FIRST FIVE-YEAR REVIEW REPORT FOR COLONIE FUSRAP SITE GROUNDWATER OPERABLE UNIT TOWN OF COLONIE ALBANY COUNTY, NEW YORK

Prepared by

U.S. Army Corps of Engineers
New York District
New York, New York

September 2017

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LIST OF ABBREVIATIONS & ACRONYMS

AFCEE	Air Force Center for Environmental Excellence
ARAR	Applicable or Relevant and Appropriate Requirement
CB&I	CB&I Federal Services LLC
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
cis-1,2-DCE	cis-1,2-dichloroethene
CFR	Code of Federal Regulations
COC	contaminant of concern
CSX	CSX Corporation
DO	dissolved oxygen
DOE	U.S. Department of Energy
EPA	U.S. Environmental Protection Agency
FS	feasibility study
FUSRAP	Formerly Utilized Sites Remedial Action Program
FYR	Five-Year Review
HHRA	human health risk assessment
LTM	long-term monitoring
LUC	land use control
MAROS	Monitoring and Remediation Optimization System
µg/L	micrograms per liter
MNA	Monitored Natural Attenuation
NCP	National Oil and Hazardous Substances Pollution Contingency Plan
NL	National Lead Industries, Inc.
NPL	National Priorities List
NYSDEC	New York State Department of Environmental Conservation
NYSDOH	New York State Department of Health
ORP	oxidation-reduction potential
OU	Operable Unit
PCE	tetrachloroethene
RAO	Remedial Action Objectives
RI	remedial investigation
ROD	Record of Decision
Site	Colonie FUSRAP Site
TCE	trichloroethene
TCG	Target Cleanup Goal
USACE	U.S. Army Corps of Engineers
UU/UE	unlimited use and unrestricted exposure
VC	vinyl chloride
VOC	volatile organic compound

EXECUTIVE SUMMARY

The remedy for the Colonie Formerly Utilized Sites Remedial Action Program Site Groundwater Operable Unit in the Town of Colonie, Albany County, New York is Monitored Natural Attenuation and Land-Use Controls (as needed) which is evaluated by an ongoing groundwater long-term monitoring program underway since November 2010. The first monitoring event following the signing of the Colonie Site Groundwater Operable Unit Record of Decision on April 9, 2010 was initiated on November 29, 2010. This date established the triggering action for this policy review representing the first Five-Year Review for the Colonie Site Groundwater Operable Unit which was to be conducted by November 29, 2015 and is expected to be completed by October 31, 2017.

The groundwater remedy at the Site is protective of human health and the environment. The assessment within this first Five-Year Review found that Monitored Natural Attenuation of Colonie Site groundwater is progressing according to plan, is generally within the initially estimated timeframe of 15 years for compliance, and is protective of human health and the environment based on current land use. The next Five-Year Review of the Colonie Site Groundwater Operable Unit is to be held within five years of the signature date of this Five-Year Review.

FIVE-YEAR REVIEW SUMMARY FORM

SITE IDENTIFICATION		
Site Name: Colonie FUSRAP Site		
EPA ID: NYD002084721		
EPA Region: 2	**State:** NY	**City/County:** Town of Colonie/Albany County

SITE STATUS	
NPL Status: Non-NPL	
Multiple OUs? Yes	**Has the site achieved construction completion?** No

REVIEW STATUS
Lead agency: Other Federal Agency ***[If "Other Federal Agency", enter Agency name]*:** U.S. Army Corps of Engineers
Author name (Federal or State Project Manager): James T. Moore, Phyllis Dellacamera
Author affiliation: U.S. Army Corps of Engineers
Review period: 2/1/2017 - 9/19/2017
Date of site inspection: 4/4/2017
Type of review: Policy
Review number: 1
Triggering action date: 11/29/2010
Due date *(five years after triggering action date)*: 11/29/2015

(continued on next page)

ISSUES/RECOMMENDATIONS
OU(s) without Issues/Recommendations Identified in the Five-Year Review:
Groundwater Operable Unit
Issues and Recommendations Identified in the Five-Year Review:

OU(s): NA	**Issue Category: No Issue**			
	Issue: NA			
	Recommendation: NA			
Affect Current Protectiveness	**Affect Future Protectiveness**	**Implementing Party**	**Oversight Party**	**Milestone Date**
NA	NA	NA	NA	NA

To add additional issues/recommendations here, copy and paste the above table as many times as necessary to document all issues/recommendations identified in the FYR report.

Protectiveness Statement(s)		
Include each individual OU protectiveness determination and statement. If you need to add more protectiveness determinations and statements for additional OUs, copy and paste the table below as many times as necessary to complete for each OU evaluated in the FYR report.		
Operable Unit: Groundwater Operable Unit	*Protectiveness Determination:* Protective	*Addendum Due Date (if applicable):* NA
Protectiveness Statement: The groundwater remedy for the Groundwater Operable Unit at the Colonie FUSRAP Site is protective of human health and the environment.		

Sitewide Protectiveness Statement (if applicable)	
For sites that have achieved construction completion, enter a sitewide protectiveness determination and statement.	
Protectiveness Determination: NA	*Addendum Due Date (if applicable):* NA
Protectiveness Statement: NA	

1.0 INTRODUCTION

The purpose of a Five-Year Review (FYR) is to evaluate the implementation and performance of a remedy to determine if the remedy will continue to be protective of human health and the environment. The methods, findings, and conclusions of reviews are documented in FYR reports such as this one. In addition, FYR reports identify issues found during the review, if any, and document recommendations to address them.

The U.S. Army Corps of Engineers (USACE) is preparing this First FYR pursuant to the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) § 121, consistent with the National Contingency Plan (NCP) 40 Code of Federal Regulations (CFR) § 300.430(f)(4)(ii), and in consideration of U.S. Environmental Protection Agency (EPA) policy. CERCLA § 121 states:

> *"If the President selects a remedial action that results in any hazardous substances, pollutants, or contaminants remaining at the site, the President shall review such remedial action no less often than each five years after the initiation of such remedial action to assure that human health and the environment are being protected by the remedial action being implemented. In addition, if upon such review it is the judgment of the President that action is appropriate at such a site in accordance with section [104] or [106], the President shall take or require such action. The President shall report to Congress a list of facilities for which such review is required, the results of all such reviews, and any actions taken as a result of such reviews."*

The EPA interpreted this requirement further in the NCP; 40 CFR § 300.430(f)(4)(ii) states:

> *"If a remedial action is selected that results in hazardous substances, pollutants, or contaminants remaining at the site above levels that allow for unlimited use and unrestricted exposure, the lead agency shall review such action no less often than every five years after the initiation of the selected remedial action."*

The USACE has conducted a FYR of the remedial action implemented for the Groundwater Operable Unit (OU) at the Colonie Formerly Utilized Sites Remedial Action Program (FUSRAP) Site (Site) in the Town of Colonie, Albany County, New York. The review was conducted from February 2017 through September 2017. This report documents the results of the review.

This is the first FYR for the Groundwater OU at the Site. The triggering action for this policy review is the first monitoring event initiated on November 29, 2010 which followed the signing of the Colonie Site Groundwater Operable Unit Record of Decision on April 9, 2010 (USACE,

2010c) for the Monitored Natural Attenuation (MNA) remedy for groundwater. This first FYR was to be completed on November 29, 2015, but is expected to be completed by October 31, 2017. This FYR has been prepared because hazardous substances, pollutants, or contaminants remain at the Site above levels that allow for unlimited use and unrestricted exposure (UU/UE).

The Site consists of the following three OUs: Groundwater OU, Colonie Main Site Soils OU, and Colonie Site Vicinity Properties OU. The Colonie FUSRAP Site Groundwater OU is the subject of this FYR. The Colonie FUSRAP Site Groundwater OU addresses onsite groundwater containing volatile organic compound (VOC) concentrations above the risk-based cleanup criteria. The Colonie Main Site Soils OU ROD (signed March 2015) will be subject to a separate FYR. The Colonie Site Vicinity Properties OU is currently in the Proposed Plan phase, and the Colonie Site Vicinity Properties OU ROD is expected to be signed in September 2017.

2.0 SITE CHRONOLOGY

The Site has been the subject of numerous environmental investigations and response actions for soil, dust, and groundwater media both at the Colonie Main Site and at the offsite Vicinity Properties. References for the documents associated with these activities are provided in Appendix A. A brief summary of the Site chronology follows:

- 1923 – Industrial operations (wood products/toy manufacturing) begin at Main Colonie Site.
- 1937 – National Lead Industries (NL) purchases property and begins electroplating operations.
- 1941 – Sometime between 1937 and 1941, NL buys an adjacent lot that contained a portion of Patroon Lake and begins filling Patroon Lake with used casting sand containing heavy metals (i.e., lead, copper, and arsenic). These metals become part of Site soils and later required remediation. The lake is subsequently used for additional waste disposal through 1961.
- 1958 – NL began manufacturing operations using uranium and thorium under Atomic Energy Commission license.
- 1960 to 1972 – NL handles small amounts of enriched uranium for experimental nuclear reactors. Uranium, along with collocated metals contamination from other Site processes, was later remediated in FUSRAP soil removal actions.
- 1984 – New York State closes plant due to environmental and ownership concerns, and the property is transferred to the U.S. Department of Energy (DOE).
- 1984 – 1995: DOE performs the following response actions at the Site:
  - Investigation of the Colonie Site Vicinity Properties, onsite structures, groundwater, and surface/subsurface soils
  - Develops a plan for early removal of radiologically-impacted soils
  - Remediation of 53 of 56 identified Colonie Site Vicinity Properties (DOE, 1989 and 1990)
  - Removal of all onsite buildings
  - Disposal of contaminated materials.
- 1997 – Congress transfers FUSRAP to USACE from the DOE. USACE assumes administration of FUSRAP and the remaining Colonie Main Site and Colonie Site Vicinity Properties under CERCLA.

