# 2019 SITE WORK DOCUMENTATION
# 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 Technical Services**

**May 2019**

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**Contract No. W912DY-09-D-0059**

**Task Order No. 0010**

**May 2019**

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# 1 INTRODUCTION

This report was prepared by AECOM on behalf of the United States Army Corps of Engineers (USACE) and the United States General Services Administration (GSA) to document groundwater monitoring well repair work, groundwater sampling activities of repaired wells and repairs to the soil vapor intrusion (SVI) mitigation systems conducted during the winter and spring of 2019 at the Former Scotia Navy Depot (FSND) (Site). The Site is located 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** and a site layout map is provided in **Figure 1-2**.

The groundwater monitoring wells that were repaired are included on the annual monitoring and sampling schedule outlined in the Site Management Plan (SMP[1]). Due to damages, these groundwater monitoring wells were unable to be used for groundwater elevation gauging or sampling during recent annual monitoring events. Also, several groundwater monitoring wells were converted from being finished with an above ground steel protective casing (stickup casing) to being finished with a flushmount protective casing due to potential to be damaged during anticipated future site development. AECOM mobilized to the site with a drilling subcontractor on two separate events to complete repairs and modifications: once in January 2019 and again in April 2019. Wells that were repaired in January 2019 were also sampled.

AECOM also mobilized to the site in April 2019 to complete repairs of SVI mitigation system damages observed during the December 2018 monitoring event.

[1] AECOM, 2017. Site Management Plan for the Defense National Stockpile Center Scotia Depot, Town of Glenville, NY. Revised, November 5, 2018.

# 2 SUMMARY OF MONITORING WELL REPAIR AND SAMPLING ACTIVITIES

## 2.1 Monitoring Well Repairs

### 2.1.1 January 2019

During the week of January 7, 2019, AECOM mobilized to the Site with Parratt-Wolff (a drilling subcontractor) to complete repairs of four groundwater monitoring wells (GEP-1, GEP-4, MW-8 and MW-11), install replacement groundwater monitoring wells for one recently observed damaged well (MW-B-1) and one well presumably paved over and lost (MW-12), and to abandon one well that was observed to be damaged during the December 2018 semi-annual groundwater sampling event (MW-22).

Damages to GEP-1, GEP-4 and MW-8 were limited to either the top of the well casing or the protective steel casing. These damages could be repaired without replacing the entire groundwater monitoring well. Attempts to repair MW-11 revealed that damages to the well casing extended well below the ground surface; therefore, plans to abandon and replace this well in the future were put into place.

Groundwater monitoring wells MW-B-1, MW-12 and MW-22 were damaged beyond repair or lost (MW-12). At this time, funding was available to abandon MW-B-1 and MW-22 and to install new replacement wells for MW-B-1 and MW-12. All groundwater monitoring well abandonment was conducted in accordance with NYSDEC Commissioner Policy CP-43. Groundwater monitoring wells MW-B-1R and MW-12R were installed to replace MW-B-1 and MW-12, respectively. These new replacement groundwater monitoring wells were constructed to the same depth and specification as the original monitoring wells. The replacement wells were then developed by purging ten well volumes of water from each well while monitoring the standard suite of field parameters. Soil boring logs are included in **Appendix A** and well construction logs are included in **Appendix B**. Purge logs for well development are included in **Appendix C**.

### 2.1.2 April 2019

During the week of April 1, 2019, AECOM mobilized to the site with Parratt-Wolff to abandon one groundwater monitoring wells (MW-11), install two groundwater monitoring wells (MW-11R and MW-22R), and to modify five groundwater monitoring wells (MW-17, MW-18, MW-19, MW-20 and MW-25).

Groundwater monitoring well MW-11 was abandoned in place in accordance with NYSDEC Commissioner Policy CB-43. Groundwater monitoring wells MW-11R and MW-22R were installed to replace MW-11 and the previously abandoned MW-22 (see above). These new replacement groundwater monitoring wells were constructed to the same depth and specification as the original monitoring wells, with the following exception: MW-22 was constructed with an above ground steel protective casing while MW-22R was constructed with a flushmount protective casing. The replacement wells were then developed by purging ten well volumes of water from each well while monitoring the standard suite of field parameters. Soil boring logs

are included in **Appendix A** and well construction logs are included in **Appendix B**. Purge logs for well development are included in **Appendix C**.

Groundwater monitoring wells MW-17, MW-18, MW-19, MW-20 and MW-25 were converted from being finished with an above ground steel protective casing (stickup casing) to being finished with a flushmount protective casing due to potential to be damaged during anticipated future site development. All five of these wells are located on property now owned by BelGioioso Cheese Inc.

### 2.1.3 Waste Management

All soil cuttings from drilling activities and purge water from well development was containerized in 55 gallon drums and stored at a secured location on GSA property as non-hazardous investigation derived waste (IDW) until the conclusion of each repair event. IDW was removed from the Site on May 16, 1019 by a certified waste hauler and disposed of in accordance with state and local regulations.

## 2.2 Monitoring Well Sampling

On January 23, 2019, groundwater samples were collected from the recently repaired or replaced groundwater monitoring wells GEP-1, GEP-4, MW-8 and MW-12R using the low flow sampling methods specified in the SMP. The samples were shipped on ice under chain of custody to ALS Environmental, Inc. for analysis of volatile organic compounds (VOCs). Groundwater samples were not collected from MW-B-1R since this well is only used for groundwater level monitoring purposes. These wells are scheduled to be sampled in June of each year as part of the annual site-wide sampling event. They were not sampled in June of 2018 due to the issues addressed with these recent repairs. They were sampled now to fill in the missing data. Groundwater samples were not collected from groundwater monitoring wells MW-11R and MW-22R in April; samples will be collected from these wells during the semi-annual sampling event in June 2019.

Groundwater sample collection forms with the field parameter readings for each monitoring well samples in January 2019 are included as **Appendix D**. Note: the YSI DSS Pro used for measurement of field parameters was unable to produce accurate dissolved oxygen (DO) measurements during this sampling event (most likely due to the low air temperatures).

### 2.2.1 Groundwater VOC results

The VOC results from the January 2019 sampling event are presented in **Table 2-1**, which includes historical sampling results for comparison. **Figure 2-1** provides a summary of the groundwater VOC results and identifies exceedances of the NYSDEC Ambient Water Quality Standards (AWQS) and Guidance Values (GV) found in the Technical and Operational Guidance Series (TOGS) 1.1.1.

Full analytical reports are included in **Appendix E**.

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

A summary of the results is presented below:

- TCE, the primary constituent of concern, was detected in all of the sampled wells except MW-12R. TCE concentrations ranged from 441 µg/L (GEP-4) to 3.4 µg/L (MW-8).

- Carbon tetrachloride was detected in GEP-4 at levels below the AWGS. Carbon tetrachloride was not detected in any other sampled locations.

- Tetrachloroethene (PCE) was detected in GEP-4 at 3.6 µg/L which is below the AWGS of 5 µg/L. PCE was not detected in any other sampled locations.

The TCE detected at GEP-4 is at higher concentration compared to recent groundwater sampling events completed since June 2017; however, historically, TCE concentrations at GEP-4 have been reported as high as 540 µg/L in samples collected in June 2001[2].

[2] EarthTech, 2002. Supplemental Investigation, Proposed Glenville Energy Park, 300 Block – Scotia-Glenville Industrial Park, New York State Route 5, Town of Glenville, NY, January 2002

# 3 SVI REPAIRS

During the December 2018 Site inspection of the SVI mitigation systems located in buildings 201, 202, 203, and 204, AECOM observed damage to several systems likely due to tenant activates. On April 15 and 16, 2019 AECOM personnel mobilized to the Site with a subcontractor (Precision Environmental Services, PES) to repair the observed damages. A summary of the repairs conducted on the SVI mitigation systems is presented below:

- Building 201: Repaired broken PVC and replaced missing monometer at extraction point 12A; replaced broken monometer at extraction point 6A.
- Building 202: Repaired broken PVC at extraction point 6B; PES replaced they Radon Away fan on system 11 due to observed seasonal fluctuations of monometer readings (fluctuations only observed during winter monitoring).
- Building 204: Repaired broken PVC and adjusted gate valve at extraction point 5A; adjusted gate valve at extraction point 10A.

The following system components within Building 204 could not be repaired at this time due to lack of access within the required areas: broken monometer at extraction point 11A, and broken vapor pin at monitoring point 204-6. These two locations were not accessible due to storage of materials within the area. These system components do not impact the operation of the mitigations systems; however, repairs are necessary in order to properly monitor the mitigation systems. AECOM will attempt to repair these system components before the next scheduled monitoring event (June 2019).

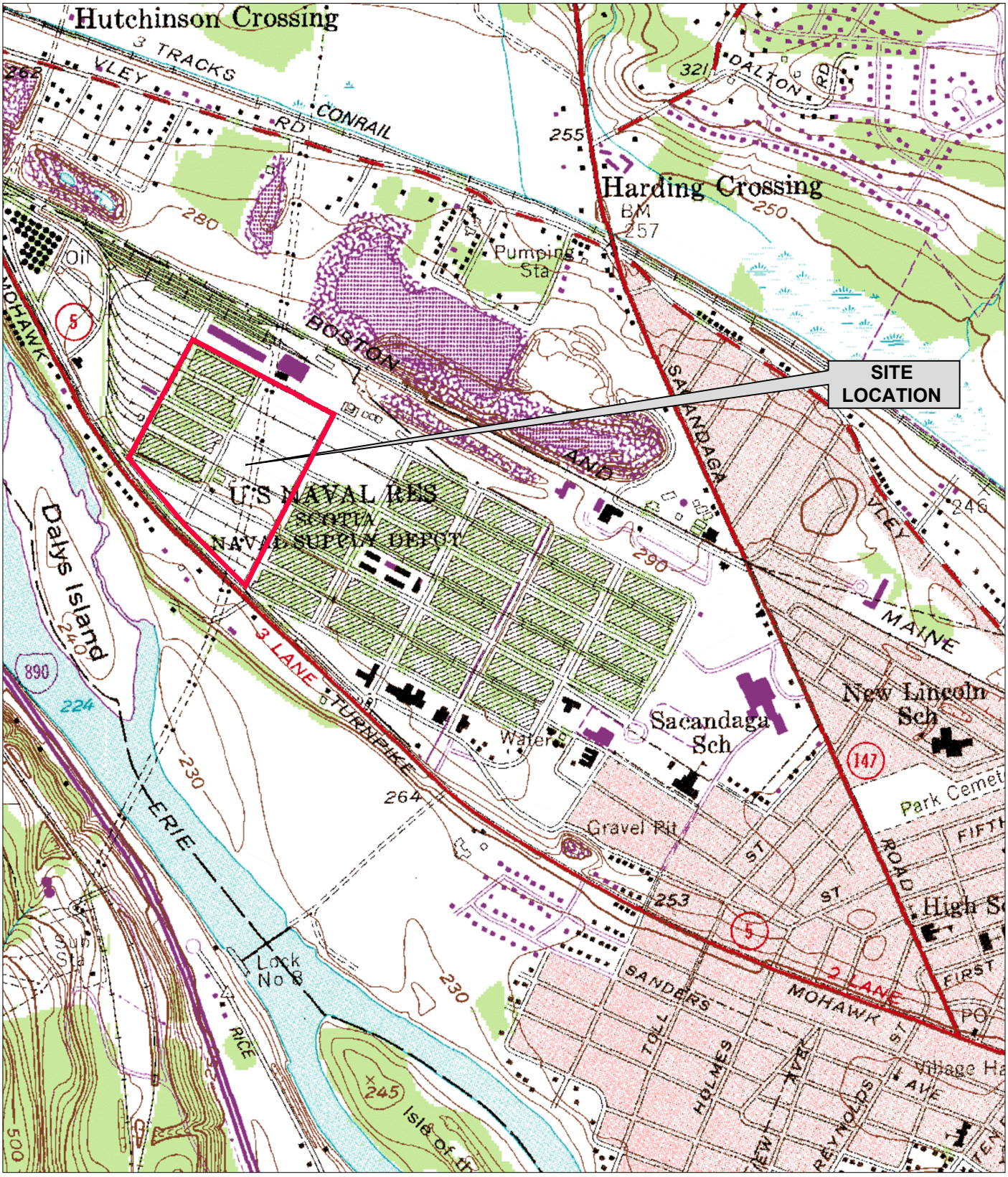
# 4 SUMMARY AND CONCLUSIONS

All groundwater monitoring wells included in the groundwater monitoring plan outlined in the SMP have been repaired or replaced, as appropriate and will now be included in the next scheduled site-wide sampling event (June 2019).

All repairs to the SVI mitigation systems have been completed, with the exception of those detailed in Section 3 of this report. The next scheduled SVI mitigation system monitoring event is scheduled for June 2019. If access is available to locations within Building 204 where the system components requiring repair are located, the remaining repairs will be completed during the June 2019 monitoring event.

Photo documentation of groundwater monitoring well and SVI mitigation system repair work is provided in **Appendix G**.

# FIGURES




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

0 2000' 4000'

**SVI MONITORING PROGRAM**
**DEFENSE NATIONAL STOCKPILE**
SCOTIA DEPOT SITE - SCOTIA, NY
Project No.: 60440641 Date: DECEMBER 2018

US ARMY Corps of Engineers

**SITE LOCATION PLAN**

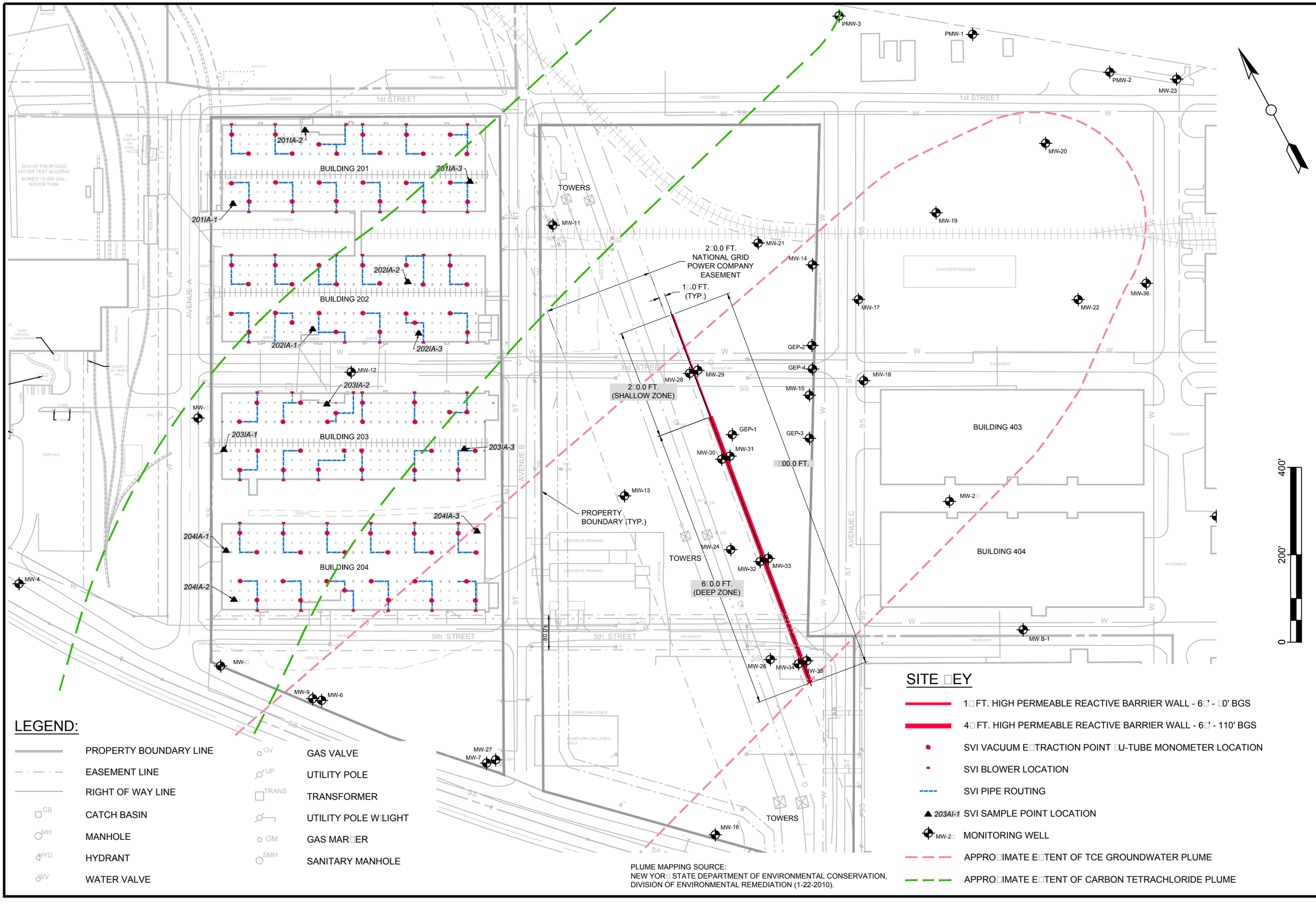
AECOM

**Figure: 1-1**

AECOM

Figure: 1-2

SITE LAYOUT PLAN




## LEGEND:

- PROPERTY BOUNDARY LINE
- EASEMENT LINE
- RIGHT OF WAY LINE
- CB — CATCH BASIN
- MH — MANHOLE
- HYD — HYDRANT
- WV — WATER VALVE
- GV — GAS VALVE
- UP — UTILITY POLE
- TRANS — TRANSFORMER
- UTILITY POLE W□LIGHT
- GM — GAS MAR□ER
- SMH — SANITARY MANHOLE

PLUME MAPPING SOURCE:
NEW YOR□ STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION,
DIVISION OF ENVIRONMENTAL REMEDIATION (1-22-2010).

## SITE □EY

- 1□ FT. HIGH PERMEABLE REACTIVE BARRIER WALL - 6□' - □0' BGS
- 4□ FT. HIGH PERMEABLE REACTIVE BARRIER WALL - 6□' - 110' BGS
- SVI VACUUM E□TRACTION POINT □U-TUBE MONOMETER LOCATION
- SVI BLOWER LOCATION
- SVI PIPE ROUTING
- *203/A-1* SVI SAMPLE POINT LOCATION
- MW-2□ MONITORING WELL
- APPRO□IMATE E□TENT OF TCE GROUNDWATER PLUME
- APPRO□IMATE E□TENT OF CARBON TETRACHLORIDE PLUME

US ARMY Corps of Engineers

**SVI MONITORING PROGRAM**
**DEFENSE NATIONAL STOCKPILE CENTER**
SCOTIA DEPOT SITE - SCOTIA, NY
Project No.: 60440641 Date: December 2018

# 2019 GROUNDWATER MONITORING WELL REPAIRS AND SAMPLE RESULTS

AECOM

Figure: 2-1

| MW-12R | |
|---|---|
| Analytes | Concentration (µg/L) Jan. 2019 |
| 1,1,1-Trichloroethane (1,1,1-TCA) | ND |
| Trichloroethene (TCE) | ND |
| Total CVOCs | ND |

| MW-8 | |
|---|---|
| Analytes | Concentration (µg/L) Jan. 2019 |
| 1,1,1-Trichloroethane (1,1,1-TCA) | **2.1 J** |
| Trichloroethene (TCE) | **3.4 J** |
| Total CVOCs | **5.5** |

| GEP-4 | | | |
|---|---|---|---|
| Analytes | Concentration (µg/L) Nov. 2015 | Jun. 2017 | Jan. 2019 |
| 1,1,1-Trichloroethane (1,1,1-TCA) | **5.1** | ND | **18.9** |
| Trichloroethene (TCE) | **85.9** | **72.4** | **441.0** |
| Total CVOCs | **91.7** | **77.9** | **466** |

| GEP-1 | | | | |
|---|---|---|---|---|
| Analytes | Concentration (µg/L) Nov. 2015 | Jun. 2017 | Jun. 2018 | Jan. 2019 |
| Trichloroethene (TCE) | **180** | **152 J+** | NS | **157** |
| Total CVOCs | **186** | **155** | NS | **164** |

## KEY

- MW-11R NEW MONITORING WELL
- MW-25 REPAIRED / MODIFIED MONITORING WELL
- MW-11 LOST / ABANDONED MONITORING WELL

## 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

## 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.
6. NS - Indicates monitoring well was inaccessible due to damage and could not be sampled.

0 200' 400'

US ARMY Corps of Engineers

**DEFENSE NATIONAL STOCKPILE CENTER**
SCOTIA DEPOT SITE - SCOTIA, NY
Project No.: 60440641 Date: May 2019

# TABLES

Table 2-1
Groundwater Sample Results
The Defense National Stockpile Center Scotia Depot

| Analytes | NYSDEC Ambient Water Quality Standards and Guidance Value | GEP-1 | | | GEP-4 | | | MW-8 | MW-12 R |
|---|---|---|---|---|---|---|---|---|---|
| | | 11/10/2015 | 6/23/2017 | 1/23/2019 | 11/9/2015 | 6/21/2017 | 1/23/2019 | 1/23/2019 | 1/23/2019 |
| | | Upgradient | | | Upgradient | | | Outside Plume | 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 |
| 1,1,1-Trichloroethane (1,1,1-TCA) | 5 | **4.6** | **3.3 J+** | **5.8** | **5.1** | **4.7** | **18.9** | **2.1 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 |
| 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 |
| 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 |
| 1,1-Dichloroethene (1,1-DCE) | 5 | **0.43 J** | 0.75 U | **0.39 J** | 0.75 U | 0.75 U | **1.2** | 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 |
| Carbon Tetrachloride | 5 | 0.75 U | 0.75 U | 0.75 U | 0.75 U | 0.75 U | **0.65 J** | 0.75 U | 0.75 U |
| cis-1,2-Dichloroethene (cis-1,2-DCE) | 5 | 0.75 U | 0.75 U | 0.75 U | 0.75 U | 0.75 U | **0.47 J** | 0.75 U | 0.75 U |
| Tetrachloroethene (PCE; PERC) | 5 | **1.0** | **0.45 J** | 0.75 U | **0.68 J** | **0.80 J** | **3.6** | 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 |
| 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 |
| Trichloroethene (TCE) | 5 | **180** | **152 J+** | **157** | **85.9** | **72.4** | **441** | **3.4 J** | 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 |
| **MNA Parameters** | | | | | | | | | |
| Acetylene | NS | NA | NA | NA | NA | NA | NA | NA | NA |
| Alkalinity, Total (as $CaCO_3$) (mg/L)[1] | NS | 223 | NA | NA | **227** | NA | NA | NA | NA |
| Chloride (mg/L) | NS | 13.2 | NA | NA | **22.5** | NA | NA | NA | NA |
| Nitrate (mg/L) | NS | 1.0 | NA | NA | **0.71** | NA | NA | NA | NA |
| Sulfate (mg/L) | NS | 10.2 | NA | NA | **13.2** | NA | NA | NA | NA |
| Methane (µg/L) | NS | 0.32 J | NA | NA | **0.4 J** | NA | NA | NA | NA |
| Ethane (µg/L) | NS | 0.5 U | NA | NA | 0.5 U | NA | NA | NA | NA |
| Ethene (µg/L) | NS | 0.75 U | NA | NA | 0.75 U | NA | NA | NA | NA |
| Total Organic Carbon (mg/L) | NS | 3.4 | NA | NA | **2.7** | NA | NA | NA | NA |
| **Field Parameters** | | | | | | | | | |
| pH (pH Unit) | NS | 7.52 | 8.31 | 7.34 | 7.67 | 7.39 | 7.22 | 7.55 | 7.50 |
| Turbidity (NTU) | NS | 33.1 | 45.6 | 5.82 | 41.8 | 9.4 | 3.24 | 0.02 | 0.02 |
| ORP (MeV) | NS | 141.8 | 203.5 | 124.1 | 110.7 | 109.9 | 106.8 | 93.60 | 87.0 |
| Conductivity (mS/cm) | NS | 0.308 | 0.396 | 0.536 | 0.363 | 0.51 | 0.72 | 0.465 | 0.476 |
| Dissolved Oxygen (mg/L) | NS | 19.53 | 9.9 | -22 * | 14.93 | 5.05 | -22.74 * | -16.2 * | -20.24 * |
| Groundwater Elevation (ft) | NS | 224.81 | NA | NA | 227.73 | 230.61 | NA | NA | NA |

Notes:
MNA - Monitored Natural Attenuation
NS - no standard
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).
* - negative DO measurements are the result of low temperatures affecting the DO probe during the sampling event
1 - TheTotal Alkalinity is titrated to a pH of 4.5 and reported as mg $CaCO_3$/L.

