GROUNDWATER MONITORING PROGRAM
2017 QUARTER FOUR STATUS REPORT
FOR
REMEDIAL ACTION AT
THE DEFENSE NATIONAL STOCKPILE CENTER SCOTIA DEPOT
GLENVILLE, NEW YORK

Prepared For:

U.S. Army Corps of Engineers

Prepared By:

AECOM

AECOM Technical Services

May 2018

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1 INTRODUCTION

This report has been prepared by AECOM on behalf of the United States Army Corps of Engineers (USACE) and the United States General Services Administration (GSA) to document the groundwater monitoring activities performed at the Former Scotia Navy Depot (FSND) (Site) for the fourth quarter of 2017 (December 11, 2017, through December 14, 2017). This report presents the results of the fifth groundwater sampling event after the completion of the construction of the zero valent iron (ZVI) permeable reactive barrier (PRB) which was installed across the volatile organic compound (VOC) plume to remediate groundwater at the Site. This groundwater sampling event was a Site-wide sampling event which included collection of groundwater samples from 12 monitoring wells. Installation of the PRB was completed in from February 2016 to December 2016. The Site is adjacent to the north side of New York State (NYS) Route 5 (Amsterdam Road) in the Town of Glenville, Schenectady County, New York. A Site location map is provided in Figure 1-1.

1.1 Site Description

The Site and adjacent properties are zoned for commercial use. Residential properties are located to the south between Amsterdam Road and the Mohawk River. The Mohawk River is located approximately 1,500 feet west-southwest of the Site and represents the major drainage feature in Schenectady County. The water table beneath the Site is approximately 65 feet below ground surface (bgs), and groundwater beneath the Site flows from northeast to southwest toward the Mohawk River.

The Site overlies a United States Environmental Protection Agency (US EPA) designated Sole Source Aquifer referred to as the Schenectady or Great Flats Aquifer system, which is adjacent to and extends beneath the Mohawk River over a distance of approximately 12 miles in Schenectady County. Relative to a series of four aquifer protection zones established to protect five municipal water supplies relying on the aquifer system, the Site lies in Zone III or the General Aquifer Recharge Area. The Site is located approximately 1,500 feet southwest of the Village of Scotia well field and approximately 1.25 miles north of the Town of Rotterdam and City of Schenectady well fields.

Portions of the original Scotia Naval Depot have been subdivided and sold since 1972 by the United States Government. The Site now consists of several large privately held parcels in addition to a portion of land still administered by the GSA. The private parcels contain a variety of industrial tenants; while the GSA leases its remaining portion to the Defense Logistics Agency/Defense National Stockpile Center and the Navy.

1.2 Site History

The Scotia Depot was built in 1942 and 1943 and was commissioned as a United States Navy facility on March 30, 1943. It served as a storage and supply depot for naval forces along the Atlantic coast and Europe, and as a storage and distribution point for National Stockpile materials. On January 1, 1960, the Navy turned the facility over to the GSA. During the period between early 1966 and approximately 1973, the USACE/Army Material Command (AMC) leased buildings from the Navy for the fabrication and storage of vehicles as well as other

military equipment. Additionally, between 1967 and 1969, the GSA and the Navy leased to the United States Army/Defense Supply Agency, Buildings 202 and 203. The agreement indicates these buildings were used for the preservation and rail loading of trucks; and storage of trucks and vehicles.

1.2.1 Summary of Previous Investigations

In the late 1980s, trichloroethene (TCE) was detected at low-level concentrations of less than 1 microgram per liter (µg/L) in the Town of Rotterdam and City of Schenectady well fields. In an effort to determine the potential source(s) of the TCE, the New York State Department of Health (NYSDOH) performed sampling of private water supply wells in the area during 1991. The private water supply sampling included residences located on NYS Route 5 in the Town of Glenville hydraulically downgradient of the Defense National Stockpile Center Scotia Depot Site. VOCs, including TCE, 1,1,1-trichloroethane (1,1,1-TCA), and tetrachloroethene (PCE), were detected in groundwater collected in some of these residential wells. The sampling results were consistent with the known groundwater contamination concentrations at the Defense National Stockpile Center Scotia Depot Site, including TCE which was detected in the NYS Route 5 residential well water samples at concentrations up to 320 µg/L. Following a recommendation by the NYSDOH to connect to public water, the homes on NYS Route 5 were subsequently connected to public water provided by the Town of Glenville. Although the drinking water standard was never exceeded in the City of Schenectady and the Town of Rotterdam municipal water supply wells, increased groundwater quality monitoring was initiated following the identification of the contamination.

Subsequent to the NYSDOH residential groundwater sampling, six subsurface investigations were completed to identify the possible source of TCE in the residential wells and to delineate the extent of the TCE groundwater plume. The investigations were completed between 1995 and 2007 and focused on the assemblage of properties comprising the former 337-acre Defense National Stockpile Center Scotia Depot. The New York State Department of Environmental Conservation (NYSDEC) 2007 Expanded Site Investigation (ESI) (NYSDEC, 2007) provides details on each of these investigations. Investigation data indicated that TCE disposal may have also occurred in the northeast corner of the 401 sub-block and the area near the north corner of the 403 sub-block.

Based on these investigations, a Record of Decision (ROD) specifying a groundwater remedy was approved by the NYSDEC in March 2010 (NYSDEC, 2010). The ROD specified a remedial action for the groundwater plume which included treatment of the plume through the installation of a zero valent iron (ZVI) PRB. During this time investigations were also conducted in relation to a carbon tetrachloride plume that was identified as a source for potential soil vapor intrusion. In addition to the groundwater remedy, the ROD also identified the need for soil vapor intrusion mitigation at the building 201 sub-block. Details on the installation and monitoring of the SVI portion of the remedy are provided in the Final Engineering Report (FER) (AECOM, 2017a). A Site Layout Map is provided in Figure 1-2.

1.2.2 Pre-Design Groundwater Investigation – 2013

A pre-design investigation (PDI) was completed by Stone Environmental in 2013 to verify the location and dimensions of the TCE plume to better estimate the appropriate location and depth of the PRB. The PDI was completed as a component of the ROD selected remedy to aid in the PRB design. The pre-design investigation included:

- Baseline groundwater sampling of 24 existing onsite monitoring wells
- Synoptic measurement of groundwater elevations in 35 on-site and off-site monitoring wells
- Vertical groundwater profile of VOC plume at 16 locations (WP-01 to WP-16)
- Installation and development of four on-site monitoring wells (MW-24 through MW-27)
- Hydraulic conductivity measurements
- Geotechnical soil sampling (laboratory sieve, bulk density, and effective porosity analyses)
- ZVI treatability study (bench-scale column test) using Site soil and groundwater

The results of the PDI indicated that the plume location had shifted to the south/southeast from the estimated plume delineation shown in the 2010 ROD (see Figure 3 from the ROD and Figures 6 and 10 from Final PDI Report) (Stone, 2013). The PDI also delineated the vertical and horizontal limits of the plume across a transect of groundwater profile locations, which had not been well defined in previous investigations. The results of the ZVI treatability study indicated that ZVI would be effective in remediating the TCE plume at the detected maximum concentrations and Site-specific geochemical conditions. The PDI evaluated a preliminary PRB design approximately 850-feet long centered on the highest concentration axis of the TCE plume and extending to estimated lateral limits of the plume based on the results of the vertical groundwater profile locations. Subsequent evaluation of the data to maximize effectiveness and efficiency of the remedial design suggested a 700-feet long deep section centered on the TCE plume with a shallower 250-feet long section to treat lower TCE concentrations would be effective at mitigating the groundwater contamination.

1.2.3 Baseline Groundwater Investigation

As part of the remedial design investigation work plan (RDIWP) (AECOM, 2015) various field activities were conducted during the fall of 2015 in order to gather data and information needed to complete the final PRB design. The main components of the remedial design investigation (RDI) field activities that related to the PRB design included:

- Installation and development of four compliance well pairs (MW-28 to MW-35) and one additional monitoring well (MW-36) to confirm upgradient edge of groundwater plume

- Collection of 33 baseline groundwater samples
- Performance of a confirmatory ZVI bench scale test
- Performance of aquifer tests including slug testing and hydraulic pulse interference testing (HPIT)

Detailed methods and results of these field activities were presented in the Remedial Action Work Plan (PRB-RAWP) (AECOM, 2016) and the 2015 RDI Work Summary Memo presented in Appendix A of the PRB-RAWP.

1.3 PRB Design Summary

The remedial investigation activities at the Site indicated that variable hydraulic conductivity and hydraulic gradient, and therefore groundwater velocity, conditions may exist at the Site. Therefore, various design cases were analyzed within the range of the measured values to determine the optimum design for the PRB. Three design cases in particular were outlined in the (PRB-RAWP) (AECOM, 2016). These design cases were based on average values from the slug test data and HPIT data from the 2015 RDI activities and historic data from the Stone PDI (Stone, 2013). The three design cases used an average value of 0.004 ft/ft for the hydraulic gradient and varied the hydraulic conductivity from 15.66 ft/day to 193.8 ft/day. This variability of hydraulic conductivity results in a range of groundwater velocity at the Site from 0.128 ft/day to 2.83 ft/day. GeoSierra Environmental, Inc. (GeoSierra), the PRB installation subcontractor, performed a sensitivity analysis based on these design cases and the design of the PRB was chosen based on design scenarios that reflected a conservative approach. A full description of the PRB design including details of each design case is presented in the PRB-RAWP (AECOM, 2016).

1.4 Remedial Action Implementation

In accordance with the ROD for the remedial action at the FSND, a ZVI PRB was installed in order to mitigate the impacted groundwater plume at the Site. AECOM, and its subcontractor GeoSierra, performed the installation of the PRB over the course of 10 months in 2016. The design and installation procedures of the PRB are outlined in the PRB-RAWP (AECOM, 2016). The main components of PRB installation were as follows:

- Installation of 77 injection wells
- Installation of 31 Resistivity strings
- Placement of ZVI into the formation via injection wells
- Post PRB installation HPIT testing

The installation of the ZVI PRB was successfully completed in November of 2016. Details of the PRB construction activities of the PRB are provided in the FER (AECOM, 2017a) for the Site.

2 QUARTERLY GROUNDWATER MONITORING PROGRAM

The eight compliance monitoring wells (MW-28 through MW-35) were installed in pairs so that groundwater quality could be monitored directly upgradient and directly downgradient to of the PRB. The four monitoring wells pairs are installed 20 feet apart on opposite sides of the wall, one being upgradient and one being downgradient, with corresponding screen depths. Figure 2-1 provides a profile well of the compliance monitoring wells showing the screened interval in relation to the PRB. Results from the groundwater monitoring program will be used to evaluate the effectiveness of the remedy at decreasing chlorinated VOC concentrations in groundwater and preventing the migration of contaminated groundwater off-site. The compliance well pairs, in addition to MW-24 (downgradient), MW-26 (downgradient), MW-15 (upgradient) and MW-16 (outside of plume), will be sampled quarterly for the first two years (eight quarters) then annually thereafter. The first quarterly sampling event was conducted in December 2016. Monitoring well locations are shown on Figure 1-2 and are described in Table 2-1 below.

Table 2-1: Location of Monitoring Wells

Monitoring Well ID	Location in Relation to PRB
MW-15	Upgradient
MW-16	Outside of Plume
MW-24	Downgradient
MW-26	Downgradient
MW-28	Downgradient
MW-29	Upgradient
MW-30	Downgradient
MW-31	Upgradient
MW-32	Downgradient
MW-33	Upgradient
MW-34	Downgradient
MW-35	Upgradient

Table 2-2 provides the monitoring well sample schedule and analytical information for the groundwater monitoring program. The groundwater monitoring program will be carried out in accordance with the schedule and sampling protocol outlined in the Site Management Plan (SMP) (AECOM, 2017b).

2.1 Sample Collection Methods

Prior to sample collection, depth to water measurements were collected with an electronic water level meter from all accessible wells on Site. Depth to water measurements were taken to the hundredth of a foot from a designated measuring point on the well casing.

The groundwater sampling event was performed in accordance with EPA's low stress, often referred to as low-flow, sampling technique (Low-Flow (Minimal Drawdown) Ground-Water Sampling Procedures, EPA/540/S-95/504) (EPA, 2010) and is discussed below.

A bladder pump was used to purge the monitoring wells with the pump intake set at the midpoint of the saturated screened interval. During purging, the pump was operated at a flow rate of approximately 100 to 500 milliliters per minute (mL/min) and water levels were monitored to ensure that the pumping rate caused minimal/no drawdown. Dedicated tubing for each monitoring well was used for groundwater sample collection. Field parameters were recorded on the Well Sampling Forms every five minutes during purging, including:

- Purge rate (mL/min)
- Depth to water (0.01 ft)
- Temperature (degrees Celsius)
- pH
- Specific conductance (millisiemens per centimeter [ms/cm])
- Dissolved Oxygen (DO) (milligrams per liter [mg/L])
- Oxidation-Reduction Potential (ORP) (millivolts [mV])
- Turbidity (NTU)

A flow-through cell was used to obtain temperature, pH, specific conductance, DO, and ORP. Turbidity will be measured using a separate instrument. Purging was considered complete when the indicator parameters have stabilized over three consecutive readings. Stabilization parameters include the following:

- Drawdown: less than 0.3 ft drawdown during purging
- pH: ± 0.1 standard unit
- Specific Conductivity: ± 3%
- DO: ± 10 % (mg/L) for values greater than 0.5 mg/L or 3 readings < 0.5 mg/L
- ORP: ±10 mV

- Turbidity: < 5 NTU or ± 10% for readings >5 NTU

Groundwater sample collection field forms with the field parameter readings for each monitoring well are included as Appendix A. Sampling instruments were calibrated daily prior to starting sampling activities, or as needed throughout the day. A log of the field equipment calibration records is provided in Appendix B.

Prior to sample collection, the flow-through cell was disconnected from the dedicated sample tubing and the sample was collected directly from the tubing into the laboratory supplied sample containers. The target flow rate during sample collection was approximately 100 mL/min and sample collection was completed within a single bladder pulse for VOC analysis. Once sampling was complete, the purge water was placed in a 55-gallon drum and will be disposed of offsite at the conclusion of the sampling event. More detailed procedures for sample collection and handling and waste handling, are included in Appendix H of the SMP (AECOM, 2017b). Appendix G of the SMP includes the analytical QAPP for the site management activities. Appendix I of the SMP includes the HASP for the site management activities.

Groundwater samples were packaged on ice and delivered to ALS Laboratory daily via courier during the sample collection timeframe. Standard chain of custody procedures were used for sample transport. In total, 12 groundwater samples were collected and analyzed for targeted VOCs (EPA method 8260C) and monitored natural attenuation (MNA) parameters including TOC (SM 5310B), alkalinity (SM 2320B), chloride, nitrate, sulfate (EPA Method 300.0), and dissolved gases (methane, ethane, and ethene; Method RSK 175).

3 RESULTS

3.1 Hydrogeologic Results

The groundwater elevations for the Site were determined based on the initial depth to groundwater measurements that were taken prior to sample collection. Table 3-1 shows the groundwater elevation data for the December 2017 sampling event and compares it to the December 2015 baseline sampling event and past sampling event levels. A potentiometric Site map indicating the overburden, groundwater elevation and direction of groundwater flow during the December 2017 sampling event is included as Figure 3-1. Observed general groundwater flow direction in December 2017 was from east to west, which is similar to past sampling events. Between the compliance well pair MW-28 and MW-29 there appears to be a very slight reverse or flat gradient during some sampling events including the December 2017 event.

Based on observed trends during the past sampling events it appears that the groundwater elevation at the Site is subject to seasonal variability. The December 2017 sampling event exhibits lower groundwater elevations than the September 2017 sampling event but similar to the December 2016 sampling event, indicating that there is a potential seasonal groundwater level trend at the Site. Groundwater elevation data for the December 2017 event indicate that groundwater levels are currently lower than the top of the PRB wall at the north most monitoring well pairs along the PRB. Meanwhile, the groundwater elevation levels are slightly above the top of the PRB for the south most monitoring well pairs. The current potentiometric surface in relation to the PRB is shown in profile on Figure 2-1A and in relation to along the axis of the estimate plume in Figure 2-1B.

The hydraulic gradient is change in hydraulic head, or water level, per unit distance. The average hydraulic gradient at the Site in the vicinity of the PRB, estimated based on the December 2017 hydrogeologic conditions, was determined to be 0.0039 ft/ft. The December 2017 hydraulic gradient is consistent with the past three quarterly sampling events where the hydraulic gradient was 0.0039ft/ft in March 2017, 0.0037 ft/ft in June 2017, and 0.0028 ft/ft in September 2017. The groundwater seepage velocity is the rate of solute transport through the open pore space in the soil. Based on the December 2017 hydraulic gradient of 0.0039 ft/ft and the range of hydraulic conductivities evaluated for the PRB design (15.66 ft/day to 193.8 ft/day) groundwater seepage velocity at the Site could vary between approximately 0.16 ft/day and 1.94 ft/day. The range of estimated groundwater seepage velocities based on the December 2017 Site conditions (0.16 ft/day-1.94 ft/day) is comparable to the range of estimated groundwater velocities used for the PRB design (0.128 ft/day-2.83 ft/day). Calculations for hydraulic gradient and velocity estimates are included in Appendix C.

The drum of purge water from the December 2017 sampling event was removed from the Site on March 28, 2018 and its contents properly disposed of by the environmental waste services contractor.

3.2 Groundwater MNA Parameter Results

Results of groundwater MNA parameters obtained from the baseline sampling event through the December 2017 quarterly sampling event for the PRB monitoring compliance wells are presented in Table 3-2. MNA parameters were compared between compliance well pairs. In general conductivity values are significantly higher throughout all the compliance well pairs when compared to past sampling events.

During previous quarterly sampling events no significant changes have been observed in DO and ORP concentrations and measurements were variable with some well pairs showing an increase and some pairs showing a decrease. DO measurements during the December 2017 generally had an increase from the previous sampling event, but decreased between each upgradient and downgradient individual monitoring well pair. ORP levels decreased significantly from upgradient to downgradient at well pairs MW-33/32 and MW-35/34. These conditions are expected downgradient of the PRB indicating reducing conditions as the groundwater passes through the PRB. Furthermore, low DO and ORP values downgradient indicate that anaerobic conditions exist which promote anaerobic biodegradation. However it should be noted that there was some increase in DO noted during this sampling event suggesting that anaerobic conditions may not be sustained. The December 2017 groundwater results showed a general increase in methane, ethane, and ethene in most downgradient compliance monitoring wells. This is most pronounced in the well pairs toward the center of the wall (MW-30/MW-31 and MW-32/MW-33). For methane, there was a particular increase in downgradient monitoring wells MW-30, MW-32 and MW-34. The largest increase in methane, ethane, and ethene this quarter was again seen in compliance monitoring well pairs in the middle of the PRB. Initially the methane, ethane, and ethene concentrations increased from the breakdown of the carrier fluid (guar). The continued increase in ethane and ethane in downgradient well pairs is indicative of the β-elimination abiotic reaction of CVOCs with the PRB. These compounds, along with acetylene, are final products from the interaction of the ZVI and COVCs. To date nitrate and sulfate levels have been variable since the 2015 baseline sampling event. In the December 2017 sampling event, Nitrate levels were variable in compliance well pairs while all sulfate levels decreased from upgradient to downgradient compliance well pairs. Nitrate and sulfate concentrations are expected to decrease from upgradient to downgradient wells as this would further indicate that bioactivity is occurring.

Overall the MNA data does not show consistency in the well pairs throughout the expanse of the PRB. They will be monitored and expanded as needed to verify the effectiveness of the PRB. The well pair MW-28/MW-29 is screened in the more transmissive upper sand and gravel and does not appear to show the same MNA affects as the other well pairs.

3.3 Groundwater VOC results

The VOC results from the December 2017 quarterly sampling event are presented in Table 3-2. This groundwater sampling included collection of 12 groundwater samples. Figure 3-2 provides a summary of the groundwater VOC results for the monitoring well compliance pairs that exceed the NYSDEC Ambient Water Quality Standards (AWQS) and Guidance Values (GV) found in

the Technical and Operational Guidance Series (TOGS) 1.1.1 (NYSDEC, 1998) and compares the December 2017 sampling event results to the historic sampling event results.

Full analytical reports are included in Appendix D.

The laboratory data was validated by an AECOM chemist and a full data usability summary report (DUSR) was prepared. The DUSR, included in Appendix E, indicated that all data points were usable and no data points were rejected.

A narrative summary of the results is presented below:

- Trichloroethene (TCE), the primary constituent of concern, was detected in 10 of the 12 wells sampled, nine of which were above the AWQS of 5 µg/L. Wells with detectable levels of TCE were MW-15, MW-24, MW-28, MW-29, MW-30, MW-31, MW-32, MW-33, MW-34, and MW-35. The concentration of TCE found in MW-24 was below the AWQS. These results are consistent with September 2017 results.

- No TCE was detected in samples from monitoring wells MW-16 and MW-26. Monitoring Well MW-16 is a plume bounding well located outside of the estimated area of the chlorinated volatile organic compound (CVOC) plume.

- For the December 2017 event some downgradient wells of the compliance well monitoring pairs showed lower levels of TCE concentrations than their upgradient counterparts. Monitoring wells MW-28, MW-32, and MW-34 were the downgradient members of the confirmation well pairs to show a slight decrease in concentration of TCE. The samples TCE concentration ranged from 19.6 µg/L (MW-30) to 201 µg/L (MW-28). These reduced concentrations could be due to either groundwater interaction with the ZVI or enhanced reductive dechlorination (ERD).

- In general detected concentrations of TCE, as well as other chlorinated VOCs, for the December 2017 sampling event were consistent with previous groundwater sample results. However, as noted in the preceding bullet there appears to be some reduction in TCE concentrations downgradient of the PRB based on the results of the compliance well pairs.

- 1,1,1-Trichloroethane was detected in three of the 12 wells sampled. The concentration of 1,1,1-Trichloroethane in wells MW-28, MW-29 were above the AWQS of 5 µg/L and the concentration in MW-15 was below the AWQS.

- Wells with detectable levels of tetrachloroethene (PCE) were MW-15, MW-28, and MW-29. The concentration of PCE measured in MW-28 and MW-29 were above the AWGS of 5 µg/L and in MW-15 was below the AWQS.

Graphs showing concentrations of CVOCs were created for the monitoring well compliance pairs to monitor groundwater concentration trends. Data shown includes the baseline sampling event in December 2015 through the most recent sampling event in December 2017. These trend plots are included in Appendix F as Figures F-1 through F-4. To date no definitive trends have been observed as groundwater concentrations have been generally consistent with the baseline sampling event.

4 SUMMARY AND CONCLUSIONS

The December 2017 groundwater monitoring event was the fourth quarterly groundwater sampling event. Quarterly groundwater sampling will continue on the selected subset of monitoring wells listed in Table 2-1.The next groundwater sampling event is scheduled for March 2018 and will include groundwater sampling at the 12 designated quarterly sample locations. The next Site-wide sampling event will be conducted in the second quarter of 2018. Details regarding the groundwater sampling program for the Site are included in the SMP (AECOM 2017b).

The laboratory results suggest that concentrations of dissolved VOCs in Site groundwater are currently similar to the baseline concentrations before installation of the ZVI PRB and no significant changes has been observed to date. Recent increased methane and ethane concentrations at some downgradient monitoring wells, particularly in the center of the wall, indicate the presence of anaerobic conditions and abiotic reduction of CVOCs in the vicinity of the PRB. While there had been increased TOC concentrations at the MW compliance pairs noted in the previous sampling events it appears TOC has moved toward baseline conditions. Results from the future sampling rounds will help to verify this trend. Downgradient parameters including the presence of ethane, ethane, and methane suggest that the abiotic degradation of TCE is taking place as impacted groundwater flows through the PRB in most well pairs. The data from the MW-28/MW-29 well pair at the northern end of the wall indicates that the wall may be less effective in the more transmissive sand and gravel or groundwater flow conditions are not optimal in this area of the Site.

Current Site groundwater flow conditions indicate that the on average the hydraulic gradient is consistent with the design. The PRB was designed based on a hydraulic gradient of 0.004 ft/ft which is similar to the estimated hydraulic gradient of 0.0039 ft/ft measured in December 2017. There appears to be a seasonal variability in groundwater elevation and hydraulic gradient which will be better understood as the quarterly monitoring continues. There apears to be a reverse gradiant in the MW-28/MW-29 well pair at the northern edge of the wall. In acctuality this is likely an area with a flat gradient and the minor vairability in grounwater levels between the well pair is due to margin of error in the survey of the well casing or with the field measurments. Historic data indicates a range of gradients from 0.001 to 0.006 ft/ft measured at the Site (Stone 2013). Based on the current gradient and estimated groundwater seepage velocity groundwater passing through the PRB has reached the downgradient monitoring wells.

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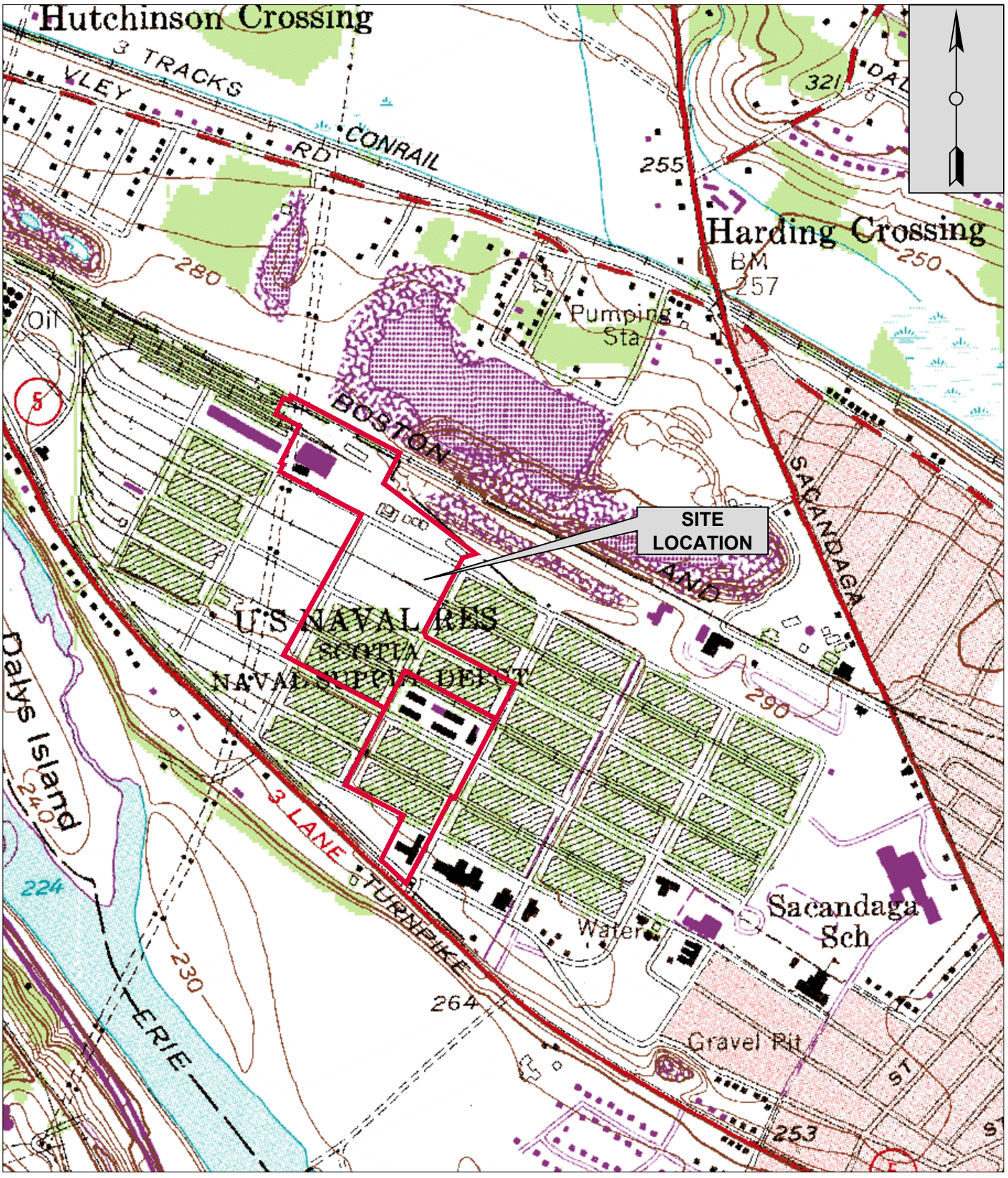
FIGURES



MAP REFERENCE:
IMAGE SHOWN FROM U.S.G.S.7.5 MINUTE
QUADRANGLE, SCHENECTADY SERIES

0 1000' 2000'

2017 4th QUARTER GROUNDWATER REPORT
DEFENSE NATIONAL STOCKPILE
SCOTIA DEPOT SITE - SCOTIA, NY
Project No.: 60440641 Date: January 2018

US ARMY Corps
of Engineers

SITE LOCATION MAP

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Figure: 1-1

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Figure: 1-2

SITE LAYOUT MAP

LEGEND

- 15 FT. HIGH PERMEABLE REACTIVE BARRIER WALL - 65' - 80' BGS
- 45 FT. HIGH PERMEABLE REACTIVE BARRIER WALL - 65' - 110' BGS
- MW-25 MONITORING WELL
- APPROXIMATE EXTENT OF TCE - TRICHLOROETHENE GROUNDWATER PLUME
- APPROXIMATE EXTENT OF CT - CARBON TETRACHLORIDE GROUNDWATER PLUME

0 200' 400'

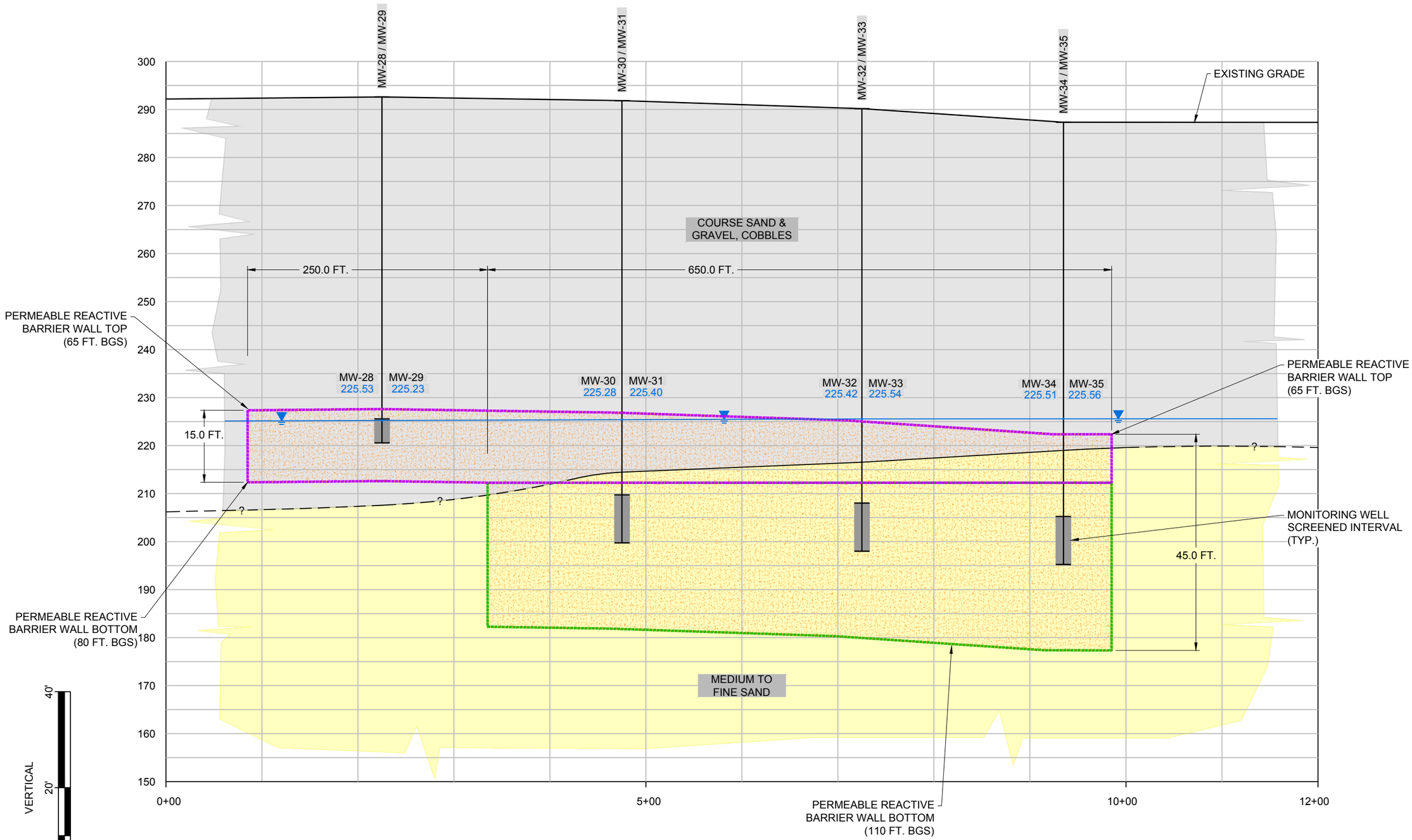
US ARMY Corps of Engineers

2017 4th QUARTER GROUNDWATER REPORT

DEFENSE NATIONAL STOCKPILE CENTER

SCOTIA DEPOT SITE - SCOTIA, NY

Project No.: 60440641 Date: January 2018



SCALE

SECTION A - A'

LEGEND

225.41 GROUNDWATER ELEVATION - DECEMBER 2017

PERMEABLE REACTIVE BARRIER WALL - 6" THICK

PERMEABLE REACTIVE BARRIER WALL - 3" THICK

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Figure: 2-1A

COMPLIANCE MONITORING WELLS AND PRB WALL PROFILE GROUNDWATER SECTION A - A' DECEMBER 2017

US ARMY Corps of Engineers

2017 4th QUARTER GROUNDWATER REPORT

DEFENSE NATIONAL STOCKPILE CENTER

SCOTIA DEPOT SITE - SCOTIA, NY

Project No.: 60440641 Date: January 2018

B

B'

AVENUE B

MW-13 (PROJ)

MW-24 (PROJ)

MW-30 (PROJ)

MW-31 (PROJ)

GEP-3

MW-18 (PROJ)

EXISTING GRADE

COURSE SAND & GRAVEL, COBBLES

PERMEABLE REACTIVE BARRIER WALL TOP (65 FT. BGS)

TO MW-9

471'

218.63

MW-13 (PROJ) 224.99

MW-24 (PROJ) 225.12

MW-30 (PROJ) 225.28

MW-31 (PROJ) 225.40

GEP-3 226.67

MW-18 (PROJ) 227.09

444'

TO MW-36

227.94

PRB 6" THICK

15.0 FT.

45.0 FT.

?

MONITORING WELL SCREENED INTERVAL (TYP.)

PRB 3 THICK

MEDIUM TO FINE SAND

PERMEABLE REACTIVE BARRIER WALL BOTTOM (110 FT. BGS)

300
290
280
270
260
250
240
230
220
210
200
190
180
170
160
150

0+00
5+00
10+00
12+00

VERTICAL
40'
20'
0

0
100'
200'
HORIZONTAL

SCALE

SECTION B - B'

LEGEND

225.41 GROUNDWATER ELEVATION - DECEMBER 2017

PERMEABLE REACTIVE BARRIER WALL - 6" THICK

PERMEABLE REACTIVE BARRIER WALL - 3" THICK

GENERAL GROUNDWATER DIRECTION

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Figure: 2-1B

GROUNDWATER
SECTION B - B'
DECEMBER 2017

US ARMY Corps of Engineers

2017 4th QUARTER GROUNDWATER REPORT
DEFENSE NATIONAL STOCKPILE CENTER
SCOTIA DEPOT SITE - SCOTIA, NY
Project No.: 60440641 Date: January 2018

LEGEND

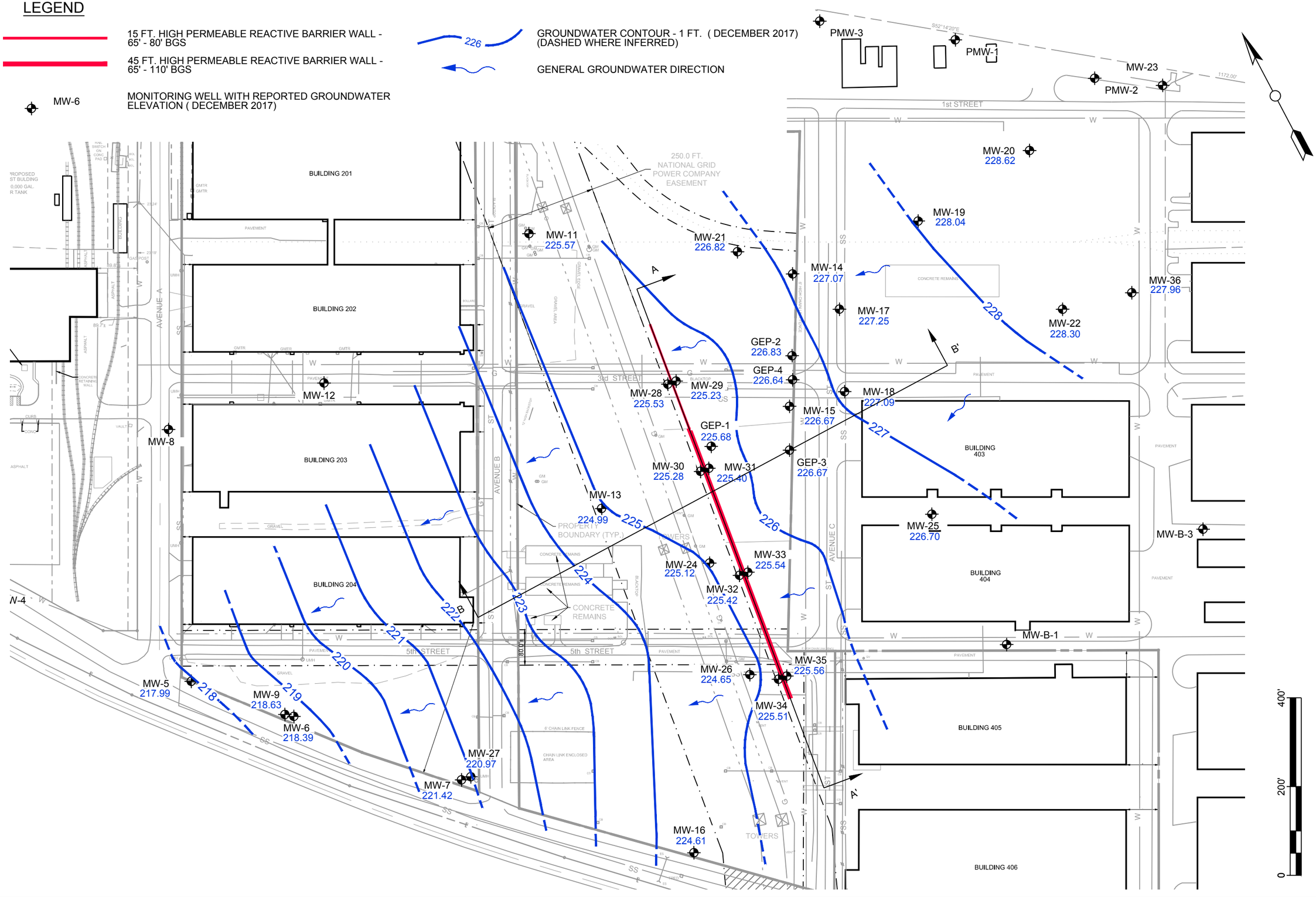
15 FT. HIGH PERMEABLE REACTIVE BARRIER WALL - 65' - 80' BGS

45 FT. HIGH PERMEABLE REACTIVE BARRIER WALL - 65' - 110' BGS

MW-6 — MONITORING WELL WITH REPORTED GROUNDWATER ELEVATION (DECEMBER 2017)

226 — GROUNDWATER CONTOUR - 1 FT. (DECEMBER 2017) (DASHED WHERE INFERRED)

GENERAL GROUNDWATER DIRECTION



POTENTIOMETRIC SITE MAP
DECEMBER 2017

AECOM

Figure: 3-1

US ARMY Corps of Engineers

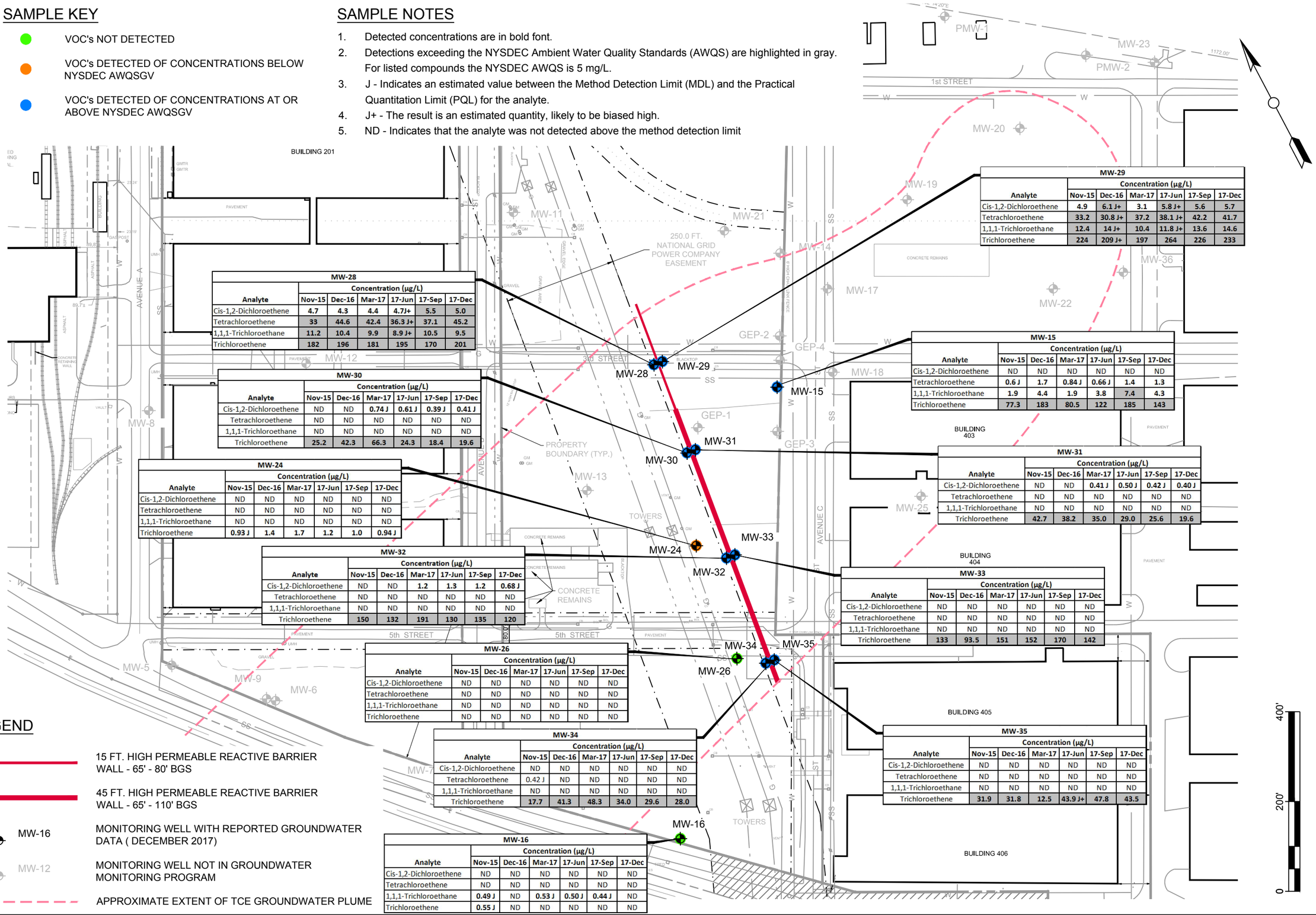
2017 4th QUARTER GROUNDWATER REPORT
DEFENSE NATIONAL STOCKPILE CENTER
SCOTIA DEPOT SITE - SCOTIA, NY
Project No.: 60440641 Date: January 2018

SAMPLE KEY

- VOC's NOT DETECTED
- VOC's DETECTED OF CONCENTRATIONS BELOW NYSDEC AWQSGV
- VOC's DETECTED OF CONCENTRATIONS AT OR ABOVE NYSDEC AWQSGV

SAMPLE NOTES

1. Detected concentrations are in bold font.
2. Detections exceeding the NYSDEC Ambient Water Quality Standards (AWQS) are highlighted in gray. For listed compounds the NYSDEC AWQS is 5 mg/L.
3. J - Indicates an estimated value between the Method Detection Limit (MDL) and the Practical Quantitation Limit (PQL) for the analyte.
4. J+ - The result is an estimated quantity, likely to be biased high.
5. ND - Indicates that the analyte was not detected above the method detection limit



MW-28

Analyte	Concentration (µg/L)					
	Nov-15	Dec-16	Mar-17	17-Jun	17-Sep	17-Dec
Cis-1,2-Dichloroethene	4.7	4.3	4.4	4.7J+	5.5	5.0
Tetrachloroethene	33	44.6	42.4	36.3 J+	37.1	45.2
1,1,1-Trichloroethane	11.2	10.4	9.9	8.9 J+	10.5	9.5
Trichloroethene	182	196	181	195	170	201

MW-29

Analyte	Concentration (µg/L)					
	Nov-15	Dec-16	Mar-17	17-Jun	17-Sep	17-Dec
Cis-1,2-Dichloroethene	4.9	6.1 J+	3.1	5.8 J+	5.6	5.7
Tetrachloroethene	33.2	30.8 J+	37.2	38.1 J+	42.2	41.7
1,1,1-Trichloroethane	12.4	14 J+	10.4	11.8 J+	13.6	14.6
Trichloroethene	224	209 J+	197	264	226	233

MW-30

Analyte	Concentration (µg/L)					
	Nov-15	Dec-16	Mar-17	17-Jun	17-Sep	17-Dec
Cis-1,2-Dichloroethene	ND	ND	0.74 J	0.61 J	0.39 J	0.41 J
Tetrachloroethene	ND	ND	ND	ND	ND	ND
1,1,1-Trichloroethane	ND	ND	ND	ND	ND	ND
Trichloroethene	25.2	42.3	66.3	24.3	18.4	19.6

MW-15

Analyte	Concentration (µg/L)					
	Nov-15	Dec-16	Mar-17	17-Jun	17-Sep	17-Dec
Cis-1,2-Dichloroethene	ND	ND	ND	ND	ND	ND
Tetrachloroethene	0.6 J	1.7	0.84 J	0.66 J	1.4	1.3
1,1,1-Trichloroethane	1.9	4.4	1.9	3.8	7.4	4.3
Trichloroethene	77.3	183	80.5	122	185	143

MW-24

Analyte	Concentration (µg/L)					
	Nov-15	Dec-16	Mar-17	17-Jun	17-Sep	17-Dec
Cis-1,2-Dichloroethene	ND	ND	ND	ND	ND	ND
Tetrachloroethene	ND	ND	ND	ND	ND	ND
1,1,1-Trichloroethane	ND	ND	ND	ND	ND	ND
Trichloroethene	0.93 J	1.4	1.7	1.2	1.0	0.94 J

MW-31

Analyte	Concentration (µg/L)					
	Nov-15	Dec-16	Mar-17	17-Jun	17-Sep	17-Dec
Cis-1,2-Dichloroethene	ND	ND	0.41 J	0.50 J	0.42 J	0.40 J
Tetrachloroethene	ND	ND	ND	ND	ND	ND
1,1,1-Trichloroethane	ND	ND	ND	ND	ND	ND
Trichloroethene	42.7	38.2	35.0	29.0	25.6	19.6

MW-32

Analyte	Concentration (µg/L)					
	Nov-15	Dec-16	Mar-17	17-Jun	17-Sep	17-Dec
Cis-1,2-Dichloroethene	ND	ND	1.2	1.3	1.2	0.68 J
Tetrachloroethene	ND	ND	ND	ND	ND	ND
1,1,1-Trichloroethane	ND	ND	ND	ND	ND	ND
Trichloroethene	150	132	191	130	135	120

MW-33

Analyte	Concentration (µg/L)					
	Nov-15	Dec-16	Mar-17	17-Jun	17-Sep	17-Dec
Cis-1,2-Dichloroethene	ND	ND	ND	ND	ND	ND
Tetrachloroethene	ND	ND	ND	ND	ND	ND
1,1,1-Trichloroethane	ND	ND	ND	ND	ND	ND
Trichloroethene	133	93.5	151	152	170	142

MW-26

Analyte	Concentration (µg/L)					
	Nov-15	Dec-16	Mar-17	17-Jun	17-Sep	17-Dec
Cis-1,2-Dichloroethene	ND	ND	ND	ND	ND	ND
Tetrachloroethene	ND	ND	ND	ND	ND	ND
1,1,1-Trichloroethane	ND	ND	ND	ND	ND	ND
Trichloroethene	ND	ND	ND	ND	ND	ND

MW-35

Analyte	Concentration (µg/L)					
	Nov-15	Dec-16	Mar-17	17-Jun	17-Sep	17-Dec
Cis-1,2-Dichloroethene	ND	ND	ND	ND	ND	ND
Tetrachloroethene	ND	ND	ND	ND	ND	ND
1,1,1-Trichloroethane	ND	ND	ND	ND	ND	ND
Trichloroethene	31.9	31.8	12.5	43.9 J+	47.8	43.5

MW-34

Analyte	Concentration (µg/L)					
	Nov-15	Dec-16	Mar-17	17-Jun	17-Sep	17-Dec
Cis-1,2-Dichloroethene	ND	ND	ND	ND	ND	ND
Tetrachloroethene	0.42 J	ND	ND	ND	ND	ND
1,1,1-Trichloroethane	ND	ND	ND	ND	ND	ND
Trichloroethene	17.7	41.3	48.3	34.0	29.6	28.0

MW-16

Analyte	Concentration (µg/L)					
	Nov-15	Dec-16	Mar-17	17-Jun	17-Sep	17-Dec
Cis-1,2-Dichloroethene	ND	ND	ND	ND	ND	ND
Tetrachloroethene	ND	ND	ND	ND	ND	ND
1,1,1-Trichloroethane	0.49 J	ND	0.53 J	0.50 J	0.44 J	ND
Trichloroethene	0.55 J	ND	ND	ND	ND	ND

LEGEND

- 15 FT. HIGH PERMEABLE REACTIVE BARRIER WALL - 65' - 80' BGS
- 45 FT. HIGH PERMEABLE REACTIVE BARRIER WALL - 65' - 110' BGS
- MW-16 — MONITORING WELL WITH REPORTED GROUNDWATER DATA (DECEMBER 2017)
- MW-12 — MONITORING WELL NOT IN GROUNDWATER MONITORING PROGRAM
- APPROXIMATE EXTENT OF TCE GROUNDWATER PLUME

0 200' 400'

AECOM

Figure: 3-2

GROUNDWATER RESULTS
QUARTERLY MONITORING LOCATIONS
DECEMBER 2017

US ARMY Corps of Engineers

2017 4th QUARTER GROUNDWATER REPORT
DEFENSE NATIONAL STOCKPILE CENTER
SCOTIA DEPOT SITE - SCOTIA, NY
Project No.: 60440641 Date: January 2018

TABLES

Table 2-2
Monitoring Well Sampling Schedule and Guidelines
The Defense National Stockpile Center Scotia Depot

Monitoring Well ID[1]	Rationale[2]	Sampling Frequency	Analytes[3]	Screen Interval (ft bgs)
MW-15	Upgradient	Quarterly for 2 years then anually	VOCs/MNA	65-80
MW-16	Outside Plume	Quarterly for 2 years then anually	VOCs/MNA	55-70
MW-24	Downgradient	Quarterly for 2 years then anually	VOCs/MNA	100-110
MW-26	Downgradient	Quarterly for 2 years then anually	VOCs/MNA	100-110
MW-28	Downgradient	Quarterly for 2 years then anually	VOCs/MNA	67-72
MW-29	Upgradient	Quarterly for 2 years then anually	VOCs/MNA	67-72
MW-30	Downgradient	Quarterly for 2 years then anually	VOCs/MNA	82-92
MW-31	Upgradient	Quarterly for 2 years then anually	VOCs/MNA	82-92
MW-32	Downgradient	Quarterly for 2 years then anually	VOCs/MNA	82-92
MW-33	Upgradient	Quarterly for 2 years then anually	VOCs/MNA	82-92
MW-34	Downgradient	Quarterly for 2 years then anually	VOCs/MNA	82-92
MW-35	Upgradient	Quarterly for 2 years then anually	VOCs/MNA	82-92
GEP-3	Upgradient	Annually	VOCs	59.6-74.6
MW-B-3	Outside Plume	Annually	VOCs	47.5-67.5
MW-5	Downgradient	Annually	VOCs	62.5-72.5
MW-6	Downgradient	Annually	VOCs	58.5-68.5
MW-7	Outside Plume	Annually	VOCs	61-71
MW-8	CT Plume	Annually	VOCs	66-76
MW-9	Downgradient	Annually	VOCs	110-120

Table 2-2
Monitoring Well Sampling Schedule and Guidelines
The Defense National Stockpile Center Scotia Depot

Monitoring Well ID[1]	Rationale[2]	Sampling Frequency	Analytes[3]	Screen Interval (ft bgs)
MW-11	CT Plume	Annually	VOCs	65-80
MW-12	CT Plume	Annually	VOCs	65-80
MW-14	Upgradient	Annually	VOCs	65-80
MW-17	Upgradient	Annually	VOCs	60-75
MW-18	Upgradient	Annually	VOCs	60-75
MW-19	Upgradient	Annually	VOCs	62-77
MW-20	Upgradient	Annually	VOCs	63-78
MW-22	Upgradient	Annually	VOCs	63-78
MW-23	Outside Plume	Annually	VOCs	63-78
MW-24	Downgradient	Annually	VOCs	90-100
MW-25	Upgradient	Annually	VOCs	65-75
MW-26	Downgradient	Annually	VOCs	100-110
MW-27	Downgradient	Annually	VOCs	100-110
MW-36	Upgradient	Annually	VOCs	70-80
GEP-2	Upgradient	Annually	VOCs	60.6-75.6
GEP-1	Upgradient	Annually	VOCs	59.6-74.6
GEP-4	Upgradient	Annually	VOCs	60.15-75.15

Notes:

[1] *2015 Compliance monitoring well

[2] Rationale: Upgradient of PRB wall; Downgradient of PRB wall; Outside of any plume; Within Carbon Tetrachloride (CT) plume

[3] Monitored natural attenuation (MNA) parameters include TOC (EPA SM 5310B), alkalinity (EPA SM 2320B), Chloride, nitrate, sulfate (EPA Method 300.0), and Dissolved Gases (Methane, ethane, and ethene; Method RSK 175).