- 2002 to 2006 – USACE conducts several rounds of indoor air sampling at selected downgradient off-site locations (USACE, 2005). Based on the results of indoor air, sub-slab vapors, and ambient outdoor air sampling, and the New York State Department of Health (NYSDOH) Decision Matrix, USACE recommends No Further Action. NYSDOH concurs with the recommendation.
- 2003 – An investigation of Patroon Creek, an unnamed tributary of Patroon Creek, and the Three Mile Reservoir is conducted by USACE (2004). Results from the 32 sediment sampling locations were all less than the radiological cleanup criterion.
- 2007 – The large-scale soil removal at the Colonie Main Site and remaining Colonie Site Vicinity Properties is completed by USACE (2010a).
- 2010 – USACE performs a data gap analysis, identifies gaps at two Colonie Site Vicinity Properties (USACE, 2010b), and addresses those properties with additional sampling and limited soil removal (USACE, 2012a).
- 2010 – USACE signs and issues the Colonie FUSRAP Site Groundwater OU ROD on April 9, 2010. The Groundwater ROD presents the Selected Remedy of MNA with Land Use Controls (LUC) temporary (as needed in the event of a change in Site land use to residential) for forward management of groundwater. Note that temporary LUCs would be utilized as appropriate to limit potential future onsite residential exposure to groundwater contaminants via the vapor intrusion pathway until TCGs are achieved. Progress of the MNA remedy is measured in accordance with the Groundwater ROD during an ongoing two- to five-year enhanced data collection and analysis period which began in November 2010. USACE establishes the groundwater LTM Program initially consisting of eight consecutive quarterly sampling events. The initial monitoring period ends in August 2012. This sampling program was built upon a four-quarter MNA demonstration event conducted from July 2008 through May 2009.
- 2012 – USACE completes the first enhanced groundwater LTM period of eight consecutive quarterly events on August 29, 2012. Results indicate reductions in concentrations of contaminants of concern (COC). USACE recommends modifications to groundwater LTM program as documented in the *2011-2012 Annual Long Term Monitoring Report, Colonie FUSRAP Site, Colonie, New York, Final,* May (USACE, 2014). New York State Department of Environmental Conservation (NYSDEC) concurs (NYSDEC, 2014).

- 2015 – Main Site Soils OU ROD signed by USACE on March 26, 2015 (USACE, 2015a).
- 2015 – Twenty-nine monitoring wells and nine piezometers decommissioned and one new monitoring well installed in July. This reduces the LTM network of monitoring wells to eight, and groundwater LTM program continues under modified program with reduced number of wells, number of analytes, and frequency of sampling (USACE, 2015b).
- 2016 – USACE issues the *Colonie FUSRAP Site Vicinity Property Operable Unit Remedial Investigation (RI) Summary Report* (USACE, 2016a), culminating the investigation involving dust sampling for uranium at commercial and residential Vicinity Property locations which began in 2011 and was reported in the *Confirmation Dust Sampling Report for the Colonie FUSRAP Site Vicinity Properties* (USACE, 2012b). As a result of the study, USACE releases a Proposed Plan recommending No Further Action for dust at all Colonie Site Vicinity Properties. NYSDEC (2016) and the NYSDOH (2016) concur with the recommendation.
- 2017 – April groundwater monitoring marks the end of the second two-year groundwater LTM period.

3.0 BACKGROUND

3.1 Physical Characteristics

The Site is an 11.2-acre vacant area located at 1130 Central Avenue (New York State Route 5) in the Town of Colonie, Albany County, New York (Figure 1, Appendix B). The Site property is relatively flat, and is fenced with gated access. The Site is bounded by a wooded area, Central Avenue (State Route 5), and CSX Corporation (CSX) railroad tracks (Figure 2, Appendix B). The Site is currently zoned for industrial use by the Town of Colonie. The most probable future land use at the Site is considered to be urban residential.

Clean fill material was placed at the Colonie Main Site during the soil removal action (described below in Section 3.4). Native soil layers underlie the clean fill and consist of fine-grained sand and sequences of fine sand and silt. These units form the shallow saturated zone (i.e., water table) at the Site, referred to as the Upper Groundwater Zone. A unit known as the Upper Clay, a distinct sequence of clay and silt, lies directly beneath the Upper Groundwater Zone, separating it from the Lower Groundwater Zone. Groundwater in the lower water bearing zone resides in a semi-confined condition within silt layers that contain some clay, and all rest upon another distinct clay unit known as the Lower Clay. Groundwater at the Site is typically encountered at a depth of less than 10 feet below grade in monitoring wells completed in either water bearing zone. Groundwater in the Upper Groundwater Zone flows in an overall southeast direction across the Site with some variation in the vicinity of the local stream as shown for March 2016 in Figure 3 (Appendix B). Groundwater in the Lower Groundwater Zone also flows in an overall southeast direction across the Site.

3.2 Land and Resource Use

The Site property is owned by DOE. It was historically used for industrial operations and is currently vacant land. Land use surrounding the Site is a mix of residential and commercial properties. CSX and Amtrak both operate railways transecting the Site's southern border. A Niagara Mohawk electrical substation occupies an area of approximately 0.15 acres off the northwest corner of the Site (Figure 2, Appendix B). Groundwater in the vicinity of the Site has been given a Class III designation meaning it is not a potable source of water. Public water to surrounding residences and businesses is provided by the municipality.

3.3 History of Contamination

The Site was used for manufacturing wood products and toys, and then converted to a brass foundry for manufacturing railroad components. NL purchased the facility in 1937 to conduct electroplating operations. Chemicals used in the plating operations included various acids,

bases, metals, and degreasing solvents. NL also filled a portion of Patroon Lake with used casting sand, and the lake was subsequently used for additional waste disposal through 1961. Sources for organic contamination were a burial site in the Patroon Lake area and chemical contamination of surfaces within a processing building. In addition, the nuclear division of NL began producing items manufactured from uranium and thorium under a license issued by the Atomic Energy Commission beginning in 1958. The plant handled enriched uranium from 1960 to 1972. During that time, NL held several contracts to manufacture fuel from enriched uranium for use in experimental nuclear reactors.

Subsurface investigations of the native soil units and the groundwater zones present at the Site revealed that historic activities resulted in contamination of soil and groundwater on the Colonie Main Site that included radiological, heavy metals, and VOCs contamination; VOCs were likely released into the Upper Groundwater Zone through subsurface soils via infiltration, percolation, and spillage.

3.4 Initial Response

Several soil response actions were conducted to address potential risks to human health and the environment at the Colonie Main Site and Colonie Site Vicinity Property OUs prior to and concurrent with the investigation and remediation of the Groundwater OU. The following actions at the Colonie Main Site Soil and Colonie Site Vicinity Property OUs are related to the evaluation and remediation of the Groundwater OU:

Colonie Main Site Soil OU:

Soil Removal Action: USACE completed a large-scale removal of a total of 135,244 cubic yards of soil at the Colonie Main Site in January 2007. This resulted in the removal of all radioactively-contaminated soils exceeding cleanup goals, all metals-contaminated soils exceeding cleanup goals to a depth of 9 feet or more below original grade, and VOC sources in soil to a depth of 5 feet below the water table surface (USACE, 2010a).

Colonie Site Vicinity Property OU:

- **Post-RI Off-Site Indoor Air Data Assessment:** The investigation included sampling of indoor air, sub-slab vapors, and ambient outdoor air for VOCs at seven residences downwind of the Site. Four rounds of sampling were conducted at various structures between July 2002 and March 2005, and a fifth round at one location in March 2006 (USACE, 2005). Based on these sampling results and the NYSDOH Decision Matrix, USACE recommended No Further Action for the seven locations. NYSDOH concurred with the recommendation.

3.5 Basis for Taking Action

An RI of the Site groundwater was performed by USACE (2003) confirming historical groundwater results that indicated elevated concentrations of VOCs in monitoring wells within the Upper Groundwater Zone. A baseline risk assessment (BLRA) was conducted to evaluate potential risks associated with exposure to contaminated groundwater. The human health risk assessment (HHRA) identified COCs and exposure pathways, and quantified the associated risks. The following four COCs were named for Site groundwater: tetrachloroethene (PCE), trichloroethene (TCE), cis-1,2-Dichloroethene (cis-1,2-DCE), and vinyl chloride (VC).

The HHRA identified and quantified two potential residential exposure pathways: 1) vapor intrusion of VOCs into buildings, and 2) groundwater consumption through domestic use.

The first pathway, inhalation of VOC vapors that could volatilize from the groundwater and migrate via vapor intrusion into residential buildings, was evaluated for both onsite and off-site receptors. The onsite pathway does not exist currently (i.e., no buildings currently onsite), but could exist in the future if the Site is used for residential or commercial purposes. The potential for vapor intrusion of VOCs into off-site residences was evaluated, with multiple rounds of indoor air samples being collected to fully assess the off-site pathway at the potential receptor locations. All exposure pathway risks related to the intrusion of volatile chemicals and resultant indoor air concentrations were estimated using EPA's spreadsheet version of the Johnson & Ettinger vapor intrusion model (EPA, 2002).

The risk assessment considers two types of risk: cancer risk and non-cancer risk. Typically, remedial action is considered at a CERCLA site when cumulative excess cancer risks exceed the EPA risk range of 10^{-5} to 10^{-4} (i.e., one in one million to one in ten thousand). For non-cancer effects, a hazard index (HI) is calculated which sums the non-cancer effects due to exposure to multiple COPCs for an exposure pathway. An HI greater than 1 indicates potential adverse non-cancer health effects. The cancer risks and noncancer hazards, which fall outside of the acceptable risk ranges, represent the basis for taking action for the Groundwater OU.

The HHRA concluded that exposure to the identified COCs in Site groundwater under a potential future onsite urban resident scenario may result in unacceptable risks (i.e., greater than the 10^{-4} and 10^{-6} risk range deemed protective in the NCP). The remedy selected in the Groundwater ROD is necessary to protect human health or welfare or the environment from actual or threatened releases of hazardous substances into the environment.

