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Ms. Ruby Crysler
RCRA Corrective Action and Permits Branch
Air and Waste Management Division
Unites States Environmental Protection Agency
Region VII
11201 Renner Boulevard
Lenexa, KS 66219

February 24, 2017

Subject: 2016 Annual Remedy Performance Report (ARPR)
2040 West River Drive; Davenport, Iowa
EPA Docket No. RCRA-07-2012-0013

Dear Ms. Crysler:

On behalf of T H Agriculture & Nutrition, L.L.C. (THAN), Elementis Chemicals, Inc., and Harcros Chemicals Inc (Respondents) of the above referenced property, CH2M HILL is submitting the 2016 ARPR as required per the U.S. Environmental Protection Agency-approved *Operation, Monitoring, and Maintenance Plan* (CH2M HILL, 2014a*)* for the facility at 2040 West River Drive, Davenport, Iowa.

Please contact me at 414-272-2426 x 40376 or Ms. Anna Kunkel at (913) 538-2349 if you have any questions.

Sincerely,

CH2M HILL

Paul Rohde

RCRA 02/24/2017

567606

Paul D. Rohde, P.G.
Project Manager

Enclosures
c: Anna Kunkel/Philips North America
John P. Cleary /Harcros Chemicals Inc.
Michael Potts/Ramboll Environ

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DRAFT 2016 ANNUAL REMEDY PERFORMANCE REPORT

2040 West River Drive, Davenport, Iowa

Prepared on behalf of

T. H. Agriculture & Nutrition, L.L.C.
Elementis Chemicals, Inc. f/k/a
Harcros Chemicals, Inc., a Delaware Corporation
U.S. EPA Docket No. RCRA-07-2012-0013

February 2017

CH2M HILL Engineers, Inc.
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Executive Summary

This Annual Remedy Performance Report (ARPR) for the 2040 West River Drive site in Davenport, Iowa, has been prepared by CH2M HILL Engineers, Inc. (CH2M) on behalf of T. H. Agriculture & Nutrition, L.L.C.; Elementis Chemicals, Inc.; and Harcros Chemicals, Inc. (Harcros), in accordance with the *Operation, Monitoring, and Maintenance Plan* (OMMP) approved by the U.S. Environmental Protection Agency (EPA) in September 2014 (CH2M, 2014). The project property is currently owned by Harcros, a Kansas Corporation. For purposes of discussion within this document, "onsite" refers to an area coincident with the 2040 West River Drive property, "offsite" refers to investigated areas outside the 2040 West River Drive property, and the term "site" includes both onsite and offsite areas.

As presented in the approved OMMP, the Remedial Action Objectives (RAOs) for groundwater specific to this project are the EPA Maximum Contaminant Levels (MCLs), or EPA Regional Screening Levels for constituents of concern that do not have established MCLs. The corrective measures undertaken for the project, as identified in the Final Decision Document/Response to Comments (EPA, 2010), are the following:

- In situ chemical oxidation (ISCO) for onsite groundwater;
- Monitored natural attenuation (MNA) for offsite groundwater;
- Enhanced in situ bioremediation (EISB) for offsite groundwater (EISB is recommended as a contingent remedy for offsite groundwater and is not currently being implemented); and
- Institutional controls (ICs) for the onsite property.

This ARPR presents the groundwater data collected during 2016 monitoring activities. An assessment of each corrective measure's effectiveness is provided by evaluating recent and historical site data. Recommendations for next year's groundwater monitoring program (to monitor ISCO and MNA effectiveness) are presented. The data collected in 2016 are consistent with the conceptual site model characteristics that were established in the OMMP.

ES.1 2016 Operation, Monitoring, and Maintenance Activities

The operation, monitoring, and maintenance activities that were completed at the site during the 2016 calendar year are the following:

- Annual well network inspection activities were performed in June 2016 at onsite and offsite wells that were sampled for analysis of *Long-term Groundwater Monitoring Plan* (LTMP) parameters (ISCO and MNA programs) and/or at wells accessed only for collection of water levels, per the EPA-approved OMMP. [The LTMP was submitted and approved with the OMMP (CH2M, 2014).]
- Annual groundwater sampling at onsite and offsite wells per the EPA-approved OMMP.
- Annual IC inspection was performed onsite on June 17, 2016.

ES.2 Remedy Effectiveness and Supporting Data/ Recommendations

Onsite soil treatment, onsite groundwater treatment, and natural attenuation processes have resulted in decreases in the lateral extent of total volatile organic compounds (VOCs) that exceed RAOs in groundwater. Annual mass estimates were performed using datasets since the LTMP well network was installed beginning in June 2005, which also generally corresponds to when corrective measures were

initiated at the site. Trend analysis was conducted for LTMP wells using data collected from the original site investigation beginning in 1999 and subsequent data collection/sampling events through 2016.

ES.2.1 In Situ Chemical Oxidation

Pilot-scale onsite groundwater treatment of the site-related COCs using ISCO/permanganate injections in the shallow bedrock zone began in 2004, with full-scale injections beginning in October 2007. As outlined in the ISCO Injection Plan (submitted as part of the OMMP [CH2M, 2014]), an injection was not completed in 2016; the next injection event will take place in 2017. Onsite well data indicate the permanganate is being effectively delivered as evidenced in 2016 by the presence of permanganate in eight onsite monitoring locations and an observed injection radius of influence between 20 and 90 feet. Additional evidence of the effectiveness of ISCO injections includes the following:

- The planar area of highest total site-related VOC concentrations (greater than 10,000 and 100,000 micrograms per liter [µg/L]) is reduced in size in the 11 years between 2005 and 2016 (Figure ES-1).
- Concentration trends for total site-related VOCs in unconsolidated, shallow bedrock, intermediate bedrock, and deep bedrock groundwater zones at onsite and offsite locations: 1) are decreasing; 2) have no trend; or 3) are not detected frequently enough to perform statistical trend analysis.
- Concentration trends for the individual chlorinated VOC (CVOC) parent compounds of tetrachloroethene (PCE) and trichloroethene (TCE) in unconsolidated, shallow bedrock, intermediate bedrock, and deep bedrock groundwater zones at onsite locations: 1) are decreasing; 2) have no trend; or 3) are not detected frequently enough to perform statistical trend analysis.
- Concentration trends for individual CVOC daughter products of cis-1,2-dichloroethylene (cis-1,2-DCE) and vinyl chloride in unconsolidated, shallow bedrock intermediate bedrock, and deep bedrock groundwater zones: 1) are decreasing; 2) have no trend; or 3) are not detected frequently enough to perform statistical trend analysis, with the exception of two ISCO locations (BW-27 and BW-37) where increases are noted and accompanied by numerous indications of ongoing reductive dechlorination.
- The reduction in onsite, total site-related VOC mass is estimated at 67.9 percent (a loss of 1,207 kilograms [kg]) in the 11 years between 2005 (1,778 kg) and 2016 (571 kg); the mass values of individual CVOC parent compounds (PCE; TCE; 1,1,1-trichloroethene [1,1,1-TCA]; and methylene chloride), CVOC daughter products (cis-1,2-DCE; 1,1-dichloroethene [1,1-DCE]; vinyl chloride; 1,1-dichloroethane [1,1-DCA]; and 1,2-dichloroethane [1,2-DCA]), and aromatic compounds (toluene, ethylbenzene, and xylenes) have also decreased over the same time period.
- Effective delivery of the oxidizing chemical—visual evidence of the presence of permanganate was observed in eight onsite monitoring locations in 2016.
- Elevated oxidation-reduction potential readings at and downgradient from ISCO injection areas – evidence of oxidizing conditions due to the presence of permanganate in groundwater.
- Elevated chloride concentrations (2 to 10 times greater than background) in onsite wells –evidence of significant oxidation of CVOCs.

ISCO injections have reduced VOC mass and concentrations in groundwater. It is recommended that the next full-scale injection event be completed in 2017, consistent with the ISCO Injection Plan (CH2M, 2014) to continue to reduce onsite VOCs in groundwater.

ES.2.2 Monitored Natural Attenuation

MNA processes continue to effectively reduce offsite groundwater VOC concentrations in each of the monitored zones (shallow, intermediate, and deep bedrock, as well as the unconsolidated zone) as evidenced by the following:

- The lateral extent of total VOC detections in 2016 is reduced as compared with the lateral extent of total VOC detections in 2005. Furthermore, the magnitude of the concentrations has decreased as evidenced by smaller planar areas that comprise the higher concentration contours (10,000 and 100,000 µg/L – yellow and peach colors, respectively) (Figure ES-1).
- Concentration trends for total site-related VOCs in unconsolidated, shallow bedrock, intermediate bedrock, and deep bedrock groundwater zones at onsite and offsite locations: 1) are decreasing; 2) have no trend; or 3) are not detected frequently enough to perform statistical trend analysis.
- Concentration trends for individual CVOC parent compound (PCE; TCE; 1,1,1-TCA; and methylene chloride) in unconsolidated, shallow bedrock, intermediate bedrock, and deep bedrock groundwater zones at offsite locations: 1) are decreasing; 2) have no trend; or 3) are not detected frequently enough to perform statistical trend analysis.
- Concentration trends for individual CVOC daughter products of cis-1,2-DCE and vinyl chloride in unconsolidated, shallow bedrock intermediate bedrock, and deep bedrock groundwater zones: 1) are decreasing; 2) have no trend; or 3) are not detected frequently enough to perform statistical trend analysis, with the exception of one MNA location (BW-14) where increases are noted and accompanied by numerous indications of ongoing reductive dechlorination.
- The reduction in onsite + offsite, total site-related VOC mass is estimated at 66 percent (a loss of 14,386 kg) in the 11 years between 2005 (21,711 kg) and 2016 (7,325 kg); the mass values of individual CVOC parent compounds (PCE; TCE; 1,1,1-TCA; and methylene chloride), CVOC daughter products (cis-1,2-DCE; 1,1-DCE; vinyl chloride; 1,1-DCA; and 1,2-DCA), and aromatic compounds (toluene, ethylbenzene, and xylenes) have also decreased over the same time period.
- The percentage of the total VOC mass contributed by CVOC daughter products has increased (with over 73 percent of the total mass contributed by CVOC daughter products in 2016 compared with 54 percent in 2005) while the individual mass of the daughter products has decreased, suggesting that natural biodegrading processes are ongoing and that daughter products continue to undergo biodegradation.
- Detection of biodegradation daughter products offsite including the predominance of CVOC daughter products versus parent compounds, the detection of the nontoxic end products ethene and ethane, and elevated chloride concentrations (2 to 10 times greater than background).
- Geochemical conditions offsite/downgradient from the site are conducive for ongoing biodegradation of CVOC parent compounds and daughter products due to reducing conditions as evidenced by field measurements, lack of nitrate, low sulfate, and/or the presence of methane.
- Ethene and ethane comprise a higher percentage of total molarity in offsite locations that are further downgradient from the site, which is expected because these compounds indicate a “more advanced” MNA process at these more distant locations.
- The perimeter well nest at BW-25/BW-26 has strong evidence of MNA effectiveness based on reducing conditions, CVOC daughter product concentrations comprising over 99 percent of the total CVOC concentrations, elevated chloride concentrations (2 to 10 times background concentrations), and the detection of ethene, ethane, and methane in each of the bedrock zones (shallow, intermediate, and deep).

- EPA screening protocol procedures (EPA, 1998) for shallow bedrock indicate there is strong evidence of ongoing anaerobic biodegradation of CVOCs.

Multiple lines of evidence continue to document that MNA processes are effectively reducing offsite groundwater VOC concentrations in each of the monitored zones.

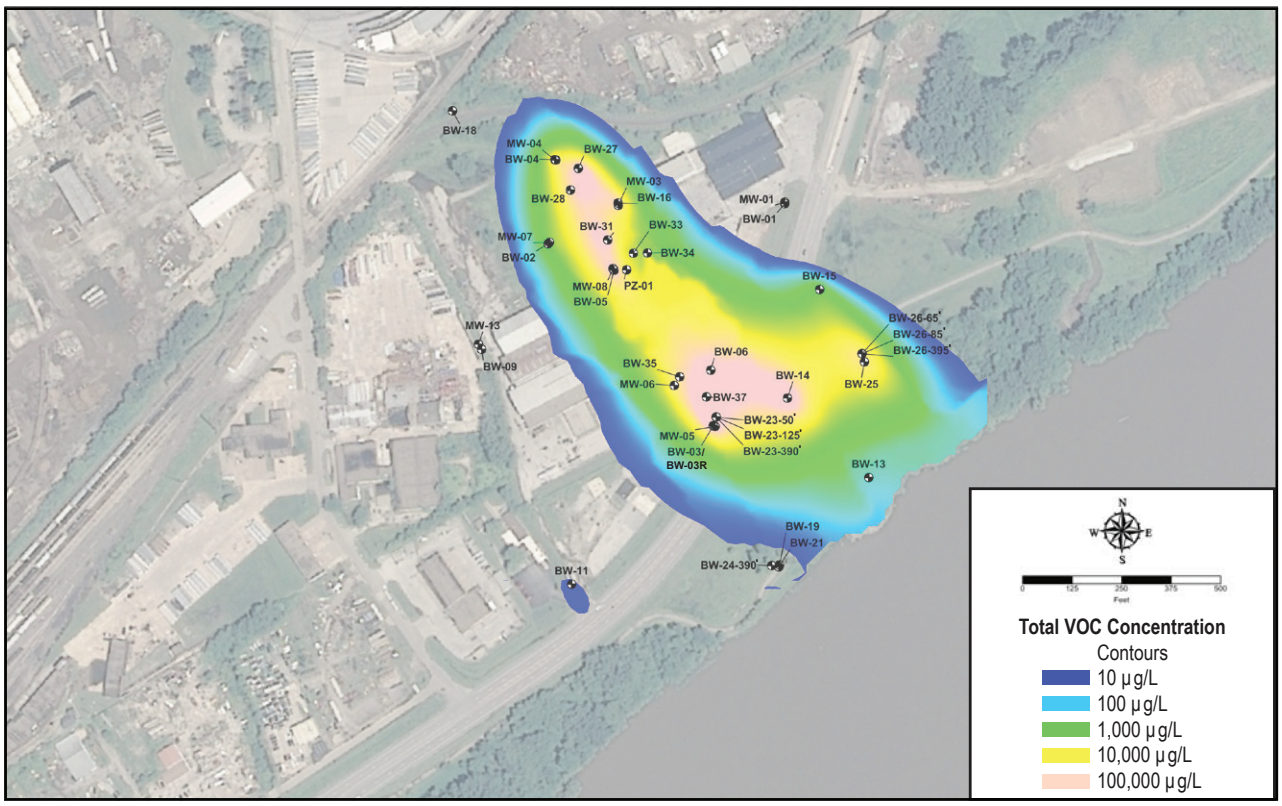
ES.2.3 Institutional Controls

The 2016 site inspection performed at the 2040 West River Drive property (onsite), per the Institutional Controls Plan (ICP; submitted and approved with the OMMP [CH2M, 2014]), did not identify activities inconsistent with ICs/land use restrictions. There were no observed land use changes, new construction, or evidence of excavation, signs of onsite drilling, or signs of other activities inconsistent with the required ICs. There were two areas where the concrete driveway was replaced in 2016, one area where gravel fill had been brought to grade/level the site, and a section of fence that was repaired. The soil in the vicinity of these areas did not appear to have been disturbed.

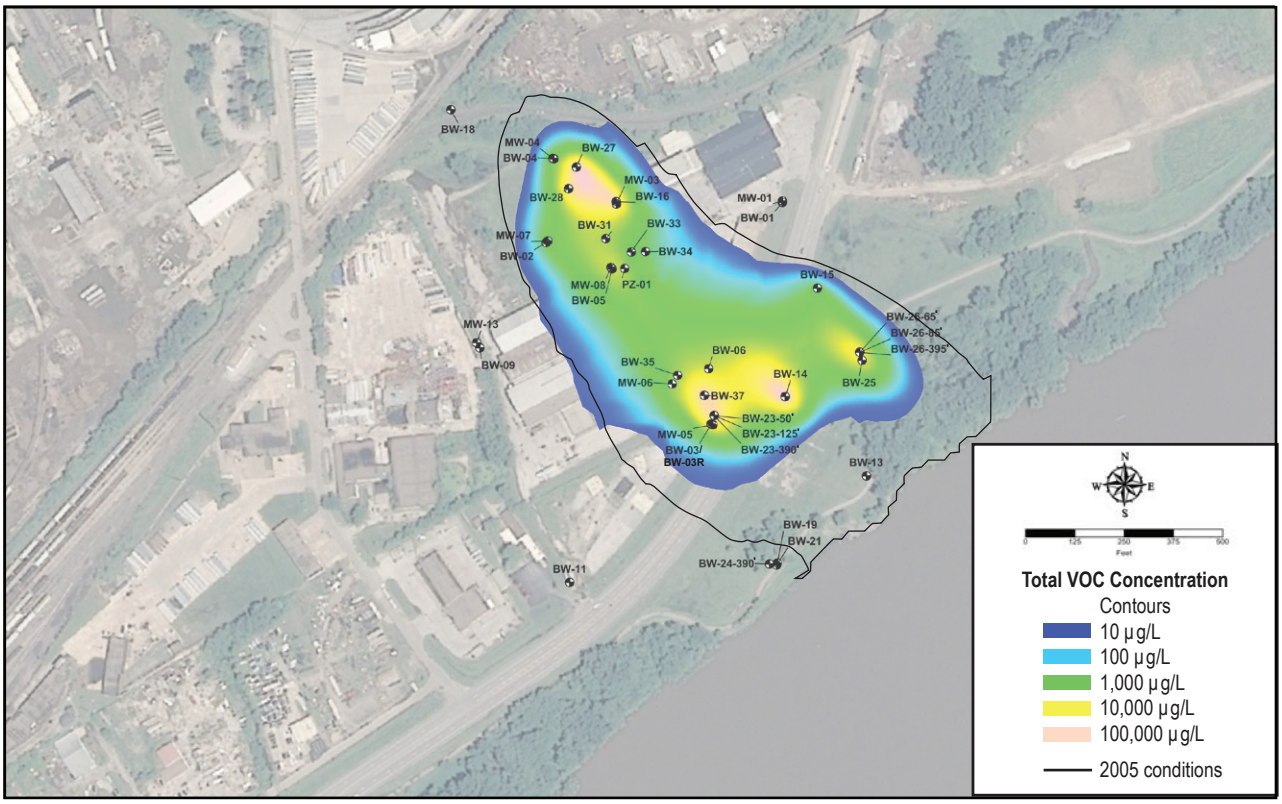
There are no recommended changes to the ICP. An environmental covenant (EC), recorded in Scott County, Iowa on March 28, 2016, which documents the required ICs and deed restrictions for the property, will be used to further prevent groundwater use and potential exposure.

ES.3 2017 Site Activities

The long-term groundwater monitoring program for both onsite and offsite wells will continue in 2017 as identified in the LTMP (CH2M, 2014). LTMP wells will be sampled annually. In accordance with the LTMP, inspection of the ICs will be performed in June 2017, concurrent with the annual groundwater monitoring event, per the OMMP and the ICP. An ISCO injection event will be completed in 2017, as indicated in the ISCO Injection Plan. The 2017 ARPR will be submitted no later than March 1, 2018.



2005 (Pre-soil treatment, pre-full scale ISCO injection conditions)



June 2016 (Current Conditions)

Note:
Isosurfaces are based on the 3-D isovolume that was generated based on kriging of each data set using the GSLIB (Deutsch , C.V. and A.G. Journel, 1992 - GSLIB: Geostatistical Software Library and User's Guide. 2nd ed. Oxford University Press, New York.) and geostatistical algorithms as implemented within the Stanford Geostatistical Modeling Software version 2.1 (SGeMS) (Remy, N., A. Boucher, and J. Wu 2009 - Applied Geostatisics with SGeMS: A User's Guide. Cambridge University).

Figure ES-1
Total VOCs in Groundwater
2040 West River Drive
Davenport, Iowa

ch2m

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Acronyms and Abbreviations

ARPR	Annual Remedy Performance Report
bgs	Below Ground Surface
BTEX	Benzene, Toluene, Ethylbenzene, and Xylenes
cis-1,2-DCE	cis-1,2-Dichloroethene
CH2M	CH2M HILL Engineers, Inc.
CHES	Clean Harbors Environmental Services
CMI	Corrective Measures Implementation
COC	Constituent of Concern
CSM	Conceptual Site Model
CVOC	Chlorinated Volatile Organic Compound
1,1-DCA	1,1-Dichloroethane
1,2-DCA	1,2-Dichloroethane
1,1-DCE	1,1-Dichloroethene
DO	Dissolved Oxygen
EC	Environmental Covenant
EISB	Enhanced In Situ Bioremediation
Elementis	Elementis Chemicals, Inc.
EPA	U.S. Environmental Protection Agency
°F	Degree Fahrenheit
ft^2	Square Foot
Harcros	Harcros Chemicals, Inc.
IC	Institutional Control
ICP	Institutional Controls Plan
IGS	Iowa Geological Survey
ISCO	In Situ Chemical Oxidation
ITRC	Interstate Technology Regulatory Council
LTMP	Long-term Groundwater Monitoring Plan
kg	Kilogram
µg/L	Microgram per Liter
MCL	Maximum Contaminant Level
mg/L	Milligram per Liter
MNA	Monitored Natural Attenuation
mV	Millivolt

Offsite	Study/remediation area situated outside the property boundaries of 2040 West River Drive
OMMP	Operation, Monitoring, and Maintenance Plan
Onsite	Within the property boundaries of 2040 West River Drive
ORP	Oxidation Reduction Potential
PCE	Tetrachloroethene
QAPP	Quality Assurance Project Plan
RAO	Remedial Action Objective
RAS	Remedial Alternatives Study
RCRA	Resource Conservation and Recovery Act
ROI	Radius of Influence
RSL	Regional Screening Level
Site	An area consisting of both onsite and offsite portions of the investigated region
SOW	Scope of Work
TCE	Trichloroethene
THAN	T. H. Agriculture & Nutrition, L.L.C.
1,1,1-TCA	1,1,1-Trichloroethane
trans-1,2-DCE	trans-1,2-Dichloroethene
USGS	U.S. Geological Survey
VOC	Volatile Organic Compound
WHP	Waste Handling Plan

SECTION 1

Introduction

This Annual Remedy Performance Report (ARPR) for the 2040 West River Drive site in Davenport, Iowa, has been prepared by CH2M HILL Engineers, Inc. (CH2M) on behalf of T. H. Agriculture & Nutrition, L.L.C. (THAN); Elementis Chemicals, Inc. (Elementis) f/k/a Harcros Chemicals, Inc. (Harcros), a Delaware Corporation. The ARPR has been prepared in accordance with the *Operation, Monitoring, and Maintenance Plan*, *2040 West River Drive, Davenport, Iowa* (OMMP) approved by the U.S. Environmental Protection Agency (EPA) in September 2014 (CH2M, 2014). This ARPR was developed in accordance with the EPA-approved OMMP, and as outlined in the Corrective Measures Implementation (CMI) Scope of Work (SOW). The CMI SOW is part of the Administrative Order on Consent made effective on May 29, 2012. All supporting information in the form of tables, figures, and appendices are presented at the end of this report.

The regional site features are shown on Figure 1-1. The property is currently owned by Harcros, a Kansas Corporation. For purposes of discussion within this document, "onsite" refers to an area coincident with the 2040 West River Drive property; "offsite" refers to the investigated areas outside of the 2040 West River Drive property; and "site" includes both the onsite and offsite areas.

Remedial alternatives recommended for implementation at the site are presented in the *Remedial Alternatives Study Report, 2040 West River Drive, Davenport, Iowa* (the Remedial Alternatives Study [RAS] Report; CH2M, 2004) and the *Addendum 1, Remedial Alternatives Study Report, 2040 West River Drive, Davenport, Iowa* (the RAS Report Addendum; CH2M, 2005) to address the site-related constituents of concern (COCs). The RAS Report and the RAS Report Addendum were approved by EPA on September 12, 2005. The recommended remedy for onsite soil included soil excavation and offsite disposal for nonhazardous soil, and onsite ex situ low-temperature thermal desorption for hazardous soil. Soil remediation activities were completed in 2003, 2005, and 2006 (CH2M, 2006) to treat "hot spot" concentrations in soil to below the preliminary risk reduction goal established in the RAS Report for soil (100 milligrams per kilogram of total volatile organic compounds [VOCs]).

The recommended groundwater remedial alternatives in the RAS Report and the RAS Report Addendum include onsite in situ chemical oxidation (ISCO) and offsite monitored natural attenuation (MNA). The EPA-approved OMMP was developed to guide implementation of the groundwater remedies and the operation, monitoring, and maintenance of the selected corrective measures (CH2M, 2014).

The OMMP contains several sub-plans describing implementation of the corrective measures: a Quality Assurance Project Plan (QAPP), an ISCO Injection Plan, a Long-term Groundwater Monitoring Plan (LTMP), an Enhanced In Situ Bioremediation (EISB) Groundwater Remediation Contingency Implementation Plan, an Institutional Controls Plan (ICP), and a Waste Handling Plan (WHP).

The project's ongoing corrective measures, as identified in EPA's *Final Decision Document/Response to Comments* (EPA, 2010) and as detailed in the RAS Report and the RAS Report Addendum include the following:

- ISCO for onsite groundwater;
- MNA for offsite groundwater;
- EISB for offsite groundwater (EISB is recommended as a contingent remedy for offsite groundwater and is not currently being implemented); and
- Institutional controls (ICs) for the onsite property.

A summary of the objectives for each of these corrective measures, along with a summary of the ongoing operation and maintenance activities, data evaluation, and reporting requirements as outlined in the OMMP, are shown in Table 1-1. As presented in the OMMP, the Remedial Action Objectives (RAOs) for groundwater specific to this project are the EPA Maximum Contaminant Levels (MCLs), or EPA Regional Screening Levels (RSLs) for COCs that do not have established MCLs.

This ARPR uses site information and data collected from early site investigations beginning in 1999 and subsequent data collection/sampling events through 2016. Each year's data are evaluated against the overall conceptual site model (CSM) that was established using data from 1999 to the present, as most recently documented in the OMMP (CH2M, 2014). If a given year's data indicate site conditions are different from the established CSM, the change or difference is reported in the ARPR. Physical CSM details that are directly relevant to the discussion of groundwater monitoring results are presented in this ARPR and include hydrogeologic characteristics of the subsurface as summarized below:

- Approximately 3 to 11 feet of fine-grained unconsolidated soils (clay and silt) overlie limestone bedrock across the site, becoming thicker (25 to 52 feet) and somewhat coarser-grained near the Mississippi River (due to the presence of river alluvium). Although groundwater samples can be collected from wells screened in the unconsolidated zone when water is seasonally present, the unit is very often dry near the site, so there is likely little to no horizontal groundwater movement/transport within this zone.
- Limestone bedrock extends to approximately 400 feet in depth above the Maquoketa Shale (a regional confining unit averaging 80 feet thick). The limestone from the top of bedrock surface to approximately 50 feet below ground surface (bgs) is more fractured and weathered, and has more solution cavities than deeper portions (50 to 400 feet bgs). A local bedrock topographic high is situated in the northern portion of the site with the bedrock surface sloping downward from this high in eastern, southern, and western directions.
- Groundwater movement beneath the site in the uppermost, or "shallow," portion of the limestone bedrock that is more fractured and weathered is toward the east, west, and south in a radial pattern outward from the highest bedrock elevation near the northern onsite boundary.
- The hydrogeology of the site is influenced by the proximity of the Mississippi River, which is a major discharge zone for shallow groundwater systems (U.S. Geological Survey [USGS], 1992; Iowa Geological Survey [IGS], 2001). The vertical gradients calculated between the shallow bedrock zone and intermediate bedrock zone, near the river, are in the upward direction.

A network of monitoring wells is presented in the LTMP, referred to as the LTMP well network, and consists of the set of wells established across the site to monitor ISCO effectiveness and/or MNA effectiveness in the unconsolidated, shallow bedrock (bedrock surface to approximately 50 feet bgs), intermediate bedrock (approximately 50 to 250 feet bgs), and deep bedrock (approximately 250 to 400 feet bgs) groundwater zones.

SECTION 2

2016 Operation, Monitoring, and Maintenance Activities

Operation, monitoring, and maintenance activities that were completed at the site during 2016 are described in the subsections that follow and include the following:

- Onsite and offsite annual groundwater sampling for evaluation of ISCO and MNA effectiveness— June 13 through 17, 2016
- Well network inspection— June 13 through 17, 2016
- IC inspection—June 17, 2016
- Disposal of the purge water generated during sampling in accordance with the WHP

2.1 ISCO Injection

Pilot-scale onsite groundwater treatment of the site-related COCs using ISCO/permanganate injections in the shallow bedrock zone began in 2004, with full-scale injections beginning in October 2007. Injections are ongoing as established in the EPA-approved ISCO Injection Plan (CH2M, 2014). As discussed in the plan, an approximate concentration of 5-percent permanganate solution is targeted for the injections. The permanganate solution is stored in delivery tanks that openly/passively inject into ISCO injection wells (Figure 2-1). Injection wells at the site are screened in the shallow bedrock zone, with a “shallower” and “deeper” nested well pair in each injection area. Both injection zones are coincident with the “shallow bedrock” zone previously defined.

Per the schedule outlined in the ISCO Injection Plan, an injection was not completed in 2016. The last injection event was completed in 2015, and the next injection event will take place in 2017.

2.2 Annual Groundwater Well Inspections and Sampling

Detailed discussions of the wells included in the LTMP monitoring well network (Figure 2-2), monitoring parameters, monitoring schedule and sampling frequency, and analytical methods are presented in the EPA-approved LTMP and the QAPP (Appendices A and E of the OMMP, respectively [CH2M, 2014]).

Annual well inspections and sampling were performed in June 2016. The weather during sampling activities was generally 75 degrees Fahrenheit (°F) in the morning and warmed up to the upper 80s or low 90s in the afternoons. Davenport, Iowa observed severe storms on June 14, 2016.

2.2.1 Monitoring Well Maintenance Inspections

Field personnel inspected and evaluated the condition of wells included in the LTMP monitoring well network and of “water level only” wells during site-wide collection of groundwater level measurements in June 2016. Field observations were recorded on groundwater level measurement forms and monitoring well purging forms, copies of which are contained in Appendix A of this report. Monitoring wells were found to be in good condition in 2016 and do not require repair.

2.2.2 Groundwater Level Measurements

Groundwater levels and total well depths were measured in accordance with the QAPP using an electronic monitoring meter at 62 monitoring wells on June 13 and 14, 2016. Groundwater level

measurements could not be obtained at all 62 wells within the 24-hour period outlined in the LTMP; however, all measurements were collected within a 28-hour time period. Level measurements were recorded on field forms included in Appendix A and are presented along with well construction information that is summarized in Table 2-1.

2.2.3 Groundwater Sampling Activities

Groundwater sampling was conducted between June 14 and 16, 2016, at the monitoring wells specified in the LTMP.

Field parameters were measured and recorded on monitoring well purging forms at LTMP monitoring wells during the sample purging process (Appendix A). As noted in the LTMP, field parameters cannot be accurately measured from FLUTe™ wells, which are used to screen zones in the intermediate and deep bedrock, due to the physical characteristics of the FLUTe™ system and the nature of the sampling method; therefore, field parameters were not measured in FLUTe™ wells.

Spectrophotometers were used at LTMP onsite wells to measure the concentrations of permanganate detected in the groundwater. Samples collected at monitoring wells BW-04, BW-05, and PZ-01 were only analyzed for chloride in June 2016, as outlined in the QAPP, because of the presence of permanganate noted at the time of sampling.

Low-flow sample collection methods were used in accordance with the QAPP and EPA's *Groundwater Sampling Guidelines for Superfund and RCRA Project Managers* (EPA, 2002). The groundwater samples from the FLUTe™ systems were collected using compressed nitrogen gas in accordance with the purging procedures presented in the QAPP. The results of the 2016 groundwater sample analysis are presented in Section 3.

2.3 Institutional Controls Inspection

A visual inspection of the property at 2040 West River Drive was conducted on June 17, 2016, in accordance with the ICP (CH2M, 2014). The visual inspection noted no changes to land use, no new construction, no evidence of excavation, no signs of onsite drilling, and no activities inconsistent with the required ICs. The concrete driveway was replaced in two areas of the site prior to June 2016. An approximately 15-foot by 40-foot area outside the southern entrance to the site, and a 15-foot by 40-foot area along the east side of Building B (Figure 2-2). Some grading of the elevation surfaces was notable to the south of Buildings A and B, where gravel had been brought in to level the site. The presence of a sand pile in the northern portion of the site was noted. The sand is for the purpose of making sand bags only (for flooding conditions). Additionally, an approximate 30-foot section of chain link fence that had previously been pushed outward by onsite truck traffic was noted to have been replaced and/or repaired on the eastern property boundary. The soil beneath the repaired section of fence did not appear to be disturbed, and the paved area did not appear to have been replaced. The observations noted during the inspection were recorded on the IC visual inspection form included in Appendix A, along with photographs taken during the inspection.

An Environmental Covenant (EC) for the site, which documents the required ICs and deed restrictions for the property, was recorded by Scott County in the State of Iowa on March 28, 2016. Additional administrative review of the EC documents, as stipulated in the AOC and repeated in the ICP, was not completed in 2016. However, an EC review will be conducted annually during IC inspections starting in 2017 to note whether additional site documents have been recorded at the County in regard to property ownership or land use zoning that may affect ICs.

2.4 Waste Disposal

Waste manifests and associated documents are included in Appendix A. Several waste streams were generated during work activities in 2016 as follows:

- Groundwater from annual sampling characterized as hazardous waste
- Contaminated sampling equipment from annual sampling disposed of as hazardous waste
- Groundwater from annual sampling characterized as nonhazardous waste based on June 2016 sampling results

The characteristically hazardous purge water generated in June 2016, which carried the Resource Conservation and Recovery Act (RCRA) waste codes D029, D039, D040 and D043, was transported by Clean Harbors Environmental Services (CHES), and properly disposed of at the Clean Harbors, El Dorado, Arkansas facility. Approximately 50 gallons of purge water were disposed of in June 2016.

The characteristically hazardous disposable sampling equipment generated in June 2016, which carried the RCRA waste codes D029, D039, D040 and D043, was transported by CHES, and properly managed at Spring Grove Resource Recovery, Inc., a Cincinnati, Ohio facility. One 55-gallon container filled with disposable sampling equipment was disposed of in June 2016.

The nonhazardous purge water generated in June 2016, was transported by CHES for proper disposal at the Clean Harbors Cleveland, Ohio facility. Approximately 50 gallons of nonhazardous purge water was disposed of in November 2016.

SECTION 3

2016 Data Results and Evaluation

The 2016 analytical data are presented in this section, which is organized to present the physical (hydraulic) groundwater data followed by the chemical analytical results, MNA performance data, and ISCO operational data.

3.1 Physical (Hydraulic) Groundwater Data

The June 2016 hydraulic groundwater data (groundwater elevations and potential groundwater flow directions) are consistent with the established CSM (see Table 2-1 and Figures 3-1 and 3-2) that is outlined in the approved OMMP. The configurations of groundwater elevation contours for the unconsolidated zone (Figure 3-1) and shallow bedrock zone (Figure 3-2) are similar to one another in 2016 and are consistent with historical observations. Accessible wells that are present at the site but are not part of the LTMP were used to supplement groundwater elevation data in the unconsolidated and shallow bedrock monitoring zones.

A contour map was not generated for the intermediate or deep bedrock zones in 2016. The 2016 groundwater elevations in the intermediate and deep bedrock zone well differ by a very small range (0.22 and 0.39 feet, respectively)—a range that is within elevation measurement error for the FLUTe™ system, and that likely negates the accuracy of a calculated flow direction.

A representative hydrograph using water level data compiled since 2002 is included in Appendix B for each groundwater monitoring zone (unconsolidated, shallow bedrock, intermediate bedrock, and deep bedrock) to illustrate overall trends by zone. The groundwater elevations measured in 2016 (Table 2-1) for the unconsolidated zone were similar to or slightly lower than those measured for previous years' sampling events, but were still within the range of historically observed measurements. The groundwater elevations measured in 2016 for the shallow, intermediate, and deep bedrock zones were generally lower than those measured for previous years' sampling events, but are still within the range of historically observed measurements.

Groundwater elevation data were used to calculate the vertical and horizontal groundwater gradients and estimated groundwater velocities, as shown in Appendix B. Calculated 2016 horizontal velocities in the unconsolidated and shallow bedrock zones are within the range of observed historical values. Horizontal gradients and velocity were not calculated for the intermediate and deep bedrock zones in 2016 since the range in groundwater elevations was within the measurement error for the FLUTe™ system, and that likely negates the accuracy for the calculations. Vertical gradients were variable across the site, with both upward and downward gradients present in each monitoring zone (similar to historical measurements). The vertical gradients in between the shallow and intermediate bedrock zones are generally upward near the Mississippi River. Vertical seepage rates from the unconsolidated zone to the shallow bedrock zone in 2016 were within the range of observed historical values.

3.2 Chemical (Field Parameter and Laboratory Analytical) Groundwater Monitoring Data

Field parameter readings recorded during the 2016 annual groundwater sampling are summarized in Table 3-1. Analytical laboratory data reports are included in Appendix C and a summary of analytical results for June 2016 is presented in Table 3-2. An overall evaluation of the field and laboratory data indicates that the sample handling, shipment, and analytical procedures required per the QAPP were followed and the data results are of a quality that can be used for data evaluation. For a detailed

account of data validity, see the Data Quality Evaluation included as Appendix D to this ARPR. A summary of the methods used and calculations completed to analyze the groundwater data is included in Appendix E of this ARPR. A discussion of how elevated detection limits and reporting limits affect the relative change in total concentrations is also included in Appendix E.

3.2.1 VOC Overview

The following classes of VOCs were detected in groundwater in June 2016 (consistent with historical monitoring results):

- Chlorinated VOC (CVOC) biodegradation "parent" compounds—1,1,1-trichloroethane (1,1,1-TCA); tetrachloroethene (PCE); trichloroethene (TCE); and methylene chloride
- CVOC biodegradation "daughter" products (compounds that are degradation products due to natural biological and other processes)—1,1-dichloroethane (1,1-DCA); 1,2-dichloroethane (1,2-DCA); 1,1-dichloroethene (1,1-DCE); cis-1,2-dichloroethene (cis-1,2-DCE); trans-1,2-dichloroethene (trans-1,2-DCE); chloroethane; and vinyl chloride
- Petroleum-related VOCs—benzene, toluene, ethylbenzene, and xylenes (BTEX) and styrene (benzene is not a site-related COC and it is detected at lower concentrations than the other aromatics; however, it is included in the trends and mass analysis discussions below to be conservative)
- Nonchlorinated VOCs—Acetone

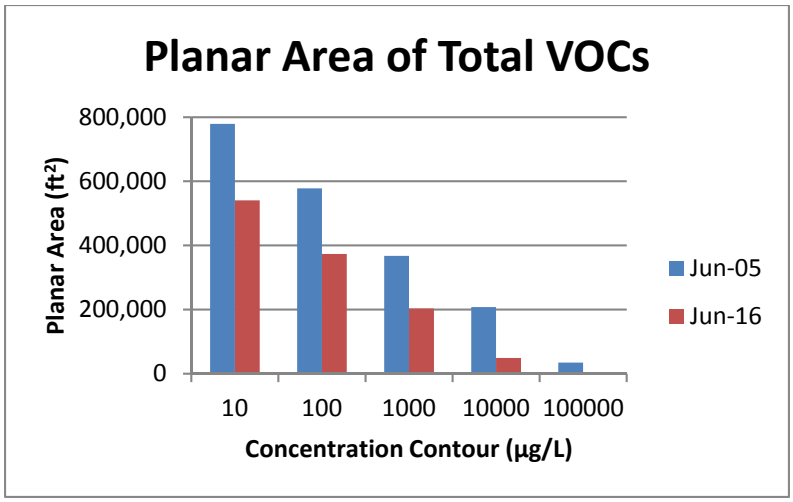
2-butanone has historically been considered a site-related COC but was not detected in groundwater in June 2016 and was last detected in June 2013. Overall data statistics for VOCs in June 2016 are shown in Table 3-3 (Appendices F and G of this ARPR contain the detailed statistical results). Consistent with historical observations, these statistics indicate that the biodegradation daughter products 1,1-DCA; cis-1,2-DCE; and vinyl chloride are detected at the highest frequency (in at least 64 percent of the samples) across the site versus other VOC analytes that were not detected in as many locations.

3.2.2 VOC Concentration Distribution

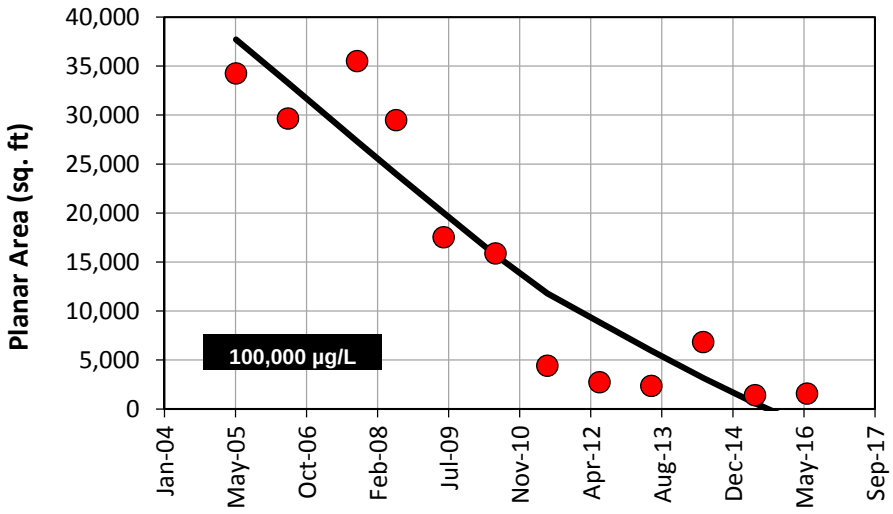
3.2.2.1 Total VOCs

Isosurface plots of total VOC concentrations from June 2005 and June 2016 were created (Figure 3-3) to show the changes, over the 11-year time period, in size and configuration of the area of dissolved, site-related COCs in groundwater. As shown on Figure 3-3, the lateral extent of total VOC detections in groundwater in 2016 is reduced as compared with the lateral extent of total VOC detections in 2005. Furthermore, the magnitude of the total VOC concentrations has decreased as evidenced by smaller planar areas (in 2016 versus 2005) that are encompassed by the higher concentration contours (10,000 and 100,000 micrograms per liter [µg/L] – yellow and peach colors, respectively). A summary of the method used to generate these isosurface plots is included in Appendix E.

Quantitative analysis of total VOC concentration isosurfaces was completed by evaluating the planar areas consisting of concentrations of 10 µg/L; 100 µg/L; 1,000 µg/L; 10,000 µg/L; and 100,000 µg/L or greater. The Mann-Kendall test (Gilbert, 1987) was also used to make inference concerning the trends in the planar areas of total VOC concentrations over time. A Mann-Kendall trend analysis of the planar area encompassed by each contour interval was performed comparing the areas in 2005 with those in 2016, as shown below and in Table 3-4. The results of the Mann-Kendall trend analysis indicate that the planar area encompassed by each concentration contour is decreasing through time. The comparison for the two separate years is also depicted on the following graph:



An evaluation of the changes of planar area within the highest concentration contour (100,000 µg/L) indicates a decrease from roughly 34,300 to 1,500 square feet (ft^2) (a decrease of 32,800 ft^2) between 2005 and 2016. The total VOC planar areas surrounded by the 100,000-µg/L contour is also shown for each of the years starting with 2005 in the following graph:



Note: Mann-Kendall Result – decreasing trend (100 percent confidence interval)

3.2.2.2 CVOCs

As shown on Figure 3-4, the lateral extent of CVOC detections in 2016 is reduced as compared with the lateral extent of CVOC detections in 2005, especially in offsite areas located south and southeast of 2040 West River Drive. Furthermore, the magnitude of the CVOC concentrations has decreased as evidenced by smaller planar areas that are encompassed by the higher concentration contours (10,000 and 100,000 µg/L – yellow and peach colors, respectively).

CVOC Parent Compounds

Parent CVOCs were detected in groundwater in the unconsolidated zone and shallow bedrock zone, and were not detected in the intermediate or deep bedrock zones in June 2016. Consistent with historical sampling, the highest total parent CVOC concentrations are observed in the shallow bedrock zones in 2016 at the following locations:

- Onsite—northern portion of site: BW-16 (24,382 µg/L; PCE dominant) and BW-27 (6,710; 1,1,1-TCA dominant)

- Onsite— southern portion of site near former storage area: BW-37 (10,400 µg/L; 1,1,1-TCA dominant)
- Offsite—downgradient from the former storage area in the southeast direction: BW-14 (8,300 µg/L; 1,1,1-TCA dominant). The highest offsite concentration of total parent CVOC concentrations observed at BW-14 is less than the highest onsite concentration (BW-16: 24,382 µg/L).

As shown on Figure 3-5, the detected concentrations of CVOC parent compounds PCE and TCE above RAOs are limited to onsite monitoring well locations.

The ratio of CVOC parent compound concentrations versus total CVOC concentrations using 2016 data is summarized on Figure 3-6. Locations where the percentage of detected CVOC parent compounds versus total detected CVOCs exceeds a value of 50 percent (indicating a predominance of parent compounds at that location) are limited to onsite monitoring well locations at MW-04, BW-04, MW-05, MW-06 and BW-31 (orange-colored dots). The highest percentage of detected CVOC parent compounds were observed in samples from onsite unconsolidated monitoring wells.

CVOC Daughter Compounds

CVOC daughter products were detected in the unconsolidated, shallow, intermediate, and deep bedrock zones in June 2016. 1,1-DCA, a biodegradation daughter compound of 1,1,1-TCA, and cis-1,2-DCE, a biodegradation daughter compound of PCE/TCE, are the most frequently detected compounds in sampled wells (detected in 78 percent of wells sampled in 2016; see Table 3-3). Vinyl chloride is also detected more frequently (64 percent) when compared with the detection frequencies of the other compounds.

Consistent with historical sampling, the highest concentrations of total CVOC daughter products detected in the shallow and intermediate bedrock zones in 2016 are as follows:

- Onsite—northern portion of site: BW-16 (92,300 µg/L) and BW-27 (231,690 µg/L). Both of these locations were also identified as areas with highest parent CVOC concentrations.
- Onsite—southern portion of the site: BW-37 (77,270 µg/L). BW-37 was also identified as an area with the highest parent CVOC concentrations.
- Offsite—downgradient from the former product storage area in the southeast direction: BW-14 (154,291 µg/L). BW-14 was also identified as an area with the highest parent CVOC concentrations.

The lateral extents of the detected concentrations of cis-1,2-DCE and vinyl chloride that are greater than RAOs is shown on Figure 3-5.

CVOC daughter product concentrations predominate versus parent concentrations at offsite wells (green dots shown on Figure 3-6). At each individual offsite well, either the concentration of CVOC parent compounds comprises less than 6 percent of the total CVOC concentration, or, if individual parent CVOC compounds are detected and comprise more than 6 percent, each is detected at a concentration below its respective RAO.

3.2.2.3 Aromatic Compounds

As shown on Figure 3-7, the lateral extent of aromatic compound detections in 2016 is reduced as compared with the lateral extent of aromatic compound detections in 2005. Furthermore, the magnitude of the aromatic concentrations has decreased as evidenced by smaller planar areas or lack of planar areas for the higher concentration contours (10,000 and 100,000 µg/L; yellow and peach colors, respectively). The lateral extent of BTEX compounds detected above RAOs in June 2016 is shown on Figure 3-8. Concentrations of BTEX compounds above RAOs are limited to two areas of the site, including a northern onsite area and an area within and downgradient from the former storage area in the southern portion of the site.

Individual aromatic compounds were generally detected less frequently and at lower concentrations in June 2016 compared with CVOC detections/concentrations (similar to the historical observations). Aromatic compounds detected at the site include BTEX and styrene. Aromatic compounds were detected in 18 of 36 monitoring wells (50 percent) that were sampled for VOCs in 2016. Toluene and xylene concentrations are an order of magnitude higher than ethylbenzene concentrations and over two orders of magnitude higher than benzene concentrations (Table 3-3).

Aromatic compounds were not detected in the unconsolidated zone at onsite or at offsite locations in June 2016. Aromatic compounds were detected in both onsite and offsite monitoring well locations within the shallow, intermediate, and deep bedrock zones. The highest detections of total aromatic compound concentrations were detected in the following shallow bedrock and intermediate bedrock site wells:

- Onsite—northern portion of the site: BW-27 (16,900 µg/L)
- Onsite—southern portion of the site in the former storage area: BW-37 (8,100 µg/L) and BW-03R (5,746 µg/L)
- Offsite—downgradient from former product storage area in the southeast direction: BW-14 (80,263 µg/L), BW-26-65' (13,593 µg/L), and BW-26-85' (7,011 µg/L)

Aromatic compounds are petroleum-related VOCs that may serve as carbon and energy sources to drive the dechlorination process for CVOCs through biodegradation (EPA, 1998). In the process of being an electron donor, petroleum-related VOCs are also biodegraded to nontoxic end products. It should be noted that the petroleum hydrocarbons are not the only potential source of electron donors to support reductive dechlorination. For example, due to the high frequency of flooding at the site, the Mississippi River is a periodic source of natural organic carbon to the shallow bedrock groundwater; this natural carbon source can also provide electron donors to support reductive CVOC dechlorination. Furthermore, permanganate has been shown to be an effective oxidant of toluene, ethylbenzene, and xylenes (ITRC, 2005).

3.2.3 VOC Concentration Trend Analysis

The Mann-Kendall test (Gilbert, 1987) supporting analysis of VOC concentration trends was conducted using the complete historical dataset (1999 through 2016) to make statistical inference concerning concentration trends of VOC data collected from the 39 LTMP locations at the site. A summary of the Mann-Kendall statistical method is included in Appendix E.

Detailed graphs and results including historical trend graphs of total VOC concentrations and Mann-Kendall statistical results are presented in Appendix F. Table 3-5 summarizes graphically/analytically confirmed increasing Mann-Kendall trends.

3.2.3.1 Total VOCs

For 21 of 21 (100 percent) onsite wells and 18 of 18 (100 percent) offsite wells, Mann-Kendall statistical analysis indicates the following (see Table 3-6):

- Total VOCs are decreasing or have no statistical trend, or
- Individual VOCs were not detected in at least 50 percent of the well's historical sampling events therefore trend analysis is not appropriate.

3.2.3.2 Individual CVOC Parent Compounds

For 21 of 21 (100 percent) onsite wells and 18 of 18 (100 percent) offsite wells, Mann-Kendall statistical analysis indicates the following (because of the number of analyses associated with numerous individual compounds, see Appendix F for individual tables and graphs):

- CVOC parent compounds PCE; TCE; 1,1,1-TCA; and methylene chloride are decreasing or have no statistical trend, or
- CVOC parent compounds PCE; TCE; 1,1,1-TCA; and methylene chloride were not detected in at least 50 percent of the well's historical sampling event such that trend analysis would not be appropriate.

3.2.3.3 Individual CVOC Daughter Compounds

For 18 of 21 (86 percent) onsite wells and 17 of 18 (94 percent) offsite wells, Mann-Kendall statistical analysis indicates the following (because of the number of analyses associated with numerous individual compounds, see Appendix F for individual tables and graphs):

- CVOC daughter products cis-1,2-DCE and vinyl chloride are decreasing or have no statistical trend, or
- CVOC daughter products cis-1,2-DCE and vinyl chloride were not detected in at least 50 percent of the historical sampling events such that trend analysis would not be appropriate.

The wells with either increasing cis-1,2-DCE and/or vinyl chloride trends are:

- Onsite well locations BW-05 (vinyl chloride), BW-27 (cis-1,2-DCE and vinyl chloride), and BW-37 (vinyl chloride)
- Offsite well location—BW-14 (vinyl chloride)

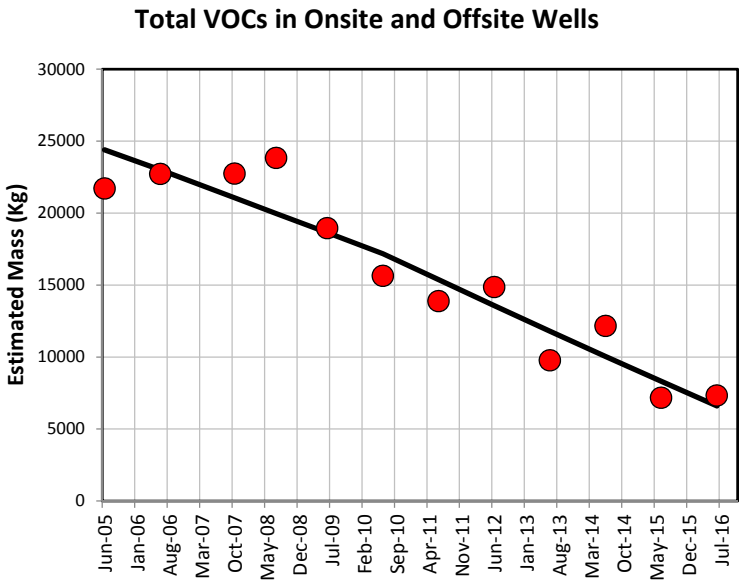
A more detailed data analysis (review of data over time and use of locally weighted scatter plot smoothing curves) of the individual CVOC daughter compound concentrations (cis-1,2-DCE and vinyl chloride) at these four wells was performed and is summarized in Appendix G. Further analysis confirms that three of these four wells (BW-14, BW-27, and BW-37) have increasing trends of individual CVOC daughter products (Appendix G), along with indications of ongoing biodegradation, as summarized in Table 3-7 (stable or decreasing trends of total VOCs; detection of nontoxic end products; MNA data indicative of reductive dechlorination; well location within/downgradient from the radius of influence [ROI] of ISCO injection zones; and/or detection of aromatic compounds). The trend graph for vinyl chloride in BW-05 has been stable since 2006 (Appendix G).

3.2.4 Mass Estimates—Trends and Composition

To evaluate stability of the area where total VOCs are detected in groundwater, the total integrated (i.e., summed) mass was estimated at annual time intervals and then the associated trends of total VOC mass over time were analyzed. The comparison of mass is a relational exercise. Individual mass for a given year is considered to be an estimate but is comparable from year to year when a consistent approach is used. A summary of the method used to calculate total mass estimates and mass estimates for individual VOC compounds is included in Appendix E.

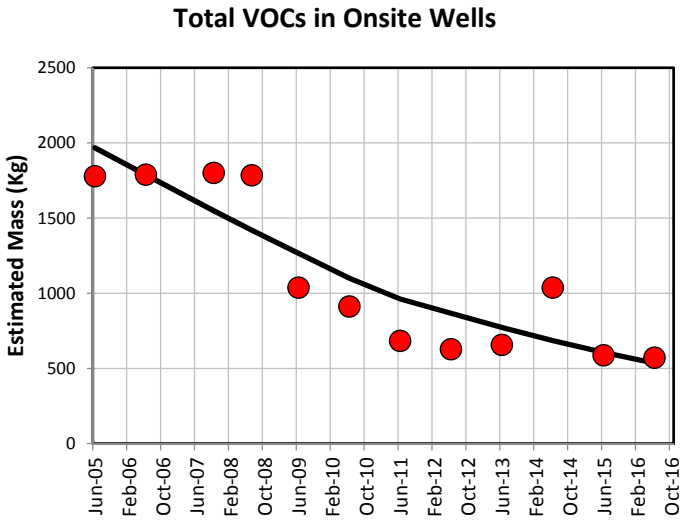
3.2.4.1 Total VOC Mass Estimates

Total VOC mass estimated for groundwater in the LTMP well network (Table 3-8) over time indicates a decreasing trend (with a 100-percent confidence interval) as shown in the following graph:



Since 2005, the total VOC mass across the site (the total mass for onsite and offsite; based on the annual mass estimate values of 21,711 kilograms [kg] in 2005 to 7,325 kg in 2016), has been reduced by approximately 66 percent (14,386 kg).

A decreasing trend (100-percent confidence interval) is also indicated for onsite total VOC mass estimates (Table 3-9) over time (as calculated using an onsite polygon network presented in Appendix E) as indicated in the next graph:

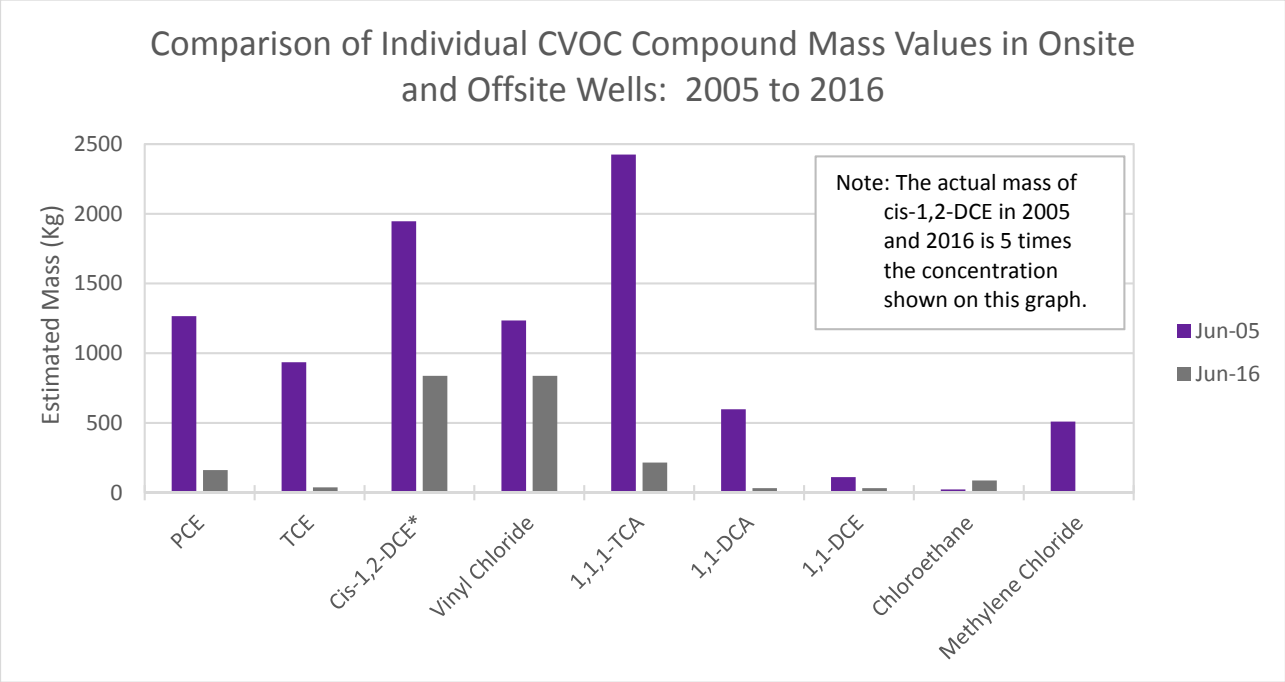


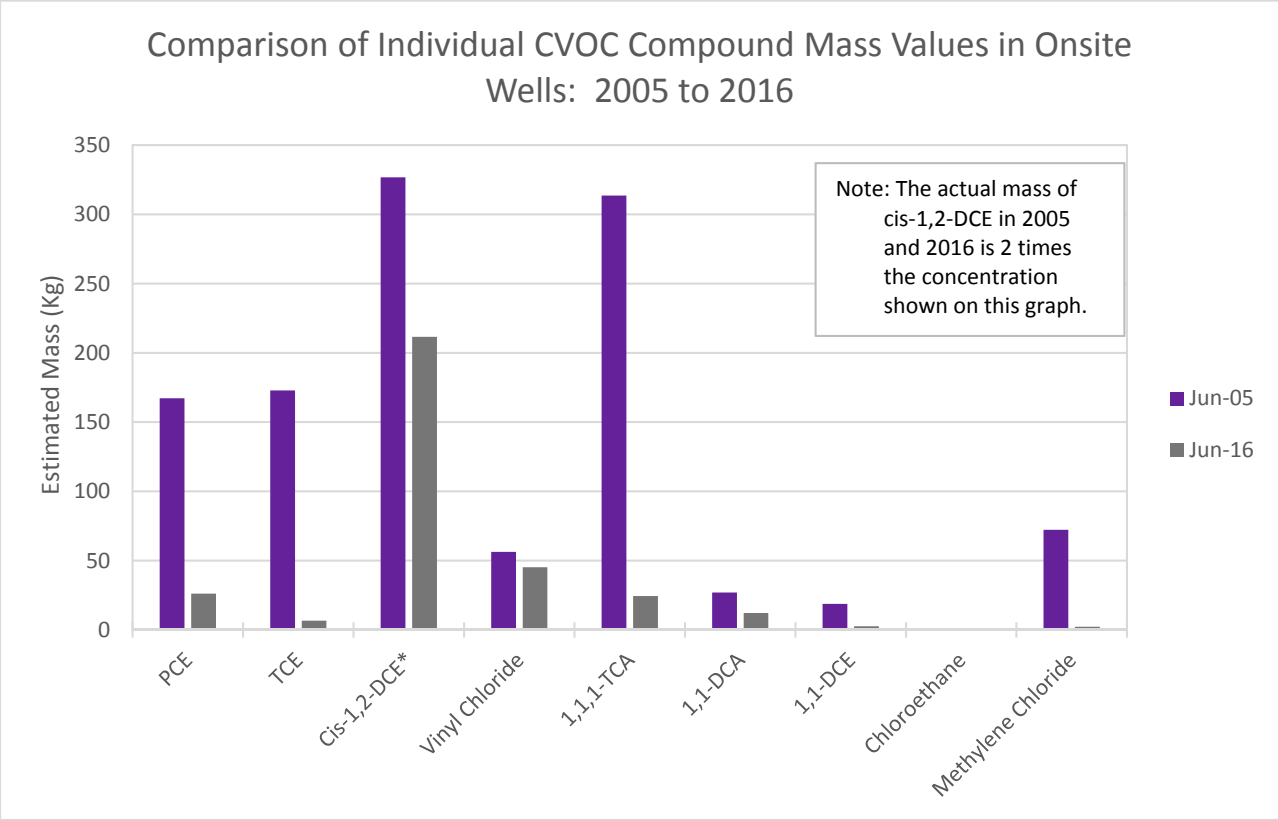
Since 2005, the total VOC mass has been reduced at onsite wells, based on the annual mass estimate values of 1,778 kg in 2005 to 571 kg in 2016, mass has been reduced by approximately 67.9 percent (1,207 kg).

3.2.4.2 Individual VOC Compound Mass Estimates

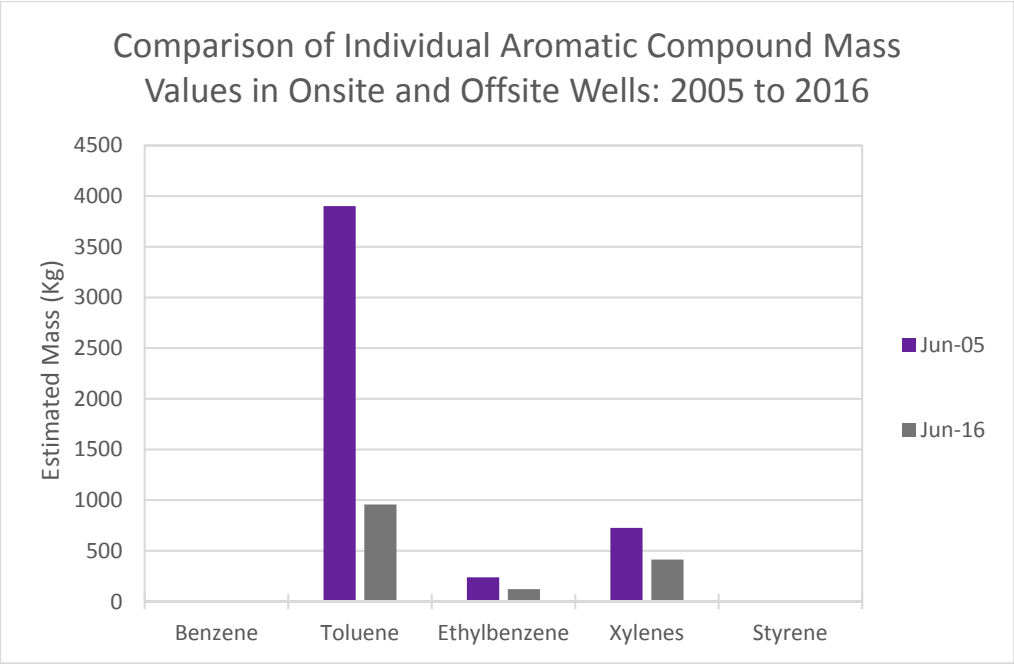
A comparison of the annual mass estimates for individual CVOC compounds (PCE; TCE; 1,1,1-TCA; methylene chloride; cis-1,2-DCE; 1,1-DCE; vinyl chloride; 1,1-DCA; and chloroethane) in the LTMP (onsite

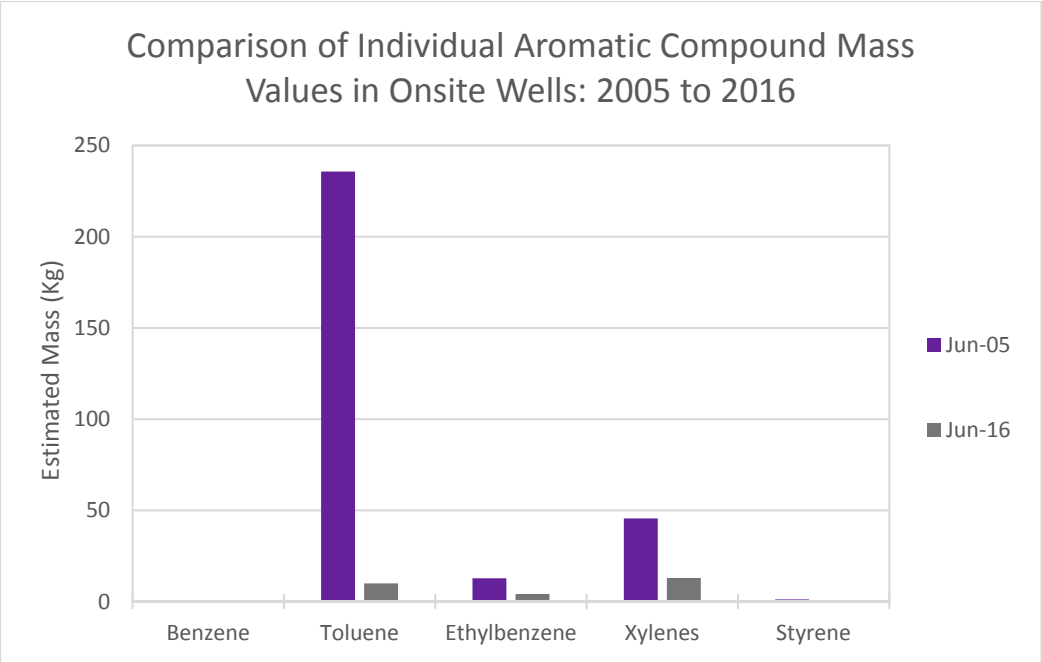
plus offsite wells) and onsite networks in 2005 and 2016 are presented in Tables 3-8 and 3-9 and shown on the following graphs:





A comparison of the annual mass estimates for individual aromatic compounds in the LTMP (onsite + offsite wells) and onsite networks in 2005 and in 2016 are presented in Tables 3-8 and 3-9 and shown on the following graphs:





Notable observations regarding mass trends for individual VOC compounds between 2005 and 2016 include the following:

- Since 2005, the estimated mass reduction for each individual CVOC parent compound in the LTMP network (onsite plus offsite wells) is a minimum of 87 percent (PCE, 87 percent; TCE, 95 percent; 1,1,1-TCA, 91 percent; and methylene chloride, 98 percent.)
- The estimated mass reduction for each CVOC daughter product (cis-1,2-DCE, 57 percent; 1,1-DCE, 71 percent; vinyl chloride, 32 percent; 1,1-DCA, 59 percent; and 1,2-DCA, 93 percent) and each aromatic compound (toluene, 75 percent; ethylbenzene, 49 percent; and xylenes, 43 percent) is also at least 32 percent in the LTMP network, suggesting that natural biodegrading processes are ongoing and that daughter products continue to undergo biodegradation to nontoxic end products.

- The percentage of the total VOC mass contributed by CVOC parent compounds (PCE; TCE; 1,1,1-TCA; and methylene chloride) has decreased since 2005. In 2016, the percentage of total CVOC parent compound mass made up less than 6 percent of the total VOC mass in the LTMP (onsite + offsite) polygon network as compared to 23 percent in 2005.
- Over 73 percent of the total VOC mass in the LTMP (onsite + offsite) network is attributed to CVOC daughter products in 2016 compared with 2005 when CVOC daughter products comprised 54 percent in the LTMP (onsite + offsite) polygon network (Tables 3-8 and 3-9).

3.2.5 MNA Performance Monitoring Data

A summary of MNA performance monitoring data for June 2016 is included in Tables 3-1 and 3-2. The MNA performance monitoring data are collected from offsite monitoring wells.

3.2.5.1 MNA Performance Monitoring Data Observations

MNA performance monitoring parameters include field-collected parameters (temperature, oxidation reduction potential [ORP], pH, and dissolved oxygen [DO]), alkalinity, nitrate, dissolved gasses (ethene, ethane, and methane), chloride, ferrous iron, sulfate, sulfide, total organic carbon, and VOCs. A review of the MNA monitoring data indicates the following:

- Downgradient and offsite groundwater conditions exhibit a reducing geochemical environment (represented by negative ORP readings, low DO, lack of nitrate, low sulfate, and/or presence of methane) that is conducive to ongoing anaerobic biodegradation of CVOCs.
- Elevated chloride concentrations in offsite/downgradient groundwater provide evidence of biodegradation of CVOCs through reductive dechlorination (chloride atoms are released during this process). The highest concentrations of chloride offsite (2 to 10 times background concentrations) occur downgradient from the former, southern storage area in the southeast direction: BW-14 (280 milligrams per liter [mg/L]), BW-25 (420 mg/L), BW-26-65’ (220 mg/L), and BW-26-85’ (170 mg/L).
- Detections of CVOC daughter products (cis-1,2-DCE; trans-1,2-DCE; 1,1-DCA; 1,1-DCE; chloroethane; and vinyl chloride) and ethene and/or ethane provide further evidence that active attenuation of CVOC parent compounds (PCE; TCE; and 1,1,1-TCA) is occurring through biological processes (specifically via “mediated reductive dechlorination” [EPA, 1998]). Complete dechlorination to nontoxic end products (ethene and ethane) is evidenced at 13 of the 18 offsite wells (Table 3-2). At the five offsite locations where ethane and ethane were not detected, either site-related COCs were also not detected, or detected concentrations of site-related COCs were below their respective RAOs.

Aromatic compounds which serve as electron donors (an energy source) for anaerobic biodegradation, were also detected in several of the offsite bedrock wells (4 of 10 shallow bedrock wells, 2 of 3 intermediate bedrock wells, and 1 of 1 deep bedrock well) providing a continued fuel source for reductive dechlorination of CVOCs. Periodic flooding of the Mississippi River adjacent to the site provides additional organic materials (i.e., energy source/substrate) to groundwater.

3.2.5.2 Preliminary Screening Table

To further support geochemical and VOC data findings, a preliminary screening for anaerobic biodegradation processes was completed for the shallow bedrock groundwater where the highest concentrations and distribution of CVOCs occur. Based on the screening results (Table 3-10), there is “*Strong evidence for anaerobic biodegradation of chlorinated organics*” in offsite shallow bedrock groundwater (EPA, 1998). The intermediate and deep groundwater parameters show general evidence of anaerobic biodegradation similar to shallow bedrock wells values, but are not presented in tabular form due to the limited number of wells screened in these two zones.

3.2.5.3 Ethene and Ethane Detections and Molarity

Since the molecular weight of ethene and ethane is much lower relative to the molecular weight of CVOCs, an evaluation of these parameters was completed using molarity. The molarity of the following constituent datasets was calculated for the 13 wells where ethene and/or ethane were detected in 2016:

- CVOC parent compounds PCE and TCE;
- CVOC daughter products cis-1,2-DCE and vinyl chloride; and
- Nontoxic end products ethene and ethane.

Figure 3-9 shows the percentage molarity that each individual compound comprises of the total molarity (total molarity equals the sum of PCE; TCE; cis-1,2-DCE; vinyl chloride; ethene; and ethane) at each offsite location where ethene and/or ethane was detected in 2016.

Groundwater at monitoring locations that are relatively close to the site is comprised of a higher molar percent of the initial CVOC daughter products (cis-1,2-DCE and vinyl chloride) produced from the degradation of parent compounds PCE and TCE (Figure 3-9). Ethene and ethane comprises a higher percentage of total molarity in locations that are further downgradient from the site (BW-25/BW-26 nest, BW-09, BW-19, BW-24-390-, BW-1, and also unconsolidated zone well MW-13), which is expected because these compounds are the end products of CVOC reductive dechlorination and indicate a “more advanced” MNA process at these more distant locations.

3.2.5.4 MNA Conditions at Downgradient Perimeter Well Nest

A review of the data collected at downgradient perimeter well nest BW-25/BW-26 was performed that indicates evidence of continuing biodegradation in that location, supporting limited VOC migration from this location. Continuing biodegradation at BW-25/BW-26 is evidenced by the following conditions (EPA, 1998):

- Detection of CVOC daughter products: cis-1,2-DCE; trans-1,2-DCE; chloroethane; vinyl chloride; and 1,1-DCA
- The concentration of CVOC daughter products comprising greater than 99 percent of the total CVOC concentration at this location (Figure 3-6)
- The detection of the highest concentrations of ethene and ethane (greater than 1,000 µg/L; nontoxic end products of CVOC reductive dechlorination) in each of the bedrock zones (shallow, intermediate, and deep)
- Elevated chloride concentrations at both locations (2 to 10 times background concentrations)
- Reducing conditions: negative ORP readings to -107.2 millivolts (mV; BW-25 only – no field parameters available from BW-26, which is a FLUTe™ well)
- Nitrate concentrations less than 1 mg/L
- Sulfate concentrations less than 20 mg/L
- Detected methane concentrations of greater than 1,000 µg/L in each of the bedrock zones (shallow, intermediate, and deep)
- Detection of elevated concentrations of petroleum hydrocarbons which serve as an energy source for anaerobic biodegradation of CVOCs

3.2.5.5 MNA Summary Statement

Natural attenuation via anaerobic biodegradation processes (i.e., reductive dechlorination) is ongoing within the area of CVOC detections as demonstrated by 2016 data, and continues to be an effective remedy for offsite groundwater.

3.2.6 ISCO Operational Data

3.2.6.1 Permanganate

Permanganate was visually observed/noted in eight shallow bedrock monitoring wells in 2016 (observed either during the purging process, at the time of sampling, or during water level measurement process) as summarized in Table 3-11.

The field spectrophotometer was utilized at all onsite wells where groundwater samples were collected in June 2016. Permanganate was detected in three shallow bedrock zone and unconsolidated zone monitoring wells at the time of sampling using this meter as summarized in Table 3-1. Locations where samples were visibly clear (not pink/purple), and had concentrations of permanganate measured of less than 5 mg/L are not believed to be impacted by permanganate at the time of meter use/readings. These measurements are within the range of error of the field spectrophotometer.

Consistent with historical observations, permanganate was not observed in June 2016 in either intermediate or deep bedrock zone monitoring wells, in monitoring wells at ISCO injection Areas 4 or 6 (Figure 2-2), or in offsite monitoring wells. The ROI of permanganate in shallow bedrock wells in June 2016 ranged from 20 to 90 feet, which is similar to the historically observed ROI of 10 to 100 feet. The onsite well data indicate the oxidizing chemical persists for ongoing treatment of VOCs in groundwater at five of the seven ISCO injection areas.

Permanganate has persisted in onsite groundwater for at least 6 months since last injection ended in December 2015 and observations were recorded in June 2016.

3.2.6.2 Oxidation Reduction Potential

June 2016 ORP values are provided in Table 3-1. ORP is a relative measure of the groundwater's ability to accept or transfer electrons (EPA, 1998). In general, strongly positive ORP readings in groundwater indicate an ability to oxidize or accept electrons from other substances, and strongly negative ORP readings indicate an ability to reduce or transfer electrons to other substances. When ISCO is used/injected, an oxidant or electron acceptor such as permanganate is added to groundwater to oxidize VOCs. The oxidant's presence in groundwater is evidenced by ORP values that are higher (or more positive) than background conditions. As VOCs are oxidized, the oxidizing ability of groundwater decreases as does the ORP value.

Elevated ORP readings at and downgradient from ISCO injection areas provide evidence of oxidizing conditions due to the presence of permanganate in groundwater (beyond checking for visual evidence of purple color).

Onsite ORP values in June 2016 are generally more oxidizing where permanganate (an oxidant) was observed at the time of sampling. The most oxidizing/highest positive ORP values are observed onsite at unconsolidated zone wells MW-04 (618.9 mV), and shallow bedrock zone monitoring wells BW-04 (579.8 mV), BW-05 (577.9 mV), and PZ-01 (650.7 mV). Elevated ORP values were also measured at unconsolidated zone monitoring well MW-08 (457.6) and shallow bedrock wells BW-01 (440.7) and BW-31 (470.5).

3.2.6.3 Chloride

During chemical oxidation of the CVOCs (parent compounds and daughter products) by permanganate, chloride is released into groundwater. Chloride is analyzed as an indicator parameter to evaluate the effectiveness of the ISCO remedy (ITRC, 2005).

The highest chloride concentrations onsite correspond with the highest concentrations of CVOCs detected onsite. Concentrations of chloride detected onsite in the unconsolidated zone and deep bedrock zone are lower than those detected in shallow and intermediate bedrock zones. Elevated concentrations of chloride (2 to 10 times greater than the background concentrations) occur at the following onsite locations:

- Northern portion of site: BW-27 (310 mg/L), BW-28 (180 mg/L), BW-05 (710 mg/L), BW-16 (190 mg/L), and BW-04 (180 mg/L) (BW-27 and BW-38 are located immediately adjacent to ISCO injection Area 1, BW-05 is immediately adjacent to ISCO injection Area 3, BW-16 is within ISCO injection Area 7, and BW-04 is within ISCO injection Area 5.)
- Southern portion of site: BW-37 (180 mg/L) (BW-37 is located downgradient from ISCO injection Area 4.)

3.2.6.4 ISCO Summary Statement

As demonstrated by the 2016 onsite well data, the oxidizing chemical permanganate is being effectively delivered as evidenced by its presence in many onsite monitoring well locations. Permanganate has persisted in onsite groundwater for 6 months since it was injected in December 2015, as it was still observed in many monitoring well locations in June 2016. Elevated chloride concentrations and ORP values both indicate oxidizing conditions are present onsite in the zones affected by permanganate injection (an approximate ROI of 20 to 90 feet). The onsite well data indicate the oxidizing chemical persists for ongoing treatment of VOCs in groundwater at five ISCO injection areas.

SECTION 4

Remedy Effectiveness

4.1 ISCO Effectiveness

ISCO treatment has been effective at decreasing VOC concentrations onsite since injection began in May 2004, as evidenced by the following:

- The planar area of highest total site-related VOC concentrations (greater than 10,000 and 100,000 µg/L) is reduced in size in the 11 years between 2005 and 2016 (Figure 3-3).
- Concentration trends for total site-related VOCs in unconsolidated, shallow bedrock, intermediate bedrock, and deep bedrock groundwater zones at onsite and offsite locations: 1) are decreasing; 2) have no trend; or 3) are not detected frequently enough to perform statistical trend analysis.
- Concentration trends for individual CVOC parent compounds (PCE and TCE) in unconsolidated, shallow bedrock, intermediate bedrock, and deep bedrock groundwater zones at onsite locations: 1) are decreasing; 2) have no trend; or 3) are not detected frequently enough to perform statistical trend analysis.
- Concentration trends for individual CVOC daughter products of cis-1,2-DCE and vinyl chloride in unconsolidated, shallow bedrock intermediate bedrock, and deep bedrock groundwater zones: 1) are decreasing; 2) have no trend; or 3) are not detected frequently enough to perform statistical trend analysis with the exception of two ISCO locations (BW-27 and BW-37) where increases are noted and accompanied by numerous indications of ongoing reductive dechlorination.
- The reduction in onsite, total site-related VOC mass is estimated at 67.9 percent (a loss of 1,207 kg) in the 11 years between 2005 (1,778 kg) and 2016 (571 kg); the mass values of individual CVOC parent compounds (PCE; TCE; 1,1,1-TCA; and methylene chloride), CVOC daughter products (cis-1,2-DCE; 1,1-DCE; vinyl chloride; 1,1-DCA; and 1,2-DCA), and aromatic compounds (toluene, ethylbenzene, and xylenes) have also decreased over the same time period.
- Effective delivery of the oxidizing chemical—visual evidence of the presence of permanganate was observed in eight onsite monitoring locations in 2016.
- Elevated ORP readings at and downgradient from ISCO injection areas—evidence of oxidizing conditions due to the presence of permanganate in groundwater.
- Elevated chloride concentrations (2 to 10 times greater than background) in onsite wells—evidence of significant oxidation of CVOCs.

4.2 MNA Remedy Effectiveness

MNA processes continue to effectively reduce offsite groundwater VOC concentrations in each of the monitored zones (shallow, intermediate, and deep bedrock, as well as the unconsolidated zone) as evidenced by the following:

- The lateral extent of total VOC detections in 2016 is reduced as compared with the lateral extent of total VOC detections in 2005. Furthermore, the magnitude of the concentrations has decreased as evidenced by smaller planar areas that are comprised by the higher concentration contours (10,000 and 100,000 µg/L – yellow and peach colors, respectively) (Figure 3-3).

- Concentration trends for total site-related VOCs in unconsolidated, shallow bedrock, intermediate bedrock, and deep bedrock groundwater zones at onsite and offsite locations: 1) are decreasing; 2) have no trend; or 3) are not detected frequently enough to perform statistical trend analysis.
- Concentration trends for individual CVOC parent compound (PCE; TCE; 1,1,1-TCA; and methylene chloride) in unconsolidated, shallow bedrock, intermediate bedrock, and deep bedrock groundwater zones at offsite locations: 1) are decreasing; 2) have no trend; or 3) are not detected frequently enough to perform statistical trend analysis.
- Concentration trends for individual CVOC daughter products of cis-1,2-DCE and vinyl chloride in unconsolidated, shallow bedrock intermediate bedrock, and deep bedrock groundwater zones: 1) are decreasing; 2) have no trend; or 3) are not detected frequently enough to perform statistical trend analysis, with the exception of one MNA location (BW-14) where increases are noted and accompanied by numerous indications of ongoing reductive dechlorination.
- The reduction in onsite + offsite, total site-related VOC mass is estimated at 66 percent (a loss of 14,386 kg) in the 11 years between 2005 (21,711 kg) and 2016 (7,325 kg); the mass values of individual CVOC parent compounds (PCE; TCE; 1,1,1-TCA; and methylene chloride), CVOC daughter products (cis-1,2-DCE; 1,1-DCE; vinyl chloride; 1,1-DCA; and 1,2-DCA), and aromatic compounds (toluene, ethylbenzene, and xylenes) have also decreased over the same time period.
- The percentage of the total VOC mass contributed by CVOC daughter products has increased (with over 73 percent of the total mass contributed by CVOC daughter products in 2016 compared with 54 percent in 2005) while the individual mass of the daughter products has decreased, suggesting that natural biodegrading processes are ongoing, and that daughter products continue to undergo biodegradation.
- Detection of biodegradation daughter products offsite including the predominance of CVOC daughter products versus parent compounds, the detection of the nontoxic end products ethene and ethane, and elevated chloride concentrations (2 to 10 times greater than background).
- Geochemical conditions offsite/downgradient from the site are conducive for ongoing biodegradation of CVOC parent compounds and daughter products due to reducing conditions as evidenced by field measurements, lack of nitrate, low sulfate, and/or the presence of methane.
- Ethene and ethane comprises a higher percentage of total molarity in offsite locations that are further downgradient from the site, which is expected because these compounds indicate a “more advanced” MNA process at these more distant locations.
- The perimeter well nest at BW-25/BW-26 has strong evidence of MNA effectiveness based on reducing conditions, CVOC daughter product concentrations comprising over 99 percent of the total CVOC concentrations, elevated chloride concentrations (2 to 10 times background concentrations), and the detection of ethene, ethane, and methane in each of the bedrock zones (shallow, intermediate, and deep).
- EPA screening protocol procedures (EPA, 1998) for shallow bedrock indicate there is strong evidence of ongoing anaerobic biodegradation of CVOCs.

4.3 Institutional Controls Inspection

ICs were implemented to limit the site to industrial use and an EC was established/recorded to prevent groundwater use and exposure. Activities that appear inconsistent with the objectives of the ICs or land use restrictions, or other actions that may interfere with the effectiveness of the ICs, were not observed during the 2016 site inspection.

SECTION 5

Summary and Recommendations

Onsite soil treatment, onsite groundwater treatment, and natural attenuation processes have resulted in decreases in the extent and magnitude of VOC concentrations in groundwater, and in a 66 percent decrease of total VOC mass (in onsite and offsite wells) between 2005 and 2016. Furthermore, groundwater data continue to provide evidence that conditions are conducive for ongoing reductive dechlorination of CVOCs supporting MNA as an effective offsite remedy.

5.1 Conceptual Site Model Updates

There are no updates to the physical characteristics of the CSM established in the OMMP using the 2016 data. The lateral extent of total VOCs detected in groundwater in 2016 is less than the 2005 lateral extent (Figure 3-3).

5.2 Monitoring Well Network Conditions

Site monitoring wells were found to be in good condition during June 2016 observations and do not require repairs. The conditions of the monitoring wells will again be evaluated in June 2017.

5.3 Institutional Controls

There are no recommended changes to the ICP. The recorded EC will be used to further prevent groundwater use and potential exposure.

5.4 ISCO Injection Program

Pilot-scale onsite groundwater treatment of the site-related COCs using ISCO/permanganate injections in the shallow bedrock zone began in 2004, with full-scale injections beginning in October 2007. As outlined in the ISCO Injection Plan (CH2M, 2014), an injection was not completed in 2016. Although the last injection was in 2015, onsite well data indicate the oxidizing chemical persists for ongoing treatment of VOCs in groundwater at five of seven ISCO injection areas. Elevated chloride concentrations and ORP values at and downgradient from onsite ISCO injection areas both indicate oxidizing conditions are present. A full-scale ISCO injection will next be completed in 2017 per the ISCO Injection Plan.

5.5 Onsite Monitoring Well Sampling/Analysis

ISCO continues to effectively reduce the highest concentrations of total VOCs as evidenced by the following:

- Large decreases in total VOC mass
- A reduction in the planer area encompassed by each total VOC concentration contour (10 µg/L; 100 µg/L; 1,000 µg/L; 10,000 µg/L; and 100,000 µg/L or greater)
- Decreasing or no trends of total VOCs concentrations and individual parent compound concentrations (1,1,1-TCA; TCE; PCE; and methylene chloride) in shallow, intermediate, and deep bedrock zones and the unconsolidated zone
- The detection of permanganate, elevated ORP readings, and elevated chloride concentrations in onsite wells

Annual sampling should be continued at the onsite LTMP wells as required per the LTMP.

5.6 Offsite Monitoring Well Sampling/Analysis

MNA processes continue to effectively reduce offsite groundwater CVOC concentrations in each of the monitored zones (shallow, intermediate, and deep bedrock, as well as the unconsolidated zone) as evidenced by decreased overall total estimated VOC mass, a predominance of CVOC daughter product versus parent compounds, detection of nontoxic end products (ethene/ethane), the presence of reducing conditions that are amenable for ongoing reductive dechlorination of CVOCs, and elevated chloride concentrations indicating evidence of reductive dechlorination.

Because of the strong evidence in each zone, including at the perimeter well nest (BW-25/BW-26), no changes are recommended for the LTMP offsite wells. Sampling should continue on an annual basis at offsite LTMP wells.

5.7 Work To Be Performed in 2017

The following work will be performed in 2017:

- The long-term groundwater monitoring program for both onsite and offsite wells will continue as identified in the EPA-approved LTMP.
- An inspection noting the conditions of the monitoring well network will be performed in June 2017, concurrent with the annual groundwater monitoring event.
- The IC inspection will be performed in June 2017, concurrent with the annual groundwater monitoring event, per the OMMP and the ICP.
- An administrative review of the EC documents (property deeds and/or land zoning-related) will be performed in June 2017 during the IC inspection.
- The 2017 ARPR will be developed using 2017 annual groundwater analytical data, and will be submitted to EPA on or before March 1, 2018.

The 2017 Corrective Measures Performance Evaluation Report, which is the report to be submitted every 5 years per the Administrative Order on Consent, will be submitted to EPA on or before May 26, 2017.

SECTION 6

References

CH2M HILL Engineers, Inc. (CH2M). 2004. *Remedial Alternatives Study Report, 2040 West River Drive, Davenport, Iowa*. Prepared for T. H. Agriculture & Nutrition, L.L.C.; Elementis Chemicals, Inc.; and Harcros Chemicals, Inc. Submitted to the U.S. Environmental Protection Agency. August.

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Tables

Table 1-1. Operation, Monitoring, and Maintenance of Corrective Measures

THAN Davenport Site, 2040 West River Drive

Corrective Measure	Targeted Medium	Objectives	Summary of Operation, Monitoring, and Maintenance Activities	Summary of Data Evaluations and Reporting Requirements per OMMP	Reference for Additional Details
ISCO	Onsite groundwater	The objective is to restore onsite groundwater to established EPA MCLs or RSLs for constituents that do not have an established MCL.	Performance groundwater monitoring to collect COC, geochemical, and permanganate data.	Data will be evaluated annually to review trends over time with respect to site-related constituent mass and individual constituent concentrations and the effectiveness of the onsite ISCO corrective measure. A steady-state evaluation of consistent concentrations in groundwater will be conducted once all of the chemical oxidant solution has been consumed, based upon visual evidence of persisting permanganate (purple color) in the groundwater. The steady-state evaluation will include a review of the groundwater remedy implementation to determine if injection of additional oxidant solution, or selection of a new groundwater remedy, would most efficiently reduce groundwater VOC concentrations.	Appendix C of the *Operation, Monitoring, and Maintenance Plan* (OMMP) (CH2M, 2014)
MNA	Offsite groundwater	The objective is to restore offsite groundwater to established EPA MCLs or RSLs for constituents that do not have an established MCL.	Performance groundwater monitoring to collect hydraulic, COC, and geochemical data.	Data will be evaluated to review trends over time with respect to constituent mass and individual constituent concentrations, nature and extent of constituents in groundwater to ensure that site-related constituents are not migrating into previously unaffected areas, verification that the geochemical and geologic conditions are still favorable for natural attenuation, and evaluation of EISB contingency triggers.	Appendix A of the OMMP
EISB (if needed)	Offsite groundwater	If triggered, the objective of EISB is the addition of amendments to the groundwater to enhance the ability of natural attenuation to remediate site-related constituents and restore offsite groundwater to established EPA MCLs or RSLs for constituents that do not have an established MCL.	Pre-design activities (bench- and pilot-scale studies) to assess the biological community, evaluate substrates, and develop optimal operation and monitoring for full-scale implementation.	Full-scale EISB performance data will be developed based on the results of the bench- and pilot-scale testing.	Appendix B of the OMMP
ICs	Onsite groundwater	The objective is to restrict groundwater use and exposure to site-related constituents in the onsite groundwater.	A visual site inspection will be conducted annually to document current land use, any visual evidence of construction and/or demolition activities, excavation activities, any waste generation/exposure, drilling activity, and any activities inconsistent with the ICs presented in the ICP.	Results of the visual inspection will be recorded on the IC Visual Inspection Form and will be submitted to EPA as an attachment to the annual remedy performance report.	Appendix F of the OMMP

Notes:
COC = constituent of concern
EISB = enhanced in situ bioremediation
EPA = U.S. Environmental Protection Agency
IC = institutional control
ICP = Institutional Control Plan
ISCO = in situ chemical oxidation
MCL = maximum contaminant level
MNA = monitored natural attenuation
OMMP = Operation, Monitoring, and Maintenance Plan
RSL = regional screening level
VOC = volatile organic compound
CH2M HILL Engineers, Inc. (CH2M). 2014. *Operation, Monitoring, and Maintenance Plan, 2040 West River Drive, Davenport, Iowa* . Prepared for T H Agriculture & Nutrition, L.L.C.; Elementis Chemicals, Inc.; and Harcros Chemicals, Inc. Submitted to the U.S. Environmental Protection Agency. June.

Table 2-1. Monitoring Well Construction Data and June 2016 Groundwater Elevations

THAN Davenport Site, 2040 West River Drive

Location	Well Screen Zone	Northing	Easting	Top of Casing Elevation (ft amsl)	Ground Elevation (ft amsl)	Bedrock Elevation (ft amsl)	Depth to Bedrock (ft bgs)	Top of Screened Interval (ft bgs)	Bottom of Screened Interval (ft bgs)	June 2003 Depth to Water	June 2003 Total Depth	June 2016 Depth to Water (ft btoc)	June 2016 GW Elevation (ft amsl)
BW-01	Shallow Bedrock	5039.23	5245.33	570.62	567.60	556.60	11.00	21	31	11.74	34.13	11.97	558.65
BW-02	Shallow Bedrock	4937.72	4642.48	570.25	567.20	562.20	5.00	11	21	5.59	23.98	4.89	565.36
BW-03/BW03R[a]	Shallow Bedrock	4479.14	5068.76	565.48	562.40	557.90	4.50	15	25	7.31	28.23	7.28	558.20
BW-04	Shallow Bedrock	5151.00	4662.94	571.84	569.20	564.20	5.00	21	31	5.62	33.79	5.34	566.50
BW-05	Shallow Bedrock	4870.19	4810.68	571.33	568.70	563.70	5.00	8.5	18.5	5.67	20.85	5.57	565.76
BW-06	Shallow Bedrock	4615.99	5057.06	563.97	567.01	561.51	5.50	16	26	NA	NA	2.66	561.31
BW-09	Shallow Bedrock	4669.60	4474.22	565.52	562.75	549.75	13.00	18	28	4.42	30.25	3.96	561.56
BW-11	Shallow Bedrock	4071.43	4703.36	561.41	561.70	551.70	10.00	17	27	6.30	26.82	6.26	555.15
BW-12	Intermediate Bedrock	4866.01	4842.84	572.34	569.44	561.44	8.00	94	104	20.38	107	18.02	554.32
BW-13	Shallow Bedrock	4342.83	5459.16	566.65	563.36	539.36	24.00	27	32	15.06	35.07	13.80	552.85
BW-14	Shallow Bedrock	4544.55	5252.28	568.24	565.20	556.20	9.00	28	38	14.53	40.15	13.85	554.39
BW-15	Shallow Bedrock	4821.56	5334.11	567.02	563.94	555.94	8.00	18	28	13.18	31.23	13.22	553.80
BW-16	Shallow Bedrock	5041.16	4820.72	571.42	568.78	563.78	5.00	22.5	32.5	5.54	33.81	5.74	565.68
BW-18	Shallow Bedrock	5275.95	4399.23	575.70	575.73	565.73	10.00	32	42	6.62	41.74	5.00	570.70
BW-19	Shallow Bedrock	4120.61	5232.37	561.93	558.78	533.78	25.00	26.5	36.5	10.36	39.55	9.39	552.54
BW-21	Intermediate Bedrock	4115.38	5230.37	562.06	559.03	534.03	25.00	140	150	10.89	154.32	7.88	554.18
BW-22	Intermediate Bedrock	4276.87	5428.65	565.19	562.40	537.40	25.00	139	149	13.76	--	11.16	554.03
BW-23-50'	Shallow Bedrock	4496.61	5070.97	565.74	562.86	--	--	50	60	8.79	--	9.16	556.58
BW-23-90'	Intermediate Bedrock	4496.61	5070.97	565.75	562.86	--	--	90	100	16.37	--	11.50	554.25
BW-23-125'	Intermediate Bedrock	4496.61	5070.97	565.74	562.86	--	--	125	135	16.38	--	11.40	554.34
BW-23-200'	Intermediate Bedrock	4496.61	5070.97	565.76	562.86	--	--	200	210	16.37	--	11.51	554.25
BW-23-290'	Deep Bedrock	4496.61	5070.97	565.77	562.86	--	--	290	300	16.37	--	11.53	554.24
BW-23-390'	Deep Bedrock	4496.61	5070.97	565.78	562.86	--	--	390	400	16.38	--	11.34	554.44
BW-23-Liner	--	4496.61	5070.97	--	--	--	--	--	--	--	--	--	--
BW-24-175'	Intermediate Bedrock	4118.22	5212.69	562.63	559.32	--	--	175	185	11.90	--	8.42	554.21
BW-24-230'	Intermediate Bedrock	4118.22	5212.69	562.63	559.32	--	--	230	240	11.84	--	8.33	554.30
BW-24-290'	Deep Bedrock	4118.22	5212.69	562.63	559.32	--	--	290	300	11.90	--	8.29	554.34
BW-24-390'	Deep Bedrock	4118.22	5212.69	562.63	559.32	--	--	390	400	12.14	--	8.43	554.20
BW-24-Liner	--	4118.22	5212.69	--	--	--	--	--	--	--	--	--	--
BW-25	Shallow Bedrock	4637.26	5447.90	566.28	564.08	--	--	28	38	15.64	40.46	15.14	551.14
BW-26-65'[b]	Intermediate Bedrock	4657.67	5442.17	567.08	564.81	538.81	26.00	65	75	--	--	13.08	554.00
BW-26-85'[b]	Intermediate Bedrock	4657.67	5442.17	567.13	564.81	538.81	26.00	85	95	--	--	13.10	554.03
BW-26-205'[b]	Intermediate Bedrock	4657.67	5442.17	567.28	564.81	538.81	26.00	205	215	--	--	13.19	554.09
BW-26-295'[b]	Deep Bedrock	4657.67	5442.17	567.18	564.81	538.81	26.00	295	305	--	--	13.12	554.06
BW-26-395'[b]	Deep Bedrock	4657.67	5442.17	567.08	564.81	538.81	26.00	395	405	--	--	13.03	554.05
BW-26-Liner[b]	--	4657.67	5442.17	--	--	--	--	--	--	--	--	--	--
BW-27[c]	Shallow Bedrock	5129.56	4719.97	570.68	--	--	10.00	15.5	40.5	--	--	4.84	565.84
BW-28[c]	Shallow Bedrock	5074.93	4699.76	569.41	--	--	9.00	15.5	40.5	--	--	4.05	565.36
BW-29[c]	Shallow Bedrock	5033.18	4750.23	569.50	--	--	8.00	11.5	36.5	--	--	3.97	565.53

Table 2-1. Monitoring Well Construction Data and June 2016 Groundwater Elevations

THAN Davenport Site, 2040 West River Drive

Location	Well Screen Zone	Northing	Easting	Top of Casing Elevation (ft amsl)	Ground Elevation (ft amsl)	Bedrock Elevation (ft amsl)	Depth to Bedrock (ft bgs)	Top of Screened Interval (ft bgs)	Bottom of Screened Interval (ft bgs)	June 2003 Depth to Water	June 2003 Total Depth	June 2016 Depth to Water (ft btoc)	June 2016 GW Elevation (ft amsl)
BW-30[c]	Shallow Bedrock	4973.09	4747.91	570.17	--	--	8.50	11.5	36.5	--	--	4.75	565.42
BW-31[c]	Shallow Bedrock	4947.55	4795.36	571.61	--	--	9.00	12	37	--	--	5.40	566.21
BW-32[c]	Shallow Bedrock	4975.52	4857.92	570.13	--	--	8.00	12	37	--	--	4.21	565.92
BW-33[c]	Shallow Bedrock	4913.75	4859.60	571.49	--	--	10.50	12	37	--	--	5.69	565.80
BW-34[c]	Shallow Bedrock	4913.99	4896.32	570.02	--	--	8.50	12	37	--	--	3.66	566.36
BW-35[c]	Shallow Bedrock	4599.13	4978.13	568.05	--	--	7.00	9.5	34.5	--	--	3.90	564.15
BW-36[c]	Shallow Bedrock	4586.10	5030.36	567.28	--	--	7.00	9.5	34.5	--	--	5.41	561.87
BW-37[c]	Shallow Bedrock	4547.82	5046.31	564.93	--	--	4.50	9.5	34.5	--	--	6.24	558.69
ISCO-IW01	Shallow Bedrock	5053.94	4815.66	570.70	--	--	5.50	20.0	30.0	NM	NM	--	--
ISCO-IW02	Shallow Bedrock	5048.20	4817.58	570.77	--	--	5.50	8	18	NM	NM	--	--
ISCO-IW03[d]	Shallow Bedrock	5090.88	4733.75	--	--	--	13.50	29.5	39.5	NM	NM	--	--
ISCO-IW04[d]	Shallow Bedrock	5092.26	4738.26	--	--	--	10.00	16.5	26.5	NM	NM	--	--
ISCO-IW05[d]	Shallow Bedrock	4985.29	4782.28	--	--	--	8.50	24.5	34.5	NM	NM	--	--
ISCO-IW06[d]	Shallow Bedrock	4987.07	4786.27	--	--	--	8.50	12	22	NM	NM	--	--
ISCO-IW07[d]	Shallow Bedrock	4915.92	4819.49	--	--	--	8.50	22	32	NM	NM	--	--
ISCO-IW08[d]	Shallow Bedrock	4917.35	4822.55	--	--	--	9.00	12	22	NM	NM	--	--
ISCO-IW09[d]	Shallow Bedrock	4620.15	5014.89	567.64	--	--	5.50	23.5	33.5	NM	NM	--	--
ISCO-IW10[d]	Shallow Bedrock	4622.55	5019.49	567.33	--	--	6.00	10.5	20.5	NM	NM	--	--
ISCO-IW11	Shallow Bedrock	4525.49	5020.25	566.28	--	--	5.00	20	30			--	--
ISCO-IW12	Shallow Bedrock	4523.29	5021.84	565.91	--	--	5.00	8	18			--	--
ISCO-IW13	Shallow Bedrock	5165.76	4673.47	570.45	--	--	6.50	21.5	31.5			--	--
ISCO-IW14	Shallow Bedrock	5167.85	4670.71	570.36	--	--	6.50	9.5	19.5			--	--
ISCO-PZ-01[b]	Shallow Bedrock	5040.33	4793.12	571.34	569.12	563.12	6.00	9	34	NM	NM	5.63	565.71
ISCO-PZ-03	Shallow Bedrock	5026.83	4829.86	570.65	568.42	562.92	5.50	10	35	NM	NM	4.86	565.79
ISCO-PZ-04[b]	Shallow Bedrock	5006.62	4831.17	570.96	569.07	563.57	5.50	10	35	NM	NM	5.14	565.82
MW-01	Unconsolidated	5043.59	5245.56	570.35	567.10	556.10	11.00	4	11	10.79	13.68	11.08	559.27
MW-03	Unconsolidated	5035.84	4821.48	570.64	568.70	563.70	5.00	2.5	5	4.70	7.36	5.10	565.54
MW-04	Unconsolidated	5151.67	4659.38	571.36	569.00	564.00	5.00	2.5	5	5.70	7.56	3.88	567.48
MW-05	Unconsolidated	4474.34	5068.12	565.90	562.20	557.70	4.50	2	5	6.36	8.22	7.65	558.25
MW-06	Unconsolidated	4576.72	4964.41	570.15	567.50	561.50	6.00	3.5	6	NA	NA	8.50	561.65
MW-07	Unconsolidated	4941.41	4647.23	570.31	567.20	562.20	5.00	2	5	5.31	8.24	5.55	564.76
MW-08	Unconsolidated	4874.70	4808.19	571.36	568.70	563.70	5.00	2	5	5.70	8.22	6.84	564.52
MW-13	Unconsolidated	4682.57	4466.12	565.74	563.00	549.00	14.00	9	14	4.51	16.7	4.76	560.98
MW-17	Unconsolidated	4066.42	4706.18	561.17	561.73	551.73	10.00	8	13	6.64	8.64	6.85	554.32
MW-18	Unconsolidated	4934.61	5676.34	565.57	562.55	510.55	52.00	42	52	13.66	54.99	11.53	554.04
MW-19	Unconsolidated	4933.94	5681.49	565.51	562.39	510.39	52.00	5	15	11.44	18.25	11.87	553.64
MW-20	Unconsolidated	5281.57	4404.09	576.13	576.16	569.36	6.80	5	7	3.60	6.85	3.20	572.93

Table 2-1. Monitoring Well Construction Data and June 2016 Groundwater Elevations

THAN Davenport Site, 2040 West River Drive

Location	Well Screen Zone	Northing	Easting	Top of Casing Elevation (ft amsl)	Ground Elevation (ft amsl)	Bedrock Elevation (ft amsl)	Depth to Bedrock (ft bgs)	Top of Screened Interval (ft bgs)	Bottom of Screened Interval (ft bgs)	June 2003 Depth to Water	June 2003 Total Depth	June 2016 Depth to Water (ft btoc)	June 2016 GW Elevation (ft amsl)
PT-01	Shallow Bedrock	4869.20	4836.66	571.33	569.30	563.80	5.50	--	--	NM	NM	5.73	565.60
PZ-01	Shallow Bedrock	4871.37	4842.89	572.31	569.24	563.74	5.50	40	50	8.43	53.49	8.42	563.89
PZ-02	Intermediate Bedrock	4871.48	4842.86	572.33	569.24	563.74	5.50	60	70	18.22	73.02	14.45	557.88

Notes:

[a]Well BW-03 was abandoned on December 4, 2012 due to damage. A replacement well for BW-03 (BW-03R) was installed between December 4 and 6, 2012, approximately 5 feet to the northeast of well BW-03. Survey coordinates presented in this table are for BW-03R.

[b]Monitoring well was installed in December 2004.

[c]Monitoring well was installed in October 2007.

[d]ISCO injection well was installed in October 2007.

[e]ISCO injection well was installed in July 2010.

-- indicates the data is not available

NM = not measured

NA = not accessible

DRY = The monitoring well was dry at the time water level measurements were collected.

ft amsl = feet above mean sea level

ft bgs = feet below ground surface

ft btoc = feet below top of casing

NL = not able to locate

NS = not surveyed

All groundwater level measurements were collected on June 13 and 14, 2016.

Table 3-1. Groundwater Field Parameter Measurements – June 2016

THAN Davenport Site, 2040 West River Drive

Well ID	Temp (°C)	Specific Conductance (µS/cm[c])	Conductivity (µS/cm)	pH (SU)	Dissolved Oxygen (mg/L)[a]	Dissolved Oxygen (Percent)[a]	Oxidation Reduction Potential (mV)	Turbidity (ntu)	Permanganate Concentrations (mg/L)[b,c, d]
BW-01	19.25	882	786	6.59	0.60	6.5	440.7	4.1	--
BW-02	22.08	1836	1761	6.95	0.33	3.9	-11.2	0.0	--
BW-03R	22.31	768	729	6.27	0.34	3.9	-10.5	1.1	0.4 (Visibly Clear)
BW-04	20.52	16200	14812	7.52	10.06	122.2	579.8	104.3	74,240 (Visibly Purple)
BW-05	18.59	4541	3984	5.31	1.10	11.9	577.9	532.1	1336 (Visibly Pink)
BW-06	16.42	1513	1265	7.08	0.27	2.7	-264.5	0.0	2.6 (Visibly Clear)
BW-09	22.99	2207	2140	7.24	0.29	2.5	-105.4	4.9	--
BW-11	20.34	1653	1506	6.56	0.48	5.3	57.1	9.9	--
BW-13	22.35	1326	1269	6.78	0.22	2.5	-138.5	0.1	--
BW-14	22.89	1854	1780	6.45	0.37	4.4	-126.9	0.6	--
BW-15	19.96	1330	1202	6.83	0.53	6.1	-29.0	2.4	--
BW-16	23.88	3767	3687	7.08	0.48	5.7	160.5	1.4	0.0 (Visibly Clear)
BW-18	14.52	921	737	6.68	0.66	6.5	226.7	0.0	--
BW-19	16.62	1335	1122	7.28	0.25	2.6	-155.9	0.0	--
BW-21	16.95	1433	1213	7.01	0.39	4.0	-42.8	11.8	--
BW-23-50'	--	--	--	--	--	--	--	--	(Visibly Clear)[c]
BW-23-125'	--	--	--	--	--	--	--	--	(Visibly Clear)[c]
BW-23-390'	--	--	--	--	--	--	--	--	(Visibly Clear)[c]
BW-24-390'	--	--	--	--	--	--	--	--	--
BW-25	16.73	2346	1975	6.40	0.2	2.0	-107.2	0.0	--
BW-26-65'	--	--	--	--	--	--	--	--	--
BW-26-85'	--	--	--	--	--	--	--	--	--
BW-26-395'	--	--	--	--	--	--	--	--	--
BW-27	17.60	1773	1523	6.51	0.21	2.2	-135.1	0.0	0.6 (Visibly Clear)
BW-28	16.36	2028	1694	6.37	1.21	12.2	198.3	23.9	0.0 (Visible Black Flakes)
BW-31	16.21	474	395	6.01	0.41	4.2	470.5	0.0	0.0 (Visibly Clear)
BW-33	14.83	2944	2375	6.04	0.41	4.1	-45.6	39.6	4.2 (Visible Yellow)
BW-34	15.81	1147	946	6.59	0.52	5.2	-53.1	0.7	0.2 (Visibly Clear)
BW-35	22.65	669	639	6.89	0.44	5.2	-122.7	0.0	0.6 (Visibly Clear)
BW-37	24.45	1873	1851	6.16	0.19	2.3	-255.3	1.2	2.4 (Visibly Clear)

Table 3-1. Groundwater Field Parameter Measurements – June 2016

THAN Davenport Site, 2040 West River Drive

Well ID	Temp (°C)	Specific Conductance (µS/cm[c])	Conductivity (µS/cm)	pH (SU)	Dissolved Oxygen (mg/L)[a]	Dissolved Oxygen (Percent)[a]	Oxidation Reduction Potential (mV)	Turbidity (ntu)	Permanganate Concentrations (mg/L)[b,c, d]
MW-01	21.17	733	679	6.93	7.99	90.1	215.4	0.0	--
MW-03	25.90	1134	1154	6.65	1.59	19.6	24.9	6.4	0.0 (Visibly Clear)
MW-04	35.91	2014	2432	6.43	1.19	17.5	618.9	78.5	0.8 (Visibly Clear)
MW-05	26.78	463	479	6.28	5.46	68.3	248.1	5.7	0.2 (Visibly Clear)
MW-06	24.28	678	669	6.40	3.56	42.6	149.3	0.0	0.4 (Visibly Clear)
MW-07	24.24	2126	2095	6.60	0.53	6.2	214.1	0.0	--
MW-08	22.99	829	798	5.72	0.48	5.6	457.6	0.0	0.0 (Visibly Clear)
MW-13	21.50	2232	2083	7.47	0.10	1.2	-258.4	9.0	--
PZ-01	19.09	3493	3099	6.31	5.59	61.1	650.7	65.3	1594 (Visibly Purple)

Notes:

[a] The long-term monitoring plan indicates that dissolved oxygen (DO) readings should not be collected from onsite wells due to the presence of the permanganate (which damages the membranes on the DO probes). In 2016, the sampling equipment had optical DO sensors; therefore, DO measurements were able to be collected from onsite wells.

[b] Permanganate concentrations were measured in onsite wells only using a Hach DR 890 Colorimeter (a spectrophotometer).

[c] The Hach DR 890 Colorimeter (a spectrophotometer) was malfunctioning on the day these samples were collected; therefore, permanganate concentrations were not measured at this location.

[d] Locations where, samples were visibly clear (not pink/purple), and had concentrations of permanganate measured of less than 5 mg/L are not believed to be impacted by permanganate. These measurements are within the range of error of the field spectrophotometer.

Note: Field parameters were not collected for FLUTe™ well nests (BW-23, BW-24, and BW-26).

SU = standard units

°C = degrees Celsius

mV = millivolts

mg/L = milligrams per liter

ntu = nephelometric turbidity units

µS/cm = micro-Siemens per centimeter

µS/cm[c] = micro-Siemens per centimeter temperature corrected to 25 °C

-- = Not measured.

Table 3-2. Groundwater Analytical Results – June 2016

THAN Davenport Site, 2040 West River Drive

	Field Sample Location:		BW-01	BW-02	BW-02	BW-03R	BW-03R	BW-04	BW-05	BW-06	BW-06	BW-06	BW-06	BW-09	BW-11	BW-13	BW-14	BW-14	BW-14	BW-14	BW-15	BW-15	BW-16
	Monitoring Well Type:		MNA	MNA	MNA	ISCO	ISCO	ISCO	ISCO	ISCO	ISCO	ISCO	ISCO	MNA	MNA	MNA	MNA	MNA	MNA	MNA	MNA	MNA	ISCO
	Sample Collection Date:		6/15/2016	6/14/2016	6/14/2016	6/15/2016	6/15/2016	6/15/2016	6/15/2016	6/16/2016	6/16/2016	6/16/2016	6/16/2016	6/14/2016	6/14/2016	6/15/2016	6/15/2016	6/15/2016	6/15/2016	6/15/2016	6/15/2016	6/15/2016	6/15/2016
	Field Sample Identification:		ADDV-009	ADDV-010	ADDV-010-DL	ADDV-011	ADDV-011-DL	ADDV-012	ADDV-013	ADDV-014	ADDV-014-DL	ADDV-015	ADDV-015-DL	ADDV-016	ADDV-017	ADDV-018	ADDV-019	ADDV-019-DL	ADDV-020	ADDV-020-DL	ADDV-021	ADDV-021-DL	ADDV-022
	Matrix:		Water	Water	Water	Water	Water	Water	Water	Water	Water	Water, Dup	Water, Dup	Water	Water	Water	Water	Water	Water, Dup	Water, Dup	Water	Water	Water
	Laboratory Sample Identification:		280-84538-13	280-84495-3	280-84495-3	280-84538-1	280-84538-1	280-84538-12	280-84538-8	280-84597-11	280-84597-11	280-84597-12	280-84597-12	280-84495-2	280-84495-5	280-84538-18	280-84538-17	280-84538-17	280-84538-15	280-84538-15	280-84538-16	280-84538-16	280-84538-10
Volatile Organic Compounds	**Units**	**RAO (EPA 2009)**																					
1,1,1-Trichloroethane	ug/L	200 µg/L	**0.22 J**	4 U	NR	**2100 =**	NR	NR	NR	**24 =**	NR	**22 =**	NR	1 U	1 U	1 U	NR	**8300 J**	NR	**7900 J**	4 U	NR	**3000 =**
1,1-Dichloroethane	ug/L	2.4 µg/L*	**0.28 J**	**140 =**	NR	**630 =**	NR	NR	NR	**260 =**	NR	**240 =**	NR	1 U	**0.23 J**	1 U	NR	**12000 J**	NR	**11000 J**	**74 =**	NR	**1200 =**
1,1-Dichloroethene	ug/L	7 µg/L	1 U	**6.4 =**	NR	**150 J**	NR	NR	NR	**5 =**	NR	**5.1 J**	NR	1 U	1 U	1 U	**1200 =**	NR	**1200 =**	NR	**4.1 =**	NR	**390 =**
1,2-Dichloroethane	ug/L	5 µg/L	1 U	4 U	NR	200 U	NR	NR	NR	5 U	NR	10 U	NR	1 U	1 U	1 U	100 U	NR	100 U	NR	4 U	NR	100 U
2-Butanone	ug/L	7100 µg/L*	6 U	24 U	NR	1200 U	NR	NR	NR	30 U	NR	60 U	NR	6 U	6 U	6 U	600 U	NR	600 U	NR	24 U	NR	600 U
Acetone	ug/L	22000 µg/L*	5.1 UB	40 U	NR	2000 U	NR	NR	NR	50 U	NR	100 U	NR	**6.7 J**	10 U	3.7 UB	1000 U	NR	1000 U	NR	**30 J**	NR	1000 U
Benzene	ug/L	5 µg/L	1 U	4 U	NR	200 U	NR	NR	NR	**22 =**	NR	**23 =**	NR	1 U	1 U	1 U	**63 J**	NR	**68 J**	NR	**1.4 J**	NR	100 U
Chloroethane	ug/L	21000 µg/L*	2 U	8 U	NR	400 U	NR	NR	NR	**220 =**	NR	**270 =**	NR	**0.94 J**	2 U	2 U	200 U	NR	200 U	NR	8 U	NR	200 U
cis-1,2-Dichloroethene	ug/L	70 µg/L	**0.3 J**	NR	**410 =**	NR	**15000 =**	NR	NR	NR	**1400 =**	NR	**1300 =**	1 U	**1.1 =**	1 U	NR	**110000 J**	NR	**110000 J**	NR	**320 =**	NR
Ethylbenzene	ug/L	700 µg/L	1 U	4 U	NR	**810 =**	NR	NR	NR	**270 =**	NR	**320 =**	NR	1 U	1 U	1 U	**4200 =**	NR	**4600 =**	NR	4 U	NR	100 U
Methylene Chloride	ug/L	5 µg/L	2 U	1.9 UB	NR	**330 J**	NR	NR	NR	**3.6 J**	NR	**5.6 J**	NR	2 U	0.33 UB	2 U	200 U	NR	200 U	NR	2.3 UB	NR	**32 J**
Styrene	ug/L	100 µg/L	1 U	4 U	NR	**36 J**	NR	NR	NR	5 U	NR	10 U	NR	1 U	1 U	1 U	100 U	NR	100 U	NR	4 U	NR	100 U
Tetrachloroethene	ug/L	5 µg/L	1 U	4 U	NR	**250 =**	NR	NR	NR	5 U	NR	10 U	NR	1 U	**0.46 J**	1 U	100 U	NR	100 U	NR	4 U	NR	NR
Toluene	ug/L	1000 µg/L	**0.25 J**	4 U	NR	**2100 =**	NR	NR	NR	NR	**1300 J**	NR	**2100 J**	1 U	1 U	1 U	NR	**55000 J**	NR	**53000 J**	4 U	NR	**220 =**
trans-1,2-Dichloroethene	ug/L	100 µg/L	1 U	**1.6 J**	NR	200 U	NR	NR	NR	**7 =**	NR	**6.5 J**	NR	1 U	1 U	1 U	**91 J**	NR	**92 J**	NR	**0.89 J**	NR	**510 =**
Trichloroethene	ug/L	5 µg/L	1 U	4 U	NR	**76 J**	NR	NR	NR	5 U	NR	10 U	NR	1 U	**0.56 J**	1 U	100 U	NR	100 U	NR	4 U	NR	**3800 =**
Vinyl Chloride	ug/L	2 µg/L	1 U	**170 =**	NR	**620 =**	NR	NR	NR	NR	**1400 =**	NR	**1300 =**	1 U	1 U	1 U	NR	**31000 J**	NR	**28000 J**	NR	**380 =**	**1200 =**
Xylenes, Total	ug/L	10000 µg/L	2 U	8 U	NR	**2800 =**	NR	NR	NR	**390 J**	NR	**580 J**	NR	2 U	2 U	2 U	**21000 =**	NR	**23000 =**	NR	8 U	NR	**430 =**
General Chemistry																							
Alkalinity, Total (As CaCO3)	mg/L	NA	**320 =**	**310 =**	NR	NR	NR	NR	NR	NR	NR	NR	NR	**460 =**	**360 =**	**540 =**	**490 =**	NR	**490 =**	NR	**350 =**	NR	NR
Chloride (As Cl)	mg/L	NA	**38 =**	**110 =**	NR	**27 =**	NR	**180 =**	**710 =**	**150 =**	NR	**150 =**	NR	**46 =**	**19 =**	**82 =**	**280 =**	NR	**280 =**	NR	**150 =**	NR	**190 =**
Ethane	ug/L	NA	5 U	5 U	NR	NR	NR	NR	NR	NR	NR	NR	NR	**12 J**	5 U	**10 J**	90 U	NR	90 U	NR	**23 =**	NR	NR
Ethene	ug/L	NA	5 U	**94 =**	NR	NR	NR	NR	NR	NR	NR	NR	NR	10 U	5 U	15 U	**5000 =**	NR	**5000 =**	NR	**37 =**	NR	NR
Ferrous Iron	mg/L	NA	0.2 UJ	0.2 UJ	NR	NR	NR	NR	NR	NR	NR	NR	NR	0.2 UJ	0.2 UJ	0.2 UJ	**1.1 J**	NR	**1.7 J**	NR	**0.028 J**	NR	NR
Methane	ug/L	NA	5 U	**260 =**	NR	NR	NR	NR	NR	NR	NR	NR	NR	**27000 =**	**170 =**	**18000 =**	**240 =**	NR	**250 =**	NR	**390 =**	NR	NR
Nitrogen, Nitrate (As N)	mg/L	NA	**2.4 =**	0.5 U	NR	NR	NR	NR	NR	NR	NR	NR	NR	0.5 U	**0.045 J**	0.5 U	0.5 U	NR	0.5 U	NR	0.5 U	NR	NR
Sulfate (As SO4)	mg/L	NA	**73 =**	**52 =**	NR	NR	NR	NR	NR	NR	NR	NR	NR	**0.53 J**	**55 =**	5 U	**21 =**	NR	**21 =**	NR	**110 =**	NR	NR
Sulfide	mg/L	NA	1 U	1 U	NR	NR	NR	NR	NR	NR	NR	NR	NR	1 U	1 U	1 U	1 U	NR	1 U	NR	1 U	NR	NR
Total Organic Carbon	mg/L	NA	**2.1 =**	**2 =**	NR	**3.7 =**	NR	NR	NR	**5.6 =**	NR	**6.1 =**	NR	**8.8 =**	**3.2 =**	**10 =**	**7.3 =**	NR	**7.5 =**	NR	**2.7 =**	NR	**15 =**

Notes:

NA = Not applicable

NR = Not reported

* RAO = Remedial action objective (If no maximum contaminant level [MCL] was available for the analyte, then the December 2009 EPA regional screening levels [RSLs] [tap water] were used.)

Bold indicates the analyte was detected in the groundwater sample.

Shading indicates the analyte was detected above the MCL.

Validation Codes:

U Undetected. The analyte was analyzed for but not detected at a concentration equal to or greater than the laboratory reporting limit.

J Estimated. The analyte was below the stated reporting limit, but greater than the method detection limit (MDL), or there is an analytical bias.

UB Undetected due to blank contamination. The analyte was detected in the sample and in an associated method, field, or trip blank. The quantity of the analyte is deemed undetected because it falls below the 95-percent confidence interval (five times the blank concentration). The analyte concentration is potentially the result of contamination.

UJ Estimated. The analyte was not detected above the MDL; however, the MDL is approximate, and may or may not represent the actual limit of detection.

Table 3-2. Groundwater Analytical Results – June 2016

THAN Davenport Site, 2040 West River Drive

	Field Sample Location:		BW-16	BW-18	BW-19	BW-21	BW-23-50'	BW-23-50'	BW-23-125'	BW-23-390'	BW-23-390'	BW-24-390'	BW-24-390'	BW-25	BW-25	BW-26-65'	BW-26-65'	BW-26-85'	BW-26-85'	BW-26-395'	BW-26-395'	BW-27	BW-27
	Monitoring Well Type:		ISCO	MNA	MNA	MNA	ISCO	ISCO	ISCO	ISCO	ISCO	MNA	MNA	MNA	MNA	MNA	MNA	MNA	MNA	MNA	MNA	ISCO	ISCO
	Sample Collection Date:		6/15/2016	6/16/2016	6/14/2016	6/14/2016	6/14/2016	6/14/2016	6/14/2016	6/14/2016	6/14/2016	6/14/2016	6/14/2016	6/15/2016	6/15/2016	6/14/2016	6/14/2016	6/14/2016	6/14/2016	6/14/2016	6/14/2016	6/16/2016	6/16/2016
	Field Sample Identification:		ADDV-022-DL	ADDV-023	ADDV-024	ADDV-025	ADDV-026	ADDV-026-DL	ADDV-027	ADDV-028	ADDV-028-DL	ADDV-029	ADDV-030	ADDV-031	ADDV-031-DL	ADDV-032	ADDV-032-DL	ADDV-033	ADDV-033-DL	ADDV-034	ADDV-034-DL	ADDV-035	ADDV-035-DL
	Matrix:		Water	Water	Water	Water	Water	Water	Water	Water	Water	Water	Water, Dup	Water	Water	Water	Water	Water	Water	Water	Water	Water	Water
	Laboratory Sample Identification:		280-84538-10	280-84597-13	280-84495-7	280-84495-6	280-84495-10	280-84495-10	280-84495-11	280-84495-12	280-84495-12	280-84495-17	280-84495-16	280-84538-19	280-84538-19	280-84495-13	280-84495-13	280-84495-14	280-84495-14	280-84495-15	280-84495-15	280-84597-8	280-84597-8
Volatile Organic Compounds	**Units**	**RAO (EPA 2009)**																					
1,1,1-Trichloroethane	ug/L	200 µg/L	NR	1 U	1 U	1 U	**390 =**	NR	1 U	1 U	NR	1 U	1 U	20 UJ	NR	**12 J**	NR	**1.8 J**	NR	2 U	NR	**6600 =**	NR
1,1-Dichloroethane	ug/L	2.4 µg/L*	NR	1 U	1 U	1 U	**2000 =**	NR	**0.98 J**	NR	**94 =**	**0.23 J**	1 U	**5.7 J**	NR	**270 J**	NR	**53 =**	NR	**2.9 =**	NR	**1800 =**	NR
1,1-Dichloroethene	ug/L	7 µg/L	NR	1 U	1 U	1 U	**290 =**	NR	1 U	**0.68 J**	NR	1 U	1 U	20 UJ	NR	40 U	NR	4 U	NR	2 U	NR	**740 =**	NR
1,2-Dichloroethane	ug/L	5 µg/L	NR	1 U	1 U	1 U	100 U	NR	1 U	1 U	NR	1 U	1 U	20 UJ	NR	40 U	NR	4 U	NR	2 U	NR	400 U	NR
2-Butanone	ug/L	7100 µg/L*	NR	6 U	6 U	6 U	600 U	NR	6 U	6 U	NR	6 U	6 U	120 UJ	NR	240 U	NR	24 U	NR	12 U	NR	2400 U	NR
Acetone	ug/L	22000 µg/L*	NR	2.4 UB	**7.1 J**	10 U	1000 U	NR	**28 =**	10 U	NR	**4.8 J**	10 U	200 UJ	NR	400 U	NR	40 U	NR	20 U	NR	4000 U	NR
Benzene	ug/L	5 µg/L	NR	1 U	1 U	1 U	**21 J**	NR	**3 =**	**3 =**	NR	1 U	1 U	**60 J**	NR	**43 J**	NR	**21 =**	NR	**19 =**	NR	400 U	NR
Chloroethane	ug/L	21000 µg/L*	NR	2 U	2 U	2 U	200 U	NR	**25 =**	NR	**170 =**	2 U	2 U	NR	**2700 =**	**1700 J**	NR	NR	**1100 =**	NR	**610 =**	800 U	NR
cis-1,2-Dichloroethene	ug/L	70 µg/L	**89000 =**	1 U	**0.27 J**	1 U	NR	**38000 =**	**1.3 =**	NR	**150 =**	1 U	1 U	20 UJ	NR	**32 J**	NR	**13 =**	NR	**0.93 J**	NR	NR	**210000 =**
Ethylbenzene	ug/L	700 µg/L	NR	1 U	1 U	1 U	**1100 =**	NR	**0.47 J**	**49 =**	NR	1 U	1 U	**260 J**	NR	**650 J**	NR	NR	**410 =**	NR	**190 =**	**1600 =**	NR
Methylene Chloride	ug/L	5 µg/L	NR	2 U	0.38 UB	0.32 UB	200 U	NR	2 U	0.62 UB	NR	2 U	2 U	40 UJ	NR	80 U	NR	1.4 UB	NR	0.98 UB	NR	800 U	NR
Styrene	ug/L	100 µg/L	NR	1 U	1 U	1 U	100 U	NR	1 U	1 U	NR	1 U	1 U	20 UJ	NR	40 U	NR	4 U	NR	2 U	NR	400 U	NR
Tetrachloroethene	ug/L	5 µg/L	**18000 =**	1 U	1 U	1 U	100 U	NR	1 U	1 U	NR	1 U	1 U	20 UJ	NR	40 U	NR	4 U	NR	2 U	NR	400 U	NR
Toluene	ug/L	1000 µg/L	NR	1 U	1 U	1 U	**640 =**	NR	**0.46 J**	**4.7 =**	NR	1 U	1 U	NR	**5900 =**	NR	**11000 =**	NR	**5700 =**	**81 =**	NR	**4300 =**	NR
trans-1,2-Dichloroethene	ug/L	100 µg/L	NR	1 U	1 U	1 U	**22 J**	NR	**0.37 J**	1 U	NR	1 U	1 U	20 UJ	NR	**7.1 J**	NR	**1.8 J**	NR	2 U	NR	**150 J**	NR
Trichloroethene	ug/L	5 µg/L	NR	1 U	1 U	1 U	100 U	NR	1 U	1 U	NR	1 U	1 U	20 UJ	NR	40 U	NR	4 U	NR	2 U	NR	**110 J**	NR
Vinyl Chloride	ug/L	2 µg/L	NR	1 U	1 U	1 U	NR	**13000 =**	**1.1 =**	NR	**270 =**	1 U	1 U	**3 J**	NR	**120 J**	NR	**35 =**	NR	**2.3 =**	NR	**19000 =**	NR
Xylenes, Total	ug/L	10000 µg/L	NR	2 U	2 U	2 U	**840 =**	NR	2 U	**14 =**	NR	2 U	2 U	**1500 J**	NR	**1900 J**	NR	**880 =**	NR	**820 =**	NR	**11000 =**	NR
General Chemistry																							
Alkalinity, Total (As CaCO3)	mg/L	NA	NR	**340 =**	**340 =**	**400 =**	NR	NR	NR	NR	NR	**470 =**	**470 =**	**580 =**	NR	**540 =**	NR	**490 =**	NR	**510 =**	NR	NR	NR
Chloride (As Cl)	mg/L	NA	NR	**23 =**	**26 =**	**3.2 =**	**150 =**	NR	**36 =**	**16 =**	NR	**9.2 =**	**11 =**	**420 =**	NR	**220 =**	NR	**170 =**	NR	**52 =**	NR	**310 =**	NR
Ethane	ug/L	NA	NR	5 U	**1.5 J**	5 U	NR	NR	NR	NR	NR	**1.6 J**	5 U	**13000 =**	NR	**1700 =**	NR	**2100 =**	NR	**5100 =**	NR	NR	NR
Ethene	ug/L	NA	NR	5 U	5 U	5 U	NR	NR	NR	NR	NR	5 U	5 U	**3800 J**	NR	**12000 =**	NR	**5000 =**	NR	90 U	NR	NR	NR
Ferrous Iron	mg/L	NA	NR	**0.041 J**	**0.057 J**	**0.096 J**	NR	NR	NR	NR	NR	**0.22 J**	**0.17 J**	**3.1 J**	NR	0.2 UJ	NR	**0.31 J**	NR	**0.17 J**	NR	NR	NR
Methane	ug/L	NA	NR	**4.4 J**	**8500 =**	**120 =**	NR	NR	NR	NR	NR	**1200 =**	**1300 =**	**18000 =**	NR	**5000 =**	NR	**4300 =**	NR	**12000 =**	NR	NR	NR
Nitrogen, Nitrate (As N)	mg/L	NA	NR	0.5 U	0.5 U	**0.052 J**	NR	NR	NR	NR	NR	0.5 U	0.5 U	0.5 U	NR	0.5 U	NR	0.5 U	NR	0.5 U	NR	NR	NR
Sulfate (As SO4)	mg/L	NA	NR	**120 =**	**0.77 J**	**6.2 =**	NR	NR	NR	NR	NR	**8.6 =**	**9.5 =**	**0.92 J**	NR	**1.2 J**	NR	**0.92 J**	NR	**0.56 J**	NR	NR	NR
Sulfide	mg/L	NA	NR	1 U	1 U	1 U	NR	NR	NR	NR	NR	1 U	1 U	1 U	NR	**7 =**	NR	**7 =**	NR	**1.6 =**	NR	NR	NR
Total Organic Carbon	mg/L	NA	NR	**2.3 =**	**4.3 =**	1.1 UB	**3 =**	NR	**1.8 =**	**4.8 =**	NR	**6 =**	**5.2 =**	**7.5 =**	NR	**12 =**	NR	**7.8 =**	NR	**3.9 =**	NR	**28 =**	NR

Notes:

NA = Not applicable

NR = Not reported

* RAO = Remedial action objective (If no maximum contaminant level [MCL] was available for the analyte, then the December 2009 EPA regional screening levels [RSLs] [tap water] were used.)

Bold indicates the analyte was detected in the groundwater sample.

Shading indicates the analyte was detected above the MCL.

Validation Codes:

U Undetected. The analyte was analyzed for but not detected at a concentration equal to or greater than the laboratory reporting limit.

J Estimated. The analyte was below the stated reporting limit, but greater than the method detection limit (MDL), or there is an analytical bias.

UB Undetected due to blank contamination. The analyte was detected in the sample and in an associated method, field, or trip blank. The quantity of the analyte is deemed undetected because it falls below the 95-percent confidence interval (five times the blank concentration). The analyte concentration is potentially the result of contamination.

UJ Estimated. The analyte was not detected above the MDL; however, the MDL is approximate, and may or may not represent the actual limit of detection.

Table 3-2. Groundwater Analytical Results – June 2016

THAN Davenport Site, 2040 West River Drive

	Field Sample Location:		BW-28	BW-28	BW-31	BW-31	BW-33	BW-33	BW-34	BW-35	BW-35	BW-37	BW-37	BW-37	BW-37	MW-01	MW-03	MW-04	MW-04	MW-05	MW-05	MW-06	MW-07	MW-07
	Monitoring Well Type:		ISCO	ISCO	ISCO	ISCO	ISCO	ISCO	ISCO	ISCO	ISCO	ISCO	ISCO	ISCO	ISCO	MNA	ISCO	ISCO	ISCO	ISCO	ISCO	ISCO	MNA	MNA
	Sample Collection Date:		6/16/2016	6/16/2016	6/16/2016	6/16/2016	6/16/2016	6/16/2016	6/16/2016	6/15/2016	6/15/2016	6/15/2016	6/15/2016	6/15/2016	6/15/2016	6/15/2016	6/15/2016	6/15/2016	6/15/2016	6/15/2016	6/15/2016	6/15/2016	6/14/2016	6/14/2016
	Field Sample Identification:		ADDV-036	ADDV-036-DL	ADDV-037	ADDV-037-DL	ADDV-038	ADDV-038-DL	ADDV-039	ADDV-040	ADDV-040-DL	ADDV-041	ADDV-041-DL	ADDV-042	ADDV-042-DL	ADDV-001	ADDV-002	ADDV-003	ADDV-003-DL	ADDV-004	ADDV-004-DL	ADDV-005	ADDV-006	ADDV-006-DL
	Matrix:		Water	Water	Water	Water	Water	Water	Water	Water	Water	Water	Water	Water, Dup	Water, Dup	Water	Water	Water	Water	Water	Water	Water	Water	Water
	Laboratory Sample Identification:		280-84597-7	280-84597-7	280-84597-4	280-84597-4	280-84597-2	280-84597-2	280-84597-3	280-84538-3	280-84538-3	280-84538-7	280-84538-7	280-84538-6	280-84538-6	280-84538-14	280-84538-5	280-84538-11	280-84538-11	280-84538-2	280-84538-2	280-84538-4	280-84495-1	280-84495-1
Volatile Organic Compounds	**Units**	**RAO (EPA 2009)**																						
1,1,1-Trichloroethane	ug/L	200 µg/L	**3200 =**	NR	NR	**1600 =**	**35 =**	NR	1 U	**45 =**	NR	**8900 =**	NR	**9100 =**	NR	1 U	**0.25 J**	**200 =**	NR	**20 =**	NR	**16 =**	**24 =**	NR
1,1-Dichloroethane	ug/L	2.4 µg/L*	**1200 =**	NR	**120 =**	NR	NR	**220 =**	**3.2 =**	**47 =**	NR	**3500 =**	NR	**3600 =**	NR	1 U	**4.1 =**	**45 =**	NR	**7.5 =**	NR	**0.88 J**	**44 =**	NR
1,1-Dichloroethene	ug/L	7 µg/L	**310 =**	NR	**77 =**	NR	1 U	NR	1 U	**11 J**	NR	**770 J**	NR	**920 J**	NR	1 U	1 U	**3.4 J**	NR	**0.78 J**	NR	1 U	**4.7 =**	NR
1,2-Dichloroethane	ug/L	5 µg/L	200 U	NR	5 U	NR	**1.2 =**	NR	**1.7 =**	20 U	NR	1000 U	NR	1000 U	NR	1 U	1 U	10 U	NR	1 U	NR	1 U	4 U	NR
2-Butanone	ug/L	7100 µg/L*	1200 U	NR	30 U	NR	6 U	NR	6 U	120 U	NR	6000 U	NR	6000 U	NR	6 U	6 U	60 U	NR	6 U	NR	6 U	24 U	NR
Acetone	ug/L	22000 µg/L*	2000 U	NR	50 U	NR	7.4 UB	NR	3.8 UB	200 U	NR	10000 U	NR	10000 U	NR	2.7 UB	**1.9 J**	100 U	NR	**3.6 J**	NR	**5.4 J**	40 U	NR
Benzene	ug/L	5 µg/L	200 U	NR	5 U	NR	**1.1 =**	NR	**1 =**	20 U	NR	1000 U	NR	1000 U	NR	1 U	1 U	10 U	NR	1 U	NR	1 U	4 U	NR
Chloroethane	ug/L	21000 µg/L*	400 U	NR	10 U	NR	**15 =**	NR	**19 =**	40 U	NR	2000 U	NR	2000 U	NR	2 U	2 U	20 U	NR	2 U	NR	2 U	8 U	NR
cis-1,2-Dichloroethene	ug/L	70 µg/L	NR	**49000 =**	NR	**580 =**	NR	**110 =**	**2.8 =**	NR	**1600 =**	NR	**60000 =**	NR	**58000 =**	1 U	**18 =**	**390 =**	NR	**18 =**	NR	**2.2 =**	NR	**570 =**
Ethylbenzene	ug/L	700 µg/L	200 U	NR	5 U	NR	**8.2 =**	NR	1 U	**94 =**	NR	**1400 =**	NR	**1500 =**	NR	1 U	1 U	10 U	NR	1 U	NR	1 U	4 U	NR
Methylene Chloride	ug/L	5 µg/L	**110 J**	NR	**1.7 J**	NR	2 U	NR	2 U	**28 J**	NR	**2000 =**	NR	**2500 =**	NR	2 U	0.77 UB	**3.3 J**	NR	0.93 UB	NR	0.95 UB	1.4 UB	NR
Styrene	ug/L	100 µg/L	200 U	NR	5 U	NR	1 U	NR	1 U	20 U	NR	1000 U	NR	1000 U	NR	1 U	1 U	10 U	NR	1 U	NR	1 U	4 U	NR
Tetrachloroethene	ug/L	5 µg/L	**710 =**	NR	**2.7 J**	NR	**0.42 J**	NR	1 U	**21 =**	NR	1000 U	NR	1000 U	NR	1 U	**7.6 =**	NR	**2000 =**	NR	**130 =**	**43 =**	4 U	NR
Toluene	ug/L	1000 µg/L	200 U	NR	5 U	NR	**1.4 =**	NR	1 U	**9.8 J**	NR	**4200 =**	NR	**4200 =**	NR	1 U	1 U	10 U	NR	1 U	NR	1 U	4 U	NR
trans-1,2-Dichloroethene	ug/L	100 µg/L	**75 J**	NR	**2.5 J**	NR	**1.1 =**	NR	**0.15 J**	20 U	NR	1000 U	NR	1000 U	NR	1 U	**0.54 J**	**2.8 J**	NR	**0.72 J**	NR	**0.27 J**	**1.9 J**	NR
Trichloroethene	ug/L	5 µg/L	**1100 =**	NR	**2 J**	NR	**1.3 =**	NR	1 U	**29 =**	NR	1000 U	NR	1000 U	NR	1 U	**9.9 =**	**180 =**	NR	**13 =**	NR	**21 =**	**2.4 J**	NR
Vinyl Chloride	ug/L	2 µg/L	**2000 =**	NR	**69 =**	NR	NR	**200 =**	**5.2 =**	**260 =**	NR	**13000 =**	NR	**13000 =**	NR	1 U	**0.91 J**	10 U	NR	1 U	NR	1 U	**140 =**	NR
Xylenes, Total	ug/L	10000 µg/L	400 U	NR	10 U	NR	**13 =**	NR	2 U	**19 J**	NR	**2500 =**	NR	**2600 =**	NR	2 U	2 U	20 U	NR	2 U	NR	2 U	8 U	NR
General Chemistry																								
Alkalinity, Total (As CaCO3)	mg/L	NA	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	**240 =**	NR	NR	NR	NR	NR	NR	**360 =**	NR
Chloride (As Cl)	mg/L	NA	**180 =**	NR	**9.4 =**	NR	**80 J**	NR	**37 =**	**30 =**	NR	**180 =**	NR	**180 =**	NR	**46 =**	**11 =**	**78 =**	NR	**7.8 =**	NR	**4.8 =**	**27 =**	NR
Ethane	ug/L	NA	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	5 U	NR	NR	NR	NR	NR	NR	**21 J**	NR
Ethene	ug/L	NA	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	5 U	NR	NR	NR	NR	NR	NR	**3.4 J**	NR
Ferrous Iron	mg/L	NA	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	0.2 UJ	NR	NR	NR	NR	NR	NR	0.2 UJ	NR
Methane	ug/L	NA	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	5 U	NR	NR	NR	NR	NR	NR	**76 =**	NR
Nitrogen, Nitrate (As N)	mg/L	NA	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	**6.8 =**	NR	NR	NR	NR	NR	NR	0.5 U	NR
Sulfate (As SO4)	mg/L	NA	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	**44 =**	NR	NR	NR	NR	NR	NR	**190 =**	NR
Sulfide	mg/L	NA	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	1 U	NR	NR	NR	NR	NR	NR	1 U	NR
Total Organic Carbon	mg/L	NA	**7.4 =**	NR	**4 =**	NR	**14 =**	NR	**4.2 =**	**3.2 =**	NR	**8.6 =**	NR	**8.5 =**	NR	**1.9 =**	**2 =**	**4.7 =**	NR	**3.3 =**	NR	**1.8 =**	**3.4 =**	NR

Notes:

NA = Not applicable

NR = Not reported

* RAO = Remedial action objective (If no maximum contaminant level [MCL] was available for the analyte, then the December 2009 EPA regional screening levels [RSLs] [tap water] were used.)

