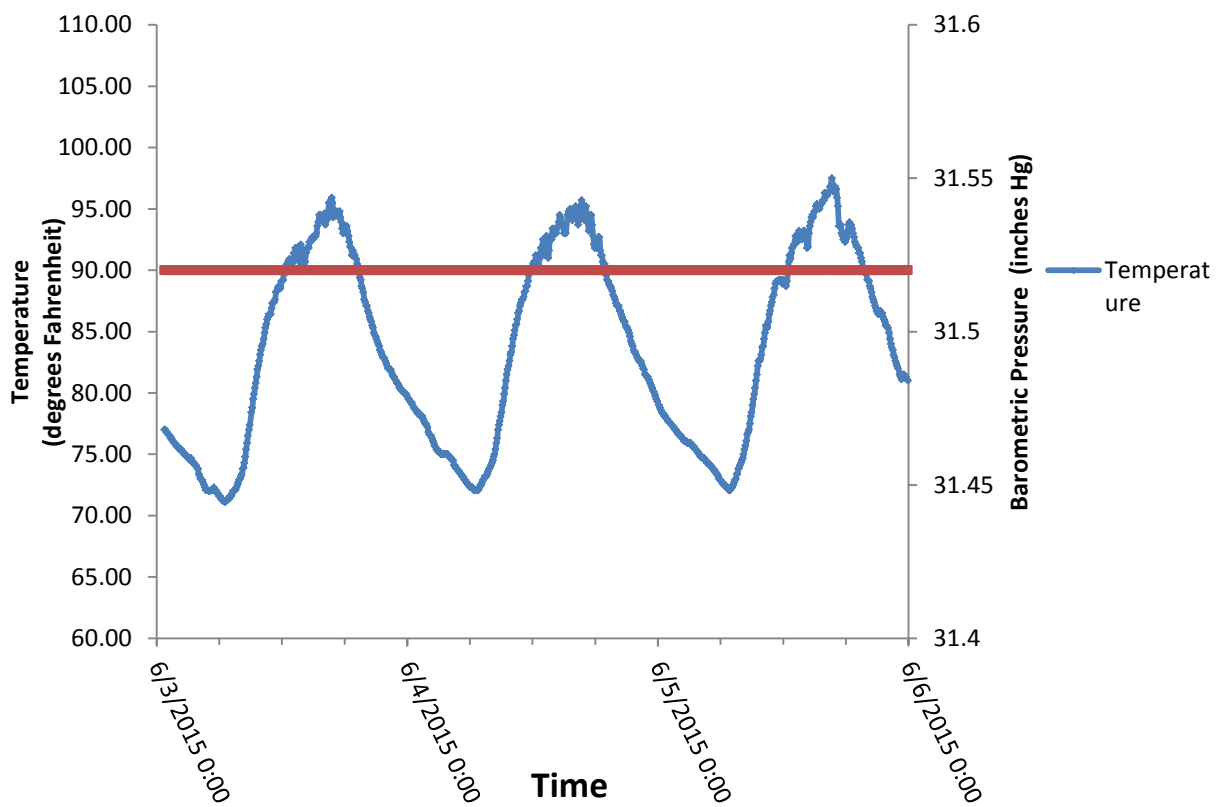



**Figure 24**-Outdoor ambient temperature and barometric pressure during June 2015 VI sampling

## 5.0 QUALITY ASSURANCE AND QUALITY CONTROL OF ANALYTICAL RESULTS

Based on the *Data Usability Summary Reports* of the analytical results included in Appendix B, the technical data review did not identify significant quality control anomalies, rejected data, or corrective actions taken or recommended for future analyses for either sampling event. For the December 2014 sampling event, the laboratory noted that radon sample 1405-SS-02-121814 had very little gas in the Tedlar bag and the result should be considered a lower limit. Therefore, that radon concentration was flagged as estimated "JL" in sample 1405-SS-02-121814 due to low sample volume and the result may be biased low. For the June 2015 sampling event, no radon sample results were qualified during data review.

Further discussion of the technical data review is discussed in the *Data Usability Summary Reports* presented in Appendix B. The other results were acceptable without qualification.

For the December 2014 and June 2015 sampling events, none of the trichloroethene and cis-1,2-DCE data were qualified for surrogate data, laboratory control samples data, blank data, organic tuning data, calibration data, internal standard areas and retention times, or field duplicate data.

## 6.0 EXCEPTIONS TO THE SAP

Exceptions to the SAP are as follows:

- The field activities consisted of two sampling events, December 2014 and June 2015, instead of just one sampling event in October/November 2014, to evaluate seasonal variations and potential effects from the HVAC systems.

- Outdoor ambient air samples (1405-AA-01 and 1422-AA-01) were removed from the field activities because the close proximity of Buildings 1405, 1422, and 1424 allowed for one representative upwind (background) location to be sampled (1424-AA-01).

- A maximum of 24 hours was allowed for equilibration following the sub-slab vapor probe installation.

- The vacuum provided for the sampling manifold leak check (SOP-DAL-VI-5, Section 5) was conducted using a laboratory-supplied purge canister because the low-flow vacuum pump could not provide enough pressure to achieve 10 inches Hg in the sampling manifold.

## 7.0 CONCLUSIONS

TCE was detected in two of the six sub-slab samples during the December 2014 sampling event and three of the six sub-slab samples during the June 2015 sampling event. However, sub-slab concentrations were well below VISLs for sub-slab vapor as well as RSLs for indoor air. Furthermore, the analytical results from both sampling events indicate that neither TCE nor cis-1,2-DCE were detected in indoor air samples. Therefore, vapor intrusion is not a current concern at the site and is not expected to pose a future concern as vapor source concentrations will continue to decrease over time.

# Appendix A
# Field Notes

Location Dallas, TX Date 12/10/14

Project / Client NAS Dallas

Task: Visual building inspection to identify anything that may be emitting chemicals in building

Staff: Cole Duckworth (CD), Tom Wiberg (TW)

Weather: 59°, overcast

0200 Arrive at site and contact Sgt Paul to notify we are at main gate

Meet with Ron who opens gates and escorts us to Bld 1422

Enter Rm 106, 107 & break room

Rm 106 tile flooring

Rm 107 carpet

Break room tile flooring

Rm 106 has 2 desks set up as office space. No chemicals observed in room

Break Rm Chemical Inventory -

Lysol Disinfectant Spray 19 oz can

Move sample location from Rm 107 to Rm 106

Used oil & lube oil, coolant in Shop area outside of Rms

Ron escorts us to Bldg 1405

Office 102 Chemical Inventory -



Location Dallas, TX Date 12/10/14

Project / Client NAS Dallas

Gila Window Film Application Solution Spray bottle 16 oz - DI $H_2O$ & sodium dodecylbenzenesulfonate

Office 102 has carpeting

Rm 108 - No chemicals found, concrete floor

Ron escorts us to Bldg 1424

Office 107 - tile floor - take sample at middle desk - No chemicals observed

Office 101 or 102 → Talk w/ Sgt Paul to see which he prefers. Both have tile floor. 101 is break room. 101 Chemical inventory → Zep Meter Mist for odors → has acetone, ethanol, diethylene glycol ethyl ether. 102 has no chemicals.

0300 Ron escorts us offsite

Location Dallas, TX Date 12/16/14

Project / Client NAS Dallas

Task: Vapor Intrusion (VI) sampling
Staff: Cole Duckworth (CD), Brian Ham (BH)
Weather: 43°, sunny

1015 Arrive onsite and tailgate meeting with Sgt Paul

1030 T. Wilson onsite
Begin to take equipment into Bldg 1422
Break Rm 103

1100 Penetrate slab with rotary hammer drill, ½" bit. Drilled to determine slab thickness at 7¼", shop vac out the cuttings then penetrate 3" into subsurface. Plug top of hole with non VOC modeling clay and use this hole for velocicalc. Don't hook up yet.

1120 Drill hole for 1422-SS-01 6¼ inches (1" shy of penetrating slab) then shop vac cuttings. Penetrate slab.
TD slab thickness = 7¼"
TD drilled = 10"
Plug hole immediately.



Location Dallas, Tx Date 12/16/14

Project / Client NAS Dallas

1130 Begin to set up sample manifold

1140 Sgt Paul tells us we need to leave site for lunch.

1300 CD & BH onsite to Bldg 1422
Tailgate with Sgt Paul

1330 Set up in Rm 106
Drill hole for 1422-SS-02
TD Slab thickness = 7"
TD drilled = 11¾"
Plug hole immediately after drilling

1430 Call Sgt Paul to get access into Bldg 1405
Enter Rm 109 and select location
Cut carpet to access concrete floor
1405-SS-01
TD Slab thickness = 5"
TD drilled = 7.5"
Shut in test done on sampling manifold
Enter Rm 109

1515 Drill 1405-SS-02 and use same hole for 1405-SS-03 (DUP)
TD subslab = ~~5¼~~ 4" TD drilled = ~~3.5~~ 6.5"

Location Dallas, TX Date 12/16/14

Project / Client NAS Dallas

Drill Velocicale hole 3' from 1405-SS-02
TD Slab thickness = ~~4"~~ 5 1/4"
TD drilled = ~~6 1/2"~~ 8.5"
Do shut in leak test
1550 Enter Bldg 1424
1600 Drill Velocicale hole in Break Rm 101
TD Slab thickness = 8 1/4"
TD drilled = 11"
Drill 1424-SS-01 in break rm 101
TD Slab thickness = 7"
TD drilled = 10". Perform Shut in test.
1624 Drill 1424-SS-02 in Rm 107
T.D slab thickness = 7.5"
TD drilled = 10 1/4". Perform shut in test
Clean up
1645 All offsite



Location Dallas, TX Date 12/17/14

Project / Client NAS Dallas

Task: Vapor Intrusion Sampling
Staff: Cole Duckworth (CD), Brian Hamm (BH)
Weather: 45°
0700 CD & BH onsite
Checkin w/ Sgt Paul
Arrive at Bldg 1422
Complete SWAP and begin
setting up in break Rm 103
Purge volume calculated using spreadsheet
3 purge volumes = 300 ml, 1:30 sec
@ 200 ml/min.
Zero Velocicale (9555P) ~~9565~~ 1087790 - 0" $H_2O$
Helium detector MGD 2002 zeroed
in ambient air
SKC Vacuum Pump (PCXR8)
Calibrated with DryCal DCLite
to 200 ml/min
Thermostat set at 67° but
actual temp is 71° per office personel
Observe 2 motorized vehicles inside
building bay (Diesel powered Bobcat & Gator)

Project / Client

105 L Helium tank Lot HLTD064-
RR-P6 99.999% Exp. April 2007
0850 Remove clay seal from drilled hole
1422-SS-01
0855 Begin Shut in test
0856 Manifold holding pressure, test passed
0903 Begin Helium leak test
0906 Helium detected
0907 Helium leak test passed (14% in shroud, 0% ext)
0908 Begin line purge
0912 Purge complete
0914 Begin sampling 1422-SS-01-121914
Summa Pressure initial = -30.17
0919 Begin sampling 1422-IA-01-121814
Summa Pressure initial = -30.20
~~0914~~ 0920 Summa Cane Height = 53½"
0924 Velocicalc started in Rm 103
0930 Begin setup in Rm 106 for
1422-SS-02
Remove Clay plug and install SS probe.
0936 Perform Shut in test



Project / Client

0937 Holding pressure, test passed
0940 Begin Helium test
0943 Helium @ 14.5% in shroud, no helium in exhaust line, helium test passed
0947 Begin line purge
0948 Purge complete
Summa Pressure initial for
1422-SS-02 = -30.21
0949 Begin Sampling 1422-SS-02-121814
1000 Begin sampling 1422-IA-02-121814
Summa Pressure initial = -30.23
1010 Summa Cane height = 50"
1015 Enter Bldg 1424
1020 Begin Vac/Shut in test for
1424-SS-~~121814~~ 01 in Break Rm 101
1021 Holding Pressure, test passed
Purge line
1022 Helium test began
1024 Helium test passed
Begin purge
1035 Begin sampling 1424-SS-01-121814

Location NAS Dallas, Tx Date 12/17/14

Project / Client

Summa initial pressure = -30.16

1033 Begin Velocicalc pressure logging
Velocicalc (9555) (# 1117570)
1424-SS-01 Summa SN 5037,
regulator 0A00538

1042 Begin sampling 1424-IA-01-121814
Summa initial Pressure = -30.21
Summa SN91081, regulator F215414
Cone height = 51"
Enter office Rm 107 for
1046 1424-SS-02
1059 Perform shut in test after purging 1 min
1100 Shut in test passed
1101 Perform helium leak check
15% helium in shroud
1102 Helium check passed, begin purging
1115 Begin sampling 1424-SS-02-121814
Summa initial Pressure = -30.07
Summa SN = 00251, regulator 0A00757
1120 Begin sampling 1424-IA-02-121814
Summa initial Pressure = -30.13



Location NAS Dallas, Tx Date 12/17/14

Project / Client

Summa SN = ~~A400376~~ 13893
Regulator = FCA00832
Cone height = 48"
1126 Cleaning crew arrives. Set Rul
informs them not to clean rooms that
air monitoring is in.
1130 offsite for lunch
1240 Back onsite. Get equipment from Bldg 1424
and go to Bldg 1405 Rm 102
Set up for 1405-SS-01-121814
1323 Shut in test performed and passed
1325 Perform helium leak check
15% helium in shroud
1326 Helium check passed, and purge started
1331 Begin sampling 1405-SS-01-121814
Summa initial pressure = -30.03
Summa SN = 02037
Regulator = 0A00348
1332 Begin sampling 1405-IA-01-121814
Summa initial Pressure = -30.05
Summa SN = 17286

Location NAS Dallas, TX Date 12/17/14

Project / Client

Regulator = FCA00811
Cone height = 53.5"
1378 Move to RM 108 for
~~1405-02~~ 1405-SS-02 & 1405-SS-03 (duplicate sample)
1347 Velocicate logging started
SN 1124044
1349 Shut in test performed
1355 Helium check complete
1356 Begin purge
End purge & set up Summas
1405-SS-02-121814 Original Summa initial pressure = -26.28 so called lab and switched to different summa. This Summa has "Ambient" and "Subslab" label on it since it was originally labeled "Ambient"
Summa SN = 12491, Regulator = OA00875
1405-SS-03-121814 Summa initial P = -30.03
Summa SN = 90992, Regulator = OA00765
1405-SS-03 is DUP sample
1413 Sample 1405-SS-02 & 1405-SS-03

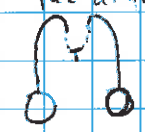


Location NAS Dallas, TX Date 12/17/14

Project / Client

Using same subslab probe/hole. We used a Swagelock T-fitting below valve 2

Set up indoor air samplers
1405-IA-02-121814
Summa initial pressure = -29.95
Summa SN = 17139, Regulator FCA00
1405-IA-03-121814 (duplicate)
Summa initial pressure = -29.98
Summa SN = 16053, Regulator FCA00
Cone height = 48"
Both cones were connected together with a tee at the end so pulling same air



1431 Begin sampling 1405-IA-02-121814 and 1405-IA-03-121814 (dup)

Location NAS Dallas, TX Date 12/17/14

Project / Client

Thermostat set at 65° in Rm 108

1445 One location decided for outdoor ambient.

Northern corner of former bldg 1419 placed summa

Wind out of East Southeast.

1451 1424-AA-01-121814 began sampling

Came height = 52"

Summa initial Pressure = -29.97

Summa SN = 1971, Regulator = FCA00092

1510 Check pressure gauge for

1422-SS-01-121814.

Pressure at 20.

1422-IA-01 Pressure at 25

1513 1422-SS-02 Pressure = 22

1422-IA-02 Pressure = 22

1518 1424-SS-01 at 24

1519 1424-IA-01 at 27

1522 1424-SS-02 at 24

1424-IA-02 at 28.5

1527 1405-01-SS at 27.5

1405-01-IA at 29.5

1528 1405-SS-02 at 27



Location NAS Dallas, TX Date 12/17/14

Project / Client

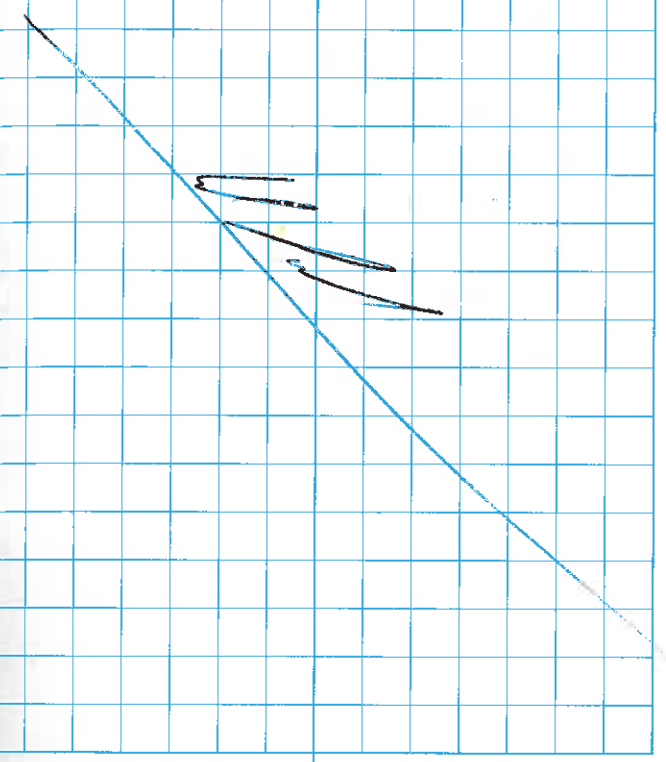
1528 1405-SS-03 at 29.5

1405-IA-02 at 28

1405-IA-03 at 30

1534 1424-AA-01 at 29.5

1540 CD + BH offsite.



Location NAS Dallas, TX Date 12/18/14

Project / Client

Task: VI sampling
Staff: C. Duckworth (CD), Brian Hun (BH)
Weather: 40's, overcast, drizzle
0815 CD & BH arrive on site. Sgt Paul is contacted and opens gate
Complete SWAP
Enter Bldg 1422

| | Sample | Pressure (in Hg) | Regulator S/N |
|---|---|---|---|
| 0825 | 1422-SS-01 | -3.5" | |
| | 1422-IA-01 | -6 3/4" | |
| | 1422-SS-02 | -5 | |
| | 1422-IA-02 | -1 (We closed valve to end test since reading at -1) | F215434 |
| 0836 | 1424-SS-01 | -5.5 | |
| | 1424-IA-01 | -9.5 | |
| | 1424SS-02 | -5 | |
| | 1424-IA-02 | -11 | |
| 0841 | 1405-SS-01 | -5.25 | |
| | 1405-IA-01 | -7 | |
| | 1405-SS-02 | -6 | |
| | 1405-SS-03 | -7.5 | |



Location NAS Dallas, TX Date 12/18/14

Project / Client

| | Sample | Pressure (in Hg) | Regulator S/N |
|---|---|---|---|
| | 1405-IA-02 | -3.5 | |
| | 1405-IA-03 | -3.75 | |
| 0847 | 1424-AA-01 | -0.75 | F215090 |

Sampling ended for 1424-AA-01 since pressure < -5 already and closed to 0

0914 Sampling ended 1422-SS-01 @ -3"
0919 Sample ended 1422-IA-01 @ -5.5"
0929 Sample ended 1422-SS-02-121814 @ -4.5"

| | | |
|---|---|---|
| 0955 | Radon Sample | 1422-SS-01-121814 |
| 1000 | Radon Sample | 1422-IA-01-121814 |
| 1007 | End Velocicalc data logging for Bldg 1422 | |
| 1015 | Radon Sample | 1422-SS-02-121814 |
| 1020 | Radon Sample | 1422-IA-02-121814 |

| | Sample | Pressure |
|---|---|---|
| 1026 | 1405-SS-01 | -4 |
| | 1405-IA-01 | -5 |
| | 1405-SS-02 | -5 |
| | 1405-SS-03 | -6.5 |
| 1027 | 1405-IA-02 | -2.5 |
| | 1405 IA-03 | -2 |

Sampling ended

Location NAS Dallas, TX Date 12/18/14

Project / Client

1035 Sample ended 1424-SS-01-121814
Pressure = -5

1050 Radon Sample 1424-SS-01-121814
1055 Radon Sample 1424-IA-01-121814

1115 Sample ended 1424-SS-02-121814
Pressure = -4

1120 Radon Sample 1424-SS-02-121814
1125 Radon Sample 1424-IA-02-121814

1130 Offsite for lunch
1230 At Lowes to pick up supplies.
1300 Set Paul lets up back in front gate
Enter Bldg 1424
1311 End Sample 1424-IA-01-121814
pressure = -5.25
1407 1405-SS-01-121814 Pressure = -2.5
end sampling
1408 1405-IA-01-121814 Pressure = -3.5
end sampling
Thermostat in Rm says set to 75° but
reading 64°F



Location NAS Dallas, TX Date 12/18/14

Project / Client

1413 1405-SS-02-121814 Pressure = -3
1405-SS-03-121814 Pressure = -4.5
End sampling
1425 Radon Sample 1405-SS-01-121814
1430 Radon Sample 1405-IA-01-121814
1435 Radon Sample 1405-SS-02-121814
1437 Radon Sample 1405-SS-03-121814
1442 Radon Sample 1405-IA-02-121814
1443 Radon Sample 1405-IA-03-121814
1500 Mix mortar to fill 1405 Bldg drill holes
Turn off Velocicalc in Bldg 1405
1530 Radon Sample 1424-AA-01-121814
1603 Sample Ended 1424-IA-02-121814 Pressure = -5
Plug holes in Bldg 1422 & 1422
with mortar
1620 End Velocicalc logging in 1424
Pick up equipment. Tape sample
boxes
1700 Offsite

Location NAS Dallas Date 6/2/15

Project / Client Dallas, TX

Sgt Paul Cell: 817-901-1242

Task: VI Sampling
Staff: C. Duckworth (CD), B. Ham (BH)
Weather: 80's, sunny
Equipment: Rotary Hammer drill, velocicate, pump

0745 CD & BH gather & prepare equipment
0845 Travel to site
0915 Meet Sgt. Paul at front gate.
H&S meeting. Sgt Paul informs us they are at elevated security FPCON Bravo.
Set up at Bldg 1422 after completing Pre-drill checklist & SWAP
Take equipment into Bldg 1422 Break Rm 103
1000 Penetrate slab with rotary hammer drill for velocicate hole
Drill hole for 1422-SS-01
TD = 7 1/4" (slab thickness)
TD drilled = 10.5"
Plug hole immediately
Set up velocicate 029816 but dont connect to substab port today



Location NAS Dallas Date 6/2/15

Project / Client

Survey Break Rm 103. No VOC sources identified in diesel vehicles in bay area.
1100 Set up in Bldg 1422 Rm 106 for 1422-SS-02 and drill hole
TD = 7" (slab thickness)
TD drilled = 10" (bottom of soil)
1115 Calibrate pump #13506 with Dry Cal DC Lite (09944) to flow to 200 ml/min for purge.
1135 check in with Sgt Paul.
1140 CD & BH offsite
1250 CD & BH check in with Sgt Paul
Set up in Bldg 1405. Thermostat at 69°F
1310 Drill hole for 1405-SS-01
Slab Thickness = 5"
TD = 9"
Plug hole w/ clay
1340 - Drill hole for 1405 SS02
Slab thickness = 4"
TD = 6.5"
Plug hole w/ modelling clay

Location NAS Dallas Date 6/2/15

Project / Client

Drill hole for Velocicalc
TD = 4.5" (concrete thickness)
TD drilled = 7.5"
1430 Tom Wikery on site.
Set up equipment in Bldg 1424
Drill hole for velocicalc, break room 101
TD (concrete thickness) = 8¼"
TD drilled = 10¾"
1424-SS-01 drilled
1445 TD = 7" (concrete thickness)
TD drilled = 10"
1510 Drill hole for 1424-SS-02
Slab Thickness = 7"
TD = 12.75"
1535 Re-calibrate pump
1550 CD & BH off site



Location Dallas, Tx Date 6/3/15

Project / Client NAS Dallas

Task: VI sampling
Staff: C. Duckworth (CD), B. Hau (BH)
Weather:
Equipment: Velocicalc, SK pump, hand tools
0730 CD & BH on site
Check in with S, & Paul and complete SWAP
Set up in Bldg 1422
0756 Zero calibrate the velocicalc
0809 Begin velocicalc data logging (ED)
Set up 1422-SS-01-060315 summa
Summa SC00060, Regulator 01A00904
0819 Begin Shut in test. Pull vacuum with syringe to 20 in Hg.
0822 Shut in test passed. Pressure remains 20.
0825 Begin Helium & purge
0830 Helium test passed & purge complete
0831 Initial Pressure = -29.25 in Hg on Summa gauge, Begin 1422-SS-01-060315 sample
Initial Pressure = -29.18 in Hg digital reading

Location Dallas, Tx Date 6/3/15

Project / Client NAS Dallas

1422-IA-01 Initial Pressure = -29.71 inHg digital reading

Initial Press = -30.0 inHg on summa

Cane Height = 52 1/4"

Summa SN = SC01070

Regulator: FCA0087

0836 Begin 1422-IA-01-060715 sample

0842 Thermostat set to 72°F, normally runs at 74°F though

Move to Rm 106

1422-SS-02 Regulator SN = AUG04934

Summa # = SSC00084

1422-IA-02 ~~Regulator~~ Summa SN = SC02092

Regulator SN = FCA00994

0851 Initial digital reading = -29.71 inHg for 1422-SS-02.

0852 Begin Shut in test, manifold held at 22 inHg

0853 Shut in passed; Begin Helium test and purge

0856 Purge complete. Helium check passed

0900 1422-SS-02-060715 sample begun



Location Dallas, Tx Date 6/3/15

Project / Client NAS Dallas

Initial pressure = -28.5 inHg on summa

0902 Initial pressure = -30 inHg on summa for 1422-IA-02-060715

0903 Begin sampling 1422-IA-02-060715

Cane Height = 52.5"

Move over to Bldg 1424

0922 Perform shut in test for 1424-SS-01 in break in 101, gauge holding steady at -20 inHg

0927 Shut in test passed

0925 Begin helium test & purge.

0928 Helium test passed, Summa = -30 inHg

0932 1424-SS-01-060715 Summa SN = SSC00173

Regulator = OM00917 begin sampling.

0935 1424-IA-01-060715 Summa SN = AS00800

Regulator SN = FCA00486 begin sampling

Initial digital read = -29.77 inHg

Summa read = -30 inHg

=> 1424-SS-01-060715 initial digital reading = -29.58 inHg, summa initial = -29.7 inHg

Cane Height = 52.25" for 1424-IA-01

Location Dallas, TX Date 6/3/15

Project / Client NAS Dallas

0945 Begin velocicalc 11961 in Break Rm
0954 Set up in Rm 107 for 1424-SS-02
0959 Begin Shut-in test, pressure = -15 in Hg
1000 Shut-in passed, pressure holding at -15 in Hg
1001 Begin Helium leak test & purge
1002 Helium detected. Re-adjust subslab connection
1003 Begin Helium leak test
1004 Helium detected
1008 Begin helium test & purge
1011 Helium test passed
1014 Begin 1424-SS-02-060415 sampling
Initial digital pressure = -29.83 in Hg
Initial summa pressure = -29.75 in Hg
1016 Begin 1424-IA-02-060415 sample
~~1017~~ Initial digital pressure = -29.66 in Hg
Initial summa pressure = -29.5 in Hg
Cone Height = 49.5"
Thermostat set to 72°F (in Rm 107)
1030 Move to Bldg 1405. Thermostat set to 69°F, Reading 84°F. Sgt Paul getting to maintenance crew to look at AC line that is frosting.



Location Dallas, TX Date 6/3/15

Project / Client NAS Dallas

Sgt Paul says it will be tomorrow before anyone can come look at it.
1052 Begin setting up for 1405-SS-01-060415
AC unit fan is still on/running. AC coolant not working.
1058 Begin Shut-in test, reading -20 in Hg
1059 Shut-in test passed, pressure steady
1103 Begin Helium test & purge
1106 Begin 1405-SS-01-060415 sample
Initial digital = -29.75 in Hg
Initial summa pressure = -30+
1114 Begin 1405-IA-060415 (01)
Initial digital = -29.60 in Hg
Initial summa = -28 in Hg
Summa S/N = A500463
Regulator = FC00959
~~Initial Summa~~
Cone Height = 53.5"
1119 Set up 1405-SS-02 & 1405-SS-03
1405-SS-02 Summa S/N = SC01594
Regulator OA00543

Location Dallas, TX Date 6/3/15

Project / Client NAS Dallas

1405-SS-03-060315 Summa SN=
SC02070 Regulator SN=OA00996
1130 Velocirak Started (15769)
1134 Begin shut in test, -20 inHg
1135 Shut in passed, pressure steady
1136 Begin helium test & purge
1142 Helium test passed
1143 Begin sampling 1405-SS-02 & 1405-SS03
1405-SS-02 = -30 inHg on summa
1405-SS-02 = -29.30 digital
1405-SS-03 = -29.5 inHg on summa
1405-SS-03 = -29.78 digital
1149 Begin sampling 1405-IA-02 & 1405-IA-03
~~1149~~ 1405-IA-02 Summa SN=AC02012
Regulator = FCA00462
Initial pressure summa = -30 inHg
Initial pressure digital = -29.84 inHg
1405-IA-03 Summa SN=SC00112
Regulator = FCA00910
Initial pressure summa = -30 inHg
Initial pressure digital = -28.93



Location Dallas, TX Date 6/3/15

Project / Client NAS Dallas

Cane height = 53.5"
Go outside to Set up 1424-AA-01
1200 Begin sampling 1424-AA-01-060315
Initial digital pressure = -29.71 inHg
Initial summa pressure = -30 inHg
Summa SN = AS00703
Regulator SN = FCA00667
Cane height = 54"
Set up at former Building 0720
location/1419
1405 1422-SS-01 = -19
1422-IA-01 = -23
1422-IA-02 ⇒ -25
1422-SS-02 ⇒ -19
1425 1424-IA-01 ⇒ -25
1424-SS-01 = -21.5
1424-IA-02 = -24
1424-SS-02 = -22.5
1432 1405-IA-01 = -24 ⇒ 82°F in vm
1405-SS-01 = -25
1405-IA-02 = -29
1405-IA-03 = -27

Location Dallas, TX Date 6/3/15

Project / Client NAS Dallas

1405-SS-02 = -29.75

1405-SS-03 = -25

1440 1424-AA-01 = -28

Helium used for leak check = 99.999%

10 SL canister Expiration April 2017

from Pine Environmental

Pack up equipment and organize work vehicle

Check out with Sgt Paul

1600 Offsite to return equipment.

~~Bldg 1405~~

~~1405-SS-02 = -7~~

~~1405-SS-03 = -4~~

~~1405-IA-02 = 8~~

~~1405-IA-03 = -6~~ CD



Location Dallas, TX Date 6/4/15

Project / Client NAS Dallas

Task: VI Sampling

Staff: C. Dalkowski (CD), B. Hom (BH)

Weather

0805 CD & BH onsite

Check in with Sgt Paul

Complete SWAP

0820 Check pressures on summa gauge

0820 1422-IA-01 = -3 in Hg test stopped

0820 1422-SS-01 = -3 in Hg sample stopped

0825 Sample 1422-IA-01-060415 radon

Shut in test for 1422-SS-01 then purge

0830 Sample 1422-SS-02-060415 radon

0835 1422-IA-01 = Final digital = 2.05 in Hg

1422-SS-01 = final digital = -3.60 in Hg

0840 1422-SS-02 = -1.5 in Hg sample stopped

1422-IA-02 = -11 in Hg so keep sampling

1422-SS-02 = final digital = -2.91

~~0845 Sample~~ CD

0849 1424-IA-01 = -4 in Hg sample stopped

1424-SS-01 = -4 in Hg sample stopped

1424-IA-01-060415 = final digital = -2.99

0855 1424-IA-01-060415 sample radon

Location Dallas, Tx Date 6/4/15

Project / Client NAS Dallas

0858 Shut in test for 1424-SS-01

Test passed, purge line

0905 1424-SS-01-060415 radon sampled

1424-SS-01-060415 = final digital = -4.29

0909 1424-IA-02-060415 = -3 in Hg sample done

1424-SS-02-060415 = -4 in Hg sample done

1424-IA-02 Summa = AS00384

Regulator = FCA00715

1424-IA-02 = final digital = -3.86 in Hg

0915 Sample 1424-IA-02-060415 radon

0916 1424-SS-02 Shut in test

0917 Test passed, begin purge

0920 Sample 1424-SS-02-060415 radon

1424-SS-02 = final digital = -3.79 in Hg

1424-SS-02 Summa SN = SC01581

Regulator SN = OA00871

0925 End Velocical logger in 1424

0940 Bldg 1405 samples

1405-SS-02 = -7

1405-SS-03 = -4

1405-IA-02 = -8

1405-IA-03 = -6



Location Dallas, Tx Date 6/4/15

Project / Client NAS Dallas

Need to wait to end sample until reading -5 in Hg

1405-IA-01 = -2.25

1405-SS-01 = -5.25

Thermostat reading 83°F, AC system fan on but coolant is not been replaced.

1405-IA-01 Summa SN = AS00463

Regulator AVG04357

1405-SS-01 Summa SN = SSC00308

Regulator SN = AVG04421

0950 1424-AA-01 Pressure = -10

Go back to check Bldg 1422

1015 1422-IA-02-060415 = -4.75 in Hg sample stopped

1017 1422-IA-02-060415 radon sample

1021 Shut test for 1422-SS-02 radon

1022 Test complete & purge line

1028 1422-SS-02-060415 radon sample

1029 Velocicalc in Bldg 1422 completed.

Location Dallas, TX Date 6/4/15

Project / Client NAS Dallas

1054 1405-IA-01-060415 = 1.75 in Hg sample done
1405-SS-01-060415 = 5 in Hg sample done
Thermostat reading 83°F
1405-IA-01-060415 = final digital = -2.84
1058 Begin shutin for 1405-SS-01 radon sample
1059 Shutin passed, begin purge
1055 1405-IA-01 radon sampled
1100 1405-SS-01 radon sample
1405-SS-01 = final digital = -3.67
1110 ~~1405~~ 1405-SS & IA-02 & 03 ready
-4 to -7 so give them more time
before sample collection
1220 Check in with Sgt Paul
Enter Bldg 1405
1230 1405-IA-02 = -5.75 end sample
1405-IA-03 = -3 end sample
1405-SS-02 = -6.5 end sample
1405-SS-03 = -3.75 end
1239 Begin Shutin for 1405-SS-02/03
1240 Test passed, purge line
1235 Sample 1405-IA-02-060415 &



Location Dallas, TX Date 6/4/15

Project / Client NAS Dallas

1405-IA-03-060415 for Radon
1240 1405-SS-02-060415 &
1405-SS-03-060415 sampled for radon
1405-IA-02 = digital final = -4.82
1405-IA-03 = digital final = -2.61
1405-SS-02 = digital final = -3.62
1405-~~IA~~ SS-03 = digital final = -3.47
1243 End Velocale logging for Bldg 1405
Fill holes with mortar Bldg 1405
1326 1424-AA-01-060413 pressure = -4
so sampled
1325 1424-AA-01 sampled for radon
1424AA-01 = final digital = -3.00
1335 Fill holes in 1422 & 1424
Pack samples & finalize COC
Check out with Sgt Paul
1445 Head to Fed Ex

# Appendix B
# Data Usability Summary Report

# Data Usability Summary
# For Vapor Intrusion Study Samples Collected December 2014
# Former Naval Air Station Dallas
# Dallas, Texas

## FOREWORD

This appendix contains the data usability summary report, indicating the quality and usability of vapor intrusion study analytical results for samples collected in December 2014. This report assesses whether sample handling, preparation, analysis, quality control, and reporting were accomplished in accordance with United States Environmental Protection Agency analytical methods and Texas Commission of Environmental Quality guidelines.

Laboratory data were reported and reviewed in accordance with the Texas Commission of Environmental Quality guidance document *Review and Reporting of COC Concentration Data under TRRP* (RG-366/TRRP-13), May 2010.

Attachment A of this data usability summary provides analytical parameters for each sample and cross-references between laboratory and field sample identifications.

Attachment B presents final results, after data review, in tabular format.

Attachment C contains laboratory reports.

## 1.0 DATA USABILITY SUMMARY

This report presents the analytical data collected as part of vapor intrusion study activities at the Former Naval Air Station Dallas, Texas site and the quality assurance/quality control (QA/QC) evaluation of those data. Data were evaluated independently from the laboratory to assess data quality. Samples discussed in this report were collected on 18 December 2014, and were submitted to ALS Environmental in Simi Valley, California (Texas certificate number T104704413-14-5). Samples collected for radon were analyzed by the University of Southern California. Tina Cantwell, Resolution Consultants chemist, reviewed the data package reported for these samples. All data were reviewed for conformance to the requirements of the Texas Commission on Environmental Quality guidance document *Review and Reporting of COC Concentration Data* (RG-366/TRRP-13), May 2010. The quality assurance criteria used to assess all data were established by the analytical methods and consistent with the relevant standards in the following United States Environmental Protection Agency (U.S. EPA) guidance documents:

- *U.S. EPA Contract Laboratory Program National Functional Guidelines for Superfund Organic Methods Data Review*, USEPA-540/R-08/01, June 2008.

- *U.S. EPA Contract Laboratory Program National Functional Guidelines for Inorganic Superfund Data Review*, USEPA-540/R-10/11, January 2010.

### 1.1 Intended Use of the Data

The intended use of the data is to assess whether trichloroethene is migrating from the groundwater plume to sub-slab vapor and indoor air in three buildings at the Former Naval Air Station Dallas, Texas project site.

### 1.2 Requested Analysis

Groundwater samples were analyzed for trichloroethene and cis-1,2-dichloroethene by gas chromatography/mass spectrometry via TO-15 and radon by scintillation cell counting via University of Southern California standard operating procedure Rn-SOP.

### 1.3 Laboratory Submittals and Field Data Examined

Laboratory submittals and field data examined are as follows:

- Reportable data
- Applicable field records, preservation, and handling procedures prior to shipment to the laboratory

## 2.0 INTRODUCTION

The following lists sample matrix, quantities and analyses:

- Trichloroethene and cis-1,2-dichloroethene — 13 air samples, 2 field duplicates
- Radon — 13 air samples, 2 field duplicates

The samples collected and sample identification cross-references are summarized in Attachment A.

### Data Evaluation Criteria

Laboratory QC: The laboratory's statistically-derived recovery QC limits for accuracy and precision were used.

Field Duplicate Precision: Relative percent difference of 30 for TO-15 and 28 for radon

## 3.0 DATA REVIEW RESULTS

Samples discussed in this report were analyzed and reported as definitive data and QC summary information were submitted for data review. The data were reported by the laboratory in two sample delivery groups: P1405132 and USC1. Elements of the deliverables provided by the laboratory were as follows:

| | |
|---|---|
| • Completed chain-of-custody documentation<br>• Analytical results<br>• Results for re-analyzed and diluted samples<br>• Sample receipt and log-in information<br>• Laboratory case narrative<br>• Laboratory blank data<br>• Sample run logs (TO-15)<br>• Method quantitation limits (TO-15)<br>• Method detection limits<br>• Data qualifiers applied to sample results<br>• Sample preparation information | • Summary of QC results<br>— Surrogate recoveries (TO-15)<br>— Laboratory control samples (LCS, TO-15)<br>— Laboratory method blanks (TO-15)<br>— Organic tuning data (TO-15)<br>— Calibration data (TO-15)<br>— Internal standard areas and retention times (TO-15) |

The following flags were used by the laboratory to annotate results:

*Laboratory Qualifiers*

**J** = **Estimated** — The analyte was detected above the SDL but less than the method quantitation limit (MQL).

**U** = **Undetected** — The analyte was undetected above the sample detection limit (SDL).

When the QC parameters did not fall within the specific method or data review guidelines, the data reviewer annotated or "flagged" the corresponding compounds. Flags used during this data review are as follows:

*Data Review Qualifiers*

**U** = **Undetected** — The parameter was analyzed but undetected.

**J** = **Estimated Value** — One or more QC parameters were outside control limits or the concentration of the analyte was above the SDL, but less than the MQL.

**JL** = **Estimated and Biased Low** — Bias in sample result is likely to be low.

## 3.1 Analytical Results

All undetected results are reported at less than the value of the SDL as defined by the Texas Risk Reduction Program rule. All values were estimated (J-flagged) by the laboratory when results were reported below the MQL but above the SDL.

## 3.2 Data Review Findings

The overall data quality for the sample results were evaluated based on method compliance, data usability, and scope-of-work satisfaction. Data evaluation for the samples included the following parameters:

- Sample receipt, preservation, and holding times
- Surrogate recoveries
- LCSs
- Blank analysis (equipment, trip, and laboratory)
- Organic tuning data
- Calibration data
- Internal standard areas and retention times
- Duplicate precision (laboratory and field)

In accordance with the project Sampling and Analysis Plan, all QC summary data indicated above, were reviewed for trichloroethene and cis-1,2-dichloroethene. Screening radon measurements were reviewed for the following QC elements: sample receipt, holding times, and duplicate precision. The following sections detail the data review findings and qualifications performed.

### 3.2.1 Sample Handling, Preservation, and Holding Times

All samples were received by the laboratory intact, properly preserved, and under proper chain-of-custody forms. All samples were analyzed within holding times. All TO-15 sample canisters were received by the laboratory under appropriate vacuum pressure. The laboratory noted that radon sample 1405-SS-02-121814 had very little gas in the Tedlar bag and the result should be considered a lower limit. Therefore, radon was flagged as estimated "JL" in sample 1405-SS-02-121814 due to low sample volume and the result may be biased low.

### 3.2.2 Surrogate Recoveries

Individual sample performance and accuracy for the TO-15 analyses were monitored by assessing surrogate percent recovery (%R) data. All surrogate recoveries were acceptable.

### 3.2.3 Laboratory Control Samples

LCS is used to monitor the overall performance of each step during analysis, including sample preparation and the LCS %R results should fall within the laboratory's control limits. All TO-15 LCS %Rs were acceptable.