Domestic groundwater consumption is a pathway that was considered but does not currently does not exist either onsite or off-site. Given the Class III designation of the groundwater (i.e., non-potable), the domestic consumption pathway is extremely unlikely to become activated in the future and, therefore, was not evaluated in the Feasibility Study (FS) (URS, 2008).

The other potentially complete exposure pathway evaluated in the HHRA was inhalation of VOC vapors that could volatilize from VOCs within the groundwater and then migrate via vapor intrusion into residential buildings for both onsite and off-site receptors. The onsite pathway does not exist currently, but could exist in the future if the Colonie FUSRAP Site land use becomes residential. As previously described, the potential offsite vapor intrusion pathway was evaluated, and no further action was required based on extensive air sampling results that indicated residents were not being impacted.

4.0 REMEDIAL ACTIONS

4.1 Remedy Selection for Groundwater Operable Unit

The Colonie Groundwater OU ROD was signed on April 9, 2010 (USACE, 2010c). As a part of the remedy selection process in the Groundwater ROD, remedial action objectives (RAO) were developed to address the VOC-contaminated groundwater while considering the long-term goals of protecting human health and the environment and meeting Applicable or Relevant and Appropriate Requirements (ARARs) of federal and state laws and regulations. As presented in the Colonie Groundwater ROD, the RAOs are:

- Limit exposure of potential future onsite urban residents to VOC constituents that may migrate into homes via the vapor intrusion pathway.
- Reduce the concentrations of VOCs in onsite groundwater to levels that are protective of future onsite urban residents who may be exposed to these compounds via the vapor intrusion pathway.

The ROD remedy is expected to reduce the excess cancer risk due to inhalation of vapors intruding into an onsite residence to less than one in one million (10^{-6}). This risk reduction will be achieved by lowering the concentrations of groundwater contaminants to the following Target Cleanup Goals (TCG) concentrations:

- PCE: 5.5 μg/L
- TCE: 18 μg/L
- cis-1,2-DCE: 1,800 μg/L
- VC: 1.4 μg/L.

In accordance with the Site Groundwater ROD, the approved remedy for groundwater was MNA with LUCs (as needed in the event of Site land use becomes residential). The major components of the remedy are:

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

- The remedial action will be considered complete and monitoring will be discontinued when compliance with the TCG concentrations have been achieved for all onsite monitoring wells included in the monitoring program. 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.

4.2 Remedy Implementation

The current status of the remedy implementation is ongoing groundwater LTM to evaluate MNA. In June 2010, the USACE established the LTM program which included an enhanced data collection period initially consisting of eight consecutive quarterly groundwater sampling events utilizing a monitoring well network of 22 wells (Figure 4, Appendix B). This included a total of 15 wells in the Upper Groundwater Zone (water table) and 7 wells in the Lower Groundwater Zone as listed in Table 1 (Appendix C).

Note that the number of Lower Groundwater Zone wells was reduced to 6 when monitoring well MW-43M became non-functional due to excessive silt buildup and was removed from the well network in May 2011. This well, located in the central portion of the Colonie Main Site, was not replaced because it had no detections of VOCs and existing wells were downgradient of MW-43M. The Site well network then consisted of 21 wells.

Eight quarterly monitoring events occurred from November 2010 through August 2012. The initial analytical protocol for this period is summarized as follows:

- VOCs: the four COCs PCE, TCE, cis-1,2-DCE, and VC, and the two constituents of interest 1,1-dichloroethene and trans-1,2-dichloroethene.
- Lead (total and dissolved) at select monitoring wells for informational purposes (not required by the Groundwater ROD and discontinued with NYSDEC concurrence upon demonstrating the protectiveness of the Site soil removal action).
- Radionuclides (including total and dissolved gross alpha, gross beta, total uranium, and combined radium-226/228) at selected monitoring wells for informational purposes (not required by the Groundwater ROD and discontinued with NYSDEC concurrence upon demonstrating the protectiveness of the Site soil removal action).

In addition, the following MNA parameters were measured: ethane, ethene, methane, total organic carbon, chloride, nitrate-N, sulfate, oxidation reduction potential (ORP) via field

measurement, dissolved oxygen (DO) via field measurement, soluble manganese via field measurement, and ferrous iron via field measurement.

Based on the progress of the MNA remedy, the NYSDEC concurred with optimizing modifications to the LTM program on May 5, 2014 that included reductions in: 1) the number of monitoring wells from 21 to 8 in the well network, 2) the number of analytes from 23 to 8 in the analytical program, and 3) the frequency of sampling from quarterly to semi-annual events. Consequently, the monitoring well network was reduced as shown in Table 2 (Appendix C).

The wells removed from the monitoring well network were decommissioned in accordance with NYSDEC regulations as documented in the Colonie *Decommissioning Report, Monitoring Wells and Piezometers* (USACE, 2015b) and concurred with by the NYSDEC. Monitoring well MW-32S was removed from the LTM network of wells because it was suspected to be yielding analytical results that did not represent local groundwater conditions. The reason for this was due to local, stagnating effects on groundwater flow by the sheet pile wall, located directly upgradient of the well. In addition, one new monitoring well (MW-44S) was installed onsite upgradient of the sheet pile wall. Figure 5 (Appendix B) shows the updated current monitoring well network.

The analytical program was modified from a quarterly to a semi-annual frequency under the following analytical protocol:

- VOCs: the four COCs – PCE, TCE, cis-1,2-DCE, and VC
- Radionuclides: total and dissolved uranium.

The MNA parameters DO and ORP were retained under the modified program and were measured in the field during well purging for sampling.

Following each yearly monitoring period, a detailed annual report of MNA progress in groundwater is prepared. The evaluations involve comparison to TCGs and extensive statistical analysis. Based on the findings and results during the course of the second two-year monitoring period, additional reductions to the groundwater LTM program were recommended in the *2015-2016 Annual Report, Long-Term Groundwater Monitoring, Natural Attenuation Remedy* (USACE, 2016b). The recommended modifications included: 1) removing well MW-32S from the well network, and 2) removing the analysis of total and dissolved uranium from the analytical program. This program recommendation was concurred with by the NYSDEC and was implemented beginning in April 2017.

The groundwater remedy also includes LUCs to be implemented as needed. LUCs, although currently not required based on current land use (i.e., vacant lot), could become necessary if future land use changes to residential. It should be noted that LUCs are also included in the environmental easement package required for closure of the Colonie Main Site Soils OU and some overlap of these controls is anticipated. In the event that land use of the Colonie FUSRAP Site becomes residential, then one or more of the following LUCs could be established to protect residents:

- Prohibit on-site home construction with basements
- Mandate installation of sub-slab ventilation systems
- Require periodic monitoring of indoor air and/or sub-slab soil vapors
- Restrict well drilling
- Restrict groundwater pumping for potable or irrigation uses.

5.0 PROGRESS SINCE THE LAST REVIEW

This is the first FYR for the Colonie FUSRAP Site Groundwater OU.

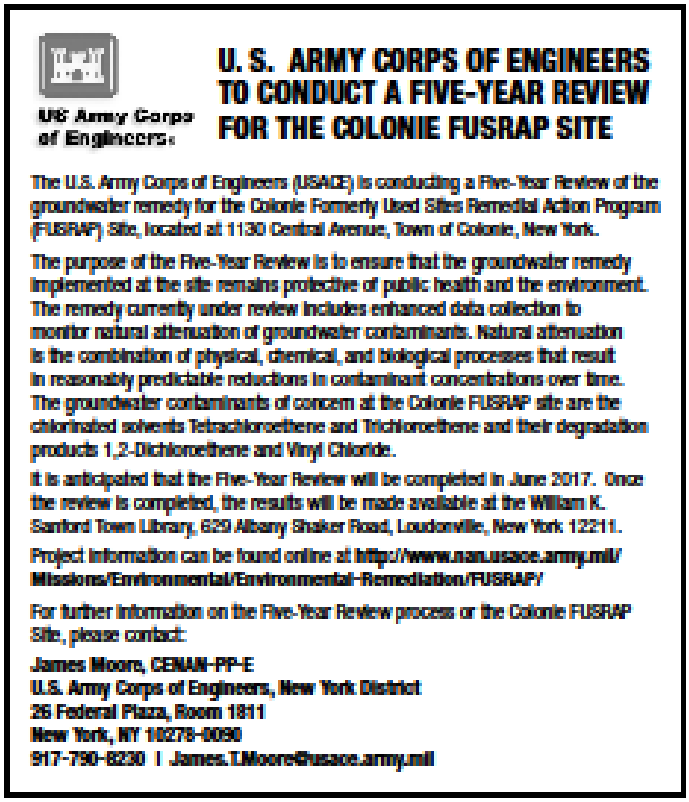
6.0 FIVE-YEAR REVIEW PROCESS

6.1 Administrative Components

The USACE is the lead agency for the restoration of the Site. This first Site FYR was led by Site Project Manager James Moore (USACE-New York District) and Project Technical Team Leader Phyllis Dellacamera (USACE-Baltimore District). Participants included David Watters, USACE Project Physicist; Cliff Opdyke, USACE Risk Assessor; Bill Kollar, CB&I Federal Services LLC (CB&I) Community Relations; and Mark Hardner, CB&I Geologist. Mr. Moore contacted John Abunaw, NYSDEC Project Manager, to inform him that the FYR process for the Colonie Groundwater OU was underway and to inform him of the anticipated timeline (see Section 6.6).

6.2 Community Notification and Involvement

A public notice of this FYR was published in the *Albany Times Union* newspaper on Thursday, April 6, 2017. The notice stated that this FYR for the Site Groundwater OU was underway as shown below.