# APPENDICIES

# APPENDIX A: Soil Boring Logs

# January 2019 Boring Logs

**AECOM, Inc.**
**40 British American Boulevard**
**Latham, New York 12110**
**Phone: (518) 951-2200**
**Fax: (518) 951-2300**

# BOREHOLE LOG

BORING ID #: **MW-B-1R**

START DATE: 1/7/19 END DATE: 1/8/19

| | | | | | |
|---|---|---|---|---|---|
| PROJECT NAME: | **Scotia Navy Depot** | PROJECT NO.: | **60440641** | PROJECT MANAGER: | **Dan Servetas** |
| SITE LOCATION: | **Scotia, NY** | BORING LOCATION: | MW-B-1R | | |
| DRILLING CO.: | **Parrat-Wolf** | DRILLER: | **Glenn Lensing** | DRILLING METHOD: | **Hollow Stem Auger** |
| BOREHOLE DIAMETER: | **6"** | DEPTH TO BEDROCK: | | TOTAL DEPTH DRILLED: | **68 fbg** |
| TOTAL DEPTH REACHED: | **68 fbg** | INSPECTOR: | **Alex Golden** | WEATHER CONDITIONS: | **19° F, cloudy** |
| LATITUDE: | **N 42° 50' 23.25"** | LONGITUDE: | **W 73° 59' 18.95"** | ELEVATION AND DATUM: | **287.81** |

| FIELD SAMPLE INFORMATION | | | | | | | | HAMMER | SAMPLER | ST. WATER LEVELS | DATE 1: DATE 2: | DEPTH 1: DEPTH 2: | TIME 1: TIME 2: |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | WEIGHT(S) | | | | | | |
| | | | | | | | FALL | | | CASING | TUBE | CORE | RIG TYPE: |
| | | | | | | | TYPE | | | | | | |
| | | | | | | | ID/OD | | | | | | |
| DEPTH (feet bgs) | Blow Count | RECOVERY | PID (ppm) | ODOR OBSERVED | LAB ANALYSIS | VISIBLE PRODUCT | GEOLOGIC DESCRIPTION | | | | | LITHOLOGY/ SOIL TYPE | WATER LEVEL / REMARKS |
| 0.0 | 14<br>10<br>9 | 16" | 0.0 | - | - | - | 0-6": topsoil, 6"-2': Dark brown, dense, fine sand, large 1" sized gravel at 6" deep | | | | | - | Moist |
| 5.0 | 3<br>3<br>3 | 15" | 0.1 | - | - | - | 5'-7.1': Dark brown, moist, dense, fine grain sand, no gravel | | | | | - | Moist |
| 10.0 | 4<br>2<br>4 | 5.5" | 0.1 | - | - | - | 10' - 10.15': Large 1.25-1.5" gravel, sub angular, dark brown, moist, fine grain sand | | | | | - | Moist |
| 15.0 | 7<br>11<br>10 | 14" | 0.1 | - | - | - | 15'-15.5': Dark brown, fine sand, moist, 15.5'-17': Dark brown, moist, fine grain sand, large 1" subrounded gravel, poorly sorted | | | | | - | Moist |
| 20.0 | 14<br>50/4" | 12" | 0.1 | - | - | - | 20' - 21': Brown, medium grain sand, large, subangular/subrounded/angular slate fragments | | | | | - | Moist |
| 25.0 | 50/4" | 10" | 0.1 | - | - | - | 25'-25.75': SAA | | | | | - | Dry |
| 30.0 | 50/4" | 8" | 0.1 | - | - | - | 30' - 30.25': white/gray, medium grain sand, large quartz cobbles, subangular, 30.25'-30.75': Dark brown, fine grain sand | | | | | - | Dry / Moist |
| 35.0 | 3<br>7<br>9 | 16" | 0.0 | - | - | - | 35' - 36': SAA, 36' - 37.15': Dark brown | | | | | - | Moist |
| 40.0 | 5<br>4<br>1 3 | 15" | 0.0 | - | - | - | SAA | | | | | - | Moist / Dry |
| 45.0 | 5<br>7<br>15 | 18" | 0.0 | - | - | - | SAA | | | | | - | Dry |

**AECOM, Inc.**
**40 British American Boulevard**
**Latham, New York 12110**
**Phone: (518) 951-2200**
**Fax: (518) 951-2300**

# BOREHOLE LOG

BORING ID #: **MW-B-1R**

START DATE: 1/7/19 END DATE: 1/8/19

| | | | | | |
|---|---|---|---|---|---|
| PROJECT NAME: | **Scotia Navy Depot** | PROJECT NO.: | **60440641** | PROJECT MANAGER: | **Dan Servetas** |
| SITE LOCATION: | **Scotia, NY** | BORING LOCATION: | MW-B-1R | | |
| DRILLING CO.: | **Parrat-Wolf** | DRILLER: | **Glenn Lensing** | DRILLING METHOD: | **Hollow Stem Auger** |
| BOREHOLE DIAMETER: | **6"** | DEPTH TO BEDROCK: | | TOTAL DEPTH DRILLED: | **68 fbg** |
| TOTAL DEPTH REACHED: | **68 fbg** | INSPECTOR: | **Alex Golden** | WEATHER CONDITIONS: | **19° F, cloudy** |
| LATITUDE: | **N 42° 50' 2325"** | LONGITUDE: | **W 73° 59' 18.95**" | ELEVATION AND DATUM: | **287.81** |

| FIELD SAMPLE INFORMATION | | | | | | | | HAMMER | SAMPLER | ST. WATER LEVELS | DATE 1: DATE 2: | DEPTH 1: DEPTH 2: | TIME 1: TIME 2: |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | WEIGHT(S) | | | | | | |
| | | | | | | | FALL | | | CASING | TUBE | CORE | RIG TYPE: |
| | | | | | | | TYPE | | | | | | |
| | | | | | | | ID/OD | | | | | | |
| DEPTH (feet bgs) | Blow Count | RECOVERY | PID (ppm) | ODOR OBSERVED | LAB ANALYSIS | VISIBLE PRODUCT | GEOLOGIC DESCRIPTION | | | | | LITHOLOGY/ SOIL TYPE | WATER LEVEL / REMARKS |
| 50.0 | 7<br>9<br>10 | 18" | 0.0 | - | - | - | SAA, no gravel | | | | | - | Dry |
| 55.0 | - | - | 0.0 | - | - | - | Same as previously logged descriptions, stopped logging | | | | | - | Moist |
| 60.0 | - | - | 0.0 | - | - | - | SAA | | | | | - | Wet |
| 65.0 | - | - | 0.0 | - | - | - | Well set to 68 fbg, screen set 48-68 fbg | | | | | - | - |
| 70.0 | - | - | 0.0 | - | - | - | | | | | | - | - |
| | | | | | | | | | | | | | |
| | | | | | | | | | | | | | |
| | | | | | | | | | | | | | |
| | | | | | | | | | | | | | |
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# BOREHOLE LOG

BORING ID #: **MW-12R**

START DATE: 1/9/19 END DATE: 1/9/19

PROJECT NAME: **Scotia Navy Depot**
SITE LOCATION: **Scotia, NY**
DRILLING CO.: **Parrat-Wolf**
BOREHOLE DIAMETER: **6"**
TOTAL DEPTH REACHED: **80 fbg**
LATITUDE: **N 42° 50' 34.75"**

PROJECT NO.: **60440641**
BORING LOCATION: **MW-12R**
DRILLER: **Glenn Lensing**
DEPTH TO BEDROCK:
INSPECTOR: **Alex Golden**
LONGITUDE: **W 73° 59' 32.40"**

PROJECT MANAGER: **Dan Servetas**
DRILLING METHOD: **Hollow Stem Auger**
TOTAL DEPTH DRILLED: **80 fbg**
WEATHER CONDITIONS: **25°, windy, cloudy**
ELEVATION AND DATUM: **292.55**

| FIELD SAMPLE INFORMATION | | | | | | | | HAMMER | SAMPLER | ST. WATER LEVELS | DATE 1: DATE 2: | DEPTH 1: DEPTH 2: | TIME 1: TIME 2: |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | WEIGHT(S) | | | | | | |
| | | | | | | | FALL | | | CASING | TUBE | CORE | RIG TYPE: |
| | | | | | | | TYPE | | | | | | |
| | | | | | | | ID/OD | | | | | | |
| DEPTH (feet bgs) | Blow Count | RECOVERY | PID (ppm) | ODOR OBSERVED | LAB ANALYSIS | VISIBLE PRODUCT | GEOLOGIC DESCRIPTION | | | | | LITHOLOGY/ SOIL TYPE | WATER LEVEL ---------- - REMARKS |
| 0.0 | - | - | 0.0 | - | - | - | Geologic Descriptions same as previously installed well | | | | | - | - |
| 5.0 | - | - | 0.0 | - | - | - | SAA | | | | | - | - |
| 10.0 | - | - | 0.0 | - | - | - | SAA | | | | | - | - |
| 15.0 | - | - | 0.0 | - | - | - | Dark Sand Color | | | | | - | - |
| 20.0 | - | - | 0.0 | - | - | - | SAA | | | | | - | - |
| 25.0 | - | - | 0.0 | - | - | - | SAA | | | | | - | - |
| 30.0 | - | - | 0.0 | - | - | - | Light Sand Color | | | | | - | - |
| 35.0 | - | - | 0.1 | - | - | - | Larger cobbles/pulled up drill bit and cleaned out | | | | | - | - |
| 40.0 | - | - | 0.0 | - | - | - | Large (2" and greater) sized cobbles | | | | | - | - |
| 45.0 | - | - | 0.0 | - | - | - | SAA | | | | | - | - |

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# BOREHOLE LOG

BORING ID #: **MW-12R**

START DATE: 1/9/19 END DATE: 1/9/19

PROJECT NAME: **Scotia Navy Depot**
SITE LOCATION: **Scotia, NY**
DRILLING CO.: **Parrat-Wolf**
BOREHOLE DIAMETER: **6"**
TOTAL DEPTH REACHED: **80 fbg**
LATITUDE: **N 42° 50' 34.75"**

PROJECT NO.: **60440641**
BORING LOCATION: **MW-12R**
DRILLER: **Glenn Lensing**
DEPTH TO BEDROCK:
INSPECTOR: **Alex Golden**
LONGITUDE: **W 73° 59' 32.40"**

PROJECT MANAGER: **Dan Servetas**
DRILLING METHOD: **Hollow Stem Auger**
TOTAL DEPTH DRILLED: **80 fbg**
WEATHER CONDITIONS: **25°, windy, cloudy**
ELEVATION AND DATUM: **292.70**

| FIELD SAMPLE INFORMATION | | | | | | | | HAMMER | SAMPLER | ST. WATER LEVELS | DATE 1: DATE 2: | DEPTH 1: DEPTH 2: | TIME 1: TIME 2: |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | WEIGHT(S) | | | | | | |
| | | | | | | | FALL | | | CASING | TUBE | CORE | RIG TYPE: |
| | | | | | | | TYPE | | | | | | |
| | | | | | | | ID/OD | | | | | | |
| DEPTH (feet bgs) | Blow Count | RECOVERY | PID (ppm) | ODOR OBSERVED | LAB ANALYSIS | VISIBLE PRODUCT | GEOLOGIC DESCRIPTION | | | | | LITHOLOGY/ SOIL TYPE | WATER LEVEL ---------- - REMARKS |
| 50.0 | - | - | 0.0 | - | - | - | SAA | | | | | - | - |
| 55.0 | - | - | 0.0 | - | - | - | SAA | | | | | - | - |
| 60.0 | - | - | 0.0 | - | - | - | SAA | | | | | - | - |
| 65.0 | 15<br>22<br>18 | 20" | 0.0 | - | - | - | 65'- 65.75': Dark brown, moist, medium/fine grain sand; 65.75'-68': Brown, moist, medium grain sand, poorly sorted, subrounded gravel throughout | | | | | SW | Moist |
| 70.0 | 14<br>16<br>19 | 21" | 0.0 | - | - | - | 70'-70.75': Dark brown, moist, medium grain sand; 70.75'- 73': Dark brown, wet, fine grain sand, densely packed, medium grain gravel intermixed | | | | | SW | Moist<br>---<br>Wet |
| 75.0 | 15<br>11<br>12 | 11" | 0.0 | - | - | - | 75'-75.75': Dark brown, fine grain sand/densely packed; 75.5'- 75.9': Dark brown, fine grian sand, mostly subangular gravel: 0.5"-2", poorly sorted | | | | | SW | Wet |
| 80.0 | - | - | 0.0 | - | - | - | Drilled to 80 fbg with 2" PVC, screen set 60-80 fbg (2x10' screen PVC) | | | | | - | - |
| | | | | | | | | | | | | | - |
| | | | | | | | | | | | | | - |
| | | | | | | | | | | | | | - |

# April 2019 Boring Logs

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# BOREHOLE LOG

BORING ID #: **MW-11R**

START DATE: 4/1/19 END DATE: 4/2/19

PROJECT NAME: **Scotia Navy Depot**
SITE LOCATION: **Scotia, NY**
DRILLING CO.: **Parrat-Wolf**
BOREHOLE DIAMETER: **4"**
TOTAL DEPTH REACHED: **80 fbg**
LATITUDE: **N 42° 50' 36.31"**

PROJECT NO.: **60440641**
BORING LOCATION: **MW-11R**
DRILLER: **Glenn Lensing**
DEPTH TO BEDROCK:
INSPECTOR: **A. Golden/ G. Wolf**
LONGITUDE: **W 73° 59' 25.68"**

PROJECT MANAGER: **Dan Servetas**
DRILLING METHOD: **Hollow Stem Auger**
TOTAL DEPTH DRILLED: **80 fbg**
WEATHER CONDITIONS: **37° F, sunny**
ELEVATION AND DATUM: **295.78**

| FIELD SAMPLE INFORMATION | | | | | | | | HAMMER | SAMPLER | ST. WATER LEVELS | DATE 1: | DEPTH 1: | TIME 1: |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | WEIGHT(S) | **140** | | | DATE 2: | DEPTH 2: | TIME 2: |
| | | | | | | | FALL | **30"** | | CASING | TUBE | CORE | RIG TYPE: |
| | | | | | | | TYPE | **Automatic** | **Split Spoon** | | | | |
| | | | | | | | ID/OD | | **2"** | | | | |
| DEPTH (feet bgs) | Blow Count | RECOVERY | PID (ppm) | ODOR OBSERVED | LAB ANALYSIS | VISIBLE PRODUCT | GEOLOGIC DESCRIPTION | | | | | LITHOLOGY/ SOIL TYPE | WATER LEVEL / REMARKS |
| 0.0 | - | - | - | - | - | - | Drilled blind: 0 - 65 fbg; Take spoons continuously after | | | | | | |
| 64.0 | - | - | - | - | - | - | Clay-like sand, little recovery | | | | | | |
| 66.0 | - | - | - | - | - | - | Sandy clay, rocks 1-2" | | | | | | |
| 68.0 | - | - | - | - | - | - | 68.5' : Water | | | | | | Saturated |
| 70.0 | 22 | 20" | - | - | - | - | Sandy clay, rocks 1-2" | | | | | | |
| 72.0 | 44 | 24" | - | - | - | - | 70'-73': Wet, moist, dark bown, mid grain sand, some large, subrounded gravel | | | | | | |
| 74.0 | 31 | 24" | - | - | - | - | Wet, dark brown, medium grain sand throughout; last 6": Large, 0.5"-1" subrounded/rounded gravel | | | | | | |
| 76.0 | 27 | 24" | - | - | - | - | Wet, dark brown, medium grain sand, poorly sorted, subangular/angular sand, medium to large gravel throughout, large cobble last 4" | | | | | | |
| 78.0 | 29 | 24" | - | - | - | - | SAA | | | | | | |
| 80.0 | - | - | - | - | - | - | SAA, Screen set 65-80 fbg | | | | | | |

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# BOREHOLE LOG

BORING ID #: **MW-22R**

START DATE: 4/3/19 END DATE: 4/4/19

PROJECT NAME: **Scotia Navy Depot**
SITE LOCATION: **Scotia, NY**
DRILLING CO.: **Parrat-Wolf**
BOREHOLE DIAMETER: **4"**
TOTAL DEPTH REACHED: **78 fbg**
LATITUDE: **N 42° 50' 29.60"**

PROJECT NO.: **60440641**
BORING LOCATION: **MW-22R**
DRILLER: **Glenn Lensing**
DEPTH TO BEDROCK:
INSPECTOR: **Alex Golden**
LONGITUDE: **W 73° 59' 12.65"**

PROJECT MANAGER: **Dan Servetas**
DRILLING METHOD: **Hollow Stem Auger**
TOTAL DEPTH DRILLED: **78 fbg**
WEATHER CONDITIONS: **55° F, sunny**
ELEVATION AND DATUM: **296.77**

| FIELD SAMPLE INFORMATION | | | | | | | | HAMMER | SAMPLER | ST. WATER LEVELS | DATE 1: | DEPTH 1: | TIME 1: |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | WEIGHT(S) | **140** | | | DATE 2: | DEPTH 2: | TIME 2: |
| | | | | | | | FALL | **30"** | | CASING | TUBE | CORE | RIG TYPE: |
| | | | | | | | TYPE | **Automatic** | **Split Spoon** | | | | |
| | | | | | | | ID/OD | | **2"** | | | | |
| DEPTH (feet bgs) | Blow Count | RECOVERY | PID (ppm) | ODOR OBSERVED | LAB ANALYSIS | VISIBLE PRODUCT | GEOLOGIC DESCRIPTION | | | | | LITHOLOGY/ SOIL TYPE | WATER LEVEL / REMARKS |
| 0.0 | - | - | - | - | - | - | Drilled blind: 0 - 63 fbg | | | | | - | - |
| 62.0 | 27<br>8<br>11 | 12" | - | - | - | - | Dry, light brown, medium grain sand; large, subrounded, poorly sorted cobbles in first 2" | | | | | - | - |
| 64.0 | 6<br>9<br>10 | 18" | - | - | - | - | Dry, light , SAA | | | | | - | - |
| 66.0 | - | 18" | - | - | - | - | SAA | | | | | - | - |
| 68.0 | - | 18" | - | - | - | - | Wet, dark brown, medium grain sand; small to medium size, subangular/subrounded, poorly sorted gravel throughout | | | | | - | - |
| 70.0 | - | 19" | - | - | - | - | Wet, SAA, Last 8": Medium-coarse grain | | | | | - | - |
| 72.0 | - | 24" | - | - | - | - | Saturated, SAA | | | | | - | Saturated |
| 74.0 | - | 24" | - | - | - | - | Saturated, SAA | | | | | - | - |
| 76.0 | - | 24" | - | - | - | - | SAA | | | | | - | - |
| 78.0 | - | - | - | - | - | - | Screen set 63-78 fbg, DTB 78' | | | | | - | - |

# APPENDIX B: Monitoring Well Construction Logs

# WELL CONSTRUCTION LOG (FLUSH MOUNT COMPLETION)

MW-B1R

| | | |
|---|---|---|
| Site: Scotia | LocID: MW-B1-R | Date/Time Started: 1/7/19 1000 |
| Project Name: Scotia NavyDepot | Project Number: 60440641 | Date/Time Completed: 1/8/19 1200 |
| Drilling Contractor: Parratt-Wolff | Drilling Equipment: Hollow Stem auger | Logged By: AG |
| Driller: Glenn Lensing | Borehole Diameter (in.): ~~6~~ 6" | Checked By: AG |

**FILTER PACK**

Type & Size of Filter Pack: Natural Sand 28 / 50 lb bag — Filter Pack Manufacturer: Bellemare

Amount of Filter Pack Used (lbs): 10 x 50 lbea = 500 lbs

**BENTONITE SEAL**

Type & Size of Bentonite: Enviroplug #16/50 lb bag — Bentonite Manufacturer: Enviroplug, WYO-Ben INC

Amount of Bentonite Used (lbs): 40 lbs

**GROUT**

Type of Cement: Quikrete cement + water — Bentonite Powder Type: High Performance Type I/II

Cement Manufacturer: Quikrete 80 lb bag — Bentonite Powder Manufacturer: WYO-Ben Inc

Amount of Cement Used (lbs): 7/6 x 80 lb bags — Amount of Bentonite Powder Used (lbs): 1 50lb bag

**WELL DETAILS**

Screen/Casing Diameter (in): 2" — Casing Material/Manufactuer: —

Screen Material/Manufactuer: PVC — Type of Well Cap/Manufactuer: ~~PVC~~ —

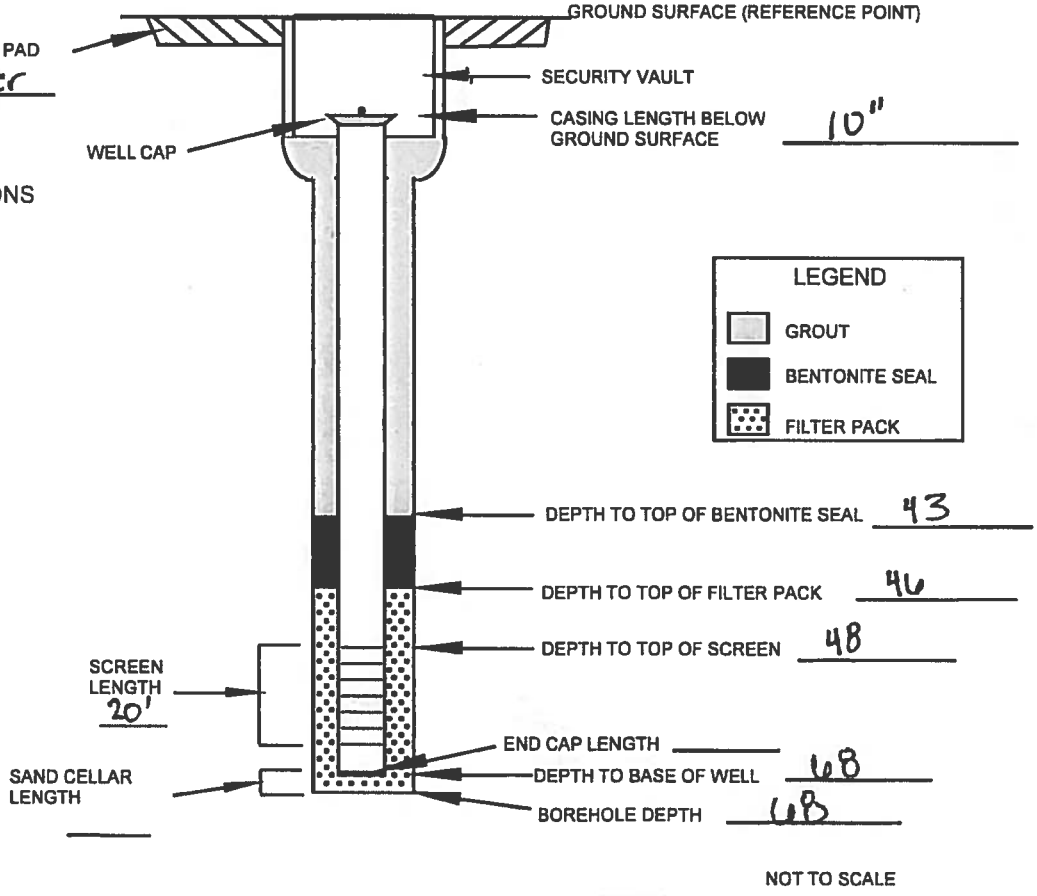
Screened Interval (ft): 48-68 fbg — Type of End Cap/Manufactuer: PVC

Depth to Water (ft): 60 fbg — Dimensions of Security Box: 8"

Water Added During Construction (gal): 26 gal

DIMENSION OF CONCRETE PAD
18" diameter
6" depm

SPECIAL CONDITIONS
(describe and draw)




NOT TO SCALE

# WELL CONSTRUCTION LOG (FLUSH MOUNT COMPLETION)

| | | |
|---|---|---|
| Site: Scotia | LocID: MW-12R | Date/Time Started: 1/8/19 1600 |
| Project Name: Scotia Navy Depot | Project Number: 60440641 | Date/Time Completed: 1/10/19 0910 |
| Drilling Contractor: Parratt-Wolff | Drilling Equipment: Hollow Stem auger | Logged By: AG |
| Driller: Glenn Lansing | Borehole Diameter (in.): 6" | Checked By: AG |

**FILTER PACK**
Type & Size of Filter Pack: Natural Sand 28 / 50 lb bag
Filter Pack Manufacturer: Bellemare
Amount of Filter Pack Used (lbs): 11 x 50 lbs bag