### 3.2.4 Laboratory Blank Analysis

Blanks help determine how much, if any, contamination was introduced in the laboratory or the field. During this sampling event two laboratory blanks were analyzed and both were acceptable.

### 3.2.5 Organic Tuning Data

All TO-15 tuning criteria were met for investigative samples.

### 3.2.6 Calibration Data

All TO-15 calibration criteria were met.

### 3.2.7 Internal Standard Areas and Retention Times

Internal standard performance criteria ensure that gas chromatography/mass spectrometry sensitivity and response are stable during each analysis. All TO-15 internal standard areas and retention times were acceptable.

### 3.2.8 Duplicate Precision (Laboratory and Field)

Two investigative samples were duplicated in the field to assess precision for TO-15 and radon analysis. Additionally, four radon samples were duplicated in the laboratory. Both TO-15 field duplicates and all four radon laboratory duplicates were acceptable.

Field duplicate pair 1405-SS-02-121814 and 1405-SS-03-121814 reported radon at concentrations of 23 picocuries per liter (piC/L) and 41 piC/L, respectively. The relative percent difference was 56.3, which was above the control limit of 28. Therefore, radon in 1405-SS-02-121814 and 1405-SS-03-121814 were qualified as estimated due to potential poor precision. It should be noted radon sample 1405-SS-02-121814 had very little gas in the Tedlar bag and this likely explains the poor duplicate precision.

## 4.0 OVERALL ASSESSMENT

The data were reviewed independently from the laboratory to assess data quality. Analytes outside individual QC criteria were flagged during this evaluation. No results were rejected and values that were flagged as estimated during data review may be biased high or low, but the results are usable for their intended purpose, according to U.S. EPA and Texas Commission on Environmental Quality guidelines. All other results were acceptable without qualification.

Attachment B presents the final results in tabular format and Attachment C contains the laboratory reports.

# Attachment A
# Sample Identifications and Analytical Parameters

**Table A-1**
**Sample Identifications and Analytical Parameters**

| Sample Delivery Group | Lab Identification | Sample Identification | Sample Date | Matrix | TO-15 | USC RnSOP |
|---|---|---|---|---|---|---|
| P1405132 | P1405132-001 | 1422-IA-02-121814 | 12/18/2014 | Indoor air | X | |
| P1405132 | P1405132-002 | 1424-AA-01-121814 | 12/18/2014 | Ambient Indoor air | X | |
| P1405132 | P1405132-003 | 1422-SS-01-121814 | 12/18/2014 | Sub-slab soil gas | X | |
| P1405132 | P1405132-004 | 1422-IA-01-121814 | 12/18/2014 | Indoor air | X | |
| P1405132 | P1405132-005 | 1422-SS-02-121814 | 12/18/2014 | Sub-slab soil gas | X | |
| P1405132 | P1405132-006 | 1405-IA-02-121814 | 12/18/2014 | Indoor air | X | |
| P1405132 | P1405132-007 | 1405-IA-03-121814 | 12/18/2014 | Indoor air<br>Duplicate of 1405-IA-02-121814 | X | |
| P1405132 | P1405132-008 | 1424-SS-01-121814 | 12/18/2014 | Sub-slab soil gas | X | |
| P1405132 | P1405132-009 | 1424-SS-02-121814 | 12/18/2014 | Sub-slab soil gas | X | |
| P1405132 | P1405132-010 | 1424-IA-01-121814 | 12/18/2014 | Indoor air | X | |
| P1405132 | P1405132-011 | 1405-SS-01-121814 | 12/18/2014 | Sub-slab soil gas | X | |
| P1405132 | P1405132-012 | 1405-IA-01-121814 | 12/18/2014 | Indoor air | X | |
| P1405132 | P1405132-013 | 1405-SS-02-121814 | 12/18/2014 | Sub-slab soil gas | X | |
| P1405132 | P1405132-014 | 1405-SS-03-121814 | 12/18/2014 | Sub-slab soil gas<br>Duplicate of 1405-SS-02-121814 | X | |
| P1405132 | P1405132-015 | 1424-IA-02-121814 | 12/18/2014 | Indoor air | X | |
| USC1 | USC1-01 | 1422-SS-01-121814 | 12/18/2014 | Sub-slab soil gas | | X |
| USC1 | USC1-02 | 1422-IA-01-121814 | 12/18/2014 | Indoor air | | X |
| USC1 | USC1-03 | 1422-SS-02-121814 | 12/18/2014 | Sub-slab soil gas | | X |
| USC1 | USC1-04 | 1422-IA-02-121814 | 12/18/2014 | Indoor air | | X |
| USC1 | USC1-05 | 1424-SS-01-121814 | 12/18/2014 | Sub-slab soil gas | | X |
| USC1 | USC1-06 | 1424-IA-01-121814 | 12/18/2014 | Indoor air | | X |
| USC1 | USC1-07 | 1424-SS-02-121814 | 12/18/2014 | Sub-slab soil gas | | X |
| USC1 | USC1-08 | 1424-IA-02-121814 | 12/18/2014 | Indoor air | | X |
| USC1 | USC1-09 | 1405-SS-01-121814 | 12/18/2014 | Sub-slab soil gas | | X |
| USC1 | USC1-10 | 1405-IA-01-121814 | 12/18/2014 | Indoor air | | X |
| USC1 | USC1-11 | 1405-SS-02-121814 | 12/18/2014 | Sub-slab soil gas | | X |
| USC1 | USC1-12 | 1405-SS-03-121814 | 12/18/2014 | Sub-slab soil gas<br>Duplicate of 1405-SS-02-121814 | | X |
| USC1 | USC1-13 | 1405-IA-02-121814 | 12/18/2014 | Indoor air | | X |
| USC1 | USC1-14 | 1405-IA-03-121814 | 12/18/2014 | Indoor air<br>Duplicate of 1405-IA-02-121814 | | X |
| USC1 | USC1-15 | 1424-AA-01-121814 | 12/18/2014 | Ambient Indoor air | | X |

***Notes*:**

TO-15 = *Compendium Method TO-15 Determination of Volatile Organic Compounds in Air Collected in Specially-Prepared Canisters and Analyzed by Gas Chromatography/Mass Spectrometry*, January 1999.

USC RnSOP = University of Southern California radon scintillation cell counting standard operating procedure

X = Samples were analyzed for the method listed in the column header

**Attachment B**

**Final Results after Data Review**

**Table B-1**
**Vapor Intrusion Study Results after Data Review**

| | | | **Sample ID** | 1405-IA-01-121814 | | | 1405-IA-02-121814 | | | 1405-IA-03-121814 | | | 1405-SS-01-121814 | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | **Sample Date** | 12/18/2014 | | | 12/18/2014 | | | 12/18/2014 | | | 12/18/2014 | | |
| | | | **Sample Type** | Normal | | | Normal | | | Duplicate | | | Normal | | |
| | | | **Matrix** | Indoor air | | | Indoor air | | | Indoor air | | | Sub-slab soil gas | | |
| **Method** | **Analyte** | **CAS No** | **Units** | Result | Qual | RC | Result | Qual | RC | Result | Qual | RC | Result | Qual | RC |
| TO-15 | cis-1,2-Dichloroethene | 156-59-2 | UG_M3 | 0.21 | U | | 0.21 | U | | 0.2 | U | | 0.22 | U | |
| TO-15 | Trichloroethene | 79-01-6 | UG_M3 | 0.18 | U | | 0.18 | U | | 0.18 | U | | 0.19 | U | |
| USC_RN_SOP | Radon | 10043-92-2 | PCI_L | 1.41 | | | 1.52 | | | 1.31 | | | 1558 | | |

| | | | **Sample ID** | 1405-SS-02-121814 | | | 1405-SS-03-121814 | | | 1422-IA-01-121814 | | | 1422-IA-02-121814 | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | **Sample Date** | 12/18/2014 | | | 12/18/2014 | | | 12/18/2014 | | | 12/18/2014 | | |
| | | | **Sample Type** | Normal | | | Duplicate | | | Normal | | | Normal | | |
| | | | **Matrix** | Sub-slab soil gas | | | Sub-slab soil gas | | | Indoor air | | | Indoor air | | |
| **Method** | **Analyte** | **CAS No** | **Units** | Result | Qual | RC | Result | Qual | RC | Result | Qual | RC | Result | Qual | RC |
| TO-15 | cis-1,2-Dichloroethene | 156-59-2 | UG_M3 | 0.22 | U | | 0.22 | U | | 0.24 | U | | 0.2 | U | |
| TO-15 | Trichloroethene | 79-01-6 | UG_M3 | 0.19 | U | | 0.19 | U | | 0.21 | U | | 0.17 | U | |
| USC_RN_SOP | Radon | 10043-92-2 | PCI_L | 23 | JL | fd,lv | 41 | J | fd | 0.8 | | | 0.55 | | |

| | | | **Sample ID** | 1422-SS-01-121814 | | | 1422-SS-02-121814 | | | 1424-AA-01-121814 | | | 1424-IA-01-121814 | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | **Sample Date** | 12/18/2014 | | | 12/18/2014 | | | 12/18/2014 | | | 12/18/2014 | | |
| | | | **Sample Type** | Normal | | | Normal | | | Normal | | | Normal | | |
| | | | **Matrix** | Sub-slab soil gas | | | Sub-slab soil gas | | | Ambient Indoor Indoor airr | | | Indoor air | | |
| **Method** | **Analyte** | **CAS No** | **Units** | Result | Qual | RC | Result | Qual | RC | Result | Qual | RC | Result | Qual | RC |
| TO-15 | cis-1,2-Dichloroethene | 156-59-2 | UG_M3 | 0.22 | U | | 0.22 | U | | 0.2 | U | | 0.23 | U | |
| TO-15 | Trichloroethene | 79-01-6 | UG_M3 | 8.4 | | | 1.5 | | | 0.17 | U | | 0.2 | U | |
| USC_RN_SOP | Radon | 10043-92-2 | PCI_L | 1075 | | | 1335 | | | 0.28 | | | 0.27 | | |

**Table B-1 (Continued)**
**Vapor Intrusion Study Results after Data Review**

| | | | **Sample ID** | 1424-IA-02-121814 | | | 1424-SS-01-121814 | | | 1424-SS-02-121814 | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | **Sample Date** | 12/18/2014 | | | 12/18/2014 | | | 12/18/2014 | | |
| | | | **Sample Type** | Normal | | | Normal | | | Normal | | |
| | | | **Matrix** | Indoor air | | | Sub-slab soil gas | | | Sub-slab soil gas | | |
| **Method** | **Analyte** | **CAS No** | **Units** | Result | Qual | RC | Result | Qual | RC | Result | Qual | RC |
| TO-15 | cis-1,2-Dichloroethene | 156-59-2 | UG_M3 | 0.23 | U | | 0.22 | U | | 0.54 | U | |
| TO-15 | Trichloroethene | 79-01-6 | UG_M3 | 0.2 | U | | 0.19 | U | | 0.48 | U | |
| USC_RN_SOP | Radon | 10043-92-2 | PCI_L | 0.24 | | | 246 | | | 1790 | | |

***Notes:***

UG_M3 = Micrograms per cubic meter
PCI_L = Picocuries per liter
Qual = Final interpreted qualifier
RC = Reason code
U = Undetected
J = Estimated value
JL = Estimated value potentially biased low

**Qualification Reason Codes:**

fd = Value qualified estimated due to poor field duplicate precision
lv = Value qualified as estimated and potentially biased low due to low sample volume in the Tedlar bag.

**Attachment C**
**Laboratory Data Packages**

**ALS**

**Sample Delivery Group P1405132**

2655 Park Center Dr., Suite A
Simi Valley, CA 93065
**T:** +1 805 526 7161
**F:** +1 805 526 7270
www.alsglobal.com

# LABORATORY REPORT

January 29, 2014

Kelly Nance
Shealy Environmental Services Inc.
106 Vantage Point Drive
West Columbia, SC 29172

**RE: NAS Dallas / 0888812796**

Dear Kelly:

A summary report has been generated per client request January 28, 2015. Enclosed are the results of the samples submitted to our laboratory on December 19, 2014. For your reference, these analyses have been assigned our service request number P1405132.

All analyses were performed according to our laboratory's NELAP and DoD-ELAP-approved quality assurance program. The test results meet requirements of the current NELAP and DoD-ELAP standards, where applicable, and except as noted in the laboratory case narrative provided. For a specific list of NELAP and DoD-ELAP-accredited analytes, refer to the certifications section at www.alsglobal.com. Results are intended to be considered in their entirety and apply only to the samples analyzed and reported herein.

If you have any questions, please call me at (805) 526-7161.

Respectfully submitted,

**ALS | Environmental**

Kate Aguilera

*By Kate Aguilera at 8:55 am, Jan 29, 2015*

Kate Aguilera
Project Manager

2655 Park Center Dr., Suite A
Simi Valley, CA 93065
**T:** +1 805 526 7161
**F:** +1 805 526 7270
www.alsglobal.com

Client: Shealy Environmental Services Inc. Service Request No: P1405132
Project: NAS Dallas / 0888812796

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## CASE NARRATIVE

The samples were received intact under chain of custody on December 19, 2014 and were stored in accordance with the analytical method requirements. Please refer to the sample acceptance check form for additional information. The results reported herein are applicable only to the condition of the samples at the time of sample receipt.

Volatile Organic Compound Analysis

The samples were analyzed for volatile organic compounds in accordance with EPA Method TO-15 from the Compendium of Methods for the Determination of Toxic Organic Compounds in Ambient Air, Second Edition (EPA/625/R-96/010b), January, 1999. This procedure is described in laboratory SOP VOA-TO15. The analytical system was comprised of a gas chromatograph / mass spectrometer (GC/MS) interfaced to a whole-air preconcentrator. This method is not included on the laboratory's AIHA-LAP scope of accreditation. Any analytes flagged with an X are not included on the laboratory's NELAP or DoD-ELAP scope of accreditation.

The Summa canisters were cleaned, prior to sampling, down to the method reporting limit (MRL) reported for this project. Please note, projects which require reporting below the MRL could have results between the MRL and method detection limit (MDL) that are biased high.

---

*The results of analyses are given in the attached laboratory report. All results are intended to be considered in their entirety, and ALS Environmental (ALS) is not responsible for utilization of less than the complete report.*

*Use of ALS Environmental (ALS)'s Name. Client shall not use ALS's name or trademark in any marketing or reporting materials, press releases or in any other manner ("Materials") whatsoever and shall not attribute to ALS any test result, tolerance or specification derived from ALS's data ("Attribution") without ALS's prior written consent, which may be withheld by ALS for any reason in its sole discretion. To request ALS's consent, Client shall provide copies of the proposed Materials or Attribution and describe in writing Client's proposed use of such Materials or Attribution. If ALS has not provided written approval of the Materials or Attribution within ten (10) days of receipt from Client, Client's request to use ALS's name or trademark in any Materials or Attribution shall be deemed denied. ALS may, in its discretion, reasonably charge Client for its time in reviewing Materials or Attribution requests. Client acknowledges and agrees that the unauthorized use of ALS's name or trademark may cause ALS to incur irreparable harm for which the recovery of money damages will be inadequate. Accordingly, Client acknowledges and agrees that a violation shall justify preliminary injunctive relief. For questions contact the laboratory.*

2655 Park Center Dr., Suite A
Simi Valley, CA 93065
**T:** +1 805 526 7161
**F:** +1 805 526 7270
**www.alsglobal.com**

ALS Environmental – Simi Valley

CERTIFICATIONS, ACCREDITATIONS, AND REGISTRATIONS

| Agency | Web Site | Number |
|---|---|---|
| AIHA | http://www.aihaaccreditedlabs.org | 101661 |
| Arizona DHS | http://www.azdhs.gov/lab/license/env.htm | AZ0694 |
| DoD ELAP | http://www.pjlabs.com/search-accredited-labs | L14-2 |
| Florida DOH (NELAP) | http://www.doh.state.fl.us/lab/EnvLabCert/WaterCert.htm | E871020 |
| Maine DHHS | http://www.maine.gov/dhhs/mecdc/environmental-health/water/dwp-services/labcert/labcert.htm | 2014025 |
| Minnesota DOH (NELAP) | http://www.health.state.mn.us/accreditation | 838341 |
| New Jersey DEP (NELAP) | http://www.nj.gov/dep/oqa/ | CA009 |
| New York DOH (NELAP) | http://www.wadsworth.org/labcert/elap/elap.html | 11221 |
| Oregon PHD (NELAP) | http://public.health.oregon.gov/LaboratoryServices/EnvironmentalLaboratoryAccreditation/Pages/index.aspx | CA200007 |
| Pennsylvania DEP | http://www.depweb.state.pa.us/labs | 68-03307 (Registration) |
| Texas CEQ (NELAP) | http://www.tceq.texas.gov/field/qa/env_lab_accreditation.html | T104704413-14-5 |
| Utah DOH (NELAP) | http://www.health.utah.gov/lab/labimp/certification/index.html | CA016272014-4 |
| Washington DOE | http://www.ecy.wa.gov/programs/eap/labs/lab-accreditation.html | C946 |

Analyses were performed according to our laboratory's NELAP and DoD-ELAP approved quality assurance program. A complete listing of specific NELAP and DoD-ELAP certified analytes can be found in the certifications section at www.alsglobal.com, or at the accreditation body's website.

Each of the certifications listed above have an explicit Scope of Accreditation that applies to specific matrices/methods/analytes; therefore, please contact the laboratory for information corresponding to a particular certification.

# ALS ENVIRONMENTAL

DETAIL SUMMARY REPORT

Client: Shealy Environmental Services Inc. Service Request: P1405132
Project ID: NAS Dallas / 0888812796

Date Received: 12/19/2014
Time Received: 11:09

| Client Sample ID | Lab Code | Matrix | Date Collected | Time Collected | Container ID | Pi1 (psig) | Pf1 (psig) | TO-15 - VOC Cans |
|---|---|---|---|---|---|---|---|---|
| 1422-IA-02-121814 | P1405132-001 | Air | 12/18/2014 | 08:25 | AS00231 | 0.19 | 3.76 | X |
| 1424-AA-01-121814 | P1405132-002 | Air | 12/18/2014 | 08:47 | AC00927 | 0.23 | 3.66 | X |
| 1422-SS-01-121814 | P1405132-003 | Air | 12/18/2014 | 09:14 | SC01603 | -1.08 | 3.77 | X |
| 1422-IA-01-121814 | P1405132-004 | Air | 12/18/2014 | 09:19 | AS00563 | -2.31 | 3.70 | X |
| 1422-SS-02-121814 | P1405132-005 | Air | 12/18/2014 | 09:29 | SC00114 | -1.23 | 3.75 | X |
| 1405-IA-02-121814 | P1405132-006 | Air | 12/18/2014 | 10:27 | AS00769 | -0.80 | 3.71 | X |
| 1405-IA-03-121814 | P1405132-007 | Air | 12/18/2014 | 10:27 | AS00665 | -0.20 | 3.62 | X |
| 1424-SS-01-121814 | P1405132-008 | Air | 12/18/2014 | 10:35 | SC02007 | -1.17 | 3.66 | X |
| 1424-SS-02-121814 | P1405132-009 | Air | 12/18/2014 | 11:15 | SC00220 | -1.22 | 3.58 | X |
| 1424-IA-01-121814 | P1405132-010 | Air | 12/18/2014 | 13:11 | AC01397 | -2.00 | 3.66 | X |
| 1405-SS-01-121814 | P1405132-011 | Air | 12/18/2014 | 14:07 | SC01743 | -1.03 | 3.71 | X |
| 1405-IA-01-121814 | P1405132-012 | Air | 12/18/2014 | 14:08 | AS00797 | -0.64 | 3.64 | X |
| 1405-SS-02-121814 | P1405132-013 | Air | 12/18/2014 | 14:13 | AS00211 | -1.52 | 3.54 | X |
| 1405-SS-03-121814 | P1405132-014 | Air | 12/18/2014 | 14:13 | SC01037 | -1.33 | 3.66 | X |
| 1424-IA-02-121814 | P1405132-015 | Air | 12/18/2014 | 16:03 | AS00376 | -1.85 | 3.76 | X |

# Air - Chain of Custody Record & Analytical Service Request



2655 Park Center Drive, Suite A
Simi Valley, California 93065
Phone (805) 526-7161
Fax (805) 526-7270

Requested Turnaround Time in Business Days (Surcharges) please circle
1 Day (100%) 2 Day (75%) 3 Day (50%) 4 Day (35%) 5 Day (25%) 10 Day-Standard

ALS Project No. P1405132

Company Name & Address (Reporting Information): Ensafe, 4545 Fuller Dr., Suite 342, Irving, TX 75038

Project Name: NAS Dallas

Project Number: 0888812796

ALS Contact: Kate Aguilera

Project Manager: Tom Wiberg

P.O. # / Billing Information: PO - 16278

Phone: 972-791-3222

Fax:

Email Address for Result Reporting: twiberg@ensafe.com

Sampler (Print & Sign): Cole Duckworth

Analysis Method: TO15

| Client Sample ID | Laboratory ID Number | Date Collected | Time Collected | Canister ID (Bar code # - AC, SC, etc.) | Flow Controller ID (Bar code # - FC #) | Canister Start Pressure "Hg | Canister End Pressure "Hg/psig | Sample Volume | TO15 | | Comments e.g. Actual Preservative or specific instructions |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1422-IA-02-121814 | 1 | 12/18/14 | 0825 | ~~12879~~ AS00231 | ~~F215434~~ FCA00618 | -30.23 | -1 | 6L | X | | +0.01 |
| 1424-AA-01-121814 | 2 | 12/18/14 | 0847 | ~~197~~ AC00127 | ~~F215070~~ FCA00092 | -29.97 | -0.75 | 6L | X | | +0.20 |
| 1422-SS-01-121814 | 3 | 12/18/14 | 0914 | SC01603 | OA01867 | -30.17 | -3 | 6L | X | | -1.20 |
| 1422-IA-01-121814 | 4 | 12/18/14 | 0919 | AS00563 | FCA00848 | -30.20 | -5.5 | 6L | X | | -2.43 |
| 1422-SS-02-121814 | 5 | 12/18/14 | 0929 | SC00114 | OA01663 | -30.21 | -4.5 | 6L | X | | -1.48 |
| 1405-IA-02-121814 | 6 | 12/18/14 | 1027 | AS00769 | FCA00720 | -29.95 | -2.5 | 6L | X | | -0.96 |
| 1405-IA-03-121814 | 7 | 12/18/14 | 1027 | AS00665 | FCA00472 | -29.98 | -2 | 6L | X | | -0.38 |
| 1424-SS-01-121814 | 8 | 12/18/14 | 1035 | SC02007 | OA00538 | -30.16 | -5 | 6L | X | | -1.29 |
| 1424-SS-02-121814 | 9 | 12/18/14 | 1115 | SC0020 | OA00757 | -30.07 | -4 | 6L | X | | -1.32 |
| 1424-IA-01-121814 | 10 | 12/18/14 | 1311 | AC01397 | FCA00841 | -30.21 | -5.25 | 6L | X | | -2.15 |
| 1405-SS-01-121814 | 11 | 12/18/14 | 1407 | SC01743 | OA00348 | -30.03 | -2.5 | 6L | X | | -1.19 |
| 1405-IA-01-121814 | 12 | 12/18/14 | 1408 | AS00797 | FCA00811 | -30.05 | -3.5 | 6L | X | | -0.84 |
| 1405-SS-02-121814 | 13 | 12/18/14 | 1413 | AS00211 | OA00875 | -30.03 | -3 | 6L | X | | -1.68 |
| 1405-SS-03-121814 | 14 | 12/18/14 | 1413 | SC01037 | OA00765 | -30.03 | -4.5 | 6L | X | | -1.14 |

Report Tier Levels - please select

Tier I - Results (Default if not specified) ____
Tier II (Results + QC Summaries) ____
Tier III (Results + QC & Calibration Summaries) ✓ - See LSR for specific requirements
Tier IV (Data Validation Package) 10% Surcharge ____

EDD required Yes / No
Type: _____ Units: _____

Chain of Custody Seal: (Circle) INTACT BROKEN ~~ABSENT~~

Project Requirements (MRLs, QAPP): See LSR

| Relinquished by: (Signature) | Date: 12/18/14 | Time: 1900 | Received by: (Signature) | Date: 12/19/14 | Time: 1109 |
|---|---|---|---|---|---|
| Relinquished by: (Signature) | Date: | Time: | Received by: (Signature) | Date: | Time: |

Cooler / Blank Temperature ____ °C

# Air - Chain of Custody Record & Analytical Service Request



2655 Park Center Drive, Suite A
Simi Valley, California 93065
Phone (805) 526-7161
Fax (805) 526-7270

**Requested Turnaround Time in Business Days (Surcharges) please circle**
1 Day (100%) 2 Day (75%) 3 Day (50%) 4 Day (35%) 5 Day (25%) 10 Day-Standard

ALS Project No. P405132

Company Name & Address (Reporting Information): Ensafe, 4545 Keller Dr, Suite 342, Irving, TX 75038

Project Name: NAS Dallas

Project Number: 0888812796

ALS Contact: Kate Aguilera

Project Manager: Tom Wiberg

P.O. # / Billing Information: PO -16278

Phone: 972-791-3222

Fax:

Email Address for Result Reporting: twiberg@ensafe.com

Sampler (Print & Sign): Cole Duckworth

| Client Sample ID | Laboratory ID Number | Date Collected | Time Collected | Canister ID (Bar code # - AC, SC, etc.) | Flow Controller ID (Bar code # - FC #) | Canister Start Pressure "Hg | Canister End Pressure "Hg/psig | Sample Volume | TO-15 | | Comments e.g. Actual Preservative or specific instructions |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1424-IA-02-121814 | 15 | 12/18/14 | 1603 | A500376 | FCA00832 | -30.13 | -5 | 6L | x | | -1.94 |

**Report Tier Levels - please select**
Tier I - Results (Default if not specified) ____
Tier II (Results + QC Summaries) ____
Tier III (Results + QC & Calibration Summaries) ✓ - See LSR for specific requirements
Tier IV (Data Validation Package) 10% Surcharge ____

EDD required Yes / No
Type: _____ Units: _____

Chain of Custody Seal: (Circle) INTACT BROKEN ABSENT

Project Requirements (MRLs, QAPP): See LSR

| Relinquished by: (Signature) | Date: | Time: | Received by: (Signature) | Date: | Time: |
|---|---|---|---|---|---|
| [signature] | 12/18/14 | 1900 | [signature] | 12/19/14 | 1109 |
| Relinquished by: (Signature) | Date: | Time: | Received by: (Signature) | Date: | Time: |
| | | | | | |

Cooler / Blank Temperature ____ °C

# ALS Environmental
## Sample Acceptance Check Form

Client: Shealy Environmental Services Inc. Work order: P1405132

Project: NAS Dallas / 0888812796

Sample(s) received on: 12/19/14 Date opened: 12/19/14 by: KKELPE

***Note:*** This form is used for all samples received by ALS. The use of this form for custody seals is strictly meant to indicate presence/absence and not as an indication of compliance or nonconformity. Thermal preservation and pH will only be evaluated either at the request of the client and/or as required by the method/SOP.

| | | Yes | No | N/A |
|---|---|---|---|---|
| 1 | Were **sample containers** properly marked with client sample ID? | ☒ | ☐ | ☐ |
| 2 | Container(s) **supplied by ALS**? | ☒ | ☐ | ☐ |
| 3 | Did **sample containers** arrive in good condition? | ☒ | ☐ | ☐ |
| 4 | Were **chain-of-custody** papers used and filled out? | ☒ | ☐ | ☐ |
| 5 | Did **sample container labels** and/or tags agree with custody papers? | ☒ | ☐ | ☐ |
| 6 | Was **sample volume** received adequate for analysis? | ☒ | ☐ | ☐ |
| 7 | Are samples within specified holding times? | ☒ | ☐ | ☐ |
| 8 | Was proper **temperature** (thermal preservation) of cooler at receipt adhered to? | ☐ | ☐ | ☒ |
| 9 | Was a **trip blank** received? | ☐ | ☒ | ☐ |
| 10 | Were **custody seals** on outside of cooler/Box? | ☒ | ☐ | ☐ |
| | Location of seal(s)? _____ Sealing Lid? | ☒ | ☐ | ☐ |
| | Were signature and date included? | ☒ | ☐ | ☐ |
| | Were seals intact? | ☒ | ☐ | ☐ |
| | Were custody seals on outside of sample container? | ☐ | ☒ | ☐ |
| | Location of seal(s)? _____ Sealing Lid? | ☐ | ☐ | ☒ |
| | Were signature and date included? | ☐ | ☐ | ☒ |
| | Were seals intact? | ☐ | ☐ | ☒ |
| 11 | Do containers have appropriate **preservation**, according to method/SOP or Client specified information? | ☐ | ☐ | ☒ |
| | Is there a client indication that the submitted samples are **pH** preserved? | ☐ | ☐ | ☒ |
| | Were **VOA vials** checked for presence/absence of air bubbles? | ☐ | ☐ | ☒ |
| | Does the client/method/SOP require that the analyst check the sample pH and if necessary alter it? | ☐ | ☐ | ☒ |
| 12 | **Tubes:** Are the tubes capped and intact? | ☐ | ☐ | ☒ |
| | Do they contain moisture? | ☐ | ☐ | ☒ |
| 13 | **Badges:** Are the badges properly capped and intact? | ☐ | ☐ | ☒ |
| | Are dual bed badges separated and individually capped and intact? | ☐ | ☐ | ☒ |

| Lab Sample ID | Container Description | Required pH * | Received pH | Adjusted pH | VOA Headspace (Presence/Absence) | Receipt / Preservation Comments |
|---|---|---|---|---|---|---|
| P1405132-001.01 | 6.0 L Silonite Can | | | | | |
| P1405132-002.01 | 6.0 L Ambient Can | | | | | |
| P1405132-003.01 | 6.0 L Source Can | | | | | |
| P1405132-004.01 | 6.0 L Silonite Can | | | | | |
| P1405132-005.01 | 6.0 L Source Can | | | | | |
| P1405132-006.01 | 6.0 L Silonite Can | | | | | |
| P1405132-007.01 | 6.0 L Silonite Can | | | | | |
| P1405132-008.01 | 6.0 L Source Can | | | | | |

Explain any discrepancies: (include lab sample ID numbers): _____

RSK - MEEPP, HCL (pH<2); RSK - CO2, (pH 5-8); Sulfur (pH>4)

# ALS Environmental
## Sample Acceptance Check Form

Client: Shealy Environmental Services Inc. Work order: P1405132

Project: NAS Dallas / 0888812796

Sample(s) received on: 12/19/14 Date opened: 12/19/14 by: KKELPE

| Lab Sample ID | Container Description | Required pH * | Received pH | Adjusted pH | VOA Headspace (Presence/Absence) | Receipt / Preservation Comments |
|---|---|---|---|---|---|---|
| P1405132-009.01 | 6.0 L Source Can | | | | | |
| P1405132-010.01 | 6.0 L Ambient Can | | | | | |
| P1405132-011.01 | 6.0 L Source Can | | | | | |
| P1405132-012.01 | 6.0 L Silonite Can | | | | | |
| P1405132-013.01 | 6.0 L Silonite Can | | | | | |
| P1405132-014.01 | 6.0 L Source Can | | | | | |
| P1405132-015.01 | 6.0 L Silonite Can | | | | | |

Explain any discrepancies: (include lab sample ID numbers):

RSK - MEEPP, HCL (pH<2); RSK - CO2, (pH 5-8); Sulfur (pH>4)

# ALS ENVIRONMENTAL

RESULTS OF ANALYSIS



**Client:** **Shealy Environmental Services Inc.**
**Client Sample ID:** **1422-IA-02-121814** ALS Project ID: P1405132
**Client Project ID:** **NAS Dallas / 0888812796** ALS Sample ID: P1405132-001

Test Code: EPA TO-15 Date Collected: 12/18/14
Instrument ID: Tekmar AUTOCAN/Agilent 5975Cinert/6890N/MS16 Date Received: 12/19/14
Analyst: Lusine Hakobyan Date Analyzed: 12/29/14
Sampling Media: 6.0 L Silonite Canister Volume(s) Analyzed: 1.00 Liter(s)
Test Notes:
Container ID: AS00231

Initial Pressure (psig): 0.19 Final Pressure (psig): 3.76

Canister Dilution Factor: 1.24

| CAS # | Compound | Result µg/m³ | LOQ µg/m³ | LOD µg/m³ | MDL µg/m³ | Data Qualifier |
|---|---|---|---|---|---|---|
| 156-59-2 | cis-1,2-Dichloroethene | 0.53 | 0.62 | 0.53 | 0.20 | **U** |
| 79-01-6 | Trichloroethene | 0.52 | 0.62 | 0.52 | 0.17 | **U** |

U = Undetected at the limit of detection: The associated data value is the limit of detection, adjusted by any dilution factor used in the analysis.
LOQ = Limit of Quantitation - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

# ALS ENVIRONMENTAL

RESULTS OF ANALYSIS



**Client:** **Shealy Environmental Services Inc.**
**Client Sample ID:** **1424-AA-01-121814** ALS Project ID: P1405132
**Client Project ID:** **NAS Dallas / 0888812796** ALS Sample ID: P1405132-002

Test Code: EPA TO-15 Date Collected: 12/18/14
Instrument ID: Tekmar AUTOCAN/Agilent 5975Cinert/6890N/MS16 Date Received: 12/19/14
Analyst: Lusine Hakobyan Date Analyzed: 12/29/14
Sampling Media: 6.0 L Summa Canister Volume(s) Analyzed: 1.00 Liter(s)
Test Notes:
Container ID: AC00927

Initial Pressure (psig): 0.23 Final Pressure (psig): 3.66

Canister Dilution Factor: 1.23

| CAS # | Compound | Result µg/m³ | LOQ µg/m³ | LOD µg/m³ | MDL µg/m³ | Data Qualifier |
|---|---|---|---|---|---|---|
| 156-59-2 | cis-1,2-Dichloroethene | 0.53 | 0.62 | 0.53 | 0.20 | **U** |
| 79-01-6 | Trichloroethene | 0.52 | 0.62 | 0.52 | 0.17 | **U** |

U = Undetected at the limit of detection: The associated data value is the limit of detection, adjusted by any dilution factor used in the analysis.
LOQ = Limit of Quantitation - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

# ALS ENVIRONMENTAL

RESULTS OF ANALYSIS



**Client:** **Shealy Environmental Services Inc.**
**Client Sample ID:** **1422-SS-01-121814** ALS Project ID: P1405132
**Client Project ID:** **NAS Dallas / 0888812796** ALS Sample ID: P1405132-003

Test Code: EPA TO-15 Date Collected: 12/18/14
Instrument ID: Tekmar AUTOCAN/Agilent 5975Cinert/6890N/MS16 Date Received: 12/19/14
Analyst: Lusine Hakobyan Date Analyzed: 12/30/14
Sampling Media: 6.0 L Summa Canister Volume(s) Analyzed: 1.00 Liter(s)
Test Notes:
Container ID: SC01603

Initial Pressure (psig): -1.08 Final Pressure (psig): 3.77

Canister Dilution Factor: 1.36

| CAS # | Compound | Result µg/m³ | LOQ µg/m³ | LOD µg/m³ | MDL µg/m³ | Data Qualifier |
|---|---|---|---|---|---|---|
| 156-59-2 | cis-1,2-Dichloroethene | 0.58 | 0.68 | 0.58 | 0.22 | **U** |
| 79-01-6 | Trichloroethene | **8.4** | 0.68 | 0.57 | 0.19 | |

U = Undetected at the limit of detection: The associated data value is the limit of detection, adjusted by any dilution factor used in the analysis.
LOQ = Limit of Quantitation - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

# ALS ENVIRONMENTAL

RESULTS OF ANALYSIS



**Client:** **Shealy Environmental Services Inc.**
**Client Sample ID:** **1422-IA-01-121814** ALS Project ID: P1405132
**Client Project ID:** **NAS Dallas / 0888812796** ALS Sample ID: P1405132-004

Test Code: EPA TO-15 Date Collected: 12/18/14
Instrument ID: Tekmar AUTOCAN/Agilent 5975Cinert/6890N/MS16 Date Received: 12/19/14
Analyst: Lusine Hakobyan Date Analyzed: 12/29/14
Sampling Media: 6.0 L Silonite Canister Volume(s) Analyzed: 1.00 Liter(s)
Test Notes:
Container ID: AS00563

Initial Pressure (psig): -2.31 Final Pressure (psig): 3.70

Canister Dilution Factor: 1.49

| CAS # | Compound | Result µg/m³ | LOQ µg/m³ | LOD µg/m³ | MDL µg/m³ | Data Qualifier |
|---|---|---|---|---|---|---|
| 156-59-2 | cis-1,2-Dichloroethene | 0.64 | 0.75 | 0.64 | 0.24 | **U** |
| 79-01-6 | Trichloroethene | 0.63 | 0.75 | 0.63 | 0.21 | **U** |

U = Undetected at the limit of detection: The associated data value is the limit of detection, adjusted by any dilution factor used in the analysis.
LOQ = Limit of Quantitation - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

# ALS ENVIRONMENTAL

RESULTS OF ANALYSIS



**Client:** **Shealy Environmental Services Inc.**
**Client Sample ID:** **1422-SS-02-121814** ALS Project ID: P1405132
**Client Project ID:** **NAS Dallas / 0888812796** ALS Sample ID: P1405132-005

Test Code: EPA TO-15 Date Collected: 12/18/14
Instrument ID: Tekmar AUTOCAN/Agilent 5975Cinert/6890N/MS16 Date Received: 12/19/14
Analyst: Lusine Hakobyan Date Analyzed: 12/29/14
Sampling Media: 6.0 L Summa Canister Volume(s) Analyzed: 1.00 Liter(s)
Test Notes:
Container ID: SC00114

Initial Pressure (psig): -1.23 Final Pressure (psig): 3.75

Canister Dilution Factor: 1.37

| CAS # | Compound | Result µg/m³ | LOQ µg/m³ | LOD µg/m³ | MDL µg/m³ | Data Qualifier |
|---|---|---|---|---|---|---|
| 156-59-2 | cis-1,2-Dichloroethene | 0.59 | 0.69 | 0.59 | 0.22 | **U** |
| 79-01-6 | Trichloroethene | **1.5** | 0.69 | 0.58 | 0.19 | |

U = Undetected at the limit of detection: The associated data value is the limit of detection, adjusted by any dilution factor used in the analysis.
LOQ = Limit of Quantitation - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

# ALS ENVIRONMENTAL

RESULTS OF ANALYSIS



**Client:** **Shealy Environmental Services Inc.**
**Client Sample ID:** **1405-IA-02-121814** ALS Project ID: P1405132
**Client Project ID:** **NAS Dallas / 0888812796** ALS Sample ID: P1405132-006

Test Code: EPA TO-15 Date Collected: 12/18/14
Instrument ID: Tekmar AUTOCAN/Agilent 5975Cinert/6890N/MS16 Date Received: 12/19/14
Analyst: Lusine Hakobyan Date Analyzed: 12/29/14
Sampling Media: 6.0 L Silonite Canister Volume(s) Analyzed: 1.00 Liter(s)
Test Notes:
Container ID: AS00769

Initial Pressure (psig): -0.80 Final Pressure (psig): 3.71

Canister Dilution Factor: 1.32

| CAS # | Compound | Result µg/m³ | LOQ µg/m³ | LOD µg/m³ | MDL µg/m³ | Data Qualifier |
|---|---|---|---|---|---|---|
| 156-59-2 | cis-1,2-Dichloroethene | 0.57 | 0.66 | 0.57 | 0.21 | **U** |
| 79-01-6 | Trichloroethene | 0.55 | 0.66 | 0.55 | 0.18 | **U** |

U = Undetected at the limit of detection: The associated data value is the limit of detection, adjusted by any dilution factor used in the analysis.
LOQ = Limit of Quantitation - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

# ALS ENVIRONMENTAL

RESULTS OF ANALYSIS



**Client:** **Shealy Environmental Services Inc.**
**Client Sample ID:** **1405-IA-03-121814** ALS Project ID: P1405132
**Client Project ID:** **NAS Dallas / 0888812796** ALS Sample ID: P1405132-007

Test Code: EPA TO-15 Date Collected: 12/18/14
Instrument ID: Tekmar AUTOCAN/Agilent 5975Cinert/6890N/MS16 Date Received: 12/19/14
Analyst: Lusine Hakobyan Date Analyzed: 12/29/14
Sampling Media: 6.0 L Silonite Canister Volume(s) Analyzed: 1.00 Liter(s)
Test Notes:
Container ID: AS00665

Initial Pressure (psig): -0.20 Final Pressure (psig): 3.62

Canister Dilution Factor: 1.26

| CAS # | Compound | Result µg/m³ | LOQ µg/m³ | LOD µg/m³ | MDL µg/m³ | Data Qualifier |
|---|---|---|---|---|---|---|
| 156-59-2 | cis-1,2-Dichloroethene | 0.54 | 0.63 | 0.54 | 0.20 | **U** |
| 79-01-6 | Trichloroethene | 0.53 | 0.63 | 0.53 | 0.18 | **U** |

U = Undetected at the limit of detection: The associated data value is the limit of detection, adjusted by any dilution factor used in the analysis.
LOQ = Limit of Quantitation - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

# ALS ENVIRONMENTAL

RESULTS OF ANALYSIS



**Client:** **Shealy Environmental Services Inc.**
**Client Sample ID:** **1424-SS-01-121814** ALS Project ID: P1405132
**Client Project ID:** **NAS Dallas / 0888812796** ALS Sample ID: P1405132-008

Test Code: EPA TO-15 Date Collected: 12/18/14
Instrument ID: Tekmar AUTOCAN/Agilent 5975Cinert/6890N/MS16 Date Received: 12/19/14
Analyst: Lusine Hakobyan Date Analyzed: 12/30/14
Sampling Media: 6.0 L Summa Canister Volume(s) Analyzed: 1.00 Liter(s)
Test Notes:
Container ID: SC02007