US Army Corps of Engineers

U. S. ARMY CORPS OF ENGINEERS TO CONDUCT A FIVE-YEAR REVIEW FOR THE COLONIE FUSRAP SITE

The U.S. Army Corps of Engineers (USACE) is conducting a Five-Year Review of the groundwater remedy for the Colonie Formerly Used Sites Remedial Action Program (FUSRAP) Site, located at 1130 Central Avenue, Town of Colonie, New York.

The purpose of the Five-Year Review is to ensure that the groundwater remedy implemented at the site remains protective of public health and the environment. The remedy currently under review includes enhanced data collection to monitor natural attenuation of groundwater contaminants. Natural attenuation is the combination of physical, chemical, and biological processes that result in reasonably predictable reductions in contaminant concentrations over time. The groundwater contaminants of concern at the Colonie FUSRAP site are the chlorinated solvents Tetrachloroethene and Trichloroethene and their degradation products 1,2-Dichloroethene and Vinyl Chloride.

It is anticipated that the Five-Year Review will be completed in June 2017. Once the review is completed, the results will be made available at the William K. Sanford Town Library, 629 Albany Shaker Road, Loudonville, New York 12211.

Project information can be found online at http://www.nan.usace.army.mil/Missions/Environmental/Environmental-Remediation/FUSRAP/

For further information on the Five-Year Review process or the Colonie FUSRAP Site, please contact:

James Moore, CENAN-PP-E
U.S. Army Corps of Engineers, New York District
26 Federal Plaza, Room 1811
New York, NY 10278-0090
917-790-8230 | James.T.Moore@usace.army.mil

Another public notice will be published when the FYR is complete and available for public review in the Information Repository for the Colonie FUSRAP Site at the William K. Sanford Town Library, 629 Albany Shaker Road, Loudonville, New York 12211.

6.3 Document Review

The relevant documents reviewed in completing this FYR are summarized in the Reference List in Appendix A.

6.4 Data Review

This section presents a review of data relevant to the COCs (i.e., the VOCs PCE, TCE, cis-1,2-DCE, and VC) in groundwater as required by the Groundwater ROD (USACE, 2010c). These four COCs must meet TCGs to close the Groundwater OU. Specifically, a comparison of these COCs to TCGs is presented for each monitoring well to evaluate remedy performance and protectiveness. The analytical chemistry results as presented in the periodic Groundwater LTM Reports were deemed to be of adequate quality and therefore usable for reliable decision making to meet the project-specific data quality objectives.

Note that prior to the issuance of the Groundwater ROD in 2010 (USACE, 2010c), a large-scale excavation of radionuclide-contaminated soil was completed in 2007 at the Colonie Main Site which included the removal of residual VOC source material from the Main Site. This action resulted in a significant reduction in VOC concentrations in the underlying groundwater.

Table 3 of Appendix C presents a summary of minimum, maximum, and latest VOC concentrations in groundwater for the monitoring period from November 2010 through April 2017. The status of each monitoring well for each of the four COCs with respect to the TCGs, along with the current active status of each well are also given in Table 3 (Appendix C). As shown in the table, there is currently one COC out of compliance with respect to its TCG at two wells as of the last 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 of the four COCs remain in compliance at all other current network wells for April 2017. Until more recent monitoring events, two other wells were sporadically out of compliance for PCE (i.e., MW-30 and MW-32S) and one well was consistently out of compliance for vinyl chloride (i.e., MW-34S) during the course of the monitoring period (November 2010 through April 2017).

Appendix D presents additional discussion of VOC results and provides time-series graphs of concentrations of the four VOCs at each monitoring well in the current well network. The direct comparison of VOC results to TCGs and the graphic representation of these results over time clearly demonstrate that the MNA remedy is making progress toward TCG compliance. Note that of the seven Site monitoring wells, three wells (MW-08S, MW-37S, and MW-42S) show no detections of any of the four 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 with

no exceedance during the last monitoring event (MW-34S), and 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 currently out of compliance for the most recent monitoring event (April 2017).

Other evidence demonstrating continued progress of the MNA, and therefore, protectiveness of the remedy, is apparent from the calculation of attenuation rates of the COCs and the assessment of geochemical parameters (i.e., DO and ORP) in groundwater.

Attenuation rates were calculated for three of the monitoring wells (MW-32S, MW-34S, and MW-41S). These wells were selected because at least one COC was detected at a concentration exceeding a TCG at these locations during August 2015-2016, and a historic data record was available to support the rate estimation. Note that recently installed monitoring well MW-44S was not included in the calculation of attenuation rates due to its relatively short data record. Also note that if the concentration of a given COC was consistently less than the method reporting limit (or limit of quantitation), attenuation rate calculations were not performed for that COC.

The following attenuation rate estimates were determined:

- The calculated estimated attenuation rate constants for PCE varied from 0.07 to 0.18 per year, with corresponding half-lives ranging from 3.8 to 9.3 years. Based on these factors, it is projected that PCE concentrations will decline to the TCG of 5.5 µg/L in approximately 1.3 years at MW-32S, and in 17 years at MW-41S.
- The calculated attenuation rate constant for TCE is estimated to vary from 0.03 to 0.15 per year, with corresponding half-lives ranging from 4.7 to 23.1 years. The 2015-2016 TCE concentrations are less than the TCG.

In addition to the calculated attenuation rates, the following relevant and related observations were made:

- Cis-1,2-DCE concentrations have been well below the TCG at the three monitoring wells (MW-32S, MW-34S, and MW-41S) since the completion of the soil removal action in September 2007.
- Since the completion of the soil removal action, VC has been detected at concentrations exceeding the TCG at monitoring well MW-34S only. The 2015-2016 average VC concentrations did not exceed the TCG of 1.4 µg/L.

The assessment of geochemical parameters indicated that geochemical conditions are variable over time and space at the Site. The evidence supports the occurrence of reductive dechlorination of VOCs, but not as optimal conditions for this process.

This information demonstrates that all of the wells with the exception of well MW-41S are projected to be in compliance with TCG within the 15-year-to-compliance period initially estimated in the Groundwater ROD, while RAOs continue to be met. As noted, monitoring well MW-44S, currently out of compliance for PCE, was not included in the attenuation rate calculations due its short data record.

6.5 Site Inspection

The inspection of the Site was conducted on April 4, 2017 by lead agency contractors Matthew Sieger, CB&I Biologist and Jeff Cook, CB&I Hydrogeologist. The purpose of the inspection was to record observations on the Site Inspection Log provided in Appendix E.

The site inspection noted the following observations:

- Damage to boundary fencing observed at three locations, including damage by a large tree that fell over the fence impacting approximately seven fence panels on western side of the Site, lower rail disconnected at one location on west side at creek crossing, and a short span of fence posts (i.e., two to three fence posts) bent and leaning in northeast portion near the Central Avenue entrance gate.
- The "No Trespassing" signs along fence perimeter are in place and intact.
- On-site gravel road in good condition overall, but somewhat soft at southern access gate.
- All dedicated monitoring well pumps observed are in good condition and in good working order. Three spare pumps are available in Site shed.
- Difficult to traverse Site by vehicle following precipitation events due to soft ground under wet conditions.

6.6 Interviews

In accordance with Section II.3 of the Five-Year Review Site Inspection Checklist (see Appendix E), Mark Hardner, CB&I Geologist, interviewed Kent Johnson, NYSDEC Geologist via telephone on May 10, 2017. During the interview, Mr. Johnson indicated that the Site is in an acceptable visual condition in terms of upkeep and the groundwater remedy is functioning as intended and making progress toward TCGs. The full interview was recorded on an interview record form available in Appendix F of this document.

7.0 TECHNICAL ASSESSMENT

7.1 Question A: Is the remedy functioning as intended by the decision documents?

Yes. MNA of the groundwater is functioning as intended by the Colonie FUSRAP Site Groundwater Operable Unit ROD. The following evidence is offered in support:

- Concentrations of the COCs (PCE, TCE, cis-1,2-DCE, and VC) in groundwater at the vast majority of monitoring wells have decreased during the monitoring period and are approaching or have met TCGs.
- TCGs have been met for a number of wells over an extended period, and many of these wells have been decommissioned in accordance with state regulations and as concurred with by NYSDEC.
- At the approximate half-way point of the 15 years estimated in the Groundwater ROD to reach compliance, it appears that the majority of the wells will be in compliance well within that period, with the possible exception of one well.
- Based on its ongoing success, the remedy has been optimized by reducing the number of monitoring wells, number of analytical parameters, and frequency of monitoring events, while still meeting the RAOs.

7.2 Question B: Are the exposure assumptions, toxicity data, cleanup levels, and remedial action objectives used at the time of the remedy selection still valid?

Yes. The groundwater cleanup levels are risk-based values computed specifically by the Johnson and Ettinger Vapor Intrusion Model and are still protective. Since the time that the vapor intrusion model was initially run to provide protective TCGs in groundwater for the vapor intrusion pathway, the toxicity input values for each of the four COCs have been changed by the EPA. Table 4 provides a comparison of the 2004 inhalation toxicity values used in the model to the current values (EPA, 2017) for each of the four COCs.

The three available cancer-based inhalation toxicity values (IURs and URFs) for PCE, TCE, and VC are currently numerically lower than the values published in 2004, by 23-fold, 27-fold, and 2-fold, respectively. There is currently no published cancer-based inhalation toxicity value for cis-1,2-DCE which had a value of 0 in 2004. As lower cancer toxicity values are less toxic than higher values, the TCGs developed using the 2004 inhalation cancer toxicity values are actually more restrictive than what would be estimated in 2017. Coupled with overall reductions in concentrations of the four COCs in groundwater since the TCGs were originally calculated, the remedy at the Site has become more protective over time.