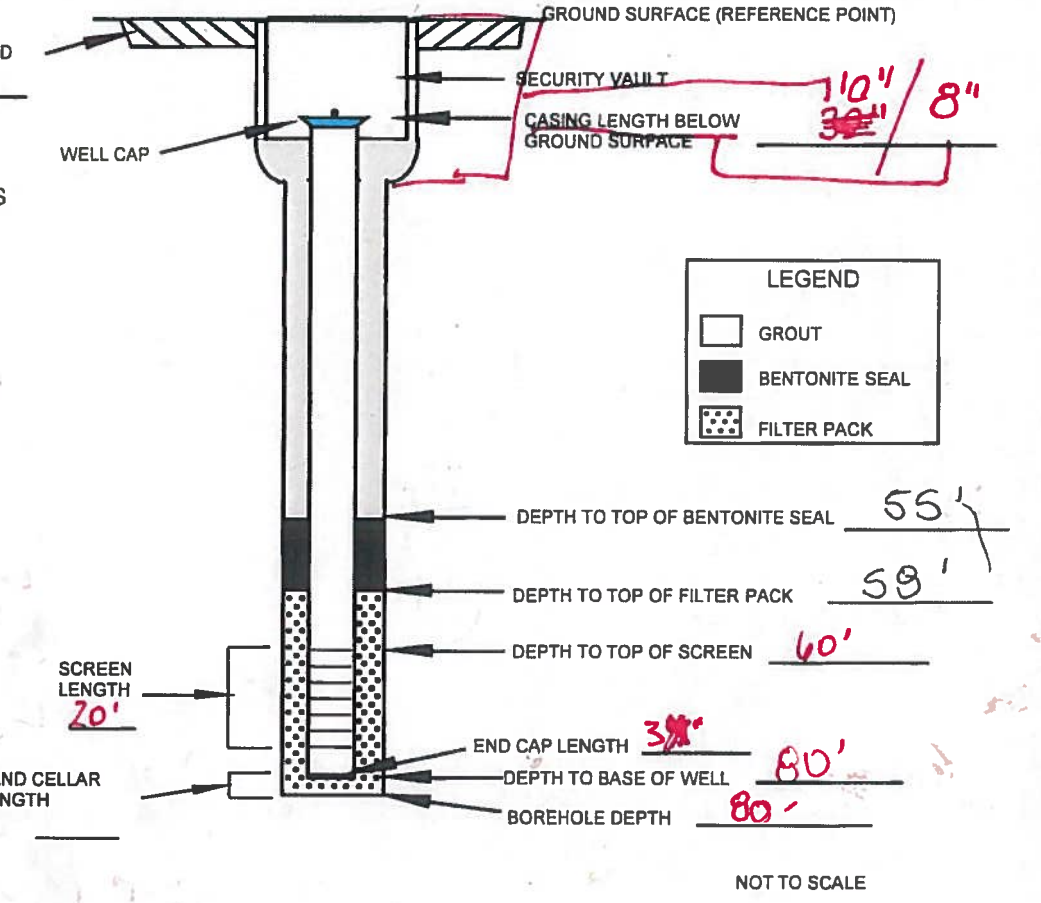
**BENTONITE SEAL**
Type & Size of Bentonite: Enviroplug #16 / 50 lb bag
Bentonite Manufacturer: Enviroplug / WYO-Ben INC.
Amount of Bentonite Used (lbs): 50 lbs

**GROUT**
Type of Cement: Quikrete Cement type I/II
Bentonite Powder Type: High Performance
Cement Manufacturer: Quikrete 80 lb bag
Bentonite Powder Manufacturer: WYO-Ben INC.
Amount of Cement Used (lbs): 20 bags
Amount of Bentonite Powder Used (lbs): 150 lb bag

**WELL DETAILS**
Screen/Casing Diameter (in): 2"
Casing Material/Manufactuer: —
Screen Material/Manufactuer: PVC
Type of Well Cap/Manufactuer: —
Screened Interval (ft): 60-80 bgs
Type of End Cap/Manufactuer: PVC
Depth to Water (ft): 69.5
Dimensions of Security Box: 8" x
Water Added During Construction (gal): 25 gal

DIMENSION OF CONCRETE PAD
18 diameter
5" depth

SPECIAL CONDITIONS
(describe and draw)




NOT TO SCALE

# WELL CONSTRUCTION LOG (FLUSH MOUNT COMPLETION)

| | | |
|---|---|---|
| **Site:** Scotia Navy Depot | **LocID:** MW-11R | Date/Time Started: 04/01/2019 |
| Project Name: | Project Number: 60440641 | Date/Time Completed: 04/02/2019 |
| Drilling Contractor: Parratt-Wolff | Drilling Equipment: Hollow stem auger | Logged By: Alexandra Golden |
| Driller: Glenn Lensing | Borehole Diameter (in.): 6" | Checked By: Alexandra Golden |

**FILTER PACK**

Type & Size of Filter Pack: Natural sand 28/50 lb bag
Filter Pack Manufacturer: Bellemare
Amount of Filter Pack Used (lbs): 10 bags

**BENTONITE SEAL**

Type & Size of Bentonite: Enviroplug #16/ 50 lb bag
Bentonite Manufacturer: Enviroplug wyo-ben INC
Amount of Bentonite Used (lbs): 40 lbs

**GROUT**

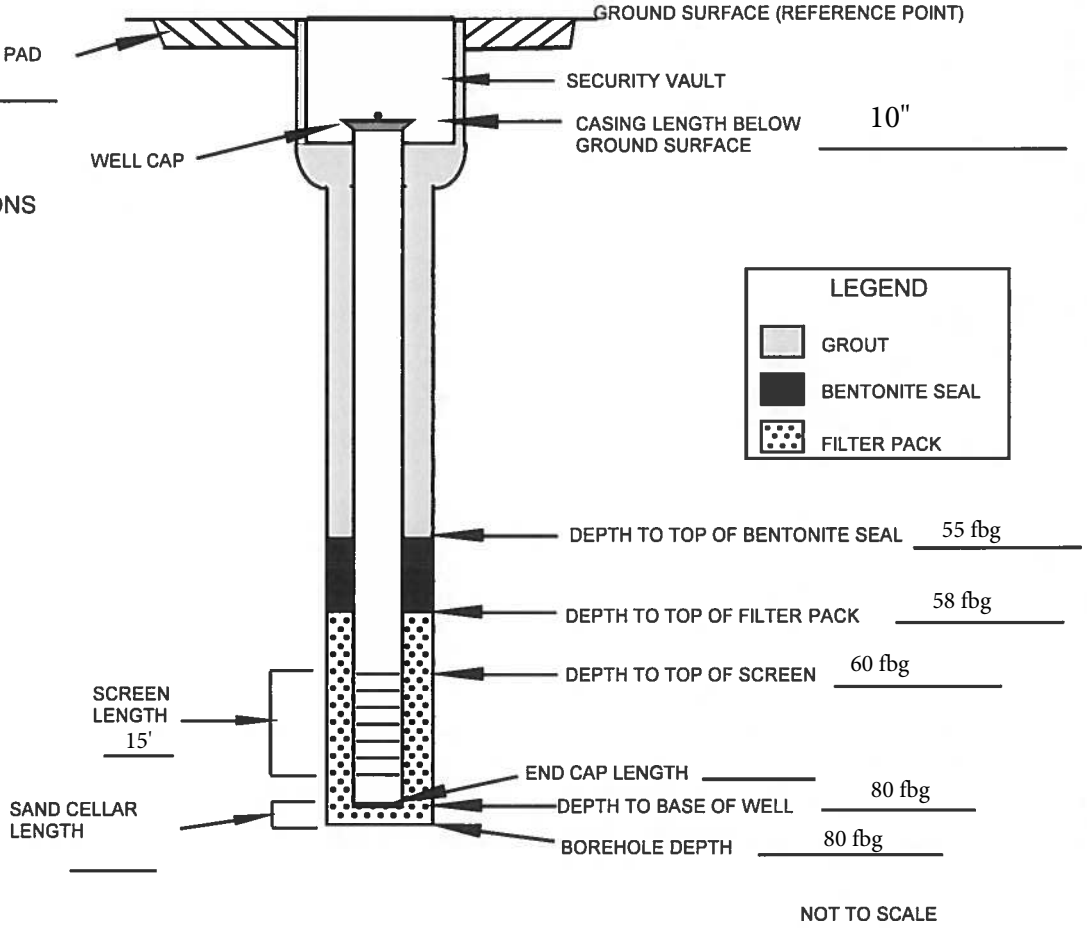
Type of Cement: Quikrete cement and water (type I/II)
Bentonite Powder Type: High Performance
Cement Manufacturer: Quikrete 80 lb bag
Bentonite Powder Manufacturer: wyo-ben inc
Amount of Cement Used (lbs): _____
Amount of Bentonite Powder Used (lbs): 1 ct 50 lb bag

**WELL DETAILS**

Screen/Casing Diameter (in): 2"
Casing Material/Manufactuer: ----
Screen Material/Manufactuer: PVC
Type of Well Cap/Manufactuer: ----
Screened Interval (ft): 80- 60 fbg
Type of End Cap/Manufactuer: PVC
Depth to Water (ft): 67.44
Dimensions of Security Box: 8"
Water Added During Construction (gal): 25 gallons

DIMENSION OF CONCRETE PAD
18" diameter
5" in depth

SPECIAL CONDITIONS
(describe and draw)




NOT TO SCALE

# WELL CONSTRUCTION LOG (FLUSH MOUNT COMPLETION)

| | | |
|---|---|---|
| **Site:** Scotia Navy Depot | **LocID:** MW-22R | Date/Time Started: 04/03/2019 |
| Project Name: | Project Number: 60440641 | Date/Time Completed: 04/04/2019 |
| Drilling Contractor: Parratt-Wolff | Drilling Equipment: Hollow stem auger | Logged By: Alexandra Golden |
| Driller: Glenn Lensing | Borehole Diameter (in.): 6" | Checked By: Alexandra Golden |

**FILTER PACK**

Type & Size of Filter Pack: Natural sand 28/50 lb bag
Filter Pack Manufacturer: Bellemare
Amount of Filter Pack Used (lbs): 12 bags

**BENTONITE SEAL**

Type & Size of Bentonite: Enviroplug #16/ 50 lb bag
Bentonite Manufacturer: Enviroplug wyo-ben INC
Amount of Bentonite Used (lbs): 40 lbs

**GROUT**

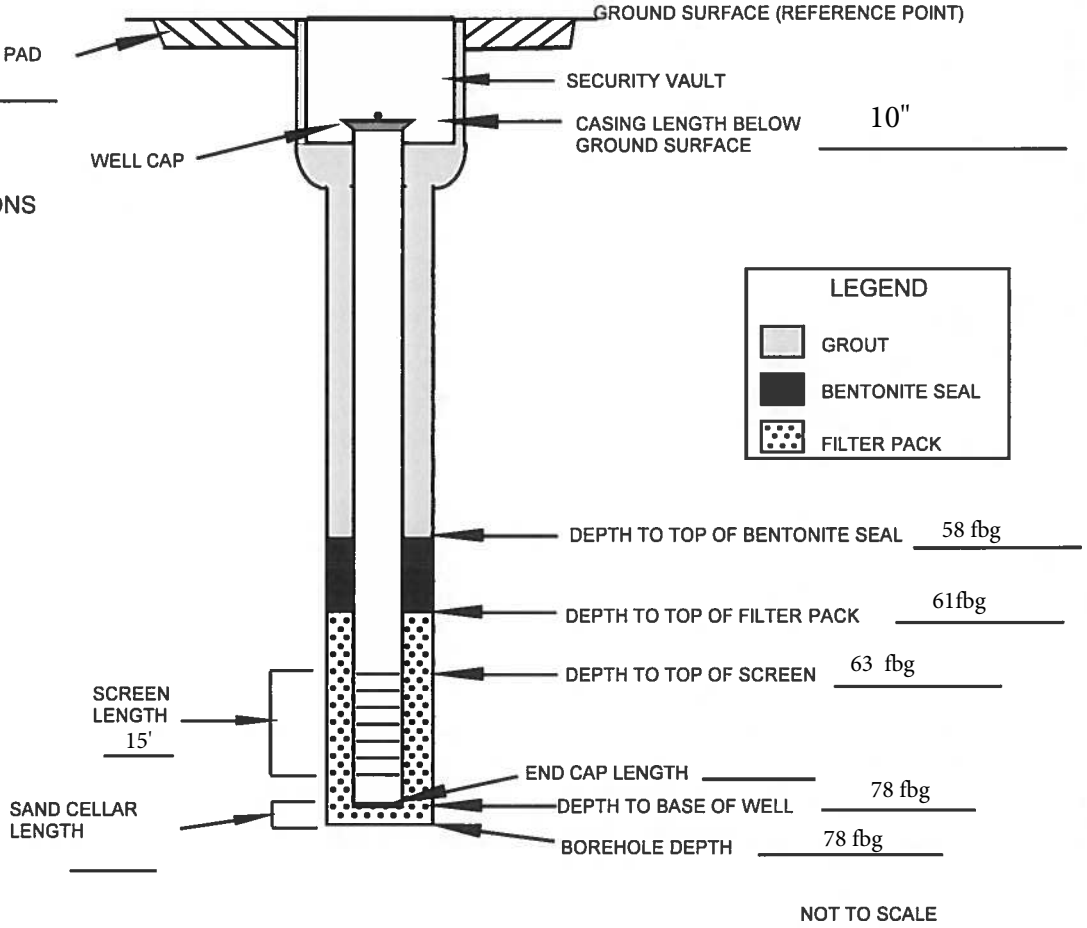
Type of Cement: Quikrete cement and water (type I/II)
Bentonite Powder Type: High Performance
Cement Manufacturer: Quikrete 80 lb bag
Bentonite Powder Manufacturer: wyo-ben INC
Amount of Cement Used (lbs): _____
Amount of Bentonite Powder Used (lbs): 1 ct 50 lb bag

**WELL DETAILS**

Screen/Casing Diameter (in): 2"
Casing Material/Manufactuer: ----
Screen Material/Manufactuer: PVC
Type of Well Cap/Manufactuer: ----
Screened Interval (ft): 63-78 fbg
Type of End Cap/Manufactuer: PVC
Depth to Water (ft): 65.41 fbg
Dimensions of Security Box: 8"
Water Added During Construction (gal): 25 gallons

DIMENSION OF CONCRETE PAD
18" diameter
5" in depth

SPECIAL CONDITIONS
(describe and draw)




NOT TO SCALE

# APPENDIX C: Monitoring Well Development Logs

# Monitoring Well Purging / Sampling Form

Project Name and Number: Scotia Navy Depot / 60440641

Monitoring Well Number: MW-12R Date: January 15, 2019

Samplers: Alexandra Golden and Jillian Kosinski

Sample Number: N/A QA/QC Collected? N/A

Purging / Sampling Method: Waterra Pump, HDPE Tubing 3/8" X 1/2"

| | | |
|---|---|---|
| 1. L = Well Depth: | 79.75 | feet |
| 2. D = Riser Diameter (I.D.): | | feet |
| 3. W = Depth to Water: | 69.6 | feet |
| 4. C = Column of Water in Well: | | feet |
| 5. V = Volume of Water in Well = C(3.14159)(0.5D)$^2$(7.48) | 1.67 | gal |
| 6. 3(V) = Target Purge Volume | 16.7 | 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 + NTU

| Parameter | Units | Readings | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Time | 24 hr | 1000 | 1015 | 1030 | 1046 | 1058 | 1114 | 1124 |
| Water Level (0.33) | feet | 69.5 | 68.6 | 68.5 | 68.5 | 68.6 | 68.5 | 68.61 |
| Volume Purged | gal | — | 1.67 | 3.34 | 5.01 | 6.68 | 8.35 | 10.02 |
| Flow Rate | mL/min | 473 | 500 | 550 | 550 | 550 | 550 | 550 |
| Turbidity (+/- 10%) | NTU | 254 | 144 | 38.9 | 23.5 | 38.8 | 48.6 | 48.9 |
| Dissolved Oxygen (+/- 10%) | % | 90.7 | 69.7 | 69.3 | 75.7 | 73.7 | 72.7 | 71.8 |
| Dissolved Oxygen (+/- 10%) | mg/L | 11.15 | 9.29 | 9.25 | 9.73 | 9.48 | 8.83 | 8.54 |
| Eh / ORP (+/- 10) | MeV | 100.6 | 88.5 | 74.3 | 68.2 | 80.3 | 75.5 | 78.9 |
| Specific Conductivity (+/- 3%) | mS/cm$^c$ | .540 | .468 | .466 | .472 | .474 | .480 | .479 |
| Conductivity (+/- 3%) | mS/cm | — | — | — | — | — | — | — |
| pH (+/- 0.1) | pH unit | 6.92 | 7.47 | 7.64 | 7.81 | 7.81 | 7.82 | 7.76 |
| Temp (+/- 0.5) | C° | 6.62 | 3.54 | 3.45 | 4.84 | 4.75 | 4.81 | 5.11 |
| Color | Visual | brown | clear | clear | clear | clear | clear | clear |
| Odor | Olfactory | — | — | — | — | — | — | — |

**Comments:**

Well Development, purge 10 WV's, No sample taken

# Monitoring Well Purging / Sampling Form

Project Name and Number: Scotia Navy Depot / 60440641

Monitoring Well Number: MW-12R cont. Date: January 15. 2019

Samplers: Alexandra Golden and Jillian Kosinski

Sample Number: N/A QA/QC Collected? N/A

Purging / Sampling Method: Waterra Pump, HDPE Tubing 3/8" X 1/2"

| | | |
|---|---|---|
| 1. L = Well Depth: | 79.75 | feet |
| 2. D = Riser Diameter (I.D.): | | feet |
| 3. W = Depth to Water: | 69.5 | feet |
| 4. C = Column of Water in Well: | | feet |
| 5. V = Volume of Water in Well = $C(3.14159)(0.5D)^2(7.48)$ | 1.67 | gal |
| 6. 3(V) = Target Purge Volume | 16.7 | 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 + NTU

| Parameter | Units | Readings | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Time | 24 hr | 1132 | 1141 | 1149 | 1157 | | | |
| Water Level (0.33) | feet | 68.6 | 68.6 | 68.5 | 68.6 | | | |
| Volume Purged | gal | 11.69 | 13.36 | 15.03 | 16.70 | | | |
| Flow Rate | mL/min | 560 | 560 | 560 | 560 | | | |
| Turbidity (+/- 10%) | NTU | 47.0 | 32.1 | 65.3 | 75.8 | | | |
| Dissolved Oxygen (+/- 10%) | % | 72.5 | 74.0 | 72.5 | 70.7 | | | |
| Dissolved Oxygen (+/- 10%) | mg/L | 8.84 | 8.63 | 8.43 | 8.47 | | | |
| Eh / ORP (+/- 10) | MeV | 86.3 | 82.6 | 84.3 | 92.3 | | | |
| Specific Conductivity (+/- 3%) | mS/cm[c] | .483 | .479 | .486 | .484 | | | |
| Conductivity (+/- 3%) | mS/cm | — | ~~7.79~~ | — | — | | | |
| pH (+/- 0.1) | pH unit | 7.80 | ~~7.79~~ | 7.71 | 7.73 | | | |
| Temp (+/- 0.5) | C° | 6.82 | 7.00 | 6.87 | 7.29 | | | |
| Color | Visual | clear | clear | clear | clear | | | |
| Odor | Olfactory | — | — | — | — | | | |

**Comments:**

Well Development, purge 10 WV's, No sample taken

# Monitoring Well Purging / Sampling Form

Project Name and Number: Scotia Navy Depot / 60440641

Monitoring Well Number: MW-B-12 Date: January 15. 2019

Samplers: Alexandra Golden and Jillian Kosinski

Sample Number: N/A QA/QC Collected? N/A

Purging / Sampling Method: Waterra Pump, HDPE Tubing 3/8" X 1/2"

| | | |
|---|---|---|
| 1. L = Well Depth: | 67.75 | feet |
| 2. D = Riser Diameter (I.D.): | | feet |
| 3. W = Depth to Water: | 59.61 | feet |
| 4. C = Column of Water in Well: | | feet |
| 5. V = Volume of Water in Well = $C(3.14159)(0.5D)^2(7.48)$ | 1.33 | gal |
| 6. 3(V) = Target Purge Volume 10(V) | 13.3 | 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 + NTU

| Parameter | Units | Readings | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Time | 24 hr | 12:55 | 13.00 | 1304 | 1309 | 1314 | 1322 | 1330 |
| Water Level (0.33) | feet | 59.61 | 59.10 | 59.12 | 59.12 | 59.12 | 59.13 | 59.12 |
| Volume Purged | gal | — | 1.33 | 2.66 | 3.99 | 5.32 | 6.65 | 7.98 |
| Flow Rate | mL/min | 700 | 700 | 700 | 700 | 700 | 600 | 600 |
| Turbidity (+/- 10%) | NTU | OR | OR | OR | OR | OR | OR | OR |
| Dissolved Oxygen (+/- 10%) | % | 77.7 | 72.0 | 72.0 | 71.2 | 70.2 | 73.2 | 74.6 |
| Dissolved Oxygen (+/- 10%) | mg/L | 9.53 | 8.27 | 8.19 | 8.06 | 7.90 | 8.50 | 8.57 |
| Eh / ORP (+/- 10) | MeV | 76.2 | 66.7 | 68.4 | 78.0 | 76.1 | 73.1 | 91.6 |
| Specific Conductivity (+/- 3%) | mS/cm[c] | .507 | .462 | .464 | .463 | .466 | .492 | .473 |
| Conductivity (+/- 3%) | mS/cm | — | — | — | — | — | — | — |
| pH (+/- 0.1) | pH unit | 7.48 | 7.63 | 7.65 | 7.61 | 7.61 | 8.93 | 7.47 |
| Temp (+/- 0.5) | C° | 6.50 | 9.35 | 9.71 | 9.58 | 10.00 | 7.53 | 9.41 |
| Color | Visual | brown | brown | brown | brown | brown | murky | murky |
| Odor | Olfactory | — | — | — | — | — | — | — |

**Comments:**

Well Development, purge 10 WV's, No sample taken

# Monitoring Well Purging / Sampling Form

Project Name and Number: Scotia Navy Depot / 60440641

Monitoring Well Number: MW-BH (OM). Date: January 15. 2019

Samplers: Alexandra Golden and Jillian Kosinski

Sample Number: N/A QA/QC Collected? N/A

Purging / Sampling Method: Waterra Pump, HDPE Tubing 3/8" X 1/2"

1. L = Well Depth: _____ feet
2. D = Riser Diameter (I.D.): _____ 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 + NTU

| Parameter | Units | Readings | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Time | 24 hr | 1335 | 1347 | 1355 | 1405 | | | |
| Water Level (0.33) | feet | 59.15 | 59.12 | 59.13 | 59.15 | | | |
| Volume Purged | gal | 9.31 | 10.64 | 11.97 | 13.30 | | | |
| Flow Rate | mL/min | 600 | 600 | 600 | 600 | | | |
| Turbidity (+/- 10%) | NTU | OR | OR | 719 | OR | | | |
| Dissolved Oxygen (+/- 10%) | % | 74.8 | 72.3 | 72.4 | 75.1 | | | |
| Dissolved Oxygen (+/- 10%) | mg/L | 8.60 | 8.32 | 8.42 | 8.55 | | | |
| Eh / ORP (+/- 10) | MeV | 90.5 | 95.0 | 91.9 | 102.9 | | | |
| Specific Conductivity (+/- 3%) | mS/cm | .472 | .469 | .476 | .479 | | | |
| Conductivity (+/- 3%) | mS/cm | — | — | — | — | | | |
| pH (+/- 0.1) | pH unit | 7.59 | 7.61 | 7.60 | 7.59 | | | |
| Temp (+/- 0.5) | C° | 9.40 | 9.20 | 9.25 | 8.59 | | | |
| Color | Visual | Murky | Murky | Murky | Murky | | | |
| Odor | Olfactory | — | — | — | — | | | |

**Comments:**

Well Development, purge 10 WV's, No sample taken

# Monitoring Well Purging / Sampling Form

Project Name and Number: Scotia Depot

Monitoring Well Number: MW-11R Date: April 11, 2019

Samplers: Tom Quackenbush and Jillian Kosinski

Sample Number: _____ QA/QC Collected? N/A

Purging / Sampling Method: Waterra

| | | |
|---|---|---|
| 1. L = Well Depth: | 81.50 | feet |
| 2. D = Riser Diameter (I.D.): | | feet |
| 3. W = Depth to Water: | 67.50 | feet |
| 4. C = Column of Water in Well: | | feet |
| 5. V = Volume of Water in Well = C(3.14159)(0.5D)$^2$(7.48) | 2.28 | gal |
| 6. 3(V) = Target Purge Volume | 22.8 | 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 and NTU

| Parameter | Units | Readings | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Time | 24 hr | 8:90 | 8:45 | 9:00 | 9:15 | 9:30 | 9:45 | 10:00 |
| Water Level (0.33) | feet | 67.5 | 67.5 | 67.5 | 67.5 | 67.5 | 67.5 | 67.5 |
| Volume Purged | gal | - | 2.28 | 4.36 | 6.84 | 9.12 | 11.40 | 13.68 |
| Flow Rate | mL/min | ~~575~~ | 575 | 575 | 575 | 575 | 575 | 575 |
| Turbidity (+/- 10%) | NTU | 210 | 208 | 535 | 238 | 102 | 164 | 195 |
| Dissolved Oxygen (+/- 10%) | % | 93.5 | 92.3 | 76.0 | 78.6 | 83.5 | 78.1 | 77.6 |
| Dissolved Oxygen (+/- 10%) | mg/L | 16.80 | 10.52 | 8.14 | 8.52 | 8.89 | 8.40 | 8.14 |
| Eh / ORP (+/- 10) | MeV | 107.8 | 105.9 | 110.6 | 101.3 | 105.8 | 106.8 | 104.8 |
| Specific Conductivity (+/- 3%) | mS/cm$^c$ | 560.3 | 550.4 | 510.0 | 512.0 | 512.9 | 502.1 | 500.0 |
| Conductivity (+/- 3%) | mS/cm | - | - | - | - | - | - | - |
| pH (+/- 0.1) | pH unit | 9.52 | 7.58 | 7.56 | 7.60 | 7.59 | 7.53 | 7.52 |
| Temp (+/- 0.5) | C° | 10.3 | 10.4 | 12.0 | 11.6 | 12.1 | 12.7 | 12.8 |
| Color | Visual | brown | brown | brown | brown | brown | brown | brown |
| Odor | Olfactory | - | - | - | - | - | - | - |