Initial Pressure (psig): -1.17 Final Pressure (psig): 3.66

Canister Dilution Factor: 1.36

| CAS # | Compound | Result µg/m³ | LOQ µg/m³ | LOD µg/m³ | MDL µg/m³ | Data Qualifier |
|---|---|---|---|---|---|---|
| 156-59-2 | cis-1,2-Dichloroethene | 0.58 | 0.68 | 0.58 | 0.22 | **U** |
| 79-01-6 | Trichloroethene | 0.57 | 0.68 | 0.57 | 0.19 | **U** |

U = Undetected at the limit of detection: The associated data value is the limit of detection, adjusted by any dilution factor used in the analysis.
LOQ = Limit of Quantitation - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

# ALS ENVIRONMENTAL

RESULTS OF ANALYSIS



**Client:** **Shealy Environmental Services Inc.**
**Client Sample ID:** **1424-SS-02-121814** ALS Project ID: P1405132
**Client Project ID:** **NAS Dallas / 0888812796** ALS Sample ID: P1405132-009

Test Code: EPA TO-15 Date Collected: 12/18/14
Instrument ID: Tekmar AUTOCAN/Agilent 5975Cinert/6890N/MS16 Date Received: 12/19/14
Analyst: Lusine Hakobyan Date Analyzed: 12/30/14
Sampling Media: 6.0 L Summa Canister Volume(s) Analyzed: 0.40 Liter(s)
Test Notes:
Container ID: SC00220

Initial Pressure (psig): -1.22 Final Pressure (psig): 3.58

Canister Dilution Factor: 1.36

| CAS # | Compound | Result µg/m³ | LOQ µg/m³ | LOD µg/m³ | MDL µg/m³ | Data Qualifier |
|---|---|---|---|---|---|---|
| 156-59-2 | cis-1,2-Dichloroethene | 1.5 | 1.7 | 1.5 | 0.54 | **U** |
| 79-01-6 | Trichloroethene | 1.4 | 1.7 | 1.4 | 0.48 | **U** |

U = Undetected at the limit of detection: The associated data value is the limit of detection, adjusted by any dilution factor used in the analysis.
LOQ = Limit of Quantitation - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

# ALS ENVIRONMENTAL

RESULTS OF ANALYSIS



**Client:** **Shealy Environmental Services Inc.**
**Client Sample ID:** **1424-IA-01-121814** ALS Project ID: P1405132
**Client Project ID:** **NAS Dallas / 0888812796** ALS Sample ID: P1405132-010

Test Code: EPA TO-15 Date Collected: 12/18/14
Instrument ID: Tekmar AUTOCAN/Agilent 5975Cinert/6890N/MS16 Date Received: 12/19/14
Analyst: Lusine Hakobyan Date Analyzed: 12/29/14
Sampling Media: 6.0 L Summa Canister Volume(s) Analyzed: 1.00 Liter(s)
Test Notes:
Container ID: AC01397

Initial Pressure (psig): -2.00 Final Pressure (psig): 3.66

Canister Dilution Factor: 1.45

| CAS # | Compound | Result µg/m³ | LOQ µg/m³ | LOD µg/m³ | MDL µg/m³ | Data Qualifier |
|---|---|---|---|---|---|---|
| 156-59-2 | cis-1,2-Dichloroethene | 0.62 | 0.73 | 0.62 | 0.23 | **U** |
| 79-01-6 | Trichloroethene | 0.61 | 0.73 | 0.61 | 0.20 | **U** |

U = Undetected at the limit of detection: The associated data value is the limit of detection, adjusted by any dilution factor used in the analysis.
LOQ = Limit of Quantitation - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

# ALS ENVIRONMENTAL

RESULTS OF ANALYSIS



**Client:** **Shealy Environmental Services Inc.**
**Client Sample ID:** **1405-SS-01-121814** ALS Project ID: P1405132
**Client Project ID:** **NAS Dallas / 0888812796** ALS Sample ID: P1405132-011

Test Code: EPA TO-15 Date Collected: 12/18/14
Instrument ID: Tekmar AUTOCAN/Agilent 5975Cinert/6890N/MS16 Date Received: 12/19/14
Analyst: Lusine Hakobyan Date Analyzed: 12/29/14
Sampling Media: 6.0 L Summa Canister Volume(s) Analyzed: 1.00 Liter(s)
Test Notes:
Container ID: SC01743

Initial Pressure (psig): -1.03 Final Pressure (psig): 3.71

Canister Dilution Factor: 1.35

| CAS # | Compound | Result µg/m³ | LOQ µg/m³ | LOD µg/m³ | MDL µg/m³ | Data Qualifier |
|---|---|---|---|---|---|---|
| 156-59-2 | cis-1,2-Dichloroethene | 0.58 | 0.68 | 0.58 | 0.22 | **U** |
| 79-01-6 | Trichloroethene | 0.57 | 0.68 | 0.57 | 0.19 | **U** |

U = Undetected at the limit of detection: The associated data value is the limit of detection, adjusted by any dilution factor used in the analysis.
LOQ = Limit of Quantitation - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

# ALS ENVIRONMENTAL

RESULTS OF ANALYSIS



**Client:** **Shealy Environmental Services Inc.**
**Client Sample ID:** **1405-IA-01-121814** ALS Project ID: P1405132
**Client Project ID:** **NAS Dallas / 0888812796** ALS Sample ID: P1405132-012

Test Code: EPA TO-15 Date Collected: 12/18/14
Instrument ID: Tekmar AUTOCAN/Agilent 5975Cinert/6890N/MS16 Date Received: 12/19/14
Analyst: Lusine Hakobyan Date Analyzed: 12/29/14
Sampling Media: 6.0 L Silonite Canister Volume(s) Analyzed: 1.00 Liter(s)
Test Notes:
Container ID: AS00797

Initial Pressure (psig): -0.64 Final Pressure (psig): 3.64

Canister Dilution Factor: 1.30

| CAS # | Compound | Result µg/m³ | LOQ µg/m³ | LOD µg/m³ | MDL µg/m³ | Data Qualifier |
|---|---|---|---|---|---|---|
| 156-59-2 | cis-1,2-Dichloroethene | 0.56 | 0.65 | 0.56 | 0.21 | **U** |
| 79-01-6 | Trichloroethene | 0.55 | 0.65 | 0.55 | 0.18 | **U** |

U = Undetected at the limit of detection: The associated data value is the limit of detection, adjusted by any dilution factor used in the analysis.
LOQ = Limit of Quantitation - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

# ALS ENVIRONMENTAL

RESULTS OF ANALYSIS



**Client:** **Shealy Environmental Services Inc.**
**Client Sample ID:** **1405-SS-02-121814** ALS Project ID: P1405132
**Client Project ID:** **NAS Dallas / 0888812796** ALS Sample ID: P1405132-013

Test Code: EPA TO-15 Date Collected: 12/18/14
Instrument ID: Tekmar AUTOCAN/Agilent 5975Cinert/6890N/MS16 Date Received: 12/19/14
Analyst: Lusine Hakobyan Date Analyzed: 12/29/14
Sampling Media: 6.0 L Silonite Canister Volume(s) Analyzed: 1.00 Liter(s)
Test Notes:
Container ID: AS00211

Initial Pressure (psig): -1.52 Final Pressure (psig): 3.54

Canister Dilution Factor: 1.38

| CAS # | Compound | Result µg/m³ | LOQ µg/m³ | LOD µg/m³ | MDL µg/m³ | Data Qualifier |
|---|---|---|---|---|---|---|
| 156-59-2 | cis-1,2-Dichloroethene | 0.59 | 0.69 | 0.59 | 0.22 | **U** |
| 79-01-6 | Trichloroethene | 0.58 | 0.69 | 0.58 | 0.19 | **U** |

U = Undetected at the limit of detection: The associated data value is the limit of detection, adjusted by any dilution factor used in the analysis.
LOQ = Limit of Quantitation - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

# ALS ENVIRONMENTAL

RESULTS OF ANALYSIS



**Client:** **Shealy Environmental Services Inc.**
**Client Sample ID:** **1405-SS-03-121814** ALS Project ID: P1405132
**Client Project ID:** **NAS Dallas / 0888812796** ALS Sample ID: P1405132-014

Test Code: EPA TO-15 Date Collected: 12/18/14
Instrument ID: Tekmar AUTOCAN/Agilent 5975Cinert/6890N/MS16 Date Received: 12/19/14
Analyst: Lusine Hakobyan Date Analyzed: 12/30/14
Sampling Media: 6.0 L Summa Canister Volume(s) Analyzed: 1.00 Liter(s)
Test Notes:
Container ID: SC01037

Initial Pressure (psig): -1.33 Final Pressure (psig): 3.66

Canister Dilution Factor: 1.37

| CAS # | Compound | Result µg/m³ | LOQ µg/m³ | LOD µg/m³ | MDL µg/m³ | Data Qualifier |
|---|---|---|---|---|---|---|
| 156-59-2 | cis-1,2-Dichloroethene | 0.59 | 0.69 | 0.59 | 0.22 | **U** |
| 79-01-6 | Trichloroethene | 0.58 | 0.69 | 0.58 | 0.19 | **U** |

U = Undetected at the limit of detection: The associated data value is the limit of detection, adjusted by any dilution factor used in the analysis.
LOQ = Limit of Quantitation - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

# ALS ENVIRONMENTAL

RESULTS OF ANALYSIS



**Client:** **Shealy Environmental Services Inc.**
**Client Sample ID:** **1424-IA-02-121814** ALS Project ID: P1405132
**Client Project ID:** **NAS Dallas / 0888812796** ALS Sample ID: P1405132-015

Test Code: EPA TO-15 Date Collected: 12/18/14
Instrument ID: Tekmar AUTOCAN/Agilent 5975Cinert/6890N/MS16 Date Received: 12/19/14
Analyst: Lusine Hakobyan Date Analyzed: 12/30/14
Sampling Media: 6.0 L Silonite Canister Volume(s) Analyzed: 1.00 Liter(s)
Test Notes:
Container ID: AS00376

Initial Pressure (psig): -1.85 Final Pressure (psig): 3.76

Canister Dilution Factor: 1.44

| CAS # | Compound | Result µg/m³ | LOQ µg/m³ | LOD µg/m³ | MDL µg/m³ | Data Qualifier |
|---|---|---|---|---|---|---|
| 156-59-2 | cis-1,2-Dichloroethene | 0.62 | 0.72 | 0.62 | 0.23 | **U** |
| 79-01-6 | Trichloroethene | 0.60 | 0.72 | 0.60 | 0.20 | **U** |

U = Undetected at the limit of detection: The associated data value is the limit of detection, adjusted by any dilution factor used in the analysis.
LOQ = Limit of Quantitation - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

# ALS ENVIRONMENTAL

RESULTS OF ANALYSIS



**Client:** **Shealy Environmental Services Inc.**
**Client Sample ID:** **Method Blank** ALS Project ID: P1405132
**Client Project ID:** **NAS Dallas / 0888812796** ALS Sample ID: P141229-MB

Test Code: EPA TO-15 Date Collected: NA
Instrument ID: Tekmar AUTOCAN/Agilent 5975Cinert/6890N/MS16 Date Received: NA
Analyst: Lusine Hakobyan Date Analyzed: 12/29/14
Sampling Media: 6.0 L Silonite Canister Volume(s) Analyzed: 1.00 Liter(s)
Test Notes:

Canister Dilution Factor: 1.00

| CAS # | Compound | Result µg/m³ | LOQ µg/m³ | LOD µg/m³ | MDL µg/m³ | Data Qualifier |
|---|---|---|---|---|---|---|
| 156-59-2 | cis-1,2-Dichloroethene | 0.43 | 0.50 | 0.43 | 0.16 | **U** |
| 79-01-6 | Trichloroethene | 0.42 | 0.50 | 0.42 | 0.14 | **U** |

U = Undetected at the limit of detection: The associated data value is the limit of detection, adjusted by any dilution factor used in the analysis.
LOQ = Limit of Quantitation - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

# ALS ENVIRONMENTAL

RESULTS OF ANALYSIS



**Client:** **Shealy Environmental Services Inc.**
**Client Sample ID:** **Method Blank** ALS Project ID: P1405132
**Client Project ID:** **NAS Dallas / 0888812796** ALS Sample ID: P141230-MB

Test Code: EPA TO-15 Date Collected: NA
Instrument ID: Tekmar AUTOCAN/Agilent 5975Cinert/6890N/MS16 Date Received: NA
Analyst: Lusine Hakobyan Date Analyzed: 12/30/14
Sampling Media: 6.0 L Silonite Canister Volume(s) Analyzed: 1.00 Liter(s)
Test Notes:

Canister Dilution Factor: 1.00

| CAS # | Compound | Result µg/m³ | LOQ µg/m³ | LOD µg/m³ | MDL µg/m³ | Data Qualifier |
|---|---|---|---|---|---|---|
| 156-59-2 | cis-1,2-Dichloroethene | 0.43 | 0.50 | 0.43 | 0.16 | **U** |
| 79-01-6 | Trichloroethene | 0.42 | 0.50 | 0.42 | 0.14 | **U** |

U = Undetected at the limit of detection: The associated data value is the limit of detection, adjusted by any dilution factor used in the analysis.
LOQ = Limit of Quantitation - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

# ALS ENVIRONMENTAL

SURROGATE SPIKE RECOVERY RESULTS



**Client:** **Shealy Environmental Services Inc.**
**Client Project ID:** **NAS Dallas / 0888812796** ALS Project ID: P1405132

Test Code: EPA TO-15
Instrument ID: Tekmar AUTOCAN/Agilent 5975Cinert/6890N/MS16 Date(s) Collected: 12/18/14
Analyst: Lusine Hakobyan Date(s) Received: 12/19/14
Sampling Media: 6.0 L Silonite Canister(s) Date(s) Analyzed: 12/29 - 12/30/14
Test Notes:

| Client Sample ID | ALS Sample ID | 1,2-Dichloroethane-d4 Percent Recovered | Toluene-d8 Percent Recovered | Bromofluorobenzene Percent Recovered | Acceptance Limits | Data Qualifier |
|---|---|---|---|---|---|---|
| Method Blank | P141229-MB | **103** | **102** | **103** | 70-130 | |
| Method Blank | P141230-MB | **102** | **98** | **102** | 70-130 | |
| Lab Control Sample | P141229-LCS | **103** | **100** | **104** | 70-130 | |
| Lab Control Sample | P141230-LCS | **101** | **100** | **104** | 70-130 | |
| 1422-IA-02-121814 | P1405132-001 | **108** | **94** | **103** | 70-130 | |
| 1424-AA-01-121814 | P1405132-002 | **106** | **96** | **103** | 70-130 | |
| 1422-SS-01-121814 | P1405132-003 | **107** | **99** | **101** | 70-130 | |
| 1422-IA-01-121814 | P1405132-004 | **102** | **96** | **101** | 70-130 | |
| 1422-SS-02-121814 | P1405132-005 | **106** | **103** | **105** | 70-130 | |
| 1405-IA-02-121814 | P1405132-006 | **102** | **99** | **103** | 70-130 | |
| 1405-IA-03-121814 | P1405132-007 | **101** | **99** | **102** | 70-130 | |
| 1424-SS-01-121814 | P1405132-008 | **106** | **100** | **103** | 70-130 | |
| 1424-SS-02-121814 | P1405132-009 | **104** | **97** | **102** | 70-130 | |
| 1424-IA-01-121814 | P1405132-010 | **109** | **98** | **105** | 70-130 | |
| 1405-SS-01-121814 | P1405132-011 | **102** | **101** | **98** | 70-130 | |
| 1405-IA-01-121814 | P1405132-012 | **106** | **99** | **103** | 70-130 | |
| 1405-SS-02-121814 | P1405132-013 | **102** | **103** | **106** | 70-130 | |
| 1405-SS-03-121814 | P1405132-014 | **104** | **100** | **104** | 70-130 | |
| 1424-IA-02-121814 | P1405132-015 | **103** | **100** | **104** | 70-130 | |

Surrogate percent recovery is verified and accepted based on the on-column result.
Reported results are shown in concentration units and as a result of the calculation, may vary slightly from the on-column percent recovery.

# ALS ENVIRONMENTAL

LABORATORY CONTROL SAMPLE SUMMARY



**Client:** **Shealy Environmental Services Inc.**
**Client Sample ID:** **Lab Control Sample** ALS Project ID: P1405132
**Client Project ID:** **NAS Dallas / 0888812796** ALS Sample ID: P141229-LCS

Test Code: EPA TO-15 Date Collected: NA
Instrument ID: Tekmar AUTOCAN/Agilent 5975Cinert/6890N/MS16 Date Received: NA
Analyst: Lusine Hakobyan Date Analyzed: 12/29/14
Sampling Media: 6.0 L Silonite Canister Volume(s) Analyzed: 0.125 Liter(s)
Test Notes:

| CAS # | Compound | Spike Amount µg/m³ | Result µg/m³ | % Recovery | DOD Acceptance Limits | Data Qualifier |
|---|---|---|---|---|---|---|
| 156-59-2 | cis-1,2-Dichloroethene | 214 | **190** | **89** | 70-121 | |
| 79-01-6 | Trichloroethene | 208 | **178** | **86** | 71-123 | |

Laboratory Control Sample percent recovery is verified and accepted based on the on-column result.
Reported results are shown in concentration units and as a result of the calculation, may vary slightly.

# ALS ENVIRONMENTAL

LABORATORY CONTROL SAMPLE SUMMARY



**Client:** **Shealy Environmental Services Inc.**
**Client Sample ID:** **Lab Control Sample** ALS Project ID: P1405132
**Client Project ID:** **NAS Dallas / 0888812796** ALS Sample ID: P141230-LCS

Test Code: EPA TO-15 Date Collected: NA
Instrument ID: Tekmar AUTOCAN/Agilent 5975Cinert/6890N/MS16 Date Received: NA
Analyst: Lusine Hakobyan Date Analyzed: 12/30/14
Sampling Media: 6.0 L Silonite Canister Volume(s) Analyzed: 0.125 Liter(s)
Test Notes:

| CAS # | Compound | Spike Amount µg/m³ | Result µg/m³ | % Recovery | DOD Acceptance Limits | Data Qualifier |
|---|---|---|---|---|---|---|
| 156-59-2 | cis-1,2-Dichloroethene | 214 | **187** | **87** | 70-121 | |
| 79-01-6 | Trichloroethene | 208 | **174** | **84** | 71-123 | |

Laboratory Control Sample percent recovery is verified and accepted based on the on-column result.
Reported results are shown in concentration units and as a result of the calculation, may vary slightly.

# ALS ENVIRONMENTAL

RESULTS OF ANALYSIS



**Client:** **Shealy Environmental Services Inc.** ALS Project ID: P1405132

**Client Project ID:** **NAS Dallas / 0888812796**

## Internal Standard Area and RT Summary

Test Code: EPA TO-15
Instrument ID: Tekmar AUTOCAN/Agilent 5975Cinert/6890N/MS16 Lab File ID: 12291402.D
Analyst: Lusine Hakobyan Date Analyzed: 12/29/14
Sampling Media: 6.0 L Silonite Canister(s) Time Analyzed: 08:40
Test Notes:

| | | IS1 (BCM) | | | IS2 (DFB) | | | IS3 (CBZ) | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | **AREA** | **#** | **RT** | **AREA** | **#** | **RT** | **AREA** | **#** | **RT** |
| | **24 Hour Standard** | 169251 | | 11.20 | 850855 | | 13.34 | 278908 | | 17.65 |
| | **Upper Limit** | 236951 | | 11.53 | 1191197 | | 13.67 | 390471 | | 17.98 |
| | **Lower Limit** | 101551 | | 10.87 | 510513 | | 13.01 | 167345 | | 17.32 |
| | **Client Sample ID** | | | | | | | | | |
| 01 | Method Blank | 177631 | | 11.20 | 861265 | | 13.33 | 298491 | | 17.65 |
| 02 | Lab Control Sample | 165875 | | 11.21 | 797769 | | 13.34 | 286932 | | 17.65 |
| 03 | 1422-IA-02-121814 | 190081 | | 11.20 | 959079 | | 13.33 | 352242 | | 17.65 |
| 04 | 1424-AA-01-121814 | 166464 | | 11.20 | 858783 | | 13.33 | 312500 | | 17.65 |
| 05 | 1422-IA-01-121814 | 177569 | | 11.20 | 880772 | | 13.33 | 322726 | | 17.65 |
| 06 | 1422-SS-02-121814 | 174215 | | 11.20 | 836578 | | 13.33 | 300957 | | 17.65 |
| 07 | 1405-IA-02-121814 | 179024 | | 11.20 | 841196 | | 13.33 | 308627 | | 17.65 |
| 08 | 1405-IA-03-121814 | 174865 | | 11.20 | 851676 | | 13.33 | 309586 | | 17.65 |
| 09 | 1424-IA-01-121814 | 168997 | | 11.20 | 851959 | | 13.34 | 296107 | | 17.65 |
| 10 | 1405-SS-01-121814 | 179959 | | 11.20 | 846419 | | 13.33 | 310397 | | 17.65 |
| 11 | 1405-IA-01-121814 | 172578 | | 11.20 | 878371 | | 13.33 | 312930 | | 17.65 |
| 12 | 1405-SS-02-121814 | 177982 | | 11.20 | 856851 | | 13.33 | 298490 | | 17.65 |
| 13 | | | | | | | | | | |
| 14 | | | | | | | | | | |
| 15 | | | | | | | | | | |
| 16 | | | | | | | | | | |
| 17 | | | | | | | | | | |
| 18 | | | | | | | | | | |
| 19 | | | | | | | | | | |
| 20 | | | | | | | | | | |

IS1 (BCM) = Bromochloromethane
IS2 (DFB) = 1,4-Difluorobenzene
IS3 (CBZ) = Chlorobenzene-d5

AREA UPPER LIMIT = 140% of internal standard area
AREA LOWER LIMIT = 60% of internal standard area
RT UPPER LIMIT = 0.33 minutes of internal standard RT
RT LOWER LIMIT = 0.33 minutes of internal standard RT

# Column used to flag values outside QC limits with an I.
I = Internal standard not within the specified limits.

# ALS ENVIRONMENTAL

RESULTS OF ANALYSIS



**Client:** **Shealy Environmental Services Inc.** ALS Project ID: P1405132

**Client Project ID:** **NAS Dallas / 0888812796**

## Internal Standard Area and RT Summary

Test Code: EPA TO-15

Instrument ID: Tekmar AUTOCAN/Agilent 5975Cinert/6890N/MS16 Lab File ID: 12301402.D

Analyst: Lusine Hakobyan Date Analyzed: 12/30/14

Sampling Media: 6.0 L Silonite Canister(s) Time Analyzed: 00:48

Test Notes:

| | | IS1 (BCM) | | | IS2 (DFB) | | | IS3 (CBZ) | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | **AREA** | **#** | **RT** | **AREA** | **#** | **RT** | **AREA** | **#** | **RT** |
| | **24 Hour Standard** | 187732 | | 11.20 | 869328 | | 13.34 | 315267 | | 17.65 |
| | **Upper Limit** | 262825 | | 11.53 | 1217059 | | 13.67 | 441374 | | 17.98 |
| | **Lower Limit** | 112639 | | 10.87 | 521597 | | 13.01 | 189160 | | 17.32 |
| | **Client Sample ID** | | | | | | | | | |
| 01 | Method Blank | 177856 | | 11.20 | 840142 | | 13.33 | 302117 | | 17.65 |
| 02 | Lab Control Sample | 181454 | | 11.21 | 855451 | | 13.34 | 303484 | | 17.65 |
| 03 | 1422-SS-01-121814 | 175700 | | 11.20 | 890982 | | 13.34 | 334565 | | 17.65 |
| 04 | 1424-SS-01-121814 | 179285 | | 11.20 | 878591 | | 13.34 | 310111 | | 17.65 |
| 05 | 1424-SS-02-121814 | 173157 | | 11.20 | 849543 | | 13.34 | 315274 | | 17.65 |
| 06 | 1405-SS-03-121814 | 193027 | | 11.20 | 949741 | | 13.33 | 346743 | | 17.65 |
| 07 | 1424-IA-02-121814 | 195358 | | 11.20 | 933252 | | 13.33 | 353674 | | 17.65 |
| 08 | | | | | | | | | | |
| 09 | | | | | | | | | | |
| 10 | | | | | | | | | | |
| 11 | | | | | | | | | | |
| 12 | | | | | | | | | | |
| 13 | | | | | | | | | | |
| 14 | | | | | | | | | | |
| 15 | | | | | | | | | | |
| 16 | | | | | | | | | | |
| 17 | | | | | | | | | | |
| 18 | | | | | | | | | | |
| 19 | | | | | | | | | | |
| 20 | | | | | | | | | | |

IS1 (BCM) = Bromochloromethane
IS2 (DFB) = 1,4-Difluorobenzene
IS3 (CBZ) = Chlorobenzene-d5

AREA UPPER LIMIT = 140% of internal standard area
AREA LOWER LIMIT = 60% of internal standard area
RT UPPER LIMIT = 0.33 minutes of internal standard RT
RT LOWER LIMIT = 0.33 minutes of internal standard RT

# Column used to flag values outside QC limits with an I.
I = Internal standard not within the specified limits.

# Response Factor Report GCMS-16

Method Path : I:\MS16\METHODS\
Method File : R16112414.M
Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
Last Update : Tue Nov 25 09:22:10 2014
Response Via : Initial Calibration

Calibration Files
0.08=11241413.D 0.10=11241414.D 0.20=11241431.D 0.40=11241432.D 1.0 =11241417.D 5.0 =11241418.D
25 =11241419.D 50 =11241420.D 100 =11241421.D

| | | Compound | 0.08 | 0.10 | 0.20 | 0.40 | 1.0 | 5.0 | 25 | 50 | 100 | Avg | %RSD |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1) | IR | Bromochloromethane... | ----------ISTD---------- | | | | | | | | | | |
| 2) | T | Propene | 1.083 | 1.060 | 1.616 | 1.184 | 1.137 | 1.048 | 1.037 | 1.027 | 0.884 | 1.120 | 18.20 |
| 3) | T | Dichlorodifluo... | 2.222 | 2.343 | 2.812 | 2.654 | 2.634 | 2.365 | 2.530 | 2.408 | 2.174 | 2.460 | 8.63 |
| 4) | T | Chloromethane | 1.579 | 1.546 | 1.999 | 1.714 | 1.834 | 1.576 | 1.719 | 1.621 | 1.359 | 1.661 | 11.07 |
| 5) | T | 1,2-Dichloro-1... | 1.287 | 1.399 | 1.826 | 1.523 | 1.586 | 1.481 | 1.479 | 1.518 | 1.383 | 1.498 | 10.15 |
| 6) | T | Vinyl Chloride | 1.428 | 1.443 | 1.939 | 1.751 | 1.815 | 1.689 | 1.783 | 1.785 | 1.586 | 1.691 | 10.23 |
| 7) | T | 1,3-Butadiene | 0.743 | 0.747 | 1.198 | 1.028 | 1.116 | 1.055 | 1.140 | 1.173 | 1.070 | 1.030 | 16.58 |
| 8) | T | Bromomethane | 1.067 | 1.088 | 1.424 | 1.315 | 1.415 | 1.206 | 1.379 | 1.282 | 1.169 | 1.260 | 10.74 |
| 9) | T | Chloroethane | 0.787 | 0.822 | 1.015 | 0.933 | 1.034 | 0.886 | 1.012 | 0.956 | 0.832 | 0.920 | 10.05 |
| 10) | T | Ethanol | | | | 0.866 | 0.855 | 0.765 | 0.777 | 0.744 | 0.650 | 0.776 | 10.22 |
| 11) | T | Acetonitrile | | | | 2.053 | 2.065 | 1.861 | 1.962 | 1.915 | 1.766 | 1.937 | 5.93 |
| 12) | T | Acrolein | 0.836 | 0.597 | 0.806 | 0.575 | 0.655 | 0.659 | 0.702 | 0.690 | 0.623 | 0.682 | 12.98 |
| 13) | T | Acetone | | | | 0.946 | 0.940 | 0.846 | 0.828 | 0.795 | 0.674 | 0.838 | 12.07 |
| 14) | T | Trichlorofluor... | 1.642 | 1.696 | 2.121 | 1.870 | 1.962 | 1.697 | 1.770 | 1.788 | 1.616 | 1.796 | 9.14 |
| 15) | T | 2-Propanol (Is... | 2.969 | 2.783 | 2.954 | 2.586 | 2.675 | 2.557 | 2.657 | 2.534 | 2.113 | 2.648 | 9.70 |
| 16) | T | Acrylonitrile | 1.337 | 0.982 | 1.922 | 1.476 | 1.565 | 1.482 | 1.605 | 1.551 | 1.427 | 1.483 | 16.76 |
| 17) | T | 1,1-Dichloroet... | 1.044 | 1.115 | 1.348 | 1.250 | 1.363 | 1.265 | 1.334 | 1.293 | 1.182 | 1.244 | 8.82 |
| 18) | T | 2-Methyl-2-Pro... | 3.249 | 3.098 | 2.895 | 2.638 | 2.724 | 2.562 | 2.788 | 2.551 | 1.947 | 2.717 | 13.74 |
| 19) | T | Methylene Chlo... | | | | 1.448 | 1.429 | 1.257 | 1.284 | 1.262 | 1.123 | 1.300 | 9.32 |
| 20) | T | 3-Chloro-1-pro... | 0.895 | 0.951 | 1.309 | 1.146 | 1.273 | 1.235 | 1.393 | 1.382 | 1.244 | 1.203 | 14.65 |
| 21) | T | Trichlorotrifl... | 1.097 | 1.053 | 1.509 | 1.139 | 1.268 | 1.063 | 1.145 | 1.035 | 1.016 | 1.147 | 13.58 |
| 22) | T | Carbon Disulfide | | | 5.352 | 4.558 | 4.814 | 4.416 | 4.691 | 4.590 | 4.120 | 4.649 | 8.19 |
| 23) | T | trans-1,2-Dich... | 1.226 | 1.339 | 1.634 | 1.485 | 1.607 | 1.534 | 1.594 | 1.592 | 1.459 | 1.497 | 9.16 |
| 24) | T | 1,1-Dichloroet... | 1.726 | 1.764 | 2.205 | 1.941 | 2.081 | 1.883 | 1.942 | 1.948 | 1.822 | 1.923 | 7.83 |
| 25) | T | Methyl tert-Bu... | 2.883 | 2.732 | 3.541 | 3.122 | 3.451 | 3.106 | 3.277 | 3.231 | 2.897 | 3.138 | 8.56 |
| 26) | T | Vinyl Acetate | 0.250 | 0.234 | 0.306 | 0.287 | 0.315 | 0.297 | 0.305 | 0.294 | 0.269 | 0.284 | 9.65 |
| 27) | T | 2-Butanone (MEK) | | | 1.042 | 0.753 | 0.778 | 0.758 | 0.793 | 0.785 | 0.725 | 0.805 | 13.30 |
| 28) | T | cis-1,2-Dichlo... | 1.189 | 1.314 | 1.614 | 1.446 | 1.547 | 1.387 | 1.493 | 1.456 | 1.359 | 1.423 | 8.96 |
| 29) | T | Diisopropyl Ether | 1.045 | 1.032 | 1.250 | 1.137 | 1.270 | 1.109 | 1.142 | 1.089 | 0.969 | 1.116 | 8.81 |
| 30) | T | Ethyl Acetate | 0.492 | 0.307 | 0.525 | 0.414 | 0.418 | 0.396 | 0.407 | 0.385 | 0.333 | 0.408 | 16.74 |
| 31) | T | n-Hexane | 1.800 | 1.743 | 1.971 | 1.696 | 1.665 | 1.507 | 1.382 | 1.363 | 1.274 | 1.600 | 14.49 |
| 32) | T | Chloroform | 1.798 | 1.778 | 2.107 | 2.012 | 2.077 | 1.886 | 1.950 | 1.899 | 1.759 | 1.919 | 6.69 |
| 33) | S | 1,2-Dichloroet... | 1.111 | 1.071 | 1.066 | 1.108 | 1.075 | 1.060 | 1.066 | 1.088 | 1.084 | 1.081 | 1.70 |
| 34) | T | Tetrahydrofura... | 0.837 | 0.836 | 1.092 | 0.767 | 0.833 | 0.752 | 0.786 | 0.771 | 0.716 | 0.821 | 13.39 |
| 35) | T | Ethyl tert-But... | 1.132 | 1.162 | 1.556 | 1.347 | 1.497 | 1.375 | 1.430 | 1.377 | 1.266 | 1.349 | 10.54 |
| 36) | T | 1,2-Dichloroet... | 1.079 | 0.992 | 1.310 | 1.201 | 1.288 | 1.135 | 1.185 | 1.179 | 1.115 | 1.165 | 8.52 |
| 37) | IR | 1,4-Difluorobenzen... | ----------ISTD---------- | | | | | | | | | | |
| 38) | T | 1,1,1-Trichlor... | 0.320 | 0.322 | 0.410 | 0.359 | 0.406 | 0.369 | 0.382 | 0.361 | 0.341 | 0.363 | 9.00 |





ch 11/25/14

Method Path : I:\MS16\METHODS\
Method File : R16112414.M
Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)

| | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 39) | T | Isopropyl Acetate | 0.145 | 0.139 | 0.171 | 0.150 | 0.158 | 0.145 | 0.151 | 0.138 | 0.122 | 0.147 | 9.36 |
| 40) | T | 1-Butanol | | 0.275 | 0.329 | 0.209 | 0.234 | 0.247 | 0.240 | 0.223 | 0.192 | 0.244 | 17.39 |
| 41) | T | Benzene | 1.038 | 1.034 | 1.223 | 1.076 | 1.112 | 0.987 | 0.971 | 0.892 | 0.794 | 1.014 | 12.26 |
| 42) | T | Carbon Tetrach... | 0.246 | 0.261 | 0.351 | 0.305 | 0.337 | 0.308 | 0.321 | 0.306 | 0.288 | 0.303 | 11.09 |
| 43) | T | Cyclohexane | 0.360 | 0.373 | 0.448 | 0.391 | 0.427 | 0.418 | 0.399 | 0.375 | 0.331 | 0.391 | 9.25 |
| 44) | T | tert-Amyl Meth... | 0.624 | 0.631 | 0.786 | 0.745 | 0.738 | 0.702 | 0.735 | 0.695 | 0.633 | 0.699 | 8.35 |
| 45) | T | 1,2-Dichloropr... | 0.209 | 0.227 | 0.276 | 0.246 | 0.263 | 0.241 | 0.251 | 0.238 | 0.221 | 0.241 | 8.62 |
| 46) | T | Bromodichlorom... | 0.291 | 0.275 | 0.349 | 0.330 | 0.350 | 0.323 | 0.354 | 0.337 | 0.307 | 0.324 | 8.52 |
| 47) | T | Trichloroethene | 0.268 | 0.277 | 0.355 | 0.324 | 0.359 | 0.318 | 0.323 | 0.310 | 0.295 | 0.314 | 9.94 |
| 48) | T | 1,4-Dioxane | 0.276 | 0.256 | 0.268 | 0.232 | 0.243 | 0.236 | 0.239 | 0.225 | 0.198 | 0.241 | 9.69 |
| 49) | T | 2,2,4-Trimethy... | 0.952 | 0.931 | 1.137 | 1.035 | 1.162 | 1.034 | 1.004 | 0.931 | 0.825 | 1.001 | 10.58 |
| 50) | T | Methyl Methacr... | 0.093 | 0.087 | 0.127 | 0.108 | 0.119 | 0.115 | 0.120 | 0.114 | 0.102 | 0.109 | 12.20 |
| 51) | T | n-Heptane | 0.205 | 0.228 | 0.254 | 0.239 | 0.264 | 0.229 | 0.224 | 0.206 | 0.198 | 0.227 | 9.75 |
| 52) | T | cis-1,3-Dichlo... | 0.286 | 0.296 | 0.403 | 0.390 | 0.400 | 0.383 | 0.420 | 0.405 | 0.367 | 0.372 | 13.04 |
| 53) | T | 4-Methyl-2-pen... | 0.215 | 0.220 | 0.237 | 0.206 | 0.228 | 0.221 | 0.241 | 0.216 | 0.193 | 0.220 | 6.75 |
| 54) | T | trans-1,3-Dich... | 0.224 | 0.224 | 0.340 | 0.306 | 0.339 | 0.345 | 0.375 | 0.361 | 0.324 | 0.315 | 17.57 |
| 55) | T | 1,1,2-Trichlor... | 0.227 | 0.236 | 0.313 | 0.287 | 0.297 | 0.276 | 0.290 | 0.271 | 0.242 | 0.271 | 11.00 |
| 56) | IR | Chlorobenzene-d5 (... | ----------ISTD---------- | | | | | | | | | | |
| 57) | S | Toluene-d8 (SS2) | 2.490 | 2.417 | 2.520 | 2.506 | 2.455 | 2.404 | 2.422 | 2.442 | 2.427 | 2.454 | 1.70 |
| 58) | T | Toluene | 3.186 | 3.065 | 4.568 | 3.269 | 3.335 | 2.883 | 2.996 | 2.842 | 2.577 | 3.191 | 17.76 |
| 59) | T | 2-Hexanone | | | | 1.244 | 1.417 | 1.399 | 1.351 | 1.300 | 1.168 | 1.313 | 7.26 |
| 60) | T | Dibromochlorom... | 0.771 | 0.755 | 0.953 | 0.848 | 0.946 | 0.905 | 0.983 | 0.932 | 0.861 | 0.884 | 9.13 |
| 61) | T | 1,2-Dibromoethane | 0.690 | 0.720 | 0.978 | 0.855 | 0.938 | 0.891 | 0.931 | 0.897 | 0.824 | 0.858 | 11.45 |
| 62) | T | n-Butyl Acetate | | 1.412 | 2.038 | 1.307 | 1.475 | 1.479 | 1.467 | 1.407 | 1.264 | 1.481 | 16.11 |
| 63) | T | n-Octane | 0.463 | 0.485 | 0.606 | 0.557 | 0.587 | 0.531 | 0.545 | 0.514 | 0.472 | 0.529 | 9.49 |
| 64) | T | Tetrachloroethene | 1.107 | 1.043 | 1.273 | 1.163 | 1.229 | 1.090 | 1.127 | 1.088 | 1.002 | 1.125 | 7.66 |
| 65) | T | Chlorobenzene | 2.116 | 2.128 | 2.553 | 2.166 | 2.306 | 2.094 | 2.175 | 2.055 | 1.872 | 2.163 | 8.60 |
| 66) | T | Ethylbenzene | 3.047 | 2.893 | 3.841 | 3.306 | 3.523 | 3.339 | 3.452 | 3.244 | 2.890 | 3.282 | 9.42 |
| 67) | T | m- & p-Xylenes | 2.378 | 2.271 | 3.172 | 2.670 | 2.798 | 2.673 | 2.676 | 2.519 | 2.215 | 2.597 | 11.34 |
| 68) | T | Bromoform | 0.712 | 0.655 | 0.823 | 0.776 | 0.894 | 0.851 | 0.927 | 0.911 | 0.834 | 0.820 | 11.19 |
| 69) | T | Styrene | 1.925 | 1.972 | 2.446 | 2.012 | 2.423 | 2.276 | 2.288 | 2.178 | 1.933 | 2.162 | 9.60 |
| 70) | T | o-Xylene | 2.474 | 2.410 | 3.132 | 2.728 | 3.010 | 2.784 | 2.721 | 2.568 | 2.261 | 2.676 | 10.50 |
| 71) | T | n-Nonane | 1.065 | 1.069 | 1.302 | 1.178 | 1.335 | 1.196 | 1.170 | 1.077 | 0.909 | 1.145 | 11.45 |
| 72) | T | 1,1,2,2-Tetrac... | 1.333 | 1.218 | 1.557 | 1.397 | 1.623 | 1.468 | 1.488 | 1.369 | 1.201 | 1.406 | 10.19 |
| 73) | S | Bromofluoroben... | 1.181 | 1.177 | 1.178 | 1.171 | 1.259 | 1.233 | 1.182 | 1.200 | 1.194 | 1.197 | 2.49 |
| 74) | T | Cumene | 3.707 | 3.470 | 4.157 | 3.613 | 4.133 | 3.722 | 3.734 | 3.541 | 3.027 | 3.678 | 9.28 |
| 75) | T | alpha-Pinene | 1.484 | 1.382 | 1.856 | 1.647 | 1.839 | 1.796 | 1.801 | 1.713 | 1.502 | 1.669 | 10.47 |
| 76) | T | n-Propylbenzene | 4.391 | 4.114 | 5.083 | 4.333 | 4.850 | 4.438 | 4.423 | 4.121 | 3.561 | 4.368 | 10.01 |
| 77) | T | 3-Ethyltoluene | 3.911 | 3.548 | 4.089 | 3.491 | 3.960 | 3.624 | 3.545 | 3.476 | 2.869 | 3.613 | 9.94 |
| 78) | T | 4-Ethyltoluene | 3.294 | 3.066 | 4.176 | 3.569 | 3.989 | 3.497 | 3.598 | 3.084 | 2.815 | 3.454 | 12.80 |
| 79) | T | 1,3,5-Trimethy... | 3.061 | 2.817 | 3.383 | 2.964 | 3.367 | 2.932 | 2.978 | 2.733 | 2.373 | 2.957 | 10.51 |
| 80) | T | alpha-Methylst... | 1.457 | 1.439 | 1.805 | 1.519 | 1.842 | 1.718 | 1.746 | 1.605 | 1.387 | 1.613 | 10.58 |
| 81) | T | 2-Ethyltoluene | 3.439 | 3.343 | 3.897 | 3.468 | 4.023 | 3.487 | 3.500 | 3.192 | 2.732 | 3.453 | 10.86 |
| 82) | T | 1,2,4-Trimethy... | 3.015 | 2.807 | 3.423 | 2.931 | 3.343 | 2.938 | 2.941 | 2.636 | 2.195 | 2.914 | 12.50 |
| 83) | T | n-Decane | 1.432 | 1.252 | 1.772 | 1.414 | 1.630 | 1.416 | 1.390 | 1.245 | 1.032 | 1.398 | 15.46 |
| 84) | T | Benzyl Chloride | 1.895 | 1.675 | 2.686 | 2.097 | 2.456 | 2.481 | 2.554 | 2.388 | 2.051 | 2.254 | 15.02 |
| 85) | T | 1,3-Dichlorobe... | 2.066 | 1.915 | 2.656 | 1.995 | 2.269 | 1.985 | 2.006 | 1.833 | 1.563 | 2.032 | 14.81 |
| 86) | T | 1,4-Dichlorobe... | 2.465 | 2.187 | 2.946 | 2.134 | 2.375 | 2.136 | 2.127 | 1.970 | 1.705 | 2.227 | 15.58 |



ek 11/25/14

Method Path : I:\MS16\METHODS\
Method File : R16112414.M
Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 87) | T | sec-Butylbenzene | 4.036 | 3.955 | 4.472 | 4.012 | 4.589 | 4.023 | 3.987 | 3.584 | 3.011 | 3.963 | 11.68 |
| 88) | T | 4-Isopropyltol... | 4.341 | 4.063 | 4.396 | 3.791 | 4.375 | 3.860 | 3.642 | 3.219 | 2.608 | 3.811 | 15.62 |
| 89) | T | 1,2,3-Trimethy... | 3.444 | 3.296 | 3.700 | 3.069 | 3.534 | 3.142 | 3.052 | 2.739 | 2.273 | 3.139 | 13.84 |
| 90) | T | 1,2-Dichlorobe... | 2.054 | 1.958 | 2.502 | 1.932 | 2.226 | 1.985 | 1.921 | 1.751 | 1.444 | 1.975 | 14.81 |
| 91) | T | d-Limonene | 0.824 | 0.837 | 1.055 | 0.974 | 1.138 | 1.073 | 1.026 | 0.909 | 0.728 | 0.951 | 14.25 |
| 92) | T | 1,2-Dibromo-3-... | 0.611 | 0.535 | 0.822 | 0.625 | 0.763 | 0.742 | 0.781 | 0.748 | 0.671 | 0.700 | 13.51 |
| 93) | T | n-Undecane | 1.767 | 1.495 | 1.648 | 1.388 | 1.658 | 1.534 | 1.486 | 1.350 | 1.103 | 1.492 | 13.24 |
| 94) | T | 1,2,4-Trichlor... | | | | 1.487 | 1.612 | 1.567 | 1.598 | 1.532 | 1.379 | 1.529 | 5.65 |
| 95) | T | Naphthalene | | | | 4.504 | 4.905 | 4.672 | 4.511 | 4.131 | 3.380 | 4.351 | 12.38 |
| 96) | T | n-Dodecane | | 1.675 | 1.633 | 1.240 | 1.453 | 1.388 | 1.300 | 1.160 | 0.902 | 1.344 | 18.85 |
| 97) | T | Hexachlorobuta... | 1.017 | 0.994 | 1.084 | 0.911 | 1.068 | 0.957 | 0.976 | 0.940 | 0.850 | 0.978 | 7.59 |
| 98) | T | Cyclohexanone | | | | 0.879 | 0.948 | 0.905 | 0.890 | 0.851 | 0.770 | 0.874 | 6.88 |
| 99) | T | tert-Butylbenzene | 3.016 | 2.915 | 3.360 | 2.956 | 3.433 | 2.956 | 2.927 | 2.596 | 2.158 | 2.924 | 12.99 |
| 100) | T | n-Butylbenzene | 3.565 | 3.320 | 3.594 | 2.990 | 3.431 | 3.150 | 3.016 | 2.800 | 2.320 | 3.132 | 13.02 |