The three available noncancer-based inhalation toxicity values (i.e., RfCs) for PCE, TCE, and VC are currently numerically lower than or equal to the values published in 2004, by 15-fold, 20-fold, and no change, respectively. As lower non-cancer values are more toxic than higher values,

the TCGs that might have been developed using the 2004 inhalation non-cancer toxicity values would have been less restrictive compared with what would have been estimated in 2017. However, as the indoor air residential RSLs (EPA, 2017) for PCE, TCE, and VC are all based on the cancer health endpoint (not the non-cancer health endpoint), the fact that the RfCs decreased for PCE and TCE is not relevant to the groundwater TCGs.

The RAOs for Site groundwater are also still valid as the MNA remedy progresses. The RAOs as presented in the Site Groundwater ROD are:

- Limit exposure of potential future onsite urban residents to VOC constituents that may migrate into homes via the vapor intrusion pathway.
- Reduce the concentrations of VOCs in onsite groundwater to levels that are protective of future onsite urban residents who may be exposed to these compounds via the vapor intrusion pathway.

These RAOs remain valid and continue to be met as applicable to current Site status and conditions. Regarding the first RAO listed above, the onsite pathway for vapor intrusion does not currently exist, but could possibly become complete in the future. However, since there has been no change in the status of the land use (i.e., from the current vacant property to residential) to date, no pathway exists for exposure to human receptors, and no physical site conditions or the understanding of these conditions have changed in a way that could affect the protectiveness of the remedy. In the event that land use of the Site becomes residential, then one or more of the LUCs described in Section 4.2 will be implemented to protect human health. Therefore, this RAO is being met at the present time.

Considering the second-listed RAO, VOC concentrations in onsite groundwater are decreasing over time under the MNA remedy which, in the event of a change in land use of the Site to residential use, will limit exposure of potential future onsite urban residents to VOC constituents that could have otherwise migrated into homes via the vapor intrusion pathway. Therefore, this will protect future onsite urban residents who may be exposed to these compounds via the vapor intrusion pathway.

Note that the remediation of groundwater at the Site is not ARAR-driven. There are no chemical-specific, location-specific, or action-specific ARARs identified for the selected remedy for groundwater at the Site.

7.3 Question C: Has any other information come to light that could call into question the protectiveness of the remedy?

No. There are no changes in physical conditions at the Site or uses that would affect the protectiveness of the remedy. There have been no impacts to the remedy from natural disasters and no new information has been identified or discovered that would diminish the protectiveness of the remedy.

7.4 Technical Assessment Summary

The remedy is functioning as intended by the ROD. There have been no changes in the physical condition of the Site that would affect the protectiveness of the remedy. Groundwater TCGs are being approached and RAOs are being met. There is no other new information that refutes the protectiveness of the remedy.

8.0 ISSUES/RECOMMENDATIONS

No issues related to current Site conditions or activities were identified during this FYR that prevents the remedy from being protective now or in the future.

8.1 Other Findings

Although not required by the Site groundwater remedy, the following actions are recommended based on the site inspection observations:

- Conduct fencing repairs at the three locations noted above.
- Inspect fencing periodically including fence integrity and presence of no trespassing signs.
- Repair gravel road by compacting surface and adding gravel near southern access gate, as needed in accordance with frequency of use.
- Replace dedicated monitoring well pumps as needed with available pumps.
- Consider constructing gravel pathways to each Colonie Main Site monitoring well to improve efficiency of groundwater sampling operations.

9.0 PROTECTIVENESS STATEMENT

The groundwater remedy at the Site is protective of human health and the environment.

The remedy remains protective since both RAOs are currently being met for Site groundwater. That is, the first RAO is met since exposure to future onsite urban residents to VOC constituents that could migrate into homes via the vapor intrusion pathway is currently a nonexistent pathway because land-use is not residential and there are no homes on the Site property. The second RAO is being met by MNA which demonstrates that VOC concentrations have steadily declined and will likely continue until TCGs are attained likely over the next ten years.

Note that no new pathways have been identified since MNA has been initiated. Domestic groundwater consumption is a pathway that was considered but dismissed for two main reasons. Direct groundwater consumption is not a viable pathway because the Upper Groundwater Zone does not yield sufficient quantities of water for daily use, nor is the groundwater from this zone considered potable (i.e., Class III designation) by the state of New York because of the high percentage of solids carried by the groundwater.

10.0 NEXT REVIEW

The next FYR review report for the Site Groundwater OU is required within five years from the completion date of this review.

APPENDIX A - REFERENCE LIST

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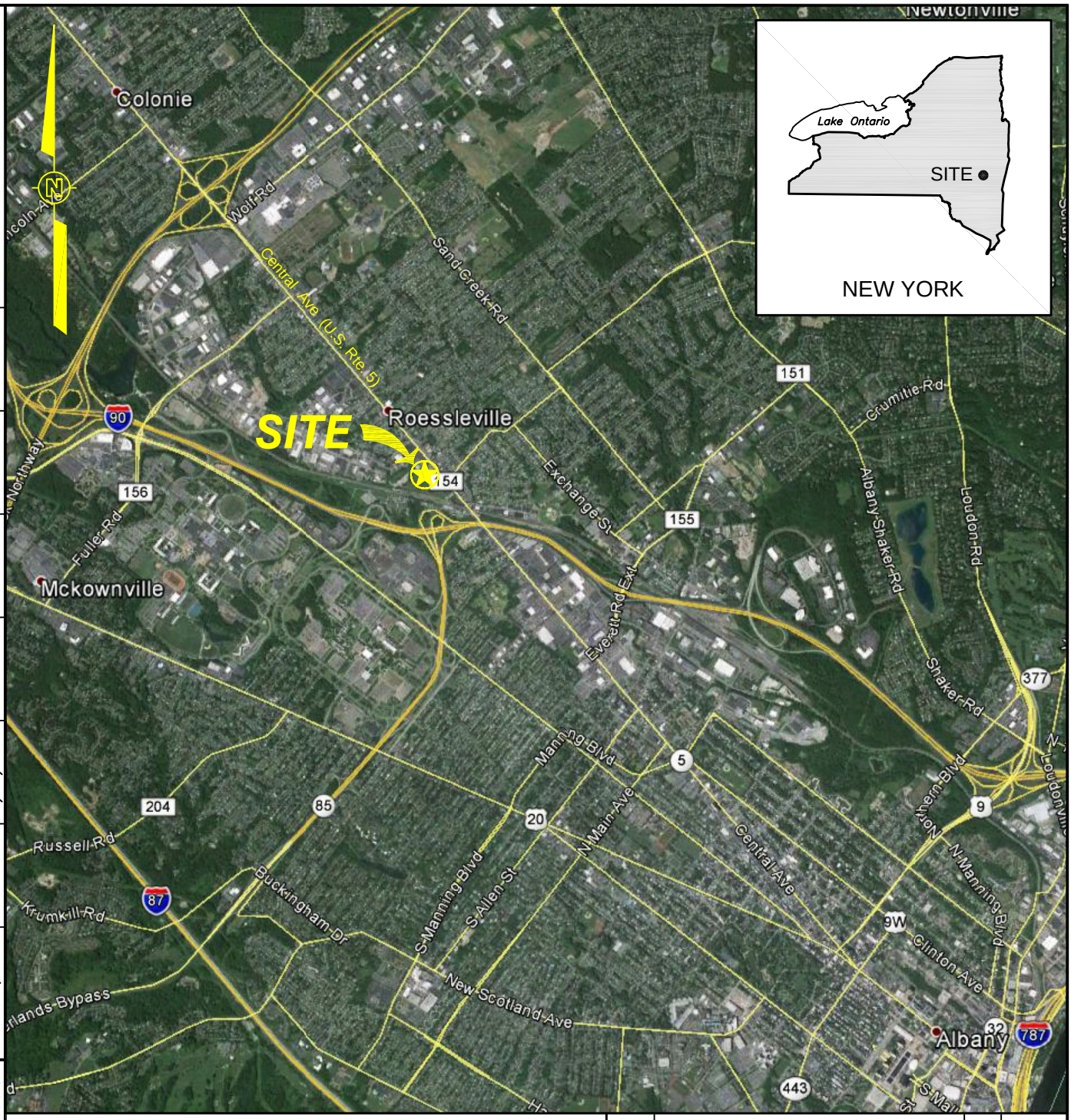
APPENDIX B - FIGURES



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COLONIE_MAP copy.jpg

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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

FIGURE 1
SITE LOCATION MAP

COLONIE FUSRAP SITE
1130 CENTRAL AVENUE
ALBANY, NY 12205

APPROVED BY:	DATE:	SCALE:	DRAWING NO.	SHEET NO.
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OFFICE Pittsburgh, PA