**Comments:**

# Monitoring Well Purging / Sampling Form

Project Name and Number: Scotia Depot

Monitoring Well Number: MW-11R cont. Date: April 11, 2019

Samplers: Tom Quackenbush and Jillian Kosinski

Sample Number: _____ QA/QC Collected? N/A

Purging / Sampling Method: Waterra

| | | |
|---|---|---|
| 1. L = Well Depth: | 81.50 | feet |
| 2. D = Riser Diameter (I.D.): | | feet |
| 3. W = Depth to Water: | 67.50 | feet |
| 4. C = Column of Water in Well: | | feet |
| 5. V = Volume of Water in Well = C(3.14159)(0.5D)$^2$(7.48) | 2.28 | gal |
| 6. 3(V) = Target Purge Volume | 22.8 | 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 and NTU

| Parameter | Units | Readings | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Time | 24 hr | 10:15 | 10:30 | 10:45 | 11:00 | | | |
| Water Level (0.33) | feet | 67.50 | 67.5 | 67.5 | 67.5 | | | |
| Volume Purged | gal | 15.96 | 18.24 | 20.52 | 22.8 | | | |
| Flow Rate | mL/min | 575 | 575 | 575 | 575 | | | |
| Turbidity (+/- 10%) | NTU | 242 | 92.4 | 51.7 | 45.5 | | | |
| Dissolved Oxygen (+/- 10%) | % | 74.8 | 83.3 | 84.1 | 87.0 | | | |
| Dissolved Oxygen (+/- 10%) | mg/L | 7.88 | 8.71 | 8.84 | 9.13 | | | |
| Eh / ORP (+/- 10) | MeV | 106.1 | 109.7 | 109.0 | 109.1 | | | |
| Specific Conductivity (+/- 3%) | mS/cm$^c$ | 505.5 | 505.1 | 503.8 | 503.8 | | | |
| Conductivity (+/- 3%) | mS/cm | — | — | — | — | | | |
| pH (+/- 0.1) | pH unit | 7.57 | 7.49 | 7.52 | 7.55 | | | |
| Temp (+/- 0.5) | C° | 12.8 | 12.9 | 12.7 | 12.5 | | | |
| Color | Visual | cloudy | cloudy | cloudy | cloudy | | | |
| Odor | Olfactory | — | — | — | — | | | |

**Comments:**

# Monitoring Well Purging / Sampling Form

Project Name and Number: Scotia Depot

Monitoring Well Number: MW-22 R2 Date: April 11, 2019

Samplers: Tom Quackenbush and Jillian Kosinski

Sample Number: _____ QA/QC Collected? N/A

Purging / Sampling Method: Waterra

| | | |
|---|---|---|
| 1. L = Well Depth: | 79.10 | feet |
| 2. D = Riser Diameter (I.D.): | | feet |
| 3. W = Depth to Water: | 65.75 | feet |
| 4. C = Column of Water in Well: | | feet |
| 5. V = Volume of Water in Well = C(3.14159)(0.5D)$^2$(7.48) | 2.18 | gal |
| 6. 3(V) = Target Purge Volume | 21.8 | 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 and NTU

| Parameter | Units | Readings | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Time | 24 hr | 12:30 | 1241 | 1248 | 1259 | 1306 | 1311 | 1317 |
| Water Level (0.33) | feet | 65.75 | 65.2 | 65.7 | 65.7 | 65.7 | 65.7 | 65.7 |
| Volume Purged | gal | – | 2.18 | 4.36 | 6.54 | 8.72 | 10.90 | 13.08 |
| Flow Rate | mL/min | 825 | 825 | 825 | 825 | 825 | 825 | 825 |
| Turbidity (+/- 10%) | NTU | OR | ~~43.6~~ OR | OR | OR | OR | OR | OR 791 |
| Dissolved Oxygen (+/- 10%) | % | 109.2 | 106.3 | 95.2 | 96.5 | 100.8 | 100.1 | 98.6 |
| Dissolved Oxygen (+/- 10%) | mg/L | 10.93 | 10.90 | 10.19 | 10.26 | 10.72 | 10.69 | 10.68 |
| Eh / ORP (+/- 10) | MeV | 122.8 | 115.5 | 121.0 | 111.9 | 109.3 | 108.9 | 108.1 |
| Specific Conductivity (+/- 3%) | mS/cm$^c$ | 0.391 | 0.385 | 0.341 | 0.340 | 0.343 | 0.340 | 0.342 |
| Conductivity (+/- 3%) | mS/cm | 502.8 | 490.1 | 450.7 | 449.6 | 454.1 | 454.2 | 454.7 |
| pH (+/- 0.1) | pH unit | 9.43 | 9.48 | 8.87 | 8.80 | 8.77 | 8.72 | 8.63 |
| Temp (+/- 0.5) | C° | 13.9 | 14.0 | 12.1 | 12.3 | 12.0 | 12.0 | 11.9 |
| Color | Visual | brown | brown | brown | brown | brown | brown | brown |
| Odor | Olfactory | – | – | – | – | – | – | – |

**Comments:**

# Monitoring Well Purging / Sampling Form

Project Name and Number: Scotia Depot

Monitoring Well Number: MW-22R cont Date: April 11, 2019

Samplers: Tom Quackenbush and Jillian Kosinski

Sample Number: _____ QA/QC Collected? N/A

Purging / Sampling Method: Waterra

| | | |
|---|---|---|
| 1. L = Well Depth: | _____ | feet |
| 2. D = Riser Diameter (I.D.): | _____ | 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 and NTU

| Parameter | Units | Readings | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Time | 24 hr | 1331 | 1340 | 1347 | 1353 | | | |
| Water Level (0.33) | feet | 65.7 | 65.7 | 65.7 | 65.7 | | | |
| Volume Purged | gal | 15.26 | 17.44 | 19.62 | 21.8 | | | |
| Flow Rate | mL/min | 325 | 325 | 325 | 325 | | | |
| Turbidity (+/- 10%) | NTU | 264 | 292 | 268 | 233 | | | |
| Dissolved Oxygen (+/- 10%) | % | 119.0 | 98.4 | 98.5 | 95.4 | | | |
| Dissolved Oxygen (+/- 10%) | mg/L | 12.43 | 10.64 | 10.66 | 10.40 | | | |
| Eh / ORP (+/- 10) | MeV | 109.7 | 110.9 | 112.8 | 104.7 | | | |
| Specific Conductivity (+/- 3%) | mS/cm[c] | 449.3 | 446.7 | 443.4 | 446.2 | | | |
| Conductivity (+/- 3%) | mS/cm | 0.340 | 0.330 | 0.328 | 0.329 | | | |
| pH (+/- 0.1) | pH unit | 8.41 | 8.41 | 8.42 | 8.41 | | | |
| Temp (+/- 0.5) | C° | 12.3 | 11.4 | 11.3 | 11.3 | | | |
| Color | Visual | brown | brown | brown | brown | | | |
| Odor | Olfactory | | | | Cloudy | | | |

**Comments:**

11.4

# APPENDIX D: Groundwater Sample Collection Field Forms

## Monitoring Well Purging / Sampling Form

Project Name and Number: Scotia Navy Depot, USACE 60440641

Monitoring Well Number: GEP-1 Date: January 23, 2019

Samplers: Alexandra Golden and Jillian Kosinski

Sample Number: GEP-1 012319 QA/QC Collected? ———

Purging / Sampling Method: Sub Pump Geocontroller Pro

| | | |
|---|---|---|
| 1. L = Well Depth: | 77.49 | feet |
| 2. D = Riser Diameter (I.D.): | | feet |
| 3. W = Depth to Water: | 67.95 | 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 & NTU

| Parameter | Units | Readings | | | | | ✓ | ✓ | ✓ |
|---|---|---|---|---|---|---|---|---|---|
| Time | 24 hr | 0820 | 0825 | 0830 | 0835 | 0840 | 0845 | 0850 | 085 |
| Water Level (0.33) | feet | 67.94 | 67.95 | 67.89 | 67.92 | 67.91 | 67.91 | 67.92 | 67.9 |
| Volume Purged | gal | .25 | .37 | .49 | .56 | .71 | .97 | 1.15 | 1.31 |
| Flow Rate | mL/min | 260 | 260 | 260 | 260 | 260 | 260 | 260 | 260 |
| Turbidity (+/- 10%) | NTU | 34.6 | 28.3 | 18.6 | 13.6 | 10.7 | 6.63 | 5.78 | 5.8 |
| Dissolved Oxygen (+/- 10%) | % | -180.4 | -179.0 | -177.6 | -177.4 | -179.8 | -179.0 | -179.2 | -178 |
| Dissolved Oxygen (+/- 10%) | mg/L | -22.46 | -22.31 | -22.22 | -22.25 | -22.27 | -21.91 | -22.11 | -22. |
| Eh / ORP (+/- 10) | MeV | 42.7 | 88.2 | 95.8 | 102.8 | 112.8 | 116.8 | 120.8 | 124. |
| Specific Conductivity (+/- 3%) | mS/cm[c] | 576 | 543 | 541 | 540 | 537 | 537 | 537 | 536 |
| Conductivity (+/- 3%) | mS/cm | — | — | — | — | — | — | — | — |
| pH (+/- 0.1) | pH unit | 7.46 | 7.36 | 7.35 | 7.34 | 7.33 | 7.32 | 7.33 | 7.3 |
| Temp (+/- 0.5) | C° | 6.2 | 6.1 | 5.7 | 5.7 | 5.9 | 6.5 | 6.3 | 6.2 |
| Color | Visual | clear | clear | clear | clear | clear | clear | clear | clear |
| Odor | Olfactory | None | None | None | None | None | None | None | None |

**Comments:** Slight brown discoloration at bottom of tubing

sample @ 0900

# Monitoring Well Purging / Sampling Form

Project Name and Number: Scotia Navy Depot, USACE 60440641

Monitoring Well Number: GEP-4 Date: January 23, 2019

Samplers: Alexandra Golden and Jillian Kosinski

Sample Number: GEP-4 012319 QA/QC Collected? NO QC ~~MS/MSD + DUP~~

Purging / Sampling Method: Sub Pump Geocontroller Pro

| | | |
|---|---|---|
| 1. L = Well Depth: | 67.75 | feet |
| 2. D = Riser Diameter (I.D.): | | feet |
| 3. W = Depth to Water: | 64.56 | 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 & NTU

| Parameter | Units | Readings | | | | ✓ | ✓ | ✓ |
|---|---|---|---|---|---|---|---|---|
| Time | 24 hr | 1015 | 1020 | 1025 | 1030 | 1035 | 1040 | 1045 |
| Water Level (0.33) | feet | 64.57 | 64.57 | 64.56 | 64.56 | 64.56 | 64.54 | 64.55 |
| Volume Purged | gal | — | 1.23 | 1.55 | 1.75 | 1.87 | 1.99 | 2.13 |
| Flow Rate | mL/min | 230 | 230 | 230 | 230 | 230 | 230 | 230 |
| Turbidity (+/- 10%) | NTU | 16.8 | 12.6 | 10.1 | 8.59 | 6.74 | 5.67 | 3.24 |
| Dissolved Oxygen (+/- 10%) | % | -186.8 | -188.9 | -190.5 | -192.0 | -194.4 | -193.6 | -190.5 |
| Dissolved Oxygen (+/- 10%) | mg/L | -22.95 | -22.82 | -23.00 | -22.81 | -23.00 | -22.84 | -22.74 |
| Eh / ORP (+/- 10) | MeV | 48.4 | 72.7 | 79.9 | 90.6 | 98.2 | 103.8 | 106.8 |
| Specific Conductivity (+/- 3%) | mS/cm[c] | 768 | 737 | 733 | 725 | 720 | 721 | 720 |
| Conductivity (+/- 3%) | mS/cm | — | — | — | — | — | — | — |
| pH (+/- 0.1) | pH unit | 7.31 | 7.23 | 7.22 | 7.21 | 7.22 | 7.22 | 7.22 |
| Temp (+/- 0.5) | C° | 6.7 | 7.1 | 7.1 | 7.7 | 7.9 | 8.1 | 7.5 |
| Color | Visual | Clear | Clear | Clear | Clear | Clear | Clear | Clear |
| Odor | Olfactory | None | None | None | None | None | None | None |

**Comments:**

Sample @ 1050

# Monitoring Well Purging / Sampling Form

Project Name and Number: Scotia Navy Depot, USACE 60440641

Monitoring Well Number: MW-8 Date: January 23, 2019

Samplers: Alexandra Golden and Jillian Kosinski

Sample Number: MW-8 012319 QA/QC Collected? _____

Purging / Sampling Method: Sub Pump Geocontroller Pro

| | | |
|---|---|---|
| 1. L = Well Depth: | ~~775.9~~ | feet |
| 2. D = Riser Diameter (I.D.): | | feet |
| 3. W = Depth to Water: | 71.76 | 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 & NTU

| Parameter | Units | Readings | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Time | 24 hr | 1320 | 1325 | 1330 | 1335 | 1340 | 1345 | 1350 | 1355 |
| Water Level (0.33) | feet | 71.6 | 71.5 | 71.5 | 71.5 | 71.5 | 71.5 | 71.5 | 71.5 |
| Volume Purged | gal | 0.0 | 0.15 | 0.30 | 0.45 | 0.60 | 0.75 | 0.90 | 1.05 |
| Flow Rate | mL/min | 256 | 256 | 256 | 256 | 256 | 256 | 256 | 256 |
| Turbidity (+/- 10%) | NTU | 0.02 | 0.02 | 0.02 | 0.02 | 0.02 | 0.02 | 0.02 | 0.0 |
| Dissolved Oxygen (+/- 10%) | % | -143.1 | -146.5 | -148.1 | -148.4 | -148.3 | -148.7 | -148.8 | -148 |
| Dissolved Oxygen (+/- 10%) | mg/L | -15.99 | -16.22 | -16.35 | -16.33 | -16.28 | -16.28 | -16.32 | -16. |
| Eh / ORP (+/- 10) | MeV | 30.4 | 51.8 | 65.8 | 72.7 | 81.2 | 88.0 | 90.2 | 93.1 |
| Specific Conductivity (+/- 3%) | mS/cm[c] | 595 | 477.5 | 470.3 | 469.4 | 467.8 | 465.7 | 466.0 | 465 |
| Conductivity (+/- 3%) | mS/cm | — | — | — | — | — | — | — | — |
| pH (+/- 0.1) | pH unit | 7.66 | 7.53 | 7.53 | 7.53 | 7.53 | 7.53 | 7.54 | 7.5 |
| Temp (+/- 0.5) | C° | 10.4 | 10.8 | 10.9 | 11.1 | 11.1 | 11.1 | 11.1 | 12.1 |
| Color | Visual | clear | clear | clear | clear | clear | clear | clear | clear |
| Odor | Olfactory | — | — | — | — | — | — | — | — |

**Comments:**

sampled @ 14:00

## Monitoring Well Purging / Sampling Form

Project Name and Number: Scotia Navy Depot, USACE 60440641

Monitoring Well Number: MW-12R Date: January 23, 2019

Samplers: Alexandra Golden and Jillian Kosinski

Sample Number: MW-12R01239 QA/QC Collected? ———

Purging / Sampling Method: Sub Pump Geocontroller Pro

| | | |
|---|---|---|
| 1. L = Well Depth: | 79.80 | feet |
| 2. D = Riser Diameter (I.D.): | | feet |
| 3. W = Depth to Water: | 68.76 | 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 & NTU

| Parameter | Units | Readings ✓ ✓ ✓ | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Time | 24 hr | 1608 | 1613 | 1618 | 1623 | 1628 | 1633 | 1638 |
| Water Level (0.33) | feet | 68.81 | 68.80 | 68.81 | 68.80 | 68.79 | 68.80 | 68.80 |
| Volume Purged | gal | .75 | .91 | 1.01 | 1.16 | 1.30 | 1.47 | 1.56 |
| Flow Rate | mL/min | 260 | 260 | 260 | 260 | 260 | 260 | 260 |
| Turbidity (+/- 10%) | NTU | 82.0 | 61.7 | 39.3 | 23.9 | 8.44 | 1.05 | 0.02 |
| Dissolved Oxygen (+/- 10%) | % | -175.6 | -174.9 | -176.4 | -172.1 | -173.3 | -171.7 | -172.2 |
| Dissolved Oxygen (+/- 10%) | mg/L | -20.50 | -20.34 | -20.44 | -20.20 | -20.32 | -20.26 | -20.24 |
| Eh / ORP (+/- 10) | MeV | 37.1 | 42.3 | 66.9 | 77.3 | 81.4 | 85.6 | 87.0 |
| Specific Conductivity (+/- 3%) | mS/cm$^c$ | 503 | 477.1 | 476.1 | 477.3 | 478.4 | 477.4 | 476.1 |
| Conductivity (+/- 3%) | mS/cm | — | — | — | — | — | — | — |
| pH (+/- 0.1) | pH unit | 7.96 | 7.55 | 7.52 | 7.50 | 7.50 | 7.50 | 7.50 |
| Temp (+/- 0.5) | C° | 8.5 | 8.6 | 8.6 | 8.4 | 8.4 | 8.0 | 8.3 |
| Color | Visual | clear | clear | clear | clear | clear | clear | clear |
| Odor | Olfactory | — | — | — | — | — | — | — |

**Comments:**

sample @ 1645

# APPENDIX E: Laboratory Reports

ALS Environmental

301 Fulling Mill Road - 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: PJLA 74618
State Certifications: FL E871113 , WA C999 , MD 128 , VA 460157 , WV DW 9961-C , WV 343

January 31, 2019

Mr. Greg Malzone
AECOM Pittsburgh
Gulf Tower
707 Grant Street, 5th Floor
Pittsburgh, PA 15219

# Certificate of Analysis

| | | | |
|---|---|---|---|
| Project Name: | **2015-SCOTIA NAVY DEPOT-PO 60440641** | Workorder: | **3012814** |
| Purchase Order: | **66432/60440641.11** | Workorder ID: | **2015-SCOTIA NAVY DEPOT-PO 6044** |

Dear Mr. Malzone:

Enclosed are the analytical results for samples received by the laboratory on Friday, January 25, 2019.

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.



CC: Ms. Gerlinde Wolfe , Mr. Daniel Servetas , 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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January 31, 2019

Mr. Greg Malzone
AECOM Pittsburgh
Gulf Tower
707 Grant Street, 5th Floor
Pittsburgh, PA 15219

# Certificate of Analysis

| | | | |
|---|---|---|---|
| Project Name: | **2015-SCOTIA NAVY DEPOT-PO 60440641** | Workorder: | **3012814** |
| Purchase Order: | **66432/60440641.11** | Workorder ID: | **2015-SCOTIA NAVY DEPOT-PO 6044** |

Dear Mr. Malzone:

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

CC: Ms. Gerlinde Wolfe , Mr. Daniel Servetas , 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: FL E871113 , WA C999 , MD 128 , VA 460157 , WV DW 9961-C , WV 343

## SAMPLE SUMMARY

Workorder: 3012814 2015-SCOTIA NAVY DEPOT-PO 6044

| Lab ID | Sample ID | Matrix | Date Collected | Date Received | Collected By |
|---|---|---|---|---|---|
| 3012814001 | GEP-1 012319 | Ground Water | 1/23/2019 09:00 | 1/25/2019 09:26 | Collected by Client |
| 3012814002 | GEP-4 012319 | Ground Water | 1/23/2019 10:50 | 1/25/2019 09:26 | Collected by Client |
| 3012814003 | MW-8 012319 | Ground Water | 1/23/2019 14:00 | 1/25/2019 09:26 | Collected by Client |
| 3012814004 | MW-12R 012319 | Ground Water | 1/23/2019 16:45 | 1/25/2019 09:26 | Collected by Client |
| 3012814005 | DUP | Ground Water | 1/23/2019 00:00 | 1/25/2019 09:26 | Collected by Client |
| 3012814006 | Trip Blank | Ground Water | 1/25/2019 09:26 | 1/25/2019 09:26 | Collected by Client |
| 3012814007 | Equipment Blank | Ground Water | 1/23/2019 16:15 | 1/25/2019 09:26 | Collected by Client |

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## SAMPLE SUMMARY

Workorder: 3012814 2015-SCOTIA NAVY DEPOT-PO 6044

**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 incubator and the "Analyzed" value is the date/time out the incubator.
-- An Analysis-Prep Method Cross Reference Table is included after Analytical Results & Qualifiers section in this report.