(#) = Out of Range



LH 11/25/14

# INITIAL CALIBRATION VERIFICATION CHECK SHEET

Data File Name: **11241433.D**
Data File Path: **I:\MS16\DATA\2014_11\24**
Operator: **LH**
Date Acquired: **11/25/14** **9:04**

Acq. Method File: **TO15.M**
Sample Name: **25ng TO-15 ICV STD**
Misc Info: **S29-11141401/S29-11241401 (**
Instrument Name: **GCMS-16**

| # | Compound Name | Ret. Time | Amt. (ng) | Spike Amt.(ng) | % Rec. | Lower Limit | Upper Limit | * OR Fail |
|---|---|---|---|---|---|---|---|---|
| 2) | Propene | 4.10 | 23.6 | 25.00 | 94 | 70 | 130 | * |
| 3) | Dichlorodifluoromethane (CFC 1 | 4.26 | 23.9 | 25.50 | 94 | 70 | 130 | * |
| 4) | Chloromethane | 4.54 | 24.3 | 24.75 | 98 | 70 | 130 | * |
| 5) | 1,2-Dichloro-1,1,2,2-tetrafluoroet | 4.81 | 25.0 | 25.75 | 97 | 70 | 130 | * |
| 6) | Vinyl Chloride | 4.97 | 26.8 | 25.25 | 106 | 70 | 130 | * |
| 7) | 1,3-Butadiene | 5.24 | 29.0 | 26.75 | 108 | 70 | 130 | * |
| 8) | Bromomethane | 5.68 | 27.3 | 25.25 | 108 | 70 | 130 | * |
| 9) | Chloroethane | 6.01 | 27.6 | 25.25 | 109 | 70 | 130 | * |
| 10) | Ethanol | 6.39 | 126 | 127.25 | 99 | 70 | 130 | * |
| 11) | Acetonitrile | 6.64 | 26.2 | 25.50 | 103 | 70 | 130 | * |
| 12) | Acrolein | 6.83 | 29.8 | 26.75 | 111 | 70 | 130 | * |
| 13) | Acetone | 7.04 | 131 | 135.00 | 97 | 70 | 130 | * |
| 14) | Trichlorofluoromethane | 7.28 | 29.6 | 24.75 | 120 | 70 | 130 | * |
| 15) | 2-Propanol (Isopropanol) | 7.54 | 51.3 | 52.50 | 98 | 70 | 130 | * |
| 16) | Acrylonitrile | 7.80 | 27.8 | 26.00 | 107 | 70 | 130 | * |
| 17) | 1,1-Dichloroethene | 8.25 | 27.5 | 26.75 | 103 | 70 | 130 | * |
| 18) | 2-Methyl-2-Propanol (tert-Butyl Alc | 8.42 | 50.3 | 52.75 | 95 | 70 | 130 | * |
| 19) | Methylene Chloride | 8.48 | 26.9 | 27.00 | 100 | 70 | 130 | * |
| 20) | 3-Chloro-1-propene (Allyl Chlorid | 8.64 | 30.8 | 27.25 | 113 | 70 | 130 | * |
| 21) | Trichlorotrifluoroethane | 8.89 | 26.4 | 27.00 | 98 | 70 | 130 | * |
| 22) | Carbon Disulfide | 8.74 | 27.5 | 24.50 | 112 | 70 | 130 | * |
| 23) | trans-1,2-Dichloroethene | 9.76 | 28.5 | 26.50 | 108 | 70 | 130 | * |
| 24) | 1,1-Dichloroethane | 10.01 | 26.4 | 26.00 | 102 | 70 | 130 | * |
| 25) | Methyl tert-Butyl Ether | 10.11 | 27.7 | 26.50 | 105 | 70 | 130 | * |
| 26) | Vinyl Acetate | 10.27 | 138 | 128.00 | 108 | 70 | 130 | * |
| 27) | 2-Butanone (MEK) | 10.51 | 26.3 | 27.00 | 97 | 70 | 130 | * |
| 28) | cis-1,2-Dichloroethene | 11.03 | 28.0 | 26.75 | 105 | 70 | 130 | * |
| 29) | Diisopropyl Ether | 11.33 | 27.6 | 27.25 | 101 | 70 | 130 | * |
| 30) | Ethyl Acetate | 11.34 | 51.5 | 53.50 | 96 | 70 | 130 | * |
| 31) | n-Hexane | 11.32 | 23.5 | 26.25 | 90 | 70 | 130 | * |
| 32) | Chloroform | 11.38 | 27.5 | 27.00 | 102 | 70 | 130 | * |
| 34) | Tetrahydrofuran (THF) | 11.78 | 24.4 | 25.75 | 95 | 70 | 130 | * |
| 35) | Ethyl tert-Butyl Ether | 11.92 | 28.0 | 26.50 | 106 | 70 | 130 | * |
| 36) | 1,2-Dichloroethane | 12.18 | 26.7 | 26.25 | 102 | 70 | 130 | * |
| 38) | 1,1,1-Trichloroethane | 12.46 | 27.9 | 26.00 | 107 | 70 | 130 | * |
| 39) | Isopropyl Acetate | 12.89 | 59.7 | 54.50 | 110 | 70 | 130 | * |
| 40) | 1-Butanol | 12.91 | 56.1 | 55.75 | 101 | 70 | 130 | * |
| 41) | Benzene | 12.94 | 27.1 | 27.50 | 99 | 70 | 130 | * |
| 42) | Carbon Tetrachloride | 13.10 | 30.9 | 26.75 | 116 | 70 | 130 | * |
| 43) | Cyclohexane | 13.23 | 56.2 | 52.75 | 107 | 70 | 130 | * |
| 44) | tert-Amyl Methyl Ether | 13.58 | 28.5 | 26.25 | 109 | 70 | 130 | * |
| 45) | 1,2-Dichloropropane | 13.79 | 27.9 | 26.50 | 105 | 70 | 130 | * |
| 46) | Bromodichloromethane | 13.99 | 30.4 | 27.00 | 113 | 70 | 130 | * |
| 47) | Trichloroethene | 14.04 | 28.0 | 26.00 | 108 | 70 | 130 | * |
| 48) | 1,4-Dioxane | 14.01 | 26.8 | 27.25 | 98 | 70 | 130 | * |
| 49) | 2,2,4-Trimethylpentane (Isooctane) | 14.11 | 27.1 | 26.00 | 104 | 70 | 130 | * |

VH 11/25/14

# INITIAL CALIBRATION VERIFICATION CHECK SHEET

Data File Name: **11241433.D**
Data File Path: **I:\MS16\DATA\2014_11\24**
Operator: **LH**
Date Acquired: **11/25/14** **9:04**

Acq. Method File: **TO15.M**
Sample Name: **25ng TO-15 ICV STD**
Misc Info: **S29-11141401/S29-11241401 (**
Instrument Name: **GCMS-16**

| # | Compound Name | Ret. Time | Amt. (ng) | Spike Amt.(ng) | % Rec. | Lower Limit | Upper Limit | * OR Fail |
|---|---|---|---|---|---|---|---|---|
| **50)** | **Methyl Methacrylate** | **14.25** | **61.1** | **52.50** | 116 | **70** | **130** | * |
| **51)** | **n-Heptane** | **14.37** | **27.3** | **26.75** | 102 | **70** | **130** | * |
| **52)** | **cis-1,3-Dichloropropene** | **14.90** | **33.7** | **28.25** | 119 | **70** | **130** | * |
| **53)** | **4-Methyl-2-pentanone** | **14.94** | **29.7** | **27.25** | 109 | **70** | **130** | * |
| **54)** | **trans-1,3-Dichloropropene** | **15.42** | **33.5** | **27.00** | 124 | **70** | **130** | * |
| **55)** | **1,1,2-Trichloroethane** | **15.60** | **28.7** | **26.50** | 108 | **70** | **130** | * |
| **58)** | **Toluene** | **15.89** | **25.9** | **26.50** | 98 | **70** | **130** | * |
| **59)** | **2-Hexanone** | **16.13** | **27.9** | **27.75** | 101 | **70** | **130** | * |
| **60)** | **Dibromochloromethane** | **16.30** | **30.3** | **27.50** | 110 | **70** | **130** | * |
| **61)** | **1,2-Dibromoethane** | **16.55** | **29.8** | **27.00** | 110 | **70** | **130** | * |
| **62)** | **n-Butyl Acetate** | **16.77** | **28.2** | **28.00** | 101 | **70** | **130** | * |
| **63)** | **n-Octane** | **16.89** | **28.0** | **26.00** | 108 | **70** | **130** | * |
| **64)** | **Tetrachloroethene** | **17.03** | **25.7** | **24.75** | 104 | **70** | **130** | * |
| **65)** | **Chlorobenzene** | **17.70** | **27.4** | **27.00** | 101 | **70** | **130** | * |
| **66)** | **Ethylbenzene** | **18.05** | **28.2** | **26.50** | 106 | **70** | **130** | * |
| **67)** | **m- & p-Xylenes** | **18.21** | **53.5** | **52.50** | 102 | **70** | **130** | * |
| **68)** | **Bromoform** | **18.27** | **32.9** | **27.00** | 122 | **70** | **130** | * |
| **69)** | **Styrene** | **18.54** | **28.9** | **27.25** | 106 | **70** | **130** | * |
| **70)** | **o-Xylene** | **18.64** | **26.3** | **25.75** | 102 | **70** | **130** | * |
| **71)** | **n-Nonane** | **18.84** | **26.2** | **25.50** | 103 | **70** | **130** | * |
| **72)** | **1,1,2,2-Tetrachloroethane** | **18.62** | **27.6** | **25.25** | 109 | **70** | **130** | * |
| **74)** | **Cumene** | **19.17** | **25.8** | **25.50** | 101 | **70** | **130** | * |
| **75)** | **alpha-Pinene** | **19.52** | **28.1** | **26.00** | 108 | **70** | **130** | * |
| **76)** | **n-Propylbenzene** | **19.62** | **26.1** | **25.25** | 103 | **70** | **130** | * |
| 77) | 3-Ethyltoluene | 19.71 | 26.5 | 26.50 | 100 | **70** | **130** | * |
| **78)** | **4-Ethyltoluene** | **19.75** | **27.7** | **26.50** | **105** | **70** | **130** | * |
| **79)** | **1,3,5-Trimethylbenzene** | **19.81** | **26.7** | **26.50** | **101** | **70** | **130** | * |
| 80) | alpha-Methylstyrene | 19.95 | 30.0 | 26.00 | **115** | **70** | **130** | * |
| 81) | 2-Ethyltoluene | 19.99 | 27.1 | 26.25 | **103** | **70** | **130** | * |
| **82)** | **1,2,4-Trimethylbenzene** | **20.18** | **26.9** | **26.25** | **102** | **70** | **130** | * |
| 83) | n-Decane | 20.27 | 26.5 | 25.75 | **103** | **70** | **130** | * |
| **84)** | **Benzyl Chloride** | **20.29** | **32.8** | **27.25** | **120** | **70** | **130** | * |
| **85)** | **1,3-Dichlorobenzene** | **20.31** | **27.4** | **27.25** | **101** | **70** | **130** | * |
| **86)** | **1,4-Dichlorobenzene** | **20.37** | **25.0** | **26.50** | **94** | **70** | **130** | * |
| 87) | sec-Butylbenzene | 20.41 | 27.2 | 26.75 | **102** | **70** | **130** | * |
| 88) | 4-Isopropyltoluene (p-Cymene) | 20.55 | 25.4 | 25.25 | **101** | **70** | **130** | * |
| 89) | 1,2,3-Trimethylbenzene | 20.55 | 25.6 | 26.25 | **98** | **70** | **130** | * |
| **90)** | **1,2-Dichlorobenzene** | **20.67** | **26.6** | **26.75** | **99** | **70** | **130** | * |
| **91)** | **d-Limonene** | **20.68** | **29.6** | **26.25** | **113** | **70** | **130** | * |
| **92)** | **1,2-Dibromo-3-Chloropropane** | **21.06** | **30.8** | **25.75** | **120** | **70** | **130** | * |
| 93) | n-Undecane | 21.37 | 26.7 | 25.25 | **106** | **70** | **130** | * |
| **94)** | **1,2,4-Trichlorobenzene** | **22.18** | **29.6** | **26.25** | **113** | **70** | **130** | * |
| **95)** | **Naphthalene** | **22.28** | **29.5** | **24.50** | **120** | **70** | **130** | * |
| 96) | n-Dodecane | 22.28 | 29.5 | 25.25 | **117** | **70** | **130** | * |
| **97)** | **Hexachlorobutadiene** | **22.60** | **28.3** | **26.75** | **106** | **70** | **130** | * |
| 98) | Cyclohexanone | 18.35 | 30.6 | 27.75 | 110 | **70** | **130** | * |
| 99) | tert-Butylbenzene | 20.18 | 26.9 | 26.50 | 102 | **70** | **130** | * |
| 100) | n-Butylbenzene | 20.92 | 26.7 | 27.25 | 98 | **70** | **130** | * |

**Bold = 75 Compound List**
*** = Pass**

LH 11/25/14


**I:\MS16\0-Instrument Info\0-Security Certificates\ICV_09041405.CRT**

# Evaluate Continuing Calibration Report

Data File: I:\MS16\DATA\2014_12\29\12291402.D
Acq On : 29 Dec 2014 8:40 Operator: LH
Sample : CCV R16122914_5.0ng
Misc : S29-11141401/S29-12031409 (1/1)
ALS Vial : 1 Sample Multiplier: 1

Quant Time: Dec 29 09:15:38 2014
Quant Method : I:\MS16\METHODS\R16112414.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Nov 25 09:22:10 2014
Response via : Initial Calibration
DataAcq Meth:TO15.M

LH 12/31/14

Min. RRF : 0.000 Min. Rel. Area : 50% Max. R.T. Dev 0.33min
Max. RRF Dev : 30% Max. Rel. Area : 200%

| | | Compound | AvgRF | CCRF | %Dev | Area% | Dev(min) |
|---|---|---|---|---|---|---|---|
| 1 | IR | Bromochloromethane (IS1) | 1.000 | 1.000 | 0.0 | 103 | 0.00 |
| 2 | T | Propene | 1.120 | 0.935 | 16.5 | 92 | -0.02 |
| 3 | T | Dichlorodifluoromethane (CF | 2.460 | 2.139 | 13.0 | 93 | -0.02 |
| 4 | T | Chloromethane | 1.661 | 1.489 | 10.4 | 97 | -0.03 |
| 5 | T | 1,2-Dichloro-1,1,2,2-tetraf | 1.498 | 1.327 | 11.4 | 92 | -0.01 |
| 6 | T | Vinyl Chloride | 1.691 | 1.587 | 6.2 | 97 | -0.02 |
| 7 | T | 1,3-Butadiene | 1.030 | 0.906 | 12.0 | 88 | -0.02 |
| 8 | T | Bromomethane | 1.260 | 1.073 | 14.8 | 92 | -0.02 |
| 9 | T | Chloroethane | 0.920 | 0.821 | 10.8 | 95 | -0.02 |
| 10 | T | Ethanol | 0.776 | 0.704 | 9.3 | 95 | 0.02 |
| 11 | T | Acetonitrile | 1.937 | 1.681 | 13.2 | 93 | 0.00 |
| 12 | T | Acrolein | 0.682 | 0.593 | 13.0 | 93 | -0.01 |
| 13 | T | Acetone | 0.838 | 0.761 | 9.2 | 93 | -0.01 |
| 14 | T | Trichlorofluoromethane | 1.796 | 1.601 | 10.9 | 97 | 0.00 |
| 15 | T | 2-Propanol (Isopropanol) | 2.648 | 2.301 | 13.1 | 93 | 0.00 |
| 16 | T | Acrylonitrile | 1.483 | 1.336 | 9.9 | 93 | 0.00 |
| 17 | T | 1,1-Dichloroethene | 1.244 | 1.136 | 8.7 | 93 | 0.00 |
| 18 | T | 2-Methyl-2-Propanol (tert-B | 2.717 | 2.330 | 14.2 | 94 | -0.01 |
| 19 | T | Methylene Chloride | 1.300 | 1.163 | 10.5 | 95 | 0.00 |
| 20 | T | 3-Chloro-1-propene (Allyl C | 1.203 | 1.140 | 5.2 | 95 | 0.00 |
| 21 | T | Trichlorotrifluoroethane | 1.147 | 1.019 | 11.2 | 99 | 0.00 |
| 22 | T | Carbon Disulfide | 4.649 | 4.090 | 12.0 | 95 | -0.01 |
| 23 | T | trans-1,2-Dichloroethene | 1.497 | 1.413 | 5.6 | 95 | 0.00 |
| 24 | T | 1,1-Dichloroethane | 1.923 | 1.789 | 7.0 | 98 | 0.01 |
| 25 | T | Methyl tert-Butyl Ether | 3.138 | 2.846 | 9.3 | 94 | -0.02 |
| 26 | T | Vinyl Acetate | 0.284 | 0.274 | 3.5 | 95 | 0.00 |
| 27 | T | 2-Butanone (MEK) | 0.805 | 0.734 | 8.8 | 100 | -0.02 |
| 28 | T | cis-1,2-Dichloroethene | 1.423 | 1.274 | 10.5 | 95 | 0.00 |
| 29 | T | Diisopropyl Ether | 1.116 | 1.021 | 8.5 | 95 | 0.00 |
| 30 | T | Ethyl Acetate | 0.408 | 0.404 | 1.0 | 105 | -0.01 |
| 31 | T | n-Hexane | 1.600 | 1.554 | 2.9 | 106 | 0.00 |
| 32 | T | Chloroform | 1.919 | 1.739 | 9.4 | 95 | 0.01 |
| 33 | S | 1,2-Dichloroethane-d4(SS1) | 1.081 | 1.153 | -6.7 | 112 | 0.01 |
| 34 | T | Tetrahydrofuran (THF) | 0.821 | 0.696 | 15.2 | 95 | -0.02 |
| 35 | T | Ethyl tert-Butyl Ether | 1.349 | 1.215 | 9.9 | 91 | 0.00 |
| 36 | T | 1,2-Dichloroethane | 1.165 | 1.096 | 5.9 | 100 | 0.00 |
| 37 | IR | 1,4-Difluorobenzene (IS2) | 1.000 | 1.000 | 0.0 | 118 | 0.00 |
| 38 | T | 1,1,1-Trichloroethane | 0.363 | 0.293 | 19.3 | 94 | 0.00 |
| 39 | T | Isopropyl Acetate | 0.147 | 0.124 | 15.6 | 101 | 0.00 |
| 40 | T | 1-Butanol | 0.244 | 0.184 | 24.6 | 88 | -0.02 |
| 41 | T | Benzene | 1.014 | 0.809 | 20.2 | 97 | 0.00 |
| 42 | T | Carbon Tetrachloride | 0.303 | 0.251 | 17.2 | 96 | 0.00 |
| 43 | T | Cyclohexane | 0.391 | 0.335 | 14.3 | 95 | 0.00 |
| 44 | T | tert-Amyl Methyl Ether | 0.699 | 0.592 | 15.3 | 100 | 0.00 |
| 45 | T | 1,2-Dichloropropane | 0.241 | 0.211 | 12.4 | 104 | 0.00 |
| 46 | T | Bromodichloromethane | 0.324 | 0.273 | 15.7 | 100 | 0.00 |
| 47 | T | Trichloroethene | 0.314 | 0.276 | 12.1 | 103 | 0.00 |
| 48 | T | 1,4-Dioxane | 0.241 | 0.191 | 20.7 | 96 | -0.02 |
| 49 | T | 2,2,4-Trimethylpentane (Iso | 1.001 | 0.801 | 20.0 | 91 | 0.00 |
| 50 | T | Methyl Methacrylate | 0.109 | 0.096 | 11.9 | 99 | 0.00 |
| 51 | T | n-Heptane | 0.227 | 0.189 | 16.7 | 97 | 0.00 |
| 52 | T | cis-1,3-Dichloropropene | 0.372 | 0.322 | 13.4 | 99 | 0.00 |
| 53 | T | 4-Methyl-2-pentanone | 0.220 | 0.179 | 18.6 | 95 | 0.00 |
| 54 | T | trans-1,3-Dichloropropene | 0.315 | 0.283 | 10.2 | 97 | 0.00 |

Evaluate Continuing Calibration Report

Data File: I:\MS16\DATA\2014_12\29\12291402.D
Acq On : 29 Dec 2014 8:40 Operator: LH
Sample : CCV R16122914_5.0ng
Misc : S29-11141401/S29-12031409 (1/1)
ALS Vial : 1 Sample Multiplier: 1

Quant Time: Dec 29 09:15:38 2014
Quant Method : I:\MS16\METHODS\R16112414.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Nov 25 09:22:10 2014
Response via : Initial Calibration
DataAcq Meth:TO15.M

Min. RRF : 0.000 Min. Rel. Area : 50% Max. R.T. Dev 0.33min
Max. RRF Dev : 30% Max. Rel. Area : 200%

| | | Compound | AvgRF | CCRF | %Dev | Area% | Dev(min) |
|---|---|---|---|---|---|---|---|
| 55 | T | 1,1,2-Trichloroethane | 0.271 | 0.229 | 15.5 | 98 | 0.00 |
| 56 | IR | Chlorobenzene-d5 (IS3) | 1.000 | 1.000 | 0.0 | 107 | 0.00 |
| 57 | S | Toluene-d8 (SS2) | 2.454 | 2.515 | -2.5 | 112 | 0.00 |
| 58 | T | Toluene | 3.191 | 2.673 | 16.2 | 99 | 0.00 |
| 59 | T | 2-Hexanone | 1.313 | 1.144 | 12.9 | 88 | 0.00 |
| 60 | T | Dibromochloromethane | 0.884 | 0.809 | 8.5 | 96 | 0.00 |
| 61 | T | 1,2-Dibromoethane | 0.858 | 0.806 | 6.1 | 97 | 0.00 |
| 62 | T | n-Butyl Acetate | 1.481 | 1.228 | 17.1 | 89 | 0.00 |
| 63 | T | n-Octane | 0.529 | 0.492 | 7.0 | 99 | 0.00 |
| 64 | T | Tetrachloroethene | 1.125 | 1.010 | 10.2 | 99 | 0.00 |
| 65 | T | Chlorobenzene | 2.163 | 1.873 | 13.4 | 96 | 0.00 |
| 66 | T | Ethylbenzene | 3.282 | 2.927 | 10.8 | 94 | 0.00 |
| 67 | T | m- & p-Xylenes | 2.597 | 2.312 | 11.0 | 93 | 0.00 |
| 68 | T | Bromoform | 0.820 | 0.770 | 6.1 | 97 | 0.00 |
| 69 | T | Styrene | 2.162 | 1.951 | 9.8 | 92 | 0.00 |
| 70 | T | o-Xylene | 2.676 | 2.389 | 10.7 | 92 | 0.00 |
| 71 | T | n-Nonane | 1.145 | 1.045 | 8.7 | 94 | 0.00 |
| 72 | T | 1,1,2,2-Tetrachloroethane | 1.406 | 1.331 | 5.3 | 97 | 0.00 |
| 73 | S | Bromofluorobenzene (SS3) | 1.197 | 1.243 | -3.8 | 108 | 0.00 |
| 74 | T | Cumene | 3.678 | 3.302 | 10.2 | 95 | 0.00 |
| 75 | T | alpha-Pinene | 1.669 | 1.519 | 9.0 | 91 | 0.00 |
| 76 | T | n-Propylbenzene | 4.368 | 4.054 | 7.2 | 98 | 0.00 |
| 77 | T | 3-Ethyltoluene | 3.613 | 3.173 | 12.2 | 94 | 0.00 |
| 78 | T | 4-Ethyltoluene | 3.454 | 3.283 | 5.0 | 101 | 0.00 |
| 79 | T | 1,3,5-Trimethylbenzene | 2.957 | 2.678 | 9.4 | 98 | 0.00 |
| 80 | T | alpha-Methylstyrene | 1.613 | 1.580 | 2.0 | 99 | 0.00 |
| 81 | T | 2-Ethyltoluene | 3.453 | 3.191 | 7.6 | 98 | 0.00 |
| 82 | T | 1,2,4-Trimethylbenzene | 2.914 | 2.677 | 8.1 | 98 | 0.00 |
| 83 | T | n-Decane | 1.398 | 1.291 | 7.7 | 98 | 0.00 |
| 84 | T | Benzyl Chloride | 2.254 | 2.153 | 4.5 | 93 | 0.00 |
| 85 | T | 1,3-Dichlorobenzene | 2.032 | 1.820 | 10.4 | 98 | 0.00 |
| 86 | T | 1,4-Dichlorobenzene | 2.227 | 1.906 | 14.4 | 96 | 0.00 |
| 87 | T | sec-Butylbenzene | 3.963 | 3.664 | 7.5 | 98 | 0.00 |
| 88 | T | 4-Isopropyltoluene (p-Cymen | 3.811 | 3.435 | 9.9 | 95 | 0.00 |
| 89 | T | 1,2,3-Trimethylbenzene | 3.139 | 2.812 | 10.4 | 96 | 0.00 |
| 90 | T | 1,2-Dichlorobenzene | 1.975 | 1.759 | 10.9 | 95 | 0.00 |
| 91 | T | d-Limonene | 0.951 | 0.964 | -1.4 | 96 | 0.00 |
| 92 | T | 1,2-Dibromo-3-Chloropropane | 0.700 | 0.673 | 3.9 | 97 | 0.00 |
| 93 | T | n-Undecane | 1.492 | 1.390 | 6.8 | 97 | 0.00 |
| 94 | T | 1,2,4-Trichlorobenzene | 1.529 | 1.398 | 8.6 | 96 | 0.00 |
| 95 | T | Naphthalene | 4.351 | 4.045 | 7.0 | 93 | 0.00 |
| 96 | T | n-Dodecane | 1.344 | 1.304 | 3.0 | 101 | 0.00 |
| 97 | T | Hexachlorobutadiene | 0.978 | 0.874 | 10.6 | 98 | 0.00 |
| 98 | T | Cyclohexanone | 0.874 | 0.781 | 10.6 | 92 | -0.01 |
| 99 | T | tert-Butylbenzene | 2.924 | 2.727 | 6.7 | 99 | 0.00 |
| 100 | T | n-Butylbenzene | 3.132 | 2.748 | 12.3 | 94 | 0.00 |

(#) = Out of Range SPCC's out = 0 CCC's out = 0

# Evaluate Continuing Calibration Report

Data File: I:\MS16\DATA\2014_12\30\12301402.D
Acq On : 30 Dec 2014 00:48 Operator: LH
Sample : CCV R16123014_5.0ng
Misc : S29-11141401/S29-12031409 (1/1)
ALS Vial : 1 Sample Multiplier: 1

Quant Time: Dec 30 08:10:21 2014
Quant Method : I:\MS16\METHODS\R16112414.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Nov 25 09:22:10 2014
Response via : Initial Calibration
DataAcq Meth:TO15.M

LH 12/31/14

Min. RRF : 0.000 Min. Rel. Area : 50% Max. R.T. Dev 0.33min
Max. RRF Dev : 30% Max. Rel. Area : 200%

| | | Compound | AvgRF | CCRF | %Dev | Area% | Dev(min) |
|---|---|---|---|---|---|---|---|
| 1 | IR | Bromochloromethane (IS1) | 1.000 | 1.000 | 0.0 | 114 | 0.00 |
| 2 | T | Propene | 1.120 | 0.905 | 19.2 | 99 | -0.03 |
| 3 | T | Dichlorodifluoromethane (CF | 2.460 | 2.050 | 16.7 | 99 | -0.02 |
| 4 | T | Chloromethane | 1.661 | 1.369 | 17.6 | 99 | -0.03 |
| 5 | T | 1,2-Dichloro-1,1,2,2-tetraf | 1.498 | 1.289 | 14.0 | 99 | -0.02 |
| 6 | T | Vinyl Chloride | 1.691 | 1.486 | 12.1 | 101 | -0.03 |
| 7 | T | 1,3-Butadiene | 1.030 | 0.885 | 14.1 | 96 | -0.03 |
| 8 | T | Bromomethane | 1.260 | 1.085 | 13.9 | 103 | -0.02 |
| 9 | T | Chloroethane | 0.920 | 0.813 | 11.6 | 105 | -0.03 |
| 10 | T | Ethanol | 0.776 | 0.670 | 13.7 | 100 | 0.01 |
| 11 | T | Acetonitrile | 1.937 | 1.617 | 16.5 | 99 | -0.02 |
| 12 | T | Acrolein | 0.682 | 0.579 | 15.1 | 100 | -0.02 |
| 13 | T | Acetone | 0.838 | 0.721 | 14.0 | 97 | -0.02 |
| 14 | T | Trichlorofluoromethane | 1.796 | 1.496 | 16.7 | 101 | -0.01 |
| 15 | T | 2-Propanol (Isopropanol) | 2.648 | 2.210 | 16.5 | 99 | 0.00 |
| 16 | T | Acrylonitrile | 1.483 | 1.291 | 12.9 | 99 | 0.00 |
| 17 | T | 1,1-Dichloroethene | 1.244 | 1.102 | 11.4 | 100 | -0.01 |
| 18 | T | 2-Methyl-2-Propanol (tert-B | 2.717 | 2.224 | 18.1 | 99 | -0.02 |
| 19 | T | Methylene Chloride | 1.300 | 1.111 | 14.5 | 101 | 0.00 |
| 20 | T | 3-Chloro-1-propene (Allyl C | 1.203 | 1.120 | 6.9 | 104 | 0.00 |
| 21 | T | Trichlorotrifluoroethane | 1.147 | 1.023 | 10.8 | 110 | 0.00 |
| 22 | T | Carbon Disulfide | 4.649 | 3.891 | 16.3 | 101 | -0.02 |
| 23 | T | trans-1,2-Dichloroethene | 1.497 | 1.359 | 9.2 | 101 | 0.00 |
| 24 | T | 1,1-Dichloroethane | 1.923 | 1.678 | 12.7 | 102 | 0.00 |
| 25 | T | Methyl tert-Butyl Ether | 3.138 | 2.699 | 14.0 | 99 | -0.02 |
| 26 | T | Vinyl Acetate | 0.284 | 0.269 | 5.3 | 103 | 0.00 |
| 27 | T | 2-Butanone (MEK) | 0.805 | 0.660 | 18.0 | 99 | -0.02 |
| 28 | T | cis-1,2-Dichloroethene | 1.423 | 1.229 | 13.6 | 101 | 0.00 |
| 29 | T | Diisopropyl Ether | 1.116 | 0.990 | 11.3 | 102 | 0.00 |
| 30 | T | Ethyl Acetate | 0.408 | 0.364 | 10.8 | 105 | -0.01 |
| 31 | T | n-Hexane | 1.600 | 1.474 | 7.9 | 112 | 0.00 |
| 32 | T | Chloroform | 1.919 | 1.673 | 12.8 | 101 | 0.00 |
| 33 | S | 1,2-Dichloroethane-d4(SS1) | 1.081 | 1.092 | -1.0 | 118 | 0.01 |
| 34 | T | Tetrahydrofuran (THF) | 0.821 | 0.660 | 19.6 | 100 | -0.02 |
| 35 | T | Ethyl tert-Butyl Ether | 1.349 | 1.189 | 11.9 | 99 | 0.00 |
| 36 | T | 1,2-Dichloroethane | 1.165 | 1.009 | 13.4 | 102 | 0.00 |
| 37 | IR | 1,4-Difluorobenzene (IS2) | 1.000 | 1.000 | 0.0 | 121 | 0.00 |
| 38 | T | 1,1,1-Trichloroethane | 0.363 | 0.304 | 16.3 | 99 | 0.00 |
| 39 | T | Isopropyl Acetate | 0.147 | 0.126 | 14.3 | 105 | -0.01 |
| 40 | T | 1-Butanol | 0.244 | 0.201 | 17.6 | 98 | -0.02 |
| 41 | T | Benzene | 1.014 | 0.847 | 16.5 | 104 | 0.00 |
| 42 | T | Carbon Tetrachloride | 0.303 | 0.257 | 15.2 | 100 | 0.00 |
| 43 | T | Cyclohexane | 0.391 | 0.349 | 10.7 | 101 | 0.00 |
| 44 | T | tert-Amyl Methyl Ether | 0.699 | 0.590 | 15.6 | 101 | 0.00 |
| 45 | T | 1,2-Dichloropropane | 0.241 | 0.209 | 13.3 | 105 | 0.00 |
| 46 | T | Bromodichloromethane | 0.324 | 0.278 | 14.2 | 104 | 0.00 |
| 47 | T | Trichloroethene | 0.314 | 0.273 | 13.1 | 104 | 0.00 |
| 48 | T | 1,4-Dioxane | 0.241 | 0.197 | 18.3 | 101 | -0.02 |
| 49 | T | 2,2,4-Trimethylpentane (Iso | 1.001 | 0.866 | 13.5 | 101 | 0.00 |
| 50 | T | Methyl Methacrylate | 0.109 | 0.100 | 8.3 | 105 | 0.00 |
| 51 | T | n-Heptane | 0.227 | 0.201 | 11.5 | 106 | 0.00 |
| 52 | T | cis-1,3-Dichloropropene | 0.372 | 0.335 | 9.9 | 106 | 0.00 |
| 53 | T | 4-Methyl-2-pentanone | 0.220 | 0.191 | 13.2 | 104 | -0.01 |
| 54 | T | trans-1,3-Dichloropropene | 0.315 | 0.295 | 6.3 | 103 | 0.00 |

Evaluate Continuing Calibration Report

Data File: I:\MS16\DATA\2014_12\30\12301402.D
Acq On : 30 Dec 2014 00:48 Operator: LH
Sample : CCV R16123014_5.0ng
Misc : S29-11141401/S29-12031409 (1/1)
ALS Vial : 1 Sample Multiplier: 1

Quant Time: Dec 30 08:10:21 2014
Quant Method : I:\MS16\METHODS\R16112414.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Nov 25 09:22:10 2014
Response via : Initial Calibration
DataAcq Meth:TO15.M

Min. RRF : 0.000 Min. Rel. Area : 50% Max. R.T. Dev 0.33min
Max. RRF Dev : 30% Max. Rel. Area : 200%

| | | Compound | AvgRF | CCRF | %Dev | Area% | Dev(min) |
|---|---|---|---|---|---|---|---|
| 55 | T | 1,1,2-Trichloroethane | 0.271 | 0.232 | 14.4 | 102 | 0.00 |
| 56 | IR | Chlorobenzene-d5 (IS3) | 1.000 | 1.000 | 0.0 | 121 | 0.00 |
| 57 | S | Toluene-d8 (SS2) | 2.454 | 2.426 | 1.1 | 122 | 0.00 |
| 58 | T | Toluene | 3.191 | 2.485 | 22.1 | 104 | 0.00 |
| 59 | T | 2-Hexanone | 1.313 | 1.143 | 12.9 | 99 | -0.01 |
| 60 | T | Dibromochloromethane | 0.884 | 0.756 | 14.5 | 101 | 0.00 |
| 61 | T | 1,2-Dibromoethane | 0.858 | 0.749 | 12.7 | 102 | 0.00 |
| 62 | T | n-Butyl Acetate | 1.481 | 1.230 | 16.9 | 101 | 0.00 |
| 63 | T | n-Octane | 0.529 | 0.462 | 12.7 | 105 | 0.00 |
| 64 | T | Tetrachloroethene | 1.125 | 0.927 | 17.6 | 103 | 0.00 |
| 65 | T | Chlorobenzene | 2.163 | 1.756 | 18.8 | 102 | 0.00 |
| 66 | T | Ethylbenzene | 3.282 | 2.817 | 14.2 | 102 | 0.00 |
| 67 | T | m- & p-Xylenes | 2.597 | 2.207 | 15.0 | 100 | 0.00 |
| 68 | T | Bromoform | 0.820 | 0.717 | 12.6 | 102 | 0.00 |
| 69 | T | Styrene | 2.162 | 1.896 | 12.3 | 101 | 0.00 |
| 70 | T | o-Xylene | 2.676 | 2.325 | 13.1 | 101 | 0.00 |
| 71 | T | n-Nonane | 1.145 | 1.019 | 11.0 | 103 | 0.00 |
| 72 | T | 1,1,2,2-Tetrachloroethane | 1.406 | 1.214 | 13.7 | 100 | 0.00 |
| 73 | S | Bromofluorobenzene (SS3) | 1.197 | 1.260 | -5.3 | 124 | 0.00 |
| 74 | T | Cumene | 3.678 | 3.118 | 15.2 | 102 | 0.00 |
| 75 | T | alpha-Pinene | 1.669 | 1.498 | 10.2 | 101 | 0.00 |
| 76 | T | n-Propylbenzene | 4.368 | 3.756 | 14.0 | 103 | 0.00 |
| 77 | T | 3-Ethyltoluene | 3.613 | 3.003 | 16.9 | 100 | 0.00 |
| 78 | T | 4-Ethyltoluene | 3.454 | 2.969 | 14.0 | 103 | 0.00 |
| 79 | T | 1,3,5-Trimethylbenzene | 2.957 | 2.454 | 17.0 | 101 | 0.00 |
| 80 | T | alpha-Methylstyrene | 1.613 | 1.437 | 10.9 | 101 | 0.00 |
| 81 | T | 2-Ethyltoluene | 3.453 | 2.915 | 15.6 | 101 | 0.00 |
| 82 | T | 1,2,4-Trimethylbenzene | 2.914 | 2.465 | 15.4 | 102 | 0.00 |
| 83 | T | n-Decane | 1.398 | 1.189 | 14.9 | 102 | 0.00 |
| 84 | T | Benzyl Chloride | 2.254 | 2.062 | 8.5 | 101 | 0.00 |
| 85 | T | 1,3-Dichlorobenzene | 2.032 | 1.661 | 18.3 | 101 | 0.00 |
| 86 | T | 1,4-Dichlorobenzene | 2.227 | 1.742 | 21.8 | 99 | 0.00 |
| 87 | T | sec-Butylbenzene | 3.963 | 3.370 | 15.0 | 102 | 0.00 |
| 88 | T | 4-Isopropyltoluene (p-Cymen | 3.811 | 3.212 | 15.7 | 101 | 0.00 |
| 89 | T | 1,2,3-Trimethylbenzene | 3.139 | 2.626 | 16.3 | 101 | 0.00 |
| 90 | T | 1,2-Dichlorobenzene | 1.975 | 1.625 | 17.7 | 99 | 0.00 |
| 91 | T | d-Limonene | 0.951 | 0.903 | 5.0 | 102 | 0.00 |
| 92 | T | 1,2-Dibromo-3-Chloropropane | 0.700 | 0.610 | 12.9 | 100 | 0.00 |
| 93 | T | n-Undecane | 1.492 | 1.296 | 13.1 | 102 | 0.00 |
| 94 | T | 1,2,4-Trichlorobenzene | 1.529 | 1.306 | 14.6 | 101 | 0.00 |
| 95 | T | Naphthalene | 4.351 | 3.759 | 13.6 | 98 | 0.00 |
| 96 | T | n-Dodecane | 1.344 | 1.232 | 8.3 | 108 | 0.00 |
| 97 | T | Hexachlorobutadiene | 0.978 | 0.816 | 16.6 | 103 | 0.00 |
| 98 | T | Cyclohexanone | 0.874 | 0.731 | 16.4 | 98 | -0.01 |
| 99 | T | tert-Butylbenzene | 2.924 | 2.480 | 15.2 | 102 | 0.00 |
| 100 | T | n-Butylbenzene | 3.132 | 2.567 | 18.0 | 99 | 0.00 |

(#) = Out of Range SPCC's out = 0 CCC's out = 0

*Sample Login and Verification Checklist*

| Service Request Number, Client & Project Name | P1405132 5 Shealy Environmental Services Inc. NAS Dallas | SDG Used | PM |
|---|---|---|---|
| | | NAS Dallas | KA |

Sample(s) delivered by: (circle) Client / ALS Emp. / DHL / GSO / FedEx / UPS / Other_____

| Yes | No | N/A | SMO Verification | |
|---|---|---|---|---|
| ✓ | | | Project number has been correctly entered. | |
| ✓ | | | Sample IDs from the COC have been correctly entered. | |
| ✓ | | | Sample date and time collected for each sample has been entered correctly. | |
| ✓ | | | Date received is correct. | |
| ✓ | | | Container tags are reconciled and applied to correct containers. | By: |
| | | ✓ | Container tags have been verified by a second person. | By: |
| | | ✓ | The analyst and PM have been alerted of Short HT or Rush samples. | Notified: |
| ✓ | | | Sample receipt discrepancies have been noted on Sample Acc. Check Form. | |
| ✓ | | | Login Completed | By: Date: 12/19/14 |

| Yes | No | N/A | Client Services Login Verification | |
|---|---|---|---|---|
| ✓ | | | Folder due date is correct. | |
| ✓ | | | Project Number, Dates, Times, and Sample IDs are correct. | |
| ✓ | | | Pricing and Rush charges are correct. | |
| | | ✓ | The subcontract containers have been tagged and sub COC has been generated. | Sub Lab: |
| | | ✓ | Samples requiring an MS/MSD are properly indicated in the folder. | |
| ✓ | | | All non-analytical tasks (encores, EDDs, etc.) are logged in and priced correctly. | |
| | | ✓ | Client has been notified regarding holding time exceedences and sample receipt discrepancies.<br>Notified by email ☐ verbally ☐ voicemail ☐ By: Date: | |
| ✓ | | | Login Approved (red button) | By: KA Date: 12/19/14 |

| Yes | No | N/A | Client Services Folder Approval | |
|---|---|---|---|---|
| ✓ | | | Pricing is correct and approved. (Prepaid work is properly indicated with check or credit card.) | |
| ✓ | | | Hazardous waste designation has been set properly for each sample. | |
| ✓ | | | Report and/or EDD are complete. | |
| ✓ | | | Folder Release | By: KA Date: 1/15/15 |

Comments:

**Case Narrative and Date Package Checklist**

Initiated By:_____ Date:_____ Project ID: P1405732

**General:**

_____ Condition of samples as received and client's consent to proceed with analysis noted, if necessary?

_____ Data verified based on the following documentation when available – Chain of Custody, SR Form, Sample Acceptance Check Form, and paperwork sent with samples.