Bold indicates the analyte was detected in the groundwater sample.

Shading indicates the analyte was detected above the MCL.

Validation Codes:

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UJ Estimated. The analyte was not detected above the MDL; however, the MDL is approximate, and may or may not represent the actual limit of detection.

Table 3-2. Groundwater Analytical Results – June 2016

THAN Davenport Site, 2040 West River Drive

	Field Sample Location:		MW-08	MW-08	MW-13	PZ-01
	Monitoring Well Type:		ISCO	ISCO	MNA	ISCO
	Sample Collection Date:		6/15/2016	6/15/2016	6/14/2016	6/16/2016
	Field Sample Identification:		ADDV-007	ADDV-007-DL	ADDV-008	ADDV-043
	Matrix:		Water	Water	Water	Water
	Laboratory Sample Identification:		280-84538-9	280-84538-9	280-84495-4	280-84597-5
Volatile Organic Compounds	**Units**	**RAO (EPA 2009)**				
1,1,1-Trichloroethane	ug/L	200 µg/L	20 U	NR	1 U	NR
1,1-Dichloroethane	ug/L	2.4 µg/L*	20 U	NR	1 U	NR
1,1-Dichloroethene	ug/L	7 µg/L	20 U	NR	1 U	NR
1,2-Dichloroethane	ug/L	5 µg/L	20 U	NR	1 U	NR
2-Butanone	ug/L	7100 µg/L*	120 U	NR	6 U	NR
Acetone	ug/L	22000 µg/L*	200 U	NR	10 U	NR
Benzene	ug/L	5 µg/L	20 U	NR	1 U	NR
Chloroethane	ug/L	21000 µg/L*	40 U	NR	**0.62 J**	NR
cis-1,2-Dichloroethene	ug/L	70 µg/L	NR	**1700 =**	1 U	NR
Ethylbenzene	ug/L	700 µg/L	20 U	NR	1 U	NR
Methylene Chloride	ug/L	5 µg/L	**27 J**	NR	0.39 UB	NR
Styrene	ug/L	100 µg/L	20 U	NR	1 U	NR
Tetrachloroethene	ug/L	5 µg/L	NR	**1700 =**	1 U	NR
Toluene	ug/L	1000 µg/L	20 U	NR	1 U	NR
trans-1,2-Dichloroethene	ug/L	100 µg/L	**6.6 J**	NR	1 U	NR
Trichloroethene	ug/L	5 µg/L	**130 =**	NR	1 U	NR
Vinyl Chloride	ug/L	2 µg/L	**460 =**	NR	1 U	NR
Xylenes, Total	ug/L	10000 µg/L	40 U	NR	2 U	NR
General Chemistry						
Alkalinity, Total (As CaCO3)	mg/L	NA	NR	NR	**520 =**	NR
Chloride (As Cl)	mg/L	NA	**7.1 =**	NR	**44 =**	**95 J**
Ethane	ug/L	NA	NR	NR	**8.2 J**	NR
Ethene	ug/L	NA	NR	NR	15 U	NR
Ferrous Iron	mg/L	NA	NR	NR	0.2 UJ	NR
Methane	ug/L	NA	NR	NR	**27000 =**	NR
Nitrogen, Nitrate (As N)	mg/L	NA	NR	NR	0.5 U	NR
Sulfate (As SO4)	mg/L	NA	NR	NR	**0.49 J**	NR
Sulfide	mg/L	NA	NR	NR	1 U	NR
Total Organic Carbon	mg/L	NA	**5.7 =**	NR	**9 =**	NR

Notes:

NA = Not applicable

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Table 3-3. Summary Statistics for Volatile Organic Compounds – June 2016 Data

THAN Davenport Site, 2040 West River Drive

Analyte	Total Samples	Detects	Non-Detects	Detect Freq. (%)	Min (µg/L)	Max (µg/L)	Mean (µg/L)	Median (µg/L)
1,1,1-Trichloroethane	36	19	17	53	0.08	8,900	958	1.60
1,1-Dichloroethane[a]	36	28	8	78	0.11	12,000	659	25.8
1,1-Dichloroethene	36	16	20	44	0.12	1,200	110	0.73
1,2-Dichloroethane	36	2	34	6	0.07	65.0	4.15	0.26
2-Butanone	36	0	36	0	1.00	1,000	62.6	3.00
Acetone	36	8	28	22	0.95	950	61.6	4.78
Benzene	36	12	24	33	0.08	80.0	11.6	1.05
Chloroethane	36	11	25	31	0.21	2,700	195	3.08
cis-1,2-Dichloroethene[a]	36	28	8	78	0.08	210,000	16,064	25
Ethylbenzene	36	14	22	39	0.08	4,200	308	0.44
Methylene Chloride	36	9	27	25	0.16	2,000	74	0.49
Styrene	36	1	35	3	0.09	85.0	5.85	0.26
Tetrachloroethene	36	12	24	33	0.10	18,000	640	0.44
Toluene	36	16	20	44	0.09	55,000	2,513	0.44
trans-1,2-Dichloroethene	36	20	16	56	0.08	510	27.1	1.00
Trichloroethene	36	14	22	39	0.08	3,800	155	0.93
Vinyl Chloride[a]	36	23	13	64	0.05	31,000	2,315	20
Xylenes, Total	36	14	22	39	0.10	21,000	1,226	0.43

Notes:

µg/L = micrograms per liter

Summary statistics (minimum, maximum, and mean) calculated using normal sample results and assuming a proxy value of one-half the method detection limit for non-detect values.

[a] The three VOC constituents with the highest frequency of detection compared with other individual compounds

Table 3-4. Mann-Kendall Trend Analysis for Total Volatile Organic Compounds – Planar Areas

THAN Davenport Site, 2040 West River Drive

Contour Line/Resultant Area for which Trend is Evaluated/Noted	Mann-Kendall Result	Area Trend	Stability
10-µg/L Contour Line Area	99.9% (sig -)	**Decreasing**	NA
100-µg/L Contour Line Area	100.0% (sig -)	**Decreasing**	NA
1,000-µg/L Contour Line Area	100.0% (sig -)	**Decreasing**	NA
10,000-µg/L Contour Line Area	100.0% (sig -)	**Decreasing**	NA
100,000-µg/L Contour Line Area	100.0% (sig -)	**Decreasing**	NA

Notes:
sig = significance
NA = Not applicable
- = decreasing
+ = increasing
Trend analysis performed using Mann-Kendall single-tailed test at 0.05 significance level.
If planar area trends exhibit "no trend" at the 95% confidence level, concentrations are deemed stable when the coefficient of variation (COV) is equal to or less than one. The COV is a relative measure of variation in the groundwater concentration data, and can be affected by the magnitude of the concentrations. As such, concentrations that are relatively "high" can include significant variation while exhibiting a small COV. While there is no objective basis for using a particular value of COV to determine stability, values greater than 1 indicate that the data exhibit a greater detail of scatter about the mean.

Table 3-5. Mann-Kendall Increasing Trends Summary

THAN Davenport Site, 2040 West River Drive

Monitoring Well[a]	Monitored Zone	Increasing trend for Total VOCs[b]	Increasing trend for Individual CVOC Parent Compound[c]				Increasing trend for Individual CVOC Daughter Product[d]	
			PCE	TCE	TCA111	MC	DCE12C	VC
Onsite								
BW-05[a]	Shallow Bedrock	--	--	--	--	--	--	--
BW-27	Shallow Bedrock	--	--	--	--	--	X	X
BW-37	Shallow Bedrock	--	--	--	--	--	--	X
Offsite								
BW-14	Shallow Bedrock	--	--	--	--	--	--	X

Notes:

-- = increasing trend not identified for this parameter

DCE12C = cis- 1,2-Dichloroethene

MC = methylene chloride

PCE = tetrachloroethene

TCA111 = 1,1,1 trichloroethane

TCE = trichloroethene

VC = vinyl chloride

CVOC = chlorinated volatile organic compound

VOC = volatile organic compound

Total VOCs include the sum of 1,1,1-trichloroethane; 1,1-dichloroethane; 1,1-dichloroethene; 1,2-dichloroethane; 2-butanone; acetone; benzene; chloroethane; cis-1,2-dichloroethene; ethylbenzene; methylene chloride; styrene; tetrachloroethene; toluene; trichloroethene; trans-1,2-dichloroethene; vinyl chloride; and xylenes.

[a]The Mann-Kendall trend analysis initially identified an increasing trend for vinyl chloride at BW-05; however, after additional evaluation (Table G-1, Appendix G) it should be noted this well has a stable trend for vinyl chloride.

[b]Increasing trends for total VOCs are summarized based upon the data analysis presented in text Section 3.2.3.1.

[c]Increasing trends for individual CVOC parent compounds are summarized based upon the data analysis presented in text Section 3.2.3.2

[d]Increasing trends for individual CVOC daughter products are summarized based upon the data analysis presented in Table G-1, Appendix G.

Table 3-6. Total VOC Concentration Trends at Individual Wells Using Mann-Kendall Trend Analysis

THAN Davenport Site, 2040 West River Drive

Well	Total Samples	Monitored Zone	Detection Frequency (%)	Mann-Kendall Result	Mann-Kendall Trend	Stability	Last Sample Date
ISCO Monitoring Wells							
BW-03/BW-03R	21	Shallow Bedrock	100	67.5% (+)	**No Trend**	**Stable**	Jun-16
BW-04	17	Shallow Bedrock	100	100.0% (sig -)	**Decreasing**	NA	Jun-11
BW-05	15	Shallow Bedrock	100	99.0% (sig -)	**Decreasing**	NA	Jun-10
BW-06	12	Shallow Bedrock	100	100.0% (sig -)	**Decreasing**	NA	Jun-16
BW-16	16	Shallow Bedrock	100	91.9% (-)	**No Trend**	**Stable**	Jun-16
BW-23-125'	22	Intermediate Bedrock	100	100.0% (sig -)	**Decreasing**	NA	Jun-16
BW-23-390'	22	Deep Bedrock	100	100.0% (sig -)	**Decreasing**	NA	Jun-16
BW-23-50'	22	Shallow Bedrock	100	100.0% (sig -)	**Decreasing**	NA	Jun-16
BW-27	14	Shallow Bedrock	100	62.6% (-)	**No Trend**	**Stable**	Jun-16
BW-28	8	Shallow Bedrock	100	80.1% (-)	**No Trend**	**Stable**	Jun-16
BW-31	12	Shallow Bedrock	100	99.3% (sig -)	**Decreasing**	NA	Jun-16
BW-33	14	Shallow Bedrock	100	92.1% (-)	**No Trend**	**Stable**	Jun-16
BW-34	14	Shallow Bedrock	100	100.0% (sig -)	**Decreasing**	NA	Jun-16
BW-35	12	Shallow Bedrock	100	84.5% (-)	**No Trend**	**Stable**	Jun-16
BW-37	13	Shallow Bedrock	100	99.9% (sig -)	**Decreasing**	NA	Jun-16
MW-03	14	Unconsolidated	100	99.9% (sig -)	**Decreasing**	NA	Jun-16
MW-04	20	Unconsolidated	100	100.0% (sig -)	**Decreasing**	NA	Jun-16
MW-05	19	Unconsolidated	100	73.6% (-)	**No Trend**	**Not Stable**	Jun-16
MW-06	7	Unconsolidated	100	98.5% (sig -)	**Decreasing**	NA	Jun-16
MW-08	18	Unconsolidated	100	100.0% (sig -)	**Decreasing**	NA	Jun-16
PZ-01	14	Shallow Bedrock	100	99.3% (sig -)	**Decreasing**	NA	Dec-14

Table 3-6. Total VOC Concentration Trends at Individual Wells Using Mann-Kendall Trend Analysis

THAN Davenport Site, 2040 West River Drive

Well	Total Samples	Monitored Zone	Detection Frequency (%)	Mann-Kendall Result	Mann-Kendall Trend	Stability	Last Sample Date
MNA Monitoring Wells							
BW-01	23	Shallow Bedrock	100	100.0% (sig -)	**Decreasing**	NA	Jun-16
BW-02	11	Shallow Bedrock	100	89.1% (-)	**No Trend**	**Stable**	Jun-16
BW-09	20	Shallow Bedrock	95	99.9% (sig -)	**Decreasing**	NA	Jun-16
BW-11	19	Shallow Bedrock	100	99.7% (sig -)	**Decreasing**	NA	Jun-16
BW-13	21	Shallow Bedrock	62	98.1% (sig -)	**Decreasing**	NA	Jun-16
BW-14	10	Shallow Bedrock	100	81.0% (+)	**No Trend**	**Stable**	Jun-16
BW-15	10	Shallow Bedrock	100	100.0% (sig -)	**Decreasing**	NA	Jun-16
BW-18	21	Shallow Bedrock	24	NA	>50% ND	NA	Jun-16
BW-19	19	Shallow Bedrock	89	99.5% (sig -)	**Decreasing**	NA	Jun-16
BW-21	18	Intermediate Bedrock	50	100.0% (sig -)	**Decreasing**	NA	Jun-16
BW-24-390'	18	Deep Bedrock	78	99.7% (sig -)	**Decreasing**	NA	Jun-16
BW-25	18	Shallow Bedrock	100	53.0% (+)	**No Trend**	**Stable**	Jun-16
BW-26-395'	11	Deep Bedrock	100	100.0% (sig -)	**Decreasing**	NA	Jun-16
BW-26-65'	13	Intermediate Bedrock	100	66.2% (-)	**No Trend**	**Stable**	Jun-16
BW-26-85'	13	Intermediate Bedrock	100	91.8% (-)	**No Trend**	**Stable**	Jun-16
MW-01	20	Unconsolidated	15	NA	>50% ND	NA	Jun-16
MW-07	9	Unconsolidated	100	100.0% (sig -)	**Decreasing**	NA	Jun-16
MW-13	8	Unconsolidated	75	92.8% (-)	**No Trend**	**Not Stable**	Jun-16

Notes:

% = percent

NA = not applicable

>50% ND = greater than 50 percent non-detects

sig = significance

- = decreasing

+ = increasing

Trend analysis performed using Mann-Kendall single-tailed test at 0.05 significance level.

For monitoring points exhibiting no trend at the 95% confidence level, concentrations are deemed stable if the coefficient of variation (COV) is equal to or less than one. The COV is a relative measure of variation in the groundwater concentration data, and can be affected by the magnitude of the concentrations. As such, concentrations that are high can include significant variation while exhibiting a small COV. While there is no objective basis for using a particular value of COV to determine stability, values greater than 1 indicate that the data exhibit a greater detail of scatter about the mean.

Total VOCs include 1,1,1-trichloroethane; 1,1-dichloroethane; 1,1-dichloroethene; 1,2-dichloroethane; 2-butanone; acetone; benzene; chloroethane; cis-1,2-dichloroethene; ethylbenzene; methylene chloride; styrene; tetrachloroethene; toluene; trichloroethene; trans-1,2-dichloroethene; vinyl chloride; and xylenes.

Table 3-7. Evaluation of Current and Future Biodegradation for Wells with Increasing CVOC Daughter Compound Trends in 2016

THAN Davenport Site, 2040 West River Drive

		Current Evidence of Biodegradation					Data Supporting Future Biodegradation	
Monitoring Well	**Monitored Zone**	**Increasing Concentration Trend for CVOC Daughter Products [a]**	**Stable or Decreasing Trends of Total VOCs [b]**	**Ethene, Ethane, and/or Methane detected [c]**	**Elevated Chloride Concentrations[c]**	**Reducing Geochemical Environment [d]**	**Located Downgradient of or Within the ROI of ISCO Treatment Areas[e]**	**Aromatic Compounds Detected [c]**
Onsite								
BW-27	Shallow Bedrock	Increasing trends for VC and DCE12C	Yes	NS	Yes	NS	Yes	Yes
BW-37	Shallow Bedrock	Increasing trend for DCE12C	Yes	NS	Yes	NS	Yes	Yes
Offsite								
BW-14	Shallow Bedrock	Increasing trend VC	Yes	Yes	Yes	Yes	Yes	Yes

Notes:

DCE12C = cis, 1-2 dichloroethene

ISCO = in situ chemical oxidation

MNA = monitored natural attenuation

NS = Not sampled for the indicated parameter(s). In accordance with the long-term groundwater monitoring plan (LTMP), only offsite LTMP monitoring wells are sampled for MNA parameters, which include field parameters, alkalinity, ethane, ethene, methane, ferrous iron, nitrate, sulfate, and sulfide.

ROI = radius of influence

VC = vinyl chloride

[a]Increasing trends for individual CVOC daughter products are summarized in Table G-1 in Appendix G.

[b]Increasing trends for total VOCs are summarized based upon the data analysis presented in Section 3.2.3.1 of the report text.

[c]June 2016 analytical results are presented in Table 3-2.

[d]Reducing environment described by field parameters in Table 3-1 and geochemical parameters (offsite wells only) in Table 3-2.

[e]ISCO treatment areas are presented on Figure 2-1.

Table 3-8. Individual VOC Compound Mass Estimate (kg) – LTMP Monitoring Wells (Onsite and Offsite Wells)

THAN Davenport Site, 2040 West River Drive

Mass[a] (Kilograms)	Jun-05	Jun-06	Oct-07	Jul-08	Jun-09	Jun-10	Jun-11	Jun-12	Jun-13	Jun-14	Jun-15	Jun-16
CVOC Parent Compounds												
1,1,1 trichloroethane	2425	2933	1881	2286	1445	1268	1060	1076	549	586	280	216
Methylene Chloride	510	463	322	674	336	210	156	145	14	608	25	10
Tetrachloroethene	1265	1424	1164	912	834	867	680	708	204	165	143	161
Trichloroethene	935	1000	844	551	347	263	183	192	76	313	38	38
CVOC Daughter Products												
cis-1,2-Dichloroethene	9731	9979	11426	12108	9398	7243	7076	7386	5226	6216	4178	4191
trans-1,2-Dichloroethene	4	44	4	0	0	0	0	4	22	4	7	7
1,1-Dichloroethene	111	105	81	84	83	73	79	91	56	49	36	32
Vinyl Chloride	1234	1179	1321	1044	1093	784	670	1253	1122	1103	558	838
1,1-Dichloroethane	598	504	541	435	432	342	312	477	426	402	284	244
1,2-Dichloroethane	0	0	0	0	0	0	0	0	2	0	0	0
Chloroethane	23	50	48	37	71	108	83	39	71	75	86	87
Aromatics												
Benzene	3	4	2	3	2	2	1	2	6	2	3	3
Toluene	3902	3988	4010	4589	3668	3406	2609	2506	1369	1814	1002	958
Ethylbenzene	239	233	282	263	314	225	216	224	160	191	124	122
Xylenes	727	742	810	825	929	795	763	765	458	638	402	414
Styrene	3	16	3	0	0	51	0	0	2	0	0	0
Other Compounds												
Acetone	2	58	0	17	0	0	0	0	0	0	0	3
2-Butanone	0	0	0	0	0	0	0	0	7	0	0	0
Total Mass	21711	22721	22739	23828	18952	15637	13889	14867	9769	12166	7167	7325

Notes:

[a]The Theissen method, a method of weighting data from non-uniformly distributed collection points (Fetter, C.W. 2004. *Applied Hydrogeology, Fourth Edition* . Merrill Publishing), was used to evaluate CVOC mass versus time. The CVOC mass associated with each well was estimated by: M = C(ADn)

Where M = contaminant mass

C = Measured concentration

A = Area of polygon (i.e., area of influence of well)

D = Depth of groundwater (thickness)

n = porosity

Petroleum-related VOC benzene is not a site-related constituent; however, it is included as part of the annual sampling

Table 3-9. Individual VOC Compound Mass Estimate (kg) – Onsite Monitoring Wells

THAN Davenport Site, 2040 West River Drive

Mass[a] (Kilograms)	Jun-05	Jun-06	Oct-07	Jul-08	Jun-09	Jun-10	Jun-11	Jun-12	Jun-13	Jun-14	Jun-15	Jun-16
CVOC Parent Compounds												
1,1,1 trichloroethane	314	324	303	283	91	72	53	55	56	59	35	24
Methylene Chloride	72	71	69	103	52	38	14	13	3	214	10	2
Tetrachloroethene	167	170	165	100	54	71	39	46	34	27	22	26
Trichloroethene	173	174	171	81	40	27	12	13	15	65	6	7
CVOC Daughter Products												
cis-1,2-Dichloroethene	654	655	696	779	528	437	387	368	430	503	412	423
trans-1,2-Dichloroethene	1	2	1	0	0	0	0	1	1	1	1	1
1,1-Dichloroethene	19	19	18	14	3	4	3	4	5	3	4	3
Vinyl Chloride	56.4	53.1	56.9	62.4	58.1	48.7	32.1	36.5	37.8	46.9	39	45
1,1-Dichloroethane	27.0	24.8	26.1	29.0	22.2	18.3	15.2	18.0	15.5	17.2	14	12
1,2-Dichloroethane	0	0	0	0	0	0	0	0	0	0	0	0
Chloroethane	1	1	1	1	1	1	1	1	1	1	1	1
Aromatics												
Benzene	0	0	0	0	0	0	0	0	0	0	0	0
Toluene	236	234	233	262	142	151	89	44	30	56	23	10
Ethylbenzene	13	12	13	14	11	10	10	7	7	8	5	4
Xylenes	46	46	47	50	35	33	29	22	20	38	15	13
Styrene	1	1	1	0	0	1	0	0	0	0	0	0
Other Compounds												
Acetone	0	1	0	7	0	0	0	0	0	0	0	0
2-Butanone	0	0	0	0	0	0	0	0	0	0	0	0
Total Mass	1778	1789	1801	1784	1037	911	683	627	656	1038	587	571

Notes:

[a]The Theissen method, a method of weighting data from non-uniformly distributed collection points (Fetter, C.W. 2004. *Applied Hydrogeology, Fourth Edition* . Merrill Publishing), was used to evaluate CVOC mass versus time. The CVOC mass associated with each well was estimated by: M = C(ADn)

Where M = contaminant mass

C = Measured concentration

A = Area of polygon (i.e., area of influence of well)

D = Depth of groundwater (thickness)

n = porosity

Petroleum-related VOC benzene is not a site-related constituent; however it is included as part of the annual sampling

Table 3-10. Screening for Anaerobic Biodegradation Processes and Interpretation of Screening Results in the Shallow Bedrock Zone

THAN Davenport Site, 2040 West River Drive

	Units	Preferred Concentration Indicating Anaerobic Biodegradation[a]	Frequency of Detection	Range in Concentration: units consistent with "preferred Concentration" column		Number of Samples in Preferred Concentration Range	Interpretation[a]	Value[a]	Points Awarded for 2016 Shallow Bedrock Zone[a,b]
Volatile Organics									
Total BTEX	µg/L	>100 µg/L	3/6	ND	80,263	2/6	Carbon and energy source; drives dechlorination.	2	0
Benzene	µg/L	--	--	--	--	--		--	--
Ethylbenzene	µg/L	--	--	--	--	--		--	--
Toluene	µg/L	--	--	--	--	--		--	--
Xylenes, Total	µg/L	--	--	--	--	--		--	--
1,1,1-Trichloroethane	µg/L	NA if released material	1/6	ND	8,300	NA	Material released.	NA	NA
Dichloroethane	µg/L	*	4/6	ND	12,000	4/6	Daughter product of TCA under reducing conditions.	2	2
1,1-Dichloroethane	µg/L	--	--	--	--	--		--	--
1,2-Dichloroethane	µg/L	--	--	--	--	--		--	--
Chloroethane	µg/L	*	1/6	ND	2700	1/6	Daughter product of DCA or VC under reducing conditions.	2	0
Dichloroethene	µg/L	*	4/6	ND	111,291	4/6	Daughter product of TCE; If cis is > 80% of total DCE it is likely a daughter product, 1,1DCE can be chemical reaction product of TCA.	2	2
cis-1,2-Dichloroethene	µg/L	--	--	--	--	--		--	--
trans-1,2-Dichloroethene	µg/L	--	--	--	--	--		--	--
1,1-Dichloroethene	µg/L	--	--	--	--	--		--	--
Tetrachloroethene	µg/L	NA if released material	0/6	ND	ND	0/6	Material released.	NA	NA
Trichloroethene	µg/L	NA if released material	0/6	ND	ND	0/6	Material released.	NA	NA
Trichloroethene	µg/L	*	0/6	ND	ND	0/6	Daughter product of PCE.	NA	0
Vinyl Chloride	µg/L	*	4/6	ND	31,000	4/6	Daughter product of DCE.	2	2

Table 3-10. Screening for Anaerobic Biodegradation Processes and Interpretation of Screening Results in the Shallow Bedrock Zone

THAN Davenport Site, 2040 West River Drive

	Units	Preferred Concentration Indicating Anaerobic Biodegradation[a]	Frequency of Detection	Range in Concentration: units consistent with "preferred Concentration" column		Number of Samples in Preferred Concentration Range	Interpretation[a]	Value[a]	Points Awarded for 2016 Shallow Bedrock Zone[a,b]
General Chemistry									
Alkalinity, Total (As CaCO3)	mg/L	> 2x background (>680 mg/L)	6/6	310	580	0/6	Results from interaction between CO_2 and aquifer materials.	1	0
Chloride (As Cl)	mg/L	> 2x background (>76 mg/L)	6/6	26	420	5/6	Daughter product of organic chlorine.	2	2
Ethane	µg/L	Total Ethene, Ethane is > 10 µg/L, or >100 µg/L	4/6	ND	13,000	4/6 > 10 µg/L; 2/6 > 100 µg/L	Daughter product of VC/ethene.	2 or 3, respectively	2
Ethene	µg/L		4/6	ND	5,000		Daughter product of VC/ethene.		
Ferrous Iron (Iron II)	mg/L	>1 mg/L	4/6	ND	3.1	2/6	Reductive pathway possible; VC may be oxidized under Fe (III)-reducing conditions.	3	0
Methane	mg/L	>500 µg/L	6/6	240	18,000	3/6	Ultimate reductive daughter product, VC accumulates.	3	3
Nitrogen, Nitrate (As N)	mg/L	<1 mg/L	0/6	ND	ND	6/6	At higher concentrations, may compete with reductive pathway.	2	2
Sulfate (As SO4)	mg/L	<20 mg/L	5/6	ND	110	3/6	At higher concentrations, may compete with reductive pathway.	2	2
Sulfide	mg/L	> 1 mg/L	0/6	ND	ND	0/6	Reductive pathway possible.	3	0
Total Organic Carbon	mg/L	> 20 mg/L	6/6	2	10	0/6	Carbon and energy source; drives dechlorination; can be natural or anthropogenic.	2	0

Table 3-10. Screening for Anaerobic Biodegradation Processes and Interpretation of Screening Results in the Shallow Bedrock Zone

THAN Davenport Site, 2040 West River Drive

	Units	Preferred Concentration Indicating Anaerobic Biodegradation[a]	Frequency of Detection	Range in Concentration: units consistent with "preferred Concentration" column		Number of Samples in Preferred Concentration Range	Interpretation[a]	Value[a]	Points Awarded for 2016 Shallow Bedrock Zone[a,b]
Field Parameters									
Dissolved Oxygen	mg/L	<0.5 mg/L	6/6	0.2	0.53	5/6	Tolerated, suppresses the reductive pathway at higher concentrations.	3	3
Dissolved Oxygen	mg/L	>5 mg/L	6/6	0.2	0.53	0/6	Not tolerated, however, VC may be oxidized aerobically.	-3	0
Oxidation Reduction Potential	millivolts	< 50 mV	6/6	-155.9	-11.2	6/6	Reductive pathway possible.	1 or 2, respectively	2
Oxidation Reduction Potential	millivolts	< -100 mV	6/6	-155.9	-11.2	4/6	Reductive pathway likely.		
pH	pH units	5 < pH < 9	6/6	6.4	7.28	6/6	Optimal range for reductive pathway.	0	0
pH	pH units	5 > pH > 9	6/6	6.4	7.28	0/6	Outside optimal range for reductive pathway.	-2	0
Temperature	°C	> 20C	6/6	16.62	22.35	3/6	At T 20C, biochemical process is accelerated.	1	1
							STRONG evidence for Biodegradation of Chlorinated Solvents[a]:		23

Notes:

[a] See Tables 2.3 and 2.4 in *Technical Protocol for Evaluating Natural Attenuation of Chlorinated Solvents in Ground Water* , EPA/600/R-98/128.

[b] Points awarded only when 50 percent or more of results for a particular parameter for the wells indicated were at the preferred concentration.

mg/L = milligrams per liter

NA = not applicable

mV = millivolts

µg/L = micrograms per liter

ND = not detected

BTEX concentration is the sum of the detected concentrations only.

Wells BW-01 and BW-18 used as upgradient background wells for the shallow bedrock zone and therefore not used in screening table. Wells BW-09 and BW-11 are cross-gradient of the site and therefore not used in the screening table.

*If the constituent is detected in at least half of the wells within the zone of affected groundwater, points are assigned.

Table 3-11. Permanganate Observation Summary for Onsite LTMP Monitoring Wells

THAN Davenport Site, 2040 West River Drive

Well ID	Well Screen Zone	Approximate Horizontal Distance Away from Closest Upgradient Injection Well (ft)	Permanganate Observed during June 2016 Annual Sampling Activites?	June 2016 Permanganate Concentrations (mg/L)[a,b]
Onsite Wells				
BW-04	Shallow Bedrock	20	Purple coloring observed in groundwater at the time of sampling.	74,240
BW-05	Shallow Bedrock	45	Purple coloring observed in groundwater at the time of sampling.	1,336
BW-28	Shallow Bedrock	90	Purple coloring observed in groundwater during purging, but the groundwater was clear at the time of sampling.	0.0 (Visible Black Flakes)
BW-29	Shallow Bedrock	60	Purple coloring observed on equipment during collection of water elevation measurements.	NA
BW-30	Shallow Bedrock	40	Purple coloring observed on equipment during collection of water elevation measurements.	NA
ISCO-PZ-03	Shallow Bedrock	25	Purple coloring observed on equipment during collection of water elevation measurements.	NA
MW-04	Unconsolidated	20	Purple coloring observed in groundwater during purging, but the groundwater was clear at the time of sampling.	0.2 (Visibly Clear)
PZ-01	Shallow Bedrock	40	Purple coloring observed in groundwater at the time of sampling.	1,594

Notes:

-- = Not measured.

mg/L = milligrams per liter

ft = feet

NA = Not Applicable. Location not sampled.

[a] Permanganate concentrations were measured using a Hach DR 890

[b] Locations where samples were visibly clear (not pink/purple), and had concentrations of permanganate measured of less than 5 mg/L are not believed to be impacted by permanganate. These measurements are within the range of error of the field spectrophotometer.

Figures

N

0 2000

Approx. Scale in Feet

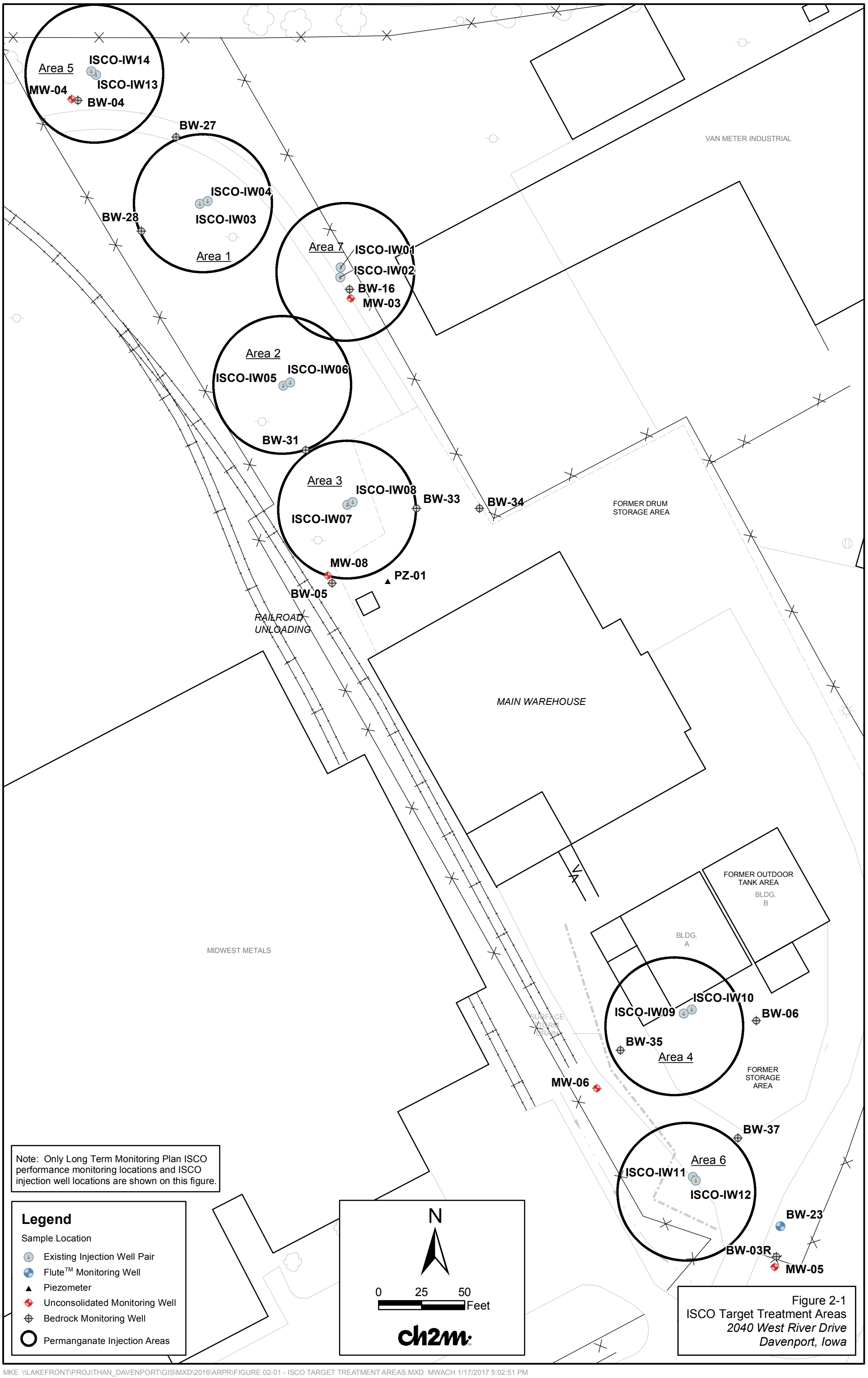
LEGEND

Approximate Onsite Boundaries

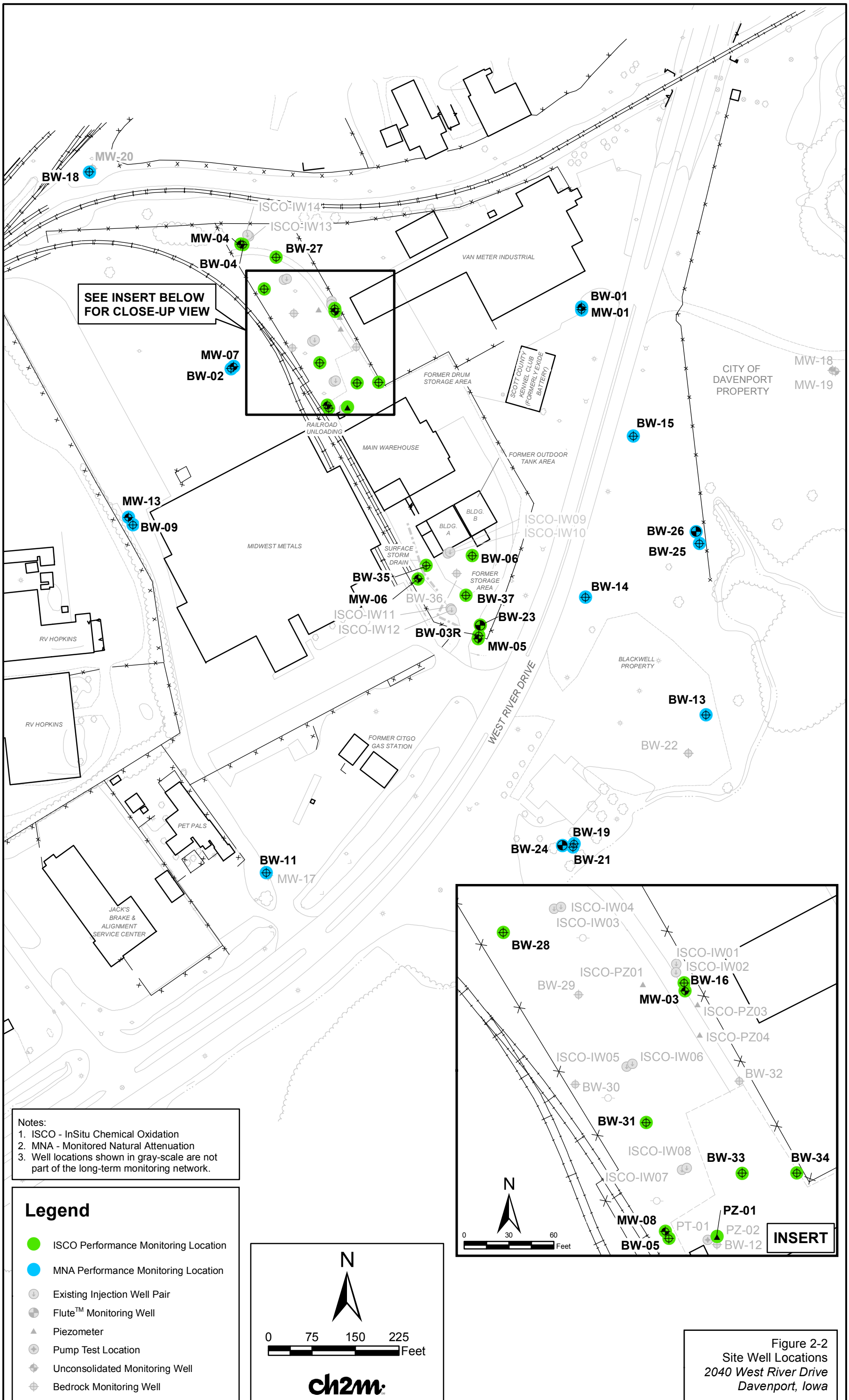
Source: U.S.G.S. 7 1/2 minute
Quadrangle: Davenport East, 1991

Figure 1-1
Regional Project Site Features
2040 West River Drive
Davenport, Iowa

ch2m



MKE \\LAKEFRONT\PROJ\THAN_DAVENPORT\GIS\MXD\2016\ARPR\FIGURE 02-01 - ISCO TARGET TREATMENT AREAS.MXD MWACH 1/17/2017 5:02:51 PM



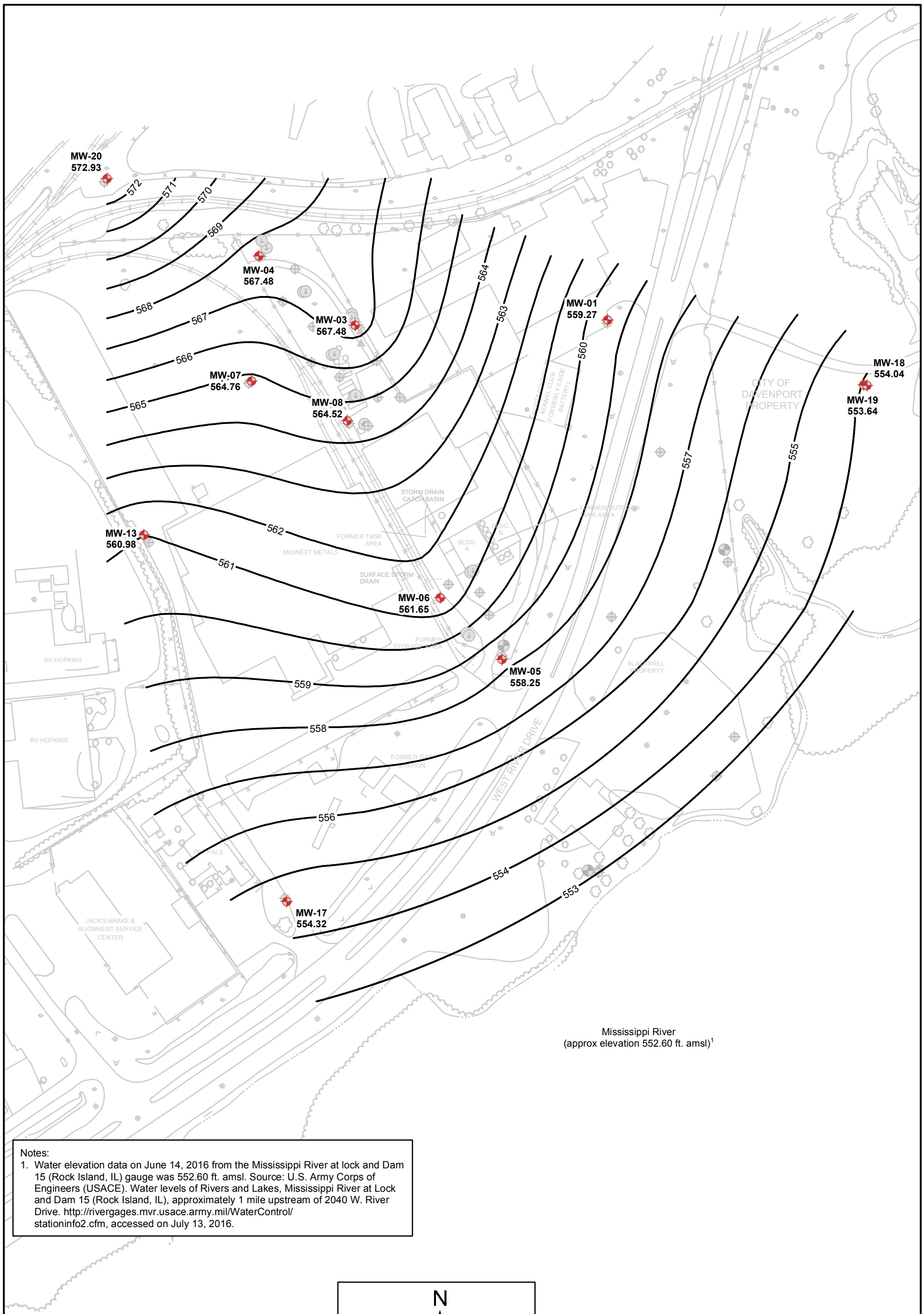
Notes:
1. ISCO - InSitu Chemical Oxidation
2. MNA - Monitored Natural Attenuation
3. Well locations shown in gray-scale are not part of the long-term monitoring network.

Legend

- ISCO Performance Monitoring Location
- MNA Performance Monitoring Location
- Existing Injection Well Pair
- Flute™ Monitoring Well
- Piezometer
- Pump Test Location
- Unconsolidated Monitoring Well
- Bedrock Monitoring Well

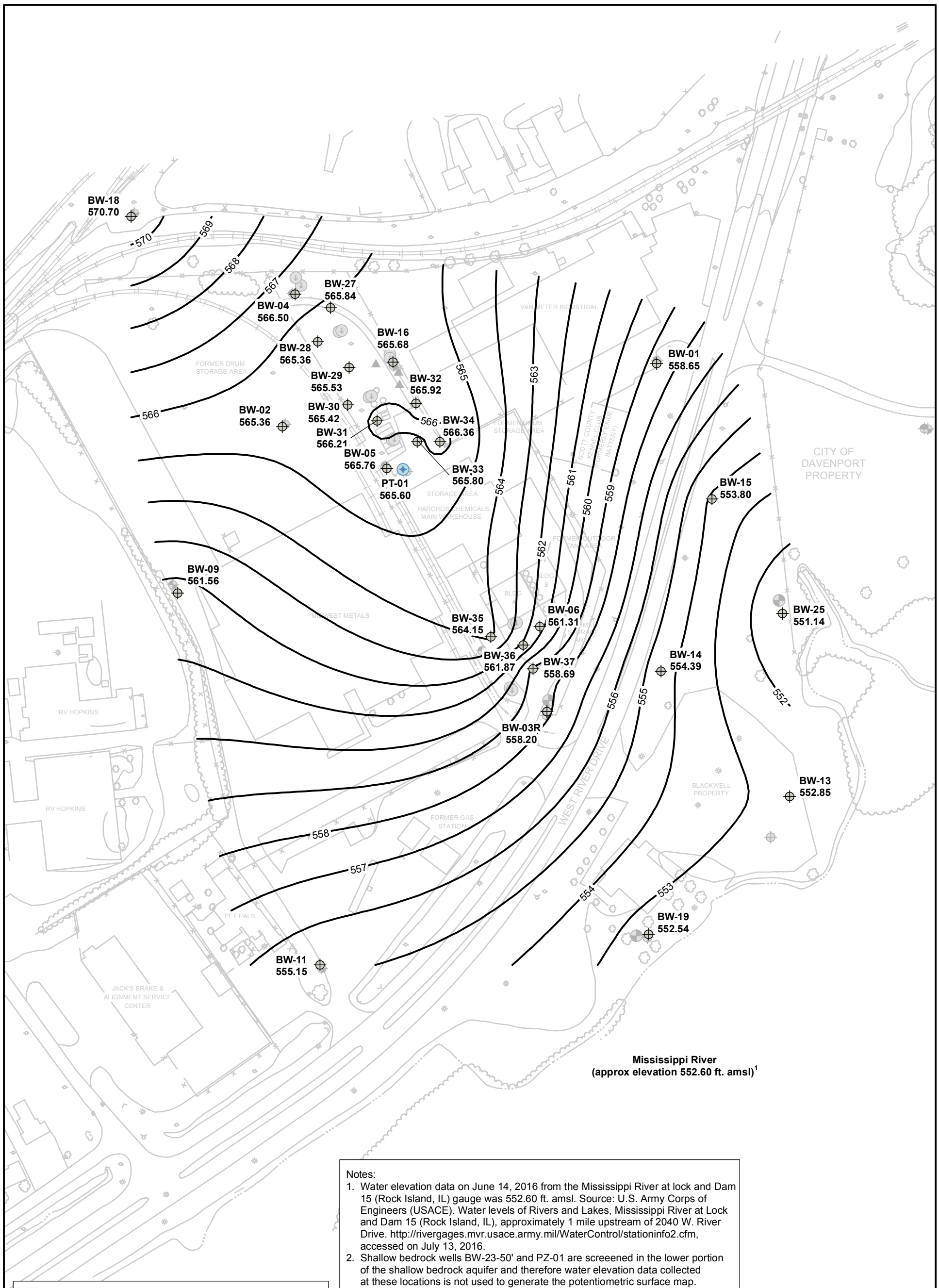
Figure 2-2
Site Well Locations
2040 West River Drive
Davenport, Iowa

MKE \\LAKEFRONT\PROJ\THAN_DAVENPORT\GIS\MXD\2014\ANNUALREPORT\FIGURE 02-02 - SITE WELL LOCATIONS.MXD MWACH 1/20/2017 2:03:42 PM



Notes:
1. Water elevation data on June 14, 2016 from the Mississippi River at lock and Dam 15 (Rock Island, IL) gauge was 552.60 ft. amsl. Source: U.S. Army Corps of Engineers (USACE). Water levels of Rivers and Lakes, Mississippi River at Lock and Dam 15 (Rock Island, IL), approximately 1 mile upstream of 2040 W. River Drive. http://rivergages.mvr.usace.army.mil/WaterControl/stationinfo2.cfm, accessed on July 13, 2016.

Figure 3-1
Unconsolidated Zone
June 2016 Potentiometric Surface
2040 West River Drive
Davenport, Iowa



Notes:
1. Water elevation data on June 14, 2016 from the Mississippi River at lock and Dam 15 (Rock Island, IL) gauge was 552.60 ft. amsl. Source: U.S. Army Corps of Engineers (USACE). Water levels of Rivers and Lakes, Mississippi River at Lock and Dam 15 (Rock Island, IL), approximately 1 mile upstream of 2040 W. River Drive. http://rivergages.mvr.usace.army.mil/WaterControl/stationinfo2.cfm, accessed on July 13, 2016.
2. Shallow bedrock wells BW-23-50' and PZ-01 are screeened in the lower portion of the shallow bedrock aquifer and therefore water elevation data collected at these locations is not used to generate the potentiometric surface map.
3. The water levels for PZ-01 and BW-23-50' are excluded from contouring in 2016.

Legend

- Injection Well
- Flute™ Monitoring Well
- Piezometer
- Pilot Boring
- Unconsolidated Monitoring Well
- Pump Test Location
- Bedrock Monitoring Well
- June 2016 Shallow Bedrock Potentiometric Contour (ft)

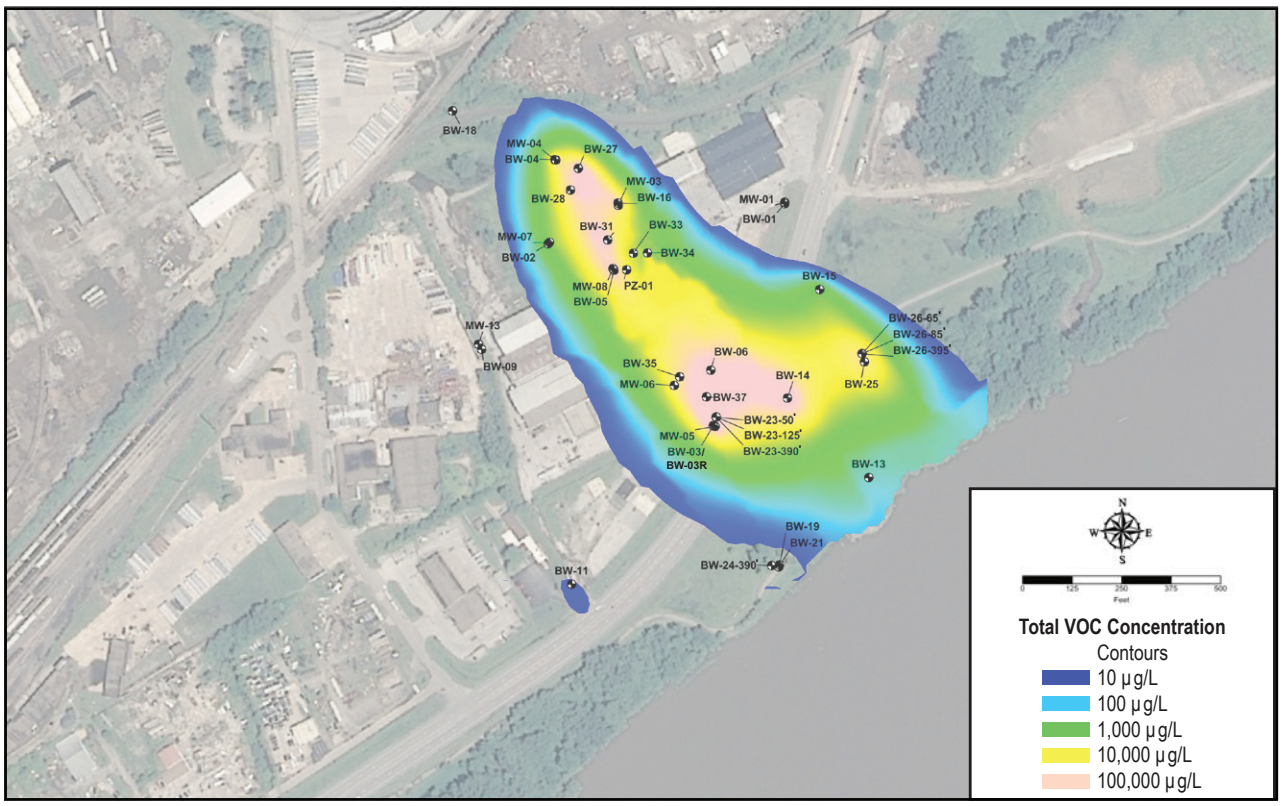
N

0 75 150 Feet

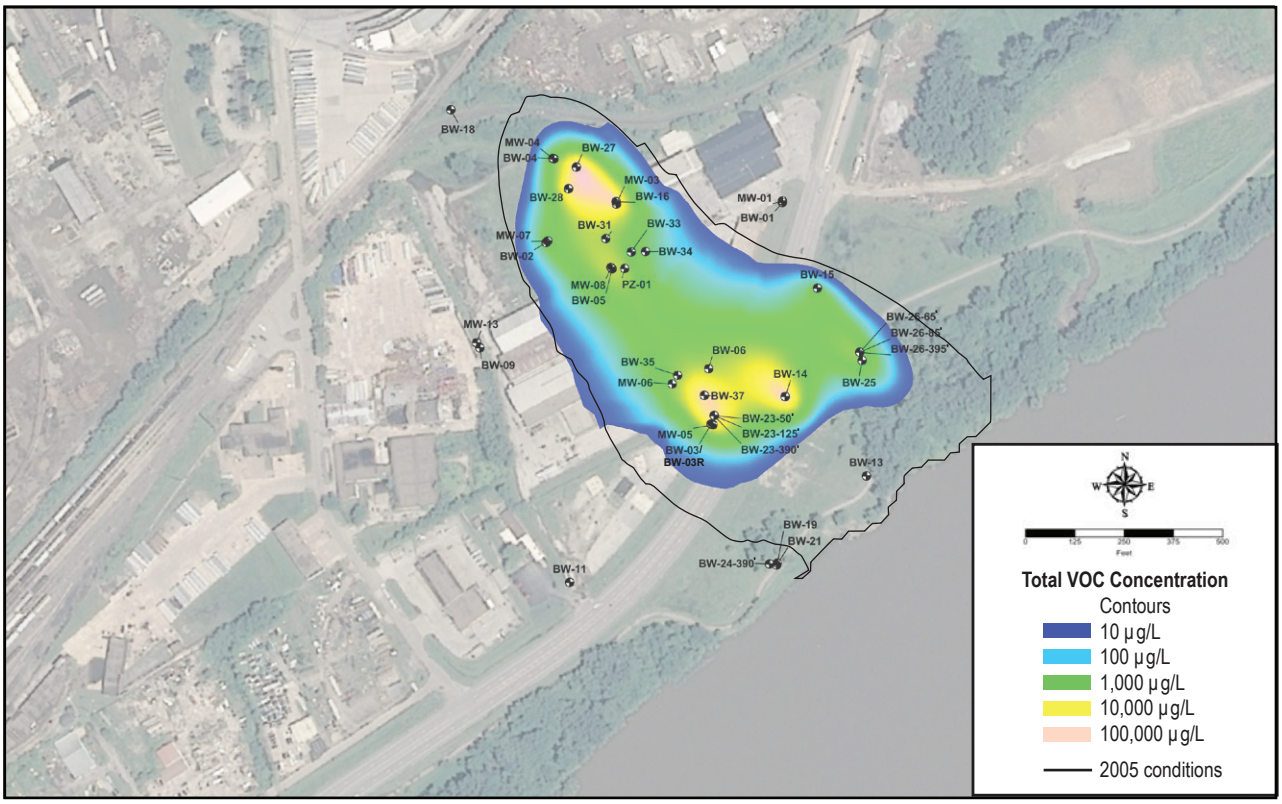
ch2m

Figure 3-2
Shallow Bedrock
June 2016 Potentiometric Surface
2040 West River Drive
Davenport, Iowa

MKE \\LAKEFRONT\PROJ\THAN_DAVENPORT\GIS\MXD\2016\ANNUALREPORT\FIGURE 03-02 - SHALLOW BEDROCK - JUNE 2016.MXD MWACH 1/17/2017 4:36:29 PM



2005 (Pre-soil treatment, pre-full scale ISCO injection conditions)

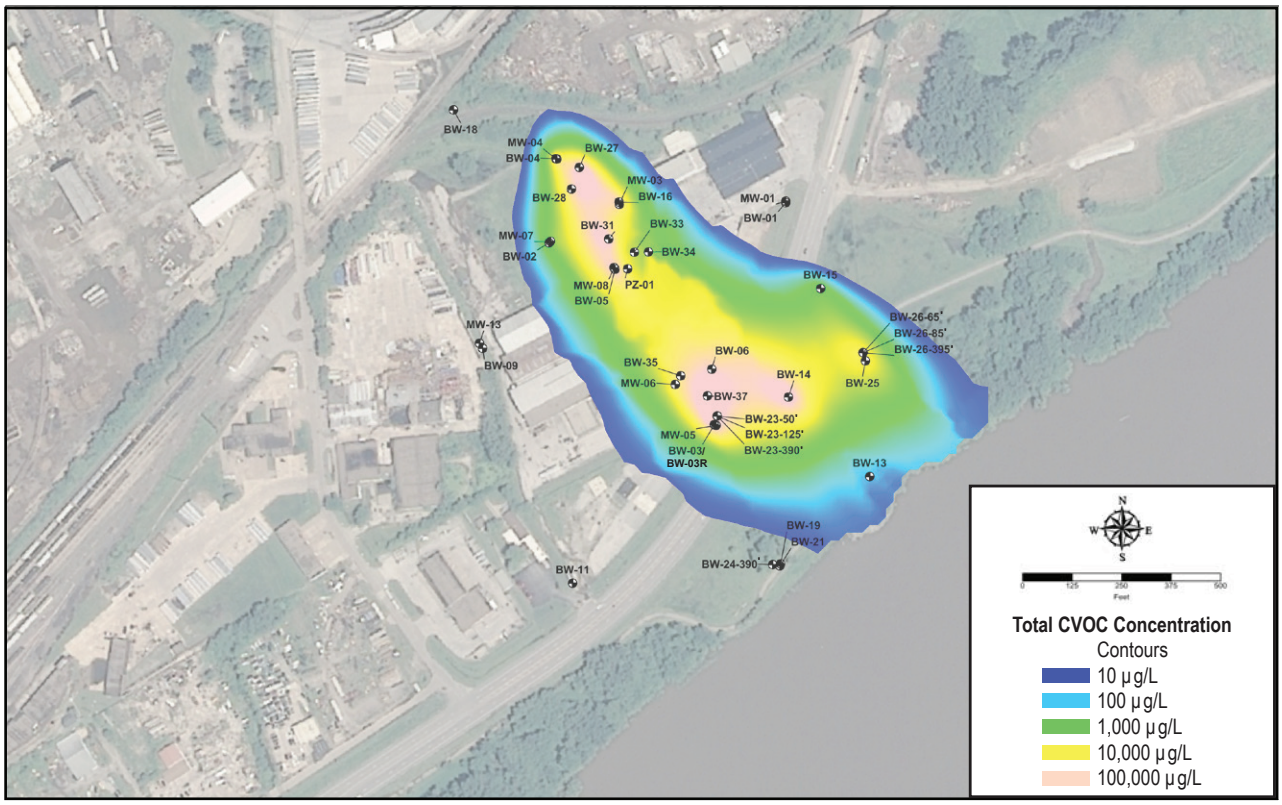


June 2016 (Current Conditions)

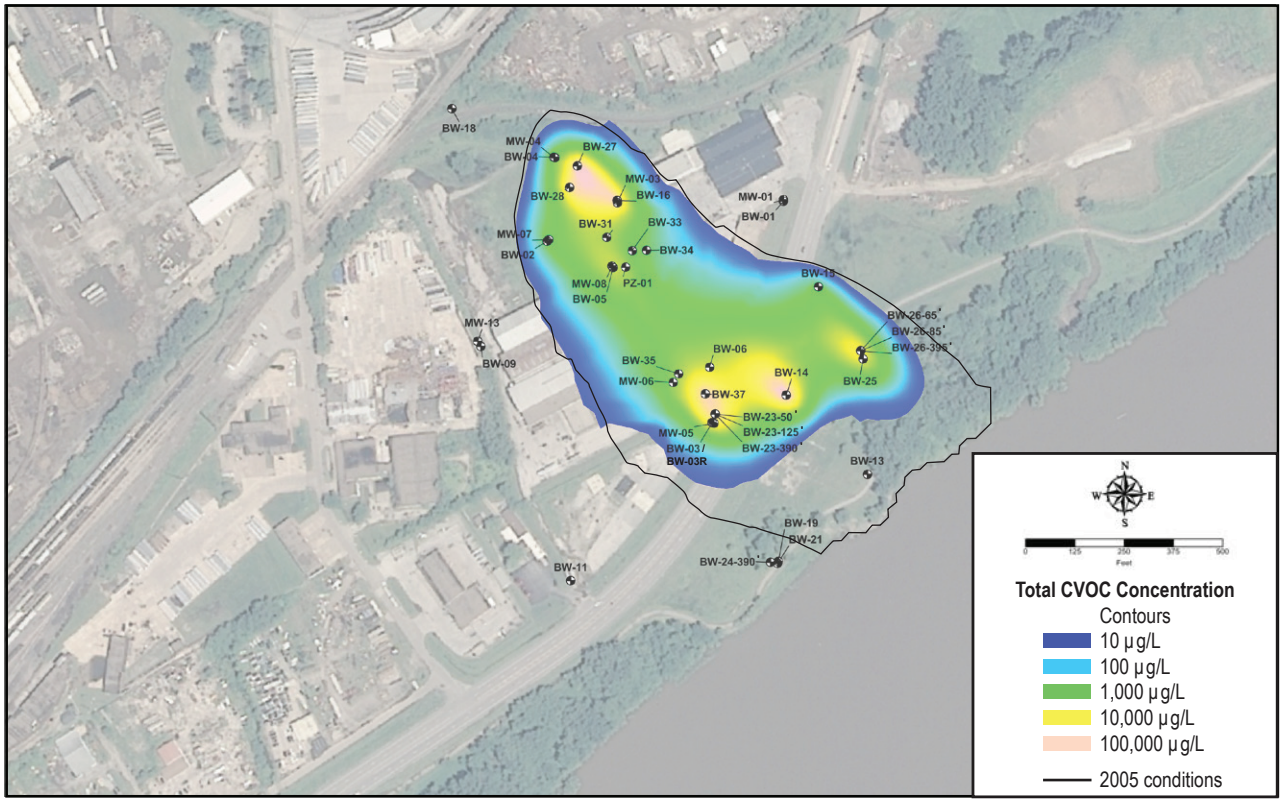
Note:
Isosurfaces are based on the 3-D isovolume that was generated based on kriging of each data set using the GSLIB (Deutsch , C.V. and A.G. Journel, 1992 - GSLIB: Geostatistical Software Library and User's Guide. 2nd ed. Oxford University Press, New York.) and geostatistical algorithms as implemented within the Stanford Geostatistical Modeling Software version 2.1 (SGeMS) (Remy, N., A. Boucher, and J. Wu 2009 - Applied Geostatisics with SGeMS: A User's Guide. Cambridge University).

Figure 3-3
Total VOCs in Groundwater
2040 West River Drive
Davenport, Iowa

ch2m



2005 (Pre-soil treatment, pre-full scale ISCO injection conditions)



June 2016 (Current Conditions)

Notes:

Isosurfaces are based on the 3-D isovolume that was generated based on kriging of each data set using the GSLIB (Deutsch , C.V. and A.G. Journel, 1992 - GSLIB: Geostatistical Software Library and User's Guide. 2nd ed. Oxford University Press, New York.) and geostatistical algorithms as implemented within the Stanford Geostatistical Modeling Software version 2.1 (SGeMS) (Remy, N., A. Boucher, and J. Wu 2009 - Applied Geostatisics with SGeMS: A User's Guide. Cambridge University).

The total CVOCs concentration is the sum of 1,1,1-trichloroethane; tetrachloroethene; trichloroethylene; methylene chloride, 1,1-dichloroethane; 1,1-dichloroethene; 1,2-dichloroethane; cis-1,2-dichloroethene; trans-1,2-dichloroethene; chloroethane; and vinyl chloride.

Figure 3-4
Total CVOCs in Groundwater
2040 West River Drive
Davenport, Iowa

ch2m

BW-18
BW-04[3]
BW-27
BW-28
BW-16
TCE
PCE
VAN METER INDUSTRIAL
BW-01
BW-31
BW-02
BW-33
BW-34
FORMER DRUM STORAGE AREA
JIMs BATTERY SALES (FORMERLY EXIDE BATTERY)
CITY OF DAVENPORT PROPERTY
Cis12DCE
VC
PZ-01[3]
BW-05[3]
RAILROAD UNLOADING
MAIN WAREHOUSE
FORMER OUTDOOR TANK AREA
BW-15
BW-09
MIDWEST METALS
BLDG. A
BLDG. B
SURFACE STORM DRAIN
BW-06
BW-25
BW-35
FORMER STORAGE AREA
BW-14
BW-37
BW-23-50'
BW-03R
RV HOPKINS
BLACKWELL PROPERTY
BW-13
FORMER CITGO GAS STATION
WEST RIVER DRIVE
PET PALS
BW-19
BW-11

Notes:
1. RAO - Remedial Action Objective
2. Well locations shown in gray-scale are not part of the shallow bedrock zone long term monitoring network.
3. For locations not sampled in June 2016, the most recent data was used to draw contours as follows: BW-05 (June 2010), PZ-01 (December 2014), and BW-04 (June 2011).
4. PCE - Tetrachloroethene
TCE - Trichloroethene
Cis12DCE - cis-1,2-Dichloroethene
VC - Vinyl Chloride

Legend

Estimated extent of monitoring wells with detected concentrations above RAOs

- PCE (RAO 5 µg/L)
- TCE (RAO 5 µg/L)
- Cis12DCE (RAO 70 µg/L)
- VC (RAO 2 µg/L)
- Existing Injection Well Pair
- Flute™ Monitoring Well
- Piezometer
- Pump Test Location
- Unconsolidated Monitoring Well
- Bedrock Monitoring Well

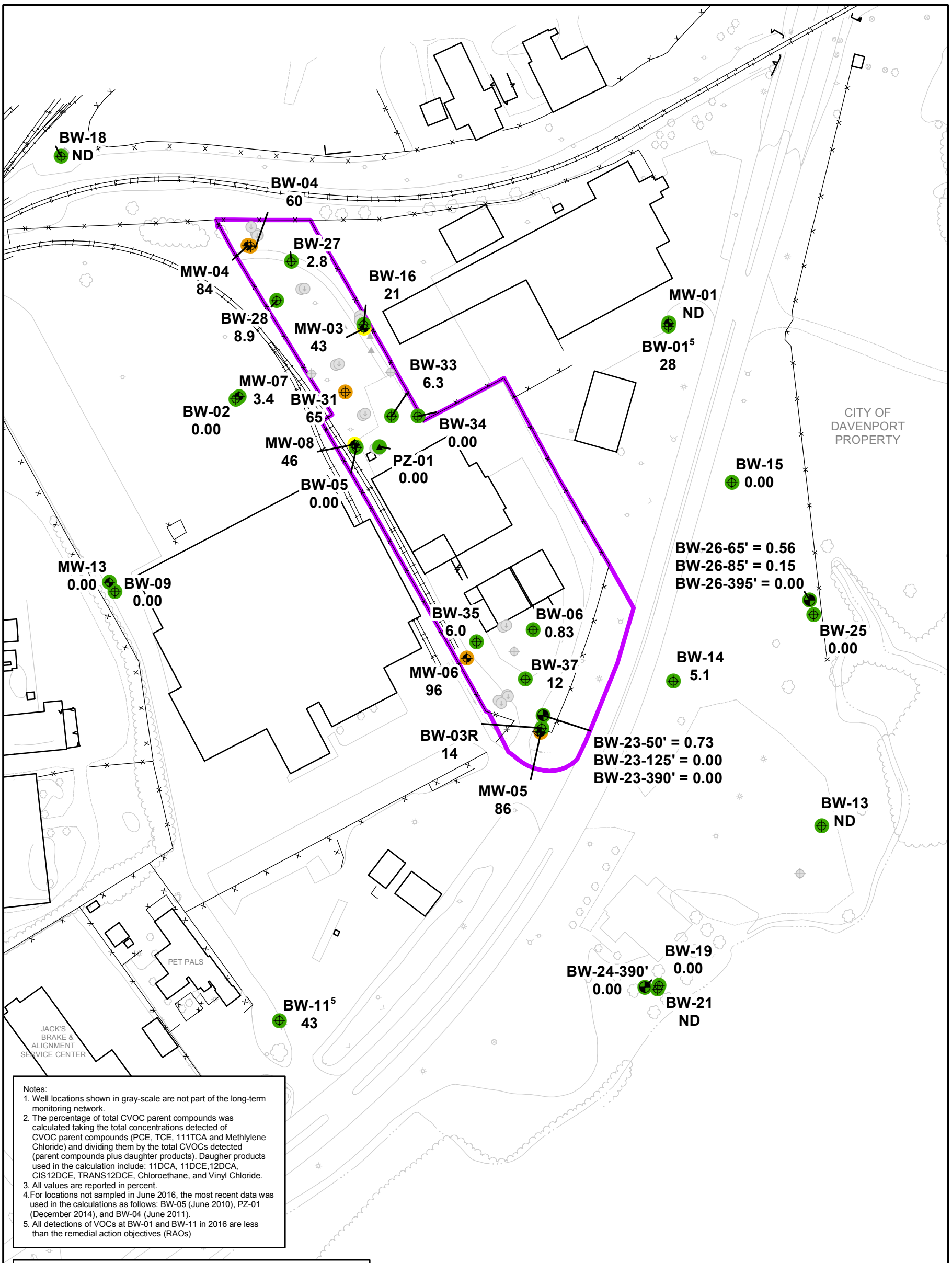
N

0 70 140 210 Feet

ch2m

Figure 3-5
Extent of Monitoring Wells with Tetrachloroethene, Trichloroethene, cis-1,2-Dichloroethene, and Vinyl Chloride RAO Exceedances in the Shallow Bedrock Zone - June 2016
2040 West River Drive
Davenport, Iowa

MKE \\LAKEFRONT\PROJ\THAN_DAVENPORT\GIS\MXD\2016\ARPR\FIGURE 03-05 - EXTENT OF MONITORING WELLS WITH PCE, TCE, CIS12DCE, AND VC RAO EXCEEDANCES - JUNE 2016.MXD MWACH 1/17/2017 4:24:15 PM



Notes:
1. Well locations shown in gray-scale are not part of the long-term monitoring network.
2. The percentage of total CVOC parent compounds was calculated taking the total concentrations detected of CVOC parent compounds (PCE, TCE, 111TCA and Methylene Chloride) and dividing them by the total CVOCs detected (parent compounds plus daughter products). Daugher products used in the calculation include: 11DCA, 11DCE,12DCA, CIS12DCE, TRANS12DCE, Chloroethane, and Vinyl Chloride.
3. All values are reported in percent.
4. For locations not sampled in June 2016, the most recent data was used in the calculations as follows: BW-05 (June 2010), PZ-01 (December 2014), and BW-04 (June 2011).
5. All detections of VOCs at BW-01 and BW-11 in 2016 are less than the remedial action objectives (RAOs)

Legend

ND All CVOCs were non-detect at this location in 2016

2.0 Percent of total CVOC parent compounds of total CVOCs (parent compounds plus daughter products) detected

- 0-25% CVOC parent compounds or all detected VOCs are less than their respective screening criteria.
- 25-50% CVOC Parent Compounds
- > 50% CVOC Parent Compounds
- Approximate Site Boundary
- Existing Injection Well Pair
- Flute™ Monitoring Well
- Piezometer
- Pump Test Location
- Unconsolidated Monitoring Well
- Bedrock Monitoring Well

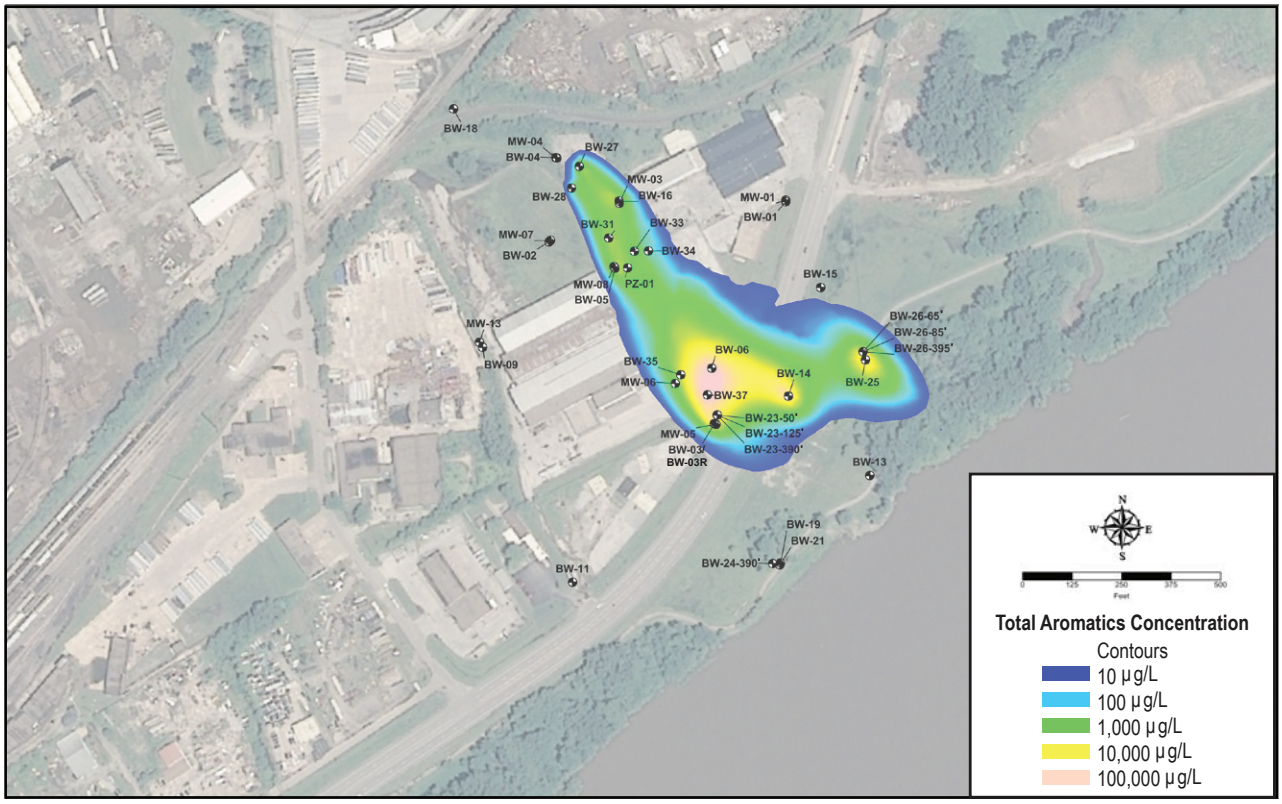
N

0 70 140 210 Feet

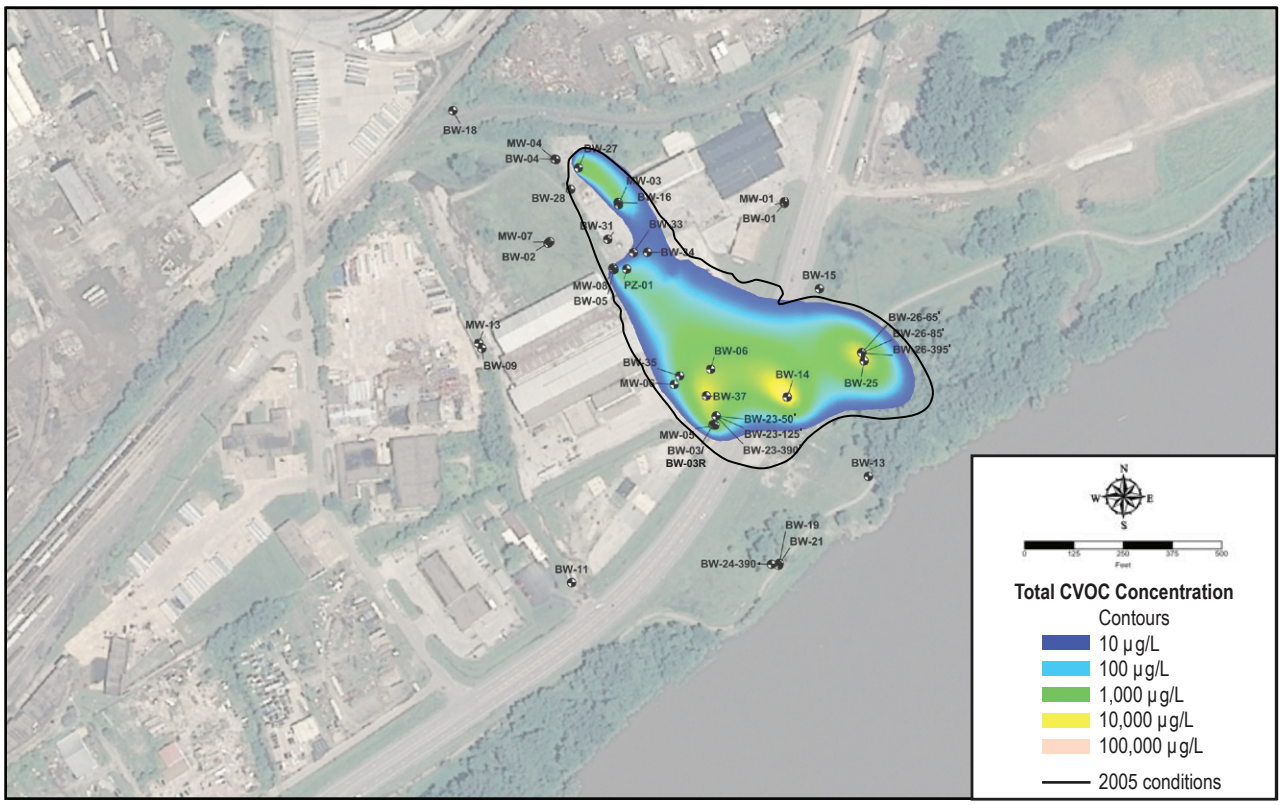
ch2m

Figure 3-6
Ratio of CVOC Parent Compound Concentrations to Total CVOC (Daughter+Parent) Concentrations
2040 West River Drive
Davenport, Iowa

\\LAKEFRONT\PROJ\THAN_DAVENPORT\GIS\MXD\2016\ANNUALREPORT\FIGURE 03-06 - RATIO OF CVOC PARENT COMP CONC TO TOTAL CVOC (DAUGHTER+PARENT) CONC - 2016.MXD MWACH 1/17/2017 4:29:07 PM



2005 (Pre-soil treatment, pre-full scale ISCO injection conditions)



June 2016 (Current Conditions)

Notes:

Isosurfaces are based on the 3-D isovolume that was generated based on kriging of each data set using the GSLIB (Deutsch , C.V. and A.G. Journel, 1992 - GSLIB: Geostatistical Software Library and User's Guide. 2nd ed. Oxford University Press, New York.) and geostatistical algorithms as implemented within the Stanford Geostatistical Modeling Software version 2.1 (SGeMS) (Remy, N., A. Boucher, and J. Wu 2009 - Applied Geostatisics with SGeMS: A User's Guide. Cambridge University).

The total aromatics concentration is the sum of benzene, ethylbenzene, styrene, toluene, and total xylene concentrations.

Figure 3-7
Total Aromatics in Groundwater
2040 West River Drive
Davenport, Iowa

ch2m

BW-18
BW-27
xylenes
ethylbenzene
toluene
BW-04[3]
BW-28
BW-16
VAN METER INDUSTRIAL
BW-01
BW-31
BW-02
BW-33
BW-34
FORMER DRUM STORAGE AREA
SCOTT COUNTY KENNEL CLUB (FORMERLY EXIDE BATTERY)
CITY OF DAVENPORT PROPERTY
BW-05[3]
PZ-01[3]
RAILROAD UNLOADING
MAIN WAREHOUSE
BW-15
FORMER OUTDOOR TANK AREA
BW-09
MIDWEST METALS
BLDG. B
BLDG. A
SURFACE STORM DRAIN
toluene
benzene
BW-25
BW-06
ethylbenzene
BW-35
FORMER STORAGE AREA
BW-14
BW-37
xylenes
BW-23-50'
toluene
benzene
BW-03R
ethylbenzene
RV HOPKINS
BLACKWELL PROPERTY
WEST RIVER DRIVE
BW-13
RV HOPKINS
FORMER CITGO GAS STATION
PET PALS
BW-19
BW-11
JACK'S BRAKE & ALIGNMENT SERVICE CENTER

Notes:
1. RAO - Remedial Action Objective
2. Well locations shown in gray-scale are not part of the shallow bedrock zone long term monitoring network.
3. For locations not sampled in June 2016, the most recent data was used to draw contours as follows: BW-05 (June 2010), PZ-01 (December 2014), and BW-04 (June 2011).

Legend

Estimated extent of monitoring wells with detected concentrations above RAOs

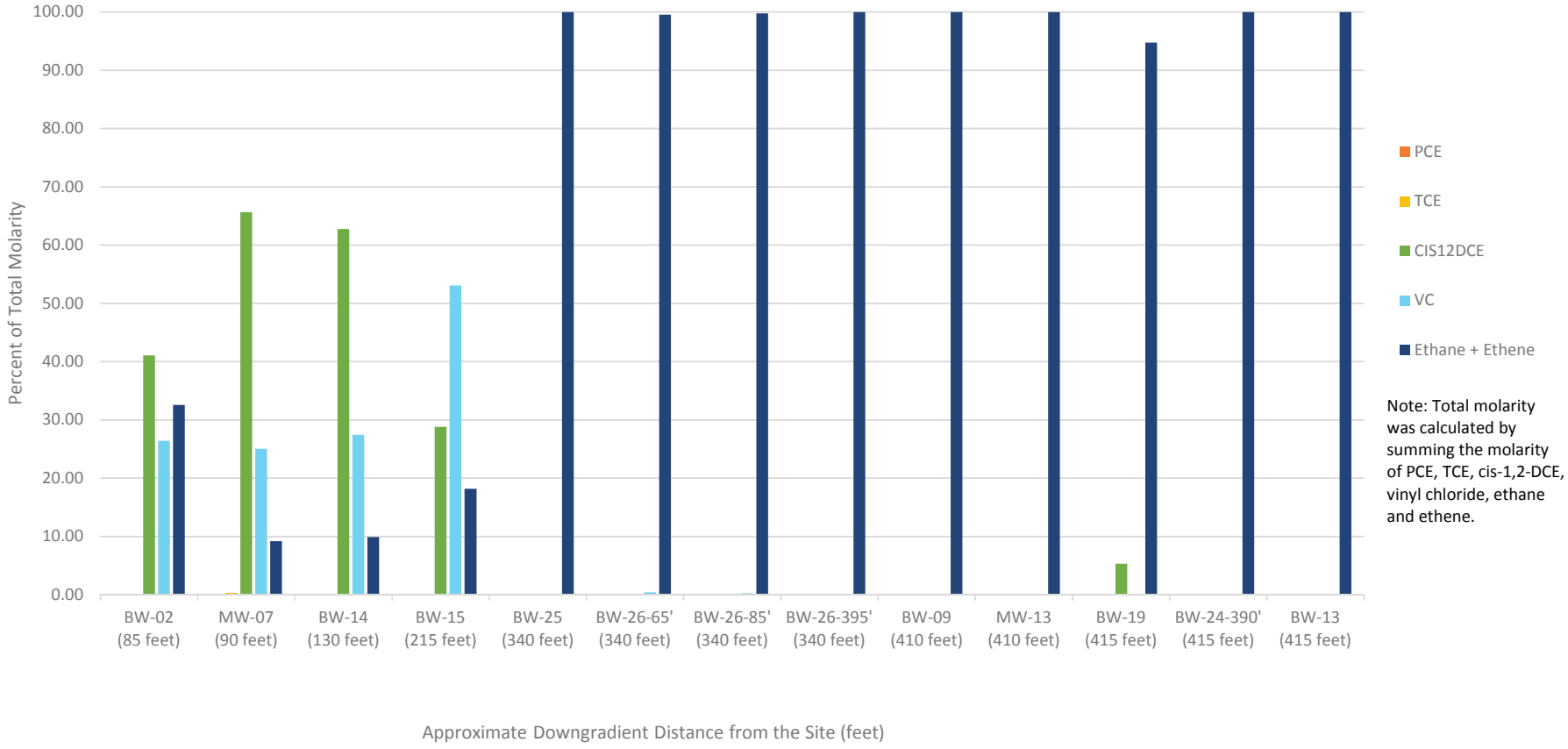
- Benzene (RAO 5 µg/L)
- Ethylbenzene (RAO 700 µg/L)
- Toluene (RAO 1,000 µg/L)
- Xylenes (RAO 10,000 µg/L)
- Existing Injection Well Pair
- Flute™ Monitoring Well
- Piezometer
- Pump Test Location
- Unconsolidated Monitoring Well
- Bedrock Monitoring Well

N

0 70 140 210 Feet

ch2m

Figure 3-8
Extent of Monitoring Wells with Benzene, Toluene, Ethylbenzene, and Xylenes RAO Exceedances in the Shallow Bedrock Zone - June 2016
2040 West River Drive
Davenport, Iowa



Note: Total molarity was calculated by summing the molarity of PCE, TCE, cis-1,2-DCE, vinyl chloride, ethane and ethene.

Figure 3-9
Percent Molarity Contribution of Individual Compounds at Offsite Locations with Ethane or Ethene Detections
2040 West River Drive, Davenport, Iowa

ch2m

Appendix A
Field Documentation

Groundwater Level Measurement Form

Team 1

Location	Date Measured	Time Measured	Measured Depth to Water (ft)	Measured depth to bottom (ft)	Measured depth to product (ft)	PID-Total VOCs (ppm)	Comments (note observations of permaganate, needed well repairs, ect.)
Onsite Wells							
BW-03R	6/13/16	1449	7.28	28.19	NONE	0	—
X BW-04							
X BW-05							
X BW-06							
X BW-12							
X BW-16							
BW-23-50'							
BW-23-90'							
BW-23-125'							
BW-23-200'							
BW-23-290'							
BW-23-390'							
X BW-27							
X BW-28							
→ BW-29	6/13/16	1625	3.97	36.70	NONE	0	dark purple permaganate
X BW-30							
X BW-31							
X BW-32							
X BW-33							
X BW-34							
X BW-35							
X BW-36							
X BW-37							
X MW-03							

Groundwater Level Measurement Form

Team 1

Location	Date Measured	Time Measured	Measured Depth to Water (ft)	Measured depth to bottom (ft)	Measured depth to product (ft)	PID-Total VOCs (ppm)	Comments (note observations of permaganate, needed well repairs, etc.)
x MW-04							
MW-05	6/13/16	14:47	7.05	7.99	NONE	0	—
X MW-06							
X MW-08							
→ ISCO-PZ01	6/13/16	1633	5.63	36.43	NONE	0	—
X ISCO-PZ03							
X ISCO-PZ04							
X PT-01							
X PZ-01							
X PZ-02							
Offsite Wells							
BW-01	6/13/16	1440	11.97	34.10	NONE	0	—
BW-02	6/14/16	1042	4.89	23.97			
BW-11 ~~BW-09~~	6/13/16	1330	6.26	27.75	none	1 ppm	water in vault
Bw-11 ~~BW-11~~	6/14/16	0924	3.96	36.25			
BW-13	6/13/16	1400	13.80	35.06	NONE	0	—
BW-14	6/13/16	1435	13.85	40.09	NONE	120 ppm	—
BW-15	6/13/16	1426	13.22	31.19	NONE	0	—
BW-18	6/13/16	1528	5.00	41.75	none	0.0	8' tall vegetation had to trim
BW-19	6/13/16	1347	9.39	39.58	NONE	0	—
BW-21	~~1342~~ 6/13	1342	7.88	154.64	NONE	0	needs new lock
BW-22	6/13/16	1353	11.16	151.10	NONE	0	rusty lock; hard to open needs new lock
BW-24-175'							
BW-24-230'							
BW-24-290'							
BW-24-390'							
BW-25	6/13/16	1420	15.14	40.42	NONE	7.5 ppm	appears weed killer sprayed around well → dead vegetation
BW-26-65'							
BW-26-85'							
BW-26-205'							

Groundwater Level Measurement Form

Team 1

Location	Date Measured	Time Measured	Measured Depth to Water (ft)	Measured depth to bottom (ft)	Measured depth to product (ft)	PID-Total VOCs (ppm)	Comments (note observations of permaganate, needed well repairs, ect.)
BW-26-295'	6/14/16	1621	13.62	NA	NA	NA	—
BW-26-395'	6/14/16	1623	13.03	NA	NA	NA	—
MW-01							
MW-07	6/14/16	1100	5.55	8.16	NA	NA	—
MW-13							
MW-17							
MW-18							
MW-19							
MW-20							

Notes:
ft = feet
ow ground surface
A = Not Applicable

Groundwater Level Measurement Form

Tem 2

Location	Date Measured	Time Measured	Measured Depth to Water (ft)	Measured depth to bottom (ft)	Measured depth to product (ft)	PID-Total VOCs (ppm)	Comments (note observations of permaganate, needed well repairs, ect.)
Onsite Wells							
BW-03R							
BW-04	6/13/16	13:15	5.34	33.78	—	0.00	light purple staining on probe
BW-05	6/13/16	13:29	5.57	11.08	—	0.00	*Bee!
BW-06	6/13/16	1455	2.66	22.59	—	VOC=0.1	none
BW-12	6/13/16	13:35	18.02	106.80	—	CO=1.0	Soft bottom
BW-16	6/13/16	1415	5.74	33.65	—	CO=1.0 VOC=49	none
BW-23-50' 1	6/14/16	1631	9.16	NA	NA	NA	
BW-23-90' 2	6/14/16	1633	11.50	NA	NA	NA	
BW-23-125' 3	6/14/16	1634	11.40	NA	NA	NA	
BW-23-200' 4	6/14/16	1636	11.51	NA	NA	NA	
BW-23-290' 5	6/14/16	1637	11.53	NA	NA	NA	
BW-23-390' 6	6/14/16	1638	11.34	NA	NA	NA	
BW-27	6/13/16	13:19	4.84	40.48	—	VOC=9.5 CO=1.0	~~odor~~ (S) none
BW-28	6/13/16	13:21	4.05	40.40	—	0.00	odor
BW-29							
BW-30	6/13/16	1530	4.75	37.81	—	VOC=2.5	purple stain at bottom on probe
BW-31	6/13/16	13:25	5.40	36.39	—	CO=1.0	soft bottom
BW-32	6/13/16	13:39	4.21	32.04	—	0.00	none
BW-33	6/13/16	13:37	5.69	33.83	—	CO=1.0	none
BW-34	6/13/16	13:39	3.66	37.24	—	0.0	vault full, pressure
BW-35	6/13/16	1560	3.90	34.84	—	0.0	vault full
BW-36	6/13/16	1445	5.41	34.05	—	CO=1.0	none
BW-37	6/13/16	1450	6.34	34.71	—	LEL=41 CO=1096	odor
MW-03	6/13/16	1410	5.10	7.50	—	0.0	none

Groundwater Level Measurement Form

team 2

Location	Date Measured	Time Measured	Measured Depth to Water (ft)	Measured depth to bottom (ft)	Measured depth to product (ft)	PID-Total VOCs (ppm)	Comments (note observations of permaganate, needed well repairs, etc.)
MW-04	6/13/16	13:17	3.88	7.55	—	VOC=3.0 O2=19.7	pressure
MW-05							
MW-06	6/13/16	1440	8.50	8.58	—	10=8.0	(v. dry)
MW-08	6/13/16	13:27	6.84	7.21	—	0.00	none
ISCO-PZ01							bees
ISCO-PZ03	6/13/16	1420	4.86	37.30	—	CO=1	permanganate
ISCO-PZ04	6/13/16	1430	5.14	37.28	—	CO=1	none
PT-01	6/13/16	1530	5.73	~~46.75~~ 39.50	—	0.0	none soft bottom
PZ-01	6/13/16	13:31	8.42	53.42	—	0.00	soft bottom, odor
PZ-02	6/13/16	13:33	14.45	73.0	—	0.00	soft bottom

Offsite Wells

BW-01							
BW-02							
BW-09							
BW-11							
BW-13							
BW-14							
BW-15							
BW-18							
BW-19							
BW-21							
BW-22							
BW-24-175'	6/14/16	1651	8.42	NA	NA	NA	—
BW-24-230'	6/14/16	1653	8.33	NA	NA	NA	—
BW-24-290'	6/14/16	1655	8.29	NA	NA	NA	—
BW-24-390'	6/14/16	1656	8.43	NA	NA	NA	—
BW-25							
BW-26-65'	6/14/16	1617	13.08	NA	NA	NA	—
BW-26-85'	6/14/16	1619	13.10	NA	NA	NA	—
BW-26-205'	6/14/16	1620	13.19	NA	NA	NA	—

Groundwater Level Measurement Form

team 2
~~tm 2~~

Location	Date Measured	Time Measured	Measured Depth to Water (ft)	Measured depth to bottom (ft)	Measured depth to product (ft)	PID-Total VOCs (ppm)	Comments (note observations of permaganate, needed well repairs, ect.)
BW-26-295'							
BW-26-395'							
MW-01	6/13/16	1447	11.08	14.63	None	0.0	—
MW-07							
MW-17 ~~MW-13~~	6/13/16	1323	6.85	8.65	None	0.0	near overgrown grape vines
MW-13 ~~MW-17~~	6/14/16	0900	4.76	16.64	None	0.0	—
MW-18	6/13/16	1409	11.53	54.82	None	0.0	—
MW-19	6/13/16	1411	11.87	18.15	None	0.0	low O_2
MW-20	6/13/16	1604	3.20	6.78	None	0.0	—

Notes:
ft = feet
ow ground surface
A = Not Applicable

Monitoring Well

Field Data Sheet 2016 Sampling

Well Number: MW-01 Field Crew: CR Purpose of Sampling: ~~2016~~ Annual LTMP Groundwater Sampling

Site: PENAC/THAN Davenport, IA Field Conditions: 85°F Sunny

WELL CONDITION

Well	Acceptable	Not Acceptable	Explain:	
Flush Mount / Stickup	Acceptable	Not Acceptable	Explain:	
Well Casing	Acceptable	Not Acceptable	Explain:	
Locking Cap	Acceptable	Not Acceptable	Explain:	

PURGE METHOD

Date: 6/15/16 Time: 835 Method: Low-flow

Total Well Depth (DTB) (ft) = 14.63 Pump Type: Peristaltic

Depth to Water (DTW) (ft) = 10.91

Water Column (ft) = 3.72

Comments:

Volume Calculations:

(DTB - DTW x Vol./ft. = Gals./well volume)

Diameter	Vol./ft.
1"	0.04
1.25"	0.06
2"	0.16
4"	0.65

OBSERVATIONS

Odor: None , Low , High , H_2S , Fuel Like , Other:

Turbidity: None , Low , Medium , High , Heavy Silts

Comments:

FIELD PARAMETERS

Time	Flow Rate (ml/min)	DTW (ft)	Temp. (C)	Sp. Cond (µs/cmC) (± 3%)	Conductivity (µs/cm)	pH (SU) (± 0.1)	DO (mg/L) (± 0.3 mg/L)	DO (%)	ORP (mV) (± 10 mV)	Turbidity (NTU) (± 10 % when > 10NTU)	Comments
855	start	purging	well								
915	80	11.50	21.81	774	727	7.00	4.09	92.2	201.6	0.0	Clear
920	80	11.74	21.15	756	700	6.97	8.03	90.5	201.7	0.0	
925	80	11.85	21.18	743	689	6.96	7.97	89.7	208.6	0.0	
930	80	11.96	21.14	738	683	6.96	8.09	91.2	211.1	0.0	
935	80	12.14	21.17	733	679	6.93	7.99	90.1	215.4	0.0	
—	sample	well									

SAMPLING

Date: 6/15/16 Time: ~~900~~ 956

Sample ID: ADDV-001 Method of Sample Collection: low flow

Analytical Parameters: VOCs, CL, TOC, MWA

Q.C. Sample Type: NA MS/MSD Duplicate Duplicate Sample ID: Dup. Time:

Trash picked up? Y Well locked? Y

SIGNED/SAMPLER:

Monitoring Well

Field Data Sheet 2016 Sampling

Well Number: MW-03 Field Crew: Mathews

Purpose of Sampling: ~~2015 Annual~~ LTMP Groundwater Sampling

Site: PENAC/THAN Davenport, IA

Field Conditions: 95° sunny

WELL CONDITION

Well	Acceptable	Not Acceptable	Explain:
Flushmount / Stickup	Acceptable	Not Acceptable	Explain:
Well Casing	Acceptable	Not Acceptable	Explain:
Locking Cap	Acceptable	Not Acceptable	Explain:

PURGE METHOD

Date: 6/15/16 Time: 1420

Method: Low-flow

Pump Type: Peristaltic

Total Well Depth (DTB) (ft) = 7.50

Depth to Water (DTW) (ft) = 4.54

Water Column (ft) = 2.96

Comments:

Volume Calculations:

(DTB - DTW x Vol./ft. = Gals./well volume)

Diameter	Vol./ft.
1"	0.04
1.25"	0.06
2"	0.16
4"	0.65

OBSERVATIONS

Odor: None , Low , High , H_2S , Fuel Like , Other:

Turbidity: None , Low , Medium , High , Heavy Silts

Comments:

FIELD PARAMETERS

Time	Flow Rate (ml/min)	DTW (ft)	Temp. (C)	Sp. Cond (µs/cmC) (± 3%)	Conductivity (µs/cm)	pH (SU) (± 0.1)	DO (mg/L) (± 0.3 mg/L)	DO (%)	ORP (mV) (± 10 mV)	Turbidity (NTU) (± 10 % when > 10NTU)	Comments
1430	50	5.49	25.79	1121	1132	6.80	3.04	37.1	20.5	12.7	clear
1435	50	5.82	25.04	1142	1143	6.61	1.72	20.8	21.8	11.3	clear
1440	50	5.83	25.19	1142	1146	6.61	1.70	20.7	21.6	9.5	clear
1445	50	5.83	25.65	1135	1149	6.64	1.70	20.9	23.8	8.3	clear
1450	50	5.92	25.90	1134	1154	6.65	1.59	19.6	24.9	6.4	clear
	1455	sampled									

SAMPLING

Date: 6/15/16

Time: 1500

Sample ID: ADOV-002

Method of Sample Collection: low flow

Analytical Parameters: VOC, TOC, Chl

Q.C. Sample Type: NA MS/MSD Duplicate

Duplicate Sample ID:

Dup. Time:

Trash picked up? Y

Well locked? Y

SIGNED/SAMPLER:

Monitoring Well

Field Data Sheet

Well Number: MW-04 Field Crew: Mauhofer Purpose of Sampling: 2016 ~~2015~~ Annual LTMP Groundwater Sampling

Site: PENAC/THAN Davenport, IA Field Conditions: 95° sunny

WELL CONDITION

Well	Acceptable	Not Acceptable	Explain:
Flushmount / Stickup	Acceptable	Not Acceptable	Explain:
Well Casing	Acceptable	Not Acceptable	Explain:
Locking Cap	Acceptable	Not Acceptable	Explain:

PURGE METHOD

Date: 6/15/16 Time: 1515 Method: Low-flow

Total Well Depth (DTB) (ft) = 7.55 Pump Type: Peristaltic

Depth to Water (DTW) (ft) = 4.28

Water Column (ft) = 3.27

Comments:

Volume Calculations:

(DTB - DTW x Vol./ft. = Gals./well volume)

Diameter	Vol./ft.
1"	0.04
1.25"	0.06
2"	0.16
4"	0.65

OBSERVATIONS

Odor: None, Low, High, H_2S, Fuel Like, Other:

Turbidity: None, Low, Medium, High, Heavy Silts

Comments: light purple/clear

FIELD PARAMETERS

Time	Flow Rate (ml/min)	DTW (ft)	Temp. (C)	Sp. Cond (µs/cmC) (± 3%)	Conductivity (µs/cm)	pH (SU) (± 0.1)	DO (mg/L) (± 0.3 mg/L)	DO (%)	ORP (mV) (± 10 mV)	Turbidity (NTU) (± 10 % when > 10NTU)	Comments
1550	50	5.28	35.10	2050	2250	6.60	1.65	23.4	500.2	111	pink
1555	50	5.65	31.67	2170	2447	6.41	1.18	16.2	560.6	79.6	clear
~~1600~~	50	pump									
~~1605~~	50	off (overheated?)									
~~1610~~	50										
1620	50	5.75	35.50	2076	2444	6.43	1.04	15.1	593.8	90.6	tinted
1625	50	6.15	35.69	2023	2436	6.42	1.24	18.1	616.4	85.4	clear
1630	50	6.17	36.08	2013	2438	6.43	1.19	17.5	616.7	70.8	clear
1635	50	6.21	35.91	2014	2432	6.43	1.19	17.5	618.9	78.5	clear
sampled											

SAMPLING

Date: 6/15/16 Time: 1645

Sample ID: ADDV-003 Method of Sample Collection: low flow

Analytical Parameters: TOC, VOC, chl

Q.C. Sample Type: NA MS/MSD Duplicate Duplicate Sample ID: Dup. Time:

Trash picked up? Y Well locked? Y

SIGNED/SAMPLER:

Monitoring Well

Field Data Sheet

Well Number: MW-05 Field Crew: C. Reiss Purpose of Sampling: 2016 ~~2016~~ Annual LTMP Groundwater Sampling

Site: PENAC/THAN Davenport, IA Field Conditions: 90°F Sunny, humid

WELL CONDITION

Well	Acceptable	Not Acceptable	Explain:
Flush / Stickup	Acceptable	Not Acceptable	Explain:
Well Casing	Acceptable	Not Acceptable	Explain:
Locking Cap	Acceptable	Not Acceptable	Explain:

PURGE METHOD

Date: 6/15/16 Time: 1043 Method: Low-flow

Total Well Depth (DTB) (ft) = 7.99 Pump Type: Peristaltic

Depth to Water (DTW) (ft) = 5.65

Water Column (ft) = 2.34

Comments:

Volume Calculations:

(DTB - DTW x Vol./ft. = Gals./well volume)

Diameter	Vol./ft.
1"	0.04
1.25"	0.06
2"	0.16
4"	0.65

OBSERVATIONS

Odor: None Low , High , H_2S , Fuel Like , Other:

Turbidity: None Low , Medium , High , Heavy Silts

Comments:

FIELD PARAMETERS

Time	Flow Rate (ml/min)	DTW (ft)	Temp. (C)	Sp. Cond (µs/cmC) (± 3%)	Conductivity (µs/cm)	pH (SU) (± 0.1)	DO (mg/L) (± 0.3 mg/L)	DO (%)	ORP (mV) (± 10 mV)	Turbidity (NTU) (± 10 % when > 10NTU)	Comments
1049	Start purging well at slow as possible → limited water for sampling										
1106	44	11.74	26.49	463	475	6.56	6.18	76.6	139.8	30.8	
1111	44	11.74	25.61	456	461	6.20	6.19	75.9	168.7	27.8	
1116	44	11.75	25.63	454	459	6.19	6.06	74.4	184.6	21.3	
1121	44	11.75	25.69	455	461	6.20	6.04	74.2	195.9	23.0	
1126	44	11.75	25.86	457	464	6.20	5.86	72.2	207.2	17.0	
1131	44	11.75	25.97	457	466	6.21	5.89	72.7	216.2	13.4	
1136	44	11.75	26.06	458	468	6.20	6.01	74.4	224.5	15.4	
1141	44	11.75	26.17	459	469	6.23	5.79	71.7	232.1	10.1	
1146	44	11.75	26.36	460	472	6.26	5.65	70.2	238.3	4.9	
1151	44	11.75	26.59	462	476	6.28	5.63	70.1	243.9	4.3	
1156	44	11.75	26.78	463	479	6.28	5.46	68.3	248.1	5.7	
— Sample well											

SAMPLING

Date: 6/15/16 Time: 1120

Sample ID: AOOV-004 Method of Sample Collection: low-flow

Analytical Parameters: VOCs, CL, TOC

Q.C. Sample Type: NA MS/MSD Duplicate Duplicate Sample ID: Dup. Time:

Trash picked up? Y Well locked? Y

SIGNED/SAMPLER:

Monitoring Well

Field Data Sheet

Well Number: MW-06 Field Crew: Maihofer Purpose of Sampling: 2016 ~~2015~~ Annual LTMP Groundwater Sampling

Site: PENAC/THAN Davenport, IA Field Conditions: 95° breezy sunny

WELL CONDITION

Well Pad	Acceptable	Not Acceptable	Explain:
Flush mount / Stickup	Acceptable	Not Acceptable	Explain:
Well Casing	Acceptable	Not Acceptable	Explain:
Locking Cap	Acceptable	Not Acceptable	Explain:

PURGE METHOD

Date: 6/15/16 Time: 1141 Method: Low-flow

Total Well Depth (DTB) (ft) = 8.58 Pump Type: Peristaltic

Depth to Water (DTW) (ft) = 5.49

Water Column (ft) = 3.09

Comments:

Volume Calculations:

(DTB - DTW x Vol./ft. = Gals./well volume)

Diameter	Vol./ft.
1"	0.04
1.25"	0.06
2"	0.16
4"	0.65

OBSERVATIONS

Odor: None, Low, High, H_2S, Fuel Like, Other:

Turbidity: None, Low, Medium, High, Heavy Silts

Comments:

FIELD PARAMETERS

Time	Flow Rate (ml/min)	DTW (ft)	Temp. (C)	Sp. Cond (µs/cmC) (± 3%)	Conductivity (µs/cm)	pH (SU) (± 0.1)	DO (mg/L) (± 0.3 mg/L)	DO (%)	ORP (mV) (± 10 mV)	Turbidity (NTU) (± 10 % when > 10NTU)	Comments
1155	50	6.00	25.92	748	809	6.61	3.14	38.7	81.9	1.1	clear
1200	50	6.06	25.50	753	766	6.57	2.87	35.3	104.9	1.0	clear
1205	50	5.95	26.03	756	769	6.56	3.00	37.2	119.8	0.0	clear
1210	50	6.09	25.17	717	718	6.48	3.68	44.7	134.3	0.0	clear
1215	50	6.15	24.33	695	685	6.44	3.49	41.8	140.9	0.0	clear
1220	50	6.14	24.30	683	674	6.41	3.51	42.1	144.2	0.0	clear
1225	50	6.09	24.28	678	669	6.40	3.56	42.6	149.3	0.0	clear

sampled

SAMPLING

Date: 6/15/16 Time: ~~1~~ 1245

Sample ID: ADDN-005 Method of Sample Collection: low flow

Analytical Parameters: VOC, TOC, Chl

Q.C. Sample Type: NA MS/MSD Duplicate Duplicate Sample ID: Dup. Time:

Trash picked up? Y Well locked? Y

SIGNED/SAMPLER:

Monitoring Well

Field Data Sheet

Well Number: MW-07 Field Crew: Mauhofer Purpose of Sampling: 2016 ~~2015~~ Annual LTMP Groundwater Sampling

Site: PENAC/THAN Davenport, IA Field Conditions: 90° sunny

WELL CONDITION

Well	Acceptable	Not Acceptable	Explain:
Flushmount / Stickup	Acceptable	Not Acceptable	Explain:
Well Casing	Acceptable	Not Acceptable	Explain:
Locking Cap	Acceptable	Not Acceptable	Explain: replaced lock

PURGE METHOD

Date: 6/14/16 Time: 1100 Method: Low-flow

Total Well Depth (DTB) (ft) = 8.16 Pump Type: Peristaltic

Depth to Water (DTW) (ft) = 5.55

Water Column (ft) = 2.61

Comments:

Volume Calculations:

(DTB - DTW x Vol./ft. = Gals./well volume)

Diameter	Vol./ft.
1"	0.04
1.25"	0.06
2"	0.16
4"	0.65

OBSERVATIONS

Odor: None , Low , High , H_2S , Fuel Like , Other:

Turbidity: None , Low , Medium , High , Heavy Silts

Comments:

FIELD PARAMETERS

Time	Flow Rate (ml/min)	DTW (ft)	Temp. (C)	Sp. Cond (µs/cmC) (± 3%)	Conductivity (µs/cm)	pH (SU) (± 0.1)	DO (mg/L) (± 0.3 mg/L)	DO (%)	ORP (mV) (± 10 mV)	Turbidity (NTU) (± 10 % when > 10NTU)	Comments
1120	100	5.86	23.61	2149	2095	6.59	0.77	9.1	152.7	0.5	clear
1125	100	5.86	23.69	2143	2090	6.58	0.63	7.5	166.1	0.8	clear
1130	100	5.86	23.80	2133	2083	6.58	0.56	6.0	193.8	0.2	clear
1135	100	5.86	24.02	2128	2088	6.58	0.48	5.8	211.9	0.0	clear
1140	100	5.86	24.24	2126	2095	6.60	0.53	6.2	214.1	0.0	clear
1145	100	Sampled									

SAMPLING

Date: 6/14/16 Time: 1145

Sample ID: ADOV-006 Method of Sample Collection: low flow

Analytical Parameters: VOC, TOC, MNA

Q.C. Sample Type: No MS/MSD Duplicate Duplicate Sample ID: Dup. Time:

Trash picked up? Y Well locked? Y

SIGNED/SAMPLER:

Monitoring Well

Field Data Sheet

Well Number: MW-08 Field Crew: K. Krukowski Purpose of Sampling: 2016 ~~2015~~ Annual LTMP Groundwater Sampling

Site: PENAC/THAN Davenport, IA Field Conditions: ~~89~~ Sunny / Humid

WELL CONDITION

Well [illegible]	Acceptable	Not Acceptable	Explain:
[illegible] Stickup	Acceptable	Not Acceptable	Explain:
Well Casing	Acceptable	Not Acceptable	Explain:
Locking Cap	Acceptable	Not Acceptable	Explain:

PURGE METHOD

Date: 6/15/16 Time: 1420 Method: Low-flow

Total Well Depth (DTB) (ft) = 7.21 Pump Type: Peristaltic

Depth to Water (DTW) (ft) = 3.76

Water Column (ft) = 3.45

Comments:

Volume Calculations:

(DTB - DTW x Vol./ft. = Gals./well volume)

Diameter	Vol./ft.
1"	0.04
1.25"	0.06
2"	0.16
4"	0.65

OBSERVATIONS

Odor: None, Low, High, H_2S, Fuel Like, Other:

Turbidity: None, Low, Medium, High, Heavy Silts

Comments:

FIELD PARAMETERS

Time	Flow Rate (ml/min)	DTW (ft)	Temp. (C)	Sp. Cond (µs/cmC) (± 3%)	Conductivity (µs/cm)	pH (SU) (± 0.1)	DO (mg/L) (± 0.3 mg/L)	DO (%)	ORP (mV) (± 10 mV)	Turbidity (NTU) (± 10 % when > 10NTU)	Comments
1441	64	5.12	26.46	778	799	6.15	1.51	18.8	147.2	2.0	clear
1446	64	5.39	26.05	758	773	6.20	1.49	18.4	191.9	2.3	"
1451	64	5.60	25.67	752	761	6.16	1.53	18.8	254.7	7.0	"
1456	64	5.84	25.30	748	752	6.11	1.54	18.8	293.5	6.4	"
1501	64	6.14	24.99	746	746	6.09	1.44	17.5	276.2	7.0	"
1506	64	6.34	24.48	748	740	6.05	1.51	18.1	269.1	4.1	"
1511	68	6.43	24.11	745	733	6.01	1.52	18.1	306.7	2.4	"
1516	68	6.48	23.98	744	730	5.99	1.49	17.7	345.7	2.1	"
1521	64	6.56	23.74	746	728	5.96	1.17	13.8	378.0	0.2	"
1526	72	6.62	23.52	760	739	5.90	1.00	11.8	393.1	0	"
1531	72	6.68	23.43	783	760	5.84	0.87	10.2	400.0	0	"
1536	72	6.74	23.44	793	770	5.83	0.86	10.1	403.0	0	"
1541	70	6.77	23.45	795	771	5.82	0.75	8.9	415.5	0	"
1546	70	6.83	23.48	797	776	5.80	0.70	8.2	426.3	0	"
1551	70	6.89	23.42	806	781	5.79	0.61	7.1	436.2	0	"
1556	76	6.94	23.22	813	785	5.78	0.60	7.0	443.9	0	"
1601	76	6.98	22.91	816	784	5.73	0.56	6.5	458.8	0	"
1606	76	7.05	22.92	820	788	5.72	0.50	5.8	464.2	0	"
1611	76	7.08	22.99	829	795	5.72	0.48	5.6	457.6	0	"

SAMPLING

Date: 6/15/16 Time: 1615

Sample ID: ADDV-007 Method of Sample Collection: low flow

Analytical Parameters: VOC, Cl, TOC, Field Parameters

Q.C. Sample Type: MS/MSD Duplicate Duplicate Sample ID: Dup. Time:

Trash picked up? Y Well locked? Y

SIGNED/SAMPLER: [signature]

Monitoring Well

Field Data Sheet

Well Number: MW-13 Field Crew: J. Sutton & S. Maihafer Purpose of Sampling: 2016 ~~2013~~ Annual LTMP Groundwater Sampling

Site: PENAC/THAN Davenport, IA Field Conditions: Sunny, humid, hot ~ 88°F

WELL CONDITION

Well	Acceptable	Not Acceptable	Explain:
Flushmount / Stickup	Acceptable	Not Acceptable	Explain: too high to close locking cap
Well Casing	Acceptable	Not Acceptable	Explain:
Locking Cap	Acceptable	Not Acceptable	Explain:

PURGE METHOD

Date: 6/14/16 Time: 900 Method: Low-flow

Total Well Depth (DTB) (ft) = 16.64 Pump Type: Peristaltic

Depth to Water (DTW) (ft) = 4.76

Water Column (ft) = 11.88

Comments:

Volume Calculations:

(DTB - DTW x Vol./ft. = Gals./well volume)

Diameter	Vol./ft.
1"	0.04
1.25"	0.06
2"	0.16
4"	0.65

OBSERVATIONS

Odor: None, Low, High, H_2S, Fuel Like, Other:

Turbidity: None, Low, Medium, High, Heavy Silts

Comments: Slight orange/brown ~~clot~~ color, cleared rapidly

*Readings from 0910 - 0930 Cond and Sp Cond are in m/cm

FIELD PARAMETERS

Time	Flow Rate (ml/min)	DTW (ft)	Temp. (C)	Sp. Cond (µs/cmC) (± 3%)	Conductivity (µs/cm)	pH (SU) (± 0.1)	DO (mg/L) (± 0.3 mg/L)	DO (%)	ORP (mV) (± 10 mV)	Turbidity (NTU) (± 10 % when > 10NTU)	Comments
JS ~~0900~~		~~4.84~~				~~7.31~~	~~0.82~~				
0910	104	4.84	24.24	2.207	2.169	7.31	0.82	5.4	-168.1	61.5	~~clear~~ orange tint
0915	96	4.86	23.25	2.212	2.137	7.45	0.35	4.0	-223.8	37.0	clear
0920	96	4.86	22.73	2.217	2.117	7.49	0.20	2.3	-242.4	31.0	clear
0925	106	4.88	21.86	2.220	2.085	7.51	0.14	1.6	-257.3	25.2	clear
0930	106	4.88	21.69	2.221	2.080	7.51	0.13	1.5	-260.3	22.2	clear
0935	106	4.88	21.55	2221	2075	7.51	0.11	1.3	-261.8	17.5	clear
0940	106	4.88	21.44	2223	2072	7.51	0.11	1.2	-264.0	15.7	clear
0945	106	4.88	21.40	2234	2080	7.50	0.11	1.2	-260.0	13.4	clear
0950	106	4.88	21.50	2232	2083	7.47	0.10	1.2	-258.4	9.0	clear

sample @ 0952

JS

SAMPLING

Date: 6/14/16 Time: 0952

Sample ID: ADDY-008 Method of Sample Collection: grab/low flow

Analytical Parameters: TOC, Sulfide, Alk, Ferrous Fe, Anions, Diss Gases, VOCs

Q.C. Sample Type: None MS/MSD Duplicate Duplicate Sample ID: — Dup. Time: —

Trash picked up? ✓

SIGNED/SAMPLER: JS : Jaime Sutton Well locked? Not able to lock (see well condition)

Monitoring Well

Field Data Sheet

Well Number: BW-01 Field Crew: Keith Kadowski Purpose of Sampling: 2016 ~~2016~~ Annual LTMP Groundwater Sampling

Site: PENAC/THAN Davenport, IA Field Conditions: 85°F Sunny

WELL CONDITION

Well	Acceptable	Not Acceptable	Explain:
Flush Mount / Stickup	Acceptable	Not Acceptable	Explain:
Well Casing	Acceptable	Not Acceptable	Explain:
Locking Cap	Acceptable	Not Acceptable	Explain:

PURGE METHOD

Date: 6/15/16 Time: 0853 Method: Low-flow

Total Well Depth (DTB) (ft) = 34.10 Pump Type: Peristaltic

Depth to Water (DTW) (ft) = 10.85

Water Column (ft) = 23.25

Comments:

Volume Calculations:

(DTB - DTW x Vol./ft. = Gals./well volume)

Diameter	Vol./ft.
1"	0.04
1.25"	0.06
2"	0.16
4"	0.65

OBSERVATIONS

Odor: None, Low, High, H_2S, Fuel Like, Other:

Turbidity: None, Low, Medium, High, Heavy Silts

Comments:

FIELD PARAMETERS

Time (start 9:00)	Flow Rate (ml/min)	DTW (ft)	Temp. (C)	Sp. Cond (µs/cmC) (± 3%)	Conductivity (µs/cm)	pH (SU) (± 0.1)	DO (mg/L) (± 0.3 mg/L)	DO (%)	ORP (mV) (± 10 mV)	Turbidity (NTU) (± 10 % when > 10NTU)	Comments
911	68	11.77	19.60	913	818	6.75	1.15	12.6	511.5	15.8	Clear
916	110	11.92	19.28	900	801	6.70	0.90	9.8	349.9	13.1	"
921	110	12.18	18.88	897	791	6.68	0.72	7.7	374.5	11.2	"
926	100	12.29	18.23	890	775	6.63	0.64	6.8	393.8	8.8	"
931	100	12.41	18.45	887	776	6.62	0.58	6.1	408.6	9.4	"
936	100	12.49	18.38	886	774	6.61	0.58	6.2	416.7	7.0	"
941	100	12.54	18.50	883	773	6.60	0.57	6.1	427.0	4.7	"
946	105	12.58	18.68	884	777	6.60	0.58	6.2	431.7	6.5	"
951	100	12.55	18.93	881	779	6.60	0.59	6.4	437.5	5.3	"
956	100	12.56	19.25	882	786	6.59	0.60	6.5	440.7	4.1	"

SAMPLING

Date: 6/15/16 Time: 1000

Sample ID: ADDU-009 Method of Sample Collection: low flow

Analytical Parameters: VOCs, Cl, TOC, MNA

Q.C. Sample Type: MS/MSD Duplicate Duplicate Sample ID: Dup. Time:

Trash picked up? Y Well locked? Y

SIGNED/SAMPLER:

Monitoring Well

Field Data Sheet

Well Number: BW-02 Field Crew: J. Sutton & S. Maihofer Purpose of Sampling: 2016 ~~2015~~ Annual LTMP Groundwater Sampling

Site: PENAC/THAN Davenport, IA Field Conditions: hot sunny light breeze ~ 81°F

WELL CONDITION

Well	Acceptable	Not Acceptable	Explain:
Flushmount / Stickup	Acceptable	Not Acceptable	Explain:
Well Casing	Acceptable	Not Acceptable	Explain:
Locking Cap	Acceptable	Not Acceptable	Explain: lock hard to open (get new lock?)

PURGE METHOD

Date: 6/14/16 Time: 1042 Method: Low-flow

Total Well Depth (DTB) (ft) = 23.97 Pump Type: Peristaltic

Depth to Water (DTW) (ft) = 4.89

Water Column (ft) = 19.08

Comments:

Volume Calculations:

(DTB - DTW x Vol./ft. = Gals./well volume)

Diameter	Vol./ft.
1"	0.04
1.25"	0.06
2"	0.16
4"	0.65

OBSERVATIONS

Odor: None , Low , High , H_2S , Fuel Like , Other:

Turbidity: None , Low , Medium , High , Heavy Silts

Comments:

none

FIELD PARAMETERS

Time	Flow Rate (ml/min)	DTW (ft)	Temp. (C)	Sp. Cond (µs/cmC) (± 3%)	Conductivity (µs/cm)	pH (SU) (± 0.1)	DO (mg/L) (± 0.3 mg/L)	DO (%)	ORP (mV) (± 10 mV)	Turbidity (NTU) (± 10 % when > 10NTU)	Comments
1100 ~~1056~~	8.8	5.70	19.95	1863	1672	5.9	0.71	7.7	1.5	0.0	clear
1105	7.6	5.71	19.88	1856	1676	6.9	0.64	7.0	-2.3	0.0	clear
1110	7.6	5.80	21.17	1846	1709	6.95	0.45	5.1	3.5	0.0	clear
1115	7.6	5.89	21.56	1843	1722	6.95	0.43	4.9	6.4	0.0	clear
1120	7.6	5.95	21.63	1843	1724	6.94	0.38	4.4	2.6	0.0	clear
1125	7.6	5.91	21.31	1846	1716	6.93	0.34	3.8	-7.5	0.0	clear
1130	7.6	5.85	21.57	1837	1718	6.93	0.36	4.1	-12.0	0.0	clear
1135	7.6	5.64	22.08	1836	1761	6.95	0.33	3.9	-11.2	0.0	clear

sampled @ 11:38

SAMPLING

Date: 6/14/16 Time: 11:38

Sample ID: ADDV-010 Method of Sample Collection: grab / low flow

Analytical Parameters: VOC, Diss Gases, TOC, Sulfide, Alkalinity, Ferrous Fe, Anions

Q.C. Sample Type: none MS/MSD Duplicate Duplicate Sample ID: — Dup. Time: —

Trash picked up? ✓ Well locked? ✓

SIGNED/SAMPLER: Jaime Sutton

Monitoring Well

Field Data Sheet

Well Number: BW-03R Field Crew: K. Kokowski Purpose of Sampling: 2016 ~~2016~~ Annual LTMP Groundwater Sampling

Site: PENAC/THAN Davenport, IA Field Conditions: 90° Sunny / Humid

WELL CONDITION

Flush Mount / Stickup	Acceptable	Not Acceptable	Explain:
Well Casing	Acceptable	Not Acceptable	Explain: Rusty
Locking Cap	Acceptable	Not Acceptable	Explain:
	Acceptable	Not Acceptable	Explain: Lock rusty

PURGE METHOD

Date: 6/15/16 Time: 1048 Method: Low-flow

Total Well Depth (DTB) (ft) = 28.19 Pump Type: Peristaltic

Depth to Water (DTW) (ft) = 5.54

Water Column (ft) = 22.65

Comments:

Volume Calculations:

(DTB - DTW x Vol./ft. = Gals./well volume)

Diameter	Vol./ft.
1"	0.04
1.25"	0.06
2"	0.16
4"	0.65

OBSERVATIONS

Odor: None , Low , High , H_2S , Fuel Like , Other:

Turbidity: None , Low , Medium , High , Heavy Silts

Comments:

FIELD PARAMETERS

Time	Flow Rate (ml/min)	DTW (ft)	Temp. (C)	Sp. Cond (µs/cmC) (± 3%)	Conductivity (µs/cm)	pH (SU) (± 0.1)	DO (mg/L) (± 0.3 mg/L)	DO (%)	ORP (mV) (± 10 mV)	Turbidity (NTU) (± 10 % when > 10NTU)	Comments
1102	90	5.51	25.21	840	840	6.47	0.95	11.5	-62.5	11.6	pump start 1051, lg slug of black sediment at start
1107	90	5.57	22.41	793	753	6.29	0.68	7.9	-57.1	8.6	clear
1112	84	5.58	22.19	793	750	6.28	0.60	6.9	-50.4	6.7	"
1117	84	5.58	22.23	793	750	6.28	0.48	5.5	-38.1	5.7	"
1122	82	5.58	22.88	787	746	6.29	0.46	5.3	-26.3	1.8	"
1127	82	5.58	22.28	780	740	6.29	0.40	4.6	-18.6	1.0	"
1132	82	5.58	22.29	774	733	6.28	0.36	4.2	-16.0	1.3	"
1137	82	5.58	22.31	768	729	6.27	0.34	3.9	-10.5	1.1	"

SAMPLING

Date: 6/15/16 Time: 1145

Sample ID: ADDV-04 Method of Sample Collection: low flow

Analytical Parameters: VOC, Cl, TOC, Field Parameters

Q.C. Sample Type: MS/MSD Duplicate Duplicate Sample ID: Dup. Time:

Trash picked up? Y Well locked? Y

SIGNED/SAMPLER:

Monitoring Well

Field Data Sheet

Well Number: BW-04 Field Crew: J. Sutton + S. Maihofer Purpose of Sampling: 2016 ~~2015~~ Annual LTMP Groundwater Sampling

Site: PENAC/THAN Davenport, IA Field Conditions: hot, humid, sunny 94°F feels like 101°F

WELL CONDITION

Well [illegible]	Acceptable	Not Acceptable	Explain:
Flushmount / Stickup	Acceptable	Not Acceptable	Explain:
Well Casing	Acceptable	Not Acceptable	Explain:
Locking Cap	Acceptable	Not Acceptable	Explain:

PURGE METHOD

Date: 6/15/16 Time: 1540 Method: Low-flow

Total Well Depth (DTB) (ft) = 33.78 Pump Type: Peristaltic

Depth to Water (DTW) (ft) = 5.09

Water Column (ft) = 28.69

Comments:

Permagnate

Volume Calculations:

(DTB - DTW x Vol./ft. = Gals./well volume)

Diameter	Vol./ft.
1"	0.04
1.25"	0.06
2"	0.16
4"	0.65

OBSERVATIONS

Odor: None, Low, High, H_2S, Fuel Like, Other:

Turbidity: None, Low, Medium, High, Heavy Silts

Comments:

Permagnate (heavy)

FIELD PARAMETERS

Time	Flow Rate (ml/min)	DTW (ft)	Temp. (C)	Sp. Cond (µs/cmC) (± 3%)	Conductivity (µs/cm)	pH (SU) (± 0.1)	DO (mg/L) (± 0.3 mg/L)	DO (%)	ORP (mV) (± 10 mV)	Turbidity (NTU) (± 10 % when > 10NTU)	Comments
1555	100	5.64	23.27	16565	16006	8.45	11.18	139.1	549.2	333.6	rich viole permagnat
1600	100	5.66	23.13	16561	15981	8.37	9.93	123.1	551.4	280.4	
1605	100	5.75	23.66	16593	15833	8.24	9.37	114.4	553.0	293.0	
1610	100	5.92	21.95	16474	15517	8.08	9.39	113.6	559.9	325.7	
1615	88	5.84	20.92	16533	15211	7.76	10.02	118.6	568.5	288.6	
1620	88	5.99	20.74	16381	15041	7.69	9.57	112.5	572.8	216.8	
1625	88	6.00	20.17	16333	14830	7.51	10.74	125.7	574.2	189.1	
1630	88	6.00	20.26	16241	14770	7.50	10.35	119.7	581.4	183.3	
1635	88	6.03	20.36	16269	14819	7.50	9.60	113.1	580.2	98.7	
1640	88	6.06	20.48	16244	14839	7.51	9.39	110.3	578.8	102.3	
1645	88	6.08	20.52	16200	14812	7.52	10.06	122.2	579.8	104.3	

Sample @ 1650

JaSH

SAMPLING

Date: 6/15/16 Time: 1650

Sample ID: ADDV-012 Method of Sample Collection: lowflow / gw grab

Analytical Parameters: Chloride

Q.C. Sample Type: NA ~~MS/MSD~~ ~~Duplicate~~ Duplicate Sample ID: — Dup. Time: —

Trash picked up? Y

Well locked? Y

SIGNED/SAMPLER: JaSH

Monitoring Well

Field Data Sheet

Well Number: BW-05 Field Crew: CK Purpose of Sampling: 2016 ~~2015~~ Annual LTMP Groundwater Sampling

Site: PENAC/THAN Davenport, IA Field Conditions: 95°F, humid, Sunny

WELL CONDITION

Well	Acceptable	Not Acceptable	Explain:
Flush Mount / Stickup	Acceptable	Not Acceptable	Explain:
Well Casing	Acceptable	Not Acceptable	Explain:
Locking Cap	Acceptable	Not Acceptable	Explain:

PURGE METHOD

Date: 6/15/16 Time: 1415 Method: Low-flow

Total Well Depth (DTB) (ft) = 11.08 Pump Type: Peristaltic

Depth to Water (DTW) (ft) = 4.97

Water Column (ft) = 6.11

Comments:

Volume Calculations:

(DTB - DTW x Vol./ft. = Gals./well volume)

Diameter	Vol./ft.
1"	0.04
1.25"	0.06
2"	0.16
4"	0.65

OBSERVATIONS

Odor: None, Low, High, H_2S, Fuel Like, Other:

Turbidity: None, Low, Medium, High, Heavy Silts

Comments: on start black flakes in well → cleared up.