Table 3-1
Groundwater Elevations Data
The Defense National Stockpile Center Scotia Depot
Fourth Quarter 2017 Status Report
AECOM Project 60440641

Well IDs	Screened Interval (ft bgs)	Ground Surface Elevation (ft)	Reference Point Elevation (ft)	Depth To Water (ft bgs) Q1 2017	Depth to Water (ft bgs) Q2 2017	Depth To Water (ft bgs) Q3 2017	Depth To Water (ft bgs) Q4 2017	Groundwater Elevation 2015	Groundwater Elevation 2016	Groundwater Elevation Q1 2017	Groundwater Elevation Q2 2017	Groundwater Elevation Q3 2017	Groundwater Elevation Q4 2017
B-1	48-68	-	287.14	-	57.34		-	227.74	-	-	**229.80**	-	-
B-3	47.5-67.5	-	287.05	-	-		-	227.95	-	-	-	-	-
MW-4	63.8-73.8	289.58	291.74	-	-		-	225.74	-	-	-	-	-
MW-5	62.5-72.5	287.95	290.11	70.50	63.82	64.00	72.12	225.75	219.29	219.61	**226.29**	**226.11**	**217.99**
MW-6	58.5-68.5	286.28	288.58	68.78	62.03	62.27	70.19	225.86	219.80	219.80	**226.55**	**226.31**	**218.39**
MW-7	61-71	286.8	289.26	68.47	61.96	61.95	67.84	226.28	223.16	220.79	**227.30**	**227.31**	**221.42**
MW-9	110-120	285.98	288.33	68.55	61.85	62.04	69.70	225.83	219.75	219.78	**226.48**	**226.29**	**218.63**
MW-10	65-80	290.94	293.15	-	-	-	-	228.24	-	-	-	-	-
MW-11	65-80	295.73	295.12	70.12	64.36	65.36	69.55	227.7	225.91	225.00	**230.76**	**229.76**	**225.57**
MW-13	65-80	292.62	293.85	69.90	64.25	64.40	68.86	227.32	225.43	223.95	**229.60**	**229.45**	**224.99**
MW-14	65-80	-	296.2	70.13	64.88	65.60	69.13	228.08	226.56	226.07	**231.32**	**230.60**	**227.07**
MW-15	65-80	-	293.67	68.35	63.07	63.49	67.00	227.8	226.27	225.32	**230.60**	**230.18**	**226.67**
MW-16	55-70	-	288.33	66.38	60.7	60.28	63.72	226.39	225.38	221.95	**227.63**	**228.05**	**224.61**
MW-17	60-75	-	295.24	69.25	64.09	64.66	67.99	228.08	226.55	225.99	**231.15**	**230.58**	**227.25**
MW-18	60-75	-	295.24	69.56	64.49	64.86	68.15	227.94	226.46	225.68	**230.75**	**230.38**	**227.09**
MW-19	62-77	-	297.67	70.54	65.74	66.42	69.63	228.43	226.85	227.13	**231.93**	**231.25**	**228.04**
MW-20	63-78	-	301.55	73.72	69.22	69.90	72.93	228.71	227.01	227.83	**232.33**	**231.65**	**228.62**
MW-21	57-72	-	296.52	70.55	65.19	65.40	69.70	228.06	226.50	225.97	**231.33**	**231.12**	**226.82**
MW-22	63-78	-	298.91	72.08	67.64	67.80	70.61	228.29	226.73	226.83	**231.27**	**231.11**	**228.30**
MW-23	63-78	-	300.54	72.14	67.98	68.55	-	228.9	227.06	228.40	**232.56**	**231.99**	-
MW-24	90-100	290.24	292.45	68.85	63.4	63.62	67.33	226.79	225.30	223.60	**229.05**	**228.83**	**225.12**
MW-25	65-75	288.16	290.26	65.44	60.61	60.57	63.56	227.16	225.82	224.82	**229.65**	**229.69**	**226.70**
MW-26	100-110	287.23	286.45	63.85	58.44	58.35	61.80	226.06	224.75	222.60	**228.01**	**228.10**	**224.65**
MW-27	100-110	286.08	288.32	68.67	61.89	62.00	67.35	225.5	223.44	219.65	**226.43**	**226.32**	**220.97**
MW-28	67-72	292.55	292.25	67.94	62.46	63.06	66.72	227.07	225.41	224.31	**229.79**	**229.19**	**225.53**
MW-29	67-72	292.50	292.13	67.80	62.31	62.94	66.90	227.05	225.38	224.33	**229.82**	**229.19**	**225.23**
MW-30	82-92	291.76	291.63	67.65	62.19	62.59	66.35	226.98	225.35	223.98	**229.44**	**229.04**	**225.28**
MW-31	82-92	291.80	291.54	67.42	62.02	62.43	66.14	226.95	225.40	224.12	**229.52**	**229.11**	**225.40**
MW-32	82-92	290.12	289.75	66.05	60.7	60.82	64.33	226.86	225.45	223.70	**229.05**	**228.93**	**225.42**
MW-33	82-92	290.27	289.91	66.11	60.8	60.86	64.37	226.89	225.51	223.80	**229.11**	**229.05**	**225.54**
MW-34	82-92	287.30	287.05	63.70	58.39	58.28	61.54	226.73	225.48	223.35	**228.66**	**228.77**	**225.51**
MW-35	82-92	287.25	286.96	63.56	58.28	58.15	61.40	226.69	225.46	223.40	**228.68**	**228.81**	**225.56**
MW-36	70-80	292.61	292.36	66.10	61.87	60.98	64.42	227.8	226.12	226.26	**230.49**	**231.38**	**227.94**
GEP-1	59.6-74.6	-	294.98	70.55	65.06	-	69.30	227.36	-	224.43	**229.92**	-	**225.68**
GEP-2	60.6-75.6	-	296.02	70.43	65.18	65.69	69.19	227.9	226.38	225.59	**230.84**	**230.33**	**226.83**
GEP-3	59.6-74.6	-	292.97	67.71	62.47	62.85	66.30	227.81	226.31	225.26	**230.50**	**230.12**	**226.67**
GEP-4	60.15-75.15	-	295.62	70.23	65.01	65.50	68.98	227.73	226.22	225.39	**230.61**	**230.12**	**226.64**

Analytes	NYSDEC Ambient Water Quality Standards and Guidance Value	MW-15						MW-16					
		11/9/2015	12/14/2016	3/22/2017	6/21/2017	9/28/2017	12/14/2017	11/11/2015	12/12/2016	3/20/2017	6/20/2017	9/25/2017	12/11/2017
		Upgradient						Outside Plume					
VOCs (µg/L)													
1,1,1,2-Tetrachloroethane	5	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U
1,1,1-Trichloroethane (1,1,1-TCA)	5	**1.9**	**4.4**	**1.9**	**3.8**	**7.4**	**4.3**	**0.49 J**	0.75 U	**0.53 J**	**0.50 J**	**0.44 J**	0.75 U
1,1,2,2-Tetrachloroethane	5	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U
1,1,2-Trichloroethane	1	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U
1,1-Dichloroethane (1,1-DCA)	5	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U
1,1-Dichloroethene (1,1-DCE)	5	0.75 U	**0.44 J**	0.75 U	0.75 U	**0.69 J**	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U
1,2-Dichloroethane (EDC)	0.6	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U
Carbon Tetrachloride	5	0.75 U	0.75 U	0.75 U	0.75 U	**0.45 J**	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 UJ
cis-1,2-Dichloroethene (cis-1,2-DCE)	5	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U
Tetrachloroethene (PCE; PERC)	5	**0.6 J**	**1.7**	**0.84 J**	**0.66 J**	**1.4**	**1.3**	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U
Toluene	5	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U
trans-1,2-Dichloroethene (trans-1,2-DCE)	5	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U
Trichloroethene (TCE)	5	**77.3**	**183**	**80.5**	**122**	**185**	**143**	**0.55 J**	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U
Vinyl Chloride (VC)	2	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U
MNA Parameters													
Alkalinity, Total (as $CaCO_3$) (mg/L)	NS	**182**	**212**	**201**	**217**	**229**	**216**	**248**	**312**	**317**	**322**	**480**	NA
Chloride (mg/L)	NS	**28.9**	**14.3**	**28.3**	**40.1**	**30.6**	**39.7**	**13.6**	**9.0**	**5.6**	**20.2**	**4.3**	**4.0**
Nitrate (mg/L)	NS	**0.58**	**0.56**	**0.90**	**0.52**	**0.58**	**0.60**	**1.6**	**1.6**	**2.1**	**3.7**	**1.4**	**1.1**
Sulfate (mg/L)	NS	**12.3**	**12.4**	**21.3**	**20.5**	**14.3**	**20.5**	**35.2**	**44.8**	**65.3**	**75.5**	**64.8**	**119**
Methane (µg/L)	NS	**0.19 J**	**0.21 J**	**0.21 J**	**0.25 J**	**0.21 J**	0.50 U	0.25 U	**0.14 J**	0.50 U	0.19 J	**0.23 J**	0.50 U
Ethane (µg/L)	NS	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
Ethene (µg/L)	NS	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U
Total Organic Carbon (mg/L)	NS	**0.55 J**	**0.57 J**	**0.47 J**	**0.21 J**	**0.59 J**	**0.33 J**	**3.6**	**0.96 J**	**1.1**	**0.67 J**	**0.64 J**	**0.9 J**
Field Parameters													
Turbidity (NTU)	NS	11.1	7.00	15.7	2.10	52.1	6.30	8.01	14.8	7.71	4.40	199	30.9
ORP (MeV)	NS	91.4	54.6	-0.6	114.6	92.8	16.6	137.6	139.9	115.9	298.7	82.2	94.5
Conductivity (mS/cm)	NS	0.358	0.250	0.387	0.487	0.709	0.416	0.361	0.388	0.436	0.486	0.928	0.596
Dissolved Oxygen (mg/L)	NS	31.45	8.04	6.37	4.90	9.22	8.38	22.27	9.50	10.40	10.82	9.81	10.30
Groundwater Elevation (ft)	NS	227.80	226.27	225.32	230.60	230.18	226.67	226.39	225.38	221.95	227.63	228.05	224.61

Notes:
MNA - Monitored Natural Attenuation
NS - No Standard
NA - Not Analyzed
Detected concentrations are in bold font.
Detections exceeding the NYSDEC Ambient Water Quality Standards (AWQS) are highlighted in gray.
J - Indicates an estimated value between the Method Detection Limit (MDL) and the Practical Quantitation Limit (PQL) for the analyte.
J+ - The result is an estimated quantity, likely to be biased high.
U - Indicates that the analyte was not detected (ND).
1 - TheTotal Alkalinity is titrated to a pH of 4.5 and reported as mg $CaCO_3$/L.
2 - Analyte was analyzed past the 48 hour holding time.
3 - The QC sample type DUP for method RSK 175 was outside the control limits for the analyte Methane. The RPD was reported as 23.8 and the upper contol limit is 20.

Analytes	NYSDEC Ambient Water Quality Standards and Guidance Value	MW-24						MW-26					
		11/10/2015	12/13/2016	3/21/2017	6/26/2017	9/26/2017	12/12/2017	11/17/2015	12/13/2016	3/21/2017	6/26/2017	9/25/2017	12/12/2017
		Downgradient						Downgradient					
VOCs (µg/L)													
1,1,1,2-Tetrachloroethane	5	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U
1,1,1-Trichloroethane (1,1,1-TCA)	5	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U
1,1,2,2-Tetrachloroethane	5	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U
1,1,2-Trichloroethane	1	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U
1,1-Dichloroethane (1,1-DCA)	5	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U
1,1-Dichloroethene (1,1-DCE)	5	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U
1,2-Dichloroethane (EDC)	0.6	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U
Carbon Tetrachloride	5	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 UJ	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 UJ
cis-1,2-Dichloroethene (cis-1,2-DCE)	5	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U
Tetrachloroethene (PCE; PERC)	5	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U
Toluene	5	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	**0.57 J**	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U
trans-1,2-Dichloroethene (trans-1,2-DCE)	5	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U
Trichloroethene (TCE)	5	**0.93 J**	**1.4**	**1.7**	**1.2**	**1.0**	**0.94 J**	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U
Vinyl Chloride (VC)	2	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U
MNA Parameters													
Alkalinity, Total (as $CaCO_3$) (mg/L)	NS	**168**	**198**	**205**	**195**	**282**	**352**	**204**	**197**	**196**	**223**	**317**	**204**
Chloride (mg/L)	NS	**36.3**	**38.5**	**59.0**	**41.0**	**110**	**155**	**45.2**	**44.9**	**53.4**	**133**	**86.2**	**56.7**
Nitrate (mg/L)	NS	**0.9**	0.06 U	0.06 U	**0.04 J**	0.06 U	0.06 U	0.06 U	**0.04 J**	0.06 U	**0.02 J**	0.06 U	0.06 U
Sulfate (mg/L)	NS	**15.5**	**21.4**	**24.1**	**22.1**	0.5 U	**0.48 J**	**25.1**	**24.6**	**29.4**	**20.9**	**5.9**	**25.7**
Methane (µg/L)	NS	**0.82**	**1.6**	**1.7**	**2.2**	**7.8**	**431**	**34.8**	**2.7**	**1.4 J**	**2.1**	**444**	**20.7**
Ethane (µg/L)	NS	**0.34 J**	0.50 U	0.50 U	0.50 U	**0.29 J**	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
Ethene (µg/L)	NS	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U
Total Organic Carbon (mg/L)	NS	**3.5**	**1.9**	**1.0 J**	**0.79 J**	**94.6**	**96.2**	**9.3**	**2.6**	**1.3 J**	**30.7**	**52.1**	**1.1**
Field Parameters													
Turbidity (NTU)	NS	9.33	13.9	16.3	35.2	88.37	2.8	68.3	21.8	31.9	0.4	60.96	57.38
ORP (MeV)	NS	-80.2	-93.2	-111.3	-108.6	-169.9	-83.1	-103.6	-28.9	-46.4	-26.9	-138.7	-173.0
Conductivity (mS/cm)	NS	0.327	0.570	0.438	0.365	1.396	0.841	0.324	0.590	0.469	0.630	1.347	4.256
Dissolved Oxygen (mg/L)	NS	0.94	0.44	0.55	1.20	0.30	0.15	0.00	0.33	0.27	0.62	0.33	0.66
Groundwater Elevation (ft)	NS	226.79	225.30	223.60	229.05	228.83	225.12	226.06	224.75	222.60	228.01	228.10	224.65

Notes:
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Detections exceeding the NYSDEC Ambient Water Quality Standards (AWQS) are highlighted in gray.
J - Indicates an estimated value between the Method Detection Limit (MDL) and the Practical Quantitation Limit (PQL) for the analyte.
J+ - The result is an estimated quantity, likely to be biased high.
U - Indicates that the analyte was not detected (ND).
1 - TheTotal Alkalinity is titrated to a pH of 4.5 and reported as mg $CaCO_3$/L.
2 - Analyte was analyzed past the 48 hour holding time.
3 - The QC sample type DUP for method RSK 175 was outside the control limits for the analyte Methane. The RPD was reported as 23.8 and the upper contol limit is 20.

Analytes	NYSDEC Ambient Water Quality Standards and Guidance Value	Confirmation Well Pair											
		MW-28						MW-29					
		12/1/2015	12/14/2016	3/22/2017	6/27/2017	9/27/2017	12/14/2017	12/1/2015	12/14/2016	3/22/2017	6/27/2017	9/27/2017	12/14/2017
		Downgradient						Upgradient					
VOCs (µg/L)													
1,1,1,2-Tetrachloroethane	5	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	3.8 U	0.75 U	0.75 U	0.75 U	0.75 U
1,1,1-Trichloroethane (1,1,1-TCA)	5	**11.2**	**10.4**	**9.9**	**8.9 J**	**10.5**	**9.5**	**12.4**	**14.0 J**	**10.4**	**11.8 J**	**13.6**	**14.6**
1,1,2,2-Tetrachloroethane	5	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	3.8 U	0.75 U	0.75 U	0.75 U	0.75 U
1,1,2-Trichloroethane	1	**0.46 J**	0.75 U	0.75 U	0.75 U	0.75 U	**0.33 J**	0.75 U	3.8 U	0.75 U	0.75 U	0.75 U	0.75 U
1,1-Dichloroethane (1,1-DCA)	5	**1.0**	**0.77 J**	**0.88 J**	**1.0 J**	**1.3**	**0.84 J**	**0.97 J**	3.8 U	**0.45 J**	**1.0 J**	**1.2**	**0.88 J**
1,1-Dichloroethene (1,1-DCE)	5	**0.53 J**	**0.43 J**	**0.53 J**	**0.38 J**	**0.76 J**	**0.45 J**	**0.68 J**	3.8 U	**0.55 J**	**0.63 J**	**0.99 J**	**0.96 J**
1,2-Dichloroethane (EDC)	0.6	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	3.8 U	0.75 U	0.75 U	0.75 U	0.75 U
Carbon Tetrachloride	5	**0.61 J**	0.75 U	**0.62 J**	0.75 U	**0.53 J**	**0.57 J**	0.75 U	3.8 U	**0.63 J**	0.75 U	**0.85 J**	**0.71 J**
cis-1,2-Dichloroethene (cis-1,2-DCE)	5	**4.7**	**4.3**	**4.4**	**4.7 J**	**5.5**	**5.0**	**4.9**	**6.1 J**	**3.1**	**5.8 J**	**5.6**	**5.7**
Tetrachloroethene (PCE; PERC)	5	**33**	**44.6**	**42.4**	**36.3 J**	**37.1**	**45.2**	**33.2**	**30.8 J**	**37.2**	**38.1 J**	**42.2**	**41.7**
Toluene	5	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	3.8 U	0.75 U	0.75 U	0.75 U	0.75 U
trans-1,2-Dichloroethene (trans-1,2-DCE)	5	0.75 U	**0.47 J**	**0.42 J**	**0.37 J**	**0.35 J**	**0.49 J**	0.75 U	3.8 U	**0.61 J**	**0.70 J**	**0.67 J**	**0.62 J**
Trichloroethene (TCE)	5	**182**	**196**	**181**	**195**	**170**	**201**	**224**	**209 J**	**197**	**264**	**226**	**233**
Vinyl Chloride (VC)	2	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	3.8 U	0.75 U	0.75 U	0.75 U	0.75 U
MNA Parameters													
Alkalinity, Total (as $CaCO_3$) (mg/L)	NS	**352**	**316**	**295**	**352**	**380**	**383**	**327**	**301**	**258**	**361**	**374**	**348**
Chloride (mg/L)	NS	**22.1**	**32.4**	**25.7**	**29.0**	**25.7**	**20.4**	**28.2**	**28.4**	**21.3**	**49.4**	**24.2**	**21.3**
Nitrate (mg/L)	NS	0.06 U	**0.06 J**	**0.44**	**1.5**	**0.18 J**	**1.2**	**0.1 J**	**0.26**	**0.52**	**1.3**	**0.12 J**	**0.86**
Sulfate (mg/L)	NS	**22.4**	**20.9**	**21.6**	**13.0**	**10.3**	**22.4**	**29.2**	**24.9**	**20.1**	**13.8**	**16.1**	**22.7**
Methane (µg/L)	NS	**3.4**	**3.0**	**0.94**	**1.0**	**0.37 J**	0.50 U	**13.9**	**0.62**	**1.1**	**0.20 J**	**0.21 J**	0.50 U
Ethane (µg/L)	NS	0.50 U	**3.6**	**1.0**	0.50 U	**0.45 J**	0.50 U	**0.81 J**	0.50 U	0.5 U	0.50	0.50 U	0.50 U
Ethene (µg/L)	NS	0.75 U	**1.3 J**	**1.9**	0.75 U	**0.72 J**	0.75 U	**0.59 J**	0.75 U	0.75 U	0.75	0.75 U	0.75 U
Total Organic Carbon (mg/L)	NS	**1.9**	**2.3**	**0.81 J**	**0.76 J**	**1.9**	**0.94 J**	**2.3**	**1.4**	**0.91 J**	**0.92 J**	**2.1**	**1.2**
Field Parameters													
Turbidity (NTU)	NS	209	1.5	2.07	-3	61.1	229.80	82.4	0.62	2.73	2.80	65.1	1.50
ORP (MeV)	NS	273	71.2	77.1	97.4	32.1	19.0	-25.1	60.9	46.1	120	41.7	33.7
Conductivity (mS/cm)	NS	0.324	0.366	0.520	0.554	1.044	0.564	0.325	0.354	0.424	0.619	1.058	0.559
Dissolved Oxygen (mg/L)	NS	6.75	3.94	5.2	7.59	4.3	8.45	4.29	6.17	9.26	7.12	6.46	8.65
Groundwater Elevation (ft)	NS	227.07	225.41	224.31	229.79	229.19	225.53	227.05	225.38	224.33	229.79	229.19	225.23

Notes:
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J+ - The result is an estimated quantity, likely to be biased high.
U - Indicates that the analyte was not detected (ND).
1 - TheTotal Alkalinity is titrated to a pH of 4.5 and reported as mg $CaCO_3$/L.
2 - Analyte was analyzed past the 48 hour holding time.
3 - The QC sample type DUP for method RSK 175 was outside the control limits for the analyte Methane. The RPD was reported as 23.8 and the upper contol limit is 20.

Analytes	NYSDEC Ambient Water Quality Standards and Guidance Value	Confirmation Well Pair											
		MW-30						MW-31					
		12/1/2015	12/13/2016	3/21/2017	6/26/2017	9/27/2017	12/13/2017	12/1/2015	12/14/2016	3/22/2017	6/26/2017	9/27/2017	12/13/2017
		Downgradient						Upgradient					
VOCs (µg/L)													
1,1,1,2-Tetrachloroethane	5	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U
1,1,1-Trichloroethane (1,1,1-TCA)	5	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U
1,1,2,2-Tetrachloroethane	5	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U
1,1,2-Trichloroethane	1	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U
1,1-Dichloroethane (1,1-DCA)	5	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U
1,1-Dichloroethene (1,1-DCE)	5	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U
1,2-Dichloroethane (EDC)	0.6	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U
Carbon Tetrachloride	5	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U
cis-1,2-Dichloroethene (cis-1,2-DCE)	5	0.75 U	0.75 U	**0.74 J**	**0.61 J**	**0.39 J**	**0.41 J**	0.75 U	0.75 U	**0.41 J**	**0.50 J**	**0.42 J**	**0.40 J**
Tetrachloroethene (PCE; PERC)	5	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U
Toluene	5	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U
trans-1,2-Dichloroethene (trans-1,2-DCE)	5	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U
Trichloroethene (TCE)	5	**25.2**	**42.3**	**66.3**	**24.3**	**18.4**	**19.6**	**42.7**	**38.2**	**35.0**	**29.0**	**25.6**	**19.6**
Vinyl Chloride (VC)	2	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U
MNA Parameters													
Alkalinity, Total (as $CaCO_3$) (mg/L)	NS	**143**	**319**	**210**	**154**	**104**	**347**	**178**	**222**	**381**	**150**	**132**	**119**
Chloride (mg/L)	NS	**38.4**	**182**	**136**	**49.6**	**35.3**	**87.3**	**41.9**	**56.6**	**98.5**	**31.0**	**31.7**	**36.3**
Nitrate (mg/L)	NS	0.06 U	0.06 U	0.06 U	0.06 U	0.06 U	0.06 U	0.06 U	0.06 U	**0.04 J**	**0.02 J**	0.06 U	0.06 U
Sulfate (mg/L)	NS	**35.9**	**2.9**	0.5 U	**0.32 J**	0.5 U	**0.22 J**	**26.3**	**10.9**	**2.6**	**5.6**	**5.6**	**7.8**
Methane (µg/L)	NS	**47.4**	**146**	**870**	**3210**	**3560**	**12900**	**20.7**	**3.5**	**106**	**56.5**	**29.1**	**59.4**
Ethane (µg/L)	NS	**4.7**	**5.4**	**23.5**	**36.7**	**39.7**	**40.5**	**2.2**	**1.5**	**10.1**	**2.7**	**2.6**	**3.3**
Ethene (µg/L)	NS	**2.2**	**3.3**	**9.1**	**12.7**	**8.5**	**4.2**	**0.91 J**	**0.84 J**	**4.7**	**3.2**	**2.3**	**1.9**
Total Organic Carbon (mg/L)	NS	**2.2**	**225**	**139**	**75.2**	**27.0**	**366**	**2.1**	**43.9**	**257**	**2.8**	**1.5**	**1.3**
Field Parameters													
Turbidity (NTU)	NS	58.2	3.55	3.82	3	69.1	16.1	51.7	8.03	11.4	4.60	8.60	8.62
ORP (MeV)	NS	-278.4	-166.3	-166.9	-173.3	-212.2	-170.1	-319.7	-163.1	-201.5	-283.2	-174.4	-208.0
Conductivity (mS/cm)	NS	0.210	1.410	0.740	0.320	0.412	0.758	0.243	0.348	0.850	0.280	0.526	0.294
Dissolved Oxygen (mg/L)	NS	3.70	0.29	0.17	0.48	0.06	0.80	1.29	0.28	0.22	0.70	0.13	0.19
Groundwater Elevation (ft)	NS	226.98	225.35	223.98	229.44	229.04	225.28	226.95	225.40	224.12	229.52	229.11	225.40

Notes:
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J+ - The result is an estimated quantity, likely to be biased high.
U - Indicates that the analyte was not detected (ND).
1 - TheTotal Alkalinity is titrated to a pH of 4.5 and reported as mg $CaCO_3$/L.
2 - Analyte was analyzed past the 48 hour holding time.
3 - The QC sample type DUP for method RSK 175 was outside the control limits for the analyte Methane. The RPD was reported as 23.8 and the upper contol limit is 20.

Analytes	NYSDEC Ambient Water Quality Standards and Guidance Value	Confirmation Well Pair											
		MW-32						MW-33					
		11/30/2015	12/13/2016	3/21/2017	6/26/2017	9/26/2017	12/13/2017	11/24/2015	12/14/2016	3/22/2017	6/26/2017	9/26/2017	12/13/2017
		Downgradient						Upgradient					
VOCs (µg/L)													
1,1,1,2-Tetrachloroethane	5	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U
1,1,1-Trichloroethane (1,1,1-TCA)	5	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U
1,1,2,2-Tetrachloroethane	5	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U
1,1,2-Trichloroethane	1	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U
1,1-Dichloroethane (1,1-DCA)	5	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U
1,1-Dichloroethene (1,1-DCE)	5	0.75 U	0.75 U	**0.40 J**	**0.48 J**	**0.60 J**	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U
1,2-Dichloroethane (EDC)	0.6	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U
Carbon Tetrachloride	5	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U
cis-1,2-Dichloroethene (cis-1,2-DCE)	5	0.75 U	0.75 U	**1.2**	**1.3**	**1.2**	**0.68 J**	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U
Tetrachloroethene (PCE; PERC)	5	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U
Toluene	5	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U
trans-1,2-Dichloroethene (trans-1,2-DCE)	5	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U
Trichloroethene (TCE)	5	**150**	**132**	**191**	**130**	**135**	**120**	**133**	**93.5**	**151**	**152**	**170**	**142**
Vinyl Chloride (VC)	2	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U
MNA Parameters													
Alkalinity, Total (as $CaCO_3$) (mg/L)	NS	**196**	**277**	**214**	**129**	**129**	**141**	**172**	**218**	**194**	**205**	**202**	**212**
Chloride (mg/L)	NS	**35.6**	**138**	**84.6**	**38.0**	**30.7**	**28.2**	**41.8**	**43.2**	**29.2**	**22.8**	**24.6**	**28.1**
Nitrate (mg/L)	NS	0.06 U	0.06 U	**0.02 J**	**0.02 J**	0.06 U	0.06 U	0.06 U	0.06 U	**0.32**	**0.32**	**0.30**	**0.32**
Sulfate (mg/L)	NS	**21.1**	**2.8**	**0.68 J**	**0.50 J**	**0.4 J**	**6.0**	**25.1**	**8.2**	**15.0**	**11.8**	**12.6**	**14.8**
Methane (µg/L)	NS	**6.8**	**16.5**	**309**	**817**	**835**	**233 J**	**64**	**3.4**	**9.2**	**16.0**	**17.8**	**7.2**
Ethane (µg/L)	NS	**0.5 J**	**1.5**	**19.3**	**35.9**	**29.4**	**5.6 J**	**7**	**0.25 J**	0.50 U	0.50 U	0.50 U	0.50 U
Ethene (µg/L)	NS	0.75 U	**1.8**	**10.3**	**15.6**	**5.4**	**2.3 J**	**3.6**	**0.48 J**	0.75 U	0.75 U	0.75 U	0.75 U
Total Organic Carbon (mg/L)	NS	**2.6**	**133**	**98.0**	**22.0**	**5.0**	**5.4 J**	**8.1**	**30.9**	**2.1**	**0.54 J**	**0.44 J**	**0.44 J**
Field Parameters													
Turbidity (NTU)	NS	180	5.92	4.01	5.10	3.91	5.11	23.1	9.31	11.7	3.40	51.2	6.38
ORP (MeV)	NS	-234.2	-107.7	-140.7	-238.7	-149.4	-181.9	-471.2	-126.8	-64.3	44.9	-3.2	-20.4
Conductivity (mS/cm)	NS	0.239	1.180	0.640	0.261	0.478	0.257	0.247	0.303	0.386	0.350	0.648	0.370
Dissolved Oxygen (mg/L)	NS	0.64	1.81	1.77	2.50	1.80	1.50	0.92	0.41	2.50	2.99	2.87	6.80
Groundwater Elevation (ft)	NS	226.86	225.45	223.70	229.05	228.93	225.42	226.89	225.51	223.80	229.11	229.05	225.54

Notes:
MNA - Monitored Natural Attenuation
NS - No Standard
NA - Not Analyzed
Detected concentrations are in bold font.
Detections exceeding the NYSDEC Ambient Water Quality Standards (AWQS) are highlighted in gray.
J - Indicates an estimated value between the Method Detection Limit (MDL) and the Practical Quantitation Limit (PQL) for the analyte.
J+ - The result is an estimated quantity, likely to be biased high.
U - Indicates that the analyte was not detected (ND).
1 - TheTotal Alkalinity is titrated to a pH of 4.5 and reported as mg $CaCO_3$/L.
2 - Analyte was analyzed past the 48 hour holding time.
3 - The QC sample type DUP for method RSK 175 was outside the control limits for the analyte Methane. The RPD was reported as 23.8 and the upper contol limit is 20.

Analytes	NYSDEC Ambient Water Quality Standards and Guidance Value	Confirmation Well Pair											
		MW-34						MW-35					
		11/24/2015	12/13/2016	3/21/2017	6/26/2017	9/26/2017	12/12/2017	11/24/2015	12/15/2016	3/22/2017	6/26/2017	9/26/2017	12/12/2017
		Downgradient						Upgradient					
VOCs (µg/L)													
1,1,1,2-Tetrachloroethane	5	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U
1,1,1-Trichloroethane (1,1,1-TCA)	5	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U
1,1,2,2-Tetrachloroethane	5	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U
1,1,2-Trichloroethane	1	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U
1,1-Dichloroethane (1,1-DCA)	5	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U
1,1-Dichloroethene (1,1-DCE)	5	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U
1,2-Dichloroethane (EDC)	0.6	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U
Carbon Tetrachloride	5	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 UJ	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 UJ
cis-1,2-Dichloroethene (cis-1,2-DCE)	5	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U
Tetrachloroethene (PCE; PERC)	5	**0.42 J**	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U
Toluene	5	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U
trans-1,2-Dichloroethene (trans-1,2-DCE)	5	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U
Trichloroethene (TCE)	5	**17.7**	**41.3**	**48.3**	**34.0**	**29.6**	**28.0**	**31.9**	**31.8**	**12.5**	**43.8 J**	**47.8**	**43.5**
Vinyl Chloride (VC)	2	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U
MNA Parameters													
Alkalinity, Total (as $CaCO_3$) (mg/L)	NS	**99**	**191**	**597**	**201**	**197**	**203**	**181**	**223**	**51**	**202**	**192**	**210**
Chloride (mg/L)	NS	**48.5**	**62.3**	**461**	**15.7**	**11.7**	**12.9**	**42.2**	**53.9**	**2.0**	**17.1**	**14.4**	**22.2**
Nitrate (mg/L)	NS	**0.56**	**0.06 J**	0.06 U	**0.04 J**	0.06 U	**0.02 J**	0.06 U	**0.04 J**	**0.14 J**	**0.66**	**0.6**	**0.44**
Sulfate (mg/L)	NS	**64.3**	**23.8**	**0.56 J**	**13.4**	**9.0**	**7.3**	**48.1**	**7.2**	**3.5**	**13.6**	**10.8**	**10.2**
Methane (µg/L)	NS	**14.5**	**1.2**	**1780**	**12.4**	**88.1**	**531**	**13.8**	**0.90**	**5.8**	**7.2**	**7.5**	**7.9**
Ethane (µg/L)	NS	**2.2**	0.50 U	**17.3**	0.50 U	**0.45 J**	**1.1**	**2.9**	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
Ethene (µg/L)	NS	**1.8**	0.75 U	**4.4**	0.75 U	**0.58 J**	0.75 U	**1.6**	0.75 U	**0.32 J**	0.75 U	0.75 U	0.75 U
Total Organic Carbon (mg/L)	NS	**5.9**	**12.0**	**631**	**3.3**	**3.8**	**4.1**	**7.7**	**18.3**	**1.4**	**0.75 J**	**0.68 J**	**0.56 J**
Field Parameters													
Turbidity (NTU)	NS	44.7	3.23	4.59	-4	4.40	4.20	381	5.99	16.3	38.2	31.91	13.81
ORP (MeV)	NS	-185.4	-8.4	-144.0	-139.4	-63.1	-133.4	-404	-167.9	-68.4	-10.6	30	0.40
Conductivity (mS/cm)	NS	0.361	0.630	2.280	0.332	0.578	0.310	0.287	0.329	0.078	0.324	0.599	0.338
Dissolved Oxygen (mg/L)	NS	6.9	1.12	0.12	0.46	0.62	2.70	0.79	0.41	6.63	3.67	4.58	4.84
Groundwater Elevation (ft)	NS	226.73	225.48	223.35	228.66	228.77	225.51	226.69	225.46	223.40	228.68	228.81	225.56

Notes:
MNA - Monitored Natural Attenuation
NS - No Standard
NA - Not Analyzed
Detected concentrations are in bold font.
Detections exceeding the NYSDEC Ambient Water Quality Standards (AWQS) are highlighted in gray.
J - Indicates an estimated value between the Method Detection Limit (MDL) and the Practical Quantitation Limit (PQL) for the analyte.
J+ - The result is an estimated quantity, likely to be biased high.
U - Indicates that the analyte was not detected (ND).
1 - TheTotal Alkalinity is titrated to a pH of 4.5 and reported as mg $CaCO_3$/L.
2 - Analyte was analyzed past the 48 hour holding time.
3 - The QC sample type DUP for method RSK 175 was outside the control limits for the analyte Methane. The RPD was reported as 23.8 and the upper contol limit is 20.

APPENDICES

APPENDIX A: Groundwater Sample Collection Field Forms

Monitoring Well Purging / Sampling Form

Project Name and Number: Scotia Navy Depot

Monitoring Well Number: MW-15 Date: 12/14/17

Samplers: Ross McCredy and Joe Scalo

Sample Number: MW-15 121417 QA/QC Collected? DUP-2 121417

Purging / Sampling Method: Bladder Pump/Low Flow

1. L = Well Depth:	65-80	81.74	feet
2. D = Riser Diameter (I.D.):		0.17	feet
3. W = Depth to Water:		67.00	feet
4. C = Column of Water in Well:		14.74	feet
5. V = Volume of Water in Well = C(3.14159)(0.5D)^2(7.48)		2.4	gal
6. 3(V) = Target Purge Volume		7.2	gal

D (inches)	D (feet)
1-inch	0.08
2-inch	0.17
3-inch	0.25
4-inch	0.33
6-inch	0.50

Conversion factors to determine V given C

D (inches)	1-inch	2-inch	3-inch	4-inch	6-inch
V (gal / ft)	0.041	0.163	0.37	0.65	1.5

Water Quality Readings Collected Using YSI Pro Plus/ Hach 2100Q

Parameter	Units	Readings					
Time	24 hr	1036	1041	1046	1051	1056	1101
Water Level (0.33)	feet	67.20	67.20	67.20	67.20	67.20	67.20
Volume Purged	gal	0	0.3	0.55	0.70	1.00	1.25
Flow Rate	mL/min	240	240	240	240	240	240
Turbidity (+/- 10%)	NTU	105.79	56.39	19.58	6.66	6.41	6.30
Dissolved Oxygen (+/- 10%)	%	77.6	77.1	75.9	75.4	75.0	75.4
Dissolved Oxygen (+/- 10%)	mg/L	8.87	8.64	8.47	8.36	8.36	8.38
Eh / ORP (+/- 10)	MeV	15.4	18.3	17.9	16.3	15.7	16.6
Specific Conductivity (+/- 3%)	mS/cm^c	558.7	569.5	577.6	575.9	576.6	574.6
Conductivity (+/- 3%)	mS/cm	392.6	408.8	416.7	417.5	417.2	416.1
pH (+/- 0.1)	pH unit	7.56	7.46	7.43	7.48	7.40	7.38
Temp (+/- 0.5)	C°	9.13	10.25	10.37	10.57	10.50	10.56
Color	Visual	clear	clear	clear	clear	clear	clear
Odor	Olfactory	None	None	None	None	NO	NO

Comments: Pump set @ ~ 73'

Sampled @ 1101

Monitoring Well Purging / Sampling Form

Project Name and Number: Scotia Navy Depot

Monitoring Well Number: MW-16 Date: 12/11/17

Samplers: Ross McCredy and Joe Scalo

Sample Number: MW-16 QA/QC Collected? No

Purging / Sampling Method: Bladder Pump/Low Flow

1. L = Well Depth:	55-70	69.50	feet
2. D = Riser Diameter (I.D.):		0.17	feet
3. W = Depth to Water:		63.72	feet
4. C = Column of Water in Well:		5.78	feet
5. V = Volume of Water in Well = C(3.14159)(0.5D)^2(7.48)		0.94	gal
6. 3(V) = Target Purge Volume		2.82	gal

D (inches)	D (feet)
1-inch	0.08
2-inch	0.17
3-inch	0.25
4-inch	0.33
6-inch	0.50

Conversion factors to determine V given C

D (inches)	1-inch	2-inch	3-inch	4-inch	6-inch
V (gal / ft)	0.041	0.163	0.37	0.65	1.5

Water Quality Readings Collected Using YSI Pro Plus/ Hach 2100Q

Parameter	Units	Readings						
Time	24 hr	1136	1141	1146	1208	1213	1220	1225
Water Level (0.33)	feet	63.75	63.78	63.74	63.79	63.79	63.79	63.79
Volume Purged	gal	0	0.10	0.20	0.30	0.40	0.50	0.90
Flow Rate	mL/min	200	200	200	200	200	200	200
Turbidity (+/- 10%)	NTU	32.57	295.10	653.12	14.16	58.68	45.09	31.93
Dissolved Oxygen (+/- 10%)	%	113.9	116.6	109.8	104.9	99.4	94.1	95.8
Dissolved Oxygen (+/- 10%)	mg/L	13.17	13.52	12.54	12.50	11.41	10.45	10.40
Eh / ORP (+/- 10)	MeV	215.9	-97.1	-85.6	-67.4	-60.3	-60.2	-60.1
Specific Conductivity (+/- 3%)	mS/cm[c]	812.14	805.7	804.6	810.1	794.4	812.8	814.7
Conductivity (+/- 3%)	mS/cm	562.0	556.6	564.1	533.8	549.8	588.2	591.3
pH (+/- 0.1)	pH unit	8.86	7.97	7.71	7.33	7.18	7.17	7.17
Temp (+/- 0.5)	C°	8.74	8.74	9.39	7.16	8.92	10.53	10.60
Color	Visual	clear	clear	clear	clear	clear	clear	clear
Odor	Olfactory	NO	NO	NO	NO	NO	NO	NO

Comments:

Pump set @ 66.61

Monitoring Well Purging / Sampling Form

Project Name and Number: Scotia Navy Depot

Monitoring Well Number: MW-16 Date: 12/11/17

Samplers: Ross McCredy and Joe Scalo

Sample Number: MW-16 12117 QA/QC Collected? No

Purging / Sampling Method: Bladder Pump/Low Flow

1. L = Well Depth:	(See pro)	feet
2. D = Riser Diameter (I.D.):	0.17	feet
3. W = Depth to Water:		feet
4. C = Column of Water in Well:		feet
5. V = Volume of Water in Well = $C(3.14159)(0.5D)^2(7.48)$		gal
6. 3(V) = Target Purge Volume		gal

D (inches)	D (feet)
1-inch	0.08
2-inch	0.17
3-inch	0.25
4-inch	0.33
6-inch	0.50

Conversion factors to determine V given C

D (inches)	1-inch	2-inch	3-inch	4-inch	6-inch
V (gal / ft)	0.041	0.163	0.37	0.65	1.5

Water Quality Readings Collected Using YSI Pro Plus/ Hach 2100Q

Parameter	Units	Readings						
Time	24 hr	1230	1235	1240	1245			
Water Level (0.33)	feet	63.79	63.79	63.78	63.79			
Volume Purged	gal	1.30	1.70	3.10	3.5			
Flow Rate	mL/min	300	300	300	350			
Turbidity (+/- 10%)	NTU	26.59	26.70	28.60	30.91			
Dissolved Oxygen (+/- 10%)	%	93.3	93.3	93.2	93.1			
Dissolved Oxygen (+/- 10%)	mg/L	10.39	10.35	10.28	10.30			
Eh / ORP (+/- 10)	MeV	100.5	97.6	94.9	94.5			
Specific Conductivity (+/- 3%)	mS/cm[c]	817.6	814.7	816.8	819.1			
Conductivity (+/- 3%)	mS/cm	591.8	591.2	595.1	595.7			
pH (+/- 0.1)	pH unit	7.16	7.12	7.10	7.10			
Temp (+/- 0.5)	C°	10.52	10.62	10.71	10.68			
Color	Visual	clear	clear	clear	Clear			
Odor	Olfactory	No	No	No	No			

Comments: Sampled @ 1245

Monitoring Well Purging / Sampling Form

Project Name and Number: Scotia Navy Depot

Monitoring Well Number: MW-24 Date: 12/12/17

Samplers: Ross McCredy and Joe Scalo

Sample Number: MW-24 121217 QA/QC Collected? –

Purging / Sampling Method: Bladder Pump/Low Flow

1. L = Well Depth:	100-110	103.40	feet
2. D = Riser Diameter (I.D.):		0.17	feet
3. W = Depth to Water:	101'	67.35	feet
4. C = Column of Water in Well:		36.06	feet
5. V = Volume of Water in Well = C(3.14159)(0.5D)^2(7.48)		5.87	gal
6. 3(V) = Target Purge Volume		17.61	gal

D (inches)	D (feet)
1-inch	0.08
2-inch	0.17
3-inch	0.25
4-inch	0.33
6-inch	0.50

Conversion factors to determine V given C

D (inches)	1-inch	2-inch	3-inch	4-inch	6-inch
V (gal / ft)	0.041	0.163	0.37	0.65	1.5

Water Quality Readings Collected Using ~~YSI Pro Plus/ Hach 2100Q~~ EXO$_2$

Parameter	Units	Readings							
Time	24 hr	1332	1337	1342	1347	1352	1357	1402	1407
Water Level (0.33)	feet	67.40	67.40	67.40	67.40	67.40	67.40	67.40	67.40
Volume Purged	gal	0	0.3	0.5	0.75	1.05	1.35	1.50	1.70
Flow Rate	mL/min	275	275	275	275	275	275	275	275
Turbidity (+/- 10%)	NTU	8.54	10.00	8.92	6.35	4.85	4.04	2.60	2.80
Dissolved Oxygen (+/- 10%)	%	30.2	8.7	3.4	2.3	2.0	1.8	1.7	1.5
Dissolved Oxygen (+/- 10%)	mg/L	3.48	1.00	0.38	0.26	0.22	0.19	0.17	0.15
Eh / ORP (+/- 10)	MeV	-159.1	-172.5	-181.0	-184.2	-186.3	-186.2	-186.1	-193.1
Specific Conductivity (+/- 3%)	mS/cm^c	755.6	912.1	1012.0	1100	1142	1160.2	1170.1	1180.3
Conductivity (+/- 3%)	mS/cm	526.1	645.3	725.6	790.1	822.5	838.6	840.1	841.1
pH (+/- 0.1)	pH unit	7.42	7.35	7.33	7.32	7.32	7.31	7.30	7.29
Temp (+/- 0.5)	C°	9.18	9.80	10.22	10.34	10.31	10.21	10.19	10.15
Color	Visual	clear	clear	Clear	clear	clear	clear	clear	clear
Odor	Olfactory	None	None	None	None	None	None	None	None

Comments:

Pump set @ 101'

Sampled @ 1412

Monitoring Well Purging / Sampling Form

Project Name and Number: Scotia Navy Depot

Monitoring Well Number: MW-26 Date: 12/12/17

Samplers: Ross McCredy and Joe Scalo

Sample Number: MW-26 121217 QA/QC Collected? DUP-1 121217

Purging / Sampling Method: Bladder Pump/Low Flow

1. L = Well Depth:	100-110	103.40	feet
2. D = Riser Diameter (I.D.):	101	0.17	feet
3. W = Depth to Water:	~98	63.62	feet
4. C = Column of Water in Well:		39.78	feet
5. V = Volume of Water in Well = C(3.14159)(0.5D)^2(7.48)		6.48	gal
6. 3(V) = Target Purge Volume		19.45	gal

D (inches)	D (feet)
1-inch	0.08
2-inch	0.17
3-inch	0.25
4-inch	0.33
6-inch	0.50

Conversion factors to determine V given C

D (inches)	1-inch	2-inch	3-inch	4-inch	6-inch
V (gal / ft)	0.041	0.163	0.37	0.65	1.5

Water Quality Readings Collected Using YSI Pro Plus/ Hach 2100Q

Parameter	Units	Readings						
Time	24 hr	826	831	836	841	846	851	856
Water Level (0.33)	feet	61.90	61.90	61.90	61.90	61.90	61.90	61.90
Volume Purged	gal	0	0.25	0.50	0.70	0.90	1.00	1.26
Flow Rate	mL/min	200	150	150	150	160	160	160
Turbidity (+/- 10%)	NTU	23.95	39.90	56.73	64.41	81.68	86.02	89.37
Dissolved Oxygen (+/- 10%)	%	118.3	115.6	103.3	87.0	73.1	61.3	44.2
Dissolved Oxygen (+/- 10%)	mg/L	14.65	13.97	12.31	10.31	8.59	7.21	5.18
Eh / ORP (+/- 10)	MeV	-142.2	-12.4	-17.7	-106.2	-100.4	-97.5	-93.1
Specific Conductivity (+/- 3%)	mS/cm^c	395.5	388.3	409.8	459.2	507.1	538.1	570.1
Conductivity (+/- 3%)	mS/cm	244.8	255.9	274.1	310.6	345.6	364.8	390.9
pH (+/- 0.1)	pH unit	8.45	8.48	8.28	8.14	8.01	7.97	7.86
Temp (+/- 0.5)	C°	5.60	7.22	7.76	8.15	8.34	8.27	8.47
Color	Visual	Clear	clear	clear	Clear	clear	clear	clear
Odor	Olfactory	None	None	None	None	None	None	None

Comments:

Monitoring Well Purging / Sampling Form

Project Name and Number: Scotia Navy Depot

Monitoring Well Number: MW-26 Date: 12/12/17

Samplers: Ross McCredy and Joe Scalo

Sample Number: MW-26 121217 QA/QC Collected? DUP-1 121217

Purging / Sampling Method: Bladder Pump/Low Flow

1. L = Well Depth:	(see prev)	feet	
2. D = Riser Diameter (I.D.):	0.17	feet	
3. W = Depth to Water:		feet	
4. C = Column of Water in Well:		feet	
5. V = Volume of Water in Well = $C(3.14159)(0.5D)^2(7.48)$		gal	
6. 3(V) = Target Purge Volume		gal	

D (inches)	D (feet)
1-inch	0.08
2-inch	0.17
3-inch	0.25
4-inch	0.33
6-inch	0.50

Conversion factors to determine V given C

D (inches)	1-inch	2-inch	3-inch	4-inch	6-inch
V (gal / ft)	0.041	0.163	0.37	0.65	1.5

Water Quality Readings Collected Using YSI Pro Plus/ Hach 2100Q

Parameter	Units	Readings					
Time	24 hr	901	906	911	916	921	926
Water Level (0.33)	feet	61.90	61.90	61.90	61.90	61.98	61.98
Volume Purged	gal	1.40	1.60	1.80	2.20	2.40	2.60
Flow Rate	mL/min	160	160	160	160	160	160
Turbidity (+/- 10%)	NTU	90.76	57.17	57.96	56.20	56.47	57.38
Dissolved Oxygen (+/- 10%)	%	35.2	24.9	17.7	8.4	7.1	6.9
Dissolved Oxygen (+/- 10%)	mg/L	4.13	2.90	2.07	0.97	0.69	0.66
Eh / ORP (+/- 10)	MeV	-135.8	-148.0	-155.0	-160.3	-171.6	-173.0
Specific Conductivity (+/- 3%)	mS/cm[c]	581.7	593.2	597.1	607.1	613.3	613.5
Conductivity (+/- 3%)	mS/cm	398.2	407.9	413.0	422.1	425.6	425.6
pH (+/- 0.1)	pH unit	7.82	7.77	7.74	7.68	7.65	7.65
Temp (+/- 0.5)	C°	8.50	8.69	8.80	9.00	8.99	8.97
Color	Visual	clear	clear	clear	clear	clear	clear
Odor	Olfactory	None	None	None	None	None	None

Comments: Sampled @ 926

Monitoring Well Purging / Sampling Form

Project Name and Number: Scotia Navy Depot

Monitoring Well Number: MW-28 Date: 12/14/17

Samplers: Ross McCredy and Joe Scalo

Sample Number: MW-28 121417 QA/QC Collected? No

Purging / Sampling Method: Bladder Pump/Low Flow

1. L = Well Depth:	67-72	71.07	feet
2. D = Riser Diameter (I.D.):		0.17	feet
3. W = Depth to Water:		66.72	feet
4. C = Column of Water in Well:		4.35	feet
5. V = Volume of Water in Well = C(3.14159)(0.5D)^2(7.48)		0.71	gal
6. 3(V) = Target Purge Volume		2.13	gal

D (inches)	D (feet)
1-inch	0.08
2-inch	0.17
3-inch	0.25
4-inch	0.33
6-inch	0.50

Conversion factors to determine V given C

D (inches)	1-inch	2-inch	3-inch	4-inch	6-inch
V (gal / ft)	0.041	0.163	0.37	0.65	1.5

Water Quality Readings Collected Using YSI Pro Plus/ Hach 2100Q

Parameter	Units	Readings					
Time	24 hr	900	905	910	915	920	925
Water Level (0.33)	feet	66.15	66.15	66.14	66.15	66.15	66.15
Volume Purged	gal	0	0.4	0.8	1.2	1.4	1.8
Flow Rate	mL/min	240	240	240	240	240	240
Turbidity (+/- 10%)	NTU	~~240~~ 144	205.2	224.1	225.10	223.09	229.8
Dissolved Oxygen (+/- 10%)	%	87.1	76.2	75.5	75.2	74.7	75.1
Dissolved Oxygen (+/- 10%)	mg/L	10.00	8.64	8.47	8.47	8.40	8.45
Eh / ORP (+/- 10)	MeV	-1.4	11.7	14.2	17.1	18.2	19.0
Specific Conductivity (+/- 3%)	mS/cm^c	779.8	784.8	788.8	792.4	787.9	790.2
Conductivity (+/- 3%)	mS/cm	544.0	559.0	562.1	565.0	563.3	564.1
pH (+/- 0.1)	pH unit	7.54	7.38	7.31	7.21	7.18	7.15
Temp (+/- 0.5)	C°	9.24	9.73	10.18	10.12	10.08	10.11
Color	Visual	cloudy	cloudy	clear	clear	clear	clear
Odor	Olfactory	None	None	None	None	None	None

Comments: set pump @ ~69'

Sampled @ 925

Monitoring Well Purging / Sampling Form

Project Name and Number: Scotia Navy Depot

Monitoring Well Number: MW-29 Date: 12/14/17

Samplers: Ross McCredy and Joe Scalo

Sample Number: MW-29 121417 QA/QC Collected? -

Purging / Sampling Method: Bladder Pump/Low Flow

1. L = Well Depth:	67.72 71.84	feet
2. D = Riser Diameter (I.D.):	0.17	feet
3. W = Depth to Water:	66.90	feet
4. C = Column of Water in Well:	4.94	feet
5. V = Volume of Water in Well = C(3.14159)(0.5D)^2(7.48)	0.81	gal
6. 3(V) = Target Purge Volume	2.41	gal

D (inches)	D (feet)
1-inch	0.08
2-inch	0.17
3-inch	0.25
4-inch	0.33
6-inch	0.50

Conversion factors to determine V given C

D (inches)	1-inch	2-inch	3-inch	4-inch	6-inch
V (gal / ft)	0.041	0.163	0.37	0.65	1.5

Water Quality Readings Collected Using YSI Pro Plus/ Hach 2100Q

Parameter	Units	Readings						
Time	24 hr	950	955	1000	1005	1010		
Water Level (0.33)	feet	66.92	66.92	66.92	66.92	66.92		
Volume Purged	gal	0	0.4	0.8	1.2	1.6		
Flow Rate	mL/min	250	250	250	250	250		
Turbidity (+/- 10%)	NTU	19.60	11.01	3.89	1.54	1.50		
Dissolved Oxygen (+/- 10%)	%	78.9	77.4	77.5	77.2	77.5		
Dissolved Oxygen (+/- 10%)	mg/L	9.00	8.79	8.73	8.67	8.65		
Eh / ORP (+/- 10)	MeV	25.1	29.9	30.9	32.1	33.7		
Specific Conductivity (+/- 3%)	mS/cm^c	768.6	778.2	782.3	780.5	777.0		
Conductivity (+/- 3%)	mS/cm	539.6	550.5	557.6	560.1	559.2		
pH (+/- 0.1)	pH unit	7.30	7.15	7.07	7.03	7.01		
Temp (+/- 0.5)	C°	9.35	9.68	9.96	10.19	10.39		
Color	Visual	clear	clear	clear	clear	clear		
Odor	Olfactory	None	No	NO	NO	NO		

Comments: set pump @ 69'

Sampled @ 1010

Monitoring Well Purging / Sampling Form

Project Name and Number: Scotia Navy Depot

Monitoring Well Number: MW-30 Date: 12/13/17

Samplers: Ross McCredy and Joe Scalo

Sample Number: MW-30 121317 QA/QC Collected? NO

Purging / Sampling Method: Bladder Pump/Low Flow

1. L = Well Depth:	91.30	feet
2. D = Riser Diameter (I.D.):	0.17	feet
3. W = Depth to Water:	66.35	feet
4. C = Column of Water in Well:	24.95	feet
5. V = Volume of Water in Well = $C(3.14159)(0.5D)^2(7.48)$	4.06	gal
6. 3(V) = Target Purge Volume	12.2	gal

D (inches)	D (feet)
1-inch	0.08
2-inch	0.17
3-inch	0.25
4-inch	0.33
6-inch	0.50

Conversion factors to determine V given C

D (inches)	1-inch	2-inch	3-inch	4-inch	6-inch
V (gal / ft)	0.041	0.163	0.37	0.65	1.5

Water Quality Readings Collected Using YSI Pro Plus/ Hach 2100Q

Parameter	Units	Readings								
Time	24 hr	1034	1039	1050	1055	1100	1105	1110	1115	
Water Level (0.33)	feet	66.66	66.60	66.60	66.6	66.6	66.6	66.6	66.6	6
Volume Purged	gal	0	2.5	3.0	3.25	3.31	3.50	3.75	4.00	4
Flow Rate	mL/min	~~125.8~~	220	220	220	220	220	220	220	2
Turbidity (+/- 10%)	NTU	125.9	120.1	21.3	16.3	16.1	17.7	~~55.5~~ 16.9	16.1	1
Dissolved Oxygen (+/- 10%)	%	107.1	106.2	99.8	109.7	109.3	~~106.0 58.1~~	6 ~~2.6~~ 7.2	7.1	6
Dissolved Oxygen (+/- 10%)	mg/L	12.2	11.96	11.07	12.28	12.30	~~8.61 12.34~~	~~10.82~~	0.80	0
Eh / ORP (+/- 10)	MeV	-157.6	-162.4	-165.5	-161.8	-162.0	-159.4	-161.4	-170.1	-
Specific Conductivity (+/- 3%)	mS/cm[c]	379.4	6465	895.6	1053.7	1066.4	1099	1051.4	1063.4	1
Conductivity (+/- 3%)	mS/cm	264.4	460.4	628.6	754.1	762.2	763.3	760.3	758.1	76
pH (+/- 0.1)	pH unit	7.87	7.64	7.52	7.48	7.43	7.44	7.50	7.41	7
Temp (+/- 0.5)	C°	9.45	9.95	9.77	10.08	10.08	10.11	10.01	10.10	10.
Color	Visual	cloudy	Clear	clear	clear	Clear	Clear	Clear	clear	cl
Odor	Olfactory	Sulfur	Sulfur	Sulfur	Sulfur	Sulfur	Sulfur	Sulfur	Sulfur	Su