_____ All Methods have Summaries

NA TO-15 canisters pressurized with helium or Nitrogen? Use AutoText: TO15HE or TO15N2

**State Specific Information:**

Arizona

_____ AZR (Result obtain by method approved for compliance)

_____ AZTO (Certified for EPA TO-15, other air methods not compliant)

Massachusetts APH - CAM Compliant

AutoText: ☐ CAMAPH ☐ CAMTO151 ☐ CAMTO152

_____ MassDEP Analytical Protocol Certification Form included

_____ Flow Controller Calibration RPD Form included

_____ QC Certification Summary included

_____ Media Request Included

**DOD Requirements:**

_____ Insert AutoText: DODLOD

**S8 Analysis:**

_____ S8ALL (Non-Suspect and Suspect and Inconclusive)

_____ S8NSS (Non-Suspect or Suspect)

**Other:**

NA All required notes from Yellow sheet added (special sample prep information, QC failure, etc.)?

**Data Package Compilation:**

| Raw Instrument QC Data | | | |
|---|---|---|---|
| ✓ | Samples | ✓ | ICAL |
| ✓ | Method Blank | ✓ | CCV |
| ✓ | LCS/DLCS | ✓ | BFB |
| NA | Duplicate | ✓ | Run Log |

Data Package Compilation and Case Narrative Review Completed by: KA Date: 11/15/15

(Note: PM signature on final report is equivalent to the data package compilation and case narrative review and therefore it is not required that this section of the checklist be completed.)

## Sample Review Checklist

(Note exceptions in Comments and include Analysis Observations/Case Narrative Summary Form as appropriate)

### EPA Compendium Method TO-15

**Method:** ☑ EPA TO-15 ☐ EPA TO-14A **Analysis Date:** 12/29,30/14 **Project #:** P1405132

**Instrument:** ☐ MS3 ☐ MS7 ☐ MS8 ☐ MS9 ☐ MS13 ☑ MS16 ☐ MS19 ☐ MS21

**Mode:** ☐ SIM ☑ Scan **Scan Low Level (0.1ng):** ☐ Yes ☑ No **DOD:** ☑ Yes ☐ No

| Analyst | | Reviewer |
|---|---|---|
| ☑ | 1. All analyte hits in the samples within the **calibration range** and/or noted? | ☑ |
| ☑ | 2. All **peak integrations** acceptable? | ☑ |
| ☑ | 3. All **manual integrations** flagged and documented? | ☑ |
| ☑ | 4. Have **Q values** been verified for each peak? | ☑ |
| ☐ | 6. All **calculations** correct? | ☐ |
| ☑ | 7. Has the analyst initialed and dated each **quantitation report**? | ☑ |
| ☐ | 8. For **TICs** are the relative intensity and other requirements met? | ☐ |
| ☑ | 9. **Auto report** correct? | ☑ |
| ☑ | 10. **MRL** = 0.5 ☑ ng ☐ pg (ethanol, acetone, vinyl acetate = 5.0ng) | ☑ |
| ☐ | 11. Pressurized with **Helium**? Is the worksheet completed for all samples? | ☐ |
| ☑ | 12. Report to **MDL**? ☑ Yes ☐ No | ☑ |
| ☑ | 13. **Global Minimum Detection Limit** = 0.09 ☑ ng ☐ pg | ☑ |
| ☐ | 14. **DOD:** Are **manual integrations** notated in the **case narrative?** | ☐ |

COMMENTS:

### Air-Phase Petroleum Hydrocarbons - VOA-MAPH Rev. 8, Effective 02/15/2014

| | | |
|---|---|---|
| ☐ | 1. Are all manual **integrations** flagged and documented (except for HC ranges)? | ☐ |
| ☐ | 2. Are all peak **integrations** acceptable? | ☐ |
| ☐ | 3. Has the analyst initialed and dated each **quantitation report**? | ☐ |
| ☐ | 4. Are the associated ICAL responses correct? | ☐ |
| ☐ | 5. Are the sample responses entered into the template correctly? | ☐ |
| ☐ | 6. Are the TO-15 target compounds entered into the template correctly? | ☐ |
| ☐ | 7. Does the lab **duplicate** meet a RPD of ≤30% for results >5x the MRL? Otherwise, repeat analyses if: | ☐ |

| | |
|---|---|
| RPD >30 (where both analyses are >5x RL | 1st analysis detect @ >5x MRL, Dup=ND |
| 1st analysis ≤5x RL; Dup=ND (RPD not calculable) | |

COMMENTS:

☑ LIMS Run Approval ☐ LIMS Supervisor Approval

Analyst: LH 1/7/15 Secondary Reviewer: [illegible]

Date: Date: 1/7/15

(TO-15 and MAPH Checklists Combined 08/05/14)

## Data Validation Review Checklist

**Reviewer:** [signature] **Client:** Sheely Env. Serv., Inc. **Tier:** IV

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Review Date: | 1/7/2015 | TO-3M | TO-4A/10A | TO-11A | TO-13A | TO-15 | TO-17 | NCASI |
| Due Date: | 1/7/2015 | 25C | 3C | APH | BTU-CHONS | RSK175 | Amines | AQL _____ |
| Project ID: | P1~~5~~0 5132 4 | Acids | Siloxanes | NIOSH | OSHA | Sulfur | S8 | Other_____ |

**Sample Data:** *(Data has been verified based on the following documentation when available -- COC, scheduling form, login, paperwork shipped with samples, raw laboratory data, laboratory spreadsheets). Check if complete or NA if not applicable:*

- ✓ Client Information (name, contact, project name, project ID, sample ID)
- ✓ Chemist & Instrument
- ✓ Date Sampled
- ✓ Date Received & Date Analyzed (check for method/media/client hold time requirements)
- ✓ Check for Correct Method Including Modifications
- ✓ Volume Analyzed (including dilution volumes) per analyte
- NA Correct Sampling Volume (matches COC or other associated documentation)
- NA Spreadsheet injection volumes and canister pressures
- ✓ Canister Pressures: Se~~cond Pressures ___ Backfill~~ ___
- NA Tedlar Bags (analysis time: 24hr - sulfurs; 72 hr - all others)
- ✓ Correct units (results, reporting and detection limits)
- ✓ Correct method reporting and detection (where applicable) limits based on volumes analyzed
- ✓ Unit conversions are correct
- ✓ Cross-comparison quantitation report and spreadsheet results with final report forms
- ✓ Footnotes & Flags
- NA Non-Accredited analytes X flagged
  - TO-15 (ACF Compounds – no certification)
  - TO-13A (any compounds in addition to standard list – no certification)
  - TO-4A/TO-10A (Flag all Aroclors <u>except</u> 1016 & 1260 – no certification)
  - RSK175 (Flag Propene & Propane – no certification)
- NA DoD Projects:
  - Manual integration noted in case narrative
  - DoD LCS Limits
- NA AZ Projects: Non-Accredited methods and analytes T flagged
- ✓ QC data (appropriate to method and any client requirements)
- NA Analysis Summary Form (correct notations and case narrative information)
- ✓ Client specific requests/requirements are fulfilled and included
- ✓ Final report pages moved to R:\Reports\0_Excel Final Reports upon completed validation

**EDD Review:**

File Pathway: R:\EDDGE\ClientFiles\AECOM EDMS CLEAN\P1405132\P1405132.2.1P Initials: RL Date: 1/9/15

File Pathway: R:\Copy_____ Initials: _____ Date: _____

Reviewed: ☐ All Data ☐ Manual Entries ☐ Samples/QC _____ ☐ Specifically _____ ☐ ____% of Data

Reviewer Initials: _____ Date: _____

**University of Southern California**
**Sample Delivery Group USC1**

# Radon Analysis (EPA Method GS: Grab Sample/Scintillation Cell counting)

**For Ensafe, Inc.**

Client Project Number: NAS Dallas

Samples Collected by: Cole Duckworth

Sample Dates: 12/18/14

Sample containers: Tedlar bags

Location: Dallas, TX

Assumed Site Pressure **0.99** atm

Analysts: Doug Hammond

based on an elevation of 430 ft

Phone: 310-490-7896

Time Zone adjustment: add to decay time

email: dhammond@usc.edu

**2** hours Collect (CST)

Run (PST)

**Summary**

| | | Collection | | Analysis | | | | | Lab Duplicates | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Date | time (CST) | Date | time (PST) | Vol run (cc) | Conc. pCi/L | ±1 sig pCi/L | mean pCi/L | ±1ssd pCi/L | Notes |
| Received 12/19/14 | | | | | | | | | | | |
| 1 | 1422-SS-01-121814 | 12/18/14 | 9:55 | 12/20/14 | 15:12 | 40 | 1075 | 54 | | | |
| 2 | 1422-IA-01-121814 | 12/18/14 | 10:00 | 12/19/14 | 21:04 | 120 | 0.80 | 0.08 | 0.86 | 0.08 | |
| | lab dupe | 12/18/14 | 10:00 | 12/20/14 | 18:30 | 60 | 0.92 | 0.09 | | | |
| 3 | 1422-SS-02-121814 | 12/18/14 | 10:15 | 12/20/14 | 15:15 | 40 | 1335 | 67 | | | |
| 4 | 1422-IA-02-121814 | 12/18/14 | 10:20 | 12/19/14 | 21:10 | 120 | 0.55 | 0.07 | | | |
| 5 | 1424-SS-01-121814 | 12/18/14 | 10:50 | 12/20/14 | 15:20 | 40 | 246 | 12 | | | |
| 6 | 1424-IA-01-121814 | 12/18/14 | 10:55 | 12/19/14 | 21:16 | 120 | 0.27 | 0.06 | | | |
| 7 | 1424-SS-02-121814 | 12/18/14 | 11:20 | 12/20/14 | 15:22 | 40 | 1790 | 90 | 1718 | 102 | |
| | lab dupe | 12/18/14 | 11:20 | 12/22/14 | 11:35 | 40 | 1646 | 82 | | | |
| 8 | 1424-IA-02-121814 | 12/18/14 | 11:25 | 12/19/14 | 21:21 | 120 | 0.24 | 0.06 | | | |
| 9 | 1405-SS-01-121814 | 12/18/14 | 14:25 | 12/20/14 | 15:26 | 40 | 1558 | 78 | 1629 | 100 | |
| | lab dupe | 12/18/14 | 14:25 | 12/22/14 | 11:40 | 40 | 1700 | 85 | | | |
| 10 | 1405-IA-01-121814 | 12/18/14 | 14:30 | 12/19/14 | 21:28 | 60 | 1.41 | 0.13 | | | |
| 11 | 1405-SS-02-121814 | 12/18/14 | 14:35 | 12/20/14 | 15:31 | 4.5 | 23 | 1 | | | ** |
| 12 | 1405-SS-03-121814 | 12/18/14 | 14:37 | 12/20/14 | 15:35 | 40 | 41 | 2 | 41 | 0 | |
| | lab dupe | 12/18/14 | 14:37 | 12/22/14 | 13:25 | 40 | 40 | 2 | | | |
| 13 | 1405-IA-02-121814 | 12/18/14 | 14:42 | 12/19/14 | 22:04 | 60 | 1.52 | 0.14 | | | |
| 14 | 1405-IA-03-121814 | 12/18/14 | 14:43 | 12/20/14 | 18:35 | 120 | 1.31 | 0.07 | | | |
| 15 | 1424AA-01-121814 | 12/18/14 | 15:30 | 12/20/14 | 18:42 | 120 | 0.28 | 0.04 | | | |

Uncertainty given in pCi/liter is based on counting statistics for low activity samples. For high activity samples uncertainty is ±5%.

The Lower Limit of Detection for Rn (95% confidence level as recommended by EPA 402-R-95-012, Oct. 97) is 0.14 pCi/liter.

Results are reported based on standardization with NIST-traceable radon sources.

These results are for application of naturally-occurring radon as a tracer of soil vapor intrusion, but are not intended for evaluation of radon hazards.

Results corrected to in situ pressure as noted above

****Very little gas in this bag. This analysis should be considered a lower limit.**

## Raw Data, Calculation factors, and Analytical Details

| | | Collection | | Analysis | | | | | | | | | | | | | count | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | **Sample ID** | Date | Time (CST) | Date | Time (PST) | Count in cell/ch | He eff | Air/He eff | Vol run (cc) | Press factor | obs dpm | sig dpm | Decay T (hours) | Decay factor | Concentration dpm/liter | pCi/liter | stats pCi/liter ±1 sig | Notes |
| Received 12/19/14 | | | | | | | | | | | | | | | | | | |
| 1 | 1422-SS-01-121814 | 12/18/14 | 9:55 | 12/20/14 | 15:12 | Z13/22 | 0.818 | 0.99 | 40 | 0.99 | 51.45 | 0.65 | 55.3 | 1.518 | 2387 | 1075 | 14 | |
| 2 | 1422-IA-01-121814 | 12/18/14 | 10:00 | 12/19/14 | 21:04 | 84/11 | 0.785 | 0.97 | 120 | 0.99 | 0.12 | 0.01 | 37.1 | 1.323 | 1.78 | 0.80 | 0.08 | |
| | lab dupe | 12/18/14 | 10:00 | 12/20/14 | 18:30 | 76/22 | 0.912 | 0.98 | 60 | 0.99 | 0.07 | 0.01 | 58.5 | 1.556 | 2.04 | 0.92 | 0.09 | |
| 3 | 1422-SS-02-121814 | 12/18/14 | 10:15 | 12/20/14 | 15:15 | Z17/11 | 0.798 | 0.99 | 40 | 0.99 | 62.43 | 0.71 | 55.0 | 1.515 | 2963 | 1335 | 15 | |
| 4 | 1422-IA-02-121814 | 12/18/14 | 10:20 | 12/19/14 | 21:10 | 82/32 | 0.743 | 0.97 | 120 | 0.99 | 0.08 | 0.01 | 36.8 | 1.321 | 1.22 | 0.55 | 0.07 | |
| 5 | 1424-SS-01-121814 | 12/18/14 | 10:50 | 12/20/14 | 15:20 | Z16/32 | 0.671 | 0.99 | 40 | 0.99 | 9.70 | 0.23 | 54.5 | 1.509 | 545 | 246 | 6 | |
| 6 | 1424-IA-01-121814 | 12/18/14 | 10:55 | 12/19/14 | 21:16 | 81/31 | 0.818 | 0.97 | 120 | 0.99 | 0.04 | 0.01 | 36.4 | 1.316 | 0.60 | 0.27 | 0.06 | |
| 7 | 1424-SS-02-121814 | 12/18/14 | 11:20 | 12/20/14 | 15:22 | 58/31 | 0.885 | 0.99 | 40 | 0.99 | 93.54 | 0.87 | 54.0 | 1.504 | 3974 | 1790 | 17 | |
| | lab dupe | 12/18/14 | 11:20 | 12/22/14 | 11:35 | Z13/22 | 0.818 | 0.99 | 40 | 0.99 | 56.93 | 1.84 | 98.3 | 2.101 | 3655 | 1646 | 53 | |
| 8 | 1424-IA-02-121814 | 12/18/14 | 11:25 | 12/19/14 | 21:21 | 83/33 | 0.806 | 0.97 | 120 | 0.99 | 0.04 | 0.01 | 35.9 | 1.312 | 0.53 | 0.24 | 0.06 | |
| 9 | 1405-SS-01-121814 | 12/18/14 | 14:25 | 12/20/14 | 15:26 | 74/34 | 0.915 | 0.99 | 40 | 0.99 | 86.14 | 0.84 | 51.0 | 1.470 | 3460 | 1558 | 15 | |
| | lab dupe | 12/18/14 | 14:25 | 12/22/14 | 11:40 | 58/31 | 0.885 | 0.99 | 40 | 0.99 | 65.08 | 0.89 | 95.3 | 2.053 | 3775 | 1700 | 23 | |
| 10 | 1405-IA-01-121814 | 12/18/14 | 14:30 | 12/19/14 | 21:28 | 71/22 | 0.919 | 0.98 | 60 | 0.99 | 0.13 | 0.01 | 33.0 | 1.283 | 3.13 | 1.41 | 0.13 | |
| 11 | 1405-SS-02-121814 | 12/18/14 | 14:35 | 12/20/14 | 15:31 | 72/34 | 0.926 | 1.00 | 4.5 | 0.99 | 0.14 | 0.01 | 50.9 | 1.469 | 50 | 23 | 1 | low volume |
| 12 | 1405-SS-03-121814 | 12/18/14 | 14:37 | 12/20/14 | 15:35 | 61/33 | 0.821 | 0.99 | 40 | 0.99 | 2.04 | 0.11 | 51.0 | 1.470 | 91 | 41 | 2 | |
| | lab dupe | 12/18/14 | 14:37 | 12/22/14 | 13:25 | 71/22 | 0.919 | 0.99 | 40 | 0.99 | 1.59 | 0.07 | 96.8 | 2.078 | 90 | 40 | 2 | |
| 13 | 1405-IA-02-121814 | 12/18/14 | 14:42 | 12/19/14 | 22:04 | 76/34 | 0.918 | 0.98 | 60 | 0.99 | 0.14 | 0.01 | 33.4 | 1.287 | 3.4 | 1.5 | 0.1 | |
| 14 | 1405-IA-03-121814 | 12/18/14 | 14:43 | 12/20/14 | 18:35 | 84/11 | 0.785 | 0.97 | 120 | 0.99 | 0.18 | 0.01 | 53.9 | 1.502 | 2.9 | 1.3 | 0.1 | |
| 15 | 1424AA-01-121814 | 12/18/14 | 15:30 | 12/20/14 | 18:42 | 83/33 | 0.806 | 0.97 | 120 | 0.99 | 0.04 | 0.01 | 53.2 | 1.495 | 0.62 | 0.28 | 0.04 | |

Decay correctiions based on Rn decay constant of 0.1813 per day

Conversion from dpm based on 0.4504 pCi/dpm

Blanks are negligible.

Radon Conc = {(0.4504)(1000)(obs dpm)(decay factor)(Press factor)}/{(cc used)(He eff)(Air/He)} (in pCi/liter)

**Definitions:**

| | | | |
|---|---|---|---|
| Cell/ch: | Counting cell and channel used | sig dpm | uncertainty (± 1 sig) in dpm based on counting statistics |
| He eff: | Cell and counter efficiency using helium matrix | Decay T: | time elapsed from sampling to analysis |
| Air/He: | Correction for matrix counting gas density | Decay factor: | Correction factor for decay from collection to analysis |
| Sample vol: | Volume analyzed (cc) | dpm/liter: | Radon concentration in disintigrations per minute per liter of sample |
| Press factor: | Correction to in situ pressure based on collection altitude | piC/liter: | Radon concentration in picoCuries per liter |
| obs dpm: | observed radon activity (disintigrations per minute) when analyzed | count stats: | uncertainty in observed radon based on counting statistics |

# Data Usability Summary
# For Vapor Intrusion Study Samples Collected June 2015
# Former Naval Air Station Dallas
# Dallas, Texas

## FOREWORD

This appendix contains the data usability summary report, indicating the quality and usability of vapor intrusion study analytical results for samples collected in June 2015. This report assesses whether sample handling, preparation, analysis, quality control, and reporting were accomplished in accordance with United States Environmental Protection Agency analytical methods and Texas Commission of Environmental Quality guidelines.

Laboratory data were reported and reviewed in accordance with the Texas Commission of Environmental Quality guidance document *Review and Reporting of COC Concentration Data under TRRP* (RG-366/TRRP-13), May 2010.

Attachment A of this data usability summary provides analytical parameters for each sample and cross-references between laboratory and field sample identifications.

Attachment B presents final results, after data review, in tabular format.

Attachment C contains laboratory reports.

## 1.0 DATA USABILITY SUMMARY

This report presents the analytical data collected as part of vapor intrusion study activities at the Former Naval Air Station Dallas, Texas site and the quality assurance/quality control (QA/QC) evaluation of those data. Data were evaluated independently from the laboratory to assess data quality. Samples discussed in this report were collected on 4 June 2015, and were submitted to ALS Environmental in Simi Valley, California (Texas certificate number T104704413-15-6). Samples collected for radon were analyzed by the University of Southern California. Tina Cantwell, Resolution Consultants chemist, reviewed the data package reported for these samples. All data were reviewed for conformance to the requirements of the Texas Commission on Environmental Quality guidance document *Review and Reporting of COC Concentration Data* (RG-366/TRRP-13), May 2010. The quality assurance criteria used to assess all data were established by the analytical methods and consistent with the relevant standards in the following United States Environmental Protection Agency (U.S. EPA) guidance documents:

- *U.S. EPA Contract Laboratory Program National Functional Guidelines for Superfund Organic Methods Data Review*, USEPA-540/R-08/01, June 2008.

- *U.S. EPA Contract Laboratory Program National Functional Guidelines for Inorganic Superfund Data Review*, USEPA-540/R-10/11, January 2010.

### 1.1 Intended Use of the Data

The intended use of the data is to assess whether trichloroethene is migrating from the groundwater plume to sub-slab vapor and indoor air in three buildings at the Former Naval Air Station Dallas, Texas project site.

### 1.2 Requested Analysis

Groundwater samples were analyzed for trichloroethene and cis-1,2-dichloroethene by gas chromatography/mass spectrometry via TO-15 and radon by scintillation cell counting via University of Southern California standard operating procedure Rn-SOP.

### 1.3 Laboratory Submittals and Field Data Examined

Laboratory submittals and field data examined are as follows:

- Reportable data
- Applicable field records, preservation, and handling procedures prior to shipment to the laboratory

## 2.0 INTRODUCTION

The following lists sample matrix, quantities and analyses:

- Trichloroethene and cis-1,2-dichloroethene — 13 air samples, 2 field duplicates
- Radon — 13 air samples, 2 field duplicates

The samples collected and sample identification cross-references are summarized in Attachment A.

### Data Evaluation Criteria

Laboratory QC: The laboratory's statistically-derived recovery QC limits for accuracy and precision were used.

Field Duplicate Precision: Relative percent difference of 30 for TO-15 and 28 for radon

## 3.0 DATA REVIEW RESULTS

Samples discussed in this report were analyzed and reported as definitive data and QC summary information were submitted for data review. The data were reported by the laboratory in two sample delivery groups: P1502283 and USC02. Elements of the deliverables provided by the laboratory were as follows:

| | |
|---|---|
| • Completed chain-of-custody documentation<br>• Analytical results<br>• Results for re-analyzed and diluted samples<br>• Sample receipt and log-in information<br>• Laboratory case narrative<br>• Laboratory blank data<br>• Sample run logs (TO-15)<br>• Method quantitation limits (TO-15)<br>• Method detection limits<br>• Data qualifiers applied to sample results<br>• Sample preparation information | • Summary of QC results<br>— Surrogate recoveries (TO-15)<br>— Laboratory control samples (TO-15)<br>— Laboratory method blanks (TO-15)<br>— Organic tuning data (TO-15)<br>— Calibration data (TO-15)<br>— Internal standard areas and retention times (TO-15) |

The following flags were used by the laboratory to annotate results:

*Laboratory Qualifiers*

**J** = **Estimated** — The analyte was detected above the SDL but less than the method quantitation limit (MQL).

**U** = **Undetected** — The analyte was undetected above the sample detection limit (SDL).

When the QC parameters did not fall within the specific method or data review guidelines, the data reviewer annotated or "flagged" the corresponding compounds. Flags used during this data review are as follows:

*Data Review Qualifiers*

**U** = **Undetected** — The parameter was analyzed but undetected.

**J** = **Estimated Value** — One or more QC parameters were outside control limits or the concentration of the analyte was above the SDL, but less than the MQL.

## 3.1 Analytical Results

All undetected results are reported at less than the value of the SDL as defined by the Texas Risk Reduction Program rule. All values were estimated (J-flagged) by the laboratory when results were reported below the MQL but above the SDL.

## 3.2 Data Review Findings

The overall data quality for the sample results were evaluated based on method compliance, data usability, and scope-of-work satisfaction. Data evaluation for the samples included the following parameters:

- Sample receipt, preservation, and holding times
- Surrogate recoveries
- Laboratory control samples (LCSs)
- Blank analysis (equipment, trip, and laboratory)
- Organic tuning data
- Calibration data
- Internal standard areas and retention times
- Duplicate precision (laboratory and field)

In accordance with the project Sampling and Analysis Plan, all QC summary data indicated above, were reviewed for trichloroethene and cis-1,2-dichloroethene. Screening radon measurements were reviewed for the following QC elements: sample receipt, holding times, and duplicate precision. The following sections detail the data review findings and qualifications performed.

### 3.2.1 Sample Handling, Preservation, and Holding Times

All samples were received by the laboratory intact, properly preserved, and under proper chain-of-custody forms. All samples were analyzed within holding times.

### 3.2.2 Surrogate Recoveries

Individual sample performance and accuracy for the TO-15 analyses were monitored by assessing surrogate percent recovery (%R) data. All surrogate recoveries were acceptable.

### 3.2.3 Laboratory Control Samples

LCS is used to monitor the overall performance of each step during analysis, including sample preparation and the LCS %R results should fall within the laboratory's control limits. All TO-15 LCS %Rs were acceptable.

### 3.2.4 Laboratory Blank Analysis

Blanks help determine how much, if any, contamination was introduced in the laboratory or the field. During this sampling event two laboratory blanks were analyzed and both were acceptable.

### 3.2.5 Organic Tuning Data

All TO-15 tuning criteria were met for investigative samples.

### 3.2.6 Calibration Data

All TO-15 calibration criteria were met.

### 3.2.7 Internal Standard Areas and Retention Times

Internal standard performance criteria ensure that gas chromatography/mass spectrometry sensitivity and response are stable during each analysis. All TO-15 internal standard areas and retention times were acceptable.

### 3.2.8 Duplicate Precision (Laboratory and Field)

Two investigative samples were duplicated in the field to assess precision for TO-15 and radon analysis. Additionally, one TO-15 and three radon samples were duplicated in the laboratory. All field duplicates laboratory duplicates were acceptable.

## 4.0 OVERALL ASSESSMENT

The data were reviewed independently from the laboratory to assess data quality. No results were qualified during data review and the results are usable for their intended purpose, according to U.S.

EPA and Texas Commission on Environmental Quality guidelines. All other results were acceptable without qualification.

Attachment B presents the final results in tabular format and Attachment C contains the laboratory reports.

# Attachment A
# Sample Identifications and Analytical Parameters

**Table A-1**
**Sample Identifications and Analytical Parameters**

| Sample Delivery Group | Lab Identification | Sample Identification | Sample Date | Matrix | TO-15 | USC RnSOP |
|---|---|---|---|---|---|---|
| P1502283 | P1502283-001 | 1422-SS-01-060415 | 6/4/2015 | Sub-slab soil gas | X | |
| P1502283 | P1502283-002 | 1422-IA-01-060415 | 6/4/2015 | Indoor air | X | |
| P1502283 | P1502283-003 | 1422-SS-02-060415 | 6/4/2015 | Sub-slab soil gas | X | |
| P1502283 | P1502283-004 | 1422-IA-02-060415 | 6/4/2015 | Indoor air | X | |
| P1502283 | P1502283-005 | 1424-SS-01-060415 | 6/4/2015 | Sub-slab soil gas | X | |
| P1502283 | P1502283-006 | 1424-IA-01-060415 | 6/4/2015 | Indoor air | X | |
| P1502283 | P1502283-007 | 1424-SS-02-060415 | 6/4/2015 | Sub-slab soil gas | X | |
| P1502283 | P1502283-008 | 1424-IA-02-060415 | 6/4/2015 | Indoor air | X | |
| P1502283 | P1502283-009 | 1405-SS-01-060415 | 6/4/2015 | Sub-slab soil gas | X | |
| P1502283 | P1502283-010 | 1405-IA-01-060415 | 6/4/2015 | Indoor air | X | |
| P1502283 | P1502283-011 | 1405-SS-02-060415 | 6/4/2015 | Sub-slab soil gas | X | |
| P1502283 | P1502283-012 | 1405-SS-03-060415 | 6/4/2015 | Sub-slab soil gas<br>Duplicate of 1405-SS-02-060415 | X | |
| P1502283 | P1502283-013 | 1405-IA-02-060415 | 6/4/2015 | Indoor air | X | |
| P1502283 | P1502283-014 | 1405-IA-03-060415 | 6/4/2015 | Indoor air<br>Duplicate of 1405-IA-02-060415 | X | |
| P1502283 | P1502283-015 | 1424-AA-01-060415 | 6/4/2015 | Ambient Outdoor air | X | |
| USC02 | USC02-1 | 1422-SS-01-060415 | 6/4/2015 | Sub-slab soil gas | | X |
| USC02 | USC02-2 | 1422-IA-01-060415 | 6/4/2015 | Indoor air | | X |
| USC02 | USC02-3 | 1422-SS-02-060415 | 6/4/2015 | Sub-slab soil gas | | X |
| USC02 | USC02-4 | 1422-IA-02-060415 | 6/4/2015 | Indoor air | | X |
| USC02 | USC02-5 | 1424-SS-01-060415 | 6/4/2015 | Sub-slab soil gas | | X |
| USC02 | USC02-6 | 1424-IA-01-060415 | 6/4/2015 | Indoor air | | X |
| USC02 | USC02-7 | 1424-SS-02-060415 | 6/4/2015 | Sub-slab soil gas | | X |
| USC02 | USC02-8 | 1424-IA-02-060415 | 6/4/2015 | Indoor air | | X |
| USC02 | USC02-9 | 1405-SS-01-060415 | 6/4/2015 | Sub-slab soil gas | | X |
| USC02 | USC02-10 | 1405-IA-01-060415 | 6/4/2015 | Indoor air | | X |
| USC02 | USC02-11 | 1405-SS-02-060415 | 6/4/2015 | Sub-slab soil gas | | X |
| USC02 | USC02-12 | 1405-SS-03-060415 | 6/4/2015 | Sub-slab soil gas<br>Duplicate of 1405-SS-02-060415 | | X |
| USC02 | USC02-13 | 1405-IA-02-060415 | 6/4/2015 | Indoor air | | X |
| USC02 | USC02-14 | 1405-IA-03-060415 | 6/4/2015 | Indoor air<br>Duplicate of 1405-IA-02-060415 | | X |
| USC02 | USC02-15 | 1424-AA-01-060415 | 6/4/2015 | Ambient Outdoor air | | X |

**Table A-1 (Continued)**
**Sample Identifications and Analytical Parameters**

***Notes*:**

| | | |
|---|---|---|
| TO-15 | = | *Compendium Method TO-15 Determination of Volatile Organic Compounds in Air Collected in Specially-Prepared Canisters and Analyzed by Gas Chromatography/Mass Spectrometry*, January 1999. |
| USC RnSOP | = | University of Southern California radon scintillation cell counting standard operating procedure |
| X | = | Samples were analyzed for the method listed in the column header |

**Attachment B**

**Final Results after Data Review**

**Table B-1**
**Vapor Intrusion Study Results after Data Review**

| | | | **Sample ID** | 1405-IA-01-060415 | 1405-IA-02-060415 | 1405-IA-03-060415 | 1405-SS-01-060415 |
|---|---|---|---|---|---|---|---|
| | | | **Sample Date** | 6/4/2015 | 6/4/2015 | 6/4/2015 | 6/4/2015 |
| | | | **Sample Type** | Normal | Normal | Duplicate | Normal |
| | | | **Matrix** | Indoor Air | Indoor Air | Indoor Air | Sub-slab soil gas |
| **Method** | **Analyte** | **CAS No** | **Units** | | | | |
| TO-15 | cis-1,2-Dichloroethene | 156-59-2 | UG_M3 | 0.69 U | 0.73 U | 0.68 U | 0.7 U |
| TO-15 | Trichloroethene | 79-01-6 | UG_M3 | 0.69 U | 0.73 U | 0.68 U | 0.7 U |
| USC_RN_SOP | Radon | 10043-92-2 | PCI_L | 0.47 | 0.5 | 0.41 | 1631 |

| | | | **Sample ID** | 1405-SS-02-060415 | 1405-SS-03-060415 | 1422-IA-01-060415 | 1422-IA-02-060415 |
|---|---|---|---|---|---|---|---|
| | | | **Sample Date** | 6/4/2015 | 6/4/2015 | 6/4/2015 | 6/4/2015 |
| | | | **Sample Type** | Normal | Duplicate | Normal | Normal |
| | | | **Matrix** | Sub-slab soil gas | Sub-slab soil gas | Indoor Air | Indoor Air |
| **Method** | **Analyte** | **CAS No** | **Units** | | | | |
| TO-15 | cis-1,2-Dichloroethene | 156-59-2 | UG_M3 | 0.71 U | 0.7 U | 0.66 U | 0.71 U |
| TO-15 | Trichloroethene | 79-01-6 | UG_M3 | 0.71 U | 0.7 U | 0.66 U | 0.71 U |
| USC_RN_SOP | Radon | 10043-92-2 | PCI_L | 41 | 42 | 0.2 | 0.24 |

| | | | **Sample ID** | 1422-SS-01-060415 | 1422-SS-02-060415 | 1424-AA-01-060415 | 1424-IA-01-060415 |
|---|---|---|---|---|---|---|---|
| | | | **Sample Date** | 6/4/2015 | 6/4/2015 | 6/4/2015 | 6/4/2015 |
| | | | **Sample Type** | Normal | Normal | Normal | Normal |
| | | | **Matrix** | Sub-slab soil gas | Sub-slab soil gas | Ambient Outdoor Air | Indoor Air |
| **Method** | **Analyte** | **CAS No** | **Units** | | | | |
| TO-15 | cis-1,2-Dichloroethene | 156-59-2 | UG_M3 | 0.7 U | 0.69 U | 0.36 J | 0.67 U |
| TO-15 | Trichloroethene | 79-01-6 | UG_M3 | 1.4 | 0.69 | 1.6 | 0.67 U |
| USC_RN_SOP | Radon | 10043-92-2 | PCI_L | 670 | 1260 | 0.03 | 0.19 |

**Table B-1 (Continued)**
**Vapor Intrusion Study Results after Data Review**

| | | | **Sample ID** | 1424-IA-02-060415 | 1424-SS-01-060415 | 1424-SS-02-060415 |
|---|---|---|---|---|---|---|
| | | | **Sample Date** | 6/4/2015 | 6/4/2015 | 6/4/2015 |
| | | | **Sample Type** | Normal | Normal | Normal |
| | | | **Matrix** | Indoor Air | Sub-slab soil gas | Sub-slab soil gas |
| **Method** | **Analyte** | **CAS No** | **Units** | | | |
| TO-15 | cis-1,2-Dichloroethene | 156-59-2 | UG_M3 | 0.7 U | 0.71 U | 0.7 U |
| TO-15 | Trichloroethene | 79-01-6 | UG_M3 | 0.7 U | 0.71 U | 0.37 J |
| USC_RN_SOP | Radon | 10043-92-2 | PCI_L | 0.14 | 342 | 1874 |

***Notes:***

UG_M3 = Micrograms per cubic meter
PCI_L = Picocuries per liter
U = Undetected
J = Estimated value below the method quantitation limit

**Attachment C**
**Laboratory Data Packages**

**ALS**

**Sample Delivery Group P1502283**

2655 Park Center Dr., Suite A
Simi Valley, CA 93065
**T:** +1 805 526 7161
**F:** +1 805 526 7270
www.alsglobal.com

# LABORATORY REPORT

July 16, 2015

Kelly Nance
Shealy Environmental Services Inc.
106 Vantage Point Drive
West Columbia, SC 29172

**RE: NAS Dallas / 0888812796**

Dear Kelly:

Tier III
Your report number P1502283 has been amended for the samples submitted to our laboratory on June 5, 2015. The EPA TO-15 analyte list has been revised to follow the client specified list for this site. The revised pages have been indicated by the "Revised Page" footer located at the bottom right of the page.

All analyses were performed according to our laboratory's NELAP and DoD-ELAP-approved quality assurance program. The test results meet requirements of the current NELAP and DoD-ELAP standards, where applicable, and except as noted in the laboratory case narrative provided. For a specific list of NELAP and DoD-ELAP-accredited analytes, refer to the certifications section at www.alsglobal.com. Results are intended to be considered in their entirety and apply only to the samples analyzed and reported herein.

If you have any questions, please call me at (805) 526-7161.

Respectfully submitted,

**ALS | Environmental**

*By Kelly Horiuchi at 3:09 pm, Jul 16, 2015*

For Kate Aguilera
Project Manager

2655 Park Center Dr., Suite A
Simi Valley, CA 93065
**T:** +1 805 526 7161
**F:** +1 805 526 7270
www.alsglobal.com

Client: Shealy Environmental Services Inc. Service Request No: P1502283
Project: NAS Dallas / 0888812796

---

## CASE NARRATIVE

The samples were received intact under chain of custody on June 5, 2015 and were stored in accordance with the analytical method requirements. Please refer to the sample acceptance check form for additional information. The results reported herein are applicable only to the condition of the samples at the time of sample receipt.

Volatile Organic Compound Analysis

The samples were analyzed for volatile organic compounds in accordance with EPA Method TO-15 from the Compendium of Methods for the Determination of Toxic Organic Compounds in Ambient Air, Second Edition (EPA/625/R-96/010b), January, 1999. This procedure is described in laboratory SOP VOA-TO15. The analytical system was comprised of a gas chromatograph / mass spectrometer (GC/MS) interfaced to a whole-air preconcentrator. This method is included on the laboratory's NELAP and DoD-ELAP scope of accreditation, however it is not part of the AIHA-LAP accreditation. Any analytes flagged with an X are not included on the NELAP or DoD-ELAP accreditation.

The canisters were cleaned, prior to sampling, down to the method reporting limit (MRL) reported for this project. Please note, projects which require reporting below the MRL could have results between the MRL and method detection limit (MDL) that are biased high.