FIELD PARAMETERS

Time	Flow Rate (ml/min)	DTW (ft)	Temp. (C)	Sp. Cond (µs/cmC) (± 3%)	Conductivity (µs/cm)	pH (SU) (± 0.1)	DO (mg/L) (± 0.3 mg/L)	DO (%)	ORP (mV) (± 10 mV)	Turbidity (NTU) (± 10 % when > 10NTU)	Comments
1423	Start purging well										
1433	120	7.02	20.31	4046	3680	6.15	1.40	16.0	79.6	117.6	yellowish white
1440	80	7.55	20.33	4010	3654	5.66	1.64	18.4	170.1	63.2	
1445	80	8.05	20.77	4005	3681	5.69	1.40	15.8	213.6	65.5	
1450	80	8.65	20.10	4024	3645	5.63	1.23	13.7	252.2	98.5	
1455	80	9.19	19.59	3995	3581	5.57	1.10	12.2	286.7	89.6	
500	80	9.70	19.45	3982	3559	5.59	1.32	14.5	323.2	70.3	
1500	80	9.70	20.41	3955	3611	5.68	1.86	21.2	335.2	107.6	
1510	80	9.70	21.40	3961	3693	5.87	2.61	30.2	339.0	83.7	brown
1520	80	10.50	18.44	545.9	5236	5.93	2.89	30.4	556.7	1322.1	purplish / brown
1525	80	10.90	16.75	4998	4202	5.43	2.58	27.0	562.0	1318.7	clk purple /
1530	80	11.32	16.78	4769	4019	5.22	1.78	18.6	561.4	1321.7	brown
– drain flow through cell because water coming up is now light pink + cell is dark purple / brown											
1542	80	12.43	18.98	4611	4079	5.67	1.80	19.6	551.2	468.9	light pink
1547	80	12.73	18.98	4544	4021	5.44	1.26	13.7	569.2	500.8	med pink
1552	80	12.90	18.94	4542	4015	5.39	1.21	13.2	573.6	521.0	med pink
1557	80	13.15	18.59	4541	3984	5.31	1.10	11.9	577.9	532.1	med pink
	Sample well										

SAMPLING

Date: 6/15/16 Time: 1605

Sample ID: ADDV-013 Method of Sample Collection: low flow

Analytical Parameters: [redacted], CL, [redacted] (chloride only - permanganate)

Q.C. Sample Type: NA MS/MSD Duplicate Duplicate Sample ID: Dup. Time:

Trash picked up? Y Well locked? Y

SIGNED/SAMPLER: [signature]

Monitoring Well

Field Data Sheet

Well Number: BW-06 Field Crew: Mathofer / Sutton Purpose of Sampling: 2016 ~~2015~~ Annual LTMP Groundwater Sampling

Site: PENAC/THAN Davenport, IA Field Conditions: hot, humid, sunny ~ 76°F

WELL CONDITION

Well	Acceptable	Not Acceptable	Explain:
Flushmount / Stickup	Acceptable	Not Acceptable	Explain:
Well Casing	Acceptable	Not Acceptable	Explain:
Locking Cap	Acceptable	Not Acceptable	Explain:

PURGE METHOD

Date: 6/16/16 Time: 0951 Method: Low-flow

Total Well Depth (DTB) (ft) = 22.59 Pump Type: Peristaltic

Depth to Water (DTW) (ft) = 2.32

Water Column (ft) = 20.27

Comments:

Volume Calculations:

(DTB - DTW x Vol./ft. = Gals./well volume)

Diameter	Vol./ft.
1"	0.04
1.25"	0.06
2"	0.16
4"	0.65

OBSERVATIONS

Odor: None , Low , High , H_2S , Fuel Like , Other:

Turbidity: None , Low , Medium , High , Heavy Silts

Comments:

FIELD PARAMETERS

Time	Flow Rate (ml/min)	DTW (ft)	Temp. (C)	Sp. Cond (µs/cmC) (± 3%)	Conductivity (µs/cm)	pH (SU) (± 0.1)	DO (mg/L) (± 0.3 mg/L)	DO (%)	ORP (mV) (± 10 mV)	Turbidity (NTU) (± 10 % when > 10NTU)	Comments
1000	160	2.79	16.58	1490	1251	7.00	0.83	8.6	-199.9	0.0	clear
1005	160	3.09	16.19	1517	1262	7.04	0.43	4.4	-227.2	0.0	clear
1010	160	3.25	16.22	1517	1262	7.05	0.35	3.6	-242.9	0.0	clear
1015	160	3.40	16.20	1517	1262	7.07	0.32	3.2	-262.2	0.0	clear
1020	160	3.51	16.29	1515	1263	7.10	0.24	2.5	-269.4	0.0	clear
1025	160	3.59	16.42	1513	1265	7.08	0.27	2.7	-264.5	0.0	clear

Sample collected @ 1030, dup collected at 1035

SAMPLING

Date: 6/16/16 Time: 1030

Sample ID: ADDV-014 Method of Sample Collection: low flow / gw grab

Analytical Parameters: TOC, VOC, Chloride

Q.C. Sample Type: MS/MSD Duplicate Duplicate Sample ID: ADDV-015 Dup. Time: 1035

Trash picked up? Y

Well locked? Y

SIGNED/SAMPLER: daSH

Monitoring Well

Field Data Sheet

Well Number: MW 09 Field Crew: Mailhofer Purpose of Sampling: 2016 ~~2015~~ Annual LTMP Groundwater Sampling

Site: PENAC/THAN Davenport, IA Field Conditions: 85° sunny

WELL CONDITION

Well	Acceptable	Not Acceptable	Explain:
Flushmount / Stickup	Acceptable	Not Acceptable	Explain:
Well Casing	Acceptable	Not Acceptable	Explain:
Locking Cap	Acceptable	Not Acceptable	Explain: does not lock

PURGE METHOD

Date: 6/14/16 Time: ~~0910~~ 0924 Method: Low-flow

Total Well Depth (DTB) (ft) = 36.25 Pump Type: Peristaltic

Depth to Water (DTW) (ft) = 3.96

Water Column (ft) = 32.29

Comments:

Volume Calculations:

(DTB - DTW x Vol./ft. = Gals./well volume)

Diameter	Vol./ft.
1"	0.04
1.25"	0.06
2"	0.16
4"	0.65

OBSERVATIONS

Odor: None , Low , High , H_2S , Fuel Like , Other:

Turbidity: None , Low , Medium , High , Heavy Silts

Comments:

FIELD PARAMETERS

Time	Flow Rate (ml/min)	DTW (ft)	Temp. (C)	Sp. Cond (µs/cmC) (± 3%)	Conductivity (µs/cm)	pH (SU) (± 0.1)	DO (mg/L) (± 0.3 mg/L)	DO (%)	ORP (mV) (± 10 mV)	Turbidity (NTU) (± 10 % when > 10NTU)	Comments
				2221	1981						
0930	150	5.20	18.82	~~2230~~	~~1967~~	7.25	1.01	10.8	-118.1	0.0	clear
0935	100	5.13	19.91	2216	2001	7.25	0.59	6.5	-102.1	1.0	clear
0940	100	5.00	20.80	2209	2032	7.25	0.44	4.9	-100.6	3.7	clear
0945	100	4.98	21.47	2203	2055	7.25	0.28	3.2	-99.6	8.9	clear
0950	100	4.89	21.88	2204	2073	7.25	0.45	4.1	-101.3	3.0	clear
0955	100	4.89	22.87	2206	2099	7.25	0.32	3.7	-103.2	3.2	clear
1000	100	4.88	22.99	2207	2140	7.24	0.29	2.5	-105.4	4.9	clear
1005	sampled										

SM

SAMPLING

Date: 6/14/16 Time: 1005

Sample ID: ADDV-016 Method of Sample Collection: low flow

Analytical Parameters: VOC, TOC, MNA

Q.C. Sample Type: NA MS/MSD Duplicate Duplicate Sample ID: Dup. Time:

Trash picked up? Y Well locked? N

SIGNED/SAMPLER:

Monitoring Well

Field Data Sheet

Well Number: SW-11 Field Crew: Machofer & Sutton Purpose of Sampling: 2016 2015 Annual LTMP Groundwater Sampling

Site: PENAC/THAN Davenport, IA Field Conditions: 95°, sunny, humid

WELL CONDITION

Well	Acceptable	Not Acceptable	Explain:
Flushmount / Stickup	Acceptable	Not Acceptable	Explain:
Well Casing	Acceptable	Not Acceptable	Explain:
Locking Cap	Acceptable	Not Acceptable	Explain:

PURGE METHOD

Date: 6/14/16 Time: 1529 Method: Low-flow

Total Well Depth (DTB) (ft) = 27.75 Pump Type: Peristaltic

Depth to Water (DTW) (ft) = 6.29

Water Column (ft) = 21.46

Comments:

Volume Calculations:

(DTB - DTW x Vol./ft. = Gals./well volume)

Diameter	Vol./ft.
1"	0.04
1.25"	0.06
2"	0.16
4"	0.65

OBSERVATIONS

Odor: None , Low , High , H_2S , Fuel Like , Other:

Turbidity: None , Low , Medium , High , Heavy Silts

Comments:

FIELD PARAMETERS

Time	Flow Rate (ml/min)	DTW (ft)	Temp. (C)	Sp. Cond (µs/cmC) (± 3%)	Conductivity (µs/cm)	pH (SU) (± 0.1)	DO (mg/L) (± 0.3 mg/L)	DO (%)	ORP (mV) (± 10 mV)	Turbidity (NTU) (± 10 % when > 10NTU)	Comments
1556	150	6.40	18.83	1691	1488	6.64	0.77	8.2	28.7	75.7	sort of cloudy
1601	150	6.40	18.96	1664	1470	6.54	0.50	5.4	35.3	51.2	sort of cloudy
1606	150	6.40	19.00	1661	1471	6.51	0.41	4.4	42.7	39.1	clear
1611	150	6.40	19.09	1657	1470	6.50	032	3.4	48.8	64.9	clear
1616	150	6.40	19.18	1659	1475	6.51	0.39	4.1	51.8	21.3	clear
1621	150	6.40	19.88	1651	1490	6.56	0.30	3.3	50.1	30.8	clear
1626	150	6.40	20.13	1653	1500	6.57	0.29	3.2	53.1	14.0	clear
1631	150	6.40	20.34	1653	1506	6.56	0.48	5.3	57.1	9.9	clear

Sample time at 1635

SAMPLING

Date: 6/14/16 Time: 1635

Sample ID: ADDV-017 Method of Sample Collection: low flow

Analytical Parameters: VOC, TOC, MNA

Q.C. Sample Type: NA MS/MSD Duplicate Duplicate Sample ID: — Dup. Time: —

Trash picked up? Y Well locked? Y

SIGNED/SAMPLER:

Monitoring Well

Field Data Sheet

Well Number: BW-13 Field Crew: J. Sutton Purpose of Sampling: 2016 ~~2015~~ Annual LTMP Groundwater Sampling

Site: PENAC/THAN Davenport, IA S. Maihofer Field Conditions: humid 70%, sunny, hot 82°F

WELL CONDITION

Well	Acceptable	Not Acceptable	Explain:
Flushmount / Stickup	Acceptable	Not Acceptable	Explain:
Well Casing	Acceptable	Not Acceptable	Explain:
Locking Cap	Acceptable	Not Acceptable	Explain:

PURGE METHOD

Date: 6/15/16 Time: 1003 Method: Low-flow

Total Well Depth (DTB) (ft) = 35.06 Pump Type: Peristaltic

Depth to Water (DTW) (ft) = 13.52

Water Column (ft) = 21.54

Comments: wasp Killer spray used in large quantity

Volume Calculations:

(DTB - DTW x Vol./ft. = Gals./well volume)

Diameter	Vol./ft.
1"	0.04
1.25"	0.06
2"	0.16
4"	0.65

OBSERVATIONS

Odor: None, Low, High, H_2S, Fuel Like, Other:

Turbidity: None, Low, Medium, High, Heavy Silts

Comments:

FIELD PARAMETERS

Time	Flow Rate (ml/min)	DTW (ft)	Temp. (C)	Sp. Cond (µs/cmC) (± 3%)	Conductivity (µs/cm)	pH (SU) (± 0.1)	DO (mg/L) (± 0.3 mg/L)	DO (%)	ORP (mV) (± 10 mV)	Turbidity (NTU) (± 10 % when > 10NTU)	Comments
1040 ~~1015~~	100	19.63	22.29	1325	1256	6.78	0.14	1.7	-150.9	0.0	clear
1045	100	19.61	22.09	1330	1255	6.78	0.42	4.8	-151.3	0.0	clear
1050	100	19.59	20.89	1324	1219	6.78	0.39	3.8	-151.2	0.0	clear
1055	100	13.59	21.45	1322	1233	6.78	0.27	3.1	-142.1	0.0	clear
1100	100	13.59	22.35	1326	1269	6.78	0.22	2.5	-138.5	0.1	clear

sampled @ 1105

dS

SAMPLING

Date: 6/15/16 Time: 1105

Sample ID: ADDV-018 Method of Sample Collection: low flow / grab sample

Analytical Parameters: TOC, VOC, MNA

Q.C. Sample Type: NA MS/MSD Duplicate Duplicate Sample ID: — Dup. Time: —

Trash picked up? Y Well locked? Y

SIGNED/SAMPLER: JaS

held stranded by demon wasp from 1015-1040

Monitoring Well

Field Data Sheet

Well Number: BW-14 Field Crew: Manhoff Purpose of Sampling: 2016 2015 Annual LTMP Groundwater Sampling

Site: PENAC/THAN Davenport, IA Field Conditions: 90° breezy sunny

WELL CONDITION

Well [illegible]	Acceptable	Not Acceptable	Explain:
Flush[illegible] / Stickup	Acceptable	Not Acceptable	Explain:
Well Casing	Acceptable	Not Acceptable	Explain:
Locking Cap	Acceptable	Not Acceptable	Explain:

PURGE METHOD

Date: 6/15/16 Time: 1007 Method: Low-flow

Total Well Depth (DTB) (ft) = 40.09 Pump Type: Peristaltic

Depth to Water (DTW) (ft) = 13.45

Water Column (ft) = 26.64

Comments:

Volume Calculations:

(DTB - DTW x Vol./ft. = Gals./well volume)

Diameter	Vol./ft.
1"	0.04
1.25"	0.06
2"	0.16
4"	0.65

OBSERVATIONS

Odor: None, Low, High, H_2S, Fuel Like, Other:

Turbidity: None, Low, Medium, High, Heavy Silts

Comments:

FIELD PARAMETERS

Time	Flow Rate (ml/min)	DTW (ft)	Temp. (C)	Sp. Cond (µs/cmC) (± 3%)	Conductivity (µs/cm)	pH (SU) (± 0.1)	DO (mg/L) (± 0.3 mg/L)	DO (%)	ORP (mV) (± 10 mV)	Turbidity (NTU) (± 10 % when > 10NTU)	Comments
1015	150	14.25	21.41	1889	1757	6.48	1.07	12.1	-103.6	0.0	clear
1020	100	14.98	21.07	1859	1720	6.45	0.62	7.0	-112.6	0.0	clear
1025	100	15.00	21.88	1852	1743	6.47	0.39	4.5	-119.2	0.0	clear
1030	100	15.01	22.31	1853	1759	6.46	0.38	4.5	-126.4	0.0	clear
1035	100	15.01	22.89	1854	1780	6.45	0.37	4.4	-126.9	0.6	clear
	1040	sampled									

SAMPLING

Date: 6/15/16 Time: 1045

Sample ID: ADDV-019 Method of Sample Collection: low flow

Analytical Parameters: VOC, Cl, TOC, ~~MNA~~, Field parameters

Q.C. Sample Type: MS/MSD Duplicate Duplicate Sample ID: ADDV-020 Dup. Time: 1050

Trash picked up? Y Well locked? Y

SIGNED/SAMPLER:

Monitoring Well

Field Data Sheet

Well Number: BN-15 Field Crew: Manhofer Purpose of Sampling: 2016 ~~2015~~ Annual LTMP Groundwater Sampling

Site: PENAC/THAN Davenport, IA Field Conditions: 90° sunny

WELL CONDITION

Well	Acceptable	Not Acceptable	Explain:
Flushmount / Stickup	Acceptable	Not Acceptable	Explain:
Well Casing	Acceptable	Not Acceptable	Explain:
Locking Cap	Acceptable	Not Acceptable	Explain:

PURGE METHOD

Date: 6/15/16 Time: 0835 Method: Low-flow

Total Well Depth (DTB) (ft) = 31.19 Pump Type: Peristaltic

Depth to Water (DTW) (ft) = 12.95

Water Column (ft) = 18.24

Comments:

Volume Calculations:

(DTB - DTW x Vol./ft. = Gals./well volume)

Diameter	Vol./ft.
1"	0.04
1.25"	0.06
2"	0.16
4"	0.65

OBSERVATIONS

Odor: None , Low , High , H_2S , Fuel Like , Other:

Turbidity: None Low , Medium , High , Heavy Silts

Comments:

FIELD PARAMETERS

Time	Flow Rate (ml/min)	DTW (ft)	Temp. (C)	Sp. Cond (µs/cmC) (± 3%)	Conductivity (µs/cm)	pH (SU) (± 0.1)	DO (mg/L) (± 0.3 mg/L)	DO (%)	ORP (mV) (± 10 mV)	Turbidity (NTU) (± 10 % when > 10NTU)	Comments
				1336							
0840	100	13.60	19.70	~~767~~	1190	6.82	1.87	20.5	52.2	2.3	clear
0845	100	13.69	19.15	1320	1173	6.84	0.95	10.3	-12.5	16.1	clear
0850	100	13.73	19.36	1325	1183	6.85	0.73	7.9	-23.4	3.5	clear
0855	100	13.74	19.75	1329	1196	6.84	0.58	6.3	-28.4	~~20.0~~ 0.4	clear
0900	100	13.74	19.96	1330	1202	6.83	0.53	6.1	-29.0	2.4	clear
	0905		sampled								

SAMPLING

Date: ~~9/~~ 6/15/16 Time: 0930

Sample ID: APDV-021 Method of Sample Collection: low flow

Analytical Parameters: VOC, TOC, MNA

Q.C. Sample Type: MS/MSD Duplicate Duplicate Sample ID: Dup. Time:

Trash picked up? Y Well locked? Y

SIGNED/SAMPLER:

Monitoring Well

Field Data Sheet

Well Number: BW-16 Field Crew: J. Sutton & S. Maihofer Purpose of Sampling: 2016 ~~2015~~ Annual LTMP Groundwater Sampling

Site: PENAC/THAN Davenport, IA Field Conditions: hot, humid, sunny 91°F

WELL CONDITION

Well [illegible]	Acceptable	Not Acceptable	Explain:
Flush[illegible] / Stickup	Acceptable	Not Acceptable	Explain:
Well Casing	Acceptable	Not Acceptable	Explain:
Locking Cap	Acceptable	Not Acceptable	Explain:

PURGE METHOD

Date: 6/15/16 Time: 14:20 Method: Low-flow

Total Well Depth (DTB) (ft) = 33.65 Pump Type: Peristaltic

Depth to Water (DTW) (ft) = 5.12

Water Column (ft) = 28.53

Comments: black flecks at begining of purge → partially degraded permaginate

Volume Calculations:

(DTB - DTW x Vol./ft. = Gals./well volume)

Diameter	Vol./ft.
1"	0.04
1.25"	0.06
2"	0.16
4"	0.65

OBSERVATIONS

Odor: None, Low, High, H_2S, Fuel Like, Other:

Turbidity: None, Low, Medium, High, Heavy Silts

Comments:

FIELD PARAMETERS

Time	Flow Rate (ml/min)	DTW (ft)	Temp. (C)	Sp. Cond (µs/cmC) (± 3%)	Conductivity (µs/cm)	pH (SU) (± 0.1)	DO (mg/L) (± 0.3 mg/L)	DO (%)	ORP (mV) (± 10 mV)	Turbidity (NTU) (± 10 % when > 10NTU)	Comments
1440	100	5.30	23.76	4555	4442	7.27	0.96	43.2	90.6	10.3	clear
1445	100	5.30	23.57	4362	4244	7.22	0.68	8.1	113.2	7.0	clear
1450	100	5.31	23.57	4072	3955	7.14	0.60	7.1	136.2	3.9	clear
1455	100	5.31	23.58	3908	3795	7.13	0.58	6.9	145.2	3.0	clear
1500	100	5.31	23.59	3822	3717	7.10	0.74	8.7	152.1	3.5	clear
1505	100	5.31	23.88	3767	3687	7.08	0.48	5.7	160.5	1.4	clear

Sampled @ 1505

JaSH

SAMPLING

Date: 6/15/16 Time: 1505

Sample ID: ADDV-022 Method of Sample Collection: grab sample/low flow

Analytical Parameters: TOC, chloride, VOCs

Q.C. Sample Type: NA ~~MS/MSD~~ ~~Duplicate~~ Duplicate Sample ID: —— Dup. Time: ——

Trash picked up? Y

SIGNED/SAMPLER: JaSH Well locked? Y

Monitoring Well

Field Data Sheet

Well Number: BW-18 Field Crew: J.Sutton/S.Mainhofer Purpose of Sampling: 2016 ~~2015~~ Annual LTMP Groundwater Sampling

Site: PENAC/THAN Davenport, IA Field Conditions: ~74°F, sunny, warm.

WELL CONDITION

Well	Acceptable	Not Acceptable	Explain:
Flush/Mount / Stickup	Acceptable	Not Acceptable	Explain:
Well Casing	Acceptable	Not Acceptable	Explain:
Locking Cap	Acceptable	Not Acceptable	Explain:

PURGE METHOD

Date: 6/16/16 Time: 0828 Method: Low-flow

Total Well Depth (DTB) (ft) = 41.75 Pump Type: Peristaltic

Depth to Water (DTW) (ft) = 4.75

Water Column (ft) = 37

Comments:

Volume Calculations:

(DTB - DTW x Vol./ft. = Gals./well volume)

Diameter	Vol./ft.
1"	0.04
1.25"	0.06
2"	0.16
4"	0.65

OBSERVATIONS

Odor: None, Low, High, H_2S, Fuel Like, Other:

Turbidity: None, Low, Medium, High, Heavy Silts

Comments:

FIELD PARAMETERS

Time	Flow Rate (ml/min)	DTW (ft)	Temp. (C)	Sp. Cond (µs/cmC) (± 3%)	Conductivity (µs/cm)	pH (SU) (± 0.1)	DO (mg/L) (± 0.3 mg/L)	DO (%)	ORP (mV) (± 10 mV)	Turbidity (NTU) (± 10 % when > 10NTU)	Comments
0835	150	5.35	14.29	957	759	6.44	9.19	89.9	292.7	0.0	clear
0840	150	5.45	13.77	929	730	6.61	1.53	14.8	264.3	0.0	clear
0845	150	5.51	13.99	924	730	6.63	1.33	13.0	265.0	0.0	clear
0850	150	5.57	14.22	923	733	6.67	1.11	10.9	255.4	0.0	clear
0855	150	5.60	14.40	922	735	6.68	0.69	6.8	233.1	0.0	clear
0900	150	5.65	14.48	921	736	6.66	0.64	6.3	236.1	0.0	clear
0905	150	5.70	14.52	921	737	6.68	0.66	6.5	226.7	0.0	clear

sampled @ 0910

SAMPLING

Date: 6/16/16 Time: 0910

Sample ID: ADDV-023 Method of Sample Collection: low flow / gw grab

Analytical Parameters: VOC, TOC, MNA

Q.C. Sample Type: NA MS/MSD ~~Duplicate~~ Duplicate Sample ID: —— Dup. Time: ——

Trash picked up? Y Well locked? Y

SIGNED/SAMPLER: JSSH

Monitoring Well

Field Data Sheet

Well Number: BW-19 Field Crew: J. Sutton & S. Mainhafer Purpose of Sampling: 2016 ~~2015~~ Annual LTMP Groundwater Sampling

Site: PENAC/THAN Davenport, IA Field Conditions: overcast, hot, humid, rain for 15 min

WELL CONDITION

Well	Acceptable	Not Acceptable	Explain:
Flushmount / Stickup	Acceptable	Not Acceptable	Explain:
Well Casing	Acceptable	Not Acceptable	Explain:
Locking Cap	Acceptable	Not Acceptable	Explain:

PURGE METHOD

Date: 6/14/16 Time: 13:50 Method: Low-flow

Total Well Depth (DTB) (ft) = 39.58 Pump Type: Peristaltic

Depth to Water (DTW) (ft) = 9.24

Water Column (ft) = 30.34

Comments:

Volume Calculations:

(DTB - DTW x Vol./ft. = Gals./well volume)

Diameter	Vol./ft.
1"	0.04
1.25"	0.06
2"	0.16
4"	0.65

OBSERVATIONS

Odor: None , Low , High , H_2S , Fuel Like , Other:

Turbidity: None , Low , Medium , High , Heavy Silts

Comments:

no water levels taken at 1410 and 1415 due to rain

FIELD PARAMETERS

Time	Flow Rate (ml/min)	DTW (ft)	Temp. (C)	Sp. Cond (µs/cmC) (± 3%)	Conductivity (µs/cm)	pH (SU) (± 0.1)	DO (mg/L) (± 0.3 mg/L)	DO (%)	ORP (mV) (± 10 mV)	Turbidity (NTU) (± 10 % when > 10NTU)	Comments
1405	100	9.95	19.63	1363	1223	7.20	0.36	14.6	-149.9	4.5	clear
1410	100	—	20.21	1352	1226	7.22	0.76	8.4	-150.9	5.1	clear
1415	100	—	16.93	1368	1149	7.24	0.66	6.7	-154.8	0.8	clear
1420	100	10.64	16.16	1336	1111	7.26	0.26	3.0	-152.5	0.0	clear
1425	110	10.90	16.51	1336	1170	7.28	0.25	2.6	-147.9	0.0	clear
1430	110	10.93	16.62	1335	1122	7.28	0.25	2.6	-155.9	0.0	clear
		sample @ 1435									

JS

SAMPLING

Date: 6/14/16 Time: 1435

Sample ID: ADDV-024 Method of Sample Collection: grab/low flow

Analytical Parameters: VOC, TOC, ~~Sulfur~~ MNA

Q.C. Sample Type: None MS/MSD Duplicate Duplicate Sample ID: — Dup. Time: —

Trash picked up? ✓ Well locked? Y

SIGNED/SAMPLER: JoSt : J. Sutton

Monitoring Well

Field Data Sheet

Well Number: BW-021 Field Crew: Machofer Purpose of Sampling: 2016 ~~2015~~ Annual LTMP Groundwater Sampling

Site: PENAC/THAN Davenport, IA Field Conditions: 90°, cloudy, storm approaching

WELL CONDITION

Well	Acceptable	Not Acceptable	Explain:
Flushmount / Stickup	Acceptable	Not Acceptable	Explain:
Well Casing	Acceptable	Not Acceptable	Explain:
Locking Cap	Acceptable	Not Acceptable	Explain:

PURGE METHOD

Date: 6/14/16 Time: 1353 Method: Low-flow

Total Well Depth (DTB) (ft) = 154.64 Pump Type: Peristaltic

Depth to Water (DTW) (ft) = 7.94

Water Column (ft) = 146.7

Comments:

Volume Calculations:

(DTB - DTW x Vol./ft. = Gals./well volume)

Diameter	Vol./ft.
1"	0.04
1.25"	0.06
2"	0.16
4"	0.65

OBSERVATIONS

Odor: None , Low , High , H_2S , Fuel Like , Other:

Turbidity: None , Low , Medium , High , Heavy Silts

Comments:

FIELD PARAMETERS

Time	Flow Rate (ml/min)	DTW (ft)	Temp. (C)	Sp. Cond (µs/cmC) (± 3%)	Conductivity (µs/cm)	pH (SU) (± 0.1)	DO (mg/L) (± 0.3 mg/L)	DO (%)	ORP (mV) (± 10 mV)	Turbidity (NTU) (± 10 % when > 10NTU)	Comments
				1300	1109						
1400	160	7.99	16.94	~~1330~~	~~9~~	6.89	1.44	14.8	10.5	208	silty
1405	160	7.99	17.12	1422	1208	6.96	0.97	16.0	-44.9	113.2	silty
1410	160	7.99	17.14	1430	1215	6.95	0.73	7.4	-47.1	47.4	silty
1415	160	7.99	16.51	1445	1210	6.97	0.80	8.2	-50.6	36.5	clearing up
1220	160	7.99	16.73	1442	1215	6.99	0.56	5.8	-47.7	32.3	clear
1225	160	7.99	16.92	1437	1215	7.00	0.55	5.7	-46.5	37.0	clear
1230	160	7.99	16.91	1437	1215	7.00	0.55	5.7	-44.3	12.8	clear
1235	160	7.99	16.76	1435	1209	7.00	0.41	4.2	-43.0	11.7	clear
1240		7.99	16.95	1433	1213	7.01	0.39	4.0	-42.8	11.8	clear
1245	sampled										

Sm

SAMPLING

Date: 6/14/16 Time: 1245

Sample ID: ADDV-025 Method of Sample Collection: low flow

Analytical Parameters: VOC, TOC, MNA

Q.C. Sample Type: NA MS/MSD Duplicate Duplicate Sample ID: Dup. Time:

Trash picked up? Y Well locked? Y

SIGNED/SAMPLER:

BW-23-50

Monitoring Well

Field Data Sheet

Well Number: [redacted] Field Crew: CR / KK Purpose of Sampling: 2016 Annual LTMP Groundwater Sampling

Site: PENAC/THAN Davenport, IA Field Conditions: 85°F Sunny humid

WELL CONDITION

Wel[redacted]	Acceptable	Not Acceptable	Explain:
Flush[redacted] / Stickup	Acceptable	Not Acceptable	Explain:
Well Casing	Acceptable	Not Acceptable	Explain:
Locking Cap	Acceptable	Not Acceptable	Explain:

PURGE METHOD

Date: 6/14/16 Time: NA Method: Low-flow / X Flute

Total Well Depth (DTB) (ft) = NA Pump Type: Peristaltic

Depth to Water (DTW) (ft) = NA

Water Column (ft) = NA

Comments:

Volume Calculations:

(DTB - DTW x Vol./ft. = Gals./well volume)

Diameter	Vol./ft.
1"	0.04
1.25"	0.06
2"	0.16
4"	0.65

OBSERVATIONS

Odor: None , Low , High , H_2S , Fuel Like , Other:

Turbidity: None , Low , Medium , High , Heavy Silts

Comments:

FIELD PARAMETERS

Time	Flow Rate (ml/min)	DTW (ft)	Temp. (C)	Sp. Cond (µs/cmC) (± 3%)	Conductivity (µs/cm)	pH (SU) (± 0.1)	DO (mg/L) (± 0.3 mg/L)	DO (%)	ORP (mV) (± 10 mV)	Turbidity (NTU) (± 10 % when > 10NTU)	Comments
No Field Parameters Flute Well											

SAMPLING

Date: 6/14/16 Time: 1133

Sample ID: ADW-026 Method of Sample Collection: Flute

Analytical Parameters: VOCs, CL, ~~TDS~~ TOC

Q.C. Sample Type: NA MS/MSD Duplicate Duplicate Sample ID: Dup. Time:

Trash picked up? Y Well locked? Y

SIGNED/SAMPLER:

Monitoring Well

Field Data Sheet

Well Number: BW-23-1251 Field Crew: CR/KH Purpose of Sampling: 2016 Annual LTMP Groundwater Sampling

Site: PENAC/THAN Davenport, IA Field Conditions: 85°F Sny humid

WELL CONDITION

Well	Acceptable	Not Acceptable	Explain:
Flush / Stickup	Acceptable	Not Acceptable	Explain:
Well Casing	Acceptable	Not Acceptable	Explain:
Locking Cap	Acceptable	Not Acceptable	Explain:

PURGE METHOD

Date: 6/14/16 Time: NA Method: ~~Low-flow~~ X

Total Well Depth (DTB) (ft) = NA Pump Type: ~~Peristaltic~~ Flute

Depth to Water (DTW) (ft) = NA

Water Column (ft) = NA

Comments:

Volume Calculations:

(DTB - DTW x Vol./ft. = Gals./well volume)

Diameter	Vol./ft.
1"	0.04
1.25"	0.06
2"	0.16
4"	0.65

OBSERVATIONS

Odor: None , Low , High , H_2S , Fuel Like , Other:

Turbidity: None , Low , Medium , High , Heavy Silts

Comments:

FIELD PARAMETERS

Time	Flow Rate (ml/min)	DTW (ft)	Temp. (C)	Sp. Cond (µs/cmC) (± 3%)	Conductivity (µs/cm)	pH (SU) (± 0.1)	DO (mg/L) (± 0.3 mg/L)	DO (%)	ORP (mV) (± 10 mV)	Turbidity (NTU) (± 10 % when > 10NTU)	Comments
No Field Parameters Flute Well											

SAMPLING

Date: 6/14/16 Time: 1137

Sample ID: ADOV-027 Method of Sample Collection: Flute

Analytical Parameters: CL, TOC, VOCS

Q.C. Sample Type: MS/MSD Duplicate Duplicate Sample ID: Dup. Time:

Trash picked up? Y Well locked? Y

SIGNED/SAMPLER:

Monitoring Well

Field Data Sheet

Well Number: BW-28-39D' Field Crew: KK / CR Purpose of Sampling: 2015 Annual LTMP Groundwater Sampling

Site: PENAC/THAN Davenport, IA Field Conditions: 65°F humid Sunny

WELL CONDITION

Well [illegible]	Acceptable	Not Acceptable	Explain:
Flush [illegible] / Stickup	Acceptable	Not Acceptable	Explain:
Well Casing	Acceptable	Not Acceptable	Explain:
Locking Cap	Acceptable	Not Acceptable	Explain:

PURGE METHOD

Date: 6/14/16 Time: NA Method: Low-flow ✓

Pump Type: Peristaltic ✓ Flute

Total Well Depth (DTB) (ft) = NA

Depth to Water (DTW) (ft) = NA

Water Column (ft) =

Comments:

Volume Calculations:

(DTB - DTW x Vol./ft. = Gals./well volume)

Diameter	Vol./ft.
1"	0.04
1.25"	0.06
2"	0.16
4"	0.65

OBSERVATIONS

Odor: None , Low , High , H_2S , Fuel Like , Other:

Turbidity: None , Low , Medium , High , Heavy Silts

Comments:

FIELD PARAMETERS

Time	Flow Rate (ml/min)	DTW (ft)	Temp. (C)	Sp. Cond (µs/cmC) (± 3%)	Conductivity (µs/cm)	pH (SU) (± 0.1)	DO (mg/L) (± 0.3 mg/L)	DO (%)	ORP (mV) (± 10 mV)	Turbidity (NTU) (± 10 % when > 10NTU)	Comments
No Field Parameters Flute well											

SAMPLING

Date: 6/14/16 Time: 1142

Sample ID: ADDV-028 Method of Sample Collection: Flute

Analytical Parameters: VOCs, CL, TOC

Q.C. Sample Type: MS/MSD Duplicate Duplicate Sample ID: Dup. Time:

Trash picked up? Y Well locked? Y

SIGNED/SAMPLER: [signature]

Monitoring Well

Field Data Sheet

Well Number: MW-21-39 Field Crew: CR / KK Purpose of Sampling: 2016 Annual LTMP Groundwater Sampling

Site: PENAC/THAN Davenport, IA Field Conditions: 85°F, Mostly Cloudy humid

WELL CONDITION

Well	Acceptable	Not Acceptable	Explain:
Flushmount / Stickup	Acceptable	Not Acceptable	Explain:
Well Casing	Acceptable	Not Acceptable	Explain:
Locking Cap	Acceptable	Not Acceptable	Explain:

PURGE METHOD

Date: 6/14/16 Time: NA Method: Low flow Pump Type: Peristaltic Flute

Total Well Depth (DTB) (ft) = NA

Depth to Water (DTW) (ft) = NA

Water Column (ft) = NA

Comments:

Volume Calculations:

(DTB - DTW x Vol./ft. = Gals./well volume)

Diameter	Vol./ft.
1"	0.04
1.25"	0.06
2"	0.16
4"	0.65

OBSERVATIONS

Odor: None , Low , High , H_2S , Fuel Like , Other:

Turbidity: None , Low , Medium , High , Heavy Silts

Comments:

FIELD PARAMETERS

Time	Flow Rate (ml/min)	DTW (ft)	Temp. (C)	Sp. Cond (µs/cmC) (± 3%)	Conductivity (µs/cm)	pH (SU) (± 0.1)	DO (mg/L) (± 0.3 mg/L)	DO (%)	ORP (mV) (± 10 mV)	Turbidity (NTU) (± 10 % when > 10NTU)	Comments
No Field Parameters flute well											

SAMPLING

Date: 6/14/16 Time: 1310 ~~Low flow~~ Flute

Sample ID: ADPW-029 Method of Sample Collection: ADPW-030

Analytical Parameters: CL, VOC, TOC, MNA

Q.C. Sample Type: MS/MSD Duplicate Duplicate Sample ID: 1515 Dup. Time:

Trash picked up? Y Well locked? Y

SIGNED/SAMPLER:

Monitoring Well

Field Data Sheet

Well Number: BW-25 Field Crew: J.Sutton & S.Mainhofer Purpose of Sampling: 2016 ~~2015~~ Annual LTMP Groundwater Sampling

Site: PENAC/THAN Davenport, IA Field Conditions: Sunny, 77°F, humid 77%

WELL CONDITION

Well	Acceptable	Not Acceptable	Explain:
Flushmount / Stickup	Acceptable	Not Acceptable	Explain:
Well Casing	Acceptable	Not Acceptable	Explain:
Locking Cap	Acceptable	Not Acceptable	Explain:

PURGE METHOD

Date: 6/15/16 Time: 0833 Method: Low-flow

Total Well Depth (DTB) (ft) = 40.42 Pump Type: Peristaltic

Depth to Water (DTW) (ft) = 15.06

Water Column (ft) = 25.36

Comments: black specks/flecks at begining of purge

Volume Calculations:

(DTB - DTW x Vol./ft. = Gals./well volume)

Diameter	Vol./ft.
1"	0.04
1.25"	0.06
2"	0.16
4"	0.65

OBSERVATIONS

Odor: None, Low, High, H_2S, Fuel Like, Other:

Turbidity: None, Low, Medium, High, Heavy Silts

Comments:

FIELD PARAMETERS

Time	Flow Rate (ml/min)	DTW (ft)	Temp. (C)	Sp. Cond (µs/cmC) (± 3%)	Conductivity (µs/cm)	pH (SU) (± 0.1)	DO (mg/L) (± 0.3 mg/L)	DO (%)	ORP (mV) (± 10 mV)	Turbidity (NTU) (± 10 % when > 10NTU)	Comments
0845	88	15.20	16.80	2400	2026	6.36	9.4	94	-85.8	0.0	black flecks in clear H_2O
0850	100	15.23	17.13	2386	2027	6.38	0.54	6.8	-86.8	0.0	clear
0855	100	15.25	16.94	2390	2023	6.39	0.41	4.3	-98.1	0.0	clear
0900	100	15.29	16.85	2382	2012	6.40	0.42	4.3	-105.2	0.0	clear
0905	100	15.29	17.20	2367	2026	6.41	0.29	3.0	-94.0	0.0	clear
0910	100	15.30	17.52	2367	2028	6.40	0.28	2.9	-89.6	0.0	clear
0915	100	15.30	16.40	2361	1972	6.40	0.23	2.4	-104.0	0.0	clear
0920	100	15.33	16.66	2353	1978	6.40	0.23	2.4	-104.1	0.0	clear
0925	100	15.35	16.73	2346	1975	6.40	0.20	2.0	-107.2	0.0	clear

sample @ 0927

SAMPLING

Date: 6/15/16 Time: 0927

Sample ID: ADDV-031 Method of Sample Collection: low flow / grab sample

Analytical Parameters: MNA, TOC, VOC

Q.C. Sample Type: N/A MS/MSD Duplicate Duplicate Sample ID: — Dup. Time: —

Trash picked up? Y Well locked? Y

SIGNED/SAMPLER: [illegible]

Monitoring Well

Field Data Sheet

Well Number: BW-26-65' Field Crew: CR/KK Purpose of Sampling: 2016 Annual LTMP Groundwater Sampling

Site: PENAC/THAN Davenport, IA Field Conditions: 80°F Sunny humid

WELL CONDITION

Well	Acceptable	Not Acceptable	Explain:
Flush Mount / Stickup	Acceptable	Not Acceptable	Explain:
Well Casing	Acceptable	Not Acceptable	Explain:
Locking Cap	Acceptable	Not Acceptable	Explain:

PURGE METHOD

Date: 6/14/16 Time: 805 Method: Low Flow X Pump Type: Peristaltic Flute

Total Well Depth (DTB) (ft) = NA

Depth to Water (DTW) (ft) = NA

Water Column (ft) = NA

Comments:

Volume Calculations:

(DTB - DTW x Vol./ft. = Gals./well volume)

Diameter	Vol./ft.
1"	0.04
1.25"	0.06
2"	0.16
4"	0.65

OBSERVATIONS

Odor: None , Low , High , H_2S , Fuel Like , Other:

Turbidity: None Low , Medium , High , Heavy Silts

Comments:

FIELD PARAMETERS

Time	Flow Rate (ml/min)	DTW (ft)	Temp. (C)	Sp. Cond (µs/cmC) (± 3%)	Conductivity (µs/cm)	pH (SU) (± 0.1)	DO (mg/L) (± 0.3 mg/L)	DO (%)	ORP (mV) (± 10 mV)	Turbidity (NTU) (± 10 % when > 10NTU)	Comments
No Field Parameters Flute Well											

SAMPLING

Date: 6/14/16 Time: 920

Sample ID: AADV-032 Method of Sample Collection: Flute well

Analytical Parameters: VOCs, TOC, CL MNA

Q.C. Sample Type: MS/MSD Duplicate Duplicate Sample ID: Dup. Time:

Trash picked up? Y Well locked? Y

SIGNED/SAMPLER:

Monitoring Well

Field Data Sheet

Well Number: BW-26-85' Field Crew: CR/KK Purpose of Sampling: 2016 Annual LTMP Groundwater Sampling

Site: PENAC/THAN Davenport, IA Field Conditions: 80°F Sunny humid

WELL CONDITION

Well [illegible]	Acceptable	Not Acceptable	Explain:
Flush [illegible] / Stickup	Acceptable	Not Acceptable	Explain:
Well Casing	Acceptable	Not Acceptable	Explain:
Locking Cap	Acceptable	Not Acceptable	Explain:

PURGE METHOD

Date: 6/14/16 Time: 825 Method: Low-flow

Total Well Depth (DTB) (ft) = NA Pump Type: ~~Peristaltic~~ Flute

Depth to Water (DTW) (ft) = NA

Water Column (ft) = NA

Comments:

Volume Calculations:

(DTB - DTW x Vol./ft. = Gals./well volume)

Diameter	Vol./ft.
1"	0.04
1.25"	0.06
2"	0.16
4"	0.65

OBSERVATIONS

Odor: None , Low , High , H_2S , Fuel Like , Other:

Turbidity: None , Low , Medium , High , Heavy Silts

Comments:

FIELD PARAMETERS

Time	Flow Rate (ml/min)	DTW (ft)	Temp. (C)	Sp. Cond (µs/cmC) (± 3%)	Conductivity (µs/cm)	pH (SU) (± 0.1)	DO (mg/L) (± 0.3 mg/L)	DO (%)	ORP (mV) (± 10 mV)	Turbidity (NTU) (± 10 % when > 10NTU)	Comments
No Field Parameters Flute											

SAMPLING

Date: 6/14/16 Time: 940

Sample ID: AADY-033 Method of Sample Collection: Flute well

Analytical Parameters: ~~BTEX~~ VOCs, TOCs, CL, MNA

Q.C. Sample Type: MS/MSD Duplicate Duplicate Sample ID: Dup. Time:

Trash picked up? Y Well locked? Y

SIGNED/SAMPLER: [illegible]

Monitoring Well

Field Data Sheet

Well Number: BW-26-395' Field Crew: CR/kk Purpose of Sampling: 2016 Annual LTMP Groundwater Sampling

Site: PENAC/THAN Davenport, IA Field Conditions: 80°F Smy humid

WELL CONDITION

Well [illegible]	Acceptable	Not Acceptable	Explain:
Flush [illegible] / Stickup	Acceptable	Not Acceptable	Explain:
Well Casing	Acceptable	Not Acceptable	Explain:
Locking Cap	Acceptable	Not Acceptable	Explain:

PURGE METHOD

Date: 6/14/16 Time: 0830 Method: ~~Low-flow~~

Total Well Depth (DTB) (ft) = NA Pump Type: ~~Peristaltic~~

Depth to Water (DTW) (ft) = NA

Water Column (ft) = NA

Comments: Flute

Volume Calculations:

(DTB - DTW x Vol./ft. = Gals./well volume)

Diameter	Vol./ft.
1"	0.04
1.25"	0.06
2"	0.16
4"	0.65

OBSERVATIONS

Odor: None , Low , High , H_2S , Fuel Like , Other:

Turbidity: None , Low , Medium , High , Heavy Silts

Comments:

FIELD PARAMETERS

Time	Flow Rate (ml/min)	DTW (ft)	Temp. (C)	Sp. Cond (µs/cmC) (± 3%)	Conductivity (µs/cm)	pH (SU) (± 0.1)	DO (mg/L) (± 0.3 mg/L)	DO (%)	ORP (mV) (± 10 mV)	Turbidity (NTU) (± 10 % when > 10NTU)	Comments
No Field Parameters Flute well											

SAMPLING

Date: 6/14/16 Time: 0950

Sample ID: AADW-034 Method of Sample Collection: Flute

Analytical Parameters: VOCs, CL, TOC, MNA

Q.C. Sample Type: NA MS/MSD Duplicate Duplicate Sample ID: Dup. Time:

Trash picked up? Y Well locked? Y

SIGNED/SAMPLER:

Monitoring Well

Field Data Sheet

Well Number: BW-27 Field Crew: J. Sutton / S. Maihofer Purpose of Sampling: 2d ~~2015 Annual LTMP Groundwater Sampling~~

Site: PENAC/THAN Davenport, IA Field Conditions: hot, sunny, light breeze ~ 79° F

WELL CONDITION

Well	Acceptable	Not Acceptable	Explain:
Flush mount / Stickup	Acceptable	Not Acceptable	Explain:
Well Casing	Acceptable	Not Acceptable	Explain:
Locking Cap	Acceptable	Not Acceptable	Explain:

PURGE METHOD

Date: 6/16/16 Time: 1100 Method: Low-flow

Total Well Depth (DTB) (ft) = 40.48 Pump Type: Peristaltic

Depth to Water (DTW) (ft) = 4.43

Water Column (ft) = 36.05

Comments:

Volume Calculations:

(DTB - DTW x Vol./ft. = Gals./well volume)

Diameter	Vol./ft.
1"	0.04
1.25"	0.06
2"	0.16
4"	0.65

OBSERVATIONS

Odor: None, Low, High, H_2S, Fuel Like, Other:

Turbidity: None, Low, Medium, High, Heavy Silts

Comments:

black partialy degraded permagnate flecks @ begining of purge

FIELD PARAMETERS

Time	Flow Rate (ml/min)	DTW (ft)	Temp. (C)	Sp. Cond (µs/cmC) (± 3%)	Conductivity (µs/cm)	pH (SU) (± 0.1)	DO (mg/L) (± 0.3 mg/L)	DO (%)	ORP (mV) (± 10 mV)	Turbidity (NTU) (± 10 % when > 10NTU)	Comments
1105	100	4.81	19.46	1786	1586	6.52	1.34	14.7	175.8	0.0	clear
1110	80	4.91	19.17	1791	1592	6.45	0.95	10.4	96.8	0.0	clear
1115	80	4.96	19.84	1789	1612	6.48	0.67	7.3	79.1	0.0	clear
1120	80	5.10	19.75	1794	1613	6.49	0.49	5.4	63.3	0.0	clear
1125	80	5.20	18.80	1786	1574	6.48	0.40	4.4	37.8	0.0	clear
1130	80	5.29	18.86	1779	1571	6.49	0.37	4.0	-47.6	0.0	clear
1135	80	5.39	19.77	1777	1600	6.51	0.36	3.9	-110.5	0.0	clear
1140	80	5.55	18.52	1790	1566	6.51	0.27	2.8	-126.4	0.0	clear
1145	80	5.63	17.48	1782	1526	6.50	0.23	2.4	-130.1	0.0	clear
1150	80	5.71	17.60	1773	1523	6.51	0.21	2.2	-135.1	0.0	clear

sample @ 1155

SAMPLING

Date: 6/16/16 Time: 11:55

Sample ID: ADDV-035 Method of Sample Collection: low flow / gw grab

Analytical Parameters:

Q.C. Sample Type: NA ~~MS/MSD~~ Duplicate Duplicate Sample ID: ____ Dup. Time: ____

Trash picked up? Y

SIGNED/SAMPLER: [signature] Well locked? Y

Monitoring Well

Field Data Sheet

Well Number: BW-28 Field Crew: Mathofer Purpose of Sampling: 2016 ~~2015~~ Annual LTMP Groundwater Sampling

Site: PENAC/THAN Davenport, IA Field Conditions: 85° sunny, N wind

WELL CONDITION

Well	Acceptable	Not Acceptable	Explain:
Flush mount / Stickup	Acceptable	Not Acceptable	Explain:
Well Casing	Acceptable	Not Acceptable	Explain:
Locking Cap	Acceptable	Not Acceptable	Explain: no bolts

PURGE METHOD

Date: 6/16/16 Time: 1055 Method: Low-flow

Total Well Depth (DTB) (ft) = 40.40 Pump Type: Peristaltic

Depth to Water (DTW) (ft) 3.09

Water Column (ft) = 37.31

Comments:

Volume Calculations:

(DTB - DTW x Vol./ft. = Gals./well volume)

Diameter	Vol./ft.
1"	0.04
1.25"	0.06
2"	0.16
4"	0.65

OBSERVATIONS

Odor: None , Low , High , H_2S , Fuel Like , Other:

Turbidity: None , Low , Medium , High , Heavy Silts

Comments: observed dark purple permanganate initially

FIELD PARAMETERS

Time	Flow Rate (ml/min)	DTW (ft)	Temp. (C)	Sp. Cond (µs/cmC) (± 3%)	Conductivity (µs/cm)	pH (SU) (± 0.1)	DO (mg/L) (± 0.3 mg/L)	DO (%)	ORP (mV) (± 10 mV)	Turbidity (NTU) (± 10 % when > 10NTU)	Comments
1100	120	3.51	17.11	2018	1712	6.48	0.99	10.3	83.3	>500	dark purple/brown
1105	120	3.50	17.13	2018	1716	6.45	0.70	7.2	100.6	>1000	"
1110	120	3.52	17.59	2008	1724	6.45	0.54	5.6	111.2	450	"
1115	120	3.63	17.55	2004	1718	6.45	0.54	5.7	116.1	>1000	"
~~1120~~	~~120~~	emptied flow-through cell-water from well is clearer									"
~~1125~~	~~120~~										
1120	120	3.60	16.91	2054	1733	6.28	9.33	96.7	253.2	86.1	clear w/ little brown
1125	120	3.63	16.60	2043	1714	6.27	4.09	41.5	245.2	71.0	chunks "
1130	120	3.66	16.30	2030	1694	6.31	2.31	23.4	215.6	45.5	"
1135	120	3.69	16.32	2030	2029	6.33	1.54	15.8	208.3	36.7	clear
1140	120	3.70	16.37	2029	1695	6.37	1.08	14.2	200.8	24.8	clear
1145	120	3.71	16.36	2029	1694	6.36	1.07	11.1	199.8	24.4	clear
1150	120	3.71	16.34	2028	1694	6.37	1.21	12.2	198.3	23.9	clear
	sampled										

SAMPLING

Date: 6/16/16 Time: 1200

Sample ID: ADW-036 Method of Sample Collection: low flow

Analytical Parameters: chl. TOC ~~&~~ VOC

Q.C. Sample Type: NA MS/MSD Duplicate Duplicate Sample ID: — Dup. Time:

Trash picked up? yes Well locked? closed

SIGNED/SAMPLER:

Monitoring Well

Field Data Sheet

Well Number: BW-31 Field Crew: Keith Krukowski Purpose of Sampling: 2016 Annual LTMP Groundwater Sampling

Site: PENAC/THAN Davenport, IA Field Conditions: 73° SUNNY

WELL CONDITION

We[illegible]	Acceptable	Not Acceptable	Explain:
Flush[illegible]t / Stickup	Acceptable	Not Acceptable	Explain:
Well Casing	Acceptable	Not Acceptable	Explain:
Locking Cap	Acceptable	Not Acceptable	Explain:

PURGE METHOD

Date: 6/16/16 Time: 0914 Method: Low-flow

Total Well Depth (DTB) (ft) = 36.39 Pump Type: Peristaltic

Depth to Water (DTW) (ft) = 4.55

Water Column (ft) = 31.84

Comments:

Volume Calculations:

(DTB - DTW x Vol./ft. = Gals./well volume)

Diameter	Vol./ft.
1"	0.04
1.25"	0.06
2"	0.16
4"	0.65

OBSERVATIONS

Odor: None, Low, High, H_2S, Fuel Like, Other:

Turbidity: None, Low, Medium, High, Heavy Silts

Comments:

FIELD PARAMETERS

Time	Flow Rate (ml/min)	DTW (ft)	Temp. (C)	Sp. Cond (µs/cmC) (± 3%)	Conductivity (µs/cm)	pH (SU) (± 0.1)	DO (mg/L) (± 0.3 mg/L)	DO (%)	ORP (mV) (± 10 mV)	Turbidity (NTU) (± 10 % when > 10NTU)	Comments
0927	~~140~~ 164	4.84	17.58	287	246	7.03	3.89	40.7	189.9	11.1	clear
0932	100	4.79	16.87	263	222	6.75	2.75	28.4	252.5	3.4	"
0937	100	4.77	17.47	265	227	6.61	2.46	25.8	296.0	2.5	"
0942	100	4.76	17.87	267	231	6.62	1.99	21.0	319.5	0.6	"
0947	80	4.76	18.15	284	247	6.58	1.72	18.2	338.2	0.7	"
0952	140	4.84	18.08	306	265	6.50	1.31	13.8	359.8	1.1	"
0957	140	4.85	16.73	347	293	6.34	1.06	11.0	383.6	1.9	"
1002	140	4.86	16.62	351	295	6.23	0.95	9.7	402.3	0.3	"
1007	140	4.87	16.53	363	304	6.17	0.85	8.7	414.9	0	"
1012	140	4.89	16.52	375	318	6.15	0.72	7.4	425.4	0	"
1017	140	4.90	16.49	397	329	6.12	0.67	6.9	433.0	0	"
1022	140	4.90	16.42	403	337	6.09	0.59	6.0	440.7	0	"
1027	140	4.91	16.43	413	346	6.06	0.58	5.9	447.5	0	"
1032	140	4.91	16.36	427	352	6.03	0.51	5.3	453.6	0	"
1037	140	4.92	16.32	431	361	6.02	0.50	5.1	458.1	0	"
1042	140	4.93	16.29	436	366	6.00	0.46	4.7	462.7	0	"
1047	140	4.94	16.38	449	375	6.00	0.44	4.5	466.0	0	"
1052	140	4.95	16.34	459	383	6.00	0.40	4.1	468.4	0	"
1057	140	4.96	16.21	474	395	6.01	0.41	4.2	470.5	0	"

SAMPLING

Date: 6/16/16 Time: 1105

Sample ID: ADOV-037 Method of Sample Collection: low flow

Analytical Parameters: VOC, Cl, TOC, Field Parameters

Q.C. Sample Type: MS/MSD Duplicate Duplicate Sample ID: Dup. Time:

Trash picked up? Y Well locked? Y

SIGNED/SAMPLER: K. Krukowski

Monitoring Well

Field Data Sheet

Well Number: BW-~~34~~ 33 Field Crew: [illegible] Purpose of Sampling: 2016 ~~2015~~ Annual LTMP Groundwater Sampling

Site: PENAC/THAN Davenport, IA Field Conditions: 70°F breezy, sunny

WELL CONDITION

[illegible]	Acceptable	Not Acceptable	Explain:
Flush [illegible]nt / Stickup	Acceptable	Not Acceptable	Explain:
Well Casing	Acceptable	Not Acceptable	Explain:
Locking Cap	Acceptable	Not Acceptable	Explain:

PURGE METHOD

Date: 6/16/16 Time: 757 Method: Low-flow

Total Well Depth (DTB) (ft) = 33.83 Pump Type: Peristaltic

Depth to Water (DTW) (ft) = 5.09

Water Column (ft) = 28.74

Comments:

Volume Calculations:

(DTB - DTW x Vol./ft. = Gals./well volume)

Diameter	Vol./ft.
1"	0.04
1.25"	0.06
2"	0.16
4"	0.65

OBSERVATIONS

Odor: None , Low , High , H_2S , Fuel Like , Other:

Turbidity: None , Low , Medium , High , Heavy Silts

Comments: V. dark brown / black on start after purging 5 minutes cleared to a rust orange color

FIELD PARAMETERS

Time	Flow Rate (ml/min)	DTW (ft)	Temp. (C)	Sp. Cond (µs/cmC) (± 3%)	Conductivity (µs/cm)	pH (SU) (± 0.1)	DO (mg/L) (± 0.3 mg/L)	DO (%)	ORP (mV) (± 10 mV)	Turbidity (NTU) (± 10 % when > 10NTU)	Comments
803	Start	purging	well								
819	136	5.15	16.23	2895	2410	5.96	4.31	44.6	331.2	38.3	clear with orange flakes
824	136	5.16	15.67	2885	2370	6.02	1.31	13.2	65.2	155.4	"
829	160	5.19	15.46	2905	2376	5.98	0.96	9.7	-16.1	116.0	light orange
834	160	5.19	15.09	2904	2383	6.00	0.48	4.8	-28.8	68.1	"
839	160	5.19	15.04	2929	2380	6.03	0.45	4.5	-41.1	42.8	tinted yellow
844	160	5.20	14.87	2946	2374	6.04	0.43	4.3	-43.1	40.4	"
849	160	5.20	14.83	2944	2373	6.04	0.41	4.1	-45.6	39.6	
—	sample	well									

sample reacts with HCL + H2S preservative

SAMPLING

Date: 6/16/16 Time: 905

Sample ID: A00V-038 Method of Sample Collection: low flow

Analytical Parameters: VOCs, CL, TOC

Q.C. Sample Type: yes MS/MSD Duplicate Duplicate Sample ID: Dup. Time:

Trash picked up? Y Well locked? Y

SIGNED/SAMPLER: [illegible]

Monitoring Well

Field Data Sheet

Well Number: BW-34 Field Crew: K. Krukowski Purpose of Sampling: 2016 Annual LTMP Groundwater Sampling

Site: PENAC/THAN Davenport, IA Field Conditions: ~71° Sunny

WELL CONDITION

[illegible]	Acceptable	Not Acceptable	Explain:
[illegible]nt / Stickup	Acceptable	Not Acceptable	Explain:
Well Casing	Acceptable	Not Acceptable	Explain:
Locking Cap	Acceptable	Not Acceptable	Explain: No screws to flush mount

PURGE METHOD

Date: 6/16/16 Time: 810 Method: Low-flow

Total Well Depth (DTB) (ft) = 37.24 Pump Type: Peristaltic

Depth to Water (DTW) (ft) = 3.88

Water Column (ft) = 33.36

Comments:

Volume Calculations:

(DTB - DTW x Vol./ft. = Gals./well volume)

Diameter	Vol./ft.
1"	0.04
1.25"	0.06
2"	0.16
4"	0.65

OBSERVATIONS

Odor: None , Low , High , H_2S , Fuel Like , Other:

Turbidity: None , Low , Medium , High , Heavy Silts

Comments:

FIELD PARAMETERS

Time	Flow Rate (ml/min)	DTW (ft)	Temp. (C)	Sp. Cond (µs/cmC) (± 3%)	Conductivity (µs/cm)	pH (SU) (± 0.1)	DO (mg/L) (± 0.3 mg/L)	DO (%)	ORP (mV) (± 10 mV)	Turbidity (NTU) (± 10 % when > 10NTU)	Comments
0819	124	4.18	15.82	1145	959	6.61	1.18	11.9	-12.8	1.6	clear
0824	100	4.24	15.40	1151	940	6.59	0.80	8.0	-55.9	2.4	"
0829	100	4.29	15.53	1150	942	6.55	0.69	7.0	-56.7	0.7	"
0834	100	4.32	15.65	1147	942	6.59	0.59	6.0	-56.2	1.3	"
0839	100	4.34	15.80	1149	947	6.60	0.55	5.6	-49.8	0.7	"
0844	100	4.38	15.81	1147	946	6.59	0.52	5.2	-53.1	0.7	"

SAMPLING

Date: 6/16/16 Time: 0850

Sample ID: ADDV-039 Method of Sample Collection: low flow

Analytical Parameters: VOC, Cl, TOC, Field parameters

Q.C. Sample Type: MS/MSD Duplicate Duplicate Sample ID: Dup. Time:

Trash picked up? Y Well locked? Y

SIGNED/SAMPLER: K. Krukowski

Monitoring Well

Field Data Sheet

Well Number: BW-35 Field Crew: J. Sutton & S. Mainhofer Purpose of Sampling: 2016 ~~2015~~ Annual LTMP Groundwater Sampling

Site: PENAC/THAN Davenport, IA Field Conditions: hot, sunny, humid 83°F 65% humidity

WELL CONDITION

Well	Acceptable	Not Acceptable	Explain:
Flushmount / Stickup	Acceptable	Not Acceptable	Explain:
Well Casing	Acceptable	Not Acceptable	Explain:
Locking Cap	Acceptable	Not Acceptable	Explain:

PURGE METHOD

Date: 6/15/16 Time: 1155 Method: Low-flow

Total Well Depth (DTB) (ft) = 34.84 Pump Type: Peristaltic

Depth to Water (DTW) (ft) = 4.0

Water Column (ft) = 30.84

Comments:

Volume Calculations:

(DTB - DTW x Vol./ft. = Gals./well volume)

Diameter	Vol./ft.
1"	0.04
1.25"	0.06
2"	0.16
4"	0.65

OBSERVATIONS

Odor: None , Low , High , H_2S , Fuel Like , Other:

Turbidity: None , Low , Medium , High , Heavy Silts

Comments:

FIELD PARAMETERS

Time	Flow Rate (ml/min)	DTW (ft)	Temp. (C)	Sp. Cond (µs/cmC) (± 3%)	Conductivity (µs/cm)	pH (SU) (± 0.1)	DO (mg/L) (± 0.3 mg/L)	DO (%)	ORP (mV) (± 10 mV)	Turbidity (NTU) (± 10 % when > 10NTU)	Comments
1200	100	4.50	20.81	675	620	6.90	0.21	2.3	-125.5	0.0	Clear
1205	~~100~~ 80	4.42	20.97	668	617	6.88	0.52	5.8	-128.5	0.0	clear
1210	~~100~~ 80	4.34	21.65	667	624	6.88	0.45	5.2	-129.9	0.0	clear
1215	~~100~~ 80	4.34	22.40	668	635	6.89	0.39	4.5	-121.7	0.0	clear
1220	80	4.34	22.65	669	639	6.89	0.44	5.2	-122.7	0.0	clear

sampled @ 1225

JS

SAMPLING

Date: 6/15/16 Time: 1225

Sample ID: ADDV-040 Method of Sample Collection: low flow/grab sample

Analytical Parameters: VOC, chloride, TOC

Q.C. Sample Type: NA ~~MS/MSD~~ ~~Duplicate~~ Duplicate Sample ID: ——— Dup. Time: ———

Trash picked up? Y Well locked? Y

SIGNED/SAMPLER: JASH

Monitoring Well

Field Data Sheet

Well Number: BW-37 Field Crew: Keith Krukowski Purpose of Sampling: 2016 Annual LTMP Groundwater Sampling

Site: PENAC/THAN Davenport, IA Field Conditions: 90° Sunny / Humid

WELL CONDITION

W[illegible]	Acceptable	Not Acceptable	Explain:
Flush[illegible]nt / Stickup	Acceptable	Not Acceptable	Explain:
Well Casing	Acceptable	Not Acceptable	Explain:
Locking Cap	Acceptable	Not Acceptable	Explain:

PURGE METHOD

Date: 6/15/16 Time: 1204 Method: Low-flow

Total Well Depth (DTB) (ft) = 34.71 Pump Type: Peristaltic

Depth to Water (DTW) (ft) = 5.84

Water Column (ft) = 28.87

Comments:

Volume Calculations:

(DTB - DTW x Vol./ft. = Gals./well volume)

Diameter	Vol./ft.
1"	0.04
1.25"	0.06
2"	0.16
4"	0.65

OBSERVATIONS

Odor: None, Low, High, H_2S, Fuel Like, Other:

Turbidity: None, Low, Medium, High, Heavy Silts

Comments:

FIELD PARAMETERS

Time	Flow Rate (ml/min)	DTW (ft)	Temp. (C)	Sp. Cond (µs/cmC) (± 3%)	Conductivity (µs/cm)	pH (SU) (± 0.1)	DO (mg/L) (± 0.3 mg/L)	DO (%)	ORP (mV) (± 10 mV)	Turbidity (NTU) (± 10 % when > 10NTU)	Comments
1215	124	7.04	24.81	~~1024~~ 1896	1844	6.19	0.67	7.8	-201.1	8	clear
1220	68	7.54	20.30	1841	1677	5.90	0.31	3.5	-232.6	2.3	"
1225	68	7.80	21.11	1869	1732	6.05	0.27	3.0	-560.2	1.4	"
1230	70	7.98	22.05	1865	1761	6.07	0.22	2.6	-328.0	0.1	"
1235	70	8.21	22.94	1863	1790	6.10	0.21	2.4	-278.4	0.9	"
1240	70	8.38	23.62	1868	1818	6.14	0.20	2.4	-257.6	0.4	"
1245	50	8.56	24.11	1848	1817	6.16	0.19	2.3	-253.1	1.0	"
1250	50	8.69	24.45	1873	1851	6.16	0.19	2.3	-255.3	1.2	"

SAMPLING

Date: 6/15/16 Time: 1255

Sample ID: ADAV-041 Method of Sample Collection: low flow

Analytical Parameters: VOC, Cl, TOC, Field Parameters

Q.C. Sample Type: MS/MSD Duplicate Duplicate Sample ID: ADAV-042 Dup. Time: 1310

Trash picked up? Y Well locked? Y

SIGNED/SAMPLER:

Monitoring Well

Field Data Sheet

Well Number: PZ01 Field Crew: Purpose of Sampling: 2016 2015 Annual LTMP Groundwater Sampling

Site: PENAC/THAN Davenport, IA Field Conditions: 75°F Sunny

WELL CONDITION

Well	Acceptable	Not Acceptable	Explain:
Flush Mount / Stickup	Acceptable	Not Acceptable	Explain:
Well Casing	Acceptable	Not Acceptable	Explain:
Locking Cap	Acceptable	Not Acceptable	Explain:

PURGE METHOD

Date: 6/16/16 Time: 920 Method: Low-flow

Total Well Depth (DTB) (ft) = 53.42 Pump Type: Peristaltic

Depth to Water (DTW) (ft) = ~~7.24~~ 7.93

Water Column (ft) = 45.49

Comments:

Volume Calculations:

(DTB - DTW x Vol./ft. = Gals./well volume)

Diameter	Vol./ft.
1"	0.04
1.25"	0.06
2"	0.16
4"	0.65

OBSERVATIONS

Odor: None, Low, High, H_2S, Fuel Like, Other:

Turbidity: None, Low, Medium, High, Heavy Silts

Comments: small black flecks

FIELD PARAMETERS

Time	Flow Rate (ml/min)	DTW (ft)	Temp. (C)	Sp. Cond (µs/cmC) (± 3%)	Conductivity (µs/cm)	pH (SU) (± 0.1)	DO (mg/L) (± 0.3 mg/L)	DO (%)	ORP (mV) (± 10 mV)	Turbidity (NTU) (± 10 % when > 10NTU)	Comments
921	Start pumping well very slow purge rate well drains down										
@939	purge water turned lightish pink										
943	160	10.85	19.76	1896	1705	6.63	0.40	4.4	-23.2	81.6	pink w/ black
952	160	10.91	19.00	1941	1719	6.39	0.67	7.3	517.5	211.7	" flecks
957	160	11.25	19.07	~~1905~~ 2030	1978	6.31	1.66	18.0	588.3	192.1	"
1002	160	11.31	19.03	2412	2141	6.31	1.98	21.5	609.4	175.9	"
1007	160	11.41	18.59	2546	2234	6.25	2.31	24.9	617.9	127.3	dk. pink to purple
1012	160	11.53	18.57	2734	2398	6.27	3.58	38.8	625.9	141.8	purple
1017	160	11.58	18.60	2681	2529	6.27	3.64	39.2	621.5	95.0	purple
1022	160	11.61	18.55	2985	2618	6.29	3.84	41.3	635.1	65.6	purple
1027	160	11.68	18.79	3116	2745	6.29	4.95	53.7	639.0	95.9	"
1032	160	11.66	18.73	3196	2815	6.29	4.84	52.5	640.6	71.4	"
1037	160	11.66	18.86	3292	2909	6.27	4.92	53.4	645.7	53.6	"
1042	160	11.70	18.89	3366	2973	6.26	5.67	61.6	646.0	95.1	"
1047	160	11.70	19.05	3412	3008	6.08	5.48	59.8	646.7	66.0	
1052	160	11.70	19.09	3493	3099	6.51	5.59	61.1	650.7	65.3	
~~1057~~	~~160~~	Sample well									

SAMPLING

Date: 6/16/16 Time: 1100

Sample ID: ADN-043 Method of Sample Collection: low flow

Analytical Parameters: CL only - Pinnacle

Q.C. Sample Type: No MS/MSD Duplicate Duplicate Sample ID: Dup. Time:

Trash picked up? Y Well locked? Y

SIGNED/SAMPLER:

Institutional Controls Visual Inspection Form

Institutional controls have been implemented to limit the site to industrial use only, and an environmental covenant on the property is used to prevent groundwater use and exposure.

Harcros Chemicals Site
2040 West River Drive
Davenport, Iowa 5280

Date of Inspection: 6/17/16

Coordinate site access with the site contact listed below:

Harcros Facility Manager (or their designee)
2040 West River Drive
Davenport, Iowa 52802
Office Phone: 563-322-3511

1) Describe current land use and current cover conditions (vegetation, pavement, etc):
mostly gravel at the surface with some areas of concrete active facility

2) Any changes in land use (agricultural, recreational, etc.)? Yes__ No X

   i) If yes, describe change.

3) Note any land disturbances

   a) Any building demolition? Yes__ No X

      i) If yes, identify building.

   b) Any building construction? Yes__ No X

      i) If yes, identify building type (residential, commercial, industrial).

   c) Any excavation performed? Yes__ No X

      i) If yes, was the respondent's project coordinator notified? Yes__ No __

      ii) If yes, measure the dimensions, depict the approximate location on site map.

   d) Any sign of waste materials exposed through excavation? Yes__ No X

      i) If yes, describe exposed waste dimensions and type of material.

   e) Was waste generated by the facility operations? Yes__ No X

i) If yes, describe how waste was handled and if waste was removed from the site. Document disposal facility, if appropriate.

f) Any sign of grading activity or elevation change Yes X No __

i) If yes, identify type of activity (cut or fill).
Some gravel Fill brought in in front of site to fill in divots. gravel fill brought in by PZ01 nest.

ii) Estimate depth of cut or height of fill.
~2-3" gravel brought in

g) Any sign of drilling activity Yes__ No X

i) If yes, identify type of activity (soil boring, well, or other).

ii) If well, identify type (water supply well, monitoring well).

iii) If new wells are identified, submit a request for information regarding the well to the site owner and/or operator.

4) Activity discovered that appears inconsistent with the IC objective or use restrictions, or other action that may interfere with the effectiveness of the ICs? Yes__ No X

i) If yes, identify activity or activities below and notify the Respondents Project Coordinator identified in the Administrative Order on Consent.

5) Pertinent records related to the site reviewed? Yes X No __

i) If yes, identify the records that were reviewed.
site plans reviewed.

CH2M

Signature Affiliation

note ~30' of fence replaced on eastern side of facility by loading dock. Soil does not appear to be distrebed.

APPENDIX A

Photographic Log

Photo 001: Looking northeast on the site towards Area 5 injection wells IW14 and IW13.

Photo 002: Near monitoring well MW-04 looking southeast at the site.

Photo 003: Near the former drum storage area looking northwest on the site.

Photo 004: To the east of the main warehouse looking southeast toward Building B. Repaired section of fence shown in photo.

Photo 005: To the southeast of Building B looking northwest towards the main warehouse. Replaced section of concrete shown in photo.

Photo 006: To the southwest of Building A looking northeast at the site.

Photo 007: Sign posted at the entrance gate to the site in accordance with the Institutional Controls Plan (ICP).

Photo 008: Near MW-37 looking south towards West River Drive. Replaced section of concrete shown in photo.

Please print or type. (Form designed for use on elite (12-pitch) typewriter.) 7Q 1603760751 SC PPW 11/2/2016 Form Approved. OMB No. 2050-0039

UNIFORM HAZARDOUS WASTE MANIFEST	1. Generator ID Number	2. Page 1 of	3. Emergency Response Phone	4. Manifest Tracking Number
	IAD022100671	1	(800) 483-3718	009516761 FLE

5. Generator's Name and Mailing Address
TH Agriculture & Nutrition LLC
15313 West 95th street
Lenexa, KS 66219
Att: Anna Kunkel
Generator's Phone: 913-538-2549

Generator's Site Address (if different than mailing address)
2040 West River Drive
Davenport, IA 52802

6. Transporter 1 Company Name: Clean Harbors Environmental Service, Inc.
U.S. EPA ID Number: MAD039322250

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

8. Designated Facility Name and Site Address
Clean Harbors Environmental Service, Inc.
2900 Rockefeller Avenue
Cleveland, OH 44115
Facility's Phone: (216) 429-2402
U.S. EPA ID Number: OHD000724153

9a. HM	9b. U.S. DOT Description (including Proper Shipping Name, Hazard Class, ID Number, and Packing Group (if any))	10. Containers No.	10. Containers Type	11. Total Quantity	12. Unit Wt./Vol.	13. Waste Codes
	1. NON HAZARDOUS, NON D.O.T. REGULATED, (MONITORING WELL WATER)	001	DM	00400	P	
	2.					
	3.					
	4.					

14. Special Handling Instructions and Additional Information
1.CH1322429 1455

15. GENERATOR'S/OFFEROR'S CERTIFICATION: I hereby declare that the contents of this consignment are fully and accurately described above by the proper shipping name, and are classified, packaged, marked and labeled/placarded, and are in all respects in proper condition for transport according to applicable international and national governmental regulations. If export shipment and I am the Primary Exporter, I certify that the contents of this consignment conform to the terms of the attached EPA Acknowledgment of Consent.
I certify that the waste minimization statement identified in 40 CFR 262.27(a) (if I am a large quantity generator) or (b) (if I am a small quantity generator) is true.

Generator's/Offeror's Printed/Typed Name: [illegible] Signature: [illegible] Month 11 Day 22 Year 16

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

17. Transporter Acknowledgment of Receipt of Materials
Transporter 1 Printed/Typed Name: Steve Mulligan Signature: [illegible] Month 11 Day 22 Year 16
Transporter 2 Printed/Typed Name: Signature: Month Day Year

18. Discrepancy
18a. Discrepancy Indication Space ☐ Quantity ☐ Type ☐ Residue ☐ Partial Rejection ☐ Full Rejection
Manifest Reference Number:

18b. Alternate Facility (or Generator) U.S. EPA ID Number
Facility's Phone:

18c. Signature of Alternate Facility (or Generator) Month Day Year

19. Hazardous Waste Report Management Method Codes (i.e., codes for hazardous waste treatment, disposal, and recycling systems)

1.	2.	3.	4.
H070			

20. Designated Facility Owner or Operator: Certification of receipt of hazardous materials covered by the manifest except as noted in Item 18a
Printed/Typed Name: Signature: Month Day Year

GENERATOR / INT'L / TRANSPORTER / DESIGNATED FACILITY

EPA Form 8700-22 (Rev. 3-05). Previous editions are obsolete. Clean Harbors has the appropriate permits for and will accept the waste the generator is shipping. GENERATOR'S INITIAL COPY

CleanHarbors
ENVIRONMENTAL SERVICES®

Land Disposal Restriction Notification Form

Printed Date :Jun 16, 2016

MANIFEST INFORMATION

Generator : TH Agriculture & Nutrition LLC

Address: ~~2040 West River Drive~~ 15313 West 95th St.
~~Davenport,IA 52802~~ Lenexa KS, 66219

EPA ID #: IAD022100671

Manifest Tracking Info.
009514919FLE

Sales Order No: 1601909286

LINE ITEM INFORMATION

Line Item:	Page No:	Profile No:	Treatability Group:	LDR Disposal Category
1.	1	CH606545	WASTEWATER	2 (This is subject to LDR.)

EPA Waste Code	EPA Waste SubCategory
D029D039D040D043	NONE

Certification	Applies to Manifest Line Items
Pursuant to 40 CFR 268.7(a), I hereby notify that this shipment contains waste restricted under 40 CFR Part 268.	1.

Waste analysis data, where available, is attached.

Signature : [signature]

Print Name Crystal Reuss/CH2M Hill as agent for and on behalf of T.H. agriculture + Nutrition LLC

Title : geologist

Date : 6/17/2015

7Q1601909286 SC PPW 2/24/2015

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

Form Approved. OMB No. 2050-0039

UNIFORM HAZARDOUS WASTE MANIFEST

1. Generator ID Number: IAD022100671
2. Page 1 of 1
3. Emergency Response Phone: (800) 453-3718
4. Manifest Tracking Number: 009514919 FLE

5. Generator's Name and Mailing Address
Th Agriculture & Nutrition LLC
15315 West 95th street
Lenexa, KS 66219

Generator's Site Address (if different than mailing address)
2040 West River Drive
Davenport,IA 52802

Generator's Phone:

6. Transporter 1 Company Name: Clean Harbors Environmental Service, Inc.
U.S. EPA ID Number: MAD039322250

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

8. Designated Facility Name and Site Address
Clean Harbors El Dorado LLC
309 American Circle
El Dorado, AR 71730
(870) 863-7173
U.S. EPA ID Number: ARD069748192

Facility's Phone:

9a. HM	9b. U.S. DOT Description (including Proper Shipping Name, Hazard Class, ID Number, and Packing Group (if any))	10. Containers No.	10. Containers Type	11. Total Quantity	12. Unit Wt./Vol.	13. Waste Codes		
X	1. UN3082, HAZARDOUS WASTE, LIQUID, N.O.S., (TRICHLOROETHENE, TETRACHLOROETHENE), 9, PG III	001	DM	0400	P	D020 D043	D039	D040
	2.							
	3.							
	4.							

14. Special Handling Instructions and Additional Information
1.CH606545 ERG#171 1X55

15. **GENERATOR'S/OFFEROR'S CERTIFICATION:** I hereby declare that the contents of this consignment are fully and accurately described above by the proper shipping name, and are classified, packaged, marked and labeled/placarded, and are in all respects in proper condition for transport according to applicable international and national governmental regulations. If export shipment and I am the Primary Exporter, I certify that the contents of this consignment conform to the terms of the attached EPA Acknowledgment of Consent.
I certify that the waste minimization statement identified in 40 CFR 262.27(a) (if I am a large quantity generator) or (b) (if I am a small quantity generator) is true.

Generator's/Offeror's Printed/Typed Name: [illegible] LLC
Signature:
Month 6 Day 17 Year 16

GENERATOR

INT'L

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

TRANSPORTER

17. Transporter Acknowledgment of Receipt of Materials
Transporter 1 Printed/Typed Name: STEVE MULLIGAN
Signature:
Month 6 Day 17 Year 16

Transporter 2 Printed/Typed Name:
Signature:
Month Day Year

DESIGNATED FACILITY

18. Discrepancy
18a. Discrepancy Indication Space ☐ Quantity ☐ Type ☐ Residue ☐ Partial Rejection ☐ Full Rejection
Manifest Reference Number:

18b. Alternate Facility (or Generator)
U.S. EPA ID Number

Facility's Phone:

18c. Signature of Alternate Facility (or Generator)
Month Day Year

19. Hazardous Waste Report Management Method Codes (i.e., codes for hazardous waste treatment, disposal, and recycling systems)
1. H040 2. 3. 4.

20. Designated Facility Owner or Operator: Certification of receipt of hazardous materials covered by the manifest except as noted in Item 18a
Printed/Typed Name
Signature
Month Day Year

Clean Harbors has the appropriate permits for and will accept the waste the generator is shipping.

EPA Form 8700-22 (Rev. 3-05). Previous editions are obsolete.

GENERATOR'S INITIAL COPY

CleanHarbors ENVIRONMENTAL SERVICES®

Land Disposal Restriction Notification Form

Printed Date :Jun 16, 2016

MANIFEST INFORMATION

Generator : TH Agriculture & Nutrition LLC

Address: ~~2040 West River Drive~~ 15313 West 95th St. ~~Davenport,IA 52802~~ Lenexa, KS 66219

EPA ID #: IAD022100671

Manifest Tracking Info.

009514920FLE

Sales Order No: 1601909286

LINE ITEM INFORMATION

Line Item:	Page No:	Profile No:	Treatability Group:	LDR Disposal Category
1.	1	CH815653	NON-WASTEWATER	3 (Alternate Debris Standard)

EPA Waste Code	EPA Waste SubCategory
D029D039D040D043	NONE

LDR Chemical Data

Chemical	Underlying Hazardous Constituents	Constituents of Concern	Contaminants Subject to Treatment
1,1-DICHLOROETHYLENE	N	N	Y
TETRACHLOROETHYLENE	N	N	Y
TRICHLOROETHYLENE	N	N	Y
VINYL CHLORIDE	N	N	Y

Certification	Applies to Manifest Line Items
This hazardous debris is subject to the Alternate Treatment Standards of 40 CFR 268.45.	1.

Waste analysis data, where available, is attached.

Signature : [signature]

Title : Geologist

Print Name Crystal Reuss/CHEM HILL as agent for and on behalf of T.H. Agriculture + Nutrition LLC

Date : 6/17/2016

Please print or type. (Form designed for use on elite (12-pitch) typewriter.) 7Q 1601909286 SC PPW 2/24/2015

Form Approved. OMB No. 2050-0039

UNIFORM HAZARDOUS WASTE MANIFEST

1. Generator ID Number: IAD022100671
2. Page 1 of: 1
3. Emergency Response Phone: (800) 483-3718
4. Manifest Tracking Number: U09514920 FLE

5. Generator's Name and Mailing Address: TN Agriculture & Nutrition LLC, 15313 West 95th street, Lenexa, KS 66219
Generator's Phone:
Generator's Site Address (if different than mailing address): 2040 West River Drive, Davenport, IA 52802

6. Transporter 1 Company Name: Clean Harbors Environmental Service, Inc.
U.S. EPA ID Number: MAD039322250

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

8. Designated Facility Name and Site Address: Spring Grove Resource Recovery Inc., 4879 Spring Grove Avenue, Cincinnati, OH 45232
Facility's Phone: (513) 681-5738
U.S. EPA ID Number: OHD000816629

9a. HM	9b. U.S. DOT Description (including Proper Shipping Name, Hazard Class, ID Number, and Packing Group (if any))	10. Containers No.	10. Containers Type	11. Total Quantity	12. Unit Wt./Vol.	13. Waste Codes		
X	1. NA3077, HAZARDOUS WASTE, SOLID, N.O.S., (TRICHLOROETHENE, TETRACHLOROETHENE), 9, PG III	001	DM	0050	P	D029	D039	D040
						D043		
	2.							
	3.							
	4.							

14. Special Handling Instructions and Additional Information
1.CH815653 ERG#171 1X55

15. **GENERATOR'S/OFFEROR'S CERTIFICATION:** I hereby declare that the contents of this consignment are fully and accurately described above by the proper shipping name, and are classified, packaged, marked and labeled/placarded, and are in all respects in proper condition for transport according to applicable international and national governmental regulations. If export shipment and I am the Primary Exporter, I certify that the contents of this consignment conform to the terms of the attached EPA Acknowledgment of Consent.
I certify that the waste minimization statement identified in 40 CFR 262.27(a) (if I am a large quantity generator) or (b) (if I am a small quantity generator) is true.

Generator's/Offeror's Printed/Typed Name: Crystal Kruss / Chemical Cs Agent for prep on behalf of T.H. Agriculture & Nutrition, LLC
Signature: [signature]
Month: 8 Day: 26 Year: 16

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

17. Transporter Acknowledgment of Receipt of Materials
Transporter 1 Printed/Typed Name: Steve Mulligan
Signature: [signature]
Month: 6 Day: 17 Year: 16
Transporter 2 Printed/Typed Name:
Signature:
Month: Day: Year:

18. Discrepancy
18a. Discrepancy Indication Space ☐ Quantity ☐ Type ☐ Residue ☐ Partial Rejection ☐ Full Rejection
Manifest Reference Number:
18b. Alternate Facility (or Generator)
U.S. EPA ID Number:
Facility's Phone:
18c. Signature of Alternate Facility (or Generator)
Month: Day: Year:

19. Hazardous Waste Report Management Method Codes (i.e., codes for hazardous waste treatment, disposal, and recycling systems)
1. H141 2. 3. 4.

20. Designated Facility Owner or Operator: Certification of receipt of hazardous materials covered by the manifest except as noted in Item 18a
Printed/Typed Name:
Signature:
Month: Day: Year:

GENERATOR / INT'L / TRANSPORTER / DESIGNATED FACILITY

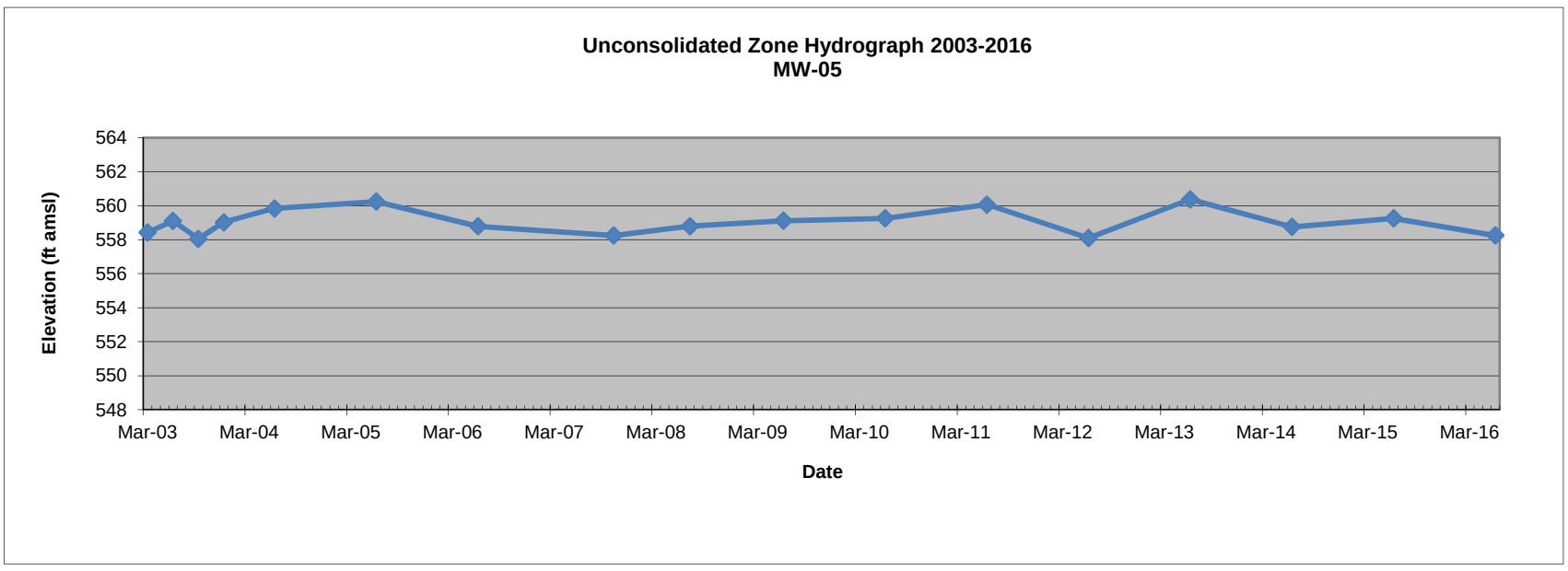
EPA Form 8700-22 (Rev. 3-05) Previous editions are obsolete.
Clean Harbors has the appropriate permits for and will accept the waste the generator is shipping.

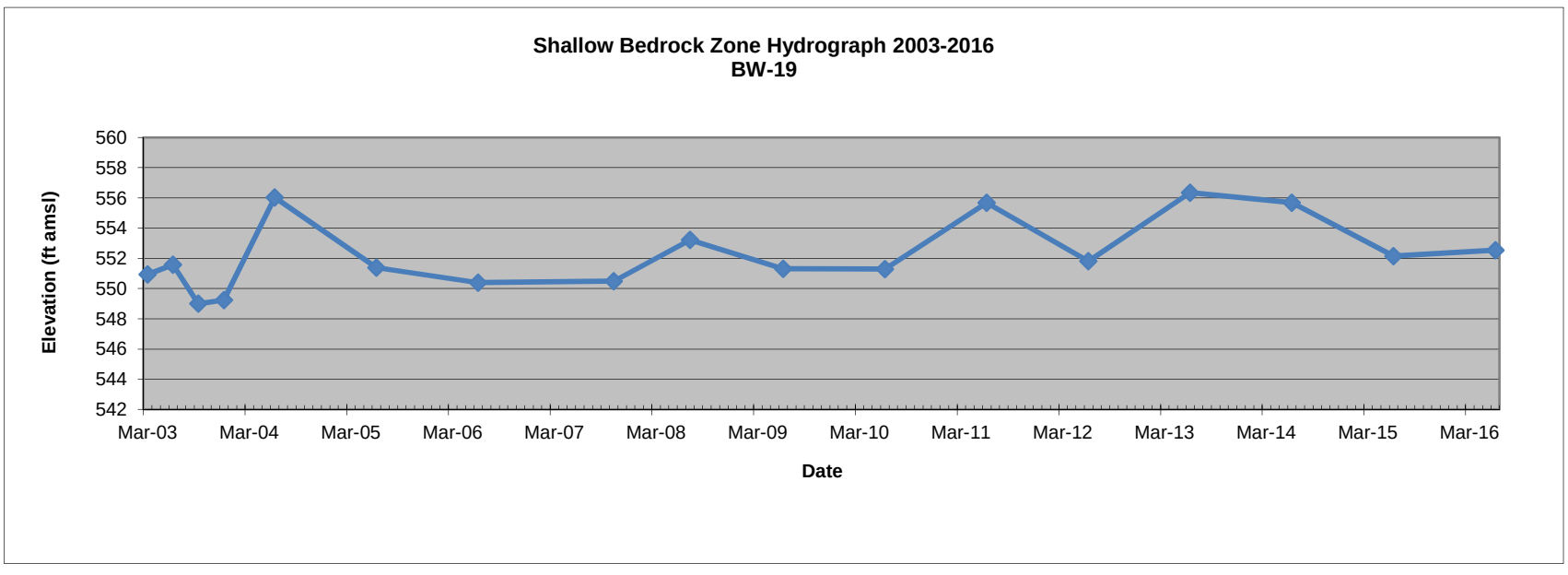
GENERATOR'S INITIAL COPY

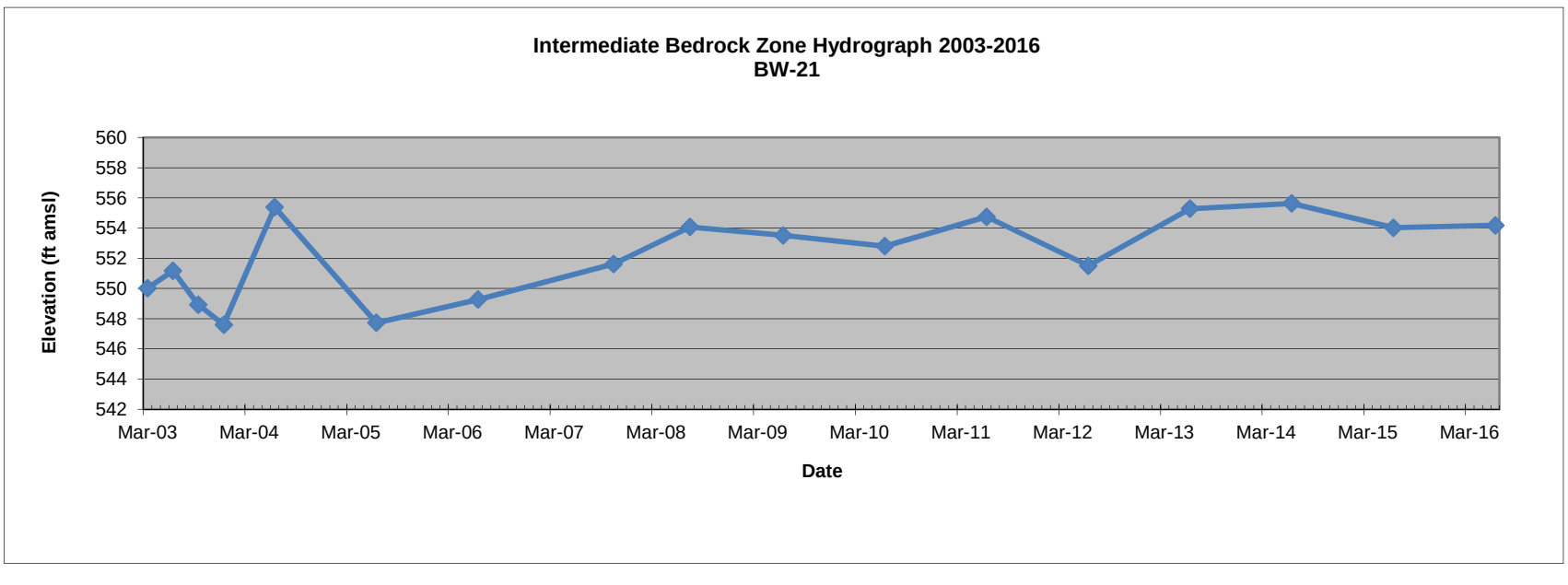
Appendix B
Hydraulic Data

Appendix B. Monitoring Well Hydrographs – June 2003 to June 2016 Data

THAN Davenport Site, 2040 West River Drive







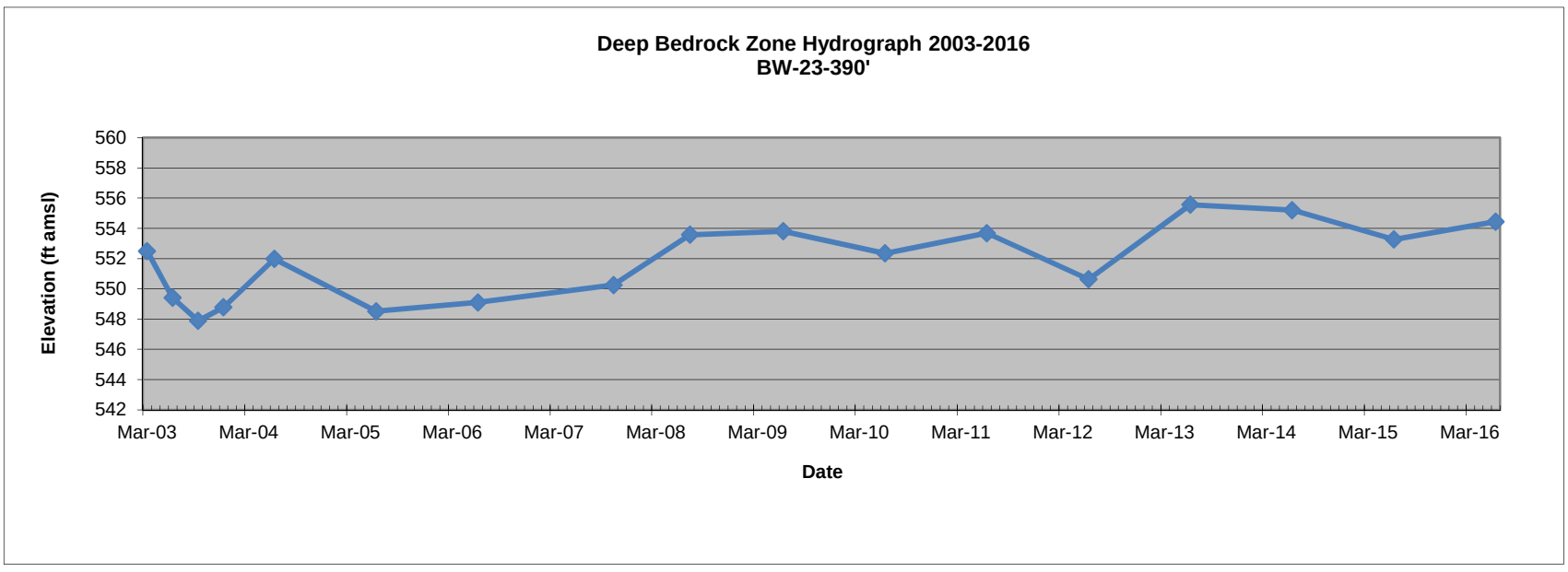


Table B-1. June 2016 Horizontal Gradient and Velocity Summary

THAN Davenport Site, 2040 West River Drive

Monitoring Wells Nearest to Flow Lines Perpendicular to GW Elev. Contour Lines (highest elevation/lowest elevation)	Monitoring Zone	Highest Groundwater Elevation (ft amsl)	Lowest Groundwater Elevation (ft amsl)	Distance Between Wells (ft)	Horizontal Gradient (ft/ft)	Hydraulic Conductivity (cm/sec)	Porosity	Linear Groundwater Velocity (ft/year)
MW-07/MW-17	Unconsolidated	564.8	554.3	916	0.0114	2.70E-06	0.38	0.08
MW-08/MW-06	Unconsolidated	564.5	561.7	335	0.0086	2.70E-06	0.38	0.06
MW-03/MW-19 (near to)	Unconsolidated	567.0	554.0	836	0.0156	2.70E-06	0.38	0.11
MW-07/MW-17	Unconsolidated	564.8	554.3	867	0.0120	2.60E-08	0.38	0.001
MW-08/MW-06	Unconsolidated	564.5	561.7	335	0.0086	2.60E-08	0.38	0.001
MW-03/MW-19 (near to)	Unconsolidated	567.0	554.0	836	0.0156	2.60E-08	0.38	0.001
BW-05/BW-11	Shallow Bedrock Zone	565.8	555.2	889	0.0119	3.40E-06	0.2	0.21
BW-03R/BW-13	Shallow Bedrock Zone	558.2	552.9	438	0.012	3.40E-06	0.2	0.21
BW-34/BW-15	Shallow Bedrock Zone	566.4	553.8	460	0.0273	3.40E-06	0.2	0.48
BW-05/BW-11		565.8	555.2	889	0.0119	4.70E-04	0.2	29.02
BW-03R/BW-13	Shallow Bedrock Zone	558.2	552.9	438	0.0122	4.70E-04	0.2	29.70
BW-34/BW-15	Shallow Bedrock Zone	566.4	553.8	460	0.027	4.70E-04	0.2	66.40
BW-23-200'/BW-26-205'	Intermediate Bedrock Zone	NA	NA	NA	NA	3.40E-06	0.15	NA
BW-24-390'/BW-23-390'	Deep Bedrock Zone	NA	NA	NA	NA	3.40E-06	0.15	NA

Notes:

All elevations in feet above mean sea level.

Estimates of hydraulic conductivity for unconsolidated material are derived from laboratory testing and represent vertical flow conditions based on laboratory methodology. The hydraulic conductivities for the unconsolidated zone were applied to estimates of horizontal groundwater gradients to estimate horizontal groundwater velocities within this unit.

NA = not applicable. The 2016 groundwater elevations in the intermediate zone (~200 feet deep) and deep zone (~400 feet deep) wells differ by very small ranges (0.23 feet and 0.39 feet, respectively)—these ranges are within measurement error for the FLUTe™ system, and that likely negates the accuracy of a calculated flow velocity.

ft = foot

ft amsl = feet above mean sea level

V = ki/n

v=average linear groundwater velocity

k = hydraulic conductivity; Unconsolidated Zone—laboratory results from the Final 2003 Site Investigation report appendix D max K and Min K selected, Shallow Bedrock Zone-range from pumping test is 3.4 X 10E-06 to 4.7 X 10E-04 cm/sec, Intermediate and Deep Bedrock Zones—lower value from shallow pump test range was 3.4 X 10E-06 cm/sec.

i = groundwater gradient (ft/ft) from June 2015 groundwater elevation map

n = porosity; Unconsolidated-38 percent, which is an average of the laboratory results from the Final 2003 Site Investigation Report, Shallow Bedrock Zone-assumed 20 percent as a mid-range for fractured limestone (from Fetter [2004]), Intermediate and Deep Bedrock Zones—assumed 15 percent for the Intermediate and Deep Bedrock Zones (from Fetter, C.W. 2004.*Applied Hydrogeology, Fourth Edition*. Merrill Publishing Company).

Table B-2. June 2016 Vertical Gradient Summary

THAN Davenport Site, 2040 West River Drive

Well Pair	Upper Monitoring Zone/Lower Monitoring Zone	Screen Midpoint Elevation Upper Zone Well (ft amsl)	Screen Midpoint Elevation Lower Zone Well (ft amsl)	Groundwater Elevation (ft amsl) June 2016 Upper Zone Well	Groundwater Elevation (ft amsl) June 2016 Lower Zone Well	Vertical Gradient (ft/ft) June 2016
Onsite						
MW-05/BW-03 (BW-03R)	Unconsolidated Zone/Shallow Bedrock Zone	558.70	542.40	558.25	558.20	0.0031
BW-03 (BW-03R) /BW-23-50'	Shallow Bedrock Zone/Shallow Bedrock Zone	542.40	507.86	558.20	556.58	0.0469
BW-23-50'/BW-23-90'	Shallow Bedrock Zone/Intermediate Bedrock Zone	507.86	467.86	556.58	554.25	0.0583
BW-23-90'/BW-23-125'	Intermediate Bedrock Zone/Intermediate Bedrock Zone	467.86	432.86	554.25	554.34	-0.0026
BW-23-125'/BW-23-200'	Intermediate Bedrock Zone/Intermediate Bedrock Zone	432.86	357.86	554.34	554.25	0.0012
BW-23-200'/BW-23-290'	Intermediate Bedrock Zone/Deep Bedrock Zone	357.86	267.86	554.25	554.24	0.0001
BW-23-290'/BW-23-390'	Deep Bedrock Zone/Deep Bedrock Zone	267.86	167.86	554.24	554.44	-0.0020
Offsite						
MW-01/BW-01	Unconsolidated Zone/Shallow Bedrock Zone	559.60	541.60	559.27	558.65	0.0344
BW-25/BW-26-65'	Shallow Bedrock Zone/Intermediate Bedrock Zone	531.08	494.81	551.14	554.00	-0.0789
BW-26-65'/BW-26-85'	Intermediate Bedrock Zone/Intermediate Bedrock Zone	494.81	474.81	554.00	554.03	-0.0015
BW-26-85'/BW-26-205'	Intermediate Bedrock Zone/Intermediate Bedrock Zone	474.81	354.81	554.03	554.09	-0.0005
BW-26-205'/BW-26-295'	Intermediate Bedrock Zone/Deep Bedrock Zone	354.81	264.81	554.09	554.06	0.0003
BW-26-295'/BW-26-395'	Deep Bedrock Zone/Deep Bedrock Zone	264.81	164.81	554.06	554.05	0.0001

Notes:

Negative values for vertical gradients indicate upward movement. Positive values indicate downward movement

All elevations in feet above mean sea level.

If the groundwater elevation is lower than the screen midpoint interval for the unconsolidated zone monitoring wells, then the groundwater elevation is used in place of the screen midpoint for the distance calculation.

ft = foot

ft amsl = feet above mean sea level

Table B-3. June 2016 Vertical Seepage Summary

THAN Davenport Site, 2040 West River Drive

Monitoring Wells (highest elevation/lowest elevation)	Monitoring Zone	Gradient (cm/cm)	K (cm/sec)	Porosity	vertical velocity (cm/sec)	vertical velocity (ft/day)	Vertical Seepage Rate (ft/year)
Onsite							
MW-05/BW-03 (BW-03R)	Unconsolidated Zone/Shallow Bedrock Zone	0.0031	2.70E-06	0.38	2.20E-08	6.24E-05	0.0228
MW-05/BW-03 (BW-03R)	Unconsolidated Zone/Shallow Bedrock Zone	0.0031	2.60E-08	0.38	2.12E-10	6.01E-07	0.0002
Offsite							
MW-01/BW-01	Unconsolidated Zone/Shallow Bedrock Zone	0.0344	2.70E-06	0.38	2.44E-07	6.93E-04	0.2529
MW-01/BW-01	Unconsolidated Zone/Shallow Bedrock Zone	0.0344	2.60E-08	0.38	2.35E-09	6.67E-06	0.0024

Notes:

V = ki/n

v = average vertical seepage rate

k = hydraulic conductivity; laboratory results from the Final 2003 Site Investigation Report (Appendix D), max K and Min K selected.

I = groundwater gradient (ft/ft), downward gradients from MW-01/BW-01 and MW-05/BW03 (BW-03R) nests in 2015 between unconsolidated and shallow zones.

n = porosity; average porosity used from the laboratory results from the Final 2003 Site Investigation Report, Appendix D.

cm = centimeter

sec = second

ft = feet

Appendix C
Laboratory Reports

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

ANALYTICAL REPORT

TestAmerica Laboratories, Inc.
TestAmerica Denver
4955 Yarrow Street
Arvada, CO 80002
Tel: (303)736-0100

TestAmerica Job ID: 280-84495-1
Client Project/Site: THAN Davenport, IA - June 2016

For:
CH2M Hill, Inc.
2020 SW 4th Ave
Suite 300
Portland, Oregon 97201

Attn: Ms. Shannon Olson

Authorized for release by:
6/29/2016 3:33:34 PM

Jamie Ide, Project Manager I
(303)736-0126
jamie.ide@testamericainc.com

LINKS

Review your project results through TotalAccess

Have a Question? Ask The Expert

Visit us at: www.testamericainc.com

The test results in this report meet all 2003 NELAC and 2009 TNI requirements for accredited parameters, exceptions are noted in this report. This report may not be reproduced except in full, and with written approval from the laboratory. For questions please contact the Project Manager at the e-mail address or telephone number listed on this page.

This report has been electronically signed and authorized by the signatory. Electronic signature is intended to be the legally binding equivalent of a traditionally handwritten signature.

Results relate only to the items tested and the sample(s) as received by the laboratory.

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Definitions/Glossary

Client: CH2M Hill, Inc.
Project/Site: THAN Davenport, IA - June 2016

TestAmerica Job ID: 280-84495-1

Qualifiers

GC/MS VOA

Qualifier	Qualifier Description
E	Result exceeded calibration range.
J	Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.
X	Surrogate is outside control limits
F2	MS/MSD RPD exceeds control limits
F1	MS and/or MSD Recovery is outside acceptance limits.
4	MS, MSD: The analyte present in the original sample is greater than 4 times the matrix spike concentration; therefore, control limits are not applicable.
*	RPD of the LCS and LCSD exceeds the control limits

GC VOA

Qualifier	Qualifier Description
J	Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.
P	The %RPD between the primary and confirmation column/detector is >40%. The higher value has been reported

General Chemistry

Qualifier	Qualifier Description
HF	Field parameter with a holding time of 15 minutes. Test performed by laboratory at client's request.
^	ICV,CCV,ICB,CCB, ISA, ISB, CRI, CRA, DLCK or MRL standard: Instrument related QC is outside acceptance limits.
B	Compound was found in the blank and sample.
J	Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
¤	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CNF	Contains no Free Liquid
DER	Duplicate error ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision level concentration
MDA	Minimum detectable activity
EDL	Estimated Detection Limit
MDC	Minimum detectable concentration
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
NC	Not Calculated
ND	Not detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
QC	Quality Control
RER	Relative error ratio
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)

Job ID: 280-84495-1

Laboratory: TestAmerica Denver

Narrative

CASE NARRATIVE
Client: CH2M Hill, Inc.
Project: THAN Davenport, IA - June 2016
Report Number: 280-84495-1

With the exceptions noted as flags or footnotes, standard analytical protocols were followed in the analysis of the samples and no problems were encountered or anomalies observed. In addition all laboratory quality control samples were within established control limits, with any exceptions noted below. Each sample was analyzed to achieve the lowest possible reporting limit within the constraints of the method. In some cases, due to interference or analytes present at high concentrations, samples were diluted. For diluted samples, the reporting limits are adjusted relative to the dilution required.

Calculations are performed before rounding to avoid round-off errors in calculated results.

All holding times were met and proper preservation noted for the methods performed on these samples, unless otherwise detailed in the individual sections below.

RECEIPT

The samples were received on 6/15/2016 10:00 AM; the samples arrived in good condition, properly preserved and, where required, on ice. The temperatures of the 2 coolers at receipt time were 1.1º C and 2.8º C.

The sample collection time on the container labels for sample ADDV-027 (280-84495-11) does not match the information listed on the chain of custody. The container labels list a collection time of 1127 while the chain of custody lists a collection time of 1137. The laboratory logged the sample collection time per the chain of custody and will proceed unless instructed otherwise. The client was notified on 6/15/2016. On 6/16/2016, the client confirmed the sample collection time on the chain of custody is correct.

VOLATILE ORGANIC COMPOUNDS (GC-MS)

Samples ADDV-006 (280-84495-1)[4X], ADDV-006 (280-84495-1)[40X], ADDV-010 (280-84495-3)[4X], ADDV-010 (280-84495-3)[40X], ADDV-026 (280-84495-10)[100X], ADDV-026 (280-84495-10)[1000X], ADDV-028 (280-84495-12)[10X], ADDV-032 (280-84495-13)[40X], ADDV-032 (280-84495-13)[400X], ADDV-033 (280-84495-14)[200X], ADDV-033 (280-84495-14)[4X], ADDV-034 (280-84495-15)[2X] and ADDV-034 (280-84495-15)[20X] required dilution prior to analysis. The reporting limits have been adjusted accordingly.

4-Bromofluorobenzene failed the surrogate recovery criteria high for ADDV-026 (280-84495-10) and ADDV-032 (280-84495-13). The associated samples were non-detect for the affected analytes; therefore, corrective action was deemed unnecessary.

The MS/MSD performed on sample ADDV-016 (280-84495-2) exhibited spike recoveries and RPD data outside QC control limits for 1,1,1-Trichloroethane, 1,1-Dichloroethene and 1,2-Dichloroethane. The associated LCS was in control and demonstrates that operating procedures were in control. No further action was required.

1,1-Dichloroethene exceeded the RPD limit for LCSD 280-331154/5. The associated LCS/LCSD spike recoveries were in control and demonstrate that operating procedures were in control. No further action was required.

The MS/MSD associated with batch 280-331154 exhibited spike recoveries outside QC control limits for several analytes. The associated LCS/LCSD was in control and demonstrates that operating procedures were in control. No further action was required.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

DISSOLVED GASES

Analytes Acetylene/Ethane co-elute on one of the columns used for this analysis. As a result, there are no results reported for the %Difference in the concentration on the Form X.

Samples ADDV-016 (280-84495-2)[2X], ADDV-008 (280-84495-4)[3X], ADDV-032 (280-84495-13)[36X], ADDV-033 (280-84495-14)[18X] and ADDV-034 (280-84495-15)[18X] required dilution prior to analysis due to the nature of the sample matrix. The reporting limits have been adjusted accordingly.

Job ID: 280-84495-1 (Continued)

Laboratory: TestAmerica Denver (Continued)

Ethene (ethylene) eluted outside the retention time window on the primary column for the following samples: ADDV-006 (280-84495-1), ADDV-010 (280-84495-3) and (280-84495-H-3 DU). This retention time shift is the result of matrix interference and data has been reported from the confirmation column which was unaffected by the matrix interference.

Ethane eluted outside the retention time window on the primary column for the following samples: ADDV-006 (280-84495-1), ADDV-016 (280-84495-2), ADDV-024 (280-84495-7) and ADDV-029 (280-84495-17). This retention time shift is the result of matrix interference. Ethane is qualitatively confirmed on the confirmation column. However, since the confirmation column does not provide ethane quantitation due to coelution with acetylene, data has been reported from the primary column.

No analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

ALKALINITY

Alkalinity was detected in method blank MB 280-330602/31 at a level that was above the method detection limit but below the reporting limit. The value should be considered an estimate, and has been flagged. If the associated sample reported a result above the MDL and/or RL, the result has been flagged.

Alkalinity was detected in method blank MB 280-330602/5 at a level that was above the method detection limit but below the reporting limit. The value should be considered an estimate, and has been flagged. If the associated sample reported a result above the MDL and/or RL, the result has been flagged.

The instrument blank for analytical batch 280-330602 contained Total Alkalinity at concentrations greater than the reporting limit; because the samples had concentrations greater than 10x the RL corrective action was deemed unnecessary.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

ANIONS (48 HOURS)

No analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

ANIONS (28 DAYS)

Sample ADDV-032 (280-84495-13)[5X] required dilution prior to analysis. The reporting limits have been adjusted accordingly.

No analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

FERROUS IRON

No analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

TOTAL ORGANIC CARBON

No analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

SULFIDE

No analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

Detection Summary

Client: CH2M Hill, Inc.
Project/Site: THAN Davenport, IA - June 2016

TestAmerica Job ID: 280-84495-1

Client Sample ID: ADDV-006 — Lab Sample ID: 280-84495-1

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
1,1,1-Trichloroethane	24		4.0	0.64	ug/L	4		8260B	Total/NA
1,1-Dichloroethane	44		4.0	0.88	ug/L	4		8260B	Total/NA
1,1-Dichloroethene	4.7		4.0	0.92	ug/L	4		8260B	Total/NA
cis-1,2-Dichloroethene	490	E	4.0	0.60	ug/L	4		8260B	Total/NA
Methylene Chloride	1.4	J	8.0	1.3	ug/L	4		8260B	Total/NA
trans-1,2-Dichloroethene	1.9	J	4.0	0.60	ug/L	4		8260B	Total/NA
Trichloroethene	2.4	J	4.0	0.64	ug/L	4		8260B	Total/NA
Vinyl chloride	140		4.0	0.40	ug/L	4		8260B	Total/NA
cis-1,2-Dichloroethene - DL	570		40	6.0	ug/L	40		8260B	Total/NA
Methane	76		5.0	0.22	ug/L	1		RSK-175	Total/NA
Ethene	3.4	J P	5.0	0.40	ug/L	1		RSK-175	Total/NA
Ethane	21		5.0	0.57	ug/L	1		RSK-175	Total/NA
Chloride	27		3.0	0.25	mg/L	1		300.0	Total/NA
Sulfate	190		5.0	0.23	mg/L	1		300.0	Total/NA
Total Organic Carbon - Average	3.4		1.0	0.16	mg/L	1		9060	Total/NA
Alkalinity	360	B ^	5.0	1.1	mg/L	1		SM 2320B	Total/NA

Client Sample ID: ADDV-016 — Lab Sample ID: 280-84495-2

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Acetone	6.7	J	10	1.9	ug/L	1		8260B	Total/NA
Chloroethane	0.94	J	2.0	0.41	ug/L	1		8260B	Total/NA
Methane	27000		10	0.44	ug/L	2		RSK-175	Total/NA
Ethane	12		10	1.1	ug/L	2		RSK-175	Total/NA
Chloride	46		3.0	0.25	mg/L	1		300.0	Total/NA
Sulfate	0.53	J	5.0	0.23	mg/L	1		300.0	Total/NA
Total Organic Carbon - Average	8.8		1.0	0.16	mg/L	1		9060	Total/NA
Alkalinity	460	B ^	5.0	1.1	mg/L	1		SM 2320B	Total/NA

Client Sample ID: ADDV-010 — Lab Sample ID: 280-84495-3

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
1,1-Dichloroethane	140		4.0	0.88	ug/L	4		8260B	Total/NA
1,1-Dichloroethene	6.4		4.0	0.92	ug/L	4		8260B	Total/NA
cis-1,2-Dichloroethene	400	E	4.0	0.60	ug/L	4		8260B	Total/NA
Methylene Chloride	1.9	J	8.0	1.3	ug/L	4		8260B	Total/NA
trans-1,2-Dichloroethene	1.6	J	4.0	0.60	ug/L	4		8260B	Total/NA
Vinyl chloride	170		4.0	0.40	ug/L	4		8260B	Total/NA
cis-1,2-Dichloroethene - DL	410		40	6.0	ug/L	40		8260B	Total/NA
Methane	260		5.0	0.22	ug/L	1		RSK-175	Total/NA
Ethene	94		5.0	0.40	ug/L	1		RSK-175	Total/NA
Chloride	110		3.0	0.25	mg/L	1		300.0	Total/NA
Sulfate	52		5.0	0.23	mg/L	1		300.0	Total/NA
Total Organic Carbon - Average	2.0		1.0	0.16	mg/L	1		9060	Total/NA
Alkalinity	310	B ^	5.0	1.1	mg/L	1		SM 2320B	Total/NA

Client Sample ID: ADDV-008 — Lab Sample ID: 280-84495-4

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Chloroethane	0.62	J	2.0	0.41	ug/L	1		8260B	Total/NA

This Detection Summary does not include radiochemical test results.

Client Sample ID: ADDV-008 (Continued) — Lab Sample ID: 280-84495-4

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Methylene Chloride	0.39	J	2.0	0.32	ug/L	1		8260B	Total/NA
Methane	27000		15	0.65	ug/L	3		RSK-175	Total/NA
Ethane	8.2	J	15	1.7	ug/L	3		RSK-175	Total/NA
Chloride	44		3.0	0.25	mg/L	1		300.0	Total/NA
Sulfate	0.49	J	5.0	0.23	mg/L	1		300.0	Total/NA
Total Organic Carbon - Average	9.0		1.0	0.16	mg/L	1		9060	Total/NA
Alkalinity	520	B ^	5.0	1.1	mg/L	1		SM 2320B	Total/NA

Client Sample ID: ADDV-017 — Lab Sample ID: 280-84495-5

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
1,1-Dichloroethane	0.23	J	1.0	0.22	ug/L	1		8260B	Total/NA
cis-1,2-Dichloroethene	1.1		1.0	0.15	ug/L	1		8260B	Total/NA
Methylene Chloride	0.33	J	2.0	0.32	ug/L	1		8260B	Total/NA
Tetrachloroethene	0.46	J	1.0	0.20	ug/L	1		8260B	Total/NA
Trichloroethene	0.56	J	1.0	0.16	ug/L	1		8260B	Total/NA
Methane	170		5.0	0.22	ug/L	1		RSK-175	Total/NA
Chloride	19		3.0	0.25	mg/L	1		300.0	Total/NA
Nitrate as N	0.045	J	0.50	0.042	mg/L	1		300.0	Total/NA
Sulfate	55		5.0	0.23	mg/L	1		300.0	Total/NA
Total Organic Carbon - Average	3.2		1.0	0.16	mg/L	1		9060	Total/NA
Alkalinity	360	B ^	5.0	1.1	mg/L	1		SM 2320B	Total/NA

Client Sample ID: ADDV-025 — Lab Sample ID: 280-84495-6

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Methylene Chloride	0.32	J	2.0	0.32	ug/L	1		8260B	Total/NA
Methane	120		5.0	0.22	ug/L	1		RSK-175	Total/NA
Chloride	3.2		3.0	0.25	mg/L	1		300.0	Total/NA
Nitrate as N	0.052	J	0.50	0.042	mg/L	1		300.0	Total/NA
Sulfate	6.2		5.0	0.23	mg/L	1		300.0	Total/NA
Total Organic Carbon - Average	1.1		1.0	0.16	mg/L	1		9060	Total/NA
Alkalinity	400	B ^	5.0	1.1	mg/L	1		SM 2320B	Total/NA
Ferrous Iron	0.096	J HF	0.20	0.021	mg/L	1		SM3500_FE_D	Total/NA

Client Sample ID: ADDV-024 — Lab Sample ID: 280-84495-7

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Acetone	7.1	J	10	1.9	ug/L	1		8260B	Total/NA
cis-1,2-Dichloroethene	0.27	J	1.0	0.15	ug/L	1		8260B	Total/NA
Methylene Chloride	0.38	J	2.0	0.32	ug/L	1		8260B	Total/NA
Methane	8500		5.0	0.22	ug/L	1		RSK-175	Total/NA
Ethane	1.5	J	5.0	0.57	ug/L	1		RSK-175	Total/NA
Chloride	26		3.0	0.25	mg/L	1		300.0	Total/NA
Sulfate	0.77	J	5.0	0.23	mg/L	1		300.0	Total/NA
Total Organic Carbon - Average	4.3		1.0	0.16	mg/L	1		9060	Total/NA
Alkalinity	340	B ^	5.0	1.1	mg/L	1		SM 2320B	Total/NA
Ferrous Iron	0.057	J HF	0.20	0.021	mg/L	1		SM3500_FE_D	Total/NA

Client Sample ID: ADDV-047 — Lab Sample ID: 280-84495-8

This Detection Summary does not include radiochemical test results.

Detection Summary

Client: CH2M Hill, Inc.
Project/Site: THAN Davenport, IA - June 2016

TestAmerica Job ID: 280-84495-1

Client Sample ID: ADDV-047 (Continued) — Lab Sample ID: 280-84495-8

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Methylene Chloride	0.51	J	2.0	0.32	ug/L	1		8260B	Total/NA

Client Sample ID: ADDV-046 — Lab Sample ID: 280-84495-9

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Methylene Chloride	0.37	J	2.0	0.32	ug/L	1		8260B	Total/NA

Client Sample ID: ADDV-026 — Lab Sample ID: 280-84495-10

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
1,1,1-Trichloroethane	390		100	16	ug/L	100		8260B	Total/NA
1,1-Dichloroethane	2000		100	22	ug/L	100		8260B	Total/NA
1,1-Dichloroethene	290		100	23	ug/L	100		8260B	Total/NA
Benzene	21	J	100	16	ug/L	100		8260B	Total/NA
cis-1,2-Dichloroethene	39000	E	100	15	ug/L	100		8260B	Total/NA
Ethylbenzene	1100		100	16	ug/L	100		8260B	Total/NA
m-Xylene & p-Xylene	510		200	34	ug/L	100		8260B	Total/NA
o-Xylene	330		100	19	ug/L	100		8260B	Total/NA
Toluene	640		100	17	ug/L	100		8260B	Total/NA
trans-1,2-Dichloroethene	22	J	100	15	ug/L	100		8260B	Total/NA
Vinyl chloride	12000	E	100	10	ug/L	100		8260B	Total/NA
Xylenes, Total	840		200	19	ug/L	100		8260B	Total/NA
cis-1,2-Dichloroethene - DL	38000		1000	150	ug/L	1000		8260B	Total/NA
Vinyl chloride - DL	13000		1000	100	ug/L	1000		8260B	Total/NA
Chloride	150		3.0	0.25	mg/L	1		300.0	Total/NA
Total Organic Carbon - Average	3.0		1.0	0.16	mg/L	1		9060	Total/NA

Client Sample ID: ADDV-027 — Lab Sample ID: 280-84495-11

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
1,1-Dichloroethane	0.98	J	1.0	0.22	ug/L	1		8260B	Total/NA
Acetone	28		10	1.9	ug/L	1		8260B	Total/NA
Benzene	3.0		1.0	0.16	ug/L	1		8260B	Total/NA
Chloroethane	25		2.0	0.41	ug/L	1		8260B	Total/NA
cis-1,2-Dichloroethene	1.3		1.0	0.15	ug/L	1		8260B	Total/NA
Ethylbenzene	0.47	J	1.0	0.16	ug/L	1		8260B	Total/NA
Toluene	0.46	J	1.0	0.17	ug/L	1		8260B	Total/NA
trans-1,2-Dichloroethene	0.37	J	1.0	0.15	ug/L	1		8260B	Total/NA
Vinyl chloride	1.1		1.0	0.10	ug/L	1		8260B	Total/NA
Chloride	36		3.0	0.25	mg/L	1		300.0	Total/NA
Total Organic Carbon - Average	1.8		1.0	0.16	mg/L	1		9060	Total/NA

Client Sample ID: ADDV-028 — Lab Sample ID: 280-84495-12

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
1,1-Dichloroethane	95	E	1.0	0.22	ug/L	1		8260B	Total/NA
1,1-Dichloroethene	0.68	J	1.0	0.23	ug/L	1		8260B	Total/NA
Benzene	3.0		1.0	0.16	ug/L	1		8260B	Total/NA
Chloroethane	170	E	2.0	0.41	ug/L	1		8260B	Total/NA
cis-1,2-Dichloroethene	160	E	1.0	0.15	ug/L	1		8260B	Total/NA

This Detection Summary does not include radiochemical test results.

Client Sample ID: ADDV-028 (Continued) — Lab Sample ID: 280-84495-12

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Ethylbenzene	49		1.0	0.16	ug/L	1		8260B	Total/NA
Methylene Chloride	0.62	J	2.0	0.32	ug/L	1		8260B	Total/NA
m-Xylene & p-Xylene	9.1		2.0	0.34	ug/L	1		8260B	Total/NA
o-Xylene	5.1		1.0	0.19	ug/L	1		8260B	Total/NA
Toluene	4.7		1.0	0.17	ug/L	1		8260B	Total/NA
Vinyl chloride	260	E	1.0	0.10	ug/L	1		8260B	Total/NA
Xylenes, Total	14		2.0	0.19	ug/L	1		8260B	Total/NA
1,1-Dichloroethane - DL	94		10	2.2	ug/L	10		8260B	Total/NA
Chloroethane - DL	170		20	4.1	ug/L	10		8260B	Total/NA
cis-1,2-Dichloroethene - DL	150		10	1.5	ug/L	10		8260B	Total/NA
Vinyl chloride - DL	270		10	1.0	ug/L	10		8260B	Total/NA
Chloride	16		3.0	0.25	mg/L	1		300.0	Total/NA
Total Organic Carbon - Average	4.8		1.0	0.16	mg/L	1		9060	Total/NA

Client Sample ID: ADDV-032 — Lab Sample ID: 280-84495-13

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
1,1,1-Trichloroethane	12	J	40	6.4	ug/L	40		8260B	Total/NA
1,1-Dichloroethane	270		40	8.8	ug/L	40		8260B	Total/NA
Benzene	43		40	6.4	ug/L	40		8260B	Total/NA
Chloroethane	1700		80	16	ug/L	40		8260B	Total/NA
cis-1,2-Dichloroethene	32	J	40	6.0	ug/L	40		8260B	Total/NA
Ethylbenzene	650		40	6.4	ug/L	40		8260B	Total/NA
m-Xylene & p-Xylene	1400		80	14	ug/L	40		8260B	Total/NA
o-Xylene	450		40	7.6	ug/L	40		8260B	Total/NA
Toluene	8400	E	40	6.8	ug/L	40		8260B	Total/NA
trans-1,2-Dichloroethene	7.1	J	40	6.0	ug/L	40		8260B	Total/NA
Vinyl chloride	120		40	4.0	ug/L	40		8260B	Total/NA
Xylenes, Total	1900		80	7.6	ug/L	40		8260B	Total/NA
Toluene - DL	11000		400	68	ug/L	400		8260B	Total/NA
Methane	5000		180	7.8	ug/L	36		RSK-175	Total/NA
Ethene	12000		180	14	ug/L	36		RSK-175	Total/NA
Ethane	1700		180	21	ug/L	36		RSK-175	Total/NA
Chloride	220		15	1.3	mg/L	5		300.0	Total/NA
Sulfate	1.2	J	5.0	0.23	mg/L	1		300.0	Total/NA
Total Organic Carbon - Average	12		1.0	0.16	mg/L	1		9060	Total/NA
Alkalinity	540	B ^	5.0	1.1	mg/L	1		SM 2320B	Total/NA
Sulfide	7.0		1.0	0.50	mg/L	1		SM 4500 S2 F	Total/NA

Client Sample ID: ADDV-033 — Lab Sample ID: 280-84495-14

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
1,1,1-Trichloroethane	1.8	J	4.0	0.64	ug/L	4		8260B	Total/NA
1,1-Dichloroethane	53		4.0	0.88	ug/L	4		8260B	Total/NA
Benzene	21		4.0	0.64	ug/L	4		8260B	Total/NA
Chloroethane	730	E	8.0	1.6	ug/L	4		8260B	Total/NA
cis-1,2-Dichloroethene	13		4.0	0.60	ug/L	4		8260B	Total/NA
Ethylbenzene	300	E	4.0	0.64	ug/L	4		8260B	Total/NA
Methylene Chloride	1.4	J	8.0	1.3	ug/L	4		8260B	Total/NA
m-Xylene & p-Xylene	670	E	8.0	1.4	ug/L	4		8260B	Total/NA

This Detection Summary does not include radiochemical test results.

Client Sample ID: ADDV-033 (Continued) — Lab Sample ID: 280-84495-14

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
o-Xylene	210		4.0	0.76	ug/L	4		8260B	Total/NA
Toluene	970	E	4.0	0.68	ug/L	4		8260B	Total/NA
trans-1,2-Dichloroethene	1.8	J	4.0	0.60	ug/L	4		8260B	Total/NA
Vinyl chloride	35		4.0	0.40	ug/L	4		8260B	Total/NA
Xylenes, Total	880		8.0	0.76	ug/L	4		8260B	Total/NA
Chloroethane - DL	1100		400	82	ug/L	200		8260B	Total/NA
Ethylbenzene - DL	410		200	32	ug/L	200		8260B	Total/NA
m-Xylene & p-Xylene - DL	860		400	68	ug/L	200		8260B	Total/NA
o-Xylene - DL	250		200	38	ug/L	200		8260B	Total/NA
Toluene - DL	5700		200	34	ug/L	200		8260B	Total/NA
Xylenes, Total - DL	1100		400	38	ug/L	200		8260B	Total/NA
Methane	4300		90	3.9	ug/L	18		RSK-175	Total/NA
Ethene	5000		90	7.2	ug/L	18		RSK-175	Total/NA
Ethane	2100		90	10	ug/L	18		RSK-175	Total/NA
Chloride	170		3.0	0.25	mg/L	1		300.0	Total/NA
Sulfate	0.92	J	5.0	0.23	mg/L	1		300.0	Total/NA
Total Organic Carbon - Average	7.8		1.0	0.16	mg/L	1		9060	Total/NA
Alkalinity	490	B ^	5.0	1.1	mg/L	1		SM 2320B	Total/NA
Sulfide	7.0		1.0	0.50	mg/L	1		SM 4500 S2 F	Total/NA
Ferrous Iron	0.31	HF	0.20	0.021	mg/L	1		SM3500_FE_D	Total/NA

Client Sample ID: ADDV-034 — Lab Sample ID: 280-84495-15

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
1,1-Dichloroethane	2.9		2.0	0.44	ug/L	2		8260B	Total/NA
Benzene	19		2.0	0.32	ug/L	2		8260B	Total/NA
Chloroethane	640	E	4.0	0.82	ug/L	2		8260B	Total/NA
cis-1,2-Dichloroethene	0.93	J	2.0	0.30	ug/L	2		8260B	Total/NA
Ethylbenzene	230	E	2.0	0.32	ug/L	2		8260B	Total/NA
Methylene Chloride	0.98	J	4.0	0.64	ug/L	2		8260B	Total/NA
m-Xylene & p-Xylene	650	E	4.0	0.68	ug/L	2		8260B	Total/NA
o-Xylene	170	E	2.0	0.38	ug/L	2		8260B	Total/NA
Toluene	81		2.0	0.34	ug/L	2		8260B	Total/NA
Vinyl chloride	2.3		2.0	0.20	ug/L	2		8260B	Total/NA
Xylenes, Total	820		4.0	0.38	ug/L	2		8260B	Total/NA
Chloroethane - DL	610		40	8.2	ug/L	20		8260B	Total/NA
Ethylbenzene - DL	190		20	3.2	ug/L	20		8260B	Total/NA
m-Xylene & p-Xylene - DL	560		40	6.8	ug/L	20		8260B	Total/NA
o-Xylene - DL	140		20	3.8	ug/L	20		8260B	Total/NA
Xylenes, Total - DL	700		40	3.8	ug/L	20		8260B	Total/NA
Methane	12000		90	3.9	ug/L	18		RSK-175	Total/NA
Ethane	5100		90	10	ug/L	18		RSK-175	Total/NA
Chloride	52		3.0	0.25	mg/L	1		300.0	Total/NA
Sulfate	0.56	J	5.0	0.23	mg/L	1		300.0	Total/NA
Total Organic Carbon - Average	3.9		1.0	0.16	mg/L	1		9060	Total/NA
Alkalinity	510	B ^	5.0	1.1	mg/L	1		SM 2320B	Total/NA
Sulfide	1.6		1.0	0.50	mg/L	1		SM 4500 S2 F	Total/NA
Ferrous Iron	0.17	J HF	0.20	0.021	mg/L	1		SM3500_FE_D	Total/NA

Client Sample ID: ADDV-030 — Lab Sample ID: 280-84495-16

This Detection Summary does not include radiochemical test results.

Detection Summary

Client: CH2M Hill, Inc.
Project/Site: THAN Davenport, IA - June 2016

TestAmerica Job ID: 280-84495-1

Client Sample ID: ADDV-030 (Continued) — Lab Sample ID: 280-84495-16

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Methane	1300		5.0	0.22	ug/L	1		RSK-175	Total/NA
Chloride	11		3.0	0.25	mg/L	1		300.0	Total/NA
Sulfate	9.5		5.0	0.23	mg/L	1		300.0	Total/NA
Total Organic Carbon - Average	5.2		1.0	0.16	mg/L	1		9060	Total/NA
Alkalinity	470	B ^	5.0	1.1	mg/L	1		SM 2320B	Total/NA
Ferrous Iron	0.17	J HF	0.20	0.021	mg/L	1		SM3500_FE_D	Total/NA

Client Sample ID: ADDV-029 — Lab Sample ID: 280-84495-17

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
1,1-Dichloroethane	0.23	J	1.0	0.22	ug/L	1		8260B	Total/NA
Acetone	4.8	J	10	1.9	ug/L	1		8260B	Total/NA
Methane	1200		5.0	0.22	ug/L	1		RSK-175	Total/NA
Ethane	1.6	J	5.0	0.57	ug/L	1		RSK-175	Total/NA
Chloride	9.2		3.0	0.25	mg/L	1		300.0	Total/NA
Sulfate	8.6		5.0	0.23	mg/L	1		300.0	Total/NA
Total Organic Carbon - Average	6.0		1.0	0.16	mg/L	1		9060	Total/NA
Alkalinity	470	B ^	5.0	1.1	mg/L	1		SM 2320B	Total/NA
Ferrous Iron	0.22	HF	0.20	0.021	mg/L	1		SM3500_FE_D	Total/NA

This Detection Summary does not include radiochemical test results.

Method Summary

Client: CH2M Hill, Inc.
Project/Site: THAN Davenport, IA - June 2016

TestAmerica Job ID: 280-84495-1

Method	Method Description	Protocol	Laboratory
8260B	Volatile Organic Compounds (GC/MS)	SW846	TAL DEN
RSK-175	Dissolved Gases (GC)	RSK	TAL DEN
300.0	Anions, Ion Chromatography	MCAWW	TAL DEN
9060	Organic Carbon, Total (TOC)	SW846	TAL DEN
SM 2320B	Alkalinity	SM	TAL DEN
SM 4500 S2 F	Sulfide, Total	SM	TAL DEN
SM3500_FE_D	Ferrous Iron	SM20	TAL DEN

Protocol References:

MCAWW = "Methods For Chemical Analysis Of Water And Wastes", EPA-600/4-79-020, March 1983 And Subsequent Revisions.

RSK = Sample Prep And Calculations For Dissolved Gas Analysis In Water Samples Using A GC Headspace Equilibration Technique, RSKSOP-175, Rev. 0, 8/11/94, USEPA Research Lab

SM = "Standard Methods For The Examination Of Water And Wastewater",

SM20 = "Standard Methods For The Examination Of Water And Wastewater", 20th Edition."

SW846 = "Test Methods For Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 And Its Updates.