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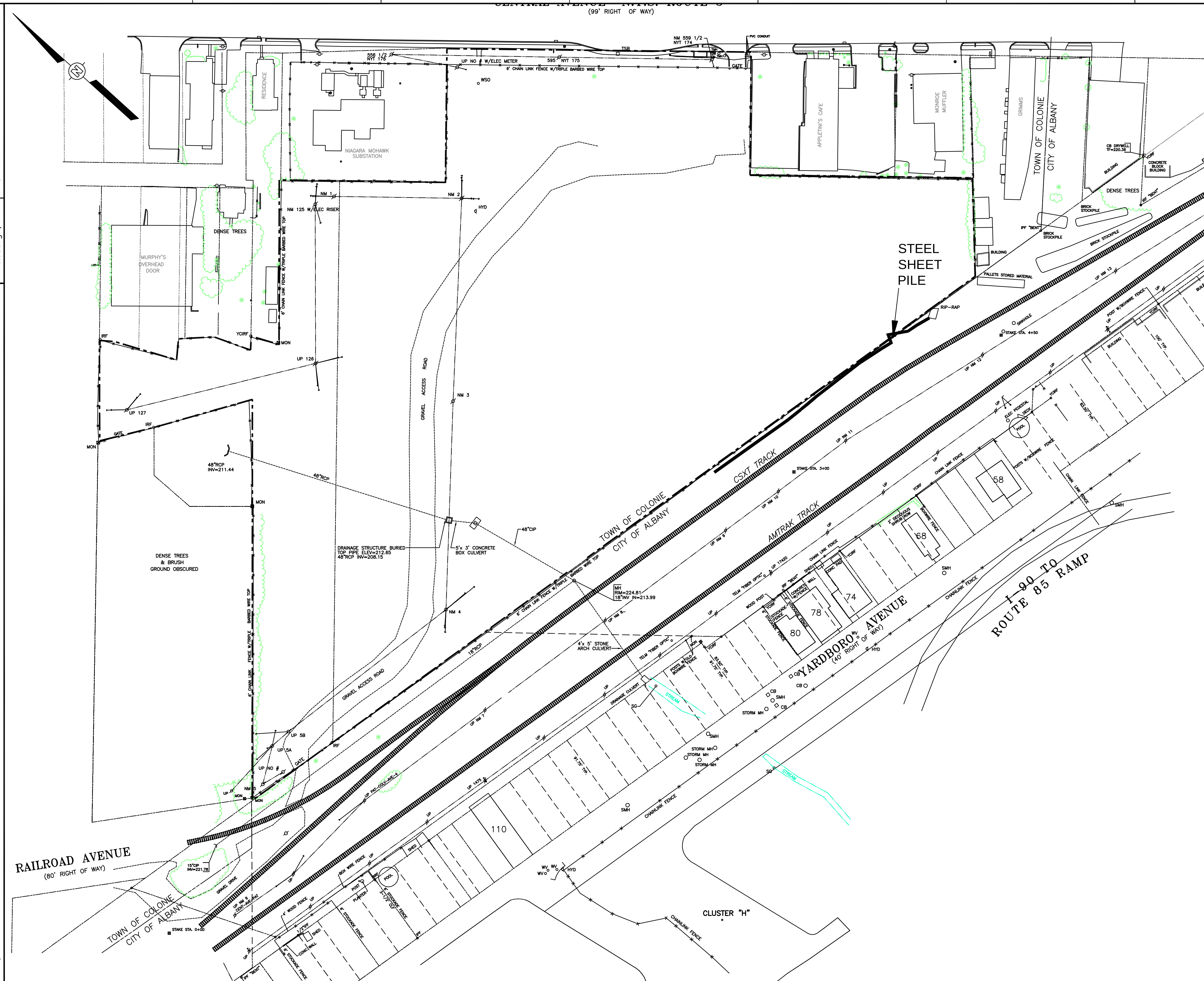

LEGEND:

- PROPERTY OUTLINE
- 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.

REV	DESCRIPTION / ISSUE	DATE	APPROVED

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

DESIGNED BY: --	FIGURE 2 SITE MAP
DRAWN BY: B. Faison	
CHECKED BY: M. Hardner	COLONIE FUSRAP SITE 1130 CENTRAL AVENUE ALBANY, NY 12205

APPROVED BY:	DATE:	SCALE:	DRAWING NO.	SHEET NO.
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8 7 6 5 4 3 2 1

CENTRAL AVENUE - NYS ROUTE 5
(99' RIGHT OF WAY)

TRUE NORTH

RESIDENCE

NIAGARA MOHAWK SUBSTATION

APPLETINI'S CAFE

MONROE MUFFLER

GRUMS

TOWN OF COLONIE
CITY OF ALBANY

MURPHY'S OVERHEAD DOOR

DENSE TREES

DENSE TREES & BRUSH GROUND OBSCURED

GRAVEL ACCESS ROAD

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

CSXT TRACK

AMTRAK TRACK

YARDBORO AVENUE
(40' RIGHT OF WAY)

RAILROAD AVENUE
(80' RIGHT OF WAY)

I-90 TO ROUTE 85 RAMP

STEEL SHEET PILE

CLUSTER "H"

STREAM

MW-08S (NM)

MW-44S (220.50)

MW-32S (218.60)

MW-41S (220.69)

MW-42S (219.42)

MW-37S (213.83)

MW-30S (219.19)

MW-34S (213.64)

225 220 215 210

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
- (NM) NOT MEASURED DURING THIS EVENT
- (219.19) GROUNDWATER ELEVATION (ABOVE MEAN SEA LEVEL)

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 3
GROUNDWATER ELEVATION CONTOURS
UPPER GROUNDWATER ZONE
MARCH 2016

COLONIE FUSRAP SITE
1130 CENTRAL AVENUE
ALBANY, NY 12205

DATE:	SCALE:	DRAWING NO.	SHEET NO.
3/8/2017	AS SHOWN	500304-D9	-

DRAWING NUMBER 500304-D10

RAILROAD AVENUE
(80' RIGHT OF WAY)

CENTRAL AVENUE - NYS ROUTE 5
(99' RIGHT OF WAY)

YARDBORO AVENUE
(40' RIGHT OF WAY)

TOWN OF COLONIE
CITY OF ALBANY

I-90 TO ROUTE 85 RAMP

MW-08S MW-08M
MW-25M
MW-02S MW-02M
MW-14S MW-14M
MW-43M MW-43S
MW-32M MW-32S
MW-41M MW-41S
MW-42M MW-42S
MW-37M MW-37S
MW-36S MW-36M
MW-40S
MW-30M MW-30S
MW-34M MW-34S
MW-10M MW-10S
MW-21M MW-21S
MW-35S MW-35M
MW-33S MW-33M
MW-39S MW-39M
MW-38S MW-38M

RESIDENCE
NIAGARA MOHAWK SUBSTATION
MURPHY'S OVERHEAD DOOR
APPLETINI'S CAFE
MONROE MUFFLER
GRIMMS
DENSE TREES
DENSE TREES & BRUSH GROUND OBSCURED
GRAVEL ACCESS ROAD
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
DRAINAGE CULVERT
STREAM
STEEL SHEET PILE
RIP-RAP
BRICK STOCKPILE
PALLETS STORED MATERIAL
CONCRETE BLOCK BUILDING
CB DRYWELL TF=220.36
EDGE OF BLACKTOP
TELM FIBER OPTIC
CHAINLINK FENCE
WOOD FENCE
POST W/ BARBWIRE FENCE
RETAINING WALL
BULKHEAD
POOL
SHED
CLUSTER "H"
STAKE STA. 0+00
STAKE STA. 3+00
STAKE STA. 4+50
58
68
74
78
80
110

LEGEND:

- PROPERTY OUTLINE
- MW-37S — MONITORING WELL USED FOR SAMPLING/WATERLEVELS
- MW-25M — MONITORING WELL USED FOR WATER LEVELS
- 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.

REV	DESCRIPTION / ISSUE	DATE	APPROVED

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

FIGURE 4
MONITORING WELL NETWORK
PRIOR TO AUGUST 2015

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	--	3/8/2017	AS SHOWN	500304-D10	-

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OFFICE Pittsburgh, PA

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CENTRAL AVENUE - NYS ROUTE 5
(99' RIGHT OF WAY)

TRUE NORTH

RESIDENCE

NIAGARA MOHAWK SUBSTATION

MURPHY'S OVERHEAD DOOR

DENSE TREES

APPLETINI'S CAFE

MONROE MUFFLER

GRIMMS

TOWN OF COLONIE
CITY OF ALBANY

CB DRYWELL TF=220.36

CONCRETE BLOCK BUILDING

BRICK STOCKPILE

PALLETS STORED MATERIAL

MW-08S

MW-44S

MW-32S

MW-41S

MW-42S

MW-37S

MW-30S

MW-34S

STEEL SHEET PILE

RIP-RAP

GRAVEL ACCESS ROAD

CSXT TRACK

AMTRAK TRACK

TOWN OF COLONIE
CITY OF ALBANY

DENSE TREES & BRUSH GROUND OBSCURED

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

48"CIP

5'x 3' CONCRETE BOX CULVERT

4'x 5' STONE ARCH CULVERT

STREAM

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"

58 68 74 78 80 110

CHAINLINK FENCE

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)

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 5
MONITORING WELL NETWORK
AUGUST 2015

COLONIE FUSRAP SITE
1130 CENTRAL AVENUE
ALBANY, NY 12205

DATE:	SCALE:	DRAWING NO.	SHEET NO.
3/8/2017	AS SHOWN	500304-D9	-

APPENDIX C - TABLES

Table 1. Colonie Monitoring Well Network (through July 2015)

Upper Groundwater Zone Monitoring Wells and Piezometers							
MW-08S	MW-10S	MW-21S	MW-30S	MW-32S	MW-34S	MW-35S	MW-36S
MW-37S	MW-38S	MW-39S	MW-40S	MW-41S	MW-42S	MW-43S	
Lower Groundwater Zone Monitoring Wells and Piezometers							
MW-08M	MW-30M	MW-32M	MW-37M	MW-41M	MW-42M	MW-43M*	

*****Note: Monitoring well MW-43M was removed from well network in May 2011.

Table 2. Colonie Monitoring Well Network (through April 2017)

Upper Groundwater Zone Monitoring Wells			
MW-08S	MW-30S	MW-32S*	MW-34S
MW-37S	MW-41S	MW-42S	MW-44S

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

Table 3. Contaminant of Concern Results and Compliance Status
Period of Record: November 2010 through April 2017