Comments: Set pump @ 87'

- water very bubbly in flow-thru cell & out of tubing, replaced bladder, ~~started~~ help much did Sampled @ ~~1145~~ 1120

Monitoring Well Purging / Sampling Form

Project Name and Number: Scotia Navy Depot

Monitoring Well Number: MW-31 Date: 12/13/17

Samplers: Ross McCredy and Joe Scalo

Sample Number: MW-31 121317 QA/QC Collected? NO

Purging / Sampling Method: Bladder Pump/Low Flow

1. L = Well Depth:	82-91.60	91.60	feet
2. D = Riser Diameter (I.D.):		0.17	feet
3. W = Depth to Water:		66.14	feet
4. C = Column of Water in Well:		25.46	feet
5. V = Volume of Water in Well = $C(3.14159)(0.5D)^2(7.48)$		4.15	gal
6. 3(V) = Target Purge Volume		12.45	gal

D (inches)	D (feet)
1-inch	0.08
2-inch	0.17
3-inch	0.25
4-inch	0.33
6-inch	0.50

Conversion factors to determine V given C

D (inches)	1-inch	2-inch	3-inch	4-inch	6-inch
V (gal / ft)	0.041	0.163	0.37	0.65	1.5

Water Quality Readings Collected Using YSI Pro Plus/ Hach 2100Q

Parameter	Units	Readings					
Time	24 hr	1150	1155	1200	1205	1210	1215
Water Level (0.33)	feet	66.42	66.42	66.42	66.42	66.42	66.42
Volume Purged	gal	0	0.25	0.41	0.55	0.70	1.00
Flow Rate	mL/min	220	220	220	220	220	220
Turbidity (+/- 10%)	NTU	8.26	10.71	8.46	9.02	8.72	8.62
Dissolved Oxygen (+/- 10%)	%	29.1	10.5	3.6	2.4	2.2	1.9
Dissolved Oxygen (+/- 10%)	mg/L	3.46	1.22	0.41	0.28	0.22	0.19
Eh / ORP (+/- 10)	MeV	-173.4	-190.3	-200.1	-202.7	-208.0	-208.8
Specific Conductivity (+/- 3%)	mS/cm^c	417.5	412.9	413.4	412.5	419.1	420.8
Conductivity (+/- 3%)	mS/cm	284.7	288.9	290.9	291.4	294.4	293.9
pH (+/- 0.1)	pH unit	7.97	7.80	7.72	7.70	7.69	7.68
Temp (+/- 0.5)	C°	8.28	9.20	9.50	9.60	9.43	9.23
Color	Visual	clear	clear	clear	clear	clear	clear
Odor	Olfactory	None	NO	NO	NO	NO	NO

Comments:

set pump @ 87'

sampled @ 1215

Monitoring Well Purging / Sampling Form

Project Name and Number: Scotia Navy Depot

Monitoring Well Number: MW-32 Date: 12/18/17

Samplers: Ross McCredy and Joe Scalo

Sample Number: MW-32 121317 QA/QC Collected? No

Purging / Sampling Method: Bladder Pump/Low Flow

1. L = Well Depth:	82-92	91.55	feet
2. D = Riser Diameter (I.D.):		0.17	feet
3. W = Depth to Water:		64.33	feet
4. C = Column of Water in Well:		27.22	feet
5. V = Volume of Water in Well = $C(3.14159)(0.5D)^2(7.48)$		4.44	gal
6. 3(V) = Target Purge Volume		13.31	gal

D (inches)	D (feet)
1-inch	0.08
2-inch	0.17
3-inch	0.25
4-inch	0.33
6-inch	0.50

Conversion factors to determine V given C

D (inches)	1-inch	2-inch	3-inch	4-inch	6-inch
V (gal / ft)	0.041	0.163	0.37	0.65	1.5

Water Quality Readings Collected Using YSI Pro Plus/ Hach 2100Q

Parameter	Units	Readings						
Time	24 hr	821	826	831	836	841		
Water Level (0.33)	feet	64.81	64.81	64.80	64.80	64.80		
Volume Purged	gal	0	0.3	0.8	1.4	1.6		
Flow Rate	mL/min	170	190	225	225	225		
Turbidity (+/- 10%)	NTU	20.14	7.16	5.31	5.32	5.11		
Dissolved Oxygen (+/- 10%)	%	66.7	9.2	12.1	12.4	13.1		
Dissolved Oxygen (+/- 10%)	mg/L	7.98	1.05	1.38	1.41	1.50		
Eh / ORP (+/- 10)	MeV	-151.3	-183.5	-181.7	-181.7	-181.9		
Specific Conductivity (+/- 3%)	mS/cm[c]	320.3	316.9	345.1	355.8	361.1		
Conductivity (+/- 3%)	mS/cm	218.8	221.8	250.1	250.8	256.3		
pH (+/- 0.1)	pH unit	7.49	7.36	7.40	7.41	7.43		
Temp (+/- 0.5)	C°	7.94	9.29	9.55	9.49	9.78		
Color	Visual	clear	Clear	clear	clear	clear		
Odor	Olfactory	~~clear~~ NO	NO	NO	NO	NO		

Comments:

Pump Set @ ~87'

Sampled @ 841

Monitoring Well Purging / Sampling Form

Project Name and Number: Scotia Navy Depot

Monitoring Well Number: MW-33 Date: 12/13/17

Samplers: Ross McCredy and Joe Scalo

Sample Number: MW-33 121317 QA/QC Collected? —

Purging / Sampling Method: Bladder Pump/Low Flow

1. L = Well Depth:		92.33	feet
2. D = Riser Diameter (I.D.):	82-92	0.17	feet
3. W = Depth to Water:		64.37	feet
4. C = Column of Water in Well:		27.96	feet
5. V = Volume of Water in Well = C(3.14159)(0.5D)^2(7.48)		4.56	gal
6. 3(V) = Target Purge Volume		13.67	gal

D (inches)	D (feet)
1-inch	0.08
2-inch	0.17
3-inch	0.25
4-inch	0.33
6-inch	0.50

Conversion factors to determine V given C

D (inches)	1-inch	2-inch	3-inch	4-inch	6-inch
V (gal / ft)	0.041	0.163	0.37	0.65	1.5

Water Quality Readings Collected Using YSI Pro Plus/ Hach 2100Q

Parameter	Units	Readings					
Time	24 hr	1015	1020	1030	1035	940	945
Water Level (0.33)	feet	64.38	64.38	64.38	64.38	64.38	64.38
Volume Purged	gal	0	0.30	0.90	1.3	1.7	2.0
Flow Rate	mL/min	150	150	150	150	150	150
Turbidity (+/- 10%)	NTU	6.80	7.38	6.67	6.62	6.40	6.38
Dissolved Oxygen (+/- 10%)	%	32.8	46.1	58.3	60.0	60.9	60.9
Dissolved Oxygen (+/- 10%)	mg/L	3.77	5.24	6.58	6.70	6.80	6.80
Eh / ORP (+/- 10)	MeV	-44.4	-38.8	-27.2	-23.3	-20.8	-20.4
Specific Conductivity (+/- 3%)	mS/cm^c	506.9	509.0	511.6	512.6	514.1	514.3
Conductivity (+/- 3%)	mS/cm	354.0	357.5	364.8	368.5	370.4	370.4
pH (+/- 0.1)	pH unit	7.41	7.43	7.48	7.50	7.52	7.53
Temp (+/- 0.5)	C°	9.20	9.32	9.98	10.32	10.37	10.48
Color	Visual	clear	clear	clear	clear	clear	clear
Odor	Olfactory	None	None	NO	NO	NO	NO

Comments: Set pump @ ~87'

Sampled @ 945

Monitoring Well Purging / Sampling Form

Project Name and Number: Scotia Navy Depot

Monitoring Well Number: MW-34 Date: 12/12/17

Samplers: Ross McCredy and Joe Scalo

Sample Number: MW-34 12/12/17 QA/QC Collected? N

Purging / Sampling Method: Bladder Pump/Low Flow

82-92

1. L = Well Depth:	88.10	feet
2. D = Riser Diameter (I.D.):	0.17	feet
3. W = Depth to Water:	61.54	feet
4. C = Column of Water in Well:	26.56	feet
5. V = Volume of Water in Well = $C(3.14159)(0.5D)^2(7.48)$	4.33	gal
6. 3(V) = Target Purge Volume	13.0	gal

D (inches)	D (feet)
1-inch	0.08
2-inch	0.17
3-inch	0.25
4-inch	0.33
6-inch	0.50

Conversion factors to determine V given C

D (inches)	1-inch	2-inch	3-inch	4-inch	6-inch
V (gal / ft)	0.041	0.163	0.37	0.65	1.5

Water Quality Readings Collected Using YSI Pro Plus/ Hach 2100Q

Parameter	Units	Readings						
Time	24 hr	1021	1026	1031	1036	1041	1046	1051
Water Level (0.33)	feet	61.80	61.80	61.80	61.80	61.80	61.80	61.80
Volume Purged	gal	0	0.19	0.40	0.60	1.02	1.50	1.70
Flow Rate	mL/min	160	160	160	160	160	160	160
Turbidity (+/- 10%)	NTU	20.60	12.95	6.77	4.46	4.48	4.31	4.20
Dissolved Oxygen (+/- 10%)	%	36.6	14.2	10.9	15.2	22.2	23.4	24.1
Dissolved Oxygen (+/- 10%)	mg/L	4.27	1.60	1.21	1.67	2.46	2.61	2.70
Eh / ORP (+/- 10)	MeV	-129.8	-145.7	-148.9	-142.3	-136.8	-133.6	-133.4
Specific Conductivity (+/- 3%)	mS/cm^c	335.5	378.9	429.0	431.1	428.5	425.3	425.2
Conductivity (+/- 3%)	mS/cm	236.1	271.7	310.1	313.8	311.6	310.0	310.0
pH (+/- 0.1)	pH unit	7.63	7.57	7.53	7.49	7.45	7.40	7.40
Temp (+/- 0.5)	C°	9.46	10.05	10.60	10.73	10.72	10.80	10.78
Color	Visual	clear	clear	clear	clear	clear	clear	clear
Odor	Olfactory	None	None	None	None	None	None	None

Comments: Pump set @ 85'

Sampled @ 1051

Monitoring Well Purging / Sampling Form

Project Name and Number: Scotia Navy Depot

Monitoring Well Number: MW-35 Date: 12/12/17

Samplers: Ross McCredy and Joe Scalo

Sample Number: MW-35 121217 QA/QC Collected? MS/MSD

Purging / Sampling Method: Bladder Pump/Low Flow

1. L = Well Depth:	92.34	feet
2. D = Riser Diameter (I.D.):	0.17	feet
3. W = Depth to Water:	61.40	feet
4. C = Column of Water in Well:	30.94	feet
5. V = Volume of Water in Well = C(3.14159)(0.5D)^2(7.48)	5.04	gal
6. 3(V) = Target Purge Volume	15.12	gal

82-92

D (inches)	D (feet)
1-inch	0.08
2-inch	0.17
3-inch	0.25
4-inch	0.33
6-inch	0.50

Conversion factors to determine V given C

D (inches)	1-inch	2-inch	3-inch	4-inch	6-inch
V (gal / ft)	0.041	0.163	0.37	0.65	1.5

Water Quality Readings Collected Using YSI Pro Plus/ Hach 2100Q

Parameter	Units	Readings						
Time	24 hr	1124	1129	1134	1139	1144	1149	1154
Water Level (0.33)	feet	61.50	61.50	61.50	61.50	61.50	61.50	61.50
Volume Purged	gal	0	0.20	0.40	0.60	0.90	1.40	1.70
Flow Rate	mL/min	180	180	180	180	180	180	180
Turbidity (+/- 10%)	NTU	33.29	32.48	27.96	21.83	15.81	14.10	13.81
Dissolved Oxygen (+/- 10%)	%	54.4	45.5	44.0	43.3	43.8	43.2	43.7
Dissolved Oxygen (+/- 10%)	mg/L	6.21	5.10	4.92	4.82	4.85	4.78	4.84
Eh / ORP (+/- 10)	MeV	-11.8	-3.0	-1.5	-0.5	-0.7	-0.7	0.4
Specific Conductivity (+/- 3%)	mS/cm^c	386.5	438.6	448.4	453.3	458.1	461.4	464.5
Conductivity (+/- 3%)	mS/cm	272.6	314.9	323.7	328.8	333.1	335.7	338.1
pH (+/- 0.1)	pH unit	7.31	7.42	7.45	7.46	7.45	7.45	7.44
Temp (+/- 0.5)	C°	9.67	10.25	10.42	10.63	10.71	10.74	10.75
Color	Visual	clear	clear	clear	clear	clear	clear	clear
Odor	Olfactory	None	None	None	NO	NO	NO	NO

Comments: Pump set @ ~87'

Sampled @ 1154

APPENDIX B: Field Calibration Forms

Calibration Log

Date:	12/11/17	Time:	1100		Instrument:		EXO2
					270.7		220
	PH_1	4.25	->	3.99	ORP	~~N/A~~	-> ~~N/A~~
	PH_2	7.13	->	7.00	Cond.	1422	-> 1413
	PH_3	9.75	->	10.01	Turb.	N/A	-> N/A
Date:	12/12/17	Time:	800		Instrument:		EXO2
	PH_1	4.12	->	4.00	ORP	236.1	-> 220.0
	PH_2	9.78	->	10.01	Cond.	1400	-> 1413
	PH_3	7.16	->	7.00	Turb.	N/A	-> N/A
Date:	12/13/17	Time:	730		Instrument:		EXO2
	PH_1	4.10	->	4.00	ORP	242.7	-> 220.1
	PH_2	7.31	->	7.01	Cond.	1449	-> 1413
	PH_3	10.11	->	10.02	Turb.	N/A	-> N/A
Date:	12/14/17	Time:			Instrument:		
	PH_1	4.20	->	4.01	ORP	244.7	-> 220.3
	PH_2	7.12	->	7.00	Cond.	1460	-> 1417
	PH_3	9.79	->	10.02	Turb.	N/A	-> N/A
Date:		Time:			Instrument:		
	PH_1		->		ORP		->
	PH_2		->		Cond.		->
	PH_3		->		Turb.		->
Date:		Time:			Instrument:		
	PH_1		->		ORP		->
	PH_2		->		Cond.		->
	PH_3		->		Turb.		->

Appendix C – Hydraulic Gradient and Velocity Calculations

December 2017 Quarterly Monitoring Report
The Defense National Stockpile Center Scotia Depot
Appendix C Hydraulic Gradient and Velocity Calculations

Hydraulic Gradient Calculation

$$hydraulic\ gradient = \frac{change\ in\ groundwater\ elevation}{change\ in\ distance} = \frac{\Delta h}{\Delta L}$$

Dec 2017 Data		GW Elevation (ft)	Delta Elevation (ft)	Delta Distance (ft)	Gradient	Average Gradient (ft/ft)
Pair 1	MW-25	226.7	2.05	540	0.003796	**0.003997**
	MW-26	224.65				
Pair 2	GEP-3	226.67	1.68	420	0.004	
	MW-13	224.99				
Pair 3	MW-17	227.25	1.72	410	0.004195	
	MW-28	225.53				

Groundwater Darcy Velocity

$$Darcy\ Velocty = K \times hydraulic\ gradient = K \times \frac{\Delta h}{\Delta L}$$

Low Hydraulic Conductivity (K) (ft/day)	15.66
High Hydraulic Conductivity (K) (ft/day)	193.8

Darcy Velocity Low (ft/day)	0.06
Darcy Velocity High (ft/day)	0.77

Seepage Velocity

$$\text{Seepage } Velocty = \frac{K \times hydraulic\ gradient}{n} = \frac{Darcy\ Velocity}{n}$$

Porosity (n)	0.4

Seepage Velocity Low (ft/day)	**0.16**
Seepage Velocity High (ft/day)	**1.94**

APPENDIX D: Laboratory Reports

ALS Environmental

34 Dogwood Lane ▪ Middletown, PA 17057 ▪ Phone: 717-944-5541 ▪ Fax: 717-944-1430 ▪ www.alsglobal.com

NELAP Certifications: NJ PA010 , NY 11759 , PA 22-293 DoD ELAP: A2LA 0818.01
State Certifications: DE ID 11 , MA PA0102 , MD 128 , VA 460157 , WV 343

December 27, 2017

Mr. John Santacroce
AECOM - LATHAM NY
40 British American Blvd.
Albany, NY 12210

Certificate of Analysis

Project Name:	**2015-SCOTIA NAVY DEPOT-PO 60440641**	Workorder:	**2282785**
Purchase Order:	**66432/60440641.11**	Workorder ID:	**ANL005|60440641**

Dear Mr. Santacroce:

Enclosed are the analytical results for samples received by the laboratory on Wednesday, December 13, 2017.

The ALS Environmental laboratory in Middletown, Pennsylvania is a National Environmental Laboratory Accreditation Program (NELAP) accredited laboratory and as such, certifies that all applicable test results meet the requirements of NELAP.

If you have any questions regarding this certificate of analysis, please contact Mrs. Vanessa N Badman (Project Coordinator) at (717) 944-5541.

Analyses were performed according to our laboratory's NELAP-approved quality assurance program and any applicable state requirements. The test results meet requirements of the current NELAP standards or state requirements, where applicable. For a specific list of accredited analytes, refer to the certifications section of the ALS website at www.alsglobal.com/en/Our-Services/Life-Sciences/Environmental/Downloads.

ALS Spring City: 10 Riverside Drive, Spring City, PA 19475 610-948-4903

CC: Ms. Kelly Lurie , Mr. Scott Underhill

This page is included as part of the Analytical Report and must be retained as a permanent record thereof.

Vanessa N. Badman
Mrs. Vanessa N Badman
Project Coordinator

ALS Environmental

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State Certifications: DE ID 11 , MA PA0102 , MD 128 , VA 460157 , WV 343

SAMPLE SUMMARY

Workorder: 2282785 ANL005|60440641

Lab ID	Sample ID	Matrix	Date Collected	Date Received	Collected By
2282785001	MW-20 121217	Ground Water	12/12/2017 09:26	12/13/2017 09:13	Collected by Client
2282785002	DUP-1 121217	Ground Water	12/12/2017 00:00	12/13/2017 09:13	Collected by Client
2282785003	EB-1 121217	Ground Water	12/12/2017 10:01	12/13/2017 09:13	Collected by Client
2282785004	MW-34 121217	Ground Water	12/12/2017 10:51	12/13/2017 09:13	Collected by Client
2282785005	MW-35 121217	Ground Water	12/12/2017 11:54	12/13/2017 09:13	Collected by Client
2282785006	MW-24 121217	Ground Water	12/12/2017 14:12	12/13/2017 09:13	Collected by Client

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SAMPLE SUMMARY

Workorder: 2282785 ANL005|60440641

Notes

-- Samples collected by ALS personnel are done so in accordance with the procedures set forth in the ALS Field Sampling Plan (20 - Field Services Sampling Plan).
-- All Waste Water analyses comply with methodology requirements of 40 CFR Part 136.
-- All Drinking Water analyses comply with methodology requirements of 40 CFR Part 141.
-- Unless otherwise noted, all quantitative results for soils are reported on a dry weight basis.
-- The Chain of Custody document is included as part of this report.
-- All Library Search analytes should be regarded as tentative identifications based on the presumptive evidence of the mass spectra. Concentrations reported are estimated values.
-- Parameters identified as "analyze immediately" require analysis within 15 minutes of collection. Any "analyze immediately" parameters not listed under the header "Field Parameters" are preformed in the laboratory and are therefore analyzed out of hold time.
-- Method references listed on this report beginning with the prefix "S" followed by a method number (such as S2310B-97) refer to methods from "Standard Methods for the Examination of Water and Wastewater".
-- For microbiological analyses, the "Prepared" value is the date/time into the incurbator and the "Analyzed" value is the date/time out the incubator.

Standard Acronyms/Flags

J	Indicates an estimated value between the Method Detection Limit (MDL) and the Practical Quantitation Limit (PQL) for the analyte
U	Indicates that the analyte was Not Detected (ND)
N	Indicates presumptive evidence of the presence of a compound
MDL	Method Detection Limit
PQL	Practical Quantitation Limit
RDL	Reporting Detection Limit
ND	Not Detected - indicates that the analyte was Not Detected at the RDL
Cntr	Analysis was performed using this container
RegLmt	Regulatory Limit
LCS	Laboratory Control Sample
MS	Matrix Spike
MSD	Matrix Spike Duplicate
DUP	Sample Duplicate
%Rec	Percent Recovery
RPD	Relative Percent Difference
LOD	DoD Limit of Detection
LOQ	DoD Limit of Quantitation
DL	DoD Detection Limit
I	Indicates reported value is greater than or equal to the Method Detection Limit (MDL) but less than the Report Detection Limit (RDL)
(S)	Surrogate Compound
NC	Not Calculated
*	Result outside of QC limits

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ANALYTICAL RESULTS

Workorder: 2282785 ANL005|60440641

Lab ID: **2282785001** Date Collected: 12/12/2017 09:26 Matrix: Ground Water

Sample ID: **MW-20 121217** Date Received: 12/13/2017 09:13

Parameters	Results	Flag	Units	LOQ	LOD	DL	Method	Prepared By	Analyzed	By	Cntr
VOLATILE ORGANICS											
Carbon Tetrachloride	0.75U	U	ug/L	1.0	0.75	0.33	SW846 8260C		12/20/17 03:31	CJG	A
1,1-Dichloroethane	0.75U	U	ug/L	1.0	0.75	0.33	SW846 8260C		12/20/17 03:31	CJG	A
1,2-Dichloroethane	0.75U	U	ug/L	1.0	0.75	0.33	SW846 8260C		12/20/17 03:31	CJG	A
1,1-Dichloroethene	0.75U	U	ug/L	1.0	0.75	0.33	SW846 8260C		12/20/17 03:31	CJG	A
cis-1,2-Dichloroethene	0.75U	U	ug/L	1.0	0.75	0.33	SW846 8260C		12/20/17 03:31	CJG	A
trans-1,2-Dichloroethene	0.75U	U	ug/L	1.0	0.75	0.33	SW846 8260C		12/20/17 03:31	CJG	A
1,1,1,2-Tetrachloroethane	0.75U	U	ug/L	1.0	0.75	0.33	SW846 8260C		12/20/17 03:31	CJG	A
1,1,2,2-Tetrachloroethane	0.75U	U	ug/L	1.0	0.75	0.33	SW846 8260C		12/20/17 03:31	CJG	A
Tetrachloroethene	0.75U	U	ug/L	1.0	0.75	0.33	SW846 8260C		12/20/17 03:31	CJG	A
Toluene	0.75U	U	ug/L	1.0	0.75	0.33	SW846 8260C		12/20/17 03:31	CJG	A
1,1,1-Trichloroethane	0.75U	U	ug/L	1.0	0.75	0.33	SW846 8260C		12/20/17 03:31	CJG	A
1,1,2-Trichloroethane	0.75U	U	ug/L	1.0	0.75	0.33	SW846 8260C		12/20/17 03:31	CJG	A
Trichloroethene	0.75U	U	ug/L	1.0	0.75	0.33	SW846 8260C		12/20/17 03:31	CJG	A
Vinyl Chloride	0.75U	U	ug/L	1.0	0.75	0.33	SW846 8260C		12/20/17 03:31	CJG	A
Surrogate Recoveries	*Results*	*Flag*	*Units*	*Limits*			*Method*	*Prepared By*	*Analyzed*	*By*	*Cntr*
1,2-Dichloroethane-d4 (S)	108		%	81 - 118			SW846 8260C		12/20/17 03:31	CJG	A
4-Bromofluorobenzene (S)	108		%	85 - 114			SW846 8260C		12/20/17 03:31	CJG	A
Dibromofluoromethane (S)	99.9		%	80 - 119			SW846 8260C		12/20/17 03:31	CJG	A
Toluene-d8 (S)	106		%	89 - 112			SW846 8260C		12/20/17 03:31	CJG	A
LIGHT HYDROCARBON GASES											
Ethane	0.50U	U	ug/L	1.0	0.50	0.25	RSK 175		12/19/17 02:03	EGO	D
Ethene	0.75U	U	ug/L	1.5	0.75	0.31	RSK 175		12/19/17 02:03	EGO	D
Methane	20.7		ug/L	0.50	0.25	0.13	RSK 175		12/19/17 02:03	EGO	D
WET CHEMISTRY											
Alkalinity, Total	204	1	mg/L	5	5	0.8	S2320B-97		12/15/17 00:51	MSA	I
Chloride	56.7		mg/L	2.0	0.50	0.16	EPA 300.0		12/14/17 06:01	CHW	I
Nitrate-N	0.060U	U	mg/L	0.20	0.060	0.020	EPA 300.0		12/14/17 06:01	CHW	I
Sulfate	25.7		mg/L	2.0	0.50	0.20	EPA 300.0		12/14/17 06:01	CHW	I
Total Organic Carbon (TOC)	1.1		mg/L	1.0	0.50	0.18	S5310B-00		12/18/17 10:42	PAG	G

Vanessa N. Badman

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Project Coordinator

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State Certifications: DE ID 11 , MA PA0102 , MD 128 , VA 460157 , WV 343

ANALYTICAL RESULTS

Workorder: 2282785 ANL005|60440641

Lab ID: **2282785002** Date Collected: 12/12/2017 00:00 Matrix: Ground Water

Sample ID: **DUP-1 121217** Date Received: 12/13/2017 09:13

Parameters	Results	Flag	Units	LOQ	LOD	DL	Method	Prepared By	Analyzed	By	Cntr
VOLATILE ORGANICS											
Carbon Tetrachloride	0.75U	U	ug/L	1.0	0.75	0.33	SW846 8260C		12/20/17 03:53	CJG	A
1,1-Dichloroethane	0.75U	U	ug/L	1.0	0.75	0.33	SW846 8260C		12/20/17 03:53	CJG	A
1,2-Dichloroethane	0.75U	U	ug/L	1.0	0.75	0.33	SW846 8260C		12/20/17 03:53	CJG	A
1,1-Dichloroethene	0.75U	U	ug/L	1.0	0.75	0.33	SW846 8260C		12/20/17 03:53	CJG	A
cis-1,2-Dichloroethene	0.75U	U	ug/L	1.0	0.75	0.33	SW846 8260C		12/20/17 03:53	CJG	A
trans-1,2-Dichloroethene	0.75U	U	ug/L	1.0	0.75	0.33	SW846 8260C		12/20/17 03:53	CJG	A
1,1,1,2-Tetrachloroethane	0.75U	U	ug/L	1.0	0.75	0.33	SW846 8260C		12/20/17 03:53	CJG	A
1,1,2,2-Tetrachloroethane	0.75U	U	ug/L	1.0	0.75	0.33	SW846 8260C		12/20/17 03:53	CJG	A
Tetrachloroethene	0.75U	U	ug/L	1.0	0.75	0.33	SW846 8260C		12/20/17 03:53	CJG	A
Toluene	0.75U	U	ug/L	1.0	0.75	0.33	SW846 8260C		12/20/17 03:53	CJG	A
1,1,1-Trichloroethane	0.75U	U	ug/L	1.0	0.75	0.33	SW846 8260C		12/20/17 03:53	CJG	A
1,1,2-Trichloroethane	0.75U	U	ug/L	1.0	0.75	0.33	SW846 8260C		12/20/17 03:53	CJG	A
Trichloroethene	0.75U	U	ug/L	1.0	0.75	0.33	SW846 8260C		12/20/17 03:53	CJG	A
Vinyl Chloride	0.75U	U	ug/L	1.0	0.75	0.33	SW846 8260C		12/20/17 03:53	CJG	A
Surrogate Recoveries	*Results*	*Flag*	*Units*	*Limits*			*Method*	*Prepared By*	*Analyzed*	*By*	*Cntr*
1,2-Dichloroethane-d4 (S)	107		%	81 - 118			SW846 8260C		12/20/17 03:53	CJG	A
4-Bromofluorobenzene (S)	110		%	85 - 114			SW846 8260C		12/20/17 03:53	CJG	A
Dibromofluoromethane (S)	98.3		%	80 - 119			SW846 8260C		12/20/17 03:53	CJG	A
Toluene-d8 (S)	104		%	89 - 112			SW846 8260C		12/20/17 03:53	CJG	A
LIGHT HYDROCARBON GASES											
Ethane	0.50U	U	ug/L	1.0	0.50	0.25	RSK 175		12/19/17 01:24	EGO	D
Ethene	0.75U	U	ug/L	1.5	0.75	0.31	RSK 175		12/19/17 01:24	EGO	D
Methane	20.8		ug/L	0.50	0.25	0.13	RSK 175		12/19/17 01:24	EGO	D
WET CHEMISTRY											
Alkalinity, Total	212	1	mg/L	5	5	0.8	S2320B-97		12/15/17 01:02	MSA	H
Chloride	50.8		mg/L	2.0	0.50	0.16	EPA 300.0		12/14/17 07:22	CHW	H
Nitrate-N	0.060U	U	mg/L	0.20	0.060	0.020	EPA 300.0		12/14/17 07:22	CHW	H
Sulfate	24.2		mg/L	2.0	0.50	0.20	EPA 300.0		12/14/17 07:22	CHW	H
Total Organic Carbon (TOC)	1.1		mg/L	1.0	0.50	0.18	S5310B-00		12/18/17 10:42	PAG	F

Vanessa N. Badman

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ANALYTICAL RESULTS

Workorder: 2282785 ANL005|60440641

Lab ID: **2282785003** Date Collected: 12/12/2017 10:01 Matrix: Ground Water

Sample ID: **EB-1 121217** Date Received: 12/13/2017 09:13

Parameters	Results	Flag	Units	LOQ	LOD	DL	Method	Prepared By	Analyzed	By	Cntr
VOLATILE ORGANICS											
Carbon Tetrachloride	0.75U	U	ug/L	1.0	0.75	0.33	SW846 8260C		12/20/17 02:25	CJG	A
1,1-Dichloroethane	0.75U	U	ug/L	1.0	0.75	0.33	SW846 8260C		12/20/17 02:25	CJG	A
1,2-Dichloroethane	0.75U	U	ug/L	1.0	0.75	0.33	SW846 8260C		12/20/17 02:25	CJG	A
1,1-Dichloroethene	0.75U	U	ug/L	1.0	0.75	0.33	SW846 8260C		12/20/17 02:25	CJG	A
cis-1,2-Dichloroethene	0.75U	U	ug/L	1.0	0.75	0.33	SW846 8260C		12/20/17 02:25	CJG	A
trans-1,2-Dichloroethene	0.75U	U	ug/L	1.0	0.75	0.33	SW846 8260C		12/20/17 02:25	CJG	A
1,1,1,2-Tetrachloroethane	0.75U	U	ug/L	1.0	0.75	0.33	SW846 8260C		12/20/17 02:25	CJG	A
1,1,2,2-Tetrachloroethane	0.75U	U	ug/L	1.0	0.75	0.33	SW846 8260C		12/20/17 02:25	CJG	A
Tetrachloroethene	0.75U	U	ug/L	1.0	0.75	0.33	SW846 8260C		12/20/17 02:25	CJG	A
Toluene	0.75U	U	ug/L	1.0	0.75	0.33	SW846 8260C		12/20/17 02:25	CJG	A
1,1,1-Trichloroethane	0.75U	U	ug/L	1.0	0.75	0.33	SW846 8260C		12/20/17 02:25	CJG	A
1,1,2-Trichloroethane	0.75U	U	ug/L	1.0	0.75	0.33	SW846 8260C		12/20/17 02:25	CJG	A
Trichloroethene	0.75U	U	ug/L	1.0	0.75	0.33	SW846 8260C		12/20/17 02:25	CJG	A
Vinyl Chloride	0.75U	U	ug/L	1.0	0.75	0.33	SW846 8260C		12/20/17 02:25	CJG	A

Surrogate Recoveries	*Results*	*Flag*	*Units*	*Limits*	*Method*	*Prepared By*	*Analyzed*	*By*	*Cntr*
1,2-Dichloroethane-d4 (S)	105		%	81 - 118	SW846 8260C		12/20/17 02:25	CJG	A
4-Bromofluorobenzene (S)	110		%	85 - 114	SW846 8260C		12/20/17 02:25	CJG	A
Dibromofluoromethane (S)	98.9		%	80 - 119	SW846 8260C		12/20/17 02:25	CJG	A
Toluene-d8 (S)	106		%	89 - 112	SW846 8260C		12/20/17 02:25	CJG	A

Vanessa N. Badman

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ANALYTICAL RESULTS

Workorder: 2282785 ANL005|60440641

Lab ID: **2282785004** Date Collected: 12/12/2017 10:51 Matrix: Ground Water

Sample ID: **MW-34 121217** Date Received: 12/13/2017 09:13

Parameters	Results	Flag	Units	LOQ	LOD	DL	Method	Prepared By	Analyzed	By	Cntr
VOLATILE ORGANICS											
Carbon Tetrachloride	0.75U	U	ug/L	1.0	0.75	0.33	SW846 8260C		12/20/17 04:15	CJG	A
1,1-Dichloroethane	0.75U	U	ug/L	1.0	0.75	0.33	SW846 8260C		12/20/17 04:15	CJG	A
1,2-Dichloroethane	0.75U	U	ug/L	1.0	0.75	0.33	SW846 8260C		12/20/17 04:15	CJG	A
1,1-Dichloroethene	0.75U	U	ug/L	1.0	0.75	0.33	SW846 8260C		12/20/17 04:15	CJG	A
cis-1,2-Dichloroethene	0.75U	U	ug/L	1.0	0.75	0.33	SW846 8260C		12/20/17 04:15	CJG	A
trans-1,2-Dichloroethene	0.75U	U	ug/L	1.0	0.75	0.33	SW846 8260C		12/20/17 04:15	CJG	A
1,1,1,2-Tetrachloroethane	0.75U	U	ug/L	1.0	0.75	0.33	SW846 8260C		12/20/17 04:15	CJG	A
1,1,2,2-Tetrachloroethane	0.75U	U	ug/L	1.0	0.75	0.33	SW846 8260C		12/20/17 04:15	CJG	A
Tetrachloroethene	0.75U	U	ug/L	1.0	0.75	0.33	SW846 8260C		12/20/17 04:15	CJG	A
Toluene	0.75U	U	ug/L	1.0	0.75	0.33	SW846 8260C		12/20/17 04:15	CJG	A
1,1,1-Trichloroethane	0.75U	U	ug/L	1.0	0.75	0.33	SW846 8260C		12/20/17 04:15	CJG	A
1,1,2-Trichloroethane	0.75U	U	ug/L	1.0	0.75	0.33	SW846 8260C		12/20/17 04:15	CJG	A
Trichloroethene	28.0		ug/L	1.0	0.75	0.33	SW846 8260C		12/20/17 04:15	CJG	A
Vinyl Chloride	0.75U	U	ug/L	1.0	0.75	0.33	SW846 8260C		12/20/17 04:15	CJG	A
Surrogate Recoveries	*Results*	*Flag*	*Units*	*Limits*			*Method*	*Prepared By*	*Analyzed*	*By*	*Cntr*
1,2-Dichloroethane-d4 (S)	107		%	81 - 118			SW846 8260C		12/20/17 04:15	CJG	A
4-Bromofluorobenzene (S)	111		%	85 - 114			SW846 8260C		12/20/17 04:15	CJG	A
Dibromofluoromethane (S)	99.9		%	80 - 119			SW846 8260C		12/20/17 04:15	CJG	A
Toluene-d8 (S)	105		%	89 - 112			SW846 8260C		12/20/17 04:15	CJG	A
LIGHT HYDROCARBON GASES											
Ethane	1.1		ug/L	1.0	0.50	0.25	RSK 175		12/19/17 02:19	EGO	D
Ethene	0.75U	U	ug/L	1.5	0.75	0.31	RSK 175		12/19/17 02:19	EGO	D
Methane	531		ug/L	0.50	0.25	0.13	RSK 175		12/19/17 02:19	EGO	D
WET CHEMISTRY											
Alkalinity, Total	203	1	mg/L	5	5	0.8	S2320B-97		12/15/17 01:12	MSA	J
Chloride	12.9		mg/L	2.0	0.50	0.16	EPA 300.0		12/14/17 07:33	CHW	J
Nitrate-N	0.020J	J	mg/L	0.20	0.060	0.020	EPA 300.0		12/14/17 07:33	CHW	J
Sulfate	7.3		mg/L	2.0	0.50	0.20	EPA 300.0		12/14/17 07:33	CHW	J
Total Organic Carbon (TOC)	4.1		mg/L	1.0	0.50	0.18	S5310B-00		12/18/17 10:42	PAG	G

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ANALYTICAL RESULTS

Workorder: 2282785 ANL005|60440641

Lab ID: **2282785005** Date Collected: 12/12/2017 11:54 Matrix: Ground Water

Sample ID: **MW-35 121217** Date Received: 12/13/2017 09:13

Parameters	Results	Flag	Units	LOQ	LOD	DL	Method	Prepared By	Analyzed	By	Cntr
VOLATILE ORGANICS											
Carbon Tetrachloride	0.75U	U	ug/L	1.0	0.75	0.33	SW846 8260C		12/20/17 04:37	CJG	A
1,1-Dichloroethane	0.75U	U	ug/L	1.0	0.75	0.33	SW846 8260C		12/20/17 04:37	CJG	A
1,2-Dichloroethane	0.75U	U	ug/L	1.0	0.75	0.33	SW846 8260C		12/20/17 04:37	CJG	A
1,1-Dichloroethene	0.75U	U	ug/L	1.0	0.75	0.33	SW846 8260C		12/20/17 04:37	CJG	A
cis-1,2-Dichloroethene	0.75U	U	ug/L	1.0	0.75	0.33	SW846 8260C		12/20/17 04:37	CJG	A
trans-1,2-Dichloroethene	0.75U	U	ug/L	1.0	0.75	0.33	SW846 8260C		12/20/17 04:37	CJG	A
1,1,1,2-Tetrachloroethane	0.75U	U	ug/L	1.0	0.75	0.33	SW846 8260C		12/20/17 04:37	CJG	A
1,1,2,2-Tetrachloroethane	0.75U	U	ug/L	1.0	0.75	0.33	SW846 8260C		12/20/17 04:37	CJG	A
Tetrachloroethene	0.75U	U	ug/L	1.0	0.75	0.33	SW846 8260C		12/20/17 04:37	CJG	A
Toluene	0.75U	U	ug/L	1.0	0.75	0.33	SW846 8260C		12/20/17 04:37	CJG	A
1,1,1-Trichloroethane	0.75U	U	ug/L	1.0	0.75	0.33	SW846 8260C		12/20/17 04:37	CJG	A
1,1,2-Trichloroethane	0.75U	U	ug/L	1.0	0.75	0.33	SW846 8260C		12/20/17 04:37	CJG	A
Trichloroethene	43.5		ug/L	1.0	0.75	0.33	SW846 8260C		12/20/17 04:37	CJG	A
Vinyl Chloride	0.75U	U	ug/L	1.0	0.75	0.33	SW846 8260C		12/20/17 04:37	CJG	A
Surrogate Recoveries	*Results*	*Flag*	*Units*	*Limits*			*Method*	*Prepared By*	*Analyzed*	*By*	*Cntr*
1,2-Dichloroethane-d4 (S)	107		%	81 - 118			SW846 8260C		12/20/17 04:37	CJG	A
4-Bromofluorobenzene (S)	107		%	85 - 114			SW846 8260C		12/20/17 04:37	CJG	A
Dibromofluoromethane (S)	99.7		%	80 - 119			SW846 8260C		12/20/17 04:37	CJG	A
Toluene-d8 (S)	103		%	89 - 112			SW846 8260C		12/20/17 04:37	CJG	A
LIGHT HYDROCARBON GASES											
Ethane	0.50U	U	ug/L	1.0	0.50	0.25	RSK 175		12/19/17 02:35	EGO	G
Ethene	0.75U	U	ug/L	1.5	0.75	0.31	RSK 175		12/19/17 02:35	EGO	G
Methane	7.9		ug/L	0.50	0.25	0.13	RSK 175		12/19/17 02:35	EGO	G
WET CHEMISTRY											
Alkalinity, Total	210	1	mg/L	5	5	0.8	S2320B-97		12/14/17 23:41	MSA	b
Chloride	22.2		mg/L	2.0	0.50	0.16	EPA 300.0		12/14/17 06:12	CHW	b
Nitrate-N	0.44		mg/L	0.20	0.060	0.020	EPA 300.0		12/14/17 06:12	CHW	b
Sulfate	10.2		mg/L	2.0	0.50	0.20	EPA 300.0		12/14/17 06:12	CHW	b
Total Organic Carbon (TOC)	0.56J	J	mg/L	1.0	0.50	0.18	S5310B-00		12/18/17 10:42	PAG	S

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ANALYTICAL RESULTS

Workorder: 2282785 ANL005|60440641

Lab ID: **2282785006** Date Collected: 12/12/2017 14:12 Matrix: Ground Water

Sample ID: **MW-24 121217** Date Received: 12/13/2017 09:13

Parameters	Results	Flag	Units	LOQ	LOD	DL	Method	Prepared By	Analyzed	By	Cntr
VOLATILE ORGANICS											
Carbon Tetrachloride	0.75U	U	ug/L	1.0	0.75	0.33	SW846 8260C		12/20/17 04:59	CJG	A
1,1-Dichloroethane	0.75U	U	ug/L	1.0	0.75	0.33	SW846 8260C		12/20/17 04:59	CJG	A
1,2-Dichloroethane	0.75U	U	ug/L	1.0	0.75	0.33	SW846 8260C		12/20/17 04:59	CJG	A
1,1-Dichloroethene	0.75U	U	ug/L	1.0	0.75	0.33	SW846 8260C		12/20/17 04:59	CJG	A
cis-1,2-Dichloroethene	0.75U	U	ug/L	1.0	0.75	0.33	SW846 8260C		12/20/17 04:59	CJG	A
trans-1,2-Dichloroethene	0.75U	U	ug/L	1.0	0.75	0.33	SW846 8260C		12/20/17 04:59	CJG	A
1,1,1,2-Tetrachloroethane	0.75U	U	ug/L	1.0	0.75	0.33	SW846 8260C		12/20/17 04:59	CJG	A
1,1,2,2-Tetrachloroethane	0.75U	U	ug/L	1.0	0.75	0.33	SW846 8260C		12/20/17 04:59	CJG	A
Tetrachloroethene	0.75U	U	ug/L	1.0	0.75	0.33	SW846 8260C		12/20/17 04:59	CJG	A
Toluene	0.75U	U	ug/L	1.0	0.75	0.33	SW846 8260C		12/20/17 04:59	CJG	A
1,1,1-Trichloroethane	0.75U	U	ug/L	1.0	0.75	0.33	SW846 8260C		12/20/17 04:59	CJG	A
1,1,2-Trichloroethane	0.75U	U	ug/L	1.0	0.75	0.33	SW846 8260C		12/20/17 04:59	CJG	A
Trichloroethene	0.94J	J	ug/L	1.0	0.75	0.33	SW846 8260C		12/20/17 04:59	CJG	A
Vinyl Chloride	0.75U	U	ug/L	1.0	0.75	0.33	SW846 8260C		12/20/17 04:59	CJG	A
Surrogate Recoveries	*Results*	*Flag*	*Units*	*Limits*			*Method*	*Prepared By*	*Analyzed*	*By*	*Cntr*
1,2-Dichloroethane-d4 (S)	107		%	81 - 118			SW846 8260C		12/20/17 04:59	CJG	A
4-Bromofluorobenzene (S)	108		%	85 - 114			SW846 8260C		12/20/17 04:59	CJG	A
Dibromofluoromethane (S)	100		%	80 - 119			SW846 8260C		12/20/17 04:59	CJG	A
Toluene-d8 (S)	104		%	89 - 112			SW846 8260C		12/20/17 04:59	CJG	A
LIGHT HYDROCARBON GASES											
Ethane	0.50U	U	ug/L	1.0	0.50	0.25	RSK 175		12/19/17 03:11	EGO	D
Ethene	0.75U	U	ug/L	1.5	0.75	0.31	RSK 175		12/19/17 03:11	EGO	D
Methane	431		ug/L	0.50	0.25	0.13	RSK 175		12/19/17 03:11	EGO	D
WET CHEMISTRY											
Alkalinity, Total	352	1	mg/L	5	5	0.8	S2320B-97		12/15/17 02:19	MSA	J
Chloride	155		mg/L	2.0	0.50	0.16	EPA 300.0		12/14/17 07:45	CHW	J
Nitrate-N	0.060U	U	mg/L	0.20	0.060	0.020	EPA 300.0		12/14/17 07:45	CHW	J
Sulfate	0.48J	J	mg/L	2.0	0.50	0.20	EPA 300.0		12/14/17 07:45	CHW	J
Total Organic Carbon (TOC)	96.2		mg/L	25.0	12.5	4.6	S5310B-00		12/19/17 15:44	PAG	G

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ANALYTICAL RESULTS

Workorder: 2282785 ANL005|60440641

PARAMETER QUALIFIERS

Lab ID	#	Sample ID	Analytical Method	Analyte
2282785001	1	MW-20 121217	S2320B-97	Alkalinity, Total
The Total Alkalinity is titrated to a pH of 4.5 and reported as mg CaCO3/L.				
2282785002	1	DUP-1 121217	S2320B-97	Alkalinity, Total
The Total Alkalinity is titrated to a pH of 4.5 and reported as mg CaCO3/L.				
2282785004	1	MW-34 121217	S2320B-97	Alkalinity, Total
The Total Alkalinity is titrated to a pH of 4.5 and reported as mg CaCO3/L.				
2282785005	1	MW-35 121217	S2320B-97	Alkalinity, Total
The Total Alkalinity is titrated to a pH of 4.5 and reported as mg CaCO3/L.				
2282785006	1	MW-24 121217	S2320B-97	Alkalinity, Total
The Total Alkalinity is titrated to a pH of 4.5 and reported as mg CaCO3/L.				

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QUALITY CONTROL DATA

Workorder: 2282785 ANL005|60440641

QC Batch: SVGC/47651 **Analysis Method:** RSK 175

QC Batch Method: RSK 175

Associated Lab Samples: 2282785001, 2282785002, 2282785004, 2282785005, 2282785006

METHOD BLANK: 2662303

Parameter	Blank Result	Units	Reporting Limit
Ethane	0.50U	ug/L	1.0
Ethene	0.75U	ug/L	1.5
Methane	0.15J	ug/L	0.50

SAMPLE DUPLICATE: 2662304 ORIGINAL: 2282785005

Parameter	Original Result	Units	DUP Result	RPD	Max RPD
Ethane	0	ug/L	0	NC	20
Ethene	0	ug/L	0	NC	20
Methane	7.93	ug/L	7.09	11.2	20

SAMPLE DUPLICATE: 2662305 ORIGINAL: 2282982001

Parameter	Original Result	Units	DUP Result	RPD	Max RPD
Ethane	5.55	ug/L	15.42	94.1*	20
Ethene	2.26	ug/L	4.64	69*	20
Methane	233.23	ug/L	611.11	89.5*	20

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QUALITY CONTROL DATA

Workorder: 2282785 ANL005|60440641

QC Batch: VOMS/45442 **Analysis Method:** SW846 8260C

QC Batch Method: SW846 8260C

Associated Lab Samples: 2282785001, 2282785002, 2282785003, 2282785004, 2282785005, 2282785006

METHOD BLANK: 2662960

Parameter	Blank Result	Units	Reporting Limit
Carbon Tetrachloride	0.75U	ug/L	1.0
1,1-Dichloroethane	0.75U	ug/L	1.0
1,2-Dichloroethane	0.75U	ug/L	1.0
1,1-Dichloroethene	0.75U	ug/L	1.0
cis-1,2-Dichloroethene	0.75U	ug/L	1.0
trans-1,2-Dichloroethene	0.75U	ug/L	1.0
1,1,1,2-Tetrachloroethane	0.75U	ug/L	1.0
1,1,2,2-Tetrachloroethane	0.75U	ug/L	1.0
Tetrachloroethene	0.75U	ug/L	1.0
Toluene	0.75U	ug/L	1.0
1,1,1-Trichloroethane	0.75U	ug/L	1.0
1,1,2-Trichloroethane	0.75U	ug/L	1.0
Trichloroethene	0.75U	ug/L	1.0
Vinyl Chloride	0.75U	ug/L	1.0
1,2-Dichloroethane-d4 (S)	105	%	81 - 118
4-Bromofluorobenzene (S)	108	%	85 - 114
Dibromofluoromethane (S)	98.1	%	80 - 119
Toluene-d8 (S)	103	%	89 - 112

LABORATORY CONTROL SAMPLE: 2662961

Parameter	LCS % Rec	Units	Spike Conc.	LCS Result	% Rec Limit
Carbon Tetrachloride	87	ug/L	20	17.4	72 - 136
1,1-Dichloroethane	98	ug/L	20	19.6	77 - 125
1,2-Dichloroethane	97.1	ug/L	20	19.4	73 - 128
1,1-Dichloroethene	101	ug/L	20	20.2	71 - 131
cis-1,2-Dichloroethene	96.1	ug/L	20	19.2	78 - 123
trans-1,2-Dichloroethene	104	ug/L	20	20.7	75 - 124
1,1,1,2-Tetrachloroethane	104	ug/L	20	20.8	78 - 124
1,1,2,2-Tetrachloroethane	99.3	ug/L	20	19.9	71 - 121
Tetrachloroethene	104	ug/L	20	20.8	74 - 129
Toluene	99.7	ug/L	20	19.9	80 - 121
1,1,1-Trichloroethane	106	ug/L	20	21.1	74 - 131
1,1,2-Trichloroethane	97.7	ug/L	20	19.5	80 - 119
Trichloroethene	93.4	ug/L	20	18.7	79 - 123

QUALITY CONTROL DATA

Workorder: 2282785 ANL005|60440641

Vinyl Chloride	98.2	ug/L	20	19.6	58 - 137
1,2-Dichloroethane-d4 (S)	104	%			81 - 118
4-Bromofluorobenzene (S)	108	%			85 - 114
Dibromofluoromethane (S)	102	%			80 - 119
Toluene-d8 (S)	101	%			89 - 112

MATRIX SPIKE: 2663057 DUPLICATE: 2663058 ORIGINAL: 2282785005

****NOTE - The Original Result shown below is a raw result and is only used for the purpose of calculating Matrix Spike percent recoveries. This result is not a final value and cannot be used as such.

Parameter	Original Result	Units	Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limit	RPD	Max RPD
Carbon Tetrachloride	0	ug/L	20	20.1411	19.9079	101	99.5	72 - 136	1.16	30
1,1-Dichloroethane	0	ug/L	20	20.8932	20.4336	104	102	77 - 125	2.22	30
1,2-Dichloroethane	0	ug/L	20	20.6907	19.9549	103	99.8	73 - 128	3.62	30
1,1-Dichloroethene	0	ug/L	20	21.5632	20.891	108	104	71 - 131	3.17	30
cis-1,2-Dichloroethene	0	ug/L	20	20.3404	19.8268	102	99.1	78 - 123	2.56	30
trans-1,2-Dichloroethene	0	ug/L	20	22.3304	21.0129	112	105	75 - 124	6.08	30
1,1,1,2-Tetrachloroethane	0	ug/L	20	21.6152	21.3327	108	107	78 - 124	1.32	30
1,1,2,2-Tetrachloroethane	0	ug/L	20	21.3914	20.0437	107	100	71 - 121	6.51	30
Tetrachloroethene	0	ug/L	20	21.9126	21.4263	110	107	74 - 129	2.24	30
Toluene	0	ug/L	20	20.7673	20.6633	104	103	80 - 121	.5	30
1,1,1-Trichloroethane	0	ug/L	20	22.5835	22.5134	113	113	74 - 131	.31	30
1,1,2-Trichloroethane	0	ug/L	20	20.5231	20.3159	103	102	80 - 119	1.01	30
Trichloroethene	43.5452	ug/L	20	65.6276	63.6674	110	101	79 - 123	3.03	30
Vinyl Chloride	0	ug/L	20	21.0066	21.0891	105	105	58 - 137	.39	30
1,2-Dichloroethane-d4 (S)	106	%				106	108	81 - 118		
4-Bromofluorobenzene (S)	108	%				108	104	85 - 114		
Dibromofluoromethane (S)	103	%				103	101	80 - 119		
Toluene-d8 (S)	99.3	%				99.3	99.9	89 - 112		

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QUALITY CONTROL DATA

Workorder: 2282785 ANL005|60440641

QC Batch: WETC/197653 **Analysis Method:** S2320B-97

QC Batch Method: S2320B-97

Associated Lab Samples: 2282785001, 2282785002, 2282785004, 2282785005, 2282785006

METHOD BLANK: 2660509

Parameter	Blank Result	Units	Reporting Limit
Alkalinity, Total	2J	mg/L	5

SAMPLE DUPLICATE: 2660514 ORIGINAL: 2282785005

Parameter	Original Result	Units	DUP Result	RPD	Max RPD
Alkalinity, Total	209.61745	mg/L	208.13216	.71	20

METHOD BLANK: 2660517

Parameter	Blank Result	Units	Reporting Limit
Alkalinity, Total	2J	mg/L	5

SAMPLE DUPLICATE: 2660518 ORIGINAL: 2282836001

Parameter	Original Result	Units	DUP Result	RPD	Max RPD
Alkalinity, Total	83.52351	mg/L	81.95883	1.89	20

METHOD BLANK: 2660521

Parameter	Blank Result	Units	Reporting Limit
Alkalinity, Total	2J	mg/L	5

SAMPLE DUPLICATE: 2660522 ORIGINAL: 2282973001

Parameter	Original Result	Units	DUP Result	RPD	Max RPD

QUALITY CONTROL DATA

Workorder: 2282785 ANL005|60440641

Alkalinity, Total	155.50861	mg/L	164.00923	5.32	20

METHOD BLANK: 2660525

Parameter	Blank Result	Units	Reporting Limit
Alkalinity, Total	2J	mg/L	5

SAMPLE DUPLICATE: 2660526 ORIGINAL: 2282976001

Parameter	Original Result	Units	DUP Result	RPD	Max RPD
Alkalinity, Total	258.27353	mg/L	249.76445	3.35	20

METHOD BLANK: 2660529

Parameter	Blank Result	Units	Reporting Limit
Alkalinity, Total	2J	mg/L	5

SAMPLE DUPLICATE: 2660530 ORIGINAL: 2283013001

Parameter	Original Result	Units	DUP Result	RPD	Max RPD
Alkalinity, Total	13.1013	mg/L	13.25463	1.16	20

METHOD BLANK: 2660533

Parameter	Blank Result	Units	Reporting Limit
Alkalinity, Total	2J	mg/L	5

SAMPLE DUPLICATE: 2660534 ORIGINAL: 2283013008

Parameter	Original Result	Units	DUP Result	RPD	Max RPD
Alkalinity, Total	12.73502	mg/L	13.1689	3.35	20

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QUALITY CONTROL DATA

Workorder: 2282785 ANL005|60440641

METHOD BLANK: 2660685

Parameter	Blank Result	Units	Reporting Limit
Alkalinity, Total	2J	mg/L	5

SAMPLE DUPLICATE: 2660686 ORIGINAL: 2283041001

Parameter	Original Result	Units	DUP Result	RPD	Max RPD
Alkalinity, Total	515.20416	mg/L	493.01376	4.4	20

METHOD BLANK: 2660689

Parameter	Blank Result	Units	Reporting Limit
Alkalinity, Total	1J	mg/L	5

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QUALITY CONTROL DATA

Workorder: 2282785 ANL005|60440641

QC Batch: WETC/197656 **Analysis Method:** EPA 300.0

QC Batch Method: EPA 300.0

Associated Lab Samples: 2282785001, 2282785002, 2282785004, 2282785005, 2282785006

METHOD BLANK: 2660594

Parameter	Blank Result	Units	Reporting Limit
Chloride	0.15J	mg/L	1.0
Nitrate-N	0.030U	mg/L	0.10
Sulfate	0.25U	mg/L	1.0

LABORATORY CONTROL SAMPLE: 2660596

Parameter	LCS % Rec	Units	Spike Conc.	LCS Result	% Rec Limit
Chloride	97.8	mg/L	20	19.6	87 - 111
Nitrate-N	96.8	mg/L	2.5	2.4	88 - 111
Sulfate	98	mg/L	20	19.6	87 - 112

MATRIX SPIKE: 2660598 DUPLICATE: 2660599 ORIGINAL: 2282785005

***NOTE - The Original Result shown below is a raw result and is only used for the purpose of calculating Matrix Spike percent recoveries. This result is not a final value and cannot be used as such.