Laboratory References:

TAL DEN = TestAmerica Denver, 4955 Yarrow Street, Arvada, CO 80002, TEL (303)736-0100

Sample Summary

Client: CH2M Hill, Inc.
Project/Site: THAN Davenport, IA - June 2016

TestAmerica Job ID: 280-84495-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
280-84495-1	ADDV-006	Water	06/14/16 11:45	06/15/16 10:00
280-84495-2	ADDV-016	Water	06/14/16 10:05	06/15/16 10:00
280-84495-3	ADDV-010	Water	06/14/16 11:38	06/15/16 10:00
280-84495-4	ADDV-008	Water	06/14/16 09:52	06/15/16 10:00
280-84495-5	ADDV-017	Water	06/14/16 16:35	06/15/16 10:00
280-84495-6	ADDV-025	Water	06/14/16 12:45	06/15/16 10:00
280-84495-7	ADDV-024	Water	06/14/16 14:35	06/15/16 10:00
280-84495-8	ADDV-047	Water	06/14/16 16:55	06/15/16 10:00
280-84495-9	ADDV-046	Water	06/14/16 12:01	06/15/16 10:00
280-84495-10	ADDV-026	Water	06/14/16 11:33	06/15/16 10:00
280-84495-11	ADDV-027	Water	06/14/16 11:37	06/15/16 10:00
280-84495-12	ADDV-028	Water	06/14/16 11:42	06/15/16 10:00
280-84495-13	ADDV-032	Water	06/14/16 09:30	06/15/16 10:00
280-84495-14	ADDV-033	Water	06/14/16 09:40	06/15/16 10:00
280-84495-15	ADDV-034	Water	06/14/16 09:50	06/15/16 10:00
280-84495-16	ADDV-030	Water	06/14/16 15:15	06/15/16 10:00
280-84495-17	ADDV-029	Water	06/14/16 13:10	06/15/16 10:00

Method: 8260B - Volatile Organic Compounds (GC/MS)

Client Sample ID: ADDV-006
Date Collected: 06/14/16 11:45
Date Received: 06/15/16 10:00

Lab Sample ID: 280-84495-1
Matrix: Water

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1,1-Trichloroethane	**24**		4.0	0.64	ug/L			06/23/16 11:10	4
1,1-Dichloroethane	**44**		4.0	0.88	ug/L			06/23/16 11:10	4
1,1-Dichloroethene	**4.7**		4.0	0.92	ug/L			06/23/16 11:10	4
1,2-Dichloroethane	ND		4.0	0.52	ug/L			06/23/16 11:10	4
Methyl ethyl ketone (MEK)	ND		24	8.0	ug/L			06/23/16 11:10	4
Acetone	ND		40	7.6	ug/L			06/23/16 11:10	4
Benzene	ND		4.0	0.64	ug/L			06/23/16 11:10	4
Chloroethane	ND		8.0	1.6	ug/L			06/23/16 11:10	4
cis-1,2-Dichloroethene	**490**	**E**	4.0	0.60	ug/L			06/23/16 11:10	4
Ethylbenzene	ND		4.0	0.64	ug/L			06/23/16 11:10	4
Methylene Chloride	**1.4**	**J**	8.0	1.3	ug/L			06/23/16 11:10	4
m-Xylene & p-Xylene	ND		8.0	1.4	ug/L			06/23/16 11:10	4
o-Xylene	ND		4.0	0.76	ug/L			06/23/16 11:10	4
Styrene	ND		4.0	0.68	ug/L			06/23/16 11:10	4
Tetrachloroethene	ND		4.0	0.80	ug/L			06/23/16 11:10	4
Toluene	ND		4.0	0.68	ug/L			06/23/16 11:10	4
trans-1,2-Dichloroethene	**1.9**	**J**	4.0	0.60	ug/L			06/23/16 11:10	4
Trichloroethene	**2.4**	**J**	4.0	0.64	ug/L			06/23/16 11:10	4
Vinyl chloride	**140**		4.0	0.40	ug/L			06/23/16 11:10	4
Xylenes, Total	ND		8.0	0.76	ug/L			06/23/16 11:10	4

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*99*		*70 - 127*		*06/23/16 11:10*	*4*
4-Bromofluorobenzene (Surr)	*107*		*78 - 120*		*06/23/16 11:10*	*4*
Dibromofluoromethane (Surr)	*94*		*77 - 120*		*06/23/16 11:10*	*4*
Toluene-d8 (Surr)	*107*		*80 - 125*		*06/23/16 11:10*	*4*

Client Sample ID: ADDV-016
Date Collected: 06/14/16 10:05
Date Received: 06/15/16 10:00

Lab Sample ID: 280-84495-2
Matrix: Water

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1,1-Trichloroethane	ND	F2	1.0	0.16	ug/L			06/23/16 11:50	1
1,1-Dichloroethane	ND		1.0	0.22	ug/L			06/23/16 11:50	1
1,1-Dichloroethene	ND	F2	1.0	0.23	ug/L			06/23/16 11:50	1
1,2-Dichloroethane	ND	F1 F2	1.0	0.13	ug/L			06/23/16 11:50	1
Methyl ethyl ketone (MEK)	ND		6.0	2.0	ug/L			06/23/16 11:50	1
Acetone	**6.7**	**J**	10	1.9	ug/L			06/23/16 11:50	1
Benzene	ND		1.0	0.16	ug/L			06/23/16 11:50	1
Chloroethane	**0.94**	**J**	2.0	0.41	ug/L			06/23/16 11:50	1
cis-1,2-Dichloroethene	ND		1.0	0.15	ug/L			06/23/16 11:50	1
Ethylbenzene	ND		1.0	0.16	ug/L			06/23/16 11:50	1
Methylene Chloride	ND		2.0	0.32	ug/L			06/23/16 11:50	1
m-Xylene & p-Xylene	ND		2.0	0.34	ug/L			06/23/16 11:50	1
o-Xylene	ND		1.0	0.19	ug/L			06/23/16 11:50	1
Styrene	ND		1.0	0.17	ug/L			06/23/16 11:50	1
Tetrachloroethene	ND		1.0	0.20	ug/L			06/23/16 11:50	1
Toluene	ND		1.0	0.17	ug/L			06/23/16 11:50	1
trans-1,2-Dichloroethene	ND		1.0	0.15	ug/L			06/23/16 11:50	1
Trichloroethene	ND		1.0	0.16	ug/L			06/23/16 11:50	1
Vinyl chloride	ND		1.0	0.10	ug/L			06/23/16 11:50	1

Method: 8260B - Volatile Organic Compounds (GC/MS) (Continued)

Client Sample ID: ADDV-016 — **Lab Sample ID: 280-84495-2**
Date Collected: 06/14/16 10:05 — **Matrix: Water**
Date Received: 06/15/16 10:00

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Xylenes, Total	ND		2.0	0.19	ug/L			06/23/16 11:50	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*99*		*70 - 127*		*06/23/16 11:50*	*1*
4-Bromofluorobenzene (Surr)	*107*		*78 - 120*		*06/23/16 11:50*	*1*
Dibromofluoromethane (Surr)	*94*		*77 - 120*		*06/23/16 11:50*	*1*
Toluene-d8 (Surr)	*104*		*80 - 125*		*06/23/16 11:50*	*1*

Client Sample ID: ADDV-010 — **Lab Sample ID: 280-84495-3**
Date Collected: 06/14/16 11:38 — **Matrix: Water**
Date Received: 06/15/16 10:00

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1,1-Trichloroethane	ND		4.0	0.64	ug/L			06/23/16 13:28	4
1,1-Dichloroethane	**140**		4.0	0.88	ug/L			06/23/16 13:28	4
1,1-Dichloroethene	**6.4**		4.0	0.92	ug/L			06/23/16 13:28	4
1,2-Dichloroethane	ND		4.0	0.52	ug/L			06/23/16 13:28	4
Methyl ethyl ketone (MEK)	ND		24	8.0	ug/L			06/23/16 13:28	4
Acetone	ND		40	7.6	ug/L			06/23/16 13:28	4
Benzene	ND		4.0	0.64	ug/L			06/23/16 13:28	4
Chloroethane	ND		8.0	1.6	ug/L			06/23/16 13:28	4
cis-1,2-Dichloroethene	**400**	**E**	4.0	0.60	ug/L			06/23/16 13:28	4
Ethylbenzene	ND		4.0	0.64	ug/L			06/23/16 13:28	4
Methylene Chloride	**1.9**	**J**	8.0	1.3	ug/L			06/23/16 13:28	4
m-Xylene & p-Xylene	ND		8.0	1.4	ug/L			06/23/16 13:28	4
o-Xylene	ND		4.0	0.76	ug/L			06/23/16 13:28	4
Styrene	ND		4.0	0.68	ug/L			06/23/16 13:28	4
Tetrachloroethene	ND		4.0	0.80	ug/L			06/23/16 13:28	4
Toluene	ND		4.0	0.68	ug/L			06/23/16 13:28	4
trans-1,2-Dichloroethene	**1.6**	**J**	4.0	0.60	ug/L			06/23/16 13:28	4
Trichloroethene	ND		4.0	0.64	ug/L			06/23/16 13:28	4
Vinyl chloride	**170**		4.0	0.40	ug/L			06/23/16 13:28	4
Xylenes, Total	ND		8.0	0.76	ug/L			06/23/16 13:28	4

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*97*		*70 - 127*		*06/23/16 13:28*	*4*
4-Bromofluorobenzene (Surr)	*104*		*78 - 120*		*06/23/16 13:28*	*4*
Dibromofluoromethane (Surr)	*92*		*77 - 120*		*06/23/16 13:28*	*4*
Toluene-d8 (Surr)	*99*		*80 - 125*		*06/23/16 13:28*	*4*

Client Sample ID: ADDV-008 — **Lab Sample ID: 280-84495-4**
Date Collected: 06/14/16 09:52 — **Matrix: Water**
Date Received: 06/15/16 10:00

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1,1-Trichloroethane	ND		1.0	0.16	ug/L			06/23/16 14:08	1
1,1-Dichloroethane	ND		1.0	0.22	ug/L			06/23/16 14:08	1
1,1-Dichloroethene	ND		1.0	0.23	ug/L			06/23/16 14:08	1
1,2-Dichloroethane	ND		1.0	0.13	ug/L			06/23/16 14:08	1
Methyl ethyl ketone (MEK)	ND		6.0	2.0	ug/L			06/23/16 14:08	1
Acetone	ND		10	1.9	ug/L			06/23/16 14:08	1
Benzene	ND		1.0	0.16	ug/L			06/23/16 14:08	1

Method: 8260B - Volatile Organic Compounds (GC/MS) (Continued)

Client Sample ID: ADDV-008
Date Collected: 06/14/16 09:52
Date Received: 06/15/16 10:00

Lab Sample ID: 280-84495-4
Matrix: Water

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloroethane	**0.62**	**J**	2.0	0.41	ug/L			06/23/16 14:08	1
cis-1,2-Dichloroethene	ND		1.0	0.15	ug/L			06/23/16 14:08	1
Ethylbenzene	ND		1.0	0.16	ug/L			06/23/16 14:08	1
Methylene Chloride	**0.39**	**J**	2.0	0.32	ug/L			06/23/16 14:08	1
m-Xylene & p-Xylene	ND		2.0	0.34	ug/L			06/23/16 14:08	1
o-Xylene	ND		1.0	0.19	ug/L			06/23/16 14:08	1
Styrene	ND		1.0	0.17	ug/L			06/23/16 14:08	1
Tetrachloroethene	ND		1.0	0.20	ug/L			06/23/16 14:08	1
Toluene	ND		1.0	0.17	ug/L			06/23/16 14:08	1
trans-1,2-Dichloroethene	ND		1.0	0.15	ug/L			06/23/16 14:08	1
Trichloroethene	ND		1.0	0.16	ug/L			06/23/16 14:08	1
Vinyl chloride	ND		1.0	0.10	ug/L			06/23/16 14:08	1
Xylenes, Total	ND		2.0	0.19	ug/L			06/23/16 14:08	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*107*		*70 - 127*		*06/23/16 14:08*	*1*
4-Bromofluorobenzene (Surr)	*111*		*78 - 120*		*06/23/16 14:08*	*1*
Dibromofluoromethane (Surr)	*96*		*77 - 120*		*06/23/16 14:08*	*1*
Toluene-d8 (Surr)	*103*		*80 - 125*		*06/23/16 14:08*	*1*

Client Sample ID: ADDV-017
Date Collected: 06/14/16 16:35
Date Received: 06/15/16 10:00

Lab Sample ID: 280-84495-5
Matrix: Water

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1,1-Trichloroethane	ND		1.0	0.16	ug/L			06/23/16 14:28	1
1,1-Dichloroethane	**0.23**	**J**	1.0	0.22	ug/L			06/23/16 14:28	1
1,1-Dichloroethene	ND		1.0	0.23	ug/L			06/23/16 14:28	1
1,2-Dichloroethane	ND		1.0	0.13	ug/L			06/23/16 14:28	1
Methyl ethyl ketone (MEK)	ND		6.0	2.0	ug/L			06/23/16 14:28	1
Acetone	ND		10	1.9	ug/L			06/23/16 14:28	1
Benzene	ND		1.0	0.16	ug/L			06/23/16 14:28	1
Chloroethane	ND		2.0	0.41	ug/L			06/23/16 14:28	1
cis-1,2-Dichloroethene	**1.1**		1.0	0.15	ug/L			06/23/16 14:28	1
Ethylbenzene	ND		1.0	0.16	ug/L			06/23/16 14:28	1
Methylene Chloride	**0.33**	**J**	2.0	0.32	ug/L			06/23/16 14:28	1
m-Xylene & p-Xylene	ND		2.0	0.34	ug/L			06/23/16 14:28	1
o-Xylene	ND		1.0	0.19	ug/L			06/23/16 14:28	1
Styrene	ND		1.0	0.17	ug/L			06/23/16 14:28	1
Tetrachloroethene	**0.46**	**J**	1.0	0.20	ug/L			06/23/16 14:28	1
Toluene	ND		1.0	0.17	ug/L			06/23/16 14:28	1
trans-1,2-Dichloroethene	ND		1.0	0.15	ug/L			06/23/16 14:28	1
Trichloroethene	**0.56**	**J**	1.0	0.16	ug/L			06/23/16 14:28	1
Vinyl chloride	ND		1.0	0.10	ug/L			06/23/16 14:28	1
Xylenes, Total	ND		2.0	0.19	ug/L			06/23/16 14:28	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*115*		*70 - 127*		*06/23/16 14:28*	*1*
4-Bromofluorobenzene (Surr)	*116*		*78 - 120*		*06/23/16 14:28*	*1*
Dibromofluoromethane (Surr)	*104*		*77 - 120*		*06/23/16 14:28*	*1*
Toluene-d8 (Surr)	*112*		*80 - 125*		*06/23/16 14:28*	*1*

Method: 8260B - Volatile Organic Compounds (GC/MS)

Client Sample ID: ADDV-025
Date Collected: 06/14/16 12:45
Date Received: 06/15/16 10:00

Lab Sample ID: 280-84495-6
Matrix: Water

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1,1-Trichloroethane	ND		1.0	0.16	ug/L			06/23/16 14:47	1
1,1-Dichloroethane	ND		1.0	0.22	ug/L			06/23/16 14:47	1
1,1-Dichloroethene	ND		1.0	0.23	ug/L			06/23/16 14:47	1
1,2-Dichloroethane	ND		1.0	0.13	ug/L			06/23/16 14:47	1
Methyl ethyl ketone (MEK)	ND		6.0	2.0	ug/L			06/23/16 14:47	1
Acetone	ND		10	1.9	ug/L			06/23/16 14:47	1
Benzene	ND		1.0	0.16	ug/L			06/23/16 14:47	1
Chloroethane	ND		2.0	0.41	ug/L			06/23/16 14:47	1
cis-1,2-Dichloroethene	ND		1.0	0.15	ug/L			06/23/16 14:47	1
Ethylbenzene	ND		1.0	0.16	ug/L			06/23/16 14:47	1
Methylene Chloride	**0.32**	**J**	2.0	0.32	ug/L			06/23/16 14:47	1
m-Xylene & p-Xylene	ND		2.0	0.34	ug/L			06/23/16 14:47	1
o-Xylene	ND		1.0	0.19	ug/L			06/23/16 14:47	1
Styrene	ND		1.0	0.17	ug/L			06/23/16 14:47	1
Tetrachloroethene	ND		1.0	0.20	ug/L			06/23/16 14:47	1
Toluene	ND		1.0	0.17	ug/L			06/23/16 14:47	1
trans-1,2-Dichloroethene	ND		1.0	0.15	ug/L			06/23/16 14:47	1
Trichloroethene	ND		1.0	0.16	ug/L			06/23/16 14:47	1
Vinyl chloride	ND		1.0	0.10	ug/L			06/23/16 14:47	1
Xylenes, Total	ND		2.0	0.19	ug/L			06/23/16 14:47	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*110*		*70 - 127*		*06/23/16 14:47*	*1*
4-Bromofluorobenzene (Surr)	*110*		*78 - 120*		*06/23/16 14:47*	*1*
Dibromofluoromethane (Surr)	*99*		*77 - 120*		*06/23/16 14:47*	*1*
Toluene-d8 (Surr)	*103*		*80 - 125*		*06/23/16 14:47*	*1*

Client Sample ID: ADDV-024
Date Collected: 06/14/16 14:35
Date Received: 06/15/16 10:00

Lab Sample ID: 280-84495-7
Matrix: Water

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1,1-Trichloroethane	ND		1.0	0.16	ug/L			06/23/16 15:07	1
1,1-Dichloroethane	ND		1.0	0.22	ug/L			06/23/16 15:07	1
1,1-Dichloroethene	ND		1.0	0.23	ug/L			06/23/16 15:07	1
1,2-Dichloroethane	ND		1.0	0.13	ug/L			06/23/16 15:07	1
Methyl ethyl ketone (MEK)	ND		6.0	2.0	ug/L			06/23/16 15:07	1
Acetone	**7.1**	**J**	10	1.9	ug/L			06/23/16 15:07	1
Benzene	ND		1.0	0.16	ug/L			06/23/16 15:07	1
Chloroethane	ND		2.0	0.41	ug/L			06/23/16 15:07	1
cis-1,2-Dichloroethene	**0.27**	**J**	1.0	0.15	ug/L			06/23/16 15:07	1
Ethylbenzene	ND		1.0	0.16	ug/L			06/23/16 15:07	1
Methylene Chloride	**0.38**	**J**	2.0	0.32	ug/L			06/23/16 15:07	1
m-Xylene & p-Xylene	ND		2.0	0.34	ug/L			06/23/16 15:07	1
o-Xylene	ND		1.0	0.19	ug/L			06/23/16 15:07	1
Styrene	ND		1.0	0.17	ug/L			06/23/16 15:07	1
Tetrachloroethene	ND		1.0	0.20	ug/L			06/23/16 15:07	1
Toluene	ND		1.0	0.17	ug/L			06/23/16 15:07	1
trans-1,2-Dichloroethene	ND		1.0	0.15	ug/L			06/23/16 15:07	1
Trichloroethene	ND		1.0	0.16	ug/L			06/23/16 15:07	1
Vinyl chloride	ND		1.0	0.10	ug/L			06/23/16 15:07	1

Method: 8260B - Volatile Organic Compounds (GC/MS) (Continued)

Client Sample ID: ADDV-024 — **Lab Sample ID: 280-84495-7**
Date Collected: 06/14/16 14:35 — **Matrix: Water**
Date Received: 06/15/16 10:00

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Xylenes, Total	ND		2.0	0.19	ug/L			06/23/16 15:07	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*110*		*70 - 127*		*06/23/16 15:07*	*1*
4-Bromofluorobenzene (Surr)	*109*		*78 - 120*		*06/23/16 15:07*	*1*
Dibromofluoromethane (Surr)	*99*		*77 - 120*		*06/23/16 15:07*	*1*
Toluene-d8 (Surr)	*104*		*80 - 125*		*06/23/16 15:07*	*1*

Client Sample ID: ADDV-047 — **Lab Sample ID: 280-84495-8**
Date Collected: 06/14/16 16:55 — **Matrix: Water**
Date Received: 06/15/16 10:00

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1,1-Trichloroethane	ND		1.0	0.16	ug/L			06/23/16 15:27	1
1,1-Dichloroethane	ND		1.0	0.22	ug/L			06/23/16 15:27	1
1,1-Dichloroethene	ND		1.0	0.23	ug/L			06/23/16 15:27	1
1,2-Dichloroethane	ND		1.0	0.13	ug/L			06/23/16 15:27	1
Methyl ethyl ketone (MEK)	ND		6.0	2.0	ug/L			06/23/16 15:27	1
Acetone	ND		10	1.9	ug/L			06/23/16 15:27	1
Benzene	ND		1.0	0.16	ug/L			06/23/16 15:27	1
Chloroethane	ND		2.0	0.41	ug/L			06/23/16 15:27	1
cis-1,2-Dichloroethene	ND		1.0	0.15	ug/L			06/23/16 15:27	1
Ethylbenzene	ND		1.0	0.16	ug/L			06/23/16 15:27	1
Methylene Chloride	**0.51**	**J**	2.0	0.32	ug/L			06/23/16 15:27	1
m-Xylene & p-Xylene	ND		2.0	0.34	ug/L			06/23/16 15:27	1
o-Xylene	ND		1.0	0.19	ug/L			06/23/16 15:27	1
Styrene	ND		1.0	0.17	ug/L			06/23/16 15:27	1
Tetrachloroethene	ND		1.0	0.20	ug/L			06/23/16 15:27	1
Toluene	ND		1.0	0.17	ug/L			06/23/16 15:27	1
trans-1,2-Dichloroethene	ND		1.0	0.15	ug/L			06/23/16 15:27	1
Trichloroethene	ND		1.0	0.16	ug/L			06/23/16 15:27	1
Vinyl chloride	ND		1.0	0.10	ug/L			06/23/16 15:27	1
Xylenes, Total	ND		2.0	0.19	ug/L			06/23/16 15:27	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*115*		*70 - 127*		*06/23/16 15:27*	*1*
4-Bromofluorobenzene (Surr)	*119*		*78 - 120*		*06/23/16 15:27*	*1*
Dibromofluoromethane (Surr)	*103*		*77 - 120*		*06/23/16 15:27*	*1*
Toluene-d8 (Surr)	*112*		*80 - 125*		*06/23/16 15:27*	*1*

Client Sample ID: ADDV-046 — **Lab Sample ID: 280-84495-9**
Date Collected: 06/14/16 12:01 — **Matrix: Water**
Date Received: 06/15/16 10:00

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1,1-Trichloroethane	ND		1.0	0.16	ug/L			06/23/16 15:47	1
1,1-Dichloroethane	ND		1.0	0.22	ug/L			06/23/16 15:47	1
1,1-Dichloroethene	ND		1.0	0.23	ug/L			06/23/16 15:47	1
1,2-Dichloroethane	ND		1.0	0.13	ug/L			06/23/16 15:47	1
Methyl ethyl ketone (MEK)	ND		6.0	2.0	ug/L			06/23/16 15:47	1
Acetone	ND		10	1.9	ug/L			06/23/16 15:47	1
Benzene	ND		1.0	0.16	ug/L			06/23/16 15:47	1

Method: 8260B - Volatile Organic Compounds (GC/MS) (Continued)

Client Sample ID: ADDV-046
Date Collected: 06/14/16 12:01
Date Received: 06/15/16 10:00

Lab Sample ID: 280-84495-9
Matrix: Water

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloroethane	ND		2.0	0.41	ug/L			06/23/16 15:47	1
cis-1,2-Dichloroethene	ND		1.0	0.15	ug/L			06/23/16 15:47	1
Ethylbenzene	ND		1.0	0.16	ug/L			06/23/16 15:47	1
Methylene Chloride	**0.37**	**J**	2.0	0.32	ug/L			06/23/16 15:47	1
m-Xylene & p-Xylene	ND		2.0	0.34	ug/L			06/23/16 15:47	1
o-Xylene	ND		1.0	0.19	ug/L			06/23/16 15:47	1
Styrene	ND		1.0	0.17	ug/L			06/23/16 15:47	1
Tetrachloroethene	ND		1.0	0.20	ug/L			06/23/16 15:47	1
Toluene	ND		1.0	0.17	ug/L			06/23/16 15:47	1
trans-1,2-Dichloroethene	ND		1.0	0.15	ug/L			06/23/16 15:47	1
Trichloroethene	ND		1.0	0.16	ug/L			06/23/16 15:47	1
Vinyl chloride	ND		1.0	0.10	ug/L			06/23/16 15:47	1
Xylenes, Total	ND		2.0	0.19	ug/L			06/23/16 15:47	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*112*		*70 - 127*		*06/23/16 15:47*	*1*
4-Bromofluorobenzene (Surr)	*110*		*78 - 120*		*06/23/16 15:47*	*1*
Dibromofluoromethane (Surr)	*100*		*77 - 120*		*06/23/16 15:47*	*1*
Toluene-d8 (Surr)	*106*		*80 - 125*		*06/23/16 15:47*	*1*

Client Sample ID: ADDV-026
Date Collected: 06/14/16 11:33
Date Received: 06/15/16 10:00

Lab Sample ID: 280-84495-10
Matrix: Water

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1,1-Trichloroethane	**390**		100	16	ug/L			06/23/16 16:06	100
1,1-Dichloroethane	**2000**		100	22	ug/L			06/23/16 16:06	100
1,1-Dichloroethene	**290**		100	23	ug/L			06/23/16 16:06	100
1,2-Dichloroethane	ND		100	13	ug/L			06/23/16 16:06	100
Methyl ethyl ketone (MEK)	ND		600	200	ug/L			06/23/16 16:06	100
Acetone	ND		1000	190	ug/L			06/23/16 16:06	100
Benzene	**21**	**J**	100	16	ug/L			06/23/16 16:06	100
Chloroethane	ND		200	41	ug/L			06/23/16 16:06	100
cis-1,2-Dichloroethene	**39000**	**E**	100	15	ug/L			06/23/16 16:06	100
Ethylbenzene	**1100**		100	16	ug/L			06/23/16 16:06	100
Methylene Chloride	ND		200	32	ug/L			06/23/16 16:06	100
m-Xylene & p-Xylene	**510**		200	34	ug/L			06/23/16 16:06	100
o-Xylene	**330**		100	19	ug/L			06/23/16 16:06	100
Styrene	ND		100	17	ug/L			06/23/16 16:06	100
Tetrachloroethene	ND		100	20	ug/L			06/23/16 16:06	100
Toluene	**640**		100	17	ug/L			06/23/16 16:06	100
trans-1,2-Dichloroethene	**22**	**J**	100	15	ug/L			06/23/16 16:06	100
Trichloroethene	ND		100	16	ug/L			06/23/16 16:06	100
Vinyl chloride	**12000**	**E**	100	10	ug/L			06/23/16 16:06	100
Xylenes, Total	**840**		200	19	ug/L			06/23/16 16:06	100

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*109*		*70 - 127*		*06/23/16 16:06*	*100*
4-Bromofluorobenzene (Surr)	*109*		*78 - 120*		*06/23/16 16:06*	*100*
Dibromofluoromethane (Surr)	*100*		*77 - 120*		*06/23/16 16:06*	*100*
Toluene-d8 (Surr)	*103*		*80 - 125*		*06/23/16 16:06*	*100*

Client Sample Results

Client: CH2M Hill, Inc.
Project/Site: THAN Davenport, IA - June 2016

TestAmerica Job ID: 280-84495-1

Method: 8260B - Volatile Organic Compounds (GC/MS)

Client Sample ID: ADDV-027
Date Collected: 06/14/16 11:37
Date Received: 06/15/16 10:00

Lab Sample ID: 280-84495-11
Matrix: Water

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1,1-Trichloroethane	ND		1.0	0.16	ug/L			06/23/16 16:46	1
1,1-Dichloroethane	**0.98**	**J**	1.0	0.22	ug/L			06/23/16 16:46	1
1,1-Dichloroethene	ND		1.0	0.23	ug/L			06/23/16 16:46	1
1,2-Dichloroethane	ND		1.0	0.13	ug/L			06/23/16 16:46	1
Methyl ethyl ketone (MEK)	ND		6.0	2.0	ug/L			06/23/16 16:46	1
Acetone	**28**		10	1.9	ug/L			06/23/16 16:46	1
Benzene	**3.0**		1.0	0.16	ug/L			06/23/16 16:46	1
Chloroethane	**25**		2.0	0.41	ug/L			06/23/16 16:46	1
cis-1,2-Dichloroethene	**1.3**		1.0	0.15	ug/L			06/23/16 16:46	1
Ethylbenzene	**0.47**	**J**	1.0	0.16	ug/L			06/23/16 16:46	1
Methylene Chloride	ND		2.0	0.32	ug/L			06/23/16 16:46	1
m-Xylene & p-Xylene	ND		2.0	0.34	ug/L			06/23/16 16:46	1
o-Xylene	ND		1.0	0.19	ug/L			06/23/16 16:46	1
Styrene	ND		1.0	0.17	ug/L			06/23/16 16:46	1
Tetrachloroethene	ND		1.0	0.20	ug/L			06/23/16 16:46	1
Toluene	**0.46**	**J**	1.0	0.17	ug/L			06/23/16 16:46	1
trans-1,2-Dichloroethene	**0.37**	**J**	1.0	0.15	ug/L			06/23/16 16:46	1
Trichloroethene	ND		1.0	0.16	ug/L			06/23/16 16:46	1
Vinyl chloride	**1.1**		1.0	0.10	ug/L			06/23/16 16:46	1
Xylenes, Total	ND		2.0	0.19	ug/L			06/23/16 16:46	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*109*		*70 - 127*		*06/23/16 16:46*	*1*
4-Bromofluorobenzene (Surr)	*111*		*78 - 120*		*06/23/16 16:46*	*1*
Dibromofluoromethane (Surr)	*96*		*77 - 120*		*06/23/16 16:46*	*1*
Toluene-d8 (Surr)	*105*		*80 - 125*		*06/23/16 16:46*	*1*

Client Sample ID: ADDV-028
Date Collected: 06/14/16 11:42
Date Received: 06/15/16 10:00

Lab Sample ID: 280-84495-12
Matrix: Water

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1,1-Trichloroethane	ND		1.0	0.16	ug/L			06/23/16 17:06	1
1,1-Dichloroethane	**95**	**E**	1.0	0.22	ug/L			06/23/16 17:06	1
1,1-Dichloroethene	**0.68**	**J**	1.0	0.23	ug/L			06/23/16 17:06	1
1,2-Dichloroethane	ND		1.0	0.13	ug/L			06/23/16 17:06	1
Methyl ethyl ketone (MEK)	ND		6.0	2.0	ug/L			06/23/16 17:06	1
Acetone	ND		10	1.9	ug/L			06/23/16 17:06	1
Benzene	**3.0**		1.0	0.16	ug/L			06/23/16 17:06	1
Chloroethane	**170**	**E**	2.0	0.41	ug/L			06/23/16 17:06	1
cis-1,2-Dichloroethene	**160**	**E**	1.0	0.15	ug/L			06/23/16 17:06	1
Ethylbenzene	**49**		1.0	0.16	ug/L			06/23/16 17:06	1
Methylene Chloride	**0.62**	**J**	2.0	0.32	ug/L			06/23/16 17:06	1
m-Xylene & p-Xylene	**9.1**		2.0	0.34	ug/L			06/23/16 17:06	1
o-Xylene	**5.1**		1.0	0.19	ug/L			06/23/16 17:06	1
Styrene	ND		1.0	0.17	ug/L			06/23/16 17:06	1
Tetrachloroethene	ND		1.0	0.20	ug/L			06/23/16 17:06	1
Toluene	**4.7**		1.0	0.17	ug/L			06/23/16 17:06	1
trans-1,2-Dichloroethene	ND		1.0	0.15	ug/L			06/23/16 17:06	1
Trichloroethene	ND		1.0	0.16	ug/L			06/23/16 17:06	1
Vinyl chloride	**260**	**E**	1.0	0.10	ug/L			06/23/16 17:06	1

Method: 8260B - Volatile Organic Compounds (GC/MS) (Continued)

Client Sample ID: ADDV-028 — **Lab Sample ID: 280-84495-12**
Date Collected: 06/14/16 11:42 — **Matrix: Water**
Date Received: 06/15/16 10:00

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Xylenes, Total	**14**		2.0	0.19	ug/L			06/23/16 17:06	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*110*		*70 - 127*		*06/23/16 17:06*	*1*
4-Bromofluorobenzene (Surr)	*115*		*78 - 120*		*06/23/16 17:06*	*1*
Dibromofluoromethane (Surr)	*97*		*77 - 120*		*06/23/16 17:06*	*1*
Toluene-d8 (Surr)	*106*		*80 - 125*		*06/23/16 17:06*	*1*

Client Sample ID: ADDV-032 — **Lab Sample ID: 280-84495-13**
Date Collected: 06/14/16 09:30 — **Matrix: Water**
Date Received: 06/15/16 10:00

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1,1-Trichloroethane	**12**	**J**	40	6.4	ug/L			06/23/16 17:45	40
1,1-Dichloroethane	**270**		40	8.8	ug/L			06/23/16 17:45	40
1,1-Dichloroethene	ND		40	9.2	ug/L			06/23/16 17:45	40
1,2-Dichloroethane	ND		40	5.2	ug/L			06/23/16 17:45	40
Methyl ethyl ketone (MEK)	ND		240	80	ug/L			06/23/16 17:45	40
Acetone	ND		400	76	ug/L			06/23/16 17:45	40
Benzene	**43**		40	6.4	ug/L			06/23/16 17:45	40
Chloroethane	**1700**		80	16	ug/L			06/23/16 17:45	40
cis-1,2-Dichloroethene	**32**	**J**	40	6.0	ug/L			06/23/16 17:45	40
Ethylbenzene	**650**		40	6.4	ug/L			06/23/16 17:45	40
Methylene Chloride	ND		80	13	ug/L			06/23/16 17:45	40
m-Xylene & p-Xylene	**1400**		80	14	ug/L			06/23/16 17:45	40
o-Xylene	**450**		40	7.6	ug/L			06/23/16 17:45	40
Styrene	ND		40	6.8	ug/L			06/23/16 17:45	40
Tetrachloroethene	ND		40	8.0	ug/L			06/23/16 17:45	40
Toluene	**8400**	**E**	40	6.8	ug/L			06/23/16 17:45	40
trans-1,2-Dichloroethene	**7.1**	**J**	40	6.0	ug/L			06/23/16 17:45	40
Trichloroethene	ND		40	6.4	ug/L			06/23/16 17:45	40
Vinyl chloride	**120**		40	4.0	ug/L			06/23/16 17:45	40
Xylenes, Total	**1900**		80	7.6	ug/L			06/23/16 17:45	40

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*118*		*70 - 127*		*06/23/16 17:45*	*40*
4-Bromofluorobenzene (Surr)	*122*	*X*	*78 - 120*		*06/23/16 17:45*	*40*
Dibromofluoromethane (Surr)	*109*		*77 - 120*		*06/23/16 17:45*	*40*
Toluene-d8 (Surr)	*112*		*80 - 125*		*06/23/16 17:45*	*40*

Client Sample ID: ADDV-033 — **Lab Sample ID: 280-84495-14**
Date Collected: 06/14/16 09:40 — **Matrix: Water**
Date Received: 06/15/16 10:00

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1,1-Trichloroethane	**1.8**	**J**	4.0	0.64	ug/L			06/23/16 18:25	4
1,1-Dichloroethane	**53**		4.0	0.88	ug/L			06/23/16 18:25	4
1,1-Dichloroethene	ND		4.0	0.92	ug/L			06/23/16 18:25	4
1,2-Dichloroethane	ND		4.0	0.52	ug/L			06/23/16 18:25	4
Methyl ethyl ketone (MEK)	ND		24	8.0	ug/L			06/23/16 18:25	4
Acetone	ND		40	7.6	ug/L			06/23/16 18:25	4
Benzene	**21**		4.0	0.64	ug/L			06/23/16 18:25	4

Method: 8260B - Volatile Organic Compounds (GC/MS) (Continued)

Client Sample ID: ADDV-033
Date Collected: 06/14/16 09:40
Date Received: 06/15/16 10:00

Lab Sample ID: 280-84495-14
Matrix: Water

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloroethane	**730**	**E**	8.0	1.6	ug/L			06/23/16 18:25	4
cis-1,2-Dichloroethene	**13**		4.0	0.60	ug/L			06/23/16 18:25	4
Ethylbenzene	**300**	**E**	4.0	0.64	ug/L			06/23/16 18:25	4
Methylene Chloride	**1.4**	**J**	8.0	1.3	ug/L			06/23/16 18:25	4
m-Xylene & p-Xylene	**670**	**E**	8.0	1.4	ug/L			06/23/16 18:25	4
o-Xylene	**210**		4.0	0.76	ug/L			06/23/16 18:25	4
Styrene	ND		4.0	0.68	ug/L			06/23/16 18:25	4
Tetrachloroethene	ND		4.0	0.80	ug/L			06/23/16 18:25	4
Toluene	**970**	**E**	4.0	0.68	ug/L			06/23/16 18:25	4
trans-1,2-Dichloroethene	**1.8**	**J**	4.0	0.60	ug/L			06/23/16 18:25	4
Trichloroethene	ND		4.0	0.64	ug/L			06/23/16 18:25	4
Vinyl chloride	**35**		4.0	0.40	ug/L			06/23/16 18:25	4
Xylenes, Total	**880**		8.0	0.76	ug/L			06/23/16 18:25	4

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*106*		*70 - 127*		*06/23/16 18:25*	*4*
4-Bromofluorobenzene (Surr)	*104*		*78 - 120*		*06/23/16 18:25*	*4*
Dibromofluoromethane (Surr)	*96*		*77 - 120*		*06/23/16 18:25*	*4*
Toluene-d8 (Surr)	*96*		*80 - 125*		*06/23/16 18:25*	*4*

Client Sample ID: ADDV-034
Date Collected: 06/14/16 09:50
Date Received: 06/15/16 10:00

Lab Sample ID: 280-84495-15
Matrix: Water

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1,1-Trichloroethane	ND		2.0	0.32	ug/L			06/23/16 19:04	2
1,1-Dichloroethane	**2.9**		2.0	0.44	ug/L			06/23/16 19:04	2
1,1-Dichloroethene	ND		2.0	0.46	ug/L			06/23/16 19:04	2
1,2-Dichloroethane	ND		2.0	0.26	ug/L			06/23/16 19:04	2
Methyl ethyl ketone (MEK)	ND		12	4.0	ug/L			06/23/16 19:04	2
Acetone	ND		20	3.8	ug/L			06/23/16 19:04	2
Benzene	**19**		2.0	0.32	ug/L			06/23/16 19:04	2
Chloroethane	**640**	**E**	4.0	0.82	ug/L			06/23/16 19:04	2
cis-1,2-Dichloroethene	**0.93**	**J**	2.0	0.30	ug/L			06/23/16 19:04	2
Ethylbenzene	**230**	**E**	2.0	0.32	ug/L			06/23/16 19:04	2
Methylene Chloride	**0.98**	**J**	4.0	0.64	ug/L			06/23/16 19:04	2
m-Xylene & p-Xylene	**650**	**E**	4.0	0.68	ug/L			06/23/16 19:04	2
o-Xylene	**170**	**E**	2.0	0.38	ug/L			06/23/16 19:04	2
Styrene	ND		2.0	0.34	ug/L			06/23/16 19:04	2
Tetrachloroethene	ND		2.0	0.40	ug/L			06/23/16 19:04	2
Toluene	**81**		2.0	0.34	ug/L			06/23/16 19:04	2
trans-1,2-Dichloroethene	ND		2.0	0.30	ug/L			06/23/16 19:04	2
Trichloroethene	ND		2.0	0.32	ug/L			06/23/16 19:04	2
Vinyl chloride	**2.3**		2.0	0.20	ug/L			06/23/16 19:04	2
Xylenes, Total	**820**		4.0	0.38	ug/L			06/23/16 19:04	2

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*113*		*70 - 127*		*06/23/16 19:04*	*2*
4-Bromofluorobenzene (Surr)	*117*		*78 - 120*		*06/23/16 19:04*	*2*
Dibromofluoromethane (Surr)	*103*		*77 - 120*		*06/23/16 19:04*	*2*
Toluene-d8 (Surr)	*111*		*80 - 125*		*06/23/16 19:04*	*2*

Client Sample Results

Client: CH2M Hill, Inc.
Project/Site: THAN Davenport, IA - June 2016

TestAmerica Job ID: 280-84495-1

Method: 8260B - Volatile Organic Compounds (GC/MS)

Client Sample ID: ADDV-030
Date Collected: 06/14/16 15:15
Date Received: 06/15/16 10:00

Lab Sample ID: 280-84495-16
Matrix: Water

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1,1-Trichloroethane	ND		1.0	0.16	ug/L			06/23/16 19:44	1
1,1-Dichloroethane	ND		1.0	0.22	ug/L			06/23/16 19:44	1
1,1-Dichloroethene	ND		1.0	0.23	ug/L			06/23/16 19:44	1
1,2-Dichloroethane	ND		1.0	0.13	ug/L			06/23/16 19:44	1
Methyl ethyl ketone (MEK)	ND		6.0	2.0	ug/L			06/23/16 19:44	1
Acetone	ND		10	1.9	ug/L			06/23/16 19:44	1
Benzene	ND		1.0	0.16	ug/L			06/23/16 19:44	1
Chloroethane	ND		2.0	0.41	ug/L			06/23/16 19:44	1
cis-1,2-Dichloroethene	ND		1.0	0.15	ug/L			06/23/16 19:44	1
Ethylbenzene	ND		1.0	0.16	ug/L			06/23/16 19:44	1
Methylene Chloride	ND		2.0	0.32	ug/L			06/23/16 19:44	1
m-Xylene & p-Xylene	ND		2.0	0.34	ug/L			06/23/16 19:44	1
o-Xylene	ND		1.0	0.19	ug/L			06/23/16 19:44	1
Styrene	ND		1.0	0.17	ug/L			06/23/16 19:44	1
Tetrachloroethene	ND		1.0	0.20	ug/L			06/23/16 19:44	1
Toluene	ND		1.0	0.17	ug/L			06/23/16 19:44	1
trans-1,2-Dichloroethene	ND		1.0	0.15	ug/L			06/23/16 19:44	1
Trichloroethene	ND		1.0	0.16	ug/L			06/23/16 19:44	1
Vinyl chloride	ND		1.0	0.10	ug/L			06/23/16 19:44	1
Xylenes, Total	ND		2.0	0.19	ug/L			06/23/16 19:44	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*107*		*70 - 127*		*06/23/16 19:44*	*1*
4-Bromofluorobenzene (Surr)	*106*		*78 - 120*		*06/23/16 19:44*	*1*
Dibromofluoromethane (Surr)	*98*		*77 - 120*		*06/23/16 19:44*	*1*
Toluene-d8 (Surr)	*103*		*80 - 125*		*06/23/16 19:44*	*1*

Client Sample ID: ADDV-029
Date Collected: 06/14/16 13:10
Date Received: 06/15/16 10:00

Lab Sample ID: 280-84495-17
Matrix: Water

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1,1-Trichloroethane	ND		1.0	0.16	ug/L			06/23/16 20:03	1
1,1-Dichloroethane	**0.23**	**J**	1.0	0.22	ug/L			06/23/16 20:03	1
1,1-Dichloroethene	ND		1.0	0.23	ug/L			06/23/16 20:03	1
1,2-Dichloroethane	ND		1.0	0.13	ug/L			06/23/16 20:03	1
Methyl ethyl ketone (MEK)	ND		6.0	2.0	ug/L			06/23/16 20:03	1
Acetone	**4.8**	**J**	10	1.9	ug/L			06/23/16 20:03	1
Benzene	ND		1.0	0.16	ug/L			06/23/16 20:03	1
Chloroethane	ND		2.0	0.41	ug/L			06/23/16 20:03	1
cis-1,2-Dichloroethene	ND		1.0	0.15	ug/L			06/23/16 20:03	1
Ethylbenzene	ND		1.0	0.16	ug/L			06/23/16 20:03	1
Methylene Chloride	ND		2.0	0.32	ug/L			06/23/16 20:03	1
m-Xylene & p-Xylene	ND		2.0	0.34	ug/L			06/23/16 20:03	1
o-Xylene	ND		1.0	0.19	ug/L			06/23/16 20:03	1
Styrene	ND		1.0	0.17	ug/L			06/23/16 20:03	1
Tetrachloroethene	ND		1.0	0.20	ug/L			06/23/16 20:03	1
Toluene	ND		1.0	0.17	ug/L			06/23/16 20:03	1
trans-1,2-Dichloroethene	ND		1.0	0.15	ug/L			06/23/16 20:03	1
Trichloroethene	ND		1.0	0.16	ug/L			06/23/16 20:03	1
Vinyl chloride	ND		1.0	0.10	ug/L			06/23/16 20:03	1

Method: 8260B - Volatile Organic Compounds (GC/MS) (Continued)

Client Sample ID: ADDV-029 — **Lab Sample ID: 280-84495-17**
Date Collected: 06/14/16 13:10 — **Matrix: Water**
Date Received: 06/15/16 10:00

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Xylenes, Total	ND		2.0	0.19	ug/L			06/23/16 20:03	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*108*		*70 - 127*		*06/23/16 20:03*	*1*
4-Bromofluorobenzene (Surr)	*110*		*78 - 120*		*06/23/16 20:03*	*1*
Dibromofluoromethane (Surr)	*95*		*77 - 120*		*06/23/16 20:03*	*1*
Toluene-d8 (Surr)	*102*		*80 - 125*		*06/23/16 20:03*	*1*

Method: 8260B - Volatile Organic Compounds (GC/MS) - DL

Client Sample ID: ADDV-006 — **Lab Sample ID: 280-84495-1**
Date Collected: 06/14/16 11:45 — **Matrix: Water**
Date Received: 06/15/16 10:00

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
cis-1,2-Dichloroethene	**570**		40	6.0	ug/L			06/23/16 11:30	40

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*95*		*70 - 127*		*06/23/16 11:30*	*40*
4-Bromofluorobenzene (Surr)	*107*		*78 - 120*		*06/23/16 11:30*	*40*
Dibromofluoromethane (Surr)	*91*		*77 - 120*		*06/23/16 11:30*	*40*
Toluene-d8 (Surr)	*105*		*80 - 125*		*06/23/16 11:30*	*40*

Client Sample ID: ADDV-010 — **Lab Sample ID: 280-84495-3**
Date Collected: 06/14/16 11:38 — **Matrix: Water**
Date Received: 06/15/16 10:00

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
cis-1,2-Dichloroethene	**410**		40	6.0	ug/L			06/23/16 13:48	40

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*96*		*70 - 127*		*06/23/16 13:48*	*40*
4-Bromofluorobenzene (Surr)	*103*		*78 - 120*		*06/23/16 13:48*	*40*
Dibromofluoromethane (Surr)	*89*		*77 - 120*		*06/23/16 13:48*	*40*
Toluene-d8 (Surr)	*99*		*80 - 125*		*06/23/16 13:48*	*40*

Client Sample ID: ADDV-026 — **Lab Sample ID: 280-84495-10**
Date Collected: 06/14/16 11:33 — **Matrix: Water**
Date Received: 06/15/16 10:00

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
cis-1,2-Dichloroethene	**38000**		1000	150	ug/L			06/23/16 16:26	1000
Vinyl chloride	**13000**		1000	100	ug/L			06/23/16 16:26	1000

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*124*		*70 - 127*		*06/23/16 16:26*	*1000*
4-Bromofluorobenzene (Surr)	*125*	*X*	*78 - 120*		*06/23/16 16:26*	*1000*
Dibromofluoromethane (Surr)	*109*		*77 - 120*		*06/23/16 16:26*	*1000*
Toluene-d8 (Surr)	*116*		*80 - 125*		*06/23/16 16:26*	*1000*

Method: 8260B - Volatile Organic Compounds (GC/MS) - DL

Client Sample ID: ADDV-028 — **Lab Sample ID: 280-84495-12**
Date Collected: 06/14/16 11:42 — **Matrix: Water**
Date Received: 06/15/16 10:00

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1-Dichloroethane	94		10	2.2	ug/L			06/23/16 17:26	10
Chloroethane	170		20	4.1	ug/L			06/23/16 17:26	10
cis-1,2-Dichloroethene	150		10	1.5	ug/L			06/23/16 17:26	10
Vinyl chloride	270		10	1.0	ug/L			06/23/16 17:26	10

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*107*		*70 - 127*		*06/23/16 17:26*	*10*
4-Bromofluorobenzene (Surr)	*109*		*78 - 120*		*06/23/16 17:26*	*10*
Dibromofluoromethane (Surr)	*97*		*77 - 120*		*06/23/16 17:26*	*10*
Toluene-d8 (Surr)	*103*		*80 - 125*		*06/23/16 17:26*	*10*

Client Sample ID: ADDV-032 — **Lab Sample ID: 280-84495-13**
Date Collected: 06/14/16 09:30 — **Matrix: Water**
Date Received: 06/15/16 10:00

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Toluene	11000		400	68	ug/L			06/23/16 18:05	400

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*113*		*70 - 127*		*06/23/16 18:05*	*400*
4-Bromofluorobenzene (Surr)	*112*		*78 - 120*		*06/23/16 18:05*	*400*
Dibromofluoromethane (Surr)	*100*		*77 - 120*		*06/23/16 18:05*	*400*
Toluene-d8 (Surr)	*106*		*80 - 125*		*06/23/16 18:05*	*400*

Client Sample ID: ADDV-033 — **Lab Sample ID: 280-84495-14**
Date Collected: 06/14/16 09:40 — **Matrix: Water**
Date Received: 06/15/16 10:00

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloroethane	1100		400	82	ug/L			06/24/16 10:37	200
Ethylbenzene	410		200	32	ug/L			06/24/16 10:37	200
m-Xylene & p-Xylene	860		400	68	ug/L			06/24/16 10:37	200
o-Xylene	250		200	38	ug/L			06/24/16 10:37	200
Toluene	5700		200	34	ug/L			06/24/16 10:37	200
Xylenes, Total	1100		400	38	ug/L			06/24/16 10:37	200

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*102*		*70 - 127*		*06/24/16 10:37*	*200*
4-Bromofluorobenzene (Surr)	*106*		*78 - 120*		*06/24/16 10:37*	*200*
Dibromofluoromethane (Surr)	*108*		*77 - 120*		*06/24/16 10:37*	*200*
Toluene-d8 (Surr)	*107*		*80 - 125*		*06/24/16 10:37*	*200*

Client Sample ID: ADDV-034 — **Lab Sample ID: 280-84495-15**
Date Collected: 06/14/16 09:50 — **Matrix: Water**
Date Received: 06/15/16 10:00

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloroethane	610		40	8.2	ug/L			06/23/16 19:24	20
Ethylbenzene	190		20	3.2	ug/L			06/23/16 19:24	20
m-Xylene & p-Xylene	560		40	6.8	ug/L			06/23/16 19:24	20
o-Xylene	140		20	3.8	ug/L			06/23/16 19:24	20
Xylenes, Total	700		40	3.8	ug/L			06/23/16 19:24	20

Method: 8260B - Volatile Organic Compounds (GC/MS) - DL (Continued)

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
1,2-Dichloroethane-d4 (Surr)	106		70 - 127		06/23/16 19:24	20
4-Bromofluorobenzene (Surr)	116		78 - 120		06/23/16 19:24	20
Dibromofluoromethane (Surr)	98		77 - 120		06/23/16 19:24	20
Toluene-d8 (Surr)	106		80 - 125		06/23/16 19:24	20

Method: RSK-175 - Dissolved Gases (GC)

Client Sample ID: ADDV-006 — **Lab Sample ID: 280-84495-1**
Date Collected: 06/14/16 11:45 — **Matrix: Water**
Date Received: 06/15/16 10:00

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Methane	76		5.0	0.22	ug/L			06/22/16 20:39	1
Ethene	3.4	J P	5.0	0.40	ug/L			06/22/16 20:39	1
Ethane	21		5.0	0.57	ug/L			06/22/16 20:39	1

Client Sample ID: ADDV-016 — **Lab Sample ID: 280-84495-2**
Date Collected: 06/14/16 10:05 — **Matrix: Water**
Date Received: 06/15/16 10:00

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Methane	27000		10	0.44	ug/L			06/22/16 23:22	2
Ethene	ND		10	0.80	ug/L			06/22/16 23:22	2
Ethane	12		10	1.1	ug/L			06/22/16 23:22	2

Client Sample ID: ADDV-010 — **Lab Sample ID: 280-84495-3**
Date Collected: 06/14/16 11:38 — **Matrix: Water**
Date Received: 06/15/16 10:00

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Methane	260		5.0	0.22	ug/L			06/22/16 21:15	1
Ethene	94		5.0	0.40	ug/L			06/22/16 21:15	1
Ethane	ND		5.0	0.57	ug/L			06/22/16 21:15	1

Client Sample ID: ADDV-008 — **Lab Sample ID: 280-84495-4**
Date Collected: 06/14/16 09:52 — **Matrix: Water**
Date Received: 06/15/16 10:00

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Methane	27000		15	0.65	ug/L			06/23/16 18:54	3
Ethene	ND		15	1.2	ug/L			06/23/16 18:54	3
Ethane	8.2	J	15	1.7	ug/L			06/23/16 18:54	3

Client Sample ID: ADDV-017 — **Lab Sample ID: 280-84495-5**
Date Collected: 06/14/16 16:35 — **Matrix: Water**
Date Received: 06/15/16 10:00

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Methane	170		5.0	0.22	ug/L			06/22/16 21:34	1
Ethene	ND		5.0	0.40	ug/L			06/22/16 21:34	1
Ethane	ND		5.0	0.57	ug/L			06/22/16 21:34	1

Client Sample ID: ADDV-025 — **Lab Sample ID: 280-84495-6**
Date Collected: 06/14/16 12:45 — **Matrix: Water**
Date Received: 06/15/16 10:00

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Methane	120		5.0	0.22	ug/L			06/22/16 21:38	1
Ethene	ND		5.0	0.40	ug/L			06/22/16 21:38	1

Method: RSK-175 - Dissolved Gases (GC) (Continued)

Client Sample ID: ADDV-025 — **Lab Sample ID: 280-84495-6**
Date Collected: 06/14/16 12:45 — **Matrix: Water**
Date Received: 06/15/16 10:00

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Ethane	ND		5.0	0.57	ug/L			06/22/16 21:38	1

Client Sample ID: ADDV-024 — **Lab Sample ID: 280-84495-7**
Date Collected: 06/14/16 14:35 — **Matrix: Water**
Date Received: 06/15/16 10:00

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Methane	**8500**		5.0	0.22	ug/L			06/22/16 21:43	1
Ethene	ND		5.0	0.40	ug/L			06/22/16 21:43	1
Ethane	**1.5**	**J**	5.0	0.57	ug/L			06/22/16 21:43	1

Client Sample ID: ADDV-032 — **Lab Sample ID: 280-84495-13**
Date Collected: 06/14/16 09:30 — **Matrix: Water**
Date Received: 06/15/16 10:00

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Methane	**5000**		180	7.8	ug/L			06/23/16 04:12	36
Ethene	**12000**		180	14	ug/L			06/23/16 04:12	36
Ethane	**1700**		180	21	ug/L			06/23/16 04:12	36

Client Sample ID: ADDV-033 — **Lab Sample ID: 280-84495-14**
Date Collected: 06/14/16 09:40 — **Matrix: Water**
Date Received: 06/15/16 10:00

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Methane	**4300**		90	3.9	ug/L			06/23/16 04:17	18
Ethene	**5000**		90	7.2	ug/L			06/23/16 04:17	18
Ethane	**2100**		90	10	ug/L			06/23/16 04:17	18

Client Sample ID: ADDV-034 — **Lab Sample ID: 280-84495-15**
Date Collected: 06/14/16 09:50 — **Matrix: Water**
Date Received: 06/15/16 10:00

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Methane	**12000**		90	3.9	ug/L			06/23/16 04:21	18
Ethene	ND		90	7.2	ug/L			06/23/16 04:21	18
Ethane	**5100**		90	10	ug/L			06/23/16 04:21	18

Client Sample ID: ADDV-030 — **Lab Sample ID: 280-84495-16**
Date Collected: 06/14/16 15:15 — **Matrix: Water**
Date Received: 06/15/16 10:00

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Methane	**1300**		5.0	0.22	ug/L			06/22/16 22:21	1
Ethene	ND		5.0	0.40	ug/L			06/22/16 22:21	1
Ethane	ND		5.0	0.57	ug/L			06/22/16 22:21	1

Client Sample ID: ADDV-029 — **Lab Sample ID: 280-84495-17**
Date Collected: 06/14/16 13:10 — **Matrix: Water**
Date Received: 06/15/16 10:00

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Methane	**1200**		5.0	0.22	ug/L			06/22/16 22:25	1
Ethene	ND		5.0	0.40	ug/L			06/22/16 22:25	1
Ethane	**1.6**	**J**	5.0	0.57	ug/L			06/22/16 22:25	1

General Chemistry

Client Sample ID: ADDV-006 — **Lab Sample ID: 280-84495-1**
Date Collected: 06/14/16 11:45 — **Matrix: Water**
Date Received: 06/15/16 10:00

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	**27**		3.0	0.25	mg/L			06/15/16 16:15	1
Nitrate as N	ND		0.50	0.042	mg/L			06/15/16 16:15	1
Sulfate	**190**		5.0	0.23	mg/L			06/15/16 16:15	1
Total Organic Carbon - Average	**3.4**		1.0	0.16	mg/L			06/17/16 20:08	1
Alkalinity	**360**	**B ^**	5.0	1.1	mg/L			06/20/16 14:43	1
Sulfide	ND		1.0	0.50	mg/L			06/17/16 15:49	1
Ferrous Iron	ND	HF	0.20	0.021	mg/L			06/16/16 21:18	1

Client Sample ID: ADDV-016 — **Lab Sample ID: 280-84495-2**
Date Collected: 06/14/16 10:05 — **Matrix: Water**
Date Received: 06/15/16 10:00

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	**46**		3.0	0.25	mg/L			06/15/16 16:35	1
Nitrate as N	ND		0.50	0.042	mg/L			06/15/16 16:35	1
Sulfate	**0.53**	**J**	5.0	0.23	mg/L			06/15/16 16:35	1
Total Organic Carbon - Average	**8.8**		1.0	0.16	mg/L			06/17/16 20:52	1
Alkalinity	**460**	**B ^**	5.0	1.1	mg/L			06/20/16 14:49	1
Sulfide	ND		1.0	0.50	mg/L			06/17/16 15:49	1
Ferrous Iron	ND	HF	0.20	0.021	mg/L			06/16/16 21:18	1

Client Sample ID: ADDV-010 — **Lab Sample ID: 280-84495-3**
Date Collected: 06/14/16 11:38 — **Matrix: Water**
Date Received: 06/15/16 10:00

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	**110**		3.0	0.25	mg/L			06/15/16 17:34	1
Nitrate as N	ND		0.50	0.042	mg/L			06/15/16 17:34	1
Sulfate	**52**		5.0	0.23	mg/L			06/15/16 17:34	1
Total Organic Carbon - Average	**2.0**		1.0	0.16	mg/L			06/17/16 21:09	1
Alkalinity	**310**	**B ^**	5.0	1.1	mg/L			06/20/16 14:55	1
Sulfide	ND		1.0	0.50	mg/L			06/17/16 15:49	1
Ferrous Iron	ND	HF	0.20	0.021	mg/L			06/16/16 21:18	1

Client Sample ID: ADDV-008 — **Lab Sample ID: 280-84495-4**
Date Collected: 06/14/16 09:52 — **Matrix: Water**
Date Received: 06/15/16 10:00

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	**44**		3.0	0.25	mg/L			06/15/16 17:54	1
Nitrate as N	ND		0.50	0.042	mg/L			06/15/16 17:54	1
Sulfate	**0.49**	**J**	5.0	0.23	mg/L			06/15/16 17:54	1
Total Organic Carbon - Average	**9.0**		1.0	0.16	mg/L			06/17/16 21:24	1
Alkalinity	**520**	**B ^**	5.0	1.1	mg/L			06/20/16 15:02	1
Sulfide	ND		1.0	0.50	mg/L			06/17/16 15:49	1
Ferrous Iron	ND	HF	0.20	0.021	mg/L			06/16/16 21:18	1

Client Sample ID: ADDV-017 — **Lab Sample ID: 280-84495-5**
Date Collected: 06/14/16 16:35 — **Matrix: Water**
Date Received: 06/15/16 10:00

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	**19**		3.0	0.25	mg/L			06/15/16 18:14	1
Nitrate as N	**0.045**	**J**	0.50	0.042	mg/L			06/15/16 18:14	1

General Chemistry (Continued)

Client Sample ID: ADDV-017 — **Lab Sample ID: 280-84495-5**
Date Collected: 06/14/16 16:35 — **Matrix: Water**
Date Received: 06/15/16 10:00

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Sulfate	55		5.0	0.23	mg/L			06/15/16 18:14	1
Total Organic Carbon - Average	3.2		1.0	0.16	mg/L			06/17/16 22:08	1
Alkalinity	360	B ^	5.0	1.1	mg/L			06/20/16 15:08	1
Sulfide	ND		1.0	0.50	mg/L			06/17/16 15:49	1
Ferrous Iron	ND	HF	0.20	0.021	mg/L			06/16/16 21:18	1

Client Sample ID: ADDV-025 — **Lab Sample ID: 280-84495-6**
Date Collected: 06/14/16 12:45 — **Matrix: Water**
Date Received: 06/15/16 10:00

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	3.2		3.0	0.25	mg/L			06/15/16 18:34	1
Nitrate as N	0.052	J	0.50	0.042	mg/L			06/15/16 18:34	1
Sulfate	6.2		5.0	0.23	mg/L			06/15/16 18:34	1
Total Organic Carbon - Average	1.1		1.0	0.16	mg/L			06/17/16 22:22	1
Alkalinity	400	B ^	5.0	1.1	mg/L			06/20/16 15:39	1
Sulfide	ND		1.0	0.50	mg/L			06/17/16 15:49	1
Ferrous Iron	0.096	J HF	0.20	0.021	mg/L			06/16/16 21:18	1

Client Sample ID: ADDV-024 — **Lab Sample ID: 280-84495-7**
Date Collected: 06/14/16 14:35 — **Matrix: Water**
Date Received: 06/15/16 10:00

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	26		3.0	0.25	mg/L			06/15/16 18:54	1
Nitrate as N	ND		0.50	0.042	mg/L			06/15/16 18:54	1
Sulfate	0.77	J	5.0	0.23	mg/L			06/15/16 18:54	1
Total Organic Carbon - Average	4.3		1.0	0.16	mg/L			06/18/16 00:13	1
Alkalinity	340	B ^	5.0	1.1	mg/L			06/20/16 15:44	1
Sulfide	ND		1.0	0.50	mg/L			06/17/16 15:49	1
Ferrous Iron	0.057	J HF	0.20	0.021	mg/L			06/16/16 21:18	1

Client Sample ID: ADDV-026 — **Lab Sample ID: 280-84495-10**
Date Collected: 06/14/16 11:33 — **Matrix: Water**
Date Received: 06/15/16 10:00

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	150		3.0	0.25	mg/L			06/19/16 15:06	1
Total Organic Carbon - Average	3.0		1.0	0.16	mg/L			06/18/16 02:11	1

Client Sample ID: ADDV-027 — **Lab Sample ID: 280-84495-11**
Date Collected: 06/14/16 11:37 — **Matrix: Water**
Date Received: 06/15/16 10:00

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	36		3.0	0.25	mg/L			06/19/16 15:23	1
Total Organic Carbon - Average	1.8		1.0	0.16	mg/L			06/18/16 02:25	1

Client Sample ID: ADDV-028 — **Lab Sample ID: 280-84495-12**
Date Collected: 06/14/16 11:42 — **Matrix: Water**
Date Received: 06/15/16 10:00

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	16		3.0	0.25	mg/L			06/19/16 15:40	1
Total Organic Carbon - Average	4.8		1.0	0.16	mg/L			06/18/16 02:40	1

General Chemistry

Client Sample ID: ADDV-032 — **Lab Sample ID: 280-84495-13**
Date Collected: 06/14/16 09:30 — **Matrix: Water**
Date Received: 06/15/16 10:00

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	220		15	1.3	mg/L			06/15/16 23:17	5
Nitrate as N	ND		0.50	0.042	mg/L			06/15/16 19:14	1
Sulfate	1.2	J	5.0	0.23	mg/L			06/15/16 19:14	1
Total Organic Carbon - Average	12		1.0	0.16	mg/L			06/18/16 02:55	1
Alkalinity	540	B ^	5.0	1.1	mg/L			06/20/16 15:52	1
Sulfide	7.0		1.0	0.50	mg/L			06/17/16 15:49	1
Ferrous Iron	ND	HF	0.20	0.021	mg/L			06/16/16 21:18	1

Client Sample ID: ADDV-033 — **Lab Sample ID: 280-84495-14**
Date Collected: 06/14/16 09:40 — **Matrix: Water**
Date Received: 06/15/16 10:00

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	170		3.0	0.25	mg/L			06/15/16 19:34	1
Nitrate as N	ND		0.50	0.042	mg/L			06/15/16 19:34	1
Sulfate	0.92	J	5.0	0.23	mg/L			06/15/16 19:34	1
Total Organic Carbon - Average	7.8		1.0	0.16	mg/L			06/18/16 03:12	1
Alkalinity	490	B ^	5.0	1.1	mg/L			06/20/16 15:59	1
Sulfide	7.0		1.0	0.50	mg/L			06/17/16 15:49	1
Ferrous Iron	0.31	HF	0.20	0.021	mg/L			06/16/16 21:18	1

Client Sample ID: ADDV-034 — **Lab Sample ID: 280-84495-15**
Date Collected: 06/14/16 09:50 — **Matrix: Water**
Date Received: 06/15/16 10:00

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	52		3.0	0.25	mg/L			06/15/16 19:54	1
Nitrate as N	ND		0.50	0.042	mg/L			06/15/16 19:54	1
Sulfate	0.56	J	5.0	0.23	mg/L			06/15/16 19:54	1
Total Organic Carbon - Average	3.9		1.0	0.16	mg/L			06/18/16 03:26	1
Alkalinity	510	B ^	5.0	1.1	mg/L			06/20/16 16:05	1
Sulfide	1.6		1.0	0.50	mg/L			06/17/16 15:49	1
Ferrous Iron	0.17	J HF	0.20	0.021	mg/L			06/16/16 21:18	1

Client Sample ID: ADDV-030 — **Lab Sample ID: 280-84495-16**
Date Collected: 06/14/16 15:15 — **Matrix: Water**
Date Received: 06/15/16 10:00

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	11		3.0	0.25	mg/L			06/15/16 20:14	1
Nitrate as N	ND		0.50	0.042	mg/L			06/15/16 20:14	1
Sulfate	9.5		5.0	0.23	mg/L			06/15/16 20:14	1
Total Organic Carbon - Average	5.2		1.0	0.16	mg/L			06/18/16 04:11	1
Alkalinity	470	B ^	5.0	1.1	mg/L			06/20/16 16:12	1
Sulfide	ND		1.0	0.50	mg/L			06/17/16 15:49	1
Ferrous Iron	0.17	J HF	0.20	0.021	mg/L			06/16/16 21:18	1

Client Sample ID: ADDV-029 — **Lab Sample ID: 280-84495-17**
Date Collected: 06/14/16 13:10 — **Matrix: Water**
Date Received: 06/15/16 10:00

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	9.2		3.0	0.25	mg/L			06/15/16 20:34	1
Nitrate as N	ND		0.50	0.042	mg/L			06/15/16 20:34	1

General Chemistry (Continued)

Client Sample ID: ADDV-029
Date Collected: 06/14/16 13:10
Date Received: 06/15/16 10:00

Lab Sample ID: 280-84495-17
Matrix: Water

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Sulfate	**8.6**		5.0	0.23	mg/L			06/15/16 20:34	1
Total Organic Carbon - Average	**6.0**		1.0	0.16	mg/L			06/18/16 04:25	1
Alkalinity	**470**	**B ^**	5.0	1.1	mg/L			06/20/16 16:19	1
Sulfide	ND		1.0	0.50	mg/L			06/17/16 15:49	1
Ferrous Iron	**0.22**	**HF**	0.20	0.021	mg/L			06/16/16 21:18	1

Surrogate Summary

Client: CH2M Hill, Inc.
Project/Site: THAN Davenport, IA - June 2016

TestAmerica Job ID: 280-84495-1

Method: 8260B - Volatile Organic Compounds (GC/MS)

Matrix: Water **Prep Type: Total/NA**

		Percent Surrogate Recovery (Acceptance Limits)			
		12DCE	BFB	DBFM	TOL
Lab Sample ID	Client Sample ID	(70-127)	(78-120)	(77-120)	(80-125)
280-84495-1	ADDV-006	99	107	94	107
280-84495-1 - DL	ADDV-006	95	107	91	105
280-84495-2	ADDV-016	99	107	94	104
280-84495-2 MS	ADDV-016	110	115	105	117
280-84495-2 MSD	ADDV-016	93	100	88	101
280-84495-3	ADDV-010	97	104	92	99
280-84495-3 - DL	ADDV-010	96	103	89	99
280-84495-4	ADDV-008	107	111	96	103
280-84495-5	ADDV-017	115	116	104	112
280-84495-6	ADDV-025	110	110	99	103
280-84495-7	ADDV-024	110	109	99	104
280-84495-8	ADDV-047	115	119	103	112
280-84495-9	ADDV-046	112	110	100	106
280-84495-10	ADDV-026	109	109	100	103
280-84495-10 - DL	ADDV-026	124	125 X	109	116
280-84495-11	ADDV-027	109	111	96	105
280-84495-12	ADDV-028	110	115	97	106
280-84495-12 - DL	ADDV-028	107	109	97	103
280-84495-13	ADDV-032	118	122 X	109	112
280-84495-13 - DL	ADDV-032	113	112	100	106
280-84495-14	ADDV-033	106	104	96	96
280-84495-14 - DL	ADDV-033	102	106	108	107
280-84495-15	ADDV-034	113	117	103	111
280-84495-15 - DL	ADDV-034	106	116	98	106
280-84495-16	ADDV-030	107	106	98	103
280-84495-17	ADDV-029	108	110	95	102
280-84588-E-6 MS	Matrix Spike	91	95	94	98
280-84588-E-6 MSD	Matrix Spike Duplicate	95	104	102	108
LCS 280-331006/4	Lab Control Sample	90	101	92	106
LCS 280-331154/4	Lab Control Sample	90	93	94	102
LCSD 280-331154/5	Lab Control Sample Dup	77	79	82	84
MB 280-331006/6	Method Blank	91	100	89	101
MB 280-331154/6	Method Blank	87	96	90	97

Surrogate Legend

12DCE = 1,2-Dichloroethane-d4 (Surr)
BFB = 4-Bromofluorobenzene (Surr)
DBFM = Dibromofluoromethane (Surr)
TOL = Toluene-d8 (Surr)

Method: 8260B - Volatile Organic Compounds (GC/MS)

Lab Sample ID: MB 280-331006/6
Matrix: Water
Analysis Batch: 331006

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1,1-Trichloroethane	ND		1.0	0.16	ug/L			06/23/16 09:52	1
1,1-Dichloroethane	ND		1.0	0.22	ug/L			06/23/16 09:52	1
1,1-Dichloroethene	ND		1.0	0.23	ug/L			06/23/16 09:52	1
1,2-Dichloroethane	ND		1.0	0.13	ug/L			06/23/16 09:52	1
Methyl ethyl ketone (MEK)	ND		6.0	2.0	ug/L			06/23/16 09:52	1
Acetone	ND		10	1.9	ug/L			06/23/16 09:52	1
Benzene	ND		1.0	0.16	ug/L			06/23/16 09:52	1
Chloroethane	ND		2.0	0.41	ug/L			06/23/16 09:52	1
cis-1,2-Dichloroethene	ND		1.0	0.15	ug/L			06/23/16 09:52	1
Ethylbenzene	ND		1.0	0.16	ug/L			06/23/16 09:52	1
Methylene Chloride	ND		2.0	0.32	ug/L			06/23/16 09:52	1
m-Xylene & p-Xylene	ND		2.0	0.34	ug/L			06/23/16 09:52	1
o-Xylene	ND		1.0	0.19	ug/L			06/23/16 09:52	1
Styrene	ND		1.0	0.17	ug/L			06/23/16 09:52	1
Tetrachloroethene	ND		1.0	0.20	ug/L			06/23/16 09:52	1
Toluene	ND		1.0	0.17	ug/L			06/23/16 09:52	1
trans-1,2-Dichloroethene	ND		1.0	0.15	ug/L			06/23/16 09:52	1
Trichloroethene	ND		1.0	0.16	ug/L			06/23/16 09:52	1
Vinyl chloride	ND		1.0	0.10	ug/L			06/23/16 09:52	1
Xylenes, Total	ND		2.0	0.19	ug/L			06/23/16 09:52	1

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*91*		*70 - 127*		*06/23/16 09:52*	*1*
4-Bromofluorobenzene (Surr)	*100*		*78 - 120*		*06/23/16 09:52*	*1*
Dibromofluoromethane (Surr)	*89*		*77 - 120*		*06/23/16 09:52*	*1*
Toluene-d8 (Surr)	*101*		*80 - 125*		*06/23/16 09:52*	*1*

Lab Sample ID: LCS 280-331006/4
Matrix: Water
Analysis Batch: 331006

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
1,1,1-Trichloroethane	5.00	5.10		ug/L		102	65 - 135
1,1-Dichloroethane	5.00	5.39		ug/L		108	65 - 135
1,1-Dichloroethene	5.00	4.97		ug/L		99	65 - 136
1,2-Dichloroethane	5.00	5.84		ug/L		117	65 - 135
Methyl ethyl ketone (MEK)	20.0	28.9		ug/L		144	44 - 177
Acetone	20.0	26.0		ug/L		130	39 - 156
Benzene	5.00	5.14		ug/L		103	65 - 135
Chloroethane	5.00	4.40		ug/L		88	46 - 136
cis-1,2-Dichloroethene	5.00	5.21		ug/L		104	65 - 135
Ethylbenzene	5.00	4.88		ug/L		98	65 - 135
Methylene Chloride	5.00	5.83		ug/L		117	54 - 141
m-Xylene & p-Xylene	5.00	5.03		ug/L		101	65 - 135
o-Xylene	5.00	5.03		ug/L		101	65 - 135
Styrene	5.00	5.00		ug/L		100	65 - 135
Tetrachloroethene	5.00	4.79		ug/L		96	65 - 135
Toluene	5.00	5.15		ug/L		103	65 - 135

Method: 8260B - Volatile Organic Compounds (GC/MS) (Continued)

Lab Sample ID: LCS 280-331006/4
Matrix: Water
Analysis Batch: 331006

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
trans-1,2-Dichloroethene	5.00	5.30		ug/L		106	65 - 135
Trichloroethene	5.00	4.95		ug/L		99	65 - 135
Vinyl chloride	5.00	4.00		ug/L		80	40 - 137
Xylenes, Total	10.0	10.1		ug/L		101	65 - 135

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
1,2-Dichloroethane-d4 (Surr)	*90*		*70 - 127*
4-Bromofluorobenzene (Surr)	*101*		*78 - 120*
Dibromofluoromethane (Surr)	*92*		*77 - 120*
Toluene-d8 (Surr)	*106*		*80 - 125*

Lab Sample ID: 280-84495-2 MS
Matrix: Water
Analysis Batch: 331006

Client Sample ID: ADDV-016
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
1,1,1-Trichloroethane	ND	F2	5.00	5.97		ug/L		119	65 - 135
1,1-Dichloroethane	ND		5.00	6.25		ug/L		125	65 - 135
1,1-Dichloroethene	ND	F2	5.00	5.43		ug/L		109	65 - 136
1,2-Dichloroethane	ND	F1 F2	5.00	7.15	F1	ug/L		143	65 - 135
Methyl ethyl ketone (MEK)	ND		20.0	35.2		ug/L		176	44 - 177
Acetone	6.7	J	20.0	32.7		ug/L		130	39 - 156
Benzene	ND		5.00	5.70		ug/L		114	65 - 135
Chloroethane	0.94	J	5.00	5.83		ug/L		98	46 - 136
cis-1,2-Dichloroethene	ND		5.00	5.77		ug/L		115	65 - 135
Ethylbenzene	ND		5.00	5.47		ug/L		109	65 - 135
Methylene Chloride	ND		5.00	6.55		ug/L		131	54 - 141
m-Xylene & p-Xylene	ND		5.00	5.58		ug/L		112	65 - 135
o-Xylene	ND		5.00	5.69		ug/L		114	65 - 135
Styrene	ND		5.00	5.66		ug/L		113	65 - 135
Tetrachloroethene	ND		5.00	5.01		ug/L		100	65 - 135
Toluene	ND		5.00	5.72		ug/L		114	65 - 135
trans-1,2-Dichloroethene	ND		5.00	5.90		ug/L		118	65 - 135
Trichloroethene	ND		5.00	5.47		ug/L		109	65 - 135
Vinyl chloride	ND		5.00	4.31		ug/L		86	40 - 137
Xylenes, Total	ND		10.0	11.3		ug/L		113	65 - 135

Surrogate	*MS %Recovery*	*MS Qualifier*	*Limits*
1,2-Dichloroethane-d4 (Surr)	*110*		*70 - 127*
4-Bromofluorobenzene (Surr)	*115*		*78 - 120*
Dibromofluoromethane (Surr)	*105*		*77 - 120*
Toluene-d8 (Surr)	*117*		*80 - 125*

Method: 8260B - Volatile Organic Compounds (GC/MS) (Continued)

Lab Sample ID: 280-84495-2 MSD
Matrix: Water
Analysis Batch: 331006

Client Sample ID: ADDV-016
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
1,1,1-Trichloroethane	ND	F2	5.00	4.77	F2	ug/L		95	65 - 135	22	20
1,1-Dichloroethane	ND		5.00	5.12		ug/L		102	65 - 135	20	21
1,1-Dichloroethene	ND	F2	5.00	4.32	F2	ug/L		86	65 - 136	23	20
1,2-Dichloroethane	ND	F1 F2	5.00	5.66	F2	ug/L		113	65 - 135	23	20
Methyl ethyl ketone (MEK)	ND		20.0	32.5		ug/L		163	44 - 177	8	32
Acetone	6.7	J	20.0	27.6		ug/L		104	39 - 156	17	23
Benzene	ND		5.00	4.73		ug/L		95	65 - 135	19	20
Chloroethane	0.94	J	5.00	5.27		ug/L		87	46 - 136	10	25
cis-1,2-Dichloroethene	ND		5.00	4.75		ug/L		95	65 - 135	19	20
Ethylbenzene	ND		5.00	4.58		ug/L		92	65 - 135	18	20
Methylene Chloride	ND		5.00	5.18		ug/L		104	54 - 141	23	26
m-Xylene & p-Xylene	ND		5.00	4.58		ug/L		92	65 - 135	20	20
o-Xylene	ND		5.00	4.70		ug/L		94	65 - 135	19	20
Styrene	ND		5.00	4.69		ug/L		94	65 - 135	19	26
Tetrachloroethene	ND		5.00	4.17		ug/L		83	65 - 135	18	20
Toluene	ND		5.00	4.87		ug/L		97	65 - 135	16	20
trans-1,2-Dichloroethene	ND		5.00	4.73		ug/L		95	65 - 135	22	24
Trichloroethene	ND		5.00	4.50		ug/L		90	65 - 135	20	20
Vinyl chloride	ND		5.00	4.42		ug/L		88	40 - 137	2	24
Xylenes, Total	ND		10.0	9.28		ug/L		93	65 - 135	19	20

Surrogate	*MSD %Recovery*	*MSD Qualifier*	*Limits*
1,2-Dichloroethane-d4 (Surr)	*93*		*70 - 127*
4-Bromofluorobenzene (Surr)	*100*		*78 - 120*
Dibromofluoromethane (Surr)	*88*		*77 - 120*
Toluene-d8 (Surr)	*101*		*80 - 125*

Lab Sample ID: MB 280-331154/6
Matrix: Water
Analysis Batch: 331154

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1,1-Trichloroethane	ND		1.0	0.16	ug/L			06/24/16 09:58	1
1,1-Dichloroethane	ND		1.0	0.22	ug/L			06/24/16 09:58	1
1,1-Dichloroethene	ND		1.0	0.23	ug/L			06/24/16 09:58	1
1,2-Dichloroethane	ND		1.0	0.13	ug/L			06/24/16 09:58	1
Methyl ethyl ketone (MEK)	ND		6.0	2.0	ug/L			06/24/16 09:58	1
Acetone	ND		10	1.9	ug/L			06/24/16 09:58	1
Benzene	ND		1.0	0.16	ug/L			06/24/16 09:58	1
Chloroethane	ND		2.0	0.41	ug/L			06/24/16 09:58	1
cis-1,2-Dichloroethene	ND		1.0	0.15	ug/L			06/24/16 09:58	1
Ethylbenzene	ND		1.0	0.16	ug/L			06/24/16 09:58	1
Methylene Chloride	ND		2.0	0.32	ug/L			06/24/16 09:58	1
m-Xylene & p-Xylene	ND		2.0	0.34	ug/L			06/24/16 09:58	1
o-Xylene	ND		1.0	0.19	ug/L			06/24/16 09:58	1
Styrene	ND		1.0	0.17	ug/L			06/24/16 09:58	1
Tetrachloroethene	ND		1.0	0.20	ug/L			06/24/16 09:58	1
Toluene	ND		1.0	0.17	ug/L			06/24/16 09:58	1

Method: 8260B - Volatile Organic Compounds (GC/MS) (Continued)

Lab Sample ID: MB 280-331154/6
Matrix: Water
Analysis Batch: 331154

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
trans-1,2-Dichloroethene	ND		1.0	0.15	ug/L			06/24/16 09:58	1
Trichloroethene	ND		1.0	0.16	ug/L			06/24/16 09:58	1
Vinyl chloride	ND		1.0	0.10	ug/L			06/24/16 09:58	1
Xylenes, Total	ND		2.0	0.19	ug/L			06/24/16 09:58	1

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*87*		*70 - 127*		*06/24/16 09:58*	*1*
4-Bromofluorobenzene (Surr)	*96*		*78 - 120*		*06/24/16 09:58*	*1*
Dibromofluoromethane (Surr)	*90*		*77 - 120*		*06/24/16 09:58*	*1*
Toluene-d8 (Surr)	*97*		*80 - 125*		*06/24/16 09:58*	*1*

Lab Sample ID: LCS 280-331154/4
Matrix: Water
Analysis Batch: 331154

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
1,1,1-Trichloroethane	5.00	4.85		ug/L		97	65 - 135
1,1-Dichloroethane	5.00	4.94		ug/L		99	65 - 135
1,1-Dichloroethene	5.00	4.73		ug/L		95	65 - 136
1,2-Dichloroethane	5.00	5.62		ug/L		112	65 - 135
Methyl ethyl ketone (MEK)	20.0	29.1		ug/L		145	44 - 177
Acetone	20.0	28.8		ug/L		144	39 - 156
Benzene	5.00	4.73		ug/L		95	65 - 135
Chloroethane	5.00	4.91		ug/L		98	46 - 136
cis-1,2-Dichloroethene	5.00	4.89		ug/L		98	65 - 135
Ethylbenzene	5.00	4.70		ug/L		94	65 - 135
Methylene Chloride	5.00	5.51		ug/L		110	54 - 141
m-Xylene & p-Xylene	5.00	4.83		ug/L		97	65 - 135
o-Xylene	5.00	4.87		ug/L		97	65 - 135
Styrene	5.00	4.82		ug/L		96	65 - 135
Tetrachloroethene	5.00	4.61		ug/L		92	65 - 135
Toluene	5.00	4.92		ug/L		98	65 - 135
trans-1,2-Dichloroethene	5.00	5.14		ug/L		103	65 - 135
Trichloroethene	5.00	4.60		ug/L		92	65 - 135
Vinyl chloride	5.00	4.95		ug/L		99	40 - 137
Xylenes, Total	10.0	9.70		ug/L		97	65 - 135

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
1,2-Dichloroethane-d4 (Surr)	*90*		*70 - 127*
4-Bromofluorobenzene (Surr)	*93*		*78 - 120*
Dibromofluoromethane (Surr)	*94*		*77 - 120*
Toluene-d8 (Surr)	*102*		*80 - 125*

Method: 8260B - Volatile Organic Compounds (GC/MS) (Continued)

Lab Sample ID: LCSD 280-331154/5
Matrix: Water
Analysis Batch: 331154

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
1,1,1-Trichloroethane	5.00	5.92		ug/L		118	65 - 135	20	20
1,1-Dichloroethane	5.00	5.65		ug/L		113	65 - 135	14	21
1,1-Dichloroethene	5.00	6.03	*	ug/L		121	65 - 136	24	20
1,2-Dichloroethane	5.00	5.96		ug/L		119	65 - 135	6	20
Methyl ethyl ketone (MEK)	20.0	33.2		ug/L		166	44 - 177	13	32
Acetone	20.0	29.3		ug/L		146	39 - 156	2	23
Benzene	5.00	5.23		ug/L		105	65 - 135	10	20
Chloroethane	5.00	5.59		ug/L		112	46 - 136	13	25
cis-1,2-Dichloroethene	5.00	5.42		ug/L		108	65 - 135	10	20
Ethylbenzene	5.00	5.17		ug/L		103	65 - 135	9	20
Methylene Chloride	5.00	5.88		ug/L		118	54 - 141	6	26
m-Xylene & p-Xylene	5.00	5.31		ug/L		106	65 - 135	10	20
o-Xylene	5.00	5.18		ug/L		104	65 - 135	6	20
Styrene	5.00	5.16		ug/L		103	65 - 135	7	26
Tetrachloroethene	5.00	5.35		ug/L		107	65 - 135	15	20
Toluene	5.00	5.47		ug/L		109	65 - 135	11	20
trans-1,2-Dichloroethene	5.00	5.87		ug/L		117	65 - 135	13	24
Trichloroethene	5.00	5.34		ug/L		107	65 - 135	15	20
Vinyl chloride	5.00	6.01		ug/L		120	40 - 137	19	24
Xylenes, Total	10.0	10.5		ug/L		105	65 - 135	8	20

Surrogate	*LCSD %Recovery*	*LCSD Qualifier*	*Limits*
1,2-Dichloroethane-d4 (Surr)	*77*		*70 - 127*
4-Bromofluorobenzene (Surr)	*79*		*78 - 120*
Dibromofluoromethane (Surr)	*82*		*77 - 120*
Toluene-d8 (Surr)	*84*		*80 - 125*

Lab Sample ID: 280-84588-E-6 MS
Matrix: Water
Analysis Batch: 331154

Client Sample ID: Matrix Spike
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
1,1,1-Trichloroethane	ND		100	109		ug/L		109	65 - 135
1,1-Dichloroethane	ND		100	107		ug/L		107	65 - 135
1,1-Dichloroethene	ND	*	100	114		ug/L		114	65 - 136
1,2-Dichloroethane	ND	F1	100	139	F1	ug/L		139	65 - 135
Methyl ethyl ketone (MEK)	ND		400	614		ug/L		153	44 - 177
Acetone	ND	F1	400	559		ug/L		140	39 - 156
Benzene	1400	E	100	644	4	ug/L		-712	65 - 135
Chloroethane	ND		100	107		ug/L		107	46 - 136
cis-1,2-Dichloroethene	ND		100	103		ug/L		103	65 - 135
Ethylbenzene	230	F1	100	161	F1	ug/L		-68	65 - 135
Methylene Chloride	15	J	100	118		ug/L		103	54 - 141
m-Xylene & p-Xylene	2100	E	100	949	4	ug/L		-1111	65 - 135
o-Xylene	450		100	260	4	ug/L		-186	65 - 135
Styrene	ND		100	111		ug/L		111	65 - 135
Tetrachloroethene	ND		100	103		ug/L		103	65 - 135
Toluene	2400	E	100	843	4	ug/L		-1549	65 - 135

Method: 8260B - Volatile Organic Compounds (GC/MS) (Continued)

Lab Sample ID: 280-84588-E-6 MS
Matrix: Water
Analysis Batch: 331154

Client Sample ID: Matrix Spike
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
trans-1,2-Dichloroethene	ND		100	111		ug/L		111	65 - 135
Trichloroethene	ND		100	103		ug/L		103	65 - 135
Vinyl chloride	ND		100	110		ug/L		110	40 - 137
Xylenes, Total	2600		200	1210	4	ug/L		-671	65 - 135

Surrogate	*MS %Recovery*	*MS Qualifier*	*Limits*
1,2-Dichloroethane-d4 (Surr)	*91*		*70 - 127*
4-Bromofluorobenzene (Surr)	*95*		*78 - 120*
Dibromofluoromethane (Surr)	*94*		*77 - 120*
Toluene-d8 (Surr)	*98*		*80 - 125*

Lab Sample ID: 280-84588-E-6 MSD
Matrix: Water
Analysis Batch: 331154

Client Sample ID: Matrix Spike Duplicate
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
1,1,1-Trichloroethane	ND		100	116		ug/L		116	65 - 135	7	20
1,1-Dichloroethane	ND		100	114		ug/L		114	65 - 135	6	21
1,1-Dichloroethene	ND	*	100	116		ug/L		116	65 - 136	2	20
1,2-Dichloroethane	ND	F1	100	147	F1	ug/L		147	65 - 135	5	20
Methyl ethyl ketone (MEK)	ND		400	676		ug/L		169	44 - 177	10	32
Acetone	ND	F1	400	636	F1	ug/L		159	39 - 156	13	23
Benzene	1400	E	100	691	4	ug/L		-665	65 - 135	7	20
Chloroethane	ND		100	110		ug/L		110	46 - 136	3	25
cis-1,2-Dichloroethene	ND		100	116		ug/L		116	65 - 135	12	20
Ethylbenzene	230	F1	100	174	F1	ug/L		-56	65 - 135	7	20
Methylene Chloride	15	J	100	126		ug/L		112	54 - 141	7	26
m-Xylene & p-Xylene	2100	E	100	1010	4	ug/L		-1046	65 - 135	7	20
o-Xylene	450		100	278	4	ug/L		-168	65 - 135	7	20
Styrene	ND		100	115		ug/L		115	65 - 135	4	26
Tetrachloroethene	ND		100	114		ug/L		114	65 - 135	10	20
Toluene	2400	E	100	904	4	ug/L		-1488	65 - 135	7	20
trans-1,2-Dichloroethene	ND		100	120		ug/L		120	65 - 135	7	24
Trichloroethene	ND		100	111		ug/L		111	65 - 135	7	20
Vinyl chloride	ND		100	116		ug/L		116	40 - 137	5	24
Xylenes, Total	2600		200	1290	4	ug/L		-631	65 - 135	6	20

Surrogate	*MSD %Recovery*	*MSD Qualifier*	*Limits*
1,2-Dichloroethane-d4 (Surr)	*95*		*70 - 127*
4-Bromofluorobenzene (Surr)	*104*		*78 - 120*
Dibromofluoromethane (Surr)	*102*		*77 - 120*
Toluene-d8 (Surr)	*108*		*80 - 125*

Method: RSK-175 - Dissolved Gases (GC)

Lab Sample ID: MB 280-330971/7 — **Client Sample ID: Method Blank**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 330971

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Methane	ND		5.0	0.22	ug/L			06/22/16 18:48	1
Ethene	ND		5.0	0.40	ug/L			06/22/16 18:48	1
Ethane	ND		5.0	0.57	ug/L			06/22/16 18:48	1

Lab Sample ID: LCS 280-330971/5 — **Client Sample ID: Lab Control Sample**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 330971

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Methane	146	163		ug/L		112	75 - 125
Ethene	255	277		ug/L		109	75 - 125
Ethane	274	308		ug/L		112	75 - 125

Lab Sample ID: LCSD 280-330971/6 — **Client Sample ID: Lab Control Sample Dup**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 330971

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Methane	146	166		ug/L		113	75 - 125	1	20
Ethene	255	279		ug/L		109	75 - 125	1	20
Ethane	274	314		ug/L		115	75 - 125	2	20

Lab Sample ID: 280-84538-X-16 MS — **Client Sample ID: Matrix Spike**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 330971

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Methane	370		2630	2990		ug/L		100	52 - 145
Ethene	37	J	4600	4610		ug/L		99	75 - 131
Ethane	22	J	4930	5070		ug/L		102	75 - 125

Lab Sample ID: 280-84538-X-16 MSD — **Client Sample ID: Matrix Spike Duplicate**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 330971

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Methane	370		2630	2540		ug/L		83	52 - 145	16	20
Ethene	37	J	4600	3940		ug/L		85	75 - 131	16	20
Ethane	22	J	4930	4290		ug/L		87	75 - 125	17	20

Lab Sample ID: 280-84495-3 DU — **Client Sample ID: ADDV-010**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 330971

Analyte	Sample Result	Sample Qualifier	DU Result	DU Qualifier	Unit	D	RPD	RPD Limit
Methane	260		250		ug/L		2	20
Ethene	94		92.4		ug/L		2	20
Ethane	ND		ND		ug/L		NC	20

Method: RSK-175 - Dissolved Gases (GC) (Continued)

Lab Sample ID: MB 280-331097/7 — **Client Sample ID: Method Blank**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 331097

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Methane	ND		5.0	0.22	ug/L			06/23/16 16:20	1
Ethene	ND		5.0	0.40	ug/L			06/23/16 16:20	1
Ethane	ND		5.0	0.57	ug/L			06/23/16 16:20	1

Lab Sample ID: LCS 280-331097/5 — **Client Sample ID: Lab Control Sample**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 331097

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Methane	146	171		ug/L		117	75 - 125
Ethene	255	285		ug/L		112	75 - 125
Ethane	274	323		ug/L		118	75 - 125

Lab Sample ID: LCSD 280-331097/6 — **Client Sample ID: Lab Control Sample Dup**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 331097

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Methane	146	178		ug/L		122	75 - 125	5	20
Ethene	255	294		ug/L		115	75 - 125	3	20
Ethane	274	338		ug/L		123	75 - 125	4	20

Lab Sample ID: 280-84538-U-16 MS — **Client Sample ID: Matrix Spike**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 331097

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Methane	390		438	889		ug/L		114	52 - 145
Ethene	37		766	857		ug/L		107	75 - 131
Ethane	23		821	973		ug/L		116	75 - 125

Lab Sample ID: 280-84538-U-16 MSD — **Client Sample ID: Matrix Spike Duplicate**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 331097

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Methane	390		438	915		ug/L		120	52 - 145	3	20
Ethene	37		766	860		ug/L		107	75 - 131	0	20
Ethane	23		821	984		ug/L		117	75 - 125	1	20

Lab Sample ID: 280-84489-L-1 DU — **Client Sample ID: Duplicate**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 331097

Analyte	Sample Result	Sample Qualifier	DU Result	DU Qualifier	Unit	D	RPD	RPD Limit
Methane	120		115		ug/L		0.4	20
Ethene	18		18.3		ug/L		0	20
Ethane	ND		ND		ug/L		NC	20

Method: 300.0 - Anions, Ion Chromatography

Lab Sample ID: MB 280-329886/6 — **Client Sample ID: Method Blank**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 329886

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Nitrate as N	ND		0.50	0.042	mg/L			06/15/16 10:47	1

Lab Sample ID: LCS 280-329886/4 — **Client Sample ID: Lab Control Sample**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 329886

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Nitrate as N	5.00	4.95		mg/L		99	90 - 110

Lab Sample ID: LCSD 280-329886/5 — **Client Sample ID: Lab Control Sample Dup**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 329886

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Nitrate as N	5.00	4.96		mg/L		99	90 - 110	0	10

Lab Sample ID: MRL 280-329886/3 — **Client Sample ID: Lab Control Sample**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 329886

Analyte	Spike Added	MRL Result	MRL Qualifier	Unit	D	%Rec	%Rec. Limits
Nitrate as N	0.200	0.211	J	mg/L		105	50 - 150

Lab Sample ID: 280-84495-2 MS — **Client Sample ID: ADDV-016**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 329886

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Nitrate as N	ND		5.00	5.10		mg/L		102	80 - 120

Lab Sample ID: 280-84495-2 MSD — **Client Sample ID: ADDV-016**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 329886

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Nitrate as N	ND		5.00	5.15		mg/L		103	80 - 120	1	20

Lab Sample ID: 280-84495-2 DU — **Client Sample ID: ADDV-016**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 329886

Analyte	Sample Result	Sample Qualifier	DU Result	DU Qualifier	Unit	D	RPD	RPD Limit
Nitrate as N	ND		ND		mg/L		NC	15

Lab Sample ID: MB 280-329887/6 — **Client Sample ID: Method Blank**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 329887

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	ND		3.0	0.25	mg/L			06/15/16 10:47	1

Method: 300.0 - Anions, Ion Chromatography (Continued)

Lab Sample ID: MB 280-329887/6 — **Client Sample ID: Method Blank**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 329887

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Sulfate	ND		5.0	0.23	mg/L			06/15/16 10:47	1

Lab Sample ID: LCS 280-329887/4 — **Client Sample ID: Lab Control Sample**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 329887

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Chloride	100	101		mg/L		101	90 - 110
Sulfate	100	99.0		mg/L		99	90 - 110

Lab Sample ID: LCSD 280-329887/5 — **Client Sample ID: Lab Control Sample Dup**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 329887

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Chloride	100	101		mg/L		101	90 - 110	0	10
Sulfate	100	99.2		mg/L		99	90 - 110	0	10

Lab Sample ID: MRL 280-329887/3 — **Client Sample ID: Lab Control Sample**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 329887

Analyte	Spike Added	MRL Result	MRL Qualifier	Unit	D	%Rec	%Rec. Limits
Chloride	2.50	2.47	J	mg/L		99	50 - 150
Sulfate	2.50	2.57	J	mg/L		103	50 - 150

Lab Sample ID: 280-84495-2 MS — **Client Sample ID: ADDV-016**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 329887

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Chloride	46		25.0	74.2		mg/L		111	80 - 120
Sulfate	0.53	J	25.0	24.2		mg/L		95	80 - 120

Lab Sample ID: 280-84495-2 MSD — **Client Sample ID: ADDV-016**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 329887

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Chloride	46		25.0	74.4		mg/L		112	80 - 120	0	20
Sulfate	0.53	J	25.0	24.5		mg/L		96	80 - 120	1	20

Lab Sample ID: 280-84495-2 DU — **Client Sample ID: ADDV-016**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 329887

Analyte	Sample Result	Sample Qualifier	DU Result	DU Qualifier	Unit	D	RPD	RPD Limit
Chloride	46		46.5		mg/L		0	15
Sulfate	0.53	J	0.606	J	mg/L		13	15

Method: 300.0 - Anions, Ion Chromatography (Continued)

Lab Sample ID: MB 280-330366/6 — **Client Sample ID: Method Blank**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 330366

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	ND		3.0	0.25	mg/L			06/19/16 10:15	1

Lab Sample ID: LCS 280-330366/4 — **Client Sample ID: Lab Control Sample**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 330366

Analyte			Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits		
Chloride			100	99.1		mg/L		99	90 - 110		

Lab Sample ID: LCSD 280-330366/5 — **Client Sample ID: Lab Control Sample Dup**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 330366

Analyte			Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Chloride			100	99.1		mg/L		99	90 - 110	0	10

Lab Sample ID: MRL 280-330366/3 — **Client Sample ID: Lab Control Sample**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 330366

Analyte			Spike Added	MRL Result	MRL Qualifier	Unit	D	%Rec	%Rec. Limits		
Chloride			2.50	2.49	J	mg/L		100	50 - 150		

Lab Sample ID: 280-84495-12 MS — **Client Sample ID: ADDV-028**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 330366

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits		
Chloride	16		25.0	42.6		mg/L		105	80 - 120		

Lab Sample ID: 280-84495-12 MSD — **Client Sample ID: ADDV-028**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 330366

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Chloride	16		25.0	42.6		mg/L		105	80 - 120	0	20

Lab Sample ID: 280-84495-12 DU — **Client Sample ID: ADDV-028**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 330366

Analyte	Sample Result	Sample Qualifier		DU Result	DU Qualifier	Unit	D			RPD	RPD Limit
Chloride	16			16.3		mg/L				0.07	15

Method: 9060 - Organic Carbon, Total (TOC)

Lab Sample ID: MB 280-330441/35 — **Client Sample ID: Method Blank**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 330441

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Organic Carbon - Average	ND		1.0	0.16	mg/L			06/17/16 23:43	1

Lab Sample ID: MB 280-330441/4 — **Client Sample ID: Method Blank**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 330441

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Organic Carbon - Average	ND		1.0	0.16	mg/L			06/17/16 15:11	1

Lab Sample ID: LCS 280-330441/3 — **Client Sample ID: Lab Control Sample**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 330441

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Total Organic Carbon - Average	25.0	24.5		mg/L		98	88 - 112

Lab Sample ID: LCS 280-330441/34 — **Client Sample ID: Lab Control Sample**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 330441

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Total Organic Carbon - Average	25.0	24.8		mg/L		99	88 - 112

Lab Sample ID: 280-84495-1 MS — **Client Sample ID: ADDV-006**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 330441

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Total Organic Carbon - Average	3.4		25.0	27.9		mg/L		98	88 - 112

Lab Sample ID: 280-84495-1 MSD — **Client Sample ID: ADDV-006**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 330441

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Total Organic Carbon - Average	3.4		25.0	27.8		mg/L		98	88 - 112	1	15

Method: SM 2320B - Alkalinity

Lab Sample ID: MB 280-330602/31 — **Client Sample ID: Method Blank**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 330602

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Alkalinity	1.87	J	5.0	1.1	mg/L			06/20/16 15:33	1

Method: SM 2320B - Alkalinity (Continued)

Lab Sample ID: MB 280-330602/5 — **Client Sample ID: Method Blank**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 330602

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Alkalinity	2.66	J	5.0	1.1	mg/L			06/20/16 12:50	1

Lab Sample ID: LCS 280-330602/30 — **Client Sample ID: Lab Control Sample**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 330602

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Alkalinity	200	188		mg/L		94	90 - 110

Lab Sample ID: LCS 280-330602/4 — **Client Sample ID: Lab Control Sample**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 330602

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Alkalinity	200	199		mg/L		99	90 - 110

Lab Sample ID: 280-84403-A-3 DU — **Client Sample ID: Duplicate**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 330602

Analyte	Sample Result	Sample Qualifier	DU Result	DU Qualifier	Unit	D	RPD	RPD Limit
Alkalinity	730	B	708		mg/L		3	10

Method: SM 4500 S2 F - Sulfide, Total

Lab Sample ID: MB 280-330284/2 — **Client Sample ID: Method Blank**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 330284

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Sulfide	ND		1.0	0.50	mg/L			06/17/16 15:49	1

Lab Sample ID: LCS 280-330284/1 — **Client Sample ID: Lab Control Sample**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 330284

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Sulfide	26.5	27.0		mg/L		102	90 - 110

Lab Sample ID: 280-84538-G-16 MSD — **Client Sample ID: Matrix Spike Duplicate**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 330284

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Sulfide	ND		26.5	27.8		mg/L		105	90 - 110	2	10

Method: SM 4500 S2 F - Sulfide, Total (Continued)

Lab Sample ID: 280-84538-I-16 MS — **Client Sample ID: Matrix Spike**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 330284

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits		
Sulfide	ND		26.5	28.4		mg/L		107	90 - 110		

Method: SM3500_FE_D - Ferrous Iron

Lab Sample ID: MB 280-330165/4 — **Client Sample ID: Method Blank**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 330165

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Ferrous Iron	ND		0.20	0.021	mg/L			06/16/16 20:23	1

Lab Sample ID: LCS 280-330165/3 — **Client Sample ID: Lab Control Sample**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 330165

Analyte			Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits		
Ferrous Iron			2.00	2.10		mg/L		105	85 - 113		

Lab Sample ID: 280-84538-A-16 MS — **Client Sample ID: Matrix Spike**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 330165

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits		
Ferrous Iron	0.028	J	2.00	2.14		mg/L		105	85 - 113		

Lab Sample ID: 280-84538-A-16 MSD — **Client Sample ID: Matrix Spike Duplicate**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 330165

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Ferrous Iron	0.028	J	2.00	2.17		mg/L		107	85 - 113	1	10

Lab Sample ID: 280-84538-A-16 DU — **Client Sample ID: Duplicate**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 330165

Analyte	Sample Result	Sample Qualifier		DU Result	DU Qualifier	Unit	D			RPD	RPD Limit
Ferrous Iron	0.028	J		0.0285	J	mg/L				0	10

QC Association Summary

Client: CH2M Hill, Inc.
Project/Site: THAN Davenport, IA - June 2016

TestAmerica Job ID: 280-84495-1

GC/MS VOA

Analysis Batch: 331006

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
280-84495-1	ADDV-006	Total/NA	Water	8260B	
280-84495-1 - DL	ADDV-006	Total/NA	Water	8260B	
280-84495-2	ADDV-016	Total/NA	Water	8260B	
280-84495-2 MS	ADDV-016	Total/NA	Water	8260B	
280-84495-2 MSD	ADDV-016	Total/NA	Water	8260B	
280-84495-3	ADDV-010	Total/NA	Water	8260B	
280-84495-3 - DL	ADDV-010	Total/NA	Water	8260B	
280-84495-4	ADDV-008	Total/NA	Water	8260B	
280-84495-5	ADDV-017	Total/NA	Water	8260B	
280-84495-6	ADDV-025	Total/NA	Water	8260B	
280-84495-7	ADDV-024	Total/NA	Water	8260B	
280-84495-8	ADDV-047	Total/NA	Water	8260B	
280-84495-9	ADDV-046	Total/NA	Water	8260B	
280-84495-10	ADDV-026	Total/NA	Water	8260B	
280-84495-10 - DL	ADDV-026	Total/NA	Water	8260B	
280-84495-11	ADDV-027	Total/NA	Water	8260B	
280-84495-12	ADDV-028	Total/NA	Water	8260B	
280-84495-12 - DL	ADDV-028	Total/NA	Water	8260B	
280-84495-13	ADDV-032	Total/NA	Water	8260B	
280-84495-13 - DL	ADDV-032	Total/NA	Water	8260B	
280-84495-14	ADDV-033	Total/NA	Water	8260B	
280-84495-15	ADDV-034	Total/NA	Water	8260B	
280-84495-15 - DL	ADDV-034	Total/NA	Water	8260B	
280-84495-16	ADDV-030	Total/NA	Water	8260B	
280-84495-17	ADDV-029	Total/NA	Water	8260B	
LCS 280-331006/4	Lab Control Sample	Total/NA	Water	8260B	
MB 280-331006/6	Method Blank	Total/NA	Water	8260B	

Analysis Batch: 331154

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
280-84495-14 - DL	ADDV-033	Total/NA	Water	8260B	
280-84588-E-6 MS	Matrix Spike	Total/NA	Water	8260B	
280-84588-E-6 MSD	Matrix Spike Duplicate	Total/NA	Water	8260B	
LCS 280-331154/4	Lab Control Sample	Total/NA	Water	8260B	
LCSD 280-331154/5	Lab Control Sample Dup	Total/NA	Water	8260B	
MB 280-331154/6	Method Blank	Total/NA	Water	8260B	

GC VOA

Analysis Batch: 330971

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
280-84495-1	ADDV-006	Total/NA	Water	RSK-175	
280-84495-2	ADDV-016	Total/NA	Water	RSK-175	
280-84495-3	ADDV-010	Total/NA	Water	RSK-175	
280-84495-3 DU	ADDV-010	Total/NA	Water	RSK-175	
280-84495-5	ADDV-017	Total/NA	Water	RSK-175	
280-84495-6	ADDV-025	Total/NA	Water	RSK-175	
280-84495-7	ADDV-024	Total/NA	Water	RSK-175	
280-84495-13	ADDV-032	Total/NA	Water	RSK-175	
280-84495-14	ADDV-033	Total/NA	Water	RSK-175	

GC VOA (Continued)

Analysis Batch: 330971 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
280-84495-15	ADDV-034	Total/NA	Water	RSK-175	
280-84495-16	ADDV-030	Total/NA	Water	RSK-175	
280-84495-17	ADDV-029	Total/NA	Water	RSK-175	
280-84538-X-16 MS	Matrix Spike	Total/NA	Water	RSK-175	
280-84538-X-16 MSD	Matrix Spike Duplicate	Total/NA	Water	RSK-175	
LCS 280-330971/5	Lab Control Sample	Total/NA	Water	RSK-175	
LCSD 280-330971/6	Lab Control Sample Dup	Total/NA	Water	RSK-175	
MB 280-330971/7	Method Blank	Total/NA	Water	RSK-175	

Analysis Batch: 331097

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
280-84489-L-1 DU	Duplicate	Total/NA	Water	RSK-175	
280-84495-4	ADDV-008	Total/NA	Water	RSK-175	
280-84538-U-16 MS	Matrix Spike	Total/NA	Water	RSK-175	
280-84538-U-16 MSD	Matrix Spike Duplicate	Total/NA	Water	RSK-175	
LCS 280-331097/5	Lab Control Sample	Total/NA	Water	RSK-175	
LCSD 280-331097/6	Lab Control Sample Dup	Total/NA	Water	RSK-175	
MB 280-331097/7	Method Blank	Total/NA	Water	RSK-175	

General Chemistry

Analysis Batch: 329886

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
280-84495-1	ADDV-006	Total/NA	Water	300.0	
280-84495-2	ADDV-016	Total/NA	Water	300.0	
280-84495-2 DU	ADDV-016	Total/NA	Water	300.0	
280-84495-2 MS	ADDV-016	Total/NA	Water	300.0	
280-84495-2 MSD	ADDV-016	Total/NA	Water	300.0	
280-84495-3	ADDV-010	Total/NA	Water	300.0	
280-84495-4	ADDV-008	Total/NA	Water	300.0	
280-84495-5	ADDV-017	Total/NA	Water	300.0	
280-84495-6	ADDV-025	Total/NA	Water	300.0	
280-84495-7	ADDV-024	Total/NA	Water	300.0	
280-84495-13	ADDV-032	Total/NA	Water	300.0	
280-84495-14	ADDV-033	Total/NA	Water	300.0	
280-84495-15	ADDV-034	Total/NA	Water	300.0	
280-84495-16	ADDV-030	Total/NA	Water	300.0	
280-84495-17	ADDV-029	Total/NA	Water	300.0	
LCS 280-329886/4	Lab Control Sample	Total/NA	Water	300.0	
LCSD 280-329886/5	Lab Control Sample Dup	Total/NA	Water	300.0	
MB 280-329886/6	Method Blank	Total/NA	Water	300.0	
MRL 280-329886/3	Lab Control Sample	Total/NA	Water	300.0	

Analysis Batch: 329887

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
280-84495-1	ADDV-006	Total/NA	Water	300.0	
280-84495-2	ADDV-016	Total/NA	Water	300.0	
280-84495-2 DU	ADDV-016	Total/NA	Water	300.0	
280-84495-2 MS	ADDV-016	Total/NA	Water	300.0	
280-84495-2 MSD	ADDV-016	Total/NA	Water	300.0	

General Chemistry (Continued)

Analysis Batch: 329887 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
280-84495-3	ADDV-010	Total/NA	Water	300.0	
280-84495-4	ADDV-008	Total/NA	Water	300.0	
280-84495-5	ADDV-017	Total/NA	Water	300.0	
280-84495-6	ADDV-025	Total/NA	Water	300.0	
280-84495-7	ADDV-024	Total/NA	Water	300.0	
280-84495-13	ADDV-032	Total/NA	Water	300.0	
280-84495-13	ADDV-032	Total/NA	Water	300.0	
280-84495-14	ADDV-033	Total/NA	Water	300.0	
280-84495-15	ADDV-034	Total/NA	Water	300.0	
280-84495-16	ADDV-030	Total/NA	Water	300.0	
280-84495-17	ADDV-029	Total/NA	Water	300.0	
LCS 280-329887/4	Lab Control Sample	Total/NA	Water	300.0	
LCSD 280-329887/5	Lab Control Sample Dup	Total/NA	Water	300.0	
MB 280-329887/6	Method Blank	Total/NA	Water	300.0	
MRL 280-329887/3	Lab Control Sample	Total/NA	Water	300.0	

Analysis Batch: 330165

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
280-84495-1	ADDV-006	Total/NA	Water	SM3500_FE_D	
280-84495-2	ADDV-016	Total/NA	Water	SM3500_FE_D	
280-84495-3	ADDV-010	Total/NA	Water	SM3500_FE_D	
280-84495-4	ADDV-008	Total/NA	Water	SM3500_FE_D	
280-84495-5	ADDV-017	Total/NA	Water	SM3500_FE_D	
280-84495-6	ADDV-025	Total/NA	Water	SM3500_FE_D	
280-84495-7	ADDV-024	Total/NA	Water	SM3500_FE_D	
280-84495-13	ADDV-032	Total/NA	Water	SM3500_FE_D	
280-84495-14	ADDV-033	Total/NA	Water	SM3500_FE_D	
280-84495-15	ADDV-034	Total/NA	Water	SM3500_FE_D	
280-84495-16	ADDV-030	Total/NA	Water	SM3500_FE_D	
280-84495-17	ADDV-029	Total/NA	Water	SM3500_FE_D	
280-84538-A-16 DU	Duplicate	Total/NA	Water	SM3500_FE_D	
280-84538-A-16 MS	Matrix Spike	Total/NA	Water	SM3500_FE_D	
280-84538-A-16 MSD	Matrix Spike Duplicate	Total/NA	Water	SM3500_FE_D	
LCS 280-330165/3	Lab Control Sample	Total/NA	Water	SM3500_FE_D	
MB 280-330165/4	Method Blank	Total/NA	Water	SM3500_FE_D	

Analysis Batch: 330284

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
280-84495-1	ADDV-006	Total/NA	Water	SM 4500 S2 F	
280-84495-2	ADDV-016	Total/NA	Water	SM 4500 S2 F	
280-84495-3	ADDV-010	Total/NA	Water	SM 4500 S2 F	
280-84495-4	ADDV-008	Total/NA	Water	SM 4500 S2 F	
280-84495-5	ADDV-017	Total/NA	Water	SM 4500 S2 F	
280-84495-6	ADDV-025	Total/NA	Water	SM 4500 S2 F	
280-84495-7	ADDV-024	Total/NA	Water	SM 4500 S2 F	
280-84495-13	ADDV-032	Total/NA	Water	SM 4500 S2 F	
280-84495-14	ADDV-033	Total/NA	Water	SM 4500 S2 F	
280-84495-15	ADDV-034	Total/NA	Water	SM 4500 S2 F	
280-84495-16	ADDV-030	Total/NA	Water	SM 4500 S2 F	
280-84495-17	ADDV-029	Total/NA	Water	SM 4500 S2 F	
280-84538-G-16 MSD	Matrix Spike Duplicate	Total/NA	Water	SM 4500 S2 F	

General Chemistry (Continued)

Analysis Batch: 330284 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
280-84538-I-16 MS	Matrix Spike	Total/NA	Water	SM 4500 S2 F	
LCS 280-330284/1	Lab Control Sample	Total/NA	Water	SM 4500 S2 F	
MB 280-330284/2	Method Blank	Total/NA	Water	SM 4500 S2 F	

Analysis Batch: 330366

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
280-84495-10	ADDV-026	Total/NA	Water	300.0	
280-84495-11	ADDV-027	Total/NA	Water	300.0	
280-84495-12	ADDV-028	Total/NA	Water	300.0	
280-84495-12 DU	ADDV-028	Total/NA	Water	300.0	
280-84495-12 MS	ADDV-028	Total/NA	Water	300.0	
280-84495-12 MSD	ADDV-028	Total/NA	Water	300.0	
LCS 280-330366/4	Lab Control Sample	Total/NA	Water	300.0	
LCSD 280-330366/5	Lab Control Sample Dup	Total/NA	Water	300.0	
MB 280-330366/6	Method Blank	Total/NA	Water	300.0	
MRL 280-330366/3	Lab Control Sample	Total/NA	Water	300.0	

Analysis Batch: 330441

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
280-84495-1	ADDV-006	Total/NA	Water	9060	
280-84495-1 MS	ADDV-006	Total/NA	Water	9060	
280-84495-1 MSD	ADDV-006	Total/NA	Water	9060	
280-84495-2	ADDV-016	Total/NA	Water	9060	
280-84495-3	ADDV-010	Total/NA	Water	9060	
280-84495-4	ADDV-008	Total/NA	Water	9060	
280-84495-5	ADDV-017	Total/NA	Water	9060	
280-84495-6	ADDV-025	Total/NA	Water	9060	
280-84495-7	ADDV-024	Total/NA	Water	9060	
280-84495-10	ADDV-026	Total/NA	Water	9060	
280-84495-11	ADDV-027	Total/NA	Water	9060	
280-84495-12	ADDV-028	Total/NA	Water	9060	
280-84495-13	ADDV-032	Total/NA	Water	9060	
280-84495-14	ADDV-033	Total/NA	Water	9060	
280-84495-15	ADDV-034	Total/NA	Water	9060	
280-84495-16	ADDV-030	Total/NA	Water	9060	
280-84495-17	ADDV-029	Total/NA	Water	9060	
LCS 280-330441/3	Lab Control Sample	Total/NA	Water	9060	
LCS 280-330441/34	Lab Control Sample	Total/NA	Water	9060	
MB 280-330441/35	Method Blank	Total/NA	Water	9060	
MB 280-330441/4	Method Blank	Total/NA	Water	9060	

Analysis Batch: 330602

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
280-84403-A-3 DU	Duplicate	Total/NA	Water	SM 2320B	
280-84495-1	ADDV-006	Total/NA	Water	SM 2320B	
280-84495-2	ADDV-016	Total/NA	Water	SM 2320B	
280-84495-3	ADDV-010	Total/NA	Water	SM 2320B	
280-84495-4	ADDV-008	Total/NA	Water	SM 2320B	
280-84495-5	ADDV-017	Total/NA	Water	SM 2320B	
280-84495-6	ADDV-025	Total/NA	Water	SM 2320B	
280-84495-7	ADDV-024	Total/NA	Water	SM 2320B	

General Chemistry (Continued)

Analysis Batch: 330602 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
280-84495-13	ADDV-032	Total/NA	Water	SM 2320B	
280-84495-14	ADDV-033	Total/NA	Water	SM 2320B	
280-84495-15	ADDV-034	Total/NA	Water	SM 2320B	
280-84495-16	ADDV-030	Total/NA	Water	SM 2320B	
280-84495-17	ADDV-029	Total/NA	Water	SM 2320B	
LCS 280-330602/30	Lab Control Sample	Total/NA	Water	SM 2320B	
LCS 280-330602/4	Lab Control Sample	Total/NA	Water	SM 2320B	
MB 280-330602/31	Method Blank	Total/NA	Water	SM 2320B	
MB 280-330602/5	Method Blank	Total/NA	Water	SM 2320B	

Lab Chronicle

Client: CH2M Hill, Inc.
Project/Site: THAN Davenport, IA - June 2016

TestAmerica Job ID: 280-84495-1

Client Sample ID: ADDV-006

Lab Sample ID: 280-84495-1
Date Collected: 06/14/16 11:45
Matrix: Water
Date Received: 06/15/16 10:00

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260B		4	20 mL	20 mL	331006	06/23/16 11:10	JLS	TAL DEN
Total/NA	Analysis	8260B	DL	40	20 mL	20 mL	331006	06/23/16 11:30	JLS	TAL DEN
Total/NA	Analysis	RSK-175		1	18 mL	18 mL	330971	06/22/16 20:39	MPS	TAL DEN
Total/NA	Analysis	300.0		1	5 mL	5 mL	329886	06/15/16 16:15	AFB	TAL DEN
Total/NA	Analysis	300.0		1	5 mL	5 mL	329887	06/15/16 16:15	AFB	TAL DEN
Total/NA	Analysis	9060		1			330441	06/17/16 20:08	CCJ	TAL DEN
Total/NA	Analysis	SM 2320B		1	1 mL		330602	06/20/16 14:43	IEU	TAL DEN
Total/NA	Analysis	SM 4500 S2 F		1	200 mL	200 mL	330284	06/17/16 15:49	KAM	TAL DEN
Total/NA	Analysis	SM3500_FE_D		1	10 mL	10 mL	330165	06/16/16 21:18	NAP	TAL DEN

Client Sample ID: ADDV-016

Lab Sample ID: 280-84495-2
Date Collected: 06/14/16 10:05
Matrix: Water
Date Received: 06/15/16 10:00

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260B		1	20 mL	20 mL	331006	06/23/16 11:50	JLS	TAL DEN
Total/NA	Analysis	RSK-175		2	18 mL	18 mL	330971	06/22/16 23:22	MPS	TAL DEN
Total/NA	Analysis	300.0		1	5 mL	5 mL	329886	06/15/16 16:35	AFB	TAL DEN
Total/NA	Analysis	300.0		1	5 mL	5 mL	329887	06/15/16 16:35	AFB	TAL DEN
Total/NA	Analysis	9060		1			330441	06/17/16 20:52	CCJ	TAL DEN
Total/NA	Analysis	SM 2320B		1	1 mL		330602	06/20/16 14:49	IEU	TAL DEN
Total/NA	Analysis	SM 4500 S2 F		1	200 mL	200 mL	330284	06/17/16 15:49	KAM	TAL DEN
Total/NA	Analysis	SM3500_FE_D		1	10 mL	10 mL	330165	06/16/16 21:18	NAP	TAL DEN

Client Sample ID: ADDV-010

Lab Sample ID: 280-84495-3
Date Collected: 06/14/16 11:38
Matrix: Water
Date Received: 06/15/16 10:00

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260B		4	20 mL	20 mL	331006	06/23/16 13:28	JLS	TAL DEN
Total/NA	Analysis	8260B	DL	40	20 mL	20 mL	331006	06/23/16 13:48	JLS	TAL DEN
Total/NA	Analysis	RSK-175		1	18 mL	18 mL	330971	06/22/16 21:15	MPS	TAL DEN
Total/NA	Analysis	300.0		1	5 mL	5 mL	329886	06/15/16 17:34	AFB	TAL DEN
Total/NA	Analysis	300.0		1	5 mL	5 mL	329887	06/15/16 17:34	AFB	TAL DEN
Total/NA	Analysis	9060		1			330441	06/17/16 21:09	CCJ	TAL DEN
Total/NA	Analysis	SM 2320B		1	1 mL		330602	06/20/16 14:55	IEU	TAL DEN
Total/NA	Analysis	SM 4500 S2 F		1	200 mL	200 mL	330284	06/17/16 15:49	KAM	TAL DEN
Total/NA	Analysis	SM3500_FE_D		1	10 mL	10 mL	330165	06/16/16 21:18	NAP	TAL DEN

Lab Chronicle

Client: CH2M Hill, Inc.
Project/Site: THAN Davenport, IA - June 2016

TestAmerica Job ID: 280-84495-1

Client Sample ID: ADDV-008

Lab Sample ID: 280-84495-4
Date Collected: 06/14/16 09:52
Matrix: Water
Date Received: 06/15/16 10:00

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260B		1	20 mL	20 mL	331006	06/23/16 14:08	JLS	TAL DEN
Total/NA	Analysis	RSK-175		3	18 mL	18 mL	331097	06/23/16 18:54	MPS	TAL DEN
Total/NA	Analysis	300.0		1	5 mL	5 mL	329886	06/15/16 17:54	AFB	TAL DEN
Total/NA	Analysis	300.0		1	5 mL	5 mL	329887	06/15/16 17:54	AFB	TAL DEN
Total/NA	Analysis	9060		1			330441	06/17/16 21:24	CCJ	TAL DEN
Total/NA	Analysis	SM 2320B		1	1 mL		330602	06/20/16 15:02	IEU	TAL DEN
Total/NA	Analysis	SM 4500 S2 F		1	200 mL	200 mL	330284	06/17/16 15:49	KAM	TAL DEN
Total/NA	Analysis	SM3500_FE_D		1	10 mL	10 mL	330165	06/16/16 21:18	NAP	TAL DEN

Client Sample ID: ADDV-017

Lab Sample ID: 280-84495-5
Date Collected: 06/14/16 16:35
Matrix: Water
Date Received: 06/15/16 10:00

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260B		1	20 mL	20 mL	331006	06/23/16 14:28	JLS	TAL DEN
Total/NA	Analysis	RSK-175		1	18 mL	18 mL	330971	06/22/16 21:34	MPS	TAL DEN
Total/NA	Analysis	300.0		1	5 mL	5 mL	329886	06/15/16 18:14	AFB	TAL DEN
Total/NA	Analysis	300.0		1	5 mL	5 mL	329887	06/15/16 18:14	AFB	TAL DEN
Total/NA	Analysis	9060		1			330441	06/17/16 22:08	CCJ	TAL DEN
Total/NA	Analysis	SM 2320B		1	1 mL		330602	06/20/16 15:08	IEU	TAL DEN
Total/NA	Analysis	SM 4500 S2 F		1	200 mL	200 mL	330284	06/17/16 15:49	KAM	TAL DEN
Total/NA	Analysis	SM3500_FE_D		1	10 mL	10 mL	330165	06/16/16 21:18	NAP	TAL DEN

Client Sample ID: ADDV-025

Lab Sample ID: 280-84495-6
Date Collected: 06/14/16 12:45
Matrix: Water
Date Received: 06/15/16 10:00

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260B		1	20 mL	20 mL	331006	06/23/16 14:47	JLS	TAL DEN
Total/NA	Analysis	RSK-175		1	18 mL	18 mL	330971	06/22/16 21:38	MPS	TAL DEN
Total/NA	Analysis	300.0		1	5 mL	5 mL	329886	06/15/16 18:34	AFB	TAL DEN
Total/NA	Analysis	300.0		1	5 mL	5 mL	329887	06/15/16 18:34	AFB	TAL DEN
Total/NA	Analysis	9060		1			330441	06/17/16 22:22	CCJ	TAL DEN
Total/NA	Analysis	SM 2320B		1	1 mL		330602	06/20/16 15:39	IEU	TAL DEN
Total/NA	Analysis	SM 4500 S2 F		1	200 mL	200 mL	330284	06/17/16 15:49	KAM	TAL DEN
Total/NA	Analysis	SM3500_FE_D		1	10 mL	10 mL	330165	06/16/16 21:18	NAP	TAL DEN

Client Sample ID: ADDV-024 — Lab Sample ID: 280-84495-7

Date Collected: 06/14/16 14:35 — **Matrix: Water**
Date Received: 06/15/16 10:00

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260B		1	20 mL	20 mL	331006	06/23/16 15:07	JLS	TAL DEN
Total/NA	Analysis	RSK-175		1	18 mL	18 mL	330971	06/22/16 21:43	MPS	TAL DEN
Total/NA	Analysis	300.0		1	5 mL	5 mL	329886	06/15/16 18:54	AFB	TAL DEN
Total/NA	Analysis	300.0		1	5 mL	5 mL	329887	06/15/16 18:54	AFB	TAL DEN
Total/NA	Analysis	9060		1			330441	06/18/16 00:13	CCJ	TAL DEN
Total/NA	Analysis	SM 2320B		1	1 mL		330602	06/20/16 15:44	IEU	TAL DEN
Total/NA	Analysis	SM 4500 S2 F		1	200 mL	200 mL	330284	06/17/16 15:49	KAM	TAL DEN
Total/NA	Analysis	SM3500_FE_D		1	10 mL	10 mL	330165	06/16/16 21:18	NAP	TAL DEN

Client Sample ID: ADDV-047 — Lab Sample ID: 280-84495-8

Date Collected: 06/14/16 16:55 — **Matrix: Water**
Date Received: 06/15/16 10:00

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260B		1	20 mL	20 mL	331006	06/23/16 15:27	JLS	TAL DEN

Client Sample ID: ADDV-046 — Lab Sample ID: 280-84495-9

Date Collected: 06/14/16 12:01 — **Matrix: Water**
Date Received: 06/15/16 10:00

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260B		1	20 mL	20 mL	331006	06/23/16 15:47	JLS	TAL DEN

Client Sample ID: ADDV-026 — Lab Sample ID: 280-84495-10

Date Collected: 06/14/16 11:33 — **Matrix: Water**
Date Received: 06/15/16 10:00

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260B		100	20 mL	20 mL	331006	06/23/16 16:06	JLS	TAL DEN
Total/NA	Analysis	8260B	DL	1000	20 mL	20 mL	331006	06/23/16 16:26	JLS	TAL DEN
Total/NA	Analysis	300.0		1	5 mL	5 mL	330366	06/19/16 15:06	CML	TAL DEN
Total/NA	Analysis	9060		1			330441	06/18/16 02:11	CCJ	TAL DEN

Client Sample ID: ADDV-027 — Lab Sample ID: 280-84495-11

Date Collected: 06/14/16 11:37 — **Matrix: Water**
Date Received: 06/15/16 10:00

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260B		1	20 mL	20 mL	331006	06/23/16 16:46	JLS	TAL DEN
Total/NA	Analysis	300.0		1	5 mL	5 mL	330366	06/19/16 15:23	CML	TAL DEN
Total/NA	Analysis	9060		1			330441	06/18/16 02:25	CCJ	TAL DEN

Lab Chronicle

Client: CH2M Hill, Inc.
Project/Site: THAN Davenport, IA - June 2016

TestAmerica Job ID: 280-84495-1

Client Sample ID: ADDV-028
Date Collected: 06/14/16 11:42
Date Received: 06/15/16 10:00

Lab Sample ID: 280-84495-12
Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260B		1	20 mL	20 mL	331006	06/23/16 17:06	JLS	TAL DEN
Total/NA	Analysis	8260B	DL	10	20 mL	20 mL	331006	06/23/16 17:26	JLS	TAL DEN
Total/NA	Analysis	300.0		1	5 mL	5 mL	330366	06/19/16 15:40	CML	TAL DEN
Total/NA	Analysis	9060		1			330441	06/18/16 02:40	CCJ	TAL DEN

Client Sample ID: ADDV-032
Date Collected: 06/14/16 09:30
Date Received: 06/15/16 10:00

Lab Sample ID: 280-84495-13
Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260B		40	20 mL	20 mL	331006	06/23/16 17:45	JLS	TAL DEN
Total/NA	Analysis	8260B	DL	400	20 mL	20 mL	331006	06/23/16 18:05	JLS	TAL DEN
Total/NA	Analysis	RSK-175		36	18 mL	18 mL	330971	06/23/16 04:12	MPS	TAL DEN
Total/NA	Analysis	300.0		1	5 mL	5 mL	329886	06/15/16 19:14	AFB	TAL DEN
Total/NA	Analysis	300.0		1	5 mL	5 mL	329887	06/15/16 19:14	AFB	TAL DEN
Total/NA	Analysis	300.0		5	5 mL	5 mL	329887	06/15/16 23:17	AFB	TAL DEN
Total/NA	Analysis	9060		1			330441	06/18/16 02:55	CCJ	TAL DEN
Total/NA	Analysis	SM 2320B		1	1 mL		330602	06/20/16 15:52	IEU	TAL DEN
Total/NA	Analysis	SM 4500 S2 F		1	200 mL	200 mL	330284	06/17/16 15:49	KAM	TAL DEN
Total/NA	Analysis	SM3500_FE_D		1	10 mL	10 mL	330165	06/16/16 21:18	NAP	TAL DEN

Client Sample ID: ADDV-033
Date Collected: 06/14/16 09:40
Date Received: 06/15/16 10:00

Lab Sample ID: 280-84495-14
Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260B		4	20 mL	20 mL	331006	06/23/16 18:25	JLS	TAL DEN
Total/NA	Analysis	8260B	DL	200	20 mL	20 mL	331154	06/24/16 10:37	JLS	TAL DEN
Total/NA	Analysis	RSK-175		18	18 mL	18 mL	330971	06/23/16 04:17	MPS	TAL DEN
Total/NA	Analysis	300.0		1	5 mL	5 mL	329886	06/15/16 19:34	AFB	TAL DEN
Total/NA	Analysis	300.0		1	5 mL	5 mL	329887	06/15/16 19:34	AFB	TAL DEN
Total/NA	Analysis	9060		1			330441	06/18/16 03:12	CCJ	TAL DEN
Total/NA	Analysis	SM 2320B		1	1 mL		330602	06/20/16 15:59	IEU	TAL DEN
Total/NA	Analysis	SM 4500 S2 F		1	200 mL	200 mL	330284	06/17/16 15:49	KAM	TAL DEN
Total/NA	Analysis	SM3500_FE_D		1	10 mL	10 mL	330165	06/16/16 21:18	NAP	TAL DEN

Client Sample ID: ADDV-034 — Lab Sample ID: 280-84495-15

Date Collected: 06/14/16 09:50 — **Matrix: Water**
Date Received: 06/15/16 10:00

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260B		2	20 mL	20 mL	331006	06/23/16 19:04	JLS	TAL DEN
Total/NA	Analysis	8260B	DL	20	20 mL	20 mL	331006	06/23/16 19:24	JLS	TAL DEN
Total/NA	Analysis	RSK-175		18	18 mL	18 mL	330971	06/23/16 04:21	MPS	TAL DEN
Total/NA	Analysis	300.0		1	5 mL	5 mL	329886	06/15/16 19:54	AFB	TAL DEN
Total/NA	Analysis	300.0		1	5 mL	5 mL	329887	06/15/16 19:54	AFB	TAL DEN
Total/NA	Analysis	9060		1			330441	06/18/16 03:26	CCJ	TAL DEN
Total/NA	Analysis	SM 2320B		1	1 mL		330602	06/20/16 16:05	IEU	TAL DEN
Total/NA	Analysis	SM 4500 S2 F		1	200 mL	200 mL	330284	06/17/16 15:49	KAM	TAL DEN
Total/NA	Analysis	SM3500_FE_D		1	10 mL	10 mL	330165	06/16/16 21:18	NAP	TAL DEN

Client Sample ID: ADDV-030 — Lab Sample ID: 280-84495-16

Date Collected: 06/14/16 15:15 — **Matrix: Water**
Date Received: 06/15/16 10:00

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260B		1	20 mL	20 mL	331006	06/23/16 19:44	JLS	TAL DEN
Total/NA	Analysis	RSK-175		1	18 mL	18 mL	330971	06/22/16 22:21	MPS	TAL DEN
Total/NA	Analysis	300.0		1	5 mL	5 mL	329886	06/15/16 20:14	AFB	TAL DEN
Total/NA	Analysis	300.0		1	5 mL	5 mL	329887	06/15/16 20:14	AFB	TAL DEN
Total/NA	Analysis	9060		1			330441	06/18/16 04:11	CCJ	TAL DEN
Total/NA	Analysis	SM 2320B		1	1 mL		330602	06/20/16 16:12	IEU	TAL DEN
Total/NA	Analysis	SM 4500 S2 F		1	200 mL	200 mL	330284	06/17/16 15:49	KAM	TAL DEN
Total/NA	Analysis	SM3500_FE_D		1	10 mL	10 mL	330165	06/16/16 21:18	NAP	TAL DEN

Client Sample ID: ADDV-029 — Lab Sample ID: 280-84495-17

Date Collected: 06/14/16 13:10 — **Matrix: Water**
Date Received: 06/15/16 10:00

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260B		1	20 mL	20 mL	331006	06/23/16 20:03	JLS	TAL DEN
Total/NA	Analysis	RSK-175		1	18 mL	18 mL	330971	06/22/16 22:25	MPS	TAL DEN
Total/NA	Analysis	300.0		1	5 mL	5 mL	329886	06/15/16 20:34	AFB	TAL DEN
Total/NA	Analysis	300.0		1	5 mL	5 mL	329887	06/15/16 20:34	AFB	TAL DEN
Total/NA	Analysis	9060		1			330441	06/18/16 04:25	CCJ	TAL DEN
Total/NA	Analysis	SM 2320B		1	1 mL		330602	06/20/16 16:19	IEU	TAL DEN
Total/NA	Analysis	SM 4500 S2 F		1	200 mL	200 mL	330284	06/17/16 15:49	KAM	TAL DEN
Total/NA	Analysis	SM3500_FE_D		1	10 mL	10 mL	330165	06/16/16 21:18	NAP	TAL DEN

Laboratory References:
TAL DEN = TestAmerica Denver, 4955 Yarrow Street, Arvada, CO 80002, TEL (303)736-0100

Certification Summary

Client: CH2M Hill, Inc.
Project/Site: THAN Davenport, IA - June 2016

TestAmerica Job ID: 280-84495-1

Laboratory: TestAmerica Denver

Unless otherwise noted, all analytes for this laboratory were covered under each certification below.

Authority	Program	EPA Region	Certification ID	Expiration Date
Florida	NELAP	4	E87667	06-30-16

The following analytes are included in this report, but are not certified under this certification:

Analysis Method	Prep Method	Matrix	Analyte
9060		Water	Total Organic Carbon - Average

The following analytes are included in this report, but certification is not offered by the governing authority:

Analysis Method	Prep Method	Matrix	Analyte
300.0		Water	Chloride
300.0		Water	Nitrate as N
300.0		Water	Sulfate

Iowa	State Program	7	370	11-30-16

The following analytes are included in this report, but certification is not offered by the governing authority:

Analysis Method	Prep Method	Matrix	Analyte
300.0		Water	Chloride
300.0		Water	Nitrate as N
300.0		Water	Sulfate
8260B		Water	1,1,1-Trichloroethane
8260B		Water	1,1-Dichloroethane
8260B		Water	1,1-Dichloroethene
8260B		Water	1,2-Dichloroethane
8260B		Water	Acetone
8260B		Water	Benzene
8260B		Water	Chloroethane
8260B		Water	cis-1,2-Dichloroethene
8260B		Water	Ethylbenzene
8260B		Water	Methyl ethyl ketone (MEK)
8260B		Water	Methylene Chloride
8260B		Water	m-Xylene & p-Xylene
8260B		Water	o-Xylene
8260B		Water	Styrene
8260B		Water	Tetrachloroethene
8260B		Water	Toluene
8260B		Water	trans-1,2-Dichloroethene
8260B		Water	Trichloroethene
8260B		Water	Vinyl chloride
8260B		Water	Xylenes, Total
9060		Water	Total Organic Carbon - Average
RSK-175		Water	Ethane
RSK-175		Water	Ethene
RSK-175		Water	Methane
SM3500_FE_D		Water	Ferrous Iron

Oregon	NELAP	10	4025	01-09-17

The following analytes are included in this report, but are not certified under this certification:

Analysis Method	Prep Method	Matrix	Analyte
9060		Water	Total Organic Carbon - Average
SM3500_FE_D		Water	Ferrous Iron

The following analytes are included in this report, but certification is not offered by the governing authority:

Analysis Method	Prep Method	Matrix	Analyte

Certification Summary

Client: CH2M Hill, Inc.
Project/Site: THAN Davenport, IA - June 2016

TestAmerica Job ID: 280-84495-1

Laboratory: TestAmerica Denver (Continued)

Unless otherwise noted, all analytes for this laboratory were covered under each certification below.

Authority	Program	EPA Region	Certification ID	Expiration Date
Oregon	NELAP	10	4025	01-09-17

The following analytes are included in this report, but certification is not offered by the governing authority:

Analysis Method	Prep Method	Matrix	Analyte
300.0		Water	Chloride
300.0		Water	Nitrate as N
300.0		Water	Sulfate

TestAmerica Denver
4955 Yarrow Street
Arvada, CO 80002
Phone (303) 736-0100 Fax (303) 431-7171

Chain of Custody Record

280-84495 Chain of Custody

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Client Information

Client Contact: Ms. Shannon Olson
Company: CH2M Hill, Inc.
Address: 2020 SW 4th Ave Suite 300
City: Portland
State, Zip: OR, 97201
Phone: 503-736-4111(Tel) 503-736-2063(Fax)
Email: shannon.olson@ch2m.com
Project Name: THAN Davenport, IA - June 2016
Site:

Sampler: Crystal Reuss
Phone: 414 847 6264
Due Date Requested: Standard TAT
TAT Requested (days): Standard TAT
PO #: 103817102176
WO #: 486615.14.18
Project #: 28013442
SSOW#:

Lab PM: Ide, Jamie N
E-Mail: jamie.ide@testamericainc.com
8045091049915

COC No: 280-53595-19251.1
Page: Page 1 of 1
Job #:

Analysis Requested

Preservation Codes:
A - HCL, B - NaOH, C - Zn Acetate, D - Nitric Acid, E - NaHSO4, F - MeOH, G - Amchlor, H - Ascorbic Acid, I - Ice, J - DI Water, K - EDTA, L - EDA
M - Hexane, N - None, O - AsNaO2, P - Na2O4S, Q - Na2SO3, R - Na2S2O3, S - H2SO4, T - TSP Dodecahydrate, U - Acetone, V - MCAA, W - ph 4-5, Z - other (specify)
Other:

Sample Identification	Sample Date	Sample Time	Sample Type (C=comp, G=grab)	Matrix (W=water, S=soil, O=waste/oil, BT=Tissue, A=Air)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	8260B - VOCs	9060 - TOC	300.0 - Chloride (only)	SM2320B 0 Alkalinity, 300.0 (Cl, NO3, SO4), 3500_FE_D Ferrous Iron	SM4500_S2_F - Total Sulfide	RSK-175 - Dissolved Gases							Total Number of containers	Special Instructions/Note:
			Preservation Code:				A	S	N	N	O B	A								
ADDV-006	6/14/16	1145	G	W	N	N	X	X		X	X	X							9	
ADDV-016	6/14/16	1005	G	W	N	N	X	X		X	X	X							9	
ADDV-010	6/14/16	1138	G	W	N	N	X	X		X	X	X							9	
ADDV-008	6/14/16	0952	G	W	N	N	X	X		X	X	X							9	
ADDV-017	6/14/16	1635	G	W	N	N	X	X		X	X	X							9	
ADDV-025	6/14/16	1245	G	W	N	N	X	X		X	X	X							9	
ADDV-024	6/14/16	1435	G	W	N	N	X	X		X	X	X							9	
ADDV-047	6/14/16	1655	G	W	N	N	X												2	

Possible Hazard Identification: [X] Non-Hazard [ ] Flammable [ ] Skin Irritant [ ] Poison B [ ] Unknown [ ] Radiological

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month): [ ] Return To Client [X] Disposal By Lab [ ] Archive For ____ Months

Deliverable Requested: I, II, III, IV, Other (specify) See SOW / PO

Special Instructions/QC Requirements:

Empty Kit Relinquished by: | Date: | Time: | Method of Shipment:

Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
[signature]	6/14/16 / 1850	CH2M	Reed Schill	6-15-16 1000	TAD

Custody Seals Intact: Δ Yes Δ No
Custody Seal No.: 735021 / 735502
Cooler Temperature(s) °C and Other Remarks: 1.1; 2.3 IR#5 +0.0 Transferred by RP 6-15-16

TestAmerica Denver
4955 Yarrow Street
Arvada, CO 80002
Phone (303) 736-0100 Fax (303) 431-7171

Chain of Custody Record

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Client Information	Sampler: Crystal Reuss	Lab PM: Ide, Jamie N	Carrier Tracking No(s): 809589104 40	COC No: 280-53595-19251.1
Client Contact: Ms. Shannon Olson	Phone: 414-847-0264	E-Mail: jamie.ide@testamericainc.com		Page: Page 1 of 1
Company: CH2M Hill, Inc.				Job #:
Address: 2020 SW 4th Ave Suite 300	Due Date Requested: Standard TAT			
City: Portland	TAT Requested (days): Standard			
State, Zip: OR, 97201				
Phone: 503-736-4111(Tel) 503-736-2063(Fax)	PO #: 103817102176			
Email: shannon.olson@ch2m.com	WO #: 486615.14.18			
Project Name: THAN Davenport, IA - June 2016	Project #: 28013442			
Site:	SSOW#:			

Analysis Requested

Preservation Codes:
A - HCL, B - NaOH, C - Zn Acetate, D - Nitric Acid, E - NaHSO4, F - MeOH, G - Amchlor, H - Ascorbic Acid, I - Ice, J - DI Water, K - EDTA, L - EDA
M - Hexane, N - None, O - AsNaO2, P - Na2O4S, Q - Na2SO3, R - Na2S2O3, S - H2SO4, T - TSP Dodecahydrate, U - Acetone, V - MCAA, W - ph 4-5, Z - other (specify)
Other:

Sample Identification	Sample Date	Sample Time	Sample Type (C=comp, G=grab)	Matrix (W=water, S=solid, O=waste/oil, BT=Tissue, A=Air)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	8260B - VOCs	9060 - TOC	300.0 - Chloride (only)	SM2320B 0 Alkalinity, 300.0 (Cl, NO3, SO4), 3500_FE_D Ferrous Iron	SM4500_S2_F - Total Sulfide	RSK-175 - Dissolved Gases							Total Number of containers	Special Instructions/Note:
			Preservation Code:				A	S	N	Z	C B	A								
ADDV-046	6/14/16	1201	G	W	N	N	X												3	
ADDV-026	6/14/16	1133	G	W	N	N	X	X	X										6	
ADDV-027	6/14/16	1137	G	W	N	N	X	X	X										6	
ADDV-028	6/14/16	1142	G	W	N	N	X	X	X										6	
ADDV-032	6/14/16	930	G	W	N	N	X	X		X	X	X							9	
ADDV-033	6/14/16	940	G	W	N	N	X	X		X	X	X							9	
ADDV-034	6/14/16	950	G	W	N	N	X	X		X	X	X							9	
ADDV-030	6/14/16	1515	G	W	N	N	X	X		X	X	X							9	
ADDV-029	6/14/16	1310	G	W	N	N	X	X		X	X	X							9	

Possible Hazard Identification
☒ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown ☐ Radiological

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
☐ Return To Client ☒ Disposal By Lab ☐ Archive For _____ Months

Deliverable Requested: I, II, III, IV, Other (specify) See SOW / PO

Special Instructions/QC Requirements:

Empty Kit Relinquished by:	Date:	Time:	Method of Shipment:		
Relinquished by:	Date/Time: 6/14/16 1800	Company: CH2M	Received by:	Date/Time: 6-15-16 1000	Company: TAD
Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company

Custody Seals Intact: Δ Yes Δ No
Custody Seal No.:
Cooler Temperature(s) °C and Other Remarks: 1.1, 2.6 IR#s 40.0 Transferred by RP 6-15-16

Login Sample Receipt Checklist

Client: CH2M Hill, Inc.

Job Number: 280-84495-1

Login Number: 84495
List Number: 1
Creator: Pottruff, Reed W

List Source: TestAmerica Denver

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	N/A	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	False	Refer to Job Narrative for details.
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	N/A	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

ANALYTICAL REPORT

TestAmerica Laboratories, Inc.
TestAmerica Denver
4955 Yarrow Street
Arvada, CO 80002
Tel: (303)736-0100

TestAmerica Job ID: 280-84538-1
Client Project/Site: THAN Davenport, IA - June 2016

For:
CH2M Hill, Inc.
2020 SW 4th Ave
Suite 300
Portland, Oregon 97201

Attn: Ms. Shannon Olson

Authorized for release by:
6/30/2016 6:29:17 PM

Jamie Ide, Project Manager I
(303)736-0126
jamie.ide@testamericainc.com

LINKS

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The test results in this report meet all 2003 NELAC and 2009 TNI requirements for accredited parameters, exceptions are noted in this report. This report may not be reproduced except in full, and with written approval from the laboratory. For questions please contact the Project Manager at the e-mail address or telephone number listed on this page.

This report has been electronically signed and authorized by the signatory. Electronic signature is intended to be the legally binding equivalent of a traditionally handwritten signature.

Results relate only to the items tested and the sample(s) as received by the laboratory.

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Qualifiers

GC/MS VOA

Qualifier	Qualifier Description
J	Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.
E	Result exceeded calibration range.
B	Compound was found in the blank and sample.
4	MS, MSD: The analyte present in the original sample is greater than 4 times the matrix spike concentration; therefore, control limits are not applicable.

GC VOA

Qualifier	Qualifier Description
J	Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.

General Chemistry

Qualifier	Qualifier Description
HF	Field parameter with a holding time of 15 minutes. Test performed by laboratory at client's request.
B	Compound was found in the blank and sample.
J	Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.
4	MS, MSD: The analyte present in the original sample is greater than 4 times the matrix spike concentration; therefore, control limits are not applicable.

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
¤	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CNF	Contains no Free Liquid
DER	Duplicate error ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision level concentration
MDA	Minimum detectable activity
EDL	Estimated Detection Limit
MDC	Minimum detectable concentration
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
NC	Not Calculated
ND	Not detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
QC	Quality Control
RER	Relative error ratio
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)

Job ID: 280-84538-1

Laboratory: TestAmerica Denver

Narrative

CASE NARRATIVE
Client: CH2M Hill, Inc.
Project: THAN Davenport, IA - June 2016
Report Number: 280-84538-1

With the exceptions noted as flags or footnotes, standard analytical protocols were followed in the analysis of the samples and no problems were encountered or anomalies observed. In addition all laboratory quality control samples were within established control limits, with any exceptions noted below. Each sample was analyzed to achieve the lowest possible reporting limit within the constraints of the method. In some cases, due to interference or analytes present at high concentrations, samples were diluted. For diluted samples, the reporting limits are adjusted relative to the dilution required.

Calculations are performed before rounding to avoid round-off errors in calculated results.

All holding times were met and proper preservation noted for the methods performed on these samples, unless otherwise detailed in the individual sections below.

RECEIPT

The samples were received on 6/16/2016 9:50 AM; the samples arrived in good condition, properly preserved and, where required, on ice. The temperatures of the 3 coolers at receipt time were 0.7º C, 1.1º C and 3.3º C.

Three of three HCl preserved VOA vials requesting 8260B VOCs analysis for sample ADDV-031 (280-84538-19) did not have a sample collection time listed on their container labels. The laboratory logged the containers sample collection time per the the chain of custody and will proceed unless instructed otherwise. The client was notified on 6/6/2016.

The sample ID listed on the container label for two of two HCl preserved VOA vials requesting 8260B VOCs analysis received for sample ADDV-048 (280-84538-20) did not match the chain of custody. The container labels list a sample ID of "048" while the chain of custody lists "ADDV-048". It can be noted that the sample collection date/time matches between the container labels and chain of custody. The laboratory logged the sample ID per the chain of custody and will proceed unless instructed otherwise. The client was notified on 6/16/2016.

The 250 mL sulfuric preserved amber glass bottle received for the requested 9060 - TOC analysis for sample ADDV-003 (280-84538-11) was not completely full but contained approximately 175 mL of sample volume. Sufficient sample volume was present to perform the requested analysis. The client was notified on 6/16/2016.