---

*The results of analyses are given in the attached laboratory report. All results are intended to be considered in their entirety, and ALS Environmental (ALS) is not responsible for utilization of less than the complete report.*

*Use of ALS Environmental (ALS)'s Name. Client shall not use ALS's name or trademark in any marketing or reporting materials, press releases or in any other manner ("Materials") whatsoever and shall not attribute to ALS any test result, tolerance or specification derived from ALS's data ("Attribution") without ALS's prior written consent, which may be withheld by ALS for any reason in its sole discretion. To request ALS's consent, Client shall provide copies of the proposed Materials or Attribution and describe in writing Client's proposed use of such Materials or Attribution. If ALS has not provided written approval of the Materials or Attribution within ten (10) days of receipt from Client, Client's request to use ALS's name or trademark in any Materials or Attribution shall be deemed denied. ALS may, in its discretion, reasonably charge Client for its time in reviewing Materials or Attribution requests. Client acknowledges and agrees that the unauthorized use of ALS's name or trademark may cause ALS to incur irreparable harm for which the recovery of money damages will be inadequate. Accordingly, Client acknowledges and agrees that a violation shall justify preliminary injunctive relief. For questions contact the laboratory.*

2655 Park Center Dr., Suite A
Simi Valley, CA 93065
**T:** +1 805 526 7161
**F:** +1 805 526 7270
**www.alsglobal.com**

ALS Environmental – Simi Valley

CERTIFICATIONS, ACCREDITATIONS, AND REGISTRATIONS

| Agency | Web Site | Number |
|---|---|---|
| AIHA | http://www.aihaaccreditedlabs.org | 101661 |
| Arizona DHS | http://www.azdhs.gov/lab/license/env.htm | AZ0694 |
| DoD ELAP | http://www.pjlabs.com/search-accredited-labs | L14-2 |
| Florida DOH (NELAP) | http://www.doh.state.fl.us/lab/EnvLabCert/WaterCert.htm | E871020 |
| Maine DHHS | http://www.maine.gov/dhhs/mecdc/environmental-health/water/dwp-services/labcert/labcert.htm | 2014025 |
| Minnesota DOH (NELAP) | http://www.health.state.mn.us/accreditation | 876241 |
| New Jersey DEP (NELAP) | http://www.nj.gov/dep/oqa/ | CA009 |
| New York DOH (NELAP) | http://www.wadsworth.org/labcert/elap/elap.html | 11221 |
| Oregon PHD (NELAP) | http://public.health.oregon.gov/LaboratoryServices/EnvironmentalLaboratoryAccreditation/Pages/index.aspx | 4068-001 |
| Pennsylvania DEP | http://www.depweb.state.pa.us/labs | 68-03307 (Registration) |
| Texas CEQ (NELAP) | http://www.tceq.texas.gov/field/qa/env_lab_accreditation.html | T104704413-14-5 |
| Utah DOH (NELAP) | http://www.health.utah.gov/lab/labimp/certification/index.html | CA016272014-4 |
| Washington DOE | http://www.ecy.wa.gov/programs/eap/labs/lab-accreditation.html | C946 |

Analyses were performed according to our laboratory's NELAP and DoD-ELAP approved quality assurance program. A complete listing of specific NELAP and DoD-ELAP certified analytes can be found in the certifications section at www.alsglobal.com, or at the accreditation body's website.

Each of the certifications listed above have an explicit Scope of Accreditation that applies to specific matrices/methods/analytes; therefore, please contact the laboratory for information corresponding to a particular certification.

# ALS ENVIRONMENTAL

DETAIL SUMMARY REPORT

Client: Shealy Environmental Services Inc. Service Request: P1502283
Project ID: NAS Dallas / 0888812796

Date Received: 6/5/2015
Time Received: 09:40

| Client Sample ID | Lab Code | Matrix | Date Collected | Time Collected | Container ID | Pi1 (psig) | Pf1 (psig) | TO-15 - VOC Cans |
|---|---|---|---|---|---|---|---|---|
| 1422-SS-01-060415 | P1502283-001 | Air | 6/4/2015 | 08:20 | SC00060 | -1.51 | 3.71 | X |
| 1422-IA-01-060415 | P1502283-002 | Air | 6/4/2015 | 08:20 | SC01720 | -0.78 | 3.56 | X |
| 1422-SS-02-060415 | P1502283-003 | Air | 6/4/2015 | 08:40 | SSC00084 | -1.23 | 3.74 | X |
| 1422-IA-02-060415 | P1502283-004 | Air | 6/4/2015 | 10:15 | SC02092 | -1.68 | 3.74 | X |
| 1424-SS-01-060415 | P1502283-005 | Air | 6/4/2015 | 08:49 | SSC00179 | -1.75 | 3.65 | X |
| 1424-IA-01-060415 | P1502283-006 | Air | 6/4/2015 | 08:49 | AS00800 | -1.14 | 3.53 | X |
| 1424-SS-02-060415 | P1502283-007 | Air | 6/4/2015 | 09:09 | SC01581 | -1.56 | 3.74 | X |
| 1424-IA-02-060415 | P1502283-008 | Air | 6/4/2015 | 09:09 | AS00384 | -1.58 | 3.70 | X |
| 1405-SS-01-060415 | P1502283-009 | Air | 6/4/2015 | 10:54 | SSC00308 | -1.70 | 3.52 | X |
| 1405-IA-01-060415 | P1502283-010 | Air | 6/4/2015 | 10:54 | AS00463 | -1.34 | 3.63 | X |
| 1405-SS-02-060415 | P1502283-011 | Air | 6/4/2015 | 12:30 | SC01594 | -1.62 | 3.74 | X |
| 1405-SS-03-060415 | P1502283-012 | Air | 6/4/2015 | 12:30 | SC02070 | -1.57 | 3.64 | X |
| 1405-IA-02-060415 | P1502283-013 | Air | 6/4/2015 | 12:30 | AC02012 | -2.19 | 3.50 | X |
| 1405-IA-03-060415 | P1502283-014 | Air | 6/4/2015 | 12:30 | SC00112 | -1.11 | 3.63 | X |
| 1424-AA-01-060415 | P1502283-015 | Air | 6/4/2015 | 13:26 | AS00703 | -1.61 | 3.53 | X |

# Air - Chain of Custody Record & Analytical Service Request



2655 Park Center Drive, Suite A
Simi Valley, California 93065
Phone (805) 526-7161
Fax (805) 526-7270

Requested Turnaround Time in Business Days (Surcharges) please circle
1 Day (100%) 2 Day (75%) 3 Day (50%) 4 Day (35%) 5 Day (25%) 10-Day-Standard

ALS Project No. P1502283

Company Name & Address (Reporting Information): Ensafe, 4545 Fuller Dr, Suite 342, Irving, TX 75038

Project Name: NAS Dallas

Project Number: 0888912796

ALS Contact: Kate Aguilera

Project Manager: Tom Wiberg

P.O. # / Billing Information: PO-16278

Phone: 972-791-3222

Fax:

Email Address for Result Reporting: twiberg@ensafe.com

Sampler (Print & Sign): Cole Duckworth

Analysis Method: TO15

| Client Sample ID | Laboratory ID Number | Date Collected | Time Collected | Canister ID (Bar code # - AC, SC, etc.) | Flow Controller ID (Bar code # - FC #) | Canister Start Pressure "Hg | Canister End Pressure "Hg/psig | Sample Volume | TO15 | | Comments e.g. Actual Preservative or specific instructions |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1422-SS-01-060415 | 1 | 6/4/15 | 0820 | SC00060 | OA00904 | -29.18 | -3.60 | 6L | X | | |
| 1422-IA-01-060415 | 2 | 6/4/15 | 0820 | SC010720 | FCA0087 | -29.71 | -2.05 | 6L | X | | |
| 1422-SS-02-060415 | 3 | 6/4/15 | 0840 | SSC00084 | AV604334 | -29.71 | -2.91 | 6L | X | | |
| 1422-IA-02-060415 | 4 | 6/4/15 | 1015 | SC02092 | FCA00994 | -29.73 | -3.85 | 6L | X | | |
| 1424-SS-01-060415 | 5 | 6/4/15 | 0849 | SSC00173 | OA00917 | -29.58 | -4.29 | 6L | X | | |
| 1424-IA-01-060415 | 6 | 6/4/15 | 0849 | AS00800 | FCA00486 | -29.77 | -2.99 | 6L | X | | |
| 1424-SS-02-060415 | 7 | 6/4/15 | 0909 | SC01581 | OA00871 | -29.83 | -3.79 | 6L | X | | |
| 1424-IA-02-060415 | 8 | 6/4/15 | 0909 | AS00384 | FCA00715 | -29.66 | -3.86 | 6L | X | | |
| 1405-SS-01-060415 | 9 | 6/4/15 | 1054 | SSC00308 | AV604442 | -29.75 | -3.67 | 6L | X | | |
| 1405-IA-01-060415 | 10 | 6/4/15 | 1054 | AS00463 | FC00959 | -29.60 | -2.84 | 6L | X | | |
| 1405-SS-02-060415 | 11 | 6/4/15 | 1230 | SC01594 | OA00543 | -29.30 | -3.62 | 6L | X | | |
| 1405-SS-03-060415 | 12 | 6/4/15 | 1230 | SC02070 | OA0096 | -29.78 | -3.47 | 6L | X | | |
| 1405-IA-02-060415 | 13 | 6/4/15 | 1230 | AC02012 | FCA00462 | -29.84 | -4.82 | 6L | X | | |
| 1405-IA-03-060415 | 14 | 6/4/15 | 1230 | SC00112 | FCA00910 | -28.93 | -2.61 | 6L | X | | |

Report Tier Levels - please select

Tier I - Results (Default in not specified) _____
Tier II (Results + QC Summaries _____
Tier III (Results + QC & Calibration Summaries) ✓ See LSR for specific requirements
Tier IV (Date Validation Package) 10% Surcharge _____

EDD required YES / No
Type: _____ Units: _____

Chain of Custody Seal: (Circle) INTACT BROKEN ABSENT

Project Requirements (MRLs, QAPP)

| Relinquished by: (Signature) | Date: | Time: | Received by: (Signature) | Date: | Time: |
|---|---|---|---|---|---|
| | 6/4/15 | 1700 | | | |
| Relinquished by: (Signature) | Date: | Time: | Received by: (Signature) | Date: | Time: |
| | | | | 6/5/15 | 0740 |

Cooler / Blank Temperature _____ °C

# Air - Chain of Custody Record & Analytical Service Request



2655 Park Center Drive, Suite A
Simi Valley, California 93065
Phone (805) 526-7161
Fax (805) 526-7270

Requested Turnaround Time in Business Days (Surcharges) please circle
1 Day (100%) 2 Day (75%) 3 Day (50%) 4 Day (35%) 5 Day (25%) 10-Day-Standard

ALS Project No. P150 2283

Company Name & Address (Reporting Information): Ensafe, 4545 Fuller Dr, Suite 342, Irving, TX 75038

Project Name: NAS Dallas

Project Number: 08888 12796

Project Manager: Tom Wiberg

P.O. # / Billing Information: PO-16278

Phone: 972-791-3222

Fax:

Email Address for Result Reporting: twiberg@ensafe.com

Sampler (Print & Sign): Cole Duckworth

ALS Contact: Kate Aguilera

Analysis Method: TO-15

| Client Sample ID | Laboratory ID Number | Date Collected | Time Collected | Canister ID (Bar code # - AC, SC, etc.) | Flow Controller ID (Bar code # - FC #) | Canister Start Pressure "Hg | Canister End Pressure "Hg/psig | Sample Volume | TO-15 | | Comments e.g. Actual Preservative or specific instructions |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1424-AA-01-060415 | 11 | 6/4/15 | 1326 | A500703 | FC400667 | -29.71 | -3.00 | 6L | X | | |

Report Tier Levels - please select

Tier I - Results (Default in not specified) ____
Tier II (Results + QC Summaries ____
Tier III (Results + QC & Calibration Summaries) ✓ See LSP for specific requirements
Tier IV (Date Validation Package) 10% Surcharge ____

EDD required YES / No
Type: ____ Units: ____

Chain of Custody Seal: (Circle) INTACT BROKEN ABSENT

Project Requirements (MRLs, QAPP)

| Relinquished by: (Signature) | Date: 6/4/15 | Time: 1700 | Received by: (Signature) | Date: | Time: |
|---|---|---|---|---|---|
| Relinquished by: (Signature) | Date: | Time: | Received by: (Signature) | Date: | Time: |

Cooler / Blank Temperature ____°C

# ALS Environmental
## Sample Acceptance Check Form

Client: Shealy Environmental Services Inc. Work order: P1502283

Project: NAS Dallas / 0888812796

Sample(s) received on: 6/5/15 Date opened: 6/5/15 by: ADAVID

***Note:*** This form is used for all samples received by ALS. The use of this form for custody seals is strictly meant to indicate presence/absence and not as an indication of compliance or nonconformity. Thermal preservation and pH will only be evaluated either at the request of the client and/or as required by the method/SOP.

| | | Yes | No | N/A |
|---|---|---|---|---|
| 1 | Were **sample containers** properly marked with client sample ID? | ☒ | ☐ | ☐ |
| 2 | Container(s) **supplied by ALS**? | ☒ | ☐ | ☐ |
| 3 | Did **sample containers** arrive in good condition? | ☒ | ☐ | ☐ |
| 4 | Were **chain-of-custody** papers used and filled out? | ☒ | ☐ | ☐ |
| 5 | Did **sample container labels** and/or tags agree with custody papers? | ☒ | ☐ | ☐ |
| 6 | Was **sample volume** received adequate for analysis? | ☒ | ☐ | ☐ |
| 7 | Are samples within specified holding times? | ☒ | ☐ | ☐ |
| 8 | Was proper **temperature** (thermal preservation) of cooler at receipt adhered to? | ☐ | ☐ | ☒ |
| 9 | Was a **trip blank** received? | ☐ | ☒ | ☐ |
| 10 | Were **custody seals** on outside of cooler/Box? | ☐ | ☒ | ☐ |
| | Location of seal(s)? _____ Sealing Lid? | ☐ | ☐ | ☒ |
| | Were signature and date included? | ☐ | ☐ | ☒ |
| | Were seals intact? | ☐ | ☐ | ☒ |
| | Were custody seals on outside of sample container? | ☐ | ☒ | ☐ |
| | Location of seal(s)? _____ Sealing Lid? | ☐ | ☐ | ☒ |
| | Were signature and date included? | ☐ | ☐ | ☒ |
| | Were seals intact? | ☐ | ☐ | ☒ |
| 11 | Do containers have appropriate **preservation**, according to method/SOP or Client specified information? | ☐ | ☐ | ☒ |
| | Is there a client indication that the submitted samples are **pH** preserved? | ☐ | ☐ | ☒ |
| | Were **VOA vials** checked for presence/absence of air bubbles? | ☐ | ☐ | ☒ |
| | Does the client/method/SOP require that the analyst check the sample pH and if necessary alter it? | ☐ | ☐ | ☒ |
| 12 | **Tubes:** Are the tubes capped and intact? | ☐ | ☐ | ☒ |
| | Do they contain moisture? | ☐ | ☐ | ☒ |
| 13 | **Badges:** Are the badges properly capped and intact? | ☐ | ☐ | ☒ |
| | Are dual bed badges separated and individually capped and intact? | ☐ | ☐ | ☒ |

| Lab Sample ID | Container Description | Required pH * | Received pH | Adjusted pH | VOA Headspace (Presence/Absence) | Receipt / Preservation Comments |
|---|---|---|---|---|---|---|
| P1502283-001.01 | 6.0 L Source Can | | | | | |
| P1502283-002.01 | 6.0 L Source Can | | | | | |
| P1502283-003.01 | 6.0 L Silonite Can | | | | | |
| P1502283-004.01 | 6.0 L Source Can | | | | | |
| P1502283-005.01 | 6.0 L Silonite Can | | | | | |
| P1502283-006.01 | 6.0 L Silonite Can | | | | | |
| P1502283-007.01 | 6.0 L Source Can | | | | | |
| P1502283-008.01 | 6.0 L Silonite Can | | | | | |

Explain any discrepancies: (include lab sample ID numbers): _____

RSK - MEEPP, HCL (pH<2); RSK - CO2, (pH 5-8); Sulfur (pH>4)

# ALS Environmental
## Sample Acceptance Check Form

Client: Shealy Environmental Services Inc. Work order: P1502283

Project: NAS Dallas / 0888812796

Sample(s) received on: 6/5/15 Date opened: 6/5/15 by: ADAVID

| Lab Sample ID | Container Description | Required pH * | Received pH | Adjusted pH | VOA Headspace (Presence/Absence) | Receipt / Preservation Comments |
|---|---|---|---|---|---|---|
| P1502283-009.01 | 6.0 L Silonite Can | | | | | |
| P1502283-010.01 | 6.0 L Silonite Can | | | | | |
| P1502283-011.01 | 6.0 L Source Can | | | | | |
| P1502283-012.01 | 6.0 L Source Can | | | | | |
| P1502283-013.01 | 6.0 L Ambient Can | | | | | |
| P1502283-014.01 | 6.0 L Source Can | | | | | |
| P1502283-015.01 | 6.0 L Silonite Can | | | | | |
| P1502283-016.02 | 6.0 L Silonite Can | | | | | |
| P1502283-017.02 | 6.0 L Source Can | | | | | |
| P1502283-018.02 | 6.0 L Silonite Can | | | | | |
| P1502283-019.02 | 6.0 L Silonite Can | | | | | |

Explain any discrepancies: (include lab sample ID numbers):

RSK - MEEPP, HCL (pH<2); RSK - CO2, (pH 5-8); Sulfur (pH>4)

# ALS ENVIRONMENTAL

RESULTS OF ANALYSIS



**Client:** **Shealy Environmental Services Inc.**
**Client Sample ID:** **1422-SS-01-060415** ALS Project ID: P1502283
**Client Project ID:** **NAS Dallas / 0888812796** ALS Sample ID: P1502283-001

Test Code: EPA TO-15 Date Collected: 6/4/15
Instrument ID: Tekmar AUTOCAN/Agilent 5975Cinert/6890N/MS16 Date Received: 6/5/15
Analyst: Lusine Hakobyan Date Analyzed: 6/12/15
Sampling Media: 6.0 L Summa Canister Volume(s) Analyzed: 1.00 Liter(s)
Test Notes:
Container ID: SC00060

Initial Pressure (psig): -1.51 Final Pressure (psig): 3.71

Canister Dilution Factor: 1.40

| CAS # | Compound | Result µg/m³ | LOQ µg/m³ | LOD µg/m³ | MDL µg/m³ | Data Qualifier |
|---|---|---|---|---|---|---|
| 156-59-2 | cis-1,2-Dichloroethene | 0.62 | 0.70 | 0.62 | 0.22 | **U** |
| 79-01-6 | Trichloroethene | **1.4** | 0.70 | 0.60 | 0.20 | |

U = Undetected at the limit of detection: The associated data value is the limit of detection, adjusted by any dilution factor used in the analysis.
LOQ = Limit of Quantitation - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

# ALS ENVIRONMENTAL

RESULTS OF ANALYSIS



**Client:** **Shealy Environmental Services Inc.**
**Client Sample ID:** **1422-IA-01-060415** ALS Project ID: P1502283
**Client Project ID:** **NAS Dallas / 0888812796** ALS Sample ID: P1502283-002

Test Code: EPA TO-15 Date Collected: 6/4/15
Instrument ID: Tekmar AUTOCAN/Agilent 5975Cinert/6890N/MS16 Date Received: 6/5/15
Analyst: Lusine Hakobyan Date Analyzed: 6/12/15
Sampling Media: 6.0 L Summa Canister Volume(s) Analyzed: 1.00 Liter(s)
Test Notes:
Container ID: SC01720

Initial Pressure (psig): -0.78 Final Pressure (psig): 3.56

Canister Dilution Factor: 1.31

| CAS # | Compound | Result µg/m³ | LOQ µg/m³ | LOD µg/m³ | MDL µg/m³ | Data Qualifier |
|---|---|---|---|---|---|---|
| 156-59-2 | cis-1,2-Dichloroethene | 0.58 | 0.66 | 0.58 | 0.21 | **U** |
| 79-01-6 | Trichloroethene | 0.56 | 0.66 | 0.56 | 0.18 | **U** |

U = Undetected at the limit of detection: The associated data value is the limit of detection, adjusted by any dilution factor used in the analysis.
LOQ = Limit of Quantitation - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

# ALS ENVIRONMENTAL

RESULTS OF ANALYSIS



**Client:** **Shealy Environmental Services Inc.**
**Client Sample ID:** **1422-SS-02-060415** ALS Project ID: P1502283
**Client Project ID:** **NAS Dallas / 0888812796** ALS Sample ID: P1502283-003

Test Code: EPA TO-15 Date Collected: 6/4/15
Instrument ID: Tekmar AUTOCAN/Agilent 5975Cinert/6890N/MS16 Date Received: 6/5/15
Analyst: Lusine Hakobyan Date Analyzed: 6/12/15
Sampling Media: 6.0 L Silonite Canister Volume(s) Analyzed: 1.00 Liter(s)
Test Notes:
Container ID: SSC00084

Initial Pressure (psig): -1.23 Final Pressure (psig): 3.74

Canister Dilution Factor: 1.37

| CAS # | Compound | Result µg/m³ | LOQ µg/m³ | LOD µg/m³ | MDL µg/m³ | Data Qualifier |
|---|---|---|---|---|---|---|
| 156-59-2 | cis-1,2-Dichloroethene | 0.60 | 0.69 | 0.60 | 0.22 | **U** |
| 79-01-6 | Trichloroethene | **0.69** | 0.69 | 0.59 | 0.19 | |

U = Undetected at the limit of detection: The associated data value is the limit of detection, adjusted by any dilution factor used in the analysis.
LOQ = Limit of Quantitation - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

# ALS ENVIRONMENTAL

RESULTS OF ANALYSIS



**Client:** **Shealy Environmental Services Inc.**
**Client Sample ID:** **1422-IA-02-060415** ALS Project ID: P1502283
**Client Project ID:** **NAS Dallas / 0888812796** ALS Sample ID: P1502283-004

Test Code: EPA TO-15 Date Collected: 6/4/15
Instrument ID: Tekmar AUTOCAN/Agilent 5975Cinert/6890N/MS16 Date Received: 6/5/15
Analyst: Lusine Hakobyan Date Analyzed: 6/12/15
Sampling Media: 6.0 L Summa Canister Volume(s) Analyzed: 1.00 Liter(s)
Test Notes:
Container ID: SC02092

Initial Pressure (psig): -1.68 Final Pressure (psig): 3.74

Canister Dilution Factor: 1.42

| CAS # | Compound | Result µg/m³ | LOQ µg/m³ | LOD µg/m³ | MDL µg/m³ | Data Qualifier |
|---|---|---|---|---|---|---|
| 156-59-2 | cis-1,2-Dichloroethene | 0.62 | 0.71 | 0.62 | 0.23 | **U** |
| 79-01-6 | Trichloroethene | 0.61 | 0.71 | 0.61 | 0.20 | **U** |

U = Undetected at the limit of detection: The associated data value is the limit of detection, adjusted by any dilution factor used in the analysis.
LOQ = Limit of Quantitation - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

# ALS ENVIRONMENTAL

RESULTS OF ANALYSIS



**Client:** **Shealy Environmental Services Inc.**
**Client Sample ID:** **1424-SS-01-060415** ALS Project ID: P1502283
**Client Project ID:** **NAS Dallas / 0888812796** ALS Sample ID: P1502283-005

Test Code: EPA TO-15 Date Collected: 6/4/15
Instrument ID: Tekmar AUTOCAN/Agilent 5975Cinert/6890N/MS16 Date Received: 6/5/15
Analyst: Lusine Hakobyan Date Analyzed: 6/12/15
Sampling Media: 6.0 L Silonite Canister Volume(s) Analyzed: 1.00 Liter(s)
Test Notes:
Container ID: SSC00179

Initial Pressure (psig): -1.75 Final Pressure (psig): 3.65

Canister Dilution Factor: 1.42

| CAS # | Compound | Result µg/m³ | LOQ µg/m³ | LOD µg/m³ | MDL µg/m³ | Data Qualifier |
|---|---|---|---|---|---|---|
| 156-59-2 | cis-1,2-Dichloroethene | 0.62 | 0.71 | 0.62 | 0.23 | **U** |
| 79-01-6 | Trichloroethene | 0.61 | 0.71 | 0.61 | 0.20 | **U** |

U = Undetected at the limit of detection: The associated data value is the limit of detection, adjusted by any dilution factor used in the analysis.
LOQ = Limit of Quantitation - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

# ALS ENVIRONMENTAL

RESULTS OF ANALYSIS



**Client:** **Shealy Environmental Services Inc.**
**Client Sample ID:** **1424-IA-01-060415** ALS Project ID: P1502283
**Client Project ID:** **NAS Dallas / 0888812796** ALS Sample ID: P1502283-006

Test Code: EPA TO-15 Date Collected: 6/4/15
Instrument ID: Tekmar AUTOCAN/Agilent 5975Cinert/6890N/MS16 Date Received: 6/5/15
Analyst: Lusine Hakobyan Date Analyzed: 6/12/15
Sampling Media: 6.0 L Silonite Canister Volume(s) Analyzed: 1.00 Liter(s)
Test Notes:
Container ID: AS00800

Initial Pressure (psig): -1.14 Final Pressure (psig): 3.53

Canister Dilution Factor: 1.34

| CAS # | Compound | Result µg/m³ | LOQ µg/m³ | LOD µg/m³ | MDL µg/m³ | Data Qualifier |
|---|---|---|---|---|---|---|
| 156-59-2 | cis-1,2-Dichloroethene | 0.59 | 0.67 | 0.59 | 0.21 | **U** |
| 79-01-6 | Trichloroethene | 0.58 | 0.67 | 0.58 | 0.19 | **U** |

U = Undetected at the limit of detection: The associated data value is the limit of detection, adjusted by any dilution factor used in the analysis.
LOQ = Limit of Quantitation - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

# ALS ENVIRONMENTAL

RESULTS OF ANALYSIS



**Client:** **Shealy Environmental Services Inc.**
**Client Sample ID:** **1424-SS-02-060415** ALS Project ID: P1502283
**Client Project ID:** **NAS Dallas / 0888812796** ALS Sample ID: P1502283-007

Test Code: EPA TO-15 Date Collected: 6/4/15
Instrument ID: Tekmar AUTOCAN/Agilent 5975Cinert/6890N/MS16 Date Received: 6/5/15
Analyst: Lusine Hakobyan Date Analyzed: 6/12/15
Sampling Media: 6.0 L Summa Canister Volume(s) Analyzed: 1.00 Liter(s)
Test Notes:
Container ID: SC01581

Initial Pressure (psig): -1.56 Final Pressure (psig): 3.74

Canister Dilution Factor: 1.40

| CAS # | Compound | Result µg/m³ | LOQ µg/m³ | LOD µg/m³ | MDL µg/m³ | Data Qualifier |
|---|---|---|---|---|---|---|
| 156-59-2 | cis-1,2-Dichloroethene | 0.62 | 0.70 | 0.62 | 0.22 | **U** |
| 79-01-6 | Trichloroethene | **0.37** | 0.70 | 0.60 | 0.20 | **J** |

U = Undetected at the limit of detection: The associated data value is the limit of detection, adjusted by any dilution factor used in the analysis.
LOQ = Limit of Quantitation - The minimum quantity of a target analyte that can be confidently determined by the referenced method.
J = The result is an estimated concentration that is less than the LOQ but greater than or equal to the MDL.

# ALS ENVIRONMENTAL

RESULTS OF ANALYSIS



**Client:** **Shealy Environmental Services Inc.**
**Client Sample ID:** **1424-IA-02-060415** ALS Project ID: P1502283
**Client Project ID:** **NAS Dallas / 0888812796** ALS Sample ID: P1502283-008

Test Code: EPA TO-15 Date Collected: 6/4/15
Instrument ID: Tekmar AUTOCAN/Agilent 5975Cinert/6890N/MS16 Date Received: 6/5/15
Analyst: Lusine Hakobyan Date Analyzed: 6/12/15
Sampling Media: 6.0 L Silonite Canister Volume(s) Analyzed: 1.00 Liter(s)
Test Notes:
Container ID: AS00384

Initial Pressure (psig): -1.58 Final Pressure (psig): 3.70

Canister Dilution Factor: 1.40

| CAS # | Compound | Result µg/m³ | LOQ µg/m³ | LOD µg/m³ | MDL µg/m³ | Data Qualifier |
|---|---|---|---|---|---|---|
| 156-59-2 | cis-1,2-Dichloroethene | 0.62 | 0.70 | 0.62 | 0.22 | **U** |
| 79-01-6 | Trichloroethene | 0.60 | 0.70 | 0.60 | 0.20 | **U** |

U = Undetected at the limit of detection: The associated data value is the limit of detection, adjusted by any dilution factor used in the analysis.
LOQ = Limit of Quantitation - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

# ALS ENVIRONMENTAL

RESULTS OF ANALYSIS



**Client:** **Shealy Environmental Services Inc.**
**Client Sample ID:** **1405-SS-01-060415** ALS Project ID: P1502283
**Client Project ID:** **NAS Dallas / 0888812796** ALS Sample ID: P1502283-009

Test Code: EPA TO-15 Date Collected: 6/4/15
Instrument ID: Tekmar AUTOCAN/Agilent 5975Cinert/6890N/MS16 Date Received: 6/5/15
Analyst: Lusine Hakobyan Date Analyzed: 6/12/15
Sampling Media: 6.0 L Silonite Canister Volume(s) Analyzed: 1.00 Liter(s)
Test Notes:
Container ID: SSC00308

Initial Pressure (psig): -1.70 Final Pressure (psig): 3.52

Canister Dilution Factor: 1.40

| CAS # | Compound | Result µg/m³ | LOQ µg/m³ | LOD µg/m³ | MDL µg/m³ | Data Qualifier |
|---|---|---|---|---|---|---|
| 156-59-2 | cis-1,2-Dichloroethene | 0.62 | 0.70 | 0.62 | 0.22 | **U** |
| 79-01-6 | Trichloroethene | 0.60 | 0.70 | 0.60 | 0.20 | **U** |

U = Undetected at the limit of detection: The associated data value is the limit of detection, adjusted by any dilution factor used in the analysis.
LOQ = Limit of Quantitation - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

# ALS ENVIRONMENTAL

RESULTS OF ANALYSIS



**Client:** **Shealy Environmental Services Inc.**
**Client Sample ID:** **1405-IA-01-060415** ALS Project ID: P1502283
**Client Project ID:** **NAS Dallas / 0888812796** ALS Sample ID: P1502283-010

Test Code: EPA TO-15 Date Collected: 6/4/15
Instrument ID: Tekmar AUTOCAN/Agilent 5975Cinert/6890N/MS16 Date Received: 6/5/15
Analyst: Lusine Hakobyan Date Analyzed: 6/12/15
Sampling Media: 6.0 L Silonite Canister Volume(s) Analyzed: 1.00 Liter(s)
Test Notes:
Container ID: AS00463

Initial Pressure (psig): -1.34 Final Pressure (psig): 3.63

Canister Dilution Factor: 1.37

| CAS # | Compound | Result µg/m³ | LOQ µg/m³ | LOD µg/m³ | MDL µg/m³ | Data Qualifier |
|---|---|---|---|---|---|---|
| 156-59-2 | cis-1,2-Dichloroethene | 0.60 | 0.69 | 0.60 | 0.22 | **U** |
| 79-01-6 | Trichloroethene | 0.59 | 0.69 | 0.59 | 0.19 | **U** |

U = Undetected at the limit of detection: The associated data value is the limit of detection, adjusted by any dilution factor used in the analysis.
LOQ = Limit of Quantitation - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

# ALS ENVIRONMENTAL

RESULTS OF ANALYSIS



**Client:** **Shealy Environmental Services Inc.**
**Client Sample ID:** **1405-SS-02-060415** ALS Project ID: P1502283
**Client Project ID:** **NAS Dallas / 0888812796** ALS Sample ID: P1502283-011

Test Code: EPA TO-15 Date Collected: 6/4/15
Instrument ID: Tekmar AUTOCAN/Agilent 5975Cinert/6890N/MS16 Date Received: 6/5/15
Analyst: Lusine Hakobyan Date Analyzed: 6/12/15
Sampling Media: 6.0 L Summa Canister Volume(s) Analyzed: 1.00 Liter(s)
Test Notes:
Container ID: SC01594

Initial Pressure (psig): -1.62 Final Pressure (psig): 3.74

Canister Dilution Factor: 1.41

| CAS # | Compound | Result µg/m³ | LOQ µg/m³ | LOD µg/m³ | MDL µg/m³ | Data Qualifier |
|---|---|---|---|---|---|---|
| 156-59-2 | cis-1,2-Dichloroethene | 0.62 | 0.71 | 0.62 | 0.23 | **U** |
| 79-01-6 | Trichloroethene | 0.61 | 0.71 | 0.61 | 0.20 | **U** |

U = Undetected at the limit of detection: The associated data value is the limit of detection, adjusted by any dilution factor used in the analysis.
LOQ = Limit of Quantitation - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

# ALS ENVIRONMENTAL

RESULTS OF ANALYSIS



**Client:** **Shealy Environmental Services Inc.**
**Client Sample ID:** **1405-SS-03-060415** ALS Project ID: P1502283
**Client Project ID:** **NAS Dallas / 0888812796** ALS Sample ID: P1502283-012

Test Code: EPA TO-15 Date Collected: 6/4/15
Instrument ID: Tekmar AUTOCAN/Agilent 5975Cinert/6890N/MS16 Date Received: 6/5/15
Analyst: Lusine Hakobyan Date Analyzed: 6/12/15
Sampling Media: 6.0 L Summa Canister Volume(s) Analyzed: 1.00 Liter(s)
Test Notes:
Container ID: SC02070

Initial Pressure (psig): -1.57 Final Pressure (psig): 3.64

Canister Dilution Factor: 1.40

| CAS # | Compound | Result µg/m³ | LOQ µg/m³ | LOD µg/m³ | MDL µg/m³ | Data Qualifier |
|---|---|---|---|---|---|---|
| 156-59-2 | cis-1,2-Dichloroethene | 0.62 | 0.70 | 0.62 | 0.22 | **U** |
| 79-01-6 | Trichloroethene | 0.60 | 0.70 | 0.60 | 0.20 | **U** |

U = Undetected at the limit of detection: The associated data value is the limit of detection, adjusted by any dilution factor used in the analysis.
LOQ = Limit of Quantitation - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

# ALS ENVIRONMENTAL

RESULTS OF ANALYSIS



**Client:** **Shealy Environmental Services Inc.**
**Client Sample ID:** **1405-IA-02-060415** ALS Project ID: P1502283
**Client Project ID:** **NAS Dallas / 0888812796** ALS Sample ID: P1502283-013

Test Code: EPA TO-15 Date Collected: 6/4/15
Instrument ID: Tekmar AUTOCAN/Agilent 5975Cinert/6890N/MS16 Date Received: 6/5/15
Analyst: Lusine Hakobyan Date Analyzed: 6/12/15
Sampling Media: 6.0 L Summa Canister Volume(s) Analyzed: 1.00 Liter(s)
Test Notes:
Container ID: AC02012

Initial Pressure (psig): -2.19 Final Pressure (psig): 3.50

Canister Dilution Factor: 1.45

| CAS # | Compound | Result µg/m³ | LOQ µg/m³ | LOD µg/m³ | MDL µg/m³ | Data Qualifier |
|---|---|---|---|---|---|---|
| 156-59-2 | cis-1,2-Dichloroethene | 0.64 | 0.73 | 0.64 | 0.23 | **U** |
| 79-01-6 | Trichloroethene | 0.62 | 0.73 | 0.62 | 0.20 | **U** |

U = Undetected at the limit of detection: The associated data value is the limit of detection, adjusted by any dilution factor used in the analysis.
LOQ = Limit of Quantitation - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

# ALS ENVIRONMENTAL

RESULTS OF ANALYSIS



**Client:** **Shealy Environmental Services Inc.**
**Client Sample ID:** **1405-IA-03-060415** ALS Project ID: P1502283
**Client Project ID:** **NAS Dallas / 0888812796** ALS Sample ID: P1502283-014

Test Code: EPA TO-15 Date Collected: 6/4/15
Instrument ID: Tekmar AUTOCAN/Agilent 5975Cinert/6890N/MS16 Date Received: 6/5/15
Analyst: Lusine Hakobyan Date Analyzed: 6/12/15
Sampling Media: 6.0 L Summa Canister Volume(s) Analyzed: 1.00 Liter(s)
Test Notes:
Container ID: SC00112

Initial Pressure (psig): -1.11 Final Pressure (psig): 3.63

Canister Dilution Factor: 1.35

| CAS # | Compound | Result µg/m³ | LOQ µg/m³ | LOD µg/m³ | MDL µg/m³ | Data Qualifier |
|---|---|---|---|---|---|---|
| 156-59-2 | cis-1,2-Dichloroethene | 0.59 | 0.68 | 0.59 | 0.22 | **U** |
| 79-01-6 | Trichloroethene | 0.58 | 0.68 | 0.58 | 0.19 | **U** |

U = Undetected at the limit of detection: The associated data value is the limit of detection, adjusted by any dilution factor used in the analysis.
LOQ = Limit of Quantitation - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

# ALS ENVIRONMENTAL

RESULTS OF ANALYSIS



**Client:** **Shealy Environmental Services Inc.**
**Client Sample ID:** **1424-AA-01-060415** ALS Project ID: P1502283
**Client Project ID:** **NAS Dallas / 0888812796** ALS Sample ID: P1502283-015

Test Code: EPA TO-15 Date Collected: 6/4/15
Instrument ID: Tekmar AUTOCAN/Agilent 5975Cinert/6890N/MS16 Date Received: 6/5/15
Analyst: Lusine Hakobyan Date Analyzed: 6/12/15
Sampling Media: 6.0 L Silonite Canister Volume(s) Analyzed: 1.00 Liter(s)
Test Notes:
Container ID: AS00703

Initial Pressure (psig): -1.61 Final Pressure (psig): 3.53

Canister Dilution Factor: 1.39

| CAS # | Compound | Result µg/m³ | LOQ µg/m³ | LOD µg/m³ | MDL µg/m³ | Data Qualifier |
|---|---|---|---|---|---|---|
| 156-59-2 | cis-1,2-Dichloroethene | **0.36** | 0.70 | 0.61 | 0.22 | **J** |
| 79-01-6 | Trichloroethene | **1.6** | 0.70 | 0.60 | 0.19 | |

U = Undetected at the limit of detection: The associated data value is the limit of detection, adjusted by any dilution factor used in the analysis.
LOQ = Limit of Quantitation - The minimum quantity of a target analyte that can be confidently determined by the referenced method.
J = The result is an estimated concentration that is less than the LOQ but greater than or equal to the MDL.

# ALS ENVIRONMENTAL

RESULTS OF ANALYSIS



**Client:** **Shealy Environmental Services Inc.**
**Client Sample ID:** **Method Blank** ALS Project ID: P1502283
**Client Project ID:** **NAS Dallas / 0888812796** ALS Sample ID: P150612-MB

Test Code: EPA TO-15 Date Collected: NA
Instrument ID: Tekmar AUTOCAN/Agilent 5975Cinert/6890N/MS16 Date Received: NA
Analyst: Lusine Hakobyan Date Analyzed: 6/12/15
Sampling Media: 6.0 L Summa Canister Volume(s) Analyzed: 1.00 Liter(s)
Test Notes:

Canister Dilution Factor: 1.00

| CAS # | Compound | Result µg/m³ | LOQ µg/m³ | LOD µg/m³ | MDL µg/m³ | Data Qualifier |
|---|---|---|---|---|---|---|
| 156-59-2 | cis-1,2-Dichloroethene | 0.44 | 0.50 | 0.44 | 0.16 | **U** |
| 79-01-6 | Trichloroethene | 0.43 | 0.50 | 0.43 | 0.14 | **U** |

U = Undetected at the limit of detection: The associated data value is the limit of detection, adjusted by any dilution factor used in the analysis.
LOQ = Limit of Quantitation - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

# ALS ENVIRONMENTAL

SURROGATE SPIKE RECOVERY RESULTS



**Client:** **Shealy Environmental Services Inc.**
**Client Project ID:** **NAS Dallas / 0888812796** ALS Project ID: P1502283

Test Code: EPA TO-15
Instrument ID: Tekmar AUTOCAN/Agilent 5975Cinert/6890N/MS16 Date(s) Collected: 6/4/15
Analyst: Lusine Hakobyan Date(s) Received: 6/5/15
Sampling Media: 6.0 L Summa Canister(s) Date(s) Analyzed: 6/12/15
Test Notes:

| Client Sample ID | ALS Sample ID | 1,2-Dichloroethane-d4 Percent Recovered | Toluene-d8 Percent Recovered | Bromofluorobenzene Percent Recovered | Acceptance Limits | Data Qualifier |
|---|---|---|---|---|---|---|
| Method Blank | P150612-MB | **97** | **103** | **86** | 70-130 | |
| Lab Control Sample | P150612-LCS | **95** | **100** | **88** | 70-130 | |
| 1422-SS-01-060415 | P1502283-001 | **98** | **101** | **87** | 70-130 | |
| 1422-IA-01-060415 | P1502283-002 | **98** | **102** | **87** | 70-130 | |
| 1422-SS-02-060415 | P1502283-003 | **98** | **102** | **87** | 70-130 | |
| 1422-IA-02-060415 | P1502283-004 | **99** | **102** | **88** | 70-130 | |
| 1424-SS-01-060415 | P1502283-005 | **98** | **99** | **90** | 70-130 | |
| 1424-IA-01-060415 | P1502283-006 | **98** | **101** | **89** | 70-130 | |
| 1424-IA-01-060415 | P1502283-006DUP | **97** | **102** | **88** | 70-130 | |
| 1424-SS-02-060415 | P1502283-007 | **99** | **92** | **83** | 70-130 | |
| 1424-IA-02-060415 | P1502283-008 | **97** | **103** | **88** | 70-130 | |
| 1405-SS-01-060415 | P1502283-009 | **97** | **100** | **88** | 70-130 | |
| 1405-IA-01-060415 | P1502283-010 | **97** | **99** | **90** | 70-130 | |
| 1405-SS-02-060415 | P1502283-011 | **97** | **101** | **92** | 70-130 | |
| 1405-SS-03-060415 | P1502283-012 | **97** | **100** | **91** | 70-130 | |
| 1405-IA-02-060415 | P1502283-013 | **97** | **99** | **91** | 70-130 | |
| 1405-IA-03-060415 | P1502283-014 | **96** | **99** | **92** | 70-130 | |
| 1424-AA-01-060415 | P1502283-015 | **96** | **99** | **91** | 70-130 | |

Surrogate percent recovery is verified and accepted based on the on-column result.
Reported results are shown in concentration units and as a result of the calculation, may vary slightly from the on-column percent recovery.