Parameter	Original Result	Units	Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limit	RPD	Max RPD
Chloride	22.2	mg/L	40	62.1	60.18	99.8	95	87 - 111	3.14	15
Nitrate-N	.44	mg/L	5	6.08	5.9	113*	109	88 - 111	3.01	15
Sulfate	10.24	mg/L	40	55.02	53.34	112	108	87 - 112	3.1	15

METHOD BLANK: 2660601

Parameter	Blank Result	Units	Reporting Limit
Chloride	0.20J	mg/L	1.0
Nitrate-N	0.030U	mg/L	0.10
Sulfate	0.25U	mg/L	1.0

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QUALITY CONTROL DATA

Workorder: 2282785 ANL005|60440641

METHOD BLANK: 2660603

Parameter	Blank Result	Units	Reporting Limit
Chloride	0.18J	mg/L	1.0
Nitrate-N	0.030U	mg/L	0.10
Sulfate	0.25U	mg/L	1.0

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QUALITY CONTROL DATA

Workorder: 2282785 ANL005|60440641

QC Batch: WETC/197787 **Analysis Method:** S5310B-00

QC Batch Method: 415.1/9060/5310B

Associated Lab Samples: 2282785001, 2282785002, 2282785004, 2282785005

METHOD BLANK: 2662125

Parameter	Blank Result	Units	Reporting Limit
Total Organic Carbon (TOC)	0.20J	mg/L	1.0

LABORATORY CONTROL SAMPLE: 2662126

Parameter	LCS % Rec	Units	Spike Conc.	LCS Result	% Rec Limit
Total Organic Carbon (TOC)	108	mg/L	1	1.1	85 - 115

MATRIX SPIKE: 2662127 DUPLICATE: 2662128 ORIGINAL: 2282576002

****NOTE - The Original Result shown below is a raw result and is only used for the purpose of calculating Matrix Spike percent recoveries. This result is not a final value and cannot be used as such.

Parameter	Original Result	Units	Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limit	RPD	Max RPD
Total Organic Carbon (TOC)	.903	mg/L	6	7.081	7.006	103	102	85 - 115	1.06	20

MATRIX SPIKE: 2662129 DUPLICATE: 2662130 ORIGINAL: 2282785005

****NOTE - The Original Result shown below is a raw result and is only used for the purpose of calculating Matrix Spike percent recoveries. This result is not a final value and cannot be used as such.

Parameter	Original Result	Units	Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limit	RPD	Max RPD
Total Organic Carbon (TOC)	.555	mg/L	6	6.595	6.6	101	101	85 - 115	.08	20

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QUALITY CONTROL DATA

Workorder: 2282785 ANL005|60440641

QC Batch: WETC/197832 **Analysis Method:** S5310B-00

QC Batch Method: 415.1/9060/5310B

Associated Lab Samples: 2282785006

METHOD BLANK: 2662782

Parameter	Blank Result	Units	Reporting Limit
Total Organic Carbon (TOC)	0.20J	mg/L	1.0

LABORATORY CONTROL SAMPLE: 2662783

Parameter	LCS % Rec	Units	Spike Conc.	LCS Result	% Rec Limit
Total Organic Carbon (TOC)	108	mg/L	1	1.1	85 - 115

MATRIX SPIKE: 2662784 DUPLICATE: 2662785 ORIGINAL: 2283142002

***NOTE - The Original Result shown below is a raw result and is only used for the purpose of calculating Matrix Spike percent recoveries. This result is not a final value and cannot be used as such.

Parameter	Original Result	Units	Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limit	RPD	Max RPD
Total Organic Carbon (TOC)	1.857	mg/L	6	7.846	7.67	99.8	96.9	85 - 115	2.27	20

MATRIX SPIKE: 2662786 DUPLICATE: 2662787 ORIGINAL: 2283291001

***NOTE - The Original Result shown below is a raw result and is only used for the purpose of calculating Matrix Spike percent recoveries. This result is not a final value and cannot be used as such.

Parameter	Original Result	Units	Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limit	RPD	Max RPD
Total Organic Carbon (TOC)	.983	mg/L	6	6.973	6.978	99.8	99.9	85 - 115	.07	20

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State Certifications: DE ID 11 , MA PA0102 , MD 128 , VA 460157 , WV 343

QUALITY CONTROL DATA CROSS REFERENCE TABLE

Workorder: 2282785 ANL005|60440641

Lab ID	Sample ID	Prep Method	Prep Batch	Analysis Method	Analysis Batch
2282785001	MW-20 121217			S2320B-97	WETC/197653
2282785002	DUP-1 121217			S2320B-97	WETC/197653
2282785004	MW-34 121217			S2320B-97	WETC/197653
2282785005	MW-35 121217			S2320B-97	WETC/197653
2282785006	MW-24 121217			S2320B-97	WETC/197653
2282785001	MW-20 121217			EPA 300.0	WETC/197656
2282785002	DUP-1 121217			EPA 300.0	WETC/197656
2282785004	MW-34 121217			EPA 300.0	WETC/197656
2282785005	MW-35 121217			EPA 300.0	WETC/197656
2282785006	MW-24 121217			EPA 300.0	WETC/197656
2282785001	MW-20 121217			S5310B-00	WETC/197787
2282785002	DUP-1 121217			S5310B-00	WETC/197787
2282785004	MW-34 121217			S5310B-00	WETC/197787
2282785005	MW-35 121217			S5310B-00	WETC/197787
2282785001	MW-20 121217			RSK 175	SVGC/47651
2282785002	DUP-1 121217			RSK 175	SVGC/47651
2282785004	MW-34 121217			RSK 175	SVGC/47651
2282785005	MW-35 121217			RSK 175	SVGC/47651
2282785006	MW-24 121217			RSK 175	SVGC/47651
2282785006	MW-24 121217			S5310B-00	WETC/197832
2282785001	MW-20 121217			SW846 8260C	VOMS/45442
2282785002	DUP-1 121217			SW846 8260C	VOMS/45442
2282785003	EB-1 121217			SW846 8260C	VOMS/45442
2282785004	MW-34 121217			SW846 8260C	VOMS/45442
2282785005	MW-35 121217			SW846 8260C	VOMS/45442
2282785006	MW-24 121217			SW846 8260C	VOMS/45442

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Middletown, PA 17057
P. 717-944-5541
F. 717-944-1430

CHAIN OF CUSTODY/ REQUEST FOR ANALYSIS

ALL SHADED AREAS MUST BE COMPLETED BY THE CLIENT / SAMPLER. INSTRUCTIONS ON THE BACK.

Page 1 of 1
Courier:
Tracking #:

2282785

Co. Name: AECOM
Contact (Report to):
Phone:
Address: 40 British American BLVD
Latham, NY
Bill to (if different than Report to):
PO#:
Project Name/#: 60440641
ALS Quote #:
TAT: ☑ Normal-Standard TAT is 10-12 business days. ☐ Rush-Subject to ALS approval and surcharges.
Date Required:
Approved By:
Email? ☑ Y John.Santacroce@aecom.com
Fax? Y No:

	8260C	TOC	RSK175	Cl, SO4, NO3	Alkalinity
***Container Type	VG	AG	CG	P	P
***Container Size	40	40	40	8oz	8oz
Preservative	HCL	HCL	-	-	-

ANALYSES/METHOD REQUESTED — Enter Number of Containers Per Analysis

#	Sample Description/Location (as it will appear on the lab report)	COC Comments	Sample Date	Military Time	*G or C	**Matrix	8260C	TOC	RSK175	Cl, SO4, NO3	Alkalinity
1	MW-26 121217		12/12/17	926	G	GW	x3	x3	x3	x1	x1
2	DUP-1 121217		↓	-	↓	↓	x3	x3	x3	x1	x1
3	EB-1 121217		↓	1001	↓	↓	x2				
4	MW-34 121217		↓	1051	↓	↓	x	x	x	x	x
5	MW-35 121217		↓	1154	↓	↓	x	x	x	x	x
6	MW-35 MS 121217		↓	1154	↓	↓	x	x	x	x	x
7	MW-35 MSD 121217		↓	1154	↓	↓	x	x	x	x	x
8	MW-24 121217		↓	1412	↓	↓	x	x	x	x	x

Received by: (Initials)
Cooler Temp: 2°
Therm. ID: 402
No. of Coolers:
Notes:

Circle appropriate Y or N.

Correct containers?	(Y)	N
Correct sample volume?	(Y)	N
Correct preservation?	(Y)	N
Headspace/Volatiles?	(Y)	N
Custody seals Present?	Y	(N)
(If present) Seals intact?	Y	N
Received on ice?	(Y)	N
COC/Labels complete/accurate?	(Y)	N
Container in good condition?	(Y)	N

SAMPLED BY (Please Print): Ross McCurdy

Project Comments: *Trip Blank for VOCs* #trip Blank not Rcvd SW

	Relinquished By / Company Name	Date	Time		Received By / Company Name	Date	Time
1	Ross McCurdy	12/12/17	1530	2	[signature]	12/12/17	1530
3	[signature]	12/13/17	330	4	[signature]	12/13	0913
5				6			
7				8			
9				10			

Data Deliverables: ☑ Standard ☐ CLP-like ☐ NJ-Reduced ☐ NJ-Full ☐ Other
EDDs Required? ☐ If yes, format type: See QAPP
SDWA Forms? yes ☐ yes ☐ yes ☐ yes ☐ Other: See QAPP
State Samples Collected In? MD ☐ NJ ☐ NY ☐ PA ☐
Enter PWSID No.
DOD Criteria Required?

ALS FIELD SERVICES: ☑ Pickup ☐ Labor ☐ Composite Sampling ☐ Rental Equipment ☐ Other:

* G=Grab; C=Composite
**Matrix: AI=Air; DW=Drinking Water; GW=Groundwater; OI=Oil; OL=Other Liquid; SL=Sludge; SO=Soil; WP=Wipe; WW=Wastewater
***Container Type: AG-Amber Glass; CG-Clear Glass; PL-Plastic. Container Size: 250ml, 500ml, 1L, 8oz, etc. Preservative: HCl, HNO3, NaOH, etc.

Copies: WHITE - ORIGINAL CANARY - CUSTOMER COPY

Rev 01-2013

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December 27, 2017

Mr. John Santacroce
AECOM - LATHAM NY
40 British American Blvd.
Albany, NY 12210

Certificate of Analysis

Project Name:	**2015-SCOTIA NAVY DEPOT-PO 60440641**	Workorder:	**2282982**
Purchase Order:	**66432/60440641.11**	Workorder ID:	**ANL006|60440641**

Dear Mr. Santacroce:

Enclosed are the analytical results for samples received by the laboratory on Thursday, December 14, 2017.

The ALS Environmental laboratory in Middletown, Pennsylvania is a National Environmental Laboratory Accreditation Program (NELAP) accredited laboratory and as such, certifies that all applicable test results meet the requirements of NELAP.

If you have any questions regarding this certificate of analysis, please contact Mrs. Vanessa N Badman (Project Coordinator) at (717) 944-5541.

Analyses were performed according to our laboratory's NELAP-approved quality assurance program and any applicable state requirements. The test results meet requirements of the current NELAP standards or state requirements, where applicable. For a specific list of accredited analytes, refer to the certifications section of the ALS website at www.alsglobal.com/en/Our-Services/Life-Sciences/Environmental/Downloads.

ALS Spring City: 10 Riverside Drive, Spring City, PA 19475 610-948-4903

CC: Ms. Kelly Lurie , Mr. Scott Underhill

This page is included as part of the Analytical Report and must be retained as a permanent record thereof.

Vanessa N. Badman
Mrs. Vanessa N Badman
Project Coordinator

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SAMPLE SUMMARY

Workorder: 2282982 ANL006|60440641

Lab ID	Sample ID	Matrix	Date Collected	Date Received	Collected By
2282982001	MW-32-121317	Ground Water	12/13/2017 08:41	12/14/2017 09:55	Collected by Client
2282982002	MW-33-121317	Ground Water	12/13/2017 09:45	12/14/2017 09:55	Collected by Client
2282982003	MW-30-121317	Ground Water	12/13/2017 11:20	12/14/2017 09:55	Collected by Client
2282982004	MW-31-121317	Ground Water	12/13/2017 12:15	12/14/2017 09:55	Collected by Client

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SAMPLE SUMMARY

Workorder: 2282982 ANL006|60440641

Notes

-- Samples collected by ALS personnel are done so in accordance with the procedures set forth in the ALS Field Sampling Plan (20 - Field Services Sampling Plan).
-- All Waste Water analyses comply with methodology requirements of 40 CFR Part 136.
-- All Drinking Water analyses comply with methodology requirements of 40 CFR Part 141.
-- Unless otherwise noted, all quantitative results for soils are reported on a dry weight basis.
-- The Chain of Custody document is included as part of this report.
-- All Library Search analytes should be regarded as tentative identifications based on the presumptive evidence of the mass spectra. Concentrations reported are estimated values.
-- Parameters identified as "analyze immediately" require analysis within 15 minutes of collection. Any "analyze immediately" parameters not listed under the header "Field Parameters" are preformed in the laboratory and are therefore analyzed out of hold time.
-- Method references listed on this report beginning with the prefix "S" followed by a method number (such as S2310B-97) refer to methods from "Standard Methods for the Examination of Water and Wastewater".
-- For microbiological analyses, the "Prepared" value is the date/time into the incurbator and the "Analyzed" value is the date/time out the incubator.

Standard Acronyms/Flags

J	Indicates an estimated value between the Method Detection Limit (MDL) and the Practical Quantitation Limit (PQL) for the analyte
U	Indicates that the analyte was Not Detected (ND)
N	Indicates presumptive evidence of the presence of a compound
MDL	Method Detection Limit
PQL	Practical Quantitation Limit
RDL	Reporting Detection Limit
ND	Not Detected - indicates that the analyte was Not Detected at the RDL
Cntr	Analysis was performed using this container
RegLmt	Regulatory Limit
LCS	Laboratory Control Sample
MS	Matrix Spike
MSD	Matrix Spike Duplicate
DUP	Sample Duplicate
%Rec	Percent Recovery
RPD	Relative Percent Difference
LOD	DoD Limit of Detection
LOQ	DoD Limit of Quantitation
DL	DoD Detection Limit
I	Indicates reported value is greater than or equal to the Method Detection Limit (MDL) but less than the Report Detection Limit (RDL)
(S)	Surrogate Compound
NC	Not Calculated
*	Result outside of QC limits

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ANALYTICAL RESULTS

Workorder: 2282982 ANL006|60440641

Lab ID: **2282982001** Date Collected: 12/13/2017 08:41 Matrix: Ground Water

Sample ID: **MW-32-121317** Date Received: 12/14/2017 09:55

Parameters	Results	Flag	Units	LOQ	LOD	DL	Method	Prepared By	Analyzed	By	Cntr
VOLATILE ORGANICS											
Carbon Tetrachloride	0.75U	U	ug/L	1.0	0.75	0.33	SW846 8260C		12/20/17 11:34	DD	C
1,1-Dichloroethane	0.75U	U	ug/L	1.0	0.75	0.33	SW846 8260C		12/20/17 11:34	DD	C
1,2-Dichloroethane	0.75U	U	ug/L	1.0	0.75	0.33	SW846 8260C		12/20/17 11:34	DD	C
1,1-Dichloroethene	0.75U	U	ug/L	1.0	0.75	0.33	SW846 8260C		12/20/17 11:34	DD	C
cis-1,2-Dichloroethene	0.68J	J	ug/L	1.0	0.75	0.33	SW846 8260C		12/20/17 11:34	DD	C
trans-1,2-Dichloroethene	0.75U	U	ug/L	1.0	0.75	0.33	SW846 8260C		12/20/17 11:34	DD	C
1,1,1,2-Tetrachloroethane	0.75U	U	ug/L	1.0	0.75	0.33	SW846 8260C		12/20/17 11:34	DD	C
1,1,2,2-Tetrachloroethane	0.75U	U	ug/L	1.0	0.75	0.33	SW846 8260C		12/20/17 11:34	DD	C
Tetrachloroethene	0.75U	U	ug/L	1.0	0.75	0.33	SW846 8260C		12/20/17 11:34	DD	C
Toluene	0.75U	U	ug/L	1.0	0.75	0.33	SW846 8260C		12/20/17 11:34	DD	C
1,1,1-Trichloroethane	0.75U	U	ug/L	1.0	0.75	0.33	SW846 8260C		12/20/17 11:34	DD	C
1,1,2-Trichloroethane	0.75U	U	ug/L	1.0	0.75	0.33	SW846 8260C		12/20/17 11:34	DD	C
Trichloroethene	120	5	ug/L	1.0	0.75	0.33	SW846 8260C		12/20/17 11:34	DD	C
Vinyl Chloride	0.75U	U	ug/L	1.0	0.75	0.33	SW846 8260C		12/20/17 11:34	DD	C
Surrogate Recoveries	*Results*	*Flag*	*Units*	*Limits*			*Method*	*Prepared By*	*Analyzed*	*By*	*Cntr*
1,2-Dichloroethane-d4 (S)	107		%	81 - 118			SW846 8260C		12/20/17 11:34	DD	C
4-Bromofluorobenzene (S)	109		%	85 - 114			SW846 8260C		12/20/17 11:34	DD	C
Dibromofluoromethane (S)	100		%	80 - 119			SW846 8260C		12/20/17 11:34	DD	C
Toluene-d8 (S)	105		%	89 - 112			SW846 8260C		12/20/17 11:34	DD	C
LIGHT HYDROCARBON GASES											
Ethane	5.6	2	ug/L	1.0	0.50	0.25	RSK 175		12/19/17 03:28	EGO	A
Ethene	2.3	3	ug/L	1.5	0.75	0.31	RSK 175		12/19/17 03:28	EGO	A
Methane	233	1	ug/L	0.50	0.25	0.13	RSK 175		12/19/17 03:28	EGO	A
WET CHEMISTRY											
Alkalinity, Total	141	4	mg/L	5	5	0.8	S2320B-97		12/15/17 06:58	MSA	H
Chloride	28.2		mg/L	2.0	0.50	0.16	EPA 300.0		12/15/17 05:36	CHW	G
Nitrate-N	0.060U	U	mg/L	0.20	0.060	0.020	EPA 300.0		12/15/17 05:36	CHW	G
Sulfate	6.0		mg/L	2.0	0.50	0.20	EPA 300.0		12/15/17 05:36	CHW	G
Total Organic Carbon (TOC)	5.4J	J	mg/L	10.0	5.0	1.8	S5310B-00		12/19/17 15:44	PAG	D

Vanessa N. Badman

Mrs. Vanessa N Badman
Project Coordinator

ALS Environmental

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NELAP Certifications: NJ PA010 , NY 11759 , PA 22-293 DoD ELAP: A2LA 0818.01
State Certifications: DE ID 11 , MA PA0102 , MD 128 , VA 460157 , WV 343

ANALYTICAL RESULTS

Workorder: 2282982 ANL006|60440641

Lab ID: **2282982002** Date Collected: 12/13/2017 09:45 Matrix: Ground Water

Sample ID: **MW-33-121317** Date Received: 12/14/2017 09:55

Parameters	Results	Flag	Units	LOQ	LOD	DL	Method	Prepared By	Analyzed	By	Cntr
VOLATILE ORGANICS											
Carbon Tetrachloride	0.75U	U	ug/L	1.0	0.75	0.33	SW846 8260C		12/20/17 11:56	DD	B
1,1-Dichloroethane	0.75U	U	ug/L	1.0	0.75	0.33	SW846 8260C		12/20/17 11:56	DD	B
1,2-Dichloroethane	0.75U	U	ug/L	1.0	0.75	0.33	SW846 8260C		12/20/17 11:56	DD	B
1,1-Dichloroethene	0.75U	U	ug/L	1.0	0.75	0.33	SW846 8260C		12/20/17 11:56	DD	B
cis-1,2-Dichloroethene	0.75U	U	ug/L	1.0	0.75	0.33	SW846 8260C		12/20/17 11:56	DD	B
trans-1,2-Dichloroethene	0.75U	U	ug/L	1.0	0.75	0.33	SW846 8260C		12/20/17 11:56	DD	B
1,1,1,2-Tetrachloroethane	0.75U	U	ug/L	1.0	0.75	0.33	SW846 8260C		12/20/17 11:56	DD	B
1,1,2,2-Tetrachloroethane	0.75U	U	ug/L	1.0	0.75	0.33	SW846 8260C		12/20/17 11:56	DD	B
Tetrachloroethene	0.75U	U	ug/L	1.0	0.75	0.33	SW846 8260C		12/20/17 11:56	DD	B
Toluene	0.75U	U	ug/L	1.0	0.75	0.33	SW846 8260C		12/20/17 11:56	DD	B
1,1,1-Trichloroethane	0.75U	U	ug/L	1.0	0.75	0.33	SW846 8260C		12/20/17 11:56	DD	B
1,1,2-Trichloroethane	0.75U	U	ug/L	1.0	0.75	0.33	SW846 8260C		12/20/17 11:56	DD	B
Trichloroethene	142		ug/L	1.0	0.75	0.33	SW846 8260C		12/20/17 11:56	DD	B
Vinyl Chloride	0.75U	U	ug/L	1.0	0.75	0.33	SW846 8260C		12/20/17 11:56	DD	B
Surrogate Recoveries	*Results*	*Flag*	*Units*	*Limits*			*Method*	*Prepared By*	*Analyzed*	*By*	*Cntr*
1,2-Dichloroethane-d4 (S)	108		%	81 - 118			SW846 8260C		12/20/17 11:56	DD	B
4-Bromofluorobenzene (S)	108		%	85 - 114			SW846 8260C		12/20/17 11:56	DD	B
Dibromofluoromethane (S)	102		%	80 - 119			SW846 8260C		12/20/17 11:56	DD	B
Toluene-d8 (S)	103		%	89 - 112			SW846 8260C		12/20/17 11:56	DD	B
LIGHT HYDROCARBON GASES											
Ethane	0.50U	U	ug/L	1.0	0.50	0.25	RSK 175		12/19/17 04:01	EGO	A
Ethene	0.75U	U	ug/L	1.5	0.75	0.31	RSK 175		12/19/17 04:01	EGO	A
Methane	7.2		ug/L	0.50	0.25	0.13	RSK 175		12/19/17 04:01	EGO	A
WET CHEMISTRY											
Alkalinity, Total	212	1	mg/L	5	5	0.8	S2320B-97		12/15/17 07:08	MSA	H
Chloride	28.1		mg/L	2.0	0.50	0.16	EPA 300.0		12/15/17 05:52	CHW	G
Nitrate-N	0.32		mg/L	0.20	0.060	0.020	EPA 300.0		12/15/17 05:52	CHW	G
Sulfate	14.8		mg/L	2.0	0.50	0.20	EPA 300.0		12/15/17 05:52	CHW	G
Total Organic Carbon (TOC)	0.44J	J	mg/L	1.0	0.50	0.18	S5310B-00		12/19/17 15:44	PAG	D

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ANALYTICAL RESULTS

Workorder: 2282982 ANL006|60440641

Lab ID: **2282982003** Date Collected: 12/13/2017 11:20 Matrix: Ground Water

Sample ID: **MW-30-121317** Date Received: 12/14/2017 09:55

Parameters	Results	Flag	Units	LOQ	LOD	DL	Method	Prepared By	Analyzed	By	Cntr
VOLATILE ORGANICS											
Carbon Tetrachloride	0.75U	U	ug/L	1.0	0.75	0.33	SW846 8260C		12/20/17 12:18	DD	J
1,1-Dichloroethane	0.75U	U	ug/L	1.0	0.75	0.33	SW846 8260C		12/20/17 12:18	DD	J
1,2-Dichloroethane	0.75U	U	ug/L	1.0	0.75	0.33	SW846 8260C		12/20/17 12:18	DD	J
1,1-Dichloroethene	0.75U	U	ug/L	1.0	0.75	0.33	SW846 8260C		12/20/17 12:18	DD	J
cis-1,2-Dichloroethene	0.41J	J	ug/L	1.0	0.75	0.33	SW846 8260C		12/20/17 12:18	DD	J
trans-1,2-Dichloroethene	0.75U	U	ug/L	1.0	0.75	0.33	SW846 8260C		12/20/17 12:18	DD	J
1,1,1,2-Tetrachloroethane	0.75U	U	ug/L	1.0	0.75	0.33	SW846 8260C		12/20/17 12:18	DD	J
1,1,2,2-Tetrachloroethane	0.75U	U	ug/L	1.0	0.75	0.33	SW846 8260C		12/20/17 12:18	DD	J
Tetrachloroethene	0.75U	U	ug/L	1.0	0.75	0.33	SW846 8260C		12/20/17 12:18	DD	J
Toluene	0.75U	U	ug/L	1.0	0.75	0.33	SW846 8260C		12/20/17 12:18	DD	J
1,1,1-Trichloroethane	0.75U	U	ug/L	1.0	0.75	0.33	SW846 8260C		12/20/17 12:18	DD	J
1,1,2-Trichloroethane	0.75U	U	ug/L	1.0	0.75	0.33	SW846 8260C		12/20/17 12:18	DD	J
Trichloroethene	19.6		ug/L	1.0	0.75	0.33	SW846 8260C		12/20/17 12:18	DD	J
Vinyl Chloride	0.75U	U	ug/L	1.0	0.75	0.33	SW846 8260C		12/20/17 12:18	DD	J
Surrogate Recoveries	*Results*	*Flag*	*Units*	*Limits*			*Method*	*Prepared By*	*Analyzed*	*By*	*Cntr*
1,2-Dichloroethane-d4 (S)	108		%	81 - 118			SW846 8260C		12/20/17 12:18	DD	J
4-Bromofluorobenzene (S)	108		%	85 - 114			SW846 8260C		12/20/17 12:18	DD	J
Dibromofluoromethane (S)	98.9		%	80 - 119			SW846 8260C		12/20/17 12:18	DD	J
Toluene-d8 (S)	104		%	89 - 112			SW846 8260C		12/20/17 12:18	DD	J
LIGHT HYDROCARBON GASES											
Ethane	40.5		ug/L	1.0	0.50	0.25	RSK 175		12/19/17 04:18	EGO	A
Ethene	4.2		ug/L	1.5	0.75	0.31	RSK 175		12/19/17 04:18	EGO	A
Methane	12900		ug/L	1.0	0.50	0.26	RSK 175		12/19/17 06:17	EGO	A
WET CHEMISTRY											
Alkalinity, Total	347	1	mg/L	5	5	0.8	S2320B-97		12/15/17 07:18	MSA	H
Chloride	87.3		mg/L	2.0	0.50	0.16	EPA 300.0		12/15/17 06:08	CHW	G
Nitrate-N	0.060U	U	mg/L	0.20	0.060	0.020	EPA 300.0		12/15/17 06:08	CHW	G
Sulfate	0.22J	J	mg/L	2.0	0.50	0.20	EPA 300.0		12/15/17 06:08	CHW	G
Total Organic Carbon (TOC)	366		mg/L	50.0	25.0	9.2	S5310B-00		12/19/17 15:44	PAG	D

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ANALYTICAL RESULTS

Workorder: 2282982 ANL006|60440641

Lab ID: **2282982004** Date Collected: 12/13/2017 12:15 Matrix: Ground Water

Sample ID: **MW-31-121317** Date Received: 12/14/2017 09:55

Parameters	Results	Flag	Units	LOQ	LOD	DL	Method	Prepared By	Analyzed	By	Cntr
VOLATILE ORGANICS											
Carbon Tetrachloride	0.75U	U	ug/L	1.0	0.75	0.33	SW846 8260C		12/20/17 12:40	DD	B
1,1-Dichloroethane	0.75U	U	ug/L	1.0	0.75	0.33	SW846 8260C		12/20/17 12:40	DD	B
1,2-Dichloroethane	0.75U	U	ug/L	1.0	0.75	0.33	SW846 8260C		12/20/17 12:40	DD	B
1,1-Dichloroethene	0.75U	U	ug/L	1.0	0.75	0.33	SW846 8260C		12/20/17 12:40	DD	B
cis-1,2-Dichloroethene	0.40J	J	ug/L	1.0	0.75	0.33	SW846 8260C		12/20/17 12:40	DD	B
trans-1,2-Dichloroethene	0.75U	U	ug/L	1.0	0.75	0.33	SW846 8260C		12/20/17 12:40	DD	B
1,1,1,2-Tetrachloroethane	0.75U	U	ug/L	1.0	0.75	0.33	SW846 8260C		12/20/17 12:40	DD	B
1,1,2,2-Tetrachloroethane	0.75U	U	ug/L	1.0	0.75	0.33	SW846 8260C		12/20/17 12:40	DD	B
Tetrachloroethene	0.75U	U	ug/L	1.0	0.75	0.33	SW846 8260C		12/20/17 12:40	DD	B
Toluene	0.75U	U	ug/L	1.0	0.75	0.33	SW846 8260C		12/20/17 12:40	DD	B
1,1,1-Trichloroethane	0.75U	U	ug/L	1.0	0.75	0.33	SW846 8260C		12/20/17 12:40	DD	B
1,1,2-Trichloroethane	0.75U	U	ug/L	1.0	0.75	0.33	SW846 8260C		12/20/17 12:40	DD	B
Trichloroethene	19.6		ug/L	1.0	0.75	0.33	SW846 8260C		12/20/17 12:40	DD	B
Vinyl Chloride	0.75U	U	ug/L	1.0	0.75	0.33	SW846 8260C		12/20/17 12:40	DD	B
Surrogate Recoveries	*Results*	*Flag*	*Units*	*Limits*			*Method*	*Prepared By*	*Analyzed*	*By*	*Cntr*
1,2-Dichloroethane-d4 (S)	106		%	81 - 118			SW846 8260C		12/20/17 12:40	DD	B
4-Bromofluorobenzene (S)	107		%	85 - 114			SW846 8260C		12/20/17 12:40	DD	B
Dibromofluoromethane (S)	99.8		%	80 - 119			SW846 8260C		12/20/17 12:40	DD	B
Toluene-d8 (S)	103		%	89 - 112			SW846 8260C		12/20/17 12:40	DD	B
LIGHT HYDROCARBON GASES											
Ethane	3.3		ug/L	1.0	0.50	0.25	RSK 175		12/19/17 04:35	EGO	A
Ethene	1.9		ug/L	1.5	0.75	0.31	RSK 175		12/19/17 04:35	EGO	A
Methane	59.4		ug/L	0.50	0.25	0.13	RSK 175		12/19/17 04:35	EGO	A
WET CHEMISTRY											
Alkalinity, Total	119	1	mg/L	5	5	0.8	S2320B-97		12/15/17 07:28	MSA	H
Chloride	36.3		mg/L	2.0	0.50	0.16	EPA 300.0		12/15/17 06:24	CHW	G
Nitrate-N	0.060U	U	mg/L	0.20	0.060	0.020	EPA 300.0		12/15/17 06:24	CHW	G
Sulfate	7.8		mg/L	2.0	0.50	0.20	EPA 300.0		12/15/17 06:24	CHW	G
Total Organic Carbon (TOC)	1.3		mg/L	1.0	0.50	0.18	S5310B-00		12/19/17 15:44	PAG	D

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ANALYTICAL RESULTS

Workorder: 2282982 ANL006|60440641

PARAMETER QUALIFIERS

Lab ID	#	Sample ID	Analytical Method	Analyte
2282982001	1	MW-32-121317	RSK 175	Methane
The QC sample type DUP for method RSK 175 was outside the control limits for the analyte Methane. The RPD was reported as 89.5 and the upper control limit is 20.				
2282982001	2	MW-32-121317	RSK 175	Ethane
The QC sample type DUP for method RSK 175 was outside the control limits for the analyte Ethane. The RPD was reported as 94.1 and the upper control limit is 20.				
2282982001	3	MW-32-121317	RSK 175	Ethene
The QC sample type DUP for method RSK 175 was outside the control limits for the analyte Ethene. The RPD was reported as 69 and the upper control limit is 20.				
2282982001	4	MW-32-121317	S2320B-97	Alkalinity, Total
The Total Alkalinity is titrated to a pH of 4.5 and reported as mg CaCO3/L.				
2282982001	5	MW-32-121317	SW846 8260C	Trichloroethene
The QC sample type MS for method SW846 8260C was outside the control limits for the analyte Trichloroethene. The % Recovery was reported as 141 and the control limits were 79 to 123.				
2282982002	1	MW-33-121317	S2320B-97	Alkalinity, Total
The Total Alkalinity is titrated to a pH of 4.5 and reported as mg CaCO3/L.				
2282982003	1	MW-30-121317	S2320B-97	Alkalinity, Total
The Total Alkalinity is titrated to a pH of 4.5 and reported as mg CaCO3/L.				
2282982004	1	MW-31-121317	S2320B-97	Alkalinity, Total
The Total Alkalinity is titrated to a pH of 4.5 and reported as mg CaCO3/L.				

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QUALITY CONTROL DATA

Workorder: 2282982 ANL006|60440641

QC Batch: SVGC/47651 **Analysis Method:** RSK 175

QC Batch Method: RSK 175

Associated Lab Samples: 2282982001, 2282982002, 2282982003, 2282982004

METHOD BLANK: 2662303

Parameter	Blank Result	Units	Reporting Limit
Ethane	0.50U	ug/L	1.0
Ethene	0.75U	ug/L	1.5
Methane	0.15J	ug/L	0.50

SAMPLE DUPLICATE: 2662304 ORIGINAL: 2282785005

Parameter	Original Result	Units	DUP Result	RPD	Max RPD
Ethane	0	ug/L	0	NC	20
Ethene	0	ug/L	0	NC	20
Methane	7.93	ug/L	7.09	11.2	20

SAMPLE DUPLICATE: 2662305 ORIGINAL: 2282982001

Parameter	Original Result	Units	DUP Result	RPD	Max RPD
Ethane	5.55	ug/L	15.42	94.1*	20
Ethene	2.26	ug/L	4.64	69*	20
Methane	233.23	ug/L	611.11	89.5*	20

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QUALITY CONTROL DATA

Workorder: 2282982 ANL006|60440641

QC Batch: VOMS/45453 **Analysis Method:** SW846 8260C

QC Batch Method: SW846 8260C

Associated Lab Samples: 2282982001, 2282982002, 2282982003, 2282982004

METHOD BLANK: 2663538

Parameter	Blank Result	Units	Reporting Limit
Carbon Tetrachloride	0.75U	ug/L	1.0
1,1-Dichloroethane	0.75U	ug/L	1.0
1,2-Dichloroethane	0.75U	ug/L	1.0
1,1-Dichloroethene	0.75U	ug/L	1.0
cis-1,2-Dichloroethene	0.75U	ug/L	1.0
trans-1,2-Dichloroethene	0.75U	ug/L	1.0
1,1,1,2-Tetrachloroethane	0.75U	ug/L	1.0
1,1,2,2-Tetrachloroethane	0.75U	ug/L	1.0
Tetrachloroethene	0.75U	ug/L	1.0
Toluene	0.75U	ug/L	1.0
1,1,1-Trichloroethane	0.75U	ug/L	1.0
1,1,2-Trichloroethane	0.75U	ug/L	1.0
Trichloroethene	0.75U	ug/L	1.0
Vinyl Chloride	0.75U	ug/L	1.0
1,2-Dichloroethane-d4 (S)	107	%	81 - 118
4-Bromofluorobenzene (S)	107	%	85 - 114
Dibromofluoromethane (S)	98.8	%	80 - 119
Toluene-d8 (S)	103	%	89 - 112

LABORATORY CONTROL SAMPLE: 2663539

Parameter	LCS % Rec	Units	Spike Conc.	LCS Result	% Rec Limit
Carbon Tetrachloride	93.2	ug/L	20	18.6	72 - 136
1,1-Dichloroethane	101	ug/L	20	20.2	77 - 125
1,2-Dichloroethane	99.2	ug/L	20	19.8	73 - 128
1,1-Dichloroethene	103	ug/L	20	20.7	71 - 131
cis-1,2-Dichloroethene	99	ug/L	20	19.8	78 - 123
trans-1,2-Dichloroethene	104	ug/L	20	20.9	75 - 124
1,1,1,2-Tetrachloroethane	106	ug/L	20	21.3	78 - 124
1,1,2,2-Tetrachloroethane	102	ug/L	20	20.5	71 - 121
Tetrachloroethene	110	ug/L	20	21.9	74 - 129
Toluene	104	ug/L	20	20.7	80 - 121
1,1,1-Trichloroethane	108	ug/L	20	21.6	74 - 131
1,1,2-Trichloroethane	103	ug/L	20	20.6	80 - 119
Trichloroethene	96.6	ug/L	20	19.3	79 - 123

QUALITY CONTROL DATA

Workorder: 2282982 ANL006|60440641

Vinyl Chloride	103	ug/L	20	20.5	58 - 137
1,2-Dichloroethane-d4 (S)	108	%			81 - 118
4-Bromofluorobenzene (S)	107	%			85 - 114
Dibromofluoromethane (S)	104	%			80 - 119
Toluene-d8 (S)	103	%			89 - 112

MATRIX SPIKE: 2663540 DUPLICATE: 2663541 ORIGINAL: 2282982001

****NOTE - The Original Result shown below is a raw result and is only used for the purpose of calculating Matrix Spike percent recoveries. This result is not a final value and cannot be used as such.

Parameter	Original Result	Units	Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limit	RPD	Max RPD
Carbon Tetrachloride	0	ug/L	20	20.1399	19.5739	101	97.9	72 - 136	2.85	30
1,1-Dichloroethane	0	ug/L	20	20.8717	20.0455	104	100	77 - 125	4.04	30
1,2-Dichloroethane	0	ug/L	20	20.4254	19.9252	102	99.6	73 - 128	2.48	30
1,1-Dichloroethene	0	ug/L	20	22.2394	20.9281	111	105	71 - 131	6.08	30
cis-1,2-Dichloroethene	.6766	ug/L	20	21.262	20.0375	103	96.8	78 - 123	5.93	30
trans-1,2-Dichloroethene	.29568	ug/L	20	22.8443	21.4083	113	106	75 - 124	6.49	30
1,1,1,2-Tetrachloroethane	0	ug/L	20	21.6903	21.0336	108	105	78 - 124	3.07	30
1,1,2,2-Tetrachloroethane	0	ug/L	20	20.888	20.2452	104	101	71 - 121	3.13	30
Tetrachloroethene	0	ug/L	20	22.4306	22.4855	112	112	74 - 129	.24	30
Toluene	0	ug/L	20	21.0495	20.3688	105	102	80 - 121	3.29	30
1,1,1-Trichloroethane	0	ug/L	20	23.0172	21.8957	115	109	74 - 131	4.99	30
1,1,2-Trichloroethane	0	ug/L	20	21.0909	20.6254	105	103	80 - 119	2.23	30
Trichloroethene	119.829	ug/L	20	148.106	138.752	NC	NC	79 - 123	6.52	30
Vinyl Chloride	0	ug/L	20	22.6834	21.2031	113	106	58 - 137	6.75	30
1,2-Dichloroethane-d4 (S)	110	%				110	108	81 - 118		
4-Bromofluorobenzene (S)	106	%				106	106	85 - 114		
Dibromofluoromethane (S)	101	%				101	103	80 - 119		
Toluene-d8 (S)	102	%				102	102	89 - 112		

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QUALITY CONTROL DATA

Workorder: 2282982 ANL006|60440641

QC Batch: WETC/197653 **Analysis Method:** S2320B-97

QC Batch Method: S2320B-97

Associated Lab Samples: 2282982001, 2282982002, 2282982003, 2282982004

METHOD BLANK: 2660509

Parameter	Blank Result	Units	Reporting Limit
Alkalinity, Total	2J	mg/L	5

SAMPLE DUPLICATE: 2660514 ORIGINAL: 2282785005

Parameter	Original Result	Units	DUP Result	RPD	Max RPD
Alkalinity, Total	209.61745	mg/L	208.13216	.71	20

METHOD BLANK: 2660517

Parameter	Blank Result	Units	Reporting Limit
Alkalinity, Total	2J	mg/L	5

SAMPLE DUPLICATE: 2660518 ORIGINAL: 2282836001

Parameter	Original Result	Units	DUP Result	RPD	Max RPD
Alkalinity, Total	83.52351	mg/L	81.95883	1.89	20

METHOD BLANK: 2660521

Parameter	Blank Result	Units	Reporting Limit
Alkalinity, Total	2J	mg/L	5

SAMPLE DUPLICATE: 2660522 ORIGINAL: 2282973001

Parameter	Original Result	Units	DUP Result	RPD	Max RPD

QUALITY CONTROL DATA

Workorder: 2282982 ANL006|60440641

Alkalinity, Total	155.50861	mg/L	164.00923	5.32	20

METHOD BLANK: 2660525

Parameter	Blank Result	Units	Reporting Limit
Alkalinity, Total	2J	mg/L	5

SAMPLE DUPLICATE: 2660526 ORIGINAL: 2282976001

Parameter	Original Result	Units	DUP Result	RPD	Max RPD
Alkalinity, Total	258.27353	mg/L	249.76445	3.35	20

METHOD BLANK: 2660529

Parameter	Blank Result	Units	Reporting Limit
Alkalinity, Total	2J	mg/L	5

SAMPLE DUPLICATE: 2660530 ORIGINAL: 2283013001

Parameter	Original Result	Units	DUP Result	RPD	Max RPD
Alkalinity, Total	13.1013	mg/L	13.25463	1.16	20

METHOD BLANK: 2660533

Parameter	Blank Result	Units	Reporting Limit
Alkalinity, Total	2J	mg/L	5

SAMPLE DUPLICATE: 2660534 ORIGINAL: 2283013008

Parameter	Original Result	Units	DUP Result	RPD	Max RPD
Alkalinity, Total	12.73502	mg/L	13.1689	3.35	20

QUALITY CONTROL DATA

Workorder: 2282982 ANL006|60440641

METHOD BLANK: 2660685

Parameter	Blank Result	Units	Reporting Limit
Alkalinity, Total	2J	mg/L	5

SAMPLE DUPLICATE: 2660686 ORIGINAL: 2283041001

Parameter	Original Result	Units	DUP Result	RPD	Max RPD
Alkalinity, Total	515.20416	mg/L	493.01376	4.4	20

METHOD BLANK: 2660689

Parameter	Blank Result	Units	Reporting Limit
Alkalinity, Total	1J	mg/L	5

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QUALITY CONTROL DATA

Workorder: 2282982 ANL006|60440641

QC Batch: WETC/197660 **Analysis Method:** EPA 300.0

QC Batch Method: EPA 300.0

Associated Lab Samples: 2282982001, 2282982002, 2282982003, 2282982004

METHOD BLANK: 2660659

Parameter	Blank Result	Units	Reporting Limit
Chloride	0.25U	mg/L	1.0
Nitrate-N	0.030U	mg/L	0.10
Sulfate	0.25U	mg/L	1.0

LABORATORY CONTROL SAMPLE: 2660661

Parameter	LCS % Rec	Units	Spike Conc.	LCS Result	% Rec Limit
Chloride	103	mg/L	20	20.6	87 - 111
Nitrate-N	98.8	mg/L	2.5	2.5	88 - 111
Sulfate	102	mg/L	20	20.4	87 - 112

METHOD BLANK: 2660899

Parameter	Blank Result	Units	Reporting Limit
Chloride	0.15J	mg/L	1.0
Nitrate-N	0.030U	mg/L	0.10
Sulfate	0.25U	mg/L	1.0

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QUALITY CONTROL DATA

Workorder: 2282982 ANL006|60440641

QC Batch: WETC/197832 **Analysis Method:** S5310B-00

QC Batch Method: 415.1/9060/5310B

Associated Lab Samples: 2282982001, 2282982002, 2282982003, 2282982004

METHOD BLANK: 2662782

Parameter	Blank Result	Units	Reporting Limit
Total Organic Carbon (TOC)	0.20J	mg/L	1.0

LABORATORY CONTROL SAMPLE: 2662783

Parameter	LCS % Rec	Units	Spike Conc.	LCS Result	% Rec Limit
Total Organic Carbon (TOC)	108	mg/L	1	1.1	85 - 115

MATRIX SPIKE: 2662784 DUPLICATE: 2662785 ORIGINAL: 2283142002

****NOTE - The Original Result shown below is a raw result and is only used for the purpose of calculating Matrix Spike percent recoveries. This result is not a final value and cannot be used as such.

Parameter	Original Result	Units	Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limit	RPD	Max RPD
Total Organic Carbon (TOC)	1.857	mg/L	6	7.846	7.67	99.8	96.9	85 - 115	2.27	20

MATRIX SPIKE: 2662786 DUPLICATE: 2662787 ORIGINAL: 2283291001

****NOTE - The Original Result shown below is a raw result and is only used for the purpose of calculating Matrix Spike percent recoveries. This result is not a final value and cannot be used as such.

Parameter	Original Result	Units	Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limit	RPD	Max RPD
Total Organic Carbon (TOC)	.983	mg/L	6	6.973	6.978	99.8	99.9	85 - 115	.07	20

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QUALITY CONTROL DATA CROSS REFERENCE TABLE

Workorder: 2282982 ANL006|60440641

Lab ID	Sample ID	Prep Method	Prep Batch	Analysis Method	Analysis Batch
2282982001	MW-32-121317			S2320B-97	WETC/197653
2282982002	MW-33-121317			S2320B-97	WETC/197653
2282982003	MW-30-121317			S2320B-97	WETC/197653
2282982004	MW-31-121317			S2320B-97	WETC/197653
2282982001	MW-32-121317			EPA 300.0	WETC/197660
2282982002	MW-33-121317			EPA 300.0	WETC/197660
2282982003	MW-30-121317			EPA 300.0	WETC/197660
2282982004	MW-31-121317			EPA 300.0	WETC/197660
2282982001	MW-32-121317			RSK 175	SVGC/47651
2282982002	MW-33-121317			RSK 175	SVGC/47651
2282982003	MW-30-121317			RSK 175	SVGC/47651
2282982004	MW-31-121317			RSK 175	SVGC/47651
2282982001	MW-32-121317			S5310B-00	WETC/197832
2282982002	MW-33-121317			S5310B-00	WETC/197832
2282982003	MW-30-121317			S5310B-00	WETC/197832
2282982004	MW-31-121317			S5310B-00	WETC/197832
2282982001	MW-32-121317			SW846 8260C	VOMS/45453
2282982002	MW-33-121317			SW846 8260C	VOMS/45453
2282982003	MW-30-121317			SW846 8260C	VOMS/45453
2282982004	MW-31-121317			SW846 8260C	VOMS/45453

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CHAIN OF CUSTODY/ REQUEST FOR ANALYSIS

ALL SHADED AREAS MUST BE COMPLETED BY THE CLIENT / SAMPLER. INSTRUCTIONS ON THE BACK.

Page ___ of ___
Courier:
Tracking #: GH 1683102876

2282982

Co. Name: AECOM
Contact (Report to): John Santacroce   Phone: 518 951 2200
Address: 40 British American Blvd
Latham, NY

Bill to (if different than Report to):   PO#:

Project Name/#: 60440641   ALS Quote #:

TAT: [✓] Normal-Standard TAT is 10-12 business days. [ ] Rush-Subject to ALS approval and surcharges.
Date Required:
Approved By:

Email? [✓] Y John.Santacroce@aecom.com
Fax? [ ] Y No:

***Container Type	VOA	VOA	VOA	PL	PL
***Container Size	40	40	40	8 oz	8 oz
***Preservative	HCL	-	HCL	-	-

ANALYSES/METHOD REQUESTED

Sample Description/Location (as it will appear on the lab report)	COC Comments	Sample Date	Military Time	*G or C	**Matrix	8260C	TOC	TCSK 175	Cl, SO4, NO3	Alkalinity
1 MW-32 121317		12/13/17	841	G	GW	x3	x3	x3	x1	x1
2 MW-33 121317	no times cw 12-14	↓	945	↓	↓	x3	x3	x3	x1	x1
3 MW-36 121317	8260	↓	1120	↓	↓	x3	x3	x3	x1	x1
4 MW-31 121317	31 8260 no time labeled	↓	1215	↓	↓	x3	x3	x3	x1	x1
5 Trip Blank	Did not receive trip blank	-	-	-	-	x1				
6										
7										
8										

Enter Number of Containers Per Analysis

(completed by Sample Receiver)
Relinquished by: [signature]
Cooler Temp: 0°
Therm. ID: 402
No. of Coolers:
Notes:

Circle appropriate Y or N.

	Y	N
Correct containers?	(Y)	N
Correct sample volume?	(Y)	N
Correct preservation?	(Y)	N
Headspace/Volatiles?	Y	(N)
Custody seals Present?	(Y)	N
(if present) Seals Intact?	(Y)	N
Received on Ice?	(Y)	N
COC/Labels complete/accurate?	Y	(N)
Container in good condition?	(Y)	N

SAMPLED BY (Please Print): Ross McCready

Project Comments:

Relinquished By / Company Name	Date	Time	Received By / Company Name	Date	Time
1 Ross McCready [signature]	12/12/17	1300	2 [signature]	12/13/17	1300
3 [signature]	12/13/17	1400	4 [signature]	12-14	0955
5			6		
7			8		
9			10		

Data Deliverables: [✓] Standard [ ] CLP-like [ ] NJ-Reduced [ ] NJ-Full [ ] See QAPP
EDDs Required? [ ] If yes, format type: See QAPP

SDWA Forms? yes [ ] yes [ ] yes [ ] yes [ ]
State Samples Collected In? MD [ ] NJ [ ] NY [ ] PA [ ]
Other: See QAPP
⇐Enter PWSID No
DOD Criteria Required?

ALS FIELD SERVICES
[ ] Pickup
[ ] Labor
[ ] Composite Sampling
[ ] Rental Equipment
[ ] Other:

* G=Grab; C=Composite
**Matrix: AI=Air; DW=Drinking Water; GW=Groundwater; OI=Oil; OL=Other Liquid; SL=Sludge; SO=Soil; WP=Wipe; WW=Wastewater
***Container Type: AG-Amber Glass; CG-Clear Glass, PL-Plastic. Container Size: 250ml, 500ml, 1L, 8oz., etc. Preservative: HCl, HNO3, NaOH, etc.

Copies: WHITE - ORIGINAL CANARY - CUSTOMER COPY
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December 28, 2017

Mr. John Santacroce
AECOM - LATHAM NY
40 British American Blvd.
Albany, NY 12210

Certificate of Analysis

Project Name:	**2015-SCOTIA NAVY DEPOT-PO 60440641**	Workorder:	**2283331**
Purchase Order:	**66432/60440641.11**	Workorder ID:	**ASN030|Scotia Navy Depot 60440**

Dear Mr. Santacroce:

Enclosed are the analytical results for samples received by the laboratory on Friday, December 15, 2017.

The ALS Environmental laboratory in Middletown, Pennsylvania is a National Environmental Laboratory Accreditation Program (NELAP) accredited laboratory and as such, certifies that all applicable test results meet the requirements of NELAP.

If you have any questions regarding this certificate of analysis, please contact Mrs. Vanessa N Badman (Project Coordinator) at (717) 944-5541.

Analyses were performed according to our laboratory's NELAP-approved quality assurance program and any applicable state requirements. The test results meet requirements of the current NELAP standards or state requirements, where applicable. For a specific list of accredited analytes, refer to the certifications section of the ALS website at www.alsglobal.com/en/Our-Services/Life-Sciences/Environmental/Downloads.

ALS Spring City: 10 Riverside Drive, Spring City, PA 19475 610-948-4903

CC: Ms. Kelly Lurie , Mr. Scott Underhill

This page is included as part of the Analytical Report and must be retained as a permanent record thereof.

Vanessa N. Badman
Mrs. Vanessa N Badman
Project Coordinator

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SAMPLE SUMMARY

Workorder: 2283331 ASN030|Scotia Navy Depot 60440

Lab ID	Sample ID	Matrix	Date Collected	Date Received	Collected By
2283331001	MW-28 121417	Ground Water	12/14/2017 09:25	12/15/2017 09:30	Collected by Client
2283331002	MW-29 121417	Ground Water	12/14/2017 10:10	12/15/2017 09:30	Collected by Client
2283331003	MW-15 121417	Ground Water	12/14/2017 11:01	12/15/2017 09:30	Collected by Client
2283331004	DUP-2 121417	Ground Water	12/14/2017 00:00	12/15/2017 09:30	Collected by Client
2283331005	TRIP BLANK	Ground Water	12/15/2017 09:30	12/15/2017 09:30	Collected by Client

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SAMPLE SUMMARY

Workorder: 2283331 ASN030|Scotia Navy Depot 60440

Notes

-- Samples collected by ALS personnel are done so in accordance with the procedures set forth in the ALS Field Sampling Plan (20 - Field Services Sampling Plan).
-- All Waste Water analyses comply with methodology requirements of 40 CFR Part 136.
-- All Drinking Water analyses comply with methodology requirements of 40 CFR Part 141.
-- Unless otherwise noted, all quantitative results for soils are reported on a dry weight basis.
-- The Chain of Custody document is included as part of this report.
-- All Library Search analytes should be regarded as tentative identifications based on the presumptive evidence of the mass spectra. Concentrations reported are estimated values.
-- Parameters identified as "analyze immediately" require analysis within 15 minutes of collection. Any "analyze immediately" parameters not listed under the header "Field Parameters" are preformed in the laboratory and are therefore analyzed out of hold time.
-- Method references listed on this report beginning with the prefix "S" followed by a method number (such as S2310B-97) refer to methods from "Standard Methods for the Examination of Water and Wastewater".
-- For microbiological analyses, the "Prepared" value is the date/time into the incurbator and the "Analyzed" value is the date/time out the incubator.

Standard Acronyms/Flags

J	Indicates an estimated value between the Method Detection Limit (MDL) and the Practical Quantitation Limit (PQL) for the analyte
U	Indicates that the analyte was Not Detected (ND)
N	Indicates presumptive evidence of the presence of a compound
MDL	Method Detection Limit
PQL	Practical Quantitation Limit
RDL	Reporting Detection Limit
ND	Not Detected - indicates that the analyte was Not Detected at the RDL
Cntr	Analysis was performed using this container
RegLmt	Regulatory Limit
LCS	Laboratory Control Sample
MS	Matrix Spike
MSD	Matrix Spike Duplicate
DUP	Sample Duplicate
%Rec	Percent Recovery
RPD	Relative Percent Difference
LOD	DoD Limit of Detection
LOQ	DoD Limit of Quantitation
DL	DoD Detection Limit
I	Indicates reported value is greater than or equal to the Method Detection Limit (MDL) but less than the Report Detection Limit (RDL)
(S)	Surrogate Compound
NC	Not Calculated
*	Result outside of QC limits

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PROJECT SUMMARY

Workorder: 2283331 ASN030|Scotia Navy Depot 60440

Sample Comments

Lab ID: 2283331001 **Sample ID:** MW-28 121417 **Sample Type:** SAMPLE

A positive residual chlorine result was detected in the preservation check for the volatile organics analysis of this sample. This may be due to the presence of residual chlorine or another oxidizing agent.

Lab ID: 2283331004 **Sample ID:** DUP-2 121417 **Sample Type:** SAMPLE

This sample was extracted for the RSK-175 analysis. The SOP states that the sample must have a pH < 2. The pH of this sample was > 2.