VOLATILE ORGANIC COMPOUNDS (GC-MS)

Samples ADDV-011 (280-84538-1)[200X], ADDV-011 (280-84538-1)[2000X], ADDV-004 (280-84538-2)[4X], ADDV-040 (280-84538-3)[20X], ADDV-040 (280-84538-3)[200X], ADDV-042 (280-84538-6)[1000X], ADDV-042 (280-84538-6)[10000X], ADDV-041 (280-84538-7)[1000X], ADDV-041 (280-84538-7)[10000X], ADDV-007 (280-84538-9)[20X], ADDV-007 (280-84538-9)[200X], ADDV-022 (280-84538-10)[100X], ADDV-022 (280-84538-10)[4000X], ADDV-003 (280-84538-11)[10X], ADDV-003 (280-84538-11)[100X], ADDV-020 (280-84538-15)[100X], ADDV-020 (280-84538-15)[4000X], ADDV-021 (280-84538-16)[4X], ADDV-021 (280-84538-16)[40X], ADDV-019 (280-84538-17)[100X], ADDV-019 (280-84538-17)[4000X], ADDV-031 (280-84538-19)[100X] and ADDV-031 (280-84538-19)[20X] required dilution prior to analysis due to the nature of the sample matrix. The reporting limits have been adjusted accordingly.

Methylene Chloride was detected in method blank MB 280-331584/6 at a level that was above the method detection limit but below the reporting limit. The value should be considered an estimate, and has been flagged. If the associated sample reported a result above the MDL and/or RL, the result has been flagged.

The MS/MSD performed on sample ADDV-021 (280-84538-16) exhibited spike recoveries outside QC control limits for Vinyl Chloride and cis-1,2-Dichloroethene. The associated LCS was in control and demonstrates that operating procedures were in control. No further action was required.

Acetone was detected in method blank MB 280-331595/6 at a level that was above the method detection limit but below the reporting limit. The value should be considered an estimate, and has been flagged. If the associated sample reported a result above the MDL and/or RL, the result has been flagged.

Job ID: 280-84538-1 (Continued)

Laboratory: TestAmerica Denver (Continued)

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

DISSOLVED GASES
Analytes Acetylene/Ethane co-elute on one of the columns used for this analysis. As a result, there are no results reported for the %Difference in the concentration on the Form X.

Samples ADDV-020 (280-84538-15)[18X], ADDV-021 (280-84538-16)[3X], ADDV-019 (280-84538-17)[18X], ADDV-018 (280-84538-18)[3X] and ADDV-031 (280-84538-19)[36X] required dilution prior to analysis. The reporting limits have been adjusted accordingly.

No analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

ALKALINITY
Alkalinity was detected in method blank MB 280-330290/5 at a level that was above the method detection limit but below the reporting limit. The value should be considered an estimate, and has been flagged. If the associated sample reported a result above the MDL and/or RL, the result has been flagged.

Alkalinity was detected in method blank MB 280-330927/31 at a level that was above the method detection limit but below the reporting limit. The value should be considered an estimate, and has been flagged. If the associated sample reported a result above the MDL and/or RL, the result has been flagged.

Alkalinity was detected in method blank MB 280-330927/5 at a level that was above the method detection limit but below the reporting limit. The value should be considered an estimate, and has been flagged. If the associated sample reported a result above the MDL and/or RL, the result has been flagged.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

ANIONS (48 HOURS)
No analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

ANIONS (28 DAYS)
Samples ADDV-013 (280-84538-8)[10X], ADDV-022 (280-84538-10)[10X], ADDV-012 (280-84538-12)[50X], ADDV-020 (280-84538-15)[5X], ADDV-019 (280-84538-17)[5X] and ADDV-031 (280-84538-19)[5X] required dilution prior to analysis. The reporting limits have been adjusted accordingly.

No analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

FERROUS IRON
Sample ADDV-031 (280-84538-19)[5X] required dilution prior to analysis. The reporting limits have been adjusted accordingly.

No analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

TOTAL ORGANIC CARBON
No analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

SULFIDE
No analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

Detection Summary

Client: CH2M Hill, Inc.
Project/Site: THAN Davenport, IA - June 2016

TestAmerica Job ID: 280-84538-1

Client Sample ID: ADDV-011 — Lab Sample ID: 280-84538-1

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
1,1,1-Trichloroethane	2100		200	32	ug/L	200		8260B	Total/NA
1,1-Dichloroethane	630		200	44	ug/L	200		8260B	Total/NA
1,1-Dichloroethene	150	J	200	46	ug/L	200		8260B	Total/NA
cis-1,2-Dichloroethene	15000	E	200	30	ug/L	200		8260B	Total/NA
Ethylbenzene	810		200	32	ug/L	200		8260B	Total/NA
Methylene Chloride	330	J B	400	64	ug/L	200		8260B	Total/NA
m-Xylene & p-Xylene	2100		400	68	ug/L	200		8260B	Total/NA
o-Xylene	680		200	38	ug/L	200		8260B	Total/NA
Styrene	36	J	200	34	ug/L	200		8260B	Total/NA
Tetrachloroethene	250		200	40	ug/L	200		8260B	Total/NA
Toluene	2100		200	34	ug/L	200		8260B	Total/NA
Trichloroethene	76	J	200	32	ug/L	200		8260B	Total/NA
Vinyl chloride	620		200	20	ug/L	200		8260B	Total/NA
Xylenes, Total	2800		400	38	ug/L	200		8260B	Total/NA
cis-1,2-Dichloroethene - DL	15000		2000	300	ug/L	2000		8260B	Total/NA
Chloride	27		3.0	0.25	mg/L	1		300.0	Total/NA
Total Organic Carbon - Average	3.7		1.0	0.16	mg/L	1		9060	Total/NA

Client Sample ID: ADDV-004 — Lab Sample ID: 280-84538-2

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
1,1,1-Trichloroethane	20		1.0	0.16	ug/L	1		8260B	Total/NA
1,1-Dichloroethane	7.5		1.0	0.22	ug/L	1		8260B	Total/NA
1,1-Dichloroethene	0.78	J	1.0	0.23	ug/L	1		8260B	Total/NA
Acetone	3.6	J	10	1.9	ug/L	1		8260B	Total/NA
cis-1,2-Dichloroethene	18		1.0	0.15	ug/L	1		8260B	Total/NA
Methylene Chloride	0.93	J B	2.0	0.32	ug/L	1		8260B	Total/NA
Tetrachloroethene	140	E	1.0	0.20	ug/L	1		8260B	Total/NA
trans-1,2-Dichloroethene	0.72	J	1.0	0.15	ug/L	1		8260B	Total/NA
Trichloroethene	13		1.0	0.16	ug/L	1		8260B	Total/NA
Tetrachloroethene - DL	130		4.0	0.80	ug/L	4		8260B	Total/NA
Chloride	7.8		3.0	0.25	mg/L	1		300.0	Total/NA
Total Organic Carbon - Average	3.3		1.0	0.16	mg/L	1		9060	Total/NA

Client Sample ID: ADDV-040 — Lab Sample ID: 280-84538-3

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
1,1,1-Trichloroethane	45		20	3.2	ug/L	20		8260B	Total/NA
1,1-Dichloroethane	47		20	4.4	ug/L	20		8260B	Total/NA
1,1-Dichloroethene	11	J	20	4.6	ug/L	20		8260B	Total/NA
cis-1,2-Dichloroethene	1600	E	20	3.0	ug/L	20		8260B	Total/NA
Ethylbenzene	94		20	3.2	ug/L	20		8260B	Total/NA
Methylene Chloride	28	J B	40	6.4	ug/L	20		8260B	Total/NA
m-Xylene & p-Xylene	12	J	40	6.8	ug/L	20		8260B	Total/NA
o-Xylene	7.0	J	20	3.8	ug/L	20		8260B	Total/NA
Tetrachloroethene	21		20	4.0	ug/L	20		8260B	Total/NA
Toluene	9.8	J	20	3.4	ug/L	20		8260B	Total/NA
Trichloroethene	29		20	3.2	ug/L	20		8260B	Total/NA
Vinyl chloride	260		20	2.0	ug/L	20		8260B	Total/NA
Xylenes, Total	19	J	40	3.8	ug/L	20		8260B	Total/NA

This Detection Summary does not include radiochemical test results.

Detection Summary

Client: CH2M Hill, Inc.
Project/Site: THAN Davenport, IA - June 2016

TestAmerica Job ID: 280-84538-1

Client Sample ID: ADDV-040 (Continued) — Lab Sample ID: 280-84538-3

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
cis-1,2-Dichloroethene - DL	1600		200	30	ug/L	200		8260B	Total/NA
Chloride	30		3.0	0.25	mg/L	1		300.0	Total/NA
Total Organic Carbon - Average	3.2		1.0	0.16	mg/L	1		9060	Total/NA

Client Sample ID: ADDV-005 — Lab Sample ID: 280-84538-4

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
1,1,1-Trichloroethane	16		1.0	0.16	ug/L	1		8260B	Total/NA
1,1-Dichloroethane	0.88	J	1.0	0.22	ug/L	1		8260B	Total/NA
Acetone	5.4	J	10	1.9	ug/L	1		8260B	Total/NA
cis-1,2-Dichloroethene	2.2		1.0	0.15	ug/L	1		8260B	Total/NA
Methylene Chloride	0.95	J B	2.0	0.32	ug/L	1		8260B	Total/NA
Tetrachloroethene	43		1.0	0.20	ug/L	1		8260B	Total/NA
trans-1,2-Dichloroethene	0.27	J	1.0	0.15	ug/L	1		8260B	Total/NA
Trichloroethene	21		1.0	0.16	ug/L	1		8260B	Total/NA
Chloride	4.8		3.0	0.25	mg/L	1		300.0	Total/NA
Total Organic Carbon - Average	1.8		1.0	0.16	mg/L	1		9060	Total/NA

Client Sample ID: ADDV-002 — Lab Sample ID: 280-84538-5

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
1,1,1-Trichloroethane	0.25	J	1.0	0.16	ug/L	1		8260B	Total/NA
1,1-Dichloroethane	4.1		1.0	0.22	ug/L	1		8260B	Total/NA
Acetone	1.9	J	10	1.9	ug/L	1		8260B	Total/NA
cis-1,2-Dichloroethene	18		1.0	0.15	ug/L	1		8260B	Total/NA
Methylene Chloride	0.77	J B	2.0	0.32	ug/L	1		8260B	Total/NA
Tetrachloroethene	7.6		1.0	0.20	ug/L	1		8260B	Total/NA
trans-1,2-Dichloroethene	0.54	J	1.0	0.15	ug/L	1		8260B	Total/NA
Trichloroethene	9.9		1.0	0.16	ug/L	1		8260B	Total/NA
Vinyl chloride	0.91	J	1.0	0.10	ug/L	1		8260B	Total/NA
Chloride	11		3.0	0.25	mg/L	1		300.0	Total/NA
Total Organic Carbon - Average	2.0		1.0	0.16	mg/L	1		9060	Total/NA

Client Sample ID: ADDV-042 — Lab Sample ID: 280-84538-6

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
1,1,1-Trichloroethane	9100		1000	160	ug/L	1000		8260B	Total/NA
1,1-Dichloroethane	3600		1000	220	ug/L	1000		8260B	Total/NA
1,1-Dichloroethene	920	J	1000	230	ug/L	1000		8260B	Total/NA
cis-1,2-Dichloroethene	63000	E	1000	150	ug/L	1000		8260B	Total/NA
Ethylbenzene	1500		1000	160	ug/L	1000		8260B	Total/NA
Methylene Chloride	2500	B	2000	320	ug/L	1000		8260B	Total/NA
m-Xylene & p-Xylene	1900	J	2000	340	ug/L	1000		8260B	Total/NA
o-Xylene	690	J	1000	190	ug/L	1000		8260B	Total/NA
Toluene	4200		1000	170	ug/L	1000		8260B	Total/NA
Vinyl chloride	13000		1000	100	ug/L	1000		8260B	Total/NA
Xylenes, Total	2600		2000	190	ug/L	1000		8260B	Total/NA
cis-1,2-Dichloroethene - DL	58000		10000	1500	ug/L	10000		8260B	Total/NA
Chloride	180		3.0	0.25	mg/L	1		300.0	Total/NA
Total Organic Carbon - Average	8.5		1.0	0.16	mg/L	1		9060	Total/NA

This Detection Summary does not include radiochemical test results.

Detection Summary

Client: CH2M Hill, Inc.
Project/Site: THAN Davenport, IA - June 2016

TestAmerica Job ID: 280-84538-1

Client Sample ID: ADDV-041 — Lab Sample ID: 280-84538-7

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
1,1,1-Trichloroethane	8900		1000	160	ug/L	1000		8260B	Total/NA
1,1-Dichloroethane	3500		1000	220	ug/L	1000		8260B	Total/NA
1,1-Dichloroethene	770	J	1000	230	ug/L	1000		8260B	Total/NA
cis-1,2-Dichloroethene	62000	E	1000	150	ug/L	1000		8260B	Total/NA
Ethylbenzene	1400		1000	160	ug/L	1000		8260B	Total/NA
Methylene Chloride	2000	B	2000	320	ug/L	1000		8260B	Total/NA
m-Xylene & p-Xylene	1800	J	2000	340	ug/L	1000		8260B	Total/NA
o-Xylene	680	J	1000	190	ug/L	1000		8260B	Total/NA
Toluene	4200		1000	170	ug/L	1000		8260B	Total/NA
Vinyl chloride	13000		1000	100	ug/L	1000		8260B	Total/NA
Xylenes, Total	2500		2000	190	ug/L	1000		8260B	Total/NA
cis-1,2-Dichloroethene - DL	60000		10000	1500	ug/L	10000		8260B	Total/NA
Chloride	180		3.0	0.25	mg/L	1		300.0	Total/NA
Total Organic Carbon - Average	8.6		1.0	0.16	mg/L	1		9060	Total/NA

Client Sample ID: ADDV-013 — Lab Sample ID: 280-84538-8

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Chloride	710		30	2.5	mg/L	10		300.0	Total/NA

Client Sample ID: ADDV-007 — Lab Sample ID: 280-84538-9

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
cis-1,2-Dichloroethene	1700	E	20	3.0	ug/L	20		8260B	Total/NA
Methylene Chloride	27	J B	40	6.4	ug/L	20		8260B	Total/NA
Tetrachloroethene	1800	E	20	4.0	ug/L	20		8260B	Total/NA
trans-1,2-Dichloroethene	6.6	J	20	3.0	ug/L	20		8260B	Total/NA
Trichloroethene	130		20	3.2	ug/L	20		8260B	Total/NA
Vinyl chloride	460		20	2.0	ug/L	20		8260B	Total/NA
cis-1,2-Dichloroethene - DL	1700		200	30	ug/L	200		8260B	Total/NA
Tetrachloroethene - DL	1700		200	40	ug/L	200		8260B	Total/NA
Chloride	7.1		3.0	0.25	mg/L	1		300.0	Total/NA
Total Organic Carbon - Average	5.7		1.0	0.16	mg/L	1		9060	Total/NA

Client Sample ID: ADDV-022 — Lab Sample ID: 280-84538-10

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
1,1,1-Trichloroethane	3000		100	16	ug/L	100		8260B	Total/NA
1,1-Dichloroethane	1200		100	22	ug/L	100		8260B	Total/NA
1,1-Dichloroethene	390		100	23	ug/L	100		8260B	Total/NA
cis-1,2-Dichloroethene	59000	E	100	15	ug/L	100		8260B	Total/NA
Methylene Chloride	32	J	200	32	ug/L	100		8260B	Total/NA
m-Xylene & p-Xylene	92	J	200	34	ug/L	100		8260B	Total/NA
o-Xylene	340		100	19	ug/L	100		8260B	Total/NA
Tetrachloroethene	22000	E	100	20	ug/L	100		8260B	Total/NA
Toluene	220		100	17	ug/L	100		8260B	Total/NA
trans-1,2-Dichloroethene	510		100	15	ug/L	100		8260B	Total/NA
Trichloroethene	3800		100	16	ug/L	100		8260B	Total/NA
Vinyl chloride	1200		100	10	ug/L	100		8260B	Total/NA
Xylenes, Total	430		200	19	ug/L	100		8260B	Total/NA

This Detection Summary does not include radiochemical test results.

Client Sample ID: ADDV-022 (Continued) — Lab Sample ID: 280-84538-10

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
cis-1,2-Dichloroethene - DL	89000		4000	600	ug/L	4000		8260B	Total/NA
Tetrachloroethene - DL	18000		4000	800	ug/L	4000		8260B	Total/NA
Chloride	190		30	2.5	mg/L	10		300.0	Total/NA
Total Organic Carbon - Average	15		1.0	0.16	mg/L	1		9060	Total/NA

Client Sample ID: ADDV-003 — Lab Sample ID: 280-84538-11

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
1,1,1-Trichloroethane	200		10	1.6	ug/L	10		8260B	Total/NA
1,1-Dichloroethane	45		10	2.2	ug/L	10		8260B	Total/NA
1,1-Dichloroethene	3.4	J	10	2.3	ug/L	10		8260B	Total/NA
cis-1,2-Dichloroethene	390		10	1.5	ug/L	10		8260B	Total/NA
Methylene Chloride	3.3	J	20	3.2	ug/L	10		8260B	Total/NA
Tetrachloroethene	2200	E	10	2.0	ug/L	10		8260B	Total/NA
trans-1,2-Dichloroethene	2.8	J	10	1.5	ug/L	10		8260B	Total/NA
Trichloroethene	180		10	1.6	ug/L	10		8260B	Total/NA
Tetrachloroethene - DL	2000		100	20	ug/L	100		8260B	Total/NA
Chloride	78		3.0	0.25	mg/L	1		300.0	Total/NA
Total Organic Carbon - Average	4.7		1.0	0.16	mg/L	1		9060	Total/NA

Client Sample ID: ADDV-012 — Lab Sample ID: 280-84538-12

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Chloride	180		150	13	mg/L	50		300.0	Total/NA

Client Sample ID: ADDV-009 — Lab Sample ID: 280-84538-13

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
1,1,1-Trichloroethane	0.22	J	1.0	0.16	ug/L	1		8260B	Total/NA
1,1-Dichloroethane	0.28	J	1.0	0.22	ug/L	1		8260B	Total/NA
Acetone	5.1	J B	10	1.9	ug/L	1		8260B	Total/NA
cis-1,2-Dichloroethene	0.30	J	1.0	0.15	ug/L	1		8260B	Total/NA
Toluene	0.25	J	1.0	0.17	ug/L	1		8260B	Total/NA
Chloride	38		3.0	0.25	mg/L	1		300.0	Total/NA
Nitrate as N	2.4		0.50	0.042	mg/L	1		300.0	Total/NA
Sulfate	73		5.0	0.23	mg/L	1		300.0	Total/NA
Total Organic Carbon - Average	2.1		1.0	0.16	mg/L	1		9060	Total/NA
Alkalinity	320	B	5.0	1.1	mg/L	1		SM 2320B	Total/NA

Client Sample ID: ADDV-001 — Lab Sample ID: 280-84538-14

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Acetone	2.7	J B	10	1.9	ug/L	1		8260B	Total/NA
Chloride	46		3.0	0.25	mg/L	1		300.0	Total/NA
Nitrate as N	6.8		0.50	0.042	mg/L	1		300.0	Total/NA
Sulfate	44		5.0	0.23	mg/L	1		300.0	Total/NA
Total Organic Carbon - Average	1.9		1.0	0.16	mg/L	1		9060	Total/NA
Alkalinity	240	B	5.0	1.1	mg/L	1		SM 2320B	Total/NA

Client Sample ID: ADDV-020 — Lab Sample ID: 280-84538-15

This Detection Summary does not include radiochemical test results.

Client Sample ID: ADDV-020 (Continued) — Lab Sample ID: 280-84538-15

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
1,1,1-Trichloroethane	9200	E	100	16	ug/L	100		8260B	Total/NA
1,1-Dichloroethane	13000	E	100	22	ug/L	100		8260B	Total/NA
1,1-Dichloroethene	1200		100	23	ug/L	100		8260B	Total/NA
Benzene	68	J	100	16	ug/L	100		8260B	Total/NA
cis-1,2-Dichloroethene	65000	E	100	15	ug/L	100		8260B	Total/NA
Ethylbenzene	4600		100	16	ug/L	100		8260B	Total/NA
m-Xylene & p-Xylene	17000	E	200	34	ug/L	100		8260B	Total/NA
o-Xylene	5800		100	19	ug/L	100		8260B	Total/NA
Toluene	22000	E	100	17	ug/L	100		8260B	Total/NA
trans-1,2-Dichloroethene	92	J	100	15	ug/L	100		8260B	Total/NA
Vinyl chloride	26000	E	100	10	ug/L	100		8260B	Total/NA
Xylenes, Total	23000		200	19	ug/L	100		8260B	Total/NA
1,1,1-Trichloroethane - DL	7900		4000	640	ug/L	4000		8260B	Total/NA
1,1-Dichloroethane - DL	11000		4000	880	ug/L	4000		8260B	Total/NA
cis-1,2-Dichloroethene - DL	110000		4000	600	ug/L	4000		8260B	Total/NA
m-Xylene & p-Xylene - DL	14000		8000	1400	ug/L	4000		8260B	Total/NA
o-Xylene - DL	3500	J	4000	760	ug/L	4000		8260B	Total/NA
Toluene - DL	53000		4000	680	ug/L	4000		8260B	Total/NA
Vinyl chloride - DL	28000		4000	400	ug/L	4000		8260B	Total/NA
Xylenes, Total - DL	18000		8000	760	ug/L	4000		8260B	Total/NA
Methane	250		90	3.9	ug/L	18		RSK-175	Total/NA
Ethene	5000		90	7.2	ug/L	18		RSK-175	Total/NA
Chloride	280		15	1.3	mg/L	5		300.0	Total/NA
Sulfate	21		5.0	0.23	mg/L	1		300.0	Total/NA
Total Organic Carbon - Average	7.5		1.0	0.16	mg/L	1		9060	Total/NA
Alkalinity	490	B	5.0	1.1	mg/L	1		SM 2320B	Total/NA
Ferrous Iron	1.7	HF	0.20	0.021	mg/L	1		SM3500_FE_D	Total/NA

Client Sample ID: ADDV-021 — Lab Sample ID: 280-84538-16

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
1,1-Dichloroethane	74		4.0	0.88	ug/L	4		8260B	Total/NA
1,1-Dichloroethene	4.1		4.0	0.92	ug/L	4		8260B	Total/NA
Acetone	30	J	40	7.6	ug/L	4		8260B	Total/NA
Benzene	1.4	J	4.0	0.64	ug/L	4		8260B	Total/NA
cis-1,2-Dichloroethene	320	E	4.0	0.60	ug/L	4		8260B	Total/NA
Methylene Chloride	2.3	J B	8.0	1.3	ug/L	4		8260B	Total/NA
trans-1,2-Dichloroethene	0.89	J	4.0	0.60	ug/L	4		8260B	Total/NA
Vinyl chloride	390	E	4.0	0.40	ug/L	4		8260B	Total/NA
cis-1,2-Dichloroethene - DL	320		40	6.0	ug/L	40		8260B	Total/NA
Vinyl chloride - DL	380		40	4.0	ug/L	40		8260B	Total/NA
Methane	390		15	0.65	ug/L	3		RSK-175	Total/NA
Ethene	37		15	1.2	ug/L	3		RSK-175	Total/NA
Ethane	23		15	1.7	ug/L	3		RSK-175	Total/NA
Chloride	150		3.0	0.25	mg/L	1		300.0	Total/NA
Sulfate	110		5.0	0.23	mg/L	1		300.0	Total/NA
Total Organic Carbon - Average	2.7		1.0	0.16	mg/L	1		9060	Total/NA
Alkalinity	350	B	5.0	1.1	mg/L	1		SM 2320B	Total/NA
Ferrous Iron	0.028	J HF	0.20	0.021	mg/L	1		SM3500_FE_D	Total/NA

This Detection Summary does not include radiochemical test results.

Detection Summary

Client: CH2M Hill, Inc.
Project/Site: THAN Davenport, IA - June 2016

TestAmerica Job ID: 280-84538-1

Client Sample ID: ADDV-019 — Lab Sample ID: 280-84538-17

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
1,1,1-Trichloroethane	8500	E	100	16	ug/L	100		8260B	Total/NA
1,1-Dichloroethane	12000	E	100	22	ug/L	100		8260B	Total/NA
1,1-Dichloroethene	1200		100	23	ug/L	100		8260B	Total/NA
Benzene	63	J	100	16	ug/L	100		8260B	Total/NA
cis-1,2-Dichloroethene	62000	E	100	15	ug/L	100		8260B	Total/NA
Ethylbenzene	4200		100	16	ug/L	100		8260B	Total/NA
m-Xylene & p-Xylene	16000	E	200	34	ug/L	100		8260B	Total/NA
o-Xylene	5300		100	19	ug/L	100		8260B	Total/NA
Toluene	20000	E	100	17	ug/L	100		8260B	Total/NA
trans-1,2-Dichloroethene	91	J	100	15	ug/L	100		8260B	Total/NA
Vinyl chloride	24000	E	100	10	ug/L	100		8260B	Total/NA
Xylenes, Total	21000		200	19	ug/L	100		8260B	Total/NA
1,1,1-Trichloroethane - DL	8300		4000	640	ug/L	4000		8260B	Total/NA
1,1-Dichloroethane - DL	12000		4000	880	ug/L	4000		8260B	Total/NA
cis-1,2-Dichloroethene - DL	110000		4000	600	ug/L	4000		8260B	Total/NA
m-Xylene & p-Xylene - DL	14000		8000	1400	ug/L	4000		8260B	Total/NA
o-Xylene - DL	3700	J	4000	760	ug/L	4000		8260B	Total/NA
Toluene - DL	55000		4000	680	ug/L	4000		8260B	Total/NA
Vinyl chloride - DL	31000		4000	400	ug/L	4000		8260B	Total/NA
Xylenes, Total - DL	18000		8000	760	ug/L	4000		8260B	Total/NA
Methane	240		90	3.9	ug/L	18		RSK-175	Total/NA
Ethene	5000		90	7.2	ug/L	18		RSK-175	Total/NA
Chloride	280		15	1.3	mg/L	5		300.0	Total/NA
Sulfate	21		5.0	0.23	mg/L	1		300.0	Total/NA
Total Organic Carbon - Average	7.3		1.0	0.16	mg/L	1		9060	Total/NA
Alkalinity	490	B	5.0	1.1	mg/L	1		SM 2320B	Total/NA
Ferrous Iron	1.1	HF	0.20	0.021	mg/L	1		SM3500_FE_D	Total/NA

Client Sample ID: ADDV-018 — Lab Sample ID: 280-84538-18

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Acetone	3.7	J B	10	1.9	ug/L	1		8260B	Total/NA
Methane	18000		15	0.65	ug/L	3		RSK-175	Total/NA
Ethane	10	J	15	1.7	ug/L	3		RSK-175	Total/NA
Chloride	82		3.0	0.25	mg/L	1		300.0	Total/NA
Total Organic Carbon - Average	10		1.0	0.16	mg/L	1		9060	Total/NA
Alkalinity	540	B	5.0	1.1	mg/L	1		SM 2320B	Total/NA

Client Sample ID: ADDV-031 — Lab Sample ID: 280-84538-19

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
1,1-Dichloroethane	5.7	J	20	4.4	ug/L	20		8260B	Total/NA
Benzene	60		20	3.2	ug/L	20		8260B	Total/NA
Chloroethane	2500	E	40	8.2	ug/L	20		8260B	Total/NA
Ethylbenzene	260		20	3.2	ug/L	20		8260B	Total/NA
m-Xylene & p-Xylene	1200		40	6.8	ug/L	20		8260B	Total/NA
o-Xylene	290		20	3.8	ug/L	20		8260B	Total/NA
Toluene	3200	E	20	3.4	ug/L	20		8260B	Total/NA
Vinyl chloride	3.0	J	20	2.0	ug/L	20		8260B	Total/NA
Xylenes, Total	1500		40	3.8	ug/L	20		8260B	Total/NA

This Detection Summary does not include radiochemical test results.

Detection Summary

Client: CH2M Hill, Inc.
Project/Site: THAN Davenport, IA - June 2016

TestAmerica Job ID: 280-84538-1

Client Sample ID: ADDV-031 (Continued) — Lab Sample ID: 280-84538-19

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Chloroethane - DL	2700		200	41	ug/L	100		8260B	Total/NA
Toluene - DL	5900		100	17	ug/L	100		8260B	Total/NA
Methane	18000		180	7.8	ug/L	36		RSK-175	Total/NA
Ethene	3800		180	14	ug/L	36		RSK-175	Total/NA
Ethane	13000		180	21	ug/L	36		RSK-175	Total/NA
Chloride	420		15	1.3	mg/L	5		300.0	Total/NA
Sulfate	0.92	J	5.0	0.23	mg/L	1		300.0	Total/NA
Total Organic Carbon - Average	7.5		1.0	0.16	mg/L	1		9060	Total/NA
Alkalinity	580	B	5.0	1.1	mg/L	1		SM 2320B	Total/NA
Ferrous Iron	3.1	HF	1.0	0.11	mg/L	5		SM3500_FE_D	Total/NA

Client Sample ID: ADDV-048 — Lab Sample ID: 280-84538-20

No Detections.

This Detection Summary does not include radiochemical test results.

Method Summary

Client: CH2M Hill, Inc.
Project/Site: THAN Davenport, IA - June 2016

TestAmerica Job ID: 280-84538-1

Method	Method Description	Protocol	Laboratory
8260B	Volatile Organic Compounds (GC/MS)	SW846	TAL DEN
RSK-175	Dissolved Gases (GC)	RSK	TAL DEN
300.0	Anions, Ion Chromatography	MCAWW	TAL DEN
9060	Organic Carbon, Total (TOC)	SW846	TAL DEN
SM 2320B	Alkalinity	SM	TAL DEN
SM 4500 S2 F	Sulfide, Total	SM	TAL DEN
SM3500_FE_D	Ferrous Iron	SM20	TAL DEN

Protocol References:

MCAWW = "Methods For Chemical Analysis Of Water And Wastes", EPA-600/4-79-020, March 1983 And Subsequent Revisions.

RSK = Sample Prep And Calculations For Dissolved Gas Analysis In Water Samples Using A GC Headspace Equilibration Technique, RSKSOP-175, Rev. 0, 8/11/94, USEPA Research Lab

SM = "Standard Methods For The Examination Of Water And Wastewater",

SM20 = "Standard Methods For The Examination Of Water And Wastewater", 20th Edition."

SW846 = "Test Methods For Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 And Its Updates.

Laboratory References:

TAL DEN = TestAmerica Denver, 4955 Yarrow Street, Arvada, CO 80002, TEL (303)736-0100

Sample Summary

Client: CH2M Hill, Inc.
Project/Site: THAN Davenport, IA - June 2016

TestAmerica Job ID: 280-84538-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
280-84538-1	ADDV-011	Water	06/15/16 11:45	06/16/16 09:50
280-84538-2	ADDV-004	Water	06/15/16 12:20	06/16/16 09:50
280-84538-3	ADDV-040	Water	06/15/16 12:25	06/16/16 09:50
280-84538-4	ADDV-005	Water	06/15/16 12:45	06/16/16 09:50
280-84538-5	ADDV-002	Water	06/15/16 15:00	06/16/16 09:50
280-84538-6	ADDV-042	Water	06/15/16 13:10	06/16/16 09:50
280-84538-7	ADDV-041	Water	06/15/16 12:55	06/16/16 09:50
280-84538-8	ADDV-013	Water	06/15/16 16:05	06/16/16 09:50
280-84538-9	ADDV-007	Water	06/15/16 16:15	06/16/16 09:50
280-84538-10	ADDV-022	Water	06/15/16 15:05	06/16/16 09:50
280-84538-11	ADDV-003	Water	06/15/16 16:45	06/16/16 09:50
280-84538-12	ADDV-012	Water	06/15/16 16:50	06/16/16 09:50
280-84538-13	ADDV-009	Water	06/15/16 10:00	06/16/16 09:50
280-84538-14	ADDV-001	Water	06/15/16 09:56	06/16/16 09:50
280-84538-15	ADDV-020	Water	06/15/16 10:50	06/16/16 09:50
280-84538-16	ADDV-021	Water	06/15/16 09:30	06/16/16 09:50
280-84538-17	ADDV-019	Water	06/15/16 10:45	06/16/16 09:50
280-84538-18	ADDV-018	Water	06/15/16 11:05	06/16/16 09:50
280-84538-19	ADDV-031	Water	06/15/16 09:27	06/16/16 09:50
280-84538-20	ADDV-048	Water	06/15/16 12:00	06/16/16 09:50

Client Sample Results

Client: CH2M Hill, Inc.
Project/Site: THAN Davenport, IA - June 2016

TestAmerica Job ID: 280-84538-1

Method: 8260B - Volatile Organic Compounds (GC/MS)

Client Sample ID: ADDV-011
Date Collected: 06/15/16 11:45
Date Received: 06/16/16 09:50

Lab Sample ID: 280-84538-1
Matrix: Water

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1,1-Trichloroethane	2100		200	32	ug/L			06/28/16 12:21	200
1,1-Dichloroethane	630		200	44	ug/L			06/28/16 12:21	200
1,1-Dichloroethene	150	J	200	46	ug/L			06/28/16 12:21	200
1,2-Dichloroethane	ND		200	26	ug/L			06/28/16 12:21	200
Methyl ethyl ketone (MEK)	ND		1200	400	ug/L			06/28/16 12:21	200
Acetone	ND		2000	380	ug/L			06/28/16 12:21	200
Benzene	ND		200	32	ug/L			06/28/16 12:21	200
Chloroethane	ND		400	82	ug/L			06/28/16 12:21	200
cis-1,2-Dichloroethene	15000	E	200	30	ug/L			06/28/16 12:21	200
Ethylbenzene	810		200	32	ug/L			06/28/16 12:21	200
Methylene Chloride	330	J B	400	64	ug/L			06/28/16 12:21	200
m-Xylene & p-Xylene	2100		400	68	ug/L			06/28/16 12:21	200
o-Xylene	680		200	38	ug/L			06/28/16 12:21	200
Styrene	36	J	200	34	ug/L			06/28/16 12:21	200
Tetrachloroethene	250		200	40	ug/L			06/28/16 12:21	200
Toluene	2100		200	34	ug/L			06/28/16 12:21	200
trans-1,2-Dichloroethene	ND		200	30	ug/L			06/28/16 12:21	200
Trichloroethene	76	J	200	32	ug/L			06/28/16 12:21	200
Vinyl chloride	620		200	20	ug/L			06/28/16 12:21	200
Xylenes, Total	2800		400	38	ug/L			06/28/16 12:21	200

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*97*		*70 - 127*		*06/28/16 12:21*	*200*
4-Bromofluorobenzene (Surr)	*105*		*78 - 120*		*06/28/16 12:21*	*200*
Dibromofluoromethane (Surr)	*116*		*77 - 120*		*06/28/16 12:21*	*200*
Toluene-d8 (Surr)	*108*		*80 - 125*		*06/28/16 12:21*	*200*

Client Sample ID: ADDV-004
Date Collected: 06/15/16 12:20
Date Received: 06/16/16 09:50

Lab Sample ID: 280-84538-2
Matrix: Water

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1,1-Trichloroethane	20		1.0	0.16	ug/L			06/28/16 13:08	1
1,1-Dichloroethane	7.5		1.0	0.22	ug/L			06/28/16 13:08	1
1,1-Dichloroethene	0.78	J	1.0	0.23	ug/L			06/28/16 13:08	1
1,2-Dichloroethane	ND		1.0	0.13	ug/L			06/28/16 13:08	1
Methyl ethyl ketone (MEK)	ND		6.0	2.0	ug/L			06/28/16 13:08	1
Acetone	3.6	J	10	1.9	ug/L			06/28/16 13:08	1
Benzene	ND		1.0	0.16	ug/L			06/28/16 13:08	1
Chloroethane	ND		2.0	0.41	ug/L			06/28/16 13:08	1
cis-1,2-Dichloroethene	18		1.0	0.15	ug/L			06/28/16 13:08	1
Ethylbenzene	ND		1.0	0.16	ug/L			06/28/16 13:08	1
Methylene Chloride	0.93	J B	2.0	0.32	ug/L			06/28/16 13:08	1
m-Xylene & p-Xylene	ND		2.0	0.34	ug/L			06/28/16 13:08	1
o-Xylene	ND		1.0	0.19	ug/L			06/28/16 13:08	1
Styrene	ND		1.0	0.17	ug/L			06/28/16 13:08	1
Tetrachloroethene	140	E	1.0	0.20	ug/L			06/28/16 13:08	1
Toluene	ND		1.0	0.17	ug/L			06/28/16 13:08	1
trans-1,2-Dichloroethene	0.72	J	1.0	0.15	ug/L			06/28/16 13:08	1
Trichloroethene	13		1.0	0.16	ug/L			06/28/16 13:08	1
Vinyl chloride	ND		1.0	0.10	ug/L			06/28/16 13:08	1

Method: 8260B - Volatile Organic Compounds (GC/MS) (Continued)

Client Sample ID: ADDV-004 — **Lab Sample ID: 280-84538-2**
Date Collected: 06/15/16 12:20 — **Matrix: Water**
Date Received: 06/16/16 09:50

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Xylenes, Total	ND		2.0	0.19	ug/L			06/28/16 13:08	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*91*		*70 - 127*		*06/28/16 13:08*	*1*
4-Bromofluorobenzene (Surr)	*103*		*78 - 120*		*06/28/16 13:08*	*1*
Dibromofluoromethane (Surr)	*114*		*77 - 120*		*06/28/16 13:08*	*1*
Toluene-d8 (Surr)	*103*		*80 - 125*		*06/28/16 13:08*	*1*

Client Sample ID: ADDV-040 — **Lab Sample ID: 280-84538-3**
Date Collected: 06/15/16 12:25 — **Matrix: Water**
Date Received: 06/16/16 09:50

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1,1-Trichloroethane	**45**		20	3.2	ug/L			06/28/16 13:55	20
1,1-Dichloroethane	**47**		20	4.4	ug/L			06/28/16 13:55	20
1,1-Dichloroethene	**11**	**J**	20	4.6	ug/L			06/28/16 13:55	20
1,2-Dichloroethane	ND		20	2.6	ug/L			06/28/16 13:55	20
Methyl ethyl ketone (MEK)	ND		120	40	ug/L			06/28/16 13:55	20
Acetone	ND		200	38	ug/L			06/28/16 13:55	20
Benzene	ND		20	3.2	ug/L			06/28/16 13:55	20
Chloroethane	ND		40	8.2	ug/L			06/28/16 13:55	20
cis-1,2-Dichloroethene	**1600**	**E**	20	3.0	ug/L			06/28/16 13:55	20
Ethylbenzene	**94**		20	3.2	ug/L			06/28/16 13:55	20
Methylene Chloride	**28**	**J B**	40	6.4	ug/L			06/28/16 13:55	20
m-Xylene & p-Xylene	**12**	**J**	40	6.8	ug/L			06/28/16 13:55	20
o-Xylene	**7.0**	**J**	20	3.8	ug/L			06/28/16 13:55	20
Styrene	ND		20	3.4	ug/L			06/28/16 13:55	20
Tetrachloroethene	**21**		20	4.0	ug/L			06/28/16 13:55	20
Toluene	**9.8**	**J**	20	3.4	ug/L			06/28/16 13:55	20
trans-1,2-Dichloroethene	ND		20	3.0	ug/L			06/28/16 13:55	20
Trichloroethene	**29**		20	3.2	ug/L			06/28/16 13:55	20
Vinyl chloride	**260**		20	2.0	ug/L			06/28/16 13:55	20
Xylenes, Total	**19**	**J**	40	3.8	ug/L			06/28/16 13:55	20

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*93*		*70 - 127*		*06/28/16 13:55*	*20*
4-Bromofluorobenzene (Surr)	*103*		*78 - 120*		*06/28/16 13:55*	*20*
Dibromofluoromethane (Surr)	*114*		*77 - 120*		*06/28/16 13:55*	*20*
Toluene-d8 (Surr)	*109*		*80 - 125*		*06/28/16 13:55*	*20*

Client Sample ID: ADDV-005 — **Lab Sample ID: 280-84538-4**
Date Collected: 06/15/16 12:45 — **Matrix: Water**
Date Received: 06/16/16 09:50

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1,1-Trichloroethane	**16**		1.0	0.16	ug/L			06/28/16 14:42	1
1,1-Dichloroethane	**0.88**	**J**	1.0	0.22	ug/L			06/28/16 14:42	1
1,1-Dichloroethene	ND		1.0	0.23	ug/L			06/28/16 14:42	1
1,2-Dichloroethane	ND		1.0	0.13	ug/L			06/28/16 14:42	1
Methyl ethyl ketone (MEK)	ND		6.0	2.0	ug/L			06/28/16 14:42	1
Acetone	**5.4**	**J**	10	1.9	ug/L			06/28/16 14:42	1
Benzene	ND		1.0	0.16	ug/L			06/28/16 14:42	1

Method: 8260B - Volatile Organic Compounds (GC/MS) (Continued)

Client Sample ID: ADDV-005
Date Collected: 06/15/16 12:45
Date Received: 06/16/16 09:50

Lab Sample ID: 280-84538-4
Matrix: Water

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloroethane	ND		2.0	0.41	ug/L			06/28/16 14:42	1
cis-1,2-Dichloroethene	**2.2**		1.0	0.15	ug/L			06/28/16 14:42	1
Ethylbenzene	ND		1.0	0.16	ug/L			06/28/16 14:42	1
Methylene Chloride	**0.95**	**J B**	2.0	0.32	ug/L			06/28/16 14:42	1
m-Xylene & p-Xylene	ND		2.0	0.34	ug/L			06/28/16 14:42	1
o-Xylene	ND		1.0	0.19	ug/L			06/28/16 14:42	1
Styrene	ND		1.0	0.17	ug/L			06/28/16 14:42	1
Tetrachloroethene	**43**		1.0	0.20	ug/L			06/28/16 14:42	1
Toluene	ND		1.0	0.17	ug/L			06/28/16 14:42	1
trans-1,2-Dichloroethene	**0.27**	**J**	1.0	0.15	ug/L			06/28/16 14:42	1
Trichloroethene	**21**		1.0	0.16	ug/L			06/28/16 14:42	1
Vinyl chloride	ND		1.0	0.10	ug/L			06/28/16 14:42	1
Xylenes, Total	ND		2.0	0.19	ug/L			06/28/16 14:42	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*94*		*70 - 127*		*06/28/16 14:42*	*1*
4-Bromofluorobenzene (Surr)	*103*		*78 - 120*		*06/28/16 14:42*	*1*
Dibromofluoromethane (Surr)	*116*		*77 - 120*		*06/28/16 14:42*	*1*
Toluene-d8 (Surr)	*107*		*80 - 125*		*06/28/16 14:42*	*1*

Client Sample ID: ADDV-002
Date Collected: 06/15/16 15:00
Date Received: 06/16/16 09:50

Lab Sample ID: 280-84538-5
Matrix: Water

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1,1-Trichloroethane	**0.25**	**J**	1.0	0.16	ug/L			06/28/16 15:05	1
1,1-Dichloroethane	**4.1**		1.0	0.22	ug/L			06/28/16 15:05	1
1,1-Dichloroethene	ND		1.0	0.23	ug/L			06/28/16 15:05	1
1,2-Dichloroethane	ND		1.0	0.13	ug/L			06/28/16 15:05	1
Methyl ethyl ketone (MEK)	ND		6.0	2.0	ug/L			06/28/16 15:05	1
Acetone	**1.9**	**J**	10	1.9	ug/L			06/28/16 15:05	1
Benzene	ND		1.0	0.16	ug/L			06/28/16 15:05	1
Chloroethane	ND		2.0	0.41	ug/L			06/28/16 15:05	1
cis-1,2-Dichloroethene	**18**		1.0	0.15	ug/L			06/28/16 15:05	1
Ethylbenzene	ND		1.0	0.16	ug/L			06/28/16 15:05	1
Methylene Chloride	**0.77**	**J B**	2.0	0.32	ug/L			06/28/16 15:05	1
m-Xylene & p-Xylene	ND		2.0	0.34	ug/L			06/28/16 15:05	1
o-Xylene	ND		1.0	0.19	ug/L			06/28/16 15:05	1
Styrene	ND		1.0	0.17	ug/L			06/28/16 15:05	1
Tetrachloroethene	**7.6**		1.0	0.20	ug/L			06/28/16 15:05	1
Toluene	ND		1.0	0.17	ug/L			06/28/16 15:05	1
trans-1,2-Dichloroethene	**0.54**	**J**	1.0	0.15	ug/L			06/28/16 15:05	1
Trichloroethene	**9.9**		1.0	0.16	ug/L			06/28/16 15:05	1
Vinyl chloride	**0.91**	**J**	1.0	0.10	ug/L			06/28/16 15:05	1
Xylenes, Total	ND		2.0	0.19	ug/L			06/28/16 15:05	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*96*		*70 - 127*		*06/28/16 15:05*	*1*
4-Bromofluorobenzene (Surr)	*102*		*78 - 120*		*06/28/16 15:05*	*1*
Dibromofluoromethane (Surr)	*117*		*77 - 120*		*06/28/16 15:05*	*1*
Toluene-d8 (Surr)	*106*		*80 - 125*		*06/28/16 15:05*	*1*

Method: 8260B - Volatile Organic Compounds (GC/MS)

Client Sample ID: ADDV-042
Date Collected: 06/15/16 13:10
Date Received: 06/16/16 09:50

Lab Sample ID: 280-84538-6
Matrix: Water

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1,1-Trichloroethane	9100		1000	160	ug/L			06/28/16 15:29	1000
1,1-Dichloroethane	3600		1000	220	ug/L			06/28/16 15:29	1000
1,1-Dichloroethene	920	J	1000	230	ug/L			06/28/16 15:29	1000
1,2-Dichloroethane	ND		1000	130	ug/L			06/28/16 15:29	1000
Methyl ethyl ketone (MEK)	ND		6000	2000	ug/L			06/28/16 15:29	1000
Acetone	ND		10000	1900	ug/L			06/28/16 15:29	1000
Benzene	ND		1000	160	ug/L			06/28/16 15:29	1000
Chloroethane	ND		2000	410	ug/L			06/28/16 15:29	1000
cis-1,2-Dichloroethene	63000	E	1000	150	ug/L			06/28/16 15:29	1000
Ethylbenzene	1500		1000	160	ug/L			06/28/16 15:29	1000
Methylene Chloride	2500	B	2000	320	ug/L			06/28/16 15:29	1000
m-Xylene & p-Xylene	1900	J	2000	340	ug/L			06/28/16 15:29	1000
o-Xylene	690	J	1000	190	ug/L			06/28/16 15:29	1000
Styrene	ND		1000	170	ug/L			06/28/16 15:29	1000
Tetrachloroethene	ND		1000	200	ug/L			06/28/16 15:29	1000
Toluene	4200		1000	170	ug/L			06/28/16 15:29	1000
trans-1,2-Dichloroethene	ND		1000	150	ug/L			06/28/16 15:29	1000
Trichloroethene	ND		1000	160	ug/L			06/28/16 15:29	1000
Vinyl chloride	13000		1000	100	ug/L			06/28/16 15:29	1000
Xylenes, Total	2600		2000	190	ug/L			06/28/16 15:29	1000

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*93*		*70 - 127*		*06/28/16 15:29*	*1000*
4-Bromofluorobenzene (Surr)	*105*		*78 - 120*		*06/28/16 15:29*	*1000*
Dibromofluoromethane (Surr)	*119*		*77 - 120*		*06/28/16 15:29*	*1000*
Toluene-d8 (Surr)	*108*		*80 - 125*		*06/28/16 15:29*	*1000*

Client Sample ID: ADDV-041
Date Collected: 06/15/16 12:55
Date Received: 06/16/16 09:50

Lab Sample ID: 280-84538-7
Matrix: Water

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1,1-Trichloroethane	8900		1000	160	ug/L			06/28/16 16:16	1000
1,1-Dichloroethane	3500		1000	220	ug/L			06/28/16 16:16	1000
1,1-Dichloroethene	770	J	1000	230	ug/L			06/28/16 16:16	1000
1,2-Dichloroethane	ND		1000	130	ug/L			06/28/16 16:16	1000
Methyl ethyl ketone (MEK)	ND		6000	2000	ug/L			06/28/16 16:16	1000
Acetone	ND		10000	1900	ug/L			06/28/16 16:16	1000
Benzene	ND		1000	160	ug/L			06/28/16 16:16	1000
Chloroethane	ND		2000	410	ug/L			06/28/16 16:16	1000
cis-1,2-Dichloroethene	62000	E	1000	150	ug/L			06/28/16 16:16	1000
Ethylbenzene	1400		1000	160	ug/L			06/28/16 16:16	1000
Methylene Chloride	2000	B	2000	320	ug/L			06/28/16 16:16	1000
m-Xylene & p-Xylene	1800	J	2000	340	ug/L			06/28/16 16:16	1000
o-Xylene	680	J	1000	190	ug/L			06/28/16 16:16	1000
Styrene	ND		1000	170	ug/L			06/28/16 16:16	1000
Tetrachloroethene	ND		1000	200	ug/L			06/28/16 16:16	1000
Toluene	4200		1000	170	ug/L			06/28/16 16:16	1000
trans-1,2-Dichloroethene	ND		1000	150	ug/L			06/28/16 16:16	1000
Trichloroethene	ND		1000	160	ug/L			06/28/16 16:16	1000
Vinyl chloride	13000		1000	100	ug/L			06/28/16 16:16	1000

Method: 8260B - Volatile Organic Compounds (GC/MS) (Continued)

Client Sample ID: ADDV-041 — **Lab Sample ID: 280-84538-7**
Date Collected: 06/15/16 12:55 — **Matrix: Water**
Date Received: 06/16/16 09:50

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Xylenes, Total	**2500**		2000	190	ug/L			06/28/16 16:16	1000

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*95*		*70 - 127*		*06/28/16 16:16*	*1000*
4-Bromofluorobenzene (Surr)	*105*		*78 - 120*		*06/28/16 16:16*	*1000*
Dibromofluoromethane (Surr)	*118*		*77 - 120*		*06/28/16 16:16*	*1000*
Toluene-d8 (Surr)	*109*		*80 - 125*		*06/28/16 16:16*	*1000*

Client Sample ID: ADDV-007 — **Lab Sample ID: 280-84538-9**
Date Collected: 06/15/16 16:15 — **Matrix: Water**
Date Received: 06/16/16 09:50

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1,1-Trichloroethane	ND		20	3.2	ug/L			06/28/16 17:03	20
1,1-Dichloroethane	ND		20	4.4	ug/L			06/28/16 17:03	20
1,1-Dichloroethene	ND		20	4.6	ug/L			06/28/16 17:03	20
1,2-Dichloroethane	ND		20	2.6	ug/L			06/28/16 17:03	20
Methyl ethyl ketone (MEK)	ND		120	40	ug/L			06/28/16 17:03	20
Acetone	ND		200	38	ug/L			06/28/16 17:03	20
Benzene	ND		20	3.2	ug/L			06/28/16 17:03	20
Chloroethane	ND		40	8.2	ug/L			06/28/16 17:03	20
cis-1,2-Dichloroethene	**1700**	**E**	20	3.0	ug/L			06/28/16 17:03	20
Ethylbenzene	ND		20	3.2	ug/L			06/28/16 17:03	20
Methylene Chloride	**27**	**J B**	40	6.4	ug/L			06/28/16 17:03	20
m-Xylene & p-Xylene	ND		40	6.8	ug/L			06/28/16 17:03	20
o-Xylene	ND		20	3.8	ug/L			06/28/16 17:03	20
Styrene	ND		20	3.4	ug/L			06/28/16 17:03	20
Tetrachloroethene	**1800**	**E**	20	4.0	ug/L			06/28/16 17:03	20
Toluene	ND		20	3.4	ug/L			06/28/16 17:03	20
trans-1,2-Dichloroethene	**6.6**	**J**	20	3.0	ug/L			06/28/16 17:03	20
Trichloroethene	**130**		20	3.2	ug/L			06/28/16 17:03	20
Vinyl chloride	**460**		20	2.0	ug/L			06/28/16 17:03	20
Xylenes, Total	ND		40	3.8	ug/L			06/28/16 17:03	20

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*98*		*70 - 127*		*06/28/16 17:03*	*20*
4-Bromofluorobenzene (Surr)	*104*		*78 - 120*		*06/28/16 17:03*	*20*
Dibromofluoromethane (Surr)	*119*		*77 - 120*		*06/28/16 17:03*	*20*
Toluene-d8 (Surr)	*106*		*80 - 125*		*06/28/16 17:03*	*20*

Client Sample ID: ADDV-022 — **Lab Sample ID: 280-84538-10**
Date Collected: 06/15/16 15:05 — **Matrix: Water**
Date Received: 06/16/16 09:50

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1,1-Trichloroethane	**3000**		100	16	ug/L			06/28/16 14:19	100
1,1-Dichloroethane	**1200**		100	22	ug/L			06/28/16 14:19	100
1,1-Dichloroethene	**390**		100	23	ug/L			06/28/16 14:19	100
1,2-Dichloroethane	ND		100	13	ug/L			06/28/16 14:19	100
Methyl ethyl ketone (MEK)	ND		600	200	ug/L			06/28/16 14:19	100
Acetone	ND		1000	190	ug/L			06/28/16 14:19	100
Benzene	ND		100	16	ug/L			06/28/16 14:19	100

Method: 8260B - Volatile Organic Compounds (GC/MS) (Continued)

Client Sample ID: ADDV-022
Date Collected: 06/15/16 15:05
Date Received: 06/16/16 09:50

Lab Sample ID: 280-84538-10
Matrix: Water

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloroethane	ND		200	41	ug/L			06/28/16 14:19	100
cis-1,2-Dichloroethene	**59000**	**E**	100	15	ug/L			06/28/16 14:19	100
Ethylbenzene	ND		100	16	ug/L			06/28/16 14:19	100
Methylene Chloride	**32**	**J**	200	32	ug/L			06/28/16 14:19	100
m-Xylene & p-Xylene	**92**	**J**	200	34	ug/L			06/28/16 14:19	100
o-Xylene	**340**		100	19	ug/L			06/28/16 14:19	100
Styrene	ND		100	17	ug/L			06/28/16 14:19	100
Tetrachloroethene	**22000**	**E**	100	20	ug/L			06/28/16 14:19	100
Toluene	**220**		100	17	ug/L			06/28/16 14:19	100
trans-1,2-Dichloroethene	**510**		100	15	ug/L			06/28/16 14:19	100
Trichloroethene	**3800**		100	16	ug/L			06/28/16 14:19	100
Vinyl chloride	**1200**		100	10	ug/L			06/28/16 14:19	100
Xylenes, Total	**430**		200	19	ug/L			06/28/16 14:19	100

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*109*		*70 - 127*		*06/28/16 14:19*	*100*
4-Bromofluorobenzene (Surr)	*103*		*78 - 120*		*06/28/16 14:19*	*100*
Dibromofluoromethane (Surr)	*106*		*77 - 120*		*06/28/16 14:19*	*100*
Toluene-d8 (Surr)	*101*		*80 - 125*		*06/28/16 14:19*	*100*

Client Sample ID: ADDV-003
Date Collected: 06/15/16 16:45
Date Received: 06/16/16 09:50

Lab Sample ID: 280-84538-11
Matrix: Water

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1,1-Trichloroethane	**200**		10	1.6	ug/L			06/28/16 15:04	10
1,1-Dichloroethane	**45**		10	2.2	ug/L			06/28/16 15:04	10
1,1-Dichloroethene	**3.4**	**J**	10	2.3	ug/L			06/28/16 15:04	10
1,2-Dichloroethane	ND		10	1.3	ug/L			06/28/16 15:04	10
Methyl ethyl ketone (MEK)	ND		60	20	ug/L			06/28/16 15:04	10
Acetone	ND		100	19	ug/L			06/28/16 15:04	10
Benzene	ND		10	1.6	ug/L			06/28/16 15:04	10
Chloroethane	ND		20	4.1	ug/L			06/28/16 15:04	10
cis-1,2-Dichloroethene	**390**		10	1.5	ug/L			06/28/16 15:04	10
Ethylbenzene	ND		10	1.6	ug/L			06/28/16 15:04	10
Methylene Chloride	**3.3**	**J**	20	3.2	ug/L			06/28/16 15:04	10
m-Xylene & p-Xylene	ND		20	3.4	ug/L			06/28/16 15:04	10
o-Xylene	ND		10	1.9	ug/L			06/28/16 15:04	10
Styrene	ND		10	1.7	ug/L			06/28/16 15:04	10
Tetrachloroethene	**2200**	**E**	10	2.0	ug/L			06/28/16 15:04	10
Toluene	ND		10	1.7	ug/L			06/28/16 15:04	10
trans-1,2-Dichloroethene	**2.8**	**J**	10	1.5	ug/L			06/28/16 15:04	10
Trichloroethene	**180**		10	1.6	ug/L			06/28/16 15:04	10
Vinyl chloride	ND		10	1.0	ug/L			06/28/16 15:04	10
Xylenes, Total	ND		20	1.9	ug/L			06/28/16 15:04	10

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*117*		*70 - 127*		*06/28/16 15:04*	*10*
4-Bromofluorobenzene (Surr)	*111*		*78 - 120*		*06/28/16 15:04*	*10*
Dibromofluoromethane (Surr)	*111*		*77 - 120*		*06/28/16 15:04*	*10*
Toluene-d8 (Surr)	*105*		*80 - 125*		*06/28/16 15:04*	*10*

Method: 8260B - Volatile Organic Compounds (GC/MS)

Client Sample ID: ADDV-009 — **Lab Sample ID: 280-84538-13**
Date Collected: 06/15/16 10:00 — **Matrix: Water**
Date Received: 06/16/16 09:50

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1,1-Trichloroethane	**0.22**	**J**	1.0	0.16	ug/L			06/28/16 15:49	1
1,1-Dichloroethane	**0.28**	**J**	1.0	0.22	ug/L			06/28/16 15:49	1
1,1-Dichloroethene	ND		1.0	0.23	ug/L			06/28/16 15:49	1
1,2-Dichloroethane	ND		1.0	0.13	ug/L			06/28/16 15:49	1
Methyl ethyl ketone (MEK)	ND		6.0	2.0	ug/L			06/28/16 15:49	1
Acetone	**5.1**	**J B**	10	1.9	ug/L			06/28/16 15:49	1
Benzene	ND		1.0	0.16	ug/L			06/28/16 15:49	1
Chloroethane	ND		2.0	0.41	ug/L			06/28/16 15:49	1
cis-1,2-Dichloroethene	**0.30**	**J**	1.0	0.15	ug/L			06/28/16 15:49	1
Ethylbenzene	ND		1.0	0.16	ug/L			06/28/16 15:49	1
Methylene Chloride	ND		2.0	0.32	ug/L			06/28/16 15:49	1
m-Xylene & p-Xylene	ND		2.0	0.34	ug/L			06/28/16 15:49	1
o-Xylene	ND		1.0	0.19	ug/L			06/28/16 15:49	1
Styrene	ND		1.0	0.17	ug/L			06/28/16 15:49	1
Tetrachloroethene	ND		1.0	0.20	ug/L			06/28/16 15:49	1
Toluene	**0.25**	**J**	1.0	0.17	ug/L			06/28/16 15:49	1
trans-1,2-Dichloroethene	ND		1.0	0.15	ug/L			06/28/16 15:49	1
Trichloroethene	ND		1.0	0.16	ug/L			06/28/16 15:49	1
Vinyl chloride	ND		1.0	0.10	ug/L			06/28/16 15:49	1
Xylenes, Total	ND		2.0	0.19	ug/L			06/28/16 15:49	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*114*		*70 - 127*		*06/28/16 15:49*	*1*
4-Bromofluorobenzene (Surr)	*106*		*78 - 120*		*06/28/16 15:49*	*1*
Dibromofluoromethane (Surr)	*107*		*77 - 120*		*06/28/16 15:49*	*1*
Toluene-d8 (Surr)	*107*		*80 - 125*		*06/28/16 15:49*	*1*

Client Sample ID: ADDV-001 — **Lab Sample ID: 280-84538-14**
Date Collected: 06/15/16 09:56 — **Matrix: Water**
Date Received: 06/16/16 09:50

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1,1-Trichloroethane	ND		1.0	0.16	ug/L			06/28/16 16:11	1
1,1-Dichloroethane	ND		1.0	0.22	ug/L			06/28/16 16:11	1
1,1-Dichloroethene	ND		1.0	0.23	ug/L			06/28/16 16:11	1
1,2-Dichloroethane	ND		1.0	0.13	ug/L			06/28/16 16:11	1
Methyl ethyl ketone (MEK)	ND		6.0	2.0	ug/L			06/28/16 16:11	1
Acetone	**2.7**	**J B**	10	1.9	ug/L			06/28/16 16:11	1
Benzene	ND		1.0	0.16	ug/L			06/28/16 16:11	1
Chloroethane	ND		2.0	0.41	ug/L			06/28/16 16:11	1
cis-1,2-Dichloroethene	ND		1.0	0.15	ug/L			06/28/16 16:11	1
Ethylbenzene	ND		1.0	0.16	ug/L			06/28/16 16:11	1
Methylene Chloride	ND		2.0	0.32	ug/L			06/28/16 16:11	1
m-Xylene & p-Xylene	ND		2.0	0.34	ug/L			06/28/16 16:11	1
o-Xylene	ND		1.0	0.19	ug/L			06/28/16 16:11	1
Styrene	ND		1.0	0.17	ug/L			06/28/16 16:11	1
Tetrachloroethene	ND		1.0	0.20	ug/L			06/28/16 16:11	1
Toluene	ND		1.0	0.17	ug/L			06/28/16 16:11	1
trans-1,2-Dichloroethene	ND		1.0	0.15	ug/L			06/28/16 16:11	1
Trichloroethene	ND		1.0	0.16	ug/L			06/28/16 16:11	1
Vinyl chloride	ND		1.0	0.10	ug/L			06/28/16 16:11	1

Method: 8260B - Volatile Organic Compounds (GC/MS) (Continued)

Client Sample ID: ADDV-001 — **Lab Sample ID: 280-84538-14**
Date Collected: 06/15/16 09:56 — **Matrix: Water**
Date Received: 06/16/16 09:50

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Xylenes, Total	ND		2.0	0.19	ug/L			06/28/16 16:11	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*106*		*70 - 127*		*06/28/16 16:11*	*1*
4-Bromofluorobenzene (Surr)	*110*		*78 - 120*		*06/28/16 16:11*	*1*
Dibromofluoromethane (Surr)	*101*		*77 - 120*		*06/28/16 16:11*	*1*
Toluene-d8 (Surr)	*108*		*80 - 125*		*06/28/16 16:11*	*1*

Client Sample ID: ADDV-020 — **Lab Sample ID: 280-84538-15**
Date Collected: 06/15/16 10:50 — **Matrix: Water**
Date Received: 06/16/16 09:50

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1,1-Trichloroethane	**9200**	**E**	100	16	ug/L			06/28/16 16:33	100
1,1-Dichloroethane	**13000**	**E**	100	22	ug/L			06/28/16 16:33	100
1,1-Dichloroethene	**1200**		100	23	ug/L			06/28/16 16:33	100
1,2-Dichloroethane	ND		100	13	ug/L			06/28/16 16:33	100
Methyl ethyl ketone (MEK)	ND		600	200	ug/L			06/28/16 16:33	100
Acetone	ND		1000	190	ug/L			06/28/16 16:33	100
Benzene	**68**	**J**	100	16	ug/L			06/28/16 16:33	100
Chloroethane	ND		200	41	ug/L			06/28/16 16:33	100
cis-1,2-Dichloroethene	**65000**	**E**	100	15	ug/L			06/28/16 16:33	100
Ethylbenzene	**4600**		100	16	ug/L			06/28/16 16:33	100
Methylene Chloride	ND		200	32	ug/L			06/28/16 16:33	100
m-Xylene & p-Xylene	**17000**	**E**	200	34	ug/L			06/28/16 16:33	100
o-Xylene	**5800**		100	19	ug/L			06/28/16 16:33	100
Styrene	ND		100	17	ug/L			06/28/16 16:33	100
Tetrachloroethene	ND		100	20	ug/L			06/28/16 16:33	100
Toluene	**22000**	**E**	100	17	ug/L			06/28/16 16:33	100
trans-1,2-Dichloroethene	**92**	**J**	100	15	ug/L			06/28/16 16:33	100
Trichloroethene	ND		100	16	ug/L			06/28/16 16:33	100
Vinyl chloride	**26000**	**E**	100	10	ug/L			06/28/16 16:33	100
Xylenes, Total	**23000**		200	19	ug/L			06/28/16 16:33	100

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*115*		*70 - 127*		*06/28/16 16:33*	*100*
4-Bromofluorobenzene (Surr)	*102*		*78 - 120*		*06/28/16 16:33*	*100*
Dibromofluoromethane (Surr)	*106*		*77 - 120*		*06/28/16 16:33*	*100*
Toluene-d8 (Surr)	*109*		*80 - 125*		*06/28/16 16:33*	*100*

Client Sample ID: ADDV-021 — **Lab Sample ID: 280-84538-16**
Date Collected: 06/15/16 09:30 — **Matrix: Water**
Date Received: 06/16/16 09:50

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1,1-Trichloroethane	ND		4.0	0.64	ug/L			06/28/16 08:27	4
1,1-Dichloroethane	**74**		4.0	0.88	ug/L			06/28/16 08:27	4
1,1-Dichloroethene	**4.1**		4.0	0.92	ug/L			06/28/16 08:27	4
1,2-Dichloroethane	ND		4.0	0.52	ug/L			06/28/16 08:27	4
Methyl ethyl ketone (MEK)	ND		24	8.0	ug/L			06/28/16 08:27	4
Acetone	**30**	**J**	40	7.6	ug/L			06/28/16 08:27	4
Benzene	**1.4**	**J**	4.0	0.64	ug/L			06/28/16 08:27	4

Method: 8260B - Volatile Organic Compounds (GC/MS) (Continued)

Client Sample ID: ADDV-021
Date Collected: 06/15/16 09:30
Date Received: 06/16/16 09:50

Lab Sample ID: 280-84538-16
Matrix: Water

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloroethane	ND		8.0	1.6	ug/L			06/28/16 08:27	4
cis-1,2-Dichloroethene	**320**	**E**	4.0	0.60	ug/L			06/28/16 08:27	4
Ethylbenzene	ND		4.0	0.64	ug/L			06/28/16 08:27	4
Methylene Chloride	**2.3**	**J B**	8.0	1.3	ug/L			06/28/16 08:27	4
m-Xylene & p-Xylene	ND		8.0	1.4	ug/L			06/28/16 08:27	4
o-Xylene	ND		4.0	0.76	ug/L			06/28/16 08:27	4
Styrene	ND		4.0	0.68	ug/L			06/28/16 08:27	4
Tetrachloroethene	ND		4.0	0.80	ug/L			06/28/16 08:27	4
Toluene	ND		4.0	0.68	ug/L			06/28/16 08:27	4
trans-1,2-Dichloroethene	**0.89**	**J**	4.0	0.60	ug/L			06/28/16 08:27	4
Trichloroethene	ND		4.0	0.64	ug/L			06/28/16 08:27	4
Vinyl chloride	**390**	**E**	4.0	0.40	ug/L			06/28/16 08:27	4
Xylenes, Total	ND		8.0	0.76	ug/L			06/28/16 08:27	4

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*97*		*70 - 127*		*06/28/16 08:27*	*4*
4-Bromofluorobenzene (Surr)	*104*		*78 - 120*		*06/28/16 08:27*	*4*
Dibromofluoromethane (Surr)	*114*		*77 - 120*		*06/28/16 08:27*	*4*
Toluene-d8 (Surr)	*106*		*80 - 125*		*06/28/16 08:27*	*4*

Client Sample ID: ADDV-019
Date Collected: 06/15/16 10:45
Date Received: 06/16/16 09:50

Lab Sample ID: 280-84538-17
Matrix: Water

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1,1-Trichloroethane	**8500**	**E**	100	16	ug/L			06/28/16 17:18	100
1,1-Dichloroethane	**12000**	**E**	100	22	ug/L			06/28/16 17:18	100
1,1-Dichloroethene	**1200**		100	23	ug/L			06/28/16 17:18	100
1,2-Dichloroethane	ND		100	13	ug/L			06/28/16 17:18	100
Methyl ethyl ketone (MEK)	ND		600	200	ug/L			06/28/16 17:18	100
Acetone	ND		1000	190	ug/L			06/28/16 17:18	100
Benzene	**63**	**J**	100	16	ug/L			06/28/16 17:18	100
Chloroethane	ND		200	41	ug/L			06/28/16 17:18	100
cis-1,2-Dichloroethene	**62000**	**E**	100	15	ug/L			06/28/16 17:18	100
Ethylbenzene	**4200**		100	16	ug/L			06/28/16 17:18	100
Methylene Chloride	ND		200	32	ug/L			06/28/16 17:18	100
m-Xylene & p-Xylene	**16000**	**E**	200	34	ug/L			06/28/16 17:18	100
o-Xylene	**5300**		100	19	ug/L			06/28/16 17:18	100
Styrene	ND		100	17	ug/L			06/28/16 17:18	100
Tetrachloroethene	ND		100	20	ug/L			06/28/16 17:18	100
Toluene	**20000**	**E**	100	17	ug/L			06/28/16 17:18	100
trans-1,2-Dichloroethene	**91**	**J**	100	15	ug/L			06/28/16 17:18	100
Trichloroethene	ND		100	16	ug/L			06/28/16 17:18	100
Vinyl chloride	**24000**	**E**	100	10	ug/L			06/28/16 17:18	100
Xylenes, Total	**21000**		200	19	ug/L			06/28/16 17:18	100

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*110*		*70 - 127*		*06/28/16 17:18*	*100*
4-Bromofluorobenzene (Surr)	*98*		*78 - 120*		*06/28/16 17:18*	*100*
Dibromofluoromethane (Surr)	*104*		*77 - 120*		*06/28/16 17:18*	*100*
Toluene-d8 (Surr)	*101*		*80 - 125*		*06/28/16 17:18*	*100*

Method: 8260B - Volatile Organic Compounds (GC/MS)

Client Sample ID: ADDV-018 **Lab Sample ID: 280-84538-18**
Date Collected: 06/15/16 11:05 **Matrix: Water**
Date Received: 06/16/16 09:50

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1,1-Trichloroethane	ND		1.0	0.16	ug/L			06/28/16 18:02	1
1,1-Dichloroethane	ND		1.0	0.22	ug/L			06/28/16 18:02	1
1,1-Dichloroethene	ND		1.0	0.23	ug/L			06/28/16 18:02	1
1,2-Dichloroethane	ND		1.0	0.13	ug/L			06/28/16 18:02	1
Methyl ethyl ketone (MEK)	ND		6.0	2.0	ug/L			06/28/16 18:02	1
Acetone	**3.7**	**J B**	10	1.9	ug/L			06/28/16 18:02	1
Benzene	ND		1.0	0.16	ug/L			06/28/16 18:02	1
Chloroethane	ND		2.0	0.41	ug/L			06/28/16 18:02	1
cis-1,2-Dichloroethene	ND		1.0	0.15	ug/L			06/28/16 18:02	1
Ethylbenzene	ND		1.0	0.16	ug/L			06/28/16 18:02	1
Methylene Chloride	ND		2.0	0.32	ug/L			06/28/16 18:02	1
m-Xylene & p-Xylene	ND		2.0	0.34	ug/L			06/28/16 18:02	1
o-Xylene	ND		1.0	0.19	ug/L			06/28/16 18:02	1
Styrene	ND		1.0	0.17	ug/L			06/28/16 18:02	1
Tetrachloroethene	ND		1.0	0.20	ug/L			06/28/16 18:02	1
Toluene	ND		1.0	0.17	ug/L			06/28/16 18:02	1
trans-1,2-Dichloroethene	ND		1.0	0.15	ug/L			06/28/16 18:02	1
Trichloroethene	ND		1.0	0.16	ug/L			06/28/16 18:02	1
Vinyl chloride	ND		1.0	0.10	ug/L			06/28/16 18:02	1
Xylenes, Total	ND		2.0	0.19	ug/L			06/28/16 18:02	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*108*		*70 - 127*		*06/28/16 18:02*	*1*
4-Bromofluorobenzene (Surr)	*107*		*78 - 120*		*06/28/16 18:02*	*1*
Dibromofluoromethane (Surr)	*101*		*77 - 120*		*06/28/16 18:02*	*1*
Toluene-d8 (Surr)	*103*		*80 - 125*		*06/28/16 18:02*	*1*

Client Sample ID: ADDV-031 **Lab Sample ID: 280-84538-19**
Date Collected: 06/15/16 09:27 **Matrix: Water**
Date Received: 06/16/16 09:50

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1,1-Trichloroethane	ND		20	3.2	ug/L			06/29/16 12:04	20
1,1-Dichloroethane	**5.7**	**J**	20	4.4	ug/L			06/29/16 12:04	20
1,1-Dichloroethene	ND		20	4.6	ug/L			06/29/16 12:04	20
1,2-Dichloroethane	ND		20	2.6	ug/L			06/29/16 12:04	20
Methyl ethyl ketone (MEK)	ND		120	40	ug/L			06/29/16 12:04	20
Acetone	ND		200	38	ug/L			06/29/16 12:04	20
Benzene	**60**		20	3.2	ug/L			06/29/16 12:04	20
Chloroethane	**2500**	**E**	40	8.2	ug/L			06/29/16 12:04	20
cis-1,2-Dichloroethene	ND		20	3.0	ug/L			06/29/16 12:04	20
Ethylbenzene	**260**		20	3.2	ug/L			06/29/16 12:04	20
Methylene Chloride	ND		40	6.4	ug/L			06/29/16 12:04	20
m-Xylene & p-Xylene	**1200**		40	6.8	ug/L			06/29/16 12:04	20
o-Xylene	**290**		20	3.8	ug/L			06/29/16 12:04	20
Styrene	ND		20	3.4	ug/L			06/29/16 12:04	20
Tetrachloroethene	ND		20	4.0	ug/L			06/29/16 12:04	20
Toluene	**3200**	**E**	20	3.4	ug/L			06/29/16 12:04	20
trans-1,2-Dichloroethene	ND		20	3.0	ug/L			06/29/16 12:04	20
Trichloroethene	ND		20	3.2	ug/L			06/29/16 12:04	20
Vinyl chloride	**3.0**	**J**	20	2.0	ug/L			06/29/16 12:04	20

Method: 8260B - Volatile Organic Compounds (GC/MS) (Continued)

Client Sample ID: ADDV-031 — **Lab Sample ID: 280-84538-19**
Date Collected: 06/15/16 09:27 — **Matrix: Water**
Date Received: 06/16/16 09:50

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Xylenes, Total	**1500**		40	3.8	ug/L			06/29/16 12:04	20

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*103*		*70 - 127*		*06/29/16 12:04*	*20*
4-Bromofluorobenzene (Surr)	*107*		*78 - 120*		*06/29/16 12:04*	*20*
Dibromofluoromethane (Surr)	*100*		*77 - 120*		*06/29/16 12:04*	*20*
Toluene-d8 (Surr)	*102*		*80 - 125*		*06/29/16 12:04*	*20*

Client Sample ID: ADDV-048 — **Lab Sample ID: 280-84538-20**
Date Collected: 06/15/16 12:00 — **Matrix: Water**
Date Received: 06/16/16 09:50

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1,1-Trichloroethane	ND		1.0	0.16	ug/L			06/29/16 12:26	1
1,1-Dichloroethane	ND		1.0	0.22	ug/L			06/29/16 12:26	1
1,1-Dichloroethene	ND		1.0	0.23	ug/L			06/29/16 12:26	1
1,2-Dichloroethane	ND		1.0	0.13	ug/L			06/29/16 12:26	1
Methyl ethyl ketone (MEK)	ND		6.0	2.0	ug/L			06/29/16 12:26	1
Acetone	ND		10	1.9	ug/L			06/29/16 12:26	1
Benzene	ND		1.0	0.16	ug/L			06/29/16 12:26	1
Chloroethane	ND		2.0	0.41	ug/L			06/29/16 12:26	1
cis-1,2-Dichloroethene	ND		1.0	0.15	ug/L			06/29/16 12:26	1
Ethylbenzene	ND		1.0	0.16	ug/L			06/29/16 12:26	1
Methylene Chloride	ND		2.0	0.32	ug/L			06/29/16 12:26	1
m-Xylene & p-Xylene	ND		2.0	0.34	ug/L			06/29/16 12:26	1
o-Xylene	ND		1.0	0.19	ug/L			06/29/16 12:26	1
Styrene	ND		1.0	0.17	ug/L			06/29/16 12:26	1
Tetrachloroethene	ND		1.0	0.20	ug/L			06/29/16 12:26	1
Toluene	ND		1.0	0.17	ug/L			06/29/16 12:26	1
trans-1,2-Dichloroethene	ND		1.0	0.15	ug/L			06/29/16 12:26	1
Trichloroethene	ND		1.0	0.16	ug/L			06/29/16 12:26	1
Vinyl chloride	ND		1.0	0.10	ug/L			06/29/16 12:26	1
Xylenes, Total	ND		2.0	0.19	ug/L			06/29/16 12:26	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*104*		*70 - 127*		*06/29/16 12:26*	*1*
4-Bromofluorobenzene (Surr)	*106*		*78 - 120*		*06/29/16 12:26*	*1*
Dibromofluoromethane (Surr)	*100*		*77 - 120*		*06/29/16 12:26*	*1*
Toluene-d8 (Surr)	*111*		*80 - 125*		*06/29/16 12:26*	*1*

Method: 8260B - Volatile Organic Compounds (GC/MS) - DL

Client Sample ID: ADDV-011 — **Lab Sample ID: 280-84538-1**
Date Collected: 06/15/16 11:45 — **Matrix: Water**
Date Received: 06/16/16 09:50

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
cis-1,2-Dichloroethene	**15000**		2000	300	ug/L			06/28/16 12:44	2000

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*94*		*70 - 127*		*06/28/16 12:44*	*2000*
4-Bromofluorobenzene (Surr)	*106*		*78 - 120*		*06/28/16 12:44*	*2000*
Dibromofluoromethane (Surr)	*115*		*77 - 120*		*06/28/16 12:44*	*2000*

Method: 8260B - Volatile Organic Compounds (GC/MS) - DL (Continued)

Client Sample ID: ADDV-011 — **Lab Sample ID: 280-84538-1**
Date Collected: 06/15/16 11:45 — **Matrix: Water**
Date Received: 06/16/16 09:50

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Toluene-d8 (Surr)	108		80 - 125		06/28/16 12:44	2000

Client Sample ID: ADDV-004 — **Lab Sample ID: 280-84538-2**
Date Collected: 06/15/16 12:20 — **Matrix: Water**
Date Received: 06/16/16 09:50

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Tetrachloroethene	130		4.0	0.80	ug/L			06/28/16 13:31	4

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
1,2-Dichloroethane-d4 (Surr)	98		70 - 127		06/28/16 13:31	4
4-Bromofluorobenzene (Surr)	104		78 - 120		06/28/16 13:31	4
Dibromofluoromethane (Surr)	115		77 - 120		06/28/16 13:31	4
Toluene-d8 (Surr)	106		80 - 125		06/28/16 13:31	4

Client Sample ID: ADDV-040 — **Lab Sample ID: 280-84538-3**
Date Collected: 06/15/16 12:25 — **Matrix: Water**
Date Received: 06/16/16 09:50

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
cis-1,2-Dichloroethene	1600		200	30	ug/L			06/28/16 14:18	200

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
1,2-Dichloroethane-d4 (Surr)	89		70 - 127		06/28/16 14:18	200
4-Bromofluorobenzene (Surr)	101		78 - 120		06/28/16 14:18	200
Dibromofluoromethane (Surr)	112		77 - 120		06/28/16 14:18	200
Toluene-d8 (Surr)	105		80 - 125		06/28/16 14:18	200

Client Sample ID: ADDV-042 — **Lab Sample ID: 280-84538-6**
Date Collected: 06/15/16 13:10 — **Matrix: Water**
Date Received: 06/16/16 09:50

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
cis-1,2-Dichloroethene	58000		10000	1500	ug/L			06/28/16 15:52	10000

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
1,2-Dichloroethane-d4 (Surr)	91		70 - 127		06/28/16 15:52	10000
4-Bromofluorobenzene (Surr)	102		78 - 120		06/28/16 15:52	10000
Dibromofluoromethane (Surr)	113		77 - 120		06/28/16 15:52	10000
Toluene-d8 (Surr)	105		80 - 125		06/28/16 15:52	10000

Client Sample ID: ADDV-041 — **Lab Sample ID: 280-84538-7**
Date Collected: 06/15/16 12:55 — **Matrix: Water**
Date Received: 06/16/16 09:50

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
cis-1,2-Dichloroethene	60000		10000	1500	ug/L			06/28/16 16:40	10000

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
1,2-Dichloroethane-d4 (Surr)	96		70 - 127		06/28/16 16:40	10000
4-Bromofluorobenzene (Surr)	101		78 - 120		06/28/16 16:40	10000
Dibromofluoromethane (Surr)	115		77 - 120		06/28/16 16:40	10000
Toluene-d8 (Surr)	108		80 - 125		06/28/16 16:40	10000

Method: 8260B - Volatile Organic Compounds (GC/MS) - DL

Client Sample ID: ADDV-007 — **Lab Sample ID: 280-84538-9**
Date Collected: 06/15/16 16:15 — **Matrix: Water**
Date Received: 06/16/16 09:50

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
cis-1,2-Dichloroethene	1700		200	30	ug/L			06/28/16 17:27	200
Tetrachloroethene	1700		200	40	ug/L			06/28/16 17:27	200

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
1,2-Dichloroethane-d4 (Surr)	93		70 - 127		06/28/16 17:27	200
4-Bromofluorobenzene (Surr)	103		78 - 120		06/28/16 17:27	200
Dibromofluoromethane (Surr)	117		77 - 120		06/28/16 17:27	200
Toluene-d8 (Surr)	106		80 - 125		06/28/16 17:27	200

Client Sample ID: ADDV-022 — **Lab Sample ID: 280-84538-10**
Date Collected: 06/15/16 15:05 — **Matrix: Water**
Date Received: 06/16/16 09:50

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
cis-1,2-Dichloroethene	89000		4000	600	ug/L			06/29/16 10:58	4000
Tetrachloroethene	18000		4000	800	ug/L			06/29/16 10:58	4000

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
1,2-Dichloroethane-d4 (Surr)	101		70 - 127		06/29/16 10:58	4000
4-Bromofluorobenzene (Surr)	105		78 - 120		06/29/16 10:58	4000
Dibromofluoromethane (Surr)	97		77 - 120		06/29/16 10:58	4000
Toluene-d8 (Surr)	104		80 - 125		06/29/16 10:58	4000

Client Sample ID: ADDV-003 — **Lab Sample ID: 280-84538-11**
Date Collected: 06/15/16 16:45 — **Matrix: Water**
Date Received: 06/16/16 09:50

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Tetrachloroethene	2000		100	20	ug/L			06/28/16 15:26	100

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
1,2-Dichloroethane-d4 (Surr)	110		70 - 127		06/28/16 15:26	100
4-Bromofluorobenzene (Surr)	105		78 - 120		06/28/16 15:26	100
Dibromofluoromethane (Surr)	107		77 - 120		06/28/16 15:26	100
Toluene-d8 (Surr)	104		80 - 125		06/28/16 15:26	100

Client Sample ID: ADDV-020 — **Lab Sample ID: 280-84538-15**
Date Collected: 06/15/16 10:50 — **Matrix: Water**
Date Received: 06/16/16 09:50

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1,1-Trichloroethane	7900		4000	640	ug/L			06/29/16 11:20	4000
1,1-Dichloroethane	11000		4000	880	ug/L			06/29/16 11:20	4000
cis-1,2-Dichloroethene	110000		4000	600	ug/L			06/29/16 11:20	4000
m-Xylene & p-Xylene	14000		8000	1400	ug/L			06/29/16 11:20	4000
o-Xylene	3500	J	4000	760	ug/L			06/29/16 11:20	4000
Toluene	53000		4000	680	ug/L			06/29/16 11:20	4000
Vinyl chloride	28000		4000	400	ug/L			06/29/16 11:20	4000
Xylenes, Total	18000		8000	760	ug/L			06/29/16 11:20	4000

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
1,2-Dichloroethane-d4 (Surr)	105		70 - 127		06/29/16 11:20	4000
4-Bromofluorobenzene (Surr)	108		78 - 120		06/29/16 11:20	4000
Dibromofluoromethane (Surr)	102		77 - 120		06/29/16 11:20	4000

Method: 8260B - Volatile Organic Compounds (GC/MS) - DL (Continued)

Client Sample ID: ADDV-020
Date Collected: 06/15/16 10:50
Date Received: 06/16/16 09:50

Lab Sample ID: 280-84538-15
Matrix: Water

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Toluene-d8 (Surr)	*106*		*80 - 125*		*06/29/16 11:20*	*4000*

Client Sample ID: ADDV-021
Date Collected: 06/15/16 09:30
Date Received: 06/16/16 09:50

Lab Sample ID: 280-84538-16
Matrix: Water

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
cis-1,2-Dichloroethene	320		40	6.0	ug/L			06/28/16 09:37	40
Vinyl chloride	380		40	4.0	ug/L			06/28/16 09:37	40

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*96*		*70 - 127*		*06/28/16 09:37*	*40*
4-Bromofluorobenzene (Surr)	*106*		*78 - 120*		*06/28/16 09:37*	*40*
Dibromofluoromethane (Surr)	*115*		*77 - 120*		*06/28/16 09:37*	*40*
Toluene-d8 (Surr)	*110*		*80 - 125*		*06/28/16 09:37*	*40*

Client Sample ID: ADDV-019
Date Collected: 06/15/16 10:45
Date Received: 06/16/16 09:50

Lab Sample ID: 280-84538-17
Matrix: Water

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1,1-Trichloroethane	8300		4000	640	ug/L			06/29/16 11:42	4000
1,1-Dichloroethane	12000		4000	880	ug/L			06/29/16 11:42	4000
cis-1,2-Dichloroethene	110000		4000	600	ug/L			06/29/16 11:42	4000
m-Xylene & p-Xylene	14000		8000	1400	ug/L			06/29/16 11:42	4000
o-Xylene	3700	J	4000	760	ug/L			06/29/16 11:42	4000
Toluene	55000		4000	680	ug/L			06/29/16 11:42	4000
Vinyl chloride	31000		4000	400	ug/L			06/29/16 11:42	4000
Xylenes, Total	18000		8000	760	ug/L			06/29/16 11:42	4000

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*107*		*70 - 127*		*06/29/16 11:42*	*4000*
4-Bromofluorobenzene (Surr)	*113*		*78 - 120*		*06/29/16 11:42*	*4000*
Dibromofluoromethane (Surr)	*104*		*77 - 120*		*06/29/16 11:42*	*4000*
Toluene-d8 (Surr)	*104*		*80 - 125*		*06/29/16 11:42*	*4000*

Client Sample ID: ADDV-031
Date Collected: 06/15/16 09:27
Date Received: 06/16/16 09:50

Lab Sample ID: 280-84538-19
Matrix: Water

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloroethane	2700		200	41	ug/L			06/28/16 18:47	100
Toluene	5900		100	17	ug/L			06/28/16 18:47	100

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*109*		*70 - 127*		*06/28/16 18:47*	*100*
4-Bromofluorobenzene (Surr)	*103*		*78 - 120*		*06/28/16 18:47*	*100*
Dibromofluoromethane (Surr)	*101*		*77 - 120*		*06/28/16 18:47*	*100*
Toluene-d8 (Surr)	*105*		*80 - 125*		*06/28/16 18:47*	*100*

Method: RSK-175 - Dissolved Gases (GC)

Client Sample ID: ADDV-009 — **Lab Sample ID: 280-84538-13**
Date Collected: 06/15/16 10:00 — **Matrix: Water**
Date Received: 06/16/16 09:50

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Methane	ND		5.0	0.22	ug/L			06/22/16 19:10	1
Ethene	ND		5.0	0.40	ug/L			06/22/16 19:10	1
Ethane	ND		5.0	0.57	ug/L			06/22/16 19:10	1

Client Sample ID: ADDV-001 — **Lab Sample ID: 280-84538-14**
Date Collected: 06/15/16 09:56 — **Matrix: Water**
Date Received: 06/16/16 09:50

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Methane	ND		5.0	0.22	ug/L			06/22/16 19:27	1
Ethene	ND		5.0	0.40	ug/L			06/22/16 19:27	1
Ethane	ND		5.0	0.57	ug/L			06/22/16 19:27	1

Client Sample ID: ADDV-020 — **Lab Sample ID: 280-84538-15**
Date Collected: 06/15/16 10:50 — **Matrix: Water**
Date Received: 06/16/16 09:50

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Methane	**250**		90	3.9	ug/L			06/22/16 22:51	18
Ethene	**5000**		90	7.2	ug/L			06/22/16 22:51	18
Ethane	ND		90	10	ug/L			06/22/16 22:51	18

Client Sample ID: ADDV-021 — **Lab Sample ID: 280-84538-16**
Date Collected: 06/15/16 09:30 — **Matrix: Water**
Date Received: 06/16/16 09:50

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Methane	**390**		15	0.65	ug/L			06/23/16 18:14	3
Ethene	**37**		15	1.2	ug/L			06/23/16 18:14	3
Ethane	**23**		15	1.7	ug/L			06/23/16 18:14	3

Client Sample ID: ADDV-019 — **Lab Sample ID: 280-84538-17**
Date Collected: 06/15/16 10:45 — **Matrix: Water**
Date Received: 06/16/16 09:50

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Methane	**240**		90	3.9	ug/L			06/22/16 23:01	18
Ethene	**5000**		90	7.2	ug/L			06/22/16 23:01	18
Ethane	ND		90	10	ug/L			06/22/16 23:01	18

Client Sample ID: ADDV-018 — **Lab Sample ID: 280-84538-18**
Date Collected: 06/15/16 11:05 — **Matrix: Water**
Date Received: 06/16/16 09:50

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Methane	**18000**		15	0.65	ug/L			06/22/16 22:41	3
Ethene	ND		15	1.2	ug/L			06/22/16 22:41	3
Ethane	**10**	**J**	15	1.7	ug/L			06/22/16 22:41	3

Client Sample ID: ADDV-031 — **Lab Sample ID: 280-84538-19**
Date Collected: 06/15/16 09:27 — **Matrix: Water**
Date Received: 06/16/16 09:50

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Methane	**18000**		180	7.8	ug/L			06/22/16 23:12	36
Ethene	**3800**		180	14	ug/L			06/22/16 23:12	36
Ethane	**13000**		180	21	ug/L			06/22/16 23:12	36

General Chemistry

Client Sample ID: ADDV-011 — **Lab Sample ID: 280-84538-1**
Date Collected: 06/15/16 11:45 — **Matrix: Water**
Date Received: 06/16/16 09:50

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	27		3.0	0.25	mg/L			06/24/16 18:05	1
Total Organic Carbon - Average	3.7		1.0	0.16	mg/L			06/18/16 06:13	1

Client Sample ID: ADDV-004 — **Lab Sample ID: 280-84538-2**
Date Collected: 06/15/16 12:20 — **Matrix: Water**
Date Received: 06/16/16 09:50

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	7.8		3.0	0.25	mg/L			06/24/16 18:25	1
Total Organic Carbon - Average	3.3		1.0	0.16	mg/L			06/18/16 06:28	1

Client Sample ID: ADDV-040 — **Lab Sample ID: 280-84538-3**
Date Collected: 06/15/16 12:25 — **Matrix: Water**
Date Received: 06/16/16 09:50

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	30		3.0	0.25	mg/L			06/24/16 19:45	1
Total Organic Carbon - Average	3.2		1.0	0.16	mg/L			06/18/16 07:12	1

Client Sample ID: ADDV-005 — **Lab Sample ID: 280-84538-4**
Date Collected: 06/15/16 12:45 — **Matrix: Water**
Date Received: 06/16/16 09:50

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	4.8		3.0	0.25	mg/L			06/27/16 18:46	1
Total Organic Carbon - Average	1.8		1.0	0.16	mg/L			06/18/16 07:27	1

Client Sample ID: ADDV-002 — **Lab Sample ID: 280-84538-5**
Date Collected: 06/15/16 15:00 — **Matrix: Water**
Date Received: 06/16/16 09:50

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	11		3.0	0.25	mg/L			06/27/16 19:57	1
Total Organic Carbon - Average	2.0		1.0	0.16	mg/L			06/21/16 16:11	1

Client Sample ID: ADDV-042 — **Lab Sample ID: 280-84538-6**
Date Collected: 06/15/16 13:10 — **Matrix: Water**
Date Received: 06/16/16 09:50

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	180		3.0	0.25	mg/L			06/24/16 21:24	1
Total Organic Carbon - Average	8.5		1.0	0.16	mg/L			06/21/16 16:25	1

Client Sample ID: ADDV-041 — **Lab Sample ID: 280-84538-7**
Date Collected: 06/15/16 12:55 — **Matrix: Water**
Date Received: 06/16/16 09:50

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	180		3.0	0.25	mg/L			06/24/16 22:04	1
Total Organic Carbon - Average	8.6		1.0	0.16	mg/L			06/21/16 16:40	1

Client Sample ID: ADDV-013 — **Lab Sample ID: 280-84538-8**
Date Collected: 06/15/16 16:05 — **Matrix: Water**
Date Received: 06/16/16 09:50

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	710		30	2.5	mg/L			06/24/16 23:04	10

General Chemistry

Client Sample ID: ADDV-007 — **Lab Sample ID: 280-84538-9**
Date Collected: 06/15/16 16:15 — **Matrix: Water**
Date Received: 06/16/16 09:50

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	7.1		3.0	0.25	mg/L			06/24/16 23:24	1
Total Organic Carbon - Average	5.7		1.0	0.16	mg/L			06/21/16 16:54	1

Client Sample ID: ADDV-022 — **Lab Sample ID: 280-84538-10**
Date Collected: 06/15/16 15:05 — **Matrix: Water**
Date Received: 06/16/16 09:50

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	190		30	2.5	mg/L			06/25/16 00:03	10
Total Organic Carbon - Average	15		1.0	0.16	mg/L			06/22/16 16:08	1

Client Sample ID: ADDV-003 — **Lab Sample ID: 280-84538-11**
Date Collected: 06/15/16 16:45 — **Matrix: Water**
Date Received: 06/16/16 09:50

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	78		3.0	0.25	mg/L			06/25/16 00:23	1
Total Organic Carbon - Average	4.7		1.0	0.16	mg/L			06/22/16 16:25	1

Client Sample ID: ADDV-012 — **Lab Sample ID: 280-84538-12**
Date Collected: 06/15/16 16:50 — **Matrix: Water**
Date Received: 06/16/16 09:50

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	180		150	13	mg/L			06/27/16 20:15	50

Client Sample ID: ADDV-009 — **Lab Sample ID: 280-84538-13**
Date Collected: 06/15/16 10:00 — **Matrix: Water**
Date Received: 06/16/16 09:50

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	38		3.0	0.25	mg/L			06/16/16 18:40	1
Nitrate as N	2.4		0.50	0.042	mg/L			06/16/16 18:40	1
Sulfate	73		5.0	0.23	mg/L			06/16/16 18:40	1
Total Organic Carbon - Average	2.1		1.0	0.16	mg/L			06/22/16 16:44	1
Alkalinity	320	B	5.0	1.1	mg/L			06/21/16 12:31	1
Sulfide	ND		1.0	0.50	mg/L			06/17/16 15:49	1
Ferrous Iron	ND	HF	0.20	0.021	mg/L			06/16/16 21:18	1

Client Sample ID: ADDV-001 — **Lab Sample ID: 280-84538-14**
Date Collected: 06/15/16 09:56 — **Matrix: Water**
Date Received: 06/16/16 09:50

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	46		3.0	0.25	mg/L			06/16/16 18:58	1
Nitrate as N	6.8		0.50	0.042	mg/L			06/16/16 18:58	1
Sulfate	44		5.0	0.23	mg/L			06/16/16 18:58	1
Total Organic Carbon - Average	1.9		1.0	0.16	mg/L			06/22/16 17:01	1
Alkalinity	240	B	5.0	1.1	mg/L			06/17/16 12:24	1
Sulfide	ND		1.0	0.50	mg/L			06/17/16 15:49	1
Ferrous Iron	ND	HF	0.20	0.021	mg/L			06/16/16 21:18	1

General Chemistry

Client Sample ID: ADDV-020 — **Lab Sample ID: 280-84538-15**
Date Collected: 06/15/16 10:50 — **Matrix: Water**
Date Received: 06/16/16 09:50

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	280		15	1.3	mg/L			06/16/16 22:16	5
Nitrate as N	ND		0.50	0.042	mg/L			06/16/16 19:16	1
Sulfate	21		5.0	0.23	mg/L			06/16/16 19:16	1
Total Organic Carbon - Average	7.5		1.0	0.16	mg/L			06/22/16 17:15	1
Alkalinity	490	B	5.0	1.1	mg/L			06/17/16 12:36	1
Sulfide	ND		1.0	0.50	mg/L			06/17/16 15:49	1
Ferrous Iron	1.7	HF	0.20	0.021	mg/L			06/16/16 21:18	1

Client Sample ID: ADDV-021 — **Lab Sample ID: 280-84538-16**
Date Collected: 06/15/16 09:30 — **Matrix: Water**
Date Received: 06/16/16 09:50

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	150		3.0	0.25	mg/L			06/16/16 19:34	1
Nitrate as N	ND		0.50	0.042	mg/L			06/16/16 19:34	1
Sulfate	110		5.0	0.23	mg/L			06/16/16 19:34	1
Total Organic Carbon - Average	2.7		1.0	0.16	mg/L			06/22/16 17:36	1
Alkalinity	350	B	5.0	1.1	mg/L			06/17/16 12:43	1
Sulfide	ND		1.0	0.50	mg/L			06/17/16 15:49	1
Ferrous Iron	0.028	J HF	0.20	0.021	mg/L			06/16/16 21:18	1

Client Sample ID: ADDV-019 — **Lab Sample ID: 280-84538-17**
Date Collected: 06/15/16 10:45 — **Matrix: Water**
Date Received: 06/16/16 09:50

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	280		15	1.3	mg/L			06/16/16 22:34	5
Nitrate as N	ND		0.50	0.042	mg/L			06/16/16 21:20	1
Sulfate	21		5.0	0.23	mg/L			06/16/16 21:20	1
Total Organic Carbon - Average	7.3		1.0	0.16	mg/L			06/22/16 18:20	1
Alkalinity	490	B	5.0	1.1	mg/L			06/17/16 12:49	1
Sulfide	ND		1.0	0.50	mg/L			06/17/16 15:49	1
Ferrous Iron	1.1	HF	0.20	0.021	mg/L			06/16/16 21:18	1

Client Sample ID: ADDV-018 — **Lab Sample ID: 280-84538-18**
Date Collected: 06/15/16 11:05 — **Matrix: Water**
Date Received: 06/16/16 09:50

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	82		3.0	0.25	mg/L			06/16/16 21:38	1
Nitrate as N	ND		0.50	0.042	mg/L			06/16/16 21:38	1
Sulfate	ND		5.0	0.23	mg/L			06/16/16 21:38	1
Total Organic Carbon - Average	10		1.0	0.16	mg/L			06/22/16 19:05	1
Alkalinity	540	B	5.0	1.1	mg/L			06/17/16 12:56	1
Sulfide	ND		1.0	0.50	mg/L			06/17/16 15:49	1
Ferrous Iron	ND	HF	0.20	0.021	mg/L			06/16/16 21:18	1

Client Sample ID: ADDV-031 — **Lab Sample ID: 280-84538-19**
Date Collected: 06/15/16 09:27 — **Matrix: Water**
Date Received: 06/16/16 09:50

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	420		15	1.3	mg/L			06/16/16 23:10	5
Nitrate as N	ND		0.50	0.042	mg/L			06/16/16 21:56	1

General Chemistry (Continued)

Client Sample ID: ADDV-031
Date Collected: 06/15/16 09:27
Date Received: 06/16/16 09:50

Lab Sample ID: 280-84538-19
Matrix: Water

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Sulfate	**0.92**	**J**	5.0	0.23	mg/L			06/16/16 21:56	1
Total Organic Carbon - Average	**7.5**		1.0	0.16	mg/L			06/22/16 19:21	1
Alkalinity	**580**	**B**	5.0	1.1	mg/L			06/17/16 13:03	1
Sulfide	ND		1.0	0.50	mg/L			06/17/16 15:49	1
Ferrous Iron	**3.1**	**HF**	1.0	0.11	mg/L			06/16/16 21:18	5

Surrogate Summary

Client: CH2M Hill, Inc.
Project/Site: THAN Davenport, IA - June 2016

TestAmerica Job ID: 280-84538-1

Method: 8260B - Volatile Organic Compounds (GC/MS)

Matrix: Water **Prep Type: Total/NA**

		Percent Surrogate Recovery (Acceptance Limits)			
		12DCE	BFB	DBFM	TOL
Lab Sample ID	Client Sample ID	(70-127)	(78-120)	(77-120)	(80-125)
280-84538-1	ADDV-011	97	105	116	108
280-84538-1 - DL	ADDV-011	94	106	115	108
280-84538-2	ADDV-004	91	103	114	103
280-84538-2 - DL	ADDV-004	98	104	115	106
280-84538-3	ADDV-040	93	103	114	109
280-84538-3 - DL	ADDV-040	89	101	112	105
280-84538-4	ADDV-005	94	103	116	107
280-84538-5	ADDV-002	96	102	117	106
280-84538-6	ADDV-042	93	105	119	108
280-84538-6 - DL	ADDV-042	91	102	113	105
280-84538-7	ADDV-041	95	105	118	109
280-84538-7 - DL	ADDV-041	96	101	115	108
280-84538-9	ADDV-007	98	104	119	106
280-84538-9 - DL	ADDV-007	93	103	117	106
280-84538-10	ADDV-022	109	103	106	101
280-84538-10 - DL	ADDV-022	101	105	97	104
280-84538-11	ADDV-003	117	111	111	105
280-84538-11 - DL	ADDV-003	110	105	107	104
280-84538-13	ADDV-009	114	106	107	107
280-84538-14	ADDV-001	106	110	101	108
280-84538-15	ADDV-020	115	102	106	109
280-84538-15 - DL	ADDV-020	105	108	102	106
280-84538-16	ADDV-021	97	104	114	106
280-84538-16 - DL	ADDV-021	96	106	115	110
280-84538-16 MS	ADDV-021	106	104	116	114
280-84538-16 MSD	ADDV-021	103	101	115	114
280-84538-17	ADDV-019	110	98	104	101
280-84538-17 - DL	ADDV-019	107	113	104	104
280-84538-18	ADDV-018	108	107	101	103
280-84538-19 - DL	ADDV-031	109	103	101	105
280-84538-19	ADDV-031	103	107	100	102
280-84538-20	ADDV-048	104	106	100	111
280-84557-H-1 MS	Matrix Spike	104	95	98	102
280-84557-H-1 MSD	Matrix Spike Duplicate	105	104	98	104
280-84934-B-1 MS	Matrix Spike	114	100	104	106
280-84934-B-1 MSD	Matrix Spike Duplicate	106	105	100	102
LCS 280-331584/4	Lab Control Sample	103	101	112	113
LCS 280-331595/4	Lab Control Sample	101	103	95	100
LCS 280-331791/4	Lab Control Sample	99	98	97	100
MB 280-331584/6	Method Blank	105	107	116	107
MB 280-331595/6	Method Blank	106	103	101	104
MB 280-331791/6	Method Blank	101	102	101	102

Surrogate Legend

12DCE = 1,2-Dichloroethane-d4 (Surr)
BFB = 4-Bromofluorobenzene (Surr)
DBFM = Dibromofluoromethane (Surr)
TOL = Toluene-d8 (Surr)

QC Sample Results

Client: CH2M Hill, Inc.
Project/Site: THAN Davenport, IA - June 2016

TestAmerica Job ID: 280-84538-1

Method: 8260B - Volatile Organic Compounds (GC/MS)

Lab Sample ID: MB 280-331584/6
Matrix: Water
Analysis Batch: 331584

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1,1-Trichloroethane	ND		1.0	0.16	ug/L			06/28/16 07:57	1
1,1-Dichloroethane	ND		1.0	0.22	ug/L			06/28/16 07:57	1
1,1-Dichloroethene	ND		1.0	0.23	ug/L			06/28/16 07:57	1
1,2-Dichloroethane	ND		1.0	0.13	ug/L			06/28/16 07:57	1
Methyl ethyl ketone (MEK)	ND		6.0	2.0	ug/L			06/28/16 07:57	1
Acetone	ND		10	1.9	ug/L			06/28/16 07:57	1
Benzene	ND		1.0	0.16	ug/L			06/28/16 07:57	1
Chloroethane	ND		2.0	0.41	ug/L			06/28/16 07:57	1
cis-1,2-Dichloroethene	ND		1.0	0.15	ug/L			06/28/16 07:57	1
Ethylbenzene	ND		1.0	0.16	ug/L			06/28/16 07:57	1
Methylene Chloride	0.629	J	2.0	0.32	ug/L			06/28/16 07:57	1
m-Xylene & p-Xylene	ND		2.0	0.34	ug/L			06/28/16 07:57	1
o-Xylene	ND		1.0	0.19	ug/L			06/28/16 07:57	1
Styrene	ND		1.0	0.17	ug/L			06/28/16 07:57	1
Tetrachloroethene	ND		1.0	0.20	ug/L			06/28/16 07:57	1
Toluene	ND		1.0	0.17	ug/L			06/28/16 07:57	1
trans-1,2-Dichloroethene	ND		1.0	0.15	ug/L			06/28/16 07:57	1
Trichloroethene	ND		1.0	0.16	ug/L			06/28/16 07:57	1
Vinyl chloride	ND		1.0	0.10	ug/L			06/28/16 07:57	1
Xylenes, Total	ND		2.0	0.19	ug/L			06/28/16 07:57	1

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*105*		*70 - 127*		*06/28/16 07:57*	*1*
4-Bromofluorobenzene (Surr)	*107*		*78 - 120*		*06/28/16 07:57*	*1*
Dibromofluoromethane (Surr)	*116*		*77 - 120*		*06/28/16 07:57*	*1*
Toluene-d8 (Surr)	*107*		*80 - 125*		*06/28/16 07:57*	*1*

Lab Sample ID: LCS 280-331584/4
Matrix: Water
Analysis Batch: 331584

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
1,1,1-Trichloroethane	5.00	5.46		ug/L		109	65 - 135
1,1-Dichloroethane	5.00	4.95		ug/L		99	65 - 135
1,1-Dichloroethene	5.00	5.51		ug/L		110	65 - 136
1,2-Dichloroethane	5.00	4.87		ug/L		97	65 - 135
Methyl ethyl ketone (MEK)	20.0	17.6		ug/L		88	44 - 177
Acetone	20.0	19.6		ug/L		98	39 - 156
Benzene	5.00	5.23		ug/L		105	65 - 135
Chloroethane	5.00	4.78		ug/L		96	46 - 136
cis-1,2-Dichloroethene	5.00	5.34		ug/L		107	65 - 135
Ethylbenzene	5.00	5.18		ug/L		104	65 - 135
Methylene Chloride	5.00	5.15		ug/L		103	54 - 141
m-Xylene & p-Xylene	5.00	5.31		ug/L		106	65 - 135
o-Xylene	5.00	5.00		ug/L		100	65 - 135
Styrene	5.00	4.45		ug/L		89	65 - 135
Tetrachloroethene	5.00	5.13		ug/L		103	65 - 135
Toluene	5.00	5.43		ug/L		109	65 - 135

Method: 8260B - Volatile Organic Compounds (GC/MS) (Continued)

Lab Sample ID: LCS 280-331584/4
Matrix: Water
Analysis Batch: 331584

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
trans-1,2-Dichloroethene	5.00	5.44		ug/L		109	65 - 135
Trichloroethene	5.00	5.66		ug/L		113	65 - 135
Vinyl chloride	5.00	5.04		ug/L		101	40 - 137
Xylenes, Total	10.0	10.3		ug/L		103	65 - 135

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
1,2-Dichloroethane-d4 (Surr)	*103*		*70 - 127*
4-Bromofluorobenzene (Surr)	*101*		*78 - 120*
Dibromofluoromethane (Surr)	*112*		*77 - 120*
Toluene-d8 (Surr)	*113*		*80 - 125*

Lab Sample ID: 280-84538-16 MS
Matrix: Water
Analysis Batch: 331584

Client Sample ID: ADDV-021
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
1,1,1-Trichloroethane	ND		20.0	21.3		ug/L		107	65 - 135
1,1-Dichloroethane	74		20.0	91.8		ug/L		87	65 - 135
1,1-Dichloroethene	4.1		20.0	25.1		ug/L		105	65 - 136
1,2-Dichloroethane	ND		20.0	19.3		ug/L		97	65 - 135
Methyl ethyl ketone (MEK)	ND		80.0	71.1		ug/L		89	44 - 177
Acetone	30	J	80.0	76.1		ug/L		58	39 - 156
Benzene	1.4	J	20.0	22.2		ug/L		104	65 - 135
Chloroethane	ND		20.0	21.4		ug/L		107	46 - 136
cis-1,2-Dichloroethene	320	E	20.0	338	E 4	ug/L		74	65 - 135
Ethylbenzene	ND		20.0	20.3		ug/L		101	65 - 135
Methylene Chloride	2.3	J B	20.0	19.6		ug/L		87	54 - 141
m-Xylene & p-Xylene	ND		20.0	21.2		ug/L		106	65 - 135
o-Xylene	ND		20.0	19.7		ug/L		99	65 - 135
Styrene	ND		20.0	17.1		ug/L		86	65 - 135
Tetrachloroethene	ND		20.0	20.4		ug/L		102	65 - 135
Toluene	ND		20.0	21.7		ug/L		108	65 - 135
trans-1,2-Dichloroethene	0.89	J	20.0	21.7		ug/L		104	65 - 135
Trichloroethene	ND		20.0	22.0		ug/L		110	65 - 135
Vinyl chloride	390	E	20.0	388	E 4	ug/L		8	40 - 137
Xylenes, Total	ND		40.0	40.9		ug/L		102	65 - 135

Surrogate	*MS %Recovery*	*MS Qualifier*	*Limits*
1,2-Dichloroethane-d4 (Surr)	*106*		*70 - 127*
4-Bromofluorobenzene (Surr)	*104*		*78 - 120*
Dibromofluoromethane (Surr)	*116*		*77 - 120*
Toluene-d8 (Surr)	*114*		*80 - 125*

Method: 8260B - Volatile Organic Compounds (GC/MS) (Continued)

Lab Sample ID: 280-84538-16 MSD — **Client Sample ID: ADDV-021**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 331584

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
1,1,1-Trichloroethane	ND		20.0	21.9		ug/L		109	65 - 135	3	20
1,1-Dichloroethane	74		20.0	90.7		ug/L		81	65 - 135	1	21
1,1-Dichloroethene	4.1		20.0	25.2		ug/L		106	65 - 136	1	20
1,2-Dichloroethane	ND		20.0	19.3		ug/L		97	65 - 135	0	20
Methyl ethyl ketone (MEK)	ND		80.0	71.4		ug/L		89	44 - 177	1	32
Acetone	30	J	80.0	93.8		ug/L		80	39 - 156	21	23
Benzene	1.4	J	20.0	22.4		ug/L		105	65 - 135	1	20
Chloroethane	ND		20.0	20.6		ug/L		103	46 - 136	4	25
cis-1,2-Dichloroethene	320	E	20.0	330	E 4	ug/L		32	65 - 135	2	20
Ethylbenzene	ND		20.0	20.9		ug/L		105	65 - 135	3	20
Methylene Chloride	2.3	J B	20.0	20.4		ug/L		91	54 - 141	4	26
m-Xylene & p-Xylene	ND		20.0	21.6		ug/L		108	65 - 135	2	20
o-Xylene	ND		20.0	20.5		ug/L		102	65 - 135	4	20
Styrene	ND		20.0	18.0		ug/L		90	65 - 135	5	26
Tetrachloroethene	ND		20.0	20.9		ug/L		105	65 - 135	3	20
Toluene	ND		20.0	22.3		ug/L		111	65 - 135	3	20
trans-1,2-Dichloroethene	0.89	J	20.0	22.0		ug/L		105	65 - 135	1	24
Trichloroethene	ND		20.0	22.7		ug/L		114	65 - 135	3	20
Vinyl chloride	390	E	20.0	380	E 4	ug/L		-31	40 - 137	2	24
Xylenes, Total	ND		40.0	42.1		ug/L		105	65 - 135	3	20

Surrogate	*MSD %Recovery*	*MSD Qualifier*	*Limits*
1,2-Dichloroethane-d4 (Surr)	*103*		*70 - 127*
4-Bromofluorobenzene (Surr)	*101*		*78 - 120*
Dibromofluoromethane (Surr)	*115*		*77 - 120*
Toluene-d8 (Surr)	*114*		*80 - 125*

Lab Sample ID: MB 280-331595/6 — **Client Sample ID: Method Blank**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 331595

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1,1-Trichloroethane	ND		1.0	0.16	ug/L			06/28/16 11:43	1
1,1-Dichloroethane	ND		1.0	0.22	ug/L			06/28/16 11:43	1
1,1-Dichloroethene	ND		1.0	0.23	ug/L			06/28/16 11:43	1
1,2-Dichloroethane	ND		1.0	0.13	ug/L			06/28/16 11:43	1
Methyl ethyl ketone (MEK)	ND		6.0	2.0	ug/L			06/28/16 11:43	1
Acetone	3.08	J	10	1.9	ug/L			06/28/16 11:43	1
Benzene	ND		1.0	0.16	ug/L			06/28/16 11:43	1
Chloroethane	ND		2.0	0.41	ug/L			06/28/16 11:43	1
cis-1,2-Dichloroethene	ND		1.0	0.15	ug/L			06/28/16 11:43	1
Ethylbenzene	ND		1.0	0.16	ug/L			06/28/16 11:43	1
Methylene Chloride	ND		2.0	0.32	ug/L			06/28/16 11:43	1
m-Xylene & p-Xylene	ND		2.0	0.34	ug/L			06/28/16 11:43	1
o-Xylene	ND		1.0	0.19	ug/L			06/28/16 11:43	1
Styrene	ND		1.0	0.17	ug/L			06/28/16 11:43	1
Tetrachloroethene	ND		1.0	0.20	ug/L			06/28/16 11:43	1
Toluene	ND		1.0	0.17	ug/L			06/28/16 11:43	1

Method: 8260B - Volatile Organic Compounds (GC/MS) (Continued)

Lab Sample ID: MB 280-331595/6
Matrix: Water
Analysis Batch: 331595

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
trans-1,2-Dichloroethene	ND		1.0	0.15	ug/L			06/28/16 11:43	1
Trichloroethene	ND		1.0	0.16	ug/L			06/28/16 11:43	1
Vinyl chloride	ND		1.0	0.10	ug/L			06/28/16 11:43	1
Xylenes, Total	ND		2.0	0.19	ug/L			06/28/16 11:43	1

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*106*		*70 - 127*		*06/28/16 11:43*	*1*
4-Bromofluorobenzene (Surr)	*103*		*78 - 120*		*06/28/16 11:43*	*1*
Dibromofluoromethane (Surr)	*101*		*77 - 120*		*06/28/16 11:43*	*1*
Toluene-d8 (Surr)	*104*		*80 - 125*		*06/28/16 11:43*	*1*

Lab Sample ID: LCS 280-331595/4
Matrix: Water
Analysis Batch: 331595

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
1,1,1-Trichloroethane	10.0	9.55		ug/L		95	65 - 135
1,1-Dichloroethane	10.0	9.04		ug/L		90	65 - 135
1,1-Dichloroethene	10.0	9.26		ug/L		93	65 - 136
1,2-Dichloroethane	10.0	9.13		ug/L		91	65 - 135
Methyl ethyl ketone (MEK)	40.0	38.8		ug/L		97	44 - 177
Acetone	40.0	54.5		ug/L		136	39 - 156
Benzene	10.0	9.02		ug/L		90	65 - 135
Chloroethane	10.0	10.7		ug/L		107	46 - 136
cis-1,2-Dichloroethene	10.0	9.54		ug/L		95	65 - 135
Ethylbenzene	10.0	9.92		ug/L		99	65 - 135
Methylene Chloride	10.0	9.71		ug/L		97	54 - 141
m-Xylene & p-Xylene	10.0	9.59		ug/L		96	65 - 135
o-Xylene	10.0	9.83		ug/L		98	65 - 135
Styrene	10.0	9.40		ug/L		94	65 - 135
Tetrachloroethene	10.0	9.21		ug/L		92	65 - 135
Toluene	10.0	9.45		ug/L		95	65 - 135
trans-1,2-Dichloroethene	10.0	9.48		ug/L		95	65 - 135
Trichloroethene	10.0	9.54		ug/L		95	65 - 135
Vinyl chloride	10.0	10.8		ug/L		108	40 - 137
Xylenes, Total	20.0	19.4		ug/L		97	65 - 135

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
1,2-Dichloroethane-d4 (Surr)	*101*		*70 - 127*
4-Bromofluorobenzene (Surr)	*103*		*78 - 120*
Dibromofluoromethane (Surr)	*95*		*77 - 120*
Toluene-d8 (Surr)	*100*		*80 - 125*

Method: 8260B - Volatile Organic Compounds (GC/MS) (Continued)

Lab Sample ID: 280-84557-H-1 MS
Matrix: Water
Analysis Batch: 331595

Client Sample ID: Matrix Spike
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
1,1,1-Trichloroethane	ND		5.00	4.61		ug/L		92	65 - 135
1,1-Dichloroethane	ND		5.00	4.45		ug/L		89	65 - 135
1,1-Dichloroethene	ND		5.00	4.23		ug/L		85	65 - 136
1,2-Dichloroethane	ND		5.00	4.79		ug/L		96	65 - 135
Methyl ethyl ketone (MEK)	ND		20.0	21.9		ug/L		109	44 - 177
Acetone	35	B	20.0	50.4		ug/L		75	39 - 156
Benzene	ND		5.00	4.51		ug/L		90	65 - 135
Chloroethane	ND		5.00	4.84		ug/L		97	46 - 136
cis-1,2-Dichloroethene	ND		5.00	4.81		ug/L		96	65 - 135
Ethylbenzene	ND		5.00	4.48		ug/L		90	65 - 135
Methylene Chloride	ND		5.00	4.70		ug/L		94	54 - 141
m-Xylene & p-Xylene	ND		5.00	4.54		ug/L		91	65 - 135
o-Xylene	ND		5.00	4.52		ug/L		90	65 - 135
Styrene	ND		5.00	4.47		ug/L		89	65 - 135
Tetrachloroethene	ND		5.00	4.28		ug/L		86	65 - 135
Toluene	ND		5.00	4.61		ug/L		92	65 - 135
trans-1,2-Dichloroethene	ND		5.00	4.56		ug/L		91	65 - 135
Trichloroethene	ND		5.00	4.56		ug/L		91	65 - 135
Vinyl chloride	ND		5.00	4.85		ug/L		97	40 - 137
Xylenes, Total	ND		10.0	9.06		ug/L		91	65 - 135

Surrogate	*MS %Recovery*	*MS Qualifier*	*Limits*
1,2-Dichloroethane-d4 (Surr)	*104*		*70 - 127*
4-Bromofluorobenzene (Surr)	*95*		*78 - 120*
Dibromofluoromethane (Surr)	*98*		*77 - 120*
Toluene-d8 (Surr)	*102*		*80 - 125*

Lab Sample ID: 280-84557-H-1 MSD
Matrix: Water
Analysis Batch: 331595

Client Sample ID: Matrix Spike Duplicate
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
1,1,1-Trichloroethane	ND		5.00	4.71		ug/L		94	65 - 135	2	20
1,1-Dichloroethane	ND		5.00	4.59		ug/L		92	65 - 135	3	21
1,1-Dichloroethene	ND		5.00	4.34		ug/L		87	65 - 136	3	20
1,2-Dichloroethane	ND		5.00	4.78		ug/L		96	65 - 135	0	20
Methyl ethyl ketone (MEK)	ND		20.0	21.7		ug/L		109	44 - 177	1	32
Acetone	35	B	20.0	51.7		ug/L		82	39 - 156	3	23
Benzene	ND		5.00	4.35		ug/L		87	65 - 135	4	20
Chloroethane	ND		5.00	5.08		ug/L		102	46 - 136	5	25
cis-1,2-Dichloroethene	ND		5.00	4.85		ug/L		97	65 - 135	1	20
Ethylbenzene	ND		5.00	4.53		ug/L		91	65 - 135	1	20
Methylene Chloride	ND		5.00	4.72		ug/L		94	54 - 141	0	26
m-Xylene & p-Xylene	ND		5.00	4.37		ug/L		87	65 - 135	4	20
o-Xylene	ND		5.00	4.63		ug/L		93	65 - 135	3	20
Styrene	ND		5.00	4.51		ug/L		90	65 - 135	1	26
Tetrachloroethene	ND		5.00	4.40		ug/L		88	65 - 135	3	20
Toluene	ND		5.00	4.70		ug/L		94	65 - 135	2	20

Method: 8260B - Volatile Organic Compounds (GC/MS) (Continued)

Lab Sample ID: 280-84557-H-1 MSD
Matrix: Water
Analysis Batch: 331595

Client Sample ID: Matrix Spike Duplicate
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
trans-1,2-Dichloroethene	ND		5.00	4.57		ug/L		91	65 - 135	0	24
Trichloroethene	ND		5.00	4.66		ug/L		93	65 - 135	2	20
Vinyl chloride	ND		5.00	5.21		ug/L		104	40 - 137	7	24
Xylenes, Total	ND		10.0	9.00		ug/L		90	65 - 135	1	20

Surrogate	*MSD %Recovery*	*MSD Qualifier*	*Limits*
1,2-Dichloroethane-d4 (Surr)	*105*		*70 - 127*
4-Bromofluorobenzene (Surr)	*104*		*78 - 120*
Dibromofluoromethane (Surr)	*98*		*77 - 120*
Toluene-d8 (Surr)	*104*		*80 - 125*

Lab Sample ID: MB 280-331791/6
Matrix: Water
Analysis Batch: 331791

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1,1-Trichloroethane	ND		1.0	0.16	ug/L			06/29/16 09:30	1
1,1-Dichloroethane	ND		1.0	0.22	ug/L			06/29/16 09:30	1
1,1-Dichloroethene	ND		1.0	0.23	ug/L			06/29/16 09:30	1
1,2-Dichloroethane	ND		1.0	0.13	ug/L			06/29/16 09:30	1
Methyl ethyl ketone (MEK)	ND		6.0	2.0	ug/L			06/29/16 09:30	1
Acetone	ND		10	1.9	ug/L			06/29/16 09:30	1
Benzene	ND		1.0	0.16	ug/L			06/29/16 09:30	1
Chloroethane	ND		2.0	0.41	ug/L			06/29/16 09:30	1
cis-1,2-Dichloroethene	ND		1.0	0.15	ug/L			06/29/16 09:30	1
Ethylbenzene	ND		1.0	0.16	ug/L			06/29/16 09:30	1
Methylene Chloride	ND		2.0	0.32	ug/L			06/29/16 09:30	1
m-Xylene & p-Xylene	ND		2.0	0.34	ug/L			06/29/16 09:30	1
o-Xylene	ND		1.0	0.19	ug/L			06/29/16 09:30	1
Styrene	ND		1.0	0.17	ug/L			06/29/16 09:30	1
Tetrachloroethene	ND		1.0	0.20	ug/L			06/29/16 09:30	1
Toluene	ND		1.0	0.17	ug/L			06/29/16 09:30	1
trans-1,2-Dichloroethene	ND		1.0	0.15	ug/L			06/29/16 09:30	1
Trichloroethene	ND		1.0	0.16	ug/L			06/29/16 09:30	1
Vinyl chloride	ND		1.0	0.10	ug/L			06/29/16 09:30	1
Xylenes, Total	ND		2.0	0.19	ug/L			06/29/16 09:30	1

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*101*		*70 - 127*		*06/29/16 09:30*	*1*
4-Bromofluorobenzene (Surr)	*102*		*78 - 120*		*06/29/16 09:30*	*1*
Dibromofluoromethane (Surr)	*101*		*77 - 120*		*06/29/16 09:30*	*1*
Toluene-d8 (Surr)	*102*		*80 - 125*		*06/29/16 09:30*	*1*

Method: 8260B - Volatile Organic Compounds (GC/MS) (Continued)

Lab Sample ID: LCS 280-331791/4
Matrix: Water
Analysis Batch: 331791

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
1,1,1-Trichloroethane	5.00	5.42		ug/L		108	65 - 135
1,1-Dichloroethane	5.00	5.40		ug/L		108	65 - 135
1,1-Dichloroethene	5.00	5.60		ug/L		112	65 - 136
1,2-Dichloroethane	5.00	5.08		ug/L		102	65 - 135
Methyl ethyl ketone (MEK)	20.0	17.0		ug/L		85	44 - 177
Acetone	20.0	21.2		ug/L		106	39 - 156
Benzene	5.00	5.29		ug/L		106	65 - 135
Chloroethane	5.00	5.14		ug/L		103	46 - 136
cis-1,2-Dichloroethene	5.00	5.51		ug/L		110	65 - 135
Ethylbenzene	5.00	5.33		ug/L		107	65 - 135
Methylene Chloride	5.00	5.72		ug/L		114	54 - 141
m-Xylene & p-Xylene	5.00	5.37		ug/L		107	65 - 135
o-Xylene	5.00	5.23		ug/L		105	65 - 135
Styrene	5.00	5.00		ug/L		100	65 - 135
Tetrachloroethene	5.00	5.50		ug/L		110	65 - 135
Toluene	5.00	5.68		ug/L		114	65 - 135
trans-1,2-Dichloroethene	5.00	5.75		ug/L		115	65 - 135
Trichloroethene	5.00	5.60		ug/L		112	65 - 135
Vinyl chloride	5.00	5.32		ug/L		106	40 - 137
Xylenes, Total	10.0	10.6		ug/L		106	65 - 135

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
1,2-Dichloroethane-d4 (Surr)	*99*		*70 - 127*
4-Bromofluorobenzene (Surr)	*98*		*78 - 120*
Dibromofluoromethane (Surr)	*97*		*77 - 120*
Toluene-d8 (Surr)	*100*		*80 - 125*

Lab Sample ID: 280-84934-B-1 MS
Matrix: Water
Analysis Batch: 331791

Client Sample ID: Matrix Spike
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
1,1,1-Trichloroethane	ND		5.00	5.45		ug/L		109	65 - 135
1,1-Dichloroethane	ND		5.00	5.48		ug/L		110	65 - 135
1,1-Dichloroethene	ND		5.00	5.24		ug/L		105	65 - 136
1,2-Dichloroethane	ND		5.00	5.69		ug/L		114	65 - 135
Methyl ethyl ketone (MEK)	ND		20.0	20.7		ug/L		103	44 - 177
Acetone	ND		20.0	19.4		ug/L		97	39 - 156
Benzene	ND		5.00	5.40		ug/L		108	65 - 135
Chloroethane	ND		5.00	5.36		ug/L		107	46 - 136
cis-1,2-Dichloroethene	ND		5.00	5.35		ug/L		107	65 - 135
Ethylbenzene	ND		5.00	5.01		ug/L		100	65 - 135
Methylene Chloride	ND		5.00	5.76		ug/L		115	54 - 141
m-Xylene & p-Xylene	ND		5.00	5.05		ug/L		101	65 - 135
o-Xylene	ND		5.00	5.07		ug/L		101	65 - 135
Styrene	ND		5.00	4.59		ug/L		92	65 - 135
Tetrachloroethene	1.4		5.00	6.14		ug/L		95	65 - 135
Toluene	ND		5.00	5.46		ug/L		109	65 - 135

Method: 8260B - Volatile Organic Compounds (GC/MS) (Continued)

Lab Sample ID: 280-84934-B-1 MS
Matrix: Water
Analysis Batch: 331791

Client Sample ID: Matrix Spike
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
trans-1,2-Dichloroethene	ND		5.00	5.50		ug/L		110	65 - 135
Trichloroethene	ND		5.00	5.29		ug/L		106	65 - 135
Vinyl chloride	ND		5.00	4.97		ug/L		99	40 - 137
Xylenes, Total	ND		10.0	10.1		ug/L		101	65 - 135

Surrogate	*MS %Recovery*	*MS Qualifier*	*Limits*
1,2-Dichloroethane-d4 (Surr)	*114*		*70 - 127*
4-Bromofluorobenzene (Surr)	*100*		*78 - 120*
Dibromofluoromethane (Surr)	*104*		*77 - 120*
Toluene-d8 (Surr)	*106*		*80 - 125*

Lab Sample ID: 280-84934-B-1 MSD
Matrix: Water
Analysis Batch: 331791

Client Sample ID: Matrix Spike Duplicate
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
1,1,1-Trichloroethane	ND		5.00	5.41		ug/L		108	65 - 135	1	20
1,1-Dichloroethane	ND		5.00	5.35		ug/L		107	65 - 135	3	21
1,1-Dichloroethene	ND		5.00	5.20		ug/L		104	65 - 136	1	20
1,2-Dichloroethane	ND		5.00	5.59		ug/L		112	65 - 135	2	20
Methyl ethyl ketone (MEK)	ND		20.0	19.5		ug/L		98	44 - 177	6	32
Acetone	ND		20.0	17.6		ug/L		88	39 - 156	10	23
Benzene	ND		5.00	5.37		ug/L		107	65 - 135	1	20
Chloroethane	ND		5.00	5.29		ug/L		106	46 - 136	1	25
cis-1,2-Dichloroethene	ND		5.00	5.43		ug/L		109	65 - 135	2	20
Ethylbenzene	ND		5.00	5.19		ug/L		104	65 - 135	4	20
Methylene Chloride	ND		5.00	5.64		ug/L		113	54 - 141	2	26
m-Xylene & p-Xylene	ND		5.00	5.23		ug/L		105	65 - 135	4	20
o-Xylene	ND		5.00	5.12		ug/L		102	65 - 135	1	20
Styrene	ND		5.00	4.53		ug/L		91	65 - 135	1	26
Tetrachloroethene	1.4		5.00	6.31		ug/L		99	65 - 135	3	20
Toluene	ND		5.00	5.51		ug/L		110	65 - 135	1	20
trans-1,2-Dichloroethene	ND		5.00	5.46		ug/L		109	65 - 135	1	24
Trichloroethene	ND		5.00	5.29		ug/L		106	65 - 135	0	20
Vinyl chloride	ND		5.00	5.07		ug/L		101	40 - 137	2	24
Xylenes, Total	ND		10.0	10.4		ug/L		104	65 - 135	2	20

Surrogate	*MSD %Recovery*	*MSD Qualifier*	*Limits*
1,2-Dichloroethane-d4 (Surr)	*106*		*70 - 127*
4-Bromofluorobenzene (Surr)	*105*		*78 - 120*
Dibromofluoromethane (Surr)	*100*		*77 - 120*
Toluene-d8 (Surr)	*102*		*80 - 125*

Method: RSK-175 - Dissolved Gases (GC)

Lab Sample ID: MB 280-330971/7 — **Client Sample ID: Method Blank**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 330971

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Methane	ND		5.0	0.22	ug/L			06/22/16 18:48	1
Ethene	ND		5.0	0.40	ug/L			06/22/16 18:48	1
Ethane	ND		5.0	0.57	ug/L			06/22/16 18:48	1

Lab Sample ID: LCS 280-330971/5 — **Client Sample ID: Lab Control Sample**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 330971

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Methane	146	163		ug/L		112	75 - 125
Ethene	255	277		ug/L		109	75 - 125
Ethane	274	308		ug/L		112	75 - 125

Lab Sample ID: LCSD 280-330971/6 — **Client Sample ID: Lab Control Sample Dup**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 330971

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Methane	146	166		ug/L		113	75 - 125	1	20
Ethene	255	279		ug/L		109	75 - 125	1	20
Ethane	274	314		ug/L		115	75 - 125	2	20

Lab Sample ID: 280-84495-H-3 DU — **Client Sample ID: Duplicate**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 330971

Analyte	Sample Result	Sample Qualifier	DU Result	DU Qualifier	Unit	D	RPD	RPD Limit
Methane	260		250		ug/L		2	20
Ethene	94		92.4		ug/L		2	20
Ethane	ND		ND		ug/L		NC	20

Lab Sample ID: MB 280-331097/7 — **Client Sample ID: Method Blank**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 331097

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Methane	ND		5.0	0.22	ug/L			06/23/16 16:20	1
Ethene	ND		5.0	0.40	ug/L			06/23/16 16:20	1
Ethane	ND		5.0	0.57	ug/L			06/23/16 16:20	1

Lab Sample ID: LCS 280-331097/5 — **Client Sample ID: Lab Control Sample**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 331097

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Methane	146	171		ug/L		117	75 - 125
Ethene	255	285		ug/L		112	75 - 125
Ethane	274	323		ug/L		118	75 - 125

Method: RSK-175 - Dissolved Gases (GC) (Continued)

Lab Sample ID: LCSD 280-331097/6 — **Client Sample ID: Lab Control Sample Dup**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 331097

Analyte			Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Methane			146	178		ug/L		122	75 - 125	5	20
Ethene			255	294		ug/L		115	75 - 125	3	20
Ethane			274	338		ug/L		123	75 - 125	4	20

Lab Sample ID: 280-84538-16 MS — **Client Sample ID: ADDV-021**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 331097

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits		
Methane	390		438	889		ug/L		114	52 - 145		
Ethene	37		766	857		ug/L		107	75 - 131		
Ethane	23		821	973		ug/L		116	75 - 125		

Lab Sample ID: 280-84538-16 MSD — **Client Sample ID: ADDV-021**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 331097

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Methane	390		438	915		ug/L		120	52 - 145	3	20
Ethene	37		766	860		ug/L		107	75 - 131	0	20
Ethane	23		821	984		ug/L		117	75 - 125	1	20

Lab Sample ID: 280-84489-L-1 DU — **Client Sample ID: Duplicate**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 331097

Analyte	Sample Result	Sample Qualifier		DU Result	DU Qualifier	Unit	D			RPD	RPD Limit
Methane	120			115		ug/L				0.4	20
Ethene	18			18.3		ug/L				0	20
Ethane	ND			ND		ug/L				NC	20

Method: 300.0 - Anions, Ion Chromatography

Lab Sample ID: MB 280-330046/6 — **Client Sample ID: Method Blank**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 330046

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Nitrate as N	ND		0.50	0.042	mg/L			06/16/16 10:56	1

Lab Sample ID: LCS 280-330046/4 — **Client Sample ID: Lab Control Sample**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 330046

Analyte			Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits		
Nitrate as N			5.00	5.05		mg/L		101	90 - 110		

Method: 300.0 - Anions, Ion Chromatography (Continued)

Lab Sample ID: LCSD 280-330046/5 — **Client Sample ID: Lab Control Sample Dup**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 330046

Analyte			Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Nitrate as N			5.00	5.04		mg/L		101	90 - 110	0	10

Lab Sample ID: MRL 280-330046/3 — **Client Sample ID: Lab Control Sample**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 330046

Analyte			Spike Added	MRL Result	MRL Qualifier	Unit	D	%Rec	%Rec. Limits		
Nitrate as N			0.200	0.212	J	mg/L		106	50 - 150		

Lab Sample ID: 280-84538-16 MS — **Client Sample ID: ADDV-021**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 330046

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits		
Nitrate as N	ND		5.00	5.10		mg/L		102	80 - 120		

Lab Sample ID: 280-84538-16 MSD — **Client Sample ID: ADDV-021**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 330046

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Nitrate as N	ND		5.00	5.26		mg/L		105	80 - 120	3	20

Lab Sample ID: 280-84538-16 DU — **Client Sample ID: ADDV-021**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 330046

Analyte	Sample Result	Sample Qualifier		DU Result	DU Qualifier	Unit	D			RPD	RPD Limit
Nitrate as N	ND			ND		mg/L				NC	15

Lab Sample ID: MB 280-330047/6 — **Client Sample ID: Method Blank**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 330047

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	ND		3.0	0.25	mg/L			06/16/16 10:56	1
Sulfate	ND		5.0	0.23	mg/L			06/16/16 10:56	1

Lab Sample ID: LCS 280-330047/4 — **Client Sample ID: Lab Control Sample**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 330047

Analyte			Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits		
Chloride			100	101		mg/L		101	90 - 110		
Sulfate			100	101		mg/L		101	90 - 110		

Method: 300.0 - Anions, Ion Chromatography (Continued)

Lab Sample ID: LCSD 280-330047/5 — **Client Sample ID: Lab Control Sample Dup**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 330047

Analyte			Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Chloride			100	101		mg/L		101	90 - 110	0	10
Sulfate			100	101		mg/L		101	90 - 110	0	10

Lab Sample ID: MRL 280-330047/3 — **Client Sample ID: Lab Control Sample**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 330047

Analyte			Spike Added	MRL Result	MRL Qualifier	Unit	D	%Rec	%Rec. Limits		
Chloride			2.50	2.52	J	mg/L		101	50 - 150		
Sulfate			2.50	2.55	J	mg/L		102	50 - 150		

Lab Sample ID: 280-84538-16 MS — **Client Sample ID: ADDV-021**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 330047

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits		
Chloride	150		25.0	176	4	mg/L		97	80 - 120		
Sulfate	110		25.0	134	4	mg/L		106	80 - 120		

Lab Sample ID: 280-84538-16 MSD — **Client Sample ID: ADDV-021**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 330047

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Chloride	150		25.0	176	4	mg/L		98	80 - 120	0	20
Sulfate	110		25.0	135	4	mg/L		108	80 - 120	1	20

Lab Sample ID: 280-84538-16 DU — **Client Sample ID: ADDV-021**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 330047

Analyte	Sample Result	Sample Qualifier		DU Result	DU Qualifier	Unit	D			RPD	RPD Limit
Chloride	150			151		mg/L				0.2	15
Sulfate	110			110		mg/L				2	15

Lab Sample ID: MB 280-331166/13 — **Client Sample ID: Method Blank**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 331166

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	ND		3.0	0.25	mg/L			06/24/16 12:17	1

Lab Sample ID: LCS 280-331166/11 — **Client Sample ID: Lab Control Sample**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 331166

Analyte			Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits		
Chloride			100	94.8		mg/L		95	90 - 110		

Method: 300.0 - Anions, Ion Chromatography (Continued)

Lab Sample ID: LCSD 280-331166/12 — **Client Sample ID: Lab Control Sample Dup**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 331166

Analyte			Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Chloride			100	94.9		mg/L		95	90 - 110	0	10

Lab Sample ID: MRL 280-331166/10 — **Client Sample ID: Lab Control Sample**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 331166

Analyte			Spike Added	MRL Result	MRL Qualifier	Unit	D	%Rec	%Rec. Limits		
Chloride			2.50	2.36	J	mg/L		95	50 - 150		

Lab Sample ID: 280-84538-2 MS — **Client Sample ID: ADDV-004**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 331166

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits		
Chloride	7.8		25.0	29.4		mg/L		86	80 - 120		

Lab Sample ID: 280-84538-2 MSD — **Client Sample ID: ADDV-004**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 331166

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Chloride	7.8		25.0	30.0		mg/L		89	80 - 120	2	20

Lab Sample ID: 280-84538-2 DU — **Client Sample ID: ADDV-004**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 331166

Analyte	Sample Result	Sample Qualifier		DU Result	DU Qualifier	Unit	D			RPD	RPD Limit
Chloride	7.8			7.83		mg/L				0	15

Lab Sample ID: MB 280-331436/6 — **Client Sample ID: Method Blank**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 331436

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	ND		3.0	0.25	mg/L			06/27/16 12:10	1

Lab Sample ID: LCS 280-331436/4 — **Client Sample ID: Lab Control Sample**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 331436

Analyte			Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits		
Chloride			100	101		mg/L		101	90 - 110		