# ALS ENVIRONMENTAL

LABORATORY CONTROL SAMPLE SUMMARY



**Client:** **Shealy Environmental Services Inc.**
**Client Sample ID:** **Lab Control Sample** ALS Project ID: P1502283
**Client Project ID:** **NAS Dallas / 0888812796** ALS Sample ID: P150612-LCS

Test Code: EPA TO-15 Date Collected: NA
Instrument ID: Tekmar AUTOCAN/Agilent 5975Cinert/6890N/MS16 Date Received: NA
Analyst: Lusine Hakobyan Date Analyzed: 6/12/15
Sampling Media: 6.0 L Summa Canister Volume(s) Analyzed: 0.125 Liter(s)
Test Notes:

| CAS # | Compound | Spike Amount µg/m³ | **Result µg/m³** | **% Recovery** | DOD Acceptance Limits | **Data Qualifier** |
|---|---|---|---|---|---|---|
| 156-59-2 | cis-1,2-Dichloroethene | 214 | **239** | **112** | 70-121 | |
| 79-01-6 | Trichloroethene | 208 | **209** | **100** | 71-123 | |

Laboratory Control Sample percent recovery is verified and accepted based on the on-column result.
Reported results are shown in concentration units and as a result of the calculation, may vary slightly.

# ALS ENVIRONMENTAL

LABORATORY DUPLICATE SUMMARY RESULTS



**Client:** **Shealy Environmental Services Inc.**
**Client Sample ID:** **1424-IA-01-060415** ALS Project ID: P1502283
**Client Project ID:** **NAS Dallas / 0888812796** ALS Sample ID: P1502283-006DUP

Test Code: EPA TO-15 Date Collected: 6/4/15
Instrument ID: Tekmar AUTOCAN/Agilent 5975Cinert/6890N/MS16 Date Received: 6/5/15
Analyst: Lusine Hakobyan Date Analyzed: 6/12/15
Sampling Media: 6.0 L Silonite Canister Volume(s) Analyzed: 1.00 Liter(s)
Test Notes:
Container ID: AS00800

Initial Pressure (psig): -1.14 Final Pressure (psig): 3.53

Canister Dilution Factor: 1.34

| **Compound** | Sample Result µg/m³ | **Duplicate Sample Result** µg/m³ | Average µg/m³ | **% RPD** | RPD Limit | **Data Qualifier** |
|---|---|---|---|---|---|---|
| cis-1,2-Dichloroethene | ND | ND | - | - | 25 | |
| Trichloroethene | ND | ND | - | - | 25 | |

U = Undetected at the limit of detection: The associated data value is the limit of detection, adjusted by any dilution factor used in the analysis.

# ALS ENVIRONMENTAL

RESULTS OF ANALYSIS



**Client:** **Shealy Environmental Services Inc.** ALS Project ID: P1502283

**Client Project ID:** **NAS Dallas / 0888812796**

## Internal Standard Area and RT Summary

Test Code: EPA TO-15
Instrument ID: Tekmar AUTOCAN/Agilent 5975Cinert/6890N/MS16 Lab File ID: 06121503.D
Analyst: Lusine Hakobyan Date Analyzed: 6/12/15
Sampling Media: 6.0 L Summa Canister(s) Time Analyzed: 09:15
Test Notes:

| | | IS1 (BCM) | | | IS2 (DFB) | | | IS3 (CBZ) | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | **AREA** | **#** | **RT** | **AREA** | **#** | **RT** | **AREA** | **#** | **RT** |
| | **24 Hour Standard** | 156617 | | 11.19 | 796587 | | 13.32 | 348831 | | 17.63 |
| | **Upper Limit** | 219264 | | 11.52 | 1115222 | | 13.65 | 488363 | | 17.96 |
| | **Lower Limit** | 93970 | | 10.86 | 477952 | | 12.99 | 209299 | | 17.30 |
| | **Client Sample ID** | | | | | | | | | |
| 01 | Method Blank | 152857 | | 11.18 | 804531 | | 13.31 | 352167 | | 17.63 |
| 02 | Lab Control Sample | 155492 | | 11.20 | 769738 | | 13.33 | 354633 | | 17.63 |
| 03 | 1422-SS-01-060415 | 156154 | | 11.19 | 813510 | | 13.32 | 362671 | | 17.63 |
| 04 | 1422-IA-01-060415 | 150496 | | 11.18 | 786706 | | 13.31 | 347777 | | 17.63 |
| 05 | 1422-SS-02-060415 | 151097 | | 11.19 | 782564 | | 13.31 | 341847 | | 17.63 |
| 06 | 1422-IA-02-060415 | 156324 | | 11.18 | 820262 | | 13.31 | 363579 | | 17.63 |
| 07 | 1424-SS-01-060415 | 152070 | | 11.19 | 775114 | | 13.32 | 344014 | | 17.63 |
| 08 | 1424-IA-01-060415 | 152167 | | 11.18 | 792334 | | 13.31 | 350998 | | 17.63 |
| 09 | 1424-IA-01-060415 (Lab Duplicate) | 152064 | | 11.18 | 789083 | | 13.31 | 348214 | | 17.63 |
| 10 | 1424-SS-02-060415 | 151479 | | 11.19 | 786527 | | 13.32 | 373377 | | 17.63 |
| 11 | 1424-IA-02-060415 | 153542 | | 11.18 | 801190 | | 13.31 | 350554 | | 17.63 |
| 12 | 1405-SS-01-060415 | 158808 | | 11.19 | 815378 | | 13.32 | 368402 | | 17.63 |
| 13 | 1405-IA-01-060415 | 156350 | | 11.18 | 798369 | | 13.31 | 354166 | | 17.63 |
| 14 | 1405-SS-02-060415 | 156740 | | 11.18 | 809618 | | 13.31 | 359362 | | 17.63 |
| 15 | 1405-SS-03-060415 | 158696 | | 11.18 | 821733 | | 13.31 | 369118 | | 17.63 |
| 16 | 1405-IA-02-060415 | 161005 | | 11.18 | 840551 | | 13.31 | 381218 | | 17.63 |
| 17 | 1405-IA-03-060415 | 160511 | | 11.18 | 822600 | | 13.31 | 365356 | | 17.63 |
| 18 | 1424-AA-01-060415 | 159748 | | 11.18 | 820075 | | 13.31 | 365498 | | 17.63 |
| 19 | | | | | | | | | | |
| 20 | | | | | | | | | | |

IS1 (BCM) = Bromochloromethane
IS2 (DFB) = 1,4-Difluorobenzene
IS3 (CBZ) = Chlorobenzene-d5

AREA UPPER LIMIT = 140% of internal standard area
AREA LOWER LIMIT = 60% of internal standard area
RT UPPER LIMIT = 0.33 minutes of internal standard RT
RT LOWER LIMIT = 0.33 minutes of internal standard RT

# Column used to flag values outside QC limits with an I.
I = Internal standard not within the specified limits.

Method Path : I:\MS16\METHODS\
Method File : R16033015.M
Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
Last Update : Tue Mar 31 09:29:26 2015
Response Via : Initial Calibration

LH 3/31/15

Calibration Files
0.08=03301512.D 0.10=03301513.D 0.20=03301531.D 0.40=03301515.D 1.0 =03301516.D 5.0 =03301517.D 25 =03301518.D
50 =03301519.D 100 =03301520.D

| | | Compound | 0.08 | 0.10 | 0.20 | 0.40 | 1.0 | 5.0 | 25 | 50 | 100 | Avg | %RSD |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1) | IR | Bromochloromethane... | ----------ISTD---------- | | | | | | | | | | |
| 2) | T | Propene | | | | 1.984 | 1.772 | 1.618 | 1.616 | 1.458 | 1.561 | 1.668 | 11.10 |
| 3) | T | Dichlorodifluo... | 3.315 | 3.751 | 4.456 | 3.788 | 3.597 | 3.491 | 3.359 | 3.191 | 2.758 | 3.523 | 13.34 |
| 4) | T | Chloromethane | 3.696 | 3.807 | 4.205 | 3.619 | 3.399 | 3.243 | 3.259 | 3.072 | 2.525 | 3.425 | 14.09 |
| 5) | T | 1,2-Dichloro-1... | 1.802 | 2.001 | 2.300 | 2.032 | 2.018 | 1.960 | 1.921 | 1.808 | 1.682 | 1.947 | 9.10 |
| 6) | T | Vinyl Chloride | 2.773 | 3.153 | 3.687 | 3.262 | 3.234 | 3.140 | 3.070 | 2.932 | 2.654 | 3.101 | 9.73 |
| 7) | T | 1,3-Butadiene | 2.060 | 2.079 | 2.591 | 1.972 | 1.813 | 1.731 | 1.953 | 1.466 | 1.593 | 1.918 | 17.09 |
| 8) | T | Bromomethane | 2.019 | 1.698 | 2.692 | 1.826 | 1.808 | 1.797 | 1.790 | 1.654 | 1.585 | 1.874 | 17.63 |
| 9) | T | Chloroethane | 1.138 | 1.144 | 1.347 | 1.183 | 1.559 | 1.543 | 1.519 | 1.437 | 1.406 | 1.364 | 12.53 |
| 10) | T | Ethanol | | 1.760 | 1.685 | 1.106 | 0.966 | 1.400 | 1.228 | 1.106 | 1.357 | 1.326 | 21.31 |
| 11) | T | Acetonitrile | | | | 3.532 | 3.156 | 2.933 | 2.839 | 2.870 | 2.718 | 3.008 | 9.80 |
| 12) | T | Acrolein | | | | 0.979 | 0.854 | 0.867 | 0.833 | 0.669 | 0.754 | 0.826 | 12.76 |
| 13) | T | Acetone | | | 1.649 | 1.278 | 1.153 | 1.162 | 1.317 | 1.237 | 1.197 | 1.285 | 13.32 |
| 14) | T | Trichlorofluor... | 2.346 | 2.696 | 3.069 | 2.643 | 2.564 | 2.502 | 2.476 | 2.495 | 2.412 | 2.578 | 8.27 |
| 15) | T | 2-Propanol (Is... | 5.904 | 5.650 | 5.520 | 4.481 | 4.074 | 4.114 | 4.472 | 4.570 | 3.556 | 4.705 | 17.11 |
| 16) | T | Acrylonitrile | 1.753 | 1.851 | 2.563 | 2.100 | 1.983 | 2.061 | 2.139 | 1.885 | 2.019 | 2.039 | 11.41 |
| 17) | T | 1,1-Dichloroet... | 1.210 | 1.359 | 1.652 | 1.384 | 1.326 | 1.322 | 1.383 | 1.420 | 1.371 | 1.381 | 8.54 |
| 18) | T | 2-Methyl-2-Pro... | 4.320 | 4.819 | 5.005 | 4.337 | 4.099 | 4.119 | 4.414 | 4.612 | 4.431 | 4.462 | 6.79 |
| 19) | T | Methylene Chlo... | | | | 1.597 | 1.487 | 1.409 | 1.474 | 1.428 | 1.576 | 1.495 | 5.14 |
| 20) | T | 3-Chloro-1-pro... | 2.282 | 2.481 | 2.695 | 2.408 | 2.219 | 2.304 | 2.371 | 2.401 | 2.228 | 2.376 | 6.22 |
| 21) | T | Trichlorotrifl... | 0.972 | 1.061 | 1.435 | 1.176 | 1.119 | 1.124 | 1.182 | 1.249 | 1.216 | 1.170 | 11.08 |
| 22) | T | Carbon Disulfide | 5.283 | 5.654 | 6.277 | 5.080 | 4.876 | 5.095 | 5.453 | 4.744 | 5.069 | 5.281 | 8.82 |
| 23) | T | trans-1,2-Dich... | 2.040 | 2.162 | 2.668 | 2.305 | 2.237 | 2.256 | 2.336 | 2.421 | 2.318 | 2.305 | 7.57 |
| 24) | T | 1,1-Dichloroet... | 2.671 | 2.831 | 3.390 | 2.887 | 2.813 | 2.725 | 2.764 | 2.828 | 2.719 | 2.848 | 7.53 |
| 25) | T | Methyl tert-Bu... | 4.224 | 4.799 | 5.484 | 4.694 | 4.386 | 4.315 | 4.452 | 4.555 | 4.360 | 4.585 | 8.37 |
| 26) | T | Vinyl Acetate | 0.479 | 0.539 | 0.401 | 0.332 | 0.310 | 0.341 | 0.410 | 0.435 | 0.412 | 0.406 | 18.02 |
| 27) | T | 2-Butanone (MEK) | | | | 1.264 | 1.193 | 0.992 | 1.014 | 1.036 | 1.034 | 1.089 | 10.27 |
| 28) | T | cis-1,2-Dichlo... | 1.850 | 2.145 | 2.597 | 2.193 | 2.136 | 2.140 | 2.237 | 2.289 | 2.232 | 2.202 | 8.81 |
| 29) | T | Diisopropyl Ether | 1.093 | 1.384 | 1.714 | 1.415 | 1.345 | 1.103 | 1.306 | 1.375 | 1.326 | 1.340 | 13.64 |
| 30) | T | Ethyl Acetate | 0.520 | 0.567 | 0.639 | 0.560 | 0.536 | 0.549 | 0.633 | 0.674 | 0.664 | 0.594 | 9.92 |
| 31) | T | n-Hexane | 2.393 | 2.788 | 3.019 | 2.494 | 2.350 | 2.148 | 2.244 | 2.283 | 2.339 | 2.451 | 11.43 |
| 32) | T | Chloroform | 2.407 | 2.703 | 3.254 | 2.737 | 2.573 | 2.565 | 2.666 | 2.696 | 2.585 | 2.687 | 8.74 |
| 33) | S | 1,2-Dichloroet... | 2.119 | 2.342 | 1.961 | 2.121 | 2.155 | 2.126 | 1.966 | 2.074 | 1.924 | 2.088 | 6.12 |
| 34) | T | Tetrahydrofura... | | | | 1.339 | 1.267 | 0.992 | 0.995 | 1.017 | 1.014 | 1.104 | 14.13 |
| 35) | T | Ethyl tert-But... | 1.400 | 1.697 | 2.002 | 1.759 | 1.668 | 1.648 | 1.792 | 1.847 | 1.839 | 1.739 | 9.61 |
| 36) | T | 1,2-Dichloroet... | 1.926 | 2.354 | 2.582 | 2.247 | 2.144 | 2.102 | 2.122 | 2.145 | 2.081 | 2.189 | 8.58 |
| 37) | IR | 1,4-Difluorobenzen... | ----------ISTD---------- | | | | | | | | | | |
| 38) | T | 1,1,1-Trichlor... | 0.414 | 0.439 | 0.575 | 0.468 | 0.435 | 0.433 | 0.473 | 0.454 | 0.456 | 0.461 | 10.13 |
| 39) | T | Isopropyl Acetate | 0.148 | 0.157 | 0.212 | 0.176 | 0.164 | 0.169 | 0.207 | 0.204 | 0.209 | 0.183 | 13.73 |
| 40) | T | 1-Butanol | 0.365 | 0.349 | 0.366 | 0.266 | 0.255 | 0.302 | 0.407 | 0.413 | 0.397 | 0.347 | 17.13 |
| 41) | T | Benzene | 1.390 | 1.547 | 1.559 | 1.199 | 1.047 | 1.010 | 1.161 | 1.165 | 1.169 | 1.250 | 16.17 |
| 42) | T | Carbon Tetrach... | 0.281 | 0.310 | 0.430 | 0.359 | 0.338 | 0.343 | 0.391 | 0.375 | 0.378 | 0.356 | 12.50 |

Method Path : I:\MS16\METHODS\
Method File : R16033015.M
Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)

| | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 43) | T | Cyclohexane | 0.386 | 0.381 | 0.536 | 0.433 | 0.400 | 0.404 | 0.477 | 0.468 | 0.457 | 0.438 | 11.71 |
| 44) | T | tert-Amyl Meth... | 0.768 | 0.801 | 1.063 | 0.871 | 0.806 | 0.817 | 0.931 | 0.899 | 0.903 | 0.873 | 10.30 |
| 45) | T | 1,2-Dichloropr... | 0.262 | 0.278 | 0.376 | 0.303 | 0.280 | 0.277 | 0.306 | 0.293 | 0.301 | 0.297 | 11.02 |
| 46) | T | Bromodichlorom... | 0.342 | 0.362 | 0.476 | 0.401 | 0.376 | 0.388 | 0.443 | 0.432 | 0.436 | 0.406 | 10.70 |
| 47) | T | Trichloroethene | 0.240 | 0.255 | 0.390 | 0.277 | 0.263 | 0.266 | 0.310 | 0.308 | 0.319 | 0.292 | 15.70 |
| 48) | T | 1,4-Dioxane | 0.238 | 0.238 | 0.286 | 0.226 | 0.216 | 0.225 | 0.268 | 0.267 | 0.283 | 0.250 | 10.63 |
| 49) | T | 2,2,4-Trimethy... | 1.129 | 1.180 | 1.618 | 1.311 | 1.225 | 1.241 | 1.380 | 1.316 | 1.274 | 1.297 | 10.94 |
| 50) | T | Methyl Methacr... | 0.096 | 0.081 | 0.127 | 0.108 | 0.100 | 0.104 | 0.125 | 0.123 | 0.126 | 0.110 | 14.82 |
| 51) | T | n-Heptane | 0.221 | 0.256 | 0.340 | 0.269 | 0.243 | 0.236 | 0.262 | 0.246 | 0.260 | 0.259 | 13.01 |
| 52) | T | cis-1,3-Dichlo... | 0.357 | 0.393 | 0.522 | 0.446 | 0.422 | 0.435 | 0.507 | 0.494 | 0.511 | 0.454 | 12.77 |
| 53) | T | 4-Methyl-2-pen... | 0.271 | 0.266 | 0.329 | 0.273 | 0.254 | 0.261 | 0.313 | 0.304 | 0.314 | 0.287 | 9.57 |
| 54) | T | trans-1,3-Dich... | 0.349 | 0.350 | 0.460 | 0.400 | 0.381 | 0.406 | 0.475 | 0.462 | 0.474 | 0.417 | 12.36 |
| 55) | T | 1,1,2-Trichlor... | 0.245 | 0.248 | 0.365 | 0.284 | 0.258 | 0.252 | 0.290 | 0.281 | 0.286 | 0.279 | 13.16 |
| 56) | IR | Chlorobenzene-d5 (... | ----------ISTD---------- | | | | | | | | | | |
| 57) | S | Toluene-d8 (SS2) | 2.151 | 2.144 | 2.200 | 2.167 | 2.149 | 2.131 | 2.087 | 2.096 | 2.102 | 2.136 | 1.71 |
| 58) | T | Toluene | 2.611 | 2.604 | 3.397 | 2.459 | 2.266 | 2.242 | 2.461 | 2.379 | 2.396 | 2.535 | 13.72 |
| 59) | T | 2-Hexanone | 2.045 | 1.888 | 1.990 | 1.611 | 1.460 | 1.555 | 1.769 | 1.717 | 1.751 | 1.754 | 11.15 |
| 60) | T | Dibromochlorom... | 0.499 | 0.552 | 0.763 | 0.648 | 0.593 | 0.645 | 0.761 | 0.752 | 0.770 | 0.665 | 15.38 |
| 61) | T | 1,2-Dibromoethane | 0.588 | 0.552 | 0.824 | 0.666 | 0.624 | 0.652 | 0.723 | 0.704 | 0.709 | 0.671 | 12.02 |
| 62) | T | n-Butyl Acetate | 1.823 | 1.719 | 2.024 | 1.720 | 1.537 | 1.620 | 1.779 | 1.720 | 1.750 | 1.744 | 7.75 |
| 63) | T | n-Octane | 0.726 | 0.755 | 0.700 | 0.603 | 0.527 | 0.507 | 0.572 | 0.561 | 0.607 | 0.618 | 14.43 |
| 64) | T | Tetrachloroethene | 0.599 | 0.623 | 0.891 | 0.669 | 0.601 | 0.611 | 0.713 | 0.722 | 0.758 | 0.687 | 13.95 |
| 65) | T | Chlorobenzene | 1.416 | 1.448 | 2.014 | 1.553 | 1.461 | 1.477 | 1.692 | 1.666 | 1.677 | 1.600 | 11.76 |
| 66) | T | Ethylbenzene | 2.528 | 2.562 | 3.539 | 2.781 | 2.565 | 2.639 | 3.024 | 2.961 | 2.889 | 2.832 | 11.39 |
| 67) | T | m- & p-Xylenes | 1.990 | 2.046 | 2.896 | 2.201 | 2.057 | 2.188 | 2.527 | 2.489 | 2.337 | 2.303 | 12.71 |
| 68) | T | Bromoform | | | 0.550 | 0.455 | 0.433 | 0.505 | 0.643 | 0.648 | 0.654 | 0.555 | 17.00 |
| 69) | T | Styrene | 1.524 | 1.490 | 2.006 | 1.564 | 1.471 | 1.635 | 1.894 | 1.835 | 1.787 | 1.689 | 11.58 |
| 70) | T | o-Xylene | 2.138 | 2.139 | 2.971 | 2.284 | 2.105 | 2.257 | 2.615 | 2.564 | 2.457 | 2.392 | 12.00 |
| 71) | T | n-Nonane | 1.345 | 1.402 | 1.706 | 1.366 | 1.261 | 1.332 | 1.526 | 1.498 | 1.511 | 1.439 | 9.39 |
| 72) | T | 1,1,2,2-Tetrac... | 1.009 | 1.060 | 1.402 | 1.178 | 1.070 | 1.185 | 1.348 | 1.331 | 1.332 | 1.213 | 12.01 |
| 73) | S | Bromofluoroben... | 0.866 | 0.891 | 0.802 | 0.798 | 0.797 | 0.823 | 0.857 | 0.866 | 0.852 | 0.839 | 4.16 |
| 74) | T | Cumene | 2.596 | 2.619 | 3.815 | 2.832 | 2.625 | 2.808 | 3.254 | 3.157 | 2.948 | 2.962 | 13.38 |
| 75) | T | alpha-Pinene | 1.153 | 1.228 | 1.721 | 1.422 | 1.341 | 1.420 | 1.683 | 1.671 | 1.640 | 1.475 | 14.33 |
| 76) | T | n-Propylbenzene | 3.558 | 3.330 | 4.889 | 3.566 | 3.262 | 3.565 | 4.083 | 3.914 | 3.518 | 3.743 | 13.39 |
| 77) | T | 3-Ethyltoluene | 2.470 | 2.454 | 3.507 | 2.656 | 2.508 | 2.739 | 3.136 | 3.186 | 2.803 | 2.829 | 13.07 |
| 78) | T | 4-Ethyltoluene | 2.455 | 2.360 | 3.181 | 2.579 | 2.389 | 2.674 | 3.161 | 2.882 | 2.774 | 2.717 | 11.40 |
| 79) | T | 1,3,5-Trimethy... | 2.087 | 2.081 | 3.067 | 2.229 | 2.069 | 2.324 | 2.674 | 2.613 | 2.433 | 2.397 | 14.08 |
| 80) | T | alpha-Methylst... | | | 1.351 | 1.130 | 1.048 | 1.246 | 1.463 | 1.419 | 1.334 | 1.284 | 11.81 |
| 81) | T | 2-Ethyltoluene | 2.390 | 2.415 | 3.495 | 2.600 | 2.419 | 2.725 | 3.086 | 2.955 | 2.725 | 2.757 | 13.36 |
| 82) | T | 1,2,4-Trimethy... | | | 2.815 | 2.214 | 2.055 | 2.407 | 2.999 | 2.830 | 2.243 | 2.509 | 14.65 |
| 83) | T | n-Decane | 1.636 | 1.348 | 1.623 | 1.341 | 1.235 | 1.387 | 1.626 | 1.621 | 1.575 | 1.488 | 10.62 |
| 84) | T | Benzyl Chloride | 1.898 | 1.826 | 2.116 | 1.764 | 1.675 | 2.114 | 2.561 | 2.540 | 2.380 | 2.097 | 15.95 |
| 85) | T | 1,3-Dichlorobe... | 1.146 | 1.143 | 1.550 | 1.188 | 1.102 | 1.305 | 1.540 | 1.482 | 1.359 | 1.313 | 13.63 |
| 86) | T | 1,4-Dichlorobe... | 1.253 | 1.241 | 1.615 | 1.207 | 1.148 | 1.368 | 1.571 | 1.524 | 1.438 | 1.374 | 12.48 |
| 87) | T | sec-Butylbenzene | | | 3.728 | 2.958 | 2.726 | 3.103 | 3.460 | 3.250 | 2.874 | 3.157 | 11.09 |
| 88) | T | 4-Isopropyltol... | | | 3.373 | 2.631 | 2.486 | 2.961 | 3.477 | 3.117 | 2.379 | 2.918 | 14.81 |
| 89) | T | 1,2,3-Trimethy... | | | 2.976 | 2.314 | 2.169 | 2.566 | 3.174 | 2.964 | 2.302 | 2.638 | 15.09 |
| 90) | T | 1,2-Dichlorobe... | | | 1.491 | 1.144 | 1.068 | 1.291 | 1.565 | 1.481 | 1.248 | 1.327 | 14.27 |
| 91) | T | d-Limonene | 0.881 | 0.810 | 1.112 | 0.923 | 0.874 | 1.040 | 1.260 | 1.259 | 1.059 | 1.024 | 16.15 |
| 92) | T | 1,2-Dibromo-3-... | | | 0.473 | 0.368 | 0.362 | 0.458 | 0.520 | 0.513 | 0.509 | 0.458 | 14.67 |
| 93) | T | n-Undecane | 1.216 | 1.321 | 1.711 | 1.432 | 1.279 | 1.456 | 1.686 | 1.693 | 1.628 | 1.491 | 12.99 |
| 94) | T | 1,2,4-Trichlor... | 0.834 | 0.779 | 0.996 | 0.695 | 0.640 | 0.798 | 0.961 | 0.994 | 0.997 | 0.855 | 16.13 |

Method Path : I:\MS16\METHODS\
Method File : R16033015.M
Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 95) | T | Naphthalene | 3.504 | 2.894 | 4.005 | 2.464 | 2.355 | 3.010 | 3.527 | 3.349 | 2.748 | 3.095 | 17.55 |
| 96) | T | n-Dodecane | | | 1.379 | 1.231 | 1.024 | 1.350 | 1.667 | 1.699 | 1.405 | 1.394 | 16.91 |
| 97) | T | Hexachlorobuta... | | | 0.524 | 0.401 | 0.376 | 0.446 | 0.556 | 0.608 | 0.638 | 0.507 | 20.09 |
| 98) | T | Cyclohexanone | 1.335 | 1.176 | 1.231 | 0.932 | 0.829 | 0.904 | 1.016 | 0.985 | 0.986 | 1.044 | 16.01 |
| 99) | T | tert-Butylbenzene | | | 2.747 | 2.126 | 2.003 | 2.301 | 2.773 | 2.543 | 2.025 | 2.360 | 13.96 |
| 100) | T | n-Butylbenzene | 2.320 | 2.307 | 2.971 | 2.394 | 2.249 | 2.563 | 2.844 | 2.710 | 2.464 | 2.536 | 10.07 |

---

(#) = Out of Range

LH 3/31/15

# INITIAL CALIBRATION VERIFICATION CHECK SHEET

Data File Name: **03301532.D**
Data File Path: **I:\MS16\DATA\2015_03\30**
Operator: **LH**
Date Acquired: **3/31/15** **9:36**

Acq. Method File: **TO15.M**
Sample Name: **25ng TO-15 ICV STD**
Misc Info: **S29-03121501/S29-03241504 (**
Instrument Name: **GCMS-16**

| # | Compound Name | Ret. Time | Amt. (ng) | Spike Amt.(ng) | % Rec. | Lower Limit | Upper Limit | * OR Fail |
|---|---|---|---|---|---|---|---|---|
| 2) | Propene | 4.11 | 23.3 | 25.00 | 93 | 70 | 130 | * |
| 3) | Dichlorodifluoromethane (CFC 12 | 4.27 | 23.8 | 25.50 | 93 | 70 | 130 | * |
| 4) | Chloromethane | 4.55 | 22.0 | 24.75 | 89 | 70 | 130 | * |
| 5) | 1,2-Dichloro-1,1,2,2-tetrafluoroeth | 4.81 | 25.2 | 25.75 | 98 | 70 | 130 | * |
| 6) | Vinyl Chloride | 4.97 | 24.0 | 25.25 | 95 | 70 | 130 | * |
| 7) | 1,3-Butadiene | 5.24 | 26.4 | 26.75 | 99 | 70 | 130 | * |
| 8) | Bromomethane | 5.68 | 23.6 | 25.25 | 93 | 70 | 130 | * |
| 9) | Chloroethane | 6.01 | 21.3 | 25.25 | 84 | 70 | 130 | * |
| 10) | Ethanol | 6.41 | 108 | 127.25 | 85 | 70 | 130 | * |
| 11) | Acetonitrile | 6.65 | 24.2 | 25.50 | 95 | 70 | 130 | * |
| 12) | Acrolein | 6.83 | 29.4 | 26.75 | 110 | 70 | 130 | * |
| 13) | Acetone | 7.05 | 131 | 135.00 | 97 | 70 | 130 | * |
| 14) | Trichlorofluoromethane | 7.28 | 26.2 | 24.75 | 106 | 70 | 130 | * |
| 15) | 2-Propanol (Isopropanol) | 7.55 | 47.7 | 52.50 | 91 | 70 | 130 | * |
| 16) | Acrylonitrile | 7.80 | 26.2 | 26.00 | 101 | 70 | 130 | * |
| 17) | 1,1-Dichloroethene | 8.24 | 26.8 | 26.75 | 100 | 70 | 130 | * |
| 18) | 2-Methyl-2-Propanol (tert-Butyl Alco | 8.42 | 50.9 | 52.75 | 96 | 70 | 130 | * |
| 19) | Methylene Chloride | 8.48 | 26.7 | 27.00 | 99 | 70 | 130 | * |
| 20) | 3-Chloro-1-propene (Allyl Chlorid | 8.63 | 25.9 | 27.25 | 95 | 70 | 130 | * |
| 21) | Trichlorotrifluoroethane | 8.88 | 27.6 | 27.00 | 102 | 70 | 130 | * |
| 22) | Carbon Disulfide | 8.73 | 27.9 | 24.50 | 114 | 70 | 130 | * |
| 23) | trans-1,2-Dichloroethene | 9.75 | 26.5 | 26.50 | 100 | 70 | 130 | * |
| 24) | 1,1-Dichloroethane | 10.00 | 24.9 | 26.00 | 96 | 70 | 130 | * |
| 25) | Methyl tert-Butyl Ether | 10.10 | 25.7 | 26.50 | 97 | 70 | 130 | * |
| 26) | Vinyl Acetate | 10.26 | 125 | 128.00 | 98 | 70 | 130 | * |
| 27) | 2-Butanone (MEK) | 10.50 | 24.4 | 27.00 | 90 | 70 | 130 | * |
| 28) | cis-1,2-Dichloroethene | 11.02 | 26.5 | 26.75 | 99 | 70 | 130 | * |
| 29) | Diisopropyl Ether | 11.32 | 26.0 | 27.25 | 95 | 70 | 130 | * |
| 30) | Ethyl Acetate | 11.32 | 53.9 | 53.50 | 101 | 70 | 130 | * |
| 31) | n-Hexane | 11.30 | 23.7 | 26.25 | 90 | 70 | 130 | * |
| 32) | Chloroform | 11.37 | 26.1 | 27.00 | 97 | 70 | 130 | * |
| 34) | Tetrahydrofuran (THF) | 11.77 | 22.4 | 25.75 | 87 | 70 | 130 | * |
| 35) | Ethyl tert-Butyl Ether | 11.91 | 27.0 | 26.50 | 102 | 70 | 130 | * |
| 36) | 1,2-Dichloroethane | 12.17 | 24.7 | 26.25 | 94 | 70 | 130 | * |
| 38) | 1,1,1-Trichloroethane | 12.45 | 25.5 | 26.00 | 98 | 70 | 130 | * |
| 39) | Isopropyl Acetate | 12.88 | 60.4 | 54.50 | 111 | 70 | 130 | * |
| 40) | 1-Butanol | 12.90 | 57.1 | 55.75 | 102 | 70 | 130 | * |
| 41) | Benzene | 12.92 | 24.0 | 27.50 | 87 | 70 | 130 | * |
| 42) | Carbon Tetrachloride | 13.08 | 30.1 | 26.75 | 113 | 70 | 130 | * |
| 43) | Cyclohexane | 13.22 | 55.2 | 52.75 | 105 | 70 | 130 | * |
| 44) | tert-Amyl Methyl Ether | 13.57 | 26.8 | 26.25 | 102 | 70 | 130 | * |
| 45) | 1,2-Dichloropropane | 13.78 | 25.9 | 26.50 | 98 | 70 | 130 | * |
| 46) | Bromodichloromethane | 13.97 | 28.0 | 27.00 | 104 | 70 | 130 | * |
| 47) | Trichloroethene | 14.02 | 27.2 | 26.00 | 105 | 70 | 130 | * |
| 48) | 1,4-Dioxane | 14.00 | 26.0 | 27.25 | 95 | 70 | 130 | * |
| 49) | 2,2,4-Trimethylpentane (Isooctane) | 14.09 | 26.3 | 26.00 | 101 | 70 | 130 | * |

# INITIAL CALIBRATION VERIFICATION CHECK SHEET

Data File Name: **03301532.D** Acq. Method File: **TO15.M**
Data File Path: **I:\MS16\DATA\2015_03\30** Sample Name: **25ng TO-15 ICV STD**
Operator: **LH** Misc Info: **S29-03121501/S29-03241504 (**
Date Acquired: **3/31/15** **9:36** Instrument Name: **GCMS-16**

| # | Compound Name | Ret. Time | Amt. (ng) | Spike Amt.(ng) | % Rec. | Lower Limit | Upper Limit | * OR Fail |
|---|---|---|---|---|---|---|---|---|
| **50)** | **Methyl Methacrylate** | **14.23** | **57.8** | **52.50** | 110 | **70** | **130** | * |
| **51)** | **n-Heptane** | **14.35** | **26.2** | **26.75** | 98 | **70** | **130** | * |
| **52)** | **cis-1,3-Dichloropropene** | **14.89** | **30.3** | **28.25** | 107 | **70** | **130** | * |
| **53)** | **4-Methyl-2-pentanone** | **14.92** | **27.4** | **27.25** | 101 | **70** | **130** | * |
| **54)** | **trans-1,3-Dichloropropene** | **15.40** | **29.2** | **27.00** | 108 | **70** | **130** | * |
| **55)** | **1,1,2-Trichloroethane** | **15.58** | **26.6** | **26.50** | 100 | **70** | **130** | * |
| **58)** | **Toluene** | **15.87** | **26.1** | **26.50** | 98 | **70** | **130** | * |
| **59)** | **2-Hexanone** | **16.11** | **25.4** | **27.75** | 92 | **70** | **130** | * |
| **60)** | **Dibromochloromethane** | **16.28** | **31.8** | **27.50** | 116 | **70** | **130** | * |
| **61)** | **1,2-Dibromoethane** | **16.53** | **29.4** | **27.00** | 109 | **70** | **130** | * |
| **62)** | **n-Butyl Acetate** | **16.75** | **28.3** | **28.00** | 101 | **70** | **130** | * |
| **63)** | **n-Octane** | **16.88** | **24.0** | **26.00** | 92 | **70** | **130** | * |
| **64)** | **Tetrachloroethene** | **17.02** | **26.5** | **24.75** | 107 | **70** | **130** | * |
| **65)** | **Chlorobenzene** | **17.68** | **28.7** | **27.00** | 106 | **70** | **130** | * |
| **66)** | **Ethylbenzene** | **18.03** | **28.5** | **26.50** | 108 | **70** | **130** | * |
| **67)** | **m- & p-Xylenes** | **18.20** | **57.3** | **52.50** | 109 | **70** | **130** | * |
| **68)** | **Bromoform** | **18.26** | **34.2** | **27.00** | 127 | **70** | **130** | * |
| **69)** | **Styrene** | **18.52** | **30.1** | **27.25** | 110 | **70** | **130** | * |
| **70)** | **o-Xylene** | **18.63** | **28.1** | **25.75** | 109 | **70** | **130** | * |
| **71)** | **n-Nonane** | **18.82** | **26.4** | **25.50** | 104 | **70** | **130** | * |
| **72)** | **1,1,2,2-Tetrachloroethane** | **18.60** | **28.3** | **25.25** | 112 | **70** | **130** | * |
| **74)** | **Cumene** | **19.15** | **28.0** | **25.50** | 110 | **70** | **130** | * |
| **75)** | **alpha-Pinene** | **19.50** | **29.4** | **26.00** | 113 | **70** | **130** | * |
| **76)** | **n-Propylbenzene** | **19.60** | **27.4** | **25.25** | 109 | **70** | **130** | * |
| 77) | 3-Ethyltoluene | 19.69 | 29.2 | 26.50 | 110 | **70** | **130** | * |
| **78)** | **4-Ethyltoluene** | **19.73** | **30.6** | **26.50** | **115** | **70** | **130** | * |
| **79)** | **1,3,5-Trimethylbenzene** | **19.80** | **29.0** | **26.50** | **109** | **70** | **130** | * |
| 80) | alpha-Methylstyrene | 19.94 | 29.6 | 26.00 | **114** | **70** | **130** | * |
| 81) | 2-Ethyltoluene | 19.97 | 29.4 | 26.25 | **112** | **70** | **130** | * |
| **82)** | **1,2,4-Trimethylbenzene** | **20.16** | **31.0** | **26.25** | **118** | **70** | **130** | * |
| 83) | n-Decane | 20.25 | 27.6 | 25.75 | **107** | **70** | **130** | * |
| **84)** | **Benzyl Chloride** | **20.28** | **32.4** | **27.25** | **119** | **70** | **130** | * |
| **85)** | **1,3-Dichlorobenzene** | **20.29** | **31.4** | **27.25** | **115** | **70** | **130** | * |
| **86)** | **1,4-Dichlorobenzene** | **20.35** | **28.6** | **26.50** | **108** | **70** | **130** | * |
| 87) | sec-Butylbenzene | 20.40 | 29.2 | 26.75 | **109** | **70** | **130** | * |
| 88) | 4-Isopropyltoluene (p-Cymene) | 20.53 | 30.4 | 25.25 | **120** | **70** | **130** | * |
| 89) | 1,2,3-Trimethylbenzene | 20.53 | 30.5 | 26.25 | **116** | **70** | **130** | * |
| **90)** | **1,2-Dichlorobenzene** | **20.66** | **31.2** | **26.75** | **117** | **70** | **130** | * |
| **91)** | **d-Limonene** | **20.66** | **31.0** | **26.25** | **118** | **70** | **130** | * |
| **92)** | **1,2-Dibromo-3-Chloropropane** | **21.04** | **30.8** | **25.75** | **120** | **70** | **130** | * |
| 93) | n-Undecane | 21.35 | 28.0 | 25.25 | **111** | **70** | **130** | * |
| **94)** | **1,2,4-Trichlorobenzene** | **22.16** | **29.5** | **26.25** | **112** | **70** | **130** | * |
| **95)** | **Naphthalene** | **22.27** | **28.4** | **24.50** | **116** | **70** | **130** | * |
| 96) | n-Dodecane | 22.26 | 32.4 | 25.25 | **128** | **70** | **130** | * |
| **97)** | **Hexachlorobutadiene** | **22.59** | **31.5** | **26.75** | **118** | **70** | **130** | * |
| 98) | Cyclohexanone | 18.33 | 26.9 | 27.75 | 97 | **70** | **130** | * |
| 99) | tert-Butylbenzene | 20.16 | 31.0 | 26.50 | 117 | **70** | **130** | * |
| 100) | n-Butylbenzene | 20.90 | 30.1 | 27.25 | 110 | **70** | **130** | * |

**Bold = 75 Compound List**
*** = Pass**

# Evaluate Continuing Calibration Report

Data File: I:\MS16\DATA\2015_06\12\06121503.D
Acq On : 12 Jun 2015 9:15 Operator: LH
Sample : CCV R16061215_5.0ng
Misc : S29-06041501/S29-05261502 (6/24)
ALS Vial : 2 Sample Multiplier: 1

Quant Time: Jun 12 09:41:49 2015
Quant Method : I:\MS16\METHODS\R16033015.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Mar 31 09:29:26 2015
Response via : Initial Calibration
DataAcq Meth:TO15.M