Monitoring Well	Contaminant of Concern	Target Cleanup Goals [1] (µg/L)	Minimum Concentration [2] (µg/L)	Maximum Concentration [2] (µg/L)	Latest Sample Result [3] (µg/L)	Target Cleanup Goal Status	Monitoring Well Active Status
MW-08S	Cis-1,2-DCE	1,800	1.0 U	1.0 U	1.0 U	In Compliance	Active (Current Network Well)
	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-10S	Cis-1,2-DCE	1,800	1.0 U	1.0 U	1.0 U	In Compliance (prior to decommissioning)	Decommissioned (August 2015)
	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-21S	Cis-1,2-DCE	1,800	1.0 U	**1.4** [4]	1.0 U	In Compliance (prior to decommissioning)	Decommissioned (August 2015)
	PCE	5.5	**0.24 J**	**1.1**	**0.24 J**		
	TCE	18	1.0 U	**0.56 J**	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	Active (Current Network Well)
	PCE	5.5	**1.5**	**6** [5]	**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-32S	Cis-1,2-DCE	1,800	**1.1**	**23**	**6.5**	In Compliance	Inactive (Existing Well Excluded from Well Network after 08/2016 Sampling Event)
	PCE	5.5	**2.4**	**50**	**2.4**		
	TCE	18	**1.1**	**19**	**1.6**		
	VC	1.4	1.0 U	**0.55 J**	1.0 U		
MW-34S	Cis-1,2-DCE	1,800	**0.79 J**	**1.6**	**1.2**	In Compliance	Active (Current Network Well)
	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-35S	Cis-1,2-DCE	1,800	1.0 U	1.0 U	1.0 U	In Compliance (prior to decommissioning)	Decommissioned (August 2015)
	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		

Table 3. Contaminant of Concern Results and Compliance Status (continued)
Period of Record: November 2010 through April 2017

Monitoring Well	Contaminant of Concern	Target Cleanup Goals [1] (µg/L)	Minimum Concentration [2] (µg/L)	Maximum Concentration [2] (µg/L)	Latest Sample Result [3] (µg/L)	Target Cleanup Goal Status	Monitoring Well Active Status
MW-36S	Cis-1,2-DCE	1,800	1.0 U	1.0 U	1.0 U	In Compliance (prior to decommissioning)	Decommissioned (August 2015)
	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-37S	Cis-1,2-DCE	1,800	**17**	**52**	**49**	In Compliance	Active (Current Network Well)
	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-38S	Cis-1,2-DCE	1,800	1.0 U	1.0 U	1.0 U	In Compliance (prior to decommissioning)	Decommissioned (August 2015)
	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-39S	Cis-1,2-DCE	1,800	1.0 U	1.0 U	1.0 U	In Compliance (prior to decommissioning)	Decommissioned (August 2015)
	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-40S	Cis-1,2-DCE	1,800	1.0 U	1.0 U	1.0 U	In Compliance (prior to decommissioning)	Decommissioned (August 2015)
	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-41S	Cis-1,2-DCE	1,800	**6.8**	**3.5**	**4.8**	In Compliance	Active (Current Network Well)
	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	Active (Current Network Well)
	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 3. Contaminant of Concern Results and Compliance Status (continued)
Period of Record: November 2010 through April 2017

Monitoring Well	Contaminant of Concern	Target Cleanup Goals [1] (µg/L)	Minimum Concentration [2] (µg/L)	Maximum Concentration [2] (µg/L)	Latest Sample Result [3] (µg/L)	Target Cleanup Goal Status	Monitoring Well Active Status
MW-43S	Cis-1,2-DCE	1,800	1.0 U	1.0 U	1.0 U	In Compliance (prior to decommissioning)	Decommissioned (August 2015)
	PCE	5.5	1.0 U	**0.23 J**	**0.23 J**		
	TCE	18	1.0 U	1.0 U	1.0 U		
	VC	1.4	1.0 U	1.0 U	1.0 U		
MW-44S	Cis-1,2-DCE	1,800	**2.8**	**3.5**	**3.3**	In Compliance	Active (Current Network Well Installed July 2015)
	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	

Notes:

(1) Target Cleanup Goals as per Colonie Groundwater ROD, April 2010.

(2) Minimum and maximum concentrations are for the period of record from November 2010 through April 2017.

(3) Latest sample for current network wells collected April 2017 and latest sample for decommissioned wells collected August 2012.

(4) Results in boldface text are laboratory detections.

(5) Shaded entry indicates that the value exceeds the Target Cleanup Goal.

Key:

µg/L = micrograms per liter

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

PCE = tetrachloroethene

TCE = trichloroethene

VC = vinyl chloride

U = non-detect at method report limit (i.e., limit of quantitation) given

J = estimated value below the method reporting limit (i.e., limit of quantitation)

Table 4
Comparison of Inhalation Toxicity Values for 2004 and 2017

COC (CAS #)	2004 URF [(1)] $(\mu g/m^3)^{-1}$	2017 IUR [(2)] $(\mu g/m^3)^{-1}$	2004 RfC (mg/m^3)	2017 RfC (mg/m^3)
cis-1,2-DCE	0	NPV	3.5×10^{-2}	NPV
PCE	5.9×10^{-6}	2.6×10^{-7}	6.0×10^{-1}	4.0×10^{-2}
TCE	1.1×10^{-4}	4.1×10^{-6}	4.0×10^{-2}	2.0×10^{-3}
VC	8.8×10^{-6}	4.4×10^{-6}	1.0×10^{-1}	1.0×10^{-1}

Note: [(1)] URF (unit risk factor) is the inhalation toxicity term that pre-dates the current term IUR (inhalation unit risk).

[(2)] EPA 2017 RSLs (reference below).

Key:
CAS # = Chemical Abstracts Service number
cis-1,2-DCE = cis-1,2-dichlroethene
COC = contaminant of concern
IUR = inhalation unit risk
$(\mu g/m^3)^{-1}$ = inverse of micrograms per cubic meter
mg/m^3 = milligrams per cubic meter
NPV = no published value
PCE = tetrachloroethene
RfC = reference concentration
TCE = trichloroethene
URF = unit risk factor
VC = vinyl chloride

References:
URS, 2008. *Final Groundwater Feasibility Study, Colonie FUSRAP Site.* URS Corporation for the U.S. Army Corps of Engineers – New York District. May 2008.

EPA, 2017. June 2017 RSLs - https://www.epa.gov/risk/regional-screening-levels-rsls-generic-tables-june-2017.

APPENDIX D – ADDITIONAL DATA REVIEW and VOC TIME-SERIES PLOTS

Additional Data Review

This appendix provides additional summary information of groundwater data supplemental to Section 6.4 (Data Review) of the FYR. It includes a discussion of groundwater data for the four COCs (i.e., the VOCs PCE, TCE, cis-1,2-DCE, and VC) as required for monitoring and compliance by the Groundwater ROD (USACE, 2010c). As mentioned in Section 6.4 of the FYR, the analytical chemistry data are considered of adequate quality and are usable for reliable decision making to meet project-specific data quality objectives.

During the first two-year monitoring period conducted from November 2010 through August 2012 following signature of the referenced Groundwater ROD, concentrations of COCs in groundwater at the Site ranged (with the number of wells having exceedances of a TCG) as follows:

- PCE: non-detected to 50 µg/L (exceedances of TCG at three monitoring wells)
- TCE: non-detected to 19 µg/L (exceedance of TCG at one monitoring well)
- cis-1,2-DCE: non-detected to 48 µg/L (exceedance of TCG at zero monitoring wells)
- VC: non-detected to 3.4 µg/L (exceedance of TCG at one monitoring well).

During the monitoring period from August 2015 through April 2017 (conducted after the initial two-year monitoring period) and following LTM program modifications, the concentrations of COCs ranged (with the number of wells having exceedances of a TCG) as follows:

- PCE: non-detected to 25 µg/L (exceedances of TCG at three monitoring wells)
- TCE: non-detected to 9.9 µg/L (exceedance of TCG at zero monitoring wells)
- cis-1,2-DCE: non-detected to 52 µg/L (exceedance of TCG at zero monitoring wells)
- VC: non-detected to 1.7 µg/L (exceedance of TCG at one monitoring well).

The maximum VOC concentrations detected during the second two-year monitoring period reduced by half, with the exception of the breakdown product cis-1,2-DCE, which maintained essentially the same concentration.

Table 3 (Appendix C) presents summary results for the four aforementioned VOCs in groundwater for the current monitoring well network at the Site for the monitoring period November 2010 through April 2017. Appendix D presents graphs of time trend plots of concentrations for the four VOCs at each monitoring well in the current well network. The VOC results and compliance status are summarized for each monitoring well during the monitoring period from November 2010 through April 2017 as follows:

- MW-08S: This upgradient well had no detections of VOCs during the monitoring period (and has been in compliance with TCGs throughout the monitoring period).
- MW-30S: One VOC (PCE) exceeded its TCG of 5.5 µg/L just two times during the monitoring period, the last of which was during the August 2012 event, with a concentration of 6.0 µg/L. No exceedances of the TCG for PCE were recorded for the last four results which ranged from 1.5 to 3.9 µg/L over the period from August 2015 through April 2017. This well is currently in compliance with TCGs (MW-32S in compliance since August 2012).
- 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. This well has been in compliance for PCE since the August 2015 event. TCE exceeded its TCG of 18.0 µg/L at this well one time during the monitoring period, with a concentration of 19 µg/L in August 2012. This well has been in compliance for TCE since the August 2012 event. This well was removed from the groundwater LTM program following the August 2016 sampling event because constituent concentrations are believed to be unrepresentative of local groundwater conditions due to a stagnating effect caused by the nearby (and just upgradient) sheet pile wall. MW-32S was in compliance at the time of removal from the LTM program, and remains at the Site (i.e., yet to be decommissioned). A monitoring well (i.e., MW-44S) located upgradient of MW-32S was installed July 2015.
- MW-34S: VC is the only VOC not meeting its TCG (1.4 µg/L) during the monitoring period. VC ranged from 1.1 to 3.4 µg/L with two recent non-exceedances of the TCG in March 2016 and April 2017. This well is currently in compliance with TCGs.
- MW-37S: This well had no exceedances of TCGs during the monitoring period. The concentrations of cis-1,2-DCE have increased yet remain well below its TCG Consistently low concentrations of PCE, TCE, and VC were all below TCGs during the monitoring period. This well is currently in compliance with TCGs and has been such throughout the monitoring period.
- MW-41S: PCE is the only VOC of the four that exceeded its TCG (5.5 µg/L) during the monitoring period. It has exceeded the limit 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 being monitored are all below their respective TCGs. PCE concentrations have decreased over time similar to the three other VOCs; however, the PCE concentrations have remained one order of magnitude above its TCG. This well

is currently out of compliance for PCE only (and has been such throughout the monitoring period).