Lab Sample ID: LCSD 280-331436/5 — **Client Sample ID: Lab Control Sample Dup**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 331436

Analyte			Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Chloride			100	101		mg/L		101	90 - 110	0	10

Lab Sample ID: MRL 280-331436/3 — **Client Sample ID: Lab Control Sample**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 331436

Analyte			Spike Added	MRL Result	MRL Qualifier	Unit	D	%Rec	%Rec. Limits		
Chloride			2.50	2.48	J	mg/L		99	50 - 150		

Lab Sample ID: 280-84538-4 MS — **Client Sample ID: ADDV-005**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 331436

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits		
Chloride	4.8		25.0	30.6		mg/L		103	80 - 120		

Lab Sample ID: 280-84538-4 MSD — **Client Sample ID: ADDV-005**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 331436

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Chloride	4.8		25.0	31.6		mg/L		107	80 - 120	3	20

Lab Sample ID: 280-84538-4 DU — **Client Sample ID: ADDV-005**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 331436

Analyte	Sample Result	Sample Qualifier		DU Result	DU Qualifier	Unit	D			RPD	RPD Limit
Chloride	4.8			4.75		mg/L				0.2	15

Method: 9060 - Organic Carbon, Total (TOC)

Lab Sample ID: MB 280-330441/35 — **Client Sample ID: Method Blank**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 330441

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Organic Carbon - Average	ND		1.0	0.16	mg/L			06/17/16 23:43	1

Lab Sample ID: LCS 280-330441/34 — **Client Sample ID: Lab Control Sample**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 330441

Analyte			Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits		
Total Organic Carbon - Average			25.0	24.8		mg/L		99	88 - 112		

Lab Sample ID: 280-84511-B-5 MS — **Client Sample ID: Matrix Spike**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 330441

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits		
Total Organic Carbon - Average	3.3		25.0	27.5		mg/L		96	88 - 112		

Method: 9060 - Organic Carbon, Total (TOC) (Continued)

Lab Sample ID: 280-84511-B-5 MSD — **Client Sample ID: Matrix Spike Duplicate**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 330441

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Total Organic Carbon - Average	3.3		25.0	28.0		mg/L		99	88 - 112	2	15

Lab Sample ID: MB 280-330835/4 — **Client Sample ID: Method Blank**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 330835

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Organic Carbon - Average	ND		1.0	0.16	mg/L			06/21/16 15:42	1

Lab Sample ID: LCS 280-330835/3 — **Client Sample ID: Lab Control Sample**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 330835

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Total Organic Carbon - Average	25.0	25.1		mg/L		100	88 - 112

Lab Sample ID: 680-126561-J-1 MS — **Client Sample ID: Matrix Spike**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 330835

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Total Organic Carbon - Average	6.1		25.0	31.1		mg/L		100	88 - 112

Lab Sample ID: 680-126561-J-1 MSD — **Client Sample ID: Matrix Spike Duplicate**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 330835

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Total Organic Carbon - Average	6.1		25.0	31.2		mg/L		100	88 - 112	0	15

Lab Sample ID: MB 280-331020/4 — **Client Sample ID: Method Blank**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 331020

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Organic Carbon - Average	ND		1.0	0.16	mg/L			06/22/16 15:39	1

Lab Sample ID: LCS 280-331020/3 — **Client Sample ID: Lab Control Sample**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 331020

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Total Organic Carbon - Average	25.0	24.6		mg/L		98	88 - 112

Lab Sample ID: 280-84538-16 MS — **Client Sample ID: ADDV-021**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 331020

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Total Organic Carbon - Average	2.7		25.0	27.1		mg/L		98	88 - 112

Lab Sample ID: 280-84538-16 MSD — **Client Sample ID: ADDV-021**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 331020

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Total Organic Carbon - Average	2.7		25.0	26.7		mg/L		96	88 - 112	1	15

Method: SM 2320B - Alkalinity

Lab Sample ID: MB 280-330290/5 — **Client Sample ID: Method Blank**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 330290

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Alkalinity	2.44	J	5.0	1.1	mg/L			06/17/16 12:13	1

Lab Sample ID: LCS 280-330290/4 — **Client Sample ID: Lab Control Sample**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 330290

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Alkalinity	200	197		mg/L		99	90 - 110

Lab Sample ID: 280-84538-14 DU — **Client Sample ID: ADDV-001**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 330290

Analyte	Sample Result	Sample Qualifier	DU Result	DU Qualifier	Unit	D	RPD	RPD Limit
Alkalinity	240	B	244		mg/L		0.5	10

Lab Sample ID: MB 280-330927/31 — **Client Sample ID: Method Blank**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 330927

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Alkalinity	1.78	J	5.0	1.1	mg/L			06/21/16 13:47	1

Lab Sample ID: MB 280-330927/5 — **Client Sample ID: Method Blank**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 330927

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Alkalinity	2.75	J	5.0	1.1	mg/L			06/21/16 11:14	1

Lab Sample ID: LCS 280-330927/30 — **Client Sample ID: Lab Control Sample**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 330927

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Alkalinity	200	195		mg/L		97	90 - 110

Method: SM 2320B - Alkalinity (Continued)

Lab Sample ID: LCS 280-330927/4 — **Client Sample ID: Lab Control Sample**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 330927

Analyte			Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits		
Alkalinity			200	199		mg/L		99	90 - 110		

Lab Sample ID: 280-84629-A-11 DU — **Client Sample ID: Duplicate**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 330927

Analyte	Sample Result	Sample Qualifier		DU Result	DU Qualifier	Unit	D			RPD	RPD Limit
Alkalinity	ND			ND		mg/L				NC	10

Method: SM 4500 S2 F - Sulfide, Total

Lab Sample ID: MB 280-330284/2 — **Client Sample ID: Method Blank**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 330284

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Sulfide	ND		1.0	0.50	mg/L			06/17/16 15:49	1

Lab Sample ID: MB 280-330284/24 — **Client Sample ID: Method Blank**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 330284

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Sulfide	ND		1.0	0.50	mg/L			06/17/16 15:49	1

Lab Sample ID: LCS 280-330284/1 — **Client Sample ID: Lab Control Sample**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 330284

Analyte			Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits		
Sulfide			26.5	27.0		mg/L		102	90 - 110		

Lab Sample ID: LCS 280-330284/23 — **Client Sample ID: Lab Control Sample**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 330284

Analyte			Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits		
Sulfide			26.5	26.4		mg/L		100	90 - 110		

Lab Sample ID: 280-84538-16 MS — **Client Sample ID: ADDV-021**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 330284

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits		
Sulfide	ND		26.5	28.4		mg/L		107	90 - 110		

Method: SM 4500 S2 F - Sulfide, Total (Continued)

Lab Sample ID: 280-84538-16 MSD — **Client Sample ID: ADDV-021**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 330284

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Sulfide	ND		26.5	27.8		mg/L		105	90 - 110	2	10

Method: SM3500_FE_D - Ferrous Iron

Lab Sample ID: MB 280-330165/4 — **Client Sample ID: Method Blank**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 330165

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Ferrous Iron	ND		0.20	0.021	mg/L			06/16/16 20:23	1

Lab Sample ID: LCS 280-330165/3 — **Client Sample ID: Lab Control Sample**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 330165

Analyte			Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits		
Ferrous Iron			2.00	2.10		mg/L		105	85 - 113		

Lab Sample ID: 280-84538-16 MS — **Client Sample ID: ADDV-021**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 330165

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits		
Ferrous Iron	0.028	J HF	2.00	2.14	HF	mg/L		105	85 - 113		

Lab Sample ID: 280-84538-16 MSD — **Client Sample ID: ADDV-021**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 330165

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Ferrous Iron	0.028	J HF	2.00	2.17	HF	mg/L		107	85 - 113	1	10

Lab Sample ID: 280-84538-16 DU — **Client Sample ID: ADDV-021**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 330165

Analyte	Sample Result	Sample Qualifier		DU Result	DU Qualifier	Unit	D			RPD	RPD Limit
Ferrous Iron	0.028	J HF		0.0285	J	mg/L				0	10

QC Association Summary

Client: CH2M Hill, Inc.
Project/Site: THAN Davenport, IA - June 2016

TestAmerica Job ID: 280-84538-1

GC/MS VOA

Analysis Batch: 331584

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
280-84538-1	ADDV-011	Total/NA	Water	8260B	
280-84538-1 - DL	ADDV-011	Total/NA	Water	8260B	
280-84538-2	ADDV-004	Total/NA	Water	8260B	
280-84538-2 - DL	ADDV-004	Total/NA	Water	8260B	
280-84538-3	ADDV-040	Total/NA	Water	8260B	
280-84538-3 - DL	ADDV-040	Total/NA	Water	8260B	
280-84538-4	ADDV-005	Total/NA	Water	8260B	
280-84538-5	ADDV-002	Total/NA	Water	8260B	
280-84538-6	ADDV-042	Total/NA	Water	8260B	
280-84538-6 - DL	ADDV-042	Total/NA	Water	8260B	
280-84538-7	ADDV-041	Total/NA	Water	8260B	
280-84538-7 - DL	ADDV-041	Total/NA	Water	8260B	
280-84538-9	ADDV-007	Total/NA	Water	8260B	
280-84538-9 - DL	ADDV-007	Total/NA	Water	8260B	
280-84538-16	ADDV-021	Total/NA	Water	8260B	
280-84538-16 - DL	ADDV-021	Total/NA	Water	8260B	
280-84538-16 MS	ADDV-021	Total/NA	Water	8260B	
280-84538-16 MSD	ADDV-021	Total/NA	Water	8260B	
LCS 280-331584/4	Lab Control Sample	Total/NA	Water	8260B	
MB 280-331584/6	Method Blank	Total/NA	Water	8260B	

Analysis Batch: 331595

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
280-84538-10	ADDV-022	Total/NA	Water	8260B	
280-84538-11	ADDV-003	Total/NA	Water	8260B	
280-84538-11 - DL	ADDV-003	Total/NA	Water	8260B	
280-84538-13	ADDV-009	Total/NA	Water	8260B	
280-84538-14	ADDV-001	Total/NA	Water	8260B	
280-84538-15	ADDV-020	Total/NA	Water	8260B	
280-84538-17	ADDV-019	Total/NA	Water	8260B	
280-84538-18	ADDV-018	Total/NA	Water	8260B	
280-84538-19 - DL	ADDV-031	Total/NA	Water	8260B	
280-84557-H-1 MS	Matrix Spike	Total/NA	Water	8260B	
280-84557-H-1 MSD	Matrix Spike Duplicate	Total/NA	Water	8260B	
LCS 280-331595/4	Lab Control Sample	Total/NA	Water	8260B	
MB 280-331595/6	Method Blank	Total/NA	Water	8260B	

Analysis Batch: 331791

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
280-84538-10 - DL	ADDV-022	Total/NA	Water	8260B	
280-84538-15 - DL	ADDV-020	Total/NA	Water	8260B	
280-84538-17 - DL	ADDV-019	Total/NA	Water	8260B	
280-84538-19	ADDV-031	Total/NA	Water	8260B	
280-84538-20	ADDV-048	Total/NA	Water	8260B	
280-84934-B-1 MS	Matrix Spike	Total/NA	Water	8260B	
280-84934-B-1 MSD	Matrix Spike Duplicate	Total/NA	Water	8260B	
LCS 280-331791/4	Lab Control Sample	Total/NA	Water	8260B	
MB 280-331791/6	Method Blank	Total/NA	Water	8260B	

QC Association Summary

Client: CH2M Hill, Inc.
Project/Site: THAN Davenport, IA - June 2016

TestAmerica Job ID: 280-84538-1

GC VOA

Analysis Batch: 330971

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
280-84495-H-3 DU	Duplicate	Total/NA	Water	RSK-175	
280-84538-13	ADDV-009	Total/NA	Water	RSK-175	
280-84538-14	ADDV-001	Total/NA	Water	RSK-175	
280-84538-15	ADDV-020	Total/NA	Water	RSK-175	
280-84538-17	ADDV-019	Total/NA	Water	RSK-175	
280-84538-18	ADDV-018	Total/NA	Water	RSK-175	
280-84538-19	ADDV-031	Total/NA	Water	RSK-175	
LCS 280-330971/5	Lab Control Sample	Total/NA	Water	RSK-175	
LCSD 280-330971/6	Lab Control Sample Dup	Total/NA	Water	RSK-175	
MB 280-330971/7	Method Blank	Total/NA	Water	RSK-175	

Analysis Batch: 331097

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
280-84489-L-1 DU	Duplicate	Total/NA	Water	RSK-175	
280-84538-16	ADDV-021	Total/NA	Water	RSK-175	
280-84538-16 MS	ADDV-021	Total/NA	Water	RSK-175	
280-84538-16 MSD	ADDV-021	Total/NA	Water	RSK-175	
LCS 280-331097/5	Lab Control Sample	Total/NA	Water	RSK-175	
LCSD 280-331097/6	Lab Control Sample Dup	Total/NA	Water	RSK-175	
MB 280-331097/7	Method Blank	Total/NA	Water	RSK-175	

General Chemistry

Analysis Batch: 330046

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
280-84538-13	ADDV-009	Total/NA	Water	300.0	
280-84538-14	ADDV-001	Total/NA	Water	300.0	
280-84538-15	ADDV-020	Total/NA	Water	300.0	
280-84538-16	ADDV-021	Total/NA	Water	300.0	
280-84538-16 DU	ADDV-021	Total/NA	Water	300.0	
280-84538-16 MS	ADDV-021	Total/NA	Water	300.0	
280-84538-16 MSD	ADDV-021	Total/NA	Water	300.0	
280-84538-17	ADDV-019	Total/NA	Water	300.0	
280-84538-18	ADDV-018	Total/NA	Water	300.0	
280-84538-19	ADDV-031	Total/NA	Water	300.0	
LCS 280-330046/4	Lab Control Sample	Total/NA	Water	300.0	
LCSD 280-330046/5	Lab Control Sample Dup	Total/NA	Water	300.0	
MB 280-330046/6	Method Blank	Total/NA	Water	300.0	
MRL 280-330046/3	Lab Control Sample	Total/NA	Water	300.0	

Analysis Batch: 330047

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
280-84538-13	ADDV-009	Total/NA	Water	300.0	
280-84538-14	ADDV-001	Total/NA	Water	300.0	
280-84538-15	ADDV-020	Total/NA	Water	300.0	
280-84538-15	ADDV-020	Total/NA	Water	300.0	
280-84538-16	ADDV-021	Total/NA	Water	300.0	
280-84538-16 DU	ADDV-021	Total/NA	Water	300.0	
280-84538-16 MS	ADDV-021	Total/NA	Water	300.0	
280-84538-16 MSD	ADDV-021	Total/NA	Water	300.0	

General Chemistry (Continued)

Analysis Batch: 330047 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
280-84538-17	ADDV-019	Total/NA	Water	300.0	
280-84538-17	ADDV-019	Total/NA	Water	300.0	
280-84538-18	ADDV-018	Total/NA	Water	300.0	
280-84538-19	ADDV-031	Total/NA	Water	300.0	
280-84538-19	ADDV-031	Total/NA	Water	300.0	
LCS 280-330047/4	Lab Control Sample	Total/NA	Water	300.0	
LCSD 280-330047/5	Lab Control Sample Dup	Total/NA	Water	300.0	
MB 280-330047/6	Method Blank	Total/NA	Water	300.0	
MRL 280-330047/3	Lab Control Sample	Total/NA	Water	300.0	

Analysis Batch: 330165

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
280-84538-13	ADDV-009	Total/NA	Water	SM3500_FE_D	
280-84538-14	ADDV-001	Total/NA	Water	SM3500_FE_D	
280-84538-15	ADDV-020	Total/NA	Water	SM3500_FE_D	
280-84538-16	ADDV-021	Total/NA	Water	SM3500_FE_D	
280-84538-16 DU	ADDV-021	Total/NA	Water	SM3500_FE_D	
280-84538-16 MS	ADDV-021	Total/NA	Water	SM3500_FE_D	
280-84538-16 MSD	ADDV-021	Total/NA	Water	SM3500_FE_D	
280-84538-17	ADDV-019	Total/NA	Water	SM3500_FE_D	
280-84538-18	ADDV-018	Total/NA	Water	SM3500_FE_D	
280-84538-19	ADDV-031	Total/NA	Water	SM3500_FE_D	
LCS 280-330165/3	Lab Control Sample	Total/NA	Water	SM3500_FE_D	
MB 280-330165/4	Method Blank	Total/NA	Water	SM3500_FE_D	

Analysis Batch: 330284

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
280-84538-13	ADDV-009	Total/NA	Water	SM 4500 S2 F	
280-84538-14	ADDV-001	Total/NA	Water	SM 4500 S2 F	
280-84538-15	ADDV-020	Total/NA	Water	SM 4500 S2 F	
280-84538-16	ADDV-021	Total/NA	Water	SM 4500 S2 F	
280-84538-16 MS	ADDV-021	Total/NA	Water	SM 4500 S2 F	
280-84538-16 MSD	ADDV-021	Total/NA	Water	SM 4500 S2 F	
280-84538-17	ADDV-019	Total/NA	Water	SM 4500 S2 F	
280-84538-18	ADDV-018	Total/NA	Water	SM 4500 S2 F	
280-84538-19	ADDV-031	Total/NA	Water	SM 4500 S2 F	
LCS 280-330284/1	Lab Control Sample	Total/NA	Water	SM 4500 S2 F	
LCS 280-330284/23	Lab Control Sample	Total/NA	Water	SM 4500 S2 F	
MB 280-330284/2	Method Blank	Total/NA	Water	SM 4500 S2 F	
MB 280-330284/24	Method Blank	Total/NA	Water	SM 4500 S2 F	

Analysis Batch: 330290

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
280-84538-14	ADDV-001	Total/NA	Water	SM 2320B	
280-84538-14 DU	ADDV-001	Total/NA	Water	SM 2320B	
280-84538-15	ADDV-020	Total/NA	Water	SM 2320B	
280-84538-16	ADDV-021	Total/NA	Water	SM 2320B	
280-84538-17	ADDV-019	Total/NA	Water	SM 2320B	
280-84538-18	ADDV-018	Total/NA	Water	SM 2320B	
280-84538-19	ADDV-031	Total/NA	Water	SM 2320B	
LCS 280-330290/4	Lab Control Sample	Total/NA	Water	SM 2320B	

General Chemistry (Continued)

Analysis Batch: 330290 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
MB 280-330290/5	Method Blank	Total/NA	Water	SM 2320B	

Analysis Batch: 330441

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
280-84511-B-5 MS	Matrix Spike	Total/NA	Water	9060	
280-84511-B-5 MSD	Matrix Spike Duplicate	Total/NA	Water	9060	
280-84538-1	ADDV-011	Total/NA	Water	9060	
280-84538-2	ADDV-004	Total/NA	Water	9060	
280-84538-3	ADDV-040	Total/NA	Water	9060	
280-84538-4	ADDV-005	Total/NA	Water	9060	
LCS 280-330441/34	Lab Control Sample	Total/NA	Water	9060	
MB 280-330441/35	Method Blank	Total/NA	Water	9060	

Analysis Batch: 330835

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
280-84538-5	ADDV-002	Total/NA	Water	9060	
280-84538-6	ADDV-042	Total/NA	Water	9060	
280-84538-7	ADDV-041	Total/NA	Water	9060	
280-84538-9	ADDV-007	Total/NA	Water	9060	
680-126561-J-1 MS	Matrix Spike	Total/NA	Water	9060	
680-126561-J-1 MSD	Matrix Spike Duplicate	Total/NA	Water	9060	
LCS 280-330835/3	Lab Control Sample	Total/NA	Water	9060	
MB 280-330835/4	Method Blank	Total/NA	Water	9060	

Analysis Batch: 330927

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
280-84538-13	ADDV-009	Total/NA	Water	SM 2320B	
280-84629-A-11 DU	Duplicate	Total/NA	Water	SM 2320B	
LCS 280-330927/30	Lab Control Sample	Total/NA	Water	SM 2320B	
LCS 280-330927/4	Lab Control Sample	Total/NA	Water	SM 2320B	
MB 280-330927/31	Method Blank	Total/NA	Water	SM 2320B	
MB 280-330927/5	Method Blank	Total/NA	Water	SM 2320B	

Analysis Batch: 331020

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
280-84538-10	ADDV-022	Total/NA	Water	9060	
280-84538-11	ADDV-003	Total/NA	Water	9060	
280-84538-13	ADDV-009	Total/NA	Water	9060	
280-84538-14	ADDV-001	Total/NA	Water	9060	
280-84538-15	ADDV-020	Total/NA	Water	9060	
280-84538-16	ADDV-021	Total/NA	Water	9060	
280-84538-16 MS	ADDV-021	Total/NA	Water	9060	
280-84538-16 MSD	ADDV-021	Total/NA	Water	9060	
280-84538-17	ADDV-019	Total/NA	Water	9060	
280-84538-18	ADDV-018	Total/NA	Water	9060	
280-84538-19	ADDV-031	Total/NA	Water	9060	
LCS 280-331020/3	Lab Control Sample	Total/NA	Water	9060	
MB 280-331020/4	Method Blank	Total/NA	Water	9060	

General Chemistry (Continued)

Analysis Batch: 331166

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
280-84538-1	ADDV-011	Total/NA	Water	300.0	
280-84538-2	ADDV-004	Total/NA	Water	300.0	
280-84538-2 DU	ADDV-004	Total/NA	Water	300.0	
280-84538-2 MS	ADDV-004	Total/NA	Water	300.0	
280-84538-2 MSD	ADDV-004	Total/NA	Water	300.0	
280-84538-3	ADDV-040	Total/NA	Water	300.0	
280-84538-6	ADDV-042	Total/NA	Water	300.0	
280-84538-7	ADDV-041	Total/NA	Water	300.0	
280-84538-8	ADDV-013	Total/NA	Water	300.0	
280-84538-9	ADDV-007	Total/NA	Water	300.0	
280-84538-10	ADDV-022	Total/NA	Water	300.0	
280-84538-11	ADDV-003	Total/NA	Water	300.0	
LCS 280-331166/11	Lab Control Sample	Total/NA	Water	300.0	
LCSD 280-331166/12	Lab Control Sample Dup	Total/NA	Water	300.0	
MB 280-331166/13	Method Blank	Total/NA	Water	300.0	
MRL 280-331166/10	Lab Control Sample	Total/NA	Water	300.0	

Analysis Batch: 331436

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
280-84538-4	ADDV-005	Total/NA	Water	300.0	
280-84538-4 DU	ADDV-005	Total/NA	Water	300.0	
280-84538-4 MS	ADDV-005	Total/NA	Water	300.0	
280-84538-4 MSD	ADDV-005	Total/NA	Water	300.0	
280-84538-5	ADDV-002	Total/NA	Water	300.0	
280-84538-12	ADDV-012	Total/NA	Water	300.0	
LCS 280-331436/4	Lab Control Sample	Total/NA	Water	300.0	
LCSD 280-331436/5	Lab Control Sample Dup	Total/NA	Water	300.0	
MB 280-331436/6	Method Blank	Total/NA	Water	300.0	
MRL 280-331436/3	Lab Control Sample	Total/NA	Water	300.0	

Lab Chronicle

Client: CH2M Hill, Inc.
Project/Site: THAN Davenport, IA - June 2016

TestAmerica Job ID: 280-84538-1

Client Sample ID: ADDV-011
Date Collected: 06/15/16 11:45
Date Received: 06/16/16 09:50

Lab Sample ID: 280-84538-1
Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260B		200	20 mL	20 mL	331584	06/28/16 12:21	MRM	TAL DEN
Total/NA	Analysis	8260B	DL	2000	20 mL	20 mL	331584	06/28/16 12:44	MRM	TAL DEN
Total/NA	Analysis	300.0		1	5 mL	5 mL	331166	06/24/16 18:05	AFB	TAL DEN
Total/NA	Analysis	9060		1			330441	06/18/16 06:13	CCJ	TAL DEN

Client Sample ID: ADDV-004
Date Collected: 06/15/16 12:20
Date Received: 06/16/16 09:50

Lab Sample ID: 280-84538-2
Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260B		1	20 mL	20 mL	331584	06/28/16 13:08	MRM	TAL DEN
Total/NA	Analysis	8260B	DL	4	20 mL	20 mL	331584	06/28/16 13:31	MRM	TAL DEN
Total/NA	Analysis	300.0		1	5 mL	5 mL	331166	06/24/16 18:25	AFB	TAL DEN
Total/NA	Analysis	9060		1			330441	06/18/16 06:28	CCJ	TAL DEN

Client Sample ID: ADDV-040
Date Collected: 06/15/16 12:25
Date Received: 06/16/16 09:50

Lab Sample ID: 280-84538-3
Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260B		20	20 mL	20 mL	331584	06/28/16 13:55	MRM	TAL DEN
Total/NA	Analysis	8260B	DL	200	20 mL	20 mL	331584	06/28/16 14:18	MRM	TAL DEN
Total/NA	Analysis	300.0		1	5 mL	5 mL	331166	06/24/16 19:45	AFB	TAL DEN
Total/NA	Analysis	9060		1			330441	06/18/16 07:12	CCJ	TAL DEN

Client Sample ID: ADDV-005
Date Collected: 06/15/16 12:45
Date Received: 06/16/16 09:50

Lab Sample ID: 280-84538-4
Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260B		1	20 mL	20 mL	331584	06/28/16 14:42	MRM	TAL DEN
Total/NA	Analysis	300.0		1	5 mL	5 mL	331436	06/27/16 18:46	AFB	TAL DEN
Total/NA	Analysis	9060		1			330441	06/18/16 07:27	CCJ	TAL DEN

Client Sample ID: ADDV-002
Date Collected: 06/15/16 15:00
Date Received: 06/16/16 09:50

Lab Sample ID: 280-84538-5
Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260B		1	20 mL	20 mL	331584	06/28/16 15:05	MRM	TAL DEN
Total/NA	Analysis	300.0		1	5 mL	5 mL	331436	06/27/16 19:57	AFB	TAL DEN

Lab Chronicle

Client: CH2M Hill, Inc.
Project/Site: THAN Davenport, IA - June 2016

TestAmerica Job ID: 280-84538-1

Client Sample ID: ADDV-002
Date Collected: 06/15/16 15:00
Date Received: 06/16/16 09:50

Lab Sample ID: 280-84538-5
Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	9060		1			330835	06/21/16 16:11	CCJ	TAL DEN

Client Sample ID: ADDV-042
Date Collected: 06/15/16 13:10
Date Received: 06/16/16 09:50

Lab Sample ID: 280-84538-6
Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260B		1000	20 mL	20 mL	331584	06/28/16 15:29	MRM	TAL DEN
Total/NA	Analysis	8260B	DL	10000	20 mL	20 mL	331584	06/28/16 15:52	MRM	TAL DEN
Total/NA	Analysis	300.0		1	5 mL	5 mL	331166	06/24/16 21:24	AFB	TAL DEN
Total/NA	Analysis	9060		1			330835	06/21/16 16:25	CCJ	TAL DEN

Client Sample ID: ADDV-041
Date Collected: 06/15/16 12:55
Date Received: 06/16/16 09:50

Lab Sample ID: 280-84538-7
Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260B		1000	20 mL	20 mL	331584	06/28/16 16:16	MRM	TAL DEN
Total/NA	Analysis	8260B	DL	10000	20 mL	20 mL	331584	06/28/16 16:40	MRM	TAL DEN
Total/NA	Analysis	300.0		1	5 mL	5 mL	331166	06/24/16 22:04	AFB	TAL DEN
Total/NA	Analysis	9060		1			330835	06/21/16 16:40	CCJ	TAL DEN

Client Sample ID: ADDV-013
Date Collected: 06/15/16 16:05
Date Received: 06/16/16 09:50

Lab Sample ID: 280-84538-8
Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	300.0		10	5 mL	5 mL	331166	06/24/16 23:04	AFB	TAL DEN

Client Sample ID: ADDV-007
Date Collected: 06/15/16 16:15
Date Received: 06/16/16 09:50

Lab Sample ID: 280-84538-9
Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260B		20	20 mL	20 mL	331584	06/28/16 17:03	MRM	TAL DEN
Total/NA	Analysis	8260B	DL	200	20 mL	20 mL	331584	06/28/16 17:27	MRM	TAL DEN
Total/NA	Analysis	300.0		1	5 mL	5 mL	331166	06/24/16 23:24	AFB	TAL DEN
Total/NA	Analysis	9060		1			330835	06/21/16 16:54	CCJ	TAL DEN

Lab Chronicle

Client: CH2M Hill, Inc.
Project/Site: THAN Davenport, IA - June 2016

TestAmerica Job ID: 280-84538-1

Client Sample ID: ADDV-022
Date Collected: 06/15/16 15:05
Date Received: 06/16/16 09:50

Lab Sample ID: 280-84538-10
Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260B		100	20 mL	20 mL	331595	06/28/16 14:19	DPI	TAL DEN
Total/NA	Analysis	8260B	DL	4000	20 mL	20 mL	331791	06/29/16 10:58	DPI	TAL DEN
Total/NA	Analysis	300.0		10	5 mL	5 mL	331166	06/25/16 00:03	AFB	TAL DEN
Total/NA	Analysis	9060		1			331020	06/22/16 16:08	CCJ	TAL DEN

Client Sample ID: ADDV-003
Date Collected: 06/15/16 16:45
Date Received: 06/16/16 09:50

Lab Sample ID: 280-84538-11
Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260B		10	20 mL	20 mL	331595	06/28/16 15:04	DPI	TAL DEN
Total/NA	Analysis	8260B	DL	100	20 mL	20 mL	331595	06/28/16 15:26	DPI	TAL DEN
Total/NA	Analysis	300.0		1	5 mL	5 mL	331166	06/25/16 00:23	AFB	TAL DEN
Total/NA	Analysis	9060		1			331020	06/22/16 16:25	CCJ	TAL DEN

Client Sample ID: ADDV-012
Date Collected: 06/15/16 16:50
Date Received: 06/16/16 09:50

Lab Sample ID: 280-84538-12
Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	300.0		50	5 mL	5 mL	331436	06/27/16 20:15	AFB	TAL DEN

Client Sample ID: ADDV-009
Date Collected: 06/15/16 10:00
Date Received: 06/16/16 09:50

Lab Sample ID: 280-84538-13
Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260B		1	20 mL	20 mL	331595	06/28/16 15:49	DPI	TAL DEN
Total/NA	Analysis	RSK-175		1	18 mL	18 mL	330971	06/22/16 19:10	MPS	TAL DEN
Total/NA	Analysis	300.0		1	5 mL	5 mL	330046	06/16/16 18:40	AFB	TAL DEN
Total/NA	Analysis	300.0		1	5 mL	5 mL	330047	06/16/16 18:40	AFB	TAL DEN
Total/NA	Analysis	9060		1			331020	06/22/16 16:44	CCJ	TAL DEN
Total/NA	Analysis	SM 2320B		1	1 mL		330927	06/21/16 12:31	IEU	TAL DEN
Total/NA	Analysis	SM 4500 S2 F		1	200 mL	200 mL	330284	06/17/16 15:49	KAM	TAL DEN
Total/NA	Analysis	SM3500_FE_D		1	10 mL	10 mL	330165	06/16/16 21:18	NAP	TAL DEN

Client Sample ID: ADDV-001 — Lab Sample ID: 280-84538-14

Date Collected: 06/15/16 09:56 — **Matrix: Water**
Date Received: 06/16/16 09:50

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260B		1	20 mL	20 mL	331595	06/28/16 16:11	DPI	TAL DEN
Total/NA	Analysis	RSK-175		1	18 mL	18 mL	330971	06/22/16 19:27	MPS	TAL DEN
Total/NA	Analysis	300.0		1	5 mL	5 mL	330046	06/16/16 18:58	AFB	TAL DEN
Total/NA	Analysis	300.0		1	5 mL	5 mL	330047	06/16/16 18:58	AFB	TAL DEN
Total/NA	Analysis	9060		1			331020	06/22/16 17:01	CCJ	TAL DEN
Total/NA	Analysis	SM 2320B		1	1 mL		330290	06/17/16 12:24	IEU	TAL DEN
Total/NA	Analysis	SM 4500 S2 F		1	200 mL	200 mL	330284	06/17/16 15:49	KAM	TAL DEN
Total/NA	Analysis	SM3500_FE_D		1	10 mL	10 mL	330165	06/16/16 21:18	NAP	TAL DEN

Client Sample ID: ADDV-020 — Lab Sample ID: 280-84538-15

Date Collected: 06/15/16 10:50 — **Matrix: Water**
Date Received: 06/16/16 09:50

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260B		100	20 mL	20 mL	331595	06/28/16 16:33	DPI	TAL DEN
Total/NA	Analysis	8260B	DL	4000	20 mL	20 mL	331791	06/29/16 11:20	DPI	TAL DEN
Total/NA	Analysis	RSK-175		18	18 mL	18 mL	330971	06/22/16 22:51	MPS	TAL DEN
Total/NA	Analysis	300.0		1	5 mL	5 mL	330046	06/16/16 19:16	AFB	TAL DEN
Total/NA	Analysis	300.0		1	5 mL	5 mL	330047	06/16/16 19:16	AFB	TAL DEN
Total/NA	Analysis	300.0		5	5 mL	5 mL	330047	06/16/16 22:16	AFB	TAL DEN
Total/NA	Analysis	9060		1			331020	06/22/16 17:15	CCJ	TAL DEN
Total/NA	Analysis	SM 2320B		1	1 mL		330290	06/17/16 12:36	IEU	TAL DEN
Total/NA	Analysis	SM 4500 S2 F		1	200 mL	200 mL	330284	06/17/16 15:49	KAM	TAL DEN
Total/NA	Analysis	SM3500_FE_D		1	10 mL	10 mL	330165	06/16/16 21:18	NAP	TAL DEN

Client Sample ID: ADDV-021 — Lab Sample ID: 280-84538-16

Date Collected: 06/15/16 09:30 — **Matrix: Water**
Date Received: 06/16/16 09:50

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260B		4	20 mL	20 mL	331584	06/28/16 08:27	MRM	TAL DEN
Total/NA	Analysis	8260B	DL	40	20 mL	20 mL	331584	06/28/16 09:37	MRM	TAL DEN
Total/NA	Analysis	RSK-175		3	18 mL	18 mL	331097	06/23/16 18:14	MPS	TAL DEN
Total/NA	Analysis	300.0		1	5 mL	5 mL	330046	06/16/16 19:34	AFB	TAL DEN
Total/NA	Analysis	300.0		1	5 mL	5 mL	330047	06/16/16 19:34	AFB	TAL DEN
Total/NA	Analysis	9060		1			331020	06/22/16 17:36	CCJ	TAL DEN
Total/NA	Analysis	SM 2320B		1	1 mL		330290	06/17/16 12:43	IEU	TAL DEN
Total/NA	Analysis	SM 4500 S2 F		1	200 mL	200 mL	330284	06/17/16 15:49	KAM	TAL DEN
Total/NA	Analysis	SM3500_FE_D		1	10 mL	10 mL	330165	06/16/16 21:18	NAP	TAL DEN

Client Sample ID: ADDV-019
Date Collected: 06/15/16 10:45
Date Received: 06/16/16 09:50

Lab Sample ID: 280-84538-17
Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260B		100	20 mL	20 mL	331595	06/28/16 17:18	DPI	TAL DEN
Total/NA	Analysis	8260B	DL	4000	20 mL	20 mL	331791	06/29/16 11:42	DPI	TAL DEN
Total/NA	Analysis	RSK-175		18	18 mL	18 mL	330971	06/22/16 23:01	MPS	TAL DEN
Total/NA	Analysis	300.0		1	5 mL	5 mL	330046	06/16/16 21:20	AFB	TAL DEN
Total/NA	Analysis	300.0		1	5 mL	5 mL	330047	06/16/16 21:20	AFB	TAL DEN
Total/NA	Analysis	300.0		5	5 mL	5 mL	330047	06/16/16 22:34	AFB	TAL DEN
Total/NA	Analysis	9060		1			331020	06/22/16 18:20	CCJ	TAL DEN
Total/NA	Analysis	SM 2320B		1	1 mL		330290	06/17/16 12:49	IEU	TAL DEN
Total/NA	Analysis	SM 4500 S2 F		1	200 mL	200 mL	330284	06/17/16 15:49	KAM	TAL DEN
Total/NA	Analysis	SM3500_FE_D		1	10 mL	10 mL	330165	06/16/16 21:18	NAP	TAL DEN

Client Sample ID: ADDV-018
Date Collected: 06/15/16 11:05
Date Received: 06/16/16 09:50

Lab Sample ID: 280-84538-18
Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260B		1	20 mL	20 mL	331595	06/28/16 18:02	DPI	TAL DEN
Total/NA	Analysis	RSK-175		3	18 mL	18 mL	330971	06/22/16 22:41	MPS	TAL DEN
Total/NA	Analysis	300.0		1	5 mL	5 mL	330046	06/16/16 21:38	AFB	TAL DEN
Total/NA	Analysis	300.0		1	5 mL	5 mL	330047	06/16/16 21:38	AFB	TAL DEN
Total/NA	Analysis	9060		1			331020	06/22/16 19:05	CCJ	TAL DEN
Total/NA	Analysis	SM 2320B		1	1 mL		330290	06/17/16 12:56	IEU	TAL DEN
Total/NA	Analysis	SM 4500 S2 F		1	200 mL	200 mL	330284	06/17/16 15:49	KAM	TAL DEN
Total/NA	Analysis	SM3500_FE_D		1	10 mL	10 mL	330165	06/16/16 21:18	NAP	TAL DEN

Client Sample ID: ADDV-031
Date Collected: 06/15/16 09:27
Date Received: 06/16/16 09:50

Lab Sample ID: 280-84538-19
Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260B	DL	100	20 mL	20 mL	331595	06/28/16 18:47	DPI	TAL DEN
Total/NA	Analysis	8260B		20	20 mL	20 mL	331791	06/29/16 12:04	DPI	TAL DEN
Total/NA	Analysis	RSK-175		36	18 mL	18 mL	330971	06/22/16 23:12	MPS	TAL DEN
Total/NA	Analysis	300.0		1	5 mL	5 mL	330046	06/16/16 21:56	AFB	TAL DEN
Total/NA	Analysis	300.0		1	5 mL	5 mL	330047	06/16/16 21:56	AFB	TAL DEN
Total/NA	Analysis	300.0		5	5 mL	5 mL	330047	06/16/16 23:10	AFB	TAL DEN
Total/NA	Analysis	9060		1			331020	06/22/16 19:21	CCJ	TAL DEN
Total/NA	Analysis	SM 2320B		1	1 mL		330290	06/17/16 13:03	IEU	TAL DEN
Total/NA	Analysis	SM 4500 S2 F		1	200 mL	200 mL	330284	06/17/16 15:49	KAM	TAL DEN
Total/NA	Analysis	SM3500_FE_D		5	10 mL	10 mL	330165	06/16/16 21:18	NAP	TAL DEN

Lab Chronicle

Client: CH2M Hill, Inc.
Project/Site: THAN Davenport, IA - June 2016

TestAmerica Job ID: 280-84538-1

Client Sample ID: ADDV-048

Date Collected: 06/15/16 12:00
Date Received: 06/16/16 09:50

Lab Sample ID: 280-84538-20

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260B		1	20 mL	20 mL	331791	06/29/16 12:26	DPI	TAL DEN

Laboratory References:

TAL DEN = TestAmerica Denver, 4955 Yarrow Street, Arvada, CO 80002, TEL (303)736-0100

Certification Summary

Client: CH2M Hill, Inc.
Project/Site: THAN Davenport, IA - June 2016

TestAmerica Job ID: 280-84538-1

Laboratory: TestAmerica Denver

Unless otherwise noted, all analytes for this laboratory were covered under each certification below.

Authority	Program	EPA Region	Certification ID	Expiration Date
Florida	NELAP	4	E87667	06-30-16

The following analytes are included in this report, but are not certified under this certification:

Analysis Method	Prep Method	Matrix	Analyte
9060		Water	Total Organic Carbon - Average

The following analytes are included in this report, but certification is not offered by the governing authority:

Analysis Method	Prep Method	Matrix	Analyte
300.0		Water	Chloride
300.0		Water	Nitrate as N
300.0		Water	Sulfate

Iowa	State Program	7	370	11-30-16

The following analytes are included in this report, but certification is not offered by the governing authority:

Analysis Method	Prep Method	Matrix	Analyte
300.0		Water	Chloride
300.0		Water	Nitrate as N
300.0		Water	Sulfate
8260B		Water	1,1,1-Trichloroethane
8260B		Water	1,1-Dichloroethane
8260B		Water	1,1-Dichloroethene
8260B		Water	1,2-Dichloroethane
8260B		Water	Acetone
8260B		Water	Benzene
8260B		Water	Chloroethane
8260B		Water	cis-1,2-Dichloroethene
8260B		Water	Ethylbenzene
8260B		Water	Methyl ethyl ketone (MEK)
8260B		Water	Methylene Chloride
8260B		Water	m-Xylene & p-Xylene
8260B		Water	o-Xylene
8260B		Water	Styrene
8260B		Water	Tetrachloroethene
8260B		Water	Toluene
8260B		Water	trans-1,2-Dichloroethene
8260B		Water	Trichloroethene
8260B		Water	Vinyl chloride
8260B		Water	Xylenes, Total
9060		Water	Total Organic Carbon - Average
RSK-175		Water	Ethane
RSK-175		Water	Ethene
RSK-175		Water	Methane
SM3500_FE_D		Water	Ferrous Iron

Oregon	NELAP	10	4025	01-09-17

The following analytes are included in this report, but are not certified under this certification:

Analysis Method	Prep Method	Matrix	Analyte
9060		Water	Total Organic Carbon - Average
SM3500_FE_D		Water	Ferrous Iron

The following analytes are included in this report, but certification is not offered by the governing authority:

Analysis Method	Prep Method	Matrix	Analyte

Certification Summary

Client: CH2M Hill, Inc.
Project/Site: THAN Davenport, IA - June 2016

TestAmerica Job ID: 280-84538-1

Laboratory: TestAmerica Denver (Continued)

Unless otherwise noted, all analytes for this laboratory were covered under each certification below.

Authority	Program	EPA Region	Certification ID	Expiration Date
Oregon	NELAP	10	4025	01-09-17

The following analytes are included in this report, but certification is not offered by the governing authority:

Analysis Method	Prep Method	Matrix	Analyte
300.0		Water	Chloride
300.0		Water	Nitrate as N
300.0		Water	Sulfate

TestAmerica Denver
4955 Yarrow Street
Arvada, CO 80002
Phone (303) 736-0100 Fax (303) 431-7171

Chain of

280-84538 Chain of Custody

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Client Information	Sampler: C Reuss	Ide, Jamie N	Carrier Tracking No(s): 809589(0445)	COC No: 280-53595-19251.1
Client Contact: Ms. Shannon Olson	Phone: 414-847-0264	E-Mail: jamie.ide@testamericainc.com		Page: Page 1 of 2
Company: CH2M Hill, Inc.				Job #:
Address: 2020 SW 4th Ave Suite 300	Due Date Requested: Standard			
City: Portland	TAT Requested (days): Standard			
State, Zip: OR, 97201				
Phone: 503-736-4111(Tel) 503-736-2063(Fax)	PO #: 103817102176			
Email: shannon.olson@ch2m.com	WO #: 486615.14.18			
Project Name: THAN Davenport, IA - June 2016	Project #: 28013442			
Site:	SSOW#:			

Analysis Requested

Preservation Codes:
A - HCL, B - NaOH, C - Zn Acetate, D - Nitric Acid, E - NaHSO4, F - MeOH, G - Amchlor, H - Ascorbic Acid, I - Ice, J - DI Water, K - EDTA, L - EDA
M - Hexane, N - None, O - AsNaO2, P - Na2O4S, Q - Na2SO3, R - Na2S2O3, S - H2SO4, T - TSP Dodecahydrate, U - Acetone, V - MCAA, W - ph 4-5, Z - other (specify)
Other:

Sample Identification	Sample Date	Sample Time	Sample Type (C=comp, G=grab)	Matrix (W=water, S=solid, O=waste/oil, BT=Tissue, A=Air)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	8260B - VOCs	9060 - TOC	300.0 - Chloride (only)	SM2320B 0 Alkalinity, 300.0 (Cl, NO3, SO4), 3500_FE_D Ferrous Iron	SM4500_S2_F - Total Sulfide	RSK-175 - Dissolved Gases	Total Number of containers	Special Instructions/Note:
			Preservation Code:				A	S	N	N	C/B	A		
ADDV - 011	6/15/16	1145	G	W	N	N		X	X				2	
ADDV - 004	6/15/16	1220	|	|	N	N		X	X				2	
ADDV - 040	6/15/16	1225	|	|	N	N		X	X				2	
ADDV - 005	6/15/16	1245	|	|	N	N		X	X				2	
ADDV - 002	6/15/16	1500	|	|	N	N		X	X				2	
ADDV - 042	6/15/16	1310	|	|	N	N		X	X				2	
ADDV - 041	6/15/16	1255	|	|	N	N		X	X				2	
ADDV - 013	6/15/16	1605	|	|	N	N			X				1	contains permagrick
ADDV - 007	6/15/16	1615	|	|	N	N		X	X				2	
ADDV - 002	6/15/16	1505	|	|	N	N		X	X				2	
ADDV - 003	6/15/16	1645	↓	↓	N	N		X	X				2	

Possible Hazard Identification
☒ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown ☐ Radiological

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
☐ Return To Client ☒ Disposal By Lab ☐ Archive For _____ Months

Deliverable Requested: I, II, III, IV, Other (specify) See SOW

Special Instructions/QC Requirements:

Empty Kit Relinquished by:	Date:	Time:	Method of Shipment:

Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
	6/15/16 800	CH2M	Reed Pitt	6-16-16 0950	TAD
Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company

Custody Seals Intact: Δ Yes Δ No

Custody Seal No.: 735026 / 735025

Cooler Temperature(s) °C and Other Remarks: 1.1, 3.3, 0.7 IR#5 +0.0 Transferred by RP 6-16-16

TestAmerica Denver
4955 Yarrow Street
Arvada, CO 80002
Phone (303) 736-0100 Fax (303) 431-7171

Chain of Custody Record

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Client Information	Sampler: Reuss	Lab PM: Ide, Jamie N	Carrier Tracking No(s): 8075891044 5	COC No: 280-53595-19251.1
Client Contact: Ms. Shannon Olson	Phone: 414 847 0264	E-Mail: jamie.ide@testamericainc.com		Page: Page 2 of 2
Company: CH2M Hill, Inc.				Job #:
Address: 2020 SW 4th Ave Suite 300	Due Date Requested: std			
City: Portland	TAT Requested (days): std			
State, Zip: OR, 97201				
Phone: 503-736-4111(Tel) 503-736-2063(Fax)	PO #: 103817102176			
Email: shannon.olson@ch2m.com	WO #: 486615.14.18			
Project Name: THAN Davenport, IA - June 2016	Project #: 28013442			
Site:	SSOW#:			

Analysis Requested

Preservation Codes:
A - HCL, B - NaOH, C - Zn Acetate, D - Nitric Acid, E - NaHSO4, F - MeOH, G - Amchlor, H - Ascorbic Acid, I - Ice, J - DI Water, K - EDTA, L - EDA, M - Hexane, N - None, O - AsNaO2, P - Na2O4S, Q - Na2SO3, R - Na2S2O3, S - H2SO4, T - TSP Dodecahydrate, U - Acetone, V - MCAA, W - ph 4-5, Z - other (specify)
Other:

Sample Identification	Sample Date	Sample Time	Sample Type (C=comp, G=grab)	Matrix (W=water, S=solid, O=waste/oil, BT=Tissue, A=Air)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	8260B - VOCs	9060 - TOC	300.0 - Chloride (only)	SM2320B 0 Alkalinity, 300.0 (Cl, NO3, SO4), 3500_FE_D Ferrous Iron	SM4500_S2_F - Total Sulfide	RSK-175 - Dissolved Gases	Total Number of containers	Special Instructions/Note:
			Preservation Code:				A	S	N		C/B	A		
ADPV — 012	6/15/16	1650	G	W					X					per Manganate

Possible Hazard Identification
☒ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown ☐ Radiological

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
☐ Return To Client ☒ Disposal By Lab ☐ Archive For _____ Months

Deliverable Requested: I, II, III, IV, Other (specify) See SOW

Special Instructions/QC Requirements:

Empty Kit Relinquished by:	Date:	Time:	Method of Shipment:

Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
	6/15/16 1800	CH2M	Reed Kohl	6-16-16 0950	TAD
Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company

Custody Seals Intact: Δ Yes Δ No
Custody Seal No.: 735026 / 735025
Cooler Temperature(s) °C and Other Remarks:

TestAmerica Denver
4955 Yarrow Street
Arvada, CO 80002
Phone (303) 736-0100 Fax (303) 431-7171

Chain of Custody Record

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Client Information	Sampler: Sara Manhofer	Lab PM: Ide, Jamie N	Carrier Tracking No(s): 809589104500	COC No: 280-53595-19251.1
Client Contact: Ms. Shannon Olson	Phone: 414 847 0243	E-Mail: jamie.ide@testamericainc.com		Page: Page 1 of 2
Company: CH2M Hill, Inc.				Job #:
Address: 2020 SW 4th Ave Suite 300	Due Date Requested: Standard			
City: Portland	TAT Requested (days): standard			
State, Zip: OR, 97201				
Phone: 503-736-4111(Tel) 503-736-2063(Fax)	PO #: 103817102176			
Email: shannon.olson@ch2m.com	WO #: 486615.14.18			
Project Name: THAN Davenport, IA - June 2016	Project #: 28013442			
Site:	SSOW#:			

Analysis Requested

Preservation Codes:

A - HCL, B - NaOH, C - Zn Acetate, D - Nitric Acid, E - NaHSO4, F - MeOH, G - Amchlor, H - Ascorbic Acid, I - Ice, J - DI Water, K - EDTA, L - EDA, M - Hexane, N - None, O - AsNaO2, P - Na2O4S, Q - Na2SO3, R - Na2S2O3, S - H2SO4, T - TSP Dodecahydrate, U - Acetone, V - MCAA, W - ph 4-5, Z - other (specify)

Other:

Sample Identification	Sample Date	Sample Time	Sample Type (C=comp, G=grab)	Matrix (W=water, S=solid, O=waste/oil, BT=Tissue, A=Air)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	8260B - VOCs	9060 - TOC	300.0 - Chloride (only)	SM2320B 0 Alkalinity, 300.0 (Cl, NO3, SO4), 3500_FE_D Ferrous Iron	SM4500_S2_F - Total Sulfide	RSK-175 - Dissolved Gases	Total Number of containers	Special Instructions/Note:
			Preservation Code:				A	S	N	N	C/B	A		
ADDV-011	~~6/15~~ 6/15/16	1145	G	W	N	N	X						6	
ADDV-004	6/15/16	1220	|	|	N	N	X						6	
ADDV-009	6/15/16	1060	|	|	N	N	X					X	6	
ADDV-001	6/15/16	0956	|	|	N	N	X					X	6	
ADDV-040	6/15/16	1225	|	|	N	N	X						6	
ADDV-005	6/15/16	1245	|	|	N	N	X						6	
ADDV-020	6/15/16	1050	|	|	N	N	X					X	6	
ADDV-021	6/15/16	0930	|	|	N	Y	X					X	8	ms/msD
ADDV-019	6/15/16	1045	|	|	N	N	X					X	6	
ADDV-018	6/15/16	1105	|	|	N	N	X					X	6	
ADDV-031	6/15/16	0927	↓	↓	N	N	X					X	6	

Possible Hazard Identification
☒ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown ☐ Radiological

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
☐ Return To Client ☒ Disposal By Lab ☐ Archive For _____ Months

Deliverable Requested: I, II, III, IV, Other (specify) see SOW

Special Instructions/QC Requirements:

Empty Kit Relinquished by: | Date: | Time: | Method of Shipment:

Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
[signature]	6/15/16 1800	CH2M	[signature]	6-16-16 0950	TAD
Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company

Custody Seals Intact: Δ Yes Δ No | Custody Seal No.: 735027 / 735028 | Cooler Temperature(s) °C and Other Remarks:

TestAmerica Denver
4955 Yarrow Street
Arvada, CO 80002
Phone (303) 736-0100 Fax (303) 431-7171

Chain of Custody Record

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Client Information	Sampler: C. Ross	Lab PM: Ide, Jamie N	Carrier Tracking No(s): 809589104500	COC No: 280-53595-19251.1
Client Contact: Ms. Shannon Olson	Phone: 414-847-0264	E-Mail: jamie.ide@testamericainc.com		Page: Page 2 of 2
Company: CH2M Hill, Inc.				Job #:
Address: 2020 SW 4th Ave Suite 300	Due Date Requested: Standard			
City: Portland	TAT Requested (days): Standard			
State, Zip: OR, 97201				
Phone: 503-736-4111(Tel) 503-736-2063(Fax)	PO #: 103817102176			
Email: shannon.olson@ch2m.com	WO #: 486615.14.18			
Project Name: THAN Davenport, IA - June 2016	Project #: 28013442			
Site:	SSOW#:			

Analysis Requested

Preservation Codes:
A - HCL, B - NaOH, C - Zn Acetate, D - Nitric Acid, E - NaHSO4, F - MeOH, G - Amchlor, H - Ascorbic Acid, I - Ice, J - DI Water, K - EDTA, L - EDA
M - Hexane, N - None, O - AsNaO2, P - Na2O4S, Q - Na2SO3, R - Na2S2O3, S - H2SO4, T - TSP Dodecahydrate, U - Acetone, V - MCAA, W - ph 4-5, Z - other (specify)
Other:

Sample Identification	Sample Date	Sample Time	Sample Type (C=comp, G=grab)	Matrix (W=water, S=solid, O=waste/oil, BT=Tissue, A=Air)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	8260B - VOCs	9060 - TOC	300.0 - Chloride (only)	SM2320B 0 Alkalinity, 300.0 (Cl, NO3, SO4), 3500_FE_D Ferrous Iron	SM4500_S2_F - Total Sulfide	RSK-175 - Dissolved Gases	Total Number of containers	Special Instructions/Note:
			Preservation Code:				A	S	N	N	C/B	A		
ADDV-048	6/15/16	1200	G	W	N	N	X						2	2 bottles
ADDV-002	6/15/16	1300	↓	↓	N	N	X						2	
ADDV-042	6/15/16	1310			N	N	X						2	
ADDV-041	6/15/16	1255			N	N	X						2	
ADDV-022	6/15/16	1505			N	N	X						2	
ADDV-007	6/15/16	1615			N	N	X						2	
ADDV-003	6/15/16	1615	↓	↓	N	N	X						2	

Possible Hazard Identification: [X] Non-Hazard [ ] Flammable [ ] Skin Irritant [ ] Poison B [ ] Unknown [ ] Radiological

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month): [ ] Return To Client [X] Disposal By Lab [ ] Archive For ____ Months

Deliverable Requested: I, II, III, IV, Other (specify) SOW

Special Instructions/QC Requirements:

Empty Kit Relinquished by:	Date:	Time:	Method of Shipment:		
Relinquished by:	Date/Time: 6/15/16 1800	Company: CH2M	Received by:	Date/Time: 6-16-16 0950	Company: TAD
Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company

Custody Seals Intact: Δ Yes Δ No
Custody Seal No.: 735087/735088
Cooler Temperature(s) °C and Other Remarks:

TestAmerica Denver
4955 Yarrow Street
Arvada, CO 80002
Phone (303) 736-0100 Fax (303) 431-7171

Chain of Custody Record

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Client Information	Sampler: Sara Mahofer	Lab PM: Ide, Jamie N	Carrier Tracking No(s): 8095891044 62	COC No: 280-53595-19251.1
Client Contact: Ms. Shannon Olson	Phone: 414 847 6243	E-Mail: jamie.ide@testamericainc.com		Page: Page 1 of 1
Company: CH2M Hill, Inc.				Job #:
Address: 2020 SW 4th Ave Suite 300	Due Date Requested: Standard			
City: Portland	TAT Requested (days): standard			
State, Zip: OR, 97201				
Phone: 503-736-4111(Tel) 503-736-2063(Fax)	PO #: 103817102176			
Email: shannon.olson@ch2m.com	WO #: 486615.14.18			
Project Name: THAN Davenport, IA - June 2016	Project #: 28013442			
Site: Davenport, IA	SSOW#:			

Analysis Requested

Preservation Codes:
A - HCL, B - NaOH, C - Zn Acetate, D - Nitric Acid, E - NaHSO4, F - MeOH, G - Amchlor, H - Ascorbic Acid, I - Ice, J - DI Water, K - EDTA, L - EDA, M - Hexane, N - None, O - AsNaO2, P - Na2O4S, Q - Na2SO3, R - Na2S2O3, S - H2SO4, T - TSP Dodecahydrate, U - Acetone, V - MCAA, W - ph 4-5, Z - other (specify)
Other:

Sample Identification	Sample Date	Sample Time	Sample Type (C=comp, G=grab)	Matrix (W=water, S=solid, O=waste/oil, BT=Tissue, A=Air)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	8260B - VOCs	9060 - TOC	300.0 - Chloride (only)	SM2320B 0 Alkalinity, 300.0 (Cl, NO3, SO4), 3500_FE_D Ferrous Iron	SM4500_S2_F - Total Sulfide	RSK-175 - Dissolved Gases	Total Number of containers	Special Instructions/Note:
			Preservation Code:				A	S	N	N	C/B	A		
ADDV - 009	6/15/16	1000	G	W	N	N		X		X	X		3	
ADDV - 001	6/15/16	0956			N	N		X		X	X		3	
ADDV - 020	6/15/16	1050			N	N		X		X	X		3	
ADDV - 021	6/15/16	0930			N	Y		X		X	X		9	MS/MSD
ADDV - 019	6/15/16	1045			N	N		X		X	X		3	
ADDV - 018	6/15/16	1105			N	N		X		X	X		3	
ADDV - 031	6/15/16	0927			N	N		X		X	X		3	

Possible Hazard Identification
☒ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown ☐ Radiological

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
☐ Return To Client ☒ Disposal By Lab ☐ Archive For _____ Months

Deliverable Requested: I, II, III, IV, Other (specify) see SOW

Special Instructions/QC Requirements:

Empty Kit Relinquished by:	Date:	Time:	Method of Shipment:		
Relinquished by:	Date/Time: 6/15/16 1740	Company	Received by:	Date/Time: 6-16-16 0950	Company TAD
Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company

Custody Seals Intact: Δ Yes Δ No
Custody Seal No.: 735023 / 735024
Cooler Temperature(s) °C and Other Remarks:

Login Sample Receipt Checklist

Client: CH2M Hill, Inc.

Job Number: 280-84538-1

Login Number: 84538
List Number: 1
Creator: Pottruff, Reed W

List Source: TestAmerica Denver

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	N/A	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	False	Refer to Job Narrative for details.
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	False	Refer to Job Narrative for details.
Sample Preservation Verified.	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

ANALYTICAL REPORT

TestAmerica Laboratories, Inc.
TestAmerica Denver
4955 Yarrow Street
Arvada, CO 80002
Tel: (303)736-0100

TestAmerica Job ID: 280-84597-1
Client Project/Site: THAN Davenport, IA - June 2016

For:
CH2M Hill, Inc.
2020 SW 4th Ave
Suite 300
Portland, Oregon 97201

Attn: Ms. Shannon Olson

Authorized for release by:
6/30/2016 6:48:11 PM

Jamie Ide, Project Manager I
(303)736-0126
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LINKS

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Visit us at: www.testamericainc.com

The test results in this report meet all 2003 NELAC and 2009 TNI requirements for accredited parameters, exceptions are noted in this report. This report may not be reproduced except in full, and with written approval from the laboratory. For questions please contact the Project Manager at the e-mail address or telephone number listed on this page.

This report has been electronically signed and authorized by the signatory. Electronic signature is intended to be the legally binding equivalent of a traditionally handwritten signature.

Results relate only to the items tested and the sample(s) as received by the laboratory.

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Qualifiers

GC/MS VOA

Qualifier	Qualifier Description
J	Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.
E	Result exceeded calibration range.
4	MS, MSD: The analyte present in the original sample is greater than 4 times the matrix spike concentration; therefore, control limits are not applicable.

GC VOA

Qualifier	Qualifier Description
J	Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.

General Chemistry

Qualifier	Qualifier Description
HF	Field parameter with a holding time of 15 minutes. Test performed by laboratory at client's request.
J	Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.
F1	MS and/or MSD Recovery is outside acceptance limits.

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
¤	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CNF	Contains no Free Liquid
DER	Duplicate error ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision level concentration
MDA	Minimum detectable activity
EDL	Estimated Detection Limit
MDC	Minimum detectable concentration
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
NC	Not Calculated
ND	Not detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
QC	Quality Control
RER	Relative error ratio
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)

Job ID: 280-84597-1

Laboratory: TestAmerica Denver

Narrative

CASE NARRATIVE
Client: CH2M Hill, Inc.
Project: THAN Davenport, IA - June 2016
Report Number: 280-84597-1

With the exceptions noted as flags or footnotes, standard analytical protocols were followed in the analysis of the samples and no problems were encountered or anomalies observed. In addition all laboratory quality control samples were within established control limits, with any exceptions noted below. Each sample was analyzed to achieve the lowest possible reporting limit within the constraints of the method. In some cases, due to interference or analytes present at high concentrations, samples were diluted. For diluted samples, the reporting limits are adjusted relative to the dilution required.

Calculations are performed before rounding to avoid round-off errors in calculated results.

All holding times were met and proper preservation noted for the methods performed on these samples, unless otherwise detailed in the individual sections below.

RECEIPT
The samples were received on 6/17/2016 10:00 AM; the samples arrived in good condition, properly preserved and, where required, on ice. The temperatures of the 2 coolers at receipt time were 2.8º C and 5.8º C.

VOLATILE ORGANIC COMPOUNDS (GC-MS)
Samples ADDV-038 (280-84597-2)[10X], ADDV-037 (280-84597-4)[5X], ADDV-037 (280-84597-4)[50X], ADDV-036 (280-84597-7)[200X], ADDV-036 (280-84597-7)[2000X], ADDV-035 (280-84597-8)[400X], ADDV-035 (280-84597-8)[4000X], ADDV-014 (280-84597-11)[5X], ADDV-014 (280-84597-11)[50X], ADDV-015 (280-84597-12)[10X] and ADDV-015 (280-84597-12)[100X] required dilution prior to analysis. The reporting limits have been adjusted accordingly.

The MS/MSD performed on sample ADDV-038 (280-84597-2) exhibited spike recoveries outside QC control limits for 1,1,1-Trichloroethane, 1,1-Dichloroethane, cis-1,2-Dichloroethene and Vinyl chloride. The associated LCS was in control and demonstrates that operating procedures were in control. No further action was required.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

DISSOLVED GASES
Analytes Acetylene/Ethane co-elute on one of the columns used for this analysis. As a result, there are no results reported for the %Difference in the concentration on the Form X.

No analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

ALKALINITY
No analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

ANIONS (48 HOURS)
No analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

ANIONS (28 DAYS)
Samples ADDV-043 (280-84597-5)[50X] and ADDV-035 (280-84597-8)[5X] required dilution prior to analysis due to the nature of the sample matrix. It was noted that the sample was dark purple in color. The reporting limits have been adjusted accordingly.

The MS/MSD performed on sample ADDV-038 (280-84597-2) exhibited spike recoveries outside QC control limits for Chloride. The associated LCS/LCSD was in control and demonstrates that operating procedures were in control. No further action was required.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

FERROUS IRON

Job ID: 280-84597-1 (Continued)

Laboratory: TestAmerica Denver (Continued)

No analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

TOTAL ORGANIC CARBON

No analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

SULFIDE

No analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

Detection Summary

Client: CH2M Hill, Inc.
Project/Site: THAN Davenport, IA - June 2016

TestAmerica Job ID: 280-84597-1

Client Sample ID: ADDV-049 — Lab Sample ID: 280-84597-1

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Acetone	2.8	J	10	1.9	ug/L	1		8260B	Total/NA

Client Sample ID: ADDV-038 — Lab Sample ID: 280-84597-2

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
1,1,1-Trichloroethane	35		1.0	0.16	ug/L	1		8260B	Total/NA
1,1-Dichloroethane	180	E	1.0	0.22	ug/L	1		8260B	Total/NA
1,2-Dichloroethane	1.2		1.0	0.13	ug/L	1		8260B	Total/NA
Acetone	7.4	J	10	1.9	ug/L	1		8260B	Total/NA
Benzene	1.1		1.0	0.16	ug/L	1		8260B	Total/NA
Chloroethane	15		2.0	0.41	ug/L	1		8260B	Total/NA
cis-1,2-Dichloroethene	100	E	1.0	0.15	ug/L	1		8260B	Total/NA
Ethylbenzene	8.2		1.0	0.16	ug/L	1		8260B	Total/NA
m-Xylene & p-Xylene	11		2.0	0.34	ug/L	1		8260B	Total/NA
o-Xylene	1.8		1.0	0.19	ug/L	1		8260B	Total/NA
Tetrachloroethene	0.42	J	1.0	0.20	ug/L	1		8260B	Total/NA
Toluene	1.4		1.0	0.17	ug/L	1		8260B	Total/NA
trans-1,2-Dichloroethene	1.1		1.0	0.15	ug/L	1		8260B	Total/NA
Trichloroethene	1.3		1.0	0.16	ug/L	1		8260B	Total/NA
Vinyl chloride	170	E	1.0	0.10	ug/L	1		8260B	Total/NA
Xylenes, Total	13		2.0	0.19	ug/L	1		8260B	Total/NA
1,1-Dichloroethane - DL	220		10	2.2	ug/L	10		8260B	Total/NA
cis-1,2-Dichloroethene - DL	110		10	1.5	ug/L	10		8260B	Total/NA
Vinyl chloride - DL	200		10	1.0	ug/L	10		8260B	Total/NA
Chloride	80	F1	3.0	0.25	mg/L	1		300.0	Total/NA
Total Organic Carbon - Average	14		1.0	0.16	mg/L	1		9060	Total/NA

Client Sample ID: ADDV-039 — Lab Sample ID: 280-84597-3

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
1,1-Dichloroethane	3.2		1.0	0.22	ug/L	1		8260B	Total/NA
1,2-Dichloroethane	1.7		1.0	0.13	ug/L	1		8260B	Total/NA
Acetone	3.8	J	10	1.9	ug/L	1		8260B	Total/NA
Benzene	1.0		1.0	0.16	ug/L	1		8260B	Total/NA
Chloroethane	19		2.0	0.41	ug/L	1		8260B	Total/NA
cis-1,2-Dichloroethene	2.8		1.0	0.15	ug/L	1		8260B	Total/NA
trans-1,2-Dichloroethene	0.15	J	1.0	0.15	ug/L	1		8260B	Total/NA
Vinyl chloride	5.2		1.0	0.10	ug/L	1		8260B	Total/NA
Chloride	37		3.0	0.25	mg/L	1		300.0	Total/NA
Total Organic Carbon - Average	4.2		1.0	0.16	mg/L	1		9060	Total/NA

Client Sample ID: ADDV-037 — Lab Sample ID: 280-84597-4

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
1,1,1-Trichloroethane	1200	E	5.0	0.80	ug/L	5		8260B	Total/NA
1,1-Dichloroethane	120		5.0	1.1	ug/L	5		8260B	Total/NA
1,1-Dichloroethene	77		5.0	1.2	ug/L	5		8260B	Total/NA
cis-1,2-Dichloroethene	540	E	5.0	0.75	ug/L	5		8260B	Total/NA
Methylene Chloride	1.7	J	10	1.6	ug/L	5		8260B	Total/NA
Tetrachloroethene	2.7	J	5.0	1.0	ug/L	5		8260B	Total/NA

This Detection Summary does not include radiochemical test results.

Detection Summary

Client: CH2M Hill, Inc.
Project/Site: THAN Davenport, IA - June 2016

TestAmerica Job ID: 280-84597-1

Client Sample ID: ADDV-037 (Continued) — Lab Sample ID: 280-84597-4

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
trans-1,2-Dichloroethene	2.5	J	5.0	0.75	ug/L	5		8260B	Total/NA
Trichloroethene	2.0	J	5.0	0.80	ug/L	5		8260B	Total/NA
Vinyl chloride	69		5.0	0.50	ug/L	5		8260B	Total/NA
1,1,1-Trichloroethane - DL	1600		50	8.0	ug/L	50		8260B	Total/NA
cis-1,2-Dichloroethene - DL	580		50	7.5	ug/L	50		8260B	Total/NA
Chloride	9.4		3.0	0.25	mg/L	1		300.0	Total/NA
Total Organic Carbon - Average	4.0		1.0	0.16	mg/L	1		9060	Total/NA

Client Sample ID: ADDV-043 — Lab Sample ID: 280-84597-5

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Chloride	95	J	150	13	mg/L	50		300.0	Total/NA

Client Sample ID: ADDV-045 — Lab Sample ID: 280-84597-6

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Acetone	4.7	J	10	1.9	ug/L	1		8260B	Total/NA
Methane	0.27	J	5.0	0.22	ug/L	1		RSK-175	Total/NA
Total Organic Carbon - Average	0.32	J	1.0	0.16	mg/L	1		9060	Total/NA

Client Sample ID: ADDV-036 — Lab Sample ID: 280-84597-7

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
1,1,1-Trichloroethane	3200		200	32	ug/L	200		8260B	Total/NA
1,1-Dichloroethane	1200		200	44	ug/L	200		8260B	Total/NA
1,1-Dichloroethene	310		200	46	ug/L	200		8260B	Total/NA
cis-1,2-Dichloroethene	46000	E	200	30	ug/L	200		8260B	Total/NA
Methylene Chloride	110	J	400	64	ug/L	200		8260B	Total/NA
Tetrachloroethene	710		200	40	ug/L	200		8260B	Total/NA
trans-1,2-Dichloroethene	75	J	200	30	ug/L	200		8260B	Total/NA
Trichloroethene	1100		200	32	ug/L	200		8260B	Total/NA
Vinyl chloride	2000		200	20	ug/L	200		8260B	Total/NA
cis-1,2-Dichloroethene - DL	49000		2000	300	ug/L	2000		8260B	Total/NA
Chloride	180		3.0	0.25	mg/L	1		300.0	Total/NA
Total Organic Carbon - Average	7.4		1.0	0.16	mg/L	1		9060	Total/NA

Client Sample ID: ADDV-035 — Lab Sample ID: 280-84597-8

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
1,1,1-Trichloroethane	6600		400	64	ug/L	400		8260B	Total/NA
1,1-Dichloroethane	1800		400	88	ug/L	400		8260B	Total/NA
1,1-Dichloroethene	740		400	92	ug/L	400		8260B	Total/NA
cis-1,2-Dichloroethene	160000	E	400	60	ug/L	400		8260B	Total/NA
Ethylbenzene	1600		400	64	ug/L	400		8260B	Total/NA
m-Xylene & p-Xylene	10000		800	140	ug/L	400		8260B	Total/NA
o-Xylene	1100		400	76	ug/L	400		8260B	Total/NA
Toluene	4300		400	68	ug/L	400		8260B	Total/NA
trans-1,2-Dichloroethene	150	J	400	60	ug/L	400		8260B	Total/NA
Trichloroethene	110	J	400	64	ug/L	400		8260B	Total/NA
Vinyl chloride	19000		400	40	ug/L	400		8260B	Total/NA

This Detection Summary does not include radiochemical test results.

Detection Summary

Client: CH2M Hill, Inc.
Project/Site: THAN Davenport, IA - June 2016

TestAmerica Job ID: 280-84597-1

Client Sample ID: ADDV-035 (Continued) — Lab Sample ID: 280-84597-8

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Xylenes, Total	11000		800	76	ug/L	400		8260B	Total/NA
cis-1,2-Dichloroethene - DL	210000		4000	600	ug/L	4000		8260B	Total/NA
Chloride	310		15	1.3	mg/L	5		300.0	Total/NA
Total Organic Carbon - Average	28		1.0	0.16	mg/L	1		9060	Total/NA

Client Sample ID: ADDV-044 — Lab Sample ID: 280-84597-9

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Acetone	8.1	J	10	1.9	ug/L	1		8260B	Total/NA
Total Organic Carbon - Average	0.24	J	1.0	0.16	mg/L	1		9060	Total/NA

Client Sample ID: ADDV-050 — Lab Sample ID: 280-84597-10

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Acetone	3.0	J	10	1.9	ug/L	1		8260B	Total/NA

Client Sample ID: ADDV-014 — Lab Sample ID: 280-84597-11

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
1,1,1-Trichloroethane	24		5.0	0.80	ug/L	5		8260B	Total/NA
1,1-Dichloroethane	260		5.0	1.1	ug/L	5		8260B	Total/NA
1,1-Dichloroethene	5.0		5.0	1.2	ug/L	5		8260B	Total/NA
Benzene	22		5.0	0.80	ug/L	5		8260B	Total/NA
Chloroethane	220		10	2.1	ug/L	5		8260B	Total/NA
cis-1,2-Dichloroethene	1300	E	5.0	0.75	ug/L	5		8260B	Total/NA
Ethylbenzene	270		5.0	0.80	ug/L	5		8260B	Total/NA
Methylene Chloride	3.6	J	10	1.6	ug/L	5		8260B	Total/NA
m-Xylene & p-Xylene	270		10	1.7	ug/L	5		8260B	Total/NA
o-Xylene	120		5.0	0.95	ug/L	5		8260B	Total/NA
Toluene	540	E	5.0	0.85	ug/L	5		8260B	Total/NA
trans-1,2-Dichloroethene	7.0		5.0	0.75	ug/L	5		8260B	Total/NA
Vinyl chloride	1200	E	5.0	0.50	ug/L	5		8260B	Total/NA
Xylenes, Total	390		10	0.95	ug/L	5		8260B	Total/NA
cis-1,2-Dichloroethene - DL	1400		50	7.5	ug/L	50		8260B	Total/NA
Toluene - DL	1300		50	8.5	ug/L	50		8260B	Total/NA
Vinyl chloride - DL	1400		50	5.0	ug/L	50		8260B	Total/NA
Chloride	150		3.0	0.25	mg/L	1		300.0	Total/NA
Total Organic Carbon - Average	5.6		1.0	0.16	mg/L	1		9060	Total/NA

Client Sample ID: ADDV-015 — Lab Sample ID: 280-84597-12

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
1,1,1-Trichloroethane	22		10	1.6	ug/L	10		8260B	Total/NA
1,1-Dichloroethane	240		10	2.2	ug/L	10		8260B	Total/NA
1,1-Dichloroethene	5.1	J	10	2.3	ug/L	10		8260B	Total/NA
Benzene	23		10	1.6	ug/L	10		8260B	Total/NA
Chloroethane	270		20	4.1	ug/L	10		8260B	Total/NA
cis-1,2-Dichloroethene	1200	E	10	1.5	ug/L	10		8260B	Total/NA
Ethylbenzene	320		10	1.6	ug/L	10		8260B	Total/NA
Methylene Chloride	5.6	J	20	3.2	ug/L	10		8260B	Total/NA

This Detection Summary does not include radiochemical test results.

Detection Summary

Client: CH2M Hill, Inc.
Project/Site: THAN Davenport, IA - June 2016

TestAmerica Job ID: 280-84597-1

Client Sample ID: ADDV-015 (Continued) — Lab Sample ID: 280-84597-12

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
m-Xylene & p-Xylene	410		20	3.4	ug/L	10		8260B	Total/NA
o-Xylene	170		10	1.9	ug/L	10		8260B	Total/NA
Toluene	1000	E	10	1.7	ug/L	10		8260B	Total/NA
trans-1,2-Dichloroethene	6.5	J	10	1.5	ug/L	10		8260B	Total/NA
Vinyl chloride	1100	E	10	1.0	ug/L	10		8260B	Total/NA
Xylenes, Total	580		20	1.9	ug/L	10		8260B	Total/NA
cis-1,2-Dichloroethene - DL	1300		100	15	ug/L	100		8260B	Total/NA
Toluene - DL	2100		100	17	ug/L	100		8260B	Total/NA
Vinyl chloride - DL	1300		100	10	ug/L	100		8260B	Total/NA
Chloride	150		3.0	0.25	mg/L	1		300.0	Total/NA
Total Organic Carbon - Average	6.1		1.0	0.16	mg/L	1		9060	Total/NA

Client Sample ID: ADDV-023 — Lab Sample ID: 280-84597-13

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Acetone	2.4	J	10	1.9	ug/L	1		8260B	Total/NA
Methane	4.4	J	5.0	0.22	ug/L	1		RSK-175	Total/NA
Chloride	23		3.0	0.25	mg/L	1		300.0	Total/NA
Sulfate	120		5.0	0.23	mg/L	1		300.0	Total/NA
Total Organic Carbon - Average	2.3		1.0	0.16	mg/L	1		9060	Total/NA
Alkalinity	340		5.0	1.1	mg/L	1		SM 2320B	Total/NA
Ferrous Iron	0.041	J HF	0.20	0.021	mg/L	1		SM3500_FE_D	Total/NA

This Detection Summary does not include radiochemical test results.

Method Summary

Client: CH2M Hill, Inc.
Project/Site: THAN Davenport, IA - June 2016

TestAmerica Job ID: 280-84597-1

Method	Method Description	Protocol	Laboratory
8260B	Volatile Organic Compounds (GC/MS)	SW846	TAL DEN
RSK-175	Dissolved Gases (GC)	RSK	TAL DEN
300.0	Anions, Ion Chromatography	MCAWW	TAL DEN
9060	Organic Carbon, Total (TOC)	SW846	TAL DEN
SM 2320B	Alkalinity	SM	TAL DEN
SM 4500 S2 F	Sulfide, Total	SM	TAL DEN
SM3500_FE_D	Ferrous Iron	SM20	TAL DEN

Protocol References:

MCAWW = "Methods For Chemical Analysis Of Water And Wastes", EPA-600/4-79-020, March 1983 And Subsequent Revisions.

RSK = Sample Prep And Calculations For Dissolved Gas Analysis In Water Samples Using A GC Headspace Equilibration Technique, RSKSOP-175, Rev. 0, 8/11/94, USEPA Research Lab

SM = "Standard Methods For The Examination Of Water And Wastewater",

SM20 = "Standard Methods For The Examination Of Water And Wastewater", 20th Edition."

SW846 = "Test Methods For Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 And Its Updates.

Laboratory References:

TAL DEN = TestAmerica Denver, 4955 Yarrow Street, Arvada, CO 80002, TEL (303)736-0100

Sample Summary

Client: CH2M Hill, Inc.
Project/Site: THAN Davenport, IA - June 2016

TestAmerica Job ID: 280-84597-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
280-84597-1	ADDV-049	Water	06/16/16 11:30	06/17/16 10:00
280-84597-2	ADDV-038	Water	06/16/16 09:05	06/17/16 10:00
280-84597-3	ADDV-039	Water	06/16/16 08:50	06/17/16 10:00
280-84597-4	ADDV-037	Water	06/16/16 11:05	06/17/16 10:00
280-84597-5	ADDV-043	Water	06/16/16 11:00	06/17/16 10:00
280-84597-6	ADDV-045	Water	06/16/16 12:10	06/17/16 10:00
280-84597-7	ADDV-036	Water	06/16/16 12:00	06/17/16 10:00
280-84597-8	ADDV-035	Water	06/16/16 11:55	06/17/16 10:00
280-84597-9	ADDV-044	Water	06/16/16 12:00	06/17/16 10:00
280-84597-10	ADDV-050	Water	06/16/16 12:30	06/17/16 10:00
280-84597-11	ADDV-014	Water	06/16/16 10:30	06/17/16 10:00
280-84597-12	ADDV-015	Water	06/16/16 10:35	06/17/16 10:00
280-84597-13	ADDV-023	Water	06/16/16 09:10	06/17/16 10:00

Client Sample Results

Client: CH2M Hill, Inc.
Project/Site: THAN Davenport, IA - June 2016

TestAmerica Job ID: 280-84597-1

Method: 8260B - Volatile Organic Compounds (GC/MS)

Client Sample ID: ADDV-049
Date Collected: 06/16/16 11:30
Date Received: 06/17/16 10:00

Lab Sample ID: 280-84597-1
Matrix: Water

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1,1-Trichloroethane	ND		1.0	0.16	ug/L			06/28/16 11:55	1
1,1-Dichloroethane	ND		1.0	0.22	ug/L			06/28/16 11:55	1
1,1-Dichloroethene	ND		1.0	0.23	ug/L			06/28/16 11:55	1
1,2-Dichloroethane	ND		1.0	0.13	ug/L			06/28/16 11:55	1
Methyl ethyl ketone (MEK)	ND		6.0	2.0	ug/L			06/28/16 11:55	1
Acetone	**2.8**	**J**	10	1.9	ug/L			06/28/16 11:55	1
Benzene	ND		1.0	0.16	ug/L			06/28/16 11:55	1
Chloroethane	ND		2.0	0.41	ug/L			06/28/16 11:55	1
cis-1,2-Dichloroethene	ND		1.0	0.15	ug/L			06/28/16 11:55	1
Ethylbenzene	ND		1.0	0.16	ug/L			06/28/16 11:55	1
Methylene Chloride	ND		2.0	0.32	ug/L			06/28/16 11:55	1
m-Xylene & p-Xylene	ND		2.0	0.34	ug/L			06/28/16 11:55	1
o-Xylene	ND		1.0	0.19	ug/L			06/28/16 11:55	1
Styrene	ND		1.0	0.17	ug/L			06/28/16 11:55	1
Tetrachloroethene	ND		1.0	0.20	ug/L			06/28/16 11:55	1
Toluene	ND		1.0	0.17	ug/L			06/28/16 11:55	1
trans-1,2-Dichloroethene	ND		1.0	0.15	ug/L			06/28/16 11:55	1
Trichloroethene	ND		1.0	0.16	ug/L			06/28/16 11:55	1
Vinyl chloride	ND		1.0	0.10	ug/L			06/28/16 11:55	1
Xylenes, Total	ND		2.0	0.19	ug/L			06/28/16 11:55	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*88*		*70 - 127*		*06/28/16 11:55*	*1*
4-Bromofluorobenzene (Surr)	*95*		*78 - 120*		*06/28/16 11:55*	*1*
Dibromofluoromethane (Surr)	*93*		*77 - 120*		*06/28/16 11:55*	*1*
Toluene-d8 (Surr)	*97*		*80 - 125*		*06/28/16 11:55*	*1*

Client Sample ID: ADDV-038
Date Collected: 06/16/16 09:05
Date Received: 06/17/16 10:00

Lab Sample ID: 280-84597-2
Matrix: Water

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1,1-Trichloroethane	**35**		1.0	0.16	ug/L			06/28/16 12:36	1
1,1-Dichloroethane	**180**	**E**	1.0	0.22	ug/L			06/28/16 12:36	1
1,1-Dichloroethene	ND		1.0	0.23	ug/L			06/28/16 12:36	1
1,2-Dichloroethane	**1.2**		1.0	0.13	ug/L			06/28/16 12:36	1
Methyl ethyl ketone (MEK)	ND		6.0	2.0	ug/L			06/28/16 12:36	1
Acetone	**7.4**	**J**	10	1.9	ug/L			06/28/16 12:36	1
Benzene	**1.1**		1.0	0.16	ug/L			06/28/16 12:36	1
Chloroethane	**15**		2.0	0.41	ug/L			06/28/16 12:36	1
cis-1,2-Dichloroethene	**100**	**E**	1.0	0.15	ug/L			06/28/16 12:36	1
Ethylbenzene	**8.2**		1.0	0.16	ug/L			06/28/16 12:36	1
Methylene Chloride	ND		2.0	0.32	ug/L			06/28/16 12:36	1
m-Xylene & p-Xylene	**11**		2.0	0.34	ug/L			06/28/16 12:36	1
o-Xylene	**1.8**		1.0	0.19	ug/L			06/28/16 12:36	1
Styrene	ND		1.0	0.17	ug/L			06/28/16 12:36	1
Tetrachloroethene	**0.42**	**J**	1.0	0.20	ug/L			06/28/16 12:36	1
Toluene	**1.4**		1.0	0.17	ug/L			06/28/16 12:36	1
trans-1,2-Dichloroethene	**1.1**		1.0	0.15	ug/L			06/28/16 12:36	1
Trichloroethene	**1.3**		1.0	0.16	ug/L			06/28/16 12:36	1
Vinyl chloride	**170**	**E**	1.0	0.10	ug/L			06/28/16 12:36	1

Method: 8260B - Volatile Organic Compounds (GC/MS) (Continued)

Client Sample ID: ADDV-038 — **Lab Sample ID: 280-84597-2**
Date Collected: 06/16/16 09:05 — **Matrix: Water**
Date Received: 06/17/16 10:00

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Xylenes, Total	**13**		2.0	0.19	ug/L			06/28/16 12:36	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*90*		*70 - 127*		*06/28/16 12:36*	*1*
4-Bromofluorobenzene (Surr)	*101*		*78 - 120*		*06/28/16 12:36*	*1*
Dibromofluoromethane (Surr)	*93*		*77 - 120*		*06/28/16 12:36*	*1*
Toluene-d8 (Surr)	*97*		*80 - 125*		*06/28/16 12:36*	*1*

Client Sample ID: ADDV-039 — **Lab Sample ID: 280-84597-3**
Date Collected: 06/16/16 08:50 — **Matrix: Water**
Date Received: 06/17/16 10:00

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1,1-Trichloroethane	ND		1.0	0.16	ug/L			06/28/16 13:59	1
1,1-Dichloroethane	**3.2**		1.0	0.22	ug/L			06/28/16 13:59	1
1,1-Dichloroethene	ND		1.0	0.23	ug/L			06/28/16 13:59	1
1,2-Dichloroethane	**1.7**		1.0	0.13	ug/L			06/28/16 13:59	1
Methyl ethyl ketone (MEK)	ND		6.0	2.0	ug/L			06/28/16 13:59	1
Acetone	**3.8**	**J**	10	1.9	ug/L			06/28/16 13:59	1
Benzene	**1.0**		1.0	0.16	ug/L			06/28/16 13:59	1
Chloroethane	**19**		2.0	0.41	ug/L			06/28/16 13:59	1
cis-1,2-Dichloroethene	**2.8**		1.0	0.15	ug/L			06/28/16 13:59	1
Ethylbenzene	ND		1.0	0.16	ug/L			06/28/16 13:59	1
Methylene Chloride	ND		2.0	0.32	ug/L			06/28/16 13:59	1
m-Xylene & p-Xylene	ND		2.0	0.34	ug/L			06/28/16 13:59	1
o-Xylene	ND		1.0	0.19	ug/L			06/28/16 13:59	1
Styrene	ND		1.0	0.17	ug/L			06/28/16 13:59	1
Tetrachloroethene	ND		1.0	0.20	ug/L			06/28/16 13:59	1
Toluene	ND		1.0	0.17	ug/L			06/28/16 13:59	1
trans-1,2-Dichloroethene	**0.15**	**J**	1.0	0.15	ug/L			06/28/16 13:59	1
Trichloroethene	ND		1.0	0.16	ug/L			06/28/16 13:59	1
Vinyl chloride	**5.2**		1.0	0.10	ug/L			06/28/16 13:59	1
Xylenes, Total	ND		2.0	0.19	ug/L			06/28/16 13:59	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*87*		*70 - 127*		*06/28/16 13:59*	*1*
4-Bromofluorobenzene (Surr)	*98*		*78 - 120*		*06/28/16 13:59*	*1*
Dibromofluoromethane (Surr)	*92*		*77 - 120*		*06/28/16 13:59*	*1*
Toluene-d8 (Surr)	*96*		*80 - 125*		*06/28/16 13:59*	*1*

Client Sample ID: ADDV-037 — **Lab Sample ID: 280-84597-4**
Date Collected: 06/16/16 11:05 — **Matrix: Water**
Date Received: 06/17/16 10:00

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1,1-Trichloroethane	**1200**	**E**	5.0	0.80	ug/L			06/28/16 14:19	5
1,1-Dichloroethane	**120**		5.0	1.1	ug/L			06/28/16 14:19	5
1,1-Dichloroethene	**77**		5.0	1.2	ug/L			06/28/16 14:19	5
1,2-Dichloroethane	ND		5.0	0.65	ug/L			06/28/16 14:19	5
Methyl ethyl ketone (MEK)	ND		30	10	ug/L			06/28/16 14:19	5
Acetone	ND		50	9.5	ug/L			06/28/16 14:19	5
Benzene	ND		5.0	0.80	ug/L			06/28/16 14:19	5

Method: 8260B - Volatile Organic Compounds (GC/MS) (Continued)

Client Sample ID: ADDV-037
Date Collected: 06/16/16 11:05
Date Received: 06/17/16 10:00

Lab Sample ID: 280-84597-4
Matrix: Water

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloroethane	ND		10	2.1	ug/L			06/28/16 14:19	5
cis-1,2-Dichloroethene	**540**	**E**	5.0	0.75	ug/L			06/28/16 14:19	5
Ethylbenzene	ND		5.0	0.80	ug/L			06/28/16 14:19	5
Methylene Chloride	**1.7**	**J**	10	1.6	ug/L			06/28/16 14:19	5
m-Xylene & p-Xylene	ND		10	1.7	ug/L			06/28/16 14:19	5
o-Xylene	ND		5.0	0.95	ug/L			06/28/16 14:19	5
Styrene	ND		5.0	0.85	ug/L			06/28/16 14:19	5
Tetrachloroethene	**2.7**	**J**	5.0	1.0	ug/L			06/28/16 14:19	5
Toluene	ND		5.0	0.85	ug/L			06/28/16 14:19	5
trans-1,2-Dichloroethene	**2.5**	**J**	5.0	0.75	ug/L			06/28/16 14:19	5
Trichloroethene	**2.0**	**J**	5.0	0.80	ug/L			06/28/16 14:19	5
Vinyl chloride	**69**		5.0	0.50	ug/L			06/28/16 14:19	5
Xylenes, Total	ND		10	0.95	ug/L			06/28/16 14:19	5

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*84*		*70 - 127*		*06/28/16 14:19*	*5*
4-Bromofluorobenzene (Surr)	*95*		*78 - 120*		*06/28/16 14:19*	*5*
Dibromofluoromethane (Surr)	*90*		*77 - 120*		*06/28/16 14:19*	*5*
Toluene-d8 (Surr)	*96*		*80 - 125*		*06/28/16 14:19*	*5*

Client Sample ID: ADDV-045
Date Collected: 06/16/16 12:10
Date Received: 06/17/16 10:00

Lab Sample ID: 280-84597-6
Matrix: Water

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1,1-Trichloroethane	ND		1.0	0.16	ug/L			06/28/16 15:01	1
1,1-Dichloroethane	ND		1.0	0.22	ug/L			06/28/16 15:01	1
1,1-Dichloroethene	ND		1.0	0.23	ug/L			06/28/16 15:01	1
1,2-Dichloroethane	ND		1.0	0.13	ug/L			06/28/16 15:01	1
Methyl ethyl ketone (MEK)	ND		6.0	2.0	ug/L			06/28/16 15:01	1
Acetone	**4.7**	**J**	10	1.9	ug/L			06/28/16 15:01	1
Benzene	ND		1.0	0.16	ug/L			06/28/16 15:01	1
Chloroethane	ND		2.0	0.41	ug/L			06/28/16 15:01	1
cis-1,2-Dichloroethene	ND		1.0	0.15	ug/L			06/28/16 15:01	1
Ethylbenzene	ND		1.0	0.16	ug/L			06/28/16 15:01	1
Methylene Chloride	ND		2.0	0.32	ug/L			06/28/16 15:01	1
m-Xylene & p-Xylene	ND		2.0	0.34	ug/L			06/28/16 15:01	1
o-Xylene	ND		1.0	0.19	ug/L			06/28/16 15:01	1
Styrene	ND		1.0	0.17	ug/L			06/28/16 15:01	1
Tetrachloroethene	ND		1.0	0.20	ug/L			06/28/16 15:01	1
Toluene	ND		1.0	0.17	ug/L			06/28/16 15:01	1
trans-1,2-Dichloroethene	ND		1.0	0.15	ug/L			06/28/16 15:01	1
Trichloroethene	ND		1.0	0.16	ug/L			06/28/16 15:01	1
Vinyl chloride	ND		1.0	0.10	ug/L			06/28/16 15:01	1
Xylenes, Total	ND		2.0	0.19	ug/L			06/28/16 15:01	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*89*		*70 - 127*		*06/28/16 15:01*	*1*
4-Bromofluorobenzene (Surr)	*100*		*78 - 120*		*06/28/16 15:01*	*1*
Dibromofluoromethane (Surr)	*94*		*77 - 120*		*06/28/16 15:01*	*1*
Toluene-d8 (Surr)	*94*		*80 - 125*		*06/28/16 15:01*	*1*

Client Sample Results

Client: CH2M Hill, Inc.
Project/Site: THAN Davenport, IA - June 2016

TestAmerica Job ID: 280-84597-1

Method: 8260B - Volatile Organic Compounds (GC/MS)

Client Sample ID: ADDV-036
Date Collected: 06/16/16 12:00
Date Received: 06/17/16 10:00

Lab Sample ID: 280-84597-7
Matrix: Water

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1,1-Trichloroethane	**3200**		200	32	ug/L			06/28/16 15:21	200
1,1-Dichloroethane	**1200**		200	44	ug/L			06/28/16 15:21	200
1,1-Dichloroethene	**310**		200	46	ug/L			06/28/16 15:21	200
1,2-Dichloroethane	ND		200	26	ug/L			06/28/16 15:21	200
Methyl ethyl ketone (MEK)	ND		1200	400	ug/L			06/28/16 15:21	200
Acetone	ND		2000	380	ug/L			06/28/16 15:21	200
Benzene	ND		200	32	ug/L			06/28/16 15:21	200
Chloroethane	ND		400	82	ug/L			06/28/16 15:21	200
cis-1,2-Dichloroethene	**46000**	**E**	200	30	ug/L			06/28/16 15:21	200
Ethylbenzene	ND		200	32	ug/L			06/28/16 15:21	200
Methylene Chloride	**110**	**J**	400	64	ug/L			06/28/16 15:21	200
m-Xylene & p-Xylene	ND		400	68	ug/L			06/28/16 15:21	200
o-Xylene	ND		200	38	ug/L			06/28/16 15:21	200
Styrene	ND		200	34	ug/L			06/28/16 15:21	200
Tetrachloroethene	**710**		200	40	ug/L			06/28/16 15:21	200
Toluene	ND		200	34	ug/L			06/28/16 15:21	200
trans-1,2-Dichloroethene	**75**	**J**	200	30	ug/L			06/28/16 15:21	200
Trichloroethene	**1100**		200	32	ug/L			06/28/16 15:21	200
Vinyl chloride	**2000**		200	20	ug/L			06/28/16 15:21	200
Xylenes, Total	ND		400	38	ug/L			06/28/16 15:21	200

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*88*		*70 - 127*		*06/28/16 15:21*	*200*
4-Bromofluorobenzene (Surr)	*94*		*78 - 120*		*06/28/16 15:21*	*200*
Dibromofluoromethane (Surr)	*92*		*77 - 120*		*06/28/16 15:21*	*200*
Toluene-d8 (Surr)	*96*		*80 - 125*		*06/28/16 15:21*	*200*

Client Sample ID: ADDV-035
Date Collected: 06/16/16 11:55
Date Received: 06/17/16 10:00

Lab Sample ID: 280-84597-8
Matrix: Water

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1,1-Trichloroethane	**6600**		400	64	ug/L			06/28/16 16:03	400
1,1-Dichloroethane	**1800**		400	88	ug/L			06/28/16 16:03	400
1,1-Dichloroethene	**740**		400	92	ug/L			06/28/16 16:03	400
1,2-Dichloroethane	ND		400	52	ug/L			06/28/16 16:03	400
Methyl ethyl ketone (MEK)	ND		2400	800	ug/L			06/28/16 16:03	400
Acetone	ND		4000	760	ug/L			06/28/16 16:03	400
Benzene	ND		400	64	ug/L			06/28/16 16:03	400
Chloroethane	ND		800	160	ug/L			06/28/16 16:03	400
cis-1,2-Dichloroethene	**160000**	**E**	400	60	ug/L			06/28/16 16:03	400
Ethylbenzene	**1600**		400	64	ug/L			06/28/16 16:03	400
Methylene Chloride	ND		800	130	ug/L			06/28/16 16:03	400
m-Xylene & p-Xylene	**10000**		800	140	ug/L			06/28/16 16:03	400
o-Xylene	**1100**		400	76	ug/L			06/28/16 16:03	400
Styrene	ND		400	68	ug/L			06/28/16 16:03	400
Tetrachloroethene	ND		400	80	ug/L			06/28/16 16:03	400
Toluene	**4300**		400	68	ug/L			06/28/16 16:03	400
trans-1,2-Dichloroethene	**150**	**J**	400	60	ug/L			06/28/16 16:03	400
Trichloroethene	**110**	**J**	400	64	ug/L			06/28/16 16:03	400
Vinyl chloride	**19000**		400	40	ug/L			06/28/16 16:03	400

Method: 8260B - Volatile Organic Compounds (GC/MS) (Continued)

Client Sample ID: ADDV-035 — **Lab Sample ID: 280-84597-8**
Date Collected: 06/16/16 11:55 — **Matrix: Water**
Date Received: 06/17/16 10:00

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Xylenes, Total	**11000**		800	76	ug/L			06/28/16 16:03	400

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*89*		*70 - 127*		*06/28/16 16:03*	*400*
4-Bromofluorobenzene (Surr)	*99*		*78 - 120*		*06/28/16 16:03*	*400*
Dibromofluoromethane (Surr)	*93*		*77 - 120*		*06/28/16 16:03*	*400*
Toluene-d8 (Surr)	*96*		*80 - 125*		*06/28/16 16:03*	*400*

Client Sample ID: ADDV-044 — **Lab Sample ID: 280-84597-9**
Date Collected: 06/16/16 12:00 — **Matrix: Water**
Date Received: 06/17/16 10:00

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1,1-Trichloroethane	ND		1.0	0.16	ug/L			06/28/16 16:44	1
1,1-Dichloroethane	ND		1.0	0.22	ug/L			06/28/16 16:44	1
1,1-Dichloroethene	ND		1.0	0.23	ug/L			06/28/16 16:44	1
1,2-Dichloroethane	ND		1.0	0.13	ug/L			06/28/16 16:44	1
Methyl ethyl ketone (MEK)	ND		6.0	2.0	ug/L			06/28/16 16:44	1
Acetone	**8.1**	**J**	10	1.9	ug/L			06/28/16 16:44	1
Benzene	ND		1.0	0.16	ug/L			06/28/16 16:44	1
Chloroethane	ND		2.0	0.41	ug/L			06/28/16 16:44	1
cis-1,2-Dichloroethene	ND		1.0	0.15	ug/L			06/28/16 16:44	1
Ethylbenzene	ND		1.0	0.16	ug/L			06/28/16 16:44	1
Methylene Chloride	ND		2.0	0.32	ug/L			06/28/16 16:44	1
m-Xylene & p-Xylene	ND		2.0	0.34	ug/L			06/28/16 16:44	1
o-Xylene	ND		1.0	0.19	ug/L			06/28/16 16:44	1
Styrene	ND		1.0	0.17	ug/L			06/28/16 16:44	1
Tetrachloroethene	ND		1.0	0.20	ug/L			06/28/16 16:44	1
Toluene	ND		1.0	0.17	ug/L			06/28/16 16:44	1
trans-1,2-Dichloroethene	ND		1.0	0.15	ug/L			06/28/16 16:44	1
Trichloroethene	ND		1.0	0.16	ug/L			06/28/16 16:44	1
Vinyl chloride	ND		1.0	0.10	ug/L			06/28/16 16:44	1
Xylenes, Total	ND		2.0	0.19	ug/L			06/28/16 16:44	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*92*		*70 - 127*		*06/28/16 16:44*	*1*
4-Bromofluorobenzene (Surr)	*100*		*78 - 120*		*06/28/16 16:44*	*1*
Dibromofluoromethane (Surr)	*94*		*77 - 120*		*06/28/16 16:44*	*1*
Toluene-d8 (Surr)	*99*		*80 - 125*		*06/28/16 16:44*	*1*

Client Sample ID: ADDV-050 — **Lab Sample ID: 280-84597-10**
Date Collected: 06/16/16 12:30 — **Matrix: Water**
Date Received: 06/17/16 10:00

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1,1-Trichloroethane	ND		1.0	0.16	ug/L			06/28/16 12:15	1
1,1-Dichloroethane	ND		1.0	0.22	ug/L			06/28/16 12:15	1
1,1-Dichloroethene	ND		1.0	0.23	ug/L			06/28/16 12:15	1
1,2-Dichloroethane	ND		1.0	0.13	ug/L			06/28/16 12:15	1
Methyl ethyl ketone (MEK)	ND		6.0	2.0	ug/L			06/28/16 12:15	1
Acetone	**3.0**	**J**	10	1.9	ug/L			06/28/16 12:15	1
Benzene	ND		1.0	0.16	ug/L			06/28/16 12:15	1

Method: 8260B - Volatile Organic Compounds (GC/MS) (Continued)

Client Sample ID: ADDV-050
Date Collected: 06/16/16 12:30
Date Received: 06/17/16 10:00

Lab Sample ID: 280-84597-10
Matrix: Water

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloroethane	ND		2.0	0.41	ug/L			06/28/16 12:15	1
cis-1,2-Dichloroethene	ND		1.0	0.15	ug/L			06/28/16 12:15	1
Ethylbenzene	ND		1.0	0.16	ug/L			06/28/16 12:15	1
Methylene Chloride	ND		2.0	0.32	ug/L			06/28/16 12:15	1
m-Xylene & p-Xylene	ND		2.0	0.34	ug/L			06/28/16 12:15	1
o-Xylene	ND		1.0	0.19	ug/L			06/28/16 12:15	1
Styrene	ND		1.0	0.17	ug/L			06/28/16 12:15	1
Tetrachloroethene	ND		1.0	0.20	ug/L			06/28/16 12:15	1
Toluene	ND		1.0	0.17	ug/L			06/28/16 12:15	1
trans-1,2-Dichloroethene	ND		1.0	0.15	ug/L			06/28/16 12:15	1
Trichloroethene	ND		1.0	0.16	ug/L			06/28/16 12:15	1
Vinyl chloride	ND		1.0	0.10	ug/L			06/28/16 12:15	1
Xylenes, Total	ND		2.0	0.19	ug/L			06/28/16 12:15	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*88*		*70 - 127*		*06/28/16 12:15*	*1*
4-Bromofluorobenzene (Surr)	*97*		*78 - 120*		*06/28/16 12:15*	*1*
Dibromofluoromethane (Surr)	*95*		*77 - 120*		*06/28/16 12:15*	*1*
Toluene-d8 (Surr)	*96*		*80 - 125*		*06/28/16 12:15*	*1*

Client Sample ID: ADDV-014
Date Collected: 06/16/16 10:30
Date Received: 06/17/16 10:00

Lab Sample ID: 280-84597-11
Matrix: Water

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1,1-Trichloroethane	**24**		5.0	0.80	ug/L			06/28/16 17:05	5
1,1-Dichloroethane	**260**		5.0	1.1	ug/L			06/28/16 17:05	5
1,1-Dichloroethene	**5.0**		5.0	1.2	ug/L			06/28/16 17:05	5
1,2-Dichloroethane	ND		5.0	0.65	ug/L			06/28/16 17:05	5
Methyl ethyl ketone (MEK)	ND		30	10	ug/L			06/28/16 17:05	5
Acetone	ND		50	9.5	ug/L			06/28/16 17:05	5
Benzene	**22**		5.0	0.80	ug/L			06/28/16 17:05	5
Chloroethane	**220**		10	2.1	ug/L			06/28/16 17:05	5
cis-1,2-Dichloroethene	**1300**	**E**	5.0	0.75	ug/L			06/28/16 17:05	5
Ethylbenzene	**270**		5.0	0.80	ug/L			06/28/16 17:05	5
Methylene Chloride	**3.6**	**J**	10	1.6	ug/L			06/28/16 17:05	5
m-Xylene & p-Xylene	**270**		10	1.7	ug/L			06/28/16 17:05	5
o-Xylene	**120**		5.0	0.95	ug/L			06/28/16 17:05	5
Styrene	ND		5.0	0.85	ug/L			06/28/16 17:05	5
Tetrachloroethene	ND		5.0	1.0	ug/L			06/28/16 17:05	5
Toluene	**540**	**E**	5.0	0.85	ug/L			06/28/16 17:05	5
trans-1,2-Dichloroethene	**7.0**		5.0	0.75	ug/L			06/28/16 17:05	5
Trichloroethene	ND		5.0	0.80	ug/L			06/28/16 17:05	5
Vinyl chloride	**1200**	**E**	5.0	0.50	ug/L			06/28/16 17:05	5
Xylenes, Total	**390**		10	0.95	ug/L			06/28/16 17:05	5

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*90*		*70 - 127*		*06/28/16 17:05*	*5*
4-Bromofluorobenzene (Surr)	*95*		*78 - 120*		*06/28/16 17:05*	*5*
Dibromofluoromethane (Surr)	*94*		*77 - 120*		*06/28/16 17:05*	*5*
Toluene-d8 (Surr)	*94*		*80 - 125*		*06/28/16 17:05*	*5*

Client Sample Results

Client: CH2M Hill, Inc.
Project/Site: THAN Davenport, IA - June 2016

TestAmerica Job ID: 280-84597-1

Method: 8260B - Volatile Organic Compounds (GC/MS)

Client Sample ID: ADDV-015
Date Collected: 06/16/16 10:35
Date Received: 06/17/16 10:00

Lab Sample ID: 280-84597-12
Matrix: Water

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1,1-Trichloroethane	**22**		10	1.6	ug/L			06/28/16 17:47	10
1,1-Dichloroethane	**240**		10	2.2	ug/L			06/28/16 17:47	10
1,1-Dichloroethene	**5.1**	**J**	10	2.3	ug/L			06/28/16 17:47	10
1,2-Dichloroethane	ND		10	1.3	ug/L			06/28/16 17:47	10
Methyl ethyl ketone (MEK)	ND		60	20	ug/L			06/28/16 17:47	10
Acetone	ND		100	19	ug/L			06/28/16 17:47	10
Benzene	**23**		10	1.6	ug/L			06/28/16 17:47	10
Chloroethane	**270**		20	4.1	ug/L			06/28/16 17:47	10
cis-1,2-Dichloroethene	**1200**	**E**	10	1.5	ug/L			06/28/16 17:47	10
Ethylbenzene	**320**		10	1.6	ug/L			06/28/16 17:47	10
Methylene Chloride	**5.6**	**J**	20	3.2	ug/L			06/28/16 17:47	10
m-Xylene & p-Xylene	**410**		20	3.4	ug/L			06/28/16 17:47	10
o-Xylene	**170**		10	1.9	ug/L			06/28/16 17:47	10
Styrene	ND		10	1.7	ug/L			06/28/16 17:47	10
Tetrachloroethene	ND		10	2.0	ug/L			06/28/16 17:47	10
Toluene	**1000**	**E**	10	1.7	ug/L			06/28/16 17:47	10
trans-1,2-Dichloroethene	**6.5**	**J**	10	1.5	ug/L			06/28/16 17:47	10
Trichloroethene	ND		10	1.6	ug/L			06/28/16 17:47	10
Vinyl chloride	**1100**	**E**	10	1.0	ug/L			06/28/16 17:47	10
Xylenes, Total	**580**		20	1.9	ug/L			06/28/16 17:47	10

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*89*		*70 - 127*		*06/28/16 17:47*	*10*
4-Bromofluorobenzene (Surr)	*95*		*78 - 120*		*06/28/16 17:47*	*10*
Dibromofluoromethane (Surr)	*91*		*77 - 120*		*06/28/16 17:47*	*10*
Toluene-d8 (Surr)	*95*		*80 - 125*		*06/28/16 17:47*	*10*

Client Sample ID: ADDV-023
Date Collected: 06/16/16 09:10
Date Received: 06/17/16 10:00

Lab Sample ID: 280-84597-13
Matrix: Water

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1,1-Trichloroethane	ND		1.0	0.16	ug/L			06/29/16 10:02	1
1,1-Dichloroethane	ND		1.0	0.22	ug/L			06/29/16 10:02	1
1,1-Dichloroethene	ND		1.0	0.23	ug/L			06/29/16 10:02	1
1,2-Dichloroethane	ND		1.0	0.13	ug/L			06/29/16 10:02	1
Methyl ethyl ketone (MEK)	ND		6.0	2.0	ug/L			06/29/16 10:02	1
Acetone	**2.4**	**J**	10	1.9	ug/L			06/29/16 10:02	1
Benzene	ND		1.0	0.16	ug/L			06/29/16 10:02	1
Chloroethane	ND		2.0	0.41	ug/L			06/29/16 10:02	1
cis-1,2-Dichloroethene	ND		1.0	0.15	ug/L			06/29/16 10:02	1
Ethylbenzene	ND		1.0	0.16	ug/L			06/29/16 10:02	1
Methylene Chloride	ND		2.0	0.32	ug/L			06/29/16 10:02	1
m-Xylene & p-Xylene	ND		2.0	0.34	ug/L			06/29/16 10:02	1
o-Xylene	ND		1.0	0.19	ug/L			06/29/16 10:02	1
Styrene	ND		1.0	0.17	ug/L			06/29/16 10:02	1
Tetrachloroethene	ND		1.0	0.20	ug/L			06/29/16 10:02	1
Toluene	ND		1.0	0.17	ug/L			06/29/16 10:02	1
trans-1,2-Dichloroethene	ND		1.0	0.15	ug/L			06/29/16 10:02	1
Trichloroethene	ND		1.0	0.16	ug/L			06/29/16 10:02	1
Vinyl chloride	ND		1.0	0.10	ug/L			06/29/16 10:02	1

Method: 8260B - Volatile Organic Compounds (GC/MS) (Continued)

Client Sample ID: ADDV-023 — **Lab Sample ID: 280-84597-13**
Date Collected: 06/16/16 09:10 — **Matrix: Water**
Date Received: 06/17/16 10:00

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Xylenes, Total	ND		2.0	0.19	ug/L			06/29/16 10:02	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*86*		*70 - 127*		*06/29/16 10:02*	*1*
4-Bromofluorobenzene (Surr)	*96*		*78 - 120*		*06/29/16 10:02*	*1*
Dibromofluoromethane (Surr)	*93*		*77 - 120*		*06/29/16 10:02*	*1*
Toluene-d8 (Surr)	*98*		*80 - 125*		*06/29/16 10:02*	*1*

Method: 8260B - Volatile Organic Compounds (GC/MS) - DL

Client Sample ID: ADDV-038 — **Lab Sample ID: 280-84597-2**
Date Collected: 06/16/16 09:05 — **Matrix: Water**
Date Received: 06/17/16 10:00

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1-Dichloroethane	**220**		10	2.2	ug/L			06/28/16 12:57	10
cis-1,2-Dichloroethene	**110**		10	1.5	ug/L			06/28/16 12:57	10
Vinyl chloride	**200**		10	1.0	ug/L			06/28/16 12:57	10

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*86*		*70 - 127*		*06/28/16 12:57*	*10*
4-Bromofluorobenzene (Surr)	*95*		*78 - 120*		*06/28/16 12:57*	*10*
Dibromofluoromethane (Surr)	*93*		*77 - 120*		*06/28/16 12:57*	*10*
Toluene-d8 (Surr)	*96*		*80 - 125*		*06/28/16 12:57*	*10*

Client Sample ID: ADDV-037 — **Lab Sample ID: 280-84597-4**
Date Collected: 06/16/16 11:05 — **Matrix: Water**
Date Received: 06/17/16 10:00

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1,1-Trichloroethane	**1600**		50	8.0	ug/L			06/28/16 14:40	50
cis-1,2-Dichloroethene	**580**		50	7.5	ug/L			06/28/16 14:40	50

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*88*		*70 - 127*		*06/28/16 14:40*	*50*
4-Bromofluorobenzene (Surr)	*97*		*78 - 120*		*06/28/16 14:40*	*50*
Dibromofluoromethane (Surr)	*93*		*77 - 120*		*06/28/16 14:40*	*50*
Toluene-d8 (Surr)	*97*		*80 - 125*		*06/28/16 14:40*	*50*

Client Sample ID: ADDV-036 — **Lab Sample ID: 280-84597-7**
Date Collected: 06/16/16 12:00 — **Matrix: Water**
Date Received: 06/17/16 10:00

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
cis-1,2-Dichloroethene	**49000**		2000	300	ug/L			06/28/16 15:42	2000

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*89*		*70 - 127*		*06/28/16 15:42*	*2000*
4-Bromofluorobenzene (Surr)	*92*		*78 - 120*		*06/28/16 15:42*	*2000*
Dibromofluoromethane (Surr)	*93*		*77 - 120*		*06/28/16 15:42*	*2000*
Toluene-d8 (Surr)	*97*		*80 - 125*		*06/28/16 15:42*	*2000*

Method: 8260B - Volatile Organic Compounds (GC/MS) - DL

Client Sample ID: ADDV-035 — **Lab Sample ID: 280-84597-8**
Date Collected: 06/16/16 11:55 — **Matrix: Water**
Date Received: 06/17/16 10:00

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
cis-1,2-Dichloroethene	210000		4000	600	ug/L			06/28/16 16:24	4000

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*92*		*70 - 127*		*06/28/16 16:24*	*4000*
4-Bromofluorobenzene (Surr)	*96*		*78 - 120*		*06/28/16 16:24*	*4000*
Dibromofluoromethane (Surr)	*94*		*77 - 120*		*06/28/16 16:24*	*4000*
Toluene-d8 (Surr)	*95*		*80 - 125*		*06/28/16 16:24*	*4000*

Client Sample ID: ADDV-014 — **Lab Sample ID: 280-84597-11**
Date Collected: 06/16/16 10:30 — **Matrix: Water**
Date Received: 06/17/16 10:00

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
cis-1,2-Dichloroethene	1400		50	7.5	ug/L			06/28/16 17:26	50
Toluene	1300		50	8.5	ug/L			06/28/16 17:26	50
Vinyl chloride	1400		50	5.0	ug/L			06/28/16 17:26	50

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*87*		*70 - 127*		*06/28/16 17:26*	*50*
4-Bromofluorobenzene (Surr)	*97*		*78 - 120*		*06/28/16 17:26*	*50*
Dibromofluoromethane (Surr)	*93*		*77 - 120*		*06/28/16 17:26*	*50*
Toluene-d8 (Surr)	*96*		*80 - 125*		*06/28/16 17:26*	*50*

Client Sample ID: ADDV-015 — **Lab Sample ID: 280-84597-12**
Date Collected: 06/16/16 10:35 — **Matrix: Water**
Date Received: 06/17/16 10:00

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
cis-1,2-Dichloroethene	1300		100	15	ug/L			06/28/16 18:07	100
Toluene	2100		100	17	ug/L			06/28/16 18:07	100
Vinyl chloride	1300		100	10	ug/L			06/28/16 18:07	100

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*88*		*70 - 127*		*06/28/16 18:07*	*100*
4-Bromofluorobenzene (Surr)	*97*		*78 - 120*		*06/28/16 18:07*	*100*
Dibromofluoromethane (Surr)	*92*		*77 - 120*		*06/28/16 18:07*	*100*
Toluene-d8 (Surr)	*97*		*80 - 125*		*06/28/16 18:07*	*100*

Method: RSK-175 - Dissolved Gases (GC)

Client Sample ID: ADDV-045 — **Lab Sample ID: 280-84597-6**
Date Collected: 06/16/16 12:10 — **Matrix: Water**
Date Received: 06/17/16 10:00

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Methane	0.27	J	5.0	0.22	ug/L			06/28/16 19:54	1
Ethene	ND		5.0	0.40	ug/L			06/28/16 19:54	1
Ethane	ND		5.0	0.57	ug/L			06/28/16 19:54	1

Client Sample ID: ADDV-044 — **Lab Sample ID: 280-84597-9**
Date Collected: 06/16/16 12:00 — **Matrix: Water**
Date Received: 06/17/16 10:00

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Methane	ND		5.0	0.22	ug/L			06/28/16 19:59	1

Method: RSK-175 - Dissolved Gases (GC) (Continued)

Client Sample ID: ADDV-044 — **Lab Sample ID: 280-84597-9**
Date Collected: 06/16/16 12:00 — **Matrix: Water**
Date Received: 06/17/16 10:00

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Ethene	ND		5.0	0.40	ug/L			06/28/16 19:59	1
Ethane	ND		5.0	0.57	ug/L			06/28/16 19:59	1

Client Sample ID: ADDV-023 — **Lab Sample ID: 280-84597-13**
Date Collected: 06/16/16 09:10 — **Matrix: Water**
Date Received: 06/17/16 10:00

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Methane	**4.4**	**J**	5.0	0.22	ug/L			06/28/16 20:03	1
Ethene	ND		5.0	0.40	ug/L			06/28/16 20:03	1
Ethane	ND		5.0	0.57	ug/L			06/28/16 20:03	1

General Chemistry

Client Sample ID: ADDV-038 — **Lab Sample ID: 280-84597-2**
Date Collected: 06/16/16 09:05 — **Matrix: Water**
Date Received: 06/17/16 10:00

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	**80**	**F1**	3.0	0.25	mg/L			06/27/16 13:40	1
Total Organic Carbon - Average	**14**		1.0	0.16	mg/L			06/23/16 15:44	1

Client Sample ID: ADDV-039 — **Lab Sample ID: 280-84597-3**
Date Collected: 06/16/16 08:50 — **Matrix: Water**
Date Received: 06/17/16 10:00

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	**37**		3.0	0.25	mg/L			06/27/16 14:59	1
Total Organic Carbon - Average	**4.2**		1.0	0.16	mg/L			06/22/16 23:09	1

Client Sample ID: ADDV-037 — **Lab Sample ID: 280-84597-4**
Date Collected: 06/16/16 11:05 — **Matrix: Water**
Date Received: 06/17/16 10:00

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	**9.4**		3.0	0.25	mg/L			06/27/16 15:19	1
Total Organic Carbon - Average	**4.0**		1.0	0.16	mg/L			06/22/16 19:38	1

Client Sample ID: ADDV-043 — **Lab Sample ID: 280-84597-5**
Date Collected: 06/16/16 11:00 — **Matrix: Water**
Date Received: 06/17/16 10:00

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	**95**	**J**	150	13	mg/L			06/27/16 15:39	50

Client Sample ID: ADDV-045 — **Lab Sample ID: 280-84597-6**
Date Collected: 06/16/16 12:10 — **Matrix: Water**
Date Received: 06/17/16 10:00

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	ND		3.0	0.25	mg/L			06/17/16 14:18	1
Nitrate as N	ND		0.50	0.042	mg/L			06/17/16 14:18	1
Sulfate	ND		5.0	0.23	mg/L			06/17/16 14:18	1
Total Organic Carbon - Average	**0.32**	**J**	1.0	0.16	mg/L			06/22/16 19:55	1
Alkalinity	ND		5.0	1.1	mg/L			06/24/16 17:59	1
Sulfide	ND		1.0	0.50	mg/L			06/17/16 15:49	1
Ferrous Iron	ND	HF	0.20	0.021	mg/L			06/17/16 18:20	1

Client Sample Results

Client: CH2M Hill, Inc.
Project/Site: THAN Davenport, IA - June 2016

TestAmerica Job ID: 280-84597-1

Client Sample ID: ADDV-036 — **Lab Sample ID: 280-84597-7**
Date Collected: 06/16/16 12:00 — **Matrix: Water**
Date Received: 06/17/16 10:00

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	**180**		3.0	0.25	mg/L			06/27/16 15:59	1
Total Organic Carbon - Average	**7.4**		1.0	0.16	mg/L			06/22/16 20:10	1

Client Sample ID: ADDV-035 — **Lab Sample ID: 280-84597-8**
Date Collected: 06/16/16 11:55 — **Matrix: Water**
Date Received: 06/17/16 10:00

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	**310**		15	1.3	mg/L			06/27/16 23:17	5
Total Organic Carbon - Average	**28**		1.0	0.16	mg/L			06/22/16 20:24	1

Client Sample ID: ADDV-044 — **Lab Sample ID: 280-84597-9**
Date Collected: 06/16/16 12:00 — **Matrix: Water**
Date Received: 06/17/16 10:00

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	ND		3.0	0.25	mg/L			06/17/16 14:35	1
Nitrate as N	ND		0.50	0.042	mg/L			06/17/16 14:35	1
Sulfate	ND		5.0	0.23	mg/L			06/17/16 14:35	1
Total Organic Carbon - Average	**0.24**	**J**	1.0	0.16	mg/L			06/22/16 20:41	1
Alkalinity	ND		5.0	1.1	mg/L			06/24/16 18:03	1
Sulfide	ND		1.0	0.50	mg/L			06/17/16 15:49	1
Ferrous Iron	ND	HF	0.20	0.021	mg/L			06/17/16 18:20	1

Client Sample ID: ADDV-014 — **Lab Sample ID: 280-84597-11**
Date Collected: 06/16/16 10:30 — **Matrix: Water**
Date Received: 06/17/16 10:00

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	**150**		3.0	0.25	mg/L			06/27/16 16:39	1
Total Organic Carbon - Average	**5.6**		1.0	0.16	mg/L			06/22/16 20:56	1

Client Sample ID: ADDV-015 — **Lab Sample ID: 280-84597-12**
Date Collected: 06/16/16 10:35 — **Matrix: Water**
Date Received: 06/17/16 10:00

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	**150**		3.0	0.25	mg/L			06/27/16 17:38	1
Total Organic Carbon - Average	**6.1**		1.0	0.16	mg/L			06/23/16 16:32	1

Client Sample ID: ADDV-023 — **Lab Sample ID: 280-84597-13**
Date Collected: 06/16/16 09:10 — **Matrix: Water**
Date Received: 06/17/16 10:00

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	**23**		3.0	0.25	mg/L			06/17/16 15:47	1
Nitrate as N	ND		0.50	0.042	mg/L			06/17/16 15:47	1
Sulfate	**120**		5.0	0.23	mg/L			06/17/16 15:47	1
Total Organic Carbon - Average	**2.3**		1.0	0.16	mg/L			06/23/16 17:16	1
Alkalinity	**340**		5.0	1.1	mg/L			06/24/16 18:07	1
Sulfide	ND		1.0	0.50	mg/L			06/17/16 15:49	1
Ferrous Iron	**0.041**	**J HF**	0.20	0.021	mg/L			06/17/16 18:20	1

Surrogate Summary

Client: CH2M Hill, Inc.
Project/Site: THAN Davenport, IA - June 2016

TestAmerica Job ID: 280-84597-1

Method: 8260B - Volatile Organic Compounds (GC/MS)

Matrix: Water **Prep Type: Total/NA**

		Percent Surrogate Recovery (Acceptance Limits)			
		12DCE	BFB	DBFM	TOL
Lab Sample ID	Client Sample ID	(70-127)	(78-120)	(77-120)	(80-125)
280-84595-D-3 MS	Matrix Spike	80	92	88	93
280-84595-D-3 MSD	Matrix Spike Duplicate	81	94	87	94
280-84597-1	ADDV-049	88	95	93	97
280-84597-2	ADDV-038	90	101	93	97
280-84597-2 - DL	ADDV-038	86	95	93	96
280-84597-2 MS	ADDV-038	85	96	91	95
280-84597-2 MSD	ADDV-038	84	97	89	94
280-84597-3	ADDV-039	87	98	92	96
280-84597-4	ADDV-037	84	95	90	96
280-84597-4 - DL	ADDV-037	88	97	93	97
280-84597-6	ADDV-045	89	100	94	94
280-84597-7	ADDV-036	88	94	92	96
280-84597-7 - DL	ADDV-036	89	92	93	97
280-84597-8	ADDV-035	89	99	93	96
280-84597-8 - DL	ADDV-035	92	96	94	95
280-84597-9	ADDV-044	92	100	94	99
280-84597-10	ADDV-050	88	97	95	96
280-84597-11	ADDV-014	90	95	94	94
280-84597-11 - DL	ADDV-014	87	97	93	96
280-84597-12	ADDV-015	89	95	91	95
280-84597-12 - DL	ADDV-015	88	97	92	97
280-84597-13	ADDV-023	86	96	93	98
LCS 280-331583/4	Lab Control Sample	84	96	88	94
LCS 280-331767/4	Lab Control Sample	87	95	88	95
MB 280-331583/6	Method Blank	86	103	90	97
MB 280-331767/6	Method Blank	85	106	92	98

Surrogate Legend

12DCE = 1,2-Dichloroethane-d4 (Surr)
BFB = 4-Bromofluorobenzene (Surr)
DBFM = Dibromofluoromethane (Surr)
TOL = Toluene-d8 (Surr)

Method: 8260B - Volatile Organic Compounds (GC/MS)

Lab Sample ID: MB 280-331583/6
Matrix: Water
Analysis Batch: 331583

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1,1-Trichloroethane	ND		1.0	0.16	ug/L			06/28/16 08:26	1
1,1-Dichloroethane	ND		1.0	0.22	ug/L			06/28/16 08:26	1
1,1-Dichloroethene	ND		1.0	0.23	ug/L			06/28/16 08:26	1
1,2-Dichloroethane	ND		1.0	0.13	ug/L			06/28/16 08:26	1
Methyl ethyl ketone (MEK)	ND		6.0	2.0	ug/L			06/28/16 08:26	1
Acetone	ND		10	1.9	ug/L			06/28/16 08:26	1
Benzene	ND		1.0	0.16	ug/L			06/28/16 08:26	1
Chloroethane	ND		2.0	0.41	ug/L			06/28/16 08:26	1
cis-1,2-Dichloroethene	ND		1.0	0.15	ug/L			06/28/16 08:26	1
Ethylbenzene	ND		1.0	0.16	ug/L			06/28/16 08:26	1
Methylene Chloride	ND		2.0	0.32	ug/L			06/28/16 08:26	1
m-Xylene & p-Xylene	ND		2.0	0.34	ug/L			06/28/16 08:26	1
o-Xylene	ND		1.0	0.19	ug/L			06/28/16 08:26	1
Styrene	ND		1.0	0.17	ug/L			06/28/16 08:26	1
Tetrachloroethene	ND		1.0	0.20	ug/L			06/28/16 08:26	1
Toluene	ND		1.0	0.17	ug/L			06/28/16 08:26	1
trans-1,2-Dichloroethene	ND		1.0	0.15	ug/L			06/28/16 08:26	1
Trichloroethene	ND		1.0	0.16	ug/L			06/28/16 08:26	1
Vinyl chloride	ND		1.0	0.10	ug/L			06/28/16 08:26	1
Xylenes, Total	ND		2.0	0.19	ug/L			06/28/16 08:26	1

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*86*		*70 - 127*		*06/28/16 08:26*	*1*
4-Bromofluorobenzene (Surr)	*103*		*78 - 120*		*06/28/16 08:26*	*1*
Dibromofluoromethane (Surr)	*90*		*77 - 120*		*06/28/16 08:26*	*1*
Toluene-d8 (Surr)	*97*		*80 - 125*		*06/28/16 08:26*	*1*

Lab Sample ID: LCS 280-331583/4
Matrix: Water
Analysis Batch: 331583

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
1,1,1-Trichloroethane	5.00	4.72		ug/L		94	65 - 135
1,1-Dichloroethane	5.00	4.80		ug/L		96	65 - 135
1,1-Dichloroethene	5.00	4.50		ug/L		90	65 - 136
1,2-Dichloroethane	5.00	4.77		ug/L		95	65 - 135
Methyl ethyl ketone (MEK)	20.0	21.3		ug/L		106	44 - 177
Acetone	20.0	21.8		ug/L		109	39 - 156
Benzene	5.00	4.77		ug/L		95	65 - 135
Chloroethane	5.00	5.11		ug/L		102	46 - 136
cis-1,2-Dichloroethene	5.00	4.78		ug/L		96	65 - 135
Ethylbenzene	5.00	4.61		ug/L		92	65 - 135
Methylene Chloride	5.00	5.00		ug/L		100	54 - 141
m-Xylene & p-Xylene	5.00	4.74		ug/L		95	65 - 135
o-Xylene	5.00	4.74		ug/L		95	65 - 135
Styrene	5.00	4.47		ug/L		89	65 - 135
Tetrachloroethene	5.00	4.53		ug/L		91	65 - 135
Toluene	5.00	5.16		ug/L		103	65 - 135

Method: 8260B - Volatile Organic Compounds (GC/MS) (Continued)

Lab Sample ID: LCS 280-331583/4
Matrix: Water
Analysis Batch: 331583

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
trans-1,2-Dichloroethene	5.00	4.83		ug/L		97	65 - 135
Trichloroethene	5.00	4.69		ug/L		94	65 - 135
Vinyl chloride	5.00	5.26		ug/L		105	40 - 137
Xylenes, Total	10.0	9.48		ug/L		95	65 - 135

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
1,2-Dichloroethane-d4 (Surr)	*84*		*70 - 127*
4-Bromofluorobenzene (Surr)	*96*		*78 - 120*
Dibromofluoromethane (Surr)	*88*		*77 - 120*
Toluene-d8 (Surr)	*94*		*80 - 125*

Lab Sample ID: 280-84597-2 MS
Matrix: Water
Analysis Batch: 331583

Client Sample ID: ADDV-038
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
1,1,1-Trichloroethane	35		5.00	39.0	4	ug/L		72	65 - 135
1,1-Dichloroethane	180	E	5.00	171	E 4	ug/L		-100	65 - 135
1,1-Dichloroethene	ND		5.00	5.22		ug/L		104	65 - 136
1,2-Dichloroethane	1.2		5.00	6.34		ug/L		103	65 - 135
Methyl ethyl ketone (MEK)	ND		20.0	23.0		ug/L		115	44 - 177
Acetone	7.4	J	20.0	25.4		ug/L		90	39 - 156
Benzene	1.1		5.00	6.30		ug/L		105	65 - 135
Chloroethane	15		5.00	19.1		ug/L		88	46 - 136
cis-1,2-Dichloroethene	100	E	5.00	104	E 4	ug/L		-14	65 - 135
Ethylbenzene	8.2		5.00	13.3		ug/L		103	65 - 135
Methylene Chloride	ND		5.00	5.13		ug/L		103	54 - 141
m-Xylene & p-Xylene	11		5.00	15.5		ug/L		95	65 - 135
o-Xylene	1.8		5.00	7.34		ug/L		111	65 - 135
Styrene	ND		5.00	5.15		ug/L		103	65 - 135
Tetrachloroethene	0.42	J	5.00	5.39		ug/L		99	65 - 135
Toluene	1.4		5.00	6.78		ug/L		108	65 - 135
trans-1,2-Dichloroethene	1.1		5.00	6.39		ug/L		107	65 - 135
Trichloroethene	1.3		5.00	6.19		ug/L		98	65 - 135
Vinyl chloride	170	E	5.00	161	E 4	ug/L		-100	40 - 137
Xylenes, Total	13		10.0	22.8		ug/L		100	65 - 135

Surrogate	*MS %Recovery*	*MS Qualifier*	*Limits*
1,2-Dichloroethane-d4 (Surr)	*85*		*70 - 127*
4-Bromofluorobenzene (Surr)	*96*		*78 - 120*
Dibromofluoromethane (Surr)	*91*		*77 - 120*
Toluene-d8 (Surr)	*95*		*80 - 125*

Method: 8260B - Volatile Organic Compounds (GC/MS) (Continued)

Lab Sample ID: 280-84597-2 MSD
Matrix: Water
Analysis Batch: 331583

Client Sample ID: ADDV-038
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
1,1,1-Trichloroethane	35		5.00	37.3	4	ug/L		39	65 - 135	4	20
1,1-Dichloroethane	180	E	5.00	166	E 4	ug/L		-198	65 - 135	3	21
1,1-Dichloroethene	ND		5.00	5.22		ug/L		104	65 - 136	0	20
1,2-Dichloroethane	1.2		5.00	6.25		ug/L		101	65 - 135	1	20
Methyl ethyl ketone (MEK)	ND		20.0	23.2		ug/L		116	44 - 177	1	32
Acetone	7.4	J	20.0	26.7		ug/L		96	39 - 156	5	23
Benzene	1.1		5.00	6.19		ug/L		103	65 - 135	2	20
Chloroethane	15		5.00	18.8		ug/L		83	46 - 136	1	25
cis-1,2-Dichloroethene	100	E	5.00	101	E 4	ug/L		-68	65 - 135	3	20
Ethylbenzene	8.2		5.00	12.5		ug/L		87	65 - 135	6	20
Methylene Chloride	ND		5.00	5.10		ug/L		102	54 - 141	1	26
m-Xylene & p-Xylene	11		5.00	14.7		ug/L		79	65 - 135	5	20
o-Xylene	1.8		5.00	7.07		ug/L		106	65 - 135	4	20
Styrene	ND		5.00	4.97		ug/L		99	65 - 135	4	26
Tetrachloroethene	0.42	J	5.00	5.16		ug/L		95	65 - 135	5	20
Toluene	1.4		5.00	6.57		ug/L		104	65 - 135	3	20
trans-1,2-Dichloroethene	1.1		5.00	6.27		ug/L		104	65 - 135	2	24
Trichloroethene	1.3		5.00	6.10		ug/L		96	65 - 135	2	20
Vinyl chloride	170	E	5.00	158	E 4	ug/L		-159	40 - 137	2	24
Xylenes, Total	13		10.0	21.8		ug/L		90	65 - 135	5	20

Surrogate	*MSD %Recovery*	*MSD Qualifier*	*Limits*
1,2-Dichloroethane-d4 (Surr)	*84*		*70 - 127*
4-Bromofluorobenzene (Surr)	*97*		*78 - 120*
Dibromofluoromethane (Surr)	*89*		*77 - 120*
Toluene-d8 (Surr)	*94*		*80 - 125*

Lab Sample ID: MB 280-331767/6
Matrix: Water
Analysis Batch: 331767

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1,1-Trichloroethane	ND		1.0	0.16	ug/L			06/29/16 08:58	1
1,1-Dichloroethane	ND		1.0	0.22	ug/L			06/29/16 08:58	1
1,1-Dichloroethene	ND		1.0	0.23	ug/L			06/29/16 08:58	1
1,2-Dichloroethane	ND		1.0	0.13	ug/L			06/29/16 08:58	1
Methyl ethyl ketone (MEK)	ND		6.0	2.0	ug/L			06/29/16 08:58	1
Acetone	ND		10	1.9	ug/L			06/29/16 08:58	1
Benzene	ND		1.0	0.16	ug/L			06/29/16 08:58	1
Chloroethane	ND		2.0	0.41	ug/L			06/29/16 08:58	1
cis-1,2-Dichloroethene	ND		1.0	0.15	ug/L			06/29/16 08:58	1
Ethylbenzene	ND		1.0	0.16	ug/L			06/29/16 08:58	1
Methylene Chloride	ND		2.0	0.32	ug/L			06/29/16 08:58	1
m-Xylene & p-Xylene	ND		2.0	0.34	ug/L			06/29/16 08:58	1
o-Xylene	ND		1.0	0.19	ug/L			06/29/16 08:58	1
Styrene	ND		1.0	0.17	ug/L			06/29/16 08:58	1
Tetrachloroethene	ND		1.0	0.20	ug/L			06/29/16 08:58	1
Toluene	ND		1.0	0.17	ug/L			06/29/16 08:58	1

Method: 8260B - Volatile Organic Compounds (GC/MS) (Continued)

Lab Sample ID: MB 280-331767/6
Matrix: Water
Analysis Batch: 331767

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
trans-1,2-Dichloroethene	ND		1.0	0.15	ug/L			06/29/16 08:58	1
Trichloroethene	ND		1.0	0.16	ug/L			06/29/16 08:58	1
Vinyl chloride	ND		1.0	0.10	ug/L			06/29/16 08:58	1
Xylenes, Total	ND		2.0	0.19	ug/L			06/29/16 08:58	1

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*85*		*70 - 127*		*06/29/16 08:58*	*1*
4-Bromofluorobenzene (Surr)	*106*		*78 - 120*		*06/29/16 08:58*	*1*
Dibromofluoromethane (Surr)	*92*		*77 - 120*		*06/29/16 08:58*	*1*
Toluene-d8 (Surr)	*98*		*80 - 125*		*06/29/16 08:58*	*1*

Lab Sample ID: LCS 280-331767/4
Matrix: Water
Analysis Batch: 331767

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
1,1,1-Trichloroethane	5.00	5.29		ug/L		106	65 - 135
1,1-Dichloroethane	5.00	5.38		ug/L		108	65 - 135
1,1-Dichloroethene	5.00	5.25		ug/L		105	65 - 136
1,2-Dichloroethane	5.00	5.50		ug/L		110	65 - 135
Methyl ethyl ketone (MEK)	20.0	20.9		ug/L		104	44 - 177
Acetone	20.0	21.6		ug/L		108	39 - 156
Benzene	5.00	5.49		ug/L		110	65 - 135
Chloroethane	5.00	5.16		ug/L		103	46 - 136
cis-1,2-Dichloroethene	5.00	5.45		ug/L		109	65 - 135
Ethylbenzene	5.00	5.29		ug/L		106	65 - 135
Methylene Chloride	5.00	5.54		ug/L		111	54 - 141
m-Xylene & p-Xylene	5.00	5.24		ug/L		105	65 - 135
o-Xylene	5.00	5.39		ug/L		108	65 - 135
Styrene	5.00	4.94		ug/L		99	65 - 135
Tetrachloroethene	5.00	5.08		ug/L		102	65 - 135
Toluene	5.00	5.76		ug/L		115	65 - 135
trans-1,2-Dichloroethene	5.00	5.47		ug/L		109	65 - 135
Trichloroethene	5.00	5.26		ug/L		105	65 - 135
Vinyl chloride	5.00	5.50		ug/L		110	40 - 137
Xylenes, Total	10.0	10.6		ug/L		106	65 - 135

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
1,2-Dichloroethane-d4 (Surr)	*87*		*70 - 127*
4-Bromofluorobenzene (Surr)	*95*		*78 - 120*
Dibromofluoromethane (Surr)	*88*		*77 - 120*
Toluene-d8 (Surr)	*95*		*80 - 125*

Method: 8260B - Volatile Organic Compounds (GC/MS) (Continued)

Lab Sample ID: 280-84595-D-3 MS
Matrix: Water
Analysis Batch: 331767

Client Sample ID: Matrix Spike
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
1,1,1-Trichloroethane	ND		5.00	5.38		ug/L		108	65 - 135
1,1-Dichloroethane	ND		5.00	5.20		ug/L		104	65 - 135
1,1-Dichloroethene	ND		5.00	5.10		ug/L		102	65 - 136
1,2-Dichloroethane	ND		5.00	5.10		ug/L		102	65 - 135
Methyl ethyl ketone (MEK)	ND		20.0	19.0		ug/L		95	44 - 177
Acetone	ND		20.0	18.1		ug/L		90	39 - 156
Benzene	ND		5.00	5.32		ug/L		106	65 - 135
Chloroethane	ND		5.00	5.07		ug/L		101	46 - 136
cis-1,2-Dichloroethene	ND		5.00	5.27		ug/L		105	65 - 135
Ethylbenzene	ND		5.00	5.21		ug/L		104	65 - 135
Methylene Chloride	ND		5.00	4.97		ug/L		99	54 - 141
m-Xylene & p-Xylene	ND		5.00	5.27		ug/L		105	65 - 135
o-Xylene	ND		5.00	5.17		ug/L		103	65 - 135
Styrene	ND		5.00	4.62		ug/L		92	65 - 135
Tetrachloroethene	ND		5.00	5.18		ug/L		104	65 - 135
Toluene	ND		5.00	5.69		ug/L		114	65 - 135
trans-1,2-Dichloroethene	ND		5.00	5.32		ug/L		106	65 - 135
Trichloroethene	ND		5.00	5.10		ug/L		102	65 - 135
Vinyl chloride	ND		5.00	5.51		ug/L		110	40 - 137
Xylenes, Total	ND		10.0	10.4		ug/L		104	65 - 135