**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: 3012814 2015-SCOTIA NAVY DEPOT-PO 6044

Lab ID: **3012814001** Date Collected: 1/23/2019 09:00 Matrix: Ground Water

Sample ID: **GEP-1 012319** Date Received: 1/25/2019 09:26

| 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 | | 1/29/19 00:27 | PDK | A |
| 1,1-Dichloroethane | 0.75U | U | ug/L | 1.0 | 0.75 | 0.33 | SW846 8260C | | 1/29/19 00:27 | PDK | A |
| 1,2-Dichloroethane | 0.75U | U | ug/L | 1.0 | 0.75 | 0.33 | SW846 8260C | | 1/29/19 00:27 | PDK | A |
| 1,1-Dichloroethene | 0.39J | J | ug/L | 1.0 | 0.75 | 0.33 | SW846 8260C | | 1/29/19 00:27 | PDK | A |
| cis-1,2-Dichloroethene | 0.75U | U | ug/L | 1.0 | 0.75 | 0.33 | SW846 8260C | | 1/29/19 00:27 | PDK | A |
| trans-1,2-Dichloroethene | 0.75U | U | ug/L | 1.0 | 0.75 | 0.33 | SW846 8260C | | 1/29/19 00:27 | PDK | A |
| 1,1,1,2-Tetrachloroethane | 0.75U | U | ug/L | 1.0 | 0.75 | 0.33 | SW846 8260C | | 1/29/19 00:27 | PDK | A |
| 1,1,2,2-Tetrachloroethane | 0.75U | U | ug/L | 1.0 | 0.75 | 0.33 | SW846 8260C | | 1/29/19 00:27 | PDK | A |
| Tetrachloroethene | 0.70J | J | ug/L | 1.0 | 0.75 | 0.33 | SW846 8260C | | 1/29/19 00:27 | PDK | A |
| Toluene | 0.75U | U | ug/L | 1.0 | 0.75 | 0.33 | SW846 8260C | | 1/29/19 00:27 | PDK | A |
| 1,1,1-Trichloroethane | 5.8 | | ug/L | 1.0 | 0.75 | 0.33 | SW846 8260C | | 1/29/19 00:27 | PDK | A |
| 1,1,2-Trichloroethane | 0.75U | U | ug/L | 1.0 | 0.75 | 0.33 | SW846 8260C | | 1/29/19 00:27 | PDK | A |
| Trichloroethene | 157 | | ug/L | 1.0 | 0.75 | 0.33 | SW846 8260C | | 1/29/19 00:27 | PDK | A |
| Vinyl Chloride | 0.75U | U | ug/L | 1.0 | 0.75 | 0.33 | SW846 8260C | | 1/29/19 00:27 | PDK | A |

| *Surrogate Recoveries* | *Results* | *Flag* | *Units* | *Limits* | *Method* | *Prepared By* | *Analyzed* | *By* | *Cntr* |
|---|---|---|---|---|---|---|---|---|---|
| 1,2-Dichloroethane-d4 (S) | 103 | | % | 81 - 118 | SW846 8260C | | 1/29/19 00:27 | PDK | A |
| 4-Bromofluorobenzene (S) | 100 | | % | 85 - 114 | SW846 8260C | | 1/29/19 00:27 | PDK | A |
| Dibromofluoromethane (S) | 98.4 | | % | 80 - 119 | SW846 8260C | | 1/29/19 00:27 | PDK | A |
| Toluene-d8 (S) | 93.3 | | % | 89 - 112 | SW846 8260C | | 1/29/19 00:27 | PDK | A |

Vanessa N. Badman

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ALS Environmental

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## ANALYTICAL RESULTS

Workorder: 3012814 2015-SCOTIA NAVY DEPOT-PO 6044

Lab ID: **3012814002** Date Collected: 1/23/2019 10:50 Matrix: Ground Water

Sample ID: **GEP-4 012319** Date Received: 1/25/2019 09:26

| Parameters | Results | Flag | Units | LOQ | LOD | DL | Method | Prepared By | Analyzed | By | Cntr |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **VOLATILE ORGANICS** | | | | | | | | | | | |
| Carbon Tetrachloride | 0.65J | J | ug/L | 1.0 | 0.75 | 0.33 | SW846 8260C | | 1/29/19 00:49 | PDK | A |
| 1,1-Dichloroethane | 0.75U | U | ug/L | 1.0 | 0.75 | 0.33 | SW846 8260C | | 1/29/19 00:49 | PDK | A |
| 1,2-Dichloroethane | 0.75U | U | ug/L | 1.0 | 0.75 | 0.33 | SW846 8260C | | 1/29/19 00:49 | PDK | A |
| 1,1-Dichloroethene | 1.2 | | ug/L | 1.0 | 0.75 | 0.33 | SW846 8260C | | 1/29/19 00:49 | PDK | A |
| cis-1,2-Dichloroethene | 0.47J | J | ug/L | 1.0 | 0.75 | 0.33 | SW846 8260C | | 1/29/19 00:49 | PDK | A |
| trans-1,2-Dichloroethene | 0.75U | U | ug/L | 1.0 | 0.75 | 0.33 | SW846 8260C | | 1/29/19 00:49 | PDK | A |
| 1,1,1,2-Tetrachloroethane | 0.75U | U | ug/L | 1.0 | 0.75 | 0.33 | SW846 8260C | | 1/29/19 00:49 | PDK | A |
| 1,1,2,2-Tetrachloroethane | 0.75U | U | ug/L | 1.0 | 0.75 | 0.33 | SW846 8260C | | 1/29/19 00:49 | PDK | A |
| Tetrachloroethene | 3.6 | | ug/L | 1.0 | 0.75 | 0.33 | SW846 8260C | | 1/29/19 00:49 | PDK | A |
| Toluene | 0.75U | U | ug/L | 1.0 | 0.75 | 0.33 | SW846 8260C | | 1/29/19 00:49 | PDK | A |
| 1,1,1-Trichloroethane | 18.9 | | ug/L | 1.0 | 0.75 | 0.33 | SW846 8260C | | 1/29/19 00:49 | PDK | A |
| 1,1,2-Trichloroethane | 0.75U | U | ug/L | 1.0 | 0.75 | 0.33 | SW846 8260C | | 1/29/19 00:49 | PDK | A |
| Trichloroethene | 441 | | ug/L | 10.0 | 7.5 | 3.3 | SW846 8260C | | 1/30/19 23:29 | PDK | B |
| Vinyl Chloride | 0.75U | U | ug/L | 1.0 | 0.75 | 0.33 | SW846 8260C | | 1/29/19 00:49 | PDK | A |

| *Surrogate Recoveries* | *Results* | *Flag* | *Units* | *Limits* | *Method* | *Prepared By* | *Analyzed* | *By* | *Cntr* |
|---|---|---|---|---|---|---|---|---|---|
| 1,2-Dichloroethane-d4 (S) | 96.1 | | % | 81 - 118 | SW846 8260C | | 1/30/19 23:29 | PDK | B |
| 1,2-Dichloroethane-d4 (S) | 103 | | % | 81 - 118 | SW846 8260C | | 1/29/19 00:49 | PDK | A |
| 4-Bromofluorobenzene (S) | 98.6 | | % | 85 - 114 | SW846 8260C | | 1/29/19 00:49 | PDK | A |
| 4-Bromofluorobenzene (S) | 95.4 | | % | 85 - 114 | SW846 8260C | | 1/30/19 23:29 | PDK | B |
| Dibromofluoromethane (S) | 103 | | % | 80 - 119 | SW846 8260C | | 1/29/19 00:49 | PDK | A |
| Dibromofluoromethane (S) | 93.9 | | % | 80 - 119 | SW846 8260C | | 1/30/19 23:29 | PDK | B |
| Toluene-d8 (S) | 92.3 | | % | 89 - 112 | SW846 8260C | | 1/29/19 00:49 | PDK | A |
| Toluene-d8 (S) | 92.3 | | % | 89 - 112 | SW846 8260C | | 1/30/19 23:29 | PDK | B |

Vanessa N. Badman

Mrs. Vanessa N Badman
Project Coordinator

ALS Environmental

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## ANALYTICAL RESULTS

Workorder: 3012814 2015-SCOTIA NAVY DEPOT-PO 6044

Lab ID: **3012814003** Date Collected: 1/23/2019 14:00 Matrix: Ground Water

Sample ID: **MW-8 012319** Date Received: 1/25/2019 09:26

| 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 | | 1/30/19 23:06 | PDK | D |
| 1,1-Dichloroethane | 0.75U | U | ug/L | 1.0 | 0.75 | 0.33 | SW846 8260C | | 1/30/19 23:06 | PDK | D |
| 1,2-Dichloroethane | 0.75U | U | ug/L | 1.0 | 0.75 | 0.33 | SW846 8260C | | 1/30/19 23:06 | PDK | D |
| 1,1-Dichloroethene | 0.75U | U | ug/L | 1.0 | 0.75 | 0.33 | SW846 8260C | | 1/30/19 23:06 | PDK | D |
| cis-1,2-Dichloroethene | 0.75U | U | ug/L | 1.0 | 0.75 | 0.33 | SW846 8260C | | 1/30/19 23:06 | PDK | D |
| trans-1,2-Dichloroethene | 0.75U | U | ug/L | 1.0 | 0.75 | 0.33 | SW846 8260C | | 1/30/19 23:06 | PDK | D |
| 1,1,1,2-Tetrachloroethane | 0.75U | U | ug/L | 1.0 | 0.75 | 0.33 | SW846 8260C | | 1/30/19 23:06 | PDK | D |
| 1,1,2,2-Tetrachloroethane | 0.75U | U | ug/L | 1.0 | 0.75 | 0.33 | SW846 8260C | | 1/30/19 23:06 | PDK | D |
| Tetrachloroethene | 0.75U | U | ug/L | 1.0 | 0.75 | 0.33 | SW846 8260C | | 1/30/19 23:06 | PDK | D |
| Toluene | 0.75U | U | ug/L | 1.0 | 0.75 | 0.33 | SW846 8260C | | 1/30/19 23:06 | PDK | D |
| 1,1,1-Trichloroethane | 2.1 | | ug/L | 1.0 | 0.75 | 0.33 | SW846 8260C | | 1/30/19 23:06 | PDK | D |
| 1,1,2-Trichloroethane | 0.75U | U | ug/L | 1.0 | 0.75 | 0.33 | SW846 8260C | | 1/30/19 23:06 | PDK | D |
| Trichloroethene | 3.4 | | ug/L | 1.0 | 0.75 | 0.33 | SW846 8260C | | 1/30/19 23:06 | PDK | D |
| Vinyl Chloride | 0.75U | U | ug/L | 1.0 | 0.75 | 0.33 | SW846 8260C | | 1/30/19 23:06 | PDK | D |

| *Surrogate Recoveries* | *Results* | *Flag* | *Units* | *Limits* | *Method* | *Prepared By* | *Analyzed* | *By* | *Cntr* |
|---|---|---|---|---|---|---|---|---|---|
| 1,2-Dichloroethane-d4 (S) | 95.1 | | % | 81 - 118 | SW846 8260C | | 1/30/19 23:06 | PDK | D |
| 4-Bromofluorobenzene (S) | 95 | | % | 85 - 114 | SW846 8260C | | 1/30/19 23:06 | PDK | D |
| Dibromofluoromethane (S) | 93.6 | | % | 80 - 119 | SW846 8260C | | 1/30/19 23:06 | PDK | D |
| Toluene-d8 (S) | 92.3 | | % | 89 - 112 | SW846 8260C | | 1/30/19 23:06 | PDK | D |

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## ANALYTICAL RESULTS

Workorder: 3012814 2015-SCOTIA NAVY DEPOT-PO 6044

Lab ID: **3012814004** Date Collected: 1/23/2019 16:45 Matrix: Ground Water

Sample ID: **MW-12 012319** Date Received: 1/25/2019 09:26

| 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 | | | 1/29/19 01:34 | PDK | A |
| 1,1-Dichloroethane | 0.75U | U | ug/L | 1.0 | 0.75 | 0.33 | SW846 8260C | | | 1/29/19 01:34 | PDK | A |
| 1,2-Dichloroethane | 0.75U | U | ug/L | 1.0 | 0.75 | 0.33 | SW846 8260C | | | 1/29/19 01:34 | PDK | A |
| 1,1-Dichloroethene | 0.75U | U | ug/L | 1.0 | 0.75 | 0.33 | SW846 8260C | | | 1/29/19 01:34 | PDK | A |
| cis-1,2-Dichloroethene | 0.75U | U | ug/L | 1.0 | 0.75 | 0.33 | SW846 8260C | | | 1/29/19 01:34 | PDK | A |
| trans-1,2-Dichloroethene | 0.75U | U | ug/L | 1.0 | 0.75 | 0.33 | SW846 8260C | | | 1/29/19 01:34 | PDK | A |
| 1,1,1,2-Tetrachloroethane | 0.75U | U | ug/L | 1.0 | 0.75 | 0.33 | SW846 8260C | | | 1/29/19 01:34 | PDK | A |
| 1,1,2,2-Tetrachloroethane | 0.75U | U | ug/L | 1.0 | 0.75 | 0.33 | SW846 8260C | | | 1/29/19 01:34 | PDK | A |
| Tetrachloroethene | 0.75U | U | ug/L | 1.0 | 0.75 | 0.33 | SW846 8260C | | | 1/29/19 01:34 | PDK | A |
| Toluene | 0.75U | U | ug/L | 1.0 | 0.75 | 0.33 | SW846 8260C | | | 1/29/19 01:34 | PDK | A |
| 1,1,1-Trichloroethane | 0.75U | U | ug/L | 1.0 | 0.75 | 0.33 | SW846 8260C | | | 1/29/19 01:34 | PDK | A |
| 1,1,2-Trichloroethane | 0.75U | U | ug/L | 1.0 | 0.75 | 0.33 | SW846 8260C | | | 1/29/19 01:34 | PDK | A |
| Trichloroethene | 0.75U | U | ug/L | 1.0 | 0.75 | 0.33 | SW846 8260C | | | 1/29/19 01:34 | PDK | A |
| Vinyl Chloride | 0.75U | U | ug/L | 1.0 | 0.75 | 0.33 | SW846 8260C | | | 1/29/19 01:34 | PDK | A |

| *Surrogate Recoveries* | *Results* | *Flag* | *Units* | *Limits* | *Method* | *Prepared* | *By* | *Analyzed* | *By* | *Cntr* |
|---|---|---|---|---|---|---|---|---|---|---|
| 1,2-Dichloroethane-d4 (S) | 102 | | % | 81 - 118 | SW846 8260C | | | 1/29/19 01:34 | PDK | A |
| 4-Bromofluorobenzene (S) | 98.4 | | % | 85 - 114 | SW846 8260C | | | 1/29/19 01:34 | PDK | A |
| Dibromofluoromethane (S) | 99.9 | | % | 80 - 119 | SW846 8260C | | | 1/29/19 01:34 | PDK | A |
| Toluene-d8 (S) | 92.9 | | % | 89 - 112 | SW846 8260C | | | 1/29/19 01:34 | PDK | A |

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## ANALYTICAL RESULTS

Workorder: 3012814 2015-SCOTIA NAVY DEPOT-PO 6044

Lab ID: **3012814005** Date Collected: 1/23/2019 00:00 Matrix: Ground Water

Sample ID: **DUP** Date Received: 1/25/2019 09:26

| 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 | | | 1/29/19 01:57 | PDK | A |
| 1,1-Dichloroethane | 0.75U | U | ug/L | 1.0 | 0.75 | 0.33 | SW846 8260C | | | 1/29/19 01:57 | PDK | A |
| 1,2-Dichloroethane | 0.75U | U | ug/L | 1.0 | 0.75 | 0.33 | SW846 8260C | | | 1/29/19 01:57 | PDK | A |
| 1,1-Dichloroethene | 0.75U | U | ug/L | 1.0 | 0.75 | 0.33 | SW846 8260C | | | 1/29/19 01:57 | PDK | A |
| cis-1,2-Dichloroethene | 0.75U | U | ug/L | 1.0 | 0.75 | 0.33 | SW846 8260C | | | 1/29/19 01:57 | PDK | A |
| trans-1,2-Dichloroethene | 0.75U | U | ug/L | 1.0 | 0.75 | 0.33 | SW846 8260C | | | 1/29/19 01:57 | PDK | A |
| 1,1,1,2-Tetrachloroethane | 0.75U | U | ug/L | 1.0 | 0.75 | 0.33 | SW846 8260C | | | 1/29/19 01:57 | PDK | A |
| 1,1,2,2-Tetrachloroethane | 0.75U | U | ug/L | 1.0 | 0.75 | 0.33 | SW846 8260C | | | 1/29/19 01:57 | PDK | A |
| Tetrachloroethene | 0.75U | U | ug/L | 1.0 | 0.75 | 0.33 | SW846 8260C | | | 1/29/19 01:57 | PDK | A |
| Toluene | 0.75U | U | ug/L | 1.0 | 0.75 | 0.33 | SW846 8260C | | | 1/29/19 01:57 | PDK | A |
| 1,1,1-Trichloroethane | 0.75U | U | ug/L | 1.0 | 0.75 | 0.33 | SW846 8260C | | | 1/29/19 01:57 | PDK | A |
| 1,1,2-Trichloroethane | 0.75U | U | ug/L | 1.0 | 0.75 | 0.33 | SW846 8260C | | | 1/29/19 01:57 | PDK | A |
| Trichloroethene | 0.75U | U | ug/L | 1.0 | 0.75 | 0.33 | SW846 8260C | | | 1/29/19 01:57 | PDK | A |
| Vinyl Chloride | 0.75U | U | ug/L | 1.0 | 0.75 | 0.33 | SW846 8260C | | | 1/29/19 01:57 | PDK | A |

| *Surrogate Recoveries* | *Results* | *Flag* | *Units* | *Limits* | *Method* | *Prepared* | *By* | *Analyzed* | *By* | *Cntr* |
|---|---|---|---|---|---|---|---|---|---|---|
| 1,2-Dichloroethane-d4 (S) | 101 | | % | 81 - 118 | SW846 8260C | | | 1/29/19 01:57 | PDK | A |
| 4-Bromofluorobenzene (S) | 97 | | % | 85 - 114 | SW846 8260C | | | 1/29/19 01:57 | PDK | A |
| Dibromofluoromethane (S) | 101 | | % | 80 - 119 | SW846 8260C | | | 1/29/19 01:57 | PDK | A |
| Toluene-d8 (S) | 93.6 | | % | 89 - 112 | SW846 8260C | | | 1/29/19 01:57 | PDK | A |

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## ANALYTICAL RESULTS

Workorder: 3012814 2015-SCOTIA NAVY DEPOT-PO 6044

Lab ID: **3012814006** Date Collected: 1/25/2019 09:26 Matrix: Ground Water

Sample ID: **Trip Blank** Date Received: 1/25/2019 09:26

| 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 | | | 1/28/19 23:42 | PDK | A |
| 1,1-Dichloroethane | 0.75U | U | ug/L | 1.0 | 0.75 | 0.33 | SW846 8260C | | | 1/28/19 23:42 | PDK | A |
| 1,2-Dichloroethane | 0.75U | U | ug/L | 1.0 | 0.75 | 0.33 | SW846 8260C | | | 1/28/19 23:42 | PDK | A |
| 1,1-Dichloroethene | 0.75U | U | ug/L | 1.0 | 0.75 | 0.33 | SW846 8260C | | | 1/28/19 23:42 | PDK | A |
| cis-1,2-Dichloroethene | 0.75U | U | ug/L | 1.0 | 0.75 | 0.33 | SW846 8260C | | | 1/28/19 23:42 | PDK | A |
| trans-1,2-Dichloroethene | 0.75U | U | ug/L | 1.0 | 0.75 | 0.33 | SW846 8260C | | | 1/28/19 23:42 | PDK | A |
| 1,1,1,2-Tetrachloroethane | 0.75U | U | ug/L | 1.0 | 0.75 | 0.33 | SW846 8260C | | | 1/28/19 23:42 | PDK | A |
| 1,1,2,2-Tetrachloroethane | 0.75U | U | ug/L | 1.0 | 0.75 | 0.33 | SW846 8260C | | | 1/28/19 23:42 | PDK | A |
| Tetrachloroethene | 0.75U | U | ug/L | 1.0 | 0.75 | 0.33 | SW846 8260C | | | 1/28/19 23:42 | PDK | A |
| Toluene | 0.75U | U | ug/L | 1.0 | 0.75 | 0.33 | SW846 8260C | | | 1/28/19 23:42 | PDK | A |
| 1,1,1-Trichloroethane | 0.75U | U | ug/L | 1.0 | 0.75 | 0.33 | SW846 8260C | | | 1/28/19 23:42 | PDK | A |
| 1,1,2-Trichloroethane | 0.75U | U | ug/L | 1.0 | 0.75 | 0.33 | SW846 8260C | | | 1/28/19 23:42 | PDK | A |
| Trichloroethene | 0.75U | U | ug/L | 1.0 | 0.75 | 0.33 | SW846 8260C | | | 1/28/19 23:42 | PDK | A |
| Vinyl Chloride | 0.75U | U | ug/L | 1.0 | 0.75 | 0.33 | SW846 8260C | | | 1/28/19 23:42 | PDK | A |

| *Surrogate Recoveries* | *Results* | *Flag* | *Units* | *Limits* | *Method* | *Prepared* | *By* | *Analyzed* | *By* | *Cntr* |
|---|---|---|---|---|---|---|---|---|---|---|
| 1,2-Dichloroethane-d4 (S) | 98.6 | | % | 81 - 118 | SW846 8260C | | | 1/28/19 23:42 | PDK | A |
| 4-Bromofluorobenzene (S) | 98 | | % | 85 - 114 | SW846 8260C | | | 1/28/19 23:42 | PDK | A |
| Dibromofluoromethane (S) | 102 | | % | 80 - 119 | SW846 8260C | | | 1/28/19 23:42 | PDK | A |
| Toluene-d8 (S) | 93.7 | | % | 89 - 112 | SW846 8260C | | | 1/28/19 23:42 | PDK | A |

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## ANALYTICAL RESULTS

Workorder: 3012814 2015-SCOTIA NAVY DEPOT-PO 6044

Lab ID: **3012814007** Date Collected: 1/23/2019 16:15 Matrix: Ground Water

Sample ID: **Equipment Blank** Date Received: 1/25/2019 09:26

| 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 | | | 1/29/19 00:04 | PDK | A |
| 1,1-Dichloroethane | 0.75U | U | ug/L | 1.0 | 0.75 | 0.33 | SW846 8260C | | | 1/29/19 00:04 | PDK | A |
| 1,2-Dichloroethane | 0.75U | U | ug/L | 1.0 | 0.75 | 0.33 | SW846 8260C | | | 1/29/19 00:04 | PDK | A |
| 1,1-Dichloroethene | 0.75U | U | ug/L | 1.0 | 0.75 | 0.33 | SW846 8260C | | | 1/29/19 00:04 | PDK | A |
| cis-1,2-Dichloroethene | 0.75U | U | ug/L | 1.0 | 0.75 | 0.33 | SW846 8260C | | | 1/29/19 00:04 | PDK | A |
| trans-1,2-Dichloroethene | 0.75U | U | ug/L | 1.0 | 0.75 | 0.33 | SW846 8260C | | | 1/29/19 00:04 | PDK | A |
| 1,1,1,2-Tetrachloroethane | 0.75U | U | ug/L | 1.0 | 0.75 | 0.33 | SW846 8260C | | | 1/29/19 00:04 | PDK | A |
| 1,1,2,2-Tetrachloroethane | 0.75U | U | ug/L | 1.0 | 0.75 | 0.33 | SW846 8260C | | | 1/29/19 00:04 | PDK | A |
| Tetrachloroethene | 0.75U | U | ug/L | 1.0 | 0.75 | 0.33 | SW846 8260C | | | 1/29/19 00:04 | PDK | A |
| Toluene | 0.75U | U | ug/L | 1.0 | 0.75 | 0.33 | SW846 8260C | | | 1/29/19 00:04 | PDK | A |
| 1,1,1-Trichloroethane | 0.75U | U | ug/L | 1.0 | 0.75 | 0.33 | SW846 8260C | | | 1/29/19 00:04 | PDK | A |
| 1,1,2-Trichloroethane | 0.75U | U | ug/L | 1.0 | 0.75 | 0.33 | SW846 8260C | | | 1/29/19 00:04 | PDK | A |
| Trichloroethene | 0.75U | U | ug/L | 1.0 | 0.75 | 0.33 | SW846 8260C | | | 1/29/19 00:04 | PDK | A |
| Vinyl Chloride | 0.75U | U | ug/L | 1.0 | 0.75 | 0.33 | SW846 8260C | | | 1/29/19 00:04 | PDK | A |

| *Surrogate Recoveries* | *Results* | *Flag* | *Units* | *Limits* | *Method* | *Prepared* | *By* | *Analyzed* | *By* | *Cntr* |
|---|---|---|---|---|---|---|---|---|---|---|
| 1,2-Dichloroethane-d4 (S) | 101 | | % | 81 - 118 | SW846 8260C | | | 1/29/19 00:04 | PDK | A |
| 4-Bromofluorobenzene (S) | 100 | | % | 85 - 114 | SW846 8260C | | | 1/29/19 00:04 | PDK | A |
| Dibromofluoromethane (S) | 102 | | % | 80 - 119 | SW846 8260C | | | 1/29/19 00:04 | PDK | A |
| Toluene-d8 (S) | 93.9 | | % | 89 - 112 | SW846 8260C | | | 1/29/19 00:04 | PDK | A |

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## ANALYSIS - PREP METHOD CROSS REFERENCE TABLE

Workorder: 3012814 2015-SCOTIA NAVY DEPOT-PO 6044

| Lab ID | Sample ID | Analysis Method | Prep Method |
|---|---|---|---|
| 3012814001 | GEP-1 012319 | SW846 8260C | |
| 3012814002 | GEP-4 012319 | SW846 8260C | |
| 3012814003 | MW-8 012319 | SW846 8260C | |
| 3012814004 | MW-12 012319 | SW846 8260C | |
| 3012814005 | DUP | SW846 8260C | |
| 3012814006 | Trip Blank | SW846 8260C | |
| 3012814007 | Equipment Blank | SW846 8260C | |

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## QUALITY CONTROL DATA

Workorder: 3012814 2015-SCOTIA NAVY DEPOT-PO 6044

**QC Batch:** VOMS/49533 **Analysis Method:** SW846 8260C

**QC Batch Method:** SW846 8260C

**Associated Lab Samples:** 3012814001, 3012814002, 3012814003, 3012814004, 3012814005, 3012814006, 3012814007

METHOD BLANK: 2882988

| 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) | 102 | % | 81 - 118 |
| 4-Bromofluorobenzene (S) | 100 | % | 85 - 114 |
| Dibromofluoromethane (S) | 100 | % | 80 - 119 |
| Toluene-d8 (S) | 96.5 | % | 89 - 112 |

LABORATORY CONTROL SAMPLE: 2882989

| Parameter | LCS % Rec | Units | Spike Conc. | LCS Result | % Rec Limit |
|---|---|---|---|---|---|
| Carbon Tetrachloride | 125 | ug/L | 20 | 25.1 | 72 - 136 |
| 1,1-Dichloroethane | 118 | ug/L | 20 | 23.6 | 77 - 125 |
| 1,2-Dichloroethane | 112 | ug/L | 20 | 22.3 | 73 - 128 |
| 1,1-Dichloroethene | 125 | ug/L | 20 | 24.9 | 71 - 131 |
| cis-1,2-Dichloroethene | 117 | ug/L | 20 | 23.4 | 78 - 123 |
| trans-1,2-Dichloroethene | 121 | ug/L | 20 | 24.1 | 75 - 124 |
| 1,1,1,2-Tetrachloroethane | 115 | ug/L | 20 | 22.9 | 78 - 124 |
| 1,1,2,2-Tetrachloroethane | 99.1 | ug/L | 20 | 19.8 | 71 - 121 |
| Tetrachloroethene | 113 | ug/L | 20 | 22.7 | 74 - 129 |
| Toluene | 110 | ug/L | 20 | 22.0 | 80 - 121 |
| 1,1,1-Trichloroethane | 123 | ug/L | 20 | 24.6 | 74 - 131 |
| 1,1,2-Trichloroethane | 105 | ug/L | 20 | 20.9 | 80 - 119 |
| Trichloroethene | 112 | ug/L | 20 | 22.5 | 79 - 123 |

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## QUALITY CONTROL DATA

Workorder: 3012814 2015-SCOTIA NAVY DEPOT-PO 6044

| | | | | | |
|---|---|---|---|---|---|
| Vinyl Chloride | 103 | ug/L | 20 | 20.5 | 58 - 137 |
| 1,2-Dichloroethane-d4 (S) | 99.5 | % | | | 81 - 118 |
| 4-Bromofluorobenzene (S) | 99.9 | % | | | 85 - 114 |
| Dibromofluoromethane (S) | 101 | % | | | 80 - 119 |
| Toluene-d8 (S) | 93.6 | % | | | 89 - 112 |

MATRIX SPIKE: 2882990 DUPLICATE: 2882991 ORIGINAL: 3012814003

****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 |
|---|---|---|---|---|---|---|---|---|---|---|
| 1,2-Dichloroethane-d4 (S) | 100 | % | | | | 100 | 99 | 81 - 118 | | |
| 4-Bromofluorobenzene (S) | 98.9 | % | | | | 98.9 | 98.1 | 85 - 114 | | |
| Dibromofluoromethane (S) | 102 | % | | | | 102 | 101 | 80 - 119 | | |
| Toluene-d8 (S) | 91.6 | % | | | | 91.6 | 93.7 | 89 - 112 | | |

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## QUALITY CONTROL DATA

Workorder: 3012814 2015-SCOTIA NAVY DEPOT-PO 6044

**QC Batch:** VOMS/49555 **Analysis Method:** SW846 8260C

**QC Batch Method:** SW846 8260C

**Associated Lab Samples:** 3012814002, 3012814003

METHOD BLANK: 2884412

| 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) | 94.3 | % | 81 - 118 |
| 4-Bromofluorobenzene (S) | 95.1 | % | 85 - 114 |
| Dibromofluoromethane (S) | 93.3 | % | 80 - 119 |
| Toluene-d8 (S) | 92.3 | % | 89 - 112 |

LABORATORY CONTROL SAMPLE: 2884413

| Parameter | LCS % Rec | Units | Spike Conc. | LCS Result | % Rec Limit |
|---|---|---|---|---|---|
| Carbon Tetrachloride | 116 | ug/L | 20 | 23.2 | 72 - 136 |
| 1,1-Dichloroethane | 109 | ug/L | 20 | 21.8 | 77 - 125 |
| 1,2-Dichloroethane | 106 | ug/L | 20 | 21.1 | 73 - 128 |
| 1,1-Dichloroethene | 114 | ug/L | 20 | 22.9 | 71 - 131 |
| cis-1,2-Dichloroethene | 112 | ug/L | 20 | 22.4 | 78 - 123 |
| trans-1,2-Dichloroethene | 114 | ug/L | 20 | 22.8 | 75 - 124 |
| 1,1,1,2-Tetrachloroethane | 109 | ug/L | 20 | 21.8 | 78 - 124 |
| 1,1,2,2-Tetrachloroethane | 101 | ug/L | 20 | 20.2 | 71 - 121 |
| Tetrachloroethene | 108 | ug/L | 20 | 21.6 | 74 - 129 |
| Toluene | 110 | ug/L | 20 | 22.1 | 80 - 121 |
| 1,1,1-Trichloroethane | 111 | ug/L | 20 | 22.3 | 74 - 131 |
| 1,1,2-Trichloroethane | 106 | ug/L | 20 | 21.2 | 80 - 119 |
| Trichloroethene | 111 | ug/L | 20 | 22.2 | 79 - 123 |

## QUALITY CONTROL DATA

Workorder: 3012814 2015-SCOTIA NAVY DEPOT-PO 6044

| | | | | | |
|---|---|---|---|---|---|
| Vinyl Chloride | 106 | ug/L | 20 | 21.1 | 58 - 137 |
| 1,2-Dichloroethane-d4 (S) | 92.9 | % | | | 81 - 118 |
| 4-Bromofluorobenzene (S) | 96.7 | % | | | 85 - 114 |
| Dibromofluoromethane (S) | 94.5 | % | | | 80 - 119 |
| Toluene-d8 (S) | 93.1 | % | | | 89 - 112 |

MATRIX SPIKE: 2884414 DUPLICATE: 2884415 ORIGINAL: 3012814003

****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 | 24.8852 | 20.8598 | 124 | 104 | 72 - 136 | 17.6 | 30 |
| 1,1-Dichloroethane | 0 | ug/L | 20 | 22.5358 | 19.7989 | 113 | 99 | 77 - 125 | 12.9 | 30 |
| 1,2-Dichloroethane | 0 | ug/L | 20 | 21.6563 | 19.3824 | 108 | 96.9 | 73 - 128 | 11.1 | 30 |
| 1,1-Dichloroethene | 0 | ug/L | 20 | 23.8418 | 20.3311 | 119 | 102 | 71 - 131 | 15.9 | 30 |
| cis-1,2-Dichloroethene | 0 | ug/L | 20 | 23.3478 | 20.3904 | 117 | 102 | 78 - 123 | 13.5 | 30 |
| trans-1,2-Dichloroethene | .26913 | ug/L | 20 | 24.0492 | 20.4972 | 119 | 101 | 75 - 124 | 15.9 | 30 |
| 1,1,1,2-Tetrachloroethane | 0 | ug/L | 20 | 21.5417 | 19.5067 | 108 | 97.5 | 78 - 124 | 9.92 | 30 |
| 1,1,2,2-Tetrachloroethane | 0 | ug/L | 20 | 19.7805 | 18.3401 | 98.9 | 91.7 | 71 - 121 | 7.56 | 30 |
| Tetrachloroethene | 0 | ug/L | 20 | 21.7161 | 19.1746 | 109 | 95.9 | 74 - 129 | 12.4 | 30 |
| Toluene | 0 | ug/L | 20 | 22.3653 | 19.7151 | 112 | 98.6 | 80 - 121 | 12.6 | 30 |
| 1,1,1-Trichloroethane | 2.13682 | ug/L | 20 | 23.2849 | 20.1528 | 106 | 90.1 | 74 - 131 | 14.4 | 30 |
| 1,1,2-Trichloroethane | 0 | ug/L | 20 | 20.7095 | 19.0662 | 104 | 95.3 | 80 - 119 | 8.26 | 30 |
| Trichloroethene | 3.35428 | ug/L | 20 | 23.1552 | 20.215 | 99 | 84.3 | 79 - 123 | 13.6 | 30 |
| Vinyl Chloride | 0 | ug/L | 20 | 22.914 | 19.2803 | 115 | 96.4 | 58 - 137 | 17.2 | 30 |
| 1,2-Dichloroethane-d4 (S) | 95.1 | % | | | | 95.1 | 89.3 | 81 - 118 | | |
| 4-Bromofluorobenzene (S) | 95.9 | % | | | | 95.9 | 91.8 | 85 - 114 | | |
| Dibromofluoromethane (S) | 94.9 | % | | | | 94.9 | 89.7 | 80 - 119 | | |
| Toluene-d8 (S) | 91.4 | % | | | | 91.4 | 87.4* | 89 - 112 | | |

ALS Environmental

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NELAP Certifications: NJ PA010 , NY 11759 , PA 22-293 DoD ELAP: PJLA 74618
State Certifications: FL E871113 , WA C999 , MD 128 , VA 460157 , WV DW 9961-C , WV 343

## QUALITY CONTROL DATA CROSS REFERENCE TABLE

Workorder: 3012814 2015-SCOTIA NAVY DEPOT-PO 6044

| Lab ID | Sample ID | Prep Method | Prep Batch | Analysis Method | Analysis Batch |
|---|---|---|---|---|---|
| 3012814001 | GEP-1 012319 | | | SW846 8260C | VOMS/49533 |
| 3012814002 | GEP-4 012319 | | | SW846 8260C | VOMS/49533 |
| 3012814004 | MW-12 012319 | | | SW846 8260C | VOMS/49533 |
| 3012814005 | DUP | | | SW846 8260C | VOMS/49533 |
| 3012814006 | Trip Blank | | | SW846 8260C | VOMS/49533 |
| 3012814007 | Equipment Blank | | | SW846 8260C | VOMS/49533 |
| 3012814002 | GEP-4 012319 | | | SW846 8260C | VOMS/49555 |
| 3012814003 | MW-8 012319 | | | SW846 8260C | VOMS/49555 |

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# CHAIN OF CUSTODY/ REQUEST FOR ANALYSIS

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

*30128145*

1 of 1

Client Name: AECOM
Address: 40 British American BLVD Latham NY 12110
Contact: Gerlinde Wolf
Phone#: 585-490-0987
Project Name/#: Scotia Navy Depot
Bill To: 60440641

TAT: [X] Normal-Standard TAT is 10-12 business days. [ ] Rush-Subject to ALS approval and surcharges.
Date Required: Approved?
Email? [X] Y gerlinde.wolf@aecom.com
Fax? [ ] Y No.:

Container Type: G
Container Size: 40ml
Preservative: HCl

ANALYSES/METHOD REQUESTED: 8260C VOC

W.O. Temp: ____ Therm ID: ____
Courier/Tracking #:
Purchase Order #:
Project Comments:

ALS Field Services: ☐ Pickup ☐ Labor ☐ Composite Sampling ☐ Rental Equipment
Other:

| | Sample Description/Location (as it will appear on the lab report) | Date Collected mm/dd/yy | Time hh:mm | *G or C | **Matrix | Enter Number of Containers Per Sample or Field Results Below. | Sample/COC Comments |
|---|---|---|---|---|---|---|---|
| 1 | GEP-1 012319 | 01/23/19 | 0900 | G | GW | 2 | |
| 2 | GEP-4 012319 | | 1050 | | | 2 | |
| 3 | MW-8 012319 | | 1400 | | | 2 | *MS/MSD taken |
| 4 | MW-12 012319 | | 1645 | | | 2 | |
| 5 | DUP | — | — | | | 2 | |
| 6 | Trip blank | — | — | | | 2 | |
| 7 | MS | 01/23/19 | — | | | 2 | |
| 8 | MSD | | — | | | 2 | |
| 9 | Equipment blank | | ~~1450~~ 1615 | | | 2 | |
| 10 | | | | | | | |

SAMPLED BY (Please Print): Alex Golden / Jill Kosinski

Sampler Comments:

Data Deliverables: [X] Standard [ ] CLP-like [ ] USACE/DOD [ ]
Special Processing: USACE [ ] Navy [ ]
State Samples Collected In: [ ] NY [ ] NJ [ ] PA [ ] NC [ ]

| | Relinquished By / Company Name | Date | Time | | Received By / Company Name | Date | Time |
|---|---|---|---|---|---|---|---|
| 1 | Alex Golden / AECOM | 1/23/19 | | 2 | | | |
| 3 | | | | 4 | | 1/25/19 | 0926 |
| 5 | | | | 6 | | | |
| 7 | | | | 8 | | | |
| 9 | | | | 10 | | | |

Reportable to PADEP? Yes [ ] No [ ]
PWSID #
Sample Disposal: Lab [ ] Special [ ]
EDDS: Format Type- SEE QAPP
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

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Rev 11/18

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Middletown, PA 17057
P: (717) 944-5541
F: (717) 944-1430

# Condition of Sample Receipt Form

**Client:** AECOM **Work Order #:** 3012894 **Initials:** WS **Date:** 1-25-19

| | | | |
|---|---|---|---|
| 1. Were airbills / tracking numbers present and recorded? | NONE | YES | NO |
| Tracking number: 8113 0089 4551 | | | |
| 2. Are Custody Seals on shipping containers intact? | NONE | YES | NO |
| 3. Are Custody Seals on sample containers intact? | NONE | YES | NO |
| 4. Is there a COC (Chain-of-Custody) present? | | YES | NO |
| 5. Are the COC and bottle labels complete, legible and in agreement? | | YES | NO |
| 5a. Does the COC contain sample locations? | | YES | NO |
| 5b. Does the COC contain date and time of sample collection for all samples? | | YES | NO |
| 5c. Does the COC contain sample collectors name? | | YES | NO |
| 5d. Does the COC note the type(s) of preservation for all bottles? | | YES | NO |
| 5e. Does the COC note the number of bottles submitted for each sample? | | YES | NO |
| 5f. Does the COC note the type of sample, composite or grab? | | YES | NO |
| 5g. Does the COC note the matrix of the sample(s)? | | YES | NO |
| 6. Are all aqueous samples requiring preservation preserved correctly? | N/A | YES | NO |
| 7. Were all samples placed in the proper containers for the requested analyses, with sufficient volume? | | YES | NO |
| 8. Are all samples within holding times for the requested analyses? | | YES | NO |
| 9. Were all sample containers received intact and headspace free when required? (not broken, leaking, frozen, etc.) | | YES | NO |
| 10. Did we receive trip blanks ( applies only for methods EPA 504, EPA 524.2 and 1631E (LL Hg)? | N/A | YES | NO |
| 11. Were the samples received on ice? | | YES | NO |
| 12. Were sample temperatures measured at 0.0-6.0°C | | YES | NO |
| 13. Are the samples DW matrix ? If YES, fill out Reportable Drinking Water questions below | | YES | NO |
| 13a. Are the samples required for SDWA compliance reporting? | N/A | YES | NO |
| 13b. Did the client provide a SDWA PWS ID#? | N/A | YES | NO |
| 13c. Are all aqueous unpreserved SDWA samples pH 5-9? | N/A | YES | NO |
| 13d. Did the client provide the SDWA sample location ID/Description? | N/A | YES | NO |
| 13e. Did the client provide the SDWA sample type (D, E, R, C, P, S)? | N/A | YES | NO |

Cooler #: _____

Temperature (°C): 5

Thermometer ID: 302

COMMENTS (Required for all NO responses above and any sample non-conformance):

Rev. 1/10/2019

# APPENDIX F: AECOM Data Usability Summary Report (DUSR)

AECOM
707 Grant Street
Pittsburgh, PA 15219
aecom.com

**Project name:**
Scotia Depot Groundwater

**Project ref:**
60440641

**From:**
Gregory A. Malzone

**Date:**
February 6, 2019

**To:**
Gerlinde Wolf
AECOM
40 British American Boulevard
Latham, NY 12110

**CC:**
Robert Davis
AECOM
1360 Peachtree St. Suite 500
Atlanta, GA 30309

# Data Assessment Memorandum

**Subject:** Data Usability Summary Report - Scotia Depot - January 2019 Groundwater Sample Data

# 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, on January 23, 2019. 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 (ALS), 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 one deliverable. The laboratory deliverable is identified by both a laboratory work order number and sample delivery group (SDG) number.

The following analytical method was requested on the chain-of-custody record (CoC).

- Method SW-846 8260C – Volatile Organic Compounds (VOCs) by Gas Chromatography/Mass Spectrometry (GC/MS)

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, as they apply to the analytical method 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.

**Review Elements**

The following elements of the data report were reviewed.

- Agreement of analyses conducted with CoC requests
- Holding times/sample preservation
- GC/MS hardware tunes, initial and continuing calibrations
- Method preparation, equipment and trip blanks
- Surrogate recoveries
- Laboratory control sample (LCS) results
- Internal standard area counts
- Matrix spike/matrix spike duplicate (MS/MSD) recoveries
- Laboratory duplicate RPDs
- Compound identification and quantitation
- Field duplicate precision

**Analytical Samples**

Table 1 below lists the sample field identifications cross-referenced to the laboratory identifications. A field duplicate sample was collected at MW-8. Sample MW-8-012319 was designated in the field to be processed as the quality control sample, that is, as the MS/MSD.

# Table 1 – Groundwater Sample Submittals

| Field ID | ALS ID | Matrix | Field QC | Date Sampled | WO Number | SDG Number |
|---|---|---|---|---|---|---|
| GEP-1-012319 | 3012814001 | Groundwater | | 1/23/2019 | 3012814 | ASN-045 |
| GEP-4-012319 | 3012814002 | Groundwater | | 1/23/2019 | 3012814 | ASN-045 |
| MW-8-012319 | 3012814003 | Groundwater | MS/MSD | 1/23/2019 | 3012814 | ASN-045 |
| MW-12R-012319 | 3012814004 | Groundwater | | 1/23/2019 | 3012814 | ASN-045 |
| DUP-012319 | 3012814005 | Groundwater | MW-8-012319 | 1/23/2019 | 3012814 | ASN-045 |
| TRIP BLANK-012319 | 3012814006 | Aqueous (QC) | | 1/23/2019 | 3012814 | ASN-045 |
| Equipment Blank-012319 | 3012814007 | Aqueous (QC) | | 1/23/2019 | 3012814 | ASN-045 |

# Discussion

**Agreement of Analyses Conducted with CoC Requests**

Sample reports were checked to verify that the results corresponded to analytical requests as designated on the CoC. No discrepancies were noted. Measurement performance indicators which did not meet criteria for VOCs analysis are presented below for the laboratory report.

**Holding Times and Preservation**

The sample shipments was received on ice, intact, and in good condition, with a cooler temperature of 5.0º C, which is within the optimal range of just above freezing to 6º C upon receipt at the laboratory. No data qualifications were required.

The samples were chemically preserved to the proper pH.

The samples were analyzed within the method-specified holding time for volatile organic compounds in groundwater of 14 days from the sample collection date for a chemically-preserved sample.

**GC/MS Hardware Tunes, Initial and Continuing Calibrations**

The GC/MS hardware tunes, initial and continuing calibrations were within the method specification limits.

**Method Preparation, Equipment and Trip Blanks**

No target compounds were detected at concentrations exceeding the method detection limits (MDLs) in the laboratory method blanks, equipment blank or the trip blank.

**Surrogate Recoveries**

All surrogate recoveries were within the quality control limits for all field samples.

**Laboratory Control Samples (LCS)**

Laboratory control sample recoveries were within the quality control limits.

**Internal Standard Area Counts**

The GC/MS internal standard area counts were within the method specifications.

**MS/MSD Recoveries**

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.

Sample MW-8-012319 was designated in the field to be processed as the quality control sample, that is, as the duplicate/MS/MSD. All MS/MSD recoveries were within the advisory limits.

**Laboratory Duplicates**

The LCS/LCSD, MS/MSD and project-specific laboratory duplicate RPDs were less than the maximum acceptance limits.

**Compound Identification and Quantitation**

Positive organic and inorganic results reported between the MDL and limit of quantitation (LOQ), were qualified "J," as estimated concentrations, due to increased uncertainty near the MDL. The "J" qualifiers were maintained in the data validation. Sample results reported between the MDL and LOQ are usable as estimated values with an unknown directional bias.

Sample GEP-4-012319 required analysis at a secondary ten-fold dilution to bring the trichloroethene concentration into the calibration range. The surrogate recoveries were within the quality control limits. The reporting limit was elevated as required. No data qualifications were required.

**Field Duplicate Precision**

A field duplicate was collected for groundwater sample MW-8-012319. Field duplicate results were evaluated using the following criteria.

Organics: The RPD must be ≤ 30% for groundwater, 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 target compound in the organic duplicate sample pair.

All results for the parent and field duplicate pairs (MW-8-012319 and DUP-012319) were non-detect except for 1,1,1-trichloroethane and trichloroethene. RPDs could not be calculated. The 1,1,1-trichloroethane and trichloroethene results for samples MW-8-012319 and DUP-012319 were qualified "J/UJ," as estimates, because of field sampling/laboratory imprecision and/or sample heterogeneity. See Table 2 below.

# Table 2 – Field Duplicate Precision

| Parameter | Units | MW-8-012319 | DUP-012319 | RPD (%) | Qual |
|---|---|---|---|---|---|
| 1,1,1-Trichloroethane | µg/L | 2.1 | 1.0 U | NC | J/UJ |
| Trichloroethene | µg/L | 3.4 | 1.0 U | NC | J/UJ |

The following notations are used in the field precision table.

RPD: Relative percent difference
NC: RPD could not be calculated.
Qual: Qualification required
µg/L: micrograms per liter (ppb)

# Summary

In general, the data are valid as reported and may be used for decision-making purposes. Sample data qualified by the data validator are presented in Table 3 below. The results were qualified by the data validator with either a "J" (estimated) or "UJ" (the reported quantitation limit is approximated and may be inaccurate or imprecise). No results were rejected. Completeness of the data set was calculated to be 100% and is within the goal of 90-100%.

# Table 3 – Qualified Groundwater Data

| Sample ID | Lab Sample ID | Method | Analyte | Concentration | | | Qualifier | Reason Code |
|---|---|---|---|---|---|---|---|---|
| MW-8-012319 | 3012814003 | 8260C | Trichloroethene | | 2.1 | µg/L | J | fd |
| MW-8-012319 | 3012814003 | 8260C | 1,1,1-Trichloroethane | | 3.4 | µg/L | J | fd |
| DUP-012319 | 3012814005 | 8260C | Trichloroethene | < | 1.0 U | µg/L | UJ | fd |
| DUP-012319 | 3012814005 | 8260C | 1,1,1-Trichloroethane | < | 1.0 U | µg/L | UJ | fd |

**Reason Code(s):**

fd: The field duplicate %RPD/absolute difference was outside the advisory limits.

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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.

* 3 0 1 2 8 1 4 *

1 of 1

Client Name: AECOM
Address: 40 British American BLVD Latham NY 12110
Contact: Gerlinde Wolf
Phone#: 585-490-0987
Project Name/#: Scotia Navy Depot
Bill To: 60444041
TAT: [X] Normal-Standard TAT is 10-12 business days. [ ] Rush-Subject to ALS approval and surcharges.
Date Required: Approved?
Email? [X] -Y gerlinde.wolf@aecom.com
Fax? [ ] -Y No.:

| Sample Description/Location (as it will appear on the lab report) | Date Collected mm/dd/yy | Time hh:mm | *G or C | **Matrix | 8260C VOC | | | | | | | | | | Sample/COC Comments |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Container Type | | G | | | | | | | | | | |
| | | | Container Size | | 40ml | | | | | | | | | | |
| | | | Preservative | | HCl | | | | | | | | | | |
| | | | ANALYSES/METHOD REQUESTED | | | | | | | | | | | | |
| | | | Enter Number of Containers Per Sample or Field Results Below. | | | | | | | | | | | | |
| 1 GEP-1 012319 | 01/23/19 | 0900 | G | GW | 2 | | | | | | | | | | |
| 2 GEP-4 012319 | | 1050 | | | 2 | | | | | | | | | | |
| 3 MW-8 012319 | | 1400 | | | 2 | | | | | | | | | | *MS/MSD taken |
| 4 MW-12 012319 | | 1645 | | | 2 | | | | | | | | | | |
| 5 DUP | — | — | | | 2 | | | | | | | | | | |
| 6 Trip blank | — | — | | | 2 | | | | | | | | | | |
| 7 MS | 01/23/19 | — | | | 2 | | | | | | | | | | |
| 8 MSD | | — | | | 2 | | | | | | | | | | |
| 9 Equipment blank | | ~~1650~~ 1615 | | | 2 | | | | | | | | | | |
| 10 | — | (Mg) | | | | | | | | | | | | | |

SAMPLED BY (Please Print): Alex Golden / Jill Kosinski

Sampler Comments:

| Relinquished By / Company Name | Date | Time | Received By / Company Name | Date | Time |
|---|---|---|---|---|---|
| 1 Alex Golden / AECOM | 1/23/19 | | 2 | | |
| 3 COURIER | | | 4 | 1/24/19 | 0926 |
| 5 | | | 6 | | |
| 7 | | | 8 | | |
| 9 | | | 10 | | |

Data Deliverables: [X] Standard [ ] CLP-like [ ] USACE/DOD [ ]
Special Processing: USACE [ ] Navy [ ]
State Samples Collected In: [ ] NY [ ] NJ [ ] PA [ ] NC [ ] other
Reportable to PADEP? Yes [ ] No [ ]
PWSID #
Sample Disposal: Lab [ ] Special [ ]
EDDS: Format Type- SEE QAPP

* 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

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Rev 11/18

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Middletown, PA 17057
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F: (717) 944-1430

# Condition of Sample Receipt Form

Client: AECom  Work Order #: 301284  Initials: WS  Date: 1-25-19

| | | | |
|---|---|---|---|
| 1. Were airbills / tracking numbers present and recorded? | NONE | (YES) | NO |
| Tracking number: 8113 0089 4551 | | | |
| 2. Are Custody Seals on shipping containers intact? | (NONE) | YES | NO |
| 3. Are Custody Seals on sample containers intact? | (NONE) | YES | NO |
| 4. Is there a COC (Chain-of-Custody) present? | | (YES) | NO |
| 5. Are the COC and bottle labels complete, legible and in agreement? | | (YES) | NO |
| 5a. Does the COC contain sample locations? | | (YES) | NO |
| 5b. Does the COC contain date and time of sample collection for all samples? | | (YES) | NO |
| 5c. Does the COC contain sample collectors name? | | (YES) | NO |
| 5d. Does the COC note the type(s) of preservation for all bottles? | | (YES) | NO |
| 5e. Does the COC note the number of bottles submitted for each sample? | | (YES) | NO |
| 5f. Does the COC note the type of sample, composite or grab? | | (YES) | NO |
| 5g. Does the COC note the matrix of the sample(s)? | | (YES) | NO |
| 6. Are all aqueous samples requiring preservation preserved correctly? | (N/A) | YES | NO |
| 7. Were all samples placed in the proper containers for the requested analyses, with sufficient volume? | | (YES) | NO |
| 8. Are all samples within holding times for the requested analyses? | | (YES) | NO |
| 9. Were all sample containers received intact and headspace free when required? (not broken, leaking, frozen, etc.) | | (YES) | NO |
| 10. Did we receive trip blanks ( applies only for methods EPA 504, EPA 524.2 and 1631E (LL Hg)? | (N/A) | (YES) | NO |
| 11. Were the samples received on ice? | | (YES) | NO |
| 12. Were sample temperatures measured at 0.0-6.0°C | | (YES) | NO |
| 13. Are the samples DW matrix ? If YES, fill out Reportable Drinking Water questions below | | YES | (NO) |
| 13a. Are the samples required for SDWA compliance reporting? | (N/A) | YES | NO |
| 13b. Did the client provide a SDWA PWS ID#? | (N/A) | YES | NO |
| 13c. Are all aqueous unpreserved SDWA samples pH 5-9? | (N/A) | YES | NO |
| 13d. Did the client provide the SDWA sample location ID/Description? | (N/A) | YES | NO |
| 13e. Did the client provide the SDWA sample type (D, E, R, C, P, S)? | (N/A) | YES | NO |

Cooler #: ____ ____ ____ ____ ____ ____ ____ ____

Temperature (°C): 5 ____ ____ ____ ____ ____ ____ ____

Thermometer ID: 302

COMMENTS (Required for all NO responses above and any sample non-conformance):

Rev. 1/10/2019

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## SAMPLE SUMMARY

Workorder: 3012814 2015-SCOTIA NAVY DEPOT-PO 6044

| Lab ID | Sample ID | Matrix | Date Collected | Date Received | Collected By |
|---|---|---|---|---|---|
| 3012814001 | GEP-1 012319 | Ground Water | 1/23/2019 09:00 | 1/25/2019 09:26 | Collected by Client |
| 3012814002 | GEP-4 012319 | Ground Water | 1/23/2019 10:50 | 1/25/2019 09:26 | Collected by Client |
| 3012814003 | MW-8 012319 | Ground Water | 1/23/2019 14:00 | 1/25/2019 09:26 | Collected by Client |
| 3012814004 | MW-12 012319 | Ground Water | 1/23/2019 16:45 | 1/25/2019 09:26 | Collected by Client |
| 3012814005 | DUP | Ground Water | 1/23/2019 00:00 | 1/25/2019 09:26 | Collected by Client |
| 3012814006 | Trip Blank | Ground Water | 1/25/2019 09:26 | 1/25/2019 09:26 | Collected by Client |
| 3012814007 | Equipment Blank | Ground Water | 1/23/2019 16:15 | 1/25/2019 09:26 | Collected by Client |

**AECOM - Latham, NY**
**ALS-Middletown**
**Case Narrative**
**ASN-045 (3012814)**

## Sample Management

This report contains the results of the analysis of seven (7) ground water samples collected on January 23 and 25, 2019. 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 January 25, 2019. 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.*** Seven (7) 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 run immediately following ICAL.

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

***Surrogates.*** Recoveries were within control limits, except as follows:

- In 2884415 MSD, Toluene-d8 was recovered below control limits.

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

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

***Internal Standards.*** Internal standard results met method criteria.

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## ANALYTICAL RESULTS

Workorder: 3012814 2015-SCOTIA NAVY DEPOT-PO 6044

Lab ID: **3012814001** Date Collected: 1/23/2019 09:00 Matrix: Ground Water
Sample ID: **GEP-1 012319** Date Received: 1/25/2019 09:26

| 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 | | 1/29/19 00:27 | PDK | A |
| 1,1-Dichloroethane | 0.75U | U | ug/L | 1.0 | 0.75 | 0.33 | SW846 8260C | | 1/29/19 00:27 | PDK | A |
| 1,2-Dichloroethane | 0.75U | U | ug/L | 1.0 | 0.75 | 0.33 | SW846 8260C | | 1/29/19 00:27 | PDK | A |
| 1,1-Dichloroethene | 0.39J | J | ug/L | 1.0 | 0.75 | 0.33 | SW846 8260C | | 1/29/19 00:27 | PDK | A |
| cis-1,2-Dichloroethene | 0.75U | U | ug/L | 1.0 | 0.75 | 0.33 | SW846 8260C | | 1/29/19 00:27 | PDK | A |
| trans-1,2-Dichloroethene | 0.75U | U | ug/L | 1.0 | 0.75 | 0.33 | SW846 8260C | | 1/29/19 00:27 | PDK | A |
| 1,1,1,2-Tetrachloroethane | 0.75U | U | ug/L | 1.0 | 0.75 | 0.33 | SW846 8260C | | 1/29/19 00:27 | PDK | A |
| 1,1,2,2-Tetrachloroethane | 0.75U | U | ug/L | 1.0 | 0.75 | 0.33 | SW846 8260C | | 1/29/19 00:27 | PDK | A |
| Tetrachloroethene | 0.70J | J | ug/L | 1.0 | 0.75 | 0.33 | SW846 8260C | | 1/29/19 00:27 | PDK | A |
| Toluene | 0.75U | U | ug/L | 1.0 | 0.75 | 0.33 | SW846 8260C | | 1/29/19 00:27 | PDK | A |
| 1,1,1-Trichloroethane | 5.8 | | ug/L | 1.0 | 0.75 | 0.33 | SW846 8260C | | 1/29/19 00:27 | PDK | A |
| 1,1,2-Trichloroethane | 0.75U | U | ug/L | 1.0 | 0.75 | 0.33 | SW846 8260C | | 1/29/19 00:27 | PDK | A |
| Trichloroethene | 157 | | ug/L | 1.0 | 0.75 | 0.33 | SW846 8260C | | 1/29/19 00:27 | PDK | A |
| Vinyl Chloride | 0.75U | U | ug/L | 1.0 | 0.75 | 0.33 | SW846 8260C | | 1/29/19 00:27 | PDK | A |

| *Surrogate Recoveries* | *Results* | *Flag* | *Units* | *Limits* | *Method* | *Prepared By* | *Analyzed* | *By* | *Cntr* |
|---|---|---|---|---|---|---|---|---|---|
| 1,2-Dichloroethane-d4 (S) | 103 | | % | 81 - 118 | SW846 8260C | | 1/29/19 00:27 | PDK | A |
| 4-Bromofluorobenzene (S) | 100 | | % | 85 - 114 | SW846 8260C | | 1/29/19 00:27 | PDK | A |
| Dibromofluoromethane (S) | 98.4 | | % | 80 - 119 | SW846 8260C | | 1/29/19 00:27 | PDK | A |
| Toluene-d8 (S) | 93.3 | | % | 89 - 112 | SW846 8260C | | 1/29/19 00:27 | PDK | A |

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## ANALYTICAL RESULTS

Workorder: 3012814 2015-SCOTIA NAVY DEPOT-PO 6044

Lab ID: **3012814002** Date Collected: 1/23/2019 10:50 Matrix: Ground Water

Sample ID: **GEP-4 012319** Date Received: 1/25/2019 09:26

| Parameters | Results | Flag | Units | LOQ | LOD | DL | Method | Prepared By | Analyzed | By | Cntr |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **VOLATILE ORGANICS** | | | | | | | | | | | |
| Carbon Tetrachloride | 0.65J | J | ug/L | 1.0 | 0.75 | 0.33 | SW846 8260C | | 1/29/19 00:49 | PDK | A |
| 1,1-Dichloroethane | 0.75U | U | ug/L | 1.0 | 0.75 | 0.33 | SW846 8260C | | 1/29/19 00:49 | PDK | A |
| 1,2-Dichloroethane | 0.75U | U | ug/L | 1.0 | 0.75 | 0.33 | SW846 8260C | | 1/29/19 00:49 | PDK | A |
| 1,1-Dichloroethene | 1.2 | | ug/L | 1.0 | 0.75 | 0.33 | SW846 8260C | | 1/29/19 00:49 | PDK | A |
| cis-1,2-Dichloroethene | 0.47J | J | ug/L | 1.0 | 0.75 | 0.33 | SW846 8260C | | 1/29/19 00:49 | PDK | A |
| trans-1,2-Dichloroethene | 0.75U | U | ug/L | 1.0 | 0.75 | 0.33 | SW846 8260C | | 1/29/19 00:49 | PDK | A |
| 1,1,1,2-Tetrachloroethane | 0.75U | U | ug/L | 1.0 | 0.75 | 0.33 | SW846 8260C | | 1/29/19 00:49 | PDK | A |
| 1,1,2,2-Tetrachloroethane | 0.75U | U | ug/L | 1.0 | 0.75 | 0.33 | SW846 8260C | | 1/29/19 00:49 | PDK | A |
| Tetrachloroethene | 3.6 | | ug/L | 1.0 | 0.75 | 0.33 | SW846 8260C | | 1/29/19 00:49 | PDK | A |
| Toluene | 0.75U | U | ug/L | 1.0 | 0.75 | 0.33 | SW846 8260C | | 1/29/19 00:49 | PDK | A |
| 1,1,1-Trichloroethane | 18.9 | | ug/L | 1.0 | 0.75 | 0.33 | SW846 8260C | | 1/29/19 00:49 | PDK | A |
| 1,1,2-Trichloroethane | 0.75U | U | ug/L | 1.0 | 0.75 | 0.33 | SW846 8260C | | 1/29/19 00:49 | PDK | A |
| Trichloroethene | 441 | | ug/L | 10.0 | 7.5 | 3.3 | SW846 8260C | | 1/30/19 23:29 | PDK | B |
| Vinyl Chloride | 0.75U | U | ug/L | 1.0 | 0.75 | 0.33 | SW846 8260C | | 1/29/19 00:49 | PDK | A |

| *Surrogate Recoveries* | *Results* | *Flag* | *Units* | *Limits* | *Method* | *Prepared By* | *Analyzed* | *By* | *Cntr* |
|---|---|---|---|---|---|---|---|---|---|
| 1,2-Dichloroethane-d4 (S) | 96.1 | | % | 81 - 118 | SW846 8260C | | 1/30/19 23:29 | PDK | B |
| 1,2-Dichloroethane-d4 (S) | 103 | | % | 81 - 118 | SW846 8260C | | 1/29/19 00:49 | PDK | A |
| 4-Bromofluorobenzene (S) | 98.6 | | % | 85 - 114 | SW846 8260C | | 1/29/19 00:49 | PDK | A |
| 4-Bromofluorobenzene (S) | 95.4 | | % | 85 - 114 | SW846 8260C | | 1/30/19 23:29 | PDK | B |
| Dibromofluoromethane (S) | 103 | | % | 80 - 119 | SW846 8260C | | 1/29/19 00:49 | PDK | A |
| Dibromofluoromethane (S) | 93.9 | | % | 80 - 119 | SW846 8260C | | 1/30/19 23:29 | PDK | B |
| Toluene-d8 (S) | 92.3 | | % | 89 - 112 | SW846 8260C | | 1/29/19 00:49 | PDK | A |
| Toluene-d8 (S) | 92.3 | | % | 89 - 112 | SW846 8260C | | 1/30/19 23:29 | PDK | B |

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## ANALYTICAL RESULTS

Workorder: 3012814 2015-SCOTIA NAVY DEPOT-PO 6044

Lab ID: **3012814003** Date Collected: 1/23/2019 14:00 Matrix: Ground Water
Sample ID: **MW-8 012319** Date Received: 1/25/2019 09:26

| 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 | | 1/30/19 23:06 | PDK | D |
| 1,1-Dichloroethane | 0.75U | U | ug/L | 1.0 | 0.75 | 0.33 | SW846 8260C | | 1/30/19 23:06 | PDK | D |
| 1,2-Dichloroethane | 0.75U | U | ug/L | 1.0 | 0.75 | 0.33 | SW846 8260C | | 1/30/19 23:06 | PDK | D |
| 1,1-Dichloroethene | 0.75U | U | ug/L | 1.0 | 0.75 | 0.33 | SW846 8260C | | 1/30/19 23:06 | PDK | D |
| cis-1,2-Dichloroethene | 0.75U | U | ug/L | 1.0 | 0.75 | 0.33 | SW846 8260C | | 1/30/19 23:06 | PDK | D |
| trans-1,2-Dichloroethene | 0.75U | U | ug/L | 1.0 | 0.75 | 0.33 | SW846 8260C | | 1/30/19 23:06 | PDK | D |
| 1,1,1,2-Tetrachloroethane | 0.75U | U | ug/L | 1.0 | 0.75 | 0.33 | SW846 8260C | | 1/30/19 23:06 | PDK | D |
| 1,1,2,2-Tetrachloroethane | 0.75U | U | ug/L | 1.0 | 0.75 | 0.33 | SW846 8260C | | 1/30/19 23:06 | PDK | D |
| Tetrachloroethene | 0.75U | U | ug/L | 1.0 | 0.75 | 0.33 | SW846 8260C | | 1/30/19 23:06 | PDK | D |
| Toluene | 0.75U | U | ug/L | 1.0 | 0.75 | 0.33 | SW846 8260C | | 1/30/19 23:06 | PDK | D |
| 1,1,1-Trichloroethane | 2.1 | J | ug/L | 1.0 | 0.75 | 0.33 | SW846 8260C | | 1/30/19 23:06 | PDK | D |
| 1,1,2-Trichloroethane | 0.75U | U | ug/L | 1.0 | 0.75 | 0.33 | SW846 8260C | | 1/30/19 23:06 | PDK | D |
| Trichloroethene | 3.4 | J | ug/L | 1.0 | 0.75 | 0.33 | SW846 8260C | | 1/30/19 23:06 | PDK | D |
| Vinyl Chloride | 0.75U | U | ug/L | 1.0 | 0.75 | 0.33 | SW846 8260C | | 1/30/19 23:06 | PDK | D |

| *Surrogate Recoveries* | *Results* | *Flag* | *Units* | *Limits* | *Method* | *Prepared By* | *Analyzed* | *By* | *Cntr* |
|---|---|---|---|---|---|---|---|---|---|
| 1,2-Dichloroethane-d4 (S) | 95.1 | | % | 81 - 118 | SW846 8260C | | 1/30/19 23:06 | PDK | D |
| 4-Bromofluorobenzene (S) | 95 | | % | 85 - 114 | SW846 8260C | | 1/30/19 23:06 | PDK | D |
| Dibromofluoromethane (S) | 93.6 | | % | 80 - 119 | SW846 8260C | | 1/30/19 23:06 | PDK | D |
| Toluene-d8 (S) | 92.3 | | % | 89 - 112 | SW846 8260C | | 1/30/19 23:06 | PDK | D |

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## ANALYTICAL RESULTS

Workorder: 3012814 2015-SCOTIA NAVY DEPOT-PO 6044

Lab ID: **3012814004** Date Collected: 1/23/2019 16:45 Matrix: Ground Water

Sample ID: **MW-12 012319** Date Received: 1/25/2019 09:26

| 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 | | 1/29/19 01:34 | PDK | A |
| 1,1-Dichloroethane | 0.75U | U | ug/L | 1.0 | 0.75 | 0.33 | SW846 8260C | | 1/29/19 01:34 | PDK | A |
| 1,2-Dichloroethane | 0.75U | U | ug/L | 1.0 | 0.75 | 0.33 | SW846 8260C | | 1/29/19 01:34 | PDK | A |
| 1,1-Dichloroethene | 0.75U | U | ug/L | 1.0 | 0.75 | 0.33 | SW846 8260C | | 1/29/19 01:34 | PDK | A |
| cis-1,2-Dichloroethene | 0.75U | U | ug/L | 1.0 | 0.75 | 0.33 | SW846 8260C | | 1/29/19 01:34 | PDK | A |
| trans-1,2-Dichloroethene | 0.75U | U | ug/L | 1.0 | 0.75 | 0.33 | SW846 8260C | | 1/29/19 01:34 | PDK | A |
| 1,1,1,2-Tetrachloroethane | 0.75U | U | ug/L | 1.0 | 0.75 | 0.33 | SW846 8260C | | 1/29/19 01:34 | PDK | A |
| 1,1,2,2-Tetrachloroethane | 0.75U | U | ug/L | 1.0 | 0.75 | 0.33 | SW846 8260C | | 1/29/19 01:34 | PDK | A |
| Tetrachloroethene | 0.75U | U | ug/L | 1.0 | 0.75 | 0.33 | SW846 8260C | | 1/29/19 01:34 | PDK | A |
| Toluene | 0.75U | U | ug/L | 1.0 | 0.75 | 0.33 | SW846 8260C | | 1/29/19 01:34 | PDK | A |
| 1,1,1-Trichloroethane | 0.75U | U | ug/L | 1.0 | 0.75 | 0.33 | SW846 8260C | | 1/29/19 01:34 | PDK | A |
| 1,1,2-Trichloroethane | 0.75U | U | ug/L | 1.0 | 0.75 | 0.33 | SW846 8260C | | 1/29/19 01:34 | PDK | A |
| Trichloroethene | 0.75U | U | ug/L | 1.0 | 0.75 | 0.33 | SW846 8260C | | 1/29/19 01:34 | PDK | A |
| Vinyl Chloride | 0.75U | U | ug/L | 1.0 | 0.75 | 0.33 | SW846 8260C | | 1/29/19 01:34 | PDK | A |

| *Surrogate Recoveries* | *Results* | *Flag* | *Units* | *Limits* | *Method* | *Prepared By* | *Analyzed* | *By* | *Cntr* |
|---|---|---|---|---|---|---|---|---|---|
| 1,2-Dichloroethane-d4 (S) | 102 | | % | 81 - 118 | SW846 8260C | | 1/29/19 01:34 | PDK | A |
| 4-Bromofluorobenzene (S) | 98.4 | | % | 85 - 114 | SW846 8260C | | 1/29/19 01:34 | PDK | A |
| Dibromofluoromethane (S) | 99.9 | | % | 80 - 119 | SW846 8260C | | 1/29/19 01:34 | PDK | A |
| Toluene-d8 (S) | 92.9 | | % | 89 - 112 | SW846 8260C | | 1/29/19 01:34 | PDK | A |

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## ANALYTICAL RESULTS

Workorder: 3012814 2015-SCOTIA NAVY DEPOT-PO 6044

Lab ID: **3012814005** Date Collected: 1/23/2019 00:00 Matrix: Ground Water

Sample ID: **DUP** Date Received: 1/25/2019 09:26

| 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 | | 1/29/19 01:57 | PDK | A |
| 1,1-Dichloroethane | 0.75U | U | ug/L | 1.0 | 0.75 | 0.33 | SW846 8260C | | 1/29/19 01:57 | PDK | A |
| 1,2-Dichloroethane | 0.75U | U | ug/L | 1.0 | 0.75 | 0.33 | SW846 8260C | | 1/29/19 01:57 | PDK | A |
| 1,1-Dichloroethene | 0.75U | U | ug/L | 1.0 | 0.75 | 0.33 | SW846 8260C | | 1/29/19 01:57 | PDK | A |
| cis-1,2-Dichloroethene | 0.75U | U | ug/L | 1.0 | 0.75 | 0.33 | SW846 8260C | | 1/29/19 01:57 | PDK | A |
| trans-1,2-Dichloroethene | 0.75U | U | ug/L | 1.0 | 0.75 | 0.33 | SW846 8260C | | 1/29/19 01:57 | PDK | A |
| 1,1,1,2-Tetrachloroethane | 0.75U | U | ug/L | 1.0 | 0.75 | 0.33 | SW846 8260C | | 1/29/19 01:57 | PDK | A |
| 1,1,2,2-Tetrachloroethane | 0.75U | U | ug/L | 1.0 | 0.75 | 0.33 | SW846 8260C | | 1/29/19 01:57 | PDK | A |
| Tetrachloroethene | 0.75U | U | ug/L | 1.0 | 0.75 | 0.33 | SW846 8260C | | 1/29/19 01:57 | PDK | A |
| Toluene | 0.75U | U | ug/L | 1.0 | 0.75 | 0.33 | SW846 8260C | | 1/29/19 01:57 | PDK | A |
| 1,1,1-Trichloroethane | 0.75U | UJ | ug/L | 1.0 | 0.75 | 0.33 | SW846 8260C | | 1/29/19 01:57 | PDK | A |
| 1,1,2-Trichloroethane | 0.75U | U | ug/L | 1.0 | 0.75 | 0.33 | SW846 8260C | | 1/29/19 01:57 | PDK | A |
| Trichloroethene | 0.75U | UJ | ug/L | 1.0 | 0.75 | 0.33 | SW846 8260C | | 1/29/19 01:57 | PDK | A |
| Vinyl Chloride | 0.75U | U | ug/L | 1.0 | 0.75 | 0.33 | SW846 8260C | | 1/29/19 01:57 | PDK | A |

| *Surrogate Recoveries* | *Results* | *Flag* | *Units* | *Limits* | *Method* | *Prepared By* | *Analyzed* | *By* | *Cntr* |
|---|---|---|---|---|---|---|---|---|---|
| 1,2-Dichloroethane-d4 (S) | 101 | | % | 81 - 118 | SW846 8260C | | 1/29/19 01:57 | PDK | A |
| 4-Bromofluorobenzene (S) | 97 | | % | 85 - 114 | SW846 8260C | | 1/29/19 01:57 | PDK | A |
| Dibromofluoromethane (S) | 101 | | % | 80 - 119 | SW846 8260C | | 1/29/19 01:57 | PDK | A |
| Toluene-d8 (S) | 93.6 | | % | 89 - 112 | SW846 8260C | | 1/29/19 01:57 | PDK | A |

Vanessa N. Badman

Mrs. Vanessa N Badman
Project Coordinator

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NELAP Certifications: NJ PA010, NY 11759, PA 22-293 DoD ELAP: PJ LA 74618
State Certifications: FL E871113, WA C999, MD 128, VA 460157, WV DW 9961-C, WV 343

## ANALYTICAL RESULTS

Workorder: 3012814 2015-SCOTIA NAVY DEPOT-PO 6044

Lab ID: **3012814006** Date Collected: 1/25/2019 09:26 Matrix: Ground Water
Sample ID: **Trip Blank** Date Received: 1/25/2019 09:26

| 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 | | 1/28/19 23:42 | PDK | A |
| 1,1-Dichloroethane | 0.75U | U | ug/L | 1.0 | 0.75 | 0.33 | SW846 8260C | | 1/28/19 23:42 | PDK | A |
| 1,2-Dichloroethane | 0.75U | U | ug/L | 1.0 | 0.75 | 0.33 | SW846 8260C | | 1/28/19 23:42 | PDK | A |
| 1,1-Dichloroethene | 0.75U | U | ug/L | 1.0 | 0.75 | 0.33 | SW846 8260C | | 1/28/19 23:42 | PDK | A |
| cis-1,2-Dichloroethene | 0.75U | U | ug/L | 1.0 | 0.75 | 0.33 | SW846 8260C | | 1/28/19 23:42 | PDK | A |
| trans-1,2-Dichloroethene | 0.75U | U | ug/L | 1.0 | 0.75 | 0.33 | SW846 8260C | | 1/28/19 23:42 | PDK | A |
| 1,1,1,2-Tetrachloroethane | 0.75U | U | ug/L | 1.0 | 0.75 | 0.33 | SW846 8260C | | 1/28/19 23:42 | PDK | A |
| 1,1,2,2-Tetrachloroethane | 0.75U | U | ug/L | 1.0 | 0.75 | 0.33 | SW846 8260C | | 1/28/19 23:42 | PDK | A |
| Tetrachloroethene | 0.75U | U | ug/L | 1.0 | 0.75 | 0.33 | SW846 8260C | | 1/28/19 23:42 | PDK | A |
| Toluene | 0.75U | U | ug/L | 1.0 | 0.75 | 0.33 | SW846 8260C | | 1/28/19 23:42 | PDK | A |
| 1,1,1-Trichloroethane | 0.75U | U | ug/L | 1.0 | 0.75 | 0.33 | SW846 8260C | | 1/28/19 23:42 | PDK | A |
| 1,1,2-Trichloroethane | 0.75U | U | ug/L | 1.0 | 0.75 | 0.33 | SW846 8260C | | 1/28/19 23:42 | PDK | A |
| Trichloroethene | 0.75U | U | ug/L | 1.0 | 0.75 | 0.33 | SW846 8260C | | 1/28/19 23:42 | PDK | A |
| Vinyl Chloride | 0.75U | U | ug/L | 1.0 | 0.75 | 0.33 | SW846 8260C | | 1/28/19 23:42 | PDK | A |

| *Surrogate Recoveries* | *Results* | *Flag* | *Units* | *Limits* | *Method* | *Prepared By* | *Analyzed* | *By* | *Cntr* |
|---|---|---|---|---|---|---|---|---|---|
| 1,2-Dichloroethane-d4 (S) | 98.6 | | % | 81 - 118 | SW846 8260C | | 1/28/19 23:42 | PDK | A |
| 4-Bromofluorobenzene (S) | 98 | | % | 85 - 114 | SW846 8260C | | 1/28/19 23:42 | PDK | A |
| Dibromofluoromethane (S) | 102 | | % | 80 - 119 | SW846 8260C | | 1/28/19 23:42 | PDK | A |
| Toluene-d8 (S) | 93.7 | | % | 89 - 112 | SW846 8260C | | 1/28/19 23:42 | PDK | A |