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ANALYTICAL RESULTS

Workorder: 2283331 ASN030|Scotia Navy Depot 60440

Lab ID: **2283331001** Date Collected: 12/14/2017 09:25 Matrix: Ground Water

Sample ID: **MW-28 121417** Date Received: 12/15/2017 09:30

Parameters	Results	Flag	Units	LOQ	LOD	DL	Method	Prepared By	Analyzed	By	Cntr
VOLATILE ORGANICS											
Carbon Tetrachloride	0.57J	J	ug/L	1.0	0.75	0.33	SW846 8260C		12/20/17 13:02	DD	A
1,1-Dichloroethane	0.84J	J	ug/L	1.0	0.75	0.33	SW846 8260C		12/20/17 13:02	DD	A
1,2-Dichloroethane	0.75U	U	ug/L	1.0	0.75	0.33	SW846 8260C		12/20/17 13:02	DD	A
1,1-Dichloroethene	0.45J	J	ug/L	1.0	0.75	0.33	SW846 8260C		12/20/17 13:02	DD	A
cis-1,2-Dichloroethene	5.0		ug/L	1.0	0.75	0.33	SW846 8260C		12/20/17 13:02	DD	A
trans-1,2-Dichloroethene	0.49J	J	ug/L	1.0	0.75	0.33	SW846 8260C		12/20/17 13:02	DD	A
1,1,1,2-Tetrachloroethane	0.75U	U	ug/L	1.0	0.75	0.33	SW846 8260C		12/20/17 13:02	DD	A
1,1,2,2-Tetrachloroethane	0.75U	U	ug/L	1.0	0.75	0.33	SW846 8260C		12/20/17 13:02	DD	A
Tetrachloroethene	45.2		ug/L	1.0	0.75	0.33	SW846 8260C		12/20/17 13:02	DD	A
Toluene	0.75U	U	ug/L	1.0	0.75	0.33	SW846 8260C		12/20/17 13:02	DD	A
1,1,1-Trichloroethane	9.5		ug/L	1.0	0.75	0.33	SW846 8260C		12/20/17 13:02	DD	A
1,1,2-Trichloroethane	0.33J	J	ug/L	1.0	0.75	0.33	SW846 8260C		12/20/17 13:02	DD	A
Trichloroethene	201		ug/L	5.0	3.8	1.7	SW846 8260C		12/21/17 22:51	CJG	B
Vinyl Chloride	0.75U	U	ug/L	1.0	0.75	0.33	SW846 8260C		12/20/17 13:02	DD	A
Surrogate Recoveries	*Results*	*Flag*	*Units*	*Limits*			*Method*	*Prepared By*	*Analyzed*	*By*	*Cntr*
1,2-Dichloroethane-d4 (S)	108		%	81 - 118			SW846 8260C		12/21/17 22:51	CJG	B
1,2-Dichloroethane-d4 (S)	106		%	81 - 118			SW846 8260C		12/20/17 13:02	DD	A
4-Bromofluorobenzene (S)	108		%	85 - 114			SW846 8260C		12/20/17 13:02	DD	A
4-Bromofluorobenzene (S)	109		%	85 - 114			SW846 8260C		12/21/17 22:51	CJG	B
Dibromofluoromethane (S)	99.9		%	80 - 119			SW846 8260C		12/20/17 13:02	DD	A
Dibromofluoromethane (S)	99.1		%	80 - 119			SW846 8260C		12/21/17 22:51	CJG	B
Toluene-d8 (S)	104		%	89 - 112			SW846 8260C		12/21/17 22:51	CJG	B
Toluene-d8 (S)	104		%	89 - 112			SW846 8260C		12/20/17 13:02	DD	A
LIGHT HYDROCARBON GASES											
Ethane	0.50U	U	ug/L	1.0	0.50	0.25	RSK 175		12/19/17 05:27	EGO	D
Ethene	0.75U	U	ug/L	1.5	0.75	0.31	RSK 175		12/19/17 05:27	EGO	D
Methane	0.38J	J	ug/L	0.50	0.25	0.13	RSK 175		12/19/17 05:27	EGO	D
WET CHEMISTRY											
Alkalinity, Total	383	1	mg/L	5	5	0.8	S2320B-97		12/16/17 17:41	MSA	K
Chloride	20.4		mg/L	2.0	0.50	0.16	EPA 300.0		12/16/17 05:45	CHW	J
Nitrate-N	1.2		mg/L	0.20	0.060	0.020	EPA 300.0		12/16/17 05:45	CHW	J
Sulfate	22.4		mg/L	2.0	0.50	0.20	EPA 300.0		12/16/17 05:45	CHW	J
Total Organic Carbon (TOC)	0.94J	J	mg/L	1.0	0.50	0.18	S5310B-00		12/20/17 12:11	PAG	G

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ANALYTICAL RESULTS

Workorder: 2283331 ASN030|Scotia Navy Depot 60440

Lab ID: **2283331001** Date Collected: 12/14/2017 09:25 Matrix: Ground Water

Sample ID: **MW-28 121417** Date Received: 12/15/2017 09:30

Parameters	Results	Flag	Units	LOQ	LOD	DL	Method	Prepared By	Analyzed	By	Cntr

Vanessa N. Badman

Mrs. Vanessa N Badman
Project Coordinator

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ANALYTICAL RESULTS

Workorder: 2283331 ASN030|Scotia Navy Depot 60440

Lab ID: **2283331002** Date Collected: 12/14/2017 10:10 Matrix: Ground Water

Sample ID: **MW-29 121417** Date Received: 12/15/2017 09:30

Parameters	Results	Flag	Units	LOQ	LOD	DL	Method	Prepared By	Analyzed	By	Cntr
VOLATILE ORGANICS											
Carbon Tetrachloride	0.71J	J	ug/L	1.0	0.75	0.33	SW846 8260C		12/20/17 14:08	DD	A
1,1-Dichloroethane	0.88J	J	ug/L	1.0	0.75	0.33	SW846 8260C		12/20/17 14:08	DD	A
1,2-Dichloroethane	0.75U	U	ug/L	1.0	0.75	0.33	SW846 8260C		12/20/17 14:08	DD	A
1,1-Dichloroethene	0.96J	J	ug/L	1.0	0.75	0.33	SW846 8260C		12/20/17 14:08	DD	A
cis-1,2-Dichloroethene	5.7		ug/L	1.0	0.75	0.33	SW846 8260C		12/20/17 14:08	DD	A
trans-1,2-Dichloroethene	0.62J	J	ug/L	1.0	0.75	0.33	SW846 8260C		12/20/17 14:08	DD	A
1,1,1,2-Tetrachloroethane	0.75U	U	ug/L	1.0	0.75	0.33	SW846 8260C		12/20/17 14:08	DD	A
1,1,2,2-Tetrachloroethane	0.75U	U	ug/L	1.0	0.75	0.33	SW846 8260C		12/20/17 14:08	DD	A
Tetrachloroethene	41.7		ug/L	1.0	0.75	0.33	SW846 8260C		12/20/17 14:08	DD	A
Toluene	0.75U	U	ug/L	1.0	0.75	0.33	SW846 8260C		12/20/17 14:08	DD	A
1,1,1-Trichloroethane	14.6		ug/L	1.0	0.75	0.33	SW846 8260C		12/20/17 14:08	DD	A
1,1,2-Trichloroethane	0.75U	U	ug/L	1.0	0.75	0.33	SW846 8260C		12/20/17 14:08	DD	A
Trichloroethene	233		ug/L	5.0	3.8	1.7	SW846 8260C		12/21/17 23:13	CJG	B
Vinyl Chloride	0.75U	U	ug/L	1.0	0.75	0.33	SW846 8260C		12/20/17 14:08	DD	A
Surrogate Recoveries	*Results*	*Flag*	*Units*	*Limits*			*Method*	*Prepared By*	*Analyzed*	*By*	*Cntr*
1,2-Dichloroethane-d4 (S)	107		%	81 - 118			SW846 8260C		12/20/17 14:08	DD	A
1,2-Dichloroethane-d4 (S)	109		%	81 - 118			SW846 8260C		12/21/17 23:13	CJG	B
4-Bromofluorobenzene (S)	111		%	85 - 114			SW846 8260C		12/20/17 14:08	DD	A
4-Bromofluorobenzene (S)	107		%	85 - 114			SW846 8260C		12/21/17 23:13	CJG	B
Dibromofluoromethane (S)	98.7		%	80 - 119			SW846 8260C		12/21/17 23:13	CJG	B
Dibromofluoromethane (S)	99.6		%	80 - 119			SW846 8260C		12/20/17 14:08	DD	A
Toluene-d8 (S)	103		%	89 - 112			SW846 8260C		12/21/17 23:13	CJG	B
Toluene-d8 (S)	104		%	89 - 112			SW846 8260C		12/20/17 14:08	DD	A
LIGHT HYDROCARBON GASES											
Ethane	0.50U	U	ug/L	1.0	0.50	0.25	RSK 175		12/19/17 05:43	EGO	D
Ethene	0.75U	U	ug/L	1.5	0.75	0.31	RSK 175		12/19/17 05:43	EGO	D
Methane	0.42J	J	ug/L	0.50	0.25	0.13	RSK 175		12/19/17 05:43	EGO	D
WET CHEMISTRY											
Alkalinity, Total	348	1	mg/L	5	5	0.8	S2320B-97		12/16/17 17:53	MSA	K
Chloride	21.3		mg/L	2.0	0.50	0.16	EPA 300.0		12/16/17 06:01	CHW	J
Nitrate-N	0.86		mg/L	0.20	0.060	0.020	EPA 300.0		12/16/17 06:01	CHW	J
Sulfate	22.7		mg/L	2.0	0.50	0.20	EPA 300.0		12/16/17 06:01	CHW	J
Total Organic Carbon (TOC)	1.2		mg/L	1.0	0.50	0.18	S5310B-00		12/20/17 12:11	PAG	G

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ANALYTICAL RESULTS

Workorder: 2283331 ASN030|Scotia Navy Depot 60440

Lab ID:	**2283331002**	Date Collected:	12/14/2017 10:10	Matrix:	Ground Water
Sample ID:	**MW-29 121417**	Date Received:	12/15/2017 09:30		

Parameters	Results	Flag	Units	LOQ	LOD	DL	Method	Prepared By	Analyzed	By	Cntr

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ANALYTICAL RESULTS

Workorder: 2283331 ASN030|Scotia Navy Depot 60440

Lab ID: **2283331003** Date Collected: 12/14/2017 11:01 Matrix: Ground Water

Sample ID: **MW-15 121417** Date Received: 12/15/2017 09:30

Parameters	Results	Flag	Units	LOQ	LOD	DL	Method	Prepared	By	Analyzed	By	Cntr
VOLATILE ORGANICS												
Carbon Tetrachloride	0.75U	U	ug/L	1.0	0.75	0.33	SW846 8260C			12/20/17 13:24	DD	C
1,1-Dichloroethane	0.75U	U	ug/L	1.0	0.75	0.33	SW846 8260C			12/20/17 13:24	DD	C
1,2-Dichloroethane	0.75U	U	ug/L	1.0	0.75	0.33	SW846 8260C			12/20/17 13:24	DD	C
1,1-Dichloroethene	0.75U	U	ug/L	1.0	0.75	0.33	SW846 8260C			12/20/17 13:24	DD	C
cis-1,2-Dichloroethene	0.75U	U	ug/L	1.0	0.75	0.33	SW846 8260C			12/20/17 13:24	DD	C
trans-1,2-Dichloroethene	0.75U	U	ug/L	1.0	0.75	0.33	SW846 8260C			12/20/17 13:24	DD	C
1,1,1,2-Tetrachloroethane	0.75U	U	ug/L	1.0	0.75	0.33	SW846 8260C			12/20/17 13:24	DD	C
1,1,2,2-Tetrachloroethane	0.75U	U	ug/L	1.0	0.75	0.33	SW846 8260C			12/20/17 13:24	DD	C
Tetrachloroethene	1.3		ug/L	1.0	0.75	0.33	SW846 8260C			12/20/17 13:24	DD	C
Toluene	0.75U	U	ug/L	1.0	0.75	0.33	SW846 8260C			12/20/17 13:24	DD	C
1,1,1-Trichloroethane	4.3		ug/L	1.0	0.75	0.33	SW846 8260C			12/20/17 13:24	DD	C
1,1,2-Trichloroethane	0.75U	U	ug/L	1.0	0.75	0.33	SW846 8260C			12/20/17 13:24	DD	C
Trichloroethene	143		ug/L	1.0	0.75	0.33	SW846 8260C			12/20/17 13:24	DD	C
Vinyl Chloride	0.75U	U	ug/L	1.0	0.75	0.33	SW846 8260C			12/20/17 13:24	DD	C
Surrogate Recoveries	*Results*	*Flag*	*Units*	*Limits*			*Method*	*Prepared*	*By*	*Analyzed*	*By*	*Cntr*
1,2-Dichloroethane-d4 (S)	107		%	81 - 118			SW846 8260C			12/20/17 13:24	DD	C
4-Bromofluorobenzene (S)	108		%	85 - 114			SW846 8260C			12/20/17 13:24	DD	C
Dibromofluoromethane (S)	100		%	80 - 119			SW846 8260C			12/20/17 13:24	DD	C
Toluene-d8 (S)	104		%	89 - 112			SW846 8260C			12/20/17 13:24	DD	C
LIGHT HYDROCARBON GASES												
Ethane	0.50U	U	ug/L	1.0	0.50	0.25	RSK 175			12/19/17 06:00	EGO	D
Ethene	0.75U	U	ug/L	1.5	0.75	0.31	RSK 175			12/19/17 06:00	EGO	D
Methane	0.28J	J	ug/L	0.50	0.25	0.13	RSK 175			12/19/17 06:00	EGO	D
WET CHEMISTRY												
Alkalinity, Total	216	1	mg/L	5	5	0.8	S2320B-97			12/16/17 18:40	MSA	K
Chloride	39.7		mg/L	2.0	0.50	0.16	EPA 300.0			12/16/17 06:19	CHW	J
Nitrate-N	0.60		mg/L	0.20	0.060	0.020	EPA 300.0			12/16/17 06:19	CHW	J
Sulfate	20.5		mg/L	2.0	0.50	0.20	EPA 300.0			12/16/17 06:19	CHW	J
Total Organic Carbon (TOC)	0.33J	J	mg/L	1.0	0.50	0.18	S5310B-00			12/20/17 12:11	PAG	G

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ANALYTICAL RESULTS

Workorder: 2283331 ASN030|Scotia Navy Depot 60440

Lab ID: **2283331004** Date Collected: 12/14/2017 00:00 Matrix: Ground Water

Sample ID: **DUP-2 121417** Date Received: 12/15/2017 09:30

Parameters	Results	Flag	Units	LOQ	LOD	DL	Method	Prepared By	Analyzed	By	Cntr
VOLATILE ORGANICS											
Carbon Tetrachloride	0.75U	U	ug/L	1.0	0.75	0.33	SW846 8260C		12/20/17 13:46	DD	A
1,1-Dichloroethane	0.75U	U	ug/L	1.0	0.75	0.33	SW846 8260C		12/20/17 13:46	DD	A
1,2-Dichloroethane	0.75U	U	ug/L	1.0	0.75	0.33	SW846 8260C		12/20/17 13:46	DD	A
1,1-Dichloroethene	0.75U	U	ug/L	1.0	0.75	0.33	SW846 8260C		12/20/17 13:46	DD	A
cis-1,2-Dichloroethene	0.75U	U	ug/L	1.0	0.75	0.33	SW846 8260C		12/20/17 13:46	DD	A
trans-1,2-Dichloroethene	0.75U	U	ug/L	1.0	0.75	0.33	SW846 8260C		12/20/17 13:46	DD	A
1,1,1,2-Tetrachloroethane	0.75U	U	ug/L	1.0	0.75	0.33	SW846 8260C		12/20/17 13:46	DD	A
1,1,2,2-Tetrachloroethane	0.75U	U	ug/L	1.0	0.75	0.33	SW846 8260C		12/20/17 13:46	DD	A
Tetrachloroethene	1.4		ug/L	1.0	0.75	0.33	SW846 8260C		12/20/17 13:46	DD	A
Toluene	0.75U	U	ug/L	1.0	0.75	0.33	SW846 8260C		12/20/17 13:46	DD	A
1,1,1-Trichloroethane	4.6		ug/L	1.0	0.75	0.33	SW846 8260C		12/20/17 13:46	DD	A
1,1,2-Trichloroethane	0.75U	U	ug/L	1.0	0.75	0.33	SW846 8260C		12/20/17 13:46	DD	A
Trichloroethene	154		ug/L	1.0	0.75	0.33	SW846 8260C		12/20/17 13:46	DD	A
Vinyl Chloride	0.75U	U	ug/L	1.0	0.75	0.33	SW846 8260C		12/20/17 13:46	DD	A
Surrogate Recoveries	*Results*	*Flag*	*Units*	*Limits*			*Method*	*Prepared By*	*Analyzed*	*By*	*Cntr*
1,2-Dichloroethane-d4 (S)	107		%	81 - 118			SW846 8260C		12/20/17 13:46	DD	A
4-Bromofluorobenzene (S)	108		%	85 - 114			SW846 8260C		12/20/17 13:46	DD	A
Dibromofluoromethane (S)	99.2		%	80 - 119			SW846 8260C		12/20/17 13:46	DD	A
Toluene-d8 (S)	104		%	89 - 112			SW846 8260C		12/20/17 13:46	DD	A
LIGHT HYDROCARBON GASES											
Ethane	0.50U	U	ug/L	1.0	0.50	0.25	RSK 175		12/19/17 05:11	EGO	D
Ethene	0.75U	U	ug/L	1.5	0.75	0.31	RSK 175		12/19/17 05:11	EGO	D
Methane	0.48J	J	ug/L	0.50	0.25	0.13	RSK 175		12/19/17 05:11	EGO	D
WET CHEMISTRY											
Alkalinity, Total	219	1	mg/L	5	5	0.8	S2320B-97		12/16/17 18:51	MSA	K
Chloride	39.5		mg/L	2.0	0.50	0.16	EPA 300.0		12/16/17 05:27	CHW	J
Nitrate-N	0.60		mg/L	0.20	0.060	0.020	EPA 300.0		12/16/17 05:27	CHW	J
Sulfate	20.8		mg/L	2.0	0.50	0.20	EPA 300.0		12/16/17 05:27	CHW	J
Total Organic Carbon (TOC)	0.40J	J	mg/L	1.0	0.50	0.18	S5310B-00		12/20/17 12:11	PAG	G

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ANALYTICAL RESULTS

Workorder: 2283331 ASN030|Scotia Navy Depot 60440

PARAMETER QUALIFIERS

Lab ID	#	Sample ID	Analytical Method	Analyte
2283331001	1	MW-28 121417	S2320B-97	Alkalinity, Total
The Total Alkalinity is titrated to a pH of 4.5 and reported as mg CaCO3/L.				
2283331002	1	MW-29 121417	S2320B-97	Alkalinity, Total
The Total Alkalinity is titrated to a pH of 4.5 and reported as mg CaCO3/L.				
2283331003	1	MW-15 121417	S2320B-97	Alkalinity, Total
The Total Alkalinity is titrated to a pH of 4.5 and reported as mg CaCO3/L.				
2283331004	1	DUP-2 121417	S2320B-97	Alkalinity, Total
The Total Alkalinity is titrated to a pH of 4.5 and reported as mg CaCO3/L.				

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QUALITY CONTROL DATA

Workorder: 2283331 ASN030|Scotia Navy Depot 60440

QC Batch: SVGC/47651 **Analysis Method:** RSK 175

QC Batch Method: RSK 175

Associated Lab Samples: 2283331001, 2283331002, 2283331003, 2283331004

METHOD BLANK: 2662303

Parameter	Blank Result	Units	Reporting Limit
Ethane	0.50U	ug/L	1.0
Ethene	0.75U	ug/L	1.5
Methane	0.15J	ug/L	0.50

SAMPLE DUPLICATE: 2662304 ORIGINAL: 2282785005

Parameter	Original Result	Units	DUP Result	RPD	Max RPD
Ethane	0	ug/L	0	NC	20
Ethene	0	ug/L	0	NC	20
Methane	7.93	ug/L	7.09	11.2	20

SAMPLE DUPLICATE: 2662305 ORIGINAL: 2282982001

Parameter	Original Result	Units	DUP Result	RPD	Max RPD
Ethane	5.55	ug/L	15.42	94.1*	20
Ethene	2.26	ug/L	4.64	69*	20
Methane	233.23	ug/L	611.11	89.5*	20

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QUALITY CONTROL DATA

Workorder: 2283331 ASN030|Scotia Navy Depot 60440

QC Batch: VOMS/45453 **Analysis Method:** SW846 8260C

QC Batch Method: SW846 8260C

Associated Lab Samples: 2283331001, 2283331002, 2283331003, 2283331004

METHOD BLANK: 2663538

Parameter	Blank Result	Units	Reporting Limit
Carbon Tetrachloride	0.75U	ug/L	1.0
1,1-Dichloroethane	0.75U	ug/L	1.0
1,2-Dichloroethane	0.75U	ug/L	1.0
1,1-Dichloroethene	0.75U	ug/L	1.0
cis-1,2-Dichloroethene	0.75U	ug/L	1.0
trans-1,2-Dichloroethene	0.75U	ug/L	1.0
1,1,1,2-Tetrachloroethane	0.75U	ug/L	1.0
1,1,2,2-Tetrachloroethane	0.75U	ug/L	1.0
Tetrachloroethene	0.75U	ug/L	1.0
Toluene	0.75U	ug/L	1.0
1,1,1-Trichloroethane	0.75U	ug/L	1.0
1,1,2-Trichloroethane	0.75U	ug/L	1.0
Trichloroethene	0.75U	ug/L	1.0
Vinyl Chloride	0.75U	ug/L	1.0
1,2-Dichloroethane-d4 (S)	107	%	81 - 118
4-Bromofluorobenzene (S)	107	%	85 - 114
Dibromofluoromethane (S)	98.8	%	80 - 119
Toluene-d8 (S)	103	%	89 - 112

LABORATORY CONTROL SAMPLE: 2663539

Parameter	LCS % Rec	Units	Spike Conc.	LCS Result	% Rec Limit
Carbon Tetrachloride	93.2	ug/L	20	18.6	72 - 136
1,1-Dichloroethane	101	ug/L	20	20.2	77 - 125
1,2-Dichloroethane	99.2	ug/L	20	19.8	73 - 128
1,1-Dichloroethene	103	ug/L	20	20.7	71 - 131
cis-1,2-Dichloroethene	99	ug/L	20	19.8	78 - 123
trans-1,2-Dichloroethene	104	ug/L	20	20.9	75 - 124
1,1,1,2-Tetrachloroethane	106	ug/L	20	21.3	78 - 124
1,1,2,2-Tetrachloroethane	102	ug/L	20	20.5	71 - 121
Tetrachloroethene	110	ug/L	20	21.9	74 - 129
Toluene	104	ug/L	20	20.7	80 - 121
1,1,1-Trichloroethane	108	ug/L	20	21.6	74 - 131
1,1,2-Trichloroethane	103	ug/L	20	20.6	80 - 119
Trichloroethene	96.6	ug/L	20	19.3	79 - 123

QUALITY CONTROL DATA

Workorder: 2283331 ASN030|Scotia Navy Depot 60440

Vinyl Chloride	103	ug/L	20	20.5	58 - 137
1,2-Dichloroethane-d4 (S)	108	%			81 - 118
4-Bromofluorobenzene (S)	107	%			85 - 114
Dibromofluoromethane (S)	104	%			80 - 119
Toluene-d8 (S)	103	%			89 - 112

MATRIX SPIKE: 2663540 DUPLICATE: 2663541 ORIGINAL: 2282982001

***NOTE - The Original Result shown below is a raw result and is only used for the purpose of calculating Matrix Spike percent recoveries. This result is not a final value and cannot be used as such.

Parameter	Original Result	Units	Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limit	RPD	Max RPD
Carbon Tetrachloride	0	ug/L	20	20.1399	19.5739	101	97.9	72 - 136	2.85	30
1,1-Dichloroethane	0	ug/L	20	20.8717	20.0455	104	100	77 - 125	4.04	30
1,2-Dichloroethane	0	ug/L	20	20.4254	19.9252	102	99.6	73 - 128	2.48	30
1,1-Dichloroethene	0	ug/L	20	22.2394	20.9281	111	105	71 - 131	6.08	30
cis-1,2-Dichloroethene	.6766	ug/L	20	21.262	20.0375	103	96.8	78 - 123	5.93	30
trans-1,2-Dichloroethene	.29568	ug/L	20	22.8443	21.4083	113	106	75 - 124	6.49	30
1,1,1,2-Tetrachloroethane	0	ug/L	20	21.6903	21.0336	108	105	78 - 124	3.07	30
1,1,2,2-Tetrachloroethane	0	ug/L	20	20.888	20.2452	104	101	71 - 121	3.13	30
Tetrachloroethene	0	ug/L	20	22.4306	22.4855	112	112	74 - 129	.24	30
Toluene	0	ug/L	20	21.0495	20.3688	105	102	80 - 121	3.29	30
1,1,1-Trichloroethane	0	ug/L	20	23.0172	21.8957	115	109	74 - 131	4.99	30
1,1,2-Trichloroethane	0	ug/L	20	21.0909	20.6254	105	103	80 - 119	2.23	30
Trichloroethene	119.829	ug/L	20	148.106	138.752	NC	NC	79 - 123	6.52	30
Vinyl Chloride	0	ug/L	20	22.6834	21.2031	113	106	58 - 137	6.75	30
1,2-Dichloroethane-d4 (S)	110	%				110	108	81 - 118		
4-Bromofluorobenzene (S)	106	%				106	106	85 - 114		
Dibromofluoromethane (S)	101	%				101	103	80 - 119		
Toluene-d8 (S)	102	%				102	102	89 - 112		

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QUALITY CONTROL DATA

Workorder: 2283331 ASN030|Scotia Navy Depot 60440

QC Batch: VOMS/45477 **Analysis Method:** SW846 8260C

QC Batch Method: SW846 8260C

Associated Lab Samples: 2283331001, 2283331002

METHOD BLANK: 2664725

Parameter	Blank Result	Units	Reporting Limit
Trichloroethene	0.75U	ug/L	1.0
1,1,1,2-Tetrachloroethane	0.75U	ug/L	1.0
1,1,1-Trichloroethane	0.75U	ug/L	1.0
1,1,2,2-Tetrachloroethane	0.75U	ug/L	1.0
1,1,2-Trichloroethane	0.75U	ug/L	1.0
1,1-Dichloroethane	0.75U	ug/L	1.0
1,1-Dichloroethene	0.75U	ug/L	1.0
1,2-Dichloroethane	0.75U	ug/L	1.0
Carbon Tetrachloride	0.75U	ug/L	1.0
Tetrachloroethene	0.75U	ug/L	1.0
Toluene	0.75U	ug/L	1.0
Vinyl Chloride	0.75U	ug/L	1.0
cis-1,2-Dichloroethene	0.75U	ug/L	1.0
trans-1,2-Dichloroethene	0.75U	ug/L	1.0
1,2-Dichloroethane-d4 (S)	107	%	81 - 118
4-Bromofluorobenzene (S)	106	%	85 - 114
Dibromofluoromethane (S)	96.9	%	80 - 119
Toluene-d8 (S)	103	%	89 - 112

LABORATORY CONTROL SAMPLE: 2664726

Parameter	LCS % Rec	Units	Spike Conc.	LCS Result	% Rec Limit
Trichloroethene	91.9	ug/L	20	18.4	79 - 123
1,1,1,2-Tetrachloroethane	101	ug/L	20	20.2	78 - 124
1,1,1-Trichloroethane	103	ug/L	20	20.7	74 - 131
1,1,2,2-Tetrachloroethane	101	ug/L	20	20.2	71 - 121
1,1,2-Trichloroethane	102	ug/L	20	20.3	80 - 119
1,1-Dichloroethane	99.2	ug/L	20	19.8	77 - 125
1,1-Dichloroethene	101	ug/L	20	20.2	71 - 131
1,2-Dichloroethane	99	ug/L	20	19.8	73 - 128
Carbon Tetrachloride	86.4	ug/L	20	17.3	72 - 136
Tetrachloroethene	101	ug/L	20	20.3	74 - 129
Toluene	98.6	ug/L	20	19.7	80 - 121
Vinyl Chloride	98.1	ug/L	20	19.6	58 - 137
cis-1,2-Dichloroethene	96.8	ug/L	20	19.4	78 - 123

QUALITY CONTROL DATA

Workorder: 2283331 ASN030|Scotia Navy Depot 60440

trans-1,2-Dichloroethene	105	ug/L	20	21.0	75 - 124
1,2-Dichloroethane-d4 (S)	108	%			81 - 118
4-Bromofluorobenzene (S)	106	%			85 - 114
Dibromofluoromethane (S)	103	%			80 - 119
Toluene-d8 (S)	100	%			89 - 112

ALS Environmental

34 Dogwood Lane ▪ Middletown, PA 17057 ▪ Phone: 717-944-5541 ▪ Fax: 717-944-1430 ▪ www.alsglobal.com

NELAP Certifications: NJ PA010 , NY 11759 , PA 22-293 DoD ELAP: A2LA 0818.01
State Certifications: DE ID 11 , MA PA0102 , MD 128 , VA 460157 , WV 343

QUALITY CONTROL DATA

Workorder: 2283331 ASN030|Scotia Navy Depot 60440

QC Batch: WETC/197724 **Analysis Method:** S2320B-97

QC Batch Method: S2320B-97

Associated Lab Samples: 2283331001, 2283331002, 2283331003, 2283331004

METHOD BLANK: 2661152

Parameter	Blank Result	Units	Reporting Limit
Alkalinity, Total	3J	mg/L	5

SAMPLE DUPLICATE: 2661157 ORIGINAL: 2283142001

Parameter	Original Result	Units	DUP Result	RPD	Max RPD
Alkalinity, Total	334.15649	mg/L	337.91794	1.12	20

METHOD BLANK: 2661160

Parameter	Blank Result	Units	Reporting Limit
Alkalinity, Total	2J	mg/L	5

SAMPLE DUPLICATE: 2661161 ORIGINAL: 2283157001

Parameter	Original Result	Units	DUP Result	RPD	Max RPD
Alkalinity, Total	205.78917	mg/L	203.4538	1.14	20

METHOD BLANK: 2661164

Parameter	Blank Result	Units	Reporting Limit
Alkalinity, Total	2J	mg/L	5

SAMPLE DUPLICATE: 2661165 ORIGINAL: 2283291001

Parameter	Original Result	Units	DUP Result	RPD	Max RPD

QUALITY CONTROL DATA

Workorder: 2283331 ASN030|Scotia Navy Depot 60440

Alkalinity, Total	319.14926	mg/L	326.99271	2.43	20

METHOD BLANK: 2661168

Parameter	Blank Result	Units	Reporting Limit
Alkalinity, Total	2J	mg/L	5

SAMPLE DUPLICATE: 2661169 ORIGINAL: 2283291002

Parameter	Original Result	Units	DUP Result	RPD	Max RPD
Alkalinity, Total	242.72678	mg/L	237.98059	1.97	20

METHOD BLANK: 2661172

Parameter	Blank Result	Units	Reporting Limit
Alkalinity, Total	2J	mg/L	5

SAMPLE DUPLICATE: 2661173 ORIGINAL: 2283291003

Parameter	Original Result	Units	DUP Result	RPD	Max RPD
Alkalinity, Total	273.78479	mg/L	253.69031	7.62	20

METHOD BLANK: 2661176

Parameter	Blank Result	Units	Reporting Limit
Alkalinity, Total	2J	mg/L	5

SAMPLE DUPLICATE: 2661177 ORIGINAL: 2283291004

Parameter	Original Result	Units	DUP Result	RPD	Max RPD
Alkalinity, Total	292.03079	mg/L	279.43884	4.41	20

QUALITY CONTROL DATA

Workorder: 2283331 ASN030|Scotia Navy Depot 60440

METHOD BLANK: 2661180

Parameter	Blank Result	Units	Reporting Limit
Alkalinity, Total	2J	mg/L	5

SAMPLE DUPLICATE: 2661181 ORIGINAL: 2283287003

Parameter	Original Result	Units	DUP Result	RPD	Max RPD
Alkalinity, Total	483.03293	mg/L	497.00146	2.85	20

METHOD BLANK: 2661184

Parameter	Blank Result	Units	Reporting Limit
Alkalinity, Total	2J	mg/L	5

SAMPLE DUPLICATE: 2661185 ORIGINAL: 2283331003

Parameter	Original Result	Units	DUP Result	RPD	Max RPD
Alkalinity, Total	216.11301	mg/L	208.50745	3.58	20

METHOD BLANK: 2661188

Parameter	Blank Result	Units	Reporting Limit
Alkalinity, Total	2J	mg/L	5

SAMPLE DUPLICATE: 2661189 ORIGINAL: 2283468001

Parameter	Original Result	Units	DUP Result	RPD	Max RPD
Alkalinity, Total	27.19653	mg/L	27.58272	1.41	20

ALS Environmental

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NELAP Certifications: NJ PA010 , NY 11759 , PA 22-293 DoD ELAP: A2LA 0818.01
State Certifications: DE ID 11 , MA PA0102 , MD 128 , VA 460157 , WV 343

QUALITY CONTROL DATA

Workorder: 2283331 ASN030|Scotia Navy Depot 60440

METHOD BLANK: 2661192

Parameter	Blank Result	Units	Reporting Limit
Alkalinity, Total	1J	mg/L	5

ALS Environmental

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NELAP Certifications: NJ PA010 , NY 11759 , PA 22-293 DoD ELAP: A2LA 0818.01
State Certifications: DE ID 11 , MA PA0102 , MD 128 , VA 460157 , WV 343

QUALITY CONTROL DATA

Workorder: 2283331 ASN030|Scotia Navy Depot 60440

QC Batch: WETC/197730 **Analysis Method:** EPA 300.0

QC Batch Method: EPA 300.0

Associated Lab Samples: 2283331001, 2283331002, 2283331003, 2283331004

METHOD BLANK: 2661313

Parameter	Blank Result	Units	Reporting Limit
Chloride	0.25U	mg/L	1.0
Nitrate-N	0.030U	mg/L	0.10
Sulfate	0.25U	mg/L	1.0

LABORATORY CONTROL SAMPLE: 2661315

Parameter	LCS % Rec	Units	Spike Conc.	LCS Result	% Rec Limit
Chloride	103	mg/L	20	20.6	87 - 111
Nitrate-N	98.8	mg/L	2.5	2.5	88 - 111
Sulfate	102	mg/L	20	20.4	87 - 112

METHOD BLANK: 2661318

Parameter	Blank Result	Units	Reporting Limit
Chloride	0.15J	mg/L	1.0
Nitrate-N	0.030U	mg/L	0.10
Sulfate	0.25U	mg/L	1.0

ALS Environmental

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NELAP Certifications: NJ PA010 , NY 11759 , PA 22-293 DoD ELAP: A2LA 0818.01
State Certifications: DE ID 11 , MA PA0102 , MD 128 , VA 460157 , WV 343

QUALITY CONTROL DATA

Workorder: 2283331 ASN030|Scotia Navy Depot 60440

QC Batch: WETC/197902 **Analysis Method:** S5310B-00

QC Batch Method: 415.1/9060/5310B

Associated Lab Samples: 2283331001, 2283331002, 2283331003, 2283331004

METHOD BLANK: 2663620

Parameter	Blank Result	Units	Reporting Limit
Total Organic Carbon (TOC)	0.50U	mg/L	1.0

LABORATORY CONTROL SAMPLE: 2663621

Parameter	LCS % Rec	Units	Spike Conc.	LCS Result	% Rec Limit
Total Organic Carbon (TOC)	102	mg/L	1	1.0	85 - 115

MATRIX SPIKE: 2663622 DUPLICATE: 2663623 ORIGINAL: 2283740001

****NOTE - The Original Result shown below is a raw result and is only used for the purpose of calculating Matrix Spike percent recoveries. This result is not a final value and cannot be used as such.

Parameter	Original Result	Units	Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limit	RPD	Max RPD
Total Organic Carbon (TOC)	.84	mg/L	6	6.605	6.701	96.1	97.7	85 - 115	1.44	20

MATRIX SPIKE: 2663624 DUPLICATE: 2663625 ORIGINAL: 2283533003

****NOTE - The Original Result shown below is a raw result and is only used for the purpose of calculating Matrix Spike percent recoveries. This result is not a final value and cannot be used as such.

Parameter	Original Result	Units	Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limit	RPD	Max RPD
Total Organic Carbon (TOC)	1.771	mg/L	6	7.405	7.477	93.9	95.1	85 - 115	.97	20

QUALITY CONTROL DATA CROSS REFERENCE TABLE

Workorder: 2283331 ASN030|Scotia Navy Depot 60440

Lab ID	Sample ID	Prep Method	Prep Batch	Analysis Method	Analysis Batch
2283331001	MW-28 121417			S2320B-97	WETC/197724
2283331002	MW-29 121417			S2320B-97	WETC/197724
2283331003	MW-15 121417			S2320B-97	WETC/197724
2283331004	DUP-2 121417			S2320B-97	WETC/197724
2283331001	MW-28 121417			EPA 300.0	WETC/197730
2283331002	MW-29 121417			EPA 300.0	WETC/197730
2283331003	MW-15 121417			EPA 300.0	WETC/197730
2283331004	DUP-2 121417			EPA 300.0	WETC/197730
2283331001	MW-28 121417			RSK 175	SVGC/47651
2283331002	MW-29 121417			RSK 175	SVGC/47651
2283331003	MW-15 121417			RSK 175	SVGC/47651
2283331004	DUP-2 121417			RSK 175	SVGC/47651
2283331001	MW-28 121417			SW846 8260C	VOMS/45453
2283331002	MW-29 121417			SW846 8260C	VOMS/45453
2283331003	MW-15 121417			SW846 8260C	VOMS/45453
2283331004	DUP-2 121417			SW846 8260C	VOMS/45453
2283331001	MW-28 121417			S5310B-00	WETC/197902
2283331002	MW-29 121417			S5310B-00	WETC/197902
2283331003	MW-15 121417			S5310B-00	WETC/197902
2283331004	DUP-2 121417			S5310B-00	WETC/197902
2283331001	MW-28 121417			SW846 8260C	VOMS/45477
2283331002	MW-29 121417			SW846 8260C	VOMS/45477

CHAIN OF CUSTODY/LABORATORY ANALYSIS REQUEST FORM

1565 Jefferson Road, Building 300, Suite 360 • Rochester, NY 14623 | +1 585 288 5380 +1 585 288 8475 (fax) PAGE

* 2 2 8 3 3 3 1 *

Project Name: Scotia Navy Depot | Project Number: 60255606641
Project Manager: John Santacroce | Report CC:
Company/Address: AECOM
40 British American Blvd
Latham NY
Phone #: (518) 951 2200 | Email: John.Santacroce@aecom.com
Sampler's Signature: | Sampler's Printed Name: Ross McCurdy

ANALYSIS REQUESTED (Include Method Number and Container Preservative)

PRESERVATIVE

CLIENT SAMPLE ID	FOR OFFICE USE ONLY LAB ID	SAMPLING DATE	SAMPLING TIME	MATRIX	NUMBER OF CONTAINERS	GC/MS VOAs • 8260 • 624 • CLP	GC/MS SVOAs • 8270 • 625	GC VOAs • 8021 • 601/602	PESTICIDES • 8081 • 608	PCBs • 8082 • 608	METALS, TOTAL (List in comments below)	METALS, DISSOLVED (List in comments below)	8260	TOC	RSK175	Cl, SO4, NO3	Alkalinity
MW-28 121417		12/14/17	925	GW	11								x3	x3	x3	x	x
MW-29 121417			1010		11								x3	x3	x3	x	x
MW-15 121417			1101		11								x2	x2	x2	x	x
DUP-2 121417					11								x	x3	x3	x	x
TRIP BLANK		—	—	—													

Preservative Key
0. NONE
1. HCL
2. HNO_3
3. H_2SO_4
4. NaOH
5. Zn. Acetate
6. MeOH
7. $NaHSO_4$
8. Other _____

REMARKS/ ALTERNATE DESCRIPTION

	Y	N	Initials
Custody Seals Present?	X		GW
(if present) Seals Intact?	X		
Received on Ice?	X		
COC/Lbls Complete		X	
Cont in Good Cond?	X		
Correct Containers?	X		
Correct Samp Vol?	X		
Correct Preservation?	X		
Headspace/Volatiles?		X	

Cooler Temp: 0° °C
Cooler #:
Therm ID:
Ship Carrier: FedEx UPS DHL
Tracking #: 647083102886

SPECIAL INSTRUCTIONS/COMMENTS
Metals
Did not receive Dup-2 8260 + GW 12-15

See QAPP ☐

TURNAROUND REQUIREMENTS
____ RUSH (SURCHARGES APPLY)
____ 1 day ____ 2 day ____ 3 day
____ 4 day ____ 5 day
STD
REQUESTED REPORT DATE

REPORT REQUIREMENTS
____ I. Results Only
____ II. Results + QC Summaries (LCS, DUP, MS/MSD as required)
____ III. Results + QC and Calibration Summaries
____ IV. Data Validation Report with Raw Data
See QAPP
Edata ____ Yes ____ No

INVOICE INFORMATION
PO #
BILL TO:

STATE WHERE SAMPLES WERE COLLECTED: NY

RELINQUISHED BY	RECEIVED BY	RELINQUISHED BY	RECEIVED BY	RELINQUISHED BY	RECEIVED BY
Signature	Signature	Signature	Signature	Signature	Signature
Printed Name: Ross McCurdy	Printed Name: DINA Ayers	Printed Name: DINA Ayers	Printed Name: ALS	Printed Name	Printed Name
Firm: AECOM	Firm: ALS	Firm: ALS	Firm	Firm	Firm
Date/Time: 12/14/17 1208	Date/Time: 12/14/17 1208	Date/Time: 12/14/17 1700	Date/Time: 12-15-17 09:30	Date/Time	Date/Time

Distribution: White - Lab Copy; Yellow - Return to Originator

ALS

APPENDIX E: AECOM Data Usability Summary Report (DUSR)

AECOM

Prepared for:
U.S. Army Corps of Engineers
Huntsville and New York Districts

Prepared by:
AECOM
Pittsburgh, PA
60440641-14
April 2018

April 16, 2018 (revised)

Data Usability Summary Report
Defense National Stockpile Center
Scotia Depot
Glenville, New York
Groundwater Sampling Event
December 2017
Final

Prepared for:
U.S. Army Corps of Engineers
Huntsville and New York Districts

Prepared by:
AECOM
Pittsburgh, PA
60440641-14
April 2018

April 16, 2018 (revised)

Data Usability Summary Report
Defense National Stockpile Center
Scotia Depot
Glenville, New York
Groundwater Sampling Event
December 2017
Final

Prepared By
Gregory Malzone, Project Chemist
AECOM
Gulf Tower
707 Grant Street, 5th floor
Pittsburgh, PA 15219

Reviewed By
Robert Davis, Data Validator/Database Technician
AECOM
1360 Peachtree Street NE, Suite 500
Atlanta, GA 30309

Contents

List of Appendices

Executive Summary

Overview

Data validation was performed by Gregory A. Malzone of AECOM-Pittsburgh on the fixed-laboratory analytical data for groundwater samples collected from the Defense National Stockpile Center Scotia Depot, Glenville, New York, from December 11, 2017 through December 14, 2017. Samples were collected as part of the baseline groundwater sampling round as described in Final Quality Assurance Project Plan for the Defense National Stockpile Center Scotia Depot Glenville, New York (the project-specific QAPP; AECOM, September 2016). Samples were submitted for analysis to ALS Environmental, 34 Dogwood Lane, Middletown, Pennsylvania 17057.

The list of field and field quality control samples submitted, the date sampled and the laboratory work order numbers are presented in Table 1. Data were reported by ALS in four deliverables. Each laboratory deliverable is identified by both a laboratory work order number and sample delivery group (SDG) number.

The following analytical methods were requested on the chain-of-custody (CoC) records.

- Volatile Organic Compounds by USEPA SW-846 Method 8260C
- Methane, Ethane and Ethene by RSK -175
- Chloride, Nitrate as N and Sulfate by Method EPA Method 300.0
- Alkalinity by Standard Methods 2320B-97
- Total Organic Carbon by Standard Methods 5310B-00

The trip blanks and the equipment blank were analyzed for VOCs only. Sample MW-35-121217 was designated in the field to be processed as the quality control sample, that is, as the matrix spike/matrix spike duplicate (MS/MSD). Unless otherwise noted, analyses were performed in accordance with the project-specific QAPP which is based on the DoD QSM v5.0.

Table 1 - Sample Submittals

Field ID	ALS ID	Matrix	Date Sampled	WO Number	SDG Number
MW-16-121117	2282912001	Groundwater	12/11/2017	2282912	ASN029
Trip Blank-121117	2282912002	Aqueous (QC)	12/11/2017	2282912	ASN029
MW-26-121217	2282785001	Groundwater	12/12/2017	2282785	ANL005
DUP-1-121217 [MW-26]	2282785002	Groundwater (QC)	12/12/2017	2282785	ANL005
EB-1-121217	2282785003	Aqueous (QC)	12/12/2017	2282785	ANL005
MW-34-121217	2282785004	Groundwater	12/12/2017	2282785	ANL005
MW-35-121217	2282785005	Groundwater	12/12/2017	2282785	ANL005
MW-24-121217	2282785006	Groundwater	12/12/2017	2282785	ANL005
MW-32-121317	2282982001	Groundwater	12/13/2017	2282982	ANL006
MW-33-121317	2282982002	Groundwater	12/13/2017	2282982	ANL006
MW-30-121317	2282982003	Groundwater	12/13/2017	2282982	ANL006
MW-31-121317	2282982004	Groundwater	12/13/2017	2282982	ANL006
MW-28-121417	2283331001	Groundwater	12/14/2017	2283331	ASN030
MW-29-121417	2283331002	Groundwater	12/14/2017	2283331	ASN030
MW-15-121417	2283331003	Groundwater	12/14/2017	2283331	ASN030
DUP-2-121417 [MW-15]	2283331004	Groundwater	12/14/2017	2283331	ASN030
Trip Blank-121417	2283331005	Aqueous (QC)	12/14/2017	2283331	ASN030

The data were evaluated for conformance to method specifications and qualifiers were applied using the USEPA Region II SOPs and the validation criteria set forth in the *USEPA Contract Laboratory Program (CLP) National Functional Guidelines for Superfund Organic Methods Data Review*, EPA-540-R-014-002, August 2014 and *USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Superfund Data Review*, EPA-540-R-013-001, August 2014, as they apply to the analytical methods employed.

Field duplicate relative percent difference (RPD) review and applicable control limits were taken from the *USEPA Region I Laboratory Data Validation Functional Guidelines for Evaluating Organics Analyses*, December 1996.

Summary

All data have been determined to be useable for the purpose of assessing the presence/absence and quantitative concentrations of the compounds and analytes in the media tested (i.e. groundwater) with the qualifications described below. Completeness of 100% was achieved for this data set. This is within the goal of 90-100% and is acceptable.

A glossary of data qualifier definitions is included in Appendix A of this report. The data qualifier summaries are attached as Appendix B of this report.

Each nonconformance with specific data usability criteria is discussed below. Page references for the supporting documentation in the laboratory reports are provided in each item header. Support documentation for data qualifications was included in Appendix C of this report.

This DUSR has been revised to correct the sample ID “MW-20-121217” to be “MW-26-121217”.

1.0 Volatile Organic Compounds

Measurement performance indicators which did not meet criteria for Volatile Organic Compounds (VOCs) analysis are presented below for each of the four laboratory reports. Analytical results for VOCs were reviewed for the following measurement performance indicators:

- Data Completeness
- Chain of Custody
- Sample Preservation
- Holding Time
- GC/MS Tunes
- Initial Calibration
- Initial Calibration Verification
- Continuing Calibration Verification
- Method Blanks
- Trip Blanks
- Surrogates
- Matrix Spike/Matrix Spike Duplicate
- Internal Standards
- Quantitation Limits
- Laboratory Control Samples
- Data package / EDD consistency

Work Order 2282912 (SDG ASN029)

Continuing Calibration Verifications (pp. 906-908): The continuing calibration verification percent difference for carbon tetrachloride was less than the lower method specification limit of -20% on December 20, 2017, at 06:05 on instrument MS03. The carbon tetrachloride result for associated samples MW-16-121117 and Trip Blank-121117 were non-detect and were qualified “UJ,” as estimates, because of low instrument bias.

Work Order 2282785 (SDG ANL005)

Continuing Calibration Verifications (pp. 975-977): The continuing calibration verification percent difference for carbon tetrachloride was less than the lower method specification limit of -20% on December 20, 2017, at 06:05 on instrument MS03. The carbon tetrachloride results for associated samples MW-26-121217, DUP-1-121217, EB-1-121217, MW-34-121217, MW-35-121217 and MW-24-121217 were non-detect and were qualified “UJ,” as estimates, because of low instrument bias.

Work Order 2282982 (SDG ANL006)

Matrix Spike Recoveries(p. 1611): The trichloroethene spike added to MW-32-121317 MS/MSD was less than 25% of the original sample result. The RPDs and percent recoveries could not be calculated. No data qualification was required.

Work Order 2283331 (SDG ASN030)

Residual Chlorine (p. 16): A positive residual chlorine result was detected in the preservation check for VOC analysis of sample MW-28-121417. Residual chlorine reacts with organic matter to produce trihalomethanes, and can react with and degrade some VOC compounds, notably styrene. Styrene and trihalomethanes are not in the target compound list. No trihalomethanes were detected on review of the sample chromatogram. No data qualifications were required.

2.0 Methane, Ethane, Ethene

Measurement performance indicators which did not meet criteria for methane, ethane, ethene (MEE) analysis are presented below for each of the four laboratory reports. Analytical results for MEE were reviewed for the following measurement performance indicators:

- Data Completeness
- Chain of Custody
- Sample Preservation
- Holding Time
- Initial Calibration
- Initial Calibration Verification
- Continuing Calibration Verification
- Method Blanks
- Matrix Spike/Matrix Spike Duplicate
- Laboratory Duplicate
- Quantitation Limits
- Laboratory Control Samples
- Data package / EDD consistency

Work Order 2282912 (SDG ASN029)

Laboratory Method Blank (p. 1587): Methane was detected in method blank 2662303 (12/19/17) at an estimated concentration of 0.15 µg/L. The methane result for associated sample MW-16-121117 was estimated to be less than the LOQ. The MW-16-121117 result for methane was qualified "U," as undetected at the limit of quantitation (LOQ), because of laboratory contamination.

Work Order 2282785 (SDG ANL005)

Laboratory Method Blank (p. 1242): Methane was detected in method blank 2662303 (12/19/17) at an estimated concentration of 0.15 µg/L. The methane results for associated samples MW-26-121217, DUP-1-121217, MW-34-121217, MW-35-121217 and MW-24-121217 were greater than the LOQ and greater than five times the method blank level. No data qualifications were required.

Work Order 2282982 (SDG ANL006)

Laboratory Method Blank (p. 1242): Methane was detected in method blank 2662303 (12/19/17) at an estimated concentration of 0.15 µg/L. The methane results for associated samples MW-32-121317, MW-33-121317, MW-30-121317 and MW-31-121317 were greater than the LOQ and greater than five times the method blank level. No data qualifications were required.

Laboratory Duplicate Precision (p. 1844): The RPDs between the MW-32-121317 original and duplicate results for methane, ethane and ethene were greater than the maximum quality control limit of 20%. The methane, ethane and ethane results for sample MW-32-121317 were positive and were qualified "J," as estimated concentrations, because of method imprecision and/or sample heterogeneity.

Work Order 2283331 (SDG ASN030)

Laboratory Method Blank (p. 2032): Methane was detected in method blank 2662303 (12/19/17) at a concentration of 0.15 µg/L. The results for methane in associated samples MW-28-121417, MW-29-12141717, MW-15-121417 and DUP-2-121417 were estimated to be less than the LOQ and were qualified "U," as undetected at the LOQ, because of laboratory contamination.

Holding Time (p. 16): The pH measurement for sample DUP-2-121417 was greater than maximum method specification limit of less than 2 SU. Sample DUP-2-121417 was analyzed within the seven-day holding time for an unpreserved/under-preserved sample. No data qualifications were required.

3.0 Chloride, Sulfate, Nitrate as N

Measurement performance indicators which did not meet criteria for chloride, sulfate and nitrate as N analysis are presented below for each of the four laboratory reports. Analytical results for these anions were reviewed for the following measurement performance indicators:

- Chain of Custody
- Sample Preservation
- Holding Time
- Quantitation Limits
- Initial Calibration
- Continuing Calibration Verification
- Method Blanks
- Matrix Spike/Matrix Spike Duplicate
- Laboratory Duplicate
- Laboratory Control Samples
- Data package / EDD consistency

Work Order 2282912 (SDG ASN029)

Continuing Calibration Blanks (p. 1252): Chloride was detected in the instrument IC-5 continuing calibration blanks on December 13, 2017 at concentrations estimated to be less than the LOQ. The chloride results for associated sample MW-16-121117 was greater than the LOQ and greater than ten times the blank levels and did not require qualification.

Work Order 2282785 (SDG ANL005)

Continuing Calibration Blanks (p. 1612): Chloride was detected in the instrument IC-5 continuing calibration blanks on December 14, 2017 at concentrations estimated to be less than the LOQ. The chloride results for associated samples MW-26-121217, DUP-1-121217, MW-34-121217, MW-35-121217 and MW-24-121217 were greater than the LOQ and greater than ten times the blank levels and did not require qualification.

Matrix Spike Recoveries(p. 1611): The MW-35-121217 MS/MSD recoveries for nitrate were high with the MS recovery being greater than the upper advisory limit. The nitrate results for associated samples MW-34-121217 and MW-35-121217 were positive and were qualified “J/J+,” as estimated concentrations, biased high due to matrix effects and/or sample heterogeneity.

Work Order 2282982 (SDG ANL006)

Continuing Calibration Blanks (p. 1862): Chloride was detected in an instrument IC-7 continuing calibration blank on December 15, 2017 at a concentration estimated to be less than the LOQ. The chloride results for associated samples MW-32-121317, MW-33-121317, MW-30-121317 and MW-31-121317 were greater than the LOQ and greater than ten times the blank level and did not require qualification.

Work Order 2283331 (SDG ASN030)

Continuing Calibration Blanks (p. 2055): Chloride was detected in the instrument IC-7 continuing calibration blank on December 16, 2017 at a concentration estimated to be less than the LOQ. The chloride results for associated samples MW-28-121417, MW-29-12141717, MW-15-121417 and DUP-2-121417 were greater than the LOQ and greater than ten times the blank level and did not require qualification.

4.0 Alkalinity

Measurement performance indicators which did not meet criteria for alkalinity analysis are presented below for each of the four laboratory reports. Analytical results for alkalinity were reviewed for the following measurement performance indicators:

- Chain of Custody
- Sample Preservation
- Holding Time
- Quantitation Limits
- Initial Calibration
- Continuing Calibration Verification
- Method Blanks
- Matrix Spike/Matrix Spike Duplicate
- Laboratory Duplicate
- Laboratory Control Samples
- Data package / EDD consistency

Work Order 2282912 (SDG ASN029)

Lost Sample (p. 15): The alkalinity test was initially logged in for sample MW-16-121117, but when the laboratory went to analyze the sample, they were unable to locate it. ALS continued to look for the sample, but was ultimately unable to locate the missing jar.

Work Order 2282785 (SDG ANL005)

No data quality issues were noted. No data qualification was required.

Work Order 2282982 (SDG ANL006)

No data quality issues were noted. No data qualification was required.

Work Order 2283331 (SDG ASN030)

No data quality issues were noted. No data qualification was required.

5.0 Total Organic Carbon

Measurement performance indicators which did not meet criteria for total organic carbon (TOC) analysis are presented below for each of the four laboratory reports. Analytical results for TOC were reviewed for the following measurement performance indicators:

- Chain of Custody
- Sample Preservation
- Holding Time
- Quantitation Limits
- Initial Calibration
- Initial Calibration Verification
- Continuing Calibration Verification
- Method Blanks
- Matrix Spike/Matrix Spike Duplicate
- Laboratory Duplicate
- Laboratory Control Samples
- Data package / EDD consistency

Work Order 2282912 (SDG ASN029)

No data quality issues were noted. No data qualification was required.

Work Order 2282785 (SDG ANL005)

No data quality issues were noted. No data qualification was required.

Work Order 2282982 (SDG ANL006)

No data quality issues were noted. No data qualification was required.

Work Order 2283331 (SDG ASN030)

No data quality issues were noted. No data qualification was required.

6.0 Field Duplicate Comparison

Field duplicate samples were collected at groundwater wells MW-15 and MW-26. See Table 2 below for the calculated RPDs for all compounds for which there were detections. Field duplicate results were evaluated using the following criteria.

Organics: The RPD must be ≤ 30% for groundwaters, for results greater than or equal to two times the LOQ. If one of the results is non-detect or less than two times the LOQ, and the duplicate is greater than two times the LOQ, the difference between the parent and field duplicate results must be less than or equal to two times the LOQ.