LH 6/12/15

Min. RRF : 0.000 Min. Rel. Area : 50% Max. R.T. Dev 0.33min
Max. RRF Dev : 30% Max. Rel. Area : 200%

| | | Compound | AvgRF | CCRF | %Dev | Area% | Dev(min) |
|---|---|---|---|---|---|---|---|
| 1 | IR | Bromochloromethane (IS1) | 1.000 | 1.000 | 0.0 | 121 | 0.00 |
| 2 | T | Propene | 1.668 | 2.057 | -23.3 | 153 | -0.05 |
| 3 | T | Dichlorodifluoromethane (CF | 3.523 | 3.126 | 11.3 | 108 | -0.05 |
| 4 | T | Chloromethane | 3.425 | 2.785 | 18.7 | 104 | -0.06 |
| 5 | T | 1,2-Dichloro-1,1,2,2-tetraf | 1.947 | 1.347 | 30.8# | 83 | -0.04 |
| 6 | T | Vinyl Chloride | 3.101 | 2.567 | 17.2 | 99 | -0.05 |
| 7 | T | 1,3-Butadiene | 1.918 | 1.913 | 0.3 | 133 | -0.05 |
| 8 | T | Bromomethane | 1.874 | 1.382 | 26.3 | 93 | -0.04 |
| 9 | T | Chloroethane | 1.364 | 1.223 | 10.3 | 96 | -0.04 |
| 10 | T | Ethanol | 1.326 | 1.253 | 5.5 | 108 | 0.01 |
| 11 | T | Acetonitrile | 3.008 | 3.250 | -8.0 | 134 | -0.02 |
| 12 | T | Acrolein | 0.826 | 0.859 | -4.0 | 120 | -0.02 |
| 13 | T | Acetone | 1.285 | 1.195 | 7.0 | 124 | -0.03 |
| 14 | T | Trichlorofluoromethane | 2.578 | 2.268 | 12.0 | 109 | -0.03 |
| 15 | T | 2-Propanol (Isopropanol) | 4.705 | 4.072 | 13.5 | 119 | -0.01 |
| 16 | T | Acrylonitrile | 2.039 | 2.205 | -8.1 | 129 | -0.01 |
| 17 | T | 1,1-Dichloroethene | 1.381 | 1.269 | 8.1 | 116 | -0.02 |
| 18 | T | 2-Methyl-2-Propanol (tert-B | 4.462 | 3.230 | 27.6 | 95 | -0.03 |
| 19 | T | Methylene Chloride | 1.495 | 1.382 | 7.6 | 118 | 0.00 |
| 20 | T | 3-Chloro-1-propene (Allyl C | 2.376 | 2.421 | -1.9 | 127 | -0.02 |
| 21 | T | Trichlorotrifluoroethane | 1.170 | 1.035 | 11.5 | 111 | -0.02 |
| 22 | T | Carbon Disulfide | 5.281 | 5.252 | 0.5 | 124 | -0.02 |
| 23 | T | trans-1,2-Dichloroethene | 2.305 | 2.265 | 1.7 | 121 | 0.00 |
| 24 | T | 1,1-Dichloroethane | 2.848 | 2.788 | 2.1 | 123 | 0.00 |
| 25 | T | Methyl tert-Butyl Ether | 4.585 | 4.206 | 8.3 | 118 | -0.02 |
| 26 | T | Vinyl Acetate | 0.406 | 0.289 | 28.8 | 103 | 0.00 |
| 27 | T | 2-Butanone (MEK) | 1.089 | 0.951 | 12.7 | 116 | -0.01 |
| 28 | T | cis-1,2-Dichloroethene | 2.202 | 2.148 | 2.5 | 121 | 0.00 |
| 29 | T | Diisopropyl Ether | 1.340 | 1.293 | 3.5 | 142 | -0.01 |
| 30 | T | Ethyl Acetate | 0.594 | 0.570 | 4.0 | 125 | 0.00 |
| 31 | T | n-Hexane | 2.451 | 2.417 | 1.4 | 136 | 0.00 |
| 32 | T | Chloroform | 2.687 | 2.381 | 11.4 | 112 | 0.01 |
| 33 | S | 1,2-Dichloroethane-d4(SS1) | 2.088 | 2.008 | 3.8 | 114 | 0.01 |
| 34 | T | Tetrahydrofuran (THF) | 1.104 | 0.938 | 15.0 | 114 | -0.02 |
| 35 | T | Ethyl tert-Butyl Ether | 1.739 | 1.582 | 9.0 | 116 | 0.00 |
| 36 | T | 1,2-Dichloroethane | 2.189 | 1.886 | 13.8 | 108 | 0.00 |
| 37 | IR | 1,4-Difluorobenzene (IS2) | 1.000 | 1.000 | 0.0 | 118 | 0.00 |
| 38 | T | 1,1,1-Trichloroethane | 0.461 | 0.404 | 12.4 | 110 | 0.00 |
| 39 | T | Isopropyl Acetate | 0.183 | 0.182 | 0.5 | 127 | 0.00 |
| 40 | T | 1-Butanol | 0.347 | 0.279 | 19.6 | 109 | -0.02 |
| 41 | T | Benzene | 1.250 | 1.031 | 17.5 | 120 | 0.00 |
| 42 | T | Carbon Tetrachloride | 0.356 | 0.306 | 14.0 | 105 | 0.00 |
| 43 | T | Cyclohexane | 0.438 | 0.403 | 8.0 | 118 | 0.00 |
| 44 | T | tert-Amyl Methyl Ether | 0.873 | 0.803 | 8.0 | 116 | 0.00 |
| 45 | T | 1,2-Dichloropropane | 0.297 | 0.299 | -0.7 | 127 | 0.00 |
| 46 | T | Bromodichloromethane | 0.406 | 0.369 | 9.1 | 112 | 0.00 |
| 47 | T | Trichloroethene | 0.292 | 0.251 | 14.0 | 111 | 0.00 |
| 48 | T | 1,4-Dioxane | 0.250 | 0.215 | 14.0 | 112 | -0.01 |
| 49 | T | 2,2,4-Trimethylpentane (Iso | 1.297 | 1.334 | -2.9 | 127 | 0.00 |
| 50 | T | Methyl Methacrylate | 0.110 | 0.100 | 9.1 | 113 | 0.00 |
| 51 | T | n-Heptane | 0.259 | 0.258 | 0.4 | 129 | 0.00 |
| 52 | T | cis-1,3-Dichloropropene | 0.454 | 0.435 | 4.2 | 118 | 0.00 |
| 53 | T | 4-Methyl-2-pentanone | 0.287 | 0.275 | 4.2 | 124 | 0.00 |
| 54 | T | trans-1,3-Dichloropropene | 0.417 | 0.394 | 5.5 | 114 | 0.00 |

Evaluate Continuing Calibration Report

Data File: I:\MS16\DATA\2015_06\12\06121503.D
Acq On : 12 Jun 2015 9:15 Operator: LH
Sample : CCV R16061215_5.0ng
Misc : S29-06041501/S29-05261502 (6/24)
ALS Vial : 2 Sample Multiplier: 1

Quant Time: Jun 12 09:41:49 2015
Quant Method : I:\MS16\METHODS\R16033015.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Mar 31 09:29:26 2015
Response via : Initial Calibration
DataAcq Meth:TO15.M

Min. RRF : 0.000 Min. Rel. Area : 50% Max. R.T. Dev 0.33min
Max. RRF Dev : 30% Max. Rel. Area : 200%

| | | Compound | AvgRF | CCRF | %Dev | Area% | Dev(min) |
|---|---|---|---|---|---|---|---|
| 55 | T | 1,1,2-Trichloroethane | 0.279 | 0.246 | 11.8 | 115 | 0.00 |
| 56 | IR | Chlorobenzene-d5 (IS3) | 1.000 | 1.000 | 0.0 | 114 | 0.00 |
| 57 | S | Toluene-d8 (SS2) | 2.136 | 2.189 | -2.5 | 117 | 0.00 |
| 58 | T | Toluene | 2.535 | 2.296 | 9.4 | 117 | 0.00 |
| 59 | T | 2-Hexanone | 1.754 | 1.665 | 5.1 | 122 | 0.00 |
| 60 | T | Dibromochloromethane | 0.665 | 0.620 | 6.8 | 110 | 0.00 |
| 61 | T | 1,2-Dibromoethane | 0.671 | 0.631 | 6.0 | 111 | 0.00 |
| 62 | T | n-Butyl Acetate | 1.744 | 1.738 | 0.3 | 123 | 0.00 |
| 63 | T | n-Octane | 0.618 | 0.590 | 4.5 | 133 | 0.00 |
| 64 | T | Tetrachloroethene | 0.687 | 0.607 | 11.6 | 114 | 0.00 |
| 65 | T | Chlorobenzene | 1.600 | 1.463 | 8.6 | 113 | 0.00 |
| 66 | T | Ethylbenzene | 2.832 | 2.632 | 7.1 | 114 | 0.00 |
| 67 | T | m- & p-Xylenes | 2.303 | 2.143 | 6.9 | 112 | 0.00 |
| 68 | T | Bromoform | 0.555 | 0.486 | 12.4 | 110 | 0.00 |
| 69 | T | Styrene | 1.689 | 1.539 | 8.9 | 108 | 0.00 |
| 70 | T | o-Xylene | 2.392 | 2.214 | 7.4 | 112 | 0.00 |
| 71 | T | n-Nonane | 1.439 | 1.574 | -9.4 | 135 | 0.00 |
| 72 | T | 1,1,2,2-Tetrachloroethane | 1.213 | 1.166 | 3.9 | 113 | 0.00 |
| 73 | S | Bromofluorobenzene (SS3) | 0.839 | 0.732 | 12.8 | 102 | 0.00 |
| 74 | T | Cumene | 2.962 | 2.699 | 8.9 | 110 | 0.00 |
| 75 | T | alpha-Pinene | 1.475 | 1.380 | 6.4 | 111 | 0.00 |
| 76 | T | n-Propylbenzene | 3.743 | 3.473 | 7.2 | 111 | 0.00 |
| 77 | T | 3-Ethyltoluene | 2.829 | 2.688 | 5.0 | 112 | 0.00 |
| 78 | T | 4-Ethyltoluene | 2.717 | 2.410 | 11.3 | 103 | 0.00 |
| 79 | T | 1,3,5-Trimethylbenzene | 2.397 | 2.175 | 9.3 | 107 | 0.00 |
| 80 | T | alpha-Methylstyrene | 1.284 | 1.090 | 15.1 | 100 | 0.00 |
| 81 | T | 2-Ethyltoluene | 2.757 | 2.534 | 8.1 | 106 | 0.00 |
| 82 | T | 1,2,4-Trimethylbenzene | 2.509 | 2.190 | 12.7 | 104 | 0.00 |
| 83 | T | n-Decane | 1.488 | 1.488 | 0.0 | 123 | 0.00 |
| 84 | T | Benzyl Chloride | 2.097 | 1.806 | 13.9 | 98 | 0.00 |
| 85 | T | 1,3-Dichlorobenzene | 1.313 | 1.159 | 11.7 | 102 | 0.00 |
| 86 | T | 1,4-Dichlorobenzene | 1.374 | 1.230 | 10.5 | 103 | 0.00 |
| 87 | T | sec-Butylbenzene | 3.157 | 2.868 | 9.2 | 106 | 0.00 |
| 88 | T | 4-Isopropyltoluene (p-Cymen | 2.918 | 2.609 | 10.6 | 101 | 0.00 |
| 89 | T | 1,2,3-Trimethylbenzene | 2.638 | 2.306 | 12.6 | 103 | 0.00 |
| 90 | T | 1,2-Dichlorobenzene | 1.327 | 1.145 | 13.7 | 101 | 0.00 |
| 91 | T | d-Limonene | 1.024 | 0.994 | 2.9 | 109 | 0.00 |
| 92 | T | 1,2-Dibromo-3-Chloropropane | 0.458 | 0.404 | 11.8 | 101 | 0.00 |
| 93 | T | n-Undecane | 1.491 | 1.494 | -0.2 | 117 | 0.00 |
| 94 | T | 1,2,4-Trichlorobenzene | 0.855 | 0.760 | 11.1 | 109 | 0.00 |
| 95 | T | Naphthalene | 3.095 | 2.408 | 22.2 | 92 | 0.00 |
| 96 | T | n-Dodecane | 1.394 | 1.256 | 9.9 | 106 | 0.00 |
| 97 | T | Hexachlorobutadiene | 0.507 | 0.464 | 8.5 | 119 | 0.00 |
| 98 | T | Cyclohexanone | 1.044 | 0.872 | 16.5 | 110 | 0.00 |
| 99 | T | tert-Butylbenzene | 2.360 | 2.048 | 13.2 | 102 | 0.00 |
| 100 | T | n-Butylbenzene | 2.536 | 2.403 | 5.2 | 107 | 0.00 |

(#) = Out of Range SPCC's out = 0 CCC's out = 0

Quantitation Report (QT Reviewed)

Data File: I:\MS16\DATA\2015_06\12\06121503.D
Acq On : 12 Jun 2015 9:15 Operator: LH
Sample : CCV R16061215_5.0ng
Misc : S29-06041501/S29-05261502 (6/24)
ALS Vial : 2 Sample Multiplier: 1

Quant Time: Jun 12 09:41:49 2015
Quant Method : I:\MS16\METHODS\R16033015.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS) LH 6/12/15
QLast Update : Tue Mar 31 09:29:26 2015
Response via : Initial Calibration
DataAcq Meth:TO15.M

| Internal Standards | R.T. | QIon | Response | Conc | Units | | Dev(Min) |
|---|---|---|---|---|---|---|---|
| 1) Bromochloromethane (IS1) | 11.19 | 130 | 156617 | 12.500 | ng | | 0.00 |
| 37) 1,4-Difluorobenzene (IS2) | 13.32 | 114 | 796587 | 12.500 | ng | | 0.00 |
| 56) Chlorobenzene-d5 (IS3) | 17.63 | 82 | 348831 | 12.500 | ng | | 0.00 |
| **System Monitoring Compounds** | | | | | | | |
| 33) 1,2-Dichloroethane-d4(... | 12.04 | 65 | 314497 | 12.024 | ng | | 0.01 |
| Spiked Amount 12.500 | | | Recovery = 96.16% | | | | |
| 57) Toluene-d8 (SS2) | 15.77 | 98 | 763428 | 12.805 | ng | | 0.00 |
| Spiked Amount 12.500 | | | Recovery = 102.40% | | | | |
| 73) Bromofluorobenzene (SS3) | 19.02 | 174 | 255229 | 10.899 | ng | | 0.00 |
| Spiked Amount 12.500 | | | Recovery = 87.20% | | | | |
| **Target Compounds** | | | | | | | Qvalue |
| 2) Propene | 4.11 | 42 | 127558 | 6.103 | ng | | 97 |
| 3) Dichlorodifluoromethan... | 4.26 | 85 | 186022 | 4.215 | ng | | 100 |
| 4) Chloromethane | 4.54 | 50 | 176236 | 4.107 | ng | | 99 |
| 5) 1,2-Dichloro-1,1,2,2-t... | 4.81 | 135 | 86050 | 3.528 | ng | | 99 |
| 6) Vinyl Chloride | 4.96 | 62 | 160829 | 4.140 | ng | | 99 |
| 7) 1,3-Butadiene | 5.23 | 54 | 124656 | 5.188 | ng | | 97 |
| 8) Bromomethane | 5.67 | 94 | 88319 | 3.761 | ng | | 99 |
| 9) Chloroethane | 6.00 | 64 | 77405 | 4.530 | ng | | 100 |
| 10) Ethanol | 6.36 | 45 | 404933 | 24.371 | ng | | 100 |
| 11) Acetonitrile | 6.62 | 41 | 215793 | 5.725 | ng | | 100 |
| 12) Acrolein | 6.82 | 56 | 60782 | 5.874 | ng | | 98 |
| 13) Acetone | 7.02 | 58 | 408667 | 25.386 | ng | | 98 |
| 14) Trichlorofluoromethane | 7.27 | 101 | 153421 | 4.750 | ng | | 99 |
| 15) 2-Propanol (Isopropanol) | 7.52 | 45 | 545927 | 9.262 | ng | | 98 |
| 16) Acrylonitrile | 7.78 | 53 | 146395 | 5.729 | ng | | 100 |
| 17) 1,1-Dichloroethene | 8.23 | 96 | 86671 | 5.009 | ng | | 95 |
| 18) 2-Methyl-2-Propanol (t... | 8.39 | 59 | 432980 | 7.745 | ng | | 96 |
| 19) Methylene Chloride | 8.45 | 84 | 97838 | 5.223 | ng | | 91 |
| 20) 3-Chloro-1-propene (Al... | 8.61 | 41 | 165307 | 5.552 | ng | | 90 |
| 21) Trichlorotrifluoroethane | 8.87 | 151 | 70648 | 4.818 | ng | | 97 |
| 22) Carbon Disulfide | 8.72 | 76 | 345476 | 5.221 | ng | | 99 |
| 23) trans-1,2-Dichloroethene | 9.73 | 61 | 150400 | 5.208 | ng | | 94 |
| 24) 1,1-Dichloroethane | 9.98 | 63 | 186860 | 5.237 | ng | | 100 |
| 25) Methyl tert-Butyl Ether | 10.09 | 73 | 287224 | 4.999 | ng | | 97 |
| 26) Vinyl Acetate | 10.25 | 86 | 95158 | 18.688 | ng | # | 50 |
| 27) 2-Butanone (MEK) | 10.49 | 72 | 66112 | 4.847 | ng | # | 86 |
| 28) cis-1,2-Dichloroethene | 11.01 | 61 | 147993 | 5.364 | ng | | 94 |
| 29) Diisopropyl Ether | 11.31 | 87 | 89124 | 5.308 | ng | # | 65 |
| 30) Ethyl Acetate | 11.32 | 61 | 76384 | 10.270 | ng | | 97 |
| 31) n-Hexane | 11.30 | 57 | 162032 | 5.277 | ng | | 99 |
| 32) Chloroform | 11.36 | 83 | 167032 | 4.961 | ng | | 100 |
| 34) Tetrahydrofuran (THF) | 11.77 | 72 | 65203 | 4.714 | ng | # | 84 |
| 35) Ethyl tert-Butyl Ether | 11.91 | 87 | 107045 | 4.912 | ng | # | 88 |
| 36) 1,2-Dichloroethane | 12.16 | 62 | 127599 | 4.651 | ng | | 100 |
| 38) 1,1,1-Trichloroethane | 12.43 | 97 | 135206 | 4.605 | ng | | 100 |
| 39) Isopropyl Acetate | 12.87 | 61 | 132654 | 11.384 | ng | | 99 |
| 40) 1-Butanol | 12.89 | 56 | 202339 | 9.163 | ng | | 86 |
| 41) Benzene | 12.92 | 78 | 371121 | 4.660 | ng | | 100 |
| 42) Carbon Tetrachloride | 13.08 | 117 | 111953 | 4.935 | ng | | 99 |
| 43) Cyclohexane | 13.21 | 84 | 275098 | 9.855 | ng | | 90 |
| 44) tert-Amyl Methyl Ether | 13.56 | 73 | 273714 | 4.919 | ng | | 97 |
| 45) 1,2-Dichloropropane | 13.77 | 63 | 104019 | 5.488 | ng | | 100 |
| 46) Bromodichloromethane | 13.96 | 83 | 128197 | 4.951 | ng | | 99 |
| 47) Trichloroethene | 14.02 | 130 | 86400 | 4.646 | ng | | 100 |
| 48) 1,4-Dioxane | 14.00 | 88 | 74619 | 4.690 | ng | | 92 |
| 49) 2,2,4-Trimethylpentane... | 14.08 | 57 | 454694 | 5.501 | ng | | 95 |

Quantitation Report (QT Reviewed)

Data File: I:\MS16\DATA\2015_06\12\06121503.D
Acq On : 12 Jun 2015 9:15 Operator: LH
Sample : CCV R16061215_5.0ng
Misc : S29-06041501/S29-05261502 (6/24)
ALS Vial : 2 Sample Multiplier: 1

Quant Time: Jun 12 09:41:49 2015
Quant Method : I:\MS16\METHODS\R16033015.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Mar 31 09:29:26 2015
Response via : Initial Calibration
DataAcq Meth:TO15.M

| Internal Standards | R.T. | QIon | Response | Conc Units | | Dev(Min) |
|---|---|---|---|---|---|---|
| 50) Methyl Methacrylate | 14.23 | 100 | 68041 | 9.697 ng | # | 87 |
| 51) n-Heptane | 14.35 | 71 | 89733 | 5.432 ng | | 94 |
| 52) cis-1,3-Dichloropropene | 14.88 | 75 | 145570 | 5.031 ng | | 100 |
| 53) 4-Methyl-2-pentanone | 14.92 | 58 | 97428 | 5.326 ng | | 91 |
| 54) trans-1,3-Dichloropropene | 15.40 | 75 | 132964 | 4.998 ng | | 100 |
| 55) 1,1,2-Trichloroethane | 15.57 | 97 | 85543 | 4.814 ng | | 97 |
| 58) Toluene | 15.87 | 91 | 352424 | 4.981 ng | | 99 |
| 59) 2-Hexanone | 16.11 | 43 | 255556 | 5.221 ng | | 97 |
| 60) Dibromochloromethane | 16.27 | 129 | 95223 | 5.132 ng | | 100 |
| 61) 1,2-Dibromoethane | 16.53 | 107 | 96812 | 5.167 ng | | 99 |
| 62) n-Butyl Acetate | 16.75 | 43 | 281281 | 5.781 ng | | 97 |
| 63) n-Octane | 16.87 | 57 | 87195 | 5.059 ng | | 92 |
| 64) Tetrachloroethene | 17.01 | 166 | 85504 | 4.457 ng | | 100 |
| 65) Chlorobenzene | 17.68 | 112 | 226592 | 5.073 ng | | 99 |
| 66) Ethylbenzene | 18.03 | 91 | 404042 | 5.112 ng | | 98 |
| 67) m- & p-Xylenes | 18.20 | 91 | 645830 | 10.047 ng | | 96 |
| 68) Bromoform | 18.25 | 173 | 77256 | 4.985 ng | | 100 |
| 69) Styrene | 18.52 | 104 | 240444 | 5.100 ng | | 99 |
| 70) o-Xylene | 18.62 | 91 | 327462 | 4.905 ng | | 97 |
| 71) n-Nonane | 18.82 | 43 | 228462 | 5.690 ng | | 93 |
| 72) 1,1,2,2-Tetrachloroethane | 18.60 | 83 | 170901 | 5.050 ng | | 99 |
| 74) Cumene | 19.15 | 105 | 391695 | 4.739 ng | | 98 |
| 75) alpha-Pinene | 19.50 | 93 | 205964 | 5.002 ng | | 97 |
| 76) n-Propylbenzene | 19.60 | 91 | 499133 | 4.779 ng | | 97 |
| 77) 3-Ethyltoluene | 19.69 | 105 | 405033 | 5.131 ng | | 94 |
| 78) 4-Ethyltoluene | 19.73 | 105 | 363110 | 4.789 ng | | 98 |
| 79) 1,3,5-Trimethylbenzene | 19.79 | 105 | 324662 | 4.853 ng | | 98 |
| 80) alpha-Methylstyrene | 19.93 | 118 | 164317 | 4.584 ng | | 98 |
| 81) 2-Ethyltoluene | 19.96 | 105 | 381869 | 4.964 ng | | 98 |
| 82) 1,2,4-Trimethylbenzene | 20.16 | 105 | 333088 | 4.757 ng | | 100 |
| 83) n-Decane | 20.24 | 57 | 220070 | 5.300 ng | | 95 |
| 84) Benzyl Chloride | 20.27 | 91 | 287298 | 4.909 ng | | 96 |
| 85) 1,3-Dichlorobenzene | 20.29 | 146 | 184430 | 5.034 ng | | 99 |
| 86) 1,4-Dichlorobenzene | 20.35 | 146 | 181928 | 4.745 ng | | 100 |
| 87) sec-Butylbenzene | 20.40 | 105 | 436204 | 4.951 ng | | 98 |
| 88) 4-Isopropyltoluene (p-... | 20.53 | 119 | 389587 | 4.785 ng | | 97 |
| 89) 1,2,3-Trimethylbenzene | 20.53 | 105 | 341114 | 4.634 ng | | 98 |
| 90) 1,2-Dichlorobenzene | 20.65 | 146 | 177286 | 4.788 ng | | 100 |
| 91) d-Limonene | 20.66 | 68 | 148335 | 5.190 ng | | 93 |
| 92) 1,2-Dibromo-3-Chloropr... | 21.04 | 157 | 62052 | 4.858 ng | | 92 |
| 93) n-Undecane | 21.34 | 57 | 216841 | 5.210 ng | | 94 |
| 94) 1,2,4-Trichlorobenzene | 22.16 | 180 | 119876 | 5.024 ng | | 99 |
| 95) Naphthalene | 22.26 | 128 | 373023 | 4.319 ng | | 98 |
| 96) n-Dodecane | 22.26 | 57 | 198068 | 5.093 ng | | 94 |
| 97) Hexachlorobutadiene | 22.58 | 225 | 72553 | 5.125 ng | | 99 |
| 98) Cyclohexanone | 18.32 | 55 | 143589 | 4.930 ng | | 96 |
| 99) tert-Butylbenzene | 20.16 | 119 | 308619 | 4.687 ng | | 98 |
| 100) n-Butylbenzene | 20.90 | 91 | 375580 | 5.307 ng | | 97 |

(#) = qualifier out of range (m) = manual integration (+) = signals summed

**Case Narrative and Data Package Checklist**

Initiated By: Kate Date: 6/13/15 Project ID: PL5022283

**General:**

✓ Condition of samples as received and client's consent to proceed with analysis noted, if necessary?

✓ Data verified based on the following documentation when available - Chain of Custody, SR Form, Sample Acceptance Check Form, and paperwork sent with samples.

✓ All Methods have Summaries

NA TO-15 canisters pressurized with helium or Nitrogen? Use AutoText: TO15HE or TO15N2

**State Specific Information:**

Arizona

/ AZR (Result not obtained by method approved for compliance)

/ AZTO (Certified for EPA TO-15 and 3C, other air methods not compliant)

Massachusetts APH - CAM Compliant

AutoText: ☐ CAMAPH ☐ CAMTO151 ☐ CAMTO152

/ MassDEP Analytical Protocol Certification Form included

/ Flow Controller Calibration RPD Form included

/ QC Certification Summary included

/ Media Request Included

**DOD Requirements:**

✓ Insert AutoText DODMI: 3C 3CM RSKFID RSKTCD TO3 1946 SIM TO15BAG TO15CAN TO15HE TO15N2

**S8 Analysis:**

/ S8ALL (Non-Suspect and Suspect and Inconclusive)

/ S8NSS (Non-Suspect or Suspect)

**Other:**

_____ All required notes from Yellow sheet added (special sample prep information, QC failure, etc.)?

**Data Package Compilation:**

| Raw Instrument QC Data | | | |
|---|---|---|---|
| | Samples | | ICAL |
| | Method Blank | | CCV |
| | LCS/DLCS | | BFB |
| | Duplicate | | Run Log |

Data Package Compilation and Case Narrative Review Completed by:_____ Date:_____

(Note: PM signature on final report is equivalent to the data package compilation and case narrative review and therefore it is not required that this section of the checklist be completed.)

## Data Validation Review Checklist

Reviewer: _____ Client: Sheely Env. Serv, Inc. Tier: IV

Review Date: 6/17/2015 TO-3M TO-4A/10A TO-11A TO-13A TO-15 TO-17 NCASI

Due Date: 6/19/2015 25C 3C APH BTU-CHONS RSK175 Amines AQL _____

Project ID: P150 2283 Acids Siloxanes NIOSH OSHA Sulfur S8 Other_____

**Sample Data:** *(Data has been verified based on the following documentation when available -- COC, scheduling form, login, paperwork shipped with samples, raw laboratory data, laboratory spreadsheets). Check if complete or NA if not applicable:*

- ✓ Client Information (name, contact, project name, project ID, sample ID)
- ✓ Chemist & Instrument
- ✓ Date Sampled
- ✓ Date Received & Date Analyzed (check for method/media/client hold time requirements)
- ✓ Check for Correct Method Including Modifications
- ✓ Volume Analyzed (including dilution volumes) per analyte
- NA Correct Sampling Volume (matches COC or other associated documentation)
- NA Spreadsheet injection volumes and canister pressures
- ✓ Canister Pressures: ~~Second Pressures ___ Backfill ___~~
- NA Tedlar Bags (analysis time: 24hr - sulfurs; 72 hr - all others)
- ✓ Correct units (results, reporting and detection limits)
- ✓ Correct method reporting and detection (where applicable) limits based on volumes analyzed
- ✓ Unit conversions are correct
- ✓ Cross-comparison quantitation report and spreadsheet results with final report forms
- ✓ Footnotes & Flags
- NA Non-Accredited analytes X flagged
  - TO-15 (ACF Compounds - no certification)
  - TO-13A (any compounds in addition to standard list - no certification)
  - TO-4A/TO-10A (Flag all Aroclors <u>except</u> 1016 & 1260 - no certification)
  - RSK175 (Flag Propene & Propane - no certification)
- ✓ DoD Projects:
  - Manual integration noted in case narrative — none for targets
  - DoD LCS Limits ✓
- NA AZ Projects: Non-Accredited methods and analytes T flagged
- ✓ QC data (appropriate to method and any client requirements)
- NA Analysis Summary Form (correct notations and case narrative information)
- ✓ Client specific requests/requirements are fulfilled and included
- ✓ Final report pages moved to R:\Reports\0_Excel Final Reports upon completed validation

**EDD Review:**

File Pathway: R:\EDDGE\ClientFiles\ARCOM EDMS CLEAN\P1502283\P1502283 EDMS. 2.P Initials: RL Date: 6/17/15

File Pathway: R:\Copy_____ Initials: _____ Date: _____

Reviewed: ☐ All Data ☐ Manual Entries ☐ Samples/QC _____ ☐ Specifically _____ ☐ ____% of Data

Reviewer Initials: _____ Date: _____

## Sample Review Checklist

(Note exceptions in Comments and include Analysis Observations/Case Narrative Summary Form as appropriate)

### EPA Compendium Method TO-15

**Method:** ☑ EPA TO-15 ☐ EPA TO-14A **Analysis Date:** 06/12/15 **Project #:** P1502283

**Instrument:** ☐ MS3 ☐ MS7 ☐ MS8 ☐ MS9 ☐ MS13 ☑ MS16 ☐ MS19 ☐ MS21

**Mode:** ☐ SIM ☑ Scan **Scan Low Level (0.1ng):** ☐ Yes ☑ No **DOD:** ☑ Yes ☐ No

| Analyst | | Reviewer |
|---|---|---|
| ☑ | 1. All analyte hits in the samples within the **calibration range** and/or noted? | ☑ |
| ☑ | 2. All **peak integrations** acceptable? | ☑ |
| ☑ | 3. All **manual integrations** flagged and documented? | ☑ |
| ☑ | 4. Have **Q values** been verified for each peak? | ☑ |
| ☐ | 6. All **calculations** correct? | ☐ |
| ☑ | 7. Has the analyst initialed and dated each **quantitation report**? | ☑ |
| ☐ | 8. For **TICs** are the relative intensity and other requirements met? | ☐ |
| ☑ | 9. **Auto report** correct? | ☑ |
| ☑ | 10. **MRL** = 0.5 ☑ ng ☐ pg (ethanol, acetone, vinyl acetate = 5.0ng) | ☑ |
| ☐ | 11. Pressurized with **Helium**? Is the worksheet completed for all samples? | ☐ |
| ☑ | 12. Report to **MDL**? ☑ Yes ☐ No | ☑ |
| ☑ | 13. **Global Minimum Detection Limit** = 0.09 ☑ ng ☐ pg | ☑ |
| ☐ | 14. **DOD:** Are **manual integrations** notated in the **case narrative?** | ☑ |

COMMENTS:

### Air-Phase Petroleum Hydrocarbons - VOA-MAPH Rev. 8, Effective 02/15/2014

| | | |
|---|---|---|
| ☐ | 1. Are all manual **integrations** flagged and documented (except for HC ranges)? | ☐ |
| ☐ | 2. Are all peak **integrations** acceptable? | ☐ |
| ☐ | 3. Has the analyst initialed and dated each **quantitation report**? | ☐ |
| ☐ | 4. Are the associated ICAL responses correct? | ☐ |
| ☐ | 5. Are the sample responses entered into the template correctly? | ☐ |
| ☐ | 6. Are the TO-15 target compounds entered into the template correctly? | ☐ |
| ☐ | 7. Does the lab **duplicate** meet a RPD of ≤30% for results >5x the MRL? Otherwise, repeat analyses if: | ☐ |

| | |
|---|---|
| RPD >30 (where both analyses are >5x RL | 1st analysis detect @ >5x MRL, Dup=ND |
| 1st analysis ≤5x RL; Dup=ND (RPD not calculable) | |

COMMENTS:

☑ LIMS Run Approval ☑ LIMS Supervisor Approval

Analyst: LH 6/15/15 Secondary Reviewer: EA

Date: Date: 6/16/15

(TO-15 and MAPH Checklists Combined 08/05/14)

**University of Southern California**
**Sample Delivery Group USC02**

# Radon Analysis (EPA Method GS: Grab Sample/Scintillation Cell counting)

**For Ensafe, Inc.**

Client Project Number: NAS Dallas, 0888812796, Phase F1-FS

Samples Collected by: Cole Duckworth
Sample Dates: 06/04/15
Sample containers: Tedlar bags
Location: Dallas, TX
Assumed Site Pressure **0.99** atm
Analysts: Doug Hammond
based on an elevation of 430 ft
Phone: 310-490-7896
Time Zone adjustment: add to decay time
email: dhammond@usc.edu
**2** hours Collect (CDT)
Run (PDT)

**Summary**

| | | Collection | | Analysis | | | | | Lab Duplicates | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Date | time (CDT) | Date | time (PDT) | Vol run (cc) | Conc. pCi/L | ±1 sig pCi/L | mean pCi/L | ±1ssd pCi/L | Notes |
| Received 06/05/15 | | | | | | | | | | | |
| 1 | 1422-SS-01-060415 | 6/4/15 | 8:30 | 6/5/15 | 13:19 | 40 | 670 | 33 | | | |
| 2 | 1422-IA-01-060415 | 6/4/15 | 8:25 | 6/5/15 | 16:43 | 60 | 0.20 | 0.10 | | | |
| 3 | 1422-SS-02-060415 | 6/4/15 | 10:28 | 6/5/15 | 13:22 | 40 | 1260 | 63 | | | |
| 4 | 1422-IA-02-060415 | 6/4/15 | 10:17 | 6/5/15 | 16:46 | 120 | 0.24 | 0.05 | | | |
| 5 | 1424-SS-01-060415 | 6/4/15 | 9:05 | 6/5/15 | 13:34 | 40 | 342 | 17 | 346 | 6 | |
| | lab dupe | 6/4/15 | 9:05 | 6/5/15 | 13:36 | 40 | 350 | 18 | | | |
| 6 | 1424-IA-01-060415 | 6/4/15 | 8:55 | 6/6/15 | 13:23 | 120 | 0.19 | 0.04 | | | |
| 7 | 1424-SS-02-060415 | 6/4/15 | 9:20 | 6/5/15 | 13:41 | 40 | 1874 | 94 | 1869 | 6 | |
| | lab dupe | 6/4/15 | 9:20 | 6/5/15 | 13:42 | 40 | 1865 | 93 | | | |
| 8 | 1424-IA-02-060415 | 6/4/15 | 9:15 | 6/6/15 | 13:36 | 120 | 0.14 | 0.04 | | | |
| 9 | 1405-SS-01-060415 | 6/4/15 | 11:00 | 6/6/15 | 10:57 | 40 | 1631 | 82 | 1609 | 31 | |
| | lab dupe | 6/4/15 | 11:00 | 6/6/15 | 11:15 | 40 | 1587 | 79 | | | |
| 10 | 1405-IA-01-060415 | 6/4/15 | 10:55 | 6/5/15 | 16:28 | 60 | 0.47 | 0.09 | | | |
| 11 | 1405-SS-02-060415 | 6/4/15 | 12:40 | 6/6/15 | 11:00 | 40 | 41 | 2 | | | |
| 12 | 1405-SS-03-060415 | 6/4/15 | 12:40 | 6/6/15 | 11:02 | 40 | 42 | 2 | | | |
| 13 | 1405-IA-02-060415 | 6/4/15 | 12:35 | 6/5/15 | 16:35 | 120 | 0.50 | 0.07 | | | |
| 14 | 1405-IA-03-060415 | 6/4/15 | 12:35 | 6/5/15 | 16:38 | 120 | 0.41 | 0.06 | | | |
| 15 | 1424AA-01-060415 | 6/4/15 | 13:26 | 6/5/15 | 16:30 | 120 | 0.03 | 0.04 | | | |

Uncertainty given in pCi/liter is based on counting statistics for low activity samples. For high activity samples uncertainty is ±5%.
The Lower Limit of Detection for Rn (95% confidence level as recommended by EPA 402-R-95-012, Oct. 97) is 0.14 pCi/liter.
Results are reported based on standardization with NIST-traceable radon sources.
These results are for application of naturally-occurring radon as a tracer of soil vapor intrusion, but are not intended for evaluation of radon hazards.
Results corrected to in situ pressure as noted above
****Very little gas in this bag. This analysis should be considered a lower limit.**

## Raw Data, Calculation factors, and Analytical Details

| | | Collection | | Analysis | | | | | | | | | | | | | count | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Sample ID | Date | Time (CDT) | Date | Time (PDT) | Count in cell/ch | He eff | Air/He eff | Vol run (cc) | Press factor | obs dpm | sig dpm | Decay T (hours) | Decay factor | Concentration dpm/liter | pCi/liter | stats pCi/liter ±1 sig | Notes |
| Received 06/05/15 | | | | | | | | | | | | | | | | | | |
| 1 | 1422-SS-01-060415 | 6/4/15 | 8:30 | 6/5/15 | 13:19 | Z13/22 | 0.818 | 0.99 | 40 | 0.99 | 38.54 | 0.47 | 30.8 | 1.262 | 1487 | 670 | 8 | |
| 2 | 1422-IA-01-060415 | 6/4/15 | 8:25 | 6/5/15 | 16:43 | 72/34 | 0.926 | 0.98 | 60 | 0.99 | 0.02 | 0.01 | 34.3 | 1.296 | 0.45 | 0.20 | 0.10 | |
| 3 | 1422-SS-02-060415 | 6/4/15 | 10:28 | 6/5/15 | 13:22 | Z17/11 | 0.798 | 0.99 | 40 | 0.99 | 71.77 | 0.63 | 28.9 | 1.244 | 2797 | 1260 | 11 | |
| 4 | 1422-IA-02-060415 | 6/4/15 | 10:17 | 6/5/15 | 16:46 | 83/33 | 0.806 | 0.97 | 120 | 0.99 | 0.04 | 0.01 | 32.5 | 1.278 | 0.54 | 0.24 | 0.05 | |
| 5 | 1424-SS-01-060415 | 6/4/15 | 9:05 | 6/5/15 | 13:34 | Z16/32 | 0.660 | 0.99 | 40 | 0.99 | 15.92 | 0.30 | 30.5 | 1.259 | 759 | 342 | 6 | |
| | lab dupe | 6/4/15 | 9:05 | 6/5/15 | 13:36 | 58/31 | 0.885 | 0.99 | 40 | 0.99 | 21.87 | 0.35 | 30.5 | 1.259 | 778 | 350 | 6 | |
| 6 | 1424-IA-01-060415 | 6/4/15 | 8:55 | 6/6/15 | 13:23 | 84/11 | 0.785 | 0.97 | 120 | 0.99 | 0.03 | 0.01 | 54.5 | 1.509 | 0.43 | 0.19 | 0.04 | |
| 7 | 1424-SS-02-060415 | 6/4/15 | 9:20 | 6/5/15 | 13:41 | 74/34 | 0.885 | 0.99 | 40 | 0.99 | 117.09 | 0.96 | 30.4 | 1.258 | 4160 | 1874 | 15 | |
| | lab dupe | 6/4/15 | 9:20 | 6/5/15 | 13:42 | 61/33 | 0.819 | 0.99 | 40 | 0.99 | 107.86 | 0.78 | 30.4 | 1.258 | 4141 | 1865 | 13 | |
| 8 | 1424-IA-02-060415 | 6/4/15 | 9:15 | 6/6/15 | 13:36 | 82/32 | 0.733 | 0.97 | 120 | 0.99 | 0.02 | 0.01 | 54.4 | 1.508 | 0.31 | 0.14 | 0.04 | |
| 9 | 1405-SS-01-060415 | 6/4/15 | 11:00 | 6/6/15 | 10:57 | 71/22 | 0.919 | 0.99 | 40 | 0.99 | 91.27 | 1.27 | 50.0 | 1.458 | 3621 | 1631 | 23 | |
| | lab dupe | 6/4/15 | 11:00 | 6/6/15 | 11:15 | 61/33 | 0.819 | 0.99 | 40 | 0.99 | 78.96 | 0.82 | 50.3 | 1.462 | 3523 | 1587 | 16 | |
| 10 | 1405-IA-01-060415 | 6/4/15 | 10:55 | 6/5/15 | 16:28 | 76/22 | 0.912 | 0.98 | 60 | 0.99 | 0.05 | 0.01 | 31.6 | 1.269 | 1.05 | 0.47 | 0.09 | |
| 11 | 1405-SS-02-060415 | 6/4/15 | 12:40 | 6/6/15 | 11:00 | 72/34 | 0.926 | 0.99 | 40 | 0.99 | 2.36 | 0.09 | 48.3 | 1.441 | 92 | 41 | 2 | |
| 12 | 1405-SS-03-060415 | 6/4/15 | 12:40 | 6/6/15 | 11:02 | 73/33 | 0.917 | 0.99 | 40 | 0.99 | 2.35 | 0.09 | 48.4 | 1.441 | 92 | 42 | 2 | |
| 13 | 1405-IA-02-060415 | 6/4/15 | 12:35 | 6/5/15 | 16:35 | 82/32 | 0.733 | 0.97 | 120 | 0.99 | 0.08 | 0.01 | 30.0 | 1.254 | 1.12 | 0.50 | 0.07 | |
| 14 | 1405-IA-03-060415 | 6/4/15 | 12:35 | 6/5/15 | 16:38 | 81/31 | 0.818 | 0.97 | 120 | 0.99 | 0.07 | 0.01 | 30.1 | 1.255 | 0.91 | 0.41 | 0.06 | |
| 15 | 1424AA-01-060415 | 6/4/15 | 13:26 | 6/5/15 | 16:30 | 84/11 | 0.785 | 0.97 | 120 | 0.99 | 0.01 | 0.01 | 29.1 | 1.246 | 0.07 | 0.03 | 0.04 | |

Decay correctiions based on Rn decay constant of 0.1813 per day
Radon Conc = {(0.4504)(1000)(obs dpm)(decay factor)(Press factor)}/{(cc used)(He eff)(Air/He)}
Conversion from dpm based on 0.4504 pCi/dpm (in pCi/liter)
Blanks are negligible.

**Definitions:**

| | | | |
|---|---|---|---|
| Cell/ch: | Counting cell and channel used | sig dpm | uncertainty (± 1 sig) in dpm based on counting statistics |
| He eff: | Cell and counter efficiency using helium matrix | Decay T: | time elapsed from sampling to analysis |
| Air/He: | Correction for matrix counting gas density | Decay factor: | Correction factor for decay from collection to analysis |
| Sample vol: | Volume analyzed (cc) | dpm/liter: | Radon concentration in disintigrations per minute per liter of sample |
| Press factor: | Correction to in situ pressure based on collection altitude | piC/liter: | Radon concentration in picoCuries per liter |
| obs dpm: | observed radon activity (disintigrations per minute) when analyzed | count stats: | uncertainty in observed radon based on counting statistics |