Surrogate	*MS %Recovery*	*MS Qualifier*	*Limits*
1,2-Dichloroethane-d4 (Surr)	*80*		*70 - 127*
4-Bromofluorobenzene (Surr)	*92*		*78 - 120*
Dibromofluoromethane (Surr)	*88*		*77 - 120*
Toluene-d8 (Surr)	*93*		*80 - 125*

Lab Sample ID: 280-84595-D-3 MSD
Matrix: Water
Analysis Batch: 331767

Client Sample ID: Matrix Spike Duplicate
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
1,1,1-Trichloroethane	ND		5.00	5.55		ug/L		111	65 - 135	3	20
1,1-Dichloroethane	ND		5.00	5.32		ug/L		106	65 - 135	2	21
1,1-Dichloroethene	ND		5.00	5.37		ug/L		107	65 - 136	5	20
1,2-Dichloroethane	ND		5.00	5.11		ug/L		102	65 - 135	0	20
Methyl ethyl ketone (MEK)	ND		20.0	19.6		ug/L		98	44 - 177	3	32
Acetone	ND		20.0	18.9		ug/L		94	39 - 156	4	23
Benzene	ND		5.00	5.43		ug/L		109	65 - 135	2	20
Chloroethane	ND		5.00	5.24		ug/L		105	46 - 136	3	25
cis-1,2-Dichloroethene	ND		5.00	5.46		ug/L		109	65 - 135	4	20
Ethylbenzene	ND		5.00	5.41		ug/L		108	65 - 135	4	20
Methylene Chloride	ND		5.00	5.10		ug/L		102	54 - 141	3	26
m-Xylene & p-Xylene	ND		5.00	5.38		ug/L		108	65 - 135	2	20
o-Xylene	ND		5.00	5.38		ug/L		108	65 - 135	4	20
Styrene	ND		5.00	4.82		ug/L		96	65 - 135	4	26
Tetrachloroethene	ND		5.00	5.42		ug/L		108	65 - 135	4	20
Toluene	ND		5.00	5.85		ug/L		117	65 - 135	3	20

Method: 8260B - Volatile Organic Compounds (GC/MS) (Continued)

Lab Sample ID: 280-84595-D-3 MSD — **Client Sample ID: Matrix Spike Duplicate**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 331767

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
trans-1,2-Dichloroethene	ND		5.00	5.50		ug/L		110	65 - 135	3	24
Trichloroethene	ND		5.00	5.30		ug/L		106	65 - 135	4	20
Vinyl chloride	ND		5.00	5.69		ug/L		114	40 - 137	3	24
Xylenes, Total	ND		10.0	10.8		ug/L		108	65 - 135	3	20

Surrogate	*MSD %Recovery*	*MSD Qualifier*	*Limits*
1,2-Dichloroethane-d4 (Surr)	*81*		*70 - 127*
4-Bromofluorobenzene (Surr)	*94*		*78 - 120*
Dibromofluoromethane (Surr)	*87*		*77 - 120*
Toluene-d8 (Surr)	*94*		*80 - 125*

Method: RSK-175 - Dissolved Gases (GC)

Lab Sample ID: MB 280-331723/7 — **Client Sample ID: Method Blank**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 331723

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Methane	ND		5.0	0.22	ug/L			06/28/16 19:12	1
Ethene	ND		5.0	0.40	ug/L			06/28/16 19:12	1
Ethane	ND		5.0	0.57	ug/L			06/28/16 19:12	1

Lab Sample ID: LCS 280-331723/5 — **Client Sample ID: Lab Control Sample**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 331723

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Methane	146	156		ug/L		107	75 - 125
Ethene	255	272		ug/L		106	75 - 125
Ethane	274	300		ug/L		110	75 - 125

Lab Sample ID: LCSD 280-331723/6 — **Client Sample ID: Lab Control Sample Dup**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 331723

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Methane	146	164		ug/L		112	75 - 125	5	20
Ethene	255	281		ug/L		110	75 - 125	3	20
Ethane	274	313		ug/L		114	75 - 125	4	20

Lab Sample ID: 320-19731-F-14 MS — **Client Sample ID: Matrix Spike**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 331723

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Methane	150		146	289		ug/L		96	52 - 145
Ethene	ND		255	265		ug/L		104	75 - 131
Ethane	ND		274	322		ug/L		118	75 - 125

Method: RSK-175 - Dissolved Gases (GC) (Continued)

Lab Sample ID: 320-19731-F-14 MSD — **Client Sample ID: Matrix Spike Duplicate**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 331723

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Methane	150		146	285		ug/L		93	52 - 145	1	20
Ethene	ND		255	263		ug/L		103	75 - 131	0	20
Ethane	ND		274	319		ug/L		117	75 - 125	1	20

Lab Sample ID: 280-84605-H-2 DU — **Client Sample ID: Duplicate**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 331723

Analyte	Sample Result	Sample Qualifier		DU Result	DU Qualifier	Unit	D			RPD	RPD Limit
Methane	1800			1760		ug/L				3	20
Ethene	4.7	J		4.47	J	ug/L				4	20
Ethane	ND			ND		ug/L				NC	20

Method: 300.0 - Anions, Ion Chromatography

Lab Sample ID: MB 280-330208/6 — **Client Sample ID: Method Blank**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 330208

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Nitrate as N	ND		0.50	0.042	mg/L			06/17/16 11:05	1

Lab Sample ID: LCS 280-330208/4 — **Client Sample ID: Lab Control Sample**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 330208

Analyte			Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits		
Nitrate as N			5.00	5.07		mg/L		101	90 - 110		

Lab Sample ID: LCSD 280-330208/5 — **Client Sample ID: Lab Control Sample Dup**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 330208

Analyte			Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Nitrate as N			5.00	5.07		mg/L		101	90 - 110	0	10

Lab Sample ID: MRL 280-330208/3 — **Client Sample ID: Lab Control Sample**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 330208

Analyte			Spike Added	MRL Result	MRL Qualifier	Unit	D	%Rec	%Rec. Limits		
Nitrate as N			0.200	0.206	J	mg/L		103	50 - 150		

Lab Sample ID: 280-84597-9 MS — **Client Sample ID: ADDV-044**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 330208

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits		
Nitrate as N	ND		5.00	5.58		mg/L		112	80 - 120		

Method: 300.0 - Anions, Ion Chromatography (Continued)

Lab Sample ID: 280-84597-9 MSD — **Client Sample ID: ADDV-044**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 330208

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Nitrate as N	ND		5.00	5.60		mg/L		112	80 - 120	0	20

Lab Sample ID: 280-84597-9 DU — **Client Sample ID: ADDV-044**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 330208

Analyte	Sample Result	Sample Qualifier		DU Result	DU Qualifier	Unit	D			RPD	RPD Limit
Nitrate as N	ND			ND		mg/L				NC	15

Lab Sample ID: MB 280-330209/6 — **Client Sample ID: Method Blank**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 330209

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	ND		3.0	0.25	mg/L			06/17/16 11:05	1
Sulfate	ND		5.0	0.23	mg/L			06/17/16 11:05	1

Lab Sample ID: LCS 280-330209/4 — **Client Sample ID: Lab Control Sample**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 330209

Analyte			Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits		
Chloride			100	101		mg/L		101	90 - 110		
Sulfate			100	101		mg/L		101	90 - 110		

Lab Sample ID: LCSD 280-330209/5 — **Client Sample ID: Lab Control Sample Dup**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 330209

Analyte			Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Chloride			100	101		mg/L		101	90 - 110	0	10
Sulfate			100	101		mg/L		101	90 - 110	0	10

Lab Sample ID: MRL 280-330209/3 — **Client Sample ID: Lab Control Sample**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 330209

Analyte			Spike Added	MRL Result	MRL Qualifier	Unit	D	%Rec	%Rec. Limits		
Chloride			2.50	2.53	J	mg/L		101	50 - 150		
Sulfate			2.50	2.53	J	mg/L		101	50 - 150		

Lab Sample ID: 280-84597-9 MS — **Client Sample ID: ADDV-044**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 330209

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits		
Chloride	ND		25.0	28.5		mg/L		114	80 - 120		
Sulfate	ND		25.0	28.5		mg/L		114	80 - 120		

Method: 300.0 - Anions, Ion Chromatography (Continued)

Lab Sample ID: 280-84597-9 MSD — **Client Sample ID: ADDV-044**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 330209

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Chloride	ND		25.0	28.6		mg/L		114	80 - 120	0	20
Sulfate	ND		25.0	28.5		mg/L		114	80 - 120	0	20

Lab Sample ID: 280-84597-9 DU — **Client Sample ID: ADDV-044**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 330209

Analyte	Sample Result	Sample Qualifier		DU Result	DU Qualifier	Unit	D			RPD	RPD Limit
Chloride	ND			ND		mg/L				NC	15
Sulfate	ND			ND		mg/L				NC	15

Lab Sample ID: MB 280-331413/6 — **Client Sample ID: Method Blank**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 331413

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	ND		3.0	0.25	mg/L			06/27/16 12:13	1

Lab Sample ID: LCS 280-331413/4 — **Client Sample ID: Lab Control Sample**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 331413

Analyte			Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits		
Chloride			100	95.7		mg/L		96	90 - 110		

Lab Sample ID: LCSD 280-331413/5 — **Client Sample ID: Lab Control Sample Dup**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 331413

Analyte			Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Chloride			100	95.7		mg/L		96	90 - 110	0	10

Lab Sample ID: MRL 280-331413/3 — **Client Sample ID: Lab Control Sample**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 331413

Analyte			Spike Added	MRL Result	MRL Qualifier	Unit	D	%Rec	%Rec. Limits		
Chloride			2.50	2.35	J	mg/L		94	50 - 150		

Lab Sample ID: 280-84597-2 MS — **Client Sample ID: ADDV-038**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 331413

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits		
Chloride	80	F1	25.0	110		mg/L		120	80 - 120		

Method: 300.0 - Anions, Ion Chromatography (Continued)

Lab Sample ID: 280-84597-2 MSD — **Client Sample ID: ADDV-038**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 331413

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Chloride	80	F1	25.0	111	F1	mg/L		125	80 - 120	1	20

Lab Sample ID: 280-84597-2 DU — **Client Sample ID: ADDV-038**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 331413

Analyte	Sample Result	Sample Qualifier		DU Result	DU Qualifier	Unit	D			RPD	RPD Limit
Chloride	80	F1		84.4		mg/L				5	15

Method: 9060 - Organic Carbon, Total (TOC)

Lab Sample ID: MB 280-331020/4 — **Client Sample ID: Method Blank**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 331020

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Organic Carbon - Average	ND		1.0	0.16	mg/L			06/22/16 15:39	1

Lab Sample ID: LCS 280-331020/3 — **Client Sample ID: Lab Control Sample**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 331020

Analyte			Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits		
Total Organic Carbon - Average			25.0	24.6		mg/L		98	88 - 112		

Lab Sample ID: 280-84538-D-16 MS — **Client Sample ID: Matrix Spike**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 331020

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits		
Total Organic Carbon - Average	2.7		25.0	27.1		mg/L		98	88 - 112		

Lab Sample ID: 280-84538-D-16 MSD — **Client Sample ID: Matrix Spike Duplicate**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 331020

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Total Organic Carbon - Average	2.7		25.0	26.7		mg/L		96	88 - 112	1	15

Lab Sample ID: 320-19563-E-3 MS — **Client Sample ID: Matrix Spike**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 331020

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits		
Total Organic Carbon - Average	0.85	J	25.0	25.2		mg/L		97	88 - 112		

Method: 9060 - Organic Carbon, Total (TOC) (Continued)

Lab Sample ID: 320-19563-E-3 MSD — **Client Sample ID: Matrix Spike Duplicate**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 331020

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Total Organic Carbon - Average	0.85	J	25.0	25.2		mg/L		97	88 - 112	0	15

Lab Sample ID: MB 280-331173/4 — **Client Sample ID: Method Blank**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 331173

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Organic Carbon - Average	ND		1.0	0.16	mg/L			06/23/16 13:58	1

Lab Sample ID: LCS 280-331173/3 — **Client Sample ID: Lab Control Sample**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 331173

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Total Organic Carbon - Average	25.0	25.3		mg/L		101	88 - 112

Lab Sample ID: 280-84597-2 MS — **Client Sample ID: ADDV-038**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 331173

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Total Organic Carbon - Average	14		25.0	39.4		mg/L		102	88 - 112

Lab Sample ID: 280-84597-2 MSD — **Client Sample ID: ADDV-038**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 331173

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Total Organic Carbon - Average	14		25.0	39.2		mg/L		102	88 - 112	0	15

Method: SM 2320B - Alkalinity

Lab Sample ID: MB 280-331257/52 — **Client Sample ID: Method Blank**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 331257

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Alkalinity	ND		5.0	1.1	mg/L			06/24/16 17:13	1

Lab Sample ID: LCS 280-331257/51 — **Client Sample ID: Lab Control Sample**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 331257

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Alkalinity	200	218		mg/L		109	90 - 110

Method: SM 2320B - Alkalinity (Continued)

Lab Sample ID: 280-84592-B-1 DU — **Client Sample ID: Duplicate**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 331257

Analyte	Sample Result	Sample Qualifier		DU Result	DU Qualifier	Unit	D			RPD	RPD Limit
Alkalinity	77			78.6		mg/L				2	10

Method: SM 4500 S2 F - Sulfide, Total

Lab Sample ID: MB 280-330284/2 — **Client Sample ID: Method Blank**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 330284

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Sulfide	ND		1.0	0.50	mg/L			06/17/16 15:49	1

Lab Sample ID: MB 280-330284/24 — **Client Sample ID: Method Blank**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 330284

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Sulfide	ND		1.0	0.50	mg/L			06/17/16 15:49	1

Lab Sample ID: LCS 280-330284/1 — **Client Sample ID: Lab Control Sample**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 330284

Analyte			Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits		
Sulfide			26.5	27.0		mg/L		102	90 - 110		

Lab Sample ID: LCS 280-330284/23 — **Client Sample ID: Lab Control Sample**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 330284

Analyte			Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits		
Sulfide			26.5	26.4		mg/L		100	90 - 110		

Lab Sample ID: 280-84538-G-16 MSD — **Client Sample ID: Matrix Spike Duplicate**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 330284

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Sulfide	ND		26.5	27.8		mg/L		105	90 - 110	2	10

Lab Sample ID: 280-84538-I-16 MS — **Client Sample ID: Matrix Spike**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 330284

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits		
Sulfide	ND		26.5	28.4		mg/L		107	90 - 110		

QC Sample Results

Client: CH2M Hill, Inc.
Project/Site: THAN Davenport, IA - June 2016

TestAmerica Job ID: 280-84597-1

Method: SM3500_FE_D - Ferrous Iron

Lab Sample ID: MB 280-330294/10
Matrix: Water
Analysis Batch: 330294

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Ferrous Iron	ND		0.20	0.021	mg/L			06/17/16 18:20	1

Lab Sample ID: LCS 280-330294/9
Matrix: Water
Analysis Batch: 330294

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte			Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits		
Ferrous Iron			2.00	1.89		mg/L		95	85 - 113		

Lab Sample ID: 280-84597-6 MS
Matrix: Water
Analysis Batch: 330294

Client Sample ID: ADDV-045
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits		
Ferrous Iron	ND	HF	2.00	1.94		mg/L		97	85 - 113		

Lab Sample ID: 280-84597-6 MSD
Matrix: Water
Analysis Batch: 330294

Client Sample ID: ADDV-045
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Ferrous Iron	ND	HF	2.00	1.93		mg/L		96	85 - 113	0	10

Lab Sample ID: 280-84597-6 DU
Matrix: Water
Analysis Batch: 330294

Client Sample ID: ADDV-045
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier		DU Result	DU Qualifier	Unit	D			RPD	RPD Limit
Ferrous Iron	ND	HF		ND		mg/L				NC	10

QC Association Summary

Client: CH2M Hill, Inc.
Project/Site: THAN Davenport, IA - June 2016

TestAmerica Job ID: 280-84597-1

GC/MS VOA

Analysis Batch: 331583

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
280-84597-1	ADDV-049	Total/NA	Water	8260B	
280-84597-2	ADDV-038	Total/NA	Water	8260B	
280-84597-2 - DL	ADDV-038	Total/NA	Water	8260B	
280-84597-2 MS	ADDV-038	Total/NA	Water	8260B	
280-84597-2 MSD	ADDV-038	Total/NA	Water	8260B	
280-84597-3	ADDV-039	Total/NA	Water	8260B	
280-84597-4	ADDV-037	Total/NA	Water	8260B	
280-84597-4 - DL	ADDV-037	Total/NA	Water	8260B	
280-84597-6	ADDV-045	Total/NA	Water	8260B	
280-84597-7	ADDV-036	Total/NA	Water	8260B	
280-84597-7 - DL	ADDV-036	Total/NA	Water	8260B	
280-84597-8	ADDV-035	Total/NA	Water	8260B	
280-84597-8 - DL	ADDV-035	Total/NA	Water	8260B	
280-84597-9	ADDV-044	Total/NA	Water	8260B	
280-84597-10	ADDV-050	Total/NA	Water	8260B	
280-84597-11	ADDV-014	Total/NA	Water	8260B	
280-84597-11 - DL	ADDV-014	Total/NA	Water	8260B	
280-84597-12	ADDV-015	Total/NA	Water	8260B	
280-84597-12 - DL	ADDV-015	Total/NA	Water	8260B	
LCS 280-331583/4	Lab Control Sample	Total/NA	Water	8260B	
MB 280-331583/6	Method Blank	Total/NA	Water	8260B	

Analysis Batch: 331767

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
280-84595-D-3 MS	Matrix Spike	Total/NA	Water	8260B	
280-84595-D-3 MSD	Matrix Spike Duplicate	Total/NA	Water	8260B	
280-84597-13	ADDV-023	Total/NA	Water	8260B	
LCS 280-331767/4	Lab Control Sample	Total/NA	Water	8260B	
MB 280-331767/6	Method Blank	Total/NA	Water	8260B	

GC VOA

Analysis Batch: 331723

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
280-84597-6	ADDV-045	Total/NA	Water	RSK-175	
280-84597-9	ADDV-044	Total/NA	Water	RSK-175	
280-84597-13	ADDV-023	Total/NA	Water	RSK-175	
280-84605-H-2 DU	Duplicate	Total/NA	Water	RSK-175	
320-19731-F-14 MS	Matrix Spike	Total/NA	Water	RSK-175	
320-19731-F-14 MSD	Matrix Spike Duplicate	Total/NA	Water	RSK-175	
LCS 280-331723/5	Lab Control Sample	Total/NA	Water	RSK-175	
LCSD 280-331723/6	Lab Control Sample Dup	Total/NA	Water	RSK-175	
MB 280-331723/7	Method Blank	Total/NA	Water	RSK-175	

General Chemistry

Analysis Batch: 330208

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
280-84597-6	ADDV-045	Total/NA	Water	300.0	
280-84597-9	ADDV-044	Total/NA	Water	300.0	

General Chemistry (Continued)

Analysis Batch: 330208 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
280-84597-9 DU	ADDV-044	Total/NA	Water	300.0	
280-84597-9 MS	ADDV-044	Total/NA	Water	300.0	
280-84597-9 MSD	ADDV-044	Total/NA	Water	300.0	
280-84597-13	ADDV-023	Total/NA	Water	300.0	
LCS 280-330208/4	Lab Control Sample	Total/NA	Water	300.0	
LCSD 280-330208/5	Lab Control Sample Dup	Total/NA	Water	300.0	
MB 280-330208/6	Method Blank	Total/NA	Water	300.0	
MRL 280-330208/3	Lab Control Sample	Total/NA	Water	300.0	

Analysis Batch: 330209

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
280-84597-6	ADDV-045	Total/NA	Water	300.0	
280-84597-9	ADDV-044	Total/NA	Water	300.0	
280-84597-9 DU	ADDV-044	Total/NA	Water	300.0	
280-84597-9 MS	ADDV-044	Total/NA	Water	300.0	
280-84597-9 MSD	ADDV-044	Total/NA	Water	300.0	
280-84597-13	ADDV-023	Total/NA	Water	300.0	
LCS 280-330209/4	Lab Control Sample	Total/NA	Water	300.0	
LCSD 280-330209/5	Lab Control Sample Dup	Total/NA	Water	300.0	
MB 280-330209/6	Method Blank	Total/NA	Water	300.0	
MRL 280-330209/3	Lab Control Sample	Total/NA	Water	300.0	

Analysis Batch: 330284

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
280-84538-G-16 MSD	Matrix Spike Duplicate	Total/NA	Water	SM 4500 S2 F	
280-84538-I-16 MS	Matrix Spike	Total/NA	Water	SM 4500 S2 F	
280-84597-6	ADDV-045	Total/NA	Water	SM 4500 S2 F	
280-84597-9	ADDV-044	Total/NA	Water	SM 4500 S2 F	
280-84597-13	ADDV-023	Total/NA	Water	SM 4500 S2 F	
LCS 280-330284/1	Lab Control Sample	Total/NA	Water	SM 4500 S2 F	
LCS 280-330284/23	Lab Control Sample	Total/NA	Water	SM 4500 S2 F	
MB 280-330284/2	Method Blank	Total/NA	Water	SM 4500 S2 F	
MB 280-330284/24	Method Blank	Total/NA	Water	SM 4500 S2 F	

Analysis Batch: 330294

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
280-84597-6	ADDV-045	Total/NA	Water	SM3500_FE_D	
280-84597-6 DU	ADDV-045	Total/NA	Water	SM3500_FE_D	
280-84597-6 MS	ADDV-045	Total/NA	Water	SM3500_FE_D	
280-84597-6 MSD	ADDV-045	Total/NA	Water	SM3500_FE_D	
280-84597-9	ADDV-044	Total/NA	Water	SM3500_FE_D	
280-84597-13	ADDV-023	Total/NA	Water	SM3500_FE_D	
LCS 280-330294/9	Lab Control Sample	Total/NA	Water	SM3500_FE_D	
MB 280-330294/10	Method Blank	Total/NA	Water	SM3500_FE_D	

Analysis Batch: 331020

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
280-84538-D-16 MS	Matrix Spike	Total/NA	Water	9060	
280-84538-D-16 MSD	Matrix Spike Duplicate	Total/NA	Water	9060	
280-84597-3	ADDV-039	Total/NA	Water	9060	
280-84597-4	ADDV-037	Total/NA	Water	9060	

General Chemistry (Continued)

Analysis Batch: 331020 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
280-84597-6	ADDV-045	Total/NA	Water	9060	
280-84597-7	ADDV-036	Total/NA	Water	9060	
280-84597-8	ADDV-035	Total/NA	Water	9060	
280-84597-9	ADDV-044	Total/NA	Water	9060	
280-84597-11	ADDV-014	Total/NA	Water	9060	
320-19563-E-3 MS	Matrix Spike	Total/NA	Water	9060	
320-19563-E-3 MSD	Matrix Spike Duplicate	Total/NA	Water	9060	
LCS 280-331020/3	Lab Control Sample	Total/NA	Water	9060	
MB 280-331020/4	Method Blank	Total/NA	Water	9060	

Analysis Batch: 331173

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
280-84597-2	ADDV-038	Total/NA	Water	9060	
280-84597-2 MS	ADDV-038	Total/NA	Water	9060	
280-84597-2 MSD	ADDV-038	Total/NA	Water	9060	
280-84597-12	ADDV-015	Total/NA	Water	9060	
280-84597-13	ADDV-023	Total/NA	Water	9060	
LCS 280-331173/3	Lab Control Sample	Total/NA	Water	9060	
MB 280-331173/4	Method Blank	Total/NA	Water	9060	

Analysis Batch: 331257

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
280-84592-B-1 DU	Duplicate	Total/NA	Water	SM 2320B	
280-84597-6	ADDV-045	Total/NA	Water	SM 2320B	
280-84597-9	ADDV-044	Total/NA	Water	SM 2320B	
280-84597-13	ADDV-023	Total/NA	Water	SM 2320B	
LCS 280-331257/51	Lab Control Sample	Total/NA	Water	SM 2320B	
MB 280-331257/52	Method Blank	Total/NA	Water	SM 2320B	

Analysis Batch: 331413

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
280-84597-2	ADDV-038	Total/NA	Water	300.0	
280-84597-2 DU	ADDV-038	Total/NA	Water	300.0	
280-84597-2 MS	ADDV-038	Total/NA	Water	300.0	
280-84597-2 MSD	ADDV-038	Total/NA	Water	300.0	
280-84597-3	ADDV-039	Total/NA	Water	300.0	
280-84597-4	ADDV-037	Total/NA	Water	300.0	
280-84597-5	ADDV-043	Total/NA	Water	300.0	
280-84597-7	ADDV-036	Total/NA	Water	300.0	
280-84597-8	ADDV-035	Total/NA	Water	300.0	
280-84597-11	ADDV-014	Total/NA	Water	300.0	
280-84597-12	ADDV-015	Total/NA	Water	300.0	
LCS 280-331413/4	Lab Control Sample	Total/NA	Water	300.0	
LCSD 280-331413/5	Lab Control Sample Dup	Total/NA	Water	300.0	
MB 280-331413/6	Method Blank	Total/NA	Water	300.0	
MRL 280-331413/3	Lab Control Sample	Total/NA	Water	300.0	

Lab Chronicle

Client: CH2M Hill, Inc.
Project/Site: THAN Davenport, IA - June 2016

TestAmerica Job ID: 280-84597-1

Client Sample ID: ADDV-049
Date Collected: 06/16/16 11:30
Date Received: 06/17/16 10:00

Lab Sample ID: 280-84597-1
Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260B		1	20 mL	20 mL	331583	06/28/16 11:55	TAW	TAL DEN

Client Sample ID: ADDV-038
Date Collected: 06/16/16 09:05
Date Received: 06/17/16 10:00

Lab Sample ID: 280-84597-2
Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260B		1	20 mL	20 mL	331583	06/28/16 12:36	TAW	TAL DEN
Total/NA	Analysis	8260B	DL	10	20 mL	20 mL	331583	06/28/16 12:57	TAW	TAL DEN
Total/NA	Analysis	300.0		1	5 mL	5 mL	331413	06/27/16 13:40	AFB	TAL DEN
Total/NA	Analysis	9060		1			331173	06/23/16 15:44	CCJ	TAL DEN

Client Sample ID: ADDV-039
Date Collected: 06/16/16 08:50
Date Received: 06/17/16 10:00

Lab Sample ID: 280-84597-3
Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260B		1	20 mL	20 mL	331583	06/28/16 13:59	TAW	TAL DEN
Total/NA	Analysis	300.0		1	5 mL	5 mL	331413	06/27/16 14:59	AFB	TAL DEN
Total/NA	Analysis	9060		1			331020	06/22/16 23:09	CCJ	TAL DEN

Client Sample ID: ADDV-037
Date Collected: 06/16/16 11:05
Date Received: 06/17/16 10:00

Lab Sample ID: 280-84597-4
Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260B		5	20 mL	20 mL	331583	06/28/16 14:19	TAW	TAL DEN
Total/NA	Analysis	8260B	DL	50	20 mL	20 mL	331583	06/28/16 14:40	TAW	TAL DEN
Total/NA	Analysis	300.0		1	5 mL	5 mL	331413	06/27/16 15:19	AFB	TAL DEN
Total/NA	Analysis	9060		1			331020	06/22/16 19:38	CCJ	TAL DEN

Client Sample ID: ADDV-043
Date Collected: 06/16/16 11:00
Date Received: 06/17/16 10:00

Lab Sample ID: 280-84597-5
Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	300.0		50	5 mL	5 mL	331413	06/27/16 15:39	AFB	TAL DEN

Client Sample ID: ADDV-045 — Lab Sample ID: 280-84597-6

Date Collected: 06/16/16 12:10 — **Matrix: Water**
Date Received: 06/17/16 10:00

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260B		1	20 mL	20 mL	331583	06/28/16 15:01	TAW	TAL DEN
Total/NA	Analysis	RSK-175		1	18 mL	18 mL	331723	06/28/16 19:54	MPS	TAL DEN
Total/NA	Analysis	300.0		1	5 mL	5 mL	330208	06/17/16 14:18	AFB	TAL DEN
Total/NA	Analysis	300.0		1	5 mL	5 mL	330209	06/17/16 14:18	AFB	TAL DEN
Total/NA	Analysis	9060		1			331020	06/22/16 19:55	CCJ	TAL DEN
Total/NA	Analysis	SM 2320B		1	1 mL		331257	06/24/16 17:59	IEU	TAL DEN
Total/NA	Analysis	SM 4500 S2 F		1	200 mL	200 mL	330284	06/17/16 15:49	KAM	TAL DEN
Total/NA	Analysis	SM3500_FE_D		1	10 mL	10 mL	330294	06/17/16 18:20	NAP	TAL DEN

Client Sample ID: ADDV-036 — Lab Sample ID: 280-84597-7

Date Collected: 06/16/16 12:00 — **Matrix: Water**
Date Received: 06/17/16 10:00

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260B		200	20 mL	20 mL	331583	06/28/16 15:21	TAW	TAL DEN
Total/NA	Analysis	8260B	DL	2000	20 mL	20 mL	331583	06/28/16 15:42	TAW	TAL DEN
Total/NA	Analysis	300.0		1	5 mL	5 mL	331413	06/27/16 15:59	AFB	TAL DEN
Total/NA	Analysis	9060		1			331020	06/22/16 20:10	CCJ	TAL DEN

Client Sample ID: ADDV-035 — Lab Sample ID: 280-84597-8

Date Collected: 06/16/16 11:55 — **Matrix: Water**
Date Received: 06/17/16 10:00

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260B		400	20 mL	20 mL	331583	06/28/16 16:03	TAW	TAL DEN
Total/NA	Analysis	8260B	DL	4000	20 mL	20 mL	331583	06/28/16 16:24	TAW	TAL DEN
Total/NA	Analysis	300.0		5	5 mL	5 mL	331413	06/27/16 23:17	AFB	TAL DEN
Total/NA	Analysis	9060		1			331020	06/22/16 20:24	CCJ	TAL DEN

Client Sample ID: ADDV-044 — Lab Sample ID: 280-84597-9

Date Collected: 06/16/16 12:00 — **Matrix: Water**
Date Received: 06/17/16 10:00

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260B		1	20 mL	20 mL	331583	06/28/16 16:44	TAW	TAL DEN
Total/NA	Analysis	RSK-175		1	18 mL	18 mL	331723	06/28/16 19:59	MPS	TAL DEN
Total/NA	Analysis	300.0		1	5 mL	5 mL	330208	06/17/16 14:35	AFB	TAL DEN
Total/NA	Analysis	300.0		1	5 mL	5 mL	330209	06/17/16 14:35	AFB	TAL DEN
Total/NA	Analysis	9060		1			331020	06/22/16 20:41	CCJ	TAL DEN
Total/NA	Analysis	SM 2320B		1	1 mL		331257	06/24/16 18:03	IEU	TAL DEN
Total/NA	Analysis	SM 4500 S2 F		1	200 mL	200 mL	330284	06/17/16 15:49	KAM	TAL DEN

Lab Chronicle

Client: CH2M Hill, Inc.
Project/Site: THAN Davenport, IA - June 2016

TestAmerica Job ID: 280-84597-1

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	SM3500_FE_D		1	10 mL	10 mL	330294	06/17/16 18:20	NAP	TAL DEN

Client Sample ID: ADDV-050 — Lab Sample ID: 280-84597-10

Date Collected: 06/16/16 12:30 — **Matrix: Water**
Date Received: 06/17/16 10:00

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260B		1	20 mL	20 mL	331583	06/28/16 12:15	TAW	TAL DEN

Client Sample ID: ADDV-014 — Lab Sample ID: 280-84597-11

Date Collected: 06/16/16 10:30 — **Matrix: Water**
Date Received: 06/17/16 10:00

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260B		5	20 mL	20 mL	331583	06/28/16 17:05	TAW	TAL DEN
Total/NA	Analysis	8260B	DL	50	20 mL	20 mL	331583	06/28/16 17:26	TAW	TAL DEN
Total/NA	Analysis	300.0		1	5 mL	5 mL	331413	06/27/16 16:39	AFB	TAL DEN
Total/NA	Analysis	9060		1			331020	06/22/16 20:56	CCJ	TAL DEN

Client Sample ID: ADDV-015 — Lab Sample ID: 280-84597-12

Date Collected: 06/16/16 10:35 — **Matrix: Water**
Date Received: 06/17/16 10:00

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260B		10	20 mL	20 mL	331583	06/28/16 17:47	TAW	TAL DEN
Total/NA	Analysis	8260B	DL	100	20 mL	20 mL	331583	06/28/16 18:07	TAW	TAL DEN
Total/NA	Analysis	300.0		1	5 mL	5 mL	331413	06/27/16 17:38	AFB	TAL DEN
Total/NA	Analysis	9060		1			331173	06/23/16 16:32	CCJ	TAL DEN

Client Sample ID: ADDV-023 — Lab Sample ID: 280-84597-13

Date Collected: 06/16/16 09:10 — **Matrix: Water**
Date Received: 06/17/16 10:00

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260B		1	20 mL	20 mL	331767	06/29/16 10:02	TAW	TAL DEN
Total/NA	Analysis	RSK-175		1	18 mL	18 mL	331723	06/28/16 20:03	MPS	TAL DEN
Total/NA	Analysis	300.0		1	5 mL	5 mL	330208	06/17/16 15:47	AFB	TAL DEN
Total/NA	Analysis	300.0		1	5 mL	5 mL	330209	06/17/16 15:47	AFB	TAL DEN
Total/NA	Analysis	9060		1			331173	06/23/16 17:16	CCJ	TAL DEN
Total/NA	Analysis	SM 2320B		1	1 mL		331257	06/24/16 18:07	IEU	TAL DEN
Total/NA	Analysis	SM 4500 S2 F		1	200 mL	200 mL	330284	06/17/16 15:49	KAM	TAL DEN
Total/NA	Analysis	SM3500_FE_D		1	10 mL	10 mL	330294	06/17/16 18:20	NAP	TAL DEN

Laboratory References:
TAL DEN = TestAmerica Denver, 4955 Yarrow Street, Arvada, CO 80002, TEL (303)736-0100

Certification Summary

Client: CH2M Hill, Inc.
Project/Site: THAN Davenport, IA - June 2016

TestAmerica Job ID: 280-84597-1

Laboratory: TestAmerica Denver

Unless otherwise noted, all analytes for this laboratory were covered under each certification below.

Authority	Program	EPA Region	Certification ID	Expiration Date
Florida	NELAP	4	E87667	06-30-16

The following analytes are included in this report, but are not certified under this certification:

Analysis Method	Prep Method	Matrix	Analyte
9060		Water	Total Organic Carbon - Average

The following analytes are included in this report, but certification is not offered by the governing authority:

Analysis Method	Prep Method	Matrix	Analyte
300.0		Water	Chloride
300.0		Water	Nitrate as N
300.0		Water	Sulfate

Iowa	State Program	7	370	11-30-16

The following analytes are included in this report, but certification is not offered by the governing authority:

Analysis Method	Prep Method	Matrix	Analyte
300.0		Water	Chloride
300.0		Water	Nitrate as N
300.0		Water	Sulfate
8260B		Water	1,1,1-Trichloroethane
8260B		Water	1,1-Dichloroethane
8260B		Water	1,1-Dichloroethene
8260B		Water	1,2-Dichloroethane
8260B		Water	Acetone
8260B		Water	Benzene
8260B		Water	Chloroethane
8260B		Water	cis-1,2-Dichloroethene
8260B		Water	Ethylbenzene
8260B		Water	Methyl ethyl ketone (MEK)
8260B		Water	Methylene Chloride
8260B		Water	m-Xylene & p-Xylene
8260B		Water	o-Xylene
8260B		Water	Styrene
8260B		Water	Tetrachloroethene
8260B		Water	Toluene
8260B		Water	trans-1,2-Dichloroethene
8260B		Water	Trichloroethene
8260B		Water	Vinyl chloride
8260B		Water	Xylenes, Total
9060		Water	Total Organic Carbon - Average
RSK-175		Water	Ethane
RSK-175		Water	Ethene
RSK-175		Water	Methane
SM3500_FE_D		Water	Ferrous Iron

Oregon	NELAP	10	4025	01-09-17

The following analytes are included in this report, but are not certified under this certification:

Analysis Method	Prep Method	Matrix	Analyte
9060		Water	Total Organic Carbon - Average
SM3500_FE_D		Water	Ferrous Iron

The following analytes are included in this report, but certification is not offered by the governing authority:

Analysis Method	Prep Method	Matrix	Analyte

Certification Summary

Client: CH2M Hill, Inc.
Project/Site: THAN Davenport, IA - June 2016

TestAmerica Job ID: 280-84597-1

Laboratory: TestAmerica Denver (Continued)

Unless otherwise noted, all analytes for this laboratory were covered under each certification below.

Authority	Program	EPA Region	Certification ID	Expiration Date
Oregon	NELAP	10	4025	01-09-17

The following analytes are included in this report, but certification is not offered by the governing authority:

Analysis Method	Prep Method	Matrix	Analyte
300.0		Water	Chloride
300.0		Water	Nitrate as N
300.0		Water	Sulfate

TestAmerica Denver
4955 Yarrow Street
Arvada, CO 80002
Phone (303) 736-0100 Fax (303) 431-7171

Chain of Custody Record

280-84597 Chain of Custody

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Client Information	Sampler: C Reuss	Lab PM: Ide, Jamie N	Carrier Tracking No(s): 809589104475
Client Contact: Ms. Shannon Olson	Phone: 414-847-0264	E-Mail: jamie.ide@testamericainc.com	COC No: 280-53595-19251.1
Company: CH2M Hill, Inc.			Page: Page 1 of 1
Address: 2020 SW 4th Ave Suite 300	Due Date Requested: standard		Job #:
City: Portland	TAT Requested (days): standard		
State, Zip: OR, 97201			
Phone: 503-736-4111(Tel) 503-736-2063(Fax)	PO #: 103817102176		
Email: shannon.olson@ch2m.com	WO #: 486615.14.18		
Project Name: THAN Davenport, IA - June 2016	Project #: 28013442		
Site: Davenport, IA	SSOW#:		

Analysis Requested

Preservation Codes:

A - HCL	M - Hexane
B - NaOH	N - None
C - Zn Acetate	O - AsNaO2
D - Nitric Acid	P - Na2O4S
E - NaHSO4	Q - Na2SO3
F - MeOH	R - Na2S2O3
G - Amchlor	S - H2SO4
H - Ascorbic Acid	T - TSP Dodecahydrate
I - Ice	U - Acetone
J - DI Water	V - MCAA
K - EDTA	W - ph 4-5
L - EDA	Z - other (specify)

Other:

Sample Identification	Sample Date	Sample Time	Sample Type (C=comp, G=grab)	Matrix (W=water, S=solid, O=waste/oil, BT=Tissue, A=Air)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	8260B - VOCs	9060 - TOC	300.0 - Chloride (only)	SM2320B 0 Alkalinity, 300.0 (Cl, NO3, SO4), 3500_FE_D Ferrous Iron	SM4500_S2_F - Total Sulfide	RSK-175 - Dissolved Gases	Total Number of containers	Special Instructions/Note:
			Preservation Code:				A	S	N	N	C/B	A		
ADDV-049	6/16/16	1130	G	W	N	N	X						2	
ADDV-038	6/16/16	905	G	W	N	Y	X	X	X				15	MS/MSD
ADDV-039	6/16/16	850	G	W	N	N	X	X	X				5	
ADDV-037	6/16/16	1105	G	W	N	N	X	X	X				5	
ADDV-043	6/16/16	1100	G	W	N	N	~~X~~	~~X~~	X				1	contains perpagonate chloride only
ADDV-045	6/16/16	1210	G	W	N	N	X	X	~~X~~	X	X	X	9	
ADDV-036	6/16/16	1200	G	W	N	N	X	X	X				5	
ADDV-035	6/16/16	1155	G	W	N	N	X	X	X				5	

Possible Hazard Identification
☒ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown ☐ Radiological

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
☐ Return To Client ☒ Disposal By Lab ☐ Archive For _____ Months

Deliverable Requested: I, II, III, IV, Other (specify) see SDW

Special Instructions/QC Requirements:

Empty Kit Relinquished by:	Date:	Time:	Method of Shipment:		
Relinquished by: [signature]	Date/Time: 6/16/16 / 1400	Company: CH2M	Received by: [signature]	Date/Time: 6/17/16 1000	Company: TAD
Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company

Custody Seals Intact: Δ Yes Δ No | Custody Seal No.: 735029/735030 | Cooler Temperature(s) °C and Other Remarks: 5.8, 2.8+0.0 IR#5 Transferred by DW 6/17/16

6/30/2016

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Chain of Custody Record

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Client Information	Sampler: C Reuss	Lab PM: Jamie Ide, 303-736-0126	Carrier Tracking No(s): 8095891044	COC No:
Client Contact: Ms. Shannon Olson	Phone: 414-847-0261	E-Mail: jamie.ide@testamericainc.com		Page: Page 1 of 1
Company: CH2M Hill, Inc.				Job #:
Address: 2020 SW 4th Ave, Suite 300	Due Date Requested: standard			
City: Portland	TAT Requested (days): standard			
State, Zip: OR, 97201				
Phone: 503-736-4111	PO #:			
Email: shannon.olson@ch2m.com	WO #:			
Project Name: THAN DAVENPORT - JUNE 2015 GW	Project #: 28013442			
Site: Davenport	SSOW#:			

Analysis Requested

Sample Identification	Sample Date	Sample Time	Sample Type (C=comp, G=grab)	Matrix (W=water, S=solid, O=waste/oil, BT=Tissue, A=Air)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	8260B - VOCs	9060 - TOC	300.0 - Nitrate	300.0 - Chloride	300.0 - Sulfate	2320B - Alkalinity	SM4500_S2_F - Sulfide	RSK-175 - Dissolved Gases (MEE)	3500_FE_E - Ferrous Iron					Total Number of containers	Special Instructions/Note:
			Preservation Code:				A	S	N	N	N	N	B/C	A	N						
ADDV-044	6/16/16	1200	G	W	N	N	X	X	X	X	X	X	X	X	X					9	Shortholds: Ferrous Iron, Nitrate(NO3)
ADDV-050	6/16/16	1030	G	W	N	N	X													2	
ADDV-014	6/16/16	1030	G	W	N	N	X	X		X										5	
ADDV-015	6/16/16	1035	G	W	N	N	X	X		X										5	
ADDV-023	6/16/16	0910	G	W	N	N	X	X	X	X	X	X	X	X	X					10	

Possible Hazard Identification
☒ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown ☐ Radiological

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
☐ Return To Client ☒ Disposal By Lab ☐ Archive For _____ Months

Deliverable Requested: I, II, III, IV, Other (specify) See SOW

Special Instructions/QC Requirements:

Empty Kit Relinquished by:	Date:	Time:	Method of Shipment:		
Relinquished by:	Date/Time: 6/16/16 / 1400	Company: CH2M	Received by:	Date/Time: 6/17/16 1000	Company: TAD
Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company

Custody Seals Intact: Δ Yes Δ No
Custody Seal No.: 498847 / 498848
Cooler Temperature(s) °C and Other Remarks:

Preservation Codes:

A - HCL	M - Hexane
B - NaOH	N - None
C - Zn Acetate	O - AsNaO2
D - Nitric Acid	P - Na2O4S
E - NaHSO4	Q - Na2SO3
F - MeOH	R - Na2S2SO3
G - Amchlor	S - H2SO4
H - Ascorbic Acid	T - TSP Dodecahydrate
I - Ice	U - Acetone
J - DI Water	V - MCAA
K - EDTA	W - ph 4-5
L - EDA	Z - other (specify)

Other:

Login Sample Receipt Checklist

Client: CH2M Hill, Inc.

Job Number: 280-84597-1

Login Number: 84597
List Number: 1
Creator: White, Denise E

List Source: TestAmerica Denver

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	N/A	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

ANALYTICAL REPORT

TestAmerica Laboratories, Inc.
TestAmerica Denver
4955 Yarrow Street
Arvada, CO 80002
Tel: (303)736-0100

TestAmerica Job ID: 280-84641-1
Client Project/Site: THAN Davenport, IA - June 2016

For:
CH2M Hill, Inc.
2020 SW 4th Ave
Suite 300
Portland, Oregon 97201

Attn: Ms. Shannon Olson

Authorized for release by:
7/7/2016 12:15:15 PM

Jamie Ide, Project Manager I
(303)736-0126
jamie.ide@testamericainc.com

LINKS

Review your project results through TotalAccess

Have a Question? Ask The Expert

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The test results in this report meet all 2003 NELAC and 2009 TNI requirements for accredited parameters, exceptions are noted in this report. This report may not be reproduced except in full, and with written approval from the laboratory. For questions please contact the Project Manager at the e-mail address or telephone number listed on this page.

This report has been electronically signed and authorized by the signatory. Electronic signature is intended to be the legally binding equivalent of a traditionally handwritten signature.

Results relate only to the items tested and the sample(s) as received by the laboratory.

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Definitions/Glossary

Client: CH2M Hill, Inc.
Project/Site: THAN Davenport, IA - June 2016

TestAmerica Job ID: 280-84641-1

Qualifiers

GC/MS VOA

Qualifier	Qualifier Description
J	Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.
4	MS, MSD: The analyte present in the original sample is greater than 4 times the matrix spike concentration; therefore, control limits are not applicable.
E	Result exceeded calibration range.

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
¤	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CNF	Contains no Free Liquid
DER	Duplicate error ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision level concentration
MDA	Minimum detectable activity
EDL	Estimated Detection Limit
MDC	Minimum detectable concentration
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
NC	Not Calculated
ND	Not detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
QC	Quality Control
RER	Relative error ratio
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)

Job ID: 280-84641-1

Laboratory: TestAmerica Denver

Narrative

CASE NARRATIVE
Client: CH2M Hill, Inc.
Project: THAN Davenport, IA - June 2016
Report Number: 280-84641-1

With the exceptions noted as flags or footnotes, standard analytical protocols were followed in the analysis of the samples and no problems were encountered or anomalies observed. In addition all laboratory quality control samples were within established control limits, with any exceptions noted below. Each sample was analyzed to achieve the lowest possible reporting limit within the constraints of the method. In some cases, due to interference or analytes present at high concentrations, samples were diluted. For diluted samples, the reporting limits are adjusted relative to the dilution required.

Calculations are performed before rounding to avoid round-off errors in calculated results.

All holding times were met and proper preservation noted for the methods performed on these samples, unless otherwise detailed in the individual sections below.

RECEIPT

The sample was received on 6/17/2016 10:00 AM; the sample arrived in good condition, properly preserved and, where required, on ice. The temperature of the cooler at receipt was 1.7º C.

Per client indication at project set up, the IDW water analyses are Total VOCs using the TCLP analyte list; not TCLP extracted VOCs as indicated on the chain of custody.

VOLATILE ORGANIC COMPOUNDS (GC-MS)

The MS/MSD associated with batch 280-332095 exhibited spike recoveries outside QC control limits for Trichloroethene. The associated LCS was in control and demonstrates that operating procedures were in control. No further action was required.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

Detection Summary

Client: CH2M Hill, Inc.
Project/Site: THAN Davenport, IA - June 2016

TestAmerica Job ID: 280-84641-1

Client Sample ID: ADDV-052 — Lab Sample ID: 280-84641-1

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Benzene	0.37	J	1.0	0.16	ug/L	1		8260B	Total/NA
1,1-Dichloroethene	0.33	J	1.0	0.23	ug/L	1		8260B	Total/NA
Tetrachloroethene	1.2		1.0	0.20	ug/L	1		8260B	Total/NA
Trichloroethene	0.60	J	1.0	0.16	ug/L	1		8260B	Total/NA
Vinyl chloride	58		1.0	0.10	ug/L	1		8260B	Total/NA

This Detection Summary does not include radiochemical test results.

Method Summary

Client: CH2M Hill, Inc.
Project/Site: THAN Davenport, IA - June 2016

TestAmerica Job ID: 280-84641-1

Method	Method Description	Protocol	Laboratory
8260B	Volatile Organic Compounds (GC/MS)	SW846	TAL DEN

Protocol References:

SW846 = "Test Methods For Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 And Its Updates.

Laboratory References:

TAL DEN = TestAmerica Denver, 4955 Yarrow Street, Arvada, CO 80002, TEL (303)736-0100

Sample Summary

Client: CH2M Hill, Inc.
Project/Site: THAN Davenport, IA - June 2016

TestAmerica Job ID: 280-84641-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
280-84641-1	ADDV-052	Water	06/16/16 16:00	06/17/16 10:00

Client Sample Results

Client: CH2M Hill, Inc.
Project/Site: THAN Davenport, IA - June 2016

TestAmerica Job ID: 280-84641-1

Method: 8260B - Volatile Organic Compounds (GC/MS)

Client Sample ID: ADDV-052
Date Collected: 06/16/16 16:00
Date Received: 06/17/16 10:00

Lab Sample ID: 280-84641-1
Matrix: Water

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	**0.37**	**J**	1.0	0.16	ug/L			06/30/16 21:18	1
2-Butanone (MEK)	ND		6.0	2.0	ug/L			06/30/16 21:18	1
Carbon tetrachloride	ND		1.0	0.19	ug/L			06/30/16 21:18	1
Chlorobenzene	ND		1.0	0.17	ug/L			06/30/16 21:18	1
Chloroform	ND		1.0	0.16	ug/L			06/30/16 21:18	1
1,2-Dichloroethane	ND		1.0	0.13	ug/L			06/30/16 21:18	1
1,1-Dichloroethene	**0.33**	**J**	1.0	0.23	ug/L			06/30/16 21:18	1
Tetrachloroethene	**1.2**		1.0	0.20	ug/L			06/30/16 21:18	1
Trichloroethene	**0.60**	**J**	1.0	0.16	ug/L			06/30/16 21:18	1
Vinyl chloride	**58**		1.0	0.10	ug/L			06/30/16 21:18	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*87*		*70 - 127*		*06/30/16 21:18*	*1*
Toluene-d8 (Surr)	*96*		*80 - 125*		*06/30/16 21:18*	*1*
4-Bromofluorobenzene (Surr)	*100*		*78 - 120*		*06/30/16 21:18*	*1*
Dibromofluoromethane (Surr)	*92*		*77 - 120*		*06/30/16 21:18*	*1*

Surrogate Summary

Client: CH2M Hill, Inc.
Project/Site: THAN Davenport, IA - June 2016

TestAmerica Job ID: 280-84641-1

Method: 8260B - Volatile Organic Compounds (GC/MS)

Matrix: Water **Prep Type: Total/NA**

		Percent Surrogate Recovery (Acceptance Limits)			
		12DCE	TOL	BFB	DBFM
Lab Sample ID	**Client Sample ID**	**(70-127)**	**(80-125)**	**(78-120)**	**(77-120)**
280-84641-1	ADDV-052	87	96	100	92
280-84789-H-2 MS	Matrix Spike	84	97	98	88
280-84789-H-2 MSD	Matrix Spike Duplicate	85	96	99	89
LCS 280-332095/6	Lab Control Sample	84	94	97	88
MB 280-332095/8	Method Blank	87	96	99	91

Surrogate Legend

12DCE = 1,2-Dichloroethane-d4 (Surr)
TOL = Toluene-d8 (Surr)
BFB = 4-Bromofluorobenzene (Surr)
DBFM = Dibromofluoromethane (Surr)

QC Sample Results

Client: CH2M Hill, Inc.
Project/Site: THAN Davenport, IA - June 2016

TestAmerica Job ID: 280-84641-1

Method: 8260B - Volatile Organic Compounds (GC/MS)

Lab Sample ID: MB 280-332095/8
Matrix: Water
Analysis Batch: 332095

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	ND		1.0	0.16	ug/L			06/30/16 19:35	1
2-Butanone (MEK)	ND		6.0	2.0	ug/L			06/30/16 19:35	1
Carbon tetrachloride	ND		1.0	0.19	ug/L			06/30/16 19:35	1
Chlorobenzene	ND		1.0	0.17	ug/L			06/30/16 19:35	1
Chloroform	ND		1.0	0.16	ug/L			06/30/16 19:35	1
1,2-Dichloroethane	ND		1.0	0.13	ug/L			06/30/16 19:35	1
1,1-Dichloroethene	ND		1.0	0.23	ug/L			06/30/16 19:35	1
Tetrachloroethene	ND		1.0	0.20	ug/L			06/30/16 19:35	1
Trichloroethene	ND		1.0	0.16	ug/L			06/30/16 19:35	1
Vinyl chloride	ND		1.0	0.10	ug/L			06/30/16 19:35	1

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*87*		*70 - 127*		*06/30/16 19:35*	*1*
Toluene-d8 (Surr)	*96*		*80 - 125*		*06/30/16 19:35*	*1*
4-Bromofluorobenzene (Surr)	*99*		*78 - 120*		*06/30/16 19:35*	*1*
Dibromofluoromethane (Surr)	*91*		*77 - 120*		*06/30/16 19:35*	*1*

Lab Sample ID: LCS 280-332095/6
Matrix: Water
Analysis Batch: 332095

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Benzene	5.00	5.82		ug/L		116	65 - 135
2-Butanone (MEK)	20.0	19.8		ug/L		99	44 - 177
Carbon tetrachloride	5.00	5.72		ug/L		114	65 - 135
Chlorobenzene	5.00	5.27		ug/L		105	65 - 135
Chloroform	5.00	5.64		ug/L		113	65 - 135
1,2-Dichloroethane	5.00	5.45		ug/L		109	65 - 135
1,1-Dichloroethene	5.00	5.70		ug/L		114	65 - 136
Tetrachloroethene	5.00	5.50		ug/L		110	65 - 135
Trichloroethene	5.00	5.64		ug/L		113	65 - 135
Vinyl chloride	5.00	4.87		ug/L		97	40 - 137

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
1,2-Dichloroethane-d4 (Surr)	*84*		*70 - 127*
Toluene-d8 (Surr)	*94*		*80 - 125*
4-Bromofluorobenzene (Surr)	*97*		*78 - 120*
Dibromofluoromethane (Surr)	*88*		*77 - 120*

Lab Sample ID: 280-84789-H-2 MS
Matrix: Water
Analysis Batch: 332095

Client Sample ID: Matrix Spike
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Benzene	ND		10.0	10.5		ug/L		105	65 - 135
2-Butanone (MEK)	ND		40.0	40.2		ug/L		101	44 - 177
Carbon tetrachloride	ND		10.0	10.6		ug/L		106	65 - 135

Method: 8260B - Volatile Organic Compounds (GC/MS) (Continued)

Lab Sample ID: 280-84789-H-2 MS
Matrix: Water
Analysis Batch: 332095

Client Sample ID: Matrix Spike
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Chlorobenzene	ND		10.0	9.68		ug/L		97	65 - 135
Chloroform	ND		10.0	11.1		ug/L		111	65 - 135
1,2-Dichloroethane	ND		10.0	10.3		ug/L		103	65 - 135
1,1-Dichloroethene	ND		10.0	11.0		ug/L		110	65 - 136
Tetrachloroethene	4.1	J	10.0	13.8		ug/L		98	65 - 135
Trichloroethene	770		10.0	606	E 4	ug/L		-1671	65 - 135
Vinyl chloride	ND		10.0	10.9		ug/L		109	40 - 137

Surrogate	*MS %Recovery*	*MS Qualifier*	*Limits*
1,2-Dichloroethane-d4 (Surr)	*84*		*70 - 127*
Toluene-d8 (Surr)	*97*		*80 - 125*
4-Bromofluorobenzene (Surr)	*98*		*78 - 120*
Dibromofluoromethane (Surr)	*88*		*77 - 120*

Lab Sample ID: 280-84789-H-2 MSD
Matrix: Water
Analysis Batch: 332095

Client Sample ID: Matrix Spike Duplicate
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Benzene	ND		10.0	11.1		ug/L		111	65 - 135	6	20
2-Butanone (MEK)	ND		40.0	42.8		ug/L		107	44 - 177	6	32
Carbon tetrachloride	ND		10.0	11.0		ug/L		110	65 - 135	3	21
Chlorobenzene	ND		10.0	10.2		ug/L		102	65 - 135	6	20
Chloroform	ND		10.0	11.7		ug/L		117	65 - 135	5	20
1,2-Dichloroethane	ND		10.0	11.1		ug/L		111	65 - 135	7	20
1,1-Dichloroethene	ND		10.0	11.7		ug/L		117	65 - 136	6	20
Tetrachloroethene	4.1	J	10.0	13.9		ug/L		98	65 - 135	0	20
Trichloroethene	770		10.0	595	E 4	ug/L		-1781	65 - 135	2	20
Vinyl chloride	ND		10.0	11.5		ug/L		115	40 - 137	6	24

Surrogate	*MSD %Recovery*	*MSD Qualifier*	*Limits*
1,2-Dichloroethane-d4 (Surr)	*85*		*70 - 127*
Toluene-d8 (Surr)	*96*		*80 - 125*
4-Bromofluorobenzene (Surr)	*99*		*78 - 120*
Dibromofluoromethane (Surr)	*89*		*77 - 120*

QC Association Summary

Client: CH2M Hill, Inc.
Project/Site: THAN Davenport, IA - June 2016

TestAmerica Job ID: 280-84641-1

GC/MS VOA

Analysis Batch: 332095

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
280-84641-1	ADDV-052	Total/NA	Water	8260B	
280-84789-H-2 MS	Matrix Spike	Total/NA	Water	8260B	
280-84789-H-2 MSD	Matrix Spike Duplicate	Total/NA	Water	8260B	
LCS 280-332095/6	Lab Control Sample	Total/NA	Water	8260B	
MB 280-332095/8	Method Blank	Total/NA	Water	8260B	

Lab Chronicle

Client: CH2M Hill, Inc.
Project/Site: THAN Davenport, IA - June 2016

TestAmerica Job ID: 280-84641-1

Client Sample ID: ADDV-052

Date Collected: 06/16/16 16:00
Date Received: 06/17/16 10:00

Lab Sample ID: 280-84641-1

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260B		1	20 mL	20 mL	332095	06/30/16 21:18	RSN	TAL DEN

Laboratory References:

TAL DEN = TestAmerica Denver, 4955 Yarrow Street, Arvada, CO 80002, TEL (303)736-0100

Certification Summary

Client: CH2M Hill, Inc.
Project/Site: THAN Davenport, IA - June 2016

TestAmerica Job ID: 280-84641-1

Laboratory: TestAmerica Denver

The certifications listed below are applicable to this report.

Authority	Program	EPA Region	Certification ID	Expiration Date
Florida	NELAP	4	E87667	06-30-16 *
Iowa	State Program	7	370	11-30-16

The following analytes are included in this report, but certification is not offered by the governing authority:

Analysis Method	Prep Method	Matrix	Analyte
8260B		Water	1,1-Dichloroethene
8260B		Water	1,2-Dichloroethane
8260B		Water	2-Butanone (MEK)
8260B		Water	Benzene
8260B		Water	Carbon tetrachloride
8260B		Water	Chlorobenzene
8260B		Water	Chloroform
8260B		Water	Tetrachloroethene
8260B		Water	Trichloroethene
8260B		Water	Vinyl chloride

Oregon	NELAP	10	4025	01-09-17

* Certification renewal pending - certification considered valid.

TestAmerica Denver
4955 Yarrow Street
Arvada, CO 80002
Phone (303) 736-0100 Fax (303) 431-7171

Chain of Custody Record

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Client Information	Sampler: C. Reuss	Lab PM: Ide, Jamie N	Carrier Tracking No(s): 804446509711	COC No: 280-53595-19251.1
Client Contact: Ms. Shannon Olson	Phone: 414-847-0264	E-Mail: jamie.ide@testamericainc.com		Page: Page 1 of 1
Company: CH2M Hill, Inc.				Job #:
Address: 2020 SW 4th Ave Suite 300	Due Date Requested: Standard			
City: Portland	TAT Requested (days): Standard			
State, Zip: OR, 97201				
Phone: 503-736-4111(Tel) 503-736-2063(Fax)	PO #: 103817102176			
Email: shannon.olson@ch2m.com	WO #: 486615.14.18			
Project Name: THAN Davenport, IA - June 2016	Project #: 28013442			
Site: Than davenport	SSOW#:			

Analysis Requested

Sample Identification	Sample Date	Sample Time	Sample Type (C=comp, G=grab)	Matrix (W=water, S=solid, O=waste/oil, BT=Tissue, A=Air)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	8260B - VOCs	9060 - TOC	300.0 - Chloride (only)	SM2320B 0 Alkalinity, 300.0 (Cl, NO3, SO4), 3500_FE_D Ferrous Iron	SM4500_S2_F - Total Sulfide	RSK-175 - Dissolved Gases	RCRA TCLP VOCs	Total Number of containers	Special Instructions/Note:
			Preservation Code:				A	S	N	N	C/B	A			
ADDV-052	6/16/16	1600	G	W	N	N							X	3	

Preservation Codes:

A - HCL	M - Hexane
B - NaOH	N - None
C - Zn Acetate	O - AsNaO2
D - Nitric Acid	P - Na2O4S
E - NaHSO4	Q - Na2SO3
F - MeOH	R - Na2S2O3
G - Amchlor	S - H2SO4
H - Ascorbic Acid	T - TSP Dodecahydrate
I - Ice	U - Acetone
J - DI Water	V - MCAA
K - EDTA	W - ph 4-5
L - EDA	Z - other (specify)

Other:

280-84641 Chain of Custody

Possible Hazard Identification
☒ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown ☐ Radiological

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
☐ Return To Client ☒ Disposal By Lab ☐ Archive For _____ Months

Deliverable Requested: I, II, III, IV, Other (specify) See SOW

Special Instructions/QC Requirements:

Empty Kit Relinquished by:	Date:	Time:	Method of Shipment:

Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
[signature]	6/16/16 1800	CH2M	[signature]	6-17-16 1000	TAD

Custody Seals Intact: Δ Yes Δ No

Custody Seal No.: 735038, 735037

Cooler Temperature(s) °C and Other Remarks: 1.7 IR#5 +0.0 Transferred by RP 6-17-16

Login Sample Receipt Checklist

Client: CH2M Hill, Inc.

Job Number: 280-84641-1

Login Number: 84641
List Number: 1
Creator: Pottruff, Reed W

List Source: TestAmerica Denver

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	N/A	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	N/A	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

Appendix D
Data Quality Evaluation

Data Quality Evaluation for THAN Davenport Semiannual Monitoring Event at the 2040 West River Drive Site, Davenport, Iowa

Introduction

The objective of this data quality evaluation (DQE) memorandum is to assess the quality of analytical results for groundwater samples collected by CH2M HILL Engineers, Inc. (CH2M) June 14 through June 16, 2016, at the 2040 West River Drive site in Davenport, Iowa, for T. H. Agriculture & Nutrition, L.L.C. (THAN); Elementis Chemicals, Inc. (Elementis); and Harcros Chemicals, Inc. (Harcros). Guidance for this DQE memorandum is from the *Quality Assurance Project Plan/Sampling and Analysis Plan, 2040 West River Drive, Davenport, Iowa* (CH2M, 2012); U.S. Environmental Protection Agency (EPA) *Contract Laboratory National Functional Guidelines (NFG) for Organic Data Review, June 2008; The EPA NFG for Inorganic Data Review, January 2010;* and individual method requirements. The analytical results were evaluated using the criteria of precision, accuracy, representativeness, comparability, and completeness (PARCC) as described in the quality assurance project plan (QAPP).

This DQE memorandum is intended as a general data quality assessment designed to summarize data issues.

Analytical Data

This DQE memorandum covers 39 groundwater samples, 4 field duplicates (FDs), 2 aliquots for groundwater laboratory matrix spike (MS)/matrix spike duplicates (MSDs), 1 equipment blank (EB), 1 field blank (FB), and 5 trip blanks (TBs). The samples were reported as three sample delivery groups (SDGs) listed as 280-84495, 280-84538, and 280-84597. Samples were collected and delivered to TestAmerica, Inc., in Arvada, Colorado. The samples were analyzed by one or more of the methods listed in Table 1.

Table 1. Analytical Parameters
Data Quality Evaluation for THAN Davenport Semiannual Monitoring Event

Parameter	Method	Laboratory
Volatile organic compounds (VOCs)	SW-846 5030B/8260B	TestAmerica
Dissolved gases	RSK-175	TestAmerica
Total organic carbon (TOC)	SW-846 9060	TestAmerica
Alkalinity	SM 2320 B	TestAmerica
Chloride, Sulfate, and Nitrate	EPA 300.0	TestAmerica
Sulfide	SM 4500 S2-F	TestAmerica
Ferrous Iron	SM 3500 FE-D	TestAmerica

The SDGs were assessed by reviewing the following: (1) the chain-of-custody documentation; (2) holding-time compliance; (3) temperature compliance; (4) method blank results; (5) FB, EB, and TB results; (6) laboratory control sample (LCS)/laboratory control sample duplicate (LCSD) recoveries; (7) MS/MSD recoveries; (8) surrogate spike recoveries; and (9) FD precision. Ten percent of the data were also reviewed for initial and continuing calibration criteria, internal standard recoveries and any other required quality control (QC) samples at the specified frequencies.

Data flags were assigned according to the NFGs. Multiple flags are routinely applied to specific sample method/matrix/analyte combinations, but there will only be one final flag. A final flag is applied to the data and is the most conservative of the applied validation flags. The final flag also includes matrix and blank sample impacts.

The data flags are listed and defined as follows:

- J = Estimated. The analyte was below the stated reporting limit (RL), but greater than the method detection limit (MDL), or there is an analytical bias.
- U = Undetected. The analyte was analyzed for but not detected at a concentration equal to or greater than the laboratory RL.
- UB = Undetected due to blank contamination. The analyte was detected in the sample and in an associated calibration, method, equipment, field, or trip blank. The analyte concentration is potentially the result of contamination.
- UJ = Estimated. The analyte was not detected above the MDL; however, the MDL is approximate, and may or may not represent the actual limit of detection.

Findings

The overall summaries of the data validation are contained in the following sections.

Holding Time and Preservation

All acceptance criteria were met with the following exceptions:

- The analytical holding time for ferrous iron was exceeded for all of the samples. The results were qualified as estimated detected or estimated non-detected results and flagged “J” or “UJ,” respectively, in the associated samples.
- The VOC analytical holding time was exceeded for samples BW-14DL, BW-14FDDL and BW-25. The results were qualified as estimated detected or estimated non-detected results and flagged “J” or “UJ,” respectively, in the associated samples.

Calibration

Initial and continuing calibration analyses were performed as required by the methods. All acceptance criteria were met in the ten percent reviewed with the following exceptions:

- The retention time window for ethane was exceeded for samples BW-09, BW-19, BW-24-390 and MW-07. The data were qualified as estimated detected results and flagged “J” in the associated samples.

Calibration Blanks

Calibration blanks were analyzed at the required frequency and were free of contamination in the 10 percent reviewed with the following exceptions:

- Chloride was detected at a concentration less than the RL in one continuing calibration blank associated with SDG 280-84538. All of the associated results were detected greater than five times the concentration found in the blank and were therefore not qualified.
- Three continuing calibration blanks associated with SDG 280-84538 detected alkalinity at concentrations less than the RL. All of the associated results were detected greater than five times the concentration found in the blanks and were therefore not qualified.

Method Blanks

Method blanks were analyzed at the required frequency and were free of contamination with the following exceptions:

- Acetone was detected at a concentration less than the RL in one method blank associated SDG 280-84538. The data were qualified as not detected at the concentration measured and flagged "UB" when the associated sample concentrations were less than ten times the blank concentration. Non-detects were not qualified.
- One method blank associated with SDG 280-84538 detected methylene chloride at a concentration less than the RL. The data were qualified as not detected at the concentration measured and flagged "UB" when the associated sample concentrations were less than ten times the blank concentration. Those results detected greater than ten times the concentration found in the blank were not qualified.
- Alkalinity was detected at concentrations less than the RL in two method blanks associated with SDG 280-84495 and three method blanks associated with SDG 280-84538. All of the associated sample results were detected greater than five times the concentration found in the blanks and were therefore not qualified.

Field Blanks

One EB (ADDV-044), one FB (ADDV-045), and five TBs (ADDV-046 through ADDV-050) were collected, analyzed, and were free of contamination with the following exceptions:

- Methylene chloride was detected at a concentration less than the RL in two TBs associated with SDG 280-84495. The data were qualified as not detected at the concentration measured and flagged "UB" when the associated sample concentrations were less than 10 times the blank concentration. Non-detected results were not qualified.
- Two TBs associated with SDG 280-84597 detected acetone at a concentration less than the RL. The data were qualified as not detected at the concentration measured and flagged "UB" when the associated sample concentrations were less than ten times the blank concentration. Non-detected results were not qualified.
- Both the EB and FB detected TOC at a concentration less than the RL. The data were qualified as not detected at the concentration measured and flagged "UB" when the associated sample concentrations were less than five times the blank concentration. Results detected greater than five times the concentration found in the blanks were not qualified.
- Methane was detected at a concentration less than the RL in the FB. All of the associated results were detected greater than five times the concentration found in the blank and were therefore not qualified.

Laboratory Control Samples

LCSs/LCSDs were analyzed as required, and all accuracy criteria were met.

Matrix Spike

MS/MSDs were analyzed as required, and all accuracy and precision criteria were met with the following exceptions:

- The MS recovered 1,2-dichlorethane greater than the upper control limit for sample BW-09, indicating a possible high bias in the sample. The associated BW-09 result was non-detect; therefore, the sample data were not qualified.
- Chloride was recovered greater than the upper control limit in the MSD for sample BW-33. The data were qualified as an estimated detected result and flagged “J” in the BW-33 sample result.

Surrogates

Surrogates were added as required and all acceptance criteria were met with the following exception:

- One VOC surrogate was recovered greater than control limits in sample BW-26-65, indicating a possible high bias. Detected results were qualified as estimated and flagged “J” in the BW-26-65 sample result.
- Surrogates that were diluted out were not flagged.

Internal Standards

Internal standards were added as required and all acceptance criteria were met in the ten percent reviewed.

Field Duplicates

FDs were collected and analyzed as required and all precision criteria were met with the following exceptions:

- The relative percent difference (RPD) for methylene chloride, m&p-xylenes, o-xylenes, total xylenes and toluene was greater than the method criteria in the FD pair BW-06/BW-06FD. The data were qualified as estimated detects and flagged “J” in the FD pair.
- Ferrous iron reported a RPD greater than the method criteria in the FD pairs BW-14/BW-14FD and BW-24-390/ BW-24-390FD. The data were qualified as estimated detects and flagged “J” in the FD pair.

Column Differential

The RPD between the primary and confirmation columns for the dissolved gas analysis were calculated to determine the precision of the results. The RPDs were generally within the established QC limits of less than 40 percent with the following exception:

- The RPD for ethene was greater than the method criteria for samples BW-25 and MW-07. The results were qualified as estimated detected results and flagged “J” in the associated samples.

Chain-of-Custody

Required procedures were followed and the documents were free of errors.

Overall Assessment

The goal of the assessment is to demonstrate that a sufficient number of representative samples were collected and the resulting analytical data can be used to support the decision making process. The following summary highlights the PARCC findings for the above-defined event:

- Precision of the data was verified through the review of the laboratory data quality indicators that include LCS/LCSD, MS/MSD, FD, and column confirmation RPDs. Precision was acceptable with the exception of a few analytes being qualified as estimated detected results in eight samples due to FD and column confirmation RPD issues as stated above. Data users should consider the impact to any result that is qualified as estimated as it may contain a bias, which could affect the decision making process.
- Accuracy of the data was verified through the review of the calibration data, LCS/LCSD, MS/MSD, surrogate, and internal standard recoveries, as well as the evaluation of calibration/method/equipment/field/trip blank data. Accuracy was acceptable with several analytes being qualified as estimated detected results in six samples due to calibration, MSD and surrogate issues. Acetone, methylene chloride and/or TOC were qualified as not detected in 20 samples due to low-level detections in the method, equipment, field and/or trip blank.
- Representativeness of the data was verified through the sample collection, storage, and preservation procedures and the verification of holding-time compliance. The laboratory did not note any problems with the sample collection, storage, and preservation procedures. The holding time criterion for ferrous iron was exceeded for all of the samples and the VOC analytical holding time was exceeded for four samples, resulting in data being qualified as estimated. All other data were reported from analyses within the recommended holding time.
- Comparability of the data was verified using standard analytical procedures and standard units for reporting. Results obtained are comparable to industry standards in that the collection and analytical techniques followed approved, documented procedures.
- Completeness is a measure of the number of valid measurements obtained in relation to the total number of measurements planned. Completeness is expressed as the percentage of valid or usable measurements compared to planned measurements. Valid data are defined as all data that are not rejected for project use. All data were considered valid. The completeness goal was met for all analytes.

Appendix E
Groundwater Data Analysis Methods

APPENDIX E

Groundwater Data Analysis Methods

The historical and most recent groundwater data were evaluated to assess the effectiveness of onsite and offsite groundwater remedies using the methods described in the following sections.

Due to changes in the monitoring well network through time and frequency of monitoring at each well, proxy values (i.e., prior sampling event results) were assigned to those wells with missing concentration data for a given year so that a consistent monitoring well network was used for interpolation of the groundwater concentration data. Nondetects were assumed to be zero for the purposes of the data analyses except for the Mann-Kendall analysis as further described below.

A discussion of elevated reporting limits and detection limits, and their effect, if any, on the relative change in concentrations is also included in the following sections.

Isosurface Images

Isosurface images were generated for total volatile organic compounds (VOCs), total chlorinated VOCs (CVOCs), and total aromatics for the 2005 and 2016 datasets. These isosurface images are based on the three-dimensional isovolume that is generated by kriging each dataset using the *GSLIB: Geostatistical Software Library and User's Guide* (Deutsch and Journel, 1992) geostatistical algorithms as implemented within the Stanford Geostatistical Modeling Software, version 2.1 (SGeMS) (Remy, 2009). The SGeMS is an open-source computer package for solving problems involving spatially related variables. The resultant isosurfaces, represented on a two-dimensional planar/map surface, represent the maximum concentration detected across the entire depth interval at each locational (x, y) grid node.

Mass Estimate Calculations

Total mass estimates and mass for individual VOC compounds were calculated using the Thiessen polygon method (Fetter, 2004), a spatially integrated method that provides a rough approximation of the dissolved mass present in groundwater. The resultant site-wide mass estimates for individual sampling events are then used to evaluate changes in the mass of total VOCs over time. The approach assumes that the estimated mass can be calculated by multiple polygons of defined area, depth, and concentration. Polygon borders are established at locations halfway between a given well and each well adjacent to it. For wells without adjacent wells on each side (i.e., downgradient monitoring wells), a polygon border of 10 percent is assigned, as shown on Figure E-1.

As discussed above, proxy values were assigned to those wells with missing concentration data for a given year so that the same number of polygons can be used for each year's calculation. Therefore, the use of proxy values conservatively overestimates mass values because ongoing/achieved constituent degradation is not accounted for when an older concentration value is used.

The mass for an individual VOC compound in groundwater was calculated by multiplying its concentration measured in a well central to its Thiessen polygon times the pore volume (polygonal area multiplied by the vertical saturated thickness and total porosity) within each individual polygon. Individual polygon masses were then summed to get the total mass for that VOC compound across the polygon network.

After the mass was estimated for each year, the Mann-Kendall test (discussed below) was applied to the set of estimated mass values to evaluate whether the total VOC mass exhibited a trend.

Mann-Kendall Statistical Test

The Mann-Kendall test is a nonparametric test used to identify whether there is a statistically significant trend over the period of monitoring. The Mann-Kendall test is based on the idea that a lack of trend should correspond to a time versus concentration plot that fluctuates randomly about a constant mean level, with no visually apparent upward or downward pattern (U.S. Environmental Protection Agency [EPA], 2009). As a nonparametric procedure, the Mann-Kendall test does not require the underlying data to follow a specific distribution. The test compares the relative magnitudes of sample data rather than the data values. Analytical data reported at less than the reporting or detection limit (nondetects) can be used by assigning them a common value that is smaller than the smallest measured value in the data set (Gilbert, 1987). For this project analysis, a value of 0.01 micrograms per liter (µg/L) was assigned to nondetects.

Maintaining statistical validity of the trend analysis requires constraints on the amount of minimum data that can be tested. To ensure a meaningful comparison of concentrations over time, evaluations of trends were performed only for wells with at least six independent sampling events and a detection frequency of greater than 50 percent. The temporal behavior of the concentration data was also examined graphically to confirm the results of the trend analysis. A time series plot of concentrations was generated for each monitoring well and includes the use of a locally weighted scatter plot smoothing curve to visually show the overall trend in the data (Cleveland, 1979).

For monitoring wells where no trend could be statistically determined at the 95-percent confidence level, concentrations were deemed stable if the coefficient of variation (COV) was less than one. The COV is a relative measure of variation in the groundwater concentration data and can be affected by the magnitude of concentrations (EPA, 2009). As such, relatively higher concentrations can include significant variation while exhibiting a small COV. While there is no objective basis for using a particular value of COV to determine stability, values greater than 1 indicate that the data exhibit a greater detail of scatter about the mean. Values less than or near to a COV of 1 indicate that the data form a relatively close group about the mean value. Therefore, it is surmised that the determination of no trend corresponds to stable concentrations if the COV is less than 1. If the COV is greater than 1, it is possible that the determination of no trend has been adversely influenced by data variability (fluctuating concentrations).

Assessment of Elevated Reporting and Detection Limits

Although the evaluation methods above are based on a relative comparison between sampling events, an evaluation of elevated reporting limits and detection limits, and their effect, if any, on the relative change in total concentrations was completed in 2015, using the 2005 to 2015 dataset. The detection and reporting limits in the datasets over a 10-year period were reviewed and the following was identified:

- In general, for a given compound, there are more instances of elevated detection and reporting limits above remedial action objectives (RAOs) in the historical datasets than there are in the more recent datasets.
- The detection and reporting limits above RAOs for a given compound in the historical datasets are also generally higher than the detection and reporting limits above RAOs in the more recent datasets.

For monitoring wells exhibiting elevated detection and reporting limits (such as offsite monitoring well BW-14), the concentrations of VOCs detected are much higher than the “value” associated with the elevated detection and reporting limits. Therefore, if one-half of the detection limit is used for nondetects to calculate the total VOC concentration instead of using 0, the total VOC concentration is

impacted minimally. For instance, the total VOC concentration was calculated for BW-14 using one-half of the detection limit as the concentration for nondetected compounds, and also 0 as the concentration for nondetected compounds from 2008 to 2015 (note offsite monitoring well BW-14 was not sampled between 2005 and 2008), and the following were identified:

- The relative percent difference between the total VOC concentrations using these two methods has ranged from 0.03 to 3.89 percent between 2008 and 2015.
- Both summation methods (using 0 for nondetects, and using one-half of the detection limit for nondetects) show a decrease in total VOC concentrations at BW-14 between 2008 and 2015. Therefore, different conclusions are not being drawn from the relative comparison between each year's data set by using 0 as the nondetect value versus using one-half of the detection limit.

Based upon this analysis, elevated detection and reporting limits are not impacting the relative comparison of each of these data analysis methods from year to year.

References

Cleveland, W.S. 1979. "Robust locally weighted regression and smoothing scatterplots." *Journal of the American Statistical Association* 74 (368): 829–836.

Deutsch, C.V. and A.G. Journel. 1992. *GSLIB: Geostatistical Software Library and User's Guide*. 2nd ed. Oxford University Press, New York.

Fetter, C. W. 2004. *Applied Hydrogeology, Fourth Addition*. Merrill Publishing Company. Pp. 75, 76.

Gilbert, R. O. 1987. *Statistical Methods for Environmental Pollution Monitoring*. John Wiley and Sons, Inc. New York.

Remy, N., A. Boucher, and J. Wu. 2009. *Applied Geostatistics with SGeMS: A User's Guide*. Cambridge University Press.

U.S. Environmental Protection Agency (EPA). 2009. *Statistical Analysis of Groundwater Monitoring Data at RCRA Facilities:* Unified Guidance. EPA-530-R-09-007. Office of Resource Conservation and Recovery. Washington DC. March.

Legend

- Purple Thiessen polygons represent the ISCO (onsite) well network only.
- Black Thiessen polygons represent the entire LTMP well network
- LTMP (offsite) well network
- ISCO (onsite) well network

ISCO = InSitu Chemical Oxidation

LTMP = Long-term Groundwater Monitoring Plan

Note:

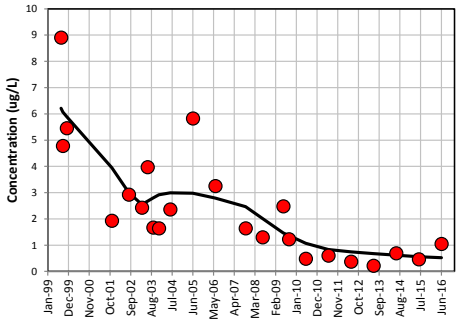
MW-06 was not included in the mass calculations since it has a history of usually being dry and therefore has a limited saturated thickness and low detected concentrations and therefore would not greatly contribute to the total mass of the plume.

Figure E-1
Thiessen Polygon Distribution
Used for Mass Estimates
2040 West River Drive
Davenport, Iowa

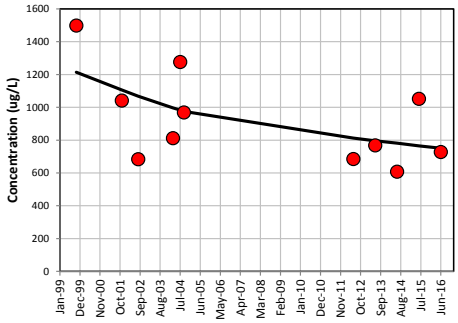
\\badger_THAN\Davenport\ARPR Reports\DRAFT_2014_ARPR\Figures

Appendix F
Mann-Kendall Trend Plots and Statistical Analysis of Trend Plots

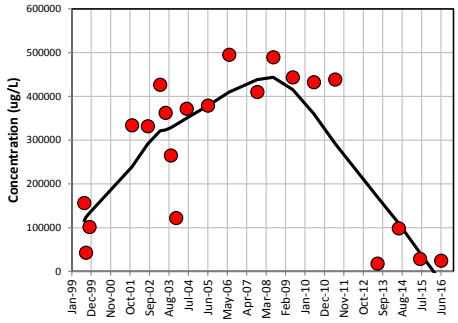
VOCS in BW-01



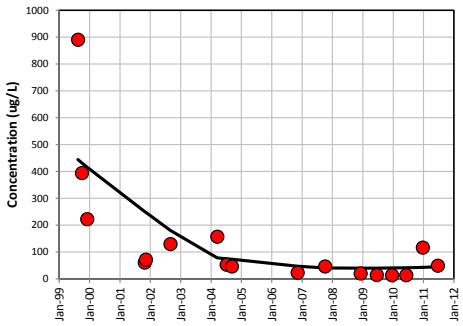
VOCS in BW-02



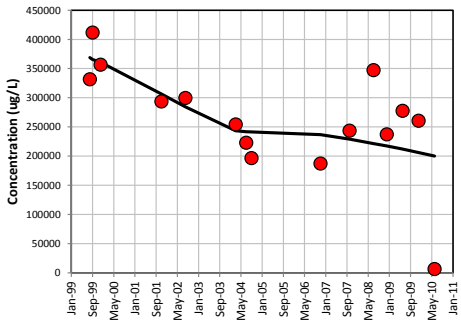
VOCS in BW-03/BW-03R



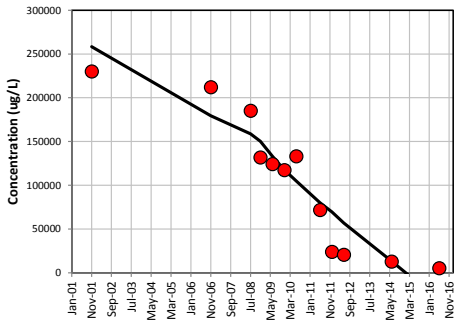
VOCS in BW-04



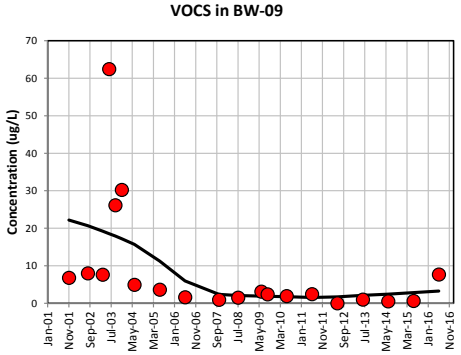
VOCS in BW-05



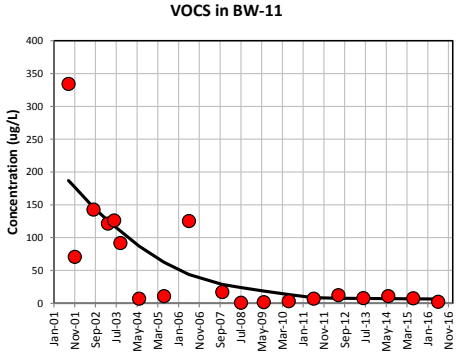
VOCS in BW-06



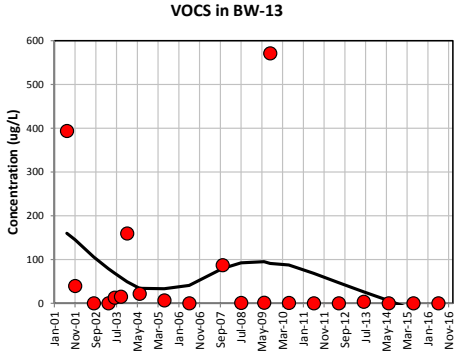
VOCS in BW-09



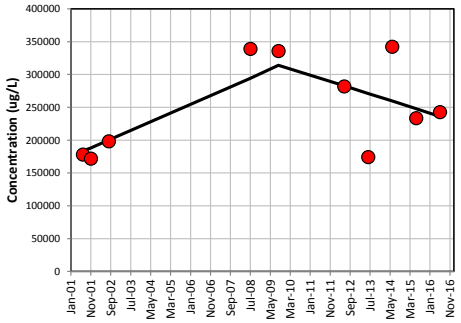
VOCS in BW-11



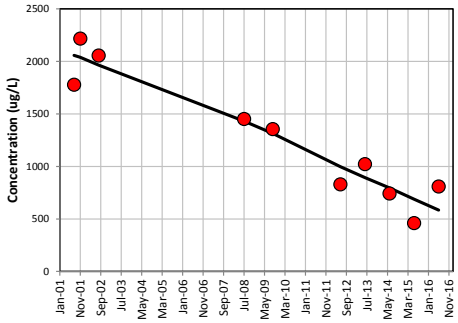
VOCS in BW-13



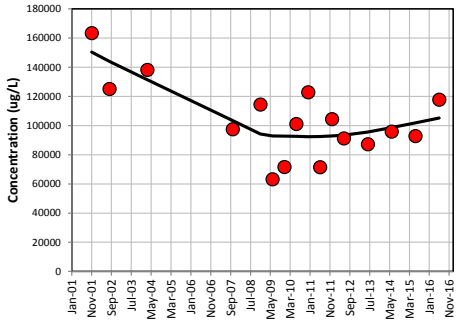
VOCS in BW-14



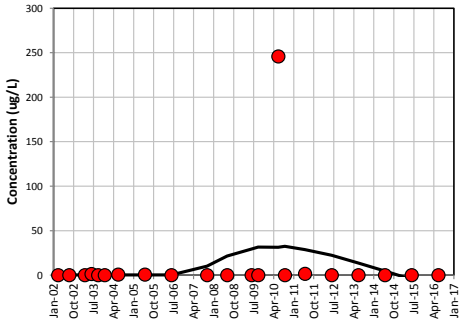
VOCS in BW-15



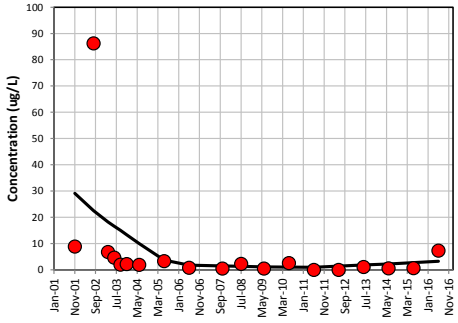
VOCS in BW-16



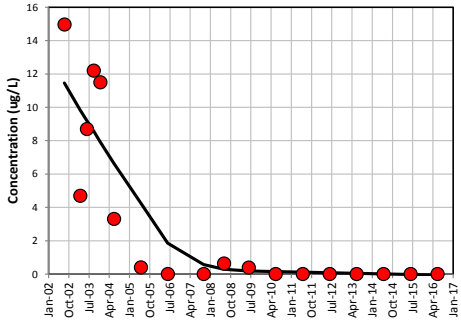
VOCS in BW-18



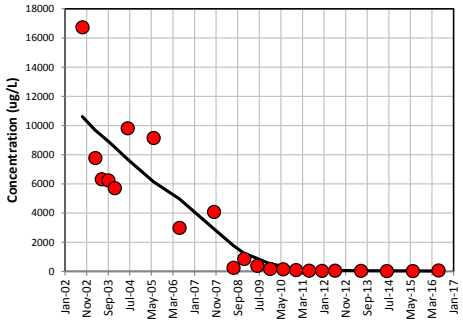
VOCS in BW-19



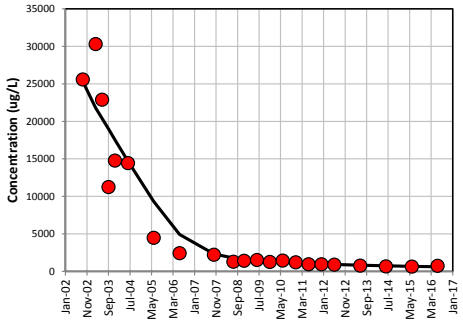
VOCS in BW-21



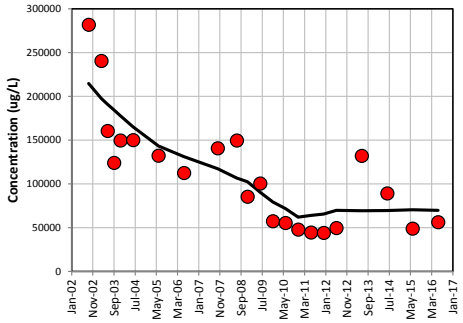
VOCS in BW-23-125'



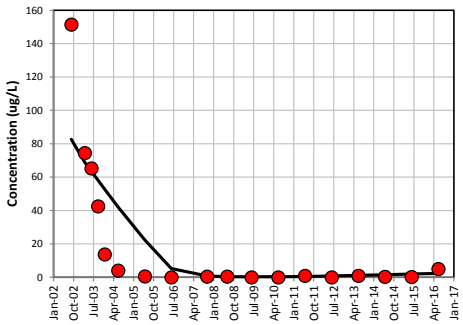
VOCS in BW-23-390'



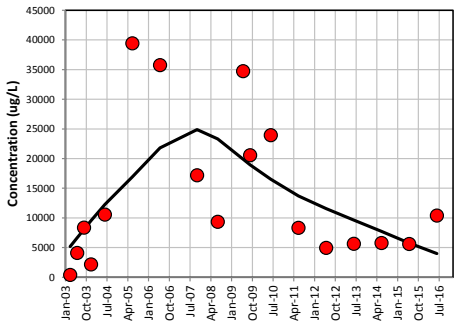
VOCS in BW-23-50'



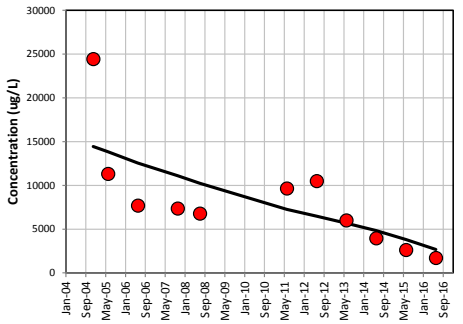
VOCS in BW-24-390'



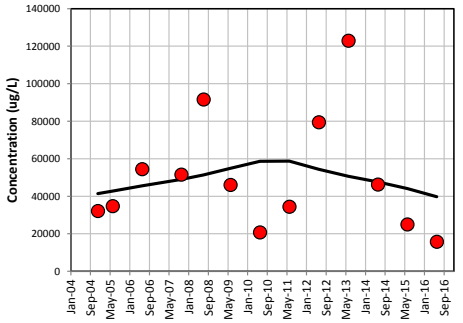
VOCS in BW-25



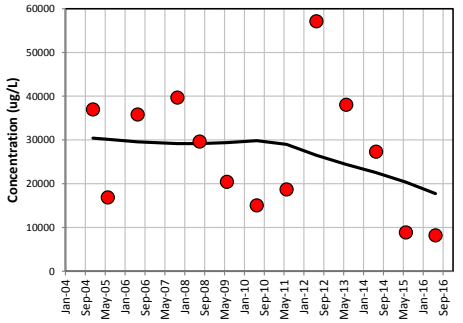
VOCS in BW-26-395'



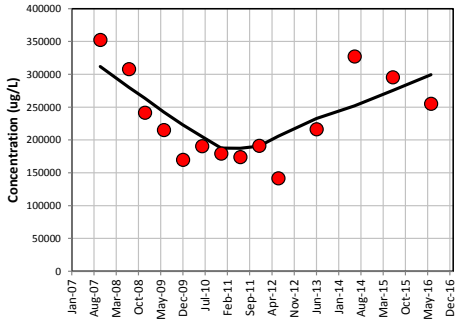
VOCS in BW-26-65'



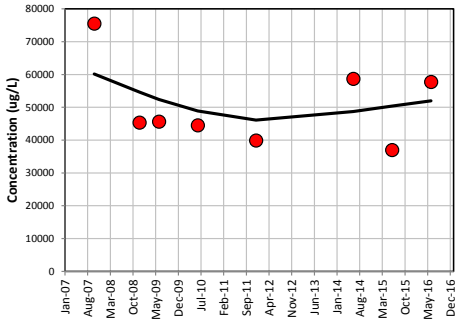
VOCS in BW-26-85'



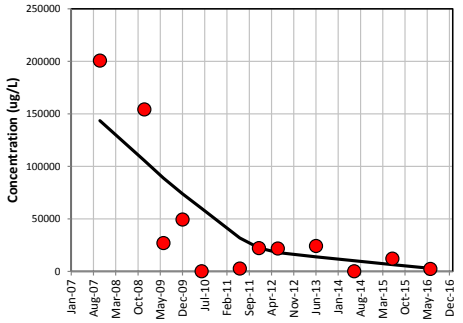
VOCS in BW-27



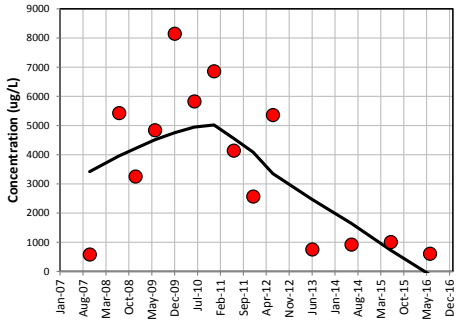
VOCS in BW-28



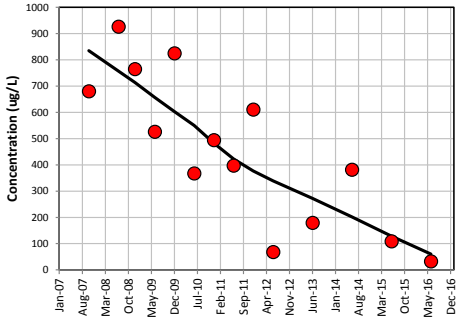
VOCS in BW-31



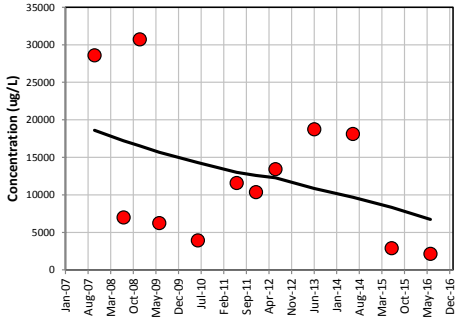
VOCS in BW-33



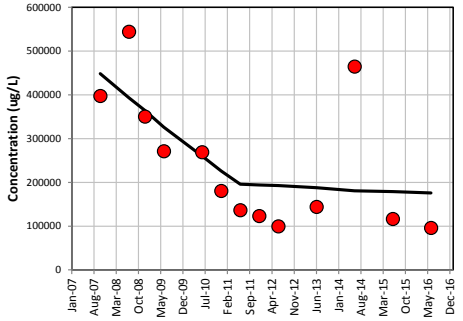
VOCS in BW-34

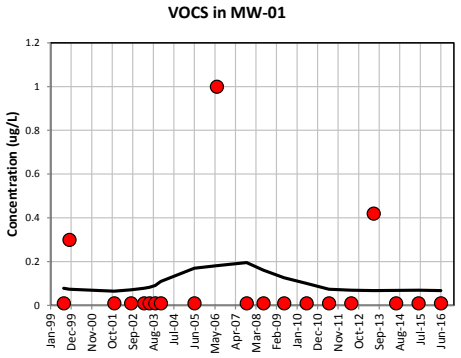


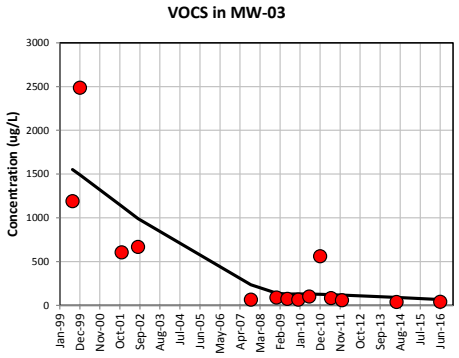
VOCS in BW-35

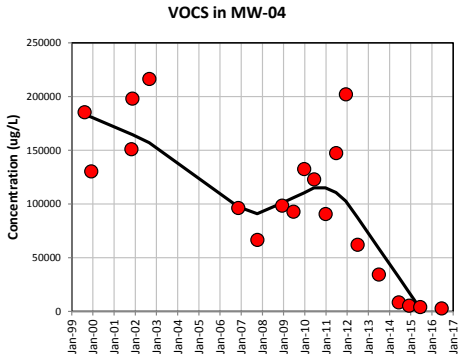


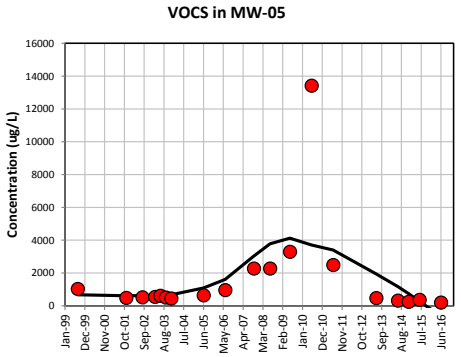
VOCS in BW-37

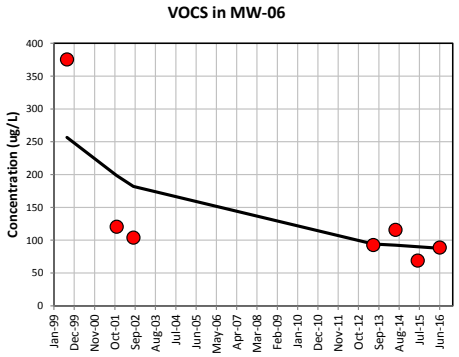


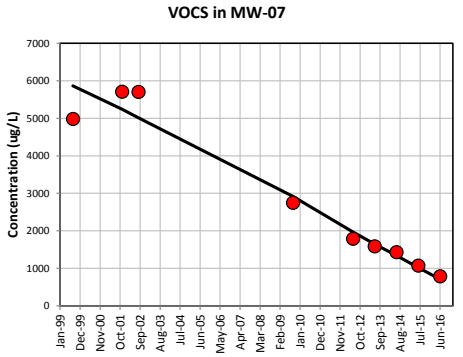

VOCS in MW-01
Concentration (ug/L)
0
0.2
0.4
0.6
0.8
1
1.2
Jan-99
Dec-99
Nov-00
Oct-01
Sep-02
Aug-03
Jul-04
Jun-05
May-06
Apr-07
Mar-08
Feb-09
Jan-10
Dec-10
Nov-11
Oct-12
Sep-13
Aug-14
Jul-15
Jun-16

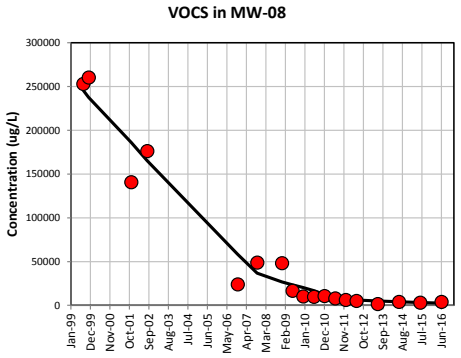

VOCS in MW-03
Concentration (ug/L)
0
500
1000
1500
2000
2500
3000
Jan-99
Dec-99
Nov-00
Oct-01
Sep-02
Aug-03
Jul-04
Jun-05
May-06
Apr-07
Mar-08
Feb-09
Jan-10
Dec-10
Nov-11
Oct-12
Sep-13
Aug-14
Jul-15
Jun-16

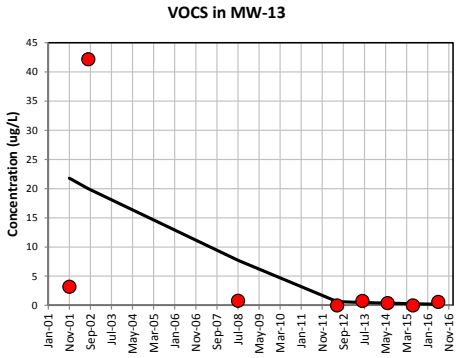

VOCS in MW-04
Concentration (ug/L)
0
50000
100000
150000
200000
250000
Jan-99
Jan-00
Jan-01
Jan-02
Jan-03
Jan-04
Jan-05
Jan-06
Jan-07
Jan-08
Jan-09
Jan-10
Jan-11
Jan-12
Jan-13
Jan-14
Jan-15
Jan-16
Jan-17


VOCS in MW-05
Concentration (ug/L)
0
2000
4000
6000
8000
10000
12000
14000
16000
Jan-99
Dec-99
Nov-00
Oct-01
Sep-02
Aug-03
Jul-04
Jun-05
May-06
Apr-07
Mar-08
Feb-09
Jan-10
Dec-10
Nov-11
Oct-12
Sep-13
Aug-14
Jul-15
Jun-16


VOCS in MW-06
Concentration (ug/L)
0
50
100
150
200
250
300
350
400
Jan-99
Dec-99
Nov-00
Oct-01
Sep-02
Aug-03
Jul-04
Jun-05
May-06
Apr-07
Mar-08
Feb-09
Jan-10
Dec-10
Nov-11
Oct-12
Sep-13
Aug-14
Jul-15
Jun-16


VOCS in MW-07
Concentration (ug/L)
0
1000
2000
3000
4000
5000
6000
7000
Jan-99
Dec-99
Nov-00
Oct-01
Sep-02
Aug-03
Jul-04
Jun-05
May-06
Apr-07
Mar-08
Feb-09
Jan-10
Dec-10
Nov-11
Oct-12
Sep-13
Aug-14
Jul-15
Jun-16


VOCS in MW-08
Concentration (ug/L)
0
50000
100000
150000
200000
250000
300000
Jan-99
Dec-99
Nov-00
Oct-01
Sep-02
Aug-03
Jul-04
Jun-05
May-06
Apr-07
Mar-08
Feb-09
Jan-10
Dec-10
Nov-11
Oct-12
Sep-13
Aug-14
Jul-15
Jun-16


VOCS in MW-13
Concentration (ug/L)
0
5
10
15
20
25
30
35
40
45
Jan-01
Nov-01
Sep-02
Jul-03
May-04
Mar-05
Jan-06
Nov-06
Sep-07
Jul-08
May-09
Mar-10
Jan-11
Nov-11
Sep-12
Jul-13
May-14
Mar-15
Jan-16
Nov-16

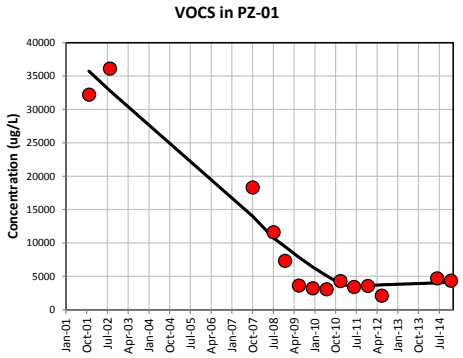

VOCS in PZ-01
Concentration (ug/L)
0
5000
10000
15000
20000
25000
30000
35000
40000
Jan-01
Oct-01
Jul-02
Apr-03
Jan-04
Oct-04
Jul-05
Apr-06
Jan-07
Oct-07
Jul-08
Apr-09
Jan-10
Oct-10
Jul-11
Apr-12
Jan-13
Oct-13
Jul-14

Table F-1. Tetrachloroethene Concentration Trends at Individual Wells Using Mann-Kendall Analysis

THAN Davenport Site, 2040 West River Drive

Well	Total Samples	Monitored Zone	Detection Frequency (%)	Mann-Kendall Result	Mann-Kendall Trend	Stability	Last Sample Date
ISCO Monitoring Wells							
BW-03/BW-03R	21	Shallow Bedrock	100	90.3% (-)	**No Trend**	**Stable**	Jun-16
BW-04	17	Shallow Bedrock	65	97.1% (sig -)	**Decreasing**	NA	Jun-11
BW-05	15	Shallow Bedrock	60	100.0% (sig -)	**Decreasing**	NA	Jun-10
BW-06	12	Shallow Bedrock	0	NA	>50% ND	NA	Jun-16
BW-16	16	Shallow Bedrock	100	100.0% (sig -)	**Decreasing**	NA	Jun-16
BW-23-125'	22	Intermediate Bedrock	5	NA	>50% ND	NA	Jun-16
BW-23-390'	22	Deep Bedrock	14	NA	>50% ND	NA	Jun-16
BW-23-50'	22	Shallow Bedrock	32	NA	>50% ND	NA	Jun-16
BW-27	14	Shallow Bedrock	71	99.9% (sig -)	**Decreasing**	NA	Jun-16
BW-28	8	Shallow Bedrock	100	96.9% (sig -)	**Decreasing**	NA	Jun-16
BW-31	12	Shallow Bedrock	33	NA	>50% ND	NA	Jun-16
BW-33	14	Shallow Bedrock	14	NA	>50% ND	NA	Jun-16
BW-34	14	Shallow Bedrock	7	NA	>50% ND	NA	Jun-16
BW-35	12	Shallow Bedrock	58	90.2% (-)	**No Trend**	**Not Stable**	Jun-16
BW-37	13	Shallow Bedrock	46	NA	>50% ND	NA	Jun-16
MW-03	14	Unconsolidated	93	72.3% (+)	**No Trend**	**Stable**	Jun-16
MW-04	20	Unconsolidated	100	99.4% (sig -)	**Decreasing**	NA	Jun-16
MW-05	19	Unconsolidated	100	96.3% (sig -)	**Decreasing**	NA	Jun-16
MW-06	7	Unconsolidated	100	88.1% (+)	**No Trend**	**Stable**	Jun-16
MW-08	18	Unconsolidated	89	53.0% (+)	**No Trend**	**Stable**	Jun-16
PZ-01	14	Shallow Bedrock	0	NA	>50% ND	NA	Dec-14
MNA Monitoring Wells							
BW-01	23	Shallow Bedrock	9	NA	>50% ND	NA	Jun-16
BW-02	11	Shallow Bedrock	0	NA	>50% ND	NA	Jun-16
BW-09	20	Shallow Bedrock	0	NA	>50% ND	NA	Jun-16
BW-11	19	Shallow Bedrock	37	NA	>50% ND	NA	Jun-16
BW-13	21	Shallow Bedrock	10	NA	>50% ND	NA	Jun-16
BW-14	10	Shallow Bedrock	20	NA	>50% ND	NA	Jun-16
BW-15	10	Shallow Bedrock	0	NA	>50% ND	NA	Jun-16
BW-18	21	Shallow Bedrock	5	NA	>50% ND	NA	Jun-16
BW-19	19	Shallow Bedrock	0	NA	>50% ND	NA	Jun-16
BW-21	18	Intermediate Bedrock	0	NA	>50% ND	NA	Jun-16
BW-24-390'	18	Deep Bedrock	0	NA	>50% ND	NA	Jun-16
BW-25	18	Shallow Bedrock	6	NA	>50% ND	NA	Jun-16
BW-26-395'	11	Deep Bedrock	0	NA	>50% ND	NA	Jun-16
BW-26-65'	13	Intermediate Bedrock	0	NA	>50% ND	NA	Jun-16
BW-26-85'	13	Intermediate Bedrock	0	NA	>50% ND	NA	Jun-16
MW-01	20	Unconsolidated	10	NA	>50% ND	NA	Jun-16
MW-07	9	Unconsolidated	22	NA	>50% ND	NA	Jun-16
MW-13	8	Unconsolidated	0	NA	>50% ND	NA	Jun-16

Notes:

% = percent

NA = not applicable

>50% ND = greater than 50 percent nondetects.

sig = significance

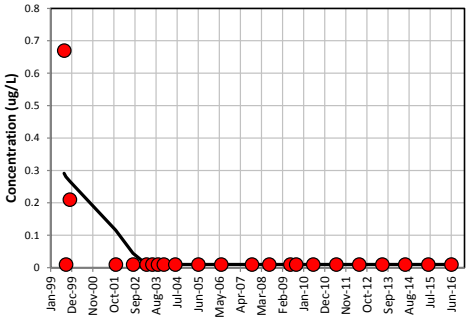
- = decreasing

+ = increasing

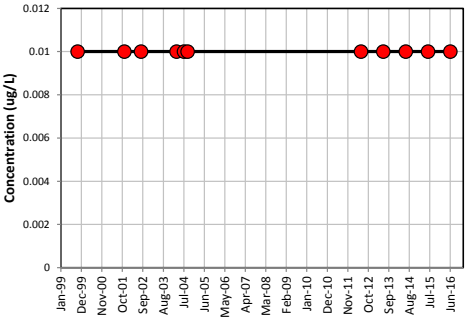
Trend analysis performed using Mann Kendall single-tailed test at 0.05 significance level.

For monitoring points exhibiting no trend at the 95% confidence level, concentrations are deemed stable if the coefficient of variation (COV) is equal to or less than one. The COV is a relative measure of variation in the groundwater concentration data, and can be affected by the magnitude of the concentrations. As such, concentrations that are high can include significant variation while exhibiting a small COV. While there is no objective basis for using a particular value of COV to determine stability, values greater than 1 indicate that the data exhibit a greater detail of scatter about the mean.

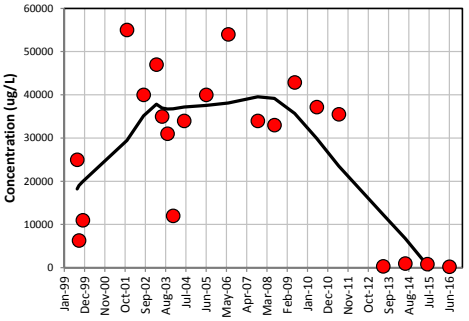
PCE in BW-01



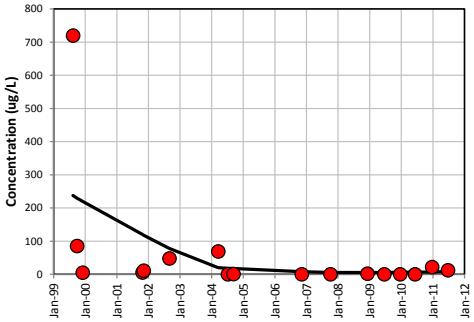
PCE in BW-02



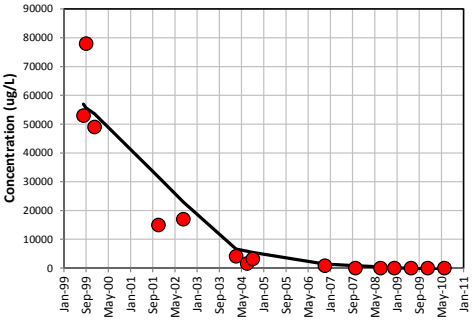
PCE in BW-03/BW-03R



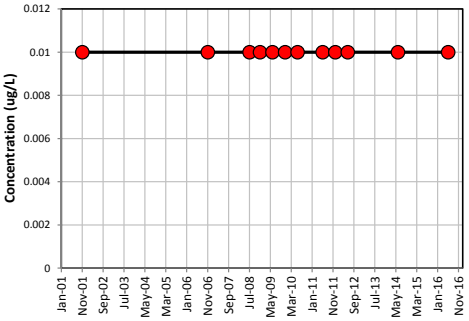
PCE in BW-04



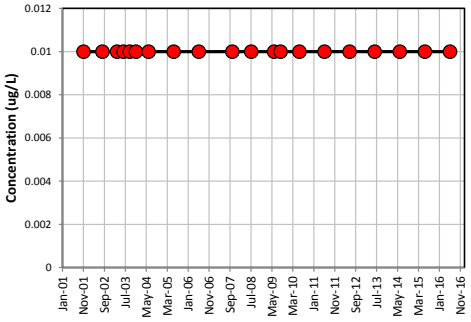
PCE in BW-05



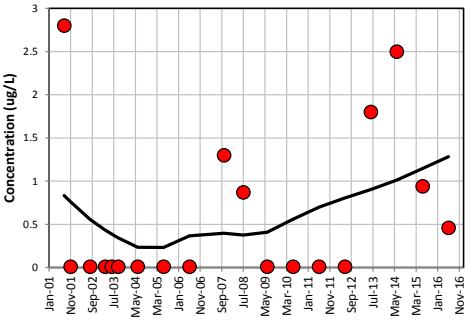
PCE in BW-06



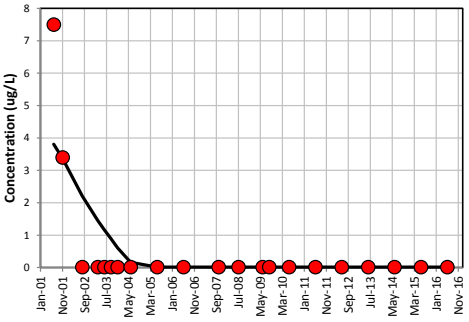
PCE in BW-09



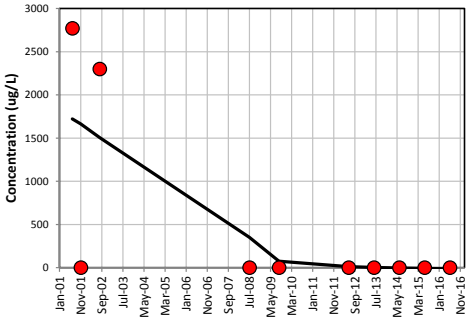
PCE in BW-11



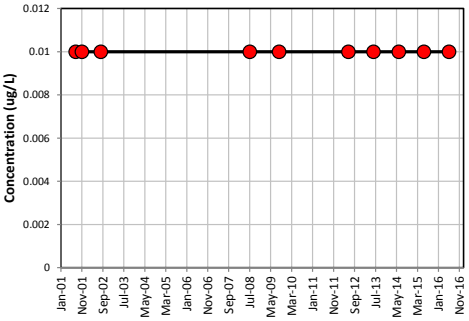
PCE in BW-13



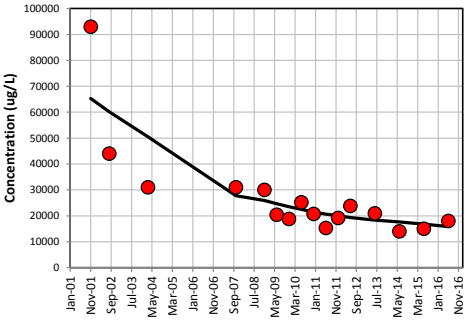
PCE in BW-14



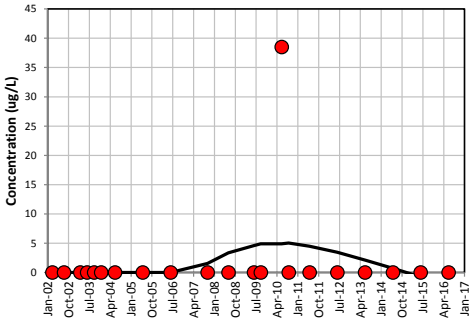
PCE in BW-15



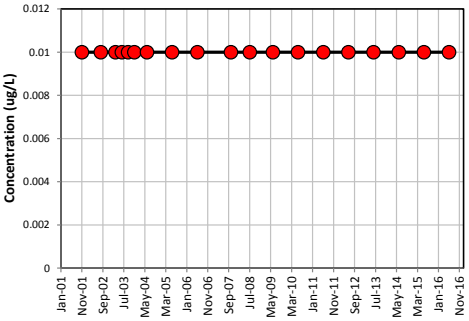
PCE in BW-16



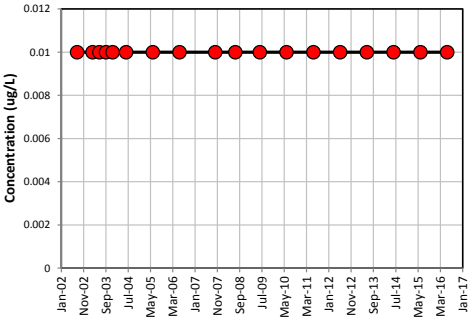
PCE in BW-18



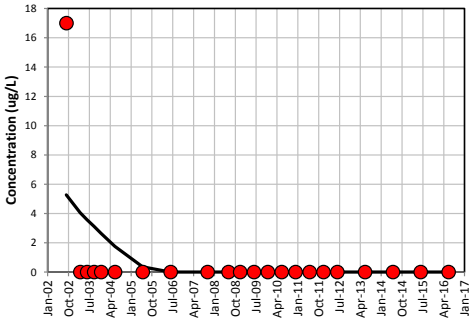
PCE in BW-19



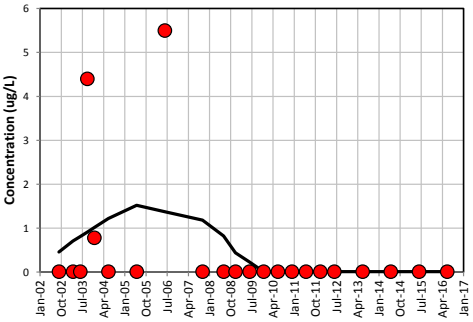
PCE in BW-21



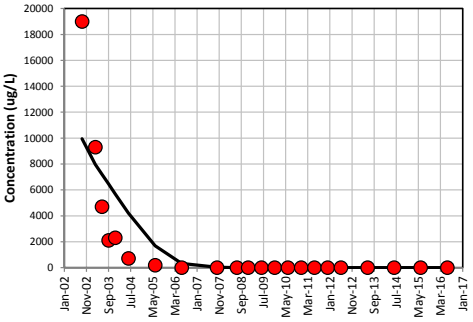
PCE in BW-23-125'



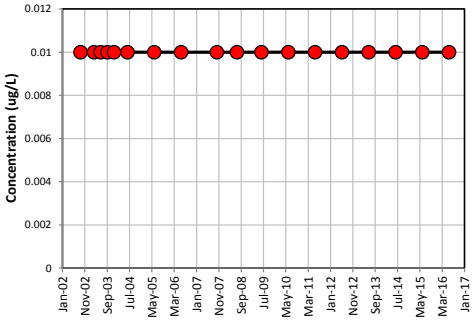
PCE in BW-23-390'



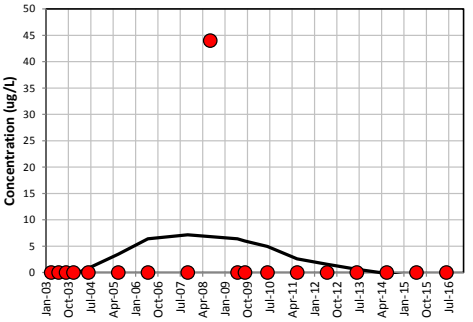
PCE in BW-23-50'



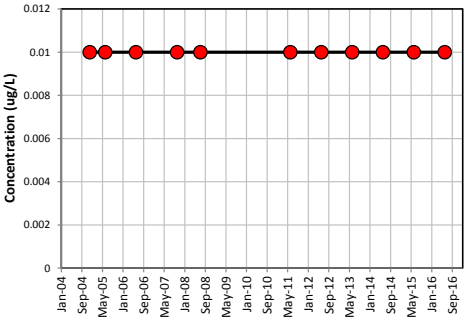
PCE in BW-24-390'



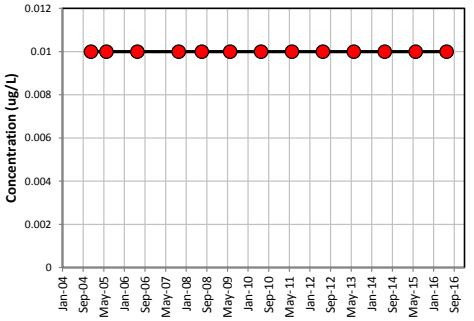
PCE in BW-25



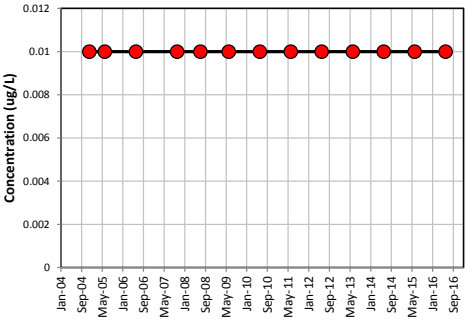
PCE in BW-26-395'



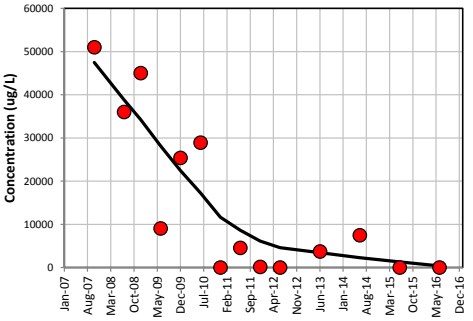
PCE in BW-26-65'



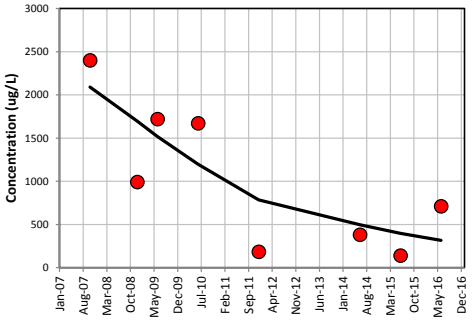
PCE in BW-26-85'



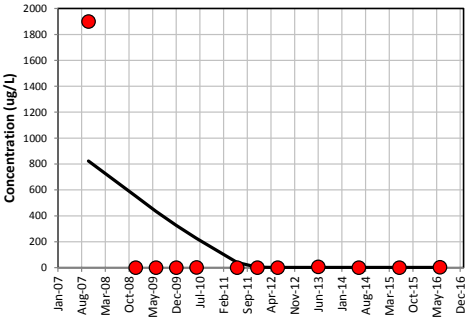
PCE in BW-27



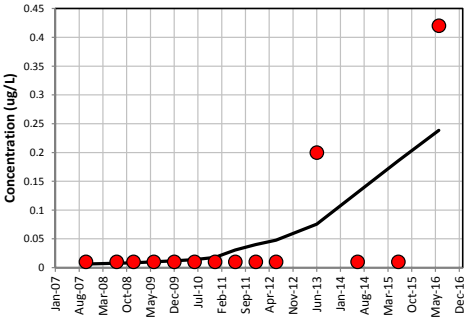
PCE in BW-28



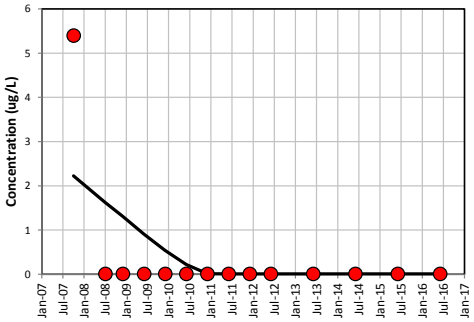
PCE in BW-31



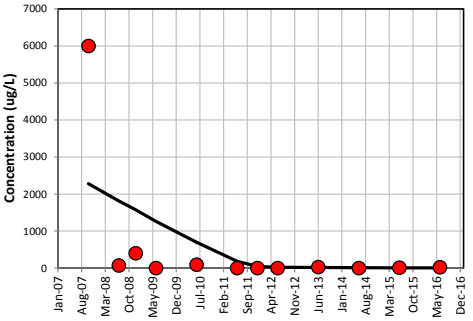
PCE in BW-33



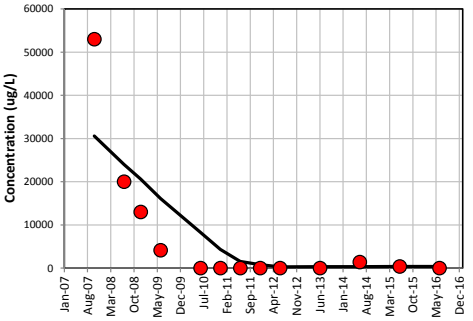
PCE in BW-34

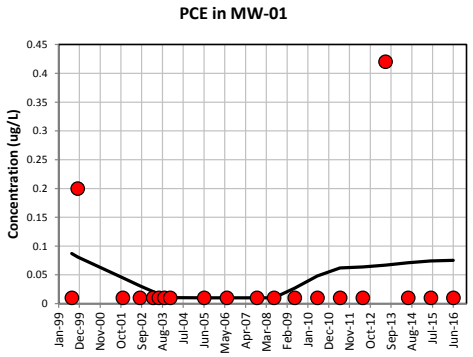


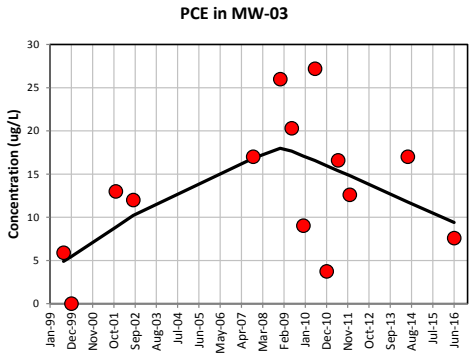
PCE in BW-35

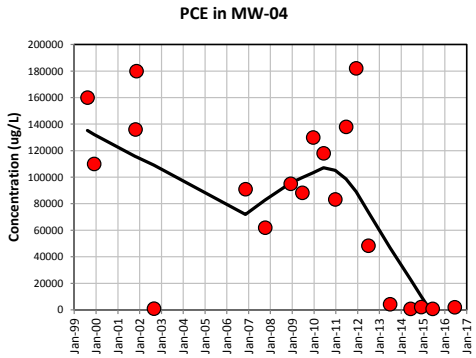


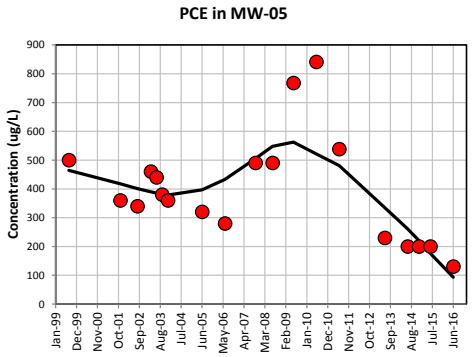
PCE in BW-37

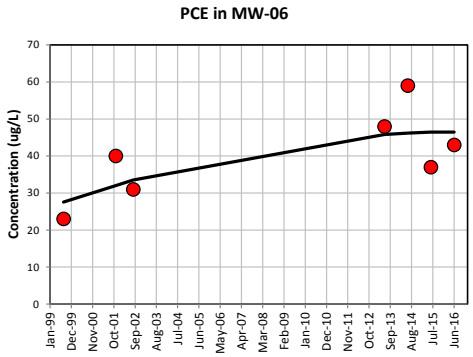


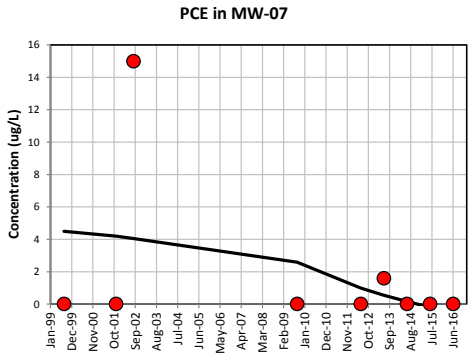

PCE in MW-01
Concentration (ug/L)

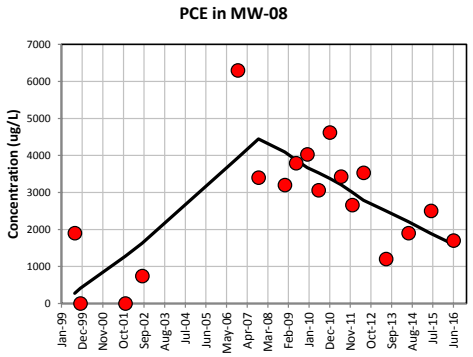

PCE in MW-03
Concentration (ug/L)

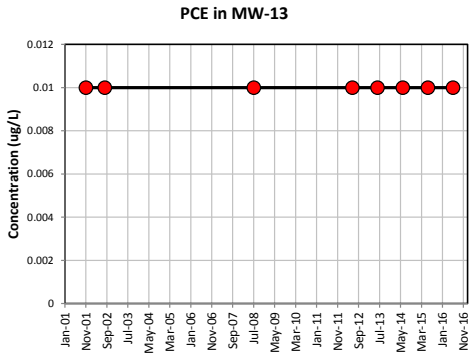

PCE in MW-04
Concentration (ug/L)


PCE in MW-05
Concentration (ug/L)


PCE in MW-06
Concentration (ug/L)


PCE in MW-07
Concentration (ug/L)


PCE in MW-08
Concentration (ug/L)


PCE in MW-13
Concentration (ug/L)

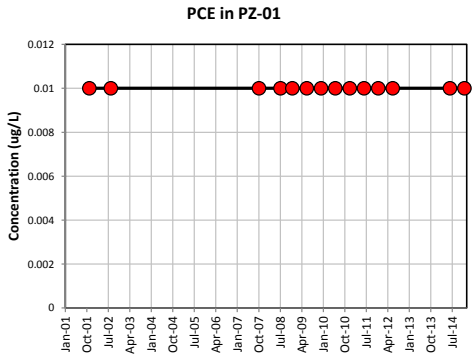

PCE in PZ-01
Concentration (ug/L)

Table F-2. Trichloroethene Concentration Trends at Individual Wells Using Mann-Kendall Analysis

THAN Davenport Site, 2040 West River Drive

Well	Total Samples	Monitored Zone	Detection Frequency (%)	Mann-Kendall Result	Mann-Kendall Trend	Stability	Last Sample Date
ISCO Monitoring Wells							
BW-03/BW-03R	21	Shallow Bedrock	95	97.1% (sig -)	**Decreasing**	NA	Jun-16
BW-04	17	Shallow Bedrock	82	99.7% (sig -)	**Decreasing**	NA	Jun-11
BW-05	15	Shallow Bedrock	53	100.0% (sig -)	**Decreasing**	NA	Jun-10
BW-06	12	Shallow Bedrock	0	NA	>50% ND	NA	Jun-16
BW-16	16	Shallow Bedrock	100	92.5% (+)	**No Trend**	**Stable**	Jun-16
BW-23-125'	22	Intermediate Bedrock	5	NA	>50% ND	NA	Jun-16
BW-23-390'	22	Deep Bedrock	18	NA	>50% ND	NA	Jun-16
BW-23-50'	22	Shallow Bedrock	36	NA	>50% ND	NA	Jun-16
BW-27	14	Shallow Bedrock	93	99.9% (sig -)	**Decreasing**	NA	Jun-16
BW-28	8	Shallow Bedrock	100	98.4% (sig -)	**Decreasing**	NA	Jun-16
BW-31	12	Shallow Bedrock	33	NA	>50% ND	NA	Jun-16
BW-33	14	Shallow Bedrock	36	NA	>50% ND	NA	Jun-16
BW-34	14	Shallow Bedrock	7	NA	>50% ND	NA	Jun-16
BW-35	12	Shallow Bedrock	50	60.6% (-)	**No Trend**	**Not Stable**	Jun-16
BW-37	13	Shallow Bedrock	38	NA	>50% ND	NA	Jun-16
MW-03	14	Unconsolidated	93	72.3% (-)	**No Trend**	**Stable**	Jun-16
MW-04	20	Unconsolidated	95	63.9% (-)	**No Trend**	**Stable**	Jun-16
MW-05	19	Unconsolidated	100	87.6% (-)	**No Trend**	**Stable**	Jun-16
MW-06	7	Unconsolidated	100	93.2% (-)	**No Trend**	**Stable**	Jun-16
MW-08	18	Unconsolidated	83	88.7% (-)	**No Trend**	**Stable**	Jun-16
PZ-01	14	Shallow Bedrock	14	NA	>50% ND	NA	Dec-14
MNA Monitoring Wells							
BW-01	23	Shallow Bedrock	13	NA	>50% ND	NA	Jun-16
BW-02	11	Shallow Bedrock	55	99.3% (sig -)	**Decreasing**	NA	Jun-16
BW-09	20	Shallow Bedrock	0	NA	>50% ND	NA	Jun-16
BW-11	19	Shallow Bedrock	63	68.8% (-)	**No Trend**	**Not Stable**	Jun-16
BW-13	21	Shallow Bedrock	10	NA	>50% ND	NA	Jun-16
BW-14	10	Shallow Bedrock	30	NA	>50% ND	NA	Jun-16
BW-15	10	Shallow Bedrock	50	99.4% (sig -)	**Decreasing**	NA	Jun-16
BW-18	21	Shallow Bedrock	5	NA	>50% ND	NA	Jun-16
BW-19	19	Shallow Bedrock	0	NA	>50% ND	NA	Jun-16
BW-21	18	Intermediate Bedrock	0	NA	>50% ND	NA	Jun-16
BW-24-390'	18	Deep Bedrock	0	NA	>50% ND	NA	Jun-16
BW-25	18	Shallow Bedrock	6	NA	>50% ND	NA	Jun-16
BW-26-395'	11	Deep Bedrock	0	NA	>50% ND	NA	Jun-16
BW-26-65'	13	Intermediate Bedrock	0	NA	>50% ND	NA	Jun-16
BW-26-85'	13	Intermediate Bedrock	0	NA	>50% ND	NA	Jun-16
MW-01	20	Unconsolidated	0	NA	>50% ND	NA	Jun-16
MW-07	9	Unconsolidated	78	92.5% (-)	**No Trend**	**Not Stable**	Jun-16
MW-13	8	Unconsolidated	0	NA	>50% ND	NA	Jun-16

Notes:

% = percent

NA = not applicable

>50% ND = greater than 50 percent nondetects.

sig = significance

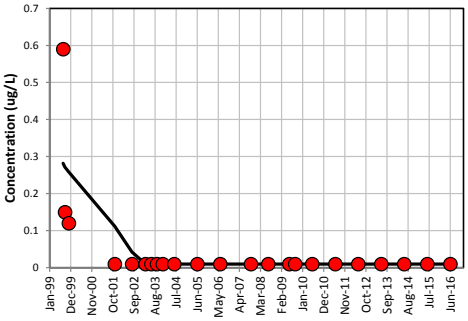
- = decreasing

+ = increasing

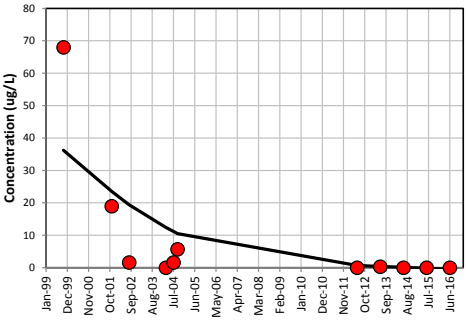
Trend analysis performed using Mann Kendall single-tailed test at 0.05 significance level.

For monitoring points exhibiting no trend at the 95% confidence level, concentrations are deemed stable if the coefficient of variation (COV) is equal to or less than one. The COV is a relative measure of variation in the groundwater concentration data, and can be affected by the magnitude of the concentrations. As such, concentrations that are high can include significant variation while exhibiting a small COV. While there is no objective basis for using a particular value of COV to determine stability, values greater than 1 indicate that the data exhibit a greater detail of scatter about the mean.