Action applies only to the affected analyte in the organic duplicate sample pair.

Inorganics: The RPD must be ≤ 30% for groundwaters, for results greater than or equal to five times the LOQ. For results less than five times the reporting limit, the difference between the parent and field duplicate results must be less than or equal to two times the LOQ.

Action applies to the affected analyte in all inorganic samples of the same matrix prepared and analyzed by the same method.

The following notations are used in the field precision table.

RPD: Relative percent difference
Qual: Qualification required
µg/L: micrograms per liter (ppb) and mg/L: milligrams per liter (ppm)
≤±2LOQ: The absolute difference between the parent and field duplicate results was less than two times the LOQ. Variation of this magnitude is acceptable.

Table 2 – Field Duplicate Precision

Parameter	Units	MW-26-121217	DUP-1-121217	RPD (%)	Qual
Methane	µg/L	20.7	20.8	0.48	None
Alkalinity, total	mg/L	204	212	3.8	None
Chloride	mg/L	56.7	50.8	11.0	None
Sulfate	mg/L	25.7	24.2	6.0	None
Total Organic Carbon	mg/L	1.1	1.1	0.0	None
Parameter	**Units**	**MW-15-121417**	**DUP-2-121417**	**RPD (%)**	**Qual**
Tetrachloroethene	µg/L	1.3	1.4	7.4	None
1,1,1-Trichloroethane	µg/L	4.3	4.6	6.7	None
Trichloroethene	µg/L	143	154	7.4	None
Alkalinity, total	mg/L	216	219	1.4	None
Chloride	mg/L	39.7	39.5	0.51	None
Nitrate	mg/L	0.60	0.60	0	None
Sulfate	mg/L	20.5	20.8	1.5	None
Total Organic Carbon	mg/L	0.33 J	0.40 J	19	None

All parent and field duplicate results were within the advisory acceptance criteria. Field sampling/laboratory precision and sample homogeneity were acceptable. No data qualifications were required.

7.0 Notes

Positive organic and inorganic results less than the LOQ, but greater than the detection limit were qualified “J,” as estimated concentrations, due to increased uncertainty near the detection limit. The “J” qualifiers were maintained in the data validation.

Matrix spike and matrix spike duplicates and laboratory duplicates that were performed on non-project samples were not evaluated because matrix similarity to project samples could not be assumed.

Appendix A

Glossary of Data Qualifier Codes

Glossary of Data Qualifier Codes

U The analyte was analyzed for, but was not detected above the level of the reported sample quantitation limit.

UJ The analyte was analyzed for, but was not detected. The reported quantitation limit is approximated and may be inaccurate or imprecise.

J The analyte was positively identified. The associated numerical value is the approximate concentration of the analyte in the sample.

J+ The result is an estimated quantity, likely to be biased high. The associated numerical value is the approximate concentration of the analyte in the sample.

J- The result is an estimated quantity, likely to be biased low. The associated numerical value is the approximate concentration of the analyte in the sample.

R The data are unusable. The sample results are rejected due to serious deficiencies in the ability to meet quality control criteria. The presence or absence of the analyte cannot be verified.

N (Organics) The analysis indicates the presence of an analyte for which there is presumptive evidence to make a tentative identification.

NJ (Organics) The analysis indicates the presence of an analyte that has been tentatively identified and the associated numerical value represents its approximate concentration.

Appendix B

Data Qualification Summaries

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State Certifications: DE ID 11 , MA PA0102 , MD 128 , VA 460157 , WV 343

ANALYTICAL RESULTS

Workorder: 2282912 ASN029|2015-SCOTIA NAVY DEPOT

Lab ID: **2282912001** Date Collected: 12/11/2017 12:45 Matrix: Ground Water

Sample ID: **MW-16 121117** Date Received: 12/12/2017 09:54

Parameters	Results	Flag	Units	LOQ	LOD	DL	Method	Prepared By	Analyzed	By	Cntr
VOLATILE ORGANICS											
Carbon Tetrachloride	0.75UJ	U	ug/L	1.0	0.75	0.33	SW846 8260C		12/20/17 03:10	CJG	A
1,1-Dichloroethane	0.75U	U	ug/L	1.0	0.75	0.33	SW846 8260C		12/20/17 03:10	CJG	A
1,2-Dichloroethane	0.75U	U	ug/L	1.0	0.75	0.33	SW846 8260C		12/20/17 03:10	CJG	A
1,1-Dichloroethene	0.75U	U	ug/L	1.0	0.75	0.33	SW846 8260C		12/20/17 03:10	CJG	A
cis-1,2-Dichloroethene	0.75U	U	ug/L	1.0	0.75	0.33	SW846 8260C		12/20/17 03:10	CJG	A
trans-1,2-Dichloroethene	0.75U	U	ug/L	1.0	0.75	0.33	SW846 8260C		12/20/17 03:10	CJG	A
1,1,1,2-Tetrachloroethane	0.75U	U	ug/L	1.0	0.75	0.33	SW846 8260C		12/20/17 03:10	CJG	A
1,1,2,2-Tetrachloroethane	0.75U	U	ug/L	1.0	0.75	0.33	SW846 8260C		12/20/17 03:10	CJG	A
Tetrachloroethene	0.75U	U	ug/L	1.0	0.75	0.33	SW846 8260C		12/20/17 03:10	CJG	A
Toluene	0.75U	U	ug/L	1.0	0.75	0.33	SW846 8260C		12/20/17 03:10	CJG	A
1,1,1-Trichloroethane	0.75U	U	ug/L	1.0	0.75	0.33	SW846 8260C		12/20/17 03:10	CJG	A
1,1,2-Trichloroethane	0.75U	U	ug/L	1.0	0.75	0.33	SW846 8260C		12/20/17 03:10	CJG	A
Trichloroethene	0.75U	U	ug/L	1.0	0.75	0.33	SW846 8260C		12/20/17 03:10	CJG	A
Vinyl Chloride	0.75U	U	ug/L	1.0	0.75	0.33	SW846 8260C		12/20/17 03:10	CJG	A
Surrogate Recoveries	*Results*	*Flag*	*Units*	*Limits*			*Method*	*Prepared By*	*Analyzed*	*By*	*Cntr*
1,2-Dichloroethane-d4 (S)	108		%	81 - 118			SW846 8260C		12/20/17 03:10	CJG	A
4-Bromofluorobenzene (S)	111		%	85 - 114			SW846 8260C		12/20/17 03:10	CJG	A
Dibromofluoromethane (S)	98.3		%	80 - 119			SW846 8260C		12/20/17 03:10	CJG	A
Toluene-d8 (S)	105		%	89 - 112			SW846 8260C		12/20/17 03:10	CJG	A
LIGHT HYDROCARBON GASES											
Ethane	0.50U	U	ug/L	1.0	0.50	0.25	RSK 175		12/19/17 01:08	EGO	D
Ethene	0.75U	U	ug/L	1.5	0.75	0.31	RSK 175		12/19/17 01:08	EGO	D
Methane 0.50U	~~0.17J~~	~~J~~	ug/L	0.50	0.25	0.13	RSK 175		12/19/17 01:08	EGO	D
WET CHEMISTRY											
Chloride	4.0		mg/L	2.0	0.50	0.16	EPA 300.0		12/13/17 05:48	CHW	J
Nitrate-N	1.1		mg/L	0.20	0.060	0.020	EPA 300.0		12/13/17 05:48	CHW	J
Sulfate	119		mg/L	2.0	0.50	0.20	EPA 300.0		12/13/17 05:48	CHW	J
Total Organic Carbon (TOC)	0.85J	J	mg/L	1.0	0.50	0.18	S5310B-00		12/18/17 10:42	PAG	G

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ANALYTICAL RESULTS

Workorder: 2282912 ASN029|2015-SCOTIA NAVY DEPOT

Lab ID: **2282912002** Date Collected: 12/11/2017 12:45 Matrix: Ground Water

Sample ID: **Trip Blank - 12117** Date Received: 12/12/2017 09:54

Parameters	Results	Flag	Units	LOQ	LOD	DL	Method	Prepared	By	Analyzed	By	Cntr
VOLATILE ORGANICS												
Carbon Tetrachloride	0.75UJ	U	ug/L	1.0	0.75	0.33	SW846 8260C			12/20/17 02:03	CJG	A
1,1-Dichloroethane	0.75U	U	ug/L	1.0	0.75	0.33	SW846 8260C			12/20/17 02:03	CJG	A
1,2-Dichloroethane	0.75U	U	ug/L	1.0	0.75	0.33	SW846 8260C			12/20/17 02:03	CJG	A
1,1-Dichloroethene	0.75U	U	ug/L	1.0	0.75	0.33	SW846 8260C			12/20/17 02:03	CJG	A
cis-1,2-Dichloroethene	0.75U	U	ug/L	1.0	0.75	0.33	SW846 8260C			12/20/17 02:03	CJG	A
trans-1,2-Dichloroethene	0.75U	U	ug/L	1.0	0.75	0.33	SW846 8260C			12/20/17 02:03	CJG	A
1,1,1,2-Tetrachloroethane	0.75U	U	ug/L	1.0	0.75	0.33	SW846 8260C			12/20/17 02:03	CJG	A
1,1,2,2-Tetrachloroethane	0.75U	U	ug/L	1.0	0.75	0.33	SW846 8260C			12/20/17 02:03	CJG	A
Tetrachloroethene	0.75U	U	ug/L	1.0	0.75	0.33	SW846 8260C			12/20/17 02:03	CJG	A
Toluene	0.75U	U	ug/L	1.0	0.75	0.33	SW846 8260C			12/20/17 02:03	CJG	A
1,1,1-Trichloroethane	0.75U	U	ug/L	1.0	0.75	0.33	SW846 8260C			12/20/17 02:03	CJG	A
1,1,2-Trichloroethane	0.75U	U	ug/L	1.0	0.75	0.33	SW846 8260C			12/20/17 02:03	CJG	A
Trichloroethene	0.75U	U	ug/L	1.0	0.75	0.33	SW846 8260C			12/20/17 02:03	CJG	A
Vinyl Chloride	0.75U	U	ug/L	1.0	0.75	0.33	SW846 8260C			12/20/17 02:03	CJG	A

Surrogate Recoveries	*Results*	*Flag*	*Units*	*Limits*	*Method*	*Prepared*	*By*	*Analyzed*	*By*	*Cntr*
1,2-Dichloroethane-d4 (S)	106		%	81 - 118	SW846 8260C			12/20/17 02:03	CJG	A
4-Bromofluorobenzene (S)	110		%	85 - 114	SW846 8260C			12/20/17 02:03	CJG	A
Dibromofluoromethane (S)	98.4		%	80 - 119	SW846 8260C			12/20/17 02:03	CJG	A
Toluene-d8 (S)	104		%	89 - 112	SW846 8260C			12/20/17 02:03	CJG	A

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ANALYTICAL RESULTS

Workorder: 2282785 ANL005|60440641

Lab ID: **2282785001** Date Collected: 12/12/2017 09:26 Matrix: Ground Water

Sample ID: ~~MW-20 121217~~ MW-26-121217 Date Received: 12/13/2017 09:13

Parameters	Results	Flag	Units	LOQ	LOD	DL	Method	Prepared By	Analyzed	By	Cntr
VOLATILE ORGANICS											
Carbon Tetrachloride	0.75U	UJ	ug/L	1.0	0.75	0.33	SW846 8260C		12/20/17 03:31	CJG	A
1,1-Dichloroethane	0.75U	U	ug/L	1.0	0.75	0.33	SW846 8260C		12/20/17 03:31	CJG	A
1,2-Dichloroethane	0.75U	U	ug/L	1.0	0.75	0.33	SW846 8260C		12/20/17 03:31	CJG	A
1,1-Dichloroethene	0.75U	U	ug/L	1.0	0.75	0.33	SW846 8260C		12/20/17 03:31	CJG	A
cis-1,2-Dichloroethene	0.75U	U	ug/L	1.0	0.75	0.33	SW846 8260C		12/20/17 03:31	CJG	A
trans-1,2-Dichloroethene	0.75U	U	ug/L	1.0	0.75	0.33	SW846 8260C		12/20/17 03:31	CJG	A
1,1,1,2-Tetrachloroethane	0.75U	U	ug/L	1.0	0.75	0.33	SW846 8260C		12/20/17 03:31	CJG	A
1,1,2,2-Tetrachloroethane	0.75U	U	ug/L	1.0	0.75	0.33	SW846 8260C		12/20/17 03:31	CJG	A
Tetrachloroethene	0.75U	U	ug/L	1.0	0.75	0.33	SW846 8260C		12/20/17 03:31	CJG	A
Toluene	0.75U	U	ug/L	1.0	0.75	0.33	SW846 8260C		12/20/17 03:31	CJG	A
1,1,1-Trichloroethane	0.75U	U	ug/L	1.0	0.75	0.33	SW846 8260C		12/20/17 03:31	CJG	A
1,1,2-Trichloroethane	0.75U	U	ug/L	1.0	0.75	0.33	SW846 8260C		12/20/17 03:31	CJG	A
Trichloroethene	0.75U	U	ug/L	1.0	0.75	0.33	SW846 8260C		12/20/17 03:31	CJG	A
Vinyl Chloride	0.75U	U	ug/L	1.0	0.75	0.33	SW846 8260C		12/20/17 03:31	CJG	A
Surrogate Recoveries	*Results*	*Flag*	*Units*	*Limits*			*Method*	*Prepared By*	*Analyzed*	*By*	*Cntr*
1,2-Dichloroethane-d4 (S)	108		%	81 - 118			SW846 8260C		12/20/17 03:31	CJG	A
4-Bromofluorobenzene (S)	108		%	85 - 114			SW846 8260C		12/20/17 03:31	CJG	A
Dibromofluoromethane (S)	99.9		%	80 - 119			SW846 8260C		12/20/17 03:31	CJG	A
Toluene-d8 (S)	106		%	89 - 112			SW846 8260C		12/20/17 03:31	CJG	A
LIGHT HYDROCARBON GASES											
Ethane	0.50U	U	ug/L	1.0	0.50	0.25	RSK 175		12/19/17 02:03	EGO	D
Ethene	0.75U	U	ug/L	1.5	0.75	0.31	RSK 175		12/19/17 02:03	EGO	D
Methane	20.7		ug/L	0.50	0.25	0.13	RSK 175		12/19/17 02:03	EGO	D
WET CHEMISTRY											
Alkalinity, Total	204		mg/L	5	5	0.8	S2320B-97		12/15/17 00:51	MSA	I
Chloride	56.7		mg/L	2.0	0.50	0.16	EPA 300.0		12/14/17 06:01	CHW	I
Nitrate-N	0.060U	U	mg/L	0.20	0.060	0.020	EPA 300.0		12/14/17 06:01	CHW	I
Sulfate	25.7		mg/L	2.0	0.50	0.20	EPA 300.0		12/14/17 06:01	CHW	I
Total Organic Carbon (TOC)	1.1		mg/L	1.0	0.50	0.18	S5310B-00		12/18/17 10:42	PAG	G

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ANALYTICAL RESULTS

Workorder: 2282785 ANL005|60440641

Lab ID: **2282785002** Date Collected: 12/12/2017 00:00 Matrix: Ground Water

Sample ID: **DUP-1 121217** Date Received: 12/13/2017 09:13

Parameters	Results	Flag	Units	LOQ	LOD	DL	Method	Prepared	By	Analyzed	By	Cntr
VOLATILE ORGANICS												
Carbon Tetrachloride	0.75U	UJ	ug/L	1.0	0.75	0.33	SW846 8260C			12/20/17 03:53	CJG	A
1,1-Dichloroethane	0.75U	U	ug/L	1.0	0.75	0.33	SW846 8260C			12/20/17 03:53	CJG	A
1,2-Dichloroethane	0.75U	U	ug/L	1.0	0.75	0.33	SW846 8260C			12/20/17 03:53	CJG	A
1,1-Dichloroethene	0.75U	U	ug/L	1.0	0.75	0.33	SW846 8260C			12/20/17 03:53	CJG	A
cis-1,2-Dichloroethene	0.75U	U	ug/L	1.0	0.75	0.33	SW846 8260C			12/20/17 03:53	CJG	A
trans-1,2-Dichloroethene	0.75U	U	ug/L	1.0	0.75	0.33	SW846 8260C			12/20/17 03:53	CJG	A
1,1,1,2-Tetrachloroethane	0.75U	U	ug/L	1.0	0.75	0.33	SW846 8260C			12/20/17 03:53	CJG	A
1,1,2,2-Tetrachloroethane	0.75U	U	ug/L	1.0	0.75	0.33	SW846 8260C			12/20/17 03:53	CJG	A
Tetrachloroethene	0.75U	U	ug/L	1.0	0.75	0.33	SW846 8260C			12/20/17 03:53	CJG	A
Toluene	0.75U	U	ug/L	1.0	0.75	0.33	SW846 8260C			12/20/17 03:53	CJG	A
1,1,1-Trichloroethane	0.75U	U	ug/L	1.0	0.75	0.33	SW846 8260C			12/20/17 03:53	CJG	A
1,1,2-Trichloroethane	0.75U	U	ug/L	1.0	0.75	0.33	SW846 8260C			12/20/17 03:53	CJG	A
Trichloroethene	0.75U	U	ug/L	1.0	0.75	0.33	SW846 8260C			12/20/17 03:53	CJG	A
Vinyl Chloride	0.75U	U	ug/L	1.0	0.75	0.33	SW846 8260C			12/20/17 03:53	CJG	A
Surrogate Recoveries	*Results*	*Flag*	*Units*	*Limits*			*Method*	*Prepared*	*By*	*Analyzed*	*By*	*Cntr*
1,2-Dichloroethane-d4 (S)	107		%	81 - 118			SW846 8260C			12/20/17 03:53	CJG	A
4-Bromofluorobenzene (S)	110		%	85 - 114			SW846 8260C			12/20/17 03:53	CJG	A
Dibromofluoromethane (S)	98.3		%	80 - 119			SW846 8260C			12/20/17 03:53	CJG	A
Toluene-d8 (S)	104		%	89 - 112			SW846 8260C			12/20/17 03:53	CJG	A
LIGHT HYDROCARBON GASES												
Ethane	0.50U	U	ug/L	1.0	0.50	0.25	RSK 175			12/19/17 01:24	EGO	D
Ethene	0.75U	U	ug/L	1.5	0.75	0.31	RSK 175			12/19/17 01:24	EGO	D
Methane	20.8		ug/L	0.50	0.25	0.13	RSK 175			12/19/17 01:24	EGO	D
WET CHEMISTRY												
Alkalinity, Total	212		mg/L	5	5	0.8	S2320B-97			12/15/17 01:02	MSA	H
Chloride	50.8		mg/L	2.0	0.50	0.16	EPA 300.0			12/14/17 07:22	CHW	H
Nitrate-N	0.060U	U	mg/L	0.20	0.060	0.020	EPA 300.0			12/14/17 07:22	CHW	H
Sulfate	24.2		mg/L	2.0	0.50	0.20	EPA 300.0			12/14/17 07:22	CHW	H
Total Organic Carbon (TOC)	1.1		mg/L	1.0	0.50	0.18	S5310B-00			12/18/17 10:42	PAG	F

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ANALYTICAL RESULTS

Workorder: 2282785 ANL005|60440641

Lab ID: **2282785003** Date Collected: 12/12/2017 10:01 Matrix: Ground Water
Sample ID: **EB-1 121217** Date Received: 12/13/2017 09:13

Parameters	Results	Flag	Units	LOQ	LOD	DL	Method	Prepared By	Analyzed	By	Cntr
VOLATILE ORGANICS											
Carbon Tetrachloride	0.75U	UJ	ug/L	1.0	0.75	0.33	SW846 8260C		12/20/17 02:25	CJG	A CCV
1,1-Dichloroethane	0.75U	U	ug/L	1.0	0.75	0.33	SW846 8260C		12/20/17 02:25	CJG	A
1,2-Dichloroethane	0.75U	U	ug/L	1.0	0.75	0.33	SW846 8260C		12/20/17 02:25	CJG	A
1,1-Dichloroethene	0.75U	U	ug/L	1.0	0.75	0.33	SW846 8260C		12/20/17 02:25	CJG	A
cis-1,2-Dichloroethene	0.75U	U	ug/L	1.0	0.75	0.33	SW846 8260C		12/20/17 02:25	CJG	A
trans-1,2-Dichloroethene	0.75U	U	ug/L	1.0	0.75	0.33	SW846 8260C		12/20/17 02:25	CJG	A
1,1,1,2-Tetrachloroethane	0.75U	U	ug/L	1.0	0.75	0.33	SW846 8260C		12/20/17 02:25	CJG	A
1,1,2,2-Tetrachloroethane	0.75U	U	ug/L	1.0	0.75	0.33	SW846 8260C		12/20/17 02:25	CJG	A
Tetrachloroethene	0.75U	U	ug/L	1.0	0.75	0.33	SW846 8260C		12/20/17 02:25	CJG	A
Toluene	0.75U	U	ug/L	1.0	0.75	0.33	SW846 8260C		12/20/17 02:25	CJG	A
1,1,1-Trichloroethane	0.75U	U	ug/L	1.0	0.75	0.33	SW846 8260C		12/20/17 02:25	CJG	A
1,1,2-Trichloroethane	0.75U	U	ug/L	1.0	0.75	0.33	SW846 8260C		12/20/17 02:25	CJG	A
Trichloroethene	0.75U	U	ug/L	1.0	0.75	0.33	SW846 8260C		12/20/17 02:25	CJG	A
Vinyl Chloride	0.75U	U	ug/L	1.0	0.75	0.33	SW846 8260C		12/20/17 02:25	CJG	A

Surrogate Recoveries	*Results*	*Flag*	*Units*	*Limits*	*Method*	*Prepared By*	*Analyzed*	*By*	*Cntr*
1,2-Dichloroethane-d4 (S)	105		%	81 - 118	SW846 8260C		12/20/17 02:25	CJG	A
4-Bromofluorobenzene (S)	110		%	85 - 114	SW846 8260C		12/20/17 02:25	CJG	A
Dibromofluoromethane (S)	98.9		%	80 - 119	SW846 8260C		12/20/17 02:25	CJG	A
Toluene-d8 (S)	106		%	89 - 112	SW846 8260C		12/20/17 02:25	CJG	A

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ANALYTICAL RESULTS

Workorder: 2282785 ANL005|60440641

Lab ID: **2282785004** Date Collected: 12/12/2017 10:51 Matrix: Ground Water

Sample ID: **MW-34 121217** Date Received: 12/13/2017 09:13

Parameters	Results	Flag	Units	LOQ	LOD	DL	Method	Prepared By	Analyzed	By	Cntr
VOLATILE ORGANICS											
Carbon Tetrachloride	0.75U	U J	ug/L	1.0	0.75	0.33	SW846 8260C		12/20/17 04:15	CJG	A
1,1-Dichloroethane	0.75U	U	ug/L	1.0	0.75	0.33	SW846 8260C		12/20/17 04:15	CJG	A
1,2-Dichloroethane	0.75U	U	ug/L	1.0	0.75	0.33	SW846 8260C		12/20/17 04:15	CJG	A
1,1-Dichloroethene	0.75U	U	ug/L	1.0	0.75	0.33	SW846 8260C		12/20/17 04:15	CJG	A
cis-1,2-Dichloroethene	0.75U	U	ug/L	1.0	0.75	0.33	SW846 8260C		12/20/17 04:15	CJG	A
trans-1,2-Dichloroethene	0.75U	U	ug/L	1.0	0.75	0.33	SW846 8260C		12/20/17 04:15	CJG	A
1,1,1,2-Tetrachloroethane	0.75U	U	ug/L	1.0	0.75	0.33	SW846 8260C		12/20/17 04:15	CJG	A
1,1,2,2-Tetrachloroethane	0.75U	U	ug/L	1.0	0.75	0.33	SW846 8260C		12/20/17 04:15	CJG	A
Tetrachloroethene	0.75U	U	ug/L	1.0	0.75	0.33	SW846 8260C		12/20/17 04:15	CJG	A
Toluene	0.75U	U	ug/L	1.0	0.75	0.33	SW846 8260C		12/20/17 04:15	CJG	A
1,1,1-Trichloroethane	0.75U	U	ug/L	1.0	0.75	0.33	SW846 8260C		12/20/17 04:15	CJG	A
1,1,2-Trichloroethane	0.75U	U	ug/L	1.0	0.75	0.33	SW846 8260C		12/20/17 04:15	CJG	A
Trichloroethene	28.0		ug/L	1.0	0.75	0.33	SW846 8260C		12/20/17 04:15	CJG	A
Vinyl Chloride	0.75U	U	ug/L	1.0	0.75	0.33	SW846 8260C		12/20/17 04:15	CJG	A

Surrogate Recoveries	*Results*	*Flag*	*Units*	*Limits*	*Method*	*Prepared By*	*Analyzed*	*By*	*Cntr*
1,2-Dichloroethane-d4 (S)	107		%	81 - 118	SW846 8260C		12/20/17 04:15	CJG	A
4-Bromofluorobenzene (S)	111		%	85 - 114	SW846 8260C		12/20/17 04:15	CJG	A
Dibromofluoromethane (S)	99.9		%	80 - 119	SW846 8260C		12/20/17 04:15	CJG	A
Toluene-d8 (S)	105		%	89 - 112	SW846 8260C		12/20/17 04:15	CJG	A

LIGHT HYDROCARBON GASES											
Ethane	1.1		ug/L	1.0	0.50	0.25	RSK 175		12/19/17 02:19	EGO	D
Ethene	0.75U	U	ug/L	1.5	0.75	0.31	RSK 175		12/19/17 02:19	EGO	D
Methane	531		ug/L	0.50	0.25	0.13	RSK 175		12/19/17 02:19	EGO	D
WET CHEMISTRY											
Alkalinity, Total	203		mg/L	5	5	0.8	S2320B-97		12/15/17 01:12	MSA	J
Chloride	12.9		mg/L	2.0	0.50	0.16	EPA 300.0		12/14/17 07:33	CHW	J
Nitrate-N	0.020J	J	mg/L	0.20	0.060	0.020	EPA 300.0		12/14/17 07:33	CHW	J
Sulfate	7.3		mg/L	2.0	0.50	0.20	EPA 300.0		12/14/17 07:33	CHW	J
Total Organic Carbon (TOC)	4.1		mg/L	1.0	0.50	0.18	S5310B-00		12/18/17 10:42	PAG	G

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ANALYTICAL RESULTS

Workorder: 2282785 ANL005|60440641

Lab ID: **2282785005** Date Collected: 12/12/2017 11:54 Matrix: Ground Water

Sample ID: **MW-35 121217** Date Received: 12/13/2017 09:13

Parameters	Results	Flag	Units	LOQ	LOD	DL	Method	Prepared By	Analyzed	By	Cntr
VOLATILE ORGANICS											
Carbon Tetrachloride	0.75U	U J	ug/L	1.0	0.75	0.33	SW846 8260C		12/20/17 04:37	CJG	A
1,1-Dichloroethane	0.75U	U	ug/L	1.0	0.75	0.33	SW846 8260C		12/20/17 04:37	CJG	A
1,2-Dichloroethane	0.75U	U	ug/L	1.0	0.75	0.33	SW846 8260C		12/20/17 04:37	CJG	A
1,1-Dichloroethene	0.75U	U	ug/L	1.0	0.75	0.33	SW846 8260C		12/20/17 04:37	CJG	A
cis-1,2-Dichloroethene	0.75U	U	ug/L	1.0	0.75	0.33	SW846 8260C		12/20/17 04:37	CJG	A
trans-1,2-Dichloroethene	0.75U	U	ug/L	1.0	0.75	0.33	SW846 8260C		12/20/17 04:37	CJG	A
1,1,1,2-Tetrachloroethane	0.75U	U	ug/L	1.0	0.75	0.33	SW846 8260C		12/20/17 04:37	CJG	A
1,1,2,2-Tetrachloroethane	0.75U	U	ug/L	1.0	0.75	0.33	SW846 8260C		12/20/17 04:37	CJG	A
Tetrachloroethene	0.75U	U	ug/L	1.0	0.75	0.33	SW846 8260C		12/20/17 04:37	CJG	A
Toluene	0.75U	U	ug/L	1.0	0.75	0.33	SW846 8260C		12/20/17 04:37	CJG	A
1,1,1-Trichloroethane	0.75U	U	ug/L	1.0	0.75	0.33	SW846 8260C		12/20/17 04:37	CJG	A
1,1,2-Trichloroethane	0.75U	U	ug/L	1.0	0.75	0.33	SW846 8260C		12/20/17 04:37	CJG	A
Trichloroethene	43.5		ug/L	1.0	0.75	0.33	SW846 8260C		12/20/17 04:37	CJG	A
Vinyl Chloride	0.75U	U	ug/L	1.0	0.75	0.33	SW846 8260C		12/20/17 04:37	CJG	A
Surrogate Recoveries	*Results*	*Flag*	*Units*	*Limits*			*Method*	*Prepared By*	*Analyzed*	*By*	*Cntr*
1,2-Dichloroethane-d4 (S)	107		%	81 - 118			SW846 8260C		12/20/17 04:37	CJG	A
4-Bromofluorobenzene (S)	107		%	85 - 114			SW846 8260C		12/20/17 04:37	CJG	A
Dibromofluoromethane (S)	99.7		%	80 - 119			SW846 8260C		12/20/17 04:37	CJG	A
Toluene-d8 (S)	103		%	89 - 112			SW846 8260C		12/20/17 04:37	CJG	A
LIGHT HYDROCARBON GASES											
Ethane	0.50U	U	ug/L	1.0	0.50	0.25	RSK 175		12/19/17 02:35	EGO	G
Ethene	0.75U	U	ug/L	1.5	0.75	0.31	RSK 175		12/19/17 02:35	EGO	G
Methane	7.9		ug/L	0.50	0.25	0.13	RSK 175		12/19/17 02:35	EGO	G
WET CHEMISTRY											
Alkalinity, Total	210		mg/L	5	5	0.8	S2320B-97		12/14/17 23:41	MSA	b
Chloride	22.2		mg/L	2.0	0.50	0.16	EPA 300.0		12/14/17 06:12	CHW	b
Nitrate-N	0.44	J+	mg/L	0.20	0.060	0.020	EPA 300.0		12/14/17 06:12	CHW	b
Sulfate	10.2		mg/L	2.0	0.50	0.20	EPA 300.0		12/14/17 06:12	CHW	b
Total Organic Carbon (TOC)	0.56J	J	mg/L	1.0	0.50	0.18	S5310B-00		12/18/17 10:42	PAG	S

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ANALYTICAL RESULTS

Workorder: 2282785 ANL005|60440641

Lab ID: **2282785006** Date Collected: 12/12/2017 14:12 Matrix: Ground Water

Sample ID: **MW-24 121217** Date Received: 12/13/2017 09:13

Parameters	Results	Flag	Units	LOQ	LOD	DL	Method	Prepared By	Analyzed	By	Cntr
VOLATILE ORGANICS											
Carbon Tetrachloride	0.75U	UJ	ug/L	1.0	0.75	0.33	SW846 8260C		12/20/17 04:59	CJG	A ccv
1,1-Dichloroethane	0.75U	U	ug/L	1.0	0.75	0.33	SW846 8260C		12/20/17 04:59	CJG	A
1,2-Dichloroethane	0.75U	U	ug/L	1.0	0.75	0.33	SW846 8260C		12/20/17 04:59	CJG	A
1,1-Dichloroethene	0.75U	U	ug/L	1.0	0.75	0.33	SW846 8260C		12/20/17 04:59	CJG	A
cis-1,2-Dichloroethene	0.75U	U	ug/L	1.0	0.75	0.33	SW846 8260C		12/20/17 04:59	CJG	A
trans-1,2-Dichloroethene	0.75U	U	ug/L	1.0	0.75	0.33	SW846 8260C		12/20/17 04:59	CJG	A
1,1,1,2-Tetrachloroethane	0.75U	U	ug/L	1.0	0.75	0.33	SW846 8260C		12/20/17 04:59	CJG	A
1,1,2,2-Tetrachloroethane	0.75U	U	ug/L	1.0	0.75	0.33	SW846 8260C		12/20/17 04:59	CJG	A
Tetrachloroethene	0.75U	U	ug/L	1.0	0.75	0.33	SW846 8260C		12/20/17 04:59	CJG	A
Toluene	0.75U	U	ug/L	1.0	0.75	0.33	SW846 8260C		12/20/17 04:59	CJG	A
1,1,1-Trichloroethane	0.75U	U	ug/L	1.0	0.75	0.33	SW846 8260C		12/20/17 04:59	CJG	A
1,1,2-Trichloroethane	0.75U	U	ug/L	1.0	0.75	0.33	SW846 8260C		12/20/17 04:59	CJG	A
Trichloroethene	0.94J	J	ug/L	1.0	0.75	0.33	SW846 8260C		12/20/17 04:59	CJG	A
Vinyl Chloride	0.75U	U	ug/L	1.0	0.75	0.33	SW846 8260C		12/20/17 04:59	CJG	A
Surrogate Recoveries	*Results*	*Flag*	*Units*	*Limits*			*Method*	*Prepared By*	*Analyzed*	*By*	*Cntr*
1,2-Dichloroethane-d4 (S)	107		%	81 - 118			SW846 8260C		12/20/17 04:59	CJG	A
4-Bromofluorobenzene (S)	108		%	85 - 114			SW846 8260C		12/20/17 04:59	CJG	A
Dibromofluoromethane (S)	100		%	80 - 119			SW846 8260C		12/20/17 04:59	CJG	A
Toluene-d8 (S)	104		%	89 - 112			SW846 8260C		12/20/17 04:59	CJG	A
LIGHT HYDROCARBON GASES											
Ethane	0.50U	U	ug/L	1.0	0.50	0.25	RSK 175		12/19/17 03:11	EGO	D
Ethene	0.75U	U	ug/L	1.5	0.75	0.31	RSK 175		12/19/17 03:11	EGO	D
Methane	431		ug/L	0.50	0.25	0.13	RSK 175		12/19/17 03:11	EGO	D
WET CHEMISTRY											
Alkalinity, Total	352	J	mg/L	5	5	0.8	S2320B-97		12/15/17 02:19	MSA	J
Chloride	155		mg/L	2.0	0.50	0.16	EPA 300.0		12/14/17 07:45	CHW	J
Nitrate-N	0.060U	U	mg/L	0.20	0.060	0.020	EPA 300.0		12/14/17 07:45	CHW	J
Sulfate	0.48J	J	mg/L	2.0	0.50	0.20	EPA 300.0		12/14/17 07:45	CHW	J
Total Organic Carbon (TOC)	96.2		mg/L	25.0	12.5	4.6	S5310B-00		12/19/17 15:44	PAG	G

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ANALYTICAL RESULTS

Workorder: 2282982 ANL006|60440641

Lab ID: **2282982001** Date Collected: 12/13/2017 08:41 Matrix: Ground Water

Sample ID: **MW-32-121317** Date Received: 12/14/2017 09:55

Parameters	Results	Flag	Units	LOQ	LOD	DL	Method	Prepared	By	Analyzed	By	Cntr
VOLATILE ORGANICS												
Carbon Tetrachloride	0.75U	U	ug/L	1.0	0.75	0.33	SW846 8260C			12/20/17 11:34	DD	C
1,1-Dichloroethane	0.75U	U	ug/L	1.0	0.75	0.33	SW846 8260C			12/20/17 11:34	DD	C
1,2-Dichloroethane	0.75U	U	ug/L	1.0	0.75	0.33	SW846 8260C			12/20/17 11:34	DD	C
1,1-Dichloroethene	0.75U	U	ug/L	1.0	0.75	0.33	SW846 8260C			12/20/17 11:34	DD	C
cis-1,2-Dichloroethene	0.68J	J	ug/L	1.0	0.75	0.33	SW846 8260C			12/20/17 11:34	DD	C
trans-1,2-Dichloroethene	0.75U	U	ug/L	1.0	0.75	0.33	SW846 8260C			12/20/17 11:34	DD	C
1,1,1,2-Tetrachloroethane	0.75U	U	ug/L	1.0	0.75	0.33	SW846 8260C			12/20/17 11:34	DD	C
1,1,2,2-Tetrachloroethane	0.75U	U	ug/L	1.0	0.75	0.33	SW846 8260C			12/20/17 11:34	DD	C
Tetrachloroethene	0.75U	U	ug/L	1.0	0.75	0.33	SW846 8260C			12/20/17 11:34	DD	C
Toluene	0.75U	U	ug/L	1.0	0.75	0.33	SW846 8260C			12/20/17 11:34	DD	C
1,1,1-Trichloroethane	0.75U	U	ug/L	1.0	0.75	0.33	SW846 8260C			12/20/17 11:34	DD	C
1,1,2-Trichloroethane	0.75U	U	ug/L	1.0	0.75	0.33	SW846 8260C			12/20/17 11:34	DD	C
Trichloroethene	120	~~B~~	ug/L	1.0	0.75	0.33	SW846 8260C			12/20/17 11:34	DD	C
Vinyl Chloride	0.75U	U	ug/L	1.0	0.75	0.33	SW846 8260C			12/20/17 11:34	DD	C
Surrogate Recoveries	*Results*	*Flag*	*Units*	*Limits*			*Method*	*Prepared*	*By*	*Analyzed*	*By*	*Cntr*
1,2-Dichloroethane-d4 (S)	107		%	81 - 118			SW846 8260C			12/20/17 11:34	DD	C
4-Bromofluorobenzene (S)	109		%	85 - 114			SW846 8260C			12/20/17 11:34	DD	C
Dibromofluoromethane (S)	100		%	80 - 119			SW846 8260C			12/20/17 11:34	DD	C
Toluene-d8 (S)	105		%	89 - 112			SW846 8260C			12/20/17 11:34	DD	C
LIGHT HYDROCARBON GASES												
Ethane	5.6	~~Z~~ J	ug/L	1.0	0.50	0.25	RSK 175			12/19/17 03:28	EGO	A
Ethene	2.3	~~B~~ J	ug/L	1.5	0.75	0.31	RSK 175			12/19/17 03:28	EGO	A
Methane	233	~~A~~ J	ug/L	0.50	0.25	0.13	RSK 175			12/19/17 03:28	EGO	A
WET CHEMISTRY												
Alkalinity, Total	141	~~M~~	mg/L	5	5	0.8	S2320B-97			12/15/17 06:58	MSA	H
Chloride	28.2		mg/L	2.0	0.50	0.16	EPA 300.0			12/15/17 05:36	CHW	G
Nitrate-N	0.060U	U	mg/L	0.20	0.060	0.020	EPA 300.0			12/15/17 05:36	CHW	G
Sulfate	6.0		mg/L	2.0	0.50	0.20	EPA 300.0			12/15/17 05:36	CHW	G
Total Organic Carbon (TOC)	5.4J	J	mg/L	10.0	5.0	1.8	S5310B-00			12/19/17 15:44	PAG	D

RD.

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State Certifications: DE ID 11 , MA PA0102 , MD 128 , VA 460157 , WV 343

ANALYTICAL RESULTS

Workorder: 2282982 ANL006|60440641

Lab ID: **2282982002** Date Collected: 12/13/2017 09:45 Matrix: Ground Water

Sample ID: **MW-33-121317** Date Received: 12/14/2017 09:55

Parameters	Results	Flag	Units	LOQ	LOD	DL	Method	Prepared By	Analyzed	By	Cntr
VOLATILE ORGANICS											
Carbon Tetrachloride	0.75U	U	ug/L	1.0	0.75	0.33	SW846 8260C		12/20/17 11:56	DD	B
1,1-Dichloroethane	0.75U	U	ug/L	1.0	0.75	0.33	SW846 8260C		12/20/17 11:56	DD	B
1,2-Dichloroethane	0.75U	U	ug/L	1.0	0.75	0.33	SW846 8260C		12/20/17 11:56	DD	B
1,1-Dichloroethene	0.75U	U	ug/L	1.0	0.75	0.33	SW846 8260C		12/20/17 11:56	DD	B
cis-1,2-Dichloroethene	0.75U	U	ug/L	1.0	0.75	0.33	SW846 8260C		12/20/17 11:56	DD	B
trans-1,2-Dichloroethene	0.75U	U	ug/L	1.0	0.75	0.33	SW846 8260C		12/20/17 11:56	DD	B
1,1,1,2-Tetrachloroethane	0.75U	U	ug/L	1.0	0.75	0.33	SW846 8260C		12/20/17 11:56	DD	B
1,1,2,2-Tetrachloroethane	0.75U	U	ug/L	1.0	0.75	0.33	SW846 8260C		12/20/17 11:56	DD	B
Tetrachloroethene	0.75U	U	ug/L	1.0	0.75	0.33	SW846 8260C		12/20/17 11:56	DD	B
Toluene	0.75U	U	ug/L	1.0	0.75	0.33	SW846 8260C		12/20/17 11:56	DD	B
1,1,1-Trichloroethane	0.75U	U	ug/L	1.0	0.75	0.33	SW846 8260C		12/20/17 11:56	DD	B
1,1,2-Trichloroethane	0.75U	U	ug/L	1.0	0.75	0.33	SW846 8260C		12/20/17 11:56	DD	B
Trichloroethene	142		ug/L	1.0	0.75	0.33	SW846 8260C		12/20/17 11:56	DD	B
Vinyl Chloride	0.75U	U	ug/L	1.0	0.75	0.33	SW846 8260C		12/20/17 11:56	DD	B

Surrogate Recoveries	*Results*	*Flag*	*Units*	*Limits*	*Method*	*Prepared By*	*Analyzed*	*By*	*Cntr*
1,2-Dichloroethane-d4 (S)	108		%	81 - 118	SW846 8260C		12/20/17 11:56	DD	B
4-Bromofluorobenzene (S)	108		%	85 - 114	SW846 8260C		12/20/17 11:56	DD	B
Dibromofluoromethane (S)	102		%	80 - 119	SW846 8260C		12/20/17 11:56	DD	B
Toluene-d8 (S)	103		%	89 - 112	SW846 8260C		12/20/17 11:56	DD	B

LIGHT HYDROCARBON GASES											
Ethane	0.50U	U	ug/L	1.0	0.50	0.25	RSK 175		12/19/17 04:01	EGO	A
Ethene	0.75U	U	ug/L	1.5	0.75	0.31	RSK 175		12/19/17 04:01	EGO	A
Methane	7.2		ug/L	0.50	0.25	0.13	RSK 175		12/19/17 04:01	EGO	A
WET CHEMISTRY											
Alkalinity, Total	212		mg/L	5	5	0.8	S2320B-97		12/15/17 07:08	MSA	H
Chloride	28.1		mg/L	2.0	0.50	0.16	EPA 300.0		12/15/17 05:52	CHW	G
Nitrate-N	0.32		mg/L	0.20	0.060	0.020	EPA 300.0		12/15/17 05:52	CHW	G
Sulfate	14.8		mg/L	2.0	0.50	0.20	EPA 300.0		12/15/17 05:52	CHW	G
Total Organic Carbon (TOC)	0.44J	J	mg/L	1.0	0.50	0.18	S5310B-00		12/19/17 15:44	PAG	D

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State Certifications: DE ID 11 , MA PA0102 , MD 128 , VA 460157 , WV 343

ANALYTICAL RESULTS

Workorder: 2282982 ANL006|60440641

Lab ID: **2282982003** Date Collected: 12/13/2017 11:20 Matrix: Ground Water

Sample ID: **MW-30-121317** Date Received: 12/14/2017 09:55

Parameters	Results	Flag	Units	LOQ	LOD	DL	Method	Prepared By	Analyzed	By	Cntr
VOLATILE ORGANICS											
Carbon Tetrachloride	0.75U	U	ug/L	1.0	0.75	0.33	SW846 8260C		12/20/17 12:18	DD	J
1,1-Dichloroethane	0.75U	U	ug/L	1.0	0.75	0.33	SW846 8260C		12/20/17 12:18	DD	J
1,2-Dichloroethane	0.75U	U	ug/L	1.0	0.75	0.33	SW846 8260C		12/20/17 12:18	DD	J
1,1-Dichloroethene	0.75U	U	ug/L	1.0	0.75	0.33	SW846 8260C		12/20/17 12:18	DD	J
cis-1,2-Dichloroethene	0.41J	J	ug/L	1.0	0.75	0.33	SW846 8260C		12/20/17 12:18	DD	J
trans-1,2-Dichloroethene	0.75U	U	ug/L	1.0	0.75	0.33	SW846 8260C		12/20/17 12:18	DD	J
1,1,1,2-Tetrachloroethane	0.75U	U	ug/L	1.0	0.75	0.33	SW846 8260C		12/20/17 12:18	DD	J
1,1,2,2-Tetrachloroethane	0.75U	U	ug/L	1.0	0.75	0.33	SW846 8260C		12/20/17 12:18	DD	J
Tetrachloroethene	0.75U	U	ug/L	1.0	0.75	0.33	SW846 8260C		12/20/17 12:18	DD	J
Toluene	0.75U	U	ug/L	1.0	0.75	0.33	SW846 8260C		12/20/17 12:18	DD	J
1,1,1-Trichloroethane	0.75U	U	ug/L	1.0	0.75	0.33	SW846 8260C		12/20/17 12:18	DD	J
1,1,2-Trichloroethane	0.75U	U	ug/L	1.0	0.75	0.33	SW846 8260C		12/20/17 12:18	DD	J
Trichloroethene	19.6		ug/L	1.0	0.75	0.33	SW846 8260C		12/20/17 12:18	DD	J
Vinyl Chloride	0.75U	U	ug/L	1.0	0.75	0.33	SW846 8260C		12/20/17 12:18	DD	J
Surrogate Recoveries	*Results*	*Flag*	*Units*	*Limits*			*Method*	*Prepared By*	*Analyzed*	*By*	*Cntr*
1,2-Dichloroethane-d4 (S)	108		%	81 - 118			SW846 8260C		12/20/17 12:18	DD	J
4-Bromofluorobenzene (S)	108		%	85 - 114			SW846 8260C		12/20/17 12:18	DD	J
Dibromofluoromethane (S)	98.9		%	80 - 119			SW846 8260C		12/20/17 12:18	DD	J
Toluene-d8 (S)	104		%	89 - 112			SW846 8260C		12/20/17 12:18	DD	J
LIGHT HYDROCARBON GASES											
Ethane	40.5		ug/L	1.0	0.50	0.25	RSK 175		12/19/17 04:18	EGO	A
Ethene	4.2		ug/L	1.5	0.75	0.31	RSK 175		12/19/17 04:18	EGO	A
Methane	12900		ug/L	1.0	0.50	0.26	RSK 175		12/19/17 06:17	EGO	A
WET CHEMISTRY											
Alkalinity, Total	347		mg/L	5	5	0.8	S2320B-97		12/15/17 07:18	MSA	H
Chloride	87.3		mg/L	2.0	0.50	0.16	EPA 300.0		12/15/17 06:08	CHW	G
Nitrate-N	0.060U	U	mg/L	0.20	0.060	0.020	EPA 300.0		12/15/17 06:08	CHW	G
Sulfate	0.22J	J	mg/L	2.0	0.50	0.20	EPA 300.0		12/15/17 06:08	CHW	G
Total Organic Carbon (TOC)	366		mg/L	50.0	25.0	9.2	S5310B-00		12/19/17 15:44	PAG	D

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ANALYTICAL RESULTS

Workorder: 2282982 ANL006|60440641

Lab ID: **2282982004** Date Collected: 12/13/2017 12:15 Matrix: Ground Water

Sample ID: **MW-31-121317** Date Received: 12/14/2017 09:55

Parameters	Results	Flag	Units	LOQ	LOD	DL	Method	Prepared By	Analyzed	By	Cntr
VOLATILE ORGANICS											
Carbon Tetrachloride	0.75U	U	ug/L	1.0	0.75	0.33	SW846 8260C		12/20/17 12:40	DD	B
1,1-Dichloroethane	0.75U	U	ug/L	1.0	0.75	0.33	SW846 8260C		12/20/17 12:40	DD	B
1,2-Dichloroethane	0.75U	U	ug/L	1.0	0.75	0.33	SW846 8260C		12/20/17 12:40	DD	B
1,1-Dichloroethene	0.75U	U	ug/L	1.0	0.75	0.33	SW846 8260C		12/20/17 12:40	DD	B
cis-1,2-Dichloroethene	0.40J	J	ug/L	1.0	0.75	0.33	SW846 8260C		12/20/17 12:40	DD	B
trans-1,2-Dichloroethene	0.75U	U	ug/L	1.0	0.75	0.33	SW846 8260C		12/20/17 12:40	DD	B
1,1,1,2-Tetrachloroethane	0.75U	U	ug/L	1.0	0.75	0.33	SW846 8260C		12/20/17 12:40	DD	B
1,1,2,2-Tetrachloroethane	0.75U	U	ug/L	1.0	0.75	0.33	SW846 8260C		12/20/17 12:40	DD	B
Tetrachloroethene	0.75U	U	ug/L	1.0	0.75	0.33	SW846 8260C		12/20/17 12:40	DD	B
Toluene	0.75U	U	ug/L	1.0	0.75	0.33	SW846 8260C		12/20/17 12:40	DD	B
1,1,1-Trichloroethane	0.75U	U	ug/L	1.0	0.75	0.33	SW846 8260C		12/20/17 12:40	DD	B
1,1,2-Trichloroethane	0.75U	U	ug/L	1.0	0.75	0.33	SW846 8260C		12/20/17 12:40	DD	B
Trichloroethene	19.6		ug/L	1.0	0.75	0.33	SW846 8260C		12/20/17 12:40	DD	B
Vinyl Chloride	0.75U	U	ug/L	1.0	0.75	0.33	SW846 8260C		12/20/17 12:40	DD	B
Surrogate Recoveries	*Results*	*Flag*	*Units*	*Limits*			*Method*	*Prepared By*	*Analyzed*	*By*	*Cntr*
1,2-Dichloroethane-d4 (S)	106		%	81 - 118			SW846 8260C		12/20/17 12:40	DD	B
4-Bromofluorobenzene (S)	107		%	85 - 114			SW846 8260C		12/20/17 12:40	DD	B
Dibromofluoromethane (S)	99.8		%	80 - 119			SW846 8260C		12/20/17 12:40	DD	B
Toluene-d8 (S)	103		%	89 - 112			SW846 8260C		12/20/17 12:40	DD	B
LIGHT HYDROCARBON GASES											
Ethane	3.3		ug/L	1.0	0.50	0.25	RSK 175		12/19/17 04:35	EGO	A
Ethene	1.9		ug/L	1.5	0.75	0.31	RSK 175		12/19/17 04:35	EGO	A
Methane	59.4		ug/L	0.50	0.25	0.13	RSK 175		12/19/17 04:35	EGO	A
WET CHEMISTRY											
Alkalinity, Total	119		mg/L	5	5	0.8	S2320B-97		12/15/17 07:28	MSA	H
Chloride	36.3		mg/L	2.0	0.50	0.16	EPA 300.0		12/15/17 06:24	CHW	G
Nitrate-N	0.060U	U	mg/L	0.20	0.060	0.020	EPA 300.0		12/15/17 06:24	CHW	G
Sulfate	7.8		mg/L	2.0	0.50	0.20	EPA 300.0		12/15/17 06:24	CHW	G
Total Organic Carbon (TOC)	1.3		mg/L	1.0	0.50	0.18	S5310B-00		12/19/17 15:44	PAG	D

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State Certifications: DE ID 11 , MA PA0102 , MD 128 , VA 460157 , WV 343

ANALYTICAL RESULTS

Workorder: 2283331 ASN030|Scotia Navy Depot 60440

Lab ID: **2283331001** Date Collected: 12/14/2017 09:25 Matrix: Ground Water

Sample ID: **MW-28 121417** Date Received: 12/15/2017 09:30

Parameters	Results	Flag	Units	LOQ	LOD	DL	Method	Prepared By	Analyzed	By	Cntr
VOLATILE ORGANICS											
Carbon Tetrachloride	0.57J	J	ug/L	1.0	0.75	0.33	SW846 8260C		12/20/17 13:02	DD	A
1,1-Dichloroethane	0.84J	J	ug/L	1.0	0.75	0.33	SW846 8260C		12/20/17 13:02	DD	A
1,2-Dichloroethane	0.75U	U	ug/L	1.0	0.75	0.33	SW846 8260C		12/20/17 13:02	DD	A
1,1-Dichloroethene	0.45J	J	ug/L	1.0	0.75	0.33	SW846 8260C		12/20/17 13:02	DD	A
cis-1,2-Dichloroethene	5.0		ug/L	1.0	0.75	0.33	SW846 8260C		12/20/17 13:02	DD	A
trans-1,2-Dichloroethene	0.49J	J	ug/L	1.0	0.75	0.33	SW846 8260C		12/20/17 13:02	DD	A
1,1,1,2-Tetrachloroethane	0.75U	U	ug/L	1.0	0.75	0.33	SW846 8260C		12/20/17 13:02	DD	A
1,1,2,2-Tetrachloroethane	0.75U	U	ug/L	1.0	0.75	0.33	SW846 8260C		12/20/17 13:02	DD	A
Tetrachloroethene	45.2		ug/L	1.0	0.75	0.33	SW846 8260C		12/20/17 13:02	DD	A
Toluene	0.75U	U	ug/L	1.0	0.75	0.33	SW846 8260C		12/20/17 13:02	DD	A
1,1,1-Trichloroethane	9.5		ug/L	1.0	0.75	0.33	SW846 8260C		12/20/17 13:02	DD	A
1,1,2-Trichloroethane	0.33J	J	ug/L	1.0	0.75	0.33	SW846 8260C		12/20/17 13:02	DD	A
Trichloroethene	201		ug/L	5.0	3.8	1.7	SW846 8260C		12/21/17 22:51	CJG	B
Vinyl Chloride	0.75U	U	ug/L	1.0	0.75	0.33	SW846 8260C		12/20/17 13:02	DD	A
Surrogate Recoveries	*Results*	*Flag*	*Units*	*Limits*			*Method*	*Prepared By*	*Analyzed*	*By*	*Cntr*
1,2-Dichloroethane-d4 (S)	108		%	81 - 118			SW846 8260C		12/21/17 22:51	CJG	B
1,2-Dichloroethane-d4 (S)	106		%	81 - 118			SW846 8260C		12/20/17 13:02	DD	A
4-Bromofluorobenzene (S)	108		%	85 - 114			SW846 8260C		12/20/17 13:02	DD	A
4-Bromofluorobenzene (S)	109		%	85 - 114			SW846 8260C		12/21/17 22:51	CJG	B
Dibromofluoromethane (S)	99.9		%	80 - 119			SW846 8260C		12/20/17 13:02	DD	A
Dibromofluoromethane (S)	99.1		%	80 - 119			SW846 8260C		12/21/17 22:51	CJG	B
Toluene-d8 (S)	104		%	89 - 112			SW846 8260C		12/21/17 22:51	CJG	B
Toluene-d8 (S)	104		%	89 - 112			SW846 8260C		12/20/17 13:02	DD	A
LIGHT HYDROCARBON GASES											
Ethane	0.50U	U	ug/L	1.0	0.50	0.25	RSK 175		12/19/17 05:27	EGO	D
Ethene	0.75U	U	ug/L	1.5	0.75	0.31	RSK 175		12/19/17 05:27	EGO	D
Methane 0.50 U	~~8.38J~~	~~J~~	ug/L	0.50	0.25	0.13	RSK 175		12/19/17 05:27	EGO	D
WET CHEMISTRY											
Alkalinity, Total	383	~~J~~	mg/L	5	5	0.8	S2320B-97		12/16/17 17:41	MSA	K
Chloride	20.4		mg/L	2.0	0.50	0.16	EPA 300.0		12/16/17 05:45	CHW	J
Nitrate-N	1.2		mg/L	0.20	0.060	0.020	EPA 300.0		12/16/17 05:45	CHW	J
Sulfate	22.4		mg/L	2.0	0.50	0.20	EPA 300.0		12/16/17 05:45	CHW	J
Total Organic Carbon (TOC)	0.94J	J	mg/L	1.0	0.50	0.18	S5310B-00		12/20/17 12:11	PAG	G

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State Certifications: DE ID 11 , MA PA0102 , MD 128 , VA 460157 , WV 343