- MW-42S: There were no exceedances of TCGs for well MW-42S 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. This well is currently in compliance with TCGs and has been such throughout the monitoring period.
- MW-44S: This well was installed in July 2015 and has been sampled 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. This well is currently out of compliance for PCE only (and has been such since March 2016).

The direct comparison of VOC results to TCGs and the graphic representation of these results over time indicates that the MNA remedy is making progress toward TCG compliance.

In addition to directly comparing groundwater concentrations to TCGs, statistical analyses were performed to evaluate data trends. A quantitative summary of the statistical information is presented below is an excerpt from the *2015-2016 Annual Report, Long-Term Groundwater Monitoring, Natural Attenuation Remedy* (USACE, 2016b). The computed results for the VOC statistical analysis (i.e., the Mann-Kendall analysis) are provided at the end of this text.

VOC Statistical Analysis:

- The Mann-Kendall analysis indicates stable to no trends in the Main Site source area wells (i.e., wells MW-32S and MW-41S), possibly decreasing trends at downgradient well MW-34S (with the exception of no TCE trend) and no trends for PCE and TCE with a stable VC trend and an increasing cis-1,2-DCE trend at downgradient well MW-37S. In general, COCs are stable or possibly decreasing in concentration, with the exception of cis-1,2-DCE at downgradient wells MW-37S.
- Linear regression results were similar; however, linear regression sometimes assigns trends while Mann-Kendall analysis shows no trend. The only increasing trends were at MW-37S (possibly increasing TCE trend and increasing cis-1,2-DCE trend).
- Monitoring and Remediation Optimization System (MAROS) software (Air Force Center for Environmental Excellence [AFCEE], 2012) was used to assess the trends in the groundwater COC data collected between November 2010 and March 2016 versus

compliance with the TCGs and recommend sampling frequency at individual well locations. The software recommendation was continued sampling at each of the monitoring wells on a semi-annual basis.

The MAROS run results are provided in Attachment 1 to this appendix.

As indicated in Section 6.4, attenuation rates calculated for three of the monitoring wells (i.e., MW-32S, MW-34S, and MW-41S) indicated that PCE concentrations will decline to the TCG of 5.5 µg/L in approximately 1.3 years at MW-32S, and in 17 years at MW-41S. The current PCE concentration at MW-34 is less than its TCG. The attenuation rate calculations are presented in Attachment 2 to this appendix.

Attachment 1 – MAROS Run Results

MAROS COC Assessment

Project: Colonie, NY
User Name: CB&I Federal Services, LLC
Location: Albany
State: New York

Toxicity:

Contaminant of Concern	Representative Concentration (mg/L)	PRG (mg/L)	Percent Above PRG
TETRACHLOROETHYLENE(PCE)	9.8E-03	5.5E-03	78.0%

Note: Top COCs by toxicity were determined by examining a representative concentration for each compound over the entire site. The compound representative concentrations are then compared with the chosen PRG for that compound, with the percentage exceedance from the PRG determining the compound's toxicity. All compounds above exceed the PRG.

Prevalence:

Contaminant of Concern	Class	Total Wells	Total Exceedance	Percent Exceedances	Total Detects
TETRACHLOROETHYLENE(PCE)	ORG	4	2	50.0%	4

Note: Top COCs by prevalence were determined by examining a representative concentration for each well location at the site. The total exceedances (values above the chosen PRGs) are compared to the total number of wells to determine the prevalence of the compound.

Mobility:

Contaminant of Concern	Kd/Koc
TETRACHLOROETHYLENE(PCE)	0.923

Note: Top COCs by mobility were determined by examining each detected compound in the dataset and comparing their mobilities (Koc's for organics, assuming foc = 0.001, and Kd's for metals).

Priority Constituents by Well:

Well Name	Average	Max
MW-08S	TETRACHLOROETHYLENE(P	cis-1,2-DICHLOROETHYLEN
MW-30S	cis-1,2-DICHLOROETHYLEN	TETRACHLOROETHYLENE(
MW-32S	TETRACHLOROETHYLENE(P	TETRACHLOROETHYLENE(
MW-34S	VINYL CHLORIDE	VINYL CHLORIDE
MW-37S	cis-1,2-DICHLOROETHYLEN	VINYL CHLORIDE
MW-41S	TETRACHLOROETHYLENE(P	TETRACHLOROETHYLENE(
MW-42S	VINYL CHLORIDE	VINYL CHLORIDE

Individual Well Cleanup Status - Optional Analysis Results

Project: **User Name:**

Location: **State:**

From Period: 11/30/2010 **to** 3/7/2016

Well	Sample Size	Sample Mean	Sample Stdev.	Normal Distribution Assumption: Significantly < Cleanup Goal?	Normal Distribution Assumption: Power	Normal Distribution Assumption: Expected Sample	Lognormal Distribution Assumption: Significantly < Cleanup Goal?	Lognormal Distribution Assumption: Power	Lognormal Distribution Assumption: Expected Sample
cis-1,2-DICHLOROETHYLENE	Cleanup Goal (mg/L) =	1.8		Alpha Level =	0.05		Expected Power =	0.8	
MW-32S	9	9.52E-03	5.95E-03	YES	1.000	<=3	YES	1.000	<=3
MW-34S	9	1.09E-03	2.87E-04	YES	1.000	<=3	YES	1.000	<=3
MW-37S	9	3.46E-02	1.11E-02	YES	1.000	<=3	YES	1.000	<=3
MW-41S	9	5.08E-03	1.07E-03	YES	1.000	<=3	YES	1.000	<=3
TETRACHLOROETHYLENE(P	Cleanup Goal (mg/L) =	0.0055		Alpha Level =	0.05		Expected Power =	0.8	
MW-32S	9	1.24E-02	1.48E-02	NO	S/E	S/E	NO	S/E	S/E
MW-34S	9	6.86E-04	1.49E-04	YES	1.000	<=3	YES	1.000	<=3
MW-37S	9	3.80E-04	1.27E-04	YES	1.000	<=3	YES	1.000	<=3
MW-41S	9	2.57E-02	7.70E-03	NO	S/E	S/E	NO	S/E	S/E
TRICHLOROETHYLENE (TCE)	Cleanup Goal (mg/L) =	0.018		Alpha Level =	0.05		Expected Power =	0.8	
MW-32S	9	5.30E-03	5.51E-03	YES	1.000	<=3	YES	0.995	4
MW-34S	9	5.56E-04	1.67E-04	YES	1.000	<=3	YES	1.000	<=3
MW-37S	9	4.94E-04	1.43E-04	YES	1.000	<=3	YES	1.000	<=3
MW-41S	9	7.23E-03	1.93E-03	YES	1.000	<=3	YES	1.000	<=3
VINYL CHLORIDE	Cleanup Goal (mg/L) =	0.0014		Alpha Level =	0.05		Expected Power =	0.8	
MW-32S	9	5.52E-04	2.11E-04	YES	1.000	<=3	YES	1.000	<=3
MW-34S	9	2.16E-03	6.35E-04	NO	S/E	S/E	NO	S/E	S/E
MW-37S	9	5.84E-04	1.67E-04	YES	1.000	<=3	YES	1.000	<=3
MW-41S	9	8.31E-04	2.26E-04	YES	1.000	<=3	YES	1.000	<=3

Note: N/C refers to "not conducted" because of insufficient data (N<4); S/E indicates the sample mean significantly exceeds the cleanup level and thus no analysis is conducted; Sample Size is the number of concentration data in a sampling location that are used in the power analysis; Expected Sample Size is the number of concentration data needed to reach the Expected Power under current sample variability; The Target Level is the expected mean concentration in wells after cleanup attainment, it is only used in individual well celanup status evaluation. The Student's t-test on mean difference is used in this analysis. Refer to Appendix A.6 of MAROS Manual for details.

MAROS Individual Well Summary Report

Project: Colonie, NY
User Name: CB&I Federal Services, LLC
Location: Albany
State: New York

COC	Priority COC for Well?	Detection Frequency	Recent Sample Above Goal?	MK Trend	COV	95% UCL	Outlier	Distribution Assumption	Attained Cleanup?	
									Normal	Lognormal
MW-32S										
DCE12C	NO	100 %	NO	S	0.62	0.0141	NO	Normal	YES	NO
PCE	YES	100 %	NO	NT	1.19	0.0238	YES	Lognormal	NO	NO
TCE	NO	100 %	NO	NT	1.04	0.0095	YES	Lognormal	YES	NO
VC	NO	56 %	NO	NT	0.41	0.0007	YES	No distribution	YES	YES
MW-34S										
DCE12C	NO	100 %	NO	PD	0.26	0.0013	NO	Normal	YES	YES
PCE	NO	100 %	NO	PD	0.22	0.0008	NO	Normal	YES	YES
TCE	NO	11 %	NO	NT	0.00	0.0007	YES	No distribution	YES	YES
VC	YES	100 %	NO	PD	0.29	0.0026	NO	Normal	NO	NO
MW-37S										
DCE12C	YES	100 %	NO	I	0.32	0.0431	NO	Normal	YES	NO
PCE	NO	89 %	NO	NT	0.36	0.0005	NO	Normal	YES	YES
TCE	NO	100 %	NO	NT	0.29	0.0006	NO	Normal	YES	YES
VC	YES	100 %	NO	S	0.29	0.0007	NO	Normal	YES	YES
MW-41S										
DCE12C	NO	100 %	NO	S	0.21	0.0059	NO	Normal	YES	YES
PCE	YES	100 %	YES	S	0.30	0.0316	NO	Normal	NO	NO
TCE	NO	100 %	NO	S	0.27	0.0087	NO	Normal	YES	YES
VC	NO	100 %	NO	NT	0.27	0.0010	NO	Normal	YES	YES

MAROS Linear Regression