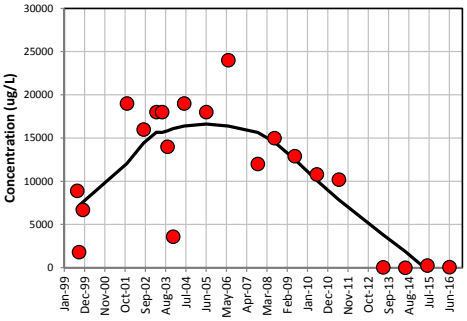
TCE in BW-01



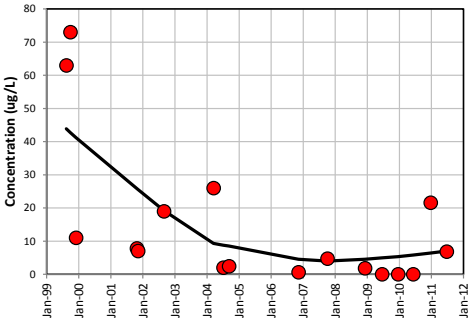
TCE in BW-02



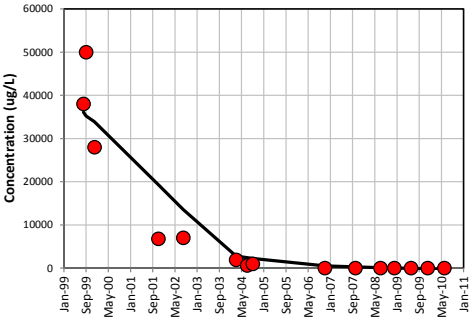
TCE in BW-03/BW-03R



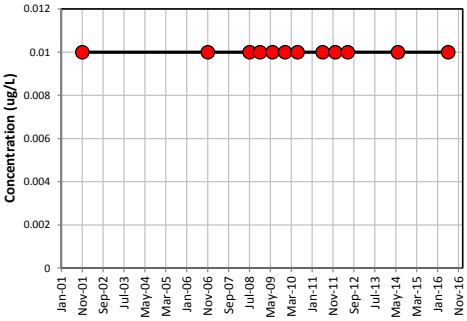
TCE in BW-04



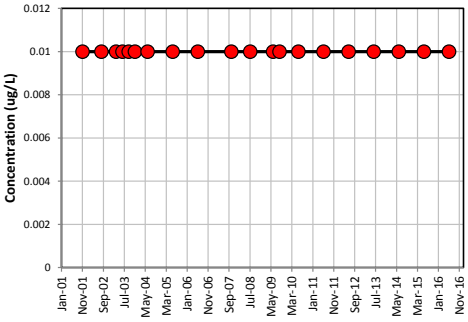
TCE in BW-05



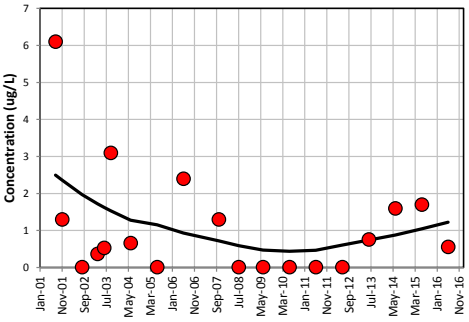
TCE in BW-06



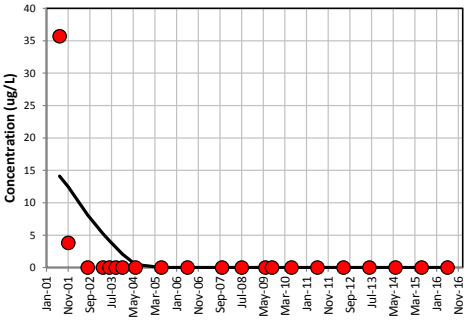
TCE in BW-09



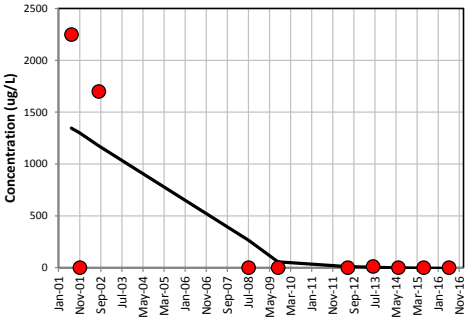
TCE in BW-11



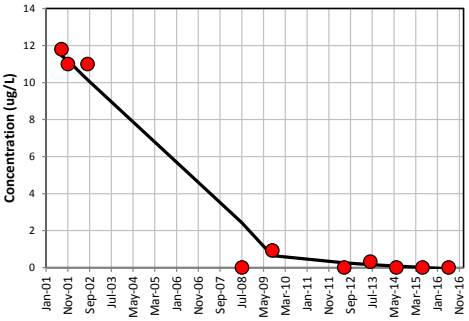
TCE in BW-13



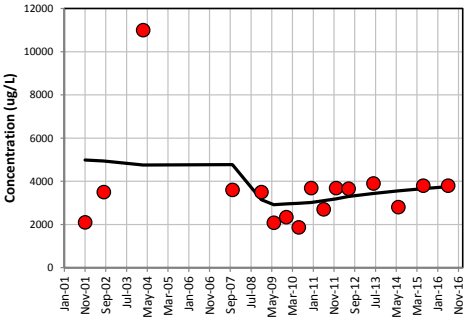
TCE in BW-14



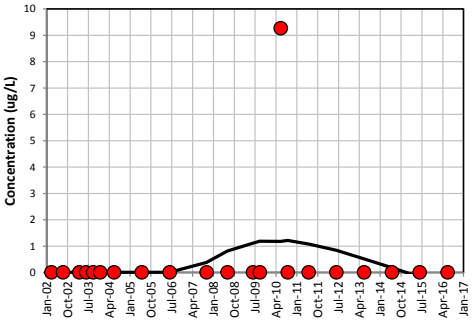
TCE in BW-15



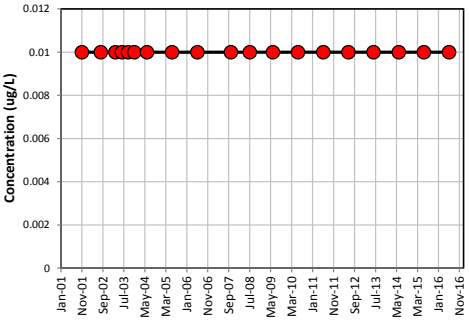
TCE in BW-16



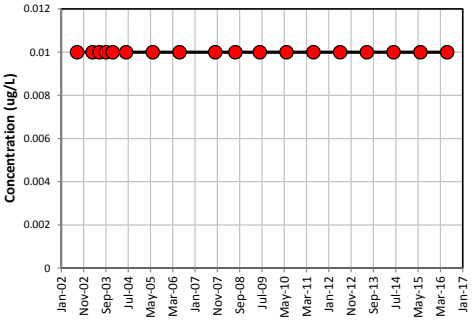
TCE in BW-18



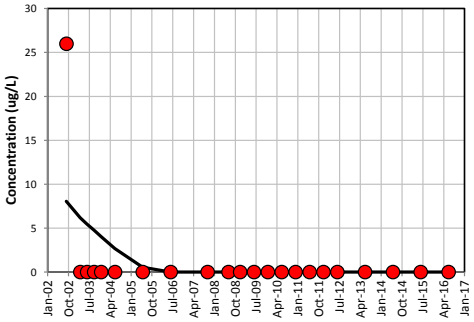
TCE in BW-19



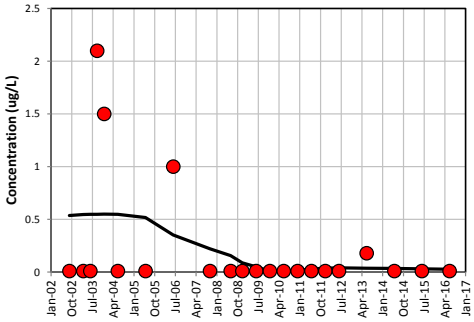
TCE in BW-21



TCE in BW-23-125'



TCE in BW-23-390'



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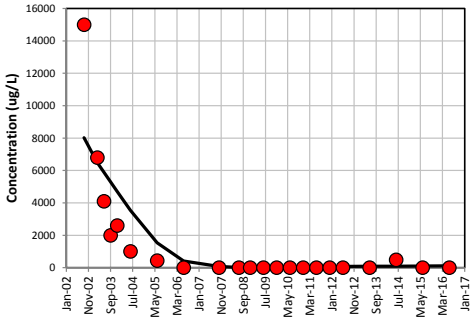
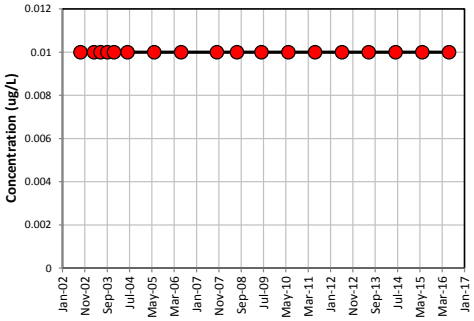
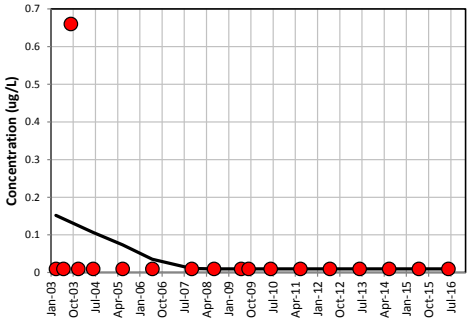


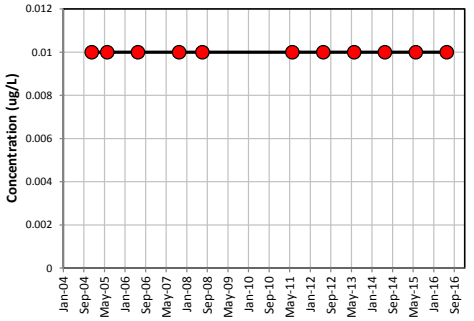
TCE in BW-24-390'



TCE in BW-25



TCE in BW-26-395'



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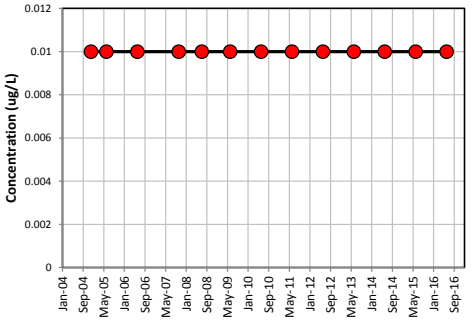
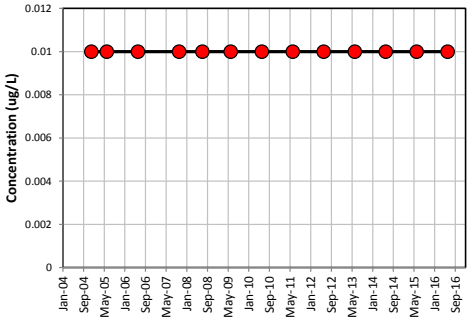
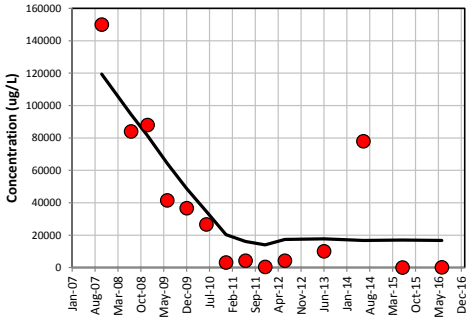


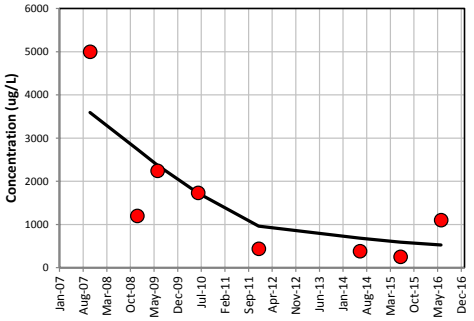
TCE in BW-26-85'



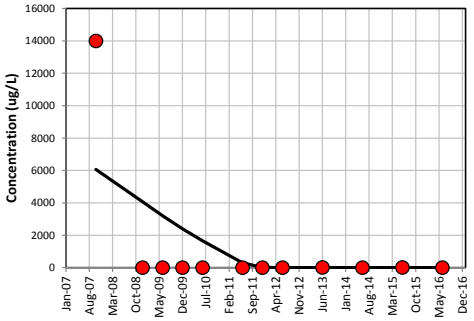
TCE in BW-27



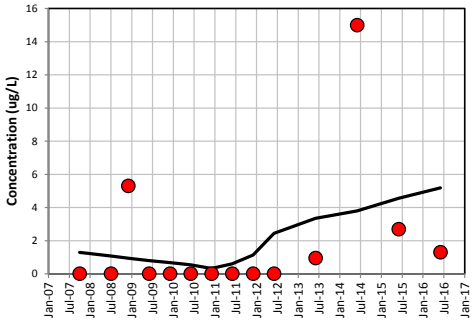
TCE in BW-28



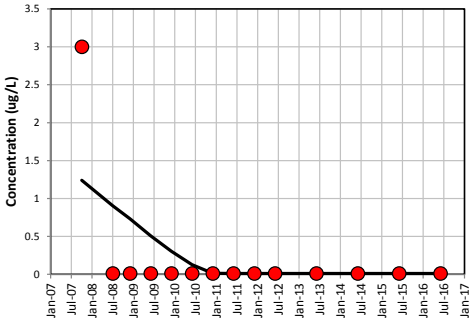
TCE in BW-31



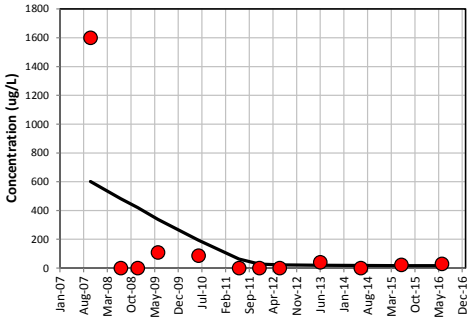
TCE in BW-33



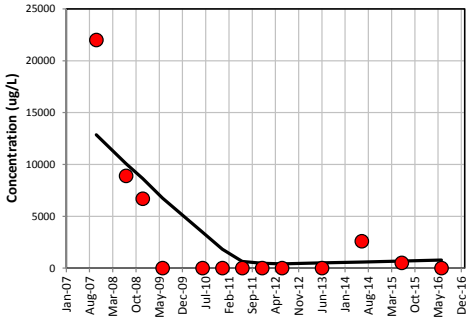
TCE in BW-34

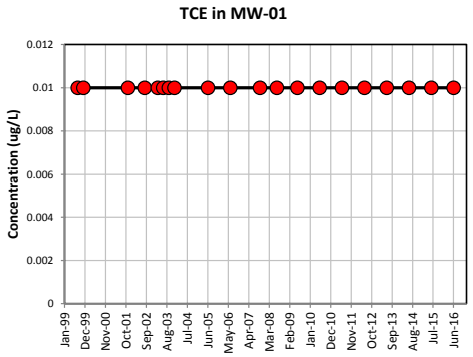


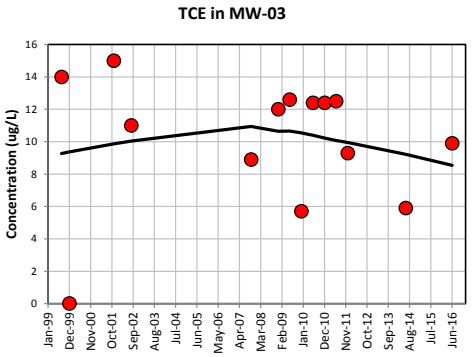
TCE in BW-35

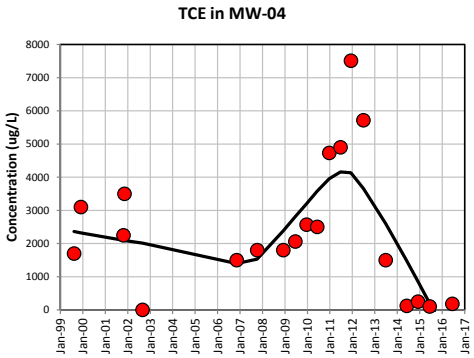


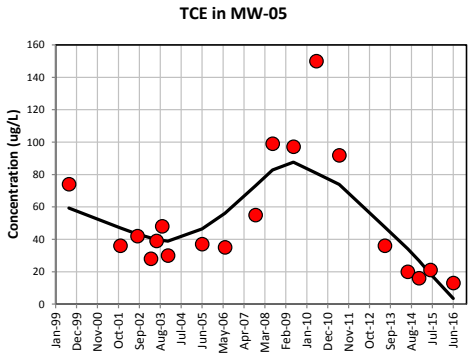
TCE in BW-37

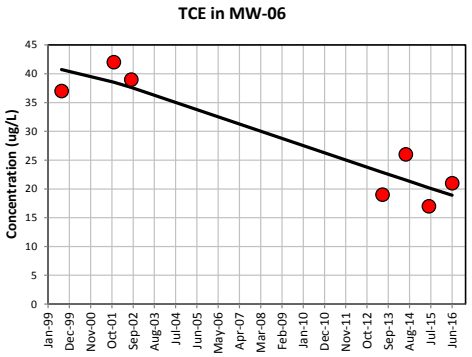


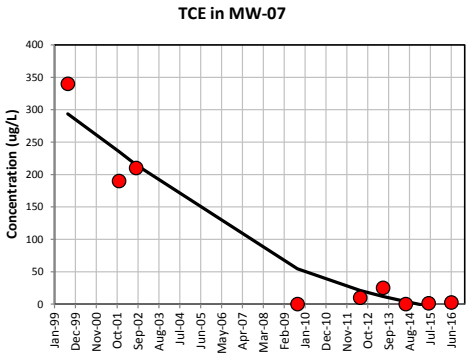

TCE in MW-01
Concentration (ug/L)

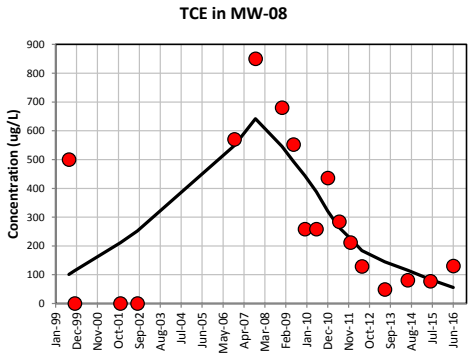

TCE in MW-03
Concentration (ug/L)

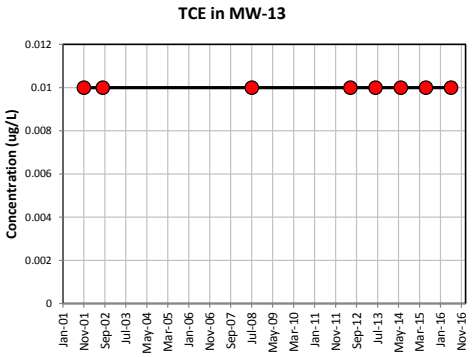

TCE in MW-04
Concentration (ug/L)


TCE in MW-05
Concentration (ug/L)


TCE in MW-06
Concentration (ug/L)


TCE in MW-07
Concentration (ug/L)


TCE in MW-08
Concentration (ug/L)


TCE in MW-13
Concentration (ug/L)

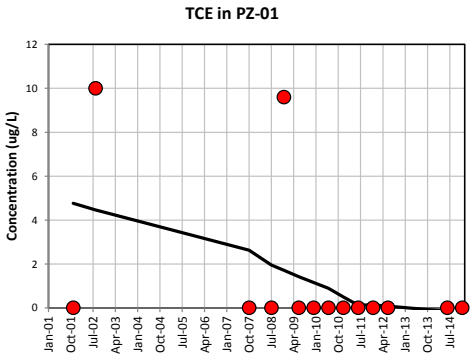

TCE in PZ-01
Concentration (ug/L)

Table F-3. 1,1,1-Trichloroethane Concentration Trends at Individual Wells Using Mann-Kendall Analysis

THAN Davenport Site, 2040 West River Drive

Well	Total Samples	Monitored Zone	Detection Frequency (%)	Mann-Kendall Result	Mann-Kendall Trend	Stability	Last Sample Date
ISCO Monitoring Wells							
BW-03/BW-03R	21	Shallow Bedrock	100	76.6% (-)	No Trend	Stable	Jun-16
BW-04	17	Shallow Bedrock	65	99.7% (sig -)	Decreasing	NA	Jun-11
BW-05	15	Shallow Bedrock	93	99.6% (sig -)	Decreasing	NA	Jun-10
BW-06	12	Shallow Bedrock	58	98.4% (sig -)	Decreasing	NA	Jun-16
BW-16	16	Shallow Bedrock	100	96.0% (sig -)	Decreasing	NA	Jun-16
BW-23-125'	22	Intermediate Bedrock	82	100.0% (sig -)	Decreasing	NA	Jun-16
BW-23-390'	22	Deep Bedrock	32	NA	>50% ND	NA	Jun-16
BW-23-50'	22	Shallow Bedrock	100	100.0% (sig -)	Decreasing	NA	Jun-16
BW-27	14	Shallow Bedrock	100	96.9% (sig -)	Decreasing	NA	Jun-16
BW-28	8	Shallow Bedrock	100	99.3% (sig -)	Decreasing	NA	Jun-16
BW-31	12	Shallow Bedrock	100	99.3% (sig -)	Decreasing	NA	Jun-16
BW-33	14	Shallow Bedrock	100	92.9% (-)	No Trend	Stable	Jun-16
BW-34	14	Shallow Bedrock	0	NA	>50% ND	NA	Jun-16
BW-35	12	Shallow Bedrock	100	95.7% (sig -)	Decreasing	NA	Jun-16
BW-37	13	Shallow Bedrock	100	99.9% (sig -)	Decreasing	NA	Jun-16
MW-03	14	Unconsolidated	93	98.5% (sig -)	Decreasing	NA	Jun-16
MW-04	20	Unconsolidated	95	100.0% (sig -)	Decreasing	NA	Jun-16
MW-05	19	Unconsolidated	100	76.9% (+)	No Trend	Not Stable	Jun-16
MW-06	7	Unconsolidated	100	80.9% (-)	No Trend	Stable	Jun-16
MW-08	18	Unconsolidated	17	NA	>50% ND	NA	Jun-16
PZ-01	14	Shallow Bedrock	86	82.0% (-)	No Trend	Not Stable	Dec-14
MNA Monitoring Wells							
BW-01	23	Shallow Bedrock	78	99.4% (sig -)	Decreasing	NA	Jun-16
BW-02	11	Shallow Bedrock	36	NA	>50% ND	NA	Jun-16
BW-09	20	Shallow Bedrock	0	NA	>50% ND	NA	Jun-16
BW-11	19	Shallow Bedrock	0	NA	>50% ND	NA	Jun-16
BW-13	21	Shallow Bedrock	10	NA	>50% ND	NA	Jun-16
BW-14	10	Shallow Bedrock	100	99.5% (sig -)	Decreasing	NA	Jun-16
BW-15	10	Shallow Bedrock	30	NA	>50% ND	NA	Jun-16
BW-18	21	Shallow Bedrock	10	NA	>50% ND	NA	Jun-16
BW-19	19	Shallow Bedrock	5	NA	>50% ND	NA	Jun-16
BW-21	18	Intermediate Bedrock	0	NA	>50% ND	NA	Jun-16
BW-24-390'	18	Deep Bedrock	0	NA	>50% ND	NA	Jun-16
BW-25	18	Shallow Bedrock	0	NA	>50% ND	NA	Jun-16
BW-26-395'	11	Deep Bedrock	45	NA	>50% ND	NA	Jun-16
BW-26-65'	13	Intermediate Bedrock	85	94.3% (-)	No Trend	Stable	Jun-16
BW-26-85'	13	Intermediate Bedrock	77	92.7% (-)	No Trend	Not Stable	Jun-16
MW-01	20	Unconsolidated	5	NA	>50% ND	NA	Jun-16
MW-07	9	Unconsolidated	100	100.0% (sig -)	Decreasing	NA	Jun-16
MW-13	8	Unconsolidated	0	NA	>50% ND	NA	Jun-16

Notes:

% = percent

NA = not applicable

>50% ND = greater than 50 percent nondetects.

sig = significance

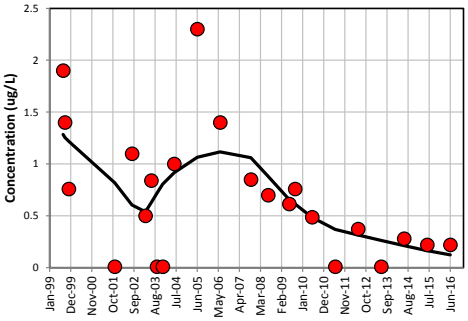
- = decreasing

+ = increasing

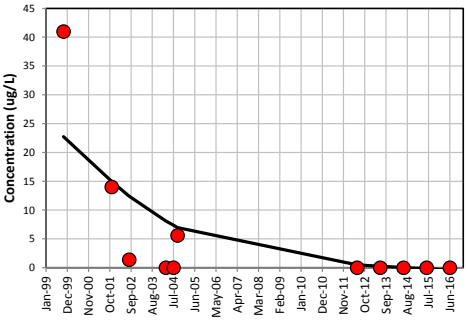
Trend analysis performed using Mann Kendall single-tailed test at 0.05 significance level.

For monitoring points exhibiting no trend at the 95% confidence level, concentrations are deemed stable if the coefficient of variation (COV) is equal to or less than one. The COV is a relative measure of variation in the groundwater concentration data, and can be affected by the magnitude of the concentrations. As such, concentrations that are high can include significant variation while exhibiting a small COV. While there is no objective basis for using a particular value of COV to determine stability, values greater than 1 indicate that the data exhibit a greater detail of scatter about the mean.

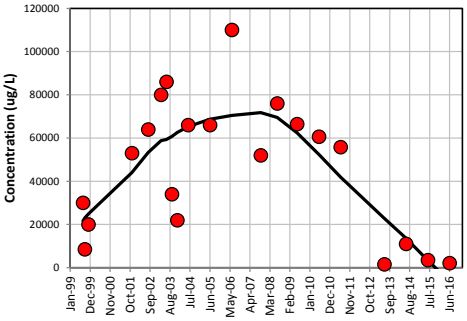
TCA111 in BW-01



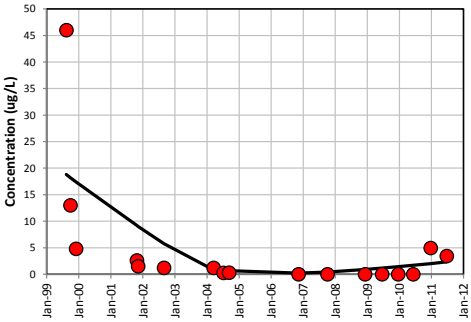
TCA111 in BW-02



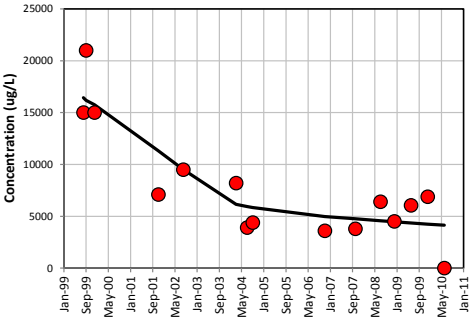
TCA111 in BW-03/BW-03R



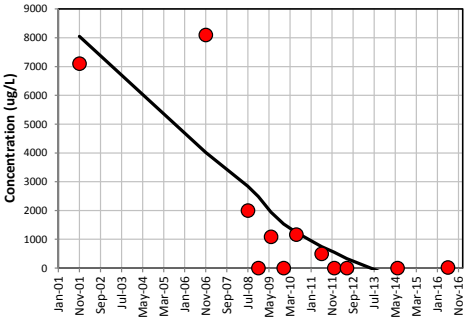
TCA111 in BW-04



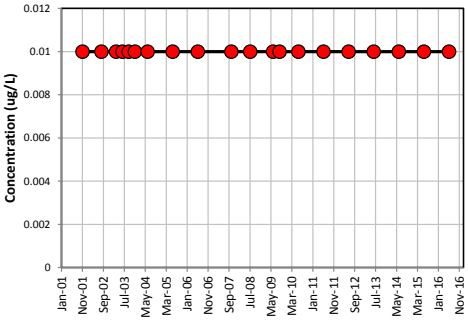
TCA111 in BW-05



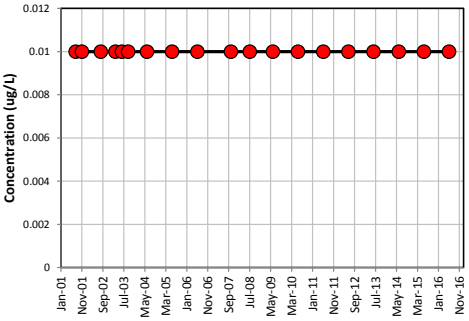
TCA111 in BW-06



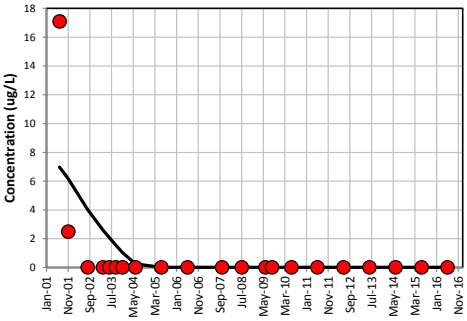
TCA111 in BW-09



TCA111 in BW-11



TCA111 in BW-13



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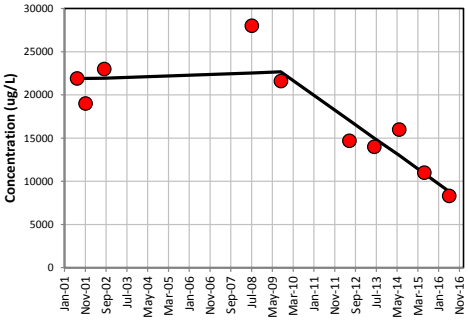

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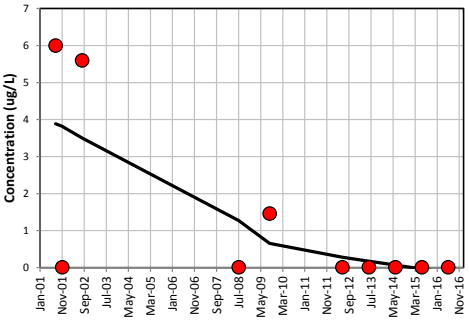
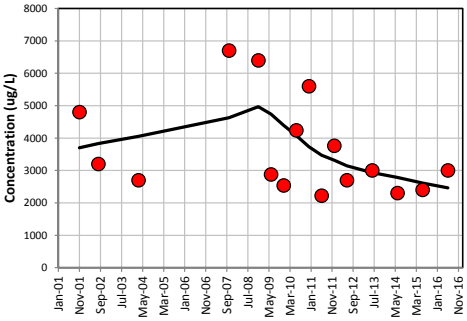
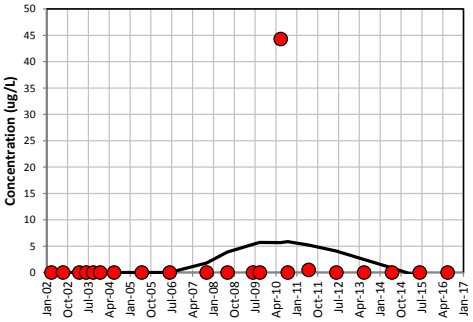


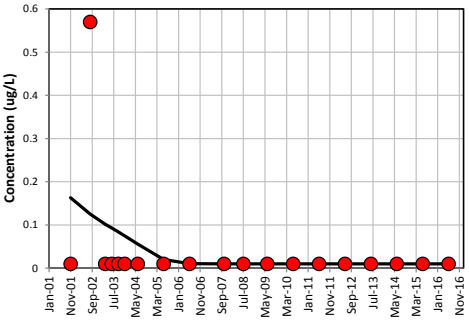
TCA111 in BW-16



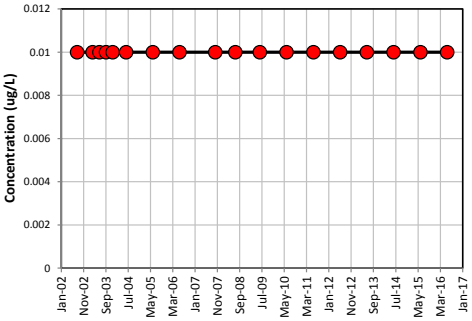
TCA111 in BW-18



TCA111 in BW-19



TCA111 in BW-21



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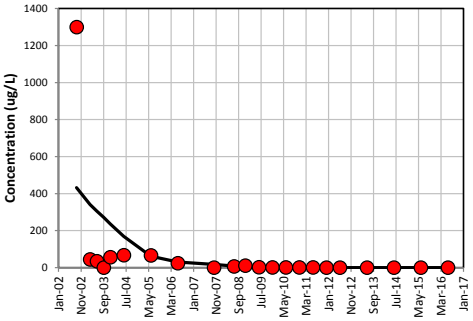

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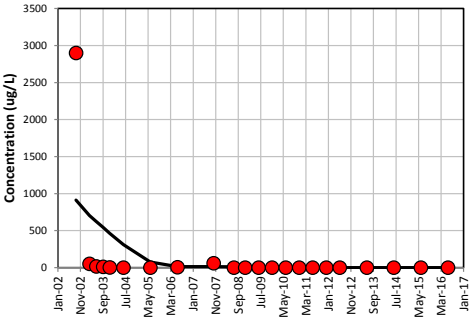

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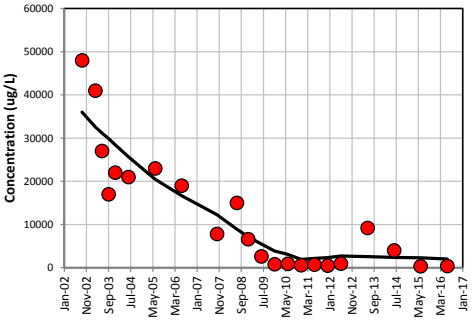

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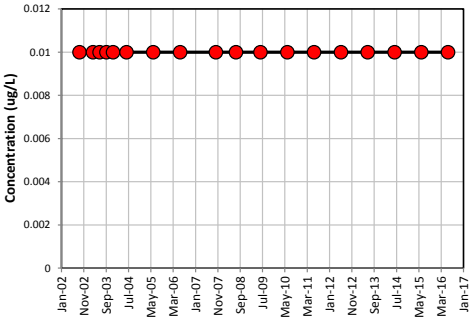

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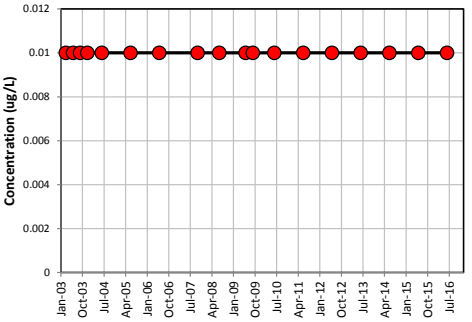

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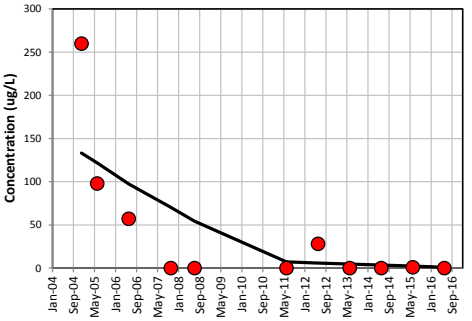
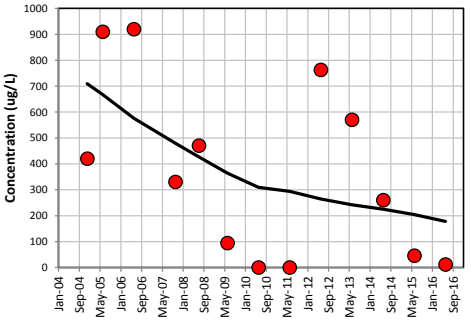
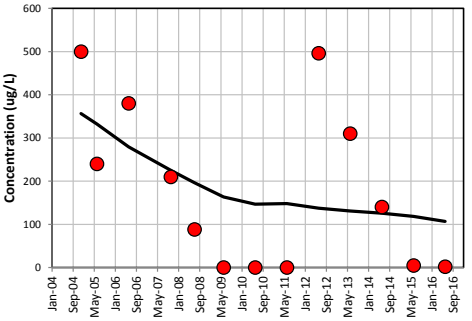


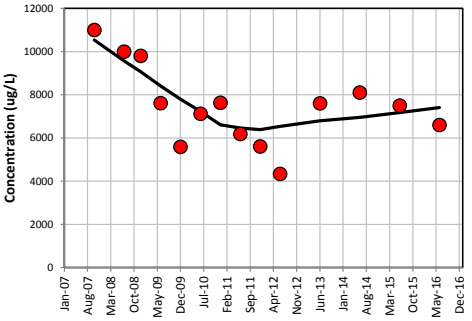
TCA111 in BW-26-65'



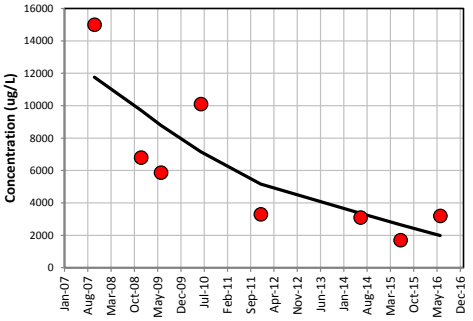
TCA111 in BW-26-85'



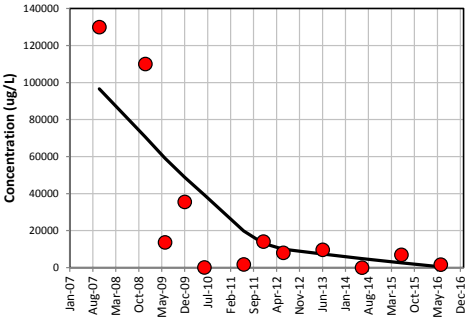
TCA111 in BW-27



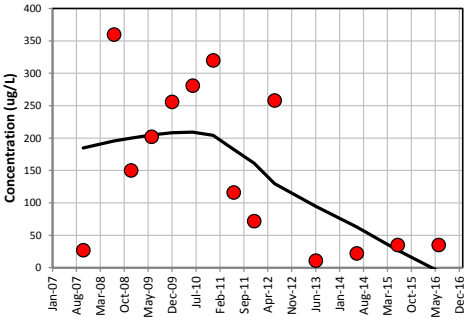
TCA111 in BW-28



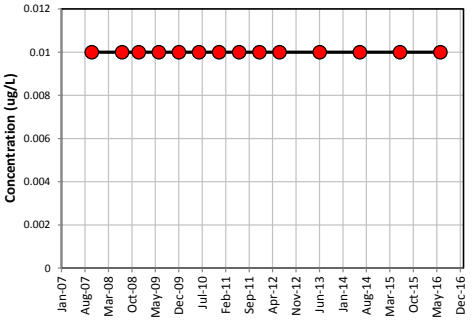
TCA111 in BW-31



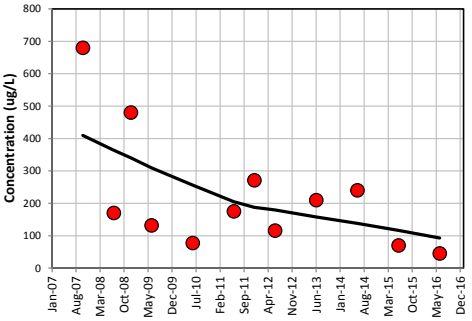
TCA111 in BW-33



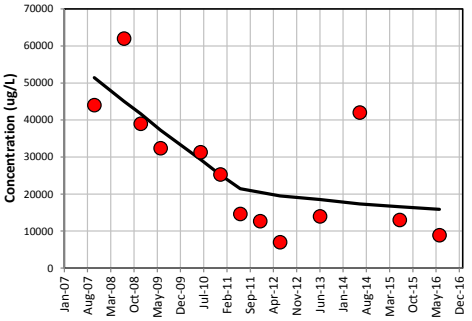
TCA111 in BW-34

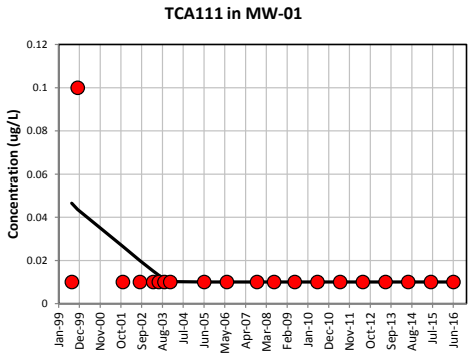


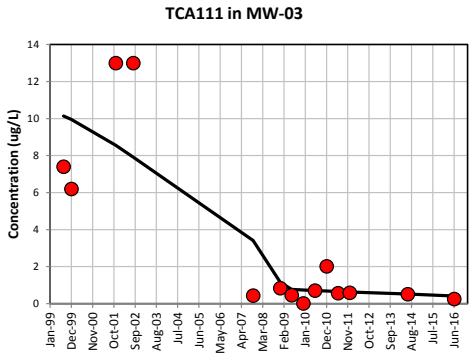
TCA111 in BW-35

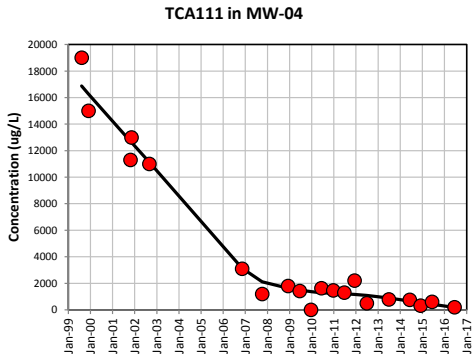


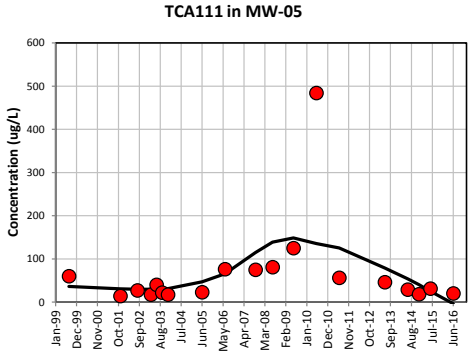
TCA111 in BW-37

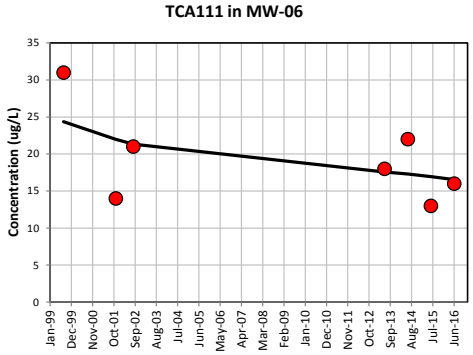



TCA111 in MW-01
Concentration (ug/L)
0.12
0.1
0.08
0.06
0.04
0.02
0
Jan-99
Dec-99
Nov-00
Oct-01
Sep-02
Aug-03
Jul-04
Jun-05
May-06
Apr-07
Mar-08
Feb-09
Jan-10
Dec-10
Nov-11
Oct-12
Sep-13
Aug-14
Jul-15
Jun-16


TCA111 in MW-03
Concentration (ug/L)
14
12
10
8
6
4
2
0
Jan-99
Dec-99
Nov-00
Oct-01
Sep-02
Aug-03
Jul-04
Jun-05
May-06
Apr-07
Mar-08
Feb-09
Jan-10
Dec-10
Nov-11
Oct-12
Sep-13
Aug-14
Jul-15
Jun-16


TCA111 in MW-04
Concentration (ug/L)
20000
18000
16000
14000
12000
10000
8000
6000
4000
2000
0
Jan-99
Jan-00
Jan-01
Jan-02
Jan-03
Jan-04
Jan-05
Jan-06
Jan-07
Jan-08
Jan-09
Jan-10
Jan-11
Jan-12
Jan-13
Jan-14
Jan-15
Jan-16
Jan-17


TCA111 in MW-05
Concentration (ug/L)
600
500
400
300
200
100
0
Jan-99
Dec-99
Nov-00
Oct-01
Sep-02
Aug-03
Jul-04
Jun-05
May-06
Apr-07
Mar-08
Feb-09
Jan-10
Dec-10
Nov-11
Oct-12
Sep-13
Aug-14
Jul-15
Jun-16


TCA111 in MW-06
Concentration (ug/L)
35
30
25
20
15
10
5
0
Jan-99
Dec-99
Nov-00
Oct-01
Sep-02
Aug-03
Jul-04
Jun-05
May-06
Apr-07
Mar-08
Feb-09
Jan-10
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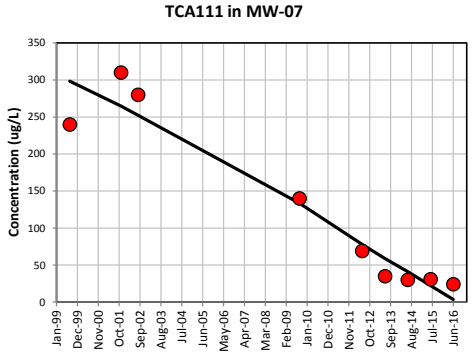
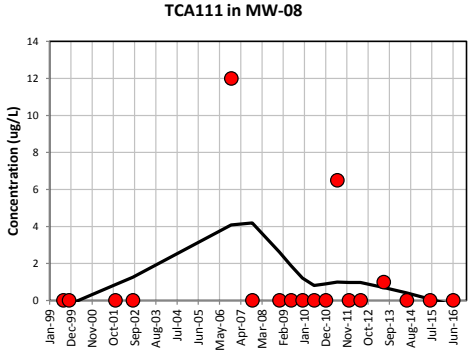
Oct-12
Sep-13
Aug-14
Jul-15
Jun-16


TCA111 in MW-07
Concentration (ug/L)
350
300
250
200
150
100
50
0
Jan-99
Dec-99
Nov-00
Oct-01
Sep-02
Aug-03
Jul-04
Jun-05
May-06
Apr-07
Mar-08
Feb-09
Jan-10
Dec-10
Nov-11
Oct-12
Sep-13
Aug-14
Jul-15
Jun-16


TCA111 in MW-08
Concentration (ug/L)
14
12
10
8
6
4
2
0
Jan-99
Dec-99
Nov-00
Oct-01
Sep-02
Aug-03
Jul-04
Jun-05
May-06
Apr-07
Mar-08
Feb-09
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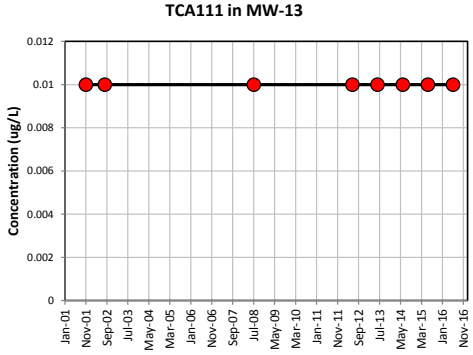
Dec-10
Nov-11
Oct-12
Sep-13
Aug-14
Jul-15
Jun-16


TCA111 in MW-13
Concentration (ug/L)
0.012
0.01
0.008
0.006
0.004
0.002
0
Jan-01
Nov-01
Sep-02
Jul-03
May-04
Mar-05
Jan-06
Nov-06
Sep-07
Jul-08
May-09
Mar-10
Jan-11
Nov-11
Sep-12
Jul-13
May-14
Mar-15
Jan-16
Nov-16

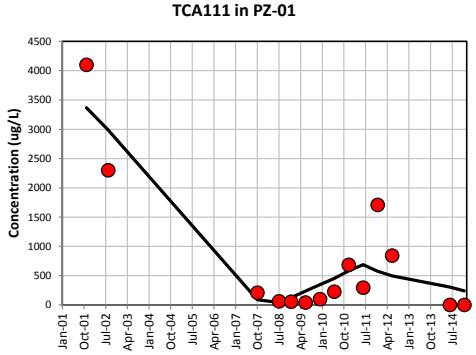

TCA111 in PZ-01
Concentration (ug/L)
4500
4000
3500
3000
2500
2000
1500
1000
500
0
Jan-01
Oct-01
Jul-02
Apr-03
Jan-04
Oct-04
Jul-05
Apr-06
Jan-07
Oct-07
Jul-08
Apr-09
Jan-10
Oct-10
Jul-11
Apr-12
Jan-13
Oct-13
Jul-14

Table F-4. Methylene Chloride Concentration Trends at Individual Wells Using Mann-Kendall Analysis

THAN Davenport Site, 2040 West River Drive

Well	Total Samples	Monitored Zone	Detection Frequency (%)	Mann-Kendall Result	Mann-Kendall Trend	Stability	Last Sample Date
ISCO Monitoring Wells							
BW-03/BW-03R	21	Shallow Bedrock	95	96.7% (sig -)	**Decreasing**	**NA**	Jun-16
BW-04	17	Shallow Bedrock	35	NA	>50% ND	NA	Jun-11
BW-05	15	Shallow Bedrock	33	NA	>50% ND	NA	Jun-10
BW-06	12	Shallow Bedrock	33	NA	>50% ND	NA	Jun-16
BW-16	16	Shallow Bedrock	13	NA	>50% ND	NA	Jun-16
BW-23-125'	22	Intermediate Bedrock	14	NA	>50% ND	NA	Jun-16
BW-23-390'	22	Deep Bedrock	41	NA	>50% ND	NA	Jun-16
BW-23-50'	22	Shallow Bedrock	55	100.0% (sig -)	**Decreasing**	NA	Jun-16
BW-27	14	Shallow Bedrock	71	99.9% (sig -)	**Decreasing**	NA	Jun-16
BW-28	8	Shallow Bedrock	63	50.0% (-)	**No Trend**	**Not Stable**	Jun-16
BW-31	12	Shallow Bedrock	17	NA	>50% ND	NA	Jun-16
BW-33	14	Shallow Bedrock	0	NA	>50% ND	NA	Jun-16
BW-34	14	Shallow Bedrock	7	NA	>50% ND	NA	Jun-16
BW-35	12	Shallow Bedrock	25	NA	>50% ND	NA	Jun-16
BW-37	13	Shallow Bedrock	100	98.9% (sig -)	**Decreasing**	NA	Jun-16
MW-03	14	Unconsolidated	7	NA	>50% ND	NA	Jun-16
MW-04	20	Unconsolidated	25	NA	>50% ND	NA	Jun-16
MW-05	19	Unconsolidated	5	NA	>50% ND	NA	Jun-16
MW-06	7	Unconsolidated	0	NA	>50% ND	NA	Jun-16
MW-08	18	Unconsolidated	28	NA	>50% ND	NA	Jun-16
PZ-01	14	Shallow Bedrock	29	NA	>50% ND	NA	Dec-14
MNA Monitoring Wells							
BW-01	23	Shallow Bedrock	4	NA	>50% ND	NA	Jun-16
BW-02	11	Shallow Bedrock	27	NA	>50% ND	NA	Jun-16
BW-09	20	Shallow Bedrock	0	NA	>50% ND	NA	Jun-16
BW-11	19	Shallow Bedrock	5	NA	>50% ND	NA	Jun-16
BW-13	21	Shallow Bedrock	10	NA	>50% ND	NA	Jun-16
BW-14	10	Shallow Bedrock	30	NA	>50% ND	NA	Jun-16
BW-15	10	Shallow Bedrock	0	NA	>50% ND	NA	Jun-16
BW-18	21	Shallow Bedrock	5	NA	>50% ND	NA	Jun-16
BW-19	19	Shallow Bedrock	0	NA	>50% ND	NA	Jun-16
BW-21	18	Intermediate Bedrock	0	NA	>50% ND	NA	Jun-16
BW-24-390'	18	Deep Bedrock	0	NA	>50% ND	NA	Jun-16
BW-25	18	Shallow Bedrock	0	NA	>50% ND	NA	Jun-16
BW-26-395'	11	Deep Bedrock	18	NA	>50% ND	NA	Jun-16
BW-26-65'	13	Intermediate Bedrock	31	NA	>50% ND	NA	Jun-16
BW-26-85'	13	Intermediate Bedrock	15	NA	>50% ND	NA	Jun-16
MW-01	20	Unconsolidated	0	NA	>50% ND	NA	Jun-16
MW-07	9	Unconsolidated	11	NA	>50% ND	NA	Jun-16
MW-13	8	Unconsolidated	0	NA	>50% ND	NA	Jun-16

Notes:

% = percent

NA = not applicable

>50% ND = greater than 50 percent nondetects.

sig = significance

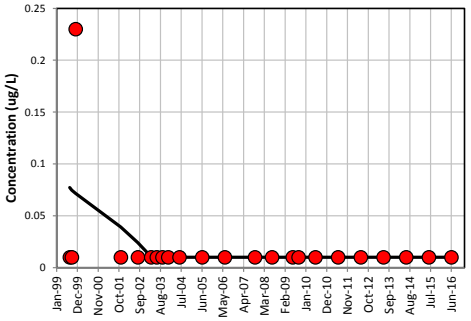
- = decreasing

+ = increasing

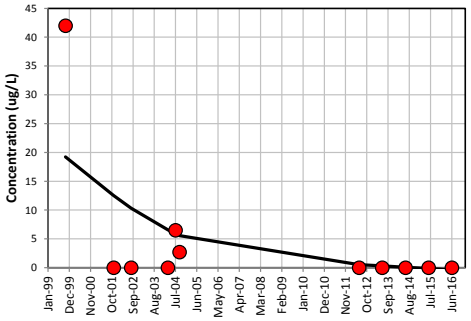
Trend analysis performed using Mann Kendall single-tailed test at 0.05 significance level.

For monitoring points exhibiting no trend at the 95% confidence level, concentrations are deemed stable if the coefficient of variation (COV) is equal to or less than one. The COV is a relative measure of variation in the groundwater concentration data, and can be affected by the magnitude of the concentrations. As such, concentrations that are high can include significant variation while exhibiting a small COV. While there is no objective basis for using a particular value of COV to determine stability, values greater than 1 indicate that the data exhibit a greater detail of scatter about the mean.

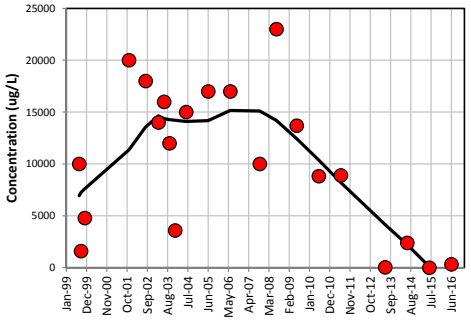
MTLNCL in BW-01



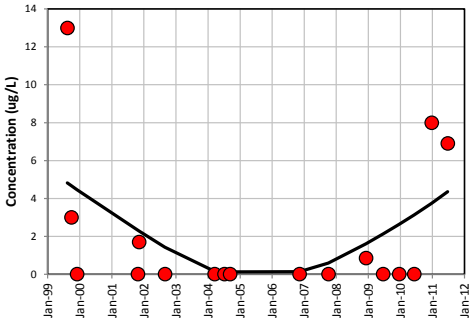
MTLNCL in BW-02



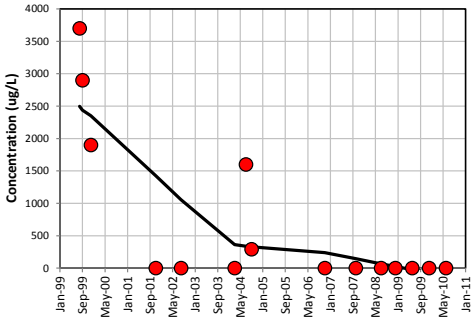
MTLNCL in BW-03/BW-03R



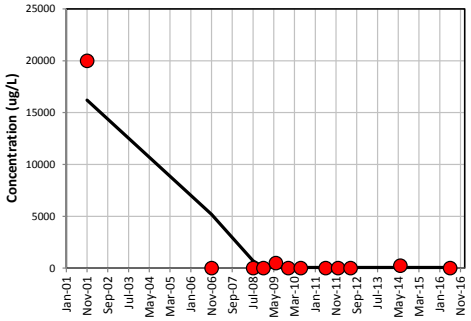
MTLNCL in BW-04



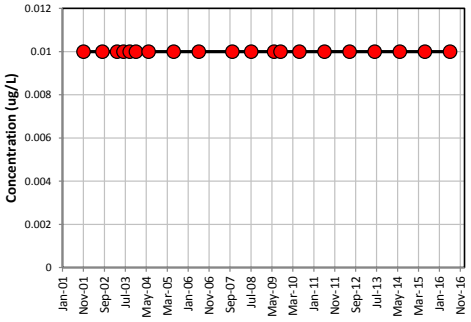
MTLNCL in BW-05



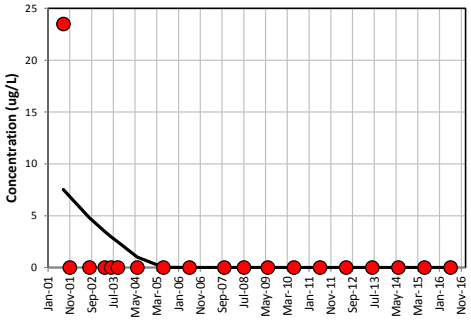
MTLNCL in BW-06



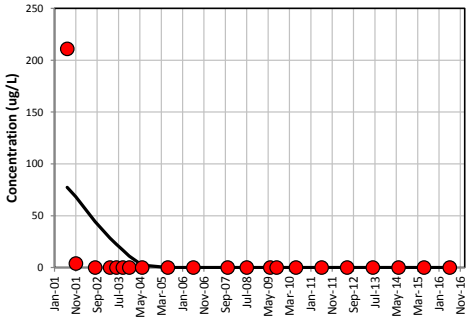
MTLNCL in BW-09



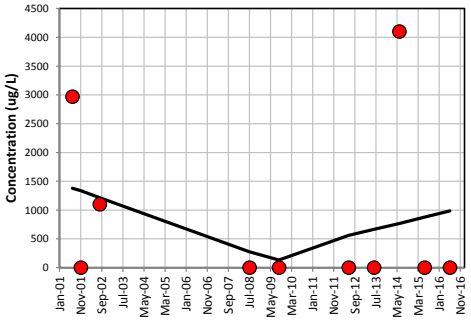
MTLNCL in BW-11



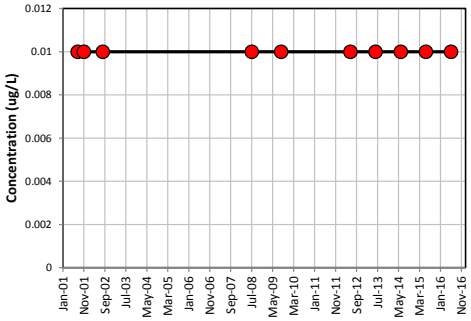
MTLNCL in BW-13



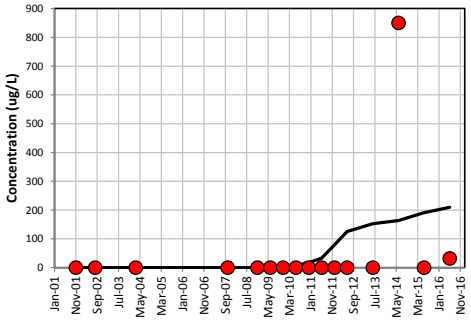
MTLNCL in BW-14



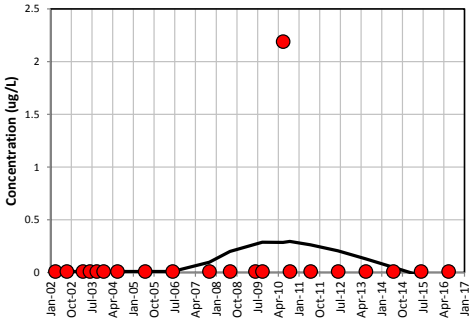
MTLNCL in BW-15



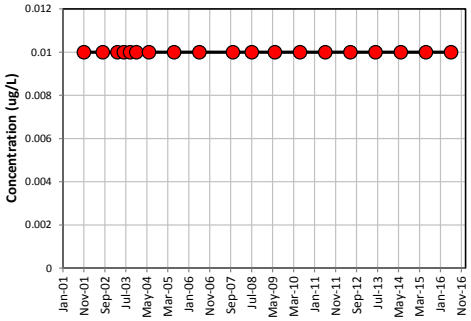
MTLNCL in BW-16



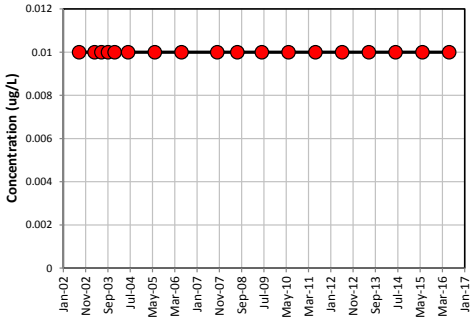
MTLNCL in BW-18



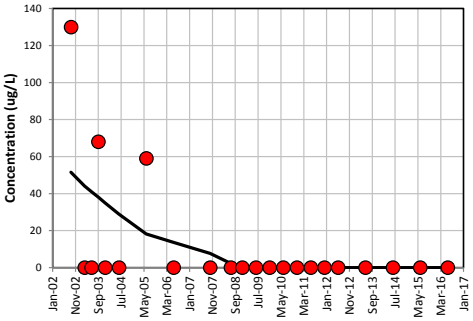
MTLNCL in BW-19



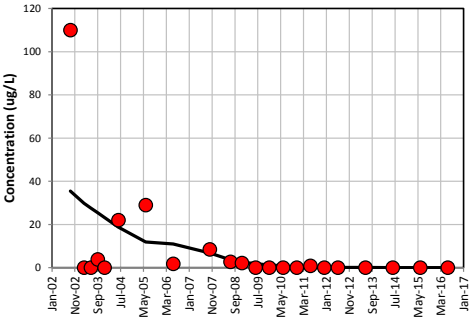
MTLNCL in BW-21



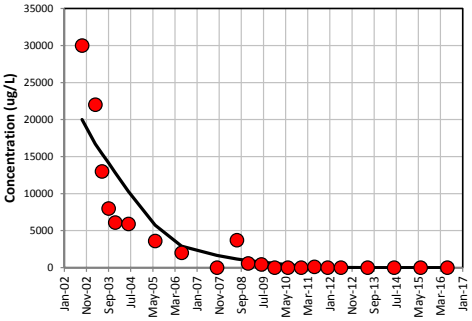
MTLNCL in BW-23-125'



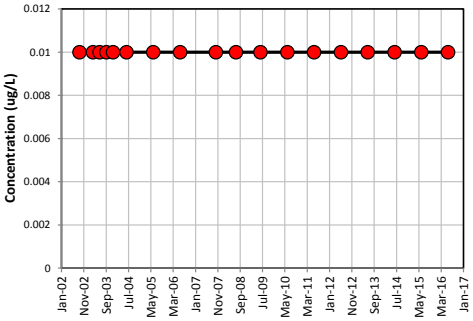
MTLNCL in BW-23-390'



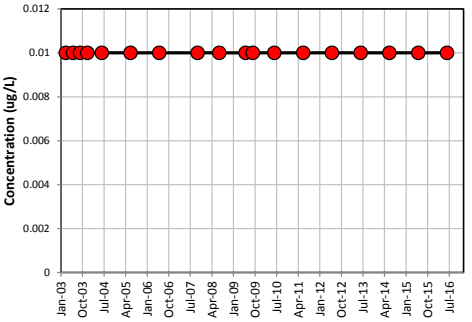
MTLNCL in BW-23-50'



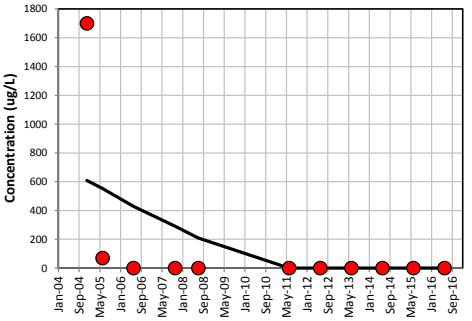
MTLNCL in BW-24-390'



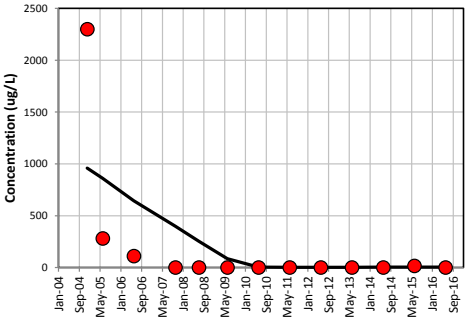
MTLNCL in BW-25



MTLNCL in BW-26-395'



MTLNCL in BW-26-65'



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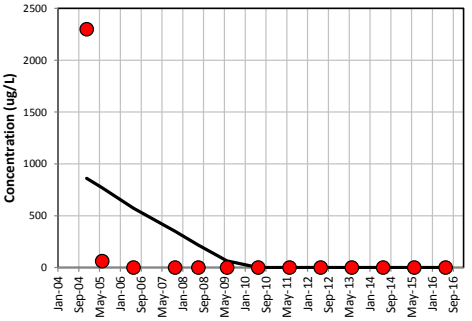

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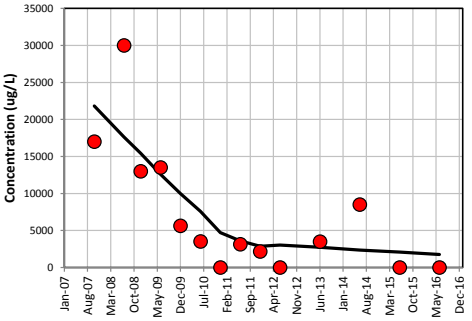
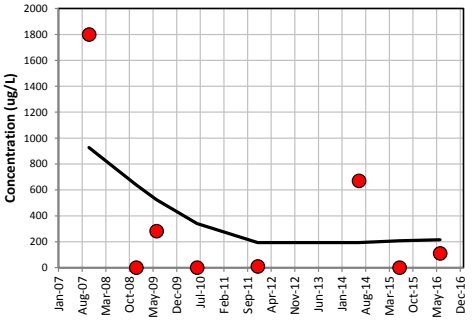
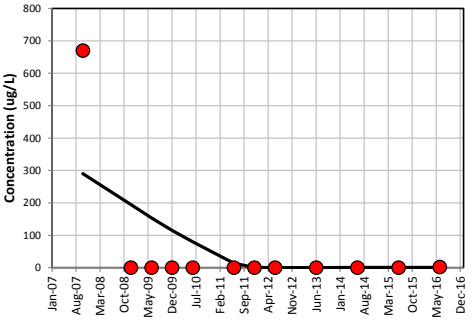


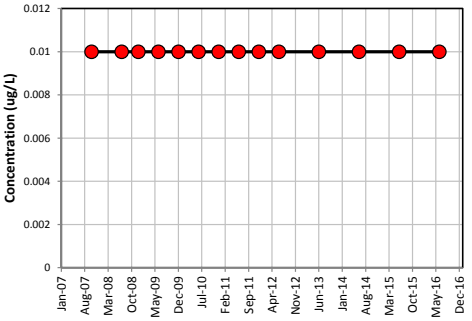
MTLNCL in BW-28



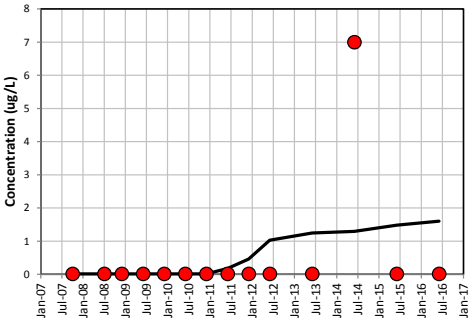
MTLNCL in BW-31



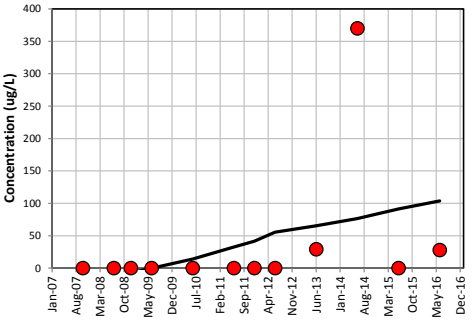
MTLNCL in BW-33



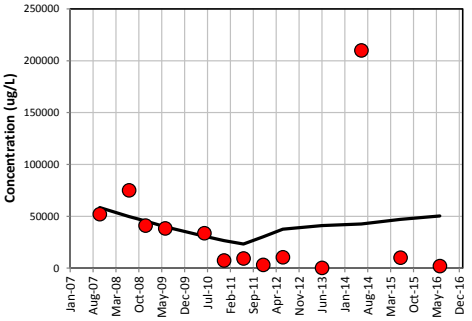
MTLNCL in BW-34

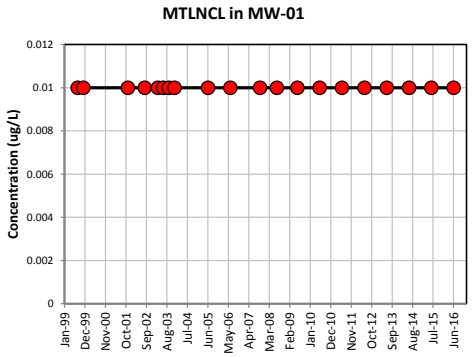


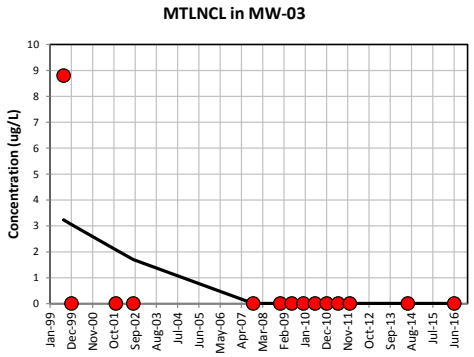
MTLNCL in BW-35

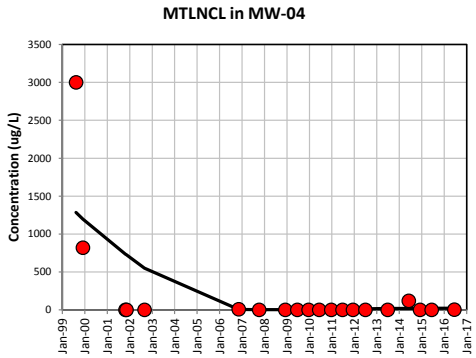


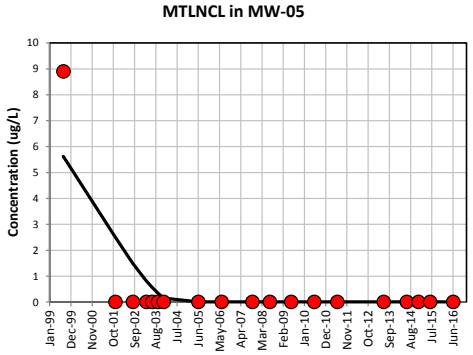
MTLNCL in BW-37

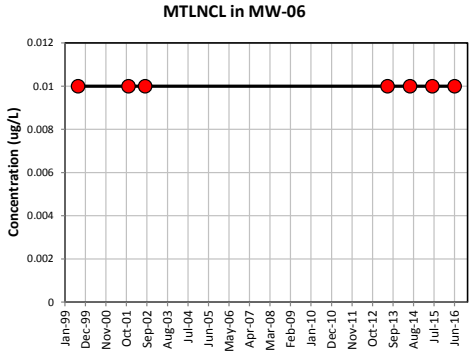


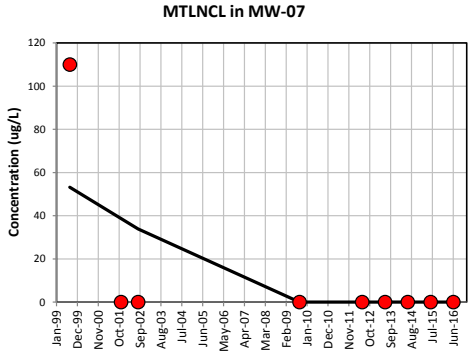

MTLNCL in MW-01
Concentration (ug/L)
0.012
0.01
0.008
0.006
0.004
0.002
0
Jan-99 Dec-99 Nov-00 Oct-01 Sep-02 Aug-03 Jul-04 Jun-05 May-06 Apr-07 Mar-08 Feb-09 Jan-10 Dec-10 Nov-11 Oct-12 Sep-13 Aug-14 Jul-15 Jun-16

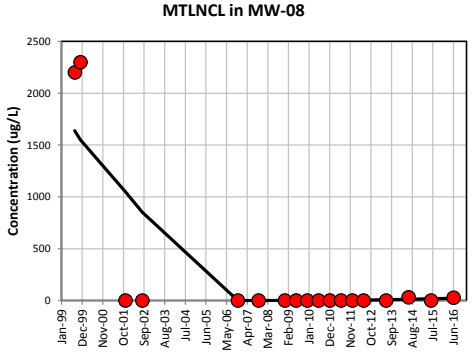

MTLNCL in MW-03
Concentration (ug/L)
10
9
8
7
6
5
4
3
2
1
0
Jan-99 Dec-99 Nov-00 Oct-01 Sep-02 Aug-03 Jul-04 Jun-05 May-06 Apr-07 Mar-08 Feb-09 Jan-10 Dec-10 Nov-11 Oct-12 Sep-13 Aug-14 Jul-15 Jun-16

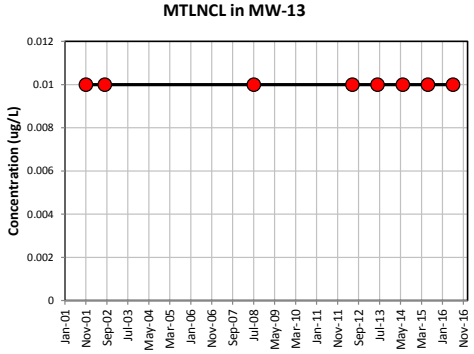

MTLNCL in MW-04
Concentration (ug/L)
3500
3000
2500
2000
1500
1000
500
0
Jan-99 Jan-00 Jan-01 Jan-02 Jan-03 Jan-04 Jan-05 Jan-06 Jan-07 Jan-08 Jan-09 Jan-10 Jan-11 Jan-12 Jan-13 Jan-14 Jan-15 Jan-16 Jan-17


MTLNCL in MW-05
Concentration (ug/L)
10
9
8
7
6
5
4
3
2
1
0
Jan-99 Dec-99 Nov-00 Oct-01 Sep-02 Aug-03 Jul-04 Jun-05 May-06 Apr-07 Mar-08 Feb-09 Jan-10 Dec-10 Nov-11 Oct-12 Sep-13 Aug-14 Jul-15 Jun-16


MTLNCL in MW-06
Concentration (ug/L)
0.012
0.01
0.008
0.006
0.004
0.002
0
Jan-99 Dec-99 Nov-00 Oct-01 Sep-02 Aug-03 Jul-04 Jun-05 May-06 Apr-07 Mar-08 Feb-09 Jan-10 Dec-10 Nov-11 Oct-12 Sep-13 Aug-14 Jul-15 Jun-16


MTLNCL in MW-07
Concentration (ug/L)
120
100
80
60
40
20
0
Jan-99 Dec-99 Nov-00 Oct-01 Sep-02 Aug-03 Jul-04 Jun-05 May-06 Apr-07 Mar-08 Feb-09 Jan-10 Dec-10 Nov-11 Oct-12 Sep-13 Aug-14 Jul-15 Jun-16


MTLNCL in MW-08
Concentration (ug/L)
2500
2000
1500
1000
500
0
Jan-99 Dec-99 Nov-00 Oct-01 Sep-02 Aug-03 Jul-04 Jun-05 May-06 Apr-07 Mar-08 Feb-09 Jan-10 Dec-10 Nov-11 Oct-12 Sep-13 Aug-14 Jul-15 Jun-16


MTLNCL in MW-13
Concentration (ug/L)
0.012
0.01
0.008
0.006
0.004
0.002
0
Jan-01 Nov-01 Sep-02 Jul-03 May-04 Mar-05 Jan-06 Nov-06 Sep-07 Jul-08 May-09 Mar-10 Jan-11 Nov-11 Sep-12 Jul-13 May-14 Mar-15 Jan-16 Nov-16

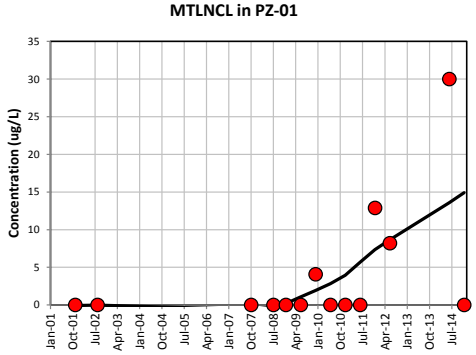

MTLNCL in PZ-01
Concentration (ug/L)
35
30
25
20
15
10
5
0
Jan-01 Oct-01 Jul-02 Apr-03 Jan-04 Oct-04 Jul-05 Apr-06 Jan-07 Oct-07 Jul-08 Apr-09 Jan-10 Oct-10 Jul-11 Apr-12 Jan-13 Oct-13 Jul-14

Table F-5. Cis-1,2-Dichloroethene Concentration Trends at Individual Wells Using Mann-Kendall Analysis

THAN Davenport Site, 2040 West River Drive

Well	Total Samples	Monitored Zone	Detection Frequency (%)	Mann-Kendall Result	Mann-Kendall Trend	Stability	Last Sample Date
ISCO Monitoring Wells							
BW-03/BW-03R	21	Shallow Bedrock	100	88.6% (+)	No Trend	Stable	Jun-16
BW-04	17	Shallow Bedrock	100	99.7% (sig -)	Decreasing	NA	Jun-11
BW-05	15	Shallow Bedrock	100	50.0% (-)	No Trend	Stable	Jun-10
BW-06	12	Shallow Bedrock	100	100.0% (sig -)	Decreasing	NA	Jun-16
BW-16	16	Shallow Bedrock	100	90.4% (+)	No Trend	Stable	Jun-16
BW-23-125'	22	Intermediate Bedrock	100	100.0% (sig -)	Decreasing	NA	Jun-16
BW-23-390'	22	Deep Bedrock	100	100.0% (sig -)	Decreasing	NA	Jun-16
BW-23-50'	22	Shallow Bedrock	100	99.9% (sig -)	Decreasing	NA	Jun-16
BW-27	14	Shallow Bedrock	100	99.9% (sig +)	Increasing	NA	Jun-16
BW-28	8	Shallow Bedrock	100	54.8% (+)	No Trend	Stable	Jun-16
BW-31	12	Shallow Bedrock	100	99.0% (sig -)	Decreasing	NA	Jun-16
BW-33	14	Shallow Bedrock	100	88.3% (-)	No Trend	Stable	Jun-16
BW-34	14	Shallow Bedrock	100	99.7% (sig -)	Decreasing	NA	Jun-16
BW-35	12	Shallow Bedrock	100	81.0% (-)	No Trend	Stable	Jun-16
BW-37	13	Shallow Bedrock	100	99.1% (sig -)	Decreasing	NA	Jun-16
MW-03	14	Unconsolidated	100	99.5% (sig -)	Decreasing	NA	Jun-16
MW-04	20	Unconsolidated	90	81.8% (+)	No Trend	Not Stable	Jun-16
MW-05	19	Unconsolidated	100	59.7% (+)	No Trend	Not Stable	Jun-16
MW-06	7	Unconsolidated	100	98.5% (sig -)	Decreasing	NA	Jun-16
MW-08	18	Unconsolidated	100	100.0% (sig -)	Decreasing	NA	Jun-16
PZ-01	14	Shallow Bedrock	100	99.3% (sig -)	Decreasing	NA	Dec-14
MNA Monitoring Wells							
BW-01	23	Shallow Bedrock	52	100.0% (sig -)	Decreasing	NA	Jun-16
BW-02	11	Shallow Bedrock	100	95.7% (sig -)	Decreasing	NA	Jun-16
BW-09	20	Shallow Bedrock	25	NA	>50% ND	NA	Jun-16
BW-11	19	Shallow Bedrock	95	98.7% (sig -)	Decreasing	NA	Jun-16
BW-13	21	Shallow Bedrock	38	NA	>50% ND	NA	Jun-16
BW-14	10	Shallow Bedrock	100	56.9% (+)	No Trend	Stable	Jun-16
BW-15	10	Shallow Bedrock	100	99.9% (sig -)	Decreasing	NA	Jun-16
BW-18	21	Shallow Bedrock	10	NA	>50% ND	NA	Jun-16
BW-19	19	Shallow Bedrock	89	100.0% (sig -)	Decreasing	NA	Jun-16
BW-21	18	Intermediate Bedrock	39	NA	>50% ND	NA	Jun-16
BW-24-390'	18	Deep Bedrock	39	NA	>50% ND	NA	Jun-16
BW-25	18	Shallow Bedrock	28	NA	>50% ND	NA	Jun-16
BW-26-395'	11	Deep Bedrock	91	99.7% (sig -)	Decreasing	NA	Jun-16
BW-26-65'	13	Intermediate Bedrock	100	78.2% (-)	No Trend	Not Stable	Jun-16
BW-26-85	13	Intermediate Bedrock	100	97.1% (sig -)	Decreasing	NA	Jun-16
MW-01	20	Unconsolidated	0	NA	>50% ND	NA	Jun-16
MW-07	9	Unconsolidated	100	100.0% (sig -)	Decreasing	NA	Jun-16
MW-13	8	Unconsolidated	13	NA	>50% ND	NA	Jun-16

Notes:

% = percent

NA = not applicable

>50% ND = greater than 50 percent nondetects.

sig = significance

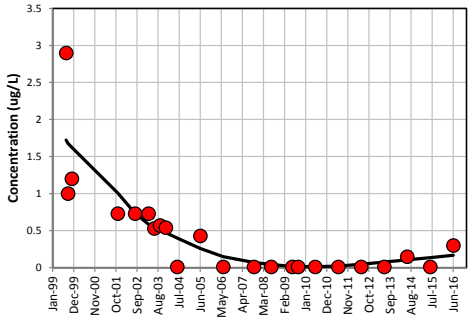
- = decreasing

+ = increasing

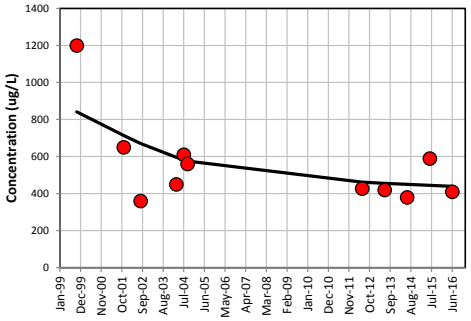
Trend analysis performed using Mann Kendall single-tailed test at 0.05 significance level.

For monitoring points exhibiting no trend at the 95% confidence level, concentrations are deemed stable if the coefficient of variation (COV) is equal to or less than one. The COV is a relative measure of variation in the groundwater concentration data, and can be affected by the magnitude of the concentrations. As such, concentrations that are high can include significant variation while exhibiting a small COV. While there is no objective basis for using a particular value of COV to determine stability, values greater than 1 indicate that the data exhibit a greater detail of scatter about the mean.

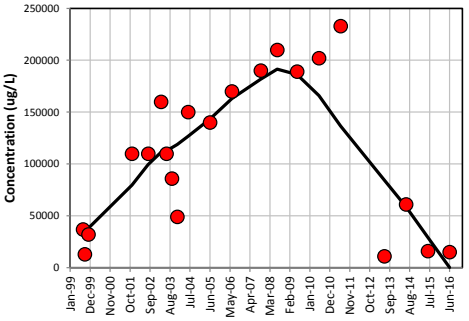
DCE12C in BW-01



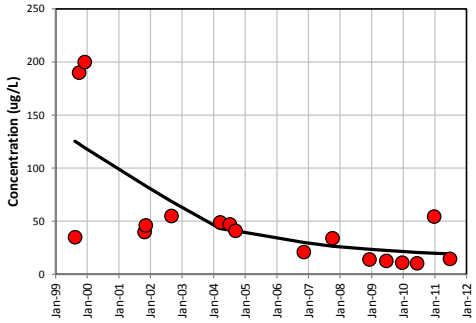
DCE12C in BW-02



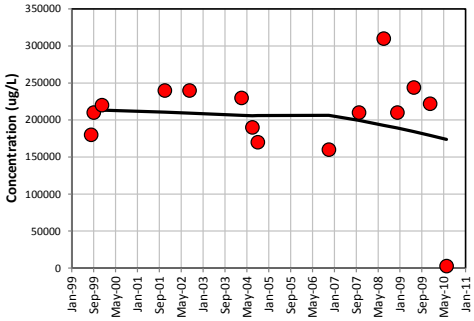
DCE12C in BW-03/BW-03R



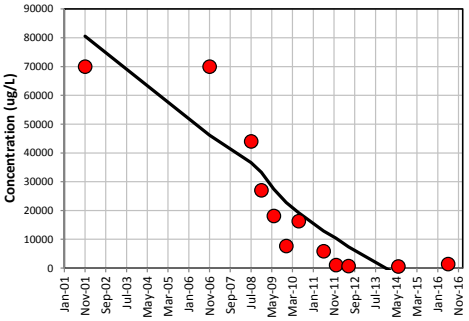
DCE12C in BW-04



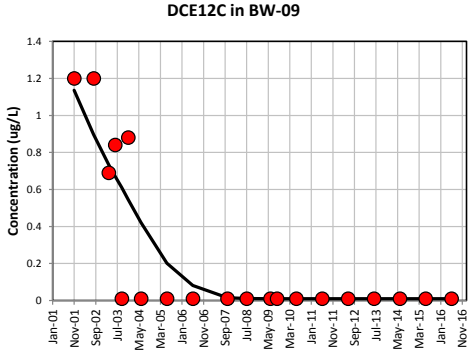
DCE12C in BW-05



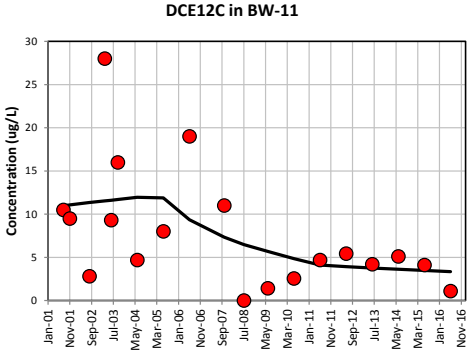
DCE12C in BW-06



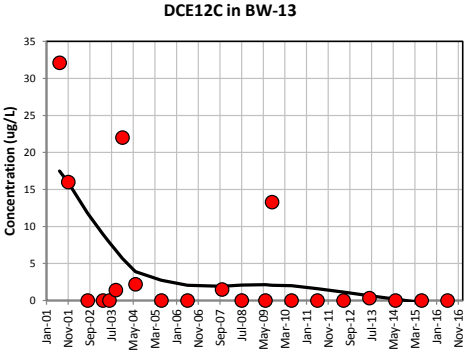
DCE12C in BW-09



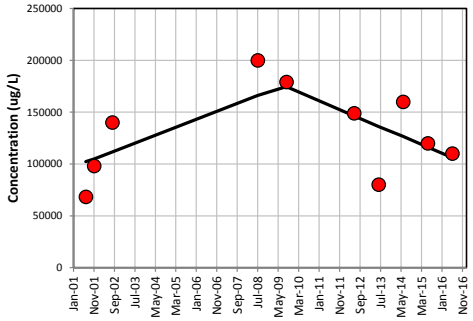
DCE12C in BW-11



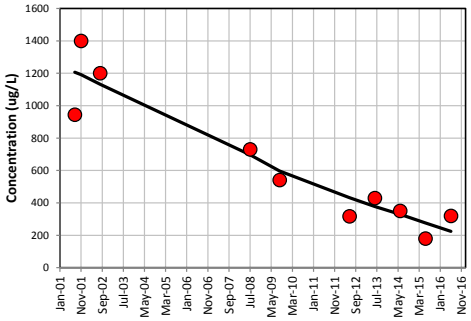
DCE12C in BW-13



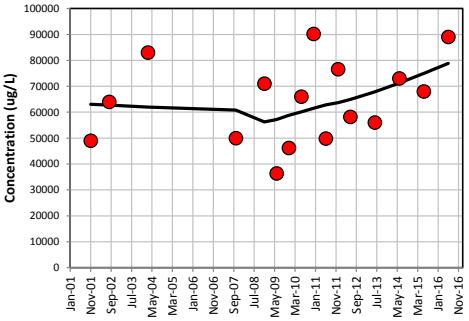
DCE12C in BW-14



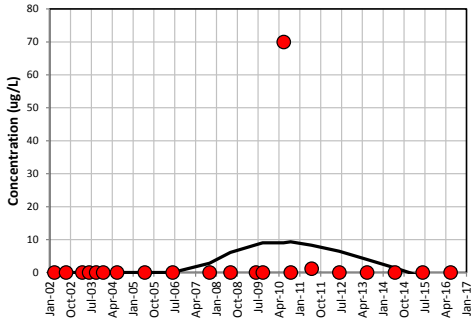
DCE12C in BW-15



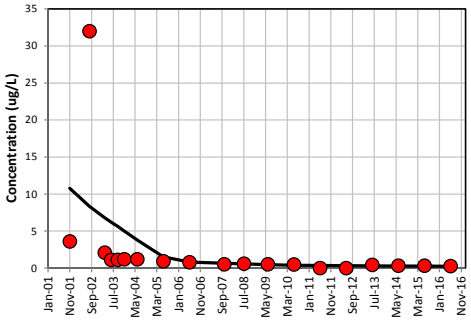
DCE12C in BW-16



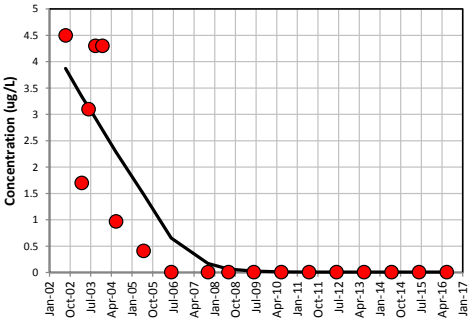
DCE12C in BW-18



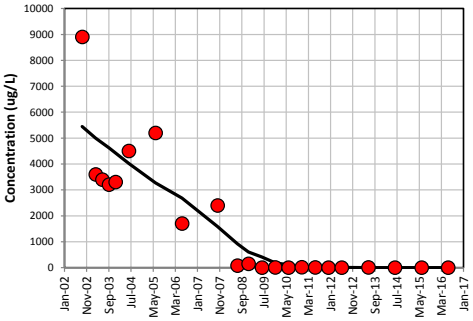
DCE12C in BW-19



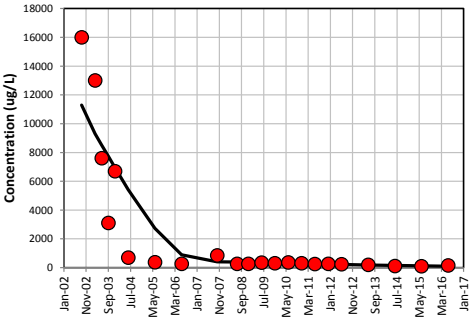
DCE12C in BW-21



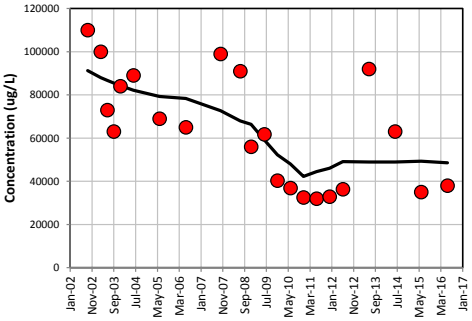
DCE12C in BW-23-125'



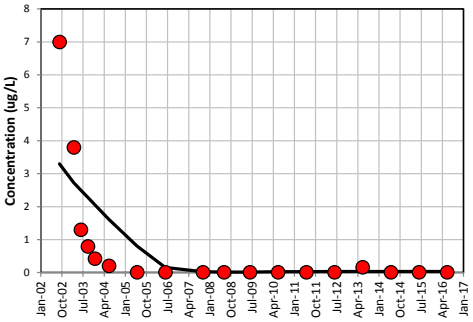
DCE12C in BW-23-390'



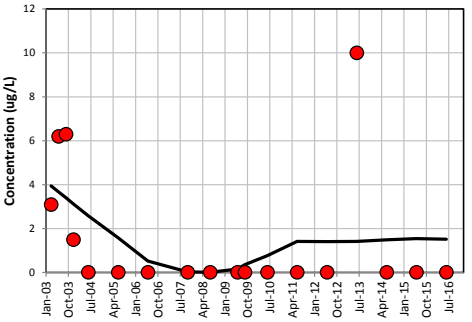
DCE12C in BW-23-50'



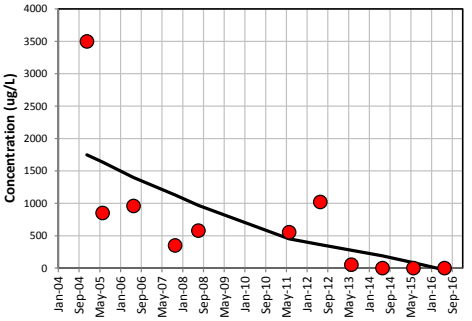
DCE12C in BW-24-390'



DCE12C in BW-25



DCE12C in BW-26-395'



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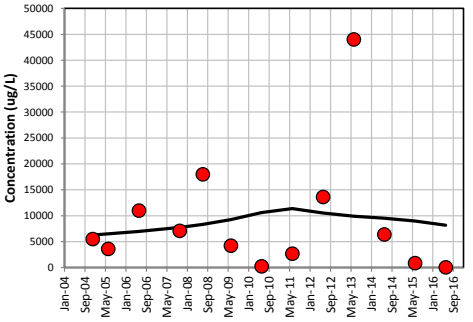
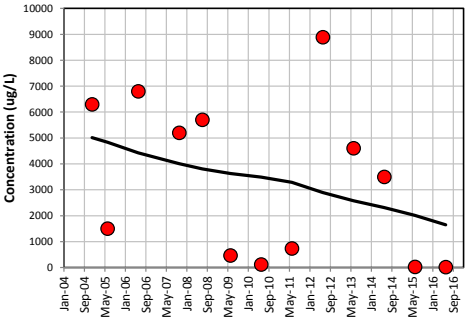
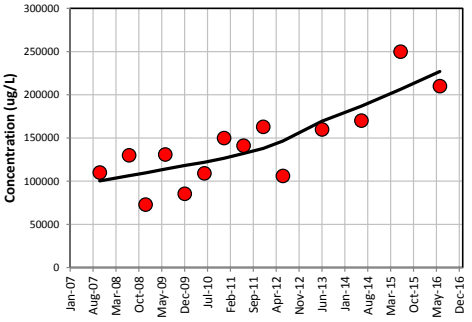


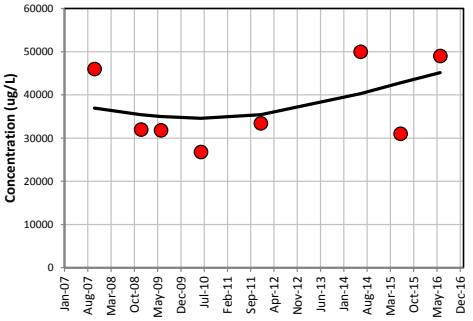
DCE12C in BW-26-85'



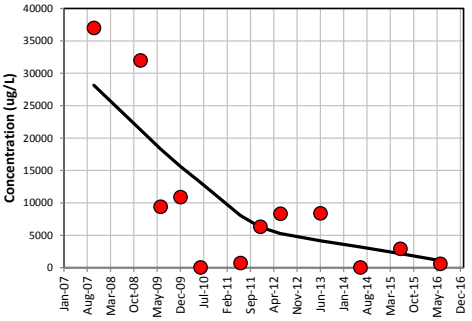
DCE12C in BW-27



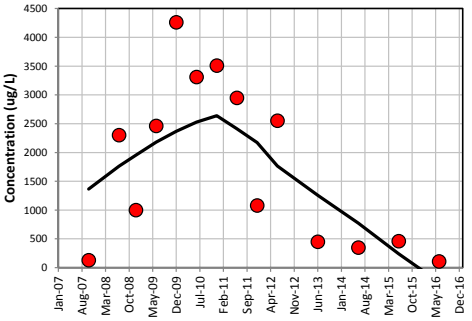
DCE12C in BW-28



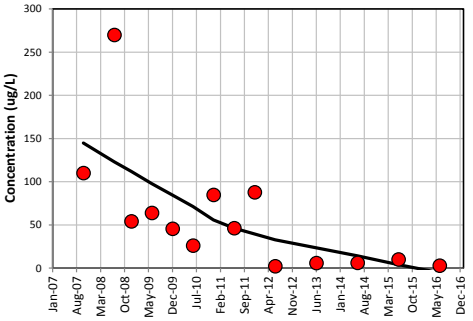
DCE12C in BW-31



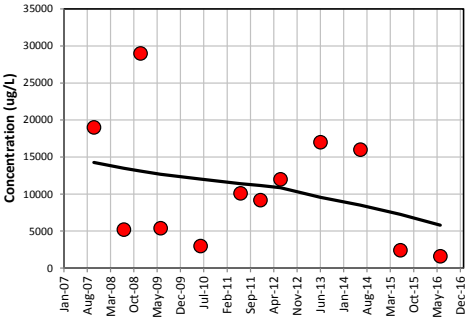
DCE12C in BW-33



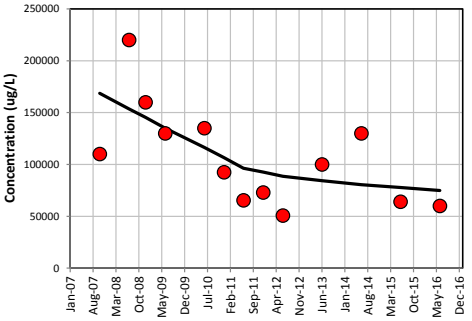
DCE12C in BW-34

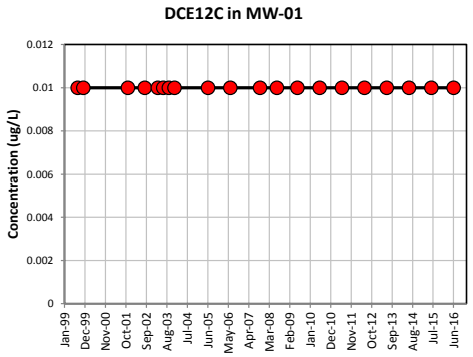


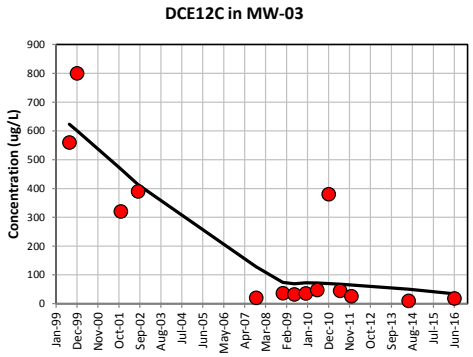
DCE12C in BW-35

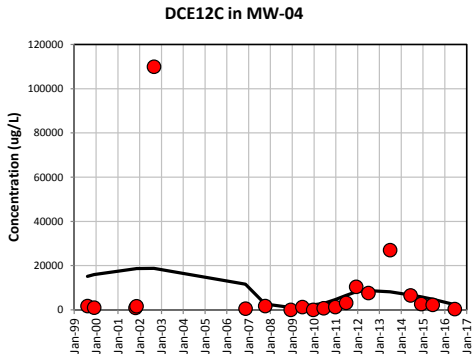


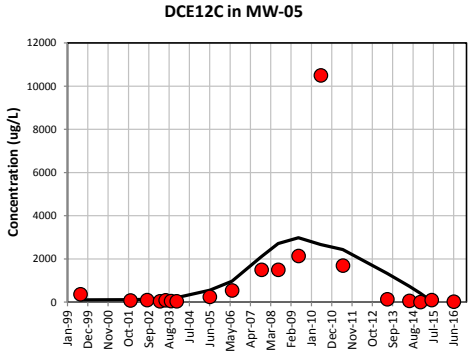
DCE12C in BW-37

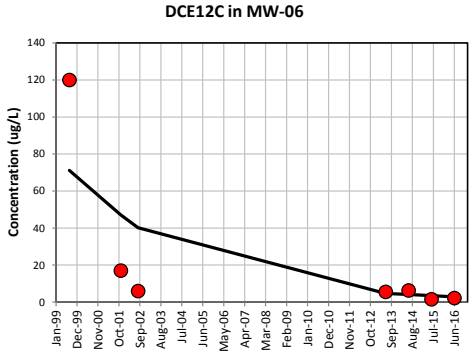


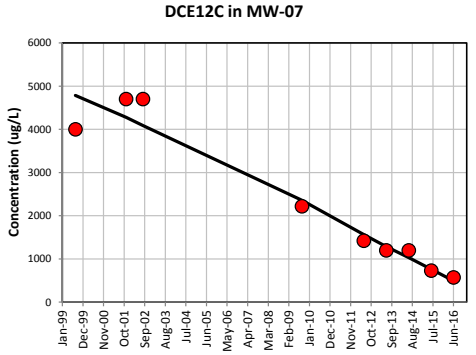

DCE12C in MW-01
Concentration (ug/L)
0.012
0.01
0.008
0.006
0.004
0.002
0
Jan-99 Dec-99 Nov-00 Oct-01 Sep-02 Aug-03 Jul-04 Jun-05 May-06 Apr-07 Mar-08 Feb-09 Jan-10 Dec-10 Nov-11 Oct-12 Sep-13 Aug-14 Jul-15 Jun-16

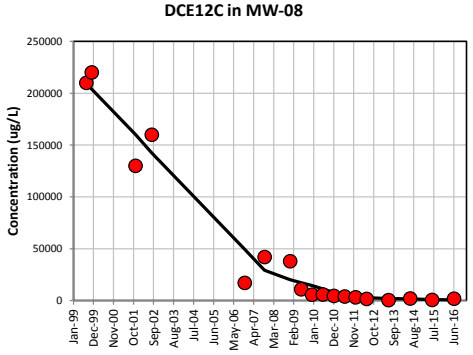

DCE12C in MW-03
Concentration (ug/L)
900
800
700
600
500
400
300
200
100
0
Jan-99 Dec-99 Nov-00 Oct-01 Sep-02 Aug-03 Jul-04 Jun-05 May-06 Apr-07 Mar-08 Feb-09 Jan-10 Dec-10 Nov-11 Oct-12 Sep-13 Aug-14 Jul-15 Jun-16

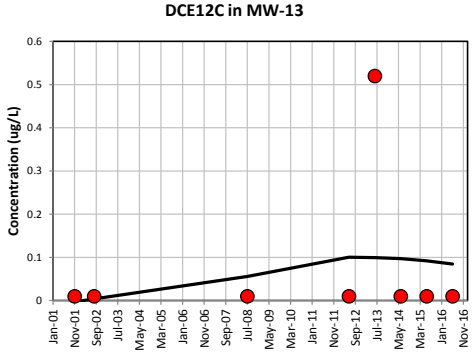

DCE12C in MW-04
Concentration (ug/L)
120000
100000
80000
60000
40000
20000
0
Jan-99 Jan-00 Jan-01 Jan-02 Jan-03 Jan-04 Jan-05 Jan-06 Jan-07 Jan-08 Jan-09 Jan-10 Jan-11 Jan-12 Jan-13 Jan-14 Jan-15 Jan-16 Jan-17


DCE12C in MW-05
Concentration (ug/L)
12000
10000
8000
6000
4000
2000
0
Jan-99 Dec-99 Nov-00 Oct-01 Sep-02 Aug-03 Jul-04 Jun-05 May-06 Apr-07 Mar-08 Feb-09 Jan-10 Dec-10 Nov-11 Oct-12 Sep-13 Aug-14 Jul-15 Jun-16


DCE12C in MW-06
Concentration (ug/L)
140
120
100
80
60
40
20
0
Jan-99 Dec-99 Nov-00 Oct-01 Sep-02 Aug-03 Jul-04 Jun-05 May-06 Apr-07 Mar-08 Feb-09 Jan-10 Dec-10 Nov-11 Oct-12 Sep-13 Aug-14 Jul-15 Jun-16


DCE12C in MW-07
Concentration (ug/L)
6000
5000
4000
3000
2000
1000
0
Jan-99 Dec-99 Nov-00 Oct-01 Sep-02 Aug-03 Jul-04 Jun-05 May-06 Apr-07 Mar-08 Feb-09 Jan-10 Dec-10 Nov-11 Oct-12 Sep-13 Aug-14 Jul-15 Jun-16


DCE12C in MW-08
Concentration (ug/L)
250000
200000
150000
100000
50000
0
Jan-99 Dec-99 Nov-00 Oct-01 Sep-02 Aug-03 Jul-04 Jun-05 May-06 Apr-07 Mar-08 Feb-09 Jan-10 Dec-10 Nov-11 Oct-12 Sep-13 Aug-14 Jul-15 Jun-16


DCE12C in MW-13
Concentration (ug/L)
0.6
0.5
0.4
0.3
0.2
0.1
0
Jan-01 Nov-01 Sep-02 Jul-03 May-04 Mar-05 Jan-06 Nov-06 Sep-07 Jul-08 May-09 Mar-10 Jan-11 Nov-11 Sep-12 Jul-13 May-14 Mar-15 Jan-16 Nov-16

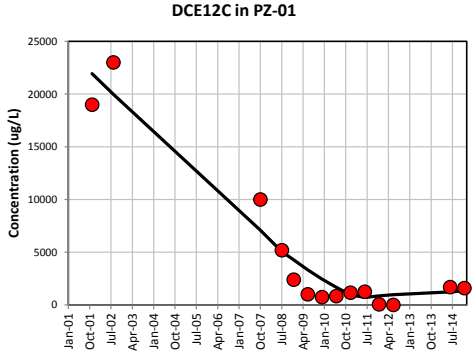

DCE12C in PZ-01
Concentration (ug/L)
25000
20000
15000
10000
5000
0
Jan-01 Oct-01 Jul-02 Apr-03 Jan-04 Oct-04 Jul-05 Apr-06 Jan-07 Oct-07 Jul-08 Apr-09 Jan-10 Oct-10 Jul-11 Apr-12 Jan-13 Oct-13 Jul-14

Table F-6. Vinyl Chloride Concentration Trends at Individual Wells Using Mann-Kendall Analysis

THAN Davenport Site, 2040 West River Drive

Well	Total Samples	Monitored Zone	Detection Frequency (%)	Mann-Kendall Result	Mann-Kendall Trend	Stability	Last Sample Date
ISCO Monitoring Wells							
BW-03/BW-03R	21	Shallow Bedrock	95	70.7% (+)	No Trend	Stable	Jun-16
BW-04	17	Shallow Bedrock	59	91.3% (+)	No Trend	Not Stable	Jun-11
BW-05	15	Shallow Bedrock	93	95.8% (sig +)	Increasing	NA	Jun-10
BW-06	12	Shallow Bedrock	100	97.3% (sig -)	Decreasing	NA	Jun-16
BW-16	16	Shallow Bedrock	100	92.5% (-)	No Trend	Stable	Jun-16
BW-23-125'	22	Intermediate Bedrock	86	100.0% (sig -)	Decreasing	NA	Jun-16
BW-23-390'	22	Deep Bedrock	100	100.0% (sig -)	Decreasing	NA	Jun-16
BW-23-50'	22	Shallow Bedrock	100	94.9% (+)	No Trend	Stable	Jun-16
BW-27	14	Shallow Bedrock	100	100.0% (sig +)	Increasing	NA	Jun-16
BW-28	8	Shallow Bedrock	100	59.4% (-)	No Trend	Stable	Jun-16
BW-31	12	Shallow Bedrock	100	72.7% (-)	No Trend	Stable	Jun-16
BW-33	14	Shallow Bedrock	100	88.3% (-)	No Trend	Stable	Jun-16
BW-34	14	Shallow Bedrock	100	100.0% (sig -)	Decreasing	NA	Jun-16
BW-35	12	Shallow Bedrock	100	84.5% (-)	No Trend	Stable	Jun-16
BW-37	13	Shallow Bedrock	100	97.1% (sig +)	Increasing	NA	Jun-16
MW-03	14	Unconsolidated	100	100.0% (sig -)	Decreasing	NA	Jun-16
MW-04	20	Unconsolidated	30	NA	>50% ND	NA	Jun-16
MW-05	19	Unconsolidated	32	NA	>50% ND	NA	Jun-16
MW-06	7	Unconsolidated	29	NA	>50% ND	NA	Jun-16
MW-08	18	Unconsolidated	89	100.0% (sig -)	Decreasing	NA	Jun-16
PZ-01	14	Shallow Bedrock	100	99.6% (sig -)	Decreasing	NA	Dec-14
MNA Monitoring Wells							
BW-01	23	Shallow Bedrock	4	NA	>50% ND	NA	Jun-16
BW-02	11	Shallow Bedrock	100	75.3% (+)	No Trend	Stable	Jun-16
BW-09	20	Shallow Bedrock	25	NA	>50% ND	NA	Jun-16
BW-11	19	Shallow Bedrock	74	93.8% (-)	No Trend	Not Stable	Jun-16
BW-13	21	Shallow Bedrock	33	NA	>50% ND	NA	Jun-16
BW-14	10	Shallow Bedrock	100	99.9% (sig +)	Increasing	NA	Jun-16
BW-15	10	Shallow Bedrock	100	99.2% (sig -)	Decreasing	NA	Jun-16
BW-18	21	Shallow Bedrock	5	NA	>50% ND	NA	Jun-16
BW-19	19	Shallow Bedrock	32	NA	>50% ND	NA	Jun-16
BW-21	18	Intermediate Bedrock	33	NA	>50% ND	NA	Jun-16
BW-24-390'	18	Deep Bedrock	33	NA	>50% ND	NA	Jun-16
BW-25	18	Shallow Bedrock	94	97.6% (sig -)	Decreasing	NA	Jun-16
BW-26-395'	11	Deep Bedrock	100	100.0% (sig -)	Decreasing	NA	Jun-16
BW-26-65'	13	Intermediate Bedrock	100	79.9% (-)	No Trend	Stable	Jun-16
BW-26-85'	13	Intermediate Bedrock	100	97.9% (sig -)	Decreasing	NA	Jun-16
MW-01	20	Unconsolidated	0	NA	>50% ND	NA	Jun-16
MW-07	9	Unconsolidated	100	97.8% (sig -)	Decreasing	NA	Jun-16
MW-13	8	Unconsolidated	13	NA	>50% ND	NA	Jun-16

Notes:

% = percent

NA = not applicable

>50% ND = greater than 50 percent nondetects.

sig = significance

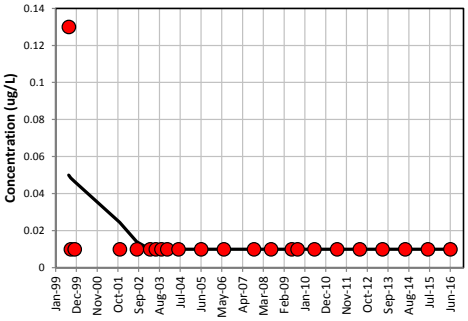
- = decreasing

+ = increasing

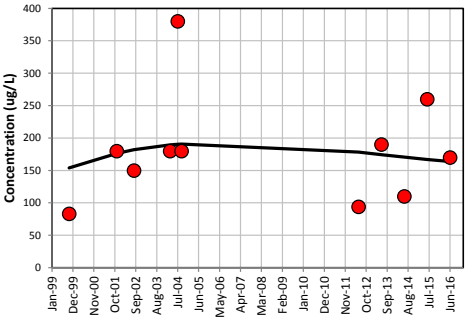
Trend analysis performed using Mann-Kendall single-tailed test at 0.05 significance level

For monitoring points exhibiting no trend at the 95% confidence level, concentrations are deemed stable if the coefficient of variation (COV) is equal to or less than one. The COV is a relative measure of variation in the groundwater concentration data, and can be affected by the magnitude of the concentrations. As such, concentrations that are high can include significant variation while exhibiting a small COV. While there is no objective basis for using a particular value of COV to determine stability, values greater than 1 indicate that the data exhibit a greater detail of scatter about the mean.

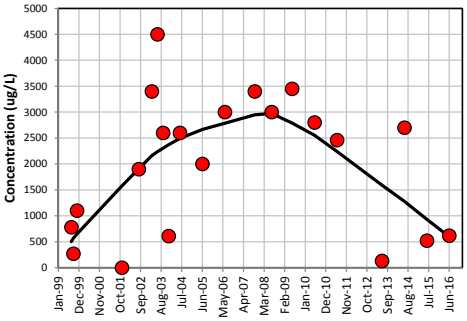
VC in BW-01



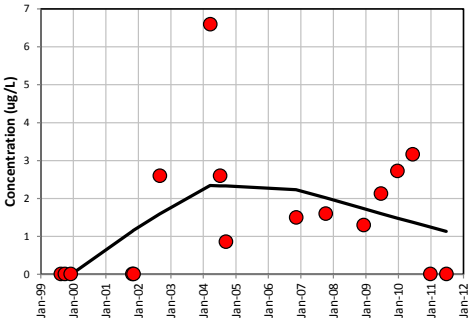
VC in BW-02



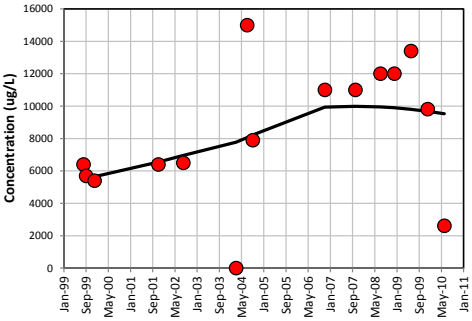
VC in BW-03/BW-03R



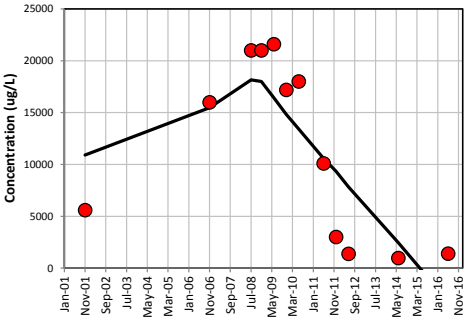
VC in BW-04



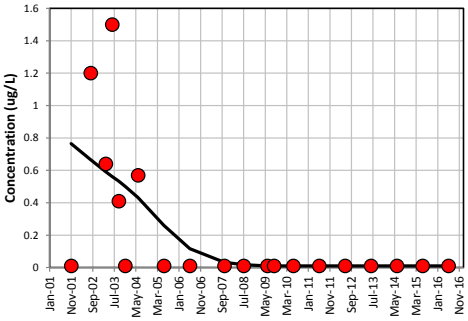
VC in BW-05



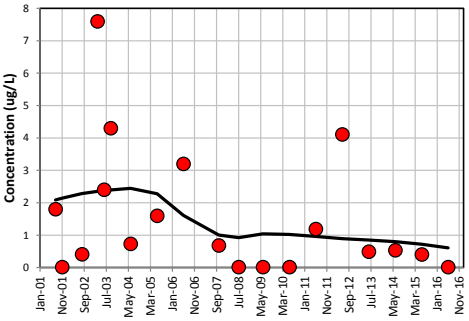
VC in BW-06



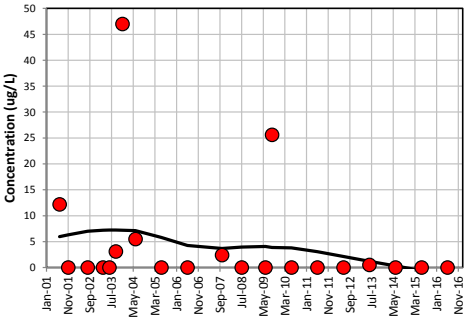
VC in BW-09



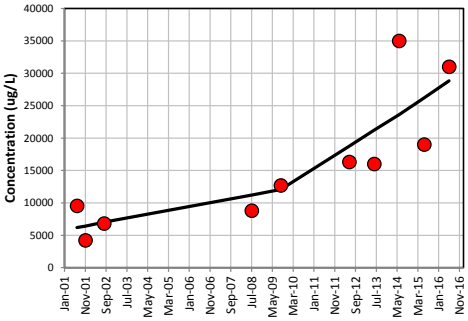
VC in BW-11



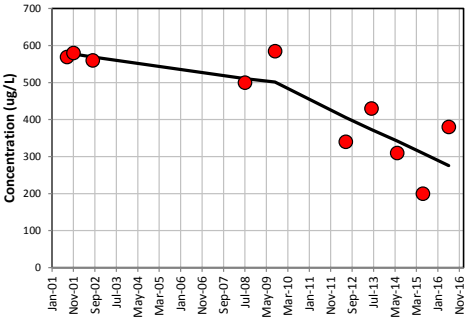
VC in BW-13



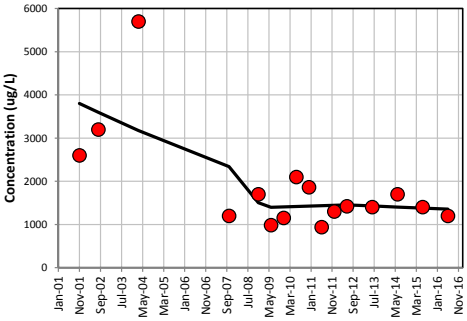
VC in BW-14



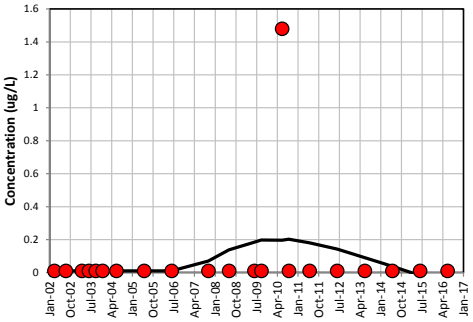
VC in BW-15



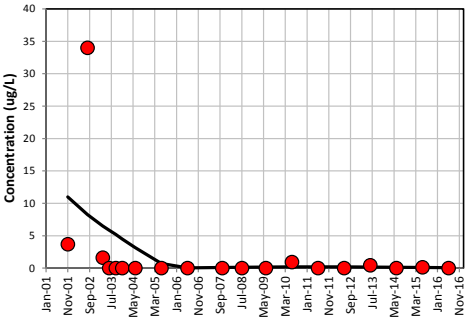
VC in BW-16



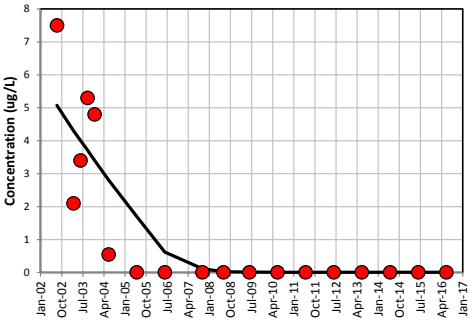
VC in BW-18



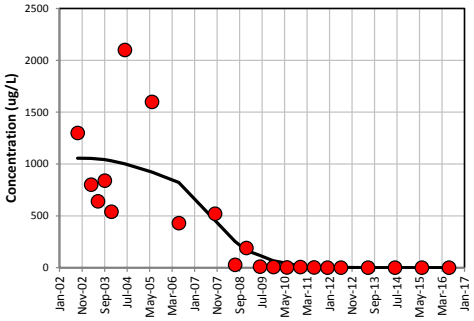
VC in BW-19



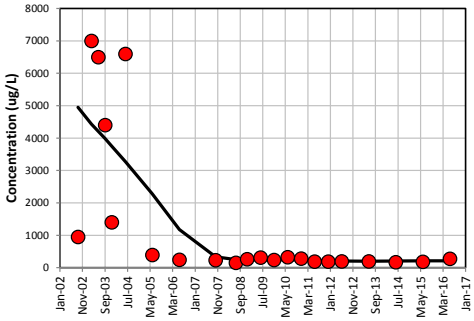
VC in BW-21



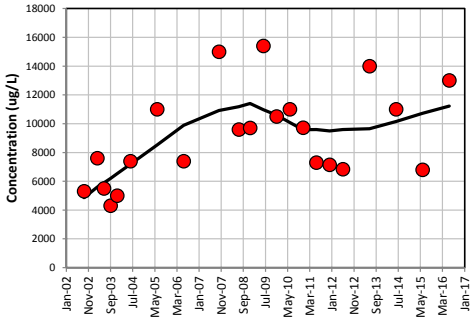
VC in BW-23-125'



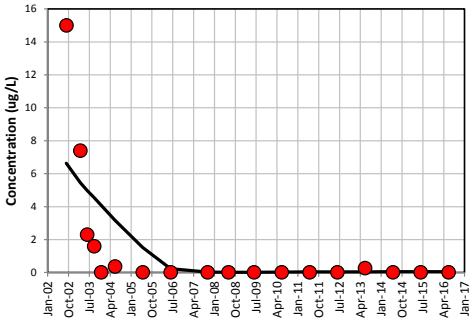
VC in BW-23-390'



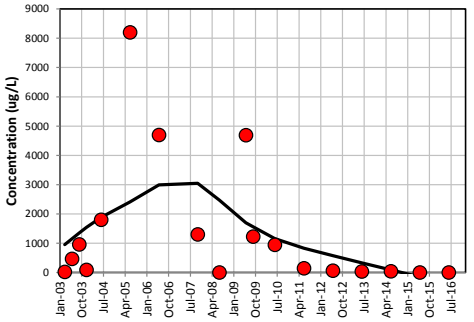
VC in BW-23-50'



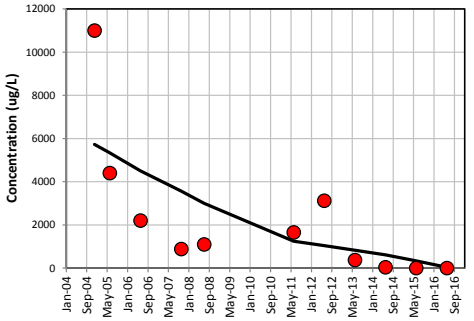
VC in BW-24-390'



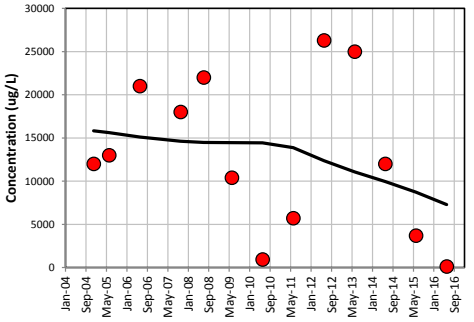
VC in BW-25



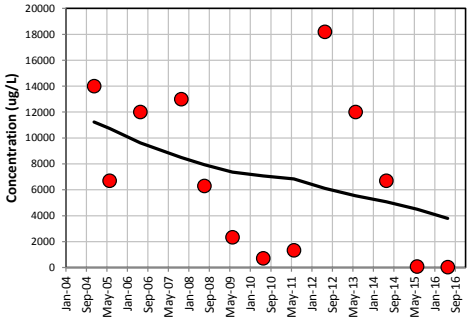
VC in BW-26-395'



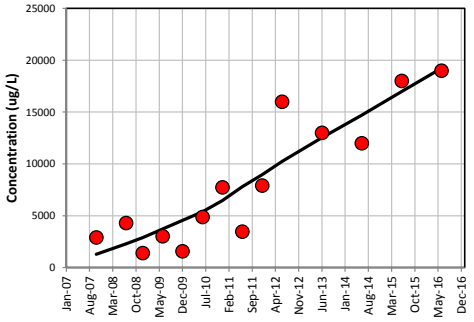
VC in BW-26-65'



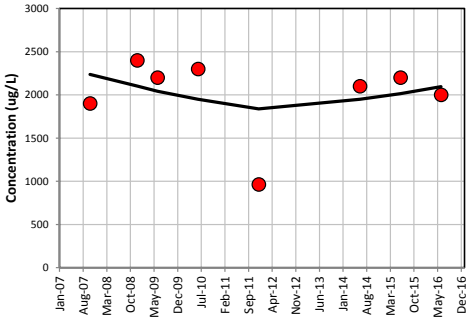
VC in BW-26-85'



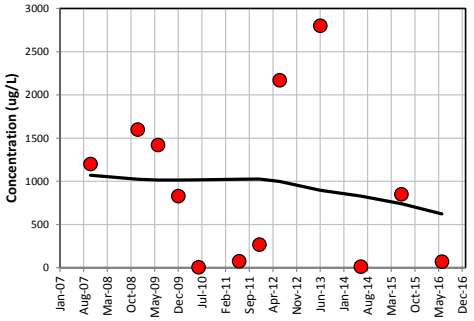
VC in BW-27



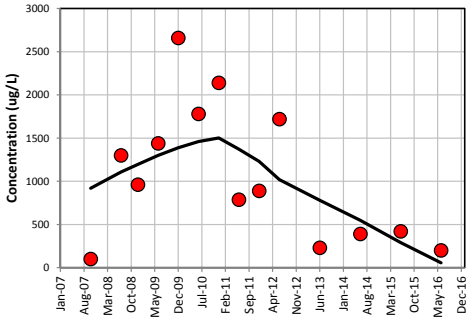
VC in BW-28



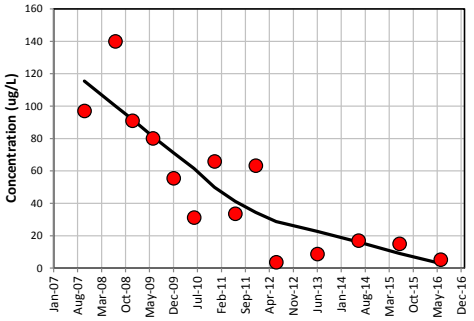
VC in BW-31



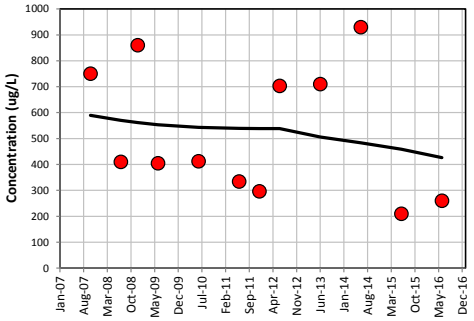
VC in BW-33



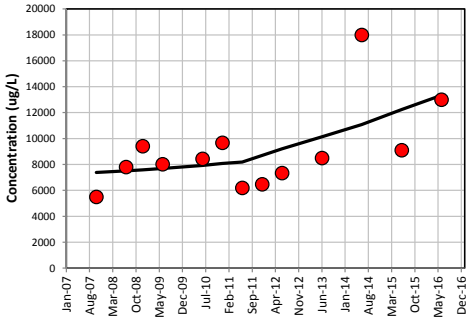
VC in BW-34

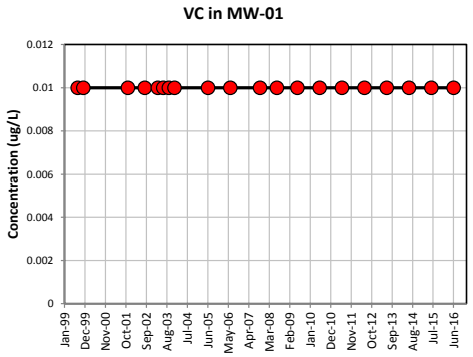


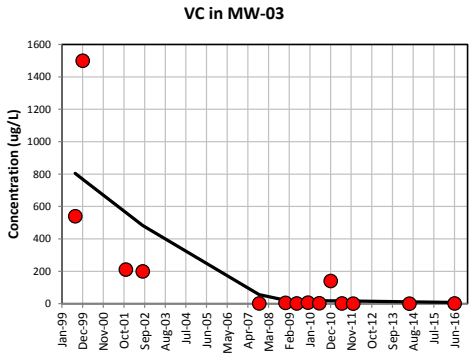
VC in BW-35

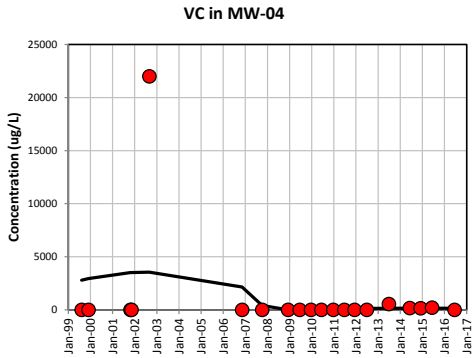


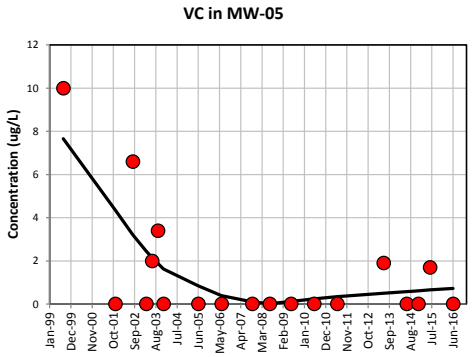
VC in BW-37

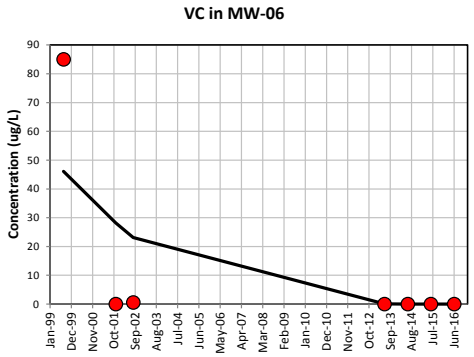


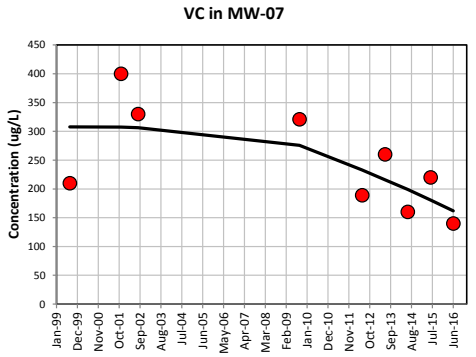

VC in MW-01
Concentration (ug/L)
0.012
0.01
0.008
0.006
0.004
0.002
0
Jan-99
Dec-99
Nov-00
Oct-01
Sep-02
Aug-03
Jul-04
Jun-05
May-06
Apr-07
Mar-08
Feb-09
Jan-10
Dec-10
Nov-11
Oct-12
Sep-13
Aug-14
Jul-15
Jun-16

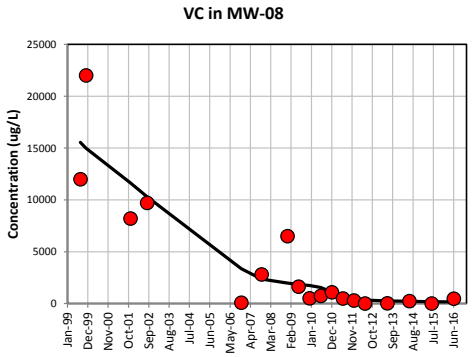

VC in MW-03
Concentration (ug/L)
1600
1400
1200
1000
800
600
400
200
0
Jan-99
Dec-99
Nov-00
Oct-01
Sep-02
Aug-03
Jul-04
Jun-05
May-06
Apr-07
Mar-08
Feb-09
Jan-10
Dec-10
Nov-11
Oct-12
Sep-13
Aug-14
Jul-15
Jun-16

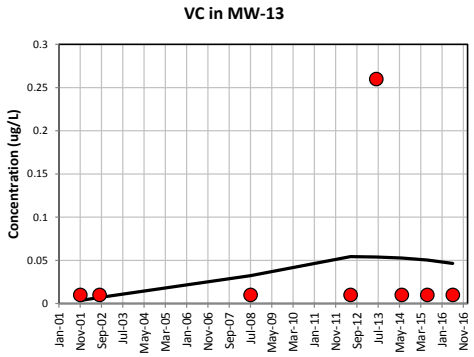

VC in MW-04
Concentration (ug/L)
25000
20000
15000
10000
5000
0
Jan-99
Jan-00
Jan-01
Jan-02
Jan-03
Jan-04
Jan-05
Jan-06
Jan-07
Jan-08
Jan-09
Jan-10
Jan-11
Jan-12
Jan-13
Jan-14
Jan-15
Jan-16
Jan-17

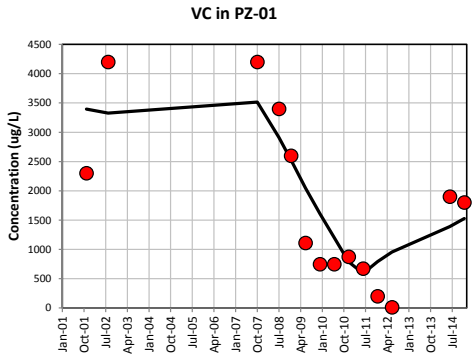

VC in MW-05
Concentration (ug/L)
12
10
8
6
4
2
0
Jan-99
Dec-99
Nov-00
Oct-01
Sep-02
Aug-03
Jul-04
Jun-05
May-06
Apr-07
Mar-08
Feb-09
Jan-10
Dec-10
Nov-11
Oct-12
Sep-13
Aug-14
Jul-15
Jun-16


VC in MW-06
Concentration (ug/L)
90
80
70
60
50
40
30
20
10
0
Jan-99
Dec-99
Nov-00
Oct-01
Sep-02
Aug-03
Jul-04
Jun-05
May-06
Apr-07
Mar-08
Feb-09
Jan-10
Dec-10
Nov-11
Oct-12
Sep-13
Aug-14
Jul-15
Jun-16


VC in MW-07
Concentration (ug/L)
450
400
350
300
250
200
150
100
50
0
Jan-99
Dec-99
Nov-00
Oct-01
Sep-02
Aug-03
Jul-04
Jun-05
May-06
Apr-07
Mar-08
Feb-09
Jan-10
Dec-10
Nov-11
Oct-12
Sep-13
Aug-14
Jul-15
Jun-16


VC in MW-08
Concentration (ug/L)
25000
20000
15000
10000
5000
0
Jan-99
Dec-99
Nov-00
Oct-01
Sep-02
Aug-03
Jul-04
Jun-05
May-06
Apr-07
Mar-08
Feb-09
Jan-10
Dec-10
Nov-11
Oct-12
Sep-13
Aug-14
Jul-15
Jun-16


VC in MW-13
Concentration (ug/L)
0.3
0.25
0.2
0.15
0.1
0.05
0
Jan-01
Nov-01
Sep-02
Jul-03
May-04
Mar-05
Jan-06
Nov-06
Sep-07
Jul-08
May-09
Mar-10
Jan-11
Nov-11
Sep-12
Jul-13
May-14
Mar-15
Jan-16
Nov-16


VC in PZ-01
Concentration (ug/L)
4500
4000
3500
3000
2500
2000
1500
1000
500
0
Jan-01
Oct-01
Jul-02
Apr-03
Jan-04
Oct-04
Jul-05
Apr-06
Jan-07
Oct-07
Jul-08
Apr-09
Jan-10
Oct-10
Jul-11
Apr-12
Jan-13
Oct-13
Jul-14

Appendix G
Evaluation Summary Tables (for wells with increasing trends for CVOC daughter compounds)

Table G-1. CVOC Daughter Products Trend Data Summary for Wells with June 2016 "Increasing" Mann-Kendall Trend Analysis Results

THAN Davenport Site, 2040 West River Drive

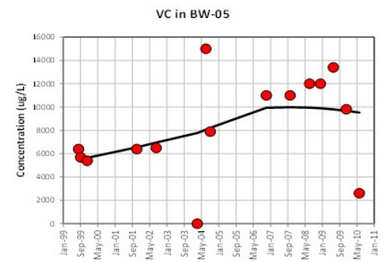
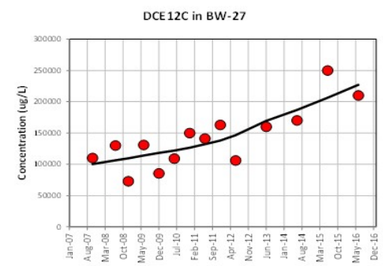
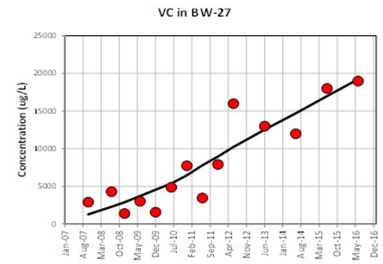
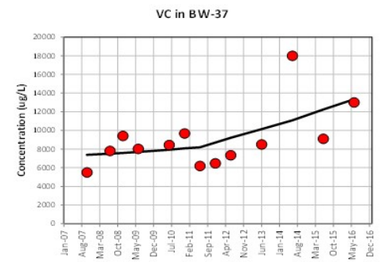
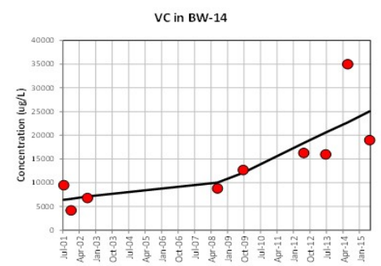
Well ID	Groundwater Monitoring Zone	Location Description[a]	Mann-Kendall Trend Analysis[b]	Trend Plot[c]	Discussion
Onsite Monitoring Wells					
BW-05	Shallow Bedrock Zone	Located in the central portion of the site just north of the main onsite building	Increasing trend for VC		- Locally weighted scatter plot smoothing curve (image in column to the left) for VC at BW-05 is stable between 2006 and June 2010 when it was last sampled. - Active treatment of this area ongoing based on the presence of permanganate noted in this well in December 2010, 2011, 2012, 2013, 2014, 2015, and 2016.
BW-27	Shallow Bedrock Zone	Northern portion of the site	Increasing trend for DCE12C Increasing trend for VC	 	-CVOC daughter compounds continue to be produced from ongoing reductive dechlorination of CVOC parent compounds. -Locally weighted scatter plot smoothing curves (images at left) for DCE12C and VC indicate increasing concentrations of both daughter products due to reductive dechlorination -BW-27 is located downgradient of ISCO Injection Area 5. -The Mann-Kendall trend analysis result for total VOCs at BW-27 is stable (Table 3-6). -The Mann-Kendall trend analysis results for CVOC parent compounds PCE, TCE, TCA111, and methylene chloride are decreasing (Appendix F). -Locally weighted scatter plot smoothing curves indicate concentrations are increasing for additional CVOC daughter compounds DCE11 and DCA11.

Table G-1. CVOC Daughter Products Trend Data Summary for Wells with June 2016 "Increasing" Mann-Kendall Trend Analysis Results

THAN Davenport Site, 2040 West River Drive

Well ID	Groundwater Monitoring Zone	Location Description[a]	Mann-Kendall Trend Analysis[b]	Trend Plot[c]	Discussion
BW-37	Shallow Bedrock Zone	Southern portion of the site	Increasing trend for VC		- CVOC daughter compounds continue to be produced from ongoing reductive dechlorination of CVOC parent compounds. - Locally weighted scatter plot smoothing curves (image at left) for VC indicate increasing concentrations of this daughter products due to reductive dechlorination. - BW-37 is located downgradient of ISCO Injection Area 4. -The Mann-Kendall trend analysis result for total VOCs at BW-37 is decreasing (Table 3-6). -CVOC parent compounds PCE and TCE have been detected at a frequency less than 50% since monitoring began in 2007 (Appendix F). -The Mann-Kendall trend analysis results for CVOC parent compounds TCA111 and methylene chloride are decreasing (Appendix F). -The Mann-Kendall trend analysis results for CVOC daughter compound DCE12C is decreasing (Appendix F). -Locally weighted scatter plot smoothing curves indicate concentrations are decreasing for additional CVOC daughter compounds DCE11 and DCA11.
Offsite Monitoring Wells					
BW-14	Shallow Bedrock Zone	Located in the southeastern portion of the site on the southeastern side of West River Drive	Increasing trend for VC		- CVOC daughter compounds continue to be produced from ongoing reductive dechlorination of CVOC parent compounds. - Locally weighted scatter plot smoothing curve (image at left) for VC in BW-14 indicates increasing concentrations of VC due to reductive dechlorination. - BW-14 is downgradient from the highest onsite groundwater concentrations. - The locally weighted scatter plot smoothing curve (Appendix F) indicates total VOC concentrations at BW-14 are decreasing since 2008. - The Mann-Kendall trend analysis result for TCA111 at BW-14 is decreasing (Appendix F). - CVOC parent compounds PCE, TCE, and methylene chloride have been detected at a frequency less than 50% since monitoring began in 2001 (Appendix F). - The Mann-Kendall Trend analysis results are stable for the additional daughter products of DCE11 , DCA11, and DCE12C (Appendix F). The daughter compounds are also undergoing reductive dechlorination as evidenced by detection of nontoxic end compound of ethene. The geochemistry of groundwater at BW-14 shows strong evidence for continued anaerobic biodegradation of VOCs based upon the following conditions: • Reducing conditions: ORP readings are less than 50 mV (–126.9 mV) • Elevated chloride concentrations compared with other offsite monitoring wells (280 mg/L) • Methane and ethene detected (240 µg/L; 5,000 µg/L) • Nitrate concentrations are less than 1 mg/L (not detected at 0.5 mg/L) • Detection of CVOC daughter compounds: DCE12C, DCE12T, DCE11, DCA11, and VC

Notes:

[a] Locations of site wells are presented on Figure 2-2.

[b] Mann-Kendall analysis for VC and DCE12C was completed for the dataset. Tables and graphs of the results are included in Table 3-6 and Appendix F.

[c] Locally weighted scatter plot with smoothing curve. The trend analysis was completed using all available data for the well, starting when it was installed.

CVOC = chlorinated volatile organic compound
DCE11 = 1,1-Dichloroethene
DCA11 = 1,1-Dichloroethane
DCE12C = cis-1,2-Dichloroethene
DCE12T = trans-1,2-Dichloroethene
ISCO = in situ chemical oxidation
LTMP = long-term groundwater monitoring plan
mg/L = milligrams per liter
mV = millivolts
PCE = tetrachloroethene
TCA111= 1,1,1 trichloroethane
TCE = trichloroethene
VC = vinyl chloride
VOC = volatile organic compound
Total VOCs include 1,1,1-trichloroethane; 1,1-dichloroethane; 1,1-dichloroethene; 1,2-dichloroethane; 2-butanone; acetone; benzene; chloroethane; cis-1,2-dichloroethene; ethylbenzene; methylene chloride; styrene; tetrachloroethene; toluene; trichloroethene; trans-1,2-dichloroethene; vinyl chloride; and xylenes.