ANALYTICAL RESULTS

Workorder: 2283331 ASN030|Scotia Navy Depot 60440

Lab ID: **2283331002** Date Collected: 12/14/2017 10:10 Matrix: Ground Water

Sample ID: **MW-29 121417** Date Received: 12/15/2017 09:30

Parameters	Results	Flag	Units	LOQ	LOD	DL	Method	Prepared	By	Analyzed	By	Cntr
VOLATILE ORGANICS												
Carbon Tetrachloride	0.71J	J	ug/L	1.0	0.75	0.33	SW846 8260C			12/20/17 14:08	DD	A
1,1-Dichloroethane	0.88J	J	ug/L	1.0	0.75	0.33	SW846 8260C			12/20/17 14:08	DD	A
1,2-Dichloroethane	0.75U	U	ug/L	1.0	0.75	0.33	SW846 8260C			12/20/17 14:08	DD	A
1,1-Dichloroethene	0.96J	J	ug/L	1.0	0.75	0.33	SW846 8260C			12/20/17 14:08	DD	A
cis-1,2-Dichloroethene	5.7		ug/L	1.0	0.75	0.33	SW846 8260C			12/20/17 14:08	DD	A
trans-1,2-Dichloroethene	0.62J	J	ug/L	1.0	0.75	0.33	SW846 8260C			12/20/17 14:08	DD	A
1,1,1,2-Tetrachloroethane	0.75U	U	ug/L	1.0	0.75	0.33	SW846 8260C			12/20/17 14:08	DD	A
1,1,2,2-Tetrachloroethane	0.75U	U	ug/L	1.0	0.75	0.33	SW846 8260C			12/20/17 14:08	DD	A
Tetrachloroethene	41.7		ug/L	1.0	0.75	0.33	SW846 8260C			12/20/17 14:08	DD	A
Toluene	0.75U	U	ug/L	1.0	0.75	0.33	SW846 8260C			12/20/17 14:08	DD	A
1,1,1-Trichloroethane	14.6		ug/L	1.0	0.75	0.33	SW846 8260C			12/20/17 14:08	DD	A
1,1,2-Trichloroethane	0.75U	U	ug/L	1.0	0.75	0.33	SW846 8260C			12/20/17 14:08	DD	A
Trichloroethene	233		ug/L	5.0	3.8	1.7	SW846 8260C			12/21/17 23:13	CJG	B
Vinyl Chloride	0.75U	U	ug/L	1.0	0.75	0.33	SW846 8260C			12/20/17 14:08	DD	A
Surrogate Recoveries	*Results*	*Flag*	*Units*	*Limits*			*Method*	*Prepared*	*By*	*Analyzed*	*By*	*Cntr*
1,2-Dichloroethane-d4 (S)	107		%	81 - 118			SW846 8260C			12/20/17 14:08	DD	A
1,2-Dichloroethane-d4 (S)	109		%	81 - 118			SW846 8260C			12/21/17 23:13	CJG	B
4-Bromofluorobenzene (S)	111		%	85 - 114			SW846 8260C			12/20/17 14:08	DD	A
4-Bromofluorobenzene (S)	107		%	85 - 114			SW846 8260C			12/21/17 23:13	CJG	B
Dibromofluoromethane (S)	98.7		%	80 - 119			SW846 8260C			12/21/17 23:13	CJG	B
Dibromofluoromethane (S)	99.6		%	80 - 119			SW846 8260C			12/20/17 14:08	DD	A
Toluene-d8 (S)	103		%	89 - 112			SW846 8260C			12/21/17 23:13	CJG	B
Toluene-d8 (S)	104		%	89 - 112			SW846 8260C			12/20/17 14:08	DD	A
LIGHT HYDROCARBON GASES												
Ethane	0.50U	U	ug/L	1.0	0.50	0.25	RSK 175			12/19/17 05:43	EGO	D
Ethene	0.75U	U	ug/L	1.5	0.75	0.31	RSK 175			12/19/17 05:43	EGO	D
Methane 0.50U	~~0.42J~~	~~J~~	ug/L	0.50	0.25	0.13	RSK 175			12/19/17 05:43	EGO	D
WET CHEMISTRY												
Alkalinity, Total	348		mg/L	5	5	0.8	S2320B-97			12/16/17 17:53	MSA	K
Chloride	21.3		mg/L	2.0	0.50	0.16	EPA 300.0			12/16/17 06:01	CHW	J
Nitrate-N	0.86		mg/L	0.20	0.060	0.020	EPA 300.0			12/16/17 06:01	CHW	J
Sulfate	22.7		mg/L	2.0	0.50	0.20	EPA 300.0			12/16/17 06:01	CHW	J
Total Organic Carbon (TOC)	1.2		mg/L	1.0	0.50	0.18	S5310B-00			12/20/17 12:11	PAG	G

ALS Environmental

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NELAP Certifications: NJ PA010 , NY 11759 , PA 22-293 DoD ELAP: A2LA 0818.01
State Certifications: DE ID 11 , MA PA0102 , MD 128 , VA 460157 , WV 343

ANALYTICAL RESULTS

Workorder: 2283331 ASN030|Scotia Navy Depot 60440

Lab ID: **2283331003** Date Collected: 12/14/2017 11:01 Matrix: Ground Water

Sample ID: **MW-15 121417** Date Received: 12/15/2017 09:30

Parameters	Results	Flag	Units	LOQ	LOD	DL	Method	Prepared By	Analyzed	By	Cntr
VOLATILE ORGANICS											
Carbon Tetrachloride	0.75U	U	ug/L	1.0	0.75	0.33	SW846 8260C		12/20/17 13:24	DD	C
1,1-Dichloroethane	0.75U	U	ug/L	1.0	0.75	0.33	SW846 8260C		12/20/17 13:24	DD	C
1,2-Dichloroethane	0.75U	U	ug/L	1.0	0.75	0.33	SW846 8260C		12/20/17 13:24	DD	C
1,1-Dichloroethene	0.75U	U	ug/L	1.0	0.75	0.33	SW846 8260C		12/20/17 13:24	DD	C
cis-1,2-Dichloroethene	0.75U	U	ug/L	1.0	0.75	0.33	SW846 8260C		12/20/17 13:24	DD	C
trans-1,2-Dichloroethene	0.75U	U	ug/L	1.0	0.75	0.33	SW846 8260C		12/20/17 13:24	DD	C
1,1,1,2-Tetrachloroethane	0.75U	U	ug/L	1.0	0.75	0.33	SW846 8260C		12/20/17 13:24	DD	C
1,1,2,2-Tetrachloroethane	0.75U	U	ug/L	1.0	0.75	0.33	SW846 8260C		12/20/17 13:24	DD	C
Tetrachloroethene	1.3		ug/L	1.0	0.75	0.33	SW846 8260C		12/20/17 13:24	DD	C
Toluene	0.75U	U	ug/L	1.0	0.75	0.33	SW846 8260C		12/20/17 13:24	DD	C
1,1,1-Trichloroethane	4.3		ug/L	1.0	0.75	0.33	SW846 8260C		12/20/17 13:24	DD	C
1,1,2-Trichloroethane	0.75U	U	ug/L	1.0	0.75	0.33	SW846 8260C		12/20/17 13:24	DD	C
Trichloroethene	143		ug/L	1.0	0.75	0.33	SW846 8260C		12/20/17 13:24	DD	C
Vinyl Chloride	0.75U	U	ug/L	1.0	0.75	0.33	SW846 8260C		12/20/17 13:24	DD	C
Surrogate Recoveries	*Results*	*Flag*	*Units*	*Limits*			*Method*	*Prepared By*	*Analyzed*	*By*	*Cntr*
1,2-Dichloroethane-d4 (S)	107		%	81 - 118			SW846 8260C		12/20/17 13:24	DD	C
4-Bromofluorobenzene (S)	108		%	85 - 114			SW846 8260C		12/20/17 13:24	DD	C
Dibromofluoromethane (S)	100		%	80 - 119			SW846 8260C		12/20/17 13:24	DD	C
Toluene-d8 (S)	104		%	89 - 112			SW846 8260C		12/20/17 13:24	DD	C
LIGHT HYDROCARBON GASES											
Ethane	0.50U	U	ug/L	1.0	0.50	0.25	RSK 175		12/19/17 06:00	EGO	D
Ethene	0.75U	U	ug/L	1.5	0.75	0.31	RSK 175		12/19/17 06:00	EGO	D
Methane 0.50 U	~~0.28J~~	~~J~~	ug/L	0.50	0.25	0.13	RSK 175		12/19/17 06:00	EGO	D
WET CHEMISTRY											
Alkalinity, Total	216		mg/L	5	5	0.8	S2320B-97		12/16/17 18:40	MSA	K
Chloride	39.7		mg/L	2.0	0.50	0.16	EPA 300.0		12/16/17 06:19	CHW	J
Nitrate-N	0.60		mg/L	0.20	0.060	0.020	EPA 300.0		12/16/17 06:19	CHW	J
Sulfate	20.5		mg/L	2.0	0.50	0.20	EPA 300.0		12/16/17 06:19	CHW	J
Total Organic Carbon (TOC)	0.33J	J	mg/L	1.0	0.50	0.18	S5310B-00		12/20/17 12:11	PAG	G

Vanessa N. Badman

Mrs. Vanessa N Badman
Project Coordinator

ALS Environmental

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NELAP Certifications: NJ PA010 , NY 11759 , PA 22-293 DoD ELAP: A2LA 0818.01
State Certifications: DE ID 11 , MA PA0102 , MD 128 , VA 460157 , WV 343

ANALYTICAL RESULTS

Workorder: 2283331 ASN030|Scotia Navy Depot 60440

Lab ID: **2283331004** Date Collected: 12/14/2017 00:00 Matrix: Ground Water

Sample ID: **DUP-2 121417** Date Received: 12/15/2017 09:30

Parameters	Results	Flag	Units	LOQ	LOD	DL	Method	Prepared By	Analyzed	By	Cntr
VOLATILE ORGANICS											
Carbon Tetrachloride	0.75U	U	ug/L	1.0	0.75	0.33	SW846 8260C		12/20/17 13:46	DD	A
1,1-Dichloroethane	0.75U	U	ug/L	1.0	0.75	0.33	SW846 8260C		12/20/17 13:46	DD	A
1,2-Dichloroethane	0.75U	U	ug/L	1.0	0.75	0.33	SW846 8260C		12/20/17 13:46	DD	A
1,1-Dichloroethene	0.75U	U	ug/L	1.0	0.75	0.33	SW846 8260C		12/20/17 13:46	DD	A
cis-1,2-Dichloroethene	0.75U	U	ug/L	1.0	0.75	0.33	SW846 8260C		12/20/17 13:46	DD	A
trans-1,2-Dichloroethene	0.75U	U	ug/L	1.0	0.75	0.33	SW846 8260C		12/20/17 13:46	DD	A
1,1,1,2-Tetrachloroethane	0.75U	U	ug/L	1.0	0.75	0.33	SW846 8260C		12/20/17 13:46	DD	A
1,1,2,2-Tetrachloroethane	0.75U	U	ug/L	1.0	0.75	0.33	SW846 8260C		12/20/17 13:46	DD	A
Tetrachloroethene	1.4		ug/L	1.0	0.75	0.33	SW846 8260C		12/20/17 13:46	DD	A
Toluene	0.75U	U	ug/L	1.0	0.75	0.33	SW846 8260C		12/20/17 13:46	DD	A
1,1,1-Trichloroethane	4.6		ug/L	1.0	0.75	0.33	SW846 8260C		12/20/17 13:46	DD	A
1,1,2-Trichloroethane	0.75U	U	ug/L	1.0	0.75	0.33	SW846 8260C		12/20/17 13:46	DD	A
Trichloroethene	154		ug/L	1.0	0.75	0.33	SW846 8260C		12/20/17 13:46	DD	A
Vinyl Chloride	0.75U	U	ug/L	1.0	0.75	0.33	SW846 8260C		12/20/17 13:46	DD	A
Surrogate Recoveries	*Results*	*Flag*	*Units*	*Limits*			*Method*	*Prepared By*	*Analyzed*	*By*	*Cntr*
1,2-Dichloroethane-d4 (S)	107		%	81 - 118			SW846 8260C		12/20/17 13:46	DD	A
4-Bromofluorobenzene (S)	108		%	85 - 114			SW846 8260C		12/20/17 13:46	DD	A
Dibromofluoromethane (S)	99.2		%	80 - 119			SW846 8260C		12/20/17 13:46	DD	A
Toluene-d8 (S)	104		%	89 - 112			SW846 8260C		12/20/17 13:46	DD	A
LIGHT HYDROCARBON GASES											
Ethane	0.50U	U	ug/L	1.0	0.50	0.25	RSK 175		12/19/17 05:11	EGO	D
Ethene	0.75U	U	ug/L	1.5	0.75	0.31	RSK 175		12/19/17 05:11	EGO	D
Methane 0.50U	~~0.48J~~	~~J~~	ug/L	0.50	0.25	0.13	RSK 175		12/19/17 05:11	EGO	D MB
WET CHEMISTRY											
Alkalinity, Total	219		mg/L	5	5	0.8	S2320B-97		12/16/17 18:51	MSA	K
Chloride	39.5		mg/L	2.0	0.50	0.16	EPA 300.0		12/16/17 05:27	CHW	J
Nitrate-N	0.60		mg/L	0.20	0.060	0.020	EPA 300.0		12/16/17 05:27	CHW	J
Sulfate	20.8		mg/L	2.0	0.50	0.20	EPA 300.0		12/16/17 05:27	CHW	J
Total Organic Carbon (TOC)	0.40J	J	mg/L	1.0	0.50	0.18	S5310B-00		12/20/17 12:11	PAG	G

Vanessa N. Badman

Mrs. Vanessa N Badman
Project Coordinator

Appendix C

Support Documentation

ALS Environmental

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NELAP Certifications: NJ PA010 , NY 11759 , PA 22-293 DoD ELAP: A2LA 0818.01
State Certifications: DE ID 11 , MA PA0102 , MD 128 , VA 460157 , WV 343

SAMPLE SUMMARY

Workorder: 2282912 ASN029|2015-SCOTIA NAVY DEPOT

Lab ID	Sample ID	Matrix	Date Collected	Date Received	Collected By
2282912001	MW-16 121117	Ground Water	12/11/2017 12:45	12/12/2017 09:54	Collected by Client
2282912002	Trip Blank	Ground Water	12/11/2017 12:45	12/12/2017 09:54	Collected by Client

VNB

ALS Environmental

34 Dogwood Lane
Middletown, PA 17057
P. 717-944-5541
F. 717-944-1430

CHAIN OF CUSTODY/ REQUEST FOR ANALYSIS

ALL SHADED AREAS MUST BE COMPLETED BY THE CLIENT/ SAMPLER. INSTRUCTIONS ON THE BACK.

Page 1 of 1

Courier:

Tracking #: 6470 8310 2831

* 2 2 8 2 9 1 2 *

Co. Name: AECOM

Contact (Report to): Phone: 518 951 2200

Address: 40 British

Bill to (if different than Report to): PO#:

Project Name/#: ALS Quote #: 518414

TAT: ☑ Normal-Standard TAT is 10-12 business days. Date Required:
☐ Rush-Subject to ALS approval and surcharges. Approved By:

Email? ☑ -Y John.Santacroce@aecom.com
Fax? ☐ -Y No.:

Sample Description/Location (as it will appear on the lab report)	COC Comments	Sample Date	Military Time	*G or C	**Matrix	***Container Type	G	A	G	PL	PL
						***Container Size	40	40	40	8oz	8oz
						***Preservative	HCL	HCL	HCL	X	X
						ANALYSES/METHOD REQUESTED	8260C	TOC	RSK175	Cl, SO_4, NO_3	Alkalinity
1 MW-16 121117		12/11/17	1245			Enter Number of Containers Per Analysis	x	x	x	x	x
2 Trip Blank		-	-				x				
3											
4											
5											
6											
7											
8											

Receipt Information
Temperature Blank Received: Y N
Received by: QNN
Cooler Temp: 8°
Therm. ID: 402
No. of Coolers:
Notes:

Circle appropriate Y or N.	Container in good condition?	COC/Labels complete/accurate?	Received on Ice?	(if present) Seals Intact?	Custody seals Present?
Y N	Y N	Y N	Y N	Y N	Y N
Y N	Y N	Y N	Y N	Y N	Y N
Y N	Y N	Y N	Y N	Y N	Y N
Y N	Y N	Y N	Y N	Y N	Y N

SAMPLED BY (Please Print): Ross McCurdy

Project Comments:

Relinquished By / Company Name	Date	Time	Received By / Company Name	Date	Time
1	12/11/17	1422	2	12/11/17	1422
3	12/11/17	1700	4	12/12	0854
5			6		
7			8		
9			10		

Data Deliverables: ☑ Standard ☐ CLP-like ☐ NJ-Reduced ☐ NJ-Full ☐ other
EDDs Required? ☐ If yes, format type: See QAPP
DOD Criteria Required?

SDWA Forms? yes ☐ yes ☐ yes ☐ yes ☐
State Samples Collected in? MD ☐ NJ ☐ NY ☐ PA ☐
Other See QAPP
Enter PWSID No.

ALS FIELD SERVICES
☐ Pickup ☐ Labor ☐ Composite Sampling ☐ Rental Equipment ☐ Other:

* G=Grab; C=Composite
**Matrix: Al=Air; DW=Drinking Water; GW=Groundwater; Oi=Oil; OL=Other Liquid; SL=Sludge; SO=Soil; WP=Wipe; WW=Wastewater
***Container Type: AG-Amber Glass; CG-Clear Glass, PL-Plastic. Container Size: 250ml, 500ml, 1L, 8oz., etc. Preservative: HCl, HNO3, NaOH, etc.

Copies: WHITE - ORIGINAL CANARY - CUSTOMER COPY

Rev 01-2013

AECOM - Latham, NY
ALS-Middletown
Case Narrative
ASN-029 (2282912)

Sample Management

This report contains the results of the analysis of two (2) ground water samples collected on December 11, 2017. Analytical results and quality control information are summarized in this data package.

Qualifier Symbol Definitions:

U = Qualifier indicates that the analyte was not detected above the LOD.
J = Qualifier indicates that the analyte value is between the DL and the LOQ.
B = Qualifier indicates that the analyte was detected in the blank.
E = Qualifier indicates that the analyte result exceeds the calibration range.
P = Qualifier indicates that the RPD between the two analytical columns is > 40%.
NSC = Qualifier indicates that spike recoveries were not calculated based on the spiking concentration.

Result Symbol Definitions:

DL = The smallest analyte concentration that can be demonstrated to be different from zero or a blank concentration at the 99% level of confidence.
LOD = The smallest analyte concentration that must be present in a sample in order to be detected at a high level of confidence.
LOQ = The lowest concentration that produces a quantitative result within specified limits of precision or bias.

Manual Integration Symbol Definitions

I = Peak was not integrated properly by chromatographic software. This may be due to baseline irregularities resulting from sample matrix, elevated baseline, or incorrect integration by software on a sample. Integration was adjusted by operator to ensure proper quantitation.
H = The incorrect peak was identified or the chromatographic software did not identify an analyte peak. Operator manually identified the correct peak as the appropriate target analyte. This flag is automatically assigned by the Target software.
SP = Peak was erroneously split. The operator manually integrated the peak to include all the area of the analyte peak to ensure proper quantitation.
MP = Two peaks were erroneously merged. This may include two discrete peaks separated by a distinguishable valley or a larger peak with a clearly identifiable shoulder. Operator manually split peaks.
AB = Integration of group of adjacent peaks did not follow baseline. Operator manually assigned integration to follow baseline.
NP = Negative spike in the baseline resulted in overstating area of analyte peaks. Analyte peaks were re-assigned.
AC = Integration of aggregate or multi-component analyte to include area off all components of the analyte (i.e., toxaphene).

AECOM - Latham, NY
ALS-Middletown
Case Narrative
ASN-029 (2282912) Modified

Sample Management

This report contains the results of the analysis of two (2) ground water samples collected on December 11, 2017. Analytical results and quality control information are summarized in this data package.

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U = Qualifier indicates that the analyte was not detected above the LOD.
J = Qualifier indicates that the analyte value is between the DL and the LOQ.
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P = Qualifier indicates that the RPD between the two analytical columns is > 40%.
NSC = Qualifier indicates that spike recoveries were not calculated based on the spiking concentration.

Result Symbol Definitions:

DL = The smallest analyte concentration that can be demonstrated to be different from zero or a blank concentration at the 99% level of confidence.
LOD = The smallest analyte concentration that must be present in a sample in order to be detected at a high level of confidence.
LOQ = The lowest concentration that produces a quantitative result within specified limits of precision or bias.

Manual Integration Symbol Definitions

I = Peak was not integrated properly by chromatographic software. This may be due to baseline irregularities resulting from sample matrix, elevated baseline, or incorrect integration by software on a sample. Integration was adjusted by operator to ensure proper quantitation.
H = The incorrect peak was identified or the chromatographic software did not identify an analyte peak. Operator manually identified the correct peak as the appropriate target analyte. This flag is automatically assigned by the Target software.
SP = Peak was erroneously split. The operator manually integrated the peak to include all the area of the analyte peak to ensure proper quantitation.
MP = Two peaks were erroneously merged. This may include two discrete peaks separated by a distinguishable valley or a larger peak with a clearly identifiable shoulder. Operator manually split peaks.
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NP = Negative spike in the baseline resulted in overstating area of analyte peaks. Analyte peaks were re-assigned.
AC = Integration of aggregate or multi-component analyte to include area off all components of the analyte (i.e., toxaphene).

Sample Receipt

Samples arrived at ALS via courier on December 12, 2017. Upon receipt, the samples were inspected and compared to the Chain of Custody. Sample temperature was documented on the enclosed Chain of Custody. Samples were received intact and properly preserved, unless noted on the enclosed Certificate of Analysis and/or Chain of Custody.

Manual Integrations

If manual integrations were performed they are indicated on the raw data quantification files for each method.

Modification

This data package was modified to include the explanation for the missing alkalinity data. The alkalinity test was initially logged in, but when the laboratory when to analyze the sample, they were unable to locate the sample. ALS continued to look for the sample, but were ultimately unable to locate the missing jar. ALS then notified Kelly Lurie and John Santacroce from AECOM of this error.

Volatile Organics by SW-846 Method 8260

Sample Handling. Two (2) water samples were analyzed by SW-846 Method 8260 for volatile organic compounds. All analyses were performed within the holding time.

Initial Calibrations. Initial calibrations were properly analyzed and met method criteria for all target analytes. **Note**: The batch LCS also serves as a second source (ICV).

Initial Calibration Verifications. Initial calibration verification samples were properly analyzed and met method criteria.

Continuing Calibration Verification. Samples were analyzed right after Initial Calibration.

Blanks. Target analytes were not detected in the method blank.

Surrogates. Recoveries were within control limits.

Laboratory control samples. Target analytes were recovered within control limits in the laboratory control samples.

Internal Standards. Internal standard results met method criteria

Light Hydrocarbon Gases by RSK-175

Sample Handling. One (1) water sample was submitted for the analysis of light hydrocarbon gases by Method RSK-175. The samples were analyzed within the method specified holding time of fourteen days.

Calibrations. The initial calibrations met method criteria for all target analytes.

Calibration verification. Prior to the analysis of samples in this group, the initial calibrations were successfully verified by the analysis of calibration verification

standards. The samples were then successfully bracketed with alternating calibration verification standards (CCV) throughout the analysis.

Continuing Calibration. A continuing calibration standard were properly analyzed and met method criteria for all target analytes.

Blanks. Target analytes were not detected in the method blank; except as follows:

- Methane was detected at 0.15J µg/L.

<u>Anions by EPA 300.0</u>

Sample handling. One (1) aqueous sample was analyzed for chloride, nitrate, and sulfate by EPA Method 300.0. The sample was analyzed within the method recommended holding time for each analyte.

Calibration. Initial calibrations, identified as Method A (high range) and Method L (low range), were properly established. Initial and continuing calibration verification standards were recovered within the QC limits.

Blanks. Initial and continuing blanks were analyzed with the samples. Chloride, nitrate, and sulfate were not detected above the reporting limits in the blanks.

Laboratory Control Samples. Laboratory control samples identified as SSL and 2660566 were analyzed with the samples. Recoveries were within the QC limits.

Spikes. A matrix spike and spike duplicate were not performed on any samples from this deliverable group.

<u>Total Organic Carbon by SM 5310B</u>

Sample handling. One (1) aqueous sample was analyzed for total organic carbon by Standard Method 5310B. The sample was analyzed within the 28-day holding time established for the method.

Calibration. Initial calibrations were properly established on the days of analysis. Initial and continuing calibration standards were analyzed for verification, and recoveries were all within the QC limits.

Blanks. Method blanks were analyzed with the samples. Total organic carbon was not detected above the reporting limit in the blanks.

Laboratory Control Samples. A laboratory control sample identified as 2662120 was analyzed with the sample. The recovery was within the QC limits.

Spikes. Matrix spike and matrix spike duplicate analyses were not performed on any samples from this deliverable group.

ALS Environmental Services

RECOVERY REPORT

Client Name:
Sample Matrix: LIQUID
Lab Smp Id: 1801
Level: LOW
Data Type: MS DATA
SpikeList File: DODENDCCV.spk
Sublist File: DODall.sub
Method File: \\ALMDTWS014\TargetData\Chem2\ms03.i\03_2017\3171219A.b\3-8260b
Misc Info:

Client SDG: 3171219A.b
Fraction: VOA

Operator: CJG
SampleType:
Quant Type: ISTD

	SPIKE COMPOUND	CONC ADDED ug/L	CONC RECOVERED ug/L	% RECOVERED	LIMITS
1	Dichlorodifluorome	50.0000	42.2433	84.49	50-150
2	Chloromethane	50.0000	49.4331	98.87	50-150
3	Vinyl Chloride	50.0000	46.0943	92.19	50-150
4	Bromomethane	50.0000	43.9004	87.80	50-150
5	Chloroethane	50.0000	45.5805	91.16	50-150
6	Pentane	50.0000	27.3540	54.71	50-150
7	Trichlorofluoromet	50.0000	46.1966	92.39	50-150
8	Dichlorofluorometh	50.0000	49.4310	98.86	50-150
9	Ethyl Ether	50.0000	53.4592	106.92	50-150
10	1,1-Dichloroethene	50.0000	44.3709	88.74	50-150
11	Freon 113	50.0000	36.2491	72.50	50-150
12	Carbon Disulfide	50.0000	46.0363	92.07	50-150
13	Iodomethane	50.0000	52.3140	104.63	50-150
14	Acrolein	500.000	496.332	99.27	50-150
15	Isopropyl Alcohol	250.000	208.522	83.41	50-150
16	3-Chloro-1-propene	50.0000	48.8364	97.67	50-150
17	Methylene Chloride	50.0000	50.6184	101.24	50-150
18	Acetone	250.000	270.119	108.05	50-150
19	Methyl acetate	50.0000	57.3658	114.73	50-150
20	trans-1,2-Dichloro	50.0000	48.9173	97.83	50-150
21	Hexane	50.0000	34.9504	69.90	50-150
22	Methyl t-Butyl Eth	50.0000	54.2665	108.53	50-150
23	tert.- Butyl Alcoh	250.000	238.523	95.41	50-150
24	Acetonitrile	250.000	264.013	105.61	50-150
25	Diisopropyl ether	50.0000	55.0933	110.19	50-150
26	Chloroprene	50.0000	47.7234	95.45	50-150
27	1,1-Dichloroethane	50.0000	50.4390	100.88	50-150
28	Acrylonitrile	250.000	264.773	105.91	50-150
30	n-Propanol	500.000	499.050	99.81	50-150
29	Ethyl tert-butyl e	50.0000	45.3621	90.72	50-150
31	Vinyl acetate	50.0000	50.7096	101.42	50-150
32	cis-1,2-Dichloroet	50.0000	50.5172	101.03	50-150
33	2,2-Dichloropropan	50.0000	33.9661	67.93	50-150
34	Bromochloromethane	50.0000	52.2245	104.45	50-150
35	Cyclohexane	50.0000	32.8982	65.80	50-150
36	Chloroform	50.0000	49.2647	98.53	50-150
37	Ethyl acetate	50.0000	50.7427	101.49	50-150
38	Methyl acrylate	50.0000	48.5170	~~97.03~~	50-150
39	Carbon Tetrachlori	50.0000	38.8931	77.79	50-150
40	Tetrahydrofuran	250.000	243.679	~~97.47~~	50-150

SPIKE	COMPOUND	CONC ADDED ug/L	CONC RECOVERED ug/L	% RECOVERED	LIMITS
42	1,1,1-Trichloroeth	50.0000	48.5004	97.00	50-150
43	2-Butanone	250.000	266.521	106.61	50-150
44	1,1-Dichloropropen	50.0000	43.5747	87.15	50-150
45	1-Chlorobutane	50.0000	43.5668	87.13	50-150
46	Heptane	50.0000	24.3789	48.76*	50-150
47	Benzene	50.0000	49.3022	98.60	50-150
48	Propionitrile	250.000	268.827	107.53	50-150
49	Methacrylonitrile	50.0000	51.4816	102.96	50-150
50	tert-amyl methyl E	50.0000	51.2908	102.58	50-150
54	Isobutyl alcohol	500.000	510.132	102.03	50-150
52	1,2-Dichloroethane	50.0000	51.1892	102.38	50-150
53	tert-Amyl Alcohol	250.000	240.033	96.01	50-150
56	Diisobutylene	50.0000	29.4629	58.93	50-150
57	Trichloroethene	50.0000	43.1660	86.33	50-150
58	Methyl cyclohexane	50.0000	27.7172	55.43	50-150
59	tert-Amyl Ethyleth	50.0000	50.7058	101.41	50-150
60	Dibromomethane	50.0000	51.8133	103.63	50-150
61	1,2-Dichloropropan	50.0000	52.0511	104.10	50-150
62	Bromodichlorometha	50.0000	50.4779	100.96	50-150
63	Methyl methacrylat	50.0000	49.4351	98.87	50-150
64	1,4-Dioxane	1250.00	1090.36	87.23	50-150
65	2-Chloroethylvinyl	50.0000	49.0011	98.00	50-150
66	cis-1,3-Dichloropr	50.0000	48.8552	97.71	50-150
67	Octane	50.0000	24.5748	49.15*	50-150
69	Toluene	50.0000	47.9051	95.81	50-150
70	Chloroacetonitrile	250.000	233.283	93.31	50-150
71	2-Nitropropane	250.000	239.425	95.77	50-150
72	1,1-Dichloro-2-pro	250.000	241.835	96.73	50-150
73	4-Methyl-2-Pentano	250.000	246.956	98.78	50-150
74	Tetrachloroethene	50.0000	41.2081	82.42	50-150
75	trans-1,3-Dichloro	50.0000	48.7280	97.46	50-150
76	Ethyl methacrylate	50.0000	50.3604	100.72	50-150
77	1,1,2-Trichloroeth	50.0000	52.4163	104.83	50-150
78	Chlorodibromometha	50.0000	49.1345	98.27	50-150
80	1,2-Dibromoethane	50.0000	55.1101	110.22	50-150
81	2-Hexanone	250.000	246.823	98.73	50-150
82	1-Chlorohexane	50.0000	31.6355	63.27	50-150
79	1,3-Dichloropropan	50.0000	51.8529	103.71	50-150
84	Chlorobenzene	50.0000	46.1277	92.26	50-150
85	Ethylbenzene	50.0000	46.0575	92.11	50-150
86	1,1,1,2-Tetrachlor	50.0000	53.4163	106.83	50-150
87	mp-Xylene	100.000	87.7756	87.78	50-150
88	o-Xylene	50.0000	47.8348	95.67	50-150
89	Styrene	50.0000	53.0937	106.19	50-150
90	Bromoform	50.0000	46.4395	92.88	50-150
91	Isopropylbenzene	50.0000	41.1286	82.26	50-150
93	Bromobenzene	50.0000	48.2910	96.58	50-150
94	n-Propylbenzene	50.0000	42.0100	84.02	50-150
95	1,1,2,2-Tetrachlor	50.0000	52.1525	104.31	50-150
96	o-Chlorotoluene	50.0000	45.8725	91.75	50-150
M 100	1,2-Dichloroethene	100.000	99.4345	99.43	50-150
97	1,3,5-Trimethylben	50.0000	44.5150	89.03	50-150
98	1,2,3-Trichloropro	50.0000	52.6702	105.34	50-150
99	trans-1,4-Dichloro	50.0000	42.5204	85.04	50-150

	SPIKE COMPOUND	CONC ADDED ug/L	CONC RECOVERED ug/L	% RECOVERED	LIMITS
	101 p-Chlorotoluene	50.0000	47.3897	94.78	50-150
	102 tert-Butylbenzene	50.0000	40.6646	81.33	50-150
	103 Pentachloroethane	50.0000	48.2539	96.51	50-150
	104 1,2,4-Trimethylben	50.0000	44.9718	89.94	50-150
	105 sec-Butylbenzene	50.0000	38.5830	77.17	50-150
	106 p-Isopropyltoluene	50.0000	42.2677	84.54	50-150
	107 1,3-Dichlorobenzen	50.0000	47.7106	95.42	50-150
	109 1,4-Dichlorobenzen	50.0000	44.3656	88.73	50-150
	110 Benzyl Chloride	50.0000	35.3966	70.79	50-150
	111 n-Butylbenzene	50.0000	40.0834	80.17	50-150
	112 Hexachloroethane	50.0000	41.0967	82.19	50-150
	113 1,2-Dichlorobenzen	50.0000	46.4158	92.83	50-150
	114 1,2-Dibromo-3-chlo	50.0000	47.4650	94.93	50-150
	115 Nitrobenzene	500.000	287.398	57.48	50-150
	116 Hexachlorobutadien	50.0000	38.4480	76.90	50-150
	117 1,2,4-Trichloroben	50.0000	45.5177	91.04	50-150
	118 Naphthalene	50.0000	44.8799	89.76	50-150
M	120 1,3-Dichloropropen	100.000	97.5833	97.58	50-150
	119 1,2,3-Trichloroben	50.0000	46.9739	93.95	50-150
M	121 TOTAL XYLENES	150.000	135.610	90.41	50-150

	SURROGATE COMPOUND	CONC ADDED ug/L	CONC RECOVERED ug/L	% RECOVERED	LIMITS
$	41 Dibromofluorometha	50.0000	51.7975	103.60	80-119
$	51 1,2-Dichloroethane	50.0000	49.9218	99.84	81-118
$	68 Toluene-d8	50.0000	50.6077	101.22	89-112
$	92 4-Bromofluorobenze	50.0000	51.3312	102.66	85-114

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

SAMPLE NO.

2662303(MB)

Lab Name: ALS Global Contract: SVGC

Lab Code: VOA Case No.: SAS No.: SDG No.: ASN-029

Matrix (soil/water): WATER Lab Sample ID: 2662303

Sample wt/vol: 0.30 (g/mL) ML Lab File ID: MLJA003.D

Level (low/med): Low Date Received: 12/18/17

% Moisture: not dec. 100.0 Date Analyzed: 12/19/17

GC Column: PORPAK Q ID: 2.0 (mm) Dilution Factor: 1.0

Soil Extract Volume: (uL) Soil Aliquot Volume: (uL)

CAS No.	Compound	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
74-82-8	METHANE	0.15	J
74-85-1	ETHENE	0.75	U
74-84-0	ETHANE	0.50	U

Form 4B
Inorganic Blank Summary

Analysis Method: EPA 300.0
Instrument: IC-5

SDG No.: ASN029

Sample ID	Analyte	Type	Matrix	Analyzed	Result	Q (1)	Units
2659059	Chloride	MB	QC-Water	12/13/2017 03:17	0.14	J	mg/L
2659059	Nitrate-N	MB	QC-Water	12/13/2017 03:17	0.030	U	mg/L
2659059	Sulfate	MB	QC-Water	12/13/2017 03:17	0.25	U	mg/L
2660669	Chloride	MB	QC-Water	12/13/2017 06:57	0.19	J	mg/L
2660669	Nitrate-N	MB	QC-Water	12/13/2017 06:57	0.030	U	mg/L
2660669	Sulfate	MB	QC-Water	12/13/2017 06:57	0.25	U	mg/L

(1) The following qualifiers are used:

U: The analyte concentration is less than the reporting limit listed
J: The analyte concentration is less than the reporting limit but greater than the method detection limit

Comments:

Form 4B
Inorganic Blank Summary

Analysis Method: S5310B-00
Instrument: TOC

SDG No.: ASN029

Sample ID	Analyte	Type	Matrix	Analyzed	Result	Q (1)	Units
2662119	Total Organic Carbon (TOC)	MB	QC-Water	12/18/2017 10:42	0.2	J	mg/L
CCB	Total Organic Carbon (TOC)	MB	QC-Water	12/18/2017 10:42	0.5	U	mg/L
CCB	Total Organic Carbon (TOC)	MB	QC-Water	12/18/2017 10:42	0.5	U	mg/L
				LOD = 0.50 mg/L. Not used to qualify data.			

(1) The following qualifiers are used:

U: The analyte concentration is less than the reporting limit listed
J: The analyte concentration is less than the reporting limit but greater than the method detection limit

Comments:

ALS Environmental

34 Dogwood Lane ▪ Middletown, PA 17057 ▪ Phone: 717-944-5541 ▪ Fax: 717-944-1430 ▪ www.alsglobal.com

NELAP Certifications: NJ PA010 , NY 11759 , PA 22-293 DoD ELAP: A2LA 0818.01
State Certifications: DE ID 11 , MA PA0102 , MD 128 , VA 460157 , WV 343

SAMPLE SUMMARY

Workorder: 2282785 ANL005|60440641

Lab ID	Sample ID	Matrix	Date Collected	Date Received	Collected By
2282785001	~~MW-26 121217~~ MW-26-121217	Ground Water	12/12/2017 09:26	12/13/2017 09:13	Collected by Client
2282785002	DUP-1 121217	Ground Water	12/12/2017 00:00	12/13/2017 09:13	Collected by Client
2282785003	EB-1 121217	Ground Water	12/12/2017 10:01	12/13/2017 09:13	Collected by Client
2282785004	MW-34 121217	Ground Water	12/12/2017 10:51	12/13/2017 09:13	Collected by Client
2282785005	MW-35 121217	Ground Water	12/12/2017 11:54	12/13/2017 09:13	Collected by Client
2282785006	MW-24 121217	Ground Water	12/12/2017 14:12	12/13/2017 09:13	Collected by Client

ALS Environmental

34 Dogwood Lane
Middletown, PA 17057
P. 717-944-5541
F. 717-944-1430

CHAIN OF CUSTODY/ REQUEST FOR ANALYSIS

ALL SHADED AREAS MUST BE COMPLETED BY THE CLIENT / SAMPLER. INSTRUCTIONS ON THE BACK.

Page 1 of 1
Courier:
Tracking #:

2282785

Co. Name: AECOM
Contact (Report to):
Phone:
Address: 40 British American BLVD, Latham, NY
Bill to (if different than Report to):
PO#:
Project Name/#: 60440641
ALS Quote #:
TAT: [✓] Normal-Standard TAT is 10-12 business days. [ ] Rush-Subject to ALS approval and surcharges.
Date Required:
Approved By:
Email? [✓] Y John.Santacroce@aecom.com
Fax? [ ] Y No:

	LG	AG	CG	P	P
***Container Type	LG	AG	CG	P	P
***Container Size	40	40	40	8250	8250
***Preservative	HCL	HCL	-	-	-

ANALYSES/METHOD REQUESTED — Enter Number of Containers Per Analysis

#	Sample Description/Location (as it will appear on the lab report)	COC Comments	Sample Date	Military Time	*G or C	**Matrix	8260C	TOC	RSK175	Cl, SO4, NO3	Alkalinity
1	MW-26 121217		12/12/17	926	G	GW	x3	x3	x3	x1	x1
2	DUP-1 121217		↓	-	↓	↓	x3	x3	x3	x1	x1
3	EB-1 121217		↓	1001	↓	↓	x2				
4	MW-34 121217		↓	1051	↓	↓	x	x	x	x	x
5	MW-35 121217		↓	1154	↓	↓	x	x	x	x	x
6	MW-35 MS 121217		↓	1154	↓	↓	x	x	x	x	x
7	MW-35 MSD 121217		↓	1154	↓	↓	x	x	x	x	x
8	MW-24 121217		↓	1412	↓	↓	x	x	x	x	x

Receipt Information (completed by Receiving Lab):
Performed by: [illegible]
Cooler Temp: 2°
Therm. ID: 402
No. of Coolers:
Notes:

Check	Y	N
Correct containers?	(Y)	N
Correct sample volume?	(Y)	N
Correct preservation?	(Y)	N
Headspace/Volatiles?	(Y)	N
Custody seals Present?	Y	(N)
(If present) Seals intact?	Y	N
Received on ice?	(Y)	N
COC/Labels complete/accurate?	(Y)	N
Container in good condition?	(Y)	N

Circle appropriate Y or N.

SAMPLED BY (Please Print): Ross McCurdy

Project Comments: *Trip Blank for VOCs* *Trip Blank not Rec'd [illegible]

#	Relinquished By / Company Name	Date	Time	#	Received By / Company Name	Date	Time
1	Ross McCurdy	12/12/17	1530	2	[signature]	12/12/17	1530
3	[signature]	12/13/17	330	4	[signature]	12/13	0913
5				6			
7				8			
9				10			

Data Deliverables: [✓] Standard [ ] CLP-like [ ] NJ-Reduced [ ] NJ-Full [ ]
EDDs Required? [ ] If yes, format type: See QAPP
SDWA Forms? yes [ ] yes [ ] yes [ ] yes [ ] Other: See QAPP
State Samples Collected In? MD [ ] NJ [ ] NY [ ] PA [ ]
Enter PWSID No.
DOD Criteria Required?

ALS FIELD SERVICES: [✓] Pickup [ ] Labor [ ] Composite Sampling [ ] Rental Equipment [ ] Other:

* G=Grab; C=Composite
**Matrix: AI=Air; DW=Drinking Water; GW=Groundwater; OI=Oil; OL=Other Liquid; SL=Sludge; SO=Soil; WP=Wipe; WW=Wastewater
***Container Type: AG-Amber Glass; CG-Clear Glass, PL-Plastic. Container Size: 250ml, 500ml, 1L, 8oz., etc. Preservative: HCl, HNO3, NaOH, etc.

Copies: WHITE - ORIGINAL CANARY - CUSTOMER COPY

Rev 01-2013

ALS Environmental

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NELAP Certifications: NJ PA010 , NY 11759 , PA 22-293 DoD ELAP: A2LA 0818.01
State Certifications: DE ID 11 , MA PA0102 , MD 128 , VA 460157 , WV 343

ANALYTICAL RESULTS

Workorder: 2282785 ANL005|60440641

PARAMETER QUALIFIERS

Lab ID	#	Sample ID	Analytical Method	Analyte
2282785001	1	~~MW-26 121217~~MW-26-121217	S2320B-97	Alkalinity, Total
The Total Alkalinity is titrated to a pH of 4.5 and reported as mg CaCO3/L.				
2282785002	1	DUP-1 121217	S2320B-97	Alkalinity, Total
The Total Alkalinity is titrated to a pH of 4.5 and reported as mg CaCO3/L.				
2282785004	1	MW-34 121217	S2320B-97	Alkalinity, Total
The Total Alkalinity is titrated to a pH of 4.5 and reported as mg CaCO3/L.				
2282785005	1	MW-35 121217	S2320B-97	Alkalinity, Total
The Total Alkalinity is titrated to a pH of 4.5 and reported as mg CaCO3/L.				
2282785006	1	MW-24 121217	S2320B-97	Alkalinity, Total
The Total Alkalinity is titrated to a pH of 4.5 and reported as mg CaCO3/L.				

AECOM - Latham, NY
ALS-Middletown
Case Narrative
ANL-005 (2282785)

Sample Management

This report contains the results of the analysis of six (6) ground water samples collected on December 12, 2017. Analytical results and quality control information are summarized in this data package.

Qualifier Symbol Definitions:

U = Qualifier indicates that the analyte was not detected above the LOD.
J = Qualifier indicates that the analyte value is between the DL and the LOQ.
B = Qualifier indicates that the analyte was detected in the blank.
E = Qualifier indicates that the analyte result exceeds the calibration range.
P = Qualifier indicates that the RPD between the two analytical columns is > 40%.
NSC = Qualifier indicates that spike recoveries were not calculated based on the spiking concentration.

Result Symbol Definitions:

DL = The smallest analyte concentration that can be demonstrated to be different from zero or a blank concentration at the 99% level of confidence.
LOD = The smallest analyte concentration that must be present in a sample in order to be detected at a high level of confidence.
LOQ = The lowest concentration that produces a quantitative result within specified limits of precision or bias.

Manual Integration Symbol Definitions

I = Peak was not integrated properly by chromatographic software. This may be due to baseline irregularities resulting from sample matrix, elevated baseline, or incorrect integration by software on a sample. Integration was adjusted by operator to ensure proper quantitation.
H = The incorrect peak was identified or the chromatographic software did not identify an analyte peak. Operator manually identified the correct peak as the appropriate target analyte. This flag is automatically assigned by the Target software.
SP = Peak was erroneously split. The operator manually integrated the peak to include all the area of the analyte peak to ensure proper quantitation.
MP = Two peaks were erroneously merged. This may include two discrete peaks separated by a distinguishable valley or a larger peak with a clearly identifiable shoulder. Operator manually split peaks.
AB = Integration of group of adjacent peaks did not follow baseline. Operator manually assigned integration to follow baseline.
NP = Negative spike in the baseline resulted in overstating area of analyte peaks. Analyte peaks were re-assigned.
AC = Integration of aggregate or multi-component analyte to include area off all components of the analyte (i.e., toxaphene).

Sample Receipt

Samples arrived at ALS via courier on December 13, 2017. Upon receipt, the samples were inspected and compared to the Chain of Custody. Sample temperature was documented on the enclosed Chain of Custody. Samples were received intact and properly preserved, unless noted on the enclosed Certificate of Analysis and/or Chain of Custody.

Manual Integrations

If manual integrations were performed they are indicated on the raw data quantification files for each method.

Volatile Organics by SW-846 Method 8260

Sample Handling. Six (6) water samples were analyzed by SW-846 Method 8260 for volatile organic compounds. The extraction and analysis were performed within holding time.

Initial Calibrations. Initial calibrations were properly analyzed and met method criteria for all target analytes. **Note:** The batch LCS also serves as a second source (ICV).

Continuing Calibration Verification. Samples were analyzed immediately following the initial calibration.

Blanks. Target analytes were not detected in the blank.

Surrogates. All surrogates were recovered within control limits.

Laboratory control samples. Target analytes were recovered within control limits,

Matrix and Matrix Spike samples. Target analytes were recovered within control limits,

Internal Standards. All internal standard results met method criteria.

Light Hydrocarbon Gases by RSK-175

Sample Handling. Five (5) water samples were submitted for the analysis of light hydrocarbon gases by Method RSK-175. The samples were analyzed within the method specified holding time of fourteen days.

Calibrations. The initial calibrations met method criteria for all target analytes.

Calibration verification. Prior to the analysis of samples in this group, the initial calibrations were successfully verified by the analysis of calibration verification standards. The samples were then successfully bracketed with alternating calibration verification standards (CCV) throughout the analysis.

Continuing Calibration. A continuing calibration standard were properly analyzed and met method criteria for all target analytes.

Blanks. Target analytes were not detected in the method blank; except as follows:

- Methane was detected at 0.15J µg/L.

Duplicate Samples. A duplicate sample, identified as 2662304, from project sample MW-35- 121217 (2282785005). Target analytes were detected as follows:

- Methane was detected at 7.9 µg/L in the sample and at 7.1 µg/L in the duplicate sample. The %RPD is 10.6%.

Anions by EPA 300.0

Sample handling. Five (5) aqueous samples were analyzed for chloride, nitrate, and sulfate by EPA Method 300.0. The samples were analyzed within the method recommended holding time for each analyte.

Calibration. Initial calibrations, identified as Method A (high range) and Method L (low range), were properly established. Initial and continuing calibration verification standards were recovered within the QC limits.

Blanks. Initial and continuing blanks were analyzed with the samples. Neither nitrate nor sulfate were detected above the reporting limits in the blanks.

Laboratory Control Samples. Laboratory control samples identified as 2660596 and SSL were analyzed initially and every 20 samples. Recoveries were within the QC limits.

Spikes. A matrix spike and spike duplicate identified as 2660598 and 2660599 were performed on sample 2282785005 (MW-35 121217). Recoveries were within QC limits except for nitrate in the matrix spike.

Total Alkalinity by SM 2320B

Sample handling. Five (5) aqueous samples were analyzed for total alkalinity by Standard Method 2320B. The samples were analyzed within the 14-day holding time established for the method.

Blanks. Method blanks were analyzed with the samples. Total alkalinity was not detected above the reporting limit in the blanks.

Calibration. The autotitrator was pH calibrated on the day of analysis. Total alkalinity and pH standards were analyzed initially and throughout the analysis. The standards were recovered within the alkalinity QC limits of 90-110% and the pH QC limits of +/- 0.05 pH units.

Duplicate. A duplicate analysis identified as 2660514 was performed on sample 2282785005 (MW-35 121217). The relative percent difference between the results was within the QC limit of 20%.

Total Organic Carbon by SM 5310B

Sample handling. Five (5) aqueous samples were analyzed for total organic carbon by Standard Method 5310B. The samples were analyzed within the 28-day holding time established for the method.

Calibration. Initial calibrations were properly established on the days of analysis. Initial and continuing calibration standards were analyzed for verification, and recoveries were all within the QC limits.

Blanks. Method blanks were analyzed with the samples. Total organic carbon was not detected above the reporting limit in the blanks.

Spikes. Matrix spike and matrix spike duplicate analyses were performed on sample 2282785005 (MW-35 121217). The spike recoveries and the relative percent difference between the spikes were all within the QC limits.

ALS Environmental Services

RECOVERY REPORT

Client Name:
Client SDG: 3171219A.b
Sample Matrix: LIQUID
Fraction: VOA
Lab Smp Id: 1801
Level: LOW
Operator: CJG
Data Type: MS DATA
SampleType:
SpikeList File: DODENDCCV.spk
Quant Type: ISTD
Sublist File: DODall.sub
Method File: \\ALMDTWS014\TargetData\Chem2\ms03.i\03_2017\3171219A.b\3-8260b
Misc Info:

SPIKE COMPOUND	CONC ADDED ug/L	CONC RECOVERED ug/L	% RECOVERED	LIMITS
1 Dichlorodifluorome	50.0000	42.2433	84.49	50-150
2 Chloromethane	50.0000	49.4331	98.87	50-150
3 Vinyl Chloride	50.0000	46.0943	92.19	50-150
4 Bromomethane	50.0000	43.9004	87.80	50-150
5 Chloroethane	50.0000	45.5805	91.16	50-150
6 Pentane	50.0000	27.3540	54.71	50-150
7 Trichlorofluoromet	50.0000	46.1966	92.39	50-150
8 Dichlorofluorometh	50.0000	49.4310	98.86	50-150
9 Ethyl Ether	50.0000	53.4592	106.92	50-150
10 1,1-Dichloroethene	50.0000	44.3709	88.74	50-150
11 Freon 113	50.0000	36.2491	72.50	50-150
12 Carbon Disulfide	50.0000	46.0363	92.07	50-150
13 Iodomethane	50.0000	52.3140	104.63	50-150
14 Acrolein	500.000	496.332	99.27	50-150
15 Isopropyl Alcohol	250.000	208.522	83.41	50-150
16 3-Chloro-1-propene	50.0000	48.8364	97.67	50-150
17 Methylene Chloride	50.0000	50.6184	101.24	50-150
18 Acetone	250.000	270.119	108.05	50-150
19 Methyl acetate	50.0000	57.3658	114.73	50-150
20 trans-1,2-Dichloro	50.0000	48.9173	97.83	50-150
21 Hexane	50.0000	34.9504	69.90	50-150
22 Methyl t-Butyl Eth	50.0000	54.2665	108.53	50-150
23 tert.- Butyl Alcoh	250.000	238.523	95.41	50-150
24 Acetonitrile	250.000	264.013	105.61	50-150
25 Diisopropyl ether	50.0000	55.0933	110.19	50-150
26 Chloroprene	50.0000	47.7234	95.45	50-150
27 1,1-Dichloroethane	50.0000	50.4390	100.88	50-150
28 Acrylonitrile	250.000	264.773	105.91	50-150
30 n-Propanol	500.000	499.050	99.81	50-150
29 Ethyl tert-butyl e	50.0000	45.3621	90.72	50-150
31 Vinyl acetate	50.0000	50.7096	101.42	50-150
32 cis-1,2-Dichloroet	50.0000	50.5172	101.03	50-150
33 2,2-Dichloropropan	50.0000	33.9661	67.93	50-150
34 Bromochloromethane	50.0000	52.2245	104.45	50-150
35 Cyclohexane	50.0000	32.8982	65.80	50-150
36 Chloroform	50.0000	49.2647	98.53	50-150
37 Ethyl acetate	50.0000	50.7427	101.49	50-150
38 Methyl acrylate	50.0000	48.5170	97.03	50-150
39 Carbon Tetrachlori	50.0000	38.8931	77.79	50-150
40 Tetrahydrofuran	250.000	243.679	97.47	50-150

SPIKE	COMPOUND	CONC ADDED ug/L	CONC RECOVERED ug/L	% RECOVERED	LIMITS
42	1,1,1-Trichloroeth	50.0000	48.5004	97.00	50-150
43	2-Butanone	250.000	266.521	106.61	50-150
44	1,1-Dichloropropen	50.0000	43.5747	87.15	50-150
45	1-Chlorobutane	50.0000	43.5668	87.13	50-150
46	Heptane	50.0000	24.3789	48.76*	50-150
47	Benzene	50.0000	49.3022	98.60	50-150
48	Propionitrile	250.000	268.827	107.53	50-150
49	Methacrylonitrile	50.0000	51.4816	102.96	50-150
50	tert-amyl methyl E	50.0000	51.2908	102.58	50-150
54	Isobutyl alcohol	500.000	510.132	102.03	50-150
52	1,2-Dichloroethane	50.0000	51.1892	102.38	50-150
53	tert-Amyl Alcohol	250.000	240.033	96.01	50-150
56	Diisobutylene	50.0000	29.4629	58.93	50-150
57	Trichloroethene	50.0000	43.1660	86.33	50-150
58	Methyl cyclohexane	50.0000	27.7172	55.43	50-150
59	tert-Amyl Ethyleth	50.0000	50.7058	101.41	50-150
60	Dibromomethane	50.0000	51.8133	103.63	50-150
61	1,2-Dichloropropan	50.0000	52.0511	104.10	50-150
62	Bromodichlorometha	50.0000	50.4779	100.96	50-150
63	Methyl methacrylat	50.0000	49.4351	98.87	50-150
64	1,4-Dioxane	1250.00	1090.36	87.23	50-150
65	2-Chloroethylvinyl	50.0000	49.0011	98.00	50-150
66	cis-1,3-Dichloropr	50.0000	48.8552	97.71	50-150
67	Octane	50.0000	24.5748	49.15*	50-150
69	Toluene	50.0000	47.9051	95.81	50-150
70	Chloroacetonitrile	250.000	233.283	93.31	50-150
71	2-Nitropropane	250.000	239.425	95.77	50-150
72	1,1-Dichloro-2-pro	250.000	241.835	96.73	50-150
73	4-Methyl-2-Pentano	250.000	246.956	98.78	50-150
74	Tetrachloroethene	50.0000	41.2081	82.42	50-150
75	trans-1,3-Dichloro	50.0000	48.7280	97.46	50-150
76	Ethyl methacrylate	50.0000	50.3604	100.72	50-150
77	1,1,2-Trichloroeth	50.0000	52.4163	104.83	50-150
78	Chlorodibromometha	50.0000	49.1345	98.27	50-150
80	1,2-Dibromoethane	50.0000	55.1101	110.22	50-150
81	2-Hexanone	250.000	246.823	98.73	50-150
82	1-Chlorohexane	50.0000	31.6355	63.27	50-150
79	1,3-Dichloropropan	50.0000	51.8529	103.71	50-150
84	Chlorobenzene	50.0000	46.1277	92.26	50-150
85	Ethylbenzene	50.0000	46.0575	92.11	50-150
86	1,1,1,2-Tetrachlor	50.0000	53.4163	106.83	50-150
87	mp-Xylene	100.000	87.7756	87.78	50-150
88	o-Xylene	50.0000	47.8348	95.67	50-150
89	Styrene	50.0000	53.0937	106.19	50-150
90	Bromoform	50.0000	46.4395	92.88	50-150
91	Isopropylbenzene	50.0000	41.1286	82.26	50-150
93	Bromobenzene	50.0000	48.2910	96.58	50-150
94	n-Propylbenzene	50.0000	42.0100	84.02	50-150
95	1,1,2,2-Tetrachlor	50.0000	52.1525	104.31	50-150
96	o-Chlorotoluene	50.0000	45.8725	91.75	50-150
M 100	1,2-Dichloroethene	100.000	99.4345	99.43	50-150
97	1,3,5-Trimethylben	50.0000	44.5150	89.03	50-150
98	1,2,3-Trichloropro	50.0000	52.6702	105.34	50-150
99	trans-1,4-Dichloro	50.0000	42.5204	85.04	50-150

SPIKE COMPOUND	CONC ADDED ug/L	CONC RECOVERED ug/L	% RECOVERED	LIMITS
101 p-Chlorotoluene	50.0000	47.3897	94.78	50-150
102 tert-Butylbenzene	50.0000	40.6646	81.33	50-150
103 Pentachloroethane	50.0000	48.2539	96.51	50-150
104 1,2,4-Trimethylben	50.0000	44.9718	89.94	50-150
105 sec-Butylbenzene	50.0000	38.5830	77.17	50-150
106 p-Isopropyltoluene	50.0000	42.2677	84.54	50-150
107 1,3-Dichlorobenzen	50.0000	47.7106	95.42	50-150
109 1,4-Dichlorobenzen	50.0000	44.3656	88.73	50-150
110 Benzyl Chloride	50.0000	35.3966	70.79	50-150
111 n-Butylbenzene	50.0000	40.0834	80.17	50-150
112 Hexachloroethane	50.0000	41.0967	82.19	50-150
113 1,2-Dichlorobenzen	50.0000	46.4158	92.83	50-150
114 1,2-Dibromo-3-chlo	50.0000	47.4650	94.93	50-150
115 Nitrobenzene	500.000	287.398	57.48	50-150
116 Hexachlorobutadien	50.0000	38.4480	76.90	50-150
117 1,2,4-Trichloroben	50.0000	45.5177	91.04	50-150
118 Naphthalene	50.0000	44.8799	89.76	50-150
M 120 1,3-Dichloropropen	100.000	97.5833	97.58	50-150
119 1,2,3-Trichloroben	50.0000	46.9739	93.95	50-150
M 121 TOTAL XYLENES	150.000	135.610	90.41	50-150

SURROGATE COMPOUND	CONC ADDED ug/L	CONC RECOVERED ug/L	% RECOVERED	LIMITS
$ 41 Dibromofluorometha	50.0000	51.7975	103.60	80-119
$ 51 1,2-Dichloroethane	50.0000	49.9218	99.84	81-118
$ 68 Toluene-d8	50.0000	50.6077	101.22	89-112
$ 92 4-Bromofluorobenze	50.0000	51.3312	102.66	85-114

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

SAMPLE NO.