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## ANALYTICAL RESULTS

Workorder: 3012814 2015-SCOTIA NAVY DEPOT-PO 6044

Lab ID: **3012814007** Date Collected: 1/23/2019 16:15 Matrix: Ground Water

Sample ID: **Equipment Blank** Date Received: 1/25/2019 09:26

| 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 | | 1/29/19 00:04 | PDK | A |
| 1,1-Dichloroethane | 0.75U | U | ug/L | 1.0 | 0.75 | 0.33 | SW846 8260C | | 1/29/19 00:04 | PDK | A |
| 1,2-Dichloroethane | 0.75U | U | ug/L | 1.0 | 0.75 | 0.33 | SW846 8260C | | 1/29/19 00:04 | PDK | A |
| 1,1-Dichloroethene | 0.75U | U | ug/L | 1.0 | 0.75 | 0.33 | SW846 8260C | | 1/29/19 00:04 | PDK | A |
| cis-1,2-Dichloroethene | 0.75U | U | ug/L | 1.0 | 0.75 | 0.33 | SW846 8260C | | 1/29/19 00:04 | PDK | A |
| trans-1,2-Dichloroethene | 0.75U | U | ug/L | 1.0 | 0.75 | 0.33 | SW846 8260C | | 1/29/19 00:04 | PDK | A |
| 1,1,1,2-Tetrachloroethane | 0.75U | U | ug/L | 1.0 | 0.75 | 0.33 | SW846 8260C | | 1/29/19 00:04 | PDK | A |
| 1,1,2,2-Tetrachloroethane | 0.75U | U | ug/L | 1.0 | 0.75 | 0.33 | SW846 8260C | | 1/29/19 00:04 | PDK | A |
| Tetrachloroethene | 0.75U | U | ug/L | 1.0 | 0.75 | 0.33 | SW846 8260C | | 1/29/19 00:04 | PDK | A |
| Toluene | 0.75U | U | ug/L | 1.0 | 0.75 | 0.33 | SW846 8260C | | 1/29/19 00:04 | PDK | A |
| 1,1,1-Trichloroethane | 0.75U | U | ug/L | 1.0 | 0.75 | 0.33 | SW846 8260C | | 1/29/19 00:04 | PDK | A |
| 1,1,2-Trichloroethane | 0.75U | U | ug/L | 1.0 | 0.75 | 0.33 | SW846 8260C | | 1/29/19 00:04 | PDK | A |
| Trichloroethene | 0.75U | U | ug/L | 1.0 | 0.75 | 0.33 | SW846 8260C | | 1/29/19 00:04 | PDK | A |
| Vinyl Chloride | 0.75U | U | ug/L | 1.0 | 0.75 | 0.33 | SW846 8260C | | 1/29/19 00:04 | PDK | A |

| *Surrogate Recoveries* | *Results* | *Flag* | *Units* | *Limits* | *Method* | *Prepared By* | *Analyzed* | *By* | *Cntr* |
|---|---|---|---|---|---|---|---|---|---|
| 1,2-Dichloroethane-d4 (S) | 101 | | % | 81 - 118 | SW846 8260C | | 1/29/19 00:04 | PDK | A |
| 4-Bromofluorobenzene (S) | 100 | | % | 85 - 114 | SW846 8260C | | 1/29/19 00:04 | PDK | A |
| Dibromofluoromethane (S) | 102 | | % | 80 - 119 | SW846 8260C | | 1/29/19 00:04 | PDK | A |
| Toluene-d8 (S) | 93.9 | | % | 89 - 112 | SW846 8260C | | 1/29/19 00:04 | PDK | A |

Vanessa N. Badman

Mrs. Vanessa N Badman
Project Coordinator

# APPENDIX G: Photo Logs

# APPENDIX E

# January 2019 Monitoring Well Repairs

| | | |
|---|---|---|
| AECOM | **Scotia Navy Depot, USACE**<br>**Scotia Depot Site** | **Daily Photos**<br>Written By: Alexandra Golden, Geologist<br>DATE: 1/7-10/2019<br>PROJECT MANAGER: Daniel Servetas<br>PROJECT NO.: 60440641 |

| MW-11R Before Repair | MW-11R During Repair | MW-11R After Repair |
|---|---|---|
|  |  |  |
| Gep-4 Before Repair | Gep-4 During Repair | Gep-4 After Repair |
|  |  |  |

| | | |
|---|---|---|
| AECOM | **Scotia Navy Depot, USACE**<br>**Scotia, New York** | **Daily Photos**<br>Written By: Alexandra Golden, Geologist<br>DATE: 1/7-10/2019<br>PROJECT MANAGER: Daniel Servetas<br>PROJECT NO.: 60440641 |

GEP-1 Before Repair

GEP-1 After Repair

Injection Well Before Repair

Collar Removed During Repair

Injection Well After Repair

| | | |
|---|---|---|
| AECOM | **Scotia Navy Depot, USACE**<br>**Scotia Depot Site** | **Daily Photos**<br>Written By: Alexandra Golden, Geologist<br>DATE: 1/7-10/2019<br>PROJECT MANAGER: Daniel Servetas<br>PROJECT NO.: 60440641 |

MW-8 Before Repair

MW-8 During Repair

MW-8 After Repair

MW-22R Before

MW-22R Crack in PVC

MW-22R Decommissioned

| | | |
|---|---|---|
| AECOM | **Scotia Navy Depot, USACE**<br>**Scotia Depot Site** | **Daily Photos**<br>Written By: Alexandra Golden, Geologist<br>DATE: 1/7-10/2019<br>PROJECT MANAGER: Daniel Servetas<br>PROJECT NO.: 60440641 |

MW-B-1R Old Well

Drilling New MW-B-1R Location

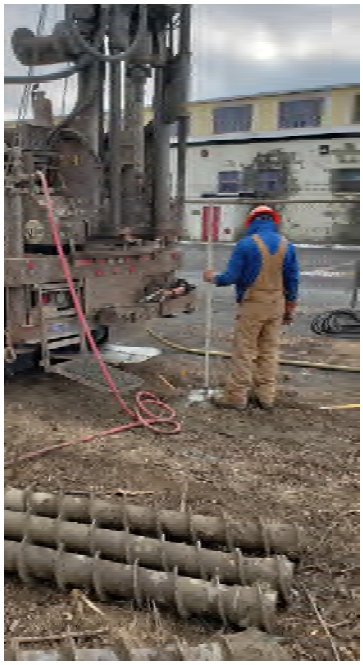
MW-B-1R Split Spoon sample

MW-B-1R Split Spoon sample

| | | |
|---|---|---|
| AECOM | **Scotia Navy Depot, USACE**<br>**Scotia Depot Site** | **Daily Photos**<br>Written By: Alexandra Golden, Geologist<br>DATE: 1/7-10/2019<br>PROJECT MANAGER: Daniel Servetas<br>PROJECT NO.: 60440641 |

MW-B-1R Complete

MW-B-1R Backfilling Old Well



MW-12R Drill cuttings

MW-12R Split spoon sample 65-68 fbg

MW-12R Split spoon sample 75-78 fbg

| | | |
|---|---|---|
| AECOM | **Scotia Navy Depot, USACE**<br>**Scotia Depot Site** | **Daily Photos**<br>Written By: Alexandra Golden, Geologist<br>DATE: 1/7-10/2019<br>PROJECT MANAGER: Daniel Servetas<br>PROJECT NO.: 60440641 |

MW-12R Complete

Decon Area

# April 2019 Monitoring Well Repairs Photo Log

| | | |
|---|---|---|
| AECOM | **The Defense National Stockpile Center Scotia Depot Glenville, NY** | **Photo Log**<br>**Written by: Alexandra Golden**<br>**Date:** 04/02-04/2019<br>**Project Manager: Daniel Servetas**<br>**Project No.:** 60440641 |

**Description:** Backfilled MW-11R in comparison to location of gas line (marked out in yellow)

| | | |
|---|---|---|
| AECOM | **The Defense National Stockpile Center Scotia Depot Glenville, NY** | **Photo Log**<br>**Written by: Alexandra Golden**<br>**Date:** 04/02-04/2019<br>**Project Manager: Daniel Servetas**<br>**Project No.:** 60440641 |

**Description:** New MW-22R, appx. 5 ft offset from old MW location

| | | |
|---|---|---|
| AECOM | **The Defense National Stockpile Center Scotia Depot Glenville, NY** | **Photo Log**<br>**Written by: Alexandra Golden**<br>**Date:** 04/02-04/2019<br>**Project Manager: Daniel Servetas**<br>**Project No.:** 60440641 |

**Description:** Drilling MW-22R

| | | |
|---|---|---|
| AECOM | **The Defense National Stockpile Center Scotia Depot Glenville, NY** | **Photo Log**<br>**Written by: Alexandra Golden**<br>**Date:** 04/02-04/2019<br>**Project Manager: Daniel Servetas**<br>**Project No.:** 60440641 |

**Description:** Soil cuttings from drilling MW-22R

| | | |
|---|---|---|
| AECOM | **The Defense National Stockpile Center Scotia Depot Glenville, NY** | **Photo Log**<br>**Written by: Alexandra Golden**<br>**Date:** 04/02-04/2019<br>**Project Manager: Daniel Servetas**<br>**Project No.:** 60440641 |

**Description:** MW-20 converted to flush mount

| | | |
|---|---|---|
| AECOM | **The Defense National Stockpile Center Scotia Depot Glenville, NY** | **Photo Log**<br>**Written by: Alexandra Golden**<br>**Date:** 04/02-04/2019<br>**Project Manager: Daniel Servetas**<br>**Project No.:** 60440641 |

**Description:** MW-25 converted to flush mount

| | | |
|---|---|---|
| AECOM | **The Defense National Stockpile Center Scotia Depot Glenville, NY** | **Photo Log** |
| | | **Written by: Alexandra Golden** |
| | | **Date:** 04/02-04/2019 |
| | | **Project Manager: Daniel Servetas** |
| | | **Project No.:** 60440641 |

**Description:** MW-18 converted to flush mount

| | | |
|---|---|---|
| AECOM | **The Defense National Stockpile Center Scotia Depot Glenville, NY** | **Photo Log** |
| | | **Written by: Alexandra Golden** |
| | | **Date:** 04/02-04/2019 |
| | | **Project Manager: Daniel Servetas** |
| | | **Project No.:** 60440641 |

**Description:** MW-17 converted to flush mount

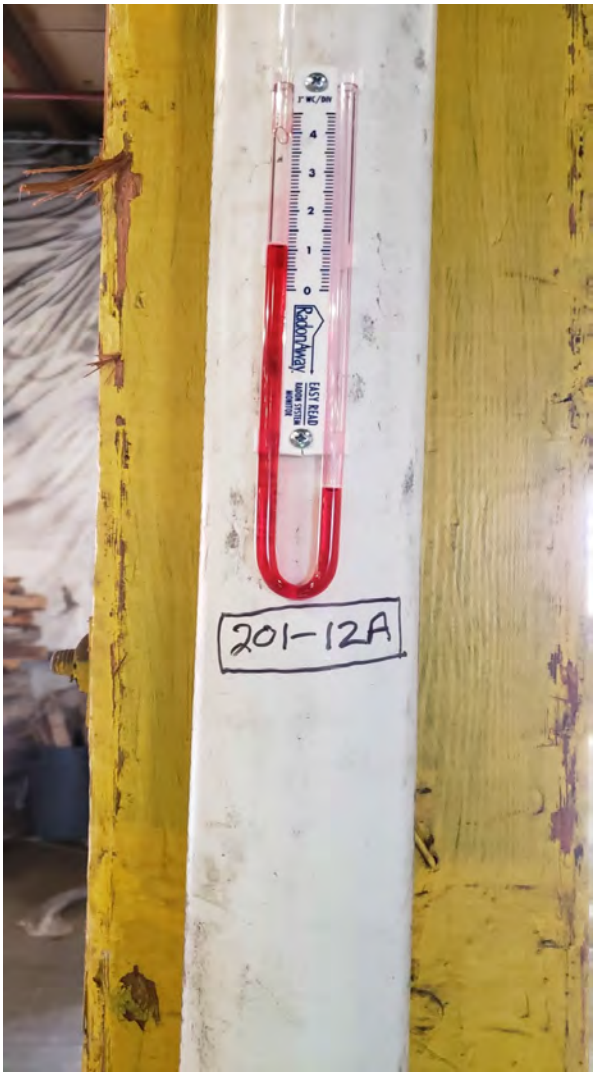
# April 2019 SVI Repairs Photo Log

| | | |
|---|---|---|
| AECOM | **The Defense National Stockpile Center Scotia Depot Glenville, NY** | **Photo Log**<br>**Written by: Alexandra Golden**<br>**Date:** 04/15-16/2019<br>**Project Manager: Daniel Servetas**<br>**Project No.:** 60440641 |

**Description:** 201-6A after SVI repairs

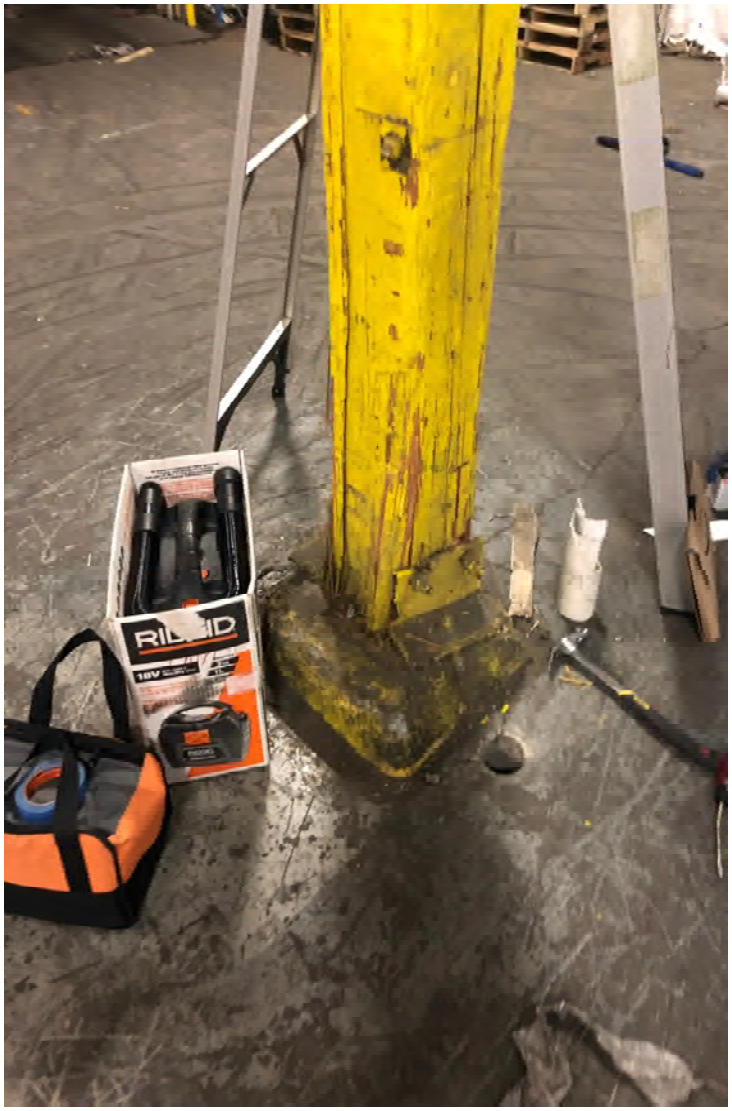
| | | |
|---|---|---|
| AECOM | **The Defense National Stockpile Center Scotia Depot Glenville, NY** | **Photo Log** |
| | | **Written by: Alexandra Golden** |
| | | **Date:** 04/15-16/2019 |
| | | **Project Manager: Daniel Servetas** |
| | | **Project No.:** 60440641 |

**Description: 201-12A after SVI repairs base (left) and monometer (right)**

| | | |
|---|---|---|
| AECOM | **The Defense National Stockpile Center Scotia Depot Glenville, NY** | **Photo Log**<br>**Written by: Alexandra Golden**<br>**Date:** 04/15-16/2019<br>**Project Manager: Daniel Servetas**<br>**Project No.:** 60440641 |

**Description:** 201-12A before SVI repairs



| | | |
|---|---|---|
| AECOM | **The Defense National Stockpile Center Scotia Depot Glenville, NY** | **Photo Log** |
| | | **Written by: Alexandra Golden** |
| | | **Date:** 04/15-16/2019 |
| | | **Project Manager: Daniel Servetas** |
| | | **Project No.:** 60440641 |

**Description:** 201-12B after SVI repair

| | | |
|---|---|---|
| AECOM | **The Defense National Stockpile Center Scotia Depot Glenville, NY** | **Photo Log** |
| | | **Written by: Alexandra Golden** |
| | | **Date:** 04/15-16/2019 |
| | | **Project Manager: Daniel Servetas** |
| | | **Project No.:** 60440641 |

**Description:** 201-12A after SVI repairs

| | | |
|---|---|---|
| AECOM | **The Defense National Stockpile Center Scotia Depot Glenville, NY** | **Photo Log** |
| | | **Written by: Alexandra Golden** |
| | | **Date:** 04/15-16/2019 |
| | | **Project Manager: Daniel Servetas** |
| | | **Project No.:** 60440641 |

**Description:** 202-6A before SVI repair

| | | |
|---|---|---|
| AECOM | **The Defense National Stockpile Center Scotia Depot Glenville, NY** | **Photo Log**<br>**Written by: Alexandra Golden**<br>**Date:** 04/15-16/2019<br>**Project Manager: Daniel Servetas**<br>**Project No.:** 60440641 |

**Description:** 202-6A after SVI repair

| | | |
|---|---|---|
| AECOM | **The Defense National Stockpile Center Scotia Depot Glenville, NY** | **Photo Log** |
| | | **Written by: Alexandra Golden** |
| | | **Date:** 04/15-16/2019 |
| | | **Project Manager: Daniel Servetas** |
| | | **Project No.:** 60440641 |

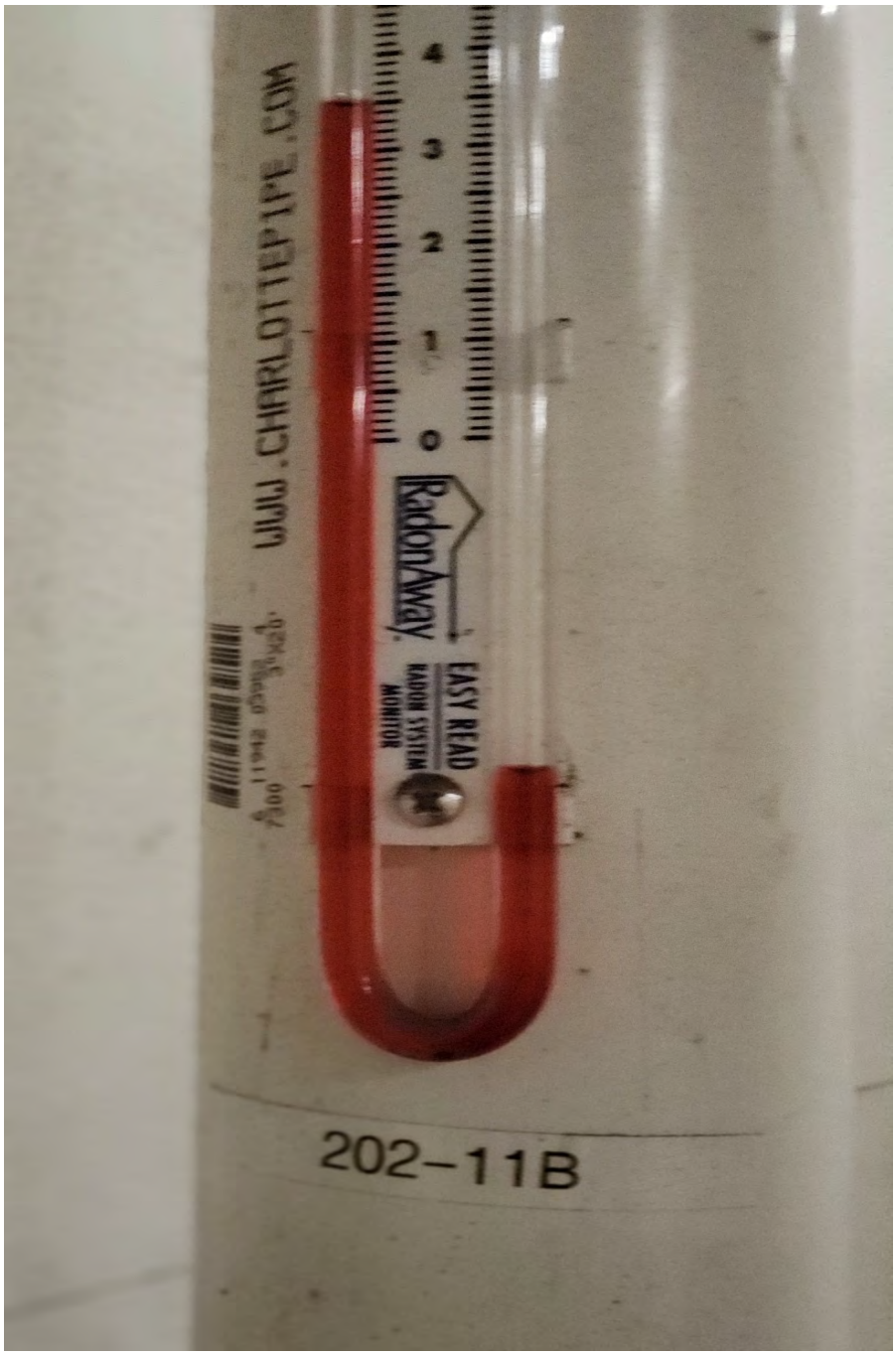
**Description:** 202-11 after SVI repair

| | | |
|---|---|---|
| AECOM | **The Defense National Stockpile Center Scotia Depot Glenville, NY** | **Photo Log** |
| | | **Written by: Alexandra Golden** |
| | | **Date:** 04/15-16/2019 |
| | | **Project Manager: Daniel Servetas** |
| | | **Project No.:** 60440641 |

**Description: 202-11A after SVI repair**

| | | |
|---|---|---|
| AECOM | **The Defense National Stockpile Center Scotia Depot Glenville, NY** | **Photo Log** |
| | | **Written by: Alexandra Golden** |
| | | **Date:** 04/15-16/2019 |
| | | **Project Manager: Daniel Servetas** |
| | | **Project No.:** 60440641 |

**Description:** 202-11B after SVI repair



| | | |
|---|---|---|
| AECOM | **The Defense National Stockpile Center Scotia Depot Glenville, NY** | **Photo Log**<br>**Written by: Alexandra Golden**<br>**Date:** 04/15-16/2019<br>**Project Manager: Daniel Servetas**<br>**Project No.:** 60440641 |

**Description: 204-5A after SVI repair**

| | | |
|---|---|---|
| AECOM | **The Defense National Stockpile Center Scotia Depot Glenville, NY** | **Photo Log** |
| | | **Written by: Alexandra Golden** |
| | | **Date:** 04/15-16/2019 |
| | | **Project Manager: Daniel Servetas** |
| | | **Project No.:** 60440641 |

**Description:** 204-5A before caulk during SVI repair

| AECOM | The Defense National Stockpile<br>Center Scotia Depot<br>Glenville, NY | **Photo Log**<br>**Written by:**<br>**Date:** 04/15-16/2019<br>**Project Manager:**<br>**Project No.:** 60440641 |
|---|---|---|

**Description:** Stack of cans preventing repairs of 204