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2016 – 2017 ANNUAL REPORT LONG-TERM GROUNDWATER MONITORING NATURAL ATTENUATION REMEDY

AUGUST 2016 and APRIL 2017 MONITORING EVENTS

Colonie FUSRAP Site
Colonie, New York

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Acronyms and Abbreviations

APTIM	APTIM Federal Services LLC
bgs	below ground surface
CB&I	CB&I Federal Services LLC
CERCLA	Comprehensive Environmental Restoration, Compensation, and Liability Act
cis-1,2-DCE	cis-1,2-dichloroethene
COC	contaminant of concern
CSXT	CSX Transportation
DO	dissolved oxygen
DoD	United States Department of Defense
DOE	United States Department of Energy
DQO	data quality objective
EM	Engineer Manual
EPA	United States Environmental Protection Agency
FUSRAP	Formerly Utilized Sites Remedial Action Program
LTM	Long-Term Monitoring
LUC	Land Use Controls
µg/L	micrograms per liter
mg/L	milligrams per liter
MNA	monitored natural attenuation
msl	mean seal level
mV	millivolt
NCP	National Oil and Hazardous Substances Pollution Contingency Plan
NL	National Lead Industries
NTU	Nephelometric Turbidity Unit
NYSDEC	New York State Department of Environmental Conservation
NYSDOH	New York State Department of Health
ORP	oxidation-reduction potential
PCE	tetrachloroethene
QA	Quality Assurance
QC	Quality Control
RAO	Remedial Action Objective
RI	remedial investigation
ROD	Record of Decision
Shaw	Shaw Environmental, Inc.
Site	Colonie Formerly Utilized Sites Remedial Action Program (FUSRAP) site

Acronyms and Abbreviations (continued)

TCE	trichloroethene
TCG	Target Cleanup Goal
USACE	United States Army Corps of Engineers
VC	vinyl chloride
VOC	volatile organic compound

EXECUTIVE SUMMARY

This Annual Long-Term Monitoring (LTM) report has been prepared on behalf of the United States Army Corps of Engineers (USACE) by APTIM Federal Services LLC (APTIM) (formerly CB&I Federal Services LLC [CB&I]) for the Colonie Formerly Utilized Sites Remedial Action Program (FUSRAP) Site (Site) located at 1130 Central Avenue (State Route 5) in the Town of Colonie, Albany County, New York. This report presents the results and evaluation of the semi-annual groundwater monitoring events conducted in August 2016 and April 2017.

The Record of Decision (ROD) for Site groundwater was signed by the USACE Division Engineer for the North Atlantic Division, Colonel Peter A. DeLuca on 9 April 2010. As required by the Groundwater ROD, the selected remedy for groundwater at the Site is Monitored Natural Attenuation (MNA). The remedial action objectives (RAOs) for Site groundwater are designed to: 1) limit exposure of potential future on-site urban residents to volatile organic compounds (VOCs) that may migrate toward homes via the vapor intrusion pathway, and 2) reduce the concentrations of VOCs in on-site groundwater to levels that are protective of future on-site urban residents who may be exposed to these compounds via the vapor intrusion pathway.

The RAOs are being achieved as evidenced by overall decreases in concentrations of the four VOC groundwater contaminants of concern (COCs) and by the comparison of these concentrations to the following ROD-specified Target Cleanup Goal (TCG) concentrations:

- Tetrachloroethene (PCE) – 5.5 micrograms per liter (μg/L)
- Trichloroethene (TCE) – 18 μg/L
- cis-1,2-Dichloroethene (cis-1,2-DCE) – 1,800 μg/L
- Vinyl chloride (VC) – 1.4 μg/L.

The groundwater remedy will be considered complete and monitoring will be discontinued when compliance has been achieved for all four VOCs with respect to these TCGs at each Site monitoring well. As set forth in the Colonie Groundwater ROD, a groundwater monitoring program was implemented to measure remedy status and progress. Each monitoring event was documented by data summary reports that were transmitted by USACE to the New York State Department of Environmental Conservation (NYSDEC). Annual reports were also prepared to evaluate remedy progress and status.

This annual LTM report presents the results and evaluation of the eleventh (August 2016) and twelfth (April 2017) groundwater monitoring events conducted since the signing of the Groundwater ROD in 2010. The monitoring events were conducted in accordance with the ROD-required LTM Program. The LTM program has evolved through optimization via program

modifications that were step-wise reductions in the number of monitoring wells, constituents analyzed, groundwater zones monitored, and frequency of sampling based on remedy progress. NYSDEC has concurred with all Colonie Groundwater LTM Program modifications.

The compliance status of the remedy for the most current monitoring event in April 2017 is provided in this report. Remedy progress is also shown graphically for VOC concentrations in groundwater over time (i.e., time series plots). Evidence of remedy progress includes the overall trends of stable or decreasing COC concentrations in groundwater using both current and historic groundwater data and the direct comparison of VOC concentrations to the TCGs. Information supporting the presence of active natural attenuation processes comes from the measured groundwater parameters – dissolved oxygen (DO) and oxidation-reduction potential (ORP). These parameters indicate general geochemical signatures that typify particular natural attenuation processes occurring in Site groundwater that result in the breakdown of COCs.

Results and Conclusions. The overall results of the MNA evaluation as presented in this report include: 1) comparison of VOC results to TCGs for the most current monitoring event, 2) VOC concentration trend analysis, and 3) geochemical indicators of MNA. The results and conclusions are summarized below.

1) Comparison of VOC Results to TCG Concentrations: Current April 2017

The VOC results that exceeded TCGs during the most recent monitoring event (April 2017) were the following:

PCE (Exceeding the TCG of 5.5 μg/L):

- MW-41S: 24.0 μg/L (04/2017)
- MW-44S: 18.0 μg/L (04/2017)

TCE (Exceeding the TCG of 18.0 μg/L):

- None

VC (Exceeding the TCG of 1.4 μg/L):

- None

Cis-1,2-DCE (Exceeding the TCG of 1,800 μg/L):

- None.

The NYSDEC has requested that concentrations of cis-1,2-DCE be compared to the New York state groundwater quality standard of 5 μg/L. The comparison showed that two wells (MW-37S and MW-42S) had concentrations of cis-1,2-DCE exceeding 5 μg/L for the April 2017 monitoring event.

The conclusion is that two wells in the monitoring well network of seven wells currently have concentrations of a VOC above its TCG. That is the TCG of 5.5 μg/L for PCE is exceeded at monitoring wells MW-41S (24 μg/L) and MW-44S (18 μg/L), both located within the boundary of the Colonie Main Site. There were no other exceedances of a TCG for the four VOCs at any other monitoring wells.

2) Current VOC Concentration Trend Analysis: April 2017

As mentioned there were two exceedances of the TCG for PCE at two monitoring wells (MW-41S and MW-44S) in April 2017. There were no other exceedances of a TCG at any other well location for the four COCs in April 2017. The concentration trends for the two monitoring wells that exceeded the TCG for PCE in April 2017 are summarized as follows:

- MW-41S exhibited an overall stable to a very slightly decreasing trend with PCE concentrations ranging 14 μg/L to 31 μg/L during the period of November 2010 through April 2017. The lowest concentration in the given range occurred in August 2015, and the most current value is 24 μg/L.
- MW-44S, installed July 2015, showed an increasing trend in PCE concentration over its relatively short period of record (August 2015 through April 2017). The four PCE results on record for this well ranged from 3.1 μg/L to 18 μg/L. Monitoring well MW-44S well may be within the stagnation zone caused by the sheet pile wall located approximately 30 feet downgradient of the well. This likely reduces the expected attenuation rates of VOCs.

Note that until more recent monitoring events, two wells (MW-30 and MW-32S) were sporadically out of compliance for PCE, and one well (MW-34S) was consistently out of compliance for vinyl chloride during the monitoring period.

The conclusion is that the majority of wells show decreasing trends for most VOCs. The exceptions are two site wells (MW-41S and MW-44S) with concentrations of PCE above the TCG. Well MW-41S displays a stable to possible slowly decreasing trend of PCE concentrations, whereas over the short period of record for the MW-44S well a slightly increasing trend is apparent for PCE values.

3) Geochemical Indicators of MNA

The assessment of the geochemical indicators in the Upper Groundwater Zone presented evidence that geochemical conditions are variable. The conclusion is that the data support the presence of reductive dechlorination of VOCs at various locations; however, not on a consistent basis.

Recommendations. Based on remedy status and on results and conclusions, it is recommended that LTM of groundwater be continued on a biennial basis beginning in Fall 2019 with monitoring specifics described below:

- Continue monitoring of PCE, TCE, cis-1,2-DCE, and VC in the Upper Groundwater Zone as follows:
  - Sample monitoring well MW-08S biennially to continue monitoring upgradient groundwater conditions.
  - Sample Site monitoring wells MW-30S, MW-41S, MW-42S, and MW-44S on a biennial basis.
  - Sample monitoring wells MW-34S and MW-37S biennially to continue monitoring downgradient groundwater conditions.
- Retain monitoring of the geochemical indicators of natural attenuation (i.e., DO and ORP) in the Upper Groundwater Zone to specifically address the chosen remedy. Sample each of the following seven monitoring wells biennially for MNA parameters: MW-08S, MW-30S, MW-34S, MW-37S, MW-41S, MW-42S, and MW-44S.

1.0 INTRODUCTION

This Annual Long-Term Monitoring (LTM) Report presents the data results and evaluation for the August 2016 and April 2017 semi-annual groundwater monitoring events at the Colonie Formerly Utilized Sites Remedial Action Program (FUSRAP) Site (Site), located at 1130 Central Avenue in the Town of Colonie, Albany County, New York. This report has been prepared on behalf of the United States Army Corps of Engineers (USACE) by APTIM Federal Services LLC (APTIM) (formerly CB&I Federal Services LLC [CB&I]) under USACE Rapid Response Program V Contract No. W9128F-12-D-0003, Task Order No. 0022.

Groundwater monitoring was conducted on a semiannual basis during this reporting period as a part of the LTM Program in support of the monitored natural attenuation (MNA) remedy for the Site. The two monitoring events represented in this annual report were completed in accordance with the *Colonie FUSRAP Site Groundwater Record of Decision* (USACE, 2010a). This report documents the results of the eleventh (August 2016) and twelfth (April 2017) groundwater monitoring events conducted since the signing of the Groundwater Record of Decision (ROD) in 2010. Since issuance of the Groundwater ROD, the LTM Program has been modified through optimization of the program requirements based on results of the initial two-year period of quarterly monitoring events. The monitoring events held August 2016 and April 2017 were performed under the optimized LTM Groundwater Program.

The purpose of this Annual LTM Report for the Colonie Site is to document progress of the groundwater natural attenuation remedy and evaluate monitoring endpoints. The progress of the remedy was evaluated by reviewing monitoring data over time. Compliance status of the remedy was ascertained by comparing groundwater analytical results to the Target Cleanup Goal (TCG) concentrations. In addition, this report provides conclusions derived from the data evaluation and offers recommendations relative to the LTM program.

This Annual LTM Report consists of the following sections:

- **Section 1.0** – Introduction: Site Background, Purpose and Scope of LTM Program, Site Description, Activities Performed, and Site Groundwater ROD.
- **Section 2.0** – Summary of Groundwater Monitoring Activities: Summary of Monitoring Events, LTM Program, Groundwater Monitoring Events, and Groundwater Analytical Results.
- **Section 3.0** – Natural Attenuation Remedy Performance Evaluation: Introduction to the Evaluation and Upper Groundwater Zone Evaluation.
- **Section 4.0** – Conclusions and Recommendations: Conclusions from the natural attenuation evaluation and recommendations for the LTM Program.
- **Section 5.0** – References: List of pertinent references.

This report contains the following appendices:

- Appendix A Groundwater ROD Figures 6 and 7
- Appendix B Historical Groundwater Data Summary Tables
- Appendix C Data Validation Reports - August 2016 and April 2017 Monitoring Events
- Appendix D Time-Series Plots of Volatile Organic Compounds
- Appendix E Time-Series Plots of Natural Attenuation Parameters.

1.1 Site Background

Industrial operations began around 1923 when the Embossing Company constructed a facility to manufacture wood products and toys on a portion of the present-day Site. In 1927, Magnus Metal Company, Inc. purchased the property and converted the facility to a brass foundry for manufacturing railroad components. The Site was owned and operated by National Lead Industries (NL) from 1937 to 1984. In 1958, the nuclear division of NL began producing items manufactured from uranium and thorium under a license issued by the Atomic Energy Commission and New York State. The New York State Supreme Court shut down the NL plant in 1984 due to environmental concerns, and ownership of the property was transferred to the U.S. Department of Energy (DOE).

Authority for remediation of the Site (as well as ownership) was assigned to DOE by Congress through the *Energy and Water Development Appropriations Act* of 1984. From 1984 to the fall of 1997, the Site was managed by the DOE. USACE assumed responsibilities for site environmental restoration from the DOE per Congressional action in October 1997. By 2007, the USACE had completed a large-scale removal action at the Site involving excavation and off-site disposal of over 135,000 cubic yards of soil contaminated with radionuclides, metals, and volatile organic compounds (VOCs) (Shaw Environmental, Inc. [Shaw], 2010). Investigations of the groundwater beneath the Site revealed that VOCs were released into the groundwater as a result of historic operations.

On 9 April 2010, the Groundwater ROD was signed by the USACE North Atlantic Division Engineer, Colonel Peter A. DeLuca. The selected remedy for management of Site groundwater was MNA with temporary Land Use Controls (LUCs) as an option if needed to limit potential exposure to groundwater contaminants until TCGs are achieved. The Groundwater ROD specified a two- to five-year enhanced data collection period to measure the progress and compliance status of the natural attenuation remedy.

In June 2010, USACE established the LTM Program which included the enhanced data collection period consisting of an initial eight consecutive quarterly groundwater monitoring events. The initial eight quarterly events following the signing of the Groundwater ROD occurred during the period of November 2010 through August 2012. The post-ROD groundwater monitoring program

built upon a four-quarter MNA demonstration event conducted from July 2008 through May 2009. Following issuance of the Groundwater ROD, the analytical protocols utilized during the MNA demonstration event were adjusted to align with ROD requirements.

Based on the results and progress of the MNA remedy during the initial 2-year monitoring period, the LTM Program was modified as presented in the *2011 – 2012 Final Annual Groundwater Long-Term Monitoring Report* (USACE, 2014). On 5 May 2014, the New York State Department of Environmental Conservation (NYSDEC) concurred with modifications to the LTM Program that included reductions in: 1) the number of wells in the monitoring well network, 2) the number of parameters in the analytical program, and 3) the frequency of sampling. Groundwater monitoring was continued under the modified LTM Program with semi-annual monitoring events conducted in August 2015, March 2016, August 2016, and April 2017.

1.2 Purpose and Scope of LTM Program

The purpose of the Groundwater LTM Program is to monitor progress and verify compliance status of the MNA remedy. The ultimate goal of the program is to achieve the TCGs for specific VOCs in groundwater, verify attainment of TCGs, and limit exposure to potential future on-site urban residents.

The scope of the program involves groundwater monitoring and associated site activities as well as data evaluation as detailed in the *Final Long-Term Monitoring Work Plan* (USACE, 2010b). The NYSDEC concurred with modifications to the LTM Program which are summarized in the *Addendum to the Final Long-Term Monitoring Work Plan* (CB&I, 2014a). These work plans along with the *Sampling and Analysis Plan-Uniform Federal Policy-Quality Assurance Project Plan* (CB&I, 2014b) provide detailed methodologies and procedures for required tasks which are aligned with the goals established in the Groundwater ROD.

1.3 Site Description

The Site in Albany County, New York is currently part of the FUSRAP program. As shown on **Figure 1**, the Site is located along New York State Route 5 in the Town of Colonie, Albany County, New York. The Site address is at 1130 Central Avenue, Colonie, New York, 12205. The 11.2-acre property is relatively flat, and is fenced with gated accesses in the northeast portion of the Site along Central Avenue, and in the southwest portion adjacent to the railroad tracks. The Site is bounded on the west by a heavily wooded lot/industrial parking lot at 7 Railroad Avenue, on the south by CSX Transportation (CSXT) rail tracks and residences, and on the north and east by active commercial properties along Central Avenue/New York State Route 5 (**Figure 2**). A fenced Niagara Mohawk electrical substation is located adjacent to the northwest corner of the Site. Overall, a mix of residential and commercial properties exists in the vicinity of the Site. The town of Colonie has a population of approximately 8,000.

USACE is the lead agency for Site activities. NYSDEC is the lead regulatory agency for the Site. Restoration activities are also coordinated with the New York State Department of Health (NYSDOH) and the Albany County Department of Health. Funding for remediation activities is provided on an annual basis by congressional appropriations under the Energy and Water Development Appropriations Act. USACE is utilizing the administrative, procedural, and regulatory provisions of the Comprehensive Environmental Restoration, Compensation, and Liability Act (CERCLA) and the National Oil and Hazardous Substances Pollution Contingency Plan (NCP) to guide the remediation process at the Site.

1.3.1 Geologic Setting

Most of the unconsolidated sediments above bedrock at the Site were deposited in glacial Lake Albany created during continental glacier advances and retreats in the Hudson Valley.

The following is a brief summary of the geological units represented at the Site, starting from the uppermost unit to the lowermost unit.

Artificial Fill and Flood Plain Sediments: This unit consists of artificial fill materials and natural flood plain sediments. Fill materials placed at the Site during industrial use included gravel, sand, brick fragments, and other construction-type materials that have since been replaced by clean fill soil during the post-excavation backfill operation at the Main Site. Flood plain sediments are thin deposits of materials related to sedimentation in the former Patroon Lake and from floods of the unnamed tributary of Patroon Creek.

Dune Sand: This unit is fine-grained sand that is light yellow-brown and cross-laminated. Based on lithologic logs, it thins from northwest to southwest across the Site, and occurs near the ground surface predominantly above the water table.

Upper Silt: This unit is composed of lake silt and sand and represents the uppermost water bearing zone or water table at the Site and is also known as the Upper Groundwater Zone. Grain-size analyses showed significant silt fractions in samples collected from this unit.

Upper Clay: This is the most easily identified unit in conductivity logs, and consists of a varved sequence of clay and silt. This unit separates the two uppermost water bearing zones at the Site, acting as a confining layer for the Lower Groundwater Zone.

Lower Silt: This unit consists predominantly of silt with some clay, and lies above the Lower Clay Unit. This confined water-bearing zone is known as the Lower Groundwater Zone.

Lower Clay: The Lower Clay is approximately 100 feet thick at the Site. It is olive gray and very homogenous, showing few signs of silt or sand interbeds. The Lower Clay is the basal hydrogeologic boundary.

Till: This glacially-deposited unit is dark gray and poorly sorted (10 percent sand, 40 percent gravel, and 50 percent clay). One Site borehole penetrated the till to a depth of 160 feet below ground surface (bgs). Bedrock underlies the till.

Additional geological information is provided in the *Final Groundwater Remedial Investigation Report* (Shaw, 2003).

1.3.2 Groundwater Hydrology

The Upper Groundwater Zone at the Site is generally encountered at a depth of less than 10 feet below surface grade. Groundwater level measurements indicate that the saturated thickness of the Upper Groundwater Zone ranges from over 20 feet in the north to less than 15 feet in the south near the Site property line. The base of the Upper Groundwater Zone is defined by the top of the Upper Clay, and ranges from elevations of approximately 202 to 205 feet above mean sea level (msl). The thickness of the Upper Clay ranges from approximately 12 to 15 feet. The top surface of the Lower Silt, in which the Lower Groundwater Zone is present, is typically encountered at an elevation of approximately 190 feet msl. The thickness of the Lower Groundwater Zone ranges from 10 feet to approximately 15 feet (Shaw, 2003).

A review of the groundwater and geologic unit elevations indicates that the Lower Groundwater Zone is a confined water bearing unit, with depth to groundwater less than 10 feet below grade. Groundwater in the Lower Groundwater Zone is under confining pressure and rises in the monitoring wells to elevations above the top of the zone to levels comparable to those of the Upper Groundwater Zone.

Permeabilities of these units obtained from field tests ranged from 0.04 to 109 feet/day in the Upper Groundwater Zone (mean and median of 1.5 and 1.3 feet/day, respectively), and 0.29 to 31 feet/day in the Lower Groundwater Zone (mean and median of 6.4 and 0.68 feet/day, respectively) (Shaw, 2003).

Groundwater flow across the Site is generally to the south-southeast in both groundwater zones. There is a downward vertical gradient over the northern portions of the Site, with an upward vertical gradient near the unnamed tributary and toward Patroon Creek.

A notable man-made feature that locally affects groundwater flow on the Site is the vertical steel sheet pile wall installed to maintain stability of the CSXT railroad tracks during the large-scale soil excavation of the Main Site (**Figure 2**). The sheet pile wall was driven to depths of 30 and 50 feet bgs in the eastern portion of the Site. It is approximately 260 feet in length (URS, 2008). This subsurface feature interupts groundwater flow locally in the southeast portion of the Site and elongates the flow path by diverting flow around the structure.

1.3.3 Nature and Extent of Contamination

Results of the groundwater remedial investigation (RI) conducted between 1999 and 2002 showed elevated concentrations of VOCs in monitoring wells within the Upper Groundwater Zone. Maximum VOC concentrations of tetrachloroethene (PCE), trichloroethene (TCE), cis-1,2-dichloroethene (cis-1,2-DCE), and vinyl chloride (VC) were identified in the eastern portion of the Site during the RI. RI data indicated that the Lower Groundwater Zone was not impacted by VOC concentrations above evaluation criteria (Shaw, 2003).

The originally-estimated extent of the on-site VOC mass area in the Upper Groundwater Zone was provided in the Groundwater ROD in Figures 6 and 7 (**Appendix A**). These drawings show that the historical VOC mass was largely present within the Site property with a portion of the mass overlapping onto CSXT property in the general direction of groundwater flow. The leading edge of the VOC mass extended just into the CSXT rail corridor at that time, but did not travel further downgradient as evidenced by groundwater results from sentinel wells located just south of the railroad tracks.

Site historical data provided in **Appendix B** includes historical groundwater analytical data for VOCs from 1998 through 2009. These results show that the highest concentrations of VOCs occurred in the early part of the record with overall decreasing trends in VOCs occurring across the Site as can be seen in subsequent data. The decreasing trend is also attributed to removal of VOC source soils during the large-scale excavation of soil and associated dewatering at the Main Site.

Analytical data obtained subsequent to the RI show that total VOC concentrations have reduced significantly and continue to do so. More current analytical results show that the only VOC exceedances of TCGs are in on-site wells MW-41S and MW-44S for PCE. Since issuance of the Groundwater ROD, groundwater monitoring results from 2010 to date indicate an overall decrease in VOC concentrations, further reducing the availability and the extent of the total VOC mass in groundwater.

1.4 Activities Performed

Activities performed during the 2016-2017 monitoring period include the following:

- August 2016 Semi-annual Groundwater Monitoring Event
- April 2017 Semi-annual Groundwater Monitoring Event.

1.5 Site Groundwater Record of Decision

The Groundwater ROD was signed on 9 April 2010 (USACE, 2010a). The selected remedy for Site groundwater consists of MNA with LUCs as needed to meet site-specific remedial action objectives (RAOs). The remedy groundwater was chosen in the ROD in accordance with the

requirements of the CERCLA as amended by *Superfund Amendments and Reauthorization Act*, 42 United States Code §9601-9675, and to the extent practicable, the National Contingency Plan (NCP), as amended, 40 Code of Federal Regulations Part 300. The decisions presented in the Groundwater ROD were based on information contained in the Administrative Record File for the Site, and have been made by the USACE in conjunction with the NYSDEC.

Natural attenuation is the combination of physical, chemical, and biological processes that result in reasonably predictable reductions in contaminant concentrations over time. MNA refers to the process of documenting the progress and effectiveness of natural attenuation through a defined monitoring program.

The groundwater remedy has the following elements regarding monitoring, remedy progress, and protection:

- A two- to five-year enhanced data collection period conducted to assess the rate of natural attenuation processes and to document that geochemical conditions have returned to a state of equilibrium.
- The progress of MNA to be assessed at the end of the data collection period in order to refine timeframes. As necessary, subsequent LTM will be implemented until compliance with the TCGs has been achieved. The timeframe for compliance was initially estimated at 15 years.
- Temporary LUCs were to be utilized, as appropriate, to limit potential future on-site residential exposure to groundwater contaminants until TCGs are achieved. In addition, groundwater use restrictions are pending that will prohibit drilling and/or groundwater pumping activities to insure that the groundwater is not used for potable or irrigation purposes.

The RAOs for Site groundwater specific to the Colonie Site were designed to: 1) limit exposure of potential future on-site urban residents to VOC constituents that could have migrated toward homes via the vapor intrusion pathway, and 2) reduce the concentrations of VOCs in on-site groundwater to levels that are protective of future on-site urban residents who may be exposed to these compounds via the vapor intrusion pathway. The proposed action was implemented to reduce excess cancer risk due to inhalation of vapors intruding into a hypothetical on-site residence to less than one in one million (10^{-6}).

Risk reduction was expected to be achieved by lowering of concentrations of groundwater contaminants to the following TCG concentrations:

- PCE – 5.5 micrograms per liter (μg/L)
- TCE – 18 μg/L
- cis-1,2-DCE – 1,800 μg/L
- VC – 1.4 μg/L.

The Groundwater ROD declares that the remedy for Site groundwater will be considered complete, and monitoring will be discontinued, when compliance with the TCG concentrations has been achieved, based on data from the on-site monitoring wells included in the monitoring program. Specifically, if during the monitoring period, measured concentrations in any well reach, and are maintained below, the TCG concentrations for four consecutive quarters, the well will be dropped from the monitoring program. Wells achieving compliance with a statistically significant criterion that is below the TCG concentration will have met the cleanup criteria, and further monitoring of these wells will be discontinued.

2.0 SUMMARY OF GROUNDWATER MONITORING ACTIVITIES

This section provides a summary of the sampling events, groundwater monitoring program, groundwater elevations, and groundwater analytical results for the 2016-2017 LTM Program period.

2.1 Summary of Monitoring Events

Semi-annual groundwater monitoring events were performed at the Site in August 2016 and April 2017. The August 2016 event was documented in the previously published report – *Draft Final Groundwater Monitoring Report, Natural Attenuation Remedy, August 2016 Sampling Event* (CB&I, 2016). Summary information for both groundwater monitoring events is presented in this document.

During the two monitoring events, groundwater level measurements were made and groundwater samples were collected for chemical analysis in accordance with the *Addendum to the Final Long-Term Monitoring Work Plan* (CB&I, 2014a) and LTM program modifications.

Groundwater samples were collected using the low-flow purging technique as specified in the *Final Long-Term Monitoring Work Plan* (USACE, 2010b), and in accordance with the USACE Engineer Manual (EM)-200-1-3 guidelines for low-flow groundwater sampling (USACE, 2001). Each monitoring well contains a dedicated bladder pump to facilitate the low-flow purge and sampling method. All sampling actions utilized a flow-through cell for field parameter collection and analysis. The flow-through cell was decontaminated between wells in accordance with the work plan.

The following water quality parameters were measured at each well during purging prior to sample collection:

- pH
- Specific conductance
- Turbidity
- Dissolved oxygen (DO)
- Temperature
- Oxygen-reduction potential (ORP).

Water quality parameters must meet the following stability criteria during well purging as required by the work plan:

- pH: ± 0.2 units
- Specific conductance: ± 3 percent
- Turbidity: ± 10 percent or 5 Nephelometric Turbidity Units (NTU), whichever is greater
- DO: ± 10 percent of the reading or 0.2 milligrams per liter (mg/L), whichever is greater

- Temperature: ± 1.0˚ Celsius
- ORP: ± 20 millivolt (mV).

In addition to the stability criteria, drawdown (i.e., induced lowering of the groundwater level in the well during purging) must not exceed 25 percent of the distance between the top of the well screen or the static water level (whichever is lower) and the pump intake level.

2.2 Long-Term Monitoring Program

This section presents the components of the groundwater monitoring program including the most current monitoring well network, analytical program, and sampling frequency. The LTM program has evolved through optimization based on evaluation of analytical results and progress of the remedy. Since the signing of the ROD and evaluation of information gained during monitoring events the program has been optimized through reductions in: 1) the number of monitoring wells, 2) the number of constituents being analyzed, and 3) in the frequency of sampling. The current monitoring well network and analytical program are described below.

2.2.1 Current Monitoring Well Network

The current monitoring well network includes the following seven Upper Groundwater Zone monitoring wells: MW-08S, MW-30S, MW-34S, MW-37S, MW-41S, MW-42S and MW-44S. The locations of the monitoring wells are shown on **Figure 2**.

Site monitoring wells and piezometers no longer used in groundwater LTM were decommissioned in July-August 2015 (with the exception of MW-32S), as reported to the NYSDEC in the *Draft Decommissioning Report, Monitoring Wells and Piezometers, Colonie FUSRAP Site* (CB&I, 2015). The effort included the decommissioning of all Lower Groundwater Zone monitoring wells. Note that well MW-32S still exists at the Site, but is not currently used for monitoring. The current Colonie Groundwater LTM Program monitoring well network is presented in **Table 1**.

2.2.2 Current Analytical Program and Sampling Frequency

The current groundwater analytical protocol includes the following chemical analyses and field measurements for the eight network monitoring wells:

- VOCs – laboratory analysis of PCE, TCE, cis-1,2-DCE, and VC
- MNA parameters – field measurement of DO and ORP.

VOCs were analyzed by the contracted laboratory using U.S. Environmental Protection Agency (EPA) Method 8260B. MNA parameters were measured in the field during sample purging using the flow-through cell equipped with a multi-parameter meter.

The sampling frequency was reduced from quarterly to semi-annual monitoring events after the initial two-year monitoring period following the signing of the Groundwater ROD. **Table 2** provides a summary of current sampling frequency and analytical requirements for each monitoring well.

Groundwater samples collected for the analysis of VOCs were shipped to ALS Environmental laboratory in Rochester, New York.

2.3 Groundwater Monitoring Events – August 2016 and April 2017

The LTM events in August 2016 and April 2017 included monitoring of groundwater elevations and sampling of groundwater for VOC analysis.

2.3.1 Groundwater Elevations

Groundwater levels were measured in each of the monitoring wells as a part of the groundwater monitoring events. The water level data shown in **Tables 3** and **4** were used to create groundwater elevation contour maps that represent the potentiometric surface of the Upper Groundwater Zone at the Site for the two monitoring events. **Figures 3** and **4** present the groundwater elevation contour maps respectively for the August 2016 and April 2017 monitoring events.

The groundwater elevations and overall apparent groundwater flow direction for these latest events are consistent with those of previous monitoring events. As shown on the figures, groundwater flow direction is generally toward the south with some localized flow to the southeast in the vicinity of the stream located southwest of monitoring well MW-34S in both August 2016 and April 2017.

2.3.2 Groundwater Sampling

The semi-annual groundwater monitoring events were conducted in August 2016 and April 2017. The analytical results associated with these events are summarized in the section to follow.

2.4 Groundwater Analytical Results – August 2016 and April 2017

Groundwater analytical results for 2016-2017 are presented in this section along with the scope of analytical services and summary of data quality.

2.4.1 Summary of Groundwater Analytical Results

The laboratory analytical results and field-measured natural attenuation parameters for the August 2016 monitoring event are summarized for each monitoring well in **Tables 5** and **6**, respectively. The laboratory analytical results and field-measured natural attenuation parameters for the April 2017 monitoring event are summarized for each monitoring well in **Tables 7** and **8**, respectively. **Table 9** presents a summary of VOC results for groundwater for the LTM period November 2010

through April 2017 with positive detections of VOCs in bold-face print, and shaded results for those results that that exceeded TCGs.

2.4.2 Summary of Analytical Services Scope

Analytical services for chemical samples were provided by the DoD Environmental Laboratory Accreditation Program and the National Environmental Laboratory Accreditation Conference-accredited laboratory ALS Environmental of Rochester, New York. The laboratory implemented the EPA *Test Methods for Evaluating Solid Waste, SW846, Fourth Edition, Update IV* (EPA, 2007) methodologies for all parameters in providing analytical results for this project.

2.4.3 Summary of Data Quality Review

This section summarizes the results of the data validation process and evaluates usability of data collected during the August 2016 and April 2017 monitoring events in accordance with the project Quality Control (QC) Program. The QC Program was developed in accordance with the specifications contained in the *Sampling and Analysis Plan – Uniform Federal Policy-Quality Assurance Project Plan, Colonie FUSRAP Site, Draft* (CB&I, 2014b) and the United States Department of Defense (DoD) *Quality Systems Manual for Environmental Laboratories, Final Version 4.2* (DoD, 2010).

Quality Assurance (QA) is the overall system for assuring the reliability of data produced. This system includes the integration of the quality planning, assessment, and improvement efforts of various groups within the project organization team. The data validation and data usability program was designed to achieve the project Data Quality Objectives (DQOs). The objectives of the DQOs are to ensure: 1) the reliability of field sampling, chemical analyses, and physical analyses; 2) the sufficiency of collected data; 3) the applicability of data for intended use; and 4) the validity of assumptions inferred from the data.

For the groundwater monitoring events, data validation was completed to assess laboratory performance, including but not limited to a review of data completeness, field documentation, sample holding times, QC results, laboratory control samples, surrogate recoveries, internal standards, and detection and reporting limits. Data Validation Reports for the August 2016 and April 2017 monitoring events are provided in **Appendix C**. These reports show how the laboratory and data validation qualifiers present on the analytical data summary tables have been assigned.

Groundwater analytical results are considered acceptable for use with the qualifications noted for the two sampling events. A comparison of analytical results between the August 2016 and April 2017 sampling events, among prior analytical results in the period of record from 2010-2015, and historical data indicates that the data are generally consistent. Based on the groundwater data quality review for the 2016-2017 monitoring events, the laboratory analytical results are

considered of sufficient quality to make informed decisions and draw sound conclusions regarding the concentrations of analytes present in groundwater.

3.0 NATURAL ATTENUATION REMEDY PERFORMANCE EVALUATION

3.1 Remedy Evaluation

This section presents the evaluation of performance of the MNA remedy for Site groundwater for data collected through April 2017. It includes a review of remedy progress over time and current compliance status of Site groundwater.

Note that the evaluation pertains to the uppermost water-bearing zone at the Site, i.e., the water table, referred to as the Upper Groundwater Zone. Monitoring of the Lower Groundwater Zone was discontinued August 2015 when all Lower Groundwater Zone monitoring wells were decommissioned in concurrence with NYSDEC as a part of LTM program optimization.

Monitoring wells in the Upper Groundwater Zone were sampled for laboratory analysis of VOCs and readings of natural attenuation parameters (i.e., geochemical indicators) were made during sampling. Groundwater analytical results evaluated include those for the identified groundwater contaminants of concern (COCs) for the Site, namely the VOCs PCE, TCE, cis-1,2-DCE, and VC. The geochemical indicators evaluated were DO and ORP.

The sections to follow present: 1) a summary of groundwater analytical results for the COCs, 2) changes in concentrations of the COCs in groundwater over time and distance, 3) comparison of VOC concentrations in groundwater to TCGs, 4) summary of geochemical indicators, and 5) current compliance status of each of the monitoring wells.

3.1.1 Analytical Results of COCs

The COCs were detected in Site monitoring wells during the twelve groundwater monitoring events conducted during the period of November 2010 through April 2017. VOC results for PCE, TCE, cis-1,2-DCE, and VC are summarized for each monitoring well during the monitoring period as follows:

- MW-08S: This upgradient well had no detections of VOCs during the monitoring period.
- MW-30S: One VOC (PCE) exceeded its TCG of 5.5 µg/L two times during the monitoring period, the last of which was during the August 2012 event at a concentration of 6.0 µg/L. No exceedances of the TCG for PCE were recorded for the last four monitoring events which ranged from 1.5 to 3.9 µg/L over the period from August 2015 through April 2017.
- MW-32S: Both PCE and TCE have exceeded respective TCGs during the monitoring period. PCE exceeded its TCG (5.5 µg/L) four times, the last of which was during the August 2015 event with a concentration of 11µg/L. TCE exceeded its limit of 18 µg/L one time during the period at a concentration of 19µg/L in August 2012.
- MW-34S: VC is the one VOC that has not met its TCG (1.4 µg/L) during the monitoring period. Overall, VC ranged from 1.1 to 3.4 µg/L with two recent non-exceedances of the

TCG in March 2016 and April 2017.

- MW-37S: This well had no exceedances of TCGs during the monitoring period. Concentrations of cis-1,2-DCE have increased somewhat yet remain well below its TCG. Consistently low concentrations of PCE, TCE, and VC were detected, all below TCGs during the monitoring period.
- MW-41S: PCE is the one VOC of the four that exceeded its TCG (5.5 µg/L) during the monitoring period for this well. The PCE limit has been exceeded during each monitoring event, ranging from 14 to 39 µg/L during those events, while ranging from 14 to 25 µg/L over the last four events. The remainder of the VOCs were below respective TCGs. PCE concentrations have decreased over time similar to the three other VOCs, however, remain one order of magnitude above its TCG.
- MW-42S: There were no exceedances of TCGs for this well during the monitoring period. Similar to well MW-37S, cis-1,2-DCE have increased but remain well below its TCG, and consistent low levels of PCE, TCE, and VC are all below TCGs during the monitoring period.
- MW-44S: This well was installed in July 2015 and has been sampled a total of four times to date. PCE concentrations exceeded the TCG of 5.5 µg/L during the last three monitoring events, with concentrations of 13 µg/L, 15 µg/L, and 18 µg/L, respectively for March 2016, August 2016, and April 2017. PCE has displayed slowly increasing concentrations since its inception in July 2015, as have TCE and cis-1,2-DCE, yet are both well below TCGs. VC has remained non-detected during each of the four monitoring events for this well.

Table 9 provides a summary of VOC results for the period of November 2010 through April 2017.

3.1.2 Change in COCs over Time

The changes in COC concentrations in groundwater over time and distance were reviewed for the monitoring period. The time-series plots graphically display the changes in concentrations of PCE, TCE, cis-1,2-DCE, and VC over time during the post-ROD LTM period of record (2010-2017) along with historical analytical data results. The time-series plots for VOCs are provided in **Appendix D**.

Current trends observed on a well-by-well basis are summarized as follows:

- MW-08S: All VOCs were non-detects, typical for this Site background monitoring well.
- MW-30S: VC remained non-detected while both TCE and cis-1,2-DCE became non-detects in April 2017. PCE had a very slight decrease in concentration to 3.1 µg/L within an overall stable decreasing trend below its TCG of 5.5 µg/L.
- MW-34S: In April 2017, PCE had a very slight increase in concentration and TCE concentration showed a detection of 0.29 J µg/L (for first-time detection during the 2010-2017 period). The VC concentration (1.1 µg/L) again reduced to below its TCG (1.4 µg/L)

for the second time since the Main Site soil removal. Cis-1,2-DCE had a very slight decrease to 1.2 µg/L. The four VOCs are all on stable low-concentration trends.

- MW-37S: PCE, TCE, and VC had very slight increases on stable trends well below respective TCGs in April 2017. Cis-1,2-DCE concentration continues leveling off with minor variations in concentrations after the sharp increase following the Main Site soil removal in 2007, yet remains several orders of magnitude below its TCG.
- MW-41S: PCE concentration (24 µg/L) remained above its TCG (5.5 µg/L) on an overall decreasing trend. The other three VOCs had minor variations on stable level trends in April 2017 well below respective TCG concentrations.
- MW-42S: Similar to MW-37S, PCE and TCE concentrations had very slight variations on stable trends well below TCGs in April 2017. VC remained non-detect. Cis-1,2-DCE concentration displayed a decreasing trend after leveling off following the sharp increase in concentration after the Main Site soil removal in 2007. The concentration of cis-1,2-DCE remained several orders of magnitude below its TCG.
- MW-44S: VC remained as non-detected in April 2017, and TCE and cis-1,2-DCE remained at essentially the same concentrations as the previous sampling event, both below TCGs. PCE concentration increased to 18 µg/L, above its TCG of 5.5 µg/L.

3.1.3 Change in COCs over Distance

This section discusses changes in COC concentrations over distance at the Site.

PCE: Monitoring well MW-37S is located downgradient of well MW-32S. The significant decrease of PCE concentration between these two monitoring wells suggests that PCE is being attenuated over distance (**Figure 5**). During the 2010-2017 monitoring events, PCE was not detected, or was detected at low concentrations (generally less than 1.0 µg/L) at the downgradient monitoring wells located off site across the railroad tracks (i.e., wells MW-34S and MW-37S). This indicates that PCE concentrations have been effectively attenuated over distance and are not migrating off site.

Site background information indicates that PCE was the primary COC released into the subsurface and the detection of its daughter product, TCE, is evidence of reductive dechlorination either occurring currently and/or having occurred in the past.

TCE: During the 2010-2017 monitoring events, TCE was detected in seven monitoring wells. Monitoring well MW-32S had one TCE concentration (19 µg/L in August 2012) that exceeded the TCG (18 µg/L). During more recent monitoring events there were no exceedances of the TCG for TCE at any of the monitoring wells.

Figure 6 presents box plots of TCE concentrations for the LTM period 2010-2017. TCE was not detected or was detected at low concentrations, generally estimated at less than 1.0 µg/L, at the downgradient monitoring wells located off site across the railroad tracks (wells MW-34S and

MW-37S). This suggests that TCE concentrations have been effectively attenuated over distance. The results indicate that natural attenuation is effectively controlling the TCE concentrations in the Upper Groundwater Zone.

Cis-1,2-DCE: Cis-1,2-DCE is preferably produced when TCE degrades via reductive dechlorination. During the 2010-2017 monitoring events, cis-1,2-DCE was detected in seven monitoring wells (MW-30S, MW-32S, MW-34S, MW-37S, MW-41S, MW-42S, and MW-44S) in the Upper Groundwater Zone at concentrations ranging from less than 1.0 µg/L to 52 µg/L. None of these results exceeded the TCG.

Figure 7 presents box plots of the cis-1,2-DCE concentration distribution for 2010-2017 monitoring period. With the exception of monitoring well MW-37S, cis-1,2-DCE was not detected, or was detected at low concentrations, generally less than 1.0 µg/L at the downgradient monitoring well positions such as well MW-34S and the former downgradient wells now decommissioned. This suggests that cis-1,2-DCE concentrations have been effectively attenuated over distance and that natural attenuation is effectively controlling cis-1,2-DCE in the Upper Groundwater Zone.

VC: VC is the final chlorinated daughter product during reductive dechlorination (i.e., PCE→TCE→cis-1,2-DCE→VC). The presence of VC is strong evidence of reductive dechlorination. During the 2010-2017 sampling events, only one monitoring well, MW-34S, had VC concentrations exceeding the TCG of 1.4 µg/L.

Figure 8 presents box plots of the VC concentration distribution for the 2010-2017 LTM period. The low-level concentrations and non-detections of VC at most of the monitoring wells reflect the low concentrations of its parent (cis-1,2-DCE). It appears that reductive dechlorination (PCE→TCE→ cis-1,2-DCE) is occurring in the Upper Groundwater Zone as evidenced by the measured concentrations of PCE daughter products, although at some locations (e.g., MW-37S) the cis-1,2-DCE→VC reaction is possibly stalled.

3.1.4 Comparison of VOC Results to TCG Concentrations

The section provides a summary of VOC results that exceed TCGs during the LTM period. Comparisons to TCGs were made for the entire period of record (November 2010-April 2017) since the signing of the ROD and separately for the most current monitoring event in April 2017.

Comparison of VOC Results to TCG Concentrations: November 2010 – April 2017

The VOC results that exceeded TCGs during LTM events conducted from November 2010 through April 2017 were the following:

PCE (exceeding the TCG of 5.5 µg/L):

- MW-30S: 5.6 µg/L (11/2010) and 6.0 µg/L (08/2012)

- MW-32S: 16.0 µg/L (05/2011), 13.0 µg/L (05/2012), 50.0 µg/L (08/2012), and 11.0 µg/L (08/2015)
- MW-41S: All 12 monitoring events, results ranging from 14.0 µg/L (08/2015) to 39.0 µg/L (05/2011)
- MW-44S (installed 07/2015): 13 µg/L (03/2016), 15.0 (08/2016), and 18.0 (04/2017)

TCE (exceeding the TCG of 18.0 µg/L):

- MW-32S: 19.0 µg/L (08/2012)

VC (exceeding the TCG of 1.4 µg/L):

- MW-34S: 10 out of 12 monitoring events with exceedances ranging from 1.6 µg/L (08/2016) to 3.4 µg/L (08/2012)

Cis-1,2-DCE (exceeding the TCG of 1,800 µg/L):

- None.

The NYSDEC requested that concentrations of cis-1,2-DCE be compared to the New York state groundwater quality standard of 5 µg/L (6 CRR-NY 703.5, 2016). Four monitoring wells (MW-32S, MW-37S, MW-41S, and MW-42S) had concentrations of cis-1,2-DCE that exceeded 5 µg/L for the period from November 2010 through April 2017.

Comparison of VOC Results to TCG Concentrations: Current April 2017

The VOC results that exceeded TCGs during the most recent monitoring event (April 2017) were the following:

PCE (Exceeding the TCG of 5.5 µg/L):

- MW-41S: 24.0 µg/L (04/2017)
- MW-44S: 18.0 µg/L (04/2017)

TCE (Exceeding the TCG of 18.0 µg/L):

- None

VC (Exceeding the TCG of 1.4 µg/L):

- None

Cis-1,2-DCE (Exceeding the TCG of 1,800 µg/L):

- None.

Comparison with the New York state groundwater quality standard of 5 µg/L showed that two wells (MW-37S and MW-42S) had concentrations of cis-1,2-DCE exceeding 5 µg/L for the April 2017 monitoring event.

In conclusion, the direct comparison of VOC results to TCGs clearly demonstrates that the MNA remedy is making progress toward TCG compliance. In support of this statement note the following regarding Site monitoring wells:

- Three wells (MW-08S, MW-37S, and MW-42S) showed no detections of any of the COCs above respective TCGs during the monitoring period.
- One well (MW-30S) had no exceedances of TCGs for the last four monitoring events.
- One well (MW-34S) with no exceedance during the last monitoring event.
- Two wells (MW-41S and MW-44S) currently have one VOC (i.e., PCE) that exceeds its TCG.

These results show that COCs in groundwater are approaching TCGs at the wells, albeit at different rates, with a total of two monitoring wells with one COC (PCE) exceeding its TCG for the most recent monitoring event in April 2017.

Other evidence in support of the continued progress of the MNA remedy comes from a review of the geochemical parameter (i.e., DO and ORP) results in groundwater.

3.1.5 Geochemical Indicators

The natural attenuation parameters DO and ORP were measured during well purging prior to sampling. These parameters were monitored to further characterize groundwater conditions and to support the assessment of the progress of the MNA remedy. There are no enforceable criteria associated with these parameters.

Time-series plots of the geochemical indicators of MNA covering the entire LTM period are presented in **Appendix E**. The following discussion focuses on the most current (April 2017) geochemical setting as evidence of MNA.

Dissolved Oxygen: DO is the relative measure of the amount of oxygen that is dissolved or carried in a given medium and is an indicator of oxygen saturation of the groundwater. A DO level of less than 0.5 mg/L is the most favorable condition for anaerobic reductive dechlorination, and anaerobic microbes would not tolerate a DO level above 5 mg/L (EPA, 1998). DO measurements ranged from 0.60 mg/L to 9.17 mg/L in April 2017, with all readings above 0.5 mg/L.

Oxidation-Reduction Potential: ORP is a measure of the tendency of a chemical species to acquire electrons, and thereby be reduced. ORP often correlates with the dominant type of microbial activity. The more negative the measurement, the more likely it is that sulfate reducing, or methanogenic conditions, can occur in the subsurface. Reductive dechlorination could occur when ORP levels are less than 50 mV (EPA, 1998); although ORP levels less than 100 mV represent the most favorable condition for reductive dechlorination. Relative ORP readings for April 2017

indicate a reductive state at wells MW-41S and MW-42S (within the area of the original VOC mass) and downgradient of the Site at well MW-37S.

The assessment of the geochemical indicators presents evidence that geochemical conditions that may support reductive dechlorination exist, but are not optimal. The DO and ORP values suggest that the groundwater conditions vary from anaerobic to aerobic conditions, with localized areas where anaerobic reductive dechlorination may be occurring, but not under optimal conditions.

3.1.6 Current Compliance Status

This section presents compliance status of the groundwater monitoring wells at the Site.

A summary of minimum, maximum, and latest VOC concentrations in groundwater for the monitoring period from November 2010 through April 2017 is presented in **Table 10**. The status of each monitoring well for the four COCs with respect to TCGs and the current active status of each well are also given in the table.

As shown in the table, there is currently one COC out of compliance with respect to its TCG at two wells as of the most recent monitoring event held in April 2017. That is, PCE exceeds its TCG of 5.5 µg/L at monitoring wells MW-41S and MW-44S. All four of the COCs are in compliance at all other network wells in April 2017. Note that until more recent monitoring events, two other wells (MW-30 and MW-32S) were sporadically out of compliance for PCE and one well (MW-34S) was consistently out of compliance for VC during the course of the monitoring period from November 2010 through April 2017.

4.0 CONCLUSIONS AND RECOMMENDATIONS

This section provides conclusions drawn during the evaluation of the natural attenuation remedy and presents recommendations regarding future monitoring activities.

4.1 Conclusions

The following conclusions were made based on the remedy evaluation:

- The direct comparison of VOC results to TCGs and the graphic representation of these results over time clearly demonstrates that the MNA remedy is making progress toward TCG compliance.
- Two wells are currently out of compliance for PCE. There were two exceedances of the TCG for PCE at two monitoring wells (MW-41S and MW-44S) in April 2017. There were no other exceedances of a TCG at any other well location for the four COCs in April 2017.
- The analytical results from the LTM program indicate that natural attenuation is occurring and still controlling the VOCs from migrating downgradient.
- The data support the presence of reductive dechlorination of VOCs, but geochemical conditions are variable over time and space.

4.2 Recommendations

This section presents recommendations based on the review of groundwater data trends, MNA evidence, and comparison of analytical results to TCG concentrations.

It is recommended that LTM of groundwater be continued on a biennial basis beginning in Fall of 2019. Based on remedy progress and status, the following groundwater LTM program is suggested:

- Continue monitoring Site COCs (i.e., PCE, TCE, cis-1,2-DCE, and VC) at each monitoring well in the Upper Groundwater Zone as follows:
  - Sample well MW-08S on a biennial basis to monitor upgradient groundwater conditions.
  - Sample Site wells MW-30S, MW-34S, MW-41S, and MW-44S on a biennial basis.
  - Sample wells MW-37S and MW-42S on biennial basis to monitor downgradient groundwater conditions.
- Retain the measuring of DO and ORP as geochemical indicators of MNA during purging prior to sampling at wells: MW-08S, MW-30S, MW-34S, MW-37S, MW-41S, MW-42S, and MW-44S.

Table 11 presents the recommended LTM program for Colonie Site groundwater.

5.0 REFERENCES

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TABLES

Table 1
Current Monitoring Well Network
2016-2017 Annual Report
Long-Term Groundwater Monitoring Program - Natural Attenuation Remedy
Colonie FUSRAP Site, Colonie New York

Current Monitoring Well Network

Upper Groundwater Zone Monitoring Wells			
MW-08S	MW-30S	MW-34S	MW-37S
MW-41S	MW-42S	MW-44S	

* Monitoring well MW-32S removed from network following the August 2016 sampling event.

Table 2
Monitoring Well Sampling Frequency and Groundwater Analytical Program
2016-2017 Annual Report
Long-Term Groundwater Monitoring Program - Natural Attenuation Remedy
Colonie FUSRAP Site, Colonie New York

Well ID	VOCs[1]	MNA[2]
Upper Groundwater Zone		
MW-08S	A	NSR
MW-30S	S	S
MW-34S	S	S
MW-37S	S	S
MW-41S	S	S
MW-42S	S	S
MW-44S	S	S

Notes:

[1] Volatile organic compounds (VOCs) include tetrachloroethene (PCE), trichloroethene (TCE), cis-1,2-dichloroethene (cis-1,2-DCE), and vinyl chloride (VC).

[2] Monitored Natural Attenuation (MNA) parameters include dissolved oxygen (DO) and oxidation-reduction potential (ORP) by field measurement.

Table 2 revised following the August 2016 sampling event (Well MW-32S removed from well network).

All wells listed above are screened in the Upper Groundwater Zone (i.e., water table).

The number and type of quality assurance/quality control (QA/QC) samples are provided in the Uniform Federal Policy-Quality Assurance Project Plan (UFP-QAPP).

Key:

S = Semi-annual Sampling (sampled each event, i.e., two times per year)
A = Annual Sampling (sampled once per year)
NSR = No Sample Required

Table 3
Groundwater Elevations - August 2016
2016-2017 Annual Report
Long-Term Groundwater Monitoring Program - Natural Attenuation Remedy
Colonie FUSRAP Site, Colonie New York

Well ID	Coordinates		Top of Well Riser Pipe Elevation	Ground Surface Elevation	Depth to Water from Well Riser Pipe	Groundwater Elevation
	Northing	Easting	(ft msl)	(ft msl)	(ft)	(ft msl)
MW-08S	1406050.14	679397.21	230.90	228.90	2.02	228.88
MW-30S	1405591.48	679047.79	226.74	225.24	7.95	218.79
MW-32S	1405404.13	679670.41	224.10	222.20	3.03	221.07
MW-34S	1405327.12	679309.35	219.84	218.33	7.71	212.13
MW-37S	1405238.84	679671.42	219.96	218.05	7.42	212.54
MW-41S	1405453.53	679538.46	224.82	223.15	6.31	218.51
MW-42S	1405480.59	679426.27	225.77	224.23	8.45	217.32
MW-44S	1405456.27	679685.18	224.65	223.20	4.60	220.05

Notes:
1.) Coordinates Ref: New York State Plane NAD83 East Zone, US Foot.
2.) Elevation measurements expressed in feet above mean sea level (msl). Water level measurements expressed in feet (ft) as measured from top of well riser pipe.
3.) Groundwater levels measured August 2-3, 2016.
4.) The groundwater elevation at well MW-32S is considered anomalous compared with surrounding elevations and relative past data and was not used in the creation of the elevation contour map on Figure 2 of this report.

Table 4
Groundwater Elevations - April 2017
2016-2017 Annual Report
Long-Term Groundwater Monitoring Program - Natural Attenuation Remedy
Colonie FUSRAP Site, Colonie New York

Well ID	Coordinates		Top of Well Riser Pipe Elevation (ft msl)	Ground Surface Elevation (ft msl)	Depth to Water from Well Riser Pipe (ft)	Groundwater Elevation (ft msl)
	Northing	Easting				
MW-08S	1406050.14	679397.21	230.90	228.90	2.07	228.83
MW-30S	1405591.48	679047.79	226.74	225.24	6.05	220.69
MW-34S	1405327.12	679309.35	219.84	218.33	5.40	214.44
MW-37S	1405238.84	679671.42	219.96	218.05	5.25	214.71
MW-41S	1405453.53	679538.46	224.82	223.15	2.90	221.92
MW-42S	1405480.59	679426.27	225.77	224.23	5.35	220.42
MW-44S	1405456.27	679685.18	224.65	223.20	2.75	221.90

Notes:
1.) Coordinates Ref: New York State Plane NAD83 East Zone, U.S. Foot.
2.) Groundwater levels measured April 3 - 4, 2017.

Key:
ft = feet
ft msl = feet above mean sea level
ID = identification

Table 5
Volatile Organic Compound Analytical Results - August 2016
Analytical Results -
Long-Term Groundwater Monitoring Program - Natural Attenuation Remedy
Colonie FUSRAP Site, Colonie New York

Monitoring Well Location	Target Cleanup Goals	MW-08S		MW-30S			MW-32S			MW-32S			MW-34S			MW-37S		
Sample Identification		MW-08S		MW-30S			MW-32S			Duplicate			MW-34S			MW-37S		
Sample Date		2-Aug-16		2-Aug-16			3-Aug-16			3-Aug-16			3-Aug-16			3-Aug-16		
Contaminants of Concern		Result	Q	Result	Q	DV	Result	Q	DV	Result	Q	DV	Result	Q	DV	Result	Q	DV
cis-1,2-Dichloroethene (cis-1,2-DCE)	1,800	1.0	U	**0.96**	**J**	**J**	**6.5**		**J**	**6.0**		**J**	**1.3**			**51**		
Tetrachloroethene (PCE)	5.5	1.0	U	**3.9**			**2.4**		**J**	**2.4**		**J**	**0.61**	**J**	**J**	1.0	U	
Trichloroethene (TCE)	18	1.0	U	**1.2**			**1.5**		**J**	**1.6**		**J**	1.0	U		**0.28**	**J**	**J**
Vinyl Chloride (VC)	1.4	1.0	U	1.0	U		1.0	U		1.0	U		**1.6**			**0.48**	**J**	**J**

Monitoring Well Location	Target Cleanup Goals	MW-41S			MW-42S			MW-44S		Trip Blank 1			Trip Blank 2	
Sample Identification		MW-41S			MW-42S			MW-44S		Trip Blank			Trip Blank	
Sample Date		3-Aug-16			2-Aug-16			3-Aug-16		2-Aug-16			3-Aug-16	
Contaminants of Concern		Result	Q	DV	Result	Q	DV	Result	Q	Result	Q		Result	Q
cis-1,2-Dichloroethene (cis-1,2-DCE)	1,800	**4.7**			**8.5**			**3.5**		1.0	U		1.0	U
Tetrachloroethene (PCE)	5.5	**18**			1.0	U		**15**		1.0	U		1.0	U
Trichloroethene (TCE)	18	**5.3**			**0.45**	**J**	**J**	**9.9**		1.0	U		1.0	U
Vinyl Chloride (VC)	1.4	**0.62**	**J**	**J**	1.0	U		1.0	U	1.0	U		1.0	U

Notes:

1.) All results are expressed in micrograms/liter (µg/L).

2.) Results in bold are laboratory detections.

3.) Shaded entry indicates value exceeds the Target Cleanup Goal.

4.) Data validation (DV) qualifiers (i.e., J qualifiers) were applied to MW-32S and MW-32S Duplicate results for cis-1,2-DCE, PCE, and VC due to high surrogate (i.e., Toluene-d8) recovery. DV qualifiers (i.e., J-qualifiers) were also applied to those samples (i.e., MW-30S, MW-34S, MW-37S, MW-41S, and MW-42S) with estimated values falling between the method detection limit and the method reporting limit.

Key:

DV = qualifier assigned through data validation

Q = Qualifier assigned through laboratory

U = Non-detect at method reporting limit given

J = Estimated value below the method reporting limit

Table 6
Natural Attenuation Parameter Results - August 2016
2016-2017 Annual Report
Long-Term Groundwater Monitoring Program - Natural Attenuation Remedy
Colonie FUSRAP Site, Colonie New York

Monitoring Well Location	MW-08S	MW-30S	MW-32S	MW-34S
Sample Identification	MW-08S	MW-30S	MW-32S	MW-34S
Sample Date	2-Aug-16	2-Aug-16	3-Aug-16	3-Aug-16
Natural Attenuation Parameters	Result	Result	Result	Result
Dissolved Oxygen (mg/L)	3.18	0.95	0.76	0.02
ORP (mV)	85.5	74.1	122.9	-75.3

Monitoring Well Location	MW-37S	MW-41S	MW-42S	MW-44S
Sample Identification	MW-37S	MW-41S	MW-42S	MW-44S
Sample Date	3-Aug-16	3-Aug-16	2-Aug-16	3-Aug-16
Natural Attenuation Parameters	Result	Result	Result	Result
Dissolved Oxygen (mg/L)	0.01	0.04	0.04	0.15
ORP (mV)	-94.0	-47.0	-87.6	-18.3

Key:
mg/L = milligrams per liter
mV = millivolt

Table 7
Volatile Organic Compound Analytical Results - April 2017
2016-2017 Annual Report
Long-Term Groundwater Monitoring Program - Natural Attenuation Remedy
Colonie FUSRAP Site, Colonie New York

Monitoring Well Location	Target Cleanup Goals	MW-08S		MW-30S			MW-30S			MW-34S		
Sample Identification		MW-08S		MW-30S			Duplicate			MW-34S		
Sample Date		03-Apr-17		04-Apr-17			04-Apr-17			03-Apr-17		
Contaminants of Concern		Result	Q	Result	Q	DV	Result	Q	DV	Result	Q	DV
cis-1,2-Dichloroethene (cis-1,2-DCE)	1,800	1.0	U	1.0	U		1.0	U		**1.2**		**J**
Tetrachloroethene (PCE)	5.5	1.0	U	**3.1**		**J**	**2.2**		**J**	**0.75**	**J**	**J**
Trichloroethene (TCE)	18	1.0	U	1.0	U		1.0	U		**0.29**	**J**	**J**
Vinyl Chloride (VC)	1.4	1.0	U	1.0	U		1.0	U		**1.1**		**J**

Monitoring Well Location	Target Cleanup Goals	MW-37S			MW-41S			MW-42S			MW-44S			NA	
Sample Identification		MW-37S			MW-41S			MW-42S			MW-44S			Trip Blank	
Sample Date		03-Apr-17			03-Apr-17			03-Apr-17			03-Apr-17			03-Apr-17	
Contaminants of Concern		Result	Q	DV	Result	Q	DV	Result	Q	DV	Result	Q	DV	Result	Q
cis-1,2-Dichloroethene (cis-1,2-DCE)	1,800	**49**		**J**	**4.8**		**J**	**7.6**		**J**	**3.3**		**J**	1.0	U
Tetrachloroethene (PCE)	5.5	**0.50**	**J**	**J**	**24**		**J**	**0.34**	**J**	**J**	**18**		**J**	1.0	U
Trichloroethene (TCE)	18	**0.42**	**J**	**J**	**5.1**		**J**	**0.75**	**J**	**J**	**9.9**		**J**	1.0	U
Vinyl Chloride (VC)	1.4	**0.65**	**J**	**J**	**0.58**	**J**	**J**	1.0	U		1.0	U		1.0	U

Notes:
1.) All results are expressed in micrograms/liter (µg/L).
2.) Results in boldface text are laboratory detections.
3.) Shaded entry indicates value exceeds the Target Cleanup Goal.
4.) J qualifiers (estimates) were assigned to all VOC detections during data validation because all samples had high toluene-d8 recoveries. The J qualifier assigned through data validation indicates that the analyte was positively identified and the associated numerical value is the approximate concentration of the analyte in the sample.

Key:
DV = qualifier assigned through data validation
Q = Qualifier assigned through laboratory
U = Non-detect at method reporting limit given
J = Estimated (analyte positively identified but the quantitation is an estimation).

Table 8
Natural Attenuation Parameter Results - April 2017
2016-2017 Annual Report
Long-Term Groundwater Monitoring Program - Natural Attenuation Remedy
Colonie FUSRAP Site, Colonie New York

Monitoring Well Location	MW-08S	MW-30S	MW-34S	MW-37S	MW-41S	MW-42S	MW-44S
Sample Identification	MW-08S	MW-30S	MW-34S	MW-37S	MW-41S	MW-42S	MW-44S
Sample Date	03-Apr-17	04-Apr-17	03-Apr-17	03-Apr-17	03-Apr-17	03-Apr-17	03-Apr-17
Natural Attenuation Parameters	Result	Result	Result	Result	Result	Result	Result
Dissolved Oxygen (mg/L)	3.23	9.17	1.67	2.39	1.38	0.86	0.60
ORP (mV)	128.6	220.5	53.7	-55.7	-21.6	-65.9	52.6

Key:
mg/L = milligrams per liter
mV = millivolt
ORP = oxidation-reduction potential

Table 9
Summary of Volatile Organic Compound Results for Groundwater, Nov 2010 - Apr 2017
2016-2017 Annual Report
Colonie FUSRAP Site, Colonie New York

Monitoring Well	Constituent	Target Cleanup Goal (µg/L)	11/2010 Result (µg/L)	02/2011 Result (µg/L)	05/2011 Result (µg/L)	08/2011 Result (µg/L)	11/2011 Result (µg/L)	02/2012 Result (µg/L)	05/2012 Result (µg/L)	08/2012 Result (µg/L)	08/2015 Result (µg/L)	03/2016 Result (µg/L)	08/2016 Result (µg/L)	04/2017 Result (µg/L)
MW-08S	Cis-1,2-DCE	1,800	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	NS	1.0 U	1.0 U
	PCE	5.5	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	NS	1.0 U	1.0 U
	TCE	18.0	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	NS	1.0 U	1.0 U
	VC	1.4	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	NS	1.0 U	1.0 U
MW-30S	Cis-1,2-DCE	1,800	**0.56 J**	**0.67 J**	1.0 U	**1.3**	**0.63 J**	**1.4**	**1.3**	**2.3**	**2.0**	**0.76 J**	**0.96J**	1.0 U / 1.0U
	PCE	5.5	**5.6**	**4.7**	**3.6**	**4.4**	**4.9**	**4.5**	**4.6**	**6.0**	**2.8**	**1.5**	**3.9**	**3.1 / 2.2**
	TCE	18.0	**1.4**	**1.1**	**0.5 J**	**1.6**	**1.2**	**1.7**	**1.6**	**2.4**	**1.6**	**0.52 J**	**1.2**	1.0 U / 1.0U
	VC	1.4	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U / 1.0U
MW-32S	Cis-1,2-DCE	1,800	**12**	**10**	**10**	**6.0**	**9.1**	**5.8**	**8.7**	**23**	**8.9 / 8.8**	**1.3 / 1.1**	**6.5 / 6.0**	NS
	PCE	5.5	**5.3**	**4.6**	**16**	**3.9**	**4.4**	**5.0**	**13**	**50**	**11 / 11**	**3.0 / 3.1**	**2.4 / 2.4**	
	TCE	18.0	**3.0**	**2.3**	**6.3**	**2.3**	**2.2**	**2.0**	**4.7**	**19**	**6.9 / 6.7**	**1.2 / 1.1**	**1.5 / 1.6**	
	VC	1.4	**0.39 J**	**0.43 J**	**0.55 J**	1.0 U	**0.52 J**	1.0 U	**0.50 J**	**1.1**	1.0 U / **0.37 J**	1.0 U / 1.0 U	1.0 U / 1.0 U	
MW-34S	Cis-1,2-DCE	1,800	**1.6**	**0.96 J**	**0.93 J**	**1.2**	**0.95 J**	**1.1 J**	**0.86 J**	**1.5**	**0.91 J**	**0.79 J**	**1.3**	**1.2**
	PCE	5.5	**0.96 J**	**0.75 J**	**0.66 J**	**0.71 J**	**0.59 J**	**0.70 J**	**0.72 J**	**0.73 J**	**0.45 J**	**0.49 J**	**0.61 J**	**0.75 J**
	TCE	18.0	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	**0.29 J**
	VC	1.4	**2.5**	**1.8**	**2.4**	**2.2**	**3.2**	**2.3**	**2.0**	**3.4**	**1.7**	**1.1**	**1.6**	**1.1**
MW-37S	Cis-1,2-DCE	1,800	**17**	**27**	**27**	**34**	**40**	**28**	**39**	**48**	**52**	**39**	**51**	**49**
	PCE	5.5	**0.25 J**	1.0 U	**0.25 J**	**0.39 J**	**0.61 J**	**0.58 J**	**0.21 J**	**0.37 J**	**0.49 J**	**0.38 J**	1.0 U	**0.50 J**
	TCE	18.0	**0.36 J**	**0.33 J**	**0.41 J**	**0.63 J**	**0.79 J**	**0.68 J**	**0.31 J**	**0.53 J**	**0.58 J**	**0.62 J**	**0.28 J**	**0.42 J**
	VC	1.4	**0.50 J**	**0.66 J**	**0.91 J**	**0.53 J**	**0.51 J**	**0.40 J**	**0.63 J**	**0.69 J**	**0.59 J**	**0.35 J**	**0.48 J**	**0.65 J**
MW-41S	Cis-1,2-DCE	1,800	**6.6**	**3.5**	**6.8**	**5.2**	**5.0**	**4.4**	**5.2**	**5.1**	**4.2**	**4.7**	**4.7**	**4.8**
	PCE	5.5	**26**	**15**	**39**	**24**	**31**	**30**	**28**	**30**	**14**	**25**	**18**	**24**
	TCE	18.0	**8.3**	**5.3**	**11.0**	**7.1**	**8.5**	**6.8**	**7.4**	**8.6**	**4.5**	**6.1**	**5.3**	**5.1**
	VC	1.4	**0.66 J**	**0.58 J**	**0.92 J**	**0.69 J**	**0.74 J**	**1.0**	**1.2**	**1.0**	**0.90 J**	**0.53 J**	**0.62 J**	**0.58 J**
MW-42S	Cis-1,2-DCE	1,800	**4.3**	**3.4**	**9.2**	**12**	**8.2**	**6.6**	**7.4**	**11**	**13**	**7.2**	**8.5**	**7.6**
	PCE	5.5	**0.43 J**	**0.20 J**	**0.37J**	**0.23 J**	1.0 U	**0.22 J**	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	**0.34 J**
	TCE	18.0	**1.3**	**1.0**	**0.75 J**	**0.73 J**	**0.57 J**	**0.54 J**	**0.73 J**	**0.59 J**	**0.65 J**	**0.44J**	**0.45J**	**0.75 J**
	VC	1.4	1.0 J	1.0 J	**0.22 J**	1.0 J	**0.34 J**	**0.22 J**	1.0 U	**0.21 J**	1.0 U	1.0 U	1.0 U	1.0 U
MW-44S	Cis-1,2-DCE	1,800									**3.1**	**2.8**	**3.5**	**3.3**
	PCE	5.5	Note: Monitoring well MW-44S installed on 27 July 2015 (no prior sampling record).								**3.1**	**13**	**15**	**18**
	TCE	18.0									**4.0**	**7.7**	**9.9**	**9.9**
	VC	1.4									1.0 U	1.0 U	1.0 U	1.0 U

Notes:

1.) Results in **bold** are laboratory detections.

2.) Shaded entry indicates Target Cleanup Goal exceeded.

3.) Duplicate result indicated by double entry (e.g., 1.0 U / 1.0 U).

Key:

Cis-1,2-DCE = cis-1,2-dichloroethene
PCE = tetrachloroethene
TCE = trichloroethene
VC = vinyl chloride

J = estimated value below the method reporting limit
µg/L = micrograms per liter
NS = not sampled (in accordance with protocol)
U = non-detect at method reporting limit given

Table 10
Groundwater COC Result Summary and Current Compliance Status [1]
2016-2017 Annual Report
Colonie FUSRAP Site, Colonie New York

Monitoring Well	Contaminant of Concern	Target Cleanup Goals (TCGs) [2] (µg/L)	Minimum Concentration [3] (µg/L)	Maximum Concentration [3] (µg/L)	Latest Sample Result [4] (µg/L)	TCG Status [5]	Remarks
MW-08S	Cis-1,2-DCE	1,800	1.0 U	1.0 U	1.0 U	In Compliance	
	PCE	5.5	1.0 U	1.0 U	1.0 U		
	TCE	18	1.0 U	1.0 U	1.0 U		
	VC	1.4	1.0 U	1.0 U	1.0 U		
MW-30S	Cis-1,2-DCE	1,800	1.0 U	**2.3**	1.0 U	In Compliance	
	PCE	5.5	**1.5** [6]	**6** [7]	**3.1**		
	TCE	18	1.0 U	**2.4**	1.0 U		
	VC	1.4	1.0 U	1.0 U	1.0 U		
MW-34S	Cis-1,2-DCE	1,800	**0.79 J**	**1.6**	**1.2**	In Compliance*	*In compliance for most recent monitoring event in April 2017, but not in compliance for four consecutive quarters
	PCE	5.5	**0.45 J**	**0.96 J**	**0.75 J**		
	TCE	18	1.0 U	**0.29 J**	**0.29 J**		
	VC	1.4	**1.1**	**3.4**	**1.1**		
MW-37S	Cis-1,2-DCE	1,800	**17**	**52**	**49**	In Compliance	
	PCE	5.5	1.0 U	**0.61 J**	**0.50 J**		
	TCE	18	**0.28 J**	**0.79 J**	**0.42 J**		
	VC	1.4	**0.35 J**	**0.91 J**	**0.65 J**		
MW-41S	Cis-1,2-DCE	1,800	**6.8**	**3.5**	**4.8**	In Compliance	
	PCE	5.5	**14**	**39**	**24**	**Out of Compliance - PCE**	
	TCE	18	**4.5**	**11**	**5.1**	In Compliance	
	VC	1.4	**0.53 J**	**1.2**	**0.58 J**	In Compliance	
MW-42S	Cis-1,2-DCE	1,800	**3.4**	**13**	**7.6**	In Compliance	
	PCE	5.5	1.0 U	**0.43 J**	**0.34 J**		
	TCE	18	**0.44 J**	**1.3**	**0.75 J**		
	VC	1.4	1.0 U	**0.34 J**	1.0 U		

Table 10
Groundwater COC Result Summary and Current Compliance Status [1]
2016-2017 Annual Report
Colonie FUSRAP Site, Colonie New York

Monitoring Well	Contaminant of Concern	Target Cleanup Goals (TCGs) [2] (µg/L)	Minimum Concentration [3] (µg/L)	Maximum Concentration [3] (µg/L)	Latest Sample Result [4] (µg/L)	TCG Status [5]	Remarks
MW-44S	Cis-1,2-DCE	1,800	**2.8**	**3.5**	**3.3**	In Compliance	
	PCE	5.5	**3.1**	**18**	**18**	**Out of Compliance - PCE**	
	TCE	18	**4.0**	**9.9**	**9.9**	In Compliance	
	VC	1.4	1.0 U	1.0 U	1.0 U	In Compliance	

Key:

cis-1,2-DCE = cis-1,2-dichloroethene

J = estimated value below the method reporting limit

µg/L = micrograms per liter

PCE = tetrachloroethene

TCE = trichloroethene

TCG = Target Cleanup Goal

U = non-detect at method reporting limit given

VC = vinyl chloride

Notes:

[1] The Period of Record for data presented in this table is November 2010 through April 2017.

[2] Target Cleanup Goals as per Colonie Groundwater ROD, April 2010.

[3] Minimum and maximum concentrations are for the period of record from November 2010 through April 2017.

[4] Latest sample for current network wells collected April 2017.

[5] "In Compliance" is defined as meeting a TCG for four consecutive quarters.

[6] Results in boldface text are laboratory detections.

[7] Shaded entry indicates that the value exceeds the Target Cleanup Goal.

Table 11
Recommended Groundwater Monitoring Program
2016-2017 Annual Report
Long-Term Groundwater Monitoring Program - Natural Attenuation Remedy
Colonie FUSRAP Site, Colonie New York

Well ID	VOCs[1]	MNA[2]
MW-08S	B	B
MW-30S	B	B
MW-34S	B	B
MW-37S	B	B
MW-41S	B	B
MW-42S	B	B
MW-44S	B	B

Notes:

[1] Volatile organic compounds (VOCs) include tetrachloroethene (PCE), trichloroethene (TCE), cis-1,2-dichloroethene (cis-1,2-DCE), and vinyl chloride (VC).

[2] Monitored Natural Attenuation (MNA) parameters include dissolved oxygen (DO) and oxidation-reduction potential (ORP) by field measurement.

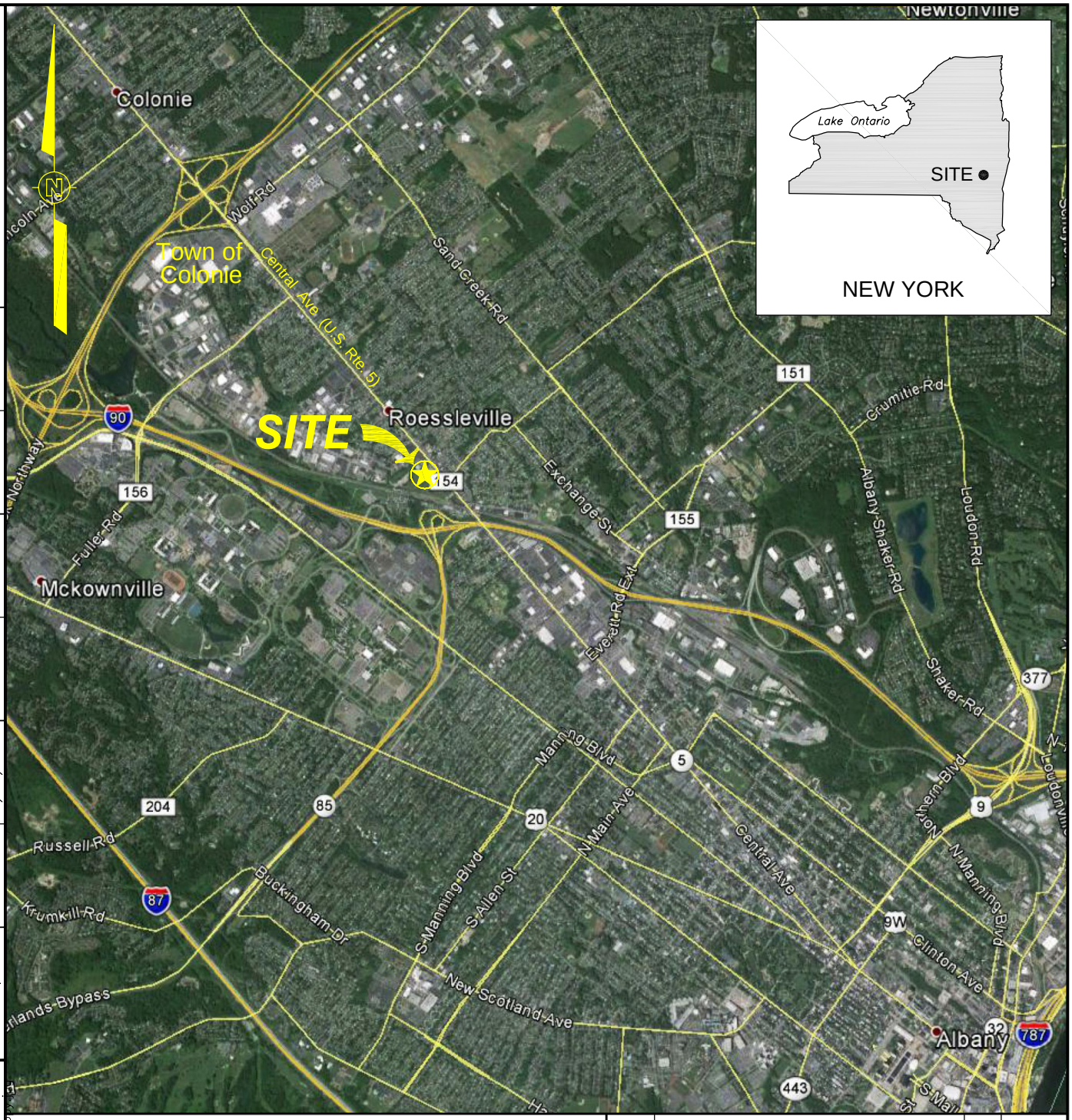
All wells listed above are screened in the Upper Groundwater Zone.

The number and type of quality assurance/quality control (QA/QC) samples are provided in the Uniform Federal Policy-Quality Assurance Project Plan (UFP-QAPP).

Key:

B = biennial sampling frequency (sampled once every two years)

FIGURES



DRAWING NUMBER	APPROVED BY	CHECKED BY	DRAWN BY	OFFICE
500304-A2		M. Hardner	B. fAISON 10/24/2014	ALBANY, NY

SCALE

0 3600 7200 FEET

REFERENCE:
BASE MAP FROM GOOGLE EARTH,
DATED: 7/15/2015

REV	DESCRIPTION / ISSUE	DATE	APPROVED

U.S. ARMY CORPS OF ENGINEERS
FORMERLY UTILIZED SITES
REMEDIAL ACTION PROGRAM

DESIGNED BY: --
DRAWN BY: B. Faison
CHECKED BY: M. Hardner
APPROVED BY: --

FIGURE 1
SITE LOCATION MAP

COLONIE FUSRAP SITE
1130 CENTRAL AVENUE
ALBANY, NY 12205

DATE:	SCALE:	DRAWING NO.	SHEET NO.
4/19/16	AS SHOWN	500304-A1	-

File: \\Cfspittfp01\cad\Shaw Offices - CAD Files\Latham, NY\500304\500304A2.dwg
Plot Date/Time: Aug 21, 2017 - 5:45pm
Plotted By: bernadette.oconnor
Image: APTIM Logo Standard Color.jpg
CBI_Logo-Color.jpg
colonie - google.jpg
Xref :

DRAWING NUMBER 500304D8

OFFICE Pittsburgh, PA

VERIFY SCALE 0 1"

Image : APTIM Logo Standard Color.jpg
CBI_Logo-Color.jpg
Figure 2 Inset.tif
Lower Zone.tif
ou-shaw.jpg
Upper Zone.tif

File: \\Cfspittfp01\cad\Shaw Offices - CAD Files\Latham, NY\500304\500304D8.dwg
Plot Date/Time: Aug 22, 2017 - 2:02pm
Plotted By: bernadette.oconnor

CENTRAL AVENUE (N.Y.S. ROUTE 5)
(99' RIGHT OF WAY)

TRUE NORTH

NIAGARA MOHAWK SUBSTATION VICINITY PROPERTY

MW-08S

MW-44S

MW-32S
(SEE NOTE)

MW-41S

MW-42S

MW-37S

MW-30S

MW-34S

COLONIE FUSRAP MAIN SITE

STEEL SHEET PILE

TOWN OF COLONIE
CITY OF ALBANY

1118 CENTRAL AVENUE

MONROE MUFFLER

GRIMMS

RESIDENCE

MURPHY'S OVERHEAD DOOR

DENSE TREES

DENSE TREES & BRUSH GROUND OBSCURED

TOWN OF COLONIE VICINITY PROPERTY

CSX VICINITY PROPERTY

AMTRAK TRACK

GRAVEL ACCESS ROAD

CLUSTER "H"

RAILROAD AVENUE
(80' RIGHT OF WAY)

YARDBORO AVENUE
(40' RIGHT OF WAY)

I-90 TO ROUTE 85 RAMP

BRICK STOCKPILE

PALLETS STORED MATERIAL

CONCRETE BLOCK BUILDING

DRAINAGE STRUCTURE BURIED TOP PIPE ELEV=212.65 48"RCP INV=208.15

5'x 3' CONCRETE BOX CULVERT

4'x 5' STONE ARCH CULVERT

STREAM

LEGEND:

- COLONIE FUSRAP SITE PROPERTY OUTLINE
- VICINITY PROPERTY OUTLINE
- MW-37S MONITORING WELL
- CB CATCH BASIN
- GUY WIRE
- IRF IRON ROD FOUND
- SMH SANITARY MANHOLE
- MON SQUARE CONCRETE MONUMENT
- STORM MH STORMWATER MANHOLE
- TMH TELEPHONE MANHOLE
- TSB TRAFFIC SIGNAL BOX
- UTILITY POLE
- WMTR WATER METER
- WSO WATER SHUT-OFF
- YCIRF YELLOW CAPPED IRON ROD FOUND
- OVERHEAD ELECTRIC
- UNDERGROUND PIPE
- FENCE LINE
- HDPE HIGH DENSITY POLYETHYLENE PIPE
- RCP REINFORCED CONCRETE PIPE
- RAILWAY (CSX)

BAR SCALE
60 0 30 60 120
1 inch = 60 ft.

NOTE: MONITORING WELL MW-32S EXISTING AT LOCATION SHOWN, BUT REMOVED FROM LONG-TERM GROUNDWATER MONITORING WELL NETWORK FOLLOWING AUGUST 2016 SAMPLING EVENT.

REV	DESCRIPTION / ISSUE	DATE	APPROVED

U.S. ARMY CORPS OF ENGINEERS
FORMERLY UTILIZED SITES
REMEDIAL ACTION PROGRAM

DESIGNED BY: --
DRAWN BY: B. Faison
CHECKED BY: M. Hardner
APPROVED BY: --

FIGURE 2
SITE PLAN

COLONIE FUSRAP SITE
1130 CENTRAL AVENUE
ALBANY, NY 12205

DATE: 08/16/17
SCALE: AS SHOWN
DRAWING NO.: 500304-D8
SHEET NO.: -

OFFICE Pittsburgh, PA

DRAWING NUMBER 500304-D13

(99' RIGHT OF WAY)

TRUE NORTH

MW-08S (228.88)

MW-44S (220.05)

MW-32S (221.07) SEE NOTE

MW-41S (218.51)

MW-42S (217.32)

MW-37S (212.54)

MW-30S (218.79)

MW-34S (212.13)

STEEL SHEET PILE

225

220

215

210

NIAGARA MOHAWK SUBSTATION

RESIDENCE

APPLETINI'S CAFE

MONROE MUFFLER

GRIMMS

TOWN OF COLONIE
CITY OF ALBANY

DENSE TREES

MURPHY'S OVERHEAD DOOR

GRAVEL ACCESS ROAD

CSXT TRACK

AMTRAK TRACK

DENSE TREES & BRUSH GROUND OBSCURED

DRAINAGE STRUCTURE BURIED TOP PIPE ELEV=212.65 48"RCP INV=208.15

5'x 3' CONCRETE BOX CULVERT

4'x 5' STONE ARCH CULVERT

MH RIM=224.81 18"INV IN=213.99

48"RCP INV=211.44

18"CIP INV=221.78

RAILROAD AVENUE
(80' RIGHT OF WAY)

YARDBORO AVENUE
(40' RIGHT OF WAY)

I-90 TO ROUTE 85 RAMP

CLUSTER "H"

110

68

78

58

LEGEND:

- PROPERTY OUTLINE
- MW-37S MONITORING WELL
- CB CATCH BASIN
- GUY WIRE
- IRF IRON ROD FOUND
- SMH SANITARY MANHOLE
- MON SQUARE CONCRETE MONUMENT
- STORM MH STORMWATER MANHOLE
- TMH TELEPHONE MANHOLE
- TSB TRAFFIC SIGNAL BOX
- UTILITY POLE
- WMTR WATER METER
- WSO WATER SHUT-OFF
- YCIRF YELLOW CAPPED IRON ROD FOUND
- OVERHEAD ELECTRIC
- UNDERGROUND PIPE
- FENCE LINE
- HDPE HIGH DENSITY POLYETHYLENE PIPE
- RCP REINFORCED CONCRETE PIPE
- RAILWAY (CSX)
- 225 GROUNDWATER ELEVATION CONTOURS (DASHED WHERE INFERRED)
- APPARENT GROUNDWATER FLOW DIRECTION
- (228.88) GROUNDWATER ELEVATION (ABOVE MEAN SEA LEVEL)

NOTE: THE ANOMALOUS ELEVATION VALUE FOR MONITORING WELL MW-32S WAS NOT USED IN THE DEPICTION OF THE 220 FT. MSL ELEVATION CONTOUR.

BAR SCALE
60 0 30 60 120
1 inch = 60 ft.

VERIFY SCALE 0 1"

REV	DESCRIPTION / ISSUE	DATE	APPROVED

U.S. ARMY CORPS OF ENGINEERS
FORMERLY UTILIZED SITES
REMEDIAL ACTION PROGRAM

FIGURE 3
GROUNDWATER ELEVATION CONTOURS
UPPER GROUNDWATER ZONE
AUGUST 2016
COLONIE FUSRAP SITE
1130 CENTRAL AVENUE
ALBANY, NY 12205

DESIGNED BY:	DRAWN BY:	CHECKED BY:	APPROVED BY:	DATE:	SCALE:	DRAWING NO.	SHEET NO.
--	B. Faison	M. Hardner	--	9/11/2017	AS SHOWN	500304-D13	-

Xref Image: CBI_Logo-Color.jpg; Figure 2_markup.jpg; overlay.jpg; Upper Zone.tif

File: \\Cfsplittfp01\cad\Show Offices - CAD Files\Latham, NY\500304\500304D13.dwg
Plot Date/Time: Sep 11, 2017 - 4:23pm
Plotted By: termaat@cecorner

OFFICE Pittsburgh, PA

DRAWING NUMBER 500304-D14

VERIFY SCALE 0 1"

Xref Image : APTIM_Logo_Standard_Color.jpg
CBI_Logo-Color.jpg
Elevation Zone.tif
Lower_Zone.tif
ou-shaw.jpg
Upper_Zone.tif

File: \\Cfspittfp01\cad\Shaw Offices - CAD Files\Latham, NY\500304\500304D14.dwg
Plot Date/Time: Sep 11, 2017 - 5:30pm
Plotted By: bernadette.oconnor

CENTRAL AVENUE (N.Y.S. ROUTE 5)
(99' RIGHT OF WAY)

TRUE NORTH

NIAGARA MOHAWK SUBSTATION VICINITY PROPERTY

RESIDENCE

MURPHY'S OVERHEAD DOOR

DENSE TREES

DENSE TREES & BRUSH GROUND OBSCURED

TOWN OF COLONIE VICINITY PROPERTY

1118 CENTRAL AVENUE

MONROE MUFFLER

GRUMMS

TOWN OF COLONIE
CITY OF ALBANY

COLONIE FUSRAP MAIN SITE

CSX VICINITY PROPERTY
AMTRAK TRACK

TOWN OF COLONIE
CITY OF ALBANY

MW-08S (228.83)

MW-44S (221.90)

MW-41S (221.92)

MW-42S (220.42)

MW-37S (214.71)

MW-30S (220.69)

MW-34S (214.44)

STEEL SHEET PILE

225

220

215

210

GRAVEL ACCESS ROAD

YARDBORO AVENUE
(40' RIGHT OF WAY)

I-90 TO ROUTE 85 RAMP

RAILROAD AVENUE
(80' RIGHT OF WAY)

TOWN OF COLONIE
CITY OF ALBANY

CLUSTER "H"

68
74
78
80
110

BAR SCALE
60 0 30 60 120
1 inch = 60 ft.

LEGEND:

- PROPERTY OUTLINE
- MW-37S MONITORING WELL
- CB CATCH BASIN
- GUY WIRE
- IRF IRON ROD FOUND
- SMH SANITARY MANHOLE
- MON SQUARE CONCRETE MONUMENT
- STORM MH STORMWATER MANHOLE
- TMH TELEPHONE MANHOLE
- TSB TRAFFIC SIGNAL BOX
- UTILITY POLE
- WMTR WATER METER
- WSO WATER SHUT-OFF
- YCIRF YELLOW CAPPED IRON ROD FOUND
- OVERHEAD ELECTRIC
- UNDERGROUND PIPE
- FENCE LINE
- HDPE HIGH DENSITY POLYETHYLENE PIPE
- RCP REINFORCED CONCRETE PIPE
- RAILWAY (CSX)
- 225 GROUNDWATER ELEVATION CONTOURS (DASHED WHERE INFERRED)
- APPARENT GROUNDWATER FLOW DIRECTION
- (214.44) GROUNDWATER ELEVATION (ABOVE MEAN SEA LEVEL)

REV	DESCRIPTION / ISSUE	DATE	APPROVED

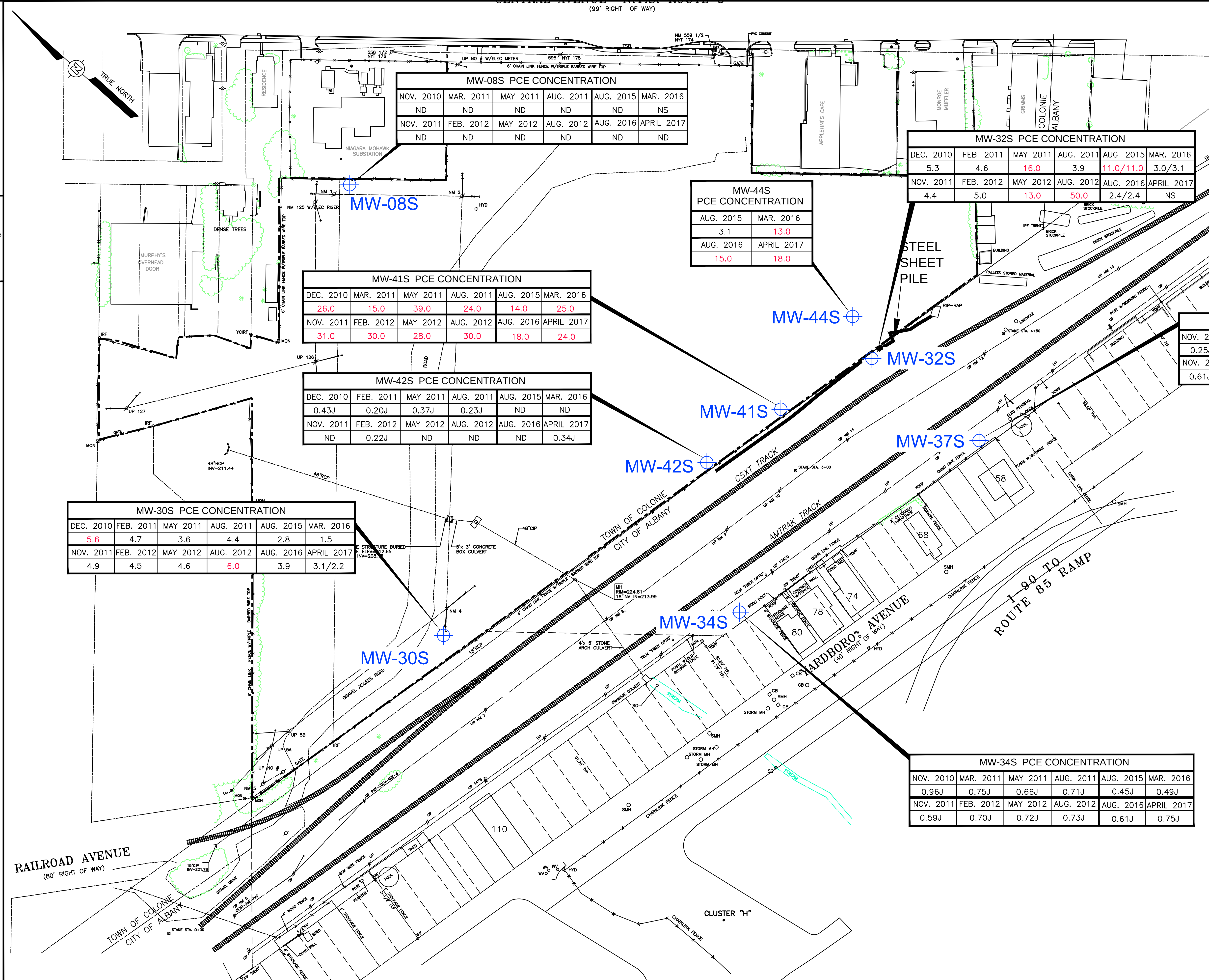
U.S. ARMY CORPS OF ENGINEERS
FORMERLY UTILIZED SITES
REMEDIAL ACTION PROGRAM

DESIGNED BY: --
DRAWN BY: B. Faison
CHECKED BY: M. Hardner
APPROVED BY: --

FIGURE 4
GROUNDWATER ELEVATION CONTOURS UPPER GROUNDWATER ZONE APRIL 2017

COLONIE FUSRAP SITE
1130 CENTRAL AVENUE
ALBANY, NY 12205

DATE:	SCALE:	DRAWING NO.	SHEET NO.
9/11/2017	AS SHOWN	500304-D14	-



MW-08S PCE CONCENTRATION

NOV. 2010	MAR. 2011	MAY 2011	AUG. 2011	AUG. 2015	MAR. 2016
ND	ND	ND	ND	ND	NS
NOV. 2011	FEB. 2012	MAY 2012	AUG. 2012	AUG. 2016	APRIL 2017
ND	ND	ND	ND	ND	ND

MW-32S PCE CONCENTRATION

DEC. 2010	FEB. 2011	MAY 2011	AUG. 2011	AUG. 2015	MAR. 2016
5.3	4.6	16.0	3.9	11.0/11.0	3.0/3.1
NOV. 2011	FEB. 2012	MAY 2012	AUG. 2012	AUG. 2016	APRIL 2017
4.4	5.0	13.0	50.0	2.4/2.4	NS

MW-44S PCE CONCENTRATION

AUG. 2015	MAR. 2016
3.1	13.0
AUG. 2016	APRIL 2017
15.0	18.0

MW-41S PCE CONCENTRATION

DEC. 2010	MAR. 2011	MAY 2011	AUG. 2011	AUG. 2015	MAR. 2016
26.0	15.0	39.0	24.0	14.0	25.0
NOV. 2011	FEB. 2012	MAY 2012	AUG. 2012	AUG. 2016	APRIL 2017
31.0	30.0	28.0	30.0	18.0	24.0

MW-42S PCE CONCENTRATION

DEC. 2010	FEB. 2011	MAY 2011	AUG. 2011	AUG. 2015	MAR. 2016
0.43J	0.20J	0.37J	0.23J	ND	ND
NOV. 2011	FEB. 2012	MAY 2012	AUG. 2012	AUG. 2016	APRIL 2017
ND	0.22J	ND	ND	ND	0.34J

MW-37S PCE CONCENTRATION

NOV. 2010	MAR. 2011	MAY 2011	AUG. 2011	AUG. 2015	MAR. 2016
0.25J	ND	0.25J	0.39J	0.49J	0.38J
NOV. 2011	FEB. 2012	MAY 2012	AUG. 2012	AUG. 2016	APRIL 2017
0.61J	0.58J	0.21J	0.37J	ND	0.50J

MW-30S PCE CONCENTRATION

DEC. 2010	FEB. 2011	MAY 2011	AUG. 2011	AUG. 2015	MAR. 2016
5.6	4.7	3.6	4.4	2.8	1.5
NOV. 2011	FEB. 2012	MAY 2012	AUG. 2012	AUG. 2016	APRIL 2017
4.9	4.5	4.6	6.0	3.9	3.1/2.2

MW-34S PCE CONCENTRATION

NOV. 2010	MAR. 2011	MAY 2011	AUG. 2011	AUG. 2015	MAR. 2016
0.96J	0.75J	0.66J	0.71J	0.45J	0.49J
NOV. 2011	FEB. 2012	MAY 2012	AUG. 2012	AUG. 2016	APRIL 2017
0.59J	0.70J	0.72J	0.73J	0.61J	0.75J

LEGEND:

Symbol	Description
— - —	PROPERTY OUTLINE
MW-37S ⊕	MONITORING WELL USED FOR LONG-TERM MONITORING
1.6	TETRACHLOROETHLENE (PCE) CONCENTRATION IN MICROGRAMS PER LITER (ug/L)
5.5	PCE TARGET CLEANUP GOAL (ug/L)
10.0	EXCEEDS PCE TARGET CLEANUP GOAL (ug/L)
11.0/11.0	DUPLICATE RESULT
J	ESTIMATED VALUE BELOW METHOD REPORTING LIMIT
ND	NON DETECTED
NS	NOT SAMPLED

REV	DESCRIPTION / ISSUE	DATE	APPROVED

U.S. ARMY CORPS OF ENGINEERS
FORMERLY UTILIZED SITES
REMEDIAL ACTION PROGRAM

FIGURE 5
TETRACHLOROETHENE CONCENTRATIONS UPPER GROUNDWATER ZONE NOVEMBER 2010 - APRIL 2017

COLONIE FUSRAP SITE
1130 CENTRAL AVENUE
ALBANY, NY 12205

DESIGNED BY: --
DRAWN BY: B. Faison
CHECKED BY: M. Hardner
APPROVED BY: --
DATE: 9/11/2017
SCALE: AS SHOWN
DRAWING NO. 500304-D13
SHEET NO. -

OFFICE Pittsburgh, PA
DRAWING NUMBER 500304D13

Xref Image: CBI_Logo-Color.jpg, Figure 4 markup.jpg, Lower Zone.tif, ou-shaw.jpg, Upper Zone.tif

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Plot Date/Time: Sep 11, 2017 - 4:46pm
Plotted By: bernadette.oconnor

OFFICE Pittsburgh, PA
DRAWING NUMBER 500304-D13

VERIFY SCALE 0 1"

Xref Image: CBL Logo-Color.jpg Figure 4 markup.jpg Lower Zone.tif ou-show.jpg Upper Zone.tif

File: \\Cfspittfp01\cad\Show Offices - CAD Files\Latham, NY\500304\500304D13.dwg
Plot Date/Time: Sep 12, 2017 - 2:01pm
Plotted By: bernadette.oconnor

(99' RIGHT OF WAY)

TRUE NORTH

MW-08S TCE CONCENTRATION					
NOV. 2010	MAR. 2011	MAY 2011	AUG. 2011	AUG. 2015	MAR. 2016
ND	ND	ND	ND	ND	NS
NOV. 2011	FEB. 2012	MAY 2012	AUG. 2012	AUG. 2016	APRIL 2017
ND	ND	ND	ND	ND	ND

MW-44S TCE CONCENTRATION	
AUG. 2015	MAR. 2016
4.0	7.7
AUG. 2016	APRIL 2017
9.9	9.9

MW-32S TCE CONCENTRATION					
DEC. 2010	FEB. 2011	MAY 2011	AUG. 2011	AUG. 2015	MAR. 2016
3.0	2.3	6.3	2.3	6.9/6.7	1.2/1.1
NOV. 2011	FEB. 2012	MAY 2012	AUG. 2012	AUG. 2016	APRIL 2017
2.2	2.0	4.7	19.0	1.5/1.6	NS

MW-41S TCE CONCENTRATION					
DEC. 2010	MAR. 2011	MAY 2011	AUG. 2011	AUG. 2015	MAR. 2016
8.3	5.3	11.0	7.1	4.5	6.1
NOV. 2011	FEB. 2012	MAY 2012	AUG. 2012	AUG. 2016	APRIL 2017
8.5	6.8	7.4	8.6	5.3	5.1

MW-42S TCE CONCENTRATION					
DEC. 2010	FEB. 2011	MAY 2011	AUG. 2011	AUG. 2015	MAR. 2016
1.3	1.0	0.75J	0.73J	0.65J	0.44J
NOV. 2011	FEB. 2012	MAY 2012	AUG. 2012	AUG. 2016	APRIL 2017
0.57J	0.54J	0.73J	0.59J	0.45J	0.75J

MW-37S TCE CONCENTRATION					
NOV. 2010	MAR. 2011	MAY 2011	AUG. 2011	AUG. 2015	MAR. 2016
0.36J	0.33J	0.41J	0.63J	0.58J	0.62J
NOV. 2011	FEB. 2012	MAY 2012	AUG. 2012	AUG. 2016	APRIL 2017
0.79J	0.68J	0.31J	0.53J	0.28J	0.42J

MW-30S TCE CONCENTRATION					
NOV. 2010	FEB. 2011	MAY 2011	AUG. 2011	AUG. 2015	MAR. 2016
1.4	1.1	0.5J	1.6	1.6	0.52J
NOV. 2011	FEB. 2012	MAY 2012	AUG. 2012	AUG. 2016	APRIL 2017
1.2	1.7	1.6	2.4	1.2	ND/ND

MW-34S TCE CONCENTRATION					
NOV. 2010	MAR. 2011	MAY 2011	AUG. 2011	AUG. 2015	MAR. 2016
ND	ND	ND	ND	ND	ND
NOV. 2011	FEB. 2012	MAY 2012	AUG. 2012	AUG. 2016	APRIL 2017
ND	ND	ND	ND	ND	0.29J

MW-08S
MW-44S
MW-32S
MW-41S
MW-37S
MW-42S
MW-34S
MW-30S

STEEL SHEET PILE

COLONIE
ALBANY
TOWN OF COLONIE
CITY OF ALBANY
CSXT TRACK
AMTRAK TRACK
RAILROAD AVENUE (80' RIGHT OF WAY)
HARDBORO AVENUE (40' RIGHT OF WAY)
I-90 TO ROUTE 85 RAMP
CLUSTER "H"
CENTRAL AVENUE (99' RIGHT OF WAY)

LEGEND:

	PROPERTY OUTLINE
MW-37S	MONITORING WELL USED FOR LONG-TERM MONITORING
1.1	TRICHLOROETHLENE (TCE) CONCENTRATION IN MICROGRAMS PER LITER (ug/L)
18.0	TCE TARGET CLEANUP GOAL (ug/L)
19.0	EXCEEDS TCE TARGET CLEANUP GOAL (ug/L)
6.9/6.7	DUPLICATE RESULT
J	ESTIMATED VALUE BELOW METHOD REPORTING LIMIT
ND	NON DETECTED
NS	NOT SAMPLED

BAR SCALE
60 0 30 60 120
1 inch = 60 ft.

REV	DESCRIPTION / ISSUE	DATE	APPROVED

U.S. ARMY CORPS OF ENGINEERS
FORMERLY UTILIZED SITES
REMEDIAL ACTION PROGRAM

DESIGNED BY: --
DRAWN BY: B. Faison
CHECKED BY: M. Hardner
APPROVED BY: --

FIGURE 6
TRICHLOROETHENE CONCENTRATIONS
UPPER GROUNDWATER ZONE
NOVEMBER 2010 - APRIL 2017
COLONIE FUSRAP SITE
1130 CENTRAL AVENUE
ALBANY, NY 12205

DATE: 9/11/2017
SCALE: AS SHOWN
DRAWING NO. 500304-D13
SHEET NO. -

OFFICE Pittsburgh, PA

DRAWING NUMBER 500304-D13

VERIFY SCALE 0 1"

Xref Image : CBI_Logo-Color.jpg Figure 4 markup.jpg Lower Zone.tif our-show.jpg Upper Zone.tif

File: \\Cfsp1ttfp01\cad\Shaw Offices - CAD Files\Latham, NY\500304\500304D13.dwg Plot Date/Time: Sep 11, 2017 - 5:09pm Plotted By: terrodet@cdmsmi.com

(99' RIGHT OF WAY)

TRUE NORTH

MW-08S CIS-1,2-DCE CONCENTRATION					
NOV. 2010	MAR. 2011	MAY 2011	AUG. 2011	AUG. 2015	MAR. 2016
ND	ND	ND	ND	ND	NS
NOV. 2011	FEB. 2012	MAY 2012	AUG. 2012	AUG. 2016	APRIL 2017
ND	ND	ND	ND	ND	ND

MW-44S CIS-1,2-DCE CONCENTRATION	
AUG. 2015	MAR. 2016
3.1	2.8
AUG. 2016	APRIL 2017
3.5	3.3

MW-32S CIS-1,2-DCE CONCENTRATION					
DEC. 2010	FEB. 2011	MAY 2011	AUG. 2011	AUG. 2015	MAR. 2016
12.0	10.0	10.0	6.0	8.9/8.8	1.3/1.1
NOV. 2011	FEB. 2012	MAY 2012	AUG. 2012	AUG. 2016	APRIL 2017
9.1	5.8	8.7	23.0	6.5/6.0	NS

MW-41S CIS-1,2-DCE CONCENTRATION					
DEC. 2010	MAR. 2011	MAY 2011	AUG. 2011	AUG. 2015	MAR. 2016
6.6	3.5	6.8	5.2	4.2	4.7
NOV. 2011	FEB. 2012	MAY 2012	AUG. 2012	AUG. 2016	APRIL 2017
5.0	4.4	5.2	5.1	4.7	4.8

MW-42S CIS-1,2-DCE CONCENTRATION					
DEC. 2010	FEB. 2011	MAY 2011	AUG. 2011	AUG. 2015	MAR. 2016
4.3	3.4	9.2	12.0	13.0	7.2
NOV. 2011	FEB. 2012	MAY 2012	AUG. 2012	AUG. 2016	APRIL 2017
8.2	6.6	7.4	11.0	8.5	7.6

MW-37S CIS-1,2-DCE CONCENTRATION					
NOV. 2010	MAR. 2011	MAY 2011	AUG. 2011	AUG. 2015	MAR. 2016
17.0	27.0	27.0	34.0	52.0	39.0
NOV. 2011	FEB. 2012	MAY 2012	AUG. 2012	AUG. 2016	APRIL 2017
40.0	28.0	39.0	48.0	51.0	49.0

MW-30S CIS-1,2-DCE CONCENTRATION					
NOV. 2010	FEB. 2011	MAY 2011	AUG. 2011	AUG. 2015	MAR. 2016
0.56J	0.67J	ND	1.3	2.0	0.76J
NOV. 2011	FEB. 2012	MAY 2012	AUG. 2012	AUG. 2016	APRIL 2017
0.63J	1.4	1.3	2.3	0.96J	ND/ND

MW-34S CIS-1,2-DCE CONCENTRATION					
NOV. 2010	MAR. 2011	MAY 2011	AUG. 2011	AUG. 2015	MAR. 2016
1.6	0.96J	0.93J	1.2	0.91J	0.79J
NOV. 2011	FEB. 2012	MAY 2012	AUG. 2012	AUG. 2016	APRIL 2017
0.95J	1.1J	0.86J	1.5	1.3	1.2

MW-08S MW-44S MW-32S MW-41S MW-42S MW-37S MW-34S MW-30S

STEEL SHEET PILE

RAILROAD AVENUE (80' RIGHT OF WAY)

HARDBORO AVENUE (40' RIGHT OF WAY)

TOWN OF COLONIE / CITY OF ALBANY

CSXT TRACK / AMTRAK TRACK

I-90 TO ROUTE 85 RAMP

CLUSTER "H"

LEGEND:

- PROPERTY OUTLINE
- MW-37S — MONITORING WELL USED FOR LONG-TERM MONITORING
- 1.4 — CIS-1,2-DICHLOROETHLENE (CIS-1,2-DCE) CONCENTRATION IN MICROGRAMS PER LITER (ug/L)
- 1,800 — CIS-1,2-DCE TARGET CLEANUP GOAL (ug/L)
- 8.9/8.8 — DUPLICATE RESULT
- J — ESTIMATED VALUE BELOW METHOD REPORTING LIMIT
- ND — NON DETECTED
- NS — NOT SAMPLED

BAR SCALE
60 0 30 60 120
1 inch = 60 ft.

REV	DESCRIPTION / ISSUE	DATE	APPROVED

U.S. ARMY CORPS OF ENGINEERS
FORMERLY UTILIZED SITES
REMEDIAL ACTION PROGRAM

DESIGNED BY: --
DRAWN BY: B. Faison
CHECKED BY: M. Hardner
APPROVED BY: --

FIGURE 7
Cis - 1,2-DICHLOROETHENE CONCENTRATIONS
UPPER GROUNDWATER ZONE
NOVEMBER 2010 - APRIL 2017
COLONIE FUSRAP SITE
1130 CENTRAL AVENUE
ALBANY, NY 12205

DATE: 9/11/2017 | SCALE: AS SHOWN | DRAWING NO. 500304-D13 | SHEET NO. -

OFFICE Pittsburgh, PA
DRAWING NUMBER 500304-D13

VERIFY SCALE 0 1"

Xref Image : CBI_Logo-Color.jpg Figure 4 Lower Zone.tif ou-shaw.jpg Upper Zone.tif

File: \\Cfspittfp01\cad\Shaw Offices - CAD Files\Latham, NY\500304\500304D13.dwg
Plot Date/Time: Sep 12, 2017 - 2:03pm
Plotted By: bernadette.oconnor

(99' RIGHT OF WAY)

TRUE NORTH

MW-08S VC CONCENTRATION					
NOV. 2010	MAR. 2011	MAY 2011	AUG. 2011	AUG. 2015	MAR. 2016
ND	ND	ND	ND	ND	NS
NOV. 2011	FEB. 2012	MAY 2012	AUG. 2012	AUG. 2016	APRIL 2017
ND	ND	ND	ND	ND	ND

MW-44S VC CONCENTRATION	
AUG. 2015	MAR. 2016
ND	ND
AUG. 2016	APRIL 2017
ND	ND

MW-32S VC CONCENTRATION					
DEC. 2010	FEB. 2011	MAY 2011	AUG. 2011	AUG. 2015	MAR. 2016
0.39J	0.43J	0.55J	ND	ND/0.37J	ND/ND
NOV. 2011	FEB. 2012	MAY 2012	AUG. 2012	AUG. 2016	APRIL 2017
0.52J	ND	0.50J	1.1	ND/ND	NS

MW-41S VC CONCENTRATION					
DEC. 2010	MAR. 2011	MAY 2011	AUG. 2011	AUG. 2015	MAR. 2016
0.66J	0.58J	0.92J	0.69J	0.90J	0.53J
NOV. 2011	FEB. 2012	MAY 2012	AUG. 2012	AUG. 2016	APRIL 2017
0.74J	1.0	1.2	1.0	0.62J	0.58J

MW-37S VC CONCENTRATION					
NOV. 2010	MAR. 2011	MAY 2011	AUG. 2011	AUG. 2015	MAR. 2016
0.50J	0.66J	0.91J	0.53J	0.59J	0.35J
NOV. 2011	FEB. 2012	MAY 2012	AUG. 2012	AUG. 2016	APRIL 2017
0.51J	0.40J	0.63J	0.69J	0.48J	0.65J

MW-42S VC CONCENTRATION					
DEC. 2010	FEB. 2011	MAY 2011	AUG. 2011	AUG. 2015	MAR. 2016
ND	ND	0.22J	ND	ND	ND
NOV. 2011	FEB. 2012	MAY 2012	AUG. 2012	AUG. 2016	APRIL 2017
0.34J	0.22J	ND	0.21J	ND	ND

MW-30S VC CONCENTRATION					
NOV. 2010	FEB. 2011	MAY 2011	AUG. 2011	AUG. 2015	MAR. 2016
ND	ND	ND	ND	ND	ND
NOV. 2011	FEB. 2012	MAY 2012	AUG. 2012	AUG. 2016	APRIL 2017
ND	ND	ND	ND	ND	ND/ND

MW-34S VC CONCENTRATION					
NOV. 2010	MAR. 2011	MAY 2011	AUG. 2011	AUG. 2015	MAR. 2016
2.5	1.8	2.4	2.2	1.7	1.1
NOV. 2011	FEB. 2012	MAY 2012	AUG. 2012	AUG. 2016	APRIL 2017
3.2	2.3	2.0	3.4	1.6	1.1

MW-08S
MW-44S
MW-32S
MW-41S
MW-37S
MW-42S
MW-30S
MW-34S

STEEL SHEET PILE

COLONIE
TOWN OF COLONIE
CITY OF ALBANY
ALBANY
RAILROAD AVENUE (80' RIGHT OF WAY)
HARDBORO AVENUE (40' RIGHT OF WAY)
CSXT TRACK
AMTRAK TRACK
I-90 TO ROUTE 85 RAMP
CLUSTER "H"
RESIDENCE
NIAGARA MOHAWK SUBSTATION
APPLETINI'S CAFE
MONROE MUFFLER
GRIMMS
MURPHY'S OVERHEAD DOOR
DENSE TREES
GRAVEL ACCESS ROAD
DRAINAGE CULVERT
4'x 5' STONE ARCH CULVERT
5'x 3' CONCRETE BOX CULVERT
STREAM
CHAINLINK FENCE
RIP-RAP
POOL
SHED
BUILDING
PALLETS STORED MATERIAL
BRICK STOCKPILE
STAKE STA. 0+00
STAKE STA. 3+00
STAKE STA. 4+50

LEGEND:

	PROPERTY OUTLINE
MW-37S	MONITORING WELL USED FOR LONG-TERM MONITORING
0.50J	VINYL CHLORIDE (VC) CONCENTRATION IN MICROGRAMS PER LITER (ug/L)
1.4	VC TARGET CLEANUP GOAL (ug/L)
1.8	EXCEEDS VC TARGET CLEANUP GOAL (ug/L)
ND/0.37J	DUPLICATE RESULT
J	ESTIMATED VALUE BELOW METHOD REPORTING LIMIT
ND	NON DETECTED
NS	NOT SAMPLED

BAR SCALE
60 0 30 60 120
1 inch = 60 ft.

REV	DESCRIPTION / ISSUE	DATE	APPROVED

U.S. ARMY CORPS OF ENGINEERS
FORMERLY UTILIZED SITES
REMEDIAL ACTION PROGRAM

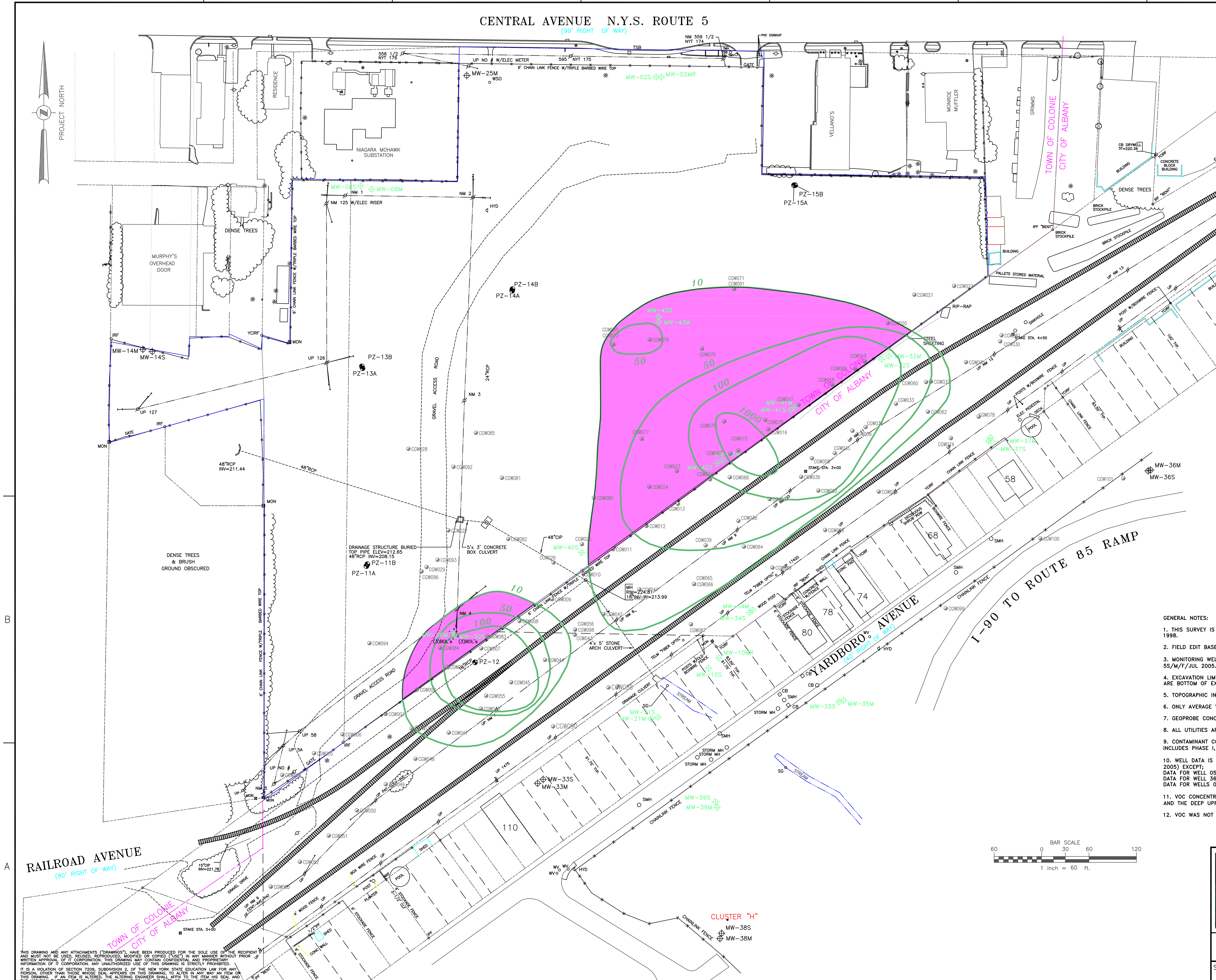
DESIGNED BY: --
DRAWN BY: B. Faison
CHECKED BY: M. Hardner
APPROVED BY: --

FIGURE 8
VINYL CHLORIDE CONCENTRATIONS
UPPER GROUNDWATER ZONE
NOVEMBER 2010 - APRIL 2017
COLONIE FUSRAP SITE
1130 CENTRAL AVENUE
ALBANY, NY 12205

DATE:	SCALE:	DRAWING NO.	SHEET NO.
9/11/2017	AS SHOWN	500304-D13	-

APPENDIX A

Groundwater ROD Figures 6 and 7



LEGEND

Symbol	Description
(green well symbol)	MONITORING WELL USED FOR LONG-TERM MONITORING
(geoprobe symbol)	GEOPROBE LOCATION
CB	CATCH BASIN
	GUY WIRE
IRF	IRON ROD FOUND
(well symbol)	MONITORING WELL
PZ-14B	PIEZOMETER
SMH	SANITARY MANHOLE
MON	SQUARE CONCRETE MONUMENT
STORM MH	STORMWATER MANHOLE
TMH	TELEPHONE MANHOLE
TSB	TRAFFIC SIGNAL BOX
	UTILITY POLE
WMTR	WATER METER
WSO	WATER SHUT-OFF
YCIRF	YELLOW CAPPED IRON ROD FOUND
	OVERHEAD ELECTRIC
	UNDERGROUND PIPE
	FENCE LINE
HDPE	HIGH DENSITY POLYETHYLENE PIPE
RCP	REINFORCED CONCRETE PIPE
(pink area)	ONSITE PORTION OF VOC PLUME

GENERAL NOTES:

1. THIS SURVEY IS BASED ON PHOTOGRAMMETRIC MAPPING PREPARED BY LOCKWOOD MAPPING, INC., PHOTOS DATED MAY 13, 1998.

2. FIELD EDIT BASED ON SITE WORK CONDUCTED THROUGH JULY 2005

3. MONITORING WELLS REMOVED DUE TO EXCAVATION: WELL 19S/NOV 2002, WELL 7S/NOV 2004, WELL 1F/JUN 2005, WELL 5S/M/F/JUL 2005.

4. EXCAVATION LIMIT CONTOURS PROVIDED BY CT MALE ASSOCIATES JULY 2005, ELEVATIONS SHOWN IN COMPLETED UNITS ARE BOTTOM OF EXCAVATION.

5. TOPOGRAPHIC INFORMATION TO THE SOUTH OF YARDBORO AVENUE SURVEYED BY CT MALE, INC. 2002.

6. ONLY AVERAGE VOC VALUES ARE SHOWN FOR WELLS.

7. GEOPROBE CONCENTRATIONS REPRESENT HISTORICAL RI DATA.

8. ALL UTILITIES ARE NOT SHOWN.

9. CONTAMINANT CONTOURS BASED ON GEOPROBE AND MONITORING WELL DATA SHOWN ON THE FIGURE. GEOPROBE DATA INCLUDES PHASE I, II, AND III RESULTS (OCT 1999 TO DEC 2001). ONLY GEOPROBE DETECTIONS ARE SHOWN.

10. WELL DATA IS AVERAGE OF FOUR 2003 TO 2005 SEMIANNUAL SAMPLE EVENTS (SECOND HALF 2003 TO FIRST HALF 2005) EXCEPT;
DATA FOR WELL 05S IS AVE. OF THREE SAMPLE EVENTS; AND
DATA FOR WELL 36S AND PZ12 IS AVE. OF TWO SAMPLE EVENTS; AND
DATA FOR WELLS 07S AND 40S IS BASED ON ONE SAMPLE EVENT.

11. VOC CONCENTRATIONS SHOWN FOR THE GEOPROBES ARE THE MAXIMUM OF THE SHALLOW UPPER SILT LAYER (0' -15') AND THE DEEP UPPER SILT LAYER (15' -30').

12. VOC WAS NOT DETECTED AT LOCATIONS WHERE NO CONCENTRATION DATA IS PROVIDED.

U.S. ARMY CORPS OF ENGINEERS
FORMERLY UTILIZED SITES
REMEDIAL ACTION PROGRAM

FIGURE 6
ESTIMATED EXTENT OF ONSITE VOCs
IN EXCESS OF RAO CONCENTRATION (2003–2005)

Cabrera Services

COLONIE FUSRAP SITE
1130 CENTRAL AVENUE, ALBANY, NY 12205

SCALE:	DRAWING NO.	SHEET NO.	REVISION NO.
1" = 60'	837935D92	1 OF 1	

LEGEND

Symbol	Description
⌖	MONITORING WELL USED FOR LONG-TERM MONITORING
□ CB	CATCH BASIN
←	GUY WIRE
○ IRF	IRON ROD FOUND
⌖	MONITORING WELL
PZ-14B	PIEZOMETER
○ SMH	SANITARY MANHOLE
⊠ MON	SQUARE CONCRETE MONUMENT
○ STORM MH	STORMWATER MANHOLE
○ TMH	TELEPHONE MANHOLE
□ TSB	TRAFFIC SIGNAL BOX
⌀	UTILITY POLE
○ WMTR	WATER METER
○ WSO	WATER SHUT-OFF
○ YCIRF	YELLOW CAPPED IRON ROD FOUND
—··—··—	OVERHEAD ELECTRIC
- - - - -	UNDERGROUND PIPE
—x—x—x—	FENCE LINE
HDPE	HIGH DENSITY POLYETHYLENE PIPE
RCP	REINFORCED CONCRETE PIPE
(magenta fill)	SOIL UNITS WHERE VOC CONTAMINATED SOILS EXCAVATED
(green contour)	VOC CONCENTRATION IN GROUNDWATER (UG/L)

GENERAL NOTES:

1. THIS SURVEY IS BASED ON PHOTOGRAMMETRIC MAPPING PREPARED BY LOCKWOOD MAPPING, INC., PHOTOS DATED MAY 13, 1998.
2. FIELD EDIT BASED ON SITE WORK CONDUCTED THROUGH JULY 2005
3. MONITORING WELLS REMOVED DUE TO EXCAVATION: WELL 19S/NOV 2002, WELL 7S/NOV 2004, WELL 1F/JUN 2005, WELL 5S/M/F/JUL 2005.
4. EXCAVATION LIMIT CONTOURS PROVIDED BY CT MALE ASSOCIATES JULY 2005, ELEVATIONS SHOWN IN COMPLETED UNITS ARE BOTTOM OF EXCAVATION.
5. TOPOGRAPHIC INFORMATION TO THE SOUTH OF YARDBORO AVENUE SURVEYED BY CT MALE, INC. 2002.
6. ONLY AVERAGE VOC VALUES ARE SHOWN FOR WELLS.
7. GEOPROBE CONCENTRATIONS REPRESENT HISTORICAL RI DATA.
8. ALL UTILITIES ARE NOT SHOWN.
9. CONTAMINANT CONTOURS BASED ON GEOPROBE AND MONITORING WELL DATA SHOWN ON THE FIGURE. GEOPROBE DATA INCLUDES PHASE I, II, AND III RESULTS (OCT 1999 TO DEC 2001). ONLY GEOPROBE DETECTIONS ARE SHOWN.
10. WELL DATA IS AVERAGE OF FOUR 2003 TO 2005 SEMIANNUAL SAMPLE EVENTS (SECOND HALF 2003 TO FIRST HALF 2005) EXCEPT;
DATA FOR WELL 05S IS AVE. OF THREE SAMPLE EVENTS; AND
DATA FOR WELL 36S AND PZ12 IS AVE. OF TWO SAMPLE EVENTS; AND
DATA FOR WELLS 07S AND 40S IS BASED ON ONE SAMPLE EVENT.
11. VOC CONCENTRATIONS SHOWN FOR THE GEOPROBES ARE THE MAXIMUM OF THE SHALLOW UPPER SILT LAYER (0' –15') AND THE DEEP UPPER SILT LAYER (15' –30').
12. VOC WAS NOT DETECTED AT LOCATIONS WHERE NO CONCENTRATION DATA IS PROVIDED.

BAR SCALE
60 0 30 60 120
1 inch = 60 ft.

U.S. ARMY CORPS OF ENGINEERS
FORMERLY UTILIZED SITES
REMEDIAL ACTION PROGRAM

FIGURE 7
SOIL EXCAVATION AREAS AND
ESTIMATED VOC PLUME IN GROUNDWATER
(2003–2005)

Cabrera Services

COLONIE FUSRAP SITE
1130 CENTRAL AVENUE, ALBANY, NY 12205

SCALE:	DRAWING NO.	SHEET NO.	REVISION NO.
1" = 60'	837935D92	1 OF 1	

APPENDIX B

Historical Groundwater Data Summary Tables

Appendix B
Table B-1
Historical Analytical Results - Upper Groundwater Zone
2016 - 2017 Annual LTM Report
Colonie FUSRAP Site, Colonie New York

Sampling Date	Units	28-Jul-08		29-Oct-08		18-Feb-09		21-May-09		1-Dec-98		1-May-99		1-Oct-99		1-Jan-00	
Well ID		MW-02S		MW-02S		MW-02S		MW-02S		MW-08S		MW-08S		MW-08S		MW-08S	
VOCs		Results	Q	Results	Q	Results	Q	Results	Q	Results	Q	Results	Q	Results	Q	Results	Q
1,1-DCE	µg/L	-		-		-		-		10	U	5	U	10	U	-	
PCE	µg/L	-		-		-		-		10	U	5	U	10	U	-	
TCE	µg/L	-		-		-		-		10	U	5	U	10	U	-	
VC	µg/L	-		-		-		-		10	U	10	U	10	U	-	
cis-1,2-DCE	µg/L	-		-		-		-		10^	U	5^	U	10^	U	-	
trans-1,2-DCE	µg/L	-		-		-		-								-	
Metals		Results	Q	Results	Q	Results	Q	Results	Q	Results	Q	Results	Q	Results	Q	Results	Q
Lead (Total)	µg/L	-		-		-		-		**1.7**	**B**	2.9	U	2.1	U	-	
Lead (Dissolved)	µg/L	-		-		-		-		-		-		-		2.3	U
Radiological Parameters		Results	Q	Results	Q	Results	Q	Results	Q	Results	Q	Results	Q	Results	Q	Results	Q
Gross Alpha	pCi/L	-		-		-		-		-		-		-		-	
Gross Beta	pCi/L	-		-		-		-		-		-		-		-	
Total Uranium	µg/L	-		-		-		-		-		-		-		-	
Combined Radium 226/228	pCi/L	-		-		-		-		-		-		-		-	
Gross Alpha - Dissolved	pCi/L	-		-		-		-		-		-		-		-	
Gross Beta - Dissolved	pCi/L	-		-		-		-		-		-		-		-	
Total Uranium - Dissolved	µg/L	-		-		-		-		-		-		-		-	
Combined Radium 226/228 - Dissolved	pCi/L	-		-		-		-		-		-		-		-	
MNA Parameters		Results	Q	Results	Q	Results	Q	Results	Q	Results	Q	Results	Q	Results	Q	Results	Q
TOC	mg/L	**1.00**	J	**1.15**	**J**	**1.24**	**J**	**0.967**	**J**	-		-		-		-	
DOC	mg/L	**1.34**	J	**0.940**	**J**	**1.190**	**J**	**0.953**	**J**	-		-		-		-	
Ethane	µg/L	2.0	U	2.0	U	2.0	U	2.0	U	-		-		-		-	
Ethene	µg/L	2.0	U	2.0	U	2.0	U	2.0	U	-		-		-		-	
Methane	µg/L	**12.0**		**14**		**13**		**8.7**		-		-		-		-	
Nitrate-N	mg/L	0.10	U	**14**	**J**	0.10	U	0.10	U	-		-		-		-	
Sulfate	mg/L	**46.7**		**14**		**62.7**		**45.0**		-		-		-		-	
Chloride	mg/L	**84.7**		**14**		**162**		**92.8**		-		-		-		-	
Soluble Manganese, Mn(II)	mg/L	**0.43**		**14**		0.50	U	0.40		-		-		-		-	
Ferrous Iron, Fe(II)	mg/L	**1.2**		**14**		**0.6**		1.4		-		-		-		-	
Field Parameters		Results	Q	Results	Q	Results	Q	Results	Q	Results	Q	Results	Q	Results	Q	Results	Q
pH	SU	6.20		7.63		7.42		7.27		-		-		-		-	
Specific Conductance	mS/cm	0.510		0.494		0.702		0.461		-		-		-		-	
Turbidity	NTU	76.0		23.0		22.4		1.5		-		-		-		-	
Dissolved Oxygen	mg/L	3.36		NM		2.12		9.97		-		-		-		-	
Temperature	^{o}C	14.11		13.26		10.72		11.99		-		-		-		-	
ORP	mV	-72.8		-133.0		-156.8		-106.2		-		-		-		-	

See notes at the end of the table.

Appendix B
Table B-1
Historical Analytical Results - Upper Groundwater Zone
2016 - 2017 Annual LTM Report
Colonie FUSRAP Site, Colonie New York

Sampling Date	Units	1-Mar-00		1-Aug-00		1-Dec-00		1-Feb-01		1-Aug-01		1-Dec-01		1-Feb-02		2-Jun-02	
Well ID		MW-08S		MW-08S		MW-08S		MW-08S		MW-08S		MW-08S		MW-08S		MW-08S	
VOCs		Results	Q	Results	Q	Results	Q	Results	Q	Results	Q	Results	Q	Results	Q	Results	Q
1,1-DCE	µg/L	10	U	10	U	-		1	U	0.83	U	-		0.5	U	0.5	U
PCE	µg/L	10	U	10	U	-		1	U	0.78	U	-		0.5	U	0.5	U
TCE	µg/L	10	U	10	U	-		1	U	0.49	U	-		0.5	U	0.5	U
VC	µg/L	10	U	10	U	-		2	U	1.0	U	-		0.5	U	0.5	U
cis-1,2-DCE	µg/L	10^	U	10^	U	-		1^	U	0.49	U	-		0.5	U	0.5	U
trans-1,2-DCE	µg/L					-				0.84	U	-		0.5	U	0.5	U
Metals		Results	Q	Results	Q	Results	Q	Results	Q	Results	Q	Results	Q	Results	Q	Results	Q
Lead (Total)	µg/L	2.3	U	1.3	U	-		**4.3**		1.2	U	-		2.8	U	2.8	U
Lead (Dissolved)	µg/L	-		-		1.3	U	3.2		-		1.2	U	2.8	U	2.8	U
Radiological Parameters		Results	Q	Results	Q	Results	Q	Results	Q	Results	Q	Results	Q	Results	Q	Results	Q
Gross Alpha	pCi/L	-		-		-		-		-		-		-		-	
Gross Beta	pCi/L	-		-		-		-		-		-		-		-	
Total Uranium	µg/L	-		-		-		-		-		-		-		-	
Combined Radium 226/228	pCi/L	-		-		-		-		-		-		-		-	
Gross Alpha - Dissolved	pCi/L	-		-		-		-		-		-		-		-	
Gross Beta - Dissolved	pCi/L	-		-		-		-		-		-		-		-	
Total Uranium - Dissolved	µg/L	-		-		-		-		-		-		-		-	
Combined Radium 226/228 - Dissolved	pCi/L	-		-		-		-		-		-		-		-	
MNA Parameters		Results	Q	Results	Q	Results	Q	Results	Q	Results	Q	Results	Q	Results	Q	Results	Q
TOC	mg/L	-		-		-		-		-		-		-		-	
DOC	mg/L	-		-		-		-		-		-		-		-	
Ethane	µg/L	-		-		-		-		-		-		-		-	
Ethene	µg/L	-		-		-		-		-		-		-		-	
Methane	µg/L	-		-		-		-		-		-		-		-	
Nitrate-N	mg/L	-		-		-		-		-		-		-		-	
Sulfate	mg/L	-		-		-		-		-		-		-		-	
Chloride	mg/L	-		-		-		-		-		-		-		-	
Soluble Manganese, Mn(II)	mg/L	-		-		-		-		-		-		-		-	
Ferrous Iron, Fe(II)	mg/L	-		-		-		-		-		-		-		-	
Field Parameters		Results	Q	Results	Q	Results	Q	Results	Q	Results	Q	Results	Q	Results	Q	Results	Q
pH	SU	-		-		-		-		-		-		-		-	
Specific Conductance	mS/cm	-		-		-		-		-		-		-		-	
Turbidity	NTU	-		-		-		-		-		-		-		-	
Dissolved Oxygen	mg/L	-		-		-		-		-		-		-		-	
Temperature	^{o}C	-		-		-		-		-		-		-		-	
ORP	mV	-		-		-		-		-		-		-		-	

See notes at the end of the table.

Appendix B
Table B-1
Historical Analytical Results - Upper Groundwater Zone
2016 - 2017 Annual LTM Report
Colonie FUSRAP Site, Colonie New York

Sampling Date	Units	1-Mar-03		3-Dec-03		4-Jul-04		4-Dec-04		5-Jun-05		5-Dec-05		1-Dec-06		26-Jun-07	
Well ID		MW-08S		MW-08S		MW-08S		MW-08S		MW-08S		MW-08S		MW-08S		MW-08S	
VOCs		Results	Q	Results	Q	Results	Q	Results	Q	Results	Q	Results	Q	Results	Q	Results	Q
1,1-DCE	µg/L	0.5	U	0.5	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U
PCE	µg/L	**0.3**	**J**	0.5	U	1.0	U	1.0	U	1.0	UJ	1.0	U	1.0	U	1.0	U
TCE	µg/L	0.5	U	0.5	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U
VC	µg/L	0.5	U	0.5	U	2.0	U	2.0	U	2.0	U	2.0	U	2.0	U	2.0	U
cis-1,2-DCE	µg/L	0.5	U	0.5	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U
trans-1,2-DCE	µg/L	0.5	U	0.5	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U
Metals		Results	Q	Results	Q	Results	Q	Results	Q	Results	Q	Results	Q	Results	Q	Results	Q
Lead (Total)	µg/L	**~~2.2~~**	**R**	2.2	U	3	U	2	UJ	2	U	2	U	2	U	2	U
Lead (Dissolved)	µg/L			2.2	U	25	U	25	U	2.2	UJ	2	U	-		-	
Radiological Parameters		Results	Q	Results	Q	Results	Q	Results	Q	Results	Q	Results	Q	Results	Q	Results	Q
Gross Alpha	pCi/L	-		-		-		-		-		-		-		-	
Gross Beta	pCi/L	-		-		-		-		-		-		-		-	
Total Uranium	µg/L	-		-		-		-		-		-		-		-	
Combined Radium 226/228	pCi/L	-		-		-		-		-		-		-		-	
Gross Alpha - Dissolved	pCi/L	-		-		-		-		-		-		-		-	
Gross Beta - Dissolved	pCi/L	-		-		-		-		-		-		-		-	
Total Uranium - Dissolved	µg/L	-		-		-		-		-		-		-		-	
Combined Radium 226/228 - Dissolved	pCi/L	-		-		-		-		-		-		-		-	
MNA Parameters		Results	Q	Results	Q	Results	Q	Results	Q	Results	Q	Results	Q	Results	Q	Results	Q
TOC	mg/L	-		-		-		-		-		-		-		-	
DOC	mg/L	-		-		-		-		-		-		-		-	
Ethane	µg/L	-		-		-		-		-		-		-		-	
Ethene	µg/L	-		-		-		-		-		-		-		-	
Methane	µg/L	-		-		-		-		-		-		-		-	
Nitrate-N	mg/L	-		-		-		-		-		-		-		-	
Sulfate	mg/L	-		-		-		-		-		-		-		-	
Chloride	mg/L	-		-		-		-		-		-		-		-	
Soluble Manganese, Mn(II)	mg/L	-		-		-		-		-		-		-		-	
Ferrous Iron, Fe(II)	mg/L	-		-		-		-		-		-		-		-	
Field Parameters		Results	Q	Results	Q	Results	Q	Results	Q	Results	Q	Results	Q	Results	Q	Results	Q
pH	SU	-		6.65		-		6.26		6.74		6.8		6.71		6.58	
Specific Conductance	mS/cm	-		0.452		-		0.353		0.432		0.633		0.336		0.314	
Turbidity	NTU	-		0.0		-		1.4		5.3		0.0		0.0		1.3	
Dissolved Oxygen	mg/L	-		4.58		-		0.71		2.28		0.86		1.05		0.64	
Temperature	^{o}C	-		6.22		-		16.72		8.63		13.17		10.02		11.28	
ORP	mV	-		222.2		-		282.3		192.4		221.1		230.6		84.3	

See notes at the end of the table.

Appendix B
Table B-1
Historical Analytical Results - Upper Groundwater Zone
2016 - 2017 Annual LTM Report
Colonie FUSRAP Site, Colonie New York

Sampling Date	Units	28-Dec-08		28-Jul-08		29-Oct-08		18-Feb-09		21-May-09		1-Dec-98		1-May-99		1-Oct-99	
Well ID		MW-08S		MW-08S		MW-08S		MW-08S		MW-08S		MW-010S		MW-010S		MW-010S	
VOCs		Results	Q	Results	Q	Results	Q	Results	Q	Results	Q	Results	Q	Results	Q	Results	Q
1,1-DCE	µg/L	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	10	U	5	U	10	U
PCE	µg/L	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	10	U	5	U	10	U
TCE	µg/L	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	10	U	5	U	10	U
VC	µg/L	2.0	U	1.0	U	1.0	U	1.0	U	1.0	U	10	U	10	U	10	U
cis-1,2-DCE	µg/L	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	10^	U	5^	U	10^	U
trans-1,2-DCE	µg/L	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U						
Metals		Results	Q	Results	Q	Results	Q	Results	Q	Results	Q	Results	Q	Results	Q	Results	Q
Lead (Total)	µg/L	-		1.0	U	1.0	U	1.0	U	1.0	U	**2.4**	**B**	2.9	U	2.1	U
Lead (Dissolved)	µg/L	-		1.0	U	1.0	U	1.0	U	1.0	U	-		-		-	
Radiological Parameters		Results	Q	Results	Q	Results	Q	Results	Q	Results	Q	Results	Q	Results	Q	Results	Q
Gross Alpha	pCi/L	-		-		-		-		-		-		-		-	
Gross Beta	pCi/L	-		-		-		-		-		-		-		-	
Total Uranium	µg/L	-		-		-		-		-		-		-		-	
Combined Radium 226/228	pCi/L	-		-		-		-		-		-		-		-	
Gross Alpha - Dissolved	pCi/L	-		-		-		-		-		-		-		-	
Gross Beta - Dissolved	pCi/L	-		-		-		-		-		-		-		-	
Total Uranium - Dissolved	µg/L	-		-		-		-		-		-		-		-	
Combined Radium 226/228 - Dissolved	pCi/L	-		-		-		-		-		-		-		-	
MNA Parameters		Results	Q	Results	Q	Results	Q	Results	Q	Results	Q	Results	Q	Results	Q	Results	Q
TOC	mg/L	-		-		-		-		-		-		-		-	
DOC	mg/L	-		-		-		-		-		-		-		-	
Ethane	µg/L	-		-		-		-		-		-		-		-	
Ethene	µg/L	-		-		-		-		-		-		-		-	
Methane	µg/L	-		-		-		-		-		-		-		-	
Nitrate-N	mg/L	-		-		-		-		-		-		-		-	
Sulfate	mg/L	-		-		-		-		-		-		-		-	
Chloride	mg/L	-		-		-		-		-		-		-		-	
Soluble Manganese, Mn(II)	mg/L	-		-		-		-									
Ferrous Iron, Fe(II)	mg/L	-		-		-		-									
Field Parameters		Results	Q	Results	Q	Results	Q	Results	Q	Results	Q	Results	Q	Results	Q	Results	Q
pH	SU	6.36		5.52		6.68		7.00		6.20		-		-		-	
Specific Conductance	mS/cm	0.486		0.401		0.280		0.483		0.418		-		-		-	
Turbidity	NTU	10.4		1.3		1.0		0.0		0.0		-		-		-	
Dissolved Oxygen	mg/L	0.97		0.95		0.45		0.00		4.08		-		-		-	
Temperature	^{o}C	13.90		16.61		12.95		5.80		13.19		-		-		-	
ORP	mV	161.4		520.3		150.0		115.0		198.1		-		-		-	

See notes at the end of the table.

Appendix B
Table B-1
Historical Analytical Results - Upper Groundwater Zone
2016 - 2017 Annual LTM Report
Colonie FUSRAP Site, Colonie New York

Sampling Date	Units	1-Jan-00		1-Mar-00		1-Aug-00		1-Dec-00		1-Feb-01		1-Aug-01		1-Dec-01		1-Feb-02	
Well ID		MW-010S		MW-010S		MW-010S		MW-010S		MW-010S		MW-010S		MW-010S		MW-010S	
VOCs		Results	Q	Results	Q	Results	Q	Results	Q	Results	Q	Results	Q	Results	Q	Results	Q
1,1-DCE	µg/L	-		10	U	10	U	-		1	U	0.83	U	-		0.5	U
PCE	µg/L	-		10	U	10	U	-		1	U	0.78	U	-		0.5	U
TCE	µg/L	-		10	U	10	U	-		1	U	0.49	U	-		0.5	U
VC	µg/L	-		10	U	10	U	-		2	U	1.0	U	-		0.5	U
cis-1,2-DCE	µg/L	-		10^	U	10^	U	-		1^	U	0.49	U	-		0.5	U
trans-1,2-DCE	µg/L	-						-				0.84	U	-		0.5	U
Metals		Results	Q	Results	Q	Results	Q	Results	Q	Results	Q	Results	Q	Results	Q	Results	Q
Lead (Total)	µg/L	-		2.3	U	1.3	UV	-		**10**		1.2	U	-		2.8	U
Lead (Dissolved)	µg/L	2.3	U	-		-		3.6	V	3.4		-		1.2	U	2.8	U
Radiological Parameters		Results	Q	Results	Q	Results	Q	Results	Q	Results	Q	Results	Q	Results	Q	Results	Q
Gross Alpha	pCi/L	-		-		-		-		-		-		-		-	
Gross Beta	pCi/L	-		-		-		-		-		-		-		-	
Total Uranium	µg/L	-		-		-		-		-		-		-		-	
Combined Radium 226/228	pCi/L	-		-		-		-		-		-		-		-	
Gross Alpha - Dissolved	pCi/L	-		-		-		-		-		-		-		-	
Gross Beta - Dissolved	pCi/L	-		-		-		-		-		-		-		-	
Total Uranium - Dissolved	µg/L	-		-		-		-		-		-		-		-	
Combined Radium 226/228 - Dissolved	pCi/L	-		-		-		-		-		-		-		-	
MNA Parameters		Results	Q	Results	Q	Results	Q	Results	Q	Results	Q	Results	Q	Results	Q	Results	Q
TOC	mg/L	-		-		-		-		-		-		-		-	
DOC	mg/L	-		-		-		-		-		-		-		-	
Ethane	µg/L	-		-		-		-		-		-		-		-	
Ethene	µg/L	-		-		-		-		-		-		-		-	
Methane	µg/L	-		-		-		-		-		-		-		-	
Nitrate-N	mg/L	-		-		-		-		-		-		-		-	
Sulfate	mg/L	-		-		-		-		-		-		-		-	
Chloride	mg/L	-		-		-		-		-		-		-		-	
Soluble Manganese, Mn(II)	mg/L																
Ferrous Iron, Fe(II)	mg/L																
Field Parameters		Results	Q	Results	Q	Results	Q	Results	Q	Results	Q	Results	Q	Results	Q	Results	Q
pH	SU	-		-		-		-		-		-		-		-	
Specific Conductance	mS/cm	-		-		-		-		-		-		-		-	
Turbidity	NTU	-		-		-		-		-		-		-		-	
Dissolved Oxygen	mg/L	-		-		-		-		-		-		-		-	
Temperature	^{o}C	-		-		-		-		-		-		-		-	
ORP	mV	-		-		-		-		-		-		-		-	

See notes at the end of the table.

Appendix B
Table B-1
Historical Analytical Results - Upper Groundwater Zone
2016 - 2017 Annual LTM Report
Colonie FUSRAP Site, Colonie New York

Sampling Date	Units	1-Jun-02		1-Mar-03		3-Dec-03		4-Jul-04		4-Dec-04		5-Jun-05		5-Dec-05		1-Dec-06		26-Jun-07	
Well ID		MW-010S		MW-010S		MW-010S		MW-010S		MW-010S		MW-010S		MW-010S		MW-010S		MW-010S	
VOCs		Results	Q	Results	Q	Results	Q	Results	Q	Results	Q	Results	Q	Results	Q	Results	Q	Results	Q
1,1-DCE	µg/L	0.5	U	0.5	U	0.5	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U
PCE	µg/L	0.5	U	0.5	U	0.5	U	1.0	U	1.0	U	1.0	UJ	1.0	U	1.0	U	1.0	U
TCE	µg/L	0.5	U	0.5	U	0.5	U	**0.21**	**J**	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U
VC	µg/L	0.5	U	0.5	U	0.5	U	2.0	U	2.0	U	2.0	U	2.0	U	2.0	U	2.0	U
cis-1,2-DCE	µg/L	0.5	U	0.5	U	0.5	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U
trans-1,2-DCE	µg/L	0.5	U	0.5	U	0.5	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U
Metals		Results	Q	Results	Q	Results	Q	Results	Q	Results	Q	Results	Q	Results	Q	Results	Q	Results	Q
Lead (Total)	µg/L	2.8	U	2.2	U	2.2	U	3	U	3	U	2	U	2	U	2	U	2	U
Lead (Dissolved)	µg/L	10	U	2.2	U	2.2	U	25	U	25	U	25	U	2	U	-		-	
Radiological Parameters		Results	Q	Results	Q	Results	Q	Results	Q	Results	Q	Results	Q	Results	Q	Results	Q	Results	Q
Gross Alpha	pCi/L	-		-		-		-		-		-		-		-		-	
Gross Beta	pCi/L	-		-		-		-		-		-		-		-		-	
Total Uranium	µg/L	-		-		-		-		-		-		-		-		-	
Combined Radium 226/228	pCi/L	-		-		-		-		-		-		-		-		-	
Gross Alpha - Dissolved	pCi/L	-		-		-		-		-		-		-		-		-	
Gross Beta - Dissolved	pCi/L	-		-		-		-		-		-		-		-		-	
Total Uranium - Dissolved	µg/L	-		-		-		-		-		-		-		-		-	
Combined Radium 226/228 - Dissolved	pCi/L	-		-		-		-		-		-		-		-		-	
MNA Parameters		Results	Q	Results	Q	Results	Q	Results	Q	Results	Q	Results	Q	Results	Q	Results	Q	Results	Q
TOC	mg/L	-		-		-		-		-		-		-		-		-	
DOC	mg/L	-		-		-		-		-		-		-		-		-	
Ethane	µg/L	-		-		-		-		-		-		-		-		-	
Ethene	µg/L	-		-		-		-		-		-		-		-		-	
Methane	µg/L	-		-		-		-		-		-		-		-		-	
Nitrate-N	mg/L	-		-		-		-		-		-		-		-		-	
Sulfate	mg/L	-		-		-		-		-		-		-		-		-	
Chloride	mg/L	-		-		-		-		-		-		-		-		-	
Soluble Manganese, Mn(II)	mg/L																		
Ferrous Iron, Fe(II)	mg/L																		
Field Parameters		Results	Q	Results	Q	Results	Q	Results	Q	Results	Q	Results	Q	Results	Q	Results	Q	Results	Q
pH	SU	-		7.95		-		7.98		8		7.91		7.74		8.00		6.90	
Specific Conductance	mS/cm	-		0.224		-		0.331		0.385		0.355		0.242		0.227		0.347	
Turbidity	NTU	-		3.8		-		0		0.5		0.2		3.2		0.0		5.2	
Dissolved Oxygen	mg/L	-		3.8		-		1.7		1.48		2.13		2.72		1.46		0.22	
Temperature	^{o}C	-		10.06		-		12.26		10.43		11.25		9.78		10.76		16.58	
ORP	mV	-		-14.7		-		-79.9		-69.2		101.3		-42.5		-94.1		201.3	

See notes at the end of the table.

Appendix B
Table B-1
Historical Analytical Results - Upper Groundwater Zone
2016 - 2017 Annual LTM Report
Colonie FUSRAP Site, Colonie New York

Sampling Date	Units	28-Jul-08		29-Oct-08		18-Feb-09		21-May-09		1-Dec-98		1-May-99		1-Oct-99		1-Jan-00	
Well ID		MW-010S		MW-010S		MW-010S		MW-010S		MW-21S		MW-21S		MW-21S		MW-21S	
VOCs		Results	Q	Results	Q	Results	Q	Results	Q	Results	Q	Results	Q	Results	Q	Results	Q
1,1-DCE	µg/L	1.0	U	1.0	U	1.0	U	1.0	U	10	U	5	U	10	U	-	
PCE	µg/L	1.0	U	1.0	U	1.0	U	1.0	U	10	U	5	U	10	U	-	
TCE	µg/L	1.0	U	1.0	U	1.0	U	1.0	U	10	U	5	U	10	U	-	
VC	µg/L	1.0	U	1.0	U	1.0	U	1.0	U	10	U	10	U	10	U	-	
cis-1,2-DCE	µg/L	1.0	U	1.0	U	1.0	U	1.0	U	10^	U	5^	U	10^	U	-	
trans-1,2-DCE	µg/L	1.0	U	1.0	U	1.0	U	1.0	U							-	
Metals		Results	Q	Results	Q	Results	Q	Results	Q	Results	Q	Results	Q	Results	Q	Results	Q
Lead (Total)	µg/L	**0.588**	J	1.0	U	1.0	U	1.0	U	**2.3**	**B**	2.9	U	2.1	U	-	
Lead (Dissolved)	µg/L	1.0	U	1.0	U	1.0	U	1.0	U	-		-		-		2.3	U
Radiological Parameters		Results	Q	Results	Q	Results	Q	Results	Q	Results	Q	Results	Q	Results	Q	Results	Q
Gross Alpha	pCi/L	-		-		-		-		-		-		-		-	
Gross Beta	pCi/L	-		-		-		-		-		-		-		-	
Total Uranium	µg/L	-		-		-		-		-		-		-		-	
Combined Radium 226/228	pCi/L	-		-		-		-		-		-		-		-	
Gross Alpha - Dissolved	pCi/L	-		-		-		-		-		-		-		-	
Gross Beta - Dissolved	pCi/L	-		-		-		-		-		-		-		-	
Total Uranium - Dissolved	µg/L	-		-		-		-		-		-		-		-	
Combined Radium 226/228 - Dissolved	pCi/L	-		-		-		-		-		-		-		-	
MNA Parameters		Results	Q	Results	Q	Results	Q	Results	Q	Results	Q	Results	Q	Results	Q	Results	Q
TOC	mg/L	-		-		-		-		-		-		-		-	
DOC	mg/L	-		-		-		-		-		-		-		-	
Ethane	µg/L	-		-		-		-		-		-		-		-	
Ethene	µg/L	-		-		-		-		-		-		-		-	
Methane	µg/L	-		-		-		-		-		-		-		-	
Nitrate-N	mg/L	-		-		-		-		-		-		-		-	
Sulfate	mg/L	-		-		-		-		-		-		-		-	
Chloride	mg/L	-		-		-		-		-		-		-		-	
Soluble Manganese, Mn(II)	mg/L																
Ferrous Iron, Fe(II)	mg/L																
Field Parameters		Results	Q	Results	Q	Results	Q	Results	Q	Results	Q	Results	Q	Results	Q	Results	Q
pH	SU	5.71		7.94		7.82		7.80		-		-		-		-	
Specific Conductance	mS/cm	0.297		0.255		0.355		0.266		-		-		-		-	
Turbidity	NTU	NM		0.0		1.2		0.0		-		-		-		-	
Dissolved Oxygen	mg/L	2.91		0.74		7.38		-		-		-		-		-	
Temperature	^{o}C	20.78		12.92		7.51		14.07		-		-		-		-	
ORP	mV	411.7		-117.8		-95.6		-9.0		-		-		-		-	

See notes at the end of the table.

Appendix B
Table B-1
Historical Analytical Results - Upper Groundwater Zone
2016 - 2017 Annual LTM Report
Colonie FUSRAP Site, Colonie New York

Sampling Date	Units	1-Mar-00		1-Aug-00		1-Dec-00		1-Feb-01		1-Aug-01		1-Dec-01		1-Feb-02		2-Jun-02	
Well ID		MW-21S		MW-21S		MW-21S		MW-21S		MW-21S		MW-21S		MW-21S		MW-21S	
VOCs		Results	Q	Results	Q	Results	Q	Results	Q	Results	Q	Results	Q	Results	Q	Results	Q
1,1-DCE	µg/L	10	U	10	U	-		1	U	0.83	U	-		0.5	U	0.5	U
PCE	µg/L	10	U	10	U	-		1	U	0.78	U	-		**240**	**D**	**41**	**D**
TCE	µg/L	10	U	10	U	-		1	U	0.49	U	-		**23**	**V**	**3**	
VC	µg/L	10	U	10	U	-		2	U	1.0	U	-		0.5	U	0.5	U
cis-1,2-DCE	µg/L	10^	U	10^	U	-		1^	U	0.49	U	-		0.5	U	0.5	U
trans-1,2-DCE	µg/L					-				0.84	U	-		0.5	U	0.5	U
Metals		Results	Q	Results	Q	Results	Q	Results	Q	Results	Q	Results	Q	Results	Q	Results	Q
Lead (Total)	µg/L	2.3	U	1.3	U	-		**2.1**	**B**	1.2	U	-		2.8	U	2.8	U
Lead (Dissolved)	µg/L	-		-		1.3	U	1.9	B	-		1.2	U	2.8	U	2.8	U
Radiological Parameters		Results	Q	Results	Q	Results	Q	Results	Q	Results	Q	Results	Q	Results	Q	Results	Q
Gross Alpha	pCi/L	-		-		-		-		-		-		-		-	
Gross Beta	pCi/L	-		-		-		-		-		-		-		-	
Total Uranium	µg/L	-		-		-		-		-		-		-		-	
Combined Radium 226/228	pCi/L	-		-		-		-		-		-		-		-	
Gross Alpha - Dissolved	pCi/L	-		-		-		-		-		-		-		-	
Gross Beta - Dissolved	pCi/L	-		-		-		-		-		-		-		-	
Total Uranium - Dissolved	µg/L	-		-		-		-		-		-		-		-	
Combined Radium 226/228 - Dissolved	pCi/L	-		-		-		-		-		-		-		-	
MNA Parameters		Results	Q	Results	Q	Results	Q	Results	Q	Results	Q	Results	Q	Results	Q	Results	Q
TOC	mg/L	-		-		-		-		-		-		-		-	
DOC	mg/L	-		-		-		-		-		-		-		-	
Ethane	µg/L	-		-		-		-		-		-		-		-	
Ethene	µg/L	-		-		-		-		-		-		-		-	
Methane	µg/L	-		-		-		-		-		-		-		-	
Nitrate-N	mg/L	-		-		-		-		-		-		-		-	
Sulfate	mg/L	-		-		-		-		-		-		-		-	
Chloride	mg/L	-		-		-		-		-		-		-		-	
Soluble Manganese, Mn(II)	mg/L																
Ferrous Iron, Fe(II)	mg/L																
Field Parameters		Results	Q	Results	Q	Results	Q	Results	Q	Results	Q	Results	Q	Results	Q	Results	Q
pH	SU	-		-		-		-		-		-		-		-	
Specific Conductance	mS/cm	-		-		-		-		-		-		-		-	
Turbidity	NTU	-		-		-		-		-		-		-		-	
Dissolved Oxygen	mg/L	-		-		-		-		-		-		-		-	
Temperature	^{o}C	-		-		-		-		-		-		-		-	
ORP	mV	-		-		-		-		-		-		-		-	

See notes at the end of the table.

Appendix B
Table B-1
Historical Analytical Results - Upper Groundwater Zone
2016 - 2017 Annual LTM Report
Colonie FUSRAP Site, Colonie New York

Sampling Date	Units	1-Mar-03		4-Dec-03		4-Jul-04		4-Dec-04		5-Jun-05		30-Nov-05		1-Dec-05		1-Dec-06	
Well ID		MW-21S		MW-21S		MW-21S		MW-21S		MW-21S		MW-21S		MW-21S		MW-21S	
VOCs		Results	Q	Results	Q	Results	Q	Results	Q	Results	Q	Results	Q	Results	Q	Results	Q
1,1-DCE	µg/L	0.5	U	0.5	U	1.0	U	1.0	U	1.0	U	-		1.0	U	1.0	U
PCE	µg/L	**7**		**3**		**2.5**		**1.7**		**1.5**	J	-		1.0	U	**0.5**	J
TCE	µg/L	**0.5**		0.5	U	1.0	U	1.0	U	1.0	U	-		1.0	U	1.0	U
VC	µg/L	0.5	U	0.5	U	2.0	U	2.0	U	2.0	U	-		2.0	U	2.0	U
cis-1,2-DCE	µg/L	0.5	U	0.5	U	1.0	U	1.0	U	1.0	U	-		1.0	U	1.0	U
trans-1,2-DCE	µg/L	0.5	U	0.5	U	1.0	U	1.0	U	1.0	U	-		1.0	U	1.0	U
Metals		Results	Q	Results	Q	Results	Q	Results	Q	Results	Q	Results	Q	Results	Q	Results	Q
Lead (Total)	µg/L	2.2	U	2.2	U	3	U	3	U	2	U	-		2	U	2	U
Lead (Dissolved)	µg/L	2.2	U	2.2	U	25	U	25	U	25	U	2	U	-		-	
Radiological Parameters		Results	Q	Results	Q	Results	Q	Results	Q	Results	Q	Results	Q	Results	Q	Results	Q
Gross Alpha	pCi/L	-		-		-		-		-		-		-		-	
Gross Beta	pCi/L	-		-		-		-		-		-		-		-	
Total Uranium	µg/L	-		-		-		-		-		-		-		-	
Combined Radium 226/228	pCi/L	-		-		-		-		-		-		-		-	
Gross Alpha - Dissolved	pCi/L	-		-		-		-		-		-		-		-	
Gross Beta - Dissolved	pCi/L	-		-		-		-		-		-		-		-	
Total Uranium - Dissolved	µg/L	-		-		-		-		-		-		-		-	
Combined Radium 226/228 - Dissolved	pCi/L	-		-		-		-		-		-		-		-	
MNA Parameters		Results	Q	Results	Q	Results	Q	Results	Q	Results	Q	Results	Q	Results	Q	Results	Q
TOC	mg/L	-		-		-		-		-		-		-		-	
DOC	mg/L	-		-		-		-		-		-		-		-	
Ethane	µg/L	-		-		-		-		-		-		-		-	
Ethene	µg/L	-		-		-		-		-		-		-		-	
Methane	µg/L	-		-		-		-		-		-		-		-	
Nitrate-N	mg/L	-		-		-		-		-		-		-		-	
Sulfate	mg/L	-		-		-		-		-		-		-		-	
Chloride	mg/L	-		-		-		-		-		-		-		-	
Soluble Manganese, Mn(II)	mg/L																
Ferrous Iron, Fe(II)	mg/L																
Field Parameters		Results	Q	Results	Q	Results	Q	Results	Q	Results	Q	Results	Q	Results	Q	Results	Q
pH	SU	7.48		7.46		7.17		7.75		7.36		7.84				4.77	
Specific Conductance	mS/cm	0.253		0.426		0.446		0.437		0.320		0.288				0.551	
Turbidity	NTU	1.0		1.6		1.8		0.4		5.3		1.4				166.0	
Dissolved Oxygen	mg/L	2.14		1.83		0.78		0.78		1.59		0.81				0.30	
Temperature	^{o}C	8.52		15.23		10.97		11.7		11.47		9.90				14.55	
ORP	mV	-38.3		-128.5		28.8		-186.8		-123.4		-149.3				114.3	

See notes at the end of the table.

Appendix B
Table B-1
Historical Analytical Results - Upper Groundwater Zone
2016 - 2017 Annual LTM Report
Colonie FUSRAP Site, Colonie New York

Sampling Date	Units	1-Jun-07		28-Jul-08		29-Oct-08		18-Feb-09		21-May-09		1-Feb-01		1-Aug-01		1-Feb-02	
Well ID		MW-21S		MW-21S		MW-21S		MW-21S		MW-21S		MW-30S		MW-30S		MW-30S	
VOCs		Results	Q	Results	Q	Results	Q	Results	Q	Results	Q	Results	Q	Results	Q	Results	Q
1,1-DCE	µg/L	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1	U	0.83	U	0.5	U
PCE	µg/L	**1.6**		1.0	U	1.0	U	1.0	U	1.0	U	**67**	**D**	**42**		**23**	**V**
TCE	µg/L	**0.12**	J	1.0	U	1.0	U	1.0	U	1.0	U	**19**		**15**		**8**	
VC	µg/L	2.0	U	1.0	U	1.0	U	1.0	U	1.0	U	2	U	1.0	U	0.5	U
cis-1,2-DCE	µg/L	**0.15**	J	1.0	U	1.0	U	1.0	U	1.0	U	**2.4^**		0.49	U	1	
trans-1,2-DCE	µg/L	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U			0.84	U	0.5	U
Metals		Results	Q	Results	Q	Results	Q	Results	Q	Results	Q	Results	Q	Results	Q	Results	Q
Lead (Total)	µg/L	1	B	1.0	U	1.0	U	1.0	U	1.0	U	**30.5**		---	**R**	2.8	U
Lead (Dissolved)	µg/L	-		1.0	U	1.0	U	1.0	U	1.0	U	**26.5**		R		2.8	U
Radiological Parameters		Results	Q	Results	Q	Results	Q	Results	Q	Results	Q	Results	Q	Results	Q	Results	Q
Gross Alpha	pCi/L	-		-		-		-		-		**47.39**		1.24	U	-	
Gross Beta	pCi/L	-		-		-		-		-		83.31		8.28		-	
Total Uranium	µg/L	-		-		-		-		-		0.54		0.0551		0.1919	**B**
Combined Radium 226/228	pCi/L	-		-		-		-		-		-		-		-	
Gross Alpha - Dissolved	pCi/L	-		-		-		-		-		-		-		-	
Gross Beta - Dissolved	pCi/L	-		-		-		-		-		-		-		-	
Total Uranium - Dissolved	µg/L	-		-		-		-		-		-		-		-	
Combined Radium 226/228 - Dissolved	pCi/L	-		-		-		-		-		-		-		-	
MNA Parameters		Results	Q	Results	Q	Results	Q	Results	Q	Results	Q	Results	Q	Results	Q	Results	Q
TOC	mg/L	-		-		-		-		-		-		-		-	
DOC	mg/L	-		-		-		-		-		-		-		-	
Ethane	µg/L	-		-		-		-		-		-		-		-	
Ethene	µg/L	-		-		-		-		-		-		-		-	
Methane	µg/L	-		-		-		-		-		-		-		-	
Nitrate-N	mg/L	-		-		-		-		-		-		-		-	
Sulfate	mg/L	-		-		-		-		-		-		-		-	
Chloride	mg/L	-		-		-		-		-		-		-		-	
Soluble Manganese, Mn(II)	mg/L																
Ferrous Iron, Fe(II)	mg/L																
Field Parameters		Results	Q	Results	Q	Results	Q	Results	Q	Results	Q	Results	Q	Results	Q	Results	Q
pH	SU	6.85		9.04		8.55		8.54		5.71		-		-		-	
Specific Conductance	mS/cm	0.195		0.179		0.183		0.147		0.409		-		-		-	
Turbidity	NTU	0.3		0.0		46.8		4.5		0.0		-		-		-	
Dissolved Oxygen	mg/L	3.91		1.89		4.53		47.34		10.11		-		-		-	
Temperature	^{o}C	14.21		12.05		9.24		11.29		11.32		-		-		-	
ORP	mV	205.7		59.8		-87.0		-48.5		-32.7		-		-		-	

See notes at the end of the table.

Appendix B
Table B-1
Historical Analytical Results - Upper Groundwater Zone
2016 - 2017 Annual LTM Report
Colonie FUSRAP Site, Colonie New York

Sampling Date	Units	2-Jun-02		1-Mar-03		3-Dec-03		4-Jul-04		1-Dec-04		5-Jun-05		1-Dec-05	
Well ID		MW-30S		MW-30S		MW-30S		MW-30S		MW-30S		MW-30S		MW-30S	
VOCs		Results	Q	Results	Q	Results	Q	Results	Q	Results	Q	Results	Q	Results	Q
1,1-DCE	µg/L	0.5	U	0.5	U	0.5	U	1.0	U	1.0	U	1.0	U	1.0	U
PCE	µg/L	**29**	**D**	**23**		**21**		**33.0**		**20.0**		**21.0**	J	**23.0**	
TCE	µg/L	**5**		**3**		**3**		**11.0**		**3.5**		**8.8**		**4.3**	
VC	µg/L	0.5	U	0.5	U	0.5	U	2.0	U	2.0	U	2.0	U	2.0	U
cis-1,2-DCE	µg/L	0.3	JJ	0.5	U	**0.6**		**1.7**		**0.5**	**J**	**2.2**		**1.1**	
trans-1,2-DCE	µg/L	0.5	U	0.5	U	0.5	U	1.0	U	1.0	U	1.0	U	1.0	U
Metals		Results	Q	Results	Q	Results	Q	Results	Q	Results	Q	Results	Q	Results	Q
Lead (Total)	µg/L	2.8	U	---	**R**	2.2	U	2	U	3	UJ	2	U	2	U
Lead (Dissolved)	µg/L	2.8	U			2.2	U	25	U	25	U	25	U	2	U
Radiological Parameters		Results	Q	Results	Q	Results	Q	Results	Q	Results	Q	Results	Q	Results	Q
Gross Alpha	pCi/L	-		-		-		-0.02	U	0.50	UJ	1.70	UJ	3.80	UJ
Gross Beta	pCi/L	-		-		-		5.70		5.10	J	4.80	J	**35.00**	J
Total Uranium	µg/L	0.2897	**B**	1.2897	**B**	0.16565	**J**	0.30		0.14	U	0.21	U	0.27	U
Combined Radium 226/228	pCi/L	-		-		-		0.78	U	0.92	UJ	0.86	UJ	**1.34**	J
Gross Alpha - Dissolved	pCi/L	-		-		-		-		-		-		-	
Gross Beta - Dissolved	pCi/L	-		-		-		-		-		-		-	
Total Uranium - Dissolved	µg/L	-		-		-		-		-		-		-	
Combined Radium 226/228 - Dissolved	pCi/L	-		-		-		-		-		-		-	
MNA Parameters		Results	Q	Results	Q	Results	Q	Results	Q	Results	Q	Results	Q	Results	Q
TOC	mg/L	-		-		-		-		-		-		-	
DOC	mg/L	-		-		-		-		-		-		-	
Ethane	µg/L	-		-		-		-		-		-		-	
Ethene	µg/L	-		-		-		-		-		-		-	
Methane	µg/L	-		-		-		-		-		-		-	
Nitrate-N	mg/L	-		-		-		-		-		-		-	
Sulfate	mg/L	-		-		-		-		-		-		-	
Chloride	mg/L	-		-		-		-		-		-		-	
Soluble Manganese, Mn(II)	mg/L														
Ferrous Iron, Fe(II)	mg/L														
Field Parameters		Results	Q	Results	Q	Results	Q	Results	Q	Results	Q	Results	Q	Results	Q
pH	SU	-		6.44		-		6.22		6.39		6.34		6.30	
Specific Conductance	mS/cm	-		0.991		-		0.777		0.903		0.741		0.527	
Turbidity	NTU	-		18		-		3.7		3		2		12.2	
Dissolved Oxygen	mg/L	-		10.31		-		2.1		5.8		6.88		2.83	
Temperature	^{o}C	-		7.36		-		16.61		10.84		12.93		12.96	
ORP	mV	-		226.7		-		222.6		212.9		191.6		187.8	

See notes at the end of the table.

Appendix B
Table B-1
Historical Analytical Results - Upper Groundwater Zone
2016 - 2017 Annual LTM Report
Colonie FUSRAP Site, Colonie New York

Sampling Date	Units	1-Dec-06		1-Jun-07		29-Jul-08		6-Nov-08		17-Feb-09		18-May-09		1-Feb-02		2-Jun-02	
Well ID		MW-30S		MW-30S		MW-30S		MW-30S		MW-30S		MW-30S		MW-32S		MW-32S	
VOCs		Results	Q	Results	Q	Results	Q	Results	Q	Results	Q	Results	Q	Results	Q	Results	Q
1,1-DCE	µg/L	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	0.5	U	**2**	
PCE	µg/L	**20.0**		**9.7**		**14.0**		**12.0**		**9.0**		**7.8**		**1200**	**D**	**490**	**D**
TCE	µg/L	**8.7**		**3.1**		**5.8**		**5.4**		**2.9**		**3.1**		**420**	**D**	**190**	**D**
VC	µg/L	2.0	U	2.0	U	1.0	U	1.0	U	1.0	U	1.0	U	**23**		**11**	
cis-1,2-DCE	µg/L	**2.0**		**0.94**	J	**3.2**		**2.7**		**1.4**		**2.4**		**940**	**D**	**440**	**D**
trans-1,2-DCE	µg/L	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	**14**		**9**	
Metals		Results	Q	Results	Q	Results	Q	Results	Q	Results	Q	Results	Q	Results	Q	Results	Q
Lead (Total)	µg/L	**2.9**		**1.6**	B	**0.529**	J	**0.881**	**J**	**1.91**		1.0	U	2.8	U	2.8	U
Lead (Dissolved)	µg/L	-		-		1.0	U	1.0	U	1.0	U	1.0	U	2.8	U	2.8	U
Radiological Parameters		Results	Q	Results	Q	Results	Q	Results	Q	Results	Q	Results	Q	Results	Q	Results	Q
Gross Alpha	pCi/L	5.30		1.20	U	0.944	U	2.89	U	2.75	U	0.600	U	-		-	
Gross Beta	pCi/L	8.60		5.90	U	**8.90**		8.35	**J**	**9.61**	**J**	**6.37**	**J**	-		-	
Total Uranium	µg/L	0.14	U	0.41		**0.56**		0.54		**0.48**		**0.475**	**J**	3.7454		28.163	
Combined Radium 226/228	pCi/L	0.51	U	0.48	J	1.755		1.769	J	**0.991**	**J**	3.296	U				
Gross Alpha - Dissolved	pCi/L	-		-1.60	U	0.303	U	1.68	U	0.212	U	-0.162	U	-		-	
Gross Beta - Dissolved	pCi/L	-		0.40	U	**5.85**	J	9.42	**J**	**8.34**	**J**	**9.91**	**J**	-		-	
Total Uranium - Dissolved	µg/L	-		0.22	U	**0.46**		0.49		**0.43**		**0.587**	**J**	-		-	
Combined Radium 226/228 - Dissolved	pCi/L	-		0.65	J	1.203		1.197	U	0.407	U	0.512	U	-		-	
MNA Parameters		Results	Q	Results	Q	Results	Q	Results	Q	Results	Q	Results	Q	Results	Q	Results	Q
TOC	mg/L	-		-		-		-		-		-		-		-	
DOC	mg/L	-		-		-		-		-		-		-		-	
Ethane	µg/L	-		-		-		-		-		-		-		-	
Ethene	µg/L	-		-		-		-		-		-		-		-	
Methane	µg/L	-		-		-		-		-		-		-		-	
Nitrate-N	mg/L	-		-		-		-		-		-		-		-	
Sulfate	mg/L	-		-		-		-		-		-		-		-	
Chloride	mg/L	-		-		-		-		-		-		-		-	
Soluble Manganese, Mn(II)	mg/L																
Ferrous Iron, Fe(II)	mg/L																
Field Parameters		Results	Q	Results	Q	Results	Q	Results	Q	Results	Q	Results	Q	Results	Q	Results	Q
pH	SU	6.07		6.29		5.80		6.22		6.31		6.37		-		-	
Specific Conductance	mS/cm	0.581		0.597		1.114		0.869		0.807		0.956		-		-	
Turbidity	NTU	146.8		110.1		5.0		16.0		0.0		60.5		-		-	
Dissolved Oxygen	mg/L	3.49		5.41		0.93		2.23		4.80		9.67		-		-	
Temperature	^{o}C	12.41		13.72		18.08		14.56		7.49		9.14		-		-	
ORP	mV	102.1		160		452.2		273.6		110.0		239.0		-		-	

See notes at the end of the table.

Appendix B
Table B-1
Historical Analytical Results - Upper Groundwater Zone
2016 - 2017 Annual LTM Report
Colonie FUSRAP Site, Colonie New York

Sampling Date	Units	1-Mar-03		3-Dec-03		4-Jul-04		4-Dec-04		5-Jun-05		1-Dec-05		1-Dec-06		1-Jun-07	
Well ID		MW-32S		MW-32S		MW-32S		MW-32S		MW-32S		MW-32S		MW-32S		MW-32S	
VOCs		Results	Q	Results	Q	Results	Q	Results	Q	Results	Q	Results	Q	Results	Q	Results	Q
1,1-DCE	µg/L	**2**		**2**		**1.0**		**0.9**	**J**	1.0	U	**0.31**	J	**0.31**	J	**1.00**	J
PCE	µg/L	**660**	**D**	**440**		**420.0**	**J**	**360.0**	**J**	**200**	J	**140**		**18**		**9.4**	
TCE	µg/L	**310**	**D**	**230**		**200.0**	**J**	**170.0**	**J**	**150**		**89**		6		4.1	
VC	µg/L	**6**		**5**		**2.8**		**2.5**	**J**	**2.3**		**2.4**		**0.4**	J	**0.53**	J
cis-1,2-DCE	µg/L	**550**	**D**	**390**		**9.5**	**J**	**230.0**	**J**	**240**		**260**		**27**		**18**	
trans-1,2-DCE	µg/L	**9**		**9**		**5.2**		**5.3**		**4.0**		**4.2**		**0.7**	J	**0.48**	J
Metals		Results	Q	Results	Q	Results	Q	Results	Q	Results	Q	Results	Q	Results	Q	Results	Q
Lead (Total)	µg/L	**3.5**	**B**	2.2	U	3	U	2	U	2	UJ	**1.2**	J	**2.9**		2	U
Lead (Dissolved)	µg/L	3.2	B	2.2	U	25	U	25	U	1.3	U	2	U	-		-	
Radiological Parameters		Results	Q	Results	Q	Results	Q	Results	Q	Results	Q	Results	Q	Results	Q	Results	Q
Gross Alpha	pCi/L	-		-		**221**	J	**322**		**535**	J	**296**	J	**53.40**		**81**	
Gross Beta	pCi/L	-		-		**112**		**128**		**376**	J	**163**	J	34.70		21.30	
Total Uranium	µg/L			**275.83**		**700**	J	**641**		**896**		**592**		**181**		**177**	
Combined Radium 226/228	pCi/L					1.24	J	1.00	J	3.17	J	0.48	UJ	0.50		0.44	U
Gross Alpha - Dissolved	pCi/L	-		-		-		-		-		-		-		**64**	
Gross Beta - Dissolved	pCi/L	-		-		-		-		-		-		-		19.10	
Total Uranium - Dissolved	µg/L	-		-		-		-		-		-		-		17.60	
Combined Radium 226/228 - Dissolved	pCi/L	-		-		-		-		-		-		-		0.66	U
MNA Parameters		Results	Q	Results	Q	Results	Q	Results	Q	Results	Q	Results	Q	Results	Q	Results	Q
TOC	mg/L	-		-		-		-		-		-		-		-	
DOC	mg/L	-		-		-		-		-		-		-		-	
Ethane	µg/L	-		-		-		-		-		-		-		-	
Ethene	µg/L	-		-		-		-		-		-		-		-	
Methane	µg/L	-		-		-		-		-		-		-		-	
Nitrate-N	mg/L	-		-		-		-		-		-		-		-	
Sulfate	mg/L	-		-		-		-		-		-		-		-	
Chloride	mg/L	-		-		-		-		-		-		-		-	
Soluble Manganese, Mn(II)	mg/L																
Ferrous Iron, Fe(II)	mg/L																
Field Parameters		Results	Q	Results	Q	Results	Q	Results	Q	Results	Q	Results	Q	Results	Q	Results	Q
pH	SU	6.52		-		5.86		6.62		6.61		6.48		6.63		6.49	
Specific Conductance	mS/cm	0.606		-		0.975		0.795		0.981		0.795		0.285		0.236	
Turbidity	NTU	115.1		-		1.8		51.8		4.7		15.9		13.8		9.8	
Dissolved Oxygen	mg/L	1.59		-		0.66		0.35		0.35		0.32		4.50		1.42	
Temperature	^{o}C	6.14		-		16.4		11.49		12.93		10.74		10.35		13.65	
ORP	mV	78		-		212		86.8		118.9		108.4		157.4		107.9	

See notes at the end of the table.

Appendix B
Table B-1
Historical Analytical Results - Upper Groundwater Zone
2016 - 2017 Annual LTM Report
Colonie FUSRAP Site, Colonie New York

Sampling Date	Units	6-Aug-08		4-Nov-08		23-Feb-09		19-May-09		1-Feb-02		2-Jun-02		1-Mar-03		3-Dec-03		4-Jul-04	
Well ID		MW-32S		MW-32S		MW-32S		MW-32S		MW-34S		MW-34S		MW-34S		MW-34S		MW-34S	
VOCs		Results	Q	Results	Q	Results	Q	Results	Q	Results	Q	Results	Q	Results	Q	Results	Q	Results	Q
1,1-DCE	µg/L	1.0	U	1.0	U	1.0	U	1.0	U	0.5	U	0.5	U	0.5	U	0.5	U	1.0	U
PCE	µg/L	**72.0**		**21.0**		**21**		**9.9**		**250**	**D**	**10**		**1**		**2**		**1.3**	
TCE	µg/L	**23.0**		**7.7**		**6.3**		**4.5**		0.5	U	0.5	U	**0.3**	**J**	0.5	U	**0.27**	**J**
VC	µg/L	**0.93**	J	**0.91**	**J**	**0.59**	**J**	**0.65**	**J**	**2**		**1**		0.5	U	**2**		**1.8**	**J**
cis-1,2-DCE	µg/L	**23.0**		**20.0**		**13**		**11**		**2**		**2**		**1**		**2**		**1.1**	
trans-1,2-DCE	µg/L	**0.98**	J	**0.64**	**J**	**0.42**	**J**	**0.44**	**J**	0.5	U	0.5	U	0.5	U	0.5	U	1.0	U
Metals		Results	Q	Results	Q	Results	Q	Results	Q	Results	Q	Results	Q	Results	Q	Results	Q	Results	Q
Lead (Total)	µg/L	1.0	U	1.0	U	1.0	U	1.0	U	-		-		-		-		-	
Lead (Dissolved)	µg/L	1.0	U	1.0	U	1.0	U	1.0	U	-		-		-		-		-	
Radiological Parameters		Results	Q	Results	Q	Results	Q	Results	Q	Results	Q	Results	Q	Results	Q	Results	Q	Results	Q
Gross Alpha	pCi/L	**60**	J	50.20		**59.6**		**35.3**	**J**	-		-		-		-		-	
Gross Beta	pCi/L	**31.1**		32.80		**37.7**		**27.0**		-		-		-		-		-	
Total Uranium	µg/L	**160**		110.00		**157**	**J**	**95.2**	**J**	-		-		-		-		-	
Combined Radium 226/228	pCi/L	0.752		2.13	J	**0.461**	**J**	1.21	U	-		-		-		-		-	
Gross Alpha - Dissolved	pCi/L	**68.3**	J	43.3		**65.5**		**36.2**	**J**	-		-		-		-		-	
Gross Beta - Dissolved	pCi/L	**31.9**		29.4		**30.3**		**25.8**	**J**	-		-		-		-		-	
Total Uranium - Dissolved	µg/L	**170**	J	108		**185**	**J**	**111**	**J**	-		-		-		-		-	
Combined Radium 226/228 - Dissolved	pCi/L	0.692		0.728	U	**0.701**	**J**	**1.581**	**J**	-		-		-		-		-	
MNA Parameters		Results	Q	Results	Q	Results	Q	Results	Q	Results	Q	Results	Q	Results	Q	Results	Q	Results	Q
TOC	mg/L	**1.80**	J	-		**1.44**	**J**	**1.44**	**J**	-		-		-		-		-	
DOC	mg/L	**1.95**	J	-		**1.62**	**J**	**1.59**		-		-		-		-		-	
Ethane	µg/L	2.0	U	-		2.0	U	2.0	U	-		-		-		-		-	
Ethene	µg/L	2.0	U	-		2.0	U	2.0	U	-		-		-		-		-	
Methane	µg/L	**150**		-		**180**		**120**		-		-		-		-		-	
Nitrate-N	mg/L	**0.0864**	J	-		**0.116**	**J**	**0.202**	**J**	-		-		-		-		-	
Sulfate	mg/L	**16.3**		-		**13.5**		**17.9**		-		-		-		-		-	
Chloride	mg/L	**7.71**		-		**5.63**		**6.71**		-		-		-		-		-	
Soluble Manganese, Mn(II)	mg/L	0.70				0.70		0.20		-		-		-		-		-	
Ferrous Iron, Fe(II)	mg/L	0.2	U			0.2	U	0.2	U	-		-		-		-		-	
Field Parameters		Results	Q	Results	Q	Results	Q	Results	Q	Results	Q	Results	Q	Results	Q	Results	Q	Results	Q
pH	SU	4.09		6.38		7.11		6.06		-		-		6.98		6.86		6.86	
Specific Conductance	mS/cm	0.225		0.198		0.292		0.379		-		-		0.68		1.123		1.123	
Turbidity	NTU	63.0		1.0		116.0		0.0		-		-		176		6.6		6.6	
Dissolved Oxygen	mg/L	1.00		0.66		0.00		0.60		-		-		0.68		0.25		0.25	
Temperature	^{o}C	18.02		14.95		6.70		10.74		-		-		8.55		13.93		13.93	
ORP	mV	425.3		111.6		107.0		237.0		-		-		115.3		141.5		141.5	

See notes at the end of the table.

Appendix B
Table B-1
Historical Analytical Results - Upper Groundwater Zone
2016 - 2017 Annual LTM Report
Colonie FUSRAP Site, Colonie New York

Sampling Date	Units	4-Dec-04		5-Jun-05		1-Dec-05		1-Dec-06		1-Jun-07		1-Aug-08		30-Oct-08		19-Feb-09		26-May-09	
Well ID		MW-34S		MW-34S		MW-34S		MW-34S		MW-34S		MW-34S		MW-34S		MW-34S		MW-34S	
VOCs		Results	Q	Results	Q	Results	Q	Results	Q	Results	Q	Results	Q	Results	Q	Results	Q	Results	Q
1,1-DCE	µg/L	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U
PCE	µg/L	**1.1**		0.6	J	**1.1**		**1.9**		**0.41**	J	**0.92**	J	**1.0**		**0.94**	**J**	**0.85**	**J**
TCE	µg/L	**0.2**	**J**	1.0	U	1.0	U	**0.4**	J	**0.16**	J	1.0	U	1.0	U	1.0	U	1.0	U
VC	µg/L	**1.7**	**J**	1.3	J	**1.8**	J	**1.0**	J	**1.3**	J	**1.6**		**1.8**		**1.6**		**2.0**	
cis-1,2-DCE	µg/L	**1.0**		0.6	J	**1.3**		**2.1**		**0.75**	J	**0.93**	J	**1.3**		**0.89**	**J**	**0.85**	**J**
trans-1,2-DCE	µg/L	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U
Metals		Results	Q	Results	Q	Results	Q	Results	Q	Results	Q	Results	Q	Results	Q	Results	Q	Results	Q
Lead (Total)	µg/L	-		-		-		-		-		-		-		-		-	
Lead (Dissolved)	µg/L	-		-		-		-		-		-		-		-		-	
Radiological Parameters		Results	Q	Results	Q	Results	Q	Results	Q	Results	Q	Results	Q	Results	Q	Results	Q	Results	Q
Gross Alpha	pCi/L	-		-		-		-		-		-		-		-		-	
Gross Beta	pCi/L	-		-		-		-		-		-		-		-		-	
Total Uranium	µg/L	-		-		-		-		-		-		-		-		-	
Combined Radium 226/228	pCi/L	-		-		-		-		-		-		-		-		-	
Gross Alpha - Dissolved	pCi/L	-		-		-		-		-		-		-		-		-	
Gross Beta - Dissolved	pCi/L	-		-		-		-		-		-		-		-		-	
Total Uranium - Dissolved	µg/L	-		-		-		-		-		-		-		-		-	
Combined Radium 226/228 - Dissolved	pCi/L	-		-		-		-		-		-		-		-		-	
MNA Parameters		Results	Q	Results	Q	Results	Q	Results	Q	Results	Q	Results	Q	Results	Q	Results	Q	Results	Q
TOC	mg/L	-		-		-		-		-		2.31	J	2.25	J	2.16		2.19	J
DOC	mg/L	-		-		-		-		-		3.13	J	2.55	J	2.4		2.65	J
Ethane	µg/L	-		-		-		-		-		2	U	2	U	2	U	2	U
Ethene	µg/L	-		-		-		-		-		2	U	2	U	2	U	2	U
Methane	µg/L	-		-		-		-		-		13		13		13		15	
Nitrate-N	mg/L	-		-		-		-		-		0.161		0.13	J	0.239		0.229	
Sulfate	mg/L	-		-		-		-		-		92		95		79		84	
Chloride	mg/L	-		-		-		-		-		96		108		73		109	
Soluble Manganese, Mn(II)	mg/L	-		-		-		-		-		1		1		0	U	1	
Ferrous Iron, Fe(II)	mg/L	-		-		-		-		-		0		0		0		0	U
Field Parameters		Results	Q	Results	Q	Results	Q	Results	Q	Results	Q	Results	Q	Results	Q	Results	Q	Results	Q
pH	SU	6.74		7.16		7.05		6.87		7.91		6.42		6.91		7.15		7.10	
Specific Conductance	mS/cm	0.707		0.833		0.500		0.353		0.620		0.414		0.507		0.582		0.527	
Turbidity	NTU	67.2		33.3		86.0		24.1		0.0		0.0		0.0		>1000		1287.0	
Dissolved Oxygen	mg/L	0.82		0.53		0.35		0.62		0.09		0.48		0.31		0.00		0.61	
Temperature	^{o}C	11.65		10.96		11.72		11.98		13.51		13.58		13.78		8.90		10.73	
ORP	mV	181.9		50		101.3		89.2		259.4		283.0		13.1		150.0		121.8	

See notes at the end of the table.

Appendix B
Table B-1
Historical Analytical Results - Upper Groundwater Zone
2016 - 2017 Annual LTM Report
Colonie FUSRAP Site, Colonie New York

Sampling Date	Units	Feb-02		Jun-02		Mar-03		Dec-03		Jul-04		Dec-04		Jun-05		Dec-05		Dec-06	
Well ID		MW-35S		MW-35S		MW-35S		MW-35S		MW-35S		MW-35S		MW-35S		MW-35S		MW-35S	
VOCs		Results	Q	Results	Q	Results	Q	Results	Q	Results	Q	Results	Q	Results	Q	Results	Q	Results	Q
1,1-DCE	µg/L	0.5	U	0.5	U	0.5	U	0.5	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U
PCE	µg/L	**0.2**	**J**	0.5	U	0.5	U	0.5	U	1.0	U	1.0	U	1.0	UJ	1.0	U	1.0	U
TCE	µg/L	0.5	U	0.5	U	0.5	U	0.5	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U
VC	µg/L	0.5	U	0.5	U	0.5	U	0.5	U	2.0	U	2.0	U	2.0	U	2.0	U	2.0	U
cis-1,2-DCE	µg/L	0.5	U	0.5	U	0.5	U	0.5	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U
trans-1,2-DCE	µg/L	0.5	U	0.5	U	0.5	U	0.5	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U
Metals		Results	Q	Results	Q	Results	Q	Results	Q	Results	Q	Results	Q	Results	Q	Results	Q	Results	Q
Lead (Total)	µg/L	-		-		-		-		-		-		-		-		-	
Lead (Dissolved)	µg/L	-		-		-		-		-		-		-		-		-	
Radiological Parameters		Results	Q	Results	Q	Results	Q	Results	Q	Results	Q	Results	Q	Results	Q	Results	Q	Results	Q
Gross Alpha	pCi/L	-		-		-		-		-		-		-		-		-	
Gross Beta	pCi/L	-		-		-		-		-		-		-		-		-	
Total Uranium	µg/L	-		-		-		-		-		-		-		-		-	
Combined Radium 226/228	pCi/L	-		-		-		-		-		-		-		-		-	
Gross Alpha - Dissolved	pCi/L	-		-		-		-		-		-		-		-		-	
Gross Beta - Dissolved	pCi/L	-		-		-		-		-		-		-		-		-	
Total Uranium - Dissolved	µg/L	-		-		-		-		-		-		-		-		-	
Combined Radium 226/228 - Dissolved	pCi/L	-		-		-		-		-		-		-		-		-	
MNA Parameters		Results	Q	Results	Q	Results	Q	Results	Q	Results	Q	Results	Q	Results	Q	Results	Q	Results	Q
TOC	mg/L	-		-		-		-		-		-		-		-		-	
DOC	mg/L	-		-		-		-		-		-		-		-		-	
Ethane	µg/L	-		-		-		-		-		-		-		-		-	
Ethene	µg/L	-		-		-		-		-		-		-		-		-	
Methane	mg/L	-		-		-		-		-		-		-		-		-	
Nitrate-N	mg/L	-		-		-		-		-		-		-		-		-	
Sulfate	mg/L	-		-		-		-		-		-		-		-		-	
Chloride	mg/L	-		-		-		-		-		-		-		-		-	
Soluble Manganese, Mn(II)	mg/L	-		-		-		-		-		-		-		-		-	
Ferrous Iron, Fe(II)	mg/L	-		-		-		-		-		-		-		-		-	
Field Parameters		Results	Q	Results	Q	Results	Q	Results	Q	Results	Q	Results	Q	Results	Q	Results	Q	Results	Q
pH	SU	-		-		7.11		6.97		7.25		6.58		6.02		6.54		6.70	
Specific Conductance	mS/cm	-		-		0.308		0.995		4.37		0.948		0.311		0.397		0.777	
Turbidity	NTU	-		-		1.4		2.2		74.3		6.5		0.0		19.5		18.6	
Dissolved Oxygen	mg/L	-		-		10.82		4.05		4.31		2.37		5.36		3.32		2.19	
Temperature	^{o}C	-		-		7.41		12.72		10.37		11.88		11.76		10.65		12.90	
ORP	mV	-		-		120.4		179.6		231.1		206.6		226.7		64.2		82.7	

See notes at the end of the table.

Appendix B
Table B-1
Historical Analytical Results - Upper Groundwater Zone
2016 - 2017 Annual LTM Report
Colonie FUSRAP Site, Colonie New York

Sampling Date	Units	Jun-07		Aug-08		Oct-08		Feb-09		May-09		Feb-02		Jun-02		Mar-03		Dec-03	
Well ID		MW-35S		MW-35S		MW-35S		MW-35S		MW-35S		MW-37S		MW-37S		MW-37S		MW-37S	
VOCs		Results	Q	Results	Q	Results	Q	Results	Q	Results	Q	Results	Q	Results	Q	Results	Q	Results	Q
1,1-DCE	µg/L	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	0.5	U	0.5	U	0.5	U	0.5	U
PCE	µg/L	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	0.5	U	0.5	U	0.5	U	0.5	U
TCE	µg/L	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	0.5	U	0.5	U	0.5	U	0.5	U
VC	µg/L	2.0	U	1.0	U	1.0	U	1.0	U	1.0	U	0.5	U	0.5	U	0.5	U	0.5	U
cis-1,2-DCE	µg/L	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	0.5	U	0.5	U	**0.4**	**J**	**0.7**	
trans-1,2-DCE	µg/L	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	0.5	U	0.5	U	0.5	U	0.5	U
Metals		Results	Q	Results	Q	Results	Q	Results	Q	Results	Q	Results	Q	Results	Q	Results	Q	Results	Q
Lead (Total)	µg/L	-		-		-		-		-		-		-		-		-	
Lead (Dissolved)	µg/L	-		-		-		-		-		-		-		-		-	
Radiological Parameters		Results	Q	Results	Q	Results	Q	Results	Q	Results	Q	Results	Q	Results	Q	Results	Q	Results	Q
Gross Alpha	pCi/L	-		-		-		-		-									
Gross Beta	pCi/L	-		-		-		-		-									
Total Uranium	µg/L	-		-		-		-		-		1.5309	B	0.6003	B			0.2418	J
Combined Radium 226/228	pCi/L	-		-		-		-		-									
Gross Alpha - Dissolved	pCi/L	-		-		-		-		-									
Gross Beta - Dissolved	pCi/L	-		-		-		-		-									
Total Uranium - Dissolved	µg/L	-		-		-		-		-									
Combined Radium 226/228 - Dissolved	pCi/L	-		-		-		-		-									
MNA Parameters		Results	Q	Results	Q	Results	Q	Results	Q	Results	Q	Results	Q	Results	Q	Results	Q	Results	Q
TOC	mg/L	-		1.01	J	1.53		1.13	J	0.847	J	-		-		-		-	
DOC	mg/L	-		1.32	J	1.6		1.06	J	1.22	J	-		-		-		-	
Ethane	µg/L	-		2	U	2	U	2	U	2	U	-		-		-		-	
Ethene	µg/L	-		2	U	2	U	2	U	2	U	-		-		-		-	
Methane	mg/L	-		2	U	2	U	2	U	2	U	-		-		-		-	
Nitrate-N	mg/L	-		0.1	U	0.0571	J	0.0588	J	0.1	U	-		-		-		-	
Sulfate	mg/L	-		11		12		10		18		-		-		-		-	
Chloride	mg/L	-		115		50		35		136		-		-		-		-	
Soluble Manganese, Mn(II)	mg/L	-		0		0	U	0	U	0	U	-		-		-		-	
Ferrous Iron, Fe(II)	mg/L	-		0	U	0	U	0	U	0	U	-		-		-		-	
Field Parameters		Results	Q	Results	Q	Results	Q	Results	Q	Results	Q	Results	Q	Results	Q	Results	Q	Results	Q
pH	SU	5.16		6.65		6.75		6.56		6.56		-		-		7.22		-	
Specific Conductance	mS/cm	0.383		0.237		0.184		0.446		0.446		-		-		0.863		-	
Turbidity	NTU	10.8		1.0		9.2		0.0		0.0		-		-		1.7		-	
Dissolved Oxygen	mg/L	6.22		9.41		13.13		3.00		3.00		-		-		0.65		-	
Temperature	^{o}C	15.73		13.76		7.12		10.78		10.78		-		-		10.09		-	
ORP	mV	545.2		192.7		68.8		61.0		61.0		-		-		-95.7		-	

See notes at the end of the table.

Appendix B
Table B-1
Historical Analytical Results - Upper Groundwater Zone
2016 - 2017 Annual LTM Report
Colonie FUSRAP Site, Colonie New York

Sampling Date	Units	Jul-04		Dec-04		Jun-05		Dec-05		Dec-06		Jun-07		Aug-08		Oct-08		Feb-09	
Well ID		MW-37S		MW-37S		MW-37S		MW-37S		MW-37S		MW-37S		MW-37S		MW-37S		MW-37S	
VOCs		Results	Q	Results	Q	Results	Q	Results	Q	Results	Q	Results	Q	Results	Q	Results	Q	Results	Q
1,1-DCE	µg/L	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U
PCE	µg/L	1.0	U	**0.6**	**J**	**0.4**	J	1.0	U	**0.3**	J	1.0	U	**0.22**	J	**0.23**	**J**	**0.51**	**J**
TCE	µg/L	**0.18**	**J**	**0.28**	**J**	**0.4**	J	1.0	U	**0.9**	J	**0.3**	J	**0.33**	J	**0.38**	**J**	**0.71**	**J**
VC	µg/L	**0.41**	**J**	**0.7**	**J**	**1.0**	J	**1.0**	J	**1.1**	J	2.0	U	**0.99**	J	**1.1**	**J**	**0.85**	**J**
cis-1,2-DCE	µg/L	**0.98**	**J**	**0.98**	**J**	**3.1**	J	**2.7**		**5.5**		**2.1**		**1.6**		**2.3**		**3.6**	
trans-1,2-DCE	µg/L	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U
Metals		Results	Q	Results	Q	Results	Q	Results	Q	Results	Q	Results	Q	Results	Q	Results	Q	Results	Q
Lead (Total)	µg/L	-		-		-		-		-		-		-		-		-	
Lead (Dissolved)	µg/L	-		-		-		-		-		-		-		-		-	
Radiological Parameters		Results	Q	Results	Q	Results	Q	Results	Q	Results	Q	Results	Q	Results	Q	Results	Q	Results	Q
Gross Alpha	pCi/L	2.4	U	10	J	0	UJ	3.2	UJ	6.9	U	4.2	U	1.26	U	1.9	J	1.26	U
Gross Beta	pCi/L	13		13.4		11.2	J		R	18		19.9		22.3		13.5		14.1	
Total Uranium	µg/L	0.5		0.24		0.61		0.21	U	0.27	U	NA	U	0.24		0.21	U	1.1	
Combined Radium 226/228	pCi/L	0.81	U	1.55	J	0.98	UJ	4.58	J	1.92	U	1.36	J	2.013		2.13	J	2.596	J
Gross Alpha - Dissolved	pCi/L											0.06	U	1.78	J	0.974	U	0.443	U
Gross Beta - Dissolved	pCi/L											11.6		16.1		9.05	J	11.2	
Total Uranium - Dissolved	µg/L											0	U	0		0	U	0	J
Combined Radium 226/228 - Dissolved	pCi/L											1	J	2		2	J	1	J
MNA Parameters		Results	Q	Results	Q	Results	Q	Results	Q	Results	Q	Results	Q	Results	Q	Results	Q	Results	Q
TOC	mg/L	-		-		-		-		-		-		1.01	J	1.53		1.13	J
DOC	mg/L	-		-		-		-		-		-		1.32	J	1.6		1.06	J
Ethane	µg/L	-		-		-		-		-		-		2	U	2	U	2	U
Ethene	µg/L	-		-		-		-		-		-		2	U	2	U	2	U
Methane	mg/L	-		-		-		-		-		-		2	U	2	U	2	U
Nitrate-N	mg/L	-		-		-		-		-		-		0.1	U	0.0571	J	0.0588	J
Sulfate	mg/L	-		-		-		-		-		-		11		12		10	
Chloride	mg/L	-		-		-		-		-		-		115		50		35	
Soluble Manganese, Mn(II)	mg/L	-		-		-		-		-		-		0		0	U	0	U
Ferrous Iron, Fe(II)	mg/L	-		-		-		-		-		-		0	U	0	U	0	U
Field Parameters		Results	Q	Results	Q	Results	Q	Results	Q	Results	Q	Results	Q	Results	Q	Results	Q	Results	Q
pH	SU	7.12		7.04		6.99		7.12		6.99		6.83		6.67		7.25		7.05	
Specific Conductance	mS/cm	0.919		0.987		1.066		0.755		0.659		0.611		0.676		0.630		0.565	
Turbidity	NTU	22.6		29.9		6.2		318.4		91.0		53.5		54.2		6.5		2085.8	
Dissolved Oxygen	mg/L	7.34		1.3		0.3		2.36		0.47		1.68		1.71		5.10		0.94	
Temperature	^{o}C	13.82		11.3		11.6		10.29		11.76		12.32		12.30		12.62		10.09	
ORP	mV	-83.6		-33.8		-74.3		-66.5		-83.8		-85.9		-77.9		-96.4		-48.9	

See notes at the end of the table.

Appendix B
Table B-1
Historical Analytical Results - Upper Groundwater Zone
2016 - 2017 Annual LTM Report
Colonie FUSRAP Site, Colonie New York

Sampling Date	Units	26-May-09		2-Jun-02		1-Mar-03		3-Dec-03		4-Jul-04		4-Dec-04		5-Jun-05		1-Dec-05	
Well ID		MW-37S		MW-39S		MW-39S		MW-39S		MW-39S		MW-39S		MW-39S		MW-39S	
VOCs		Results	Q	Results	Q	Results	Q	Results	Q	Results	Q	Results	Q	Results	Q	Results	Q
1,1-DCE	µg/L	1.0	U	0.5	U	0.5	U	0.5	U	1.0	U	1.0	U	1.0	U	1.0	U
PCE	µg/L	**0.27**	**J**	0.5	U	0.5	U	0.5	U	1.0	U	1.0	U	1.0	UJ	1.0	U
TCE	µg/L	**0.36**	**J**	0.5	U	0.5	U	0.5	U	1.0	U	1.0	U	1.0	U	1.0	U
VC	µg/L	**1.2**	**J**	0.5	U	0.5	U	0.5	U	2.0	U	2.0	U	2.0	U	2.0	U
cis-1,2-DCE	µg/L	**1.9**		0.5	U	0.5	U	0.5	U	1.0	U	1.0	U	1.0	U	1.0	U
trans-1,2-DCE	µg/L	1.0	U	0.5	U	0.5	U	0.5	U	1.0	U	1.0	U	1.0	U	1.0	U
Metals		Results	Q	Results	Q	Results	Q	Results	Q	Results	Q	Results	Q	Results	Q	Results	Q
Lead (Total)	µg/L	-		-		-		-		-		-		-		-	
Lead (Dissolved)	µg/L	-		-		-		-		-		-		-		-	
Radiological Parameters		Results	Q	Results	Q	Results	Q	Results	Q	Results	Q	Results	Q	Results	Q	Results	Q
Gross Alpha	pCi/L	1.47	J	-		-		-		-		-		-		-	
Gross Beta	pCi/L	11.8		-		-		-		-		-		-		-	
Total Uranium	µg/L	0.285		-		-		-		-		-		-		-	
Combined Radium 226/228	pCi/L	2.74	U	-		-		-		-		-		-		-	
Gross Alpha - Dissolved	pCi/L	2.29	J	-		-		-		-		-		-		-	
Gross Beta - Dissolved	pCi/L	1.58	J	-		-		-		-		-		-		-	
Total Uranium - Dissolved	µg/L	0		-		-		-		-		-		-		-	
Combined Radium 226/228 - Dissolved	pCi/L	0	U	-		-		-		-		-		-		-	
MNA Parameters		Results	Q	Results	Q	Results	Q	Results	Q	Results	Q	Results	Q	Results	Q	Results	Q
TOC	mg/L	0.847	J	-		-		-		-		-		-		-	
DOC	mg/L	1.22	J	-		-		-		-		-		-		-	
Ethane	µg/L	2	U	-		-		-		-		-		-		-	
Ethene	µg/L	2	U	-		-		-		-		-		-		-	
Methane	mg/L	2	U	-		-		-		-		-		-		-	
Nitrate-N	mg/L	0.1	U	-		-		-		-		-		-		-	
Sulfate	mg/L	18		-		-		-		-		-		-		-	
Chloride	mg/L	136		-		-		-		-		-		-		-	
Soluble Manganese, Mn(II)	mg/L	0	U	-		-		-		-		-		-		-	
Ferrous Iron, Fe(II)	mg/L	0	U	-		-		-		-		-		-		-	
Field Parameters		Results	Q	Results	Q	Results	Q	Results	Q	Results	Q	Results	Q	Results	Q	Results	Q
pH	SU	6.41		-		7.96		-		7.6		7.62		7.34		8	
Specific Conductance	mS/cm	0.717		-		0.254		-		0.754		0.514		1.603		0.448	
Turbidity	NTU	76.0		-		721.6		-		194		745.1		854		701	
Dissolved Oxygen	mg/L	1.14		-		2.06		-		1.58		3		2.13		4.57	
Temperature	^{o}C	11.48		-		7.83		-		11.25		10.37		10.88		12.67	
ORP	mV	-56.3		-		71.1		-		167.1		59.8		90		-71.5	

See notes at the end of the table.

Appendix B
Table B-1
Historical Analytical Results - Upper Groundwater Zone
2016 - 2017 Annual LTM Report
Colonie FUSRAP Site, Colonie New York

Sampling Date	Units	1-Dec-06		1-Jun-07		1-Aug-08		30-Oct-08		19-Feb-09		May-09	
Well ID		MW-39S		MW-39S		MW-39S		MW-39S		MW-39S		MW-39S	
VOCs		Results	Q	Results	Q	Results	Q	Results	Q	Results	Q	Results	Q
1,1-DCE	µg/L	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U
PCE	µg/L	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U
TCE	µg/L	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U
VC	µg/L	2.0	U	2.0	U	1.0	U	1.0	U	1.0	U	1.0	U
cis-1,2-DCE	µg/L	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U
trans-1,2-DCE	µg/L	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U
Metals		Results	Q	Results	Q	Results	Q	Results	Q	Results	Q	Results	Q
Lead (Total)	µg/L	-		-		-		-		-		-	
Lead (Dissolved)	µg/L	-		-		-		-		-		-	
Radiological Parameters		Results	Q	Results	Q	Results	Q	Results	Q	Results	Q	Results	Q
Gross Alpha	pCi/L	-		-		-		-		-		-	
Gross Beta	pCi/L	-		-		-		-		-		-	
Total Uranium	µg/L	-		-		-		-		-		-	
Combined Radium 226/228	pCi/L	-		-		-		-		-		-	
Gross Alpha - Dissolved	pCi/L	-		-		-		-		-		-	
Gross Beta - Dissolved	pCi/L	-		-		-		-		-		-	
Total Uranium - Dissolved	µg/L	-		-		-		-		-		-	
Combined Radium 226/228 - Dissolved	pCi/L	-		-		-		-		-		-	
MNA Parameters		Results	Q	Results	Q	Results	Q	Results	Q	Results	Q	Results	Q
TOC	mg/L	-		-		-		-		-		-	
DOC	mg/L	-		-		-		-		-		-	
Ethane	µg/L	-		-		-		-		-		-	
Ethene	µg/L	-		-		-		-		-		-	
Methane	mg/L	-		-		-		-		-		-	
Nitrate-N	mg/L	-		-		-		-		-		-	
Sulfate	mg/L	-		-		-		-		-		-	
Chloride	mg/L	-		-		-		-		-		-	
Soluble Manganese, Mn(II)	mg/L	-		-		-		-		-		-	
Ferrous Iron, Fe(II)	mg/L	-		-		-		-		-		-	
Field Parameters		Results	Q	Results	Q	Results	Q	Results	Q	Results	Q	Results	Q
pH	SU	7.9		3.38		7.12		7.65		7.89		7.64	
Specific Conductance	mS/cm	0.335		2.074		0.427		0.384		0.418		0.703	
Turbidity	NTU	681		335.0		1350.3		473.0		559.6		495.0	
Dissolved Oxygen	mg/L	3.81		0.12		1.60		1.23		10.77		5.05	
Temperature	^{o}C	10.78		11.31		12.66		9.86		8.59		8.96	
ORP	mV	-10.2		369.2		351.5		25.2		-152.7		38.2	

See notes at the end of the table.

Appendix B
Table B-1
Historical Analytical Results - Upper Groundwater
Zone 2016 - 2017 Annual LTM Report
Colonie FUSRAP Site, Colonie New York

Sampling Date	Units	Dec-98		May-99		Oct-99		Mar-00		Aug-00		Feb-01		Aug-01		Feb-02	
Well ID		MW-40S		MW-40S		MW-40S		MW-40S		MW-40S		MW-40S		MW-40S		MW-40S	
VOCs		Results	Q	Results	Q	Results	Q	Results	Q	Results	Q	Results	Q	Results	Q	Results	Q
1,1-DCE	µg/L	10	U	5	U	0.5	U	10	U	20	U	2	U	0.83	U	0.5	U
PCE	µg/L	**1**	**J**	**1**	**J**	**3**		**2**	**J**	**6**	**JD**	2	U	0.78	U	0.5	U
TCE	µg/L	**2**	**J**	5	U	**1**		10	U	20	U	2	U	0.49	U	0.5	U
VC	µg/L	**14**		**4**	**J**	**10**		**8**	**J**	20	U	**2.3**	**J**	1.0	U	**3**	
cis-1,2-DCE	µg/L	**14^**		**8^**		**10^**		**6^**	**J**	20^	U	**2^**	**J**	**2**	**J**	**2**	
trans-1,2-DCE	µg/L													0.84	U	0.5	U
Metals		Results	Q	Results	Q	Results	Q	Results	Q	Results	Q	Results	Q	Results	Q	Results	Q
Lead (Total)	µg/L	**16**		**3,120**		**151**		**339**		**701**		**1,180**		**133**		**95.1**	**NV**
Lead (Dissolved)	µg/L	-		-		-		-		-		-		-		-	
Radiological Parameters		Results	Q	Results	Q	Results	Q	Results	Q	Results	Q	Results	Q	Results	Q	Results	Q
Gross Alpha	pCi/L	-		-		-		-		-		-		-		-	
Gross Beta	pCi/L	-		-		-		-		-		-		-		-	
Total Uranium	µg/L	-		-		-		-		-		-		-		-	
Combined Radium 226/228	pCi/L	-		-		-		-		-		-		-		-	
Gross Alpha - Dissolved	pCi/L	-		-		-		-		-		-		-		-	
Gross Beta - Dissolved	pCi/L	-		-		-		-		-		-		-		-	
Total Uranium - Dissolved	µg/L	-		-		-		-		-		-		-		-	
Combined Radium 226/228 - Dissolved	pCi/L	-		-		-		-		-		-		-		-	
MNA Parameters		Results	Q	Results	Q	Results	Q	Results	Q	Results	Q	Results	Q	Results	Q	Results	Q
TOC	mg/L	-		-		-		-		-		-		-		-	
DOC	mg/L	-		-		-		-		-		-		-		-	
Ethane	µg/L	-		-		-		-		-		-		-		-	
Ethene	µg/L	-		-		-		-		-		-		-		-	
Methane	µg/L	-		-		-		-		-		-		-		-	
Nitrate-N	mg/L	-		-		-		-		-		-		-		-	
Sulfate	mg/L	-		-		-		-		-		-		-		-	
Chloride	mg/L	-		-		-		-		-		-		-		-	
Soluble Manganese, Mn(II)	mg/L	-		-		-		-		-		-		-		-	
Ferrous Iron, Fe(II)	mg/L	-		-		-		-		-		-		-		-	
Field Parameters		Results	Q	Results	Q	Results	Q	Results	Q	Results	Q	Results	Q	Results	Q	Results	Q
pH	SU	-		-		-		-		-		-		-		-	
Specific Conductance	mS/cm	-		-		-		-		-		-		-		-	
Turbidity	NTU	-		-		-		-		-		-		-		-	
Dissolved Oxygen	mg/L	-		-		-		-		-		-		-		-	
Temperature	^{o}C	-		-		-		-		-		-		-		-	
ORP	mV	-		-		-		-		-		-		-		-	

See notes at the end of the table.

Appendix B
Table B-1
Historical Analytical Results - Upper Groundwater
Zone 2016 - 2017 Annual LTM Report
Colonie FUSRAP Site, Colonie New York

Sampling Date	Units	Jun-02		Jul-04		Dec-04		Jun-05		Dec-05		Dec-06		Jun-07		Aug-08	
Well ID		MW-40S		MW-40S		MW-40S		MW-40S		MW-40S		MW-40S		MW-40S		MW-40S	
VOCs		Results	Q	Results	Q	Results	Q	Results	Q	Results	Q	Results	Q	Results	Q	Results	Q
1,1-DCE	µg/L	0.5	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U
PCE	µg/L	0.5	U	1.0	U	1.0	U	1.0	UJ	1.0	U	1.0	U	1.0	U	1.0	U
TCE	µg/L	0.5	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U
VC	µg/L	**3**		2.0	U	2.0	U	2.0	U	2.0	UJ	2.0	U	2.0	U	1.0	U
cis-1,2-DCE	µg/L	**4**		1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U
trans-1,2-DCE	µg/L	0.5	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U
Metals		Results	Q	Results	Q	Results	Q	Results	Q	Results	Q	Results	Q	Results	Q	Results	Q
Lead (Total)	µg/L	**206**		**61.7**		**247**	J	**125**		**3.9**		**424**		**170**		**77.5**	
Lead (Dissolved)	µg/L	-		-		-		-		-		-		-		**0.541**	J
Radiological Parameters		Results	Q	Results	Q	Results	Q	Results	Q	Results	Q	Results	Q	Results	Q	Results	Q
Gross Alpha	pCi/L	-		0.37	U	8.80	J	4.70	J	1.00	UJ	3.70		4.70		**25.3**	
Gross Beta	pCi/L	-		0.80	U	4.20	U	5.10	J	1.30	U	3.50	J	3.10	U	**52.2**	
Total Uranium	µg/L	-		0.50		0.50		0.42	J	-		0.20	U	0.87		**2.3**	
Combined Radium 226/228	pCi/L	-		0.32	U	0.73	UJ	0.10	UJ	-		0.39	U	0.54	J	2.083	
Gross Alpha - Dissolved	pCi/L	-		-		-		-		-		-		0.40	U	**2.85**	J
Gross Beta - Dissolved	pCi/L	-		-		-		-		-		-		0.90	U	**10.6**	
Total Uranium - Dissolved	µg/L	-		-		-		-		-		-		1.00		**0.51**	J
Combined Radium 226/228 - Dissolved	pCi/L	-		-		-		-		-		-		0.53	U	1.235	
MNA Parameters		Results	Q	Results	Q	Results	Q	Results	Q	Results	Q	Results	Q	Results	Q	Results	Q
TOC	mg/L	-		-		-		-		-		-		-		**0.801**	
DOC	mg/L	-		-		-		-		-		-		-		**1.12**	J
Ethane	µg/L	-		-		-		-		-		-		-		**0.680**	J
Ethene	µg/L	-		-		-		-		-		-		-		2.0	U
Methane	µg/L	-		-		-		-		-		-		-		**53.0**	
Nitrate-N	mg/L	-		-		-		-		-		-		-		**0.243**	
Sulfate	mg/L	-		-		-		-		-		-		-		**13.8**	J
Chloride	mg/L	-		-		-		-		-		-		-		**38.0**	
Soluble Manganese, Mn(II)	mg/L	-		-		-		-		-		-		-		0.35	
Ferrous Iron, Fe(II)	mg/L	-		-		-		-		-		-		-		0.2	U
Field Parameters		Results	Q	Results	Q	Results	Q	Results	Q	Results	Q	Results	Q	Results	Q	Results	Q
pH	SU	-		7.02		7.84		7.95		8.16		7.73		7.64		6.91	
Specific Conductance	mS/cm	-		0.399		0.326		0.321		0.224		0.211		0.223		0.201	
Turbidity	NTU	-		16.7		146.8		83		18.9		97.1		64.7		1555.0	
Dissolved Oxygen	mg/L	-		0.82		0.9		5.99		2.21		1.75		2.38		1.68	
Temperature	^{o}C	-		37.97		12.94		12.56		11.92		13.29		13.07		18.00	
ORP	mV	-		-23.9		87.1		29.3		-113.8		-47.9		-78.9		389.5	

See notes at the end of the table.

Appendix B
Table B-1
Historical Analytical Results - Upper Groundwater
Zone 2016 - 2017 Annual LTM Report
Colonie FUSRAP Site, Colonie New York

Sampling Date	Units	Nov-08		Feb-09		May-09		Dec-06		Jan-07		Jun-07		Aug-08		Nov-08	
Well ID		MW-40S		MW-40S		MW-40S		MW-41S		MW-41S		MW-41S		MW-41S		MW-41S	
VOCs		Results	Q	Results	Q	Results	Q	Results	Q	Results	Q	Results	Q	Results	Q	Results	Q
1,1-DCE	µg/L	1.0	U	1.0	U	1.0	U	1.0	U	-		1.0	U	1.0	U	1.0	U
PCE	µg/L	1.0	U	1.0	U	1.0	U	**53**	D	-		**45**	E	**33.0**		**31.0**	
TCE	µg/L	1.0	U	1.0	U	1.0	U	**8.3**		-		**10.0**		**7.3**		**6.7**	
VC	µg/L	1.0	U	1.0	U	1.0	U	**0.6**	J	-		**0.6**	J	**0.78**	J	**0.77**	**J**
cis-1,2-DCE	µg/L	1.0	U	1.0	U	1.0	U	**6.4**		-		**8.3**		**4.7**		**4.6**	
trans-1,2-DCE	µg/L	1.0	U	1.0	U	1.0	U	1.0	U	-		0.2	J	1.0	U	1.0	U
Metals		Results	Q	Results	Q	Results	Q	Results	Q	Results	Q	Results	Q	Results	Q	Results	Q
Lead (Total)	µg/L	**129**		**41.8**		**110**		**20.3**		-		**6.2**		**13.8**		**3.16**	
Lead (Dissolved)	µg/L	**3.38**		**0.654**	**J**	1.0	U	-		-		-		1.0	U	1.0	U
Radiological Parameters		Results	Q	Results	Q	Results	Q	Results	Q	Results	Q	Results	Q	Results	Q	Results	Q
Gross Alpha	pCi/L	7	**J**	**38.9**		**40.7**	**J**	-		**56**		4.60	J	**17.5**		4.58	**J**
Gross Beta	pCi/L	10		**72.1**		**55.5**	**J**	-		**103**		9.60	J	**51.2**	J	15.1	
Total Uranium	µg/L	1		**0.87**		**3.55**		-		3.50		0.90		**1.7**		0.81	
Combined Radium 226/228	pCi/L	1.182	U	**1.07**	**J**	3.13	U	-		1.69		0.93	J	1.285		1.889	**J**
Gross Alpha - Dissolved	pCi/L	1.110	U	1.36	U	**1.73**	**J**	-		-		2.00	U	1.55	U	2	U
Gross Beta - Dissolved	pCi/L	1.200	U	-0.395	U	1.33	U	-		-		4.40		**6.63**	J	4.75	**J**
Total Uranium - Dissolved	µg/L	0.190	**J**	**0.31**		**2.57**		-		-		0.30	U	**0.38**		0.28	
Combined Radium 226/228 - Dissolved	pCi/L	0.897	U	**0.826**	**J**	0.775	U	-		-		1.16	J	0.901		0.743	U
MNA Parameters		Results	Q	Results	Q	Results	Q	Results	Q	Results	Q	Results	Q	Results	Q	Results	Q
TOC	mg/L	**0.678**	**J**	**0.677**	**J**	**0.713**	**J**	-		-		-		**2.89**		**2.64**	**J**
DOC	mg/L	**0.962**	**J**	**0.698**	**J**	**0.882**	**J**	-		-		-		**3.21**		**3.09**	**J**
Ethane	µg/L	0.63	J	2.0	U	**12**		-		-		-		**1.4**	J	0.84	J
Ethene	µg/L	2.0	U	2.0	U	2.0	U	-		-		-		2.0	U	2.0	U
Methane	µg/L	**57**		**55**		**190**		-		-		-		**78.0**		**56**	
Nitrate-N	mg/L	**0.117**	**J**	**0.0839**	**J**	0.10	U	-		-		-		**0.114**	J	**0.106**	**J**
Sulfate	mg/L	**15.4**		**14.4**		**13.8**		-		-		-		**75.6**		**80.1**	
Chloride	mg/L	**42.1**		**43.2**		**45**		-		-		-		**49.0**		**63.1**	
Soluble Manganese, Mn(II)	mg/L	0.25		0.025		0.025		-		-		-		0.68		0.68	
Ferrous Iron, Fe(II)	mg/L	0.2	U	0.2	U	0.2	U	-		-		-		0.6		0.6	
Field Parameters		Results	Q	Results	Q	Results	Q	Results	Q	Results	Q	Results	Q	Results	Q	Results	Q
pH	SU	7.88		7.88		7.50		7.14		-		7.08		3.89		7.12	
Specific Conductance	mS/cm	0.176		0.261		0.255		0.484		-		0.390		0.471		0.415	
Turbidity	NTU	491		202.4		1866.0		910.1		-		48.3		676.0		378	
Dissolved Oxygen	mg/L	1.79		8.16		5.93		2.70		-		1.40		2.37		0.31	
Temperature	^{o}C	15.14		11.21		10.52		12.83		-		13.48		14.44		14.17	
ORP	mV	78.8		-88.5		-52.0		16.8		-		-50.0		413.1		-33.7	

See notes at the end of the table.

Appendix B
Table B-1
Historical Analytical Results - Upper Groundwater
Zone 2016 - 2017 Annual LTM Report
Colonie FUSRAP Site, Colonie New York

Sampling Date	Units	Feb-09		May-09		Dec-06		1-Jan-07		1-Jun-07		5-Aug-08		4-Nov-08		17-Feb-09	
Well ID		MW-41S		MW-41S		MW-42S		MW-42S		MW-42S		MW-42S		MW-42S		MW-42S	
VOCs		Results	Q	Results	Q	Results	Q	Results	Q	Results	Q	Results	Q	Results	Q	Results	Q
1,1-DCE	µg/L	1.0	U	1.0	U	1.0	U	-		1.0	U	1.0	U	1.0	U	1.0	U
PCE	µg/L	**37**		**37**		**0.8**	J	-		1.0	U	**0.51**	J	**0.34**	**J**	**0.30**	**J**
TCE	µg/L	**6.9**		**6.5**		**0.3**	J	-		1.0	U	**1.1**		**1.0**	**J**	**1.0**	
VC	µg/L	1.0	U	**0.56**	**J**	2.0	U	-		2.0	U	1.0	U	1.0	U	1.0	U
cis-1,2-DCE	µg/L	**4.7**		**4.7**		**2.9**		-		**2.2**		**2.2**		**2.3**		**2.0**	
trans-1,2-DCE	µg/L	1.0	U	**0.24**	**J**	1.0	U	-		1.0	U	1.0	U	1.0	U	1.0	U
Metals		Results	Q	Results	Q	Results	Q	Results	Q	Results	Q	Results	Q	Results	Q	Results	Q
Lead (Total)	µg/L	**2.02**		**2.96**		**2.4**		-		**1.6**	B	**3.56**		**3.26**		**3.69**	
Lead (Dissolved)	µg/L	1.0	U	1.0	U	-		-		-		1.0	U	1.0	U	1.0	U
Radiological Parameters		Results	Q	Results	Q	Results	Q	Results	Q	Results	Q	Results	Q	Results	Q	Results	Q
Gross Alpha	pCi/L	2.86	U	**11.8**		-		1.40	U	1.10	U	**4.51**	J	2.95	J	**12.1**	
Gross Beta	pCi/L	**6.26**		**31.3**		-		8.00	U	0.20	U	**15.5**		2.08	U	**27.1**	
Total Uranium	µg/L	**0.49**		**2.01**	**J**	-		0.90		0.37		**0.59**		0.43		**0.44**	
Combined Radium 226/228	pCi/L	**0.586**	**J**	2.183	U	-		1.20	J	0.87	J	1.622		1.501	U	**1.97**	
Gross Alpha - Dissolved	pCi/L	-0.063	U	**1.80**	**J**	-		-		2.30	U	1.17	U	2.9	J	0.0717	U
Gross Beta - Dissolved	pCi/L	**5.56**	**J**	**5.11**		-		-		1.30	U	**14.4**		2.71	U	1.65	U
Total Uranium - Dissolved	µg/L	**0.33**		**2.93**	**J**	-		-		0.69		**0.23**	J	0.27		**0.40**	
Combined Radium 226/228 - Dissolved	pCi/L	**0.772**	**J**	0.952	U	-		-		0.41	U	0.751		0.89	U	**0.638**	**J**
MNA Parameters		Results	Q	Results	Q	Results	Q	Results	Q	Results	Q	Results	Q	Results	Q	Results	Q
TOC	mg/L	**2.72**		**2.88**		-		-		-		**14.5**		**12.1**		**9.53**	
DOC	mg/L	**2.48**		**2.79**		-		-		-		**14.9**		**12.7**		**9.48**	
Ethane	µg/L	2.0	U	**0.65**	**J**	-		-		-		**1.2**	J	2.0	U	2.0	U
Ethene	µg/L	2.0	U	2.0	U	-		-		-		2.0	U	2.0	U	2.0	U
Methane	µg/L	**66**		**110**		-		-		-		**230**		**400**		**510**	
Nitrate-N	mg/L	**0.112**	**J**	0.10	U	-		-		-		0.10	U	**0.118**	**J**	**0.0789**	**J**
Sulfate	mg/L	**74.2**		**70.8**		-		-		-		**98.6**		**96.1**		**75.2**	
Chloride	mg/L	**68.1**		**90.4**		-		-		-		**55**		**69.5**		**87.4**	
Soluble Manganese, Mn(II)	mg/L	0.05		0.68		-		-		-		0.70		0.70		0.05	
Ferrous Iron, Fe(II)	mg/L	0.8		1.8		-		-		-		2.2		2.2		2.6	
Field Parameters		Results	Q	Results	Q	Results	Q	Results	Q	Results	Q	Results	Q	Results	Q	Results	Q
pH	SU	6.94		6.92		6.89		-		6.75		6.10		6.83		6.93	
Specific Conductance	mS/cm	0.545		0.773		0.703		-		0.691		0.592		0.603		0.674	
Turbidity	NTU	154.3		17.6		32.1		-		29.4		466.0		155		261.0	
Dissolved Oxygen	mg/L	2.74		3.18		0.41		-		3.12		1.11		6.38		0.89	
Temperature	^{o}C	9.11		10.19		12.56		-		13.57		15.82		14.66		9.49	
ORP	mV	-8.1		18.0		-60.1		-		-83.7		-173.3		-62.7		-87.1	

See notes at the end of the table.

Appendix B
Table B-1
Historical Analytical Results - Upper Groundwater
Zone 2016 - 2017 Annual LTM Report
Colonie FUSRAP Site, Colonie New York

Sampling Date	Units	19-May-09		1-Dec-06		1-Jan-07		1-Jun-07		5-Aug-08		4-Nov-08		17-Feb-09		19-May-09	
Well ID		MW-42S		MW-43S		MW-43S		MW-43S		MW-43S		MW-43S		MW-43S		MW-43S	
VOCs		Results	Q	Results	Q	Results	Q	Results	Q	Results	Q	Results	Q	Results	Q	Results	Q
1,1-DCE	µg/L	1.0	U	1.0	U	-		1.0	U	1.0	U	1.0	U	1.0	U	1.0	U
PCE	µg/L	**0.28**	**J**	1.0	U	-		1.0	U	1.0	U	**0.22**	**J**	1.0	U	1.0	U
TCE	µg/L	**0.78**	**J**	1.0	U	-		1.0	U	1.0	U	1.0	U	1.0	U	1.0	U
VC	µg/L	1.0	U	2.0	U	-		2.0	U	1.0	U	1.0	U	1.0	U	1.0	U
cis-1,2-DCE	µg/L	**1.5**		1.0	U	-		1.0	U	1.0	U	1.0	U	1.0	U	1.0	U
trans-1,2-DCE	µg/L	1.0	U	1.0	U	-		1.0	U	1.0	U	1.0	U	1.0	U	1.0	U
Metals		Results	Q	Results	Q	Results	Q	Results	Q	Results	Q	Results	Q	Results	Q	Results	Q
Lead (Total)	µg/L	**3.59**		**1.0**	B	-		2.0	U	1.0	U	1.0	U	1.0	U	1.0	U
Lead (Dissolved)	µg/L	1.0	U	-		-		-		1.0	U	1.0	U	1.0	U	1.0	U
Radiological Parameters		Results	Q	Results	Q	Results	Q	Results	Q	Results	Q	Results	Q	Results	Q	Results	Q
Gross Alpha	pCi/L	**10.7**	**J**	-		13.60		4.10	U	-0.0578	U	1.1	U	-0.343	U	-0.0199	U
Gross Beta	pCi/L	**20.1**	**J**	-		11.20		5.20	U	**14.0**		7.4	**J**	**3.62**	**J**	**2.11**	**J**
Total Uranium	µg/L	**0.834**		-		7.40		1.09		**0.74**		0.86		**0.64**		**0.449**	**J**
Combined Radium 226/228	pCi/L	1.749	U	-		1.38	J	0.85	J	0.82035		1.019	U	0.258	U	0.653	U
Gross Alpha - Dissolved	pCi/L	**1.78**	**J**	-		-		1.90	U	1.57	U	1.79	U	0.237	U	-0.245	U
Gross Beta - Dissolved	pCi/L	**1.93**	**J**	-		-		4.10	U	**5.71**	J	4.64	**J**	**2.72**	**J**	**2.76**	**J**
Total Uranium - Dissolved	µg/L	**0.344**		-		-		0.70		**0.74**		0.78		**0.89**		**0.507**	**J**
Combined Radium 226/228 - Dissolved	pCi/L	**0.931**	**J**	-		-		0.62	J	**1.206**		1.445	U	0.465	U	**0.947**	**J**
MNA Parameters		Results	Q	Results	Q	Results	Q	Results	Q	Results	Q	Results	Q	Results	Q	Results	Q
TOC	mg/L	**8.79**		-		-		-		**1.68**	J	**1.64**		**1.66**		**1.09**	**J**
DOC	mg/L	**8.90**		-		-		-		**1.93**	J	**1.74**		**1.49**	**J**	**1.19**	**J**
Ethane	µg/L	**1.2**	**J**	-		-		-		2.0	U	2.0	U	2.0	U	2.0	U
Ethene	µg/L	2.0	U	-		-		-		2.0	U	2.0	U	2.0	U	2.0	U
Methane	µg/L	**470**		-		-		-		**6.6**		**1.8**	**J**	**5.8**		**6.5**	
Nitrate-N	mg/L	0.10	U	-		-		-		**0.345**		**0.320**		**0.135**	**J**	**0.164**	
Sulfate	mg/L	**66.3**		-		-		-		**44.3**		**45.0**		**46.1**		**37.2**	
Chloride	mg/L	**101**		-		-		-		**108**		**94.2**		**71.5**		**97.6**	
Soluble Manganese, Mn(II)	mg/L	0.68		-		-		-		0.50		0.46		0.175		0.500	
Ferrous Iron, Fe(II)	mg/L	1.2		-		-		-		0.2	U	0.2	U	0.2	U	0.0	
Field Parameters		Results	Q	Results	Q	Results	Q	Results	Q	Results	Q	Results	Q	Results	Q	Results	Q
pH	SU	4.84		7.07		-		7.01		5.90		7.15		7.34		8.56	
Specific Conductance	mS/cm	0.681		1.100		-		0.824		0.560		0.371		0.458		0.150	
Turbidity	NTU	66.5		43.4		-		41.5		28.0		14		20.0		1305.0	
Dissolved Oxygen	mg/L	17.39		1.52		-		1.41		NM		2.54		2.24		1.32	
Temperature	^{o}C	9.77		10.29		-		12.43		14.23		13.05		7.18		12.59	
ORP	mV	-28.5		42.9		-		-14.9		176.1		58.2		12.0		84.4	

See notes at the end of the table.

Appendix B
Table B-1
Historical Analytical Results - Upper Groundwater
Zone 2016 - 2017 Annual LTM Report
Colonie FUSRAP Site, Colonie New York

Notes:
Q = data qualifier
^ = total value of cis-1,2-Dichloroethene and trans-1,2-Dichloroethene µg/L = micrograms per liter
mg/L = milligrams per liter
pCi/L = picoCuries per liter
mS/cm = microSiemens per centimeter
NTU = Nephelometric Turbidity Units
SU - Standard Units
mV = millivolts
Boldface text = result was detected above the method detection limits

* = standard applies to each isomer individually
U = non-detect as less than method reporting limit
J = estimated value
B = blank
E = exceeding the calibration range
N = spiked sample recovery not within control limits
V = presumptive evidence of a compound
UJ = estimated, not detected
JB = estimated, blank value
NM = analyte not measured

APPENDIX C

Data Validation Reports

August 2016 and April 2017 Monitoring Events

CB&I Federal Services LLC
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Tel: (412) 858-1631
richardw.mccracken@cbifederalservices.com

MEMORANDUM

TO: Mark Hardner, CB&I Federal Services LLC (CB&I) Colonie Project Manager

FROM: Richard McCracken, CB&I Chemist

SUBJECT: Colonie Data Validation - Volatiles
ALS Environmental, Service Request Number R1608026

DATE: October 21, 2016

This memorandum presents the data validation report for the Colonie groundwater samples collected on August 2 and 3, 2016. The samples were analyzed for volatile organic compounds (VOCs) using USEPA SW846 method 8260C. A total of eleven samples (including two trip blanks) were validated. The sample IDs are:

Field Sample ID	Lab Sample ID	Field Sample ID	Lab Sample ID
MW-08S	R1608026-001	MW-44S	R1608026-009
MW-30S	R1608026-002	MW-34S	R1608026-011
MW-42S	R1608026-003	MW-41S	R1608026-012
Trip Blank 1	R1608026-004	MW-37S	R1608026-013
Duplicate	R1608026-005	Trip Blank 2	R1608026-015
MW-32S	R1608026-007		

Data were reviewed and validated using a combination of project QAPP, *DoD Quality Systems Manual for Environmental Laboratories, Final Version 5.0, July 2013* (DoD, 2013) (DoD QSM), and method-specific criteria. The data qualifier scheme was consistent with the *USEPA Region II SOP Validating Volatile Organic Compounds by Gas Chromatography / Mass Spectroscopy SW-846 Method 8260B, Revision 2 (SOP HW-24, August 2008*). Parameters evaluated are presented in **Table 1**. Data associated with parameters in compliance with quality control specifications have not been qualified. Data associated with parameters that did not comply with quality control specifications and directly impacting project data have been qualified in accordance with USEPA guidelines.

Table 1 Laboratory Performance Criteria

Qualified Data		Parameter
Yes	No	
	X	Holding Times and Preservation
	X	Instrument Performance Results
	X	Initial Calibration
	X	Continuing Calibration
	X	Blank Analysis
	X	Laboratory Control Sample
	X	Matrix Spike / Spike Duplicate Sample
X		System Monitoring Compounds
	X	Internal Standards
	X	Field Sample Duplicate
X		Quantitation Verification and Data Review

The quality of data collected in support of this sampling activity is considered acceptable, with noted qualifications.

Richard McCracken, Chemist

10/21/16
Date

COLONIE VALIDATION REPORT
VOLATILES REVIEW
Service Request Number R1608026

I-Holding Times and Preservation
The objective is to ascertain the validity of results based on the holding time of the sample from time of collection to time of analysis. Holding time criteria: For aqueous samples, VOC compounds are shipped cooled (@4°C ± 2°C) and preserved pH≤2 HCl with a maximum holding time of 14 days (7 days if no HCl) from sample collection to determinative analysis (USEPA criteria).

- Temperature Review: A temperature blank was sent with each cooler and recorded by the laboratory upon receipt. Aqueous samples collected on 8/2/16 and 8/3/16 were received by ALS on 8/3/16 and 8/4/16 at 2.0 and 4.9 °C. The temperature criteria was met, no qualifiers were applied.

- Holding Time Review: The aqueous samples were collected during 8/2/16 and 8/3/16, and were analyzed for VOCs on 8/9/16 and 8/10/16. Sample collection and analysis dates may be found on the attached form 1s. All criteria were met. No qualifiers were applied.

II-Instrument Performance Check
The analysis of the instrument performance check solution must be performed at the beginning of each 12-hour period during which samples are analyzed.

- The instrument performance check, bromofluorobenzene (BFB), met the ion abundance criteria during ICAL and sample analysis. All samples were analyzed within the 12 hour limit. No qualification was required.

III-Initial Calibration
Compliance requirements for satisfactory instrument calibration are established to ensure that the instrument used is capable of producing acceptable qualitative and quantitative data for volatile target compounds. Initial calibration demonstrates that the instrument is capable of acceptable performance in the beginning of the analytical run and of producing a linear calibration curve and establishes the relative response factors on which the quantitations are based. The RRF must be greater than 0.1 for chloromethane, 1,1-dichloroethane, and bromoform and greater than 0.3 for 1,1,2,2-tetrachloroethane and chlorobenzene. The minimum relative response factor (RRF) must be ≥0.05 for all other compounds. The DoD QSM specifies that the percent relative standard deviation (%RSD) must be ≤15% for each target compound and must be ≤30% for each calibration check compound. For compounds analyzed using linear regression or second order, correlation coefficients must be >0.995 and coefficients of determination >0.99.

- Initial calibration was performed on 5/9/16 using instrument R-MS-12. All SPCCs, CCCs, and target compounds were within criteria (%RSD≤15% or ≤30%; RRF≥0.05). No data qualifiers were applied.

IV-Continuing Calibration
Compliance requirements for satisfactory instrument calibration are established to ensure that the instrument used is capable of producing acceptable qualitative and quantitative data for volatile target compounds. Continuing calibration checks satisfactory performance of the instrument on a day-to-day basis. The RRF must be greater than 0.1 for chloromethane, 1,1-dichloroethane, and bromoform and greater than 0.3 for 1,1,2,2-tetrachloroethane and chlorobenzene. The minimum relative response factor (RRF) must be ≥0.05 for all other compounds. The DoD QSM specifies that the percent difference (%D) between the initial calibration RRF and the continuing calibration RRF must be within 20% for all target compounds. ICV recoveries should be within 80%≤%R≤120%.

- Continuing calibration was performed on 8/9/16 @2154 using instrument R-MS-12. All SPCCs, CCCs, and target compounds were within criteria (%D≤20%; %Drift≤20%; RRF≥0.05), no data qualifiers were applied. All samples were analyzed following this calibration.

V-Blank Analysis

The purpose of blank analyses is to determine the presence and magnitude of contamination problems resulting from field and laboratory activities. A method blank analysis must be performed after the calibration standards and once every 12-hour time period beginning with the injection of BFB. No contaminants should be detected in any of the associated blanks > the MDL. The UFP-QAPP criterion specifies all concentrations should be less than the reporting limit. Positive sample results are reported and qualified "U" if the concentration of the compound in the sample is ≤10 times (10x) the maximum amount in any blank for the common laboratory contaminants (methylene chloride, acetone, toluene, and 2-butanone), or 5 times (5x) the maximum amount for other volatile target compounds. **Table 2** summarizes the blank contamination analysis. Action levels are based upon dilution factor of one. The trip blanks from 3/7, 3/8, and 3/9 were also used to evaluate the groundwater samples collected in this data set.

Table 2 Blank Contamination Analysis Summary

Analysis Date	QC Blank ID	Compound	Max Conc. µg/L	Action Level µg/L	U qualified samples
8/9/16	RQ1609301-04	All target <MRL	NA	NA	None
8/9/16	Trip Blank 1	All target <MRL	NA	NA	None
8/10/16	Trip Blank 2	All target <MRL	NA	NA	None

NA = Not Applicable
MRL = Method Reporting Limit

VI-Laboratory Control Sample

Data for laboratory control samples (LCSs) are evaluated to determine long-term precision and accuracy of the analytical method on various matrices. Percent recoveries (%Rs) should be within the specified control limits. DoD LCS aqueous recovery limits are specified in Table 24 of the DoD QSM (DoD, 2013). If the compound is not listed, then the laboratory criteria shall be used. The LCS/LCSD RPD criterion for the laboratory and for DOD QSM is ≤30%.

- Sample RQ1609301-03 was used as the aqueous LCS for the VOC analysis performed on 8/9/16. All target compounds met recovery criteria.

VII-Matrix Spike/Matrix Spike Duplicate

Data for matrix spike/matrix spike duplicates (MS/MSD) are generated to determine long-term precision and accuracy of the analytical method on various matrices and to demonstrate acceptable compound recovery by the laboratory at the time of sample analysis. The percent recoveries (%Rs) and the relative percent difference (RPD) must be within the specified control limits. The DoD MS/MSD aqueous recovery limits follow the LCS criteria and are specified in Table 24 of the DoD QSM (DoD, 2013). If the compound is not listed, then the laboratory criteria shall be used. The MS/MSD RPD criterion for the laboratory and for DOD QSM is ≤30%.

- Sample MW-44S was used as the aqueous MS/MSD for the VOC analysis. All target compounds met recovery and RPD criteria. No data qualification was required.

VIII-System Monitoring Compounds (Surrogates)
Laboratory performance on individual samples is evaluated through the review of surrogate spike samples. Recoveries for system monitoring compounds in volatile samples and blanks must be within the specified control limits.

UFP-QAPP Criteria: Dibromofluoromethane (80-119%)
4-bromofluorobenzene (85-114%)
Toluene-d8 (89-112%)

- Samples R1608026-005 and -007 had high toluene-d8 recoveries. All detections have been qualified "J".
- All other surrogates met recovery criteria.

IX-Internal Standards (IS)
Internal standards performance criteria ensure that GC/MS sensitivity and response are stable during every analytical run. Specific criteria include: area counts (-50% to +100%) of the associated calibration standard, and retention time (± 30 seconds) from that of the associated calibration standard.

- All criteria were met. No qualifiers were applied.

X-Field Duplicate Sample Analysis
Field duplicates were collected to identify the cumulative precision of the sampling and analytical process and sent to the laboratory blind. The RPD was calculated only for those analytes which were detected at levels exceeding the method reporting limits in both samples of the duplicate pair. Analytes that were rejected (R-qualified) in either sample of the duplicate pair were excluded from the duplicate assessment. Precision control criterion was established at 50% RPD for the aqueous samples.

- The Duplicate sample was a duplicate of MW-32S. All RPDs met criteria. No qualifiers were applied.

XI-Quantitation Verification
The accuracy of analytical results is verified through the calculation of several parameters.

- The percent difference between the calculated and the reported values should be < 10%.
- Any sample value >MDL and <MRL was qualified as estimated, "J".

Sample: R1608026-012, tetrachloroethene

Conc. (µg/L) = (Ax)*(Is)*(DF) / (Ais)*(RRF)

where: Ax is the compound area
Ais is the corresponding internal standard area
Is is the corresponding internal standard concentration (µg/L)
DF is the dilution factor
RRF is the relative response factor.

Conc. µg/L = (78966 * 50 * 1) / (1135948 * 0.1928) = 18 µg/L
Reported Conc. = 18 µg/L
%D = 0.0%, values were within 10% difference.

Laboratory and Data Validation Qualifiers

Qualifier	Definition
Laboratory Qualifiers[1]	
No Code	Confirmed identification.
U	Undetected at the limit of detection: The associated data value is the limit of detection, adjusted by any dilution factor used in the analysis.
J	Estimated: The analyte was positively identified; the quantitation is estimation.
B	Blank contamination: The analyte was detected above one-half the reporting limit in an associated blank.
N	Non-target analyte: The analyte is a tentatively identified compound (using mass spectroscopy).
Q	One or more quality control criteria failed.
USEPA Region II Data Validation Qualifiers[2]	
U	The analyte was analyzed for, but was not detected above the level of the reported sample quantitation limit.
J	The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample.
N	The analysis indicates the present of an analyte for which there is presumptive evidence to make a "tentative identification".
NJ	The analysis indicates the presence of an analyte that has been "tentatively identified" and the associated numerical value represents its approximate concentration.
R	The sample results are rejected due to serious deficiencies in the ability to analyze the sample and meeting the Quality Control criteria. The presence or absence of the analyte cannot be verified.
UJ	The analyte was not detected above the reported sample quantitation limit. However, the reported quantitation limit is approximate and may or may not represent the actual limit of quantitation necessary to accurately and precisely measure the analyte in the sample.

[1]The noted laboratory qualifiers are a minimum. If a laboratory has more and they are consistent with DoD and properly defined, the laboratory may use them. Data qualifiers may be combined when appropriate. Ref.: *DOD Quality Systems Manual for Environmental Laboratories, Final Version 4.2* (DoD, 2010).

[2]The USEPA data validation qualifiers are referenced from *USEPA Region II SOP Validating Volatile Organic Compounds by Gas Chromatography / Mass Spectroscopy SW-846 Method 8260B, Revision 2 (SOP HW-24, August 2008).*

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Analytical Report

Client:	CB&I	**Service Request:**	R1608026
Project:	Colonie/201207	**Date Collected:**	8/ 2/16 1150
Sample Matrix:	Water	**Date Received:**	8/ 3/16
Sample Name:	MW-08S	**Units:**	µg/L
Lab Code:	R1608026-001	**Basis:**	NA

Volatile Organic Compounds by GC/MS

Analytical Method: 8260C
Prep Method: EPA 5030C

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Analysis Lot	Note
Tetrachloroethene (PCE)	1.0	U	1.0	0.30	1	NA	8/10/16 00:57		509117	
Trichloroethene (TCE)	1.0	U	1.0	0.22	1	NA	8/10/16 00:57		509117	
Vinyl Chloride	1.0	U	1.0	0.32	1	NA	8/10/16 00:57		509117	
cis-1,2-Dichloroethene	1.0	U	1.0	0.30	1	NA	8/10/16 00:57		509117	

Surrogate Name	%Rec	Control Limits	Date Analyzed	Q
4-Bromofluorobenzene	100	85-122	8/10/16 00:57	
Dibromofluoromethane	111	89-119	8/10/16 00:57	
Toluene-d8	112	87-121	8/10/16 00:57	

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Analytical Report

Client:	CB&I	**Service Request:**	R1608026
Project:	Colonie/201207	**Date Collected:**	8/ 2/16 1500
Sample Matrix:	Water	**Date Received:**	8/ 3/16
Sample Name:	MW-30S	**Units:**	µg/L
Lab Code:	R1608026-002	**Basis:**	NA

Volatile Organic Compounds by GC/MS

Analytical Method: 8260C
Prep Method: EPA 5030C

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Analysis Lot	Note
Tetrachloroethene (PCE)	**3.9**		1.0	0.30	1	NA	8/10/16 01:28		509117	
Trichloroethene (TCE)	**1.2**		1.0	0.22	1	NA	8/10/16 01:28		509117	
Vinyl Chloride	1.0	U	1.0	0.32	1	NA	8/10/16 01:28		509117	
cis-1,2-Dichloroethene	**0.96**	J	1.0	0.30	1	NA	8/10/16 01:28		509117	

Surrogate Name	%Rec	Control Limits	Date Analyzed	Q
4-Bromofluorobenzene	104	85-122	8/10/16 01:28	
Dibromofluoromethane	113	89-119	8/10/16 01:28	
Toluene-d8	105	87-121	8/10/16 01:28	

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Analytical Report

Client:	CB&I	**Service Request:**	R1608026
Project:	Colonie/201207	**Date Collected:**	8/ 2/16 1635
Sample Matrix:	Water	**Date Received:**	8/ 3/16
Sample Name:	MW-42S	**Units:**	µg/L
Lab Code:	R1608026-003	**Basis:**	NA

Volatile Organic Compounds by GC/MS

Analytical Method: 8260C
Prep Method: EPA 5030C

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Analysis Lot	Note
Tetrachloroethene (PCE)	1.0	U	1.0	0.30	1	NA	8/10/16 01:59		509117	
Trichloroethene (TCE)	**0.45**	J	1.0	0.22	1	NA	8/10/16 01:59		509117	
Vinyl Chloride	1.0	U	1.0	0.32	1	NA	8/10/16 01:59		509117	
cis-1,2-Dichloroethene	**8.5**		1.0	0.30	1	NA	8/10/16 01:59		509117	

Surrogate Name	%Rec	Control Limits	Date Analyzed	Q
4-Bromofluorobenzene	102	85-122	8/10/16 01:59	
Dibromofluoromethane	111	89-119	8/10/16 01:59	
Toluene-d8	104	87-121	8/10/16 01:59	

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Analytical Report

Client:	CB&I	**Service Request:**	R1608026
Project:	Colonie/201207	**Date Collected:**	8/ 2/16 2359
Sample Matrix:	Water	**Date Received:**	8/ 3/16
Sample Name:	TRIP BLANK 1	**Units:**	µg/L
Lab Code:	R1608026-004	**Basis:**	NA

Volatile Organic Compounds by GC/MS

Analytical Method: 8260C
Prep Method: EPA 5030C

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Analysis Lot	Note
Tetrachloroethene (PCE)	1.0	U	1.0	0.30	1	NA	8/9/16 23:57		509117	
Trichloroethene (TCE)	1.0	U	1.0	0.22	1	NA	8/9/16 23:57		509117	
Vinyl Chloride	1.0	U	1.0	0.32	1	NA	8/9/16 23:57		509117	
cis-1,2-Dichloroethene	1.0	U	1.0	0.30	1	NA	8/9/16 23:57		509117	

Surrogate Name	%Rec	Control Limits	Date Analyzed	Q
4-Bromofluorobenzene	100	85-122	8/9/16 23:57	
Dibromofluoromethane	112	89-119	8/9/16 23:57	
Toluene-d8	111	87-121	8/9/16 23:57	

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Analytical Report

Client:	CB&I	**Service Request:**	R1608026
Project:	Colonie/201207	**Date Collected:**	8/ 3/16 2359
Sample Matrix:	Water	**Date Received:**	8/ 4/16
Sample Name:	DUPLICATE	**Units:**	µg/L
Lab Code:	R1608026-005	**Basis:**	NA

Volatile Organic Compounds by GC/MS

Analytical Method: 8260C
Prep Method: EPA 5030C

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Analysis Lot	Note
Tetrachloroethene (PCE)	**2.4**	J	1.0	0.30	1	NA	8/10/16 02:29		509117	
Trichloroethene (TCE)	**1.6**	J	1.0	0.22	1	NA	8/10/16 02:29		509117	
Vinyl Chloride	1.0	U	1.0	0.32	1	NA	8/10/16 02:29		509117	
cis-1,2-Dichloroethene	**6.0**	J	1.0	0.30	1	NA	8/10/16 02:29		509117	

Surrogate Name	%Rec	Control Limits	Date Analyzed	Q
4-Bromofluorobenzene	102	85-122	8/10/16 02:29	
Dibromofluoromethane	111	89-119	8/10/16 02:29	
Toluene-d8	113	87-121	8/10/16 02:29	

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Analytical Report

Client:	CB&I	**Service Request:**	R1608026
Project:	Colonie/201207	**Date Collected:**	8/ 3/16 1010
Sample Matrix:	Water	**Date Received:**	8/ 4/16
Sample Name:	MW-32S	**Units:**	µg/L
Lab Code:	R1608026-007	**Basis:**	NA

Volatile Organic Compounds by GC/MS

Analytical Method: 8260C
Prep Method: EPA 5030C

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Analysis Lot	Note
Tetrachloroethene (PCE)	**2.4**	J	1.0	0.30	1	NA	8/10/16 03:00		509117	
Trichloroethene (TCE)	**1.5**	J	1.0	0.22	1	NA	8/10/16 03:00		509117	
Vinyl Chloride	1.0	U	1.0	0.32	1	NA	8/10/16 03:00		509117	
cis-1,2-Dichloroethene	**6.5**	J	1.0	0.30	1	NA	8/10/16 03:00		509117	

Surrogate Name	%Rec	Control Limits	Date Analyzed	Q
4-Bromofluorobenzene	102	85-122	8/10/16 03:00	
Dibromofluoromethane	111	89-119	8/10/16 03:00	
Toluene-d8	113	87-121	8/10/16 03:00	

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Analytical Report

Client:	CB&I	**Service Request:**	R1608026
Project:	Colonie/201207	**Date Collected:**	8/ 3/16 1120
Sample Matrix:	Water	**Date Received:**	8/ 4/16
Sample Name:	MW-44S	**Units:**	µg/L
Lab Code:	R1608026-009	**Basis:**	NA

Volatile Organic Compounds by GC/MS

Analytical Method: 8260C
Prep Method: EPA 5030C

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Analysis Lot	Note
Tetrachloroethene (PCE)	**15**		1.0	0.30	1	NA	8/10/16 05:02		509117	
Trichloroethene (TCE)	**9.9**		1.0	0.22	1	NA	8/10/16 05:02		509117	
Vinyl Chloride	1.0	U	1.0	0.32	1	NA	8/10/16 05:02		509117	
cis-1,2-Dichloroethene	**3.5**		1.0	0.30	1	NA	8/10/16 05:02		509117	

Surrogate Name	%Rec	Control Limits	Date Analyzed	Q
4-Bromofluorobenzene	104	85-122	8/10/16 05:02	
Dibromofluoromethane	110	89-119	8/10/16 05:02	
Toluene-d8	107	87-121	8/10/16 05:02	

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Analytical Report

Client:	CB&I	**Service Request:**	R1608026
Project:	Colonie/201207	**Date Collected:**	8/ 3/16 1225
Sample Matrix:	Water	**Date Received:**	8/ 4/16
Sample Name:	MW-34S	**Units:**	µg/L
Lab Code:	R1608026-011	**Basis:**	NA

Volatile Organic Compounds by GC/MS

Analytical Method: 8260C
Prep Method: EPA 5030C

Analyte Name	Result	Q		MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Analysis Lot	Note
Tetrachloroethene (PCE)	**0.61**	J	J	1.0	0.30	1	NA	8/10/16 03:30		509117	
Trichloroethene (TCE)	1.0	U		1.0	0.22	1	NA	8/10/16 03:30		509117	
Vinyl Chloride	**1.6**			1.0	0.32	1	NA	8/10/16 03:30		509117	
cis-1,2-Dichloroethene	**1.3**			1.0	0.30	1	NA	8/10/16 03:30		509117	

Surrogate Name	%Rec	Control Limits	Date Analyzed	Q
4-Bromofluorobenzene	101	85-122	8/10/16 03:30	
Dibromofluoromethane	112	89-119	8/10/16 03:30	
Toluene-d8	110	87-121	8/10/16 03:30	

ALS Group USA, Corp. dba ALS Environmental

Analytical Report

Client:	CB&I	**Service Request:**	R1608026
Project:	Colonie/201207	**Date Collected:**	8/ 3/16 1225
Sample Matrix:	Water	**Date Received:**	8/ 4/16
Sample Name:	MW-41S	**Units:**	µg/L
Lab Code:	R1608026-012	**Basis:**	NA

Volatile Organic Compounds by GC/MS

Analytical Method: 8260C
Prep Method: EPA 5030C

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Analysis Lot	Note
Tetrachloroethene (PCE)	**18**		1.0	0.30	1	NA	8/10/16 04:01		509117	
Trichloroethene (TCE)	**5.3**		1.0	0.22	1	NA	8/10/16 04:01		509117	
Vinyl Chloride	**0.62**	J	1.0	0.32	1	NA	8/10/16 04:01		509117	
cis-1,2-Dichloroethene	**4.7**		1.0	0.30	1	NA	8/10/16 04:01		509117	

Surrogate Name	%Rec	Control Limits	Date Analyzed	Q
4-Bromofluorobenzene	102	85-122	8/10/16 04:01	
Dibromofluoromethane	110	89-119	8/10/16 04:01	
Toluene-d8	111	87-121	8/10/16 04:01	

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Analytical Report

Client:	CB&I	**Service Request:**	R1608026
Project:	Colonie/201207	**Date Collected:**	8/ 3/16 1520
Sample Matrix:	Water	**Date Received:**	8/ 4/16
Sample Name:	MW-37S	**Units:**	µg/L
Lab Code:	R1608026-013	**Basis:**	NA

Volatile Organic Compounds by GC/MS

Analytical Method: 8260C
Prep Method: EPA 5030C

Analyte Name	Result	Q		MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Analysis Lot	Note
Tetrachloroethene (PCE)	1.0	U		1.0	0.30	1	NA	8/10/16 04:31		509117	
Trichloroethene (TCE)	**0.28**	J	J	1.0	0.22	1	NA	8/10/16 04:31		509117	
Vinyl Chloride	**0.48**	J	J	1.0	0.32	1	NA	8/10/16 04:31		509117	
cis-1,2-Dichloroethene	**51**			1.0	0.30	1	NA	8/10/16 04:31		509117	

Surrogate Name	%Rec	Control Limits	Date Analyzed	Q
4-Bromofluorobenzene	103	85-122	8/10/16 04:31	
Dibromofluoromethane	113	89-119	8/10/16 04:31	
Toluene-d8	106	87-121	8/10/16 04:31	

ALS Group USA, Corp. dba ALS Environmental

Analytical Report

Client:	CB&I	**Service Request:**	R1608026
Project:	Colonie/201207	**Date Collected:**	8/ 3/16 2359
Sample Matrix:	Water	**Date Received:**	8/ 4/16
Sample Name:	TRIP BLANK 2	**Units:**	µg/L
Lab Code:	R1608026-015	**Basis:**	NA

Volatile Organic Compounds by GC/MS

Analytical Method: 8260C
Prep Method: EPA 5030C

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Analysis Lot	Note
Tetrachloroethene (PCE)	1.0	U	1.0	0.30	1	NA	8/10/16 00:27		509117	
Trichloroethene (TCE)	1.0	U	1.0	0.22	1	NA	8/10/16 00:27		509117	
Vinyl Chloride	1.0	U	1.0	0.32	1	NA	8/10/16 00:27		509117	
cis-1,2-Dichloroethene	1.0	U	1.0	0.30	1	NA	8/10/16 00:27		509117	

Surrogate Name	%Rec	Control Limits	Date Analyzed	Q
4-Bromofluorobenzene	102	85-122	8/10/16 00:27	
Dibromofluoromethane	109	89-119	8/10/16 00:27	
Toluene-d8	113	87-121	8/10/16 00:27	

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MEMORANDUM

TO: Mark Hardner, CB&I Federal Services LLC (CB&I) Colonie Project Manager

FROM: Richard McCracken, CB&I Chemist

SUBJECT: Colonie Data Validation - Volatiles
ALS Environmental, Service Request Number R1702933

DATE: May 3, 2017

This memorandum presents the data validation report for the Colonie groundwater samples collected on April 3 and 4, 2017. The samples were analyzed for volatile organic compounds (VOCs) using USEPA SW846 method 8260C. A total of nine samples (including a trip blank) were validated. The sample IDs are:

Field Sample ID	Lab Sample ID	Field Sample ID	Lab Sample ID
MW-44S	R1702933-001	MW-08S	R1702933-006
MW-41S	R1702933-002	MW-30S	R1702933-007
MW-42S	R1702933-003	Duplicate	R1702933-008
MW-34S	R1702933-004	Trip Blank	R1702933-009
MW-37S	R1702933-005		

Data were reviewed and validated using a combination of project QAPP, *DoD Quality Systems Manual for Environmental Laboratories, Final Version 5.0, July 2013* (DoD, 2013) (DoD QSM), and method-specific criteria. The data qualifier scheme was consistent with the *USEPA Region II SOP Validating Volatile Organic Compounds by Gas Chromatography / Mass Spectroscopy SW-846 Method 8260B, Revision 2 (SOP HW-24, August 2008*). Parameters evaluated are presented in **Table 1**. Data associated with parameters in compliance with quality control specifications have not been qualified. Data associated with parameters that did not comply with quality control specifications and directly impacting project data have been qualified in accordance with USEPA guidelines.

Table 1 Laboratory Performance Criteria

Qualified Data		Parameter
Yes	No	
	X	Holding Times and Preservation
	X	Instrument Performance Results
	X	Initial Calibration
	X	Continuing Calibration
	X	Blank Analysis
	X	Laboratory Control Sample
	X	Matrix Spike / Spike Duplicate Sample
X		System Monitoring Compounds
	X	Internal Standards
	X	Field Sample Duplicate
X		Quantitation Verification and Data Review

The quality of data collected in support of this sampling activity is considered acceptable, with noted qualifications.

Richard McCracken, Chemist

5/3/17
Date

COLONIE VALIDATION REPORT
VOLATILES REVIEW
Service Request Number R1702933

I-Holding Times and Preservation
Sample holding time, defined as the time from sample collection to sample analysis, must meet empirically established criteria. The VOC holding time for aqueous samples cooled @4°C ± 2°C and preserved with HCl to pH≤2 is 14 days from sample collection to analysis.

- Temperature Review: A temperature blank was sent with each cooler and recorded by the laboratory upon receipt. Aqueous samples collected on 4/3/17 and 4/4/17 were received by ALS on 4/5/17 at 3.4 °C. The temperature criteria was met, no qualifiers were applied.

- Holding Time Review: The aqueous samples were collected on 4/3/17 and 4/4/17, and were analyzed for VOCs on 4/7/17 and 4/11/17. Sample collection and analysis dates may be found on the attached form 1s. All criteria were met, no qualifiers were applied.

II-Instrument Performance Check
The analysis of the instrument performance check solution must be performed at the beginning of each 12-hour period during which samples are analyzed.

- The bromofluorobenzene (BFB) instrument performance check met the ion abundance criteria during ICAL and sample analysis. All samples were analyzed within the 12 hour limit. No qualification was required.

III-Initial Calibration
Compliance requirements for satisfactory instrument calibration are established to ensure that the instrument used is capable of producing acceptable qualitative and quantitative data for volatile target compounds. Initial calibration demonstrates that the instrument is capable of acceptable performance in the beginning of the analytical run and of producing a linear calibration curve and establishes the relative response factors on which the quantitations are based.

SW8260C indicates that the percent relative standard deviation (%RSD) must be ≤20% for each target compound; the response factor (RF) must be ≥ 0.1 for vinyl chloride and cis-1,2-dichloroethene; and RF must be ≥ 0.2 for trichloroethene and tetrachloroethene.

The DoD QSM specifies that the %RSD must be ≤15% for each target compound. Compounds quantitated using linear regression or second order, must have correlation coefficients >0.99 or coefficients of determination >0.99.

- Initial calibration was performed on 4/3/17 using instrument R-MS-15. All target compounds met %RSD criteria. Tetrachloroethene (0.1939) had a low RF, which would normally require that the associated data be qualified "J/R". However, the continuing calibration performed at the beginning of the 12-hour analytical sequence on 4/7/17 had an acceptable RF for tetrachloroethene, so no data qualification was required. Samples R1702933-001, -002, -003, -004, -005, -006, and -007 were analyzed in conjunction with this initial calibration.

- Initial calibration was performed on 4/10/17 using instrument R-MS-15. All target compounds were met criteria, no data qualifiers were applied. Samples L1702933-008 and -009 were analyzed in conjunction with this ICAL.

IV-Continuing Calibration
Compliance requirements for satisfactory instrument calibration are established to ensure that the instrument used is capable of producing acceptable qualitative and quantitative data for volatile target compounds. Continuing calibration checks satisfactory performance of the instrument on a day-to-day basis.

SW8260C indicates that the percent difference (%D) must be ≤20% for each target compound; the response factor (RF) must be ≥ 0.1 for vinyl chloride and cis-1,2-dichloroethene; and RRF must be ≥ 0.2 for trichloroethene and tetrachloroethene.

The DoD QSM specifies that the percent difference (%D) must be ≤20% for each target compound.

- Second source calibration performed on 4/4/17 @1211 using instrument R-MS-15; all target compounds met %D criteria. Tetrachloroethene (0.1719) had a low RRF, which would normally require that the associated data be qualified "J/R". However, the continuing calibration performed at the beginning of the 12-hour analytical sequence on 4/7/17 had an acceptable RF for tetrachloroethene, so no data qualification was required. Samples R1702933-001, -002, -003, -004, -005, -006, and -007 were analyzed in conjunction with this initial calibration.

- Second source calibration performed on 4/10/17 @1637 using instrument R-MS-15; all target compounds met %D and RF criteria. No data qualifiers were applied. Samples L1702933-008 and -009 were analyzed in conjunction with this calibration.

- Continuing calibration was performed on 4/7/17 @1332 using instrument R-MS-15; all target compounds met %D and RF criteria. Surrogate 4-bromofluorobenzene (20.6%) had a high %D, but the 4-bromofluorobenzene recoveries met criteria in all associated samples, no data qualification was required. Samples R1702933-001, -002, -003, -004, -005, -006, and -007 were analyzed following this calibration

- Continuing calibration was performed on 4/11/17 @0944 using instrument R-MS-15; all target compounds met %D and RF criteria. No data qualification was required. Samples L1702933-008 and -009 were analyzed following with this calibration.

V-Blank Analysis

The purpose of blank analyses is to determine the presence and magnitude of contamination problems resulting from field and laboratory activities. A method blank analysis must be performed after the calibration standards and once every 12-hour time period beginning with the injection of BFB. No contaminants should be detected in any of the associated blanks > the MDL. The UFP-QAPP criterion specifies all concentrations should be less than the reporting limit. Positive sample results are reported and qualified "U" if the concentration of the compound in the sample is ≤10 times (10x) the maximum amount in any blank for the common laboratory contaminants (methylene chloride, acetone, toluene, and 2-butanone), or 5 times (5x) the maximum amount for other volatile target compounds. **Table 2** summarizes the blank contamination analysis. Action levels are based upon dilution factor of one. The trip blank was also used to evaluate the groundwater samples collected in this data set.

Table 2 Blank Contamination Analysis Summary

Analysis Date	QC Blank ID	Compound	Max Conc. µg/L	Action Level µg/L	U qualified samples
4/7/17	RQ1702899-04	All target <MRL	NA	NA	None
4/11/17	RQ1703009-04	All target <MRL	NA	NA	None
4/11/17	Trip Blank	All target <MRL	NA	NA	None

NA = Not Applicable
MRL = Method Reporting Limit

VI-Laboratory Control Sample
Data for laboratory control samples (LCSs) are evaluated to determine long-term precision and accuracy of the analytical method on various matrices. Percent recoveries (%Rs) should be within the specified control limits. DoD LCS aqueous recovery limits are specified in Table 24 of the DoD QSM (DoD, 2013). If the compound is not listed, then the laboratory criteria shall be used.

- Sample RQ1702899-03 was used as the aqueous LCS for the VOC analysis performed on 4/7/17. All target compounds met recovery criteria. Samples R1702933-001, -002, -003, -004, -005, -006, and -007 were analyzed in conjunction with this LCS.

- Sample RQ1703009-03 was used as the aqueous LCS for the VOC analysis performed on 4/11/17. All target compounds met recovery criteria. Samples R1702933-008 and -009 were analyzed in conjunction with this LCS.

VII-Matrix Spike/Matrix Spike Duplicate
Data for matrix spike/matrix spike duplicates (MS/MSD) are generated to determine long-term precision and accuracy of the analytical method on various matrices and to demonstrate acceptable compound recovery by the laboratory at the time of sample analysis. The percent recoveries (%Rs) and the relative percent difference (RPD) must be within the specified control limits. The DoD MS/MSD aqueous recovery limits follow the LCS criteria and are specified in Table 24 of the DoD QSM (DoD, 2013). If the compound is not listed, then the laboratory criteria shall be used. The MS/MSD RPD criterion (DOD QSM) is ≤20%.

- Sample MW-44S was used as the aqueous MS/MSD for the VOC analysis. All target compounds met recovery and RPD criteria. No data qualification was required.

VIII-System Monitoring Compounds (Surrogates)
Laboratory performance on individual samples is evaluated through the review of surrogate spike samples. Recoveries for system monitoring compounds in volatile samples and blanks must be within the specified control limits.

UFP-QAPP Criteria: Dibromofluoromethane (80-119%)
4-bromofluorobenzene (85-114%)
Toluene-d8 (89-112%)

- All samples had high toluene-d8 recoveries. All detections have been qualified "J".

- All samples met dibromofluoromethane and 4-bromofluorobenzene recovery criteria.

IX-Internal Standards (IS)
Internal standards performance criteria ensure that GC/MS sensitivity and response are stable during every analytical run. Specific criteria include: area counts (-50% to +100%) of the associated calibration standard, and retention time (± 10 seconds) from that of the associated calibration standard.

- All criteria were met, no qualifiers were applied.

X-Field Duplicate Sample Analysis
Field duplicates were collected to identify the cumulative precision of the sampling and analytical process and sent to the laboratory blind. The RPD was calculated only for those analytes which were detected at levels exceeding the method reporting limits in both samples of the duplicate pair. Analytes that were rejected (R-qualified) in either sample of the duplicate pair were excluded from the duplicate assessment. Precision control criterion was established at 50% RPD for the aqueous samples.

- The Duplicate sample was a duplicate of MW-32S. All RPDs met criteria, no qualifiers were applied.

XI-Quantitation Verification
The accuracy of analytical results is verified through the calculation of several parameters.

- The percent difference between the calculated and the reported values should be < 10%.
- Any sample value >MDL and <MRL was qualified as estimated, "J".

Sample: R1702933-001, tetrachloroethene

Conc. (µg/L) = (Ax)*(Is)*(DF) / (Ais)*(RRF)

where: Ax is the compound area
Ais is the corresponding internal standard area
Is is the corresponding internal standard concentration (µg/L)
DF is the dilution factor
RRF is the relative response factor.

Conc. µg/L = (110,750 * 50 * 1) / (1,593,245 * 0.1939) = 18 µg/L
Reported Conc. = 18 µg/L
%D = 0.0%, values were within 10% difference.

Laboratory and Data Validation Qualifiers

Qualifier	Definition
Laboratory Qualifiers[1]	
No Code	Confirmed identification.
U	Undetected at the limit of detection: The associated data value is the limit of detection, adjusted by any dilution factor used in the analysis.
J	Estimated: The analyte was positively identified; the quantitation is estimation.
B	Blank contamination: The analyte was detected above one-half the reporting limit in an associated blank.
N	Non-target analyte: The analyte is a tentatively identified compound (using mass spectroscopy).
Q	One or more quality control criteria failed.
USEPA Region II Data Validation Qualifiers[2]	
U	The analyte was analyzed for, but was not detected above the level of the reported sample quantitation limit.
J	The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample.
N	The analysis indicates the present of an analyte for which there is presumptive evidence to make a "tentative identification".
NJ	The analysis indicates the presence of an analyte that has been "tentatively identified" and the associated numerical value represents its approximate concentration.
R	The sample results are rejected due to serious deficiencies in the ability to analyze the sample and meeting the Quality Control criteria. The presence or absence of the analyte cannot be verified.
UJ	The analyte was not detected above the reported sample quantitation limit. However, the reported quantitation limit is approximate and may or may not represent the actual limit of quantitation necessary to accurately and precisely measure the analyte in the sample.

[1]The noted laboratory qualifiers are a minimum. If a laboratory has more and they are consistent with DoD and properly defined, the laboratory may use them. Data qualifiers may be combined when appropriate. Ref.: *DOD Quality Systems Manual for Environmental Laboratories, Final Version 4.2* (DoD, 2010).

[2]The USEPA data validation qualifiers are referenced from *USEPA Region II SOP Validating Volatile Organic Compounds by Gas Chromatography / Mass Spectroscopy SW-846 Method 8260B, Revision 2 (SOP HW-24, August 2008).*

ALS Group USA, Corp.
dba ALS Environmental

Analytical Report

Client:	CB&I	**Service Request:**	R1702933
Project:	Colonie/500304	**Date Collected:**	04/03/17 10:25
Sample Matrix:	Water	**Date Received:**	04/05/17 09:20
Sample Name:	MW-44S	**Units:**	ug/L
Lab Code:	R1702933-001	**Basis:**	NA

Volatile Organic Compounds by GC/MS

Analysis Method: 8260C
Prep Method: EPA 5030C

Analyte Name	Result		MRL	MDL	Dil.	Date Analyzed	Q
Tetrachloroethene (PCE)	**18**	T	1.0	0.30	1	04/07/17 15:45	
Trichloroethene (TCE)	**9.9**	T	1.0	0.22	1	04/07/17 15:45	
Vinyl Chloride	1.0	U	1.0	0.32	1	04/07/17 15:45	
cis-1,2-Dichloroethene	**3.3**	T	1.0	0.30	1	04/07/17 15:45	

Surrogate Name	% Rec	Control Limits	Date Analyzed	Q
4-Bromofluorobenzene	113	85 - 122	04/07/17 15:45	
Dibromofluoromethane	110	89 - 119	04/07/17 15:45	
Toluene-d8	120	87 - 121	04/07/17 15:45	

Client:	CB&I	**Service Request:**	R1702933
Project:	Colonie/500304	**Date Collected:**	04/03/17 11:45
Sample Matrix:	Water	**Date Received:**	04/05/17 09:20
Sample Name:	MW-41S	**Units:**	ug/L
Lab Code:	R1702933-002	**Basis:**	NA

Volatile Organic Compounds by GC/MS

Analysis Method: 8260C
Prep Method: EPA 5030C

Analyte Name	Result		MRL	MDL	Dil.	Date Analyzed	Q
Tetrachloroethene (PCE)	**24**		1.0	0.30	1	04/07/17 16:09	
Trichloroethene (TCE)	**5.1**		1.0	0.22	1	04/07/17 16:09	
Vinyl Chloride	**0.58**	**J**	1.0	0.32	1	04/07/17 16:09	
cis-1,2-Dichloroethene	**4.8**		1.0	0.30	1	04/07/17 16:09	

Surrogate Name	% Rec	Control Limits	Date Analyzed	Q
4-Bromofluorobenzene	113	85 - 122	04/07/17 16:09	
Dibromofluoromethane	109	89 - 119	04/07/17 16:09	
Toluene-d8	119	87 - 121	04/07/17 16:09	

Client:	CB&I	**Service Request:**	R1702933
Project:	Colonie/500304	**Date Collected:**	04/03/17 12:50
Sample Matrix:	Water	**Date Received:**	04/05/17 09:20
Sample Name:	MW-42S	**Units:**	ug/L
Lab Code:	R1702933-003	**Basis:**	NA

Volatile Organic Compounds by GC/MS

Analysis Method: 8260C
Prep Method: EPA 5030C

Analyte Name	Result	MRL	MDL	Dil.	Date Analyzed	Q
Tetrachloroethene (PCE)	**0.34 J** J	1.0	0.30	1	04/07/17 16:33	
Trichloroethene (TCE)	**0.75 J** J	1.0	0.22	1	04/07/17 16:33	
Vinyl Chloride	1.0 U	1.0	0.32	1	04/07/17 16:33	
cis-1,2-Dichloroethene	**7.6** J	1.0	0.30	1	04/07/17 16:33	

Surrogate Name	% Rec	Control Limits	Date Analyzed	Q
4-Bromofluorobenzene	110	85 - 122	04/07/17 16:33	
Dibromofluoromethane	109	89 - 119	04/07/17 16:33	
Toluene-d8	118	87 - 121	04/07/17 16:33	

Client:	CB&I	**Service Request:**	R1702933
Project:	Colonie/500304	**Date Collected:**	04/03/17 14:35
Sample Matrix:	Water	**Date Received:**	04/05/17 09:20
Sample Name:	MW-34S	**Units:**	ug/L
Lab Code:	R1702933-004	**Basis:**	NA

Volatile Organic Compounds by GC/MS

Analysis Method: 8260C
Prep Method: EPA 5030C

Analyte Name	Result	MRL	MDL	Dil.	Date Analyzed	Q
Tetrachloroethene (PCE)	**0.75 J**	1.0	0.30	1	04/07/17 16:57	
Trichloroethene (TCE)	**0.29 J**	1.0	0.22	1	04/07/17 16:57	
Vinyl Chloride	**1.1**	1.0	0.32	1	04/07/17 16:57	
cis-1,2-Dichloroethene	**1.2**	1.0	0.30	1	04/07/17 16:57	

Surrogate Name	% Rec	Control Limits	Date Analyzed	Q
4-Bromofluorobenzene	113	85 - 122	04/07/17 16:57	
Dibromofluoromethane	109	89 - 119	04/07/17 16:57	
Toluene-d8	118	87 - 121	04/07/17 16:57	

Client:	CB&I	**Service Request:**	R1702933
Project:	Colonie/500304	**Date Collected:**	04/03/17 15:45
Sample Matrix:	Water	**Date Received:**	04/05/17 09:20
Sample Name:	MW-37S	**Units:**	ug/L
Lab Code:	R1702933-005	**Basis:**	NA

Volatile Organic Compounds by GC/MS

Analysis Method: 8260C
Prep Method: EPA 5030C

Analyte Name	Result	MRL	MDL	Dil.	Date Analyzed	Q
Tetrachloroethene (PCE)	**0.50 J**	1.0	0.30	1	04/07/17 17:21	
Trichloroethene (TCE)	**0.42 J**	1.0	0.22	1	04/07/17 17:21	
Vinyl Chloride	**0.65 J**	1.0	0.32	1	04/07/17 17:21	
cis-1,2-Dichloroethene	**49**	1.0	0.30	1	04/07/17 17:21	

Surrogate Name	% Rec	Control Limits	Date Analyzed	Q
4-Bromofluorobenzene	113	85 - 122	04/07/17 17:21	
Dibromofluoromethane	112	89 - 119	04/07/17 17:21	
Toluene-d8	118	87 - 121	04/07/17 17:21	

Client:	CB&I	**Service Request:**	R1702933
Project:	Colonie/500304	**Date Collected:**	04/03/17 16:55
Sample Matrix:	Water	**Date Received:**	04/05/17 09:20
Sample Name:	MW-08S	**Units:**	ug/L
Lab Code:	R1702933-006	**Basis:**	NA

Volatile Organic Compounds by GC/MS

Analysis Method: 8260C
Prep Method: EPA 5030C

Analyte Name	Result	MRL	MDL	Dil.	Date Analyzed	Q
Tetrachloroethene (PCE)	1.0 U	1.0	0.30	1	04/07/17 17:44	
Trichloroethene (TCE)	1.0 U	1.0	0.22	1	04/07/17 17:44	
Vinyl Chloride	1.0 U	1.0	0.32	1	04/07/17 17:44	
cis-1,2-Dichloroethene	1.0 U	1.0	0.30	1	04/07/17 17:44	

Surrogate Name	% Rec	Control Limits	Date Analyzed	Q
4-Bromofluorobenzene	113	85 - 122	04/07/17 17:44	
Dibromofluoromethane	110	89 - 119	04/07/17 17:44	
Toluene-d8	121	87 - 121	04/07/17 17:44	

Client:	CB&I	**Service Request:**	R1702933
Project:	Colonie/500304	**Date Collected:**	04/03/17 09:10
Sample Matrix:	Water	**Date Received:**	04/05/17 09:20
Sample Name:	MW-30S	**Units:**	ug/L
Lab Code:	R1702933-007	**Basis:**	NA

Volatile Organic Compounds by GC/MS

Analysis Method: 8260C
Prep Method: EPA 5030C

Analyte Name	Result	MRL	MDL	Dil.	Date Analyzed	Q
Tetrachloroethene (PCE)	**3.1** J	1.0	0.30	1	04/07/17 18:08	
Trichloroethene (TCE)	1.0 U	1.0	0.22	1	04/07/17 18:08	
Vinyl Chloride	1.0 U	1.0	0.32	1	04/07/17 18:08	
cis-1,2-Dichloroethene	1.0 U	1.0	0.30	1	04/07/17 18:08	

Surrogate Name	% Rec	Control Limits	Date Analyzed	Q
4-Bromofluorobenzene	114	85 - 122	04/07/17 18:08	
Dibromofluoromethane	111	89 - 119	04/07/17 18:08	
Toluene-d8	120	87 - 121	04/07/17 18:08	

Client:	CB&I	**Service Request:**	R1702933
Project:	Colonie/500304	**Date Collected:**	04/03/17 09:10
Sample Matrix:	Water	**Date Received:**	04/05/17 09:20
Sample Name:	DUPLICATE	**Units:**	ug/L
Lab Code:	R1702933-008	**Basis:**	NA

Volatile Organic Compounds by GC/MS

Analysis Method: 8260C
Prep Method: EPA 5030C

Analyte Name	Result		MRL	MDL	Dil.	Date Analyzed	Q
Tetrachloroethene (PCE)	**2.2**	J	1.0	0.30	1	04/11/17 12:28	
Trichloroethene (TCE)	1.0 U		1.0	0.22	1	04/11/17 12:28	
Vinyl Chloride	1.0 U		1.0	0.32	1	04/11/17 12:28	
cis-1,2-Dichloroethene	1.0 U		1.0	0.30	1	04/11/17 12:28	

Surrogate Name	% Rec	Control Limits	Date Analyzed	Q
4-Bromofluorobenzene	113	85 - 122	04/11/17 12:28	
Dibromofluoromethane	108	89 - 119	04/11/17 12:28	
Toluene-d8	119	87 - 121	04/11/17 12:28	

Client:	CB&I	**Service Request:**	R1702933
Project:	Colonie/500304	**Date Collected:**	04/03/17
Sample Matrix:	Water	**Date Received:**	04/05/17 09:20
Sample Name:	TRIP BLANK	**Units:**	ug/L
Lab Code:	R1702933-009	**Basis:**	NA

Volatile Organic Compounds by GC/MS

Analysis Method: 8260C
Prep Method: EPA 5030C

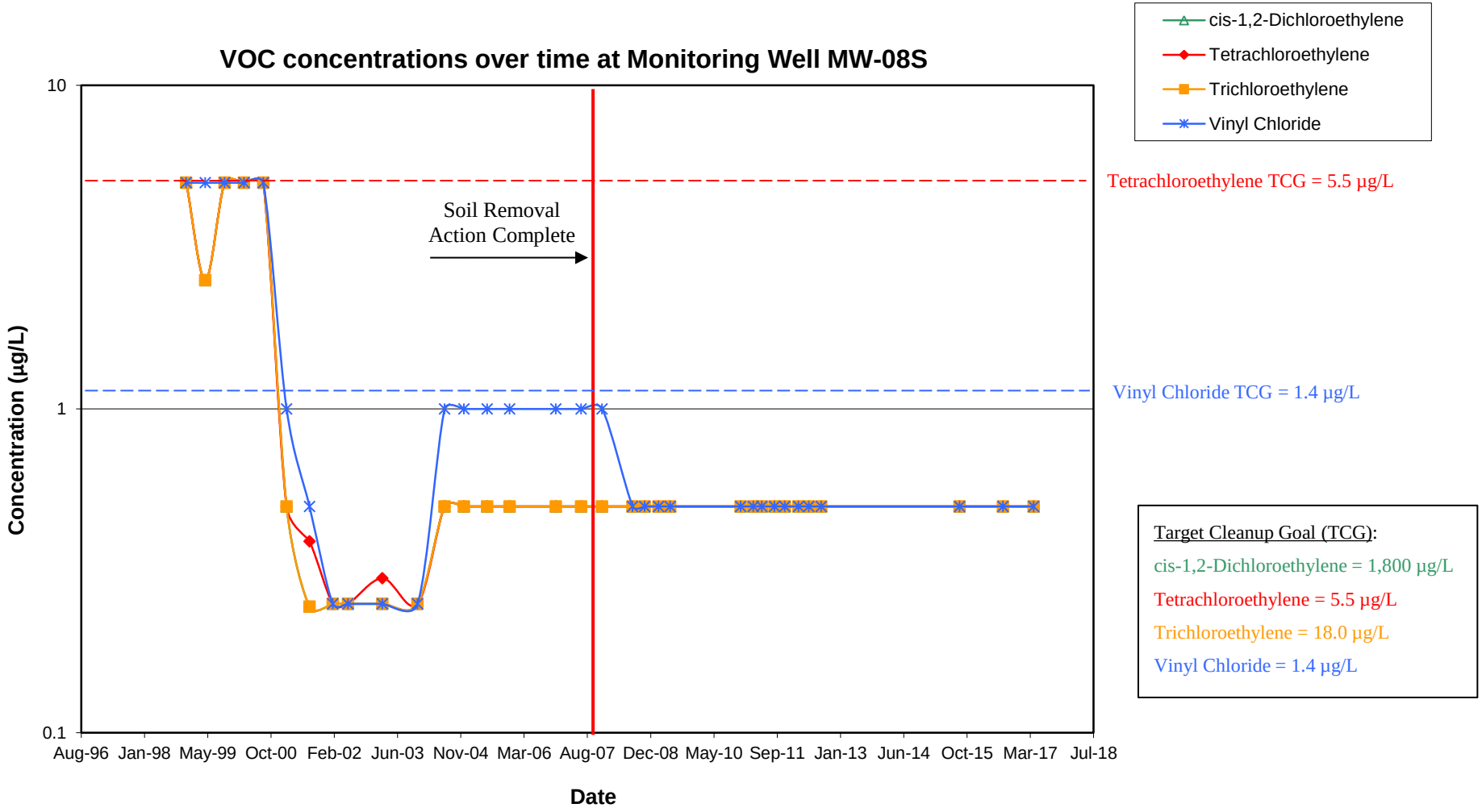
Analyte Name	Result	MRL	MDL	Dil.	Date Analyzed	Q
Tetrachloroethene (PCE)	1.0 U	1.0	0.30	1	04/11/17 12:04	
Trichloroethene (TCE)	1.0 U	1.0	0.22	1	04/11/17 12:04	
Vinyl Chloride	1.0 U	1.0	0.32	1	04/11/17 12:04	
cis-1,2-Dichloroethene	1.0 U	1.0	0.30	1	04/11/17 12:04	

Surrogate Name	% Rec	Control Limits	Date Analyzed	Q
4-Bromofluorobenzene	111	85 - 122	04/11/17 12:04	
Dibromofluoromethane	112	89 - 119	04/11/17 12:04	
Toluene-d8	118	87 - 121	04/11/17 12:04	

APPENDIX D

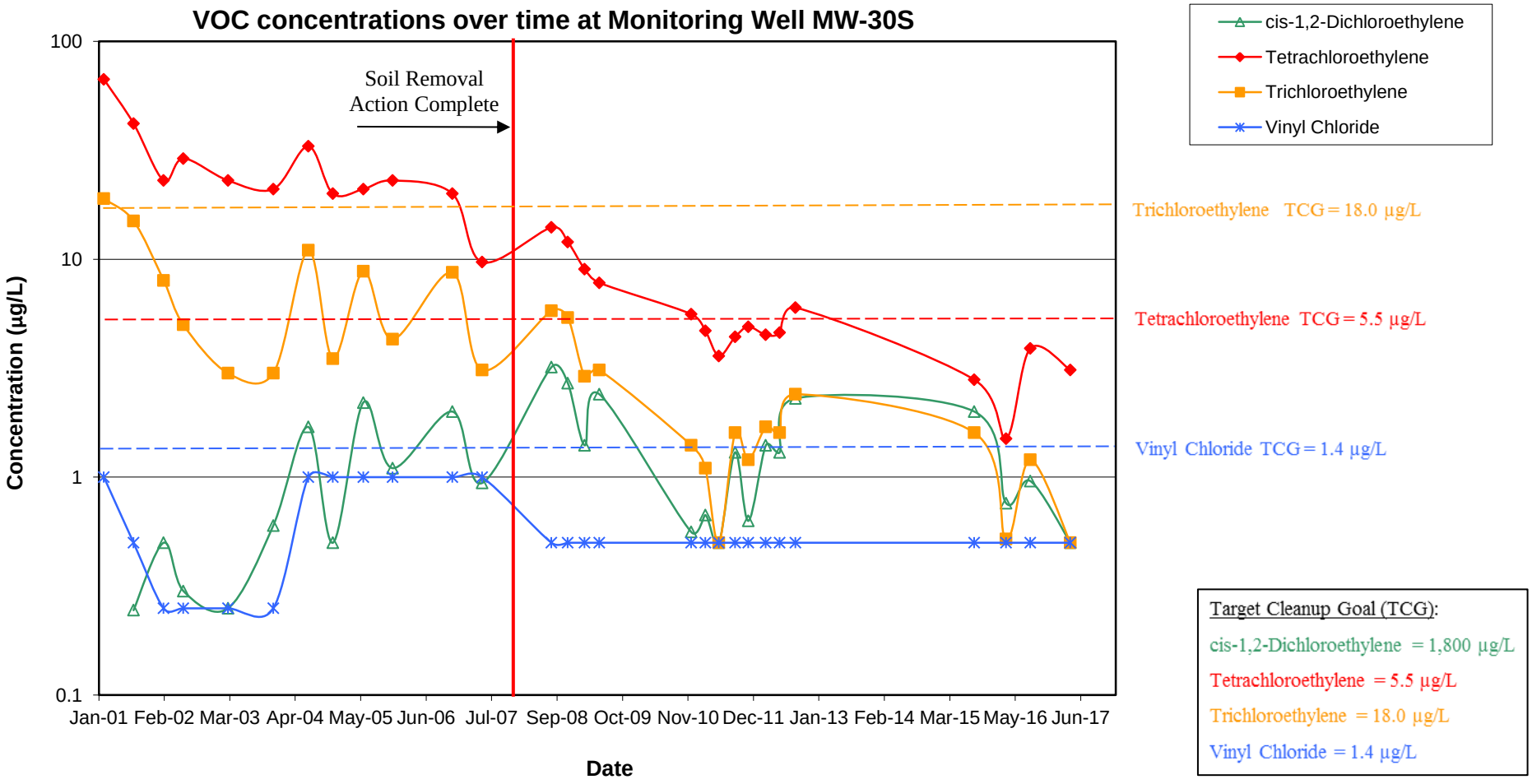
Time-Series Plots of Volatile Organic Compound Results

Temporal Trends



Notes:
1. Time-trend plots include the four volatile organic compounds (VOCs) identified as constituents of concern (COCs) in the Groundwater Record of Decision (ROD).
2. VOCs not detected at the method reporting limit of 1.0 µg/L were plotted as one half of the method reporting limit (i.e., 0.5 µg/L).

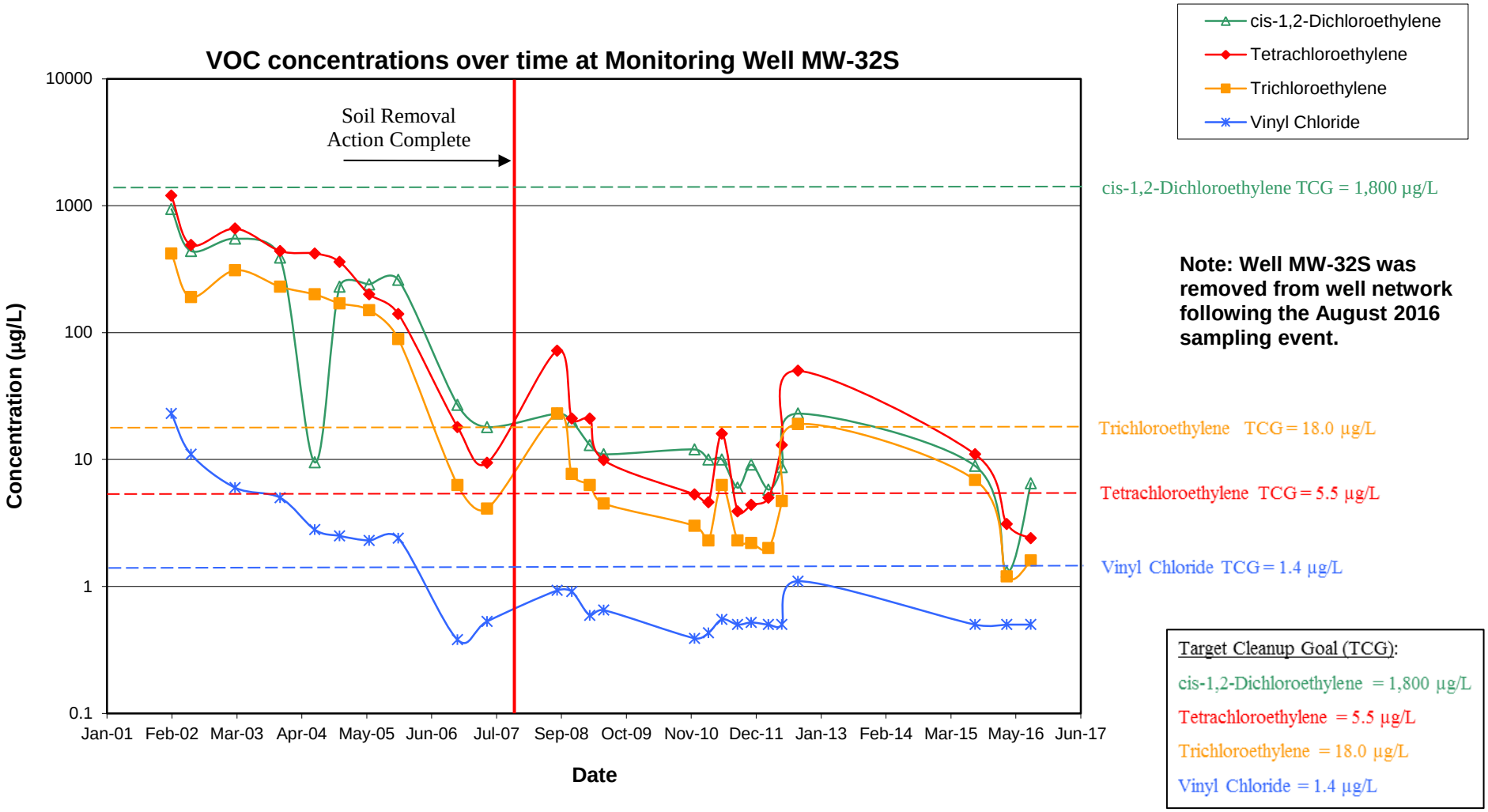
Temporal Trends
Page 1 of 1



Notes:

1. Time-trend plots include the four volatile organic compounds (VOCs) identified as constituents of concern (COCs) in the Groundwater Record of Decision (ROD).
2. VOCs not detected at the method reporting limit of 1.0 µg/L were plotted as one half of the method reporting limit (i.e., 0.5 µg/L).

Temporal Trends

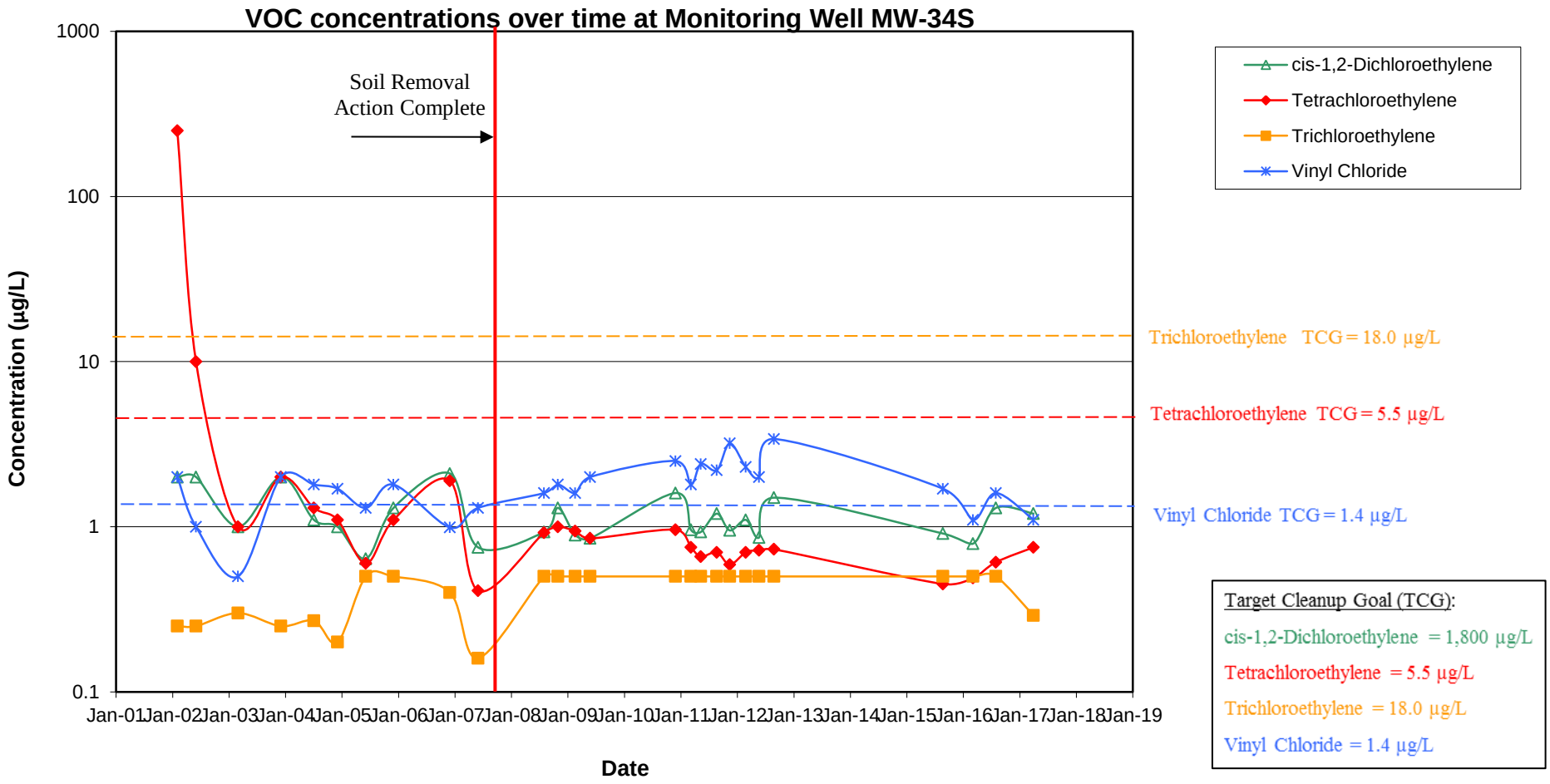


Note: Well MW-32S was removed from well network following the August 2016 sampling event.

Target Cleanup Goal (TCG):
- cis-1,2-Dichloroethylene = 1,800 µg/L
- Tetrachloroethylene = 5.5 µg/L
- Trichloroethylene = 18.0 µg/L
- Vinyl Chloride = 1.4 µg/L

Notes:
1. Time-trend plots include the four volatile organic compounds (VOCs) identified as constituents of concern (COCs) in the Groundwater Record of Decision (ROD).
2. VOCs not detected at the method reporting limit of 1.0 µg/L were plotted as one half of the method reporting limit (i.e., 0.5 µg/L).

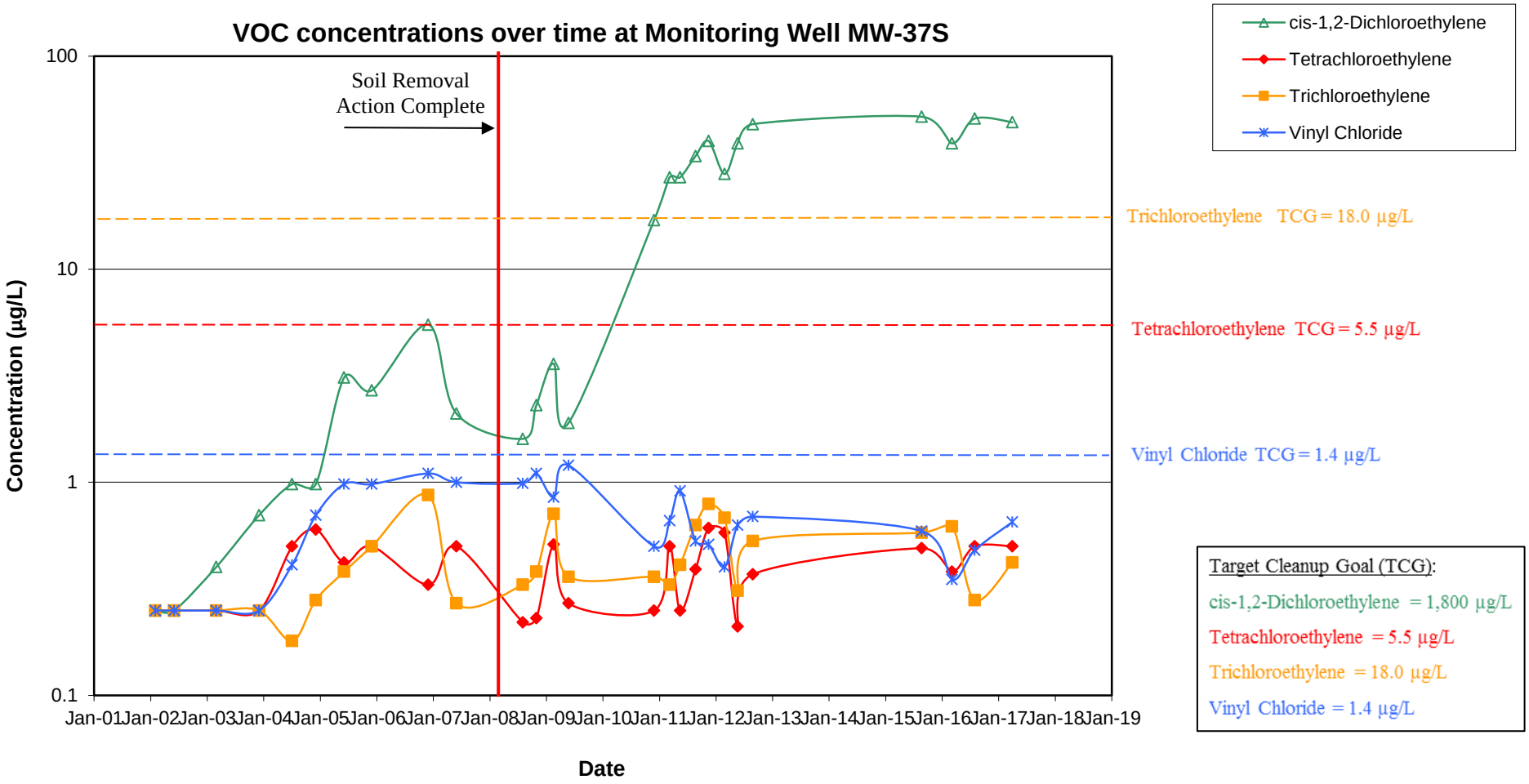
Temporal Trends



Notes:

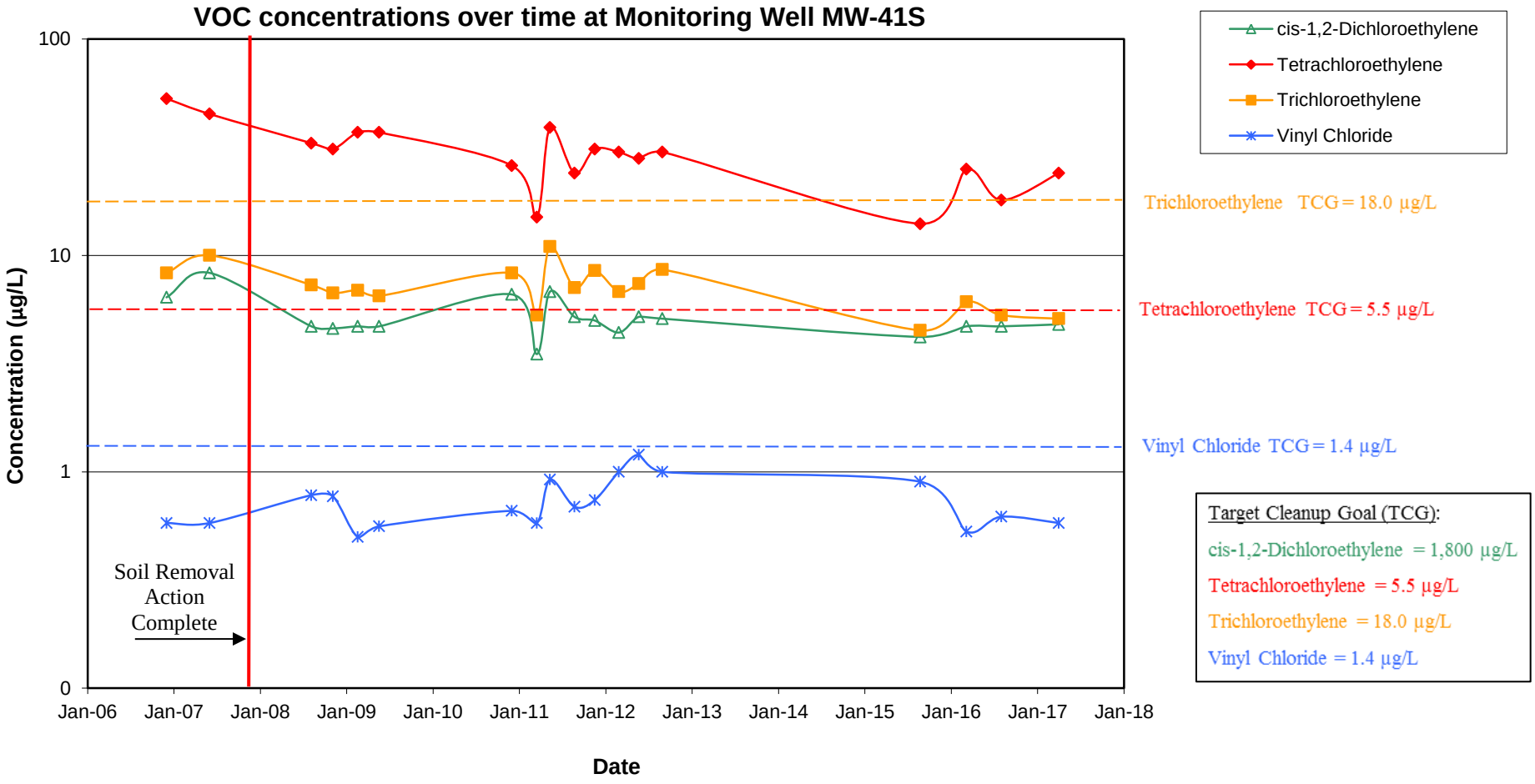
1. Time-trend plots include the four volatile organic compounds (VOCs) identified as constituents of concern (COCs) in the Groundwater Record of Decision (ROD).
2. VOCs not detected at the method reporting limit of 1.0 µg/L were plotted as one half of the method reporting limit (i.e., 0.5 µg/L).

Temporal Trends



Note:
1. Time-trend plots include the four volatile organic compounds (VOCs) identified as constituents of concern (COCs) in the Groundwater Record of Decision (ROD).

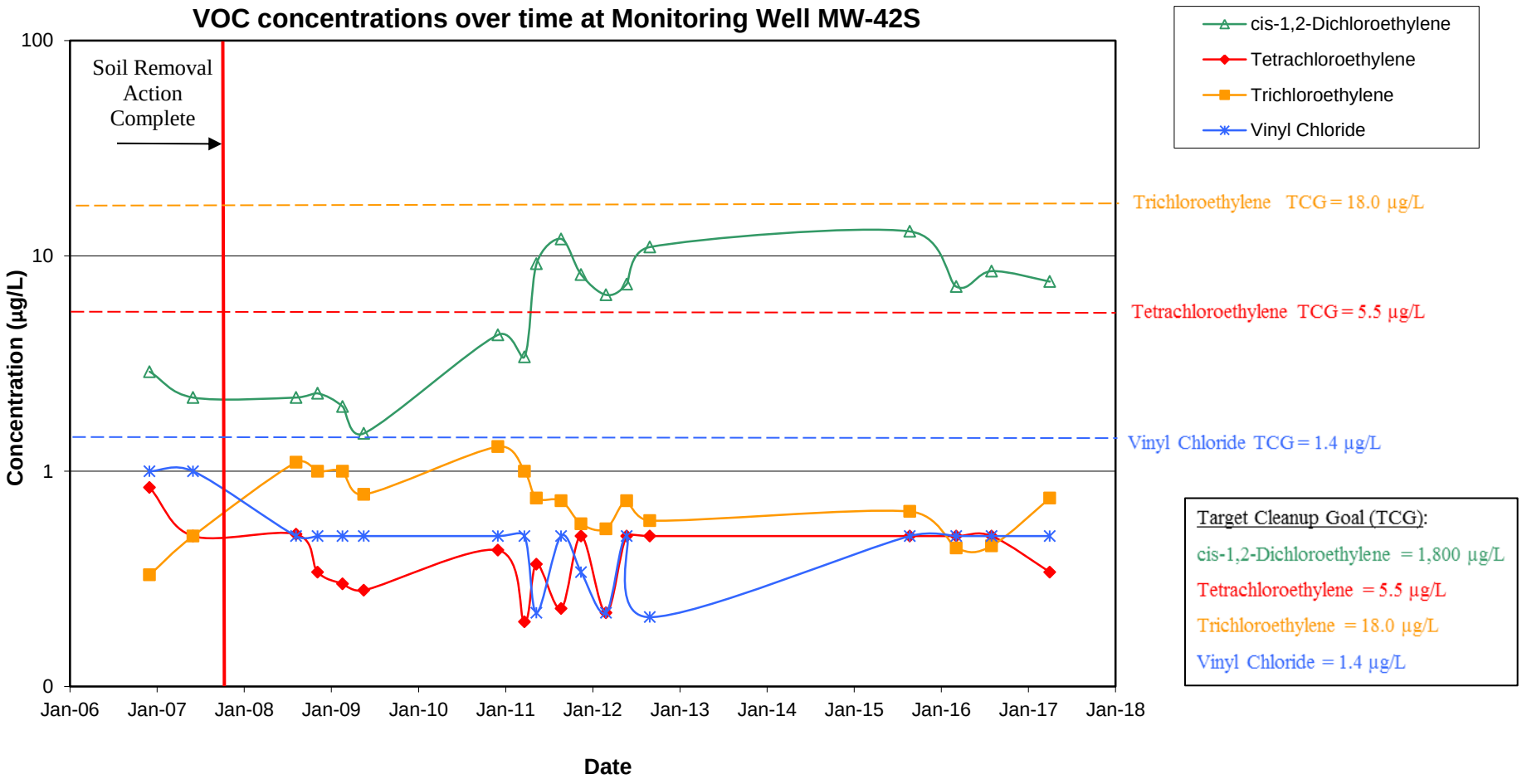
Temporal Trends



Note:

1. Time-trend plots include the four volatile organic compounds (VOCs) identified as constituents of concern (COCs) in the Groundwater Record of Decision (ROD).

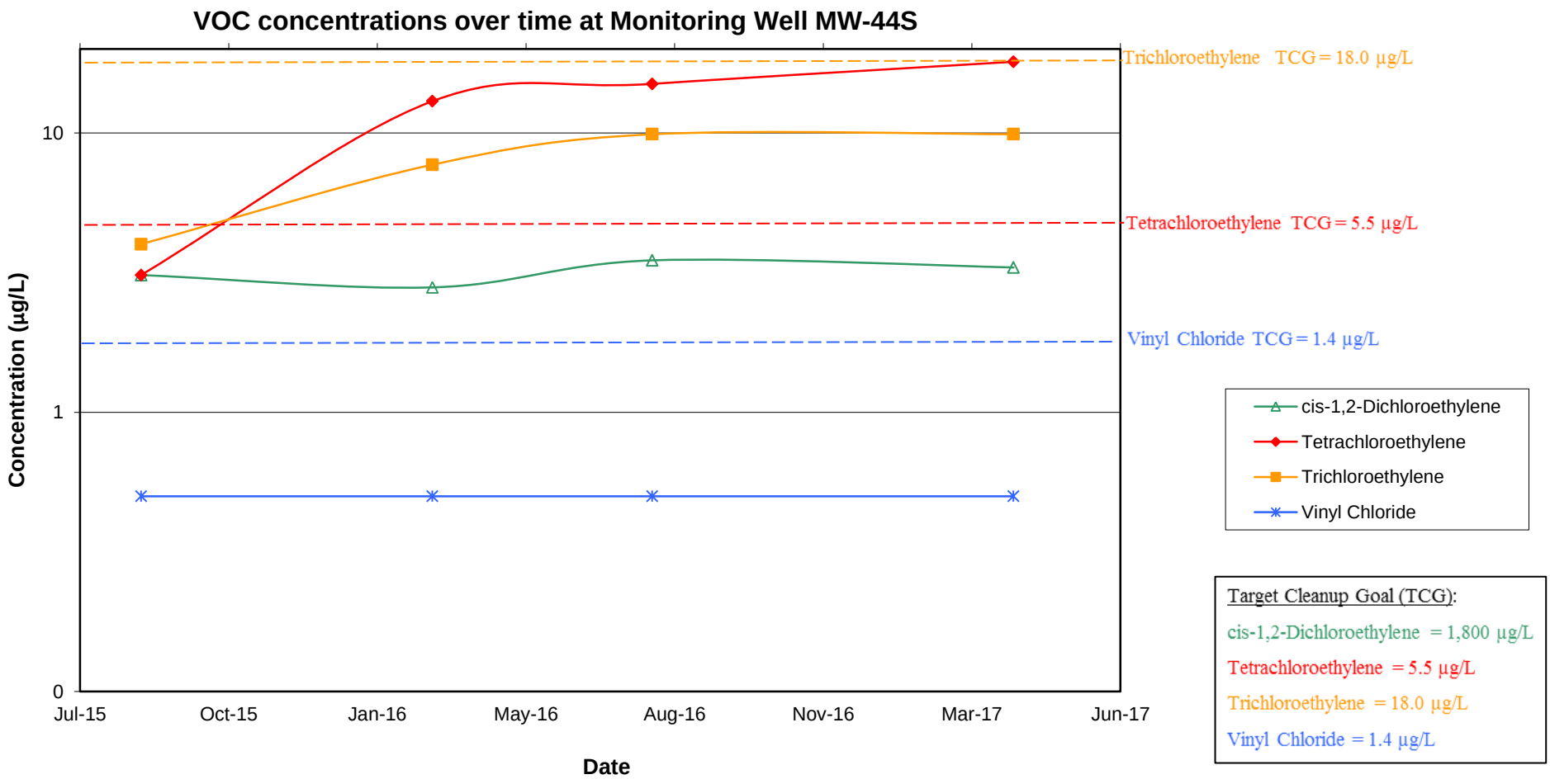
Temporal Trends
Page 1 of 1



Notes:

1. Time-trend plots include the four volatile organic compounds (VOCs) identified as constituents of concern (COCs) in the Groundwater Record of Decision (ROD).
2. VOCs not detected at the method reporting limit of 1.0 µg/L were plotted as one half of the method reporting limit (i.e., 0.5 µg/L).

Temporal Trends

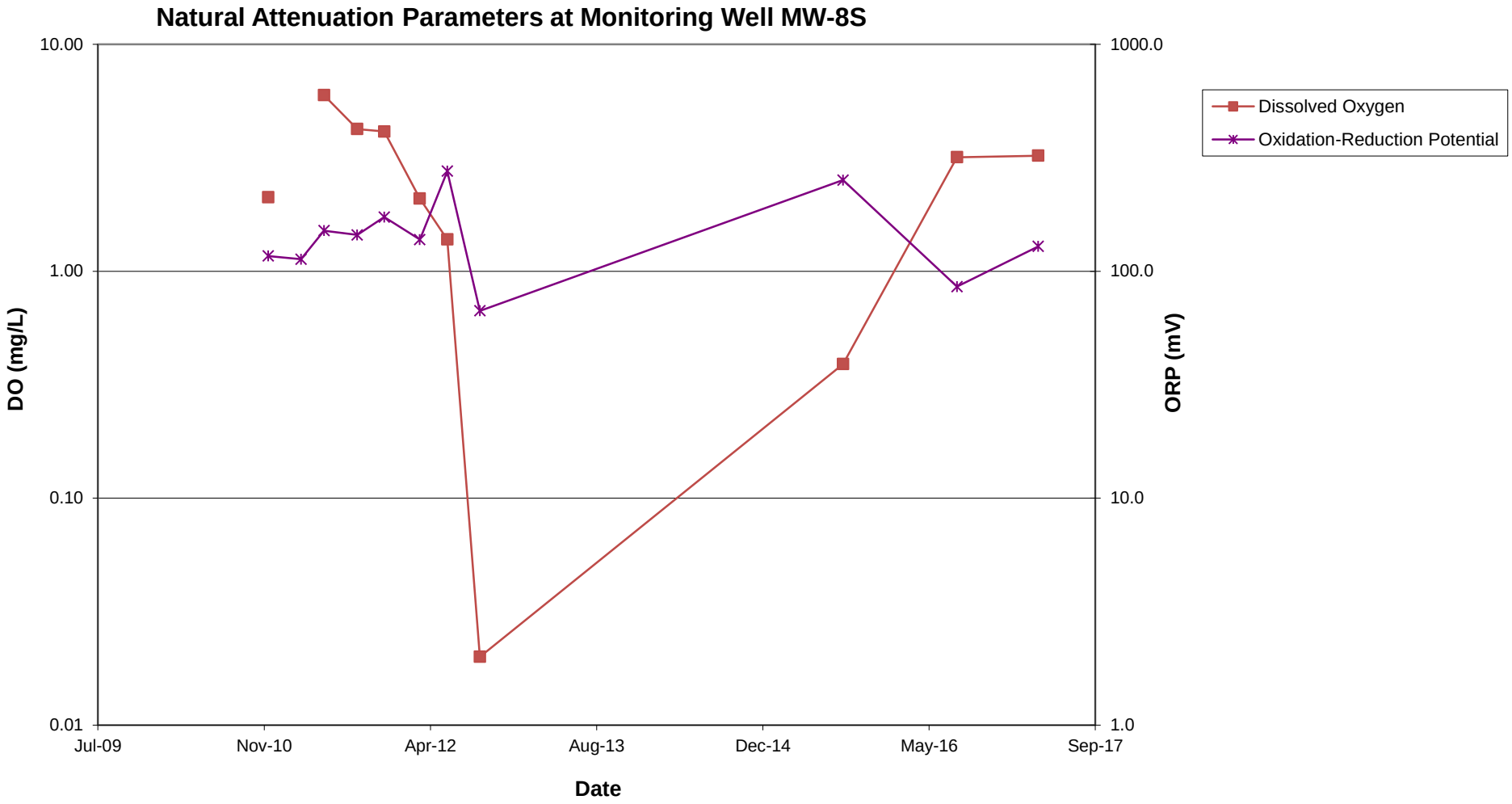


Notes:

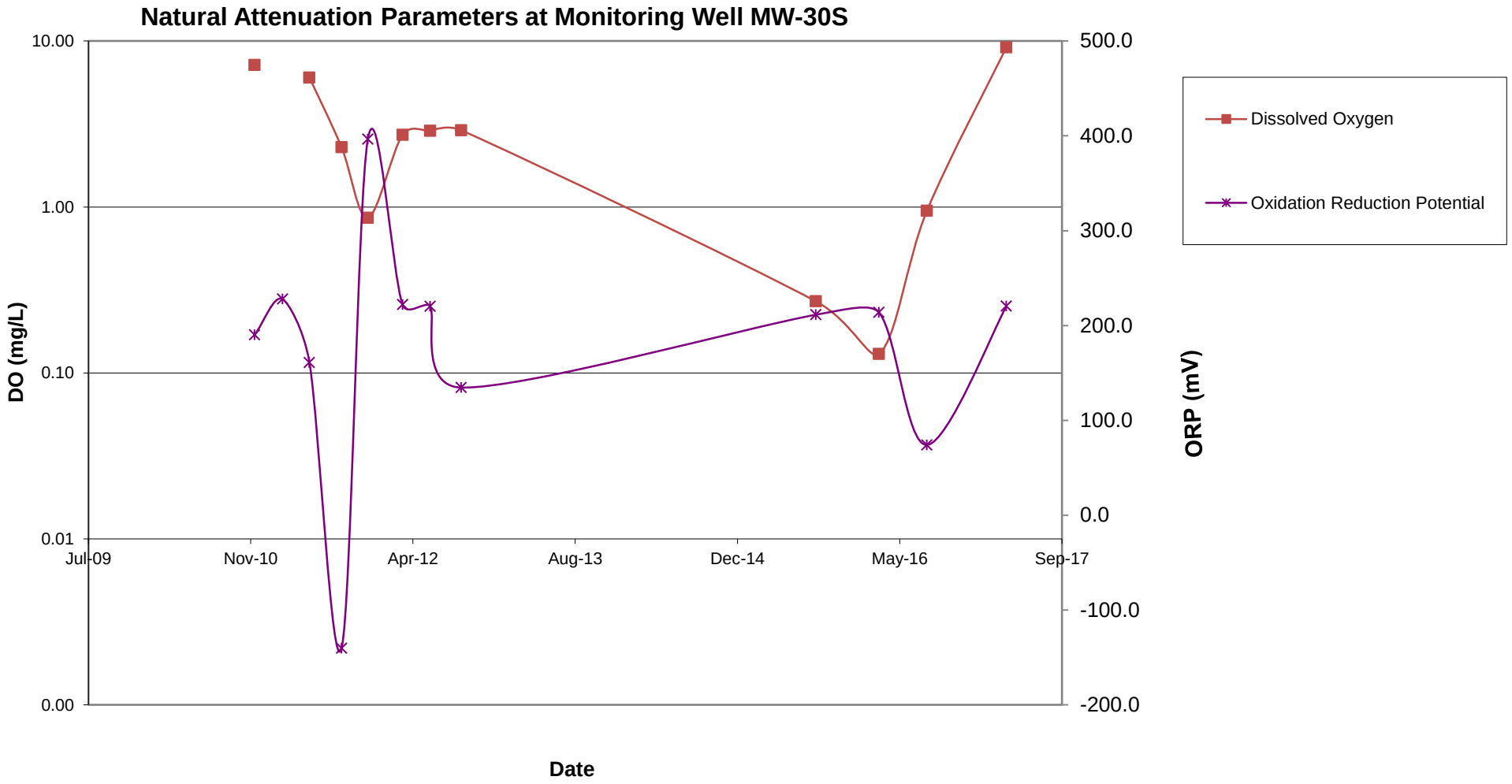
1. Time-trend plots include the four volatile organic compounds (VOCs) identified as constituents of concern (COCs) in the Groundwater Record of DecisionROD.
2. VOCs not detected at the method reporting limit of 1.0 µg/L were plotted as one half of the method reporting limit (i.e., 0.5 µg/L).
3. Results represent the initial two samplings of newly-installed monitoring well MW-44S (27 July 2015).

APPENDIX E

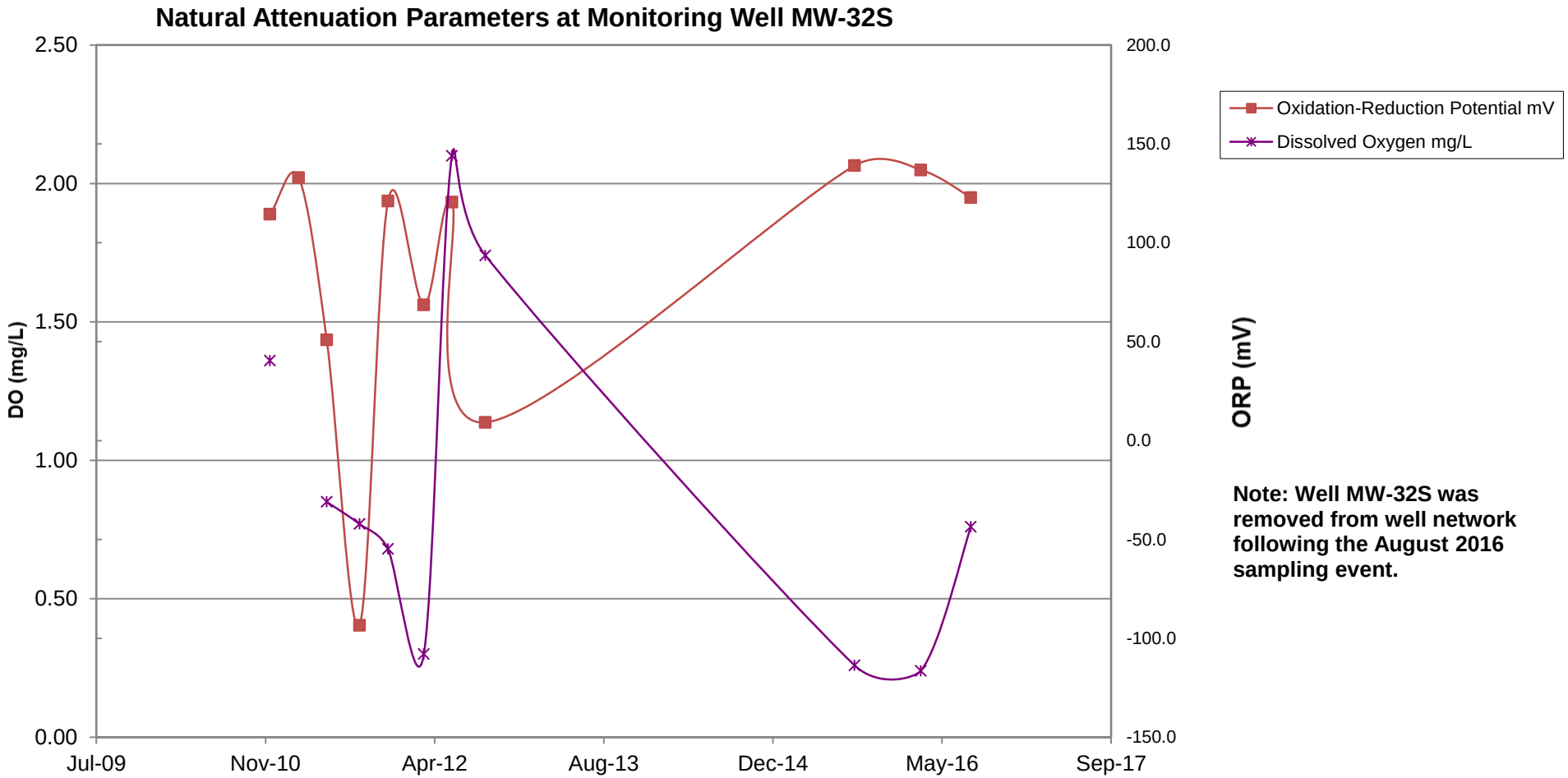
Time-Series Plots of Natural Attenuation Parameter Results



Note:
1. Dissolved Oxygen (DO) reported in units of milligrams per liter (mg/L) and Oxidation-Reduction potential reported in millivolts (mV).



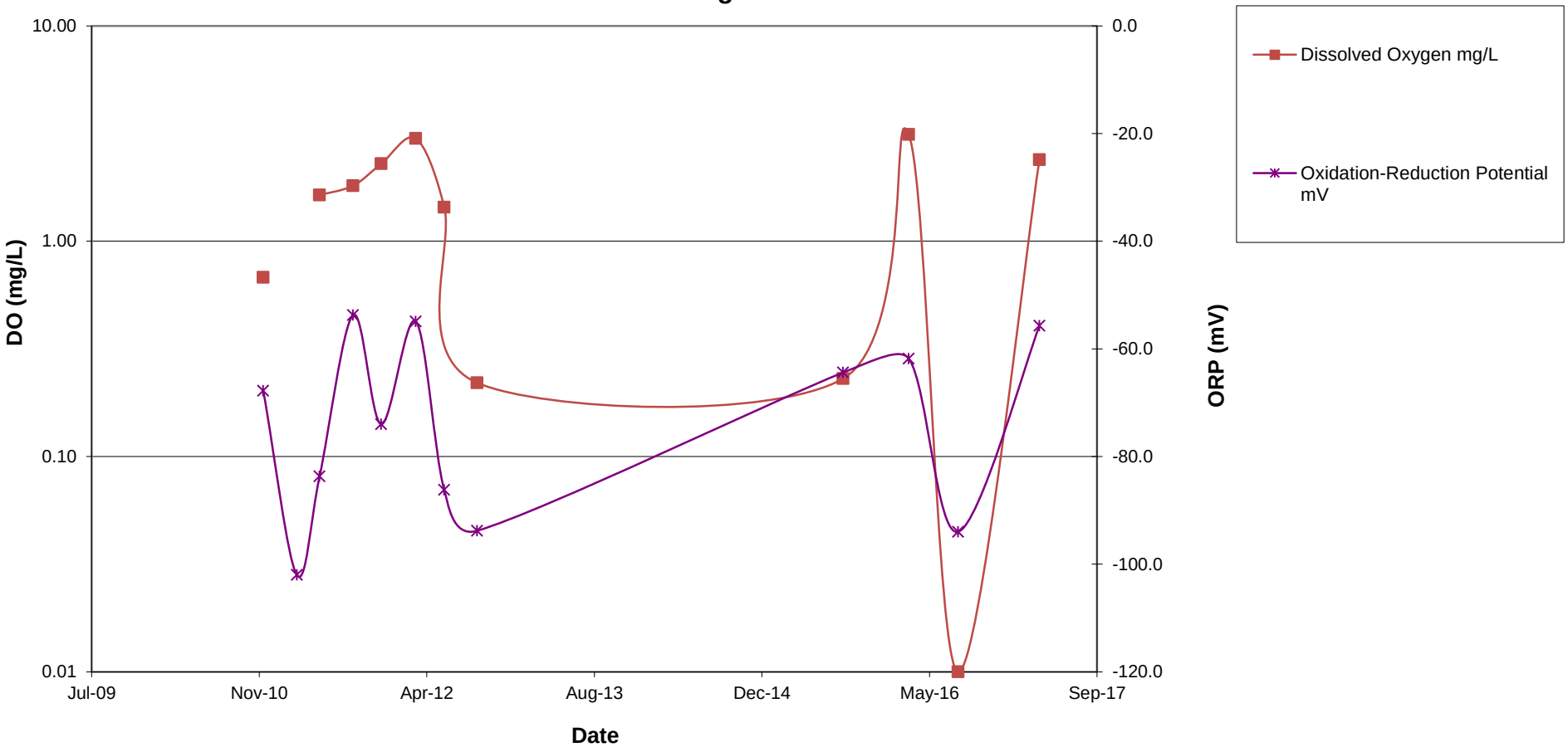
Note:
1. Dissolved Oxygen (DO) reported in units of milligrams per liter (mg/L) and Oxidation-Reduction potential reported in millivolts (mV).



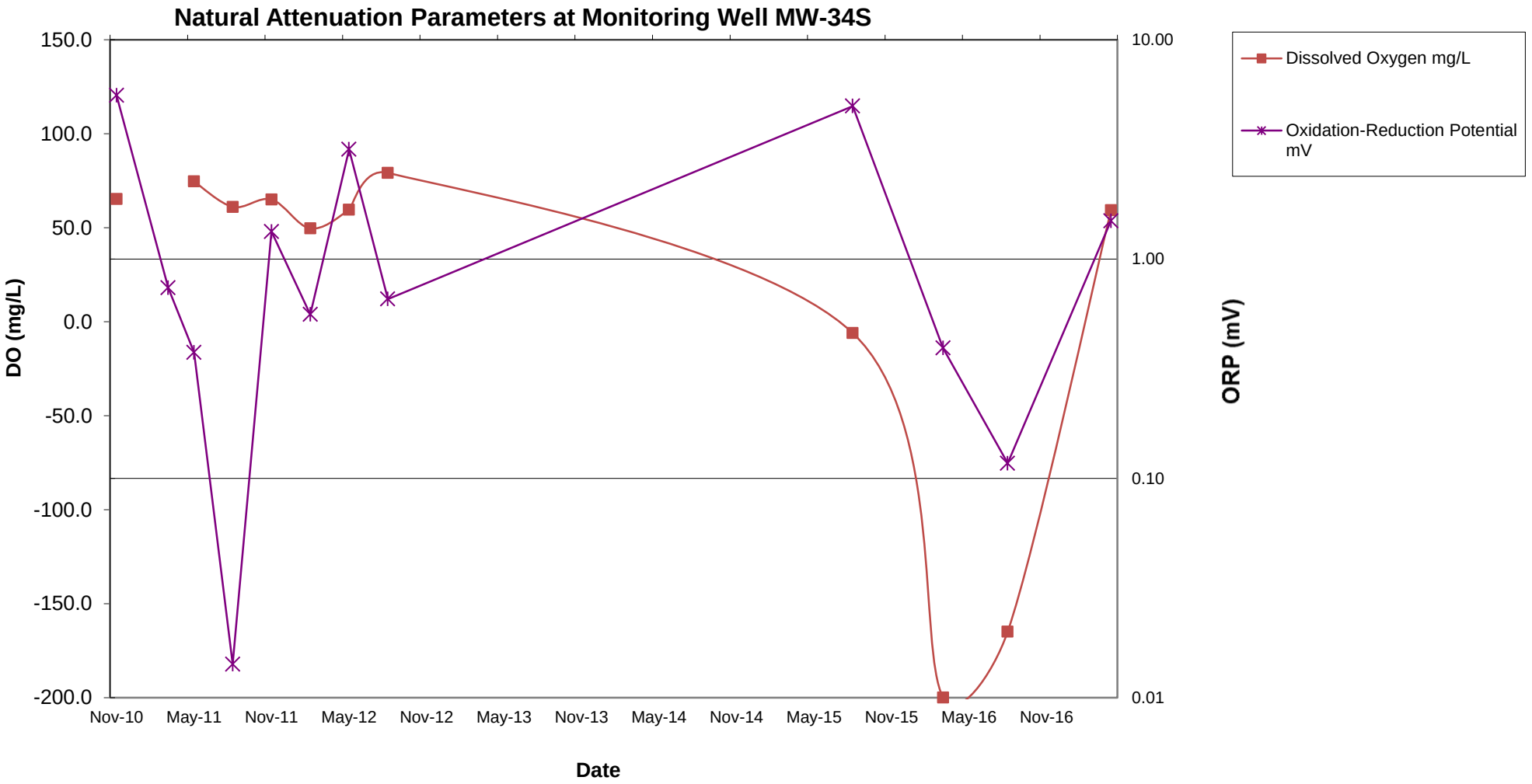
Note: Well MW-32S was removed from well network following the August 2016 sampling event.

Note:
1. Dissolved Oxygen (DO) reported in units of milligrams per liter (mg/L) and Oxidation-Reduction potential reported in millivolts (mV).

Natural Attenuation Parameters at Monitoring Well MW-37S

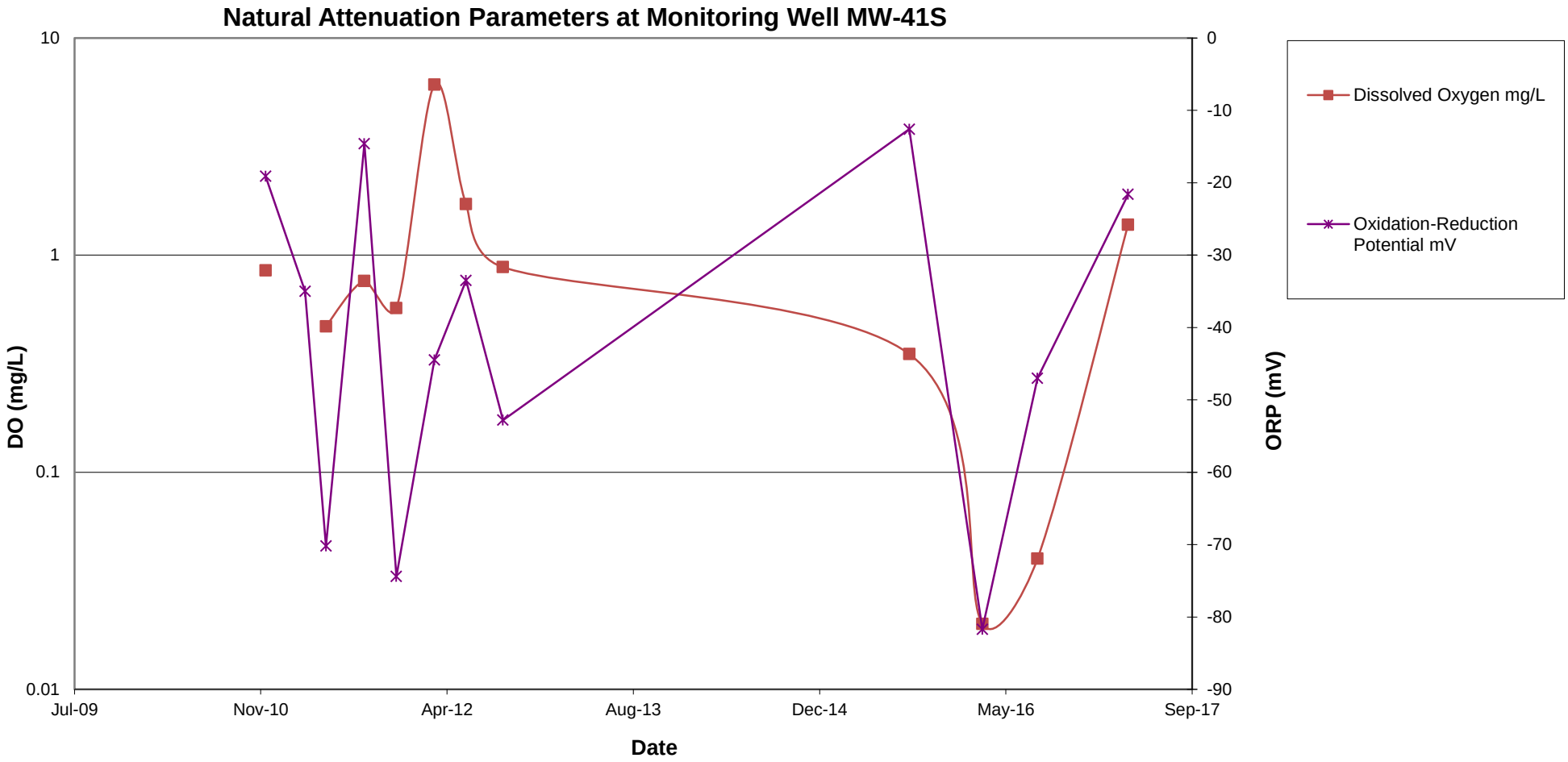


Note:
1. Dissolved Oxygen (DO) reported in units of milligrams per liter (mg/L) and Oxidation-Reduction potential reported in millivolts (mV).

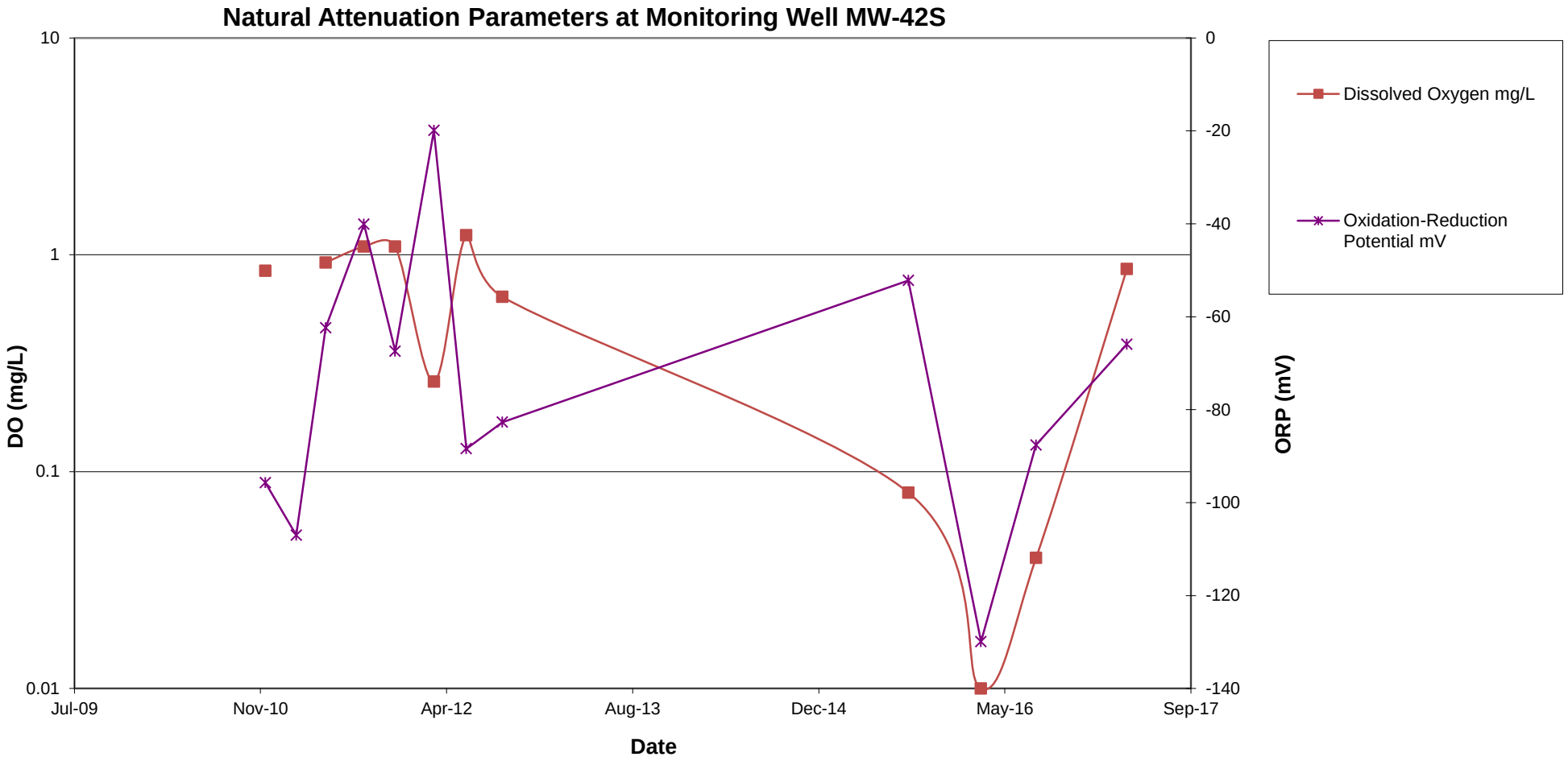


Note:

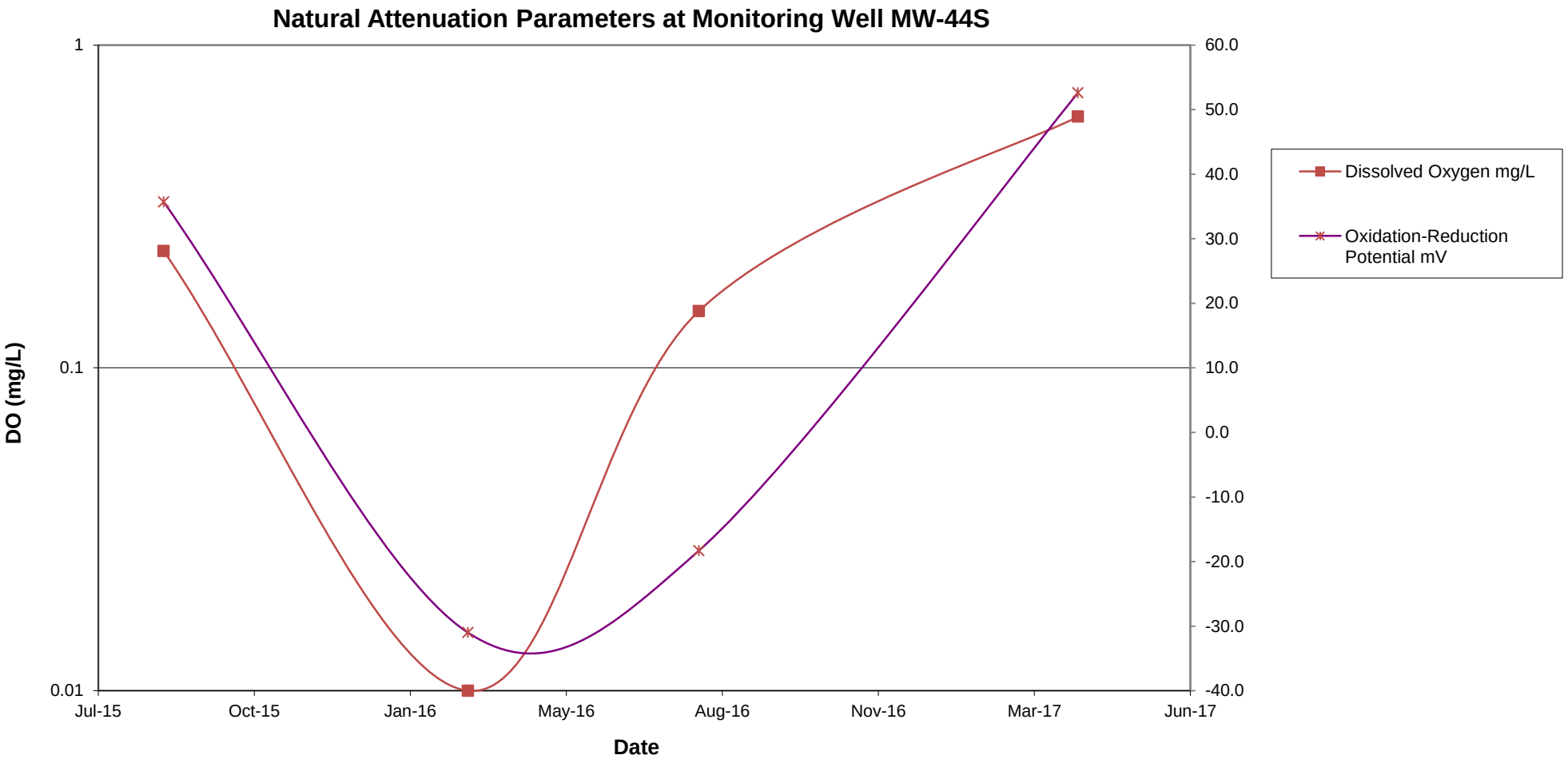
1. Dissolved Oxygen (DO) reported in units of milligrams per liter (mg/L) and Oxidation-Reduction potential reported in millivolts (mV).



Note:
1. Dissolved Oxygen (DO) reported in units of milligrams per liter (mg/L) and Oxidation-Reduction potential reported in millivolts (mV).



Note:
1. Dissolved Oxygen (DO) reported in units of milligrams per liter (mg/L) and Oxidation-Reduction potential reported in millivolts (mV).



Note:
1. Natural Attenuation parameters reported in units of milligrams per liter (mg/L), and Oxidation-Reduction potential reported in millivolts (mV).