2662303(MB)

Lab Name: ALS Global Contract: SVGC

Lab Code: VOA Case No.: SAS No.: SDG No.: ANL-005

Matrix (soil/water): WATER Lab Sample ID: 2662303

Sample wt/vol: 0.30 (g/mL) ML Lab File ID: MLJA003.D

Level (low/med): Low Date Received: 12/18/17

% Moisture: not dec. 100.0 Date Analyzed: 12/19/17

GC Column: PORPAK Q ID: 2.0 (mm) Dilution Factor: 1.0

Soil Extract Volume: (uL) Soil Aliquot Volume: (uL)

CAS No.	Compound	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
74-82-8	METHANE	0.15	J
74-85-1	ETHENE	0.75	U
74-84-0	ETHANE	0.50	U

Form 4B
Inorganic Blank Summary

Analysis Method: EPA 300.0
Instrument: IC-5

SDG No.: ANL005

Sample ID	Analyte	Type	Matrix	Analyzed	Result	Q (1)	Units
BLANK	Chloride	ICB	QC-Water	11/30/2017 02:53	0.24	J	mg/L
BLANK	Nitrate-N	ICB	QC-Water	11/30/2017 02:53	n.a.	J	mg/L
BLANK	Sulfate	ICB	QC-Water	11/30/2017 02:53	n.a.	J	mg/L
2660594	Chloride	MB	QC-Water	12/14/2017 03:30	0.15	J	mg/L
2660594	Nitrate-N	MB	QC-Water	12/14/2017 03:30	0.030	U	mg/L
2660594	Sulfate	MB	QC-Water	12/14/2017 03:30	0.25	U	mg/L
2660601	Chloride	MB	QC-Water	12/14/2017 07:10	0.2	J	mg/L
2660601	Nitrate-N	MB	QC-Water	12/14/2017 07:10	0.030	U	mg/L
2660601	Sulfate	MB	QC-Water	12/14/2017 07:10	0.25	U	mg/L
2660603	Chloride	MB	QC-Water	12/14/2017 10:04	0.18	J	mg/L
2660603	Nitrate-N	MB	QC-Water	12/14/2017 10:04	0.030	U	mg/L
2660603	Sulfate	MB	QC-Water	12/14/2017 10:04	0.25	U	mg/L

(1) The following qualifiers are used:

U: The analyte concentration is less than the reporting limit listed
J: The analyte concentration is less than the reporting limit but greater than the method detection limit

Comments:

Sample Description

MW-35 121217

Form 3A
Matrix Spike and Matrix Spike Duplicate Recovery Summary

Analysis Method: EPA 300.0
Matrix (soil/water): Ground Water

SDG No.: ANL005
Units: mg/L
Lab Sample ID: 2282785005
Lab MS Sample ID: 2660598
Lab MSD Sample ID: 2660599

Analyte	Spike Added	Sample Concentration	MS Concentration	MS Recovery (%)	(1)	Acceptable Limits (%)
Chloride	40	22.2	62.1	99.8		87 - 111
Nitrate-N	5	0.44	6.1	113	*	88 - 111
Sulfate	40	10.2	55.0	112		87 - 112

Analyte	Spike Added	MSD Concentration	MSD Recovery (%)	(1)	Acceptable Limits (%)	RPD (%)	(1)	Acc. Lim. (%)
Chloride	40	60.2	95		87 - 111	3.14		15
Nitrate-N	5	5.9	109		88 - 111	3.01		15
Sulfate	40	53.3	108		87 - 112	3.1		15

(1) The following qualifiers are used:

* : Values outside of acceptable limits
D : Spikes diluted out

Comments:

Form 4B
Inorganic Blank Summary

Analysis Method: S2320B-97
Instrument: AUTOT

SDG No.: ANL005

Sample ID	Analyte	Type	Matrix	Analyzed	Result	Q (1)	Units
2660509	Alkalinity, Total	MB	QC-Water	12/14/2017 22:53	2	J	mg/L
2660517	Alkalinity, Total	MB	QC-Water	12/15/2017 01:37	2	J	mg/L
2660521	Alkalinity, Total	MB	QC-Water	12/15/2017 03:29	2	J	mg/L
				LOD = 5 mg/L Not used to qualify data.			

(1) The following qualifiers are used:

U: The analyte concentration is less than the reporting limit listed
J: The analyte concentration is less than the reporting limit but greater than the method detection limit

Comments:

Form 4B
Inorganic Blank Summary

Analysis Method: S5310B-00
Instrument: TOC

SDG No.: ANL005

Sample ID	Analyte	Type	Matrix	Analyzed	Result	Q (1)	Units
2662125	Total Organic Carbon (TOC)	MB	QC-Water	12/18/2017 10:42	0.2	J	mg/L
2662782	Total Organic Carbon (TOC)	MB	QC-Water	12/19/2017 15:44	0.2	J	mg/L
				MDL = 0.18 mg/L LOD = 0.50 mg/L			
				No need to qualify data.			

(1) The following qualifiers are used:

U: The analyte concentration is less than the reporting limit listed
J: The analyte concentration is less than the reporting limit but greater than the method detection limit

Comments:

ALS Environmental

34 Dogwood Lane ▪ Middletown, PA 17057 ▪ Phone: 717-944-5541 ▪ Fax: 717-944-1430 ▪ www.alsglobal.com

NELAP Certifications: NJ PA010 , NY 11759 , PA 22-293 DoD ELAP: A2LA 0818.01
State Certifications: DE ID 11 , MA PA0102 , MD 128 , VA 460157 , WV 343

SAMPLE SUMMARY

Workorder: 2282982 ANL006|60440641

Lab ID	Sample ID	Matrix	Date Collected	Date Received	Collected By
2282982001	MW-32-121317	Ground Water	12/13/2017 08:41	12/14/2017 09:55	Collected by Client
2282982002	MW-33-121317	Ground Water	12/13/2017 09:45	12/14/2017 09:55	Collected by Client
2282982003	MW-30-121317	Ground Water	12/13/2017 11:20	12/14/2017 09:55	Collected by Client
2282982004	MW-31-121317	Ground Water	12/13/2017 12:15	12/14/2017 09:55	Collected by Client

ALS Environmental
34 Dogwood Lane
Middletown, PA 17057
P. 717-944-5541
F. 717-944-1430

CHAIN OF CUSTODY/ REQUEST FOR ANALYSIS

ALL SHADED AREAS MUST BE COMPLETED BY THE CLIENT / SAMPLER. INSTRUCTIONS ON THE BACK.

Page ___ of ___
Courier:
Tracking #: 647683102875

* 2282982 *

(completed by Sample Receiving)
Performed by: Courier
Cooler Temp: 0°
Therm. ID: 407
No. of Coolers:
Notes:

Co. Name: AECOM
Contact (Report to): John Santacroce Phone: 518 951 2200
Address: 40 British American BLVD
Latham, NY

Bill to (If different than Report to): PO#:

Project Name/#: 60440641 ALS Quote #:

TAT: [✓] Normal-Standard TAT is 10-12 business days. Date Required:
[ ] Rush-Subject to ALS approval and surcharges. Approved By:

Email? [✓] -Y John.Santacroce@aecom.com
Fax? [ ] -Y No.:

Sample Description/Location (as it will appear on the lab report)	COC Comments	Sample Date	Military Time	*G or C	**Matrix	Enter Number of Containers Per Analysis										Correct containers?	Correct sample volume?	Correct preservation?	Headspace/Volatiles?	Circle appropriate Y or N.
***Container Type						VOA	VOA	VOA	DL	PL						N	N	N		
***Container Size						40	40	40	8 oz	8 oz						Y	Y	Y	Y	
*** Preservative						HCL	-	HCL	-	-										
						ANALYSES/METHOD REQUESTED														
						8260C	TOC	TCLP 1,1,5	Cl, SO4, NO3	Alkalinity										
1	MW-32 121317		12/13/17	841	G	GW	x3	x3	x3	x1	x1									
2	MW-33 121317			915			x3	x3	x3	x1	x1									
3	MW-30 121317			1120			x3	x3	x3	x1	x1									
4	MW-31 121317			1215			x3	x3	x3	x1	x1									
5	TRIP BLANK		-	-	-	-	x													
6																				
7																				
8																				

NOTICES due 12-14
8260 MS/MSD labeled
Did not receive trip blank 12/14

SAMPLED BY (Please Print): Ross McCready

Project Comments:

Relinquished By / Company Name	Date	Time	Received By / Company Name	Date	Time
1 Ross McCready	12/12/17	1300	2	12/13/17	1300
3	12/13/17	1400	4	12/14	0955
5			6		
7			8		
9			10		

Data Deliverables: [✓] Standard [ ] CLP-like [ ] NJ-Reduced [ ] NJ-Full [ ] See QAPP
EDDs Required? [ ] If yes, format type: See QAPP
SDWA Forms?⇨ yes [ ] Other See QAPP ⇦Enter PWSID No
State Samples Collected In? MD [ ] NJ [ ] NY [ ] PA [ ]
DOD Criteria Required?

ALS FIELD SERVICES
[ ] Pickup
[ ] Labor
[ ] Composite Sampling
[ ] Rental Equipment
[ ] Other:

* G=Grab; C=Composite
**Matrix: AI=Air; DW=Drinking Water; GW=Groundwater; OI=Oil; OL=Other Liquid; SL=Sludge; SO=Soil; WP=Wipe; WW=Wastewater
***Container Type: AG-Amber Glass; CG-Clear Glass, PL-Plastic. Container Size: 250ml, 500ml, 1L, 8oz., etc. Preservative: HCl, HNO3, NaOH, etc.

Copies: WHITE - ORIGINAL CANARY - CUSTOMER COPY
Rev 01-2013

ALS Environmental

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NELAP Certifications: NJ PA010 , NY 11759 , PA 22-293 DoD ELAP: A2LA 0818.01
State Certifications: DE ID 11 , MA PA0102 , MD 128 , VA 460157 , WV 343

ANALYTICAL RESULTS

Workorder: 2282982 ANL006|60440641

PARAMETER QUALIFIERS

Lab ID	#	Sample ID	Analytical Method	Analyte
2282982001	1	MW-32-121317	RSK 175	Methane
The QC sample type DUP for method RSK 175 was outside the control limits for the analyte Methane. The RPD was reported as 89.5 and the upper control limit is 20.				
2282982001	2	MW-32-121317	RSK 175	Ethane
The QC sample type DUP for method RSK 175 was outside the control limits for the analyte Ethane. The RPD was reported as 94.1 and the upper control limit is 20.				
2282982001	3	MW-32-121317	RSK 175	Ethene
The QC sample type DUP for method RSK 175 was outside the control limits for the analyte Ethene. The RPD was reported as 69 and the upper control limit is 20.				
2282982001	4	MW-32-121317	S2320B-97	Alkalinity, Total
The Total Alkalinity is titrated to a pH of 4.5 and reported as mg CaCO3/L.				
2282982001	5	MW-32-121317	SW846 8260C	Trichloroethene
The QC sample type MS for method SW846 8260C was outside the control limits for the analyte Trichloroethene. The % Recovery was reported as 141 and the control limits were 79 to 123.				
2282982002	1	MW-33-121317	S2320B-97	Alkalinity, Total
The Total Alkalinity is titrated to a pH of 4.5 and reported as mg CaCO3/L.				
2282982003	1	MW-30-121317	S2320B-97	Alkalinity, Total
The Total Alkalinity is titrated to a pH of 4.5 and reported as mg CaCO3/L.				
2282982004	1	MW-31-121317	S2320B-97	Alkalinity, Total
The Total Alkalinity is titrated to a pH of 4.5 and reported as mg CaCO3/L.				

AECOM - Latham, NY
ALS-Middletown
Case Narrative
ANL-006 (2282982)

Sample Management

This report contains the results of the analysis of four (4) ground water samples collected on December 13, 2017. Analytical results and quality control information are summarized in this data package.

Qualifier Symbol Definitions:

U = Qualifier indicates that the analyte was not detected above the LOD.
J = Qualifier indicates that the analyte value is between the DL and the LOQ.
B = Qualifier indicates that the analyte was detected in the blank.
E = Qualifier indicates that the analyte result exceeds the calibration range.
P = Qualifier indicates that the RPD between the two analytical columns is > 40%.
NSC = Qualifier indicates that spike recoveries were not calculated based on the spiking concentration.

Result Symbol Definitions:

DL = The smallest analyte concentration that can be demonstrated to be different from zero or a blank concentration at the 99% level of confidence.
LOD = The smallest analyte concentration that must be present in a sample in order to be detected at a high level of confidence.
LOQ = The lowest concentration that produces a quantitative result within specified limits of precision or bias.

Manual Integration Symbol Definitions

I = Peak was not integrated properly by chromatographic software. This may be due to baseline irregularities resulting from sample matrix, elevated baseline, or incorrect integration by software on a sample. Integration was adjusted by operator to ensure proper quantitation.
H = The incorrect peak was identified or the chromatographic software did not identify an analyte peak. Operator manually identified the correct peak as the appropriate target analyte. This flag is automatically assigned by the Target software.
SP = Peak was erroneously split. The operator manually integrated the peak to include all the area of the analyte peak to ensure proper quantitation.
MP = Two peaks were erroneously merged. This may include two discrete peaks separated by a distinguishable valley or a larger peak with a clearly identifiable shoulder. Operator manually split peaks.
AB = Integration of group of adjacent peaks did not follow baseline. Operator manually assigned integration to follow baseline.
NP = Negative spike in the baseline resulted in overstating area of analyte peaks. Analyte peaks were re-assigned.
AC = Integration of aggregate or multi-component analyte to include area off all components of the analyte (i.e., toxaphene).

Sample Receipt

Samples arrived at ALS via courier on December 14, 2017. Upon receipt, the samples were inspected and compared to the Chain of Custody. Sample temperature was documented on the enclosed Chain of Custody. Samples were received intact and properly preserved, unless noted on the enclosed Certificate of Analysis and/or Chain of Custody.

Manual Integrations

If manual integrations were performed they are indicated on the raw data quantification files for each method.

Volatile Organics by SW-846 Method 8260

Sample Handling. Four (4) water samples were analyzed by SW-846 Method 8260 for volatile organic compounds. The extraction and analysis were performed within holding time.

Initial Calibrations. Initial calibrations were properly analyzed and met method criteria for all target analytes. **Note:** The batch LCS also serves as a second source (ICV).

Continuing Calibration Verification. Samples were analyzed immediately following the initial calibration.

Blanks. Target analytes were not detected in the blank.

Surrogates. All surrogates were recovered within control limits.

Laboratory control samples. Target analytes were recovered within control limits,

Matrix and Matrix Spike samples. Target analytes were recovered within control limits, except as follows:

- In 2663540 MS, Trichloroethene was recovered above control limits.

Internal Standards. All internal standard results met method criteria.

Light Hydrocarbon Gases by RSK-175

Sample Handling. Four (4) water samples were submitted for the analysis of light hydrocarbon gases by Method RSK-175. The samples were analyzed within the method specified holding time of fourteen days.

Calibrations. The initial calibrations met method criteria for all target analytes.

Calibration verification. Prior to the analysis of samples in this group, the initial calibrations were successfully verified by the analysis of calibration verification standards. The samples were then successfully bracketed with alternating calibration verification standards (CCV) throughout the analysis.

Continuing Calibration. A continuing calibration standard were properly analyzed and met method criteria for all target analytes.

Blanks. Target analytes were not detected in the method blank; except as follows:

- Methane was detected at 0.15J µg/L.

Duplicate Samples. A duplicate sample, identified as 2662305, from project sample MW-32- 121317 (2282982001). Target analytes were detected as follows:

- Methane was detected at 233 µg/L in the sample and at 611 µg/L in the duplicate sample. The %RPD is 89%.
- Ethene was detected at 2.3J µg/L in the sample and at 4.6J µg/L in the duplicate sample. The %RPD is 66%.
- Ethane was detected at 5.6J µg/L in the sample and at 15.4J µg/L in the duplicate sample. The %RPD is 93%.

Anions by EPA 300.0

Sample handling. Four (4) aqueous samples were analyzed for chloride, nitrate, and sulfate by EPA Method 300.0. The samples were analyzed within the method recommended holding time for each analyte.

Calibration. Initial calibrations, identified as Method A (high range) and Method L (low range), were properly established. Initial and continuing calibration verification standards were recovered within the QC limits.

Blanks. Initial and continuing blanks were analyzed with the samples. Chloride, nitrate, and sulfate were not detected above the reporting limits in the blanks.

Laboratory Control Samples. Laboratory control samples identified as SSL and 2660661 were analyzed initially and every 20 samples. Recoveries were within the QC limits.

Spikes. A matrix spike and spike duplicate were not prepared on any samples in this deliverable group.

Total Alkalinity by SM 2320B

Sample handling. Four (4) aqueous samples were analyzed for total alkalinity by Standard Method 2320B. The samples were analyzed within the 14-day holding time established for the method.

Blanks. Method blanks were analyzed with the samples. Total alkalinity was not detected above the reporting limit in the blanks.

Calibration. The autotitrator was pH calibrated on the day of analysis. Total alkalinity and pH standards were analyzed initially and throughout the analysis. The standards were recovered within the alkalinity QC limits of 90-110% and the pH QC limits of +/- 0.05 pH units.

Duplicate. A duplicate analysis was not performed on any samples within this deliverable group.

Spikes. A matrix spike and spike duplicate were not prepared on any samples in this deliverable group.

Total Organic Carbon by SM 5310B

Sample handling. Four (4) aqueous samples were analyzed for total organic carbon by Standard Method 5310B. The samples were analyzed within the 28-day holding time established for the method.

Calibration. Initial calibrations were properly established on the days of analysis. Initial and continuing calibration standards were analyzed for verification, and recoveries were all within the QC limits.

Blanks. Method blanks were analyzed with the samples. Total organic carbon was not detected above the reporting limit in the blanks.

Duplicate. A duplicate analysis was not performed on any samples within this deliverable group.

Spikes. A matrix spike and spike duplicate were not prepared on any samples in this deliverable group.

3A

WATER VOLATILE MATRIX SPIKE/MATRIX SPIKE DUPLICATE RECOVERY

Lab Name: ALS Global Contract: VOMS

Lab Code: VOA Case No.: SAS No.: SDG No.: ANL-006

Matrix Spike - Sample No: MW-32-121317MS

COMPOUND	SPIKE ADDED (ug/L)	SAMPLE CONCENTRATION (ug/L)	MS CONCENTRATION (ug/L)	MS % REC#	QC LIMIT REC
Carbon Tetrachloride	20	0	20.1	101	(72-136)
1,1-Dichloroethane	20	0	20.9	104	(77-125)
1,2-Dichloroethane	20	0	20.4	102	(73-128)
1,1-Dichloroethene	20	0	22.2	111	(71-131)
cis-1,2-Dichloroethene	20	0.68	21.3	103	(78-123)
trans-1,2-Dichloroethene	20	0.3	22.8	113	(75-124)
1,1,1,2-Tetrachloroethane	20	0	21.7	108	(78-124)
1,1,2,2-Tetrachloroethane	20	0	20.9	104	(71-121)
Tetrachloroethene	20	0	22.4	112	(74-129)
Toluene	20	0	21.0	105	(80-121)
1,1,1-Trichloroethane	20	0	23.0	115	(74-131)
1,1,2-Trichloroethane	20	0	21.1	105	(80-119)
Trichloroethene	20	120	148	141*	(79-123)
Vinyl Chloride	20	0	22.7	113	(58-137)

Column to be used to flag recovery and RPD values with an asterisk
* Values outside of QC limits

RPD: 0 out of 0 outside limits

Spike Recovery: 1 out of 14 outside limits

Comments:

3A

WATER VOLATILE MATRIX SPIKE/MATRIX SPIKE DUPLICATE RECOVERY

Lab Name: ALS Global Contract: VOMS

Lab Code: VOA Case No.: SAS No.: SDG No.: ANL-006

Matrix Spike - Sample No: MW-32-121317MSD

COMPOUND	SPIKE ADDED (ug/L)	MSD CONCENTRATION (ug/L)	MSD % REC #	MSD % RPD #	QC LIMITS RPD	QC LIMITS REC
Carbon Tetrachloride	20	19.6	97.9	2.85	30	(72-136)
1,1-Dichloroethane	20	20.0	100	4.04	30	(77-125)
1,2-Dichloroethane	20	19.9	99.6	2.48	30	(73-128)
1,1-Dichloroethene	20	20.9	105	6.08	30	(71-131)
cis-1,2-Dichloroethene	20	20.0	96.8	5.93	30	(78-123)
trans-1,2-Dichloroethene	20	21.4	106	6.49	30	(75-124)
1,1,1,2-Tetrachloroethane	20	21.0	105	3.07	30	(78-124)
1,1,2,2-Tetrachloroethane	20	20.2	101	3.13	30	(71-121)
Tetrachloroethene	20	22.5	112	.24	30	(74-129)
Toluene	20	20.4	102	3.29	30	(80-121)
1,1,1-Trichloroethane	20	21.9	109	4.99	30	(74-131)
1,1,2-Trichloroethane	20	20.6	103	2.23	30	(80-119)
Trichloroethene	20	139	94.6	6.52	30	(79-123)
Vinyl Chloride	20	21.2	106	6.75	30	(58-137)

Column to be used to flag recovery and RPD values with an asterisk
* Values outside of QC limits

RPD: 0 out of 14 outside limits

Spike Recovery: 0 out of 14 outside limits

Comments:

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

SAMPLE NO.

2662303(MB)

Lab Name: ALS Global Contract: SVGC

Lab Code: VOA Case No.: SAS No.: SDG No.: ANL-006

Matrix (soil/water): WATER Lab Sample ID: 2662303

Sample wt/vol: 0.30 (g/mL) ML Lab File ID: MLJA003.D

Level (low/med): Low Date Received: 12/18/17

% Moisture: not dec. 100.0 Date Analyzed: 12/19/17

GC Column: PORPAK Q ID: 2.0 (mm) Dilution Factor: 1.0

Soil Extract Volume: (uL) Soil Aliquot Volume: (uL)

CAS No.	Compound	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
74-82-8	METHANE	0.15	J
74-85-1	ETHENE	0.75	U
74-84-0	ETHANE	0.50	U

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

SAMPLE NO.

MW-32-121317(2282982001DUP)

Lab Name: ALS Global Contract: SVGC

Lab Code: VOA Case No.: SAS No.: SDG No.: ANL-006

Matrix (soil/water): WATER Lab Sample ID: 2662305

Sample wt/vol: 0.30 (g/mL) ML Lab File ID: MLJA012.D

Level (low/med): Low Date Received: 12/14/17

% Moisture: not dec. 100.0 Date Analyzed: 12/19/17

GC Column: PORPAK Q ID: 2.0 (mm) Dilution Factor: 1.0

Soil Extract Volume: (uL) Soil Aliquot Volume: (uL)

CAS No.	Compound	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L		Q	
74-82-8	METHANE	233	611		KPDs 89.5
74-85-1	ETHENE	2.3	4.6		94.1
74-84-0	ETHANE	5.6	15.4		69

Form 4B
Inorganic Blank Summary

Analysis Method: EPA 300.0
Instrument: IC-7

SDG No.: ANL006

Sample ID	Analyte	Type	Matrix	Analyzed	Result	Q (1)	Units
BLANK	Chloride	ICB	QC-Water	12/05/2017 01:43	n.a.	J	mg/L
BLANK	Nitrate-N	ICB	QC-Water	12/05/2017 01:43	n.a.	J	mg/L
BLANK	Sulfate	ICB	QC-Water	12/05/2017 01:43	n.a.	J	mg/L
2660659	Chloride	MB	QC-Water	12/15/2017 03:30	0.25	U	mg/L
2660659	Nitrate-N	MB	QC-Water	12/15/2017 03:30	0.030	U	mg/L
2660659	Sulfate	MB	QC-Water	12/15/2017 03:30	0.25	U	mg/L
2660899	Chloride	MB	QC-Water	12/15/2017 08:47	0.15	J	mg/L
2660899	Nitrate-N	MB	QC-Water	12/15/2017 08:47	0.030	U	mg/L
2660899	Sulfate	MB	QC-Water	12/15/2017 08:47	0.25	U	mg/L

(1) The following qualifiers are used:

U: The analyte concentration is less than the reporting limit listed
J: The analyte concentration is less than the reporting limit but greater than the method detection limit

Comments:

Form 4B
Inorganic Blank Summary

Analysis Method: S2320B-97
Instrument: AUTOT

SDG No.: ANL006

Sample ID	Analyte	Type	Matrix	Analyzed	Result	Q (1)	Units
2660509	Alkalinity, Total	MB	QC-Water	12/14/2017 22:53	2	J	mg/L
2660525	Alkalinity, Total	MB	QC-Water	12/15/2017 05:57	2	J	mg/L
2660529	Alkalinity, Total	MB	QC-Water	12/15/2017 07:53	2	J	mg/L
				LOD = 5 mg/L Not used to qualify data			

(1) The following qualifiers are used:

U: The analyte concentration is less than the reporting limit listed
J: The analyte concentration is less than the reporting limit but greater than the method detection limit

Comments:

Form 4B
Inorganic Blank Summary

Analysis Method: S5310B-00
Instrument: TOC

SDG No.: ANL006

Sample ID	Analyte	Type	Matrix	Analyzed	Result	Q (1)	Units
2662782	Total Organic Carbon (TOC)	MB	QC-Water	12/19/2017 15:44	0.2	J	mg/L
				LOQ 0.5 mg/L	Not used to qualify data.		

(1) The following qualifiers are used:

U: The analyte concentration is less than the reporting limit listed
J: The analyte concentration is less than the reporting limit but greater than the method detection limit

Comments:

ALS Environmental

34 Dogwood Lane ▪ Middletown, PA 17057 ▪ Phone: 717-944-5541 ▪ Fax: 717-944-1430 ▪ www.alsglobal.com

NELAP Certifications: NJ PA010 , NY 11759 , PA 22-293 DoD ELAP: A2LA 0818.01
State Certifications: DE ID 11 , MA PA0102 , MD 128 , VA 460157 , WV 343

SAMPLE SUMMARY

Workorder: 2283331 ASN030|Scotia Navy Depot 60440

Lab ID	Sample ID	Matrix	Date Collected	Date Received	Collected By
2283331001	MW-28 121417	Ground Water	12/14/2017 09:25	12/15/2017 09:30	Collected by Client
2283331002	MW-29 121417	Ground Water	12/14/2017 10:10	12/15/2017 09:30	Collected by Client
2283331003	MW-15 121417	Ground Water	12/14/2017 11:01	12/15/2017 09:30	Collected by Client
2283331004	DUP-2 121417	Ground Water	12/14/2017 00:00	12/15/2017 09:30	Collected by Client
2283331005	TRIP BLANK	Ground Water	12/15/2017 09:30	12/15/2017 09:30	Collected by Client

ALS Environmental

34 Dogwood Lane ▪ Middletown, PA 17057 ▪ Phone: 717-944-5541 ▪ Fax: 717-944-1430 ▪ www.alsglobal.com

NELAP Certifications: NJ PA010 , NY 11759 , PA 22-293 DoD ELAP: A2LA 0818.01
State Certifications: DE ID 11 , MA PA0102 , MD 128 , VA 460157 , WV 343

PROJECT SUMMARY

Workorder: 2283331 ASN030|Scotia Navy Depot 60440

Sample Comments

Lab ID: 2283331001 **Sample ID:** MW-28 121417 **Sample Type:** SAMPLE

A positive residual chlorine result was detected in the preservation check for the volatile organics analysis of this sample. This may be due to the presence of residual chlorine or another oxidizing agent.

Lab ID: 2283331004 **Sample ID:** DUP-2 121417 **Sample Type:** SAMPLE

This sample was extracted for the RSK-175 analysis. The SOP states that the sample must have a pH < 2. The pH of this sample was > 2.

CHAIN OF CUSTODY/LABORATORY ANALYSIS REQUEST FORM

1565 Jefferson Road, Building 300, Suite 360 • Rochester, NY 14623 | +1 585 288 5380 +1 585 288 8475 (fax) PAGE

* 2 2 8 3 3 3 1 *

Project Name: Scotia Navy Dept	Project Number: 60514064
Project Manager: John Santacroce	Report CC:
Company/Address: AECOM 40 British American BLVD Latham NY	
Phone #: (518) 951 2200	Email: John.Santacroce@aecom.com
Sampler's Signature:	Sampler's Printed Name: Ross McCurdy

ANALYSIS REQUESTED (Include Method Number and Container Preservative)

PRESERVATIVE

CLIENT SAMPLE ID	FOR OFFICE USE ONLY LAB ID	SAMPLING DATE	SAMPLING TIME	MATRIX	NUMBER OF CONTAINERS	8260	TOC	RSK175	Cl, SO4, NO3	Alkalinity
MW-28 121417		12/14/17	925	GW	11	x3	x3	x3	x	x
MW-29 121417			1010		11	x3	x3	x3	x	x
MW-15 121417			1101		11	x2	x2	x2	x	x
DUP-2 121417			—		11	x	x3	x3	x	x
TRIP BLANK		—	—	—						

Preservative Key
0. NONE
1. HCL
2. HNO_3
3. H_2SO_4
4. NaOH
5. Zn. Acetate
6. MeOH
7. $NaHSO_4$
8. Other ____

REMARKS/ ALTERNATE DESCRIPTION

	Y	N	Initials
Custody Seals Present?	X		GW
(if present) Seals Intact?	X		
Received on Ice?	X		
COC/Lbls Complete		X	
Cont in Good Cond?	X		
Correct Containers?	X		
Correct Samp Vol?	X		
Correct Preservation?	X		
Headspace/Volatiles?		X	

Cooler Temp: 0.4 °C
Cooler #:
Therm ID:
Ship Carrier: FedEx UPS DHL
Tracking #: 647083102886

SPECIAL INSTRUCTIONS/COMMENTS
Metals
Did not receive Dup-2 8260 GW 12-15

See QAPP ☐

STATE WHERE SAMPLES WERE COLLECTED: NY

TURNAROUND REQUIREMENTS
____ RUSH (SURCHARGES APPLY)
____ 1 day ____ 2 day ____ 3 day
____ 4 day ____ 5 day
STD
REQUESTED REPORT DATE

REPORT REQUIREMENTS
____ I. Results Only
____ II. Results + QC Summaries (LCS, DUP, MS/MSD as required)
____ III. Results + QC and Calibration Summaries
____ IV. Data Validation Report with Raw Data
See QAPP
Edata ____ Yes ____ No

INVOICE INFORMATION
PO #
BILL TO:

RELINQUISHED BY	RECEIVED BY	RELINQUISHED BY	RECEIVED BY	RELINQUISHED BY	RECEIVED BY
Signature	Signature D. Ayers	Signature D. Ayers	Signature J. Sumpf	Signature	Signature
Printed Name Ross McCurdy	Printed Name DINA Ayers	Printed Name DINA Ayers	Printed Name ALS	Printed Name	Printed Name
Firm AECOM	Firm ALS	Firm ALS	Firm	Firm	Firm
Date/Time 12/14/17 1208	Date/Time 12/14/17 1208	Date/Time 12/14/17 1700	Date/Time 12-15-17 09:30	Date/Time	Date/Time

Distribution: White - Lab Copy; Yellow - Return to Originator

ALS Environmental

34 Dogwood Lane ▪ Middletown, PA 17057 ▪ Phone: 717-944-5541 ▪ Fax: 717-944-1430 ▪ www.alsglobal.com

NELAP Certifications: NJ PA010 , NY 11759 , PA 22-293 DoD ELAP: A2LA 0818.01
State Certifications: DE ID 11 , MA PA0102 , MD 128 , VA 460157 , WV 343

ANALYTICAL RESULTS

Workorder: 2283331 ASN030|Scotia Navy Depot 60440

PARAMETER QUALIFIERS

Lab ID	#	Sample ID	Analytical Method	Analyte
2283331001	1	MW-28 121417	S2320B-97	Alkalinity, Total
The Total Alkalinity is titrated to a pH of 4.5 and reported as mg CaCO3/L.				
2283331002	1	MW-29 121417	S2320B-97	Alkalinity, Total
The Total Alkalinity is titrated to a pH of 4.5 and reported as mg CaCO3/L.				
2283331003	1	MW-15 121417	S2320B-97	Alkalinity, Total
The Total Alkalinity is titrated to a pH of 4.5 and reported as mg CaCO3/L.				
2283331004	1	DUP-2 121417	S2320B-97	Alkalinity, Total
The Total Alkalinity is titrated to a pH of 4.5 and reported as mg CaCO3/L.				

AECOM - Latham, NY
ALS-Middletown
Case Narrative
ASN-030 (2283331)

Sample Management

This report contains the results of the analysis of five (5) ground water samples collected on December 14-15, 2017. Analytical results and quality control information are summarized in this data package.

Qualifier Symbol Definitions:

U = Qualifier indicates that the analyte was not detected above the LOD.
J = Qualifier indicates that the analyte value is between the DL and the LOQ.
B = Qualifier indicates that the analyte was detected in the blank.
E = Qualifier indicates that the analyte result exceeds the calibration range.
P = Qualifier indicates that the RPD between the two analytical columns is > 40%.
NSC = Qualifier indicates that spike recoveries were not calculated based on the spiking concentration.

Result Symbol Definitions:

DL = The smallest analyte concentration that can be demonstrated to be different from zero or a blank concentration at the 99% level of confidence.
LOD = The smallest analyte concentration that must be present in a sample in order to be detected at a high level of confidence.
LOQ = The lowest concentration that produces a quantitative result within specified limits of precision or bias.

Manual Integration Symbol Definitions

I = Peak was not integrated properly by chromatographic software. This may be due to baseline irregularities resulting from sample matrix, elevated baseline, or incorrect integration by software on a sample. Integration was adjusted by operator to ensure proper quantitation.
H = The incorrect peak was identified or the chromatographic software did not identify an analyte peak. Operator manually identified the correct peak as the appropriate target analyte. This flag is automatically assigned by the Target software.
SP = Peak was erroneously split. The operator manually integrated the peak to include all the area of the analyte peak to ensure proper quantitation.
MP = Two peaks were erroneously merged. This may include two discrete peaks separated by a distinguishable valley or a larger peak with a clearly identifiable shoulder. Operator manually split peaks.
AB = Integration of group of adjacent peaks did not follow baseline. Operator manually assigned integration to follow baseline.
NP = Negative spike in the baseline resulted in overstating area of analyte peaks. Analyte peaks were re-assigned.
AC = Integration of aggregate or multi-component analyte to include area off all components of the analyte (i.e., toxaphene).

Sample Receipt

Samples arrived at ALS via courier on December 15, 2017. Upon receipt, the samples were inspected and compared to the Chain of Custody. Sample temperature was documented on the enclosed Chain of Custody. Samples were received intact and properly preserved, unless noted on the enclosed Certificate of Analysis and/or Chain of Custody.

Manual Integrations

If manual integrations were performed they are indicated on the raw data quantification files for each method.

Volatile Organics by SW-846 Method 8260

Sample Handling. Five (5) water samples were analyzed by SW-846 Method 8260 for volatile organic compounds. All analyses were performed within the holding time.

Initial Calibrations. Initial calibrations were properly analyzed and met method criteria for all target analytes. **Note**: The batch LCS also serves as a second source (ICV).

Initial Calibration Verifications. Initial calibration verification samples were properly analyzed and met method criteria.

Continuing Calibration Verification. Continuing Calibration Verification samples were analyzed and met method criteria for all target analytes.

Blanks. Target analytes were not detected in the method blank.

Surrogates. Recoveries were within control limits

Laboratory control samples. Target analytes were recovered within control limits in the laboratory control samples.

Internal Standards. Internal standard results met method criteria

Light Hydrocarbon Gases by RSK-175

Sample Handling. Four (4) water samples were submitted for the analysis of light hydrocarbon gases by Method RSK-175. The samples were analyzed within the method specified holding time of fourteen days.

Calibrations. The initial calibrations met method criteria for all target analytes.

Calibration verification. Prior to the analysis of samples in this group, the initial calibrations were successfully verified by the analysis of calibration verification standards. The samples were then successfully bracketed with alternating calibration verification standards (CCV) throughout the analysis.

Continuing Calibration. A continuing calibration standard were properly analyzed and met method criteria for all target analytes.

Blanks. Target analytes were not detected in the method blank; except as follows:

- Methane was detected at 0.15J µg/L.

Anions by EPA 300.0

Sample handling. Four (04) aqueous samples were analyzed for chloride, nitrate-N, and sulfate by EPA Method 300.0. The samples were analyzed within the method recommended holding time for each analyte.

Calibration. Initial calibrations, identified as Method A (high range) and Method L (low range), were properly established. All calibration verification standards were recovered within the QC limits.

Blanks. Initial and continuing blanks were analyzed with the samples. No analyte was detected above ½ the reporting limits in the blanks.

Laboratory Control Samples. Laboratory control samples identified as 2661315 and SSL were analyzed initially and every 20 samples. Recoveries were within the QC limits.

Duplicate. A duplicate analysis was not performed on any samples in this deliverable group.

Spikes. A matrix spike analysis was not performed on any samples in this deliverable group.

Total Alkalinity by SM 2320B

Sample handling. Four (04) aqueous samples were analyzed for total alkalinity by Standard Method 2320B. The samples were analyzed within the 14-day holding time established for the method.

Blanks. Method blanks were analyzed with the samples. Total alkalinity was not detected above ½ the reporting limit in the blanks.

Calibration. The standards were recovered within the alkalinity QC limits.

Duplicate. A duplicate analysis identified as 2661185 was performed on sample 2283331003 (MW-15 121417). The recovery was within the QC limit of 20%.

Spikes. A matrix spike analysis was not performed on any samples in this deliverable group.

Total Organic Carbon by SM 5310B

Sample handling. Four (04) aqueous samples were analyzed for total organic carbon by Standard Method 5310B. The samples were analyzed within the 28-day holding time established for the method.

Calibration. Initial calibrations were properly established on the days of analysis. Initial and continuing calibration standards were analyzed for verification, and recoveries were all within the QC limits.

Blanks. Method blanks were analyzed with the samples. Total organic carbon was not detected above ½ the reporting limit in the blanks.

Duplicate. A duplicate analysis was not performed on any samples in this deliverable group.

Spikes. A matrix spike analysis was not performed on any samples in this deliverable group.

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

SAMPLE NO.

2662303(MB)

Lab Name: ALS Global Contract: SVGC

Lab Code: VOA Case No.: SAS No.: SDG No.: ASN-030

Matrix (soil/water): WATER Lab Sample ID: 2662303

Sample wt/vol: 0.30 (g/mL) ML Lab File ID: MLJA003.D

Level (low/med): Low Date Received: 12/18/17

% Moisture: not dec. 100.0 Date Analyzed: 12/19/17

GC Column: PORPAK Q ID: 2.0 (mm) Dilution Factor: 1.0

Soil Extract Volume: (uL) Soil Aliquot Volume: (uL)

CAS No.	Compound	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
74-82-8	METHANE	0.15	J
74-85-1	ETHENE	0.75	U
74-84-0	ETHANE	0.50	U

Form 4B
Inorganic Blank Summary

Analysis Method: EPA 300.0
Instrument: IC-7

SDG No.: ASN030

Sample ID	Analyte	Type	Matrix	Analyzed	Result	Q (1)	Units
BLANK	Chloride	ICB	QC-Water	12/05/2017 01:43	n.a.	J	mg/L
BLANK	Nitrate-N	ICB	QC-Water	12/05/2017 01:43	n.a.	J	mg/L
BLANK	Sulfate	ICB	QC-Water	12/05/2017 01:43	n.a.	J	mg/L
2661313	Chloride	MB	QC-Water	12/16/2017 03:33	0.25	U	mg/L
2661313	Nitrate-N	MB	QC-Water	12/16/2017 03:33	0.030	U	mg/L
2661313	Sulfate	MB	QC-Water	12/16/2017 03:33	0.25	U	mg/L
2661318	Chloride	MB	QC-Water	12/16/2017 10:14	0.15	J	mg/L
2661318	Nitrate-N	MB	QC-Water	12/16/2017 10:14	0.030	U	mg/L
2661318	Sulfate	MB	QC-Water	12/16/2017 10:14	0.25	U	mg/L

(1) The following qualifiers are used:

U: The analyte concentration is less than the reporting limit listed
J: The analyte concentration is less than the reporting limit but greater than the method detection limit

Comments:

Form 4B
Inorganic Blank Summary

Analysis Method: S2320B-97
Instrument: AUTOT

SDG No.: ASN030

Sample ID	Analyte	Type	Matrix	Analyzed	Result	Q (1)	Units
2661152	Alkalinity, Total	MB	QC-Water	12/16/2017 01:53	3	J	mg/L
2661180	Alkalinity, Total	MB	QC-Water	12/16/2017 15:54	2	J	mg/L
2661184	Alkalinity, Total	MB	QC-Water	12/16/2017 18:18	2	J	mg/L
2661188	Alkalinity, Total	MB	QC-Water	12/16/2017 20:15	2	J	mg/L

Less than LOD of 5 mg/L. Not used to qualify data.

(1) The following qualifiers are used:

U: The analyte concentration is less than the reporting limit listed
J: The analyte concentration is less than the reporting limit but greater than the method detection limit

Comments:

APPENDIX F: Groundwater Concentration Trend Plots

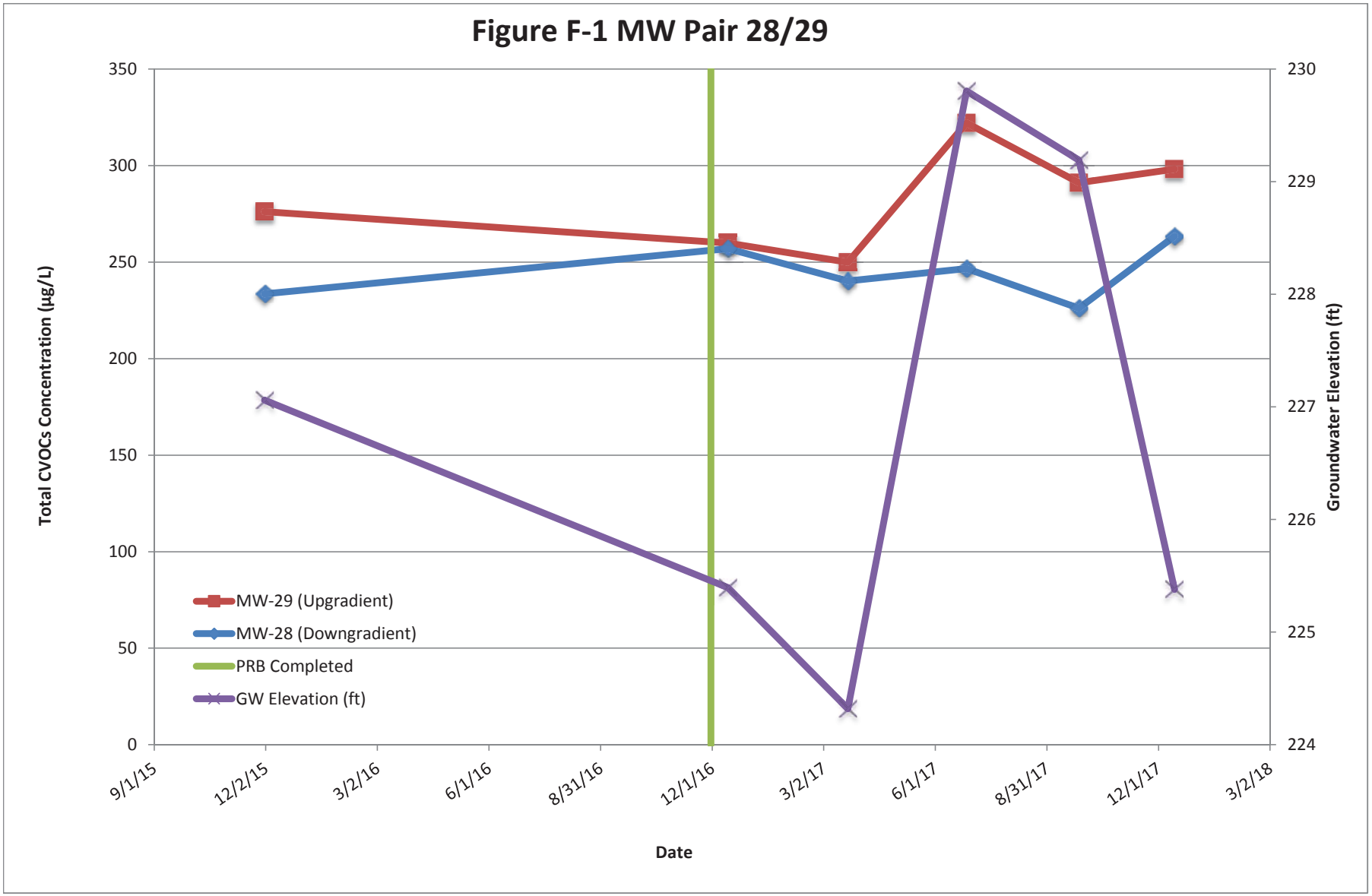
Figure F-1 MW Pair 28/29
Total CVOCs Concentration (µg/L)
Groundwater Elevation (ft)
Date
350
300
250
200
150
100
50
0
230
229
228
227
226
225
224
9/1/15
12/2/15
3/2/16
6/1/16
8/31/16
12/1/16
3/2/17
6/1/17
8/31/17
12/1/17
3/2/18
MW-29 (Upgradient)
MW-28 (Downgradient)
PRB Completed
GW Elevation (ft)

Figure F-2 MW Pair 30/31

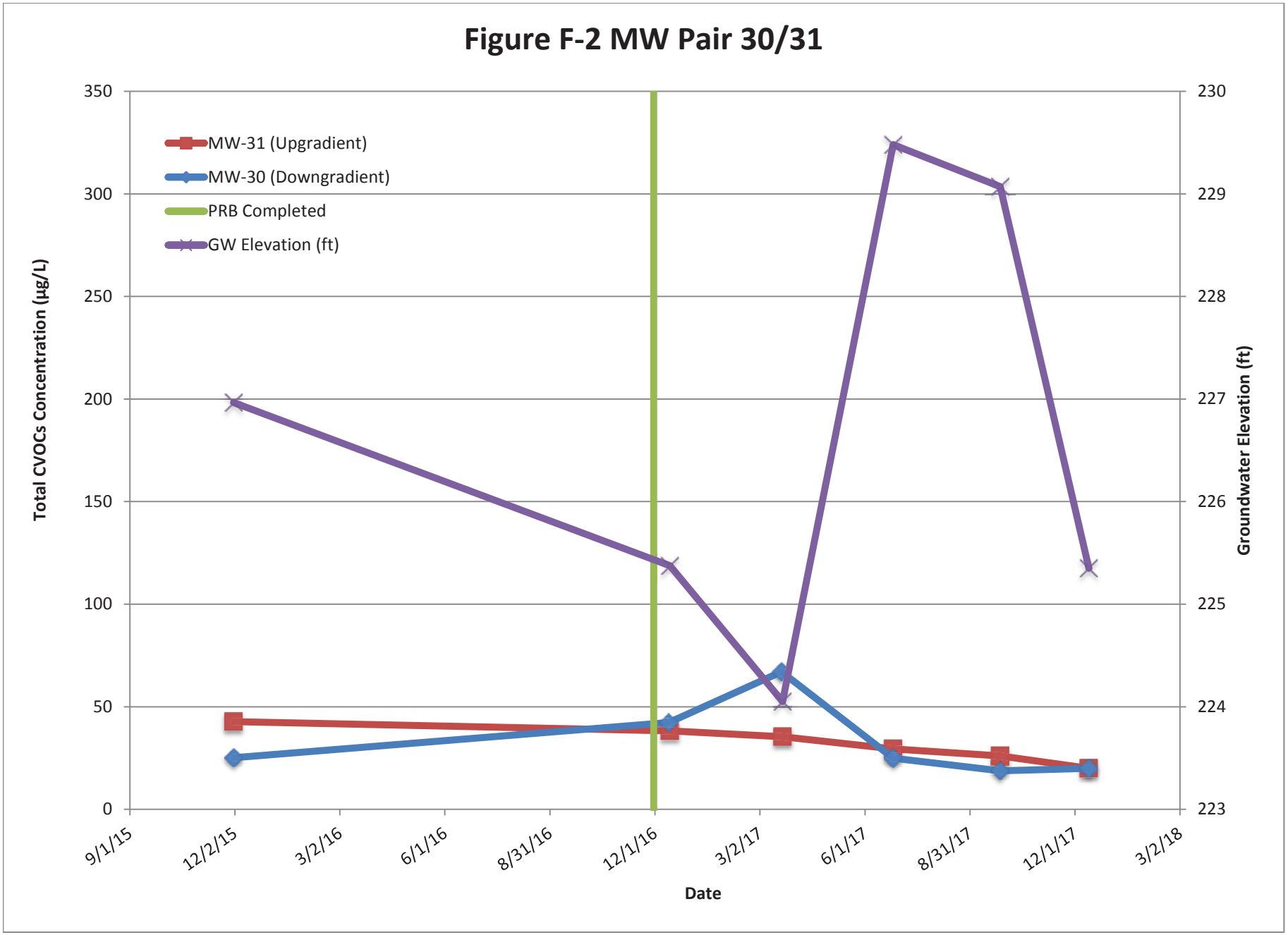

Figure F-3 MW Pair 32/33

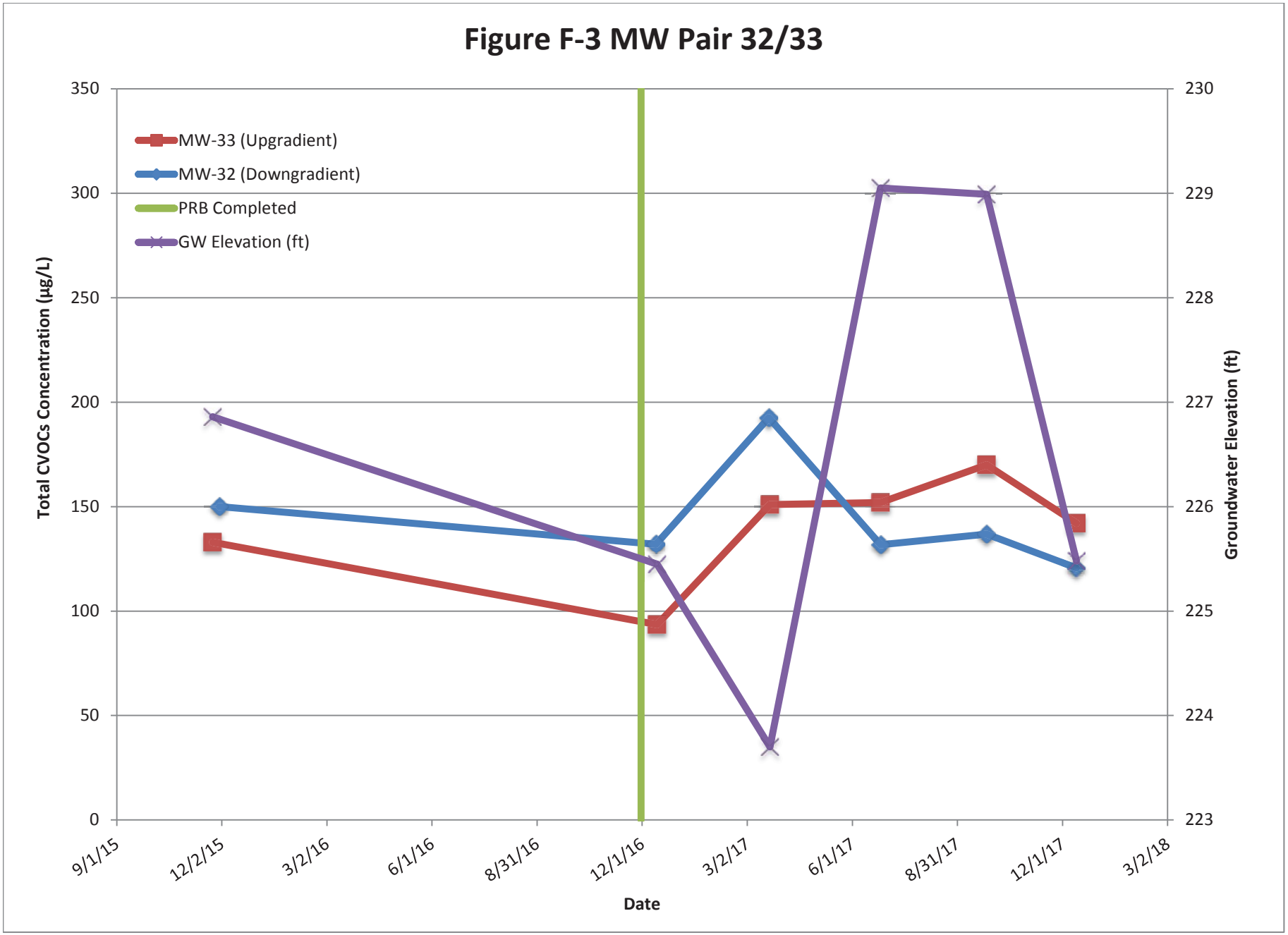

Figure F-4 MW Pair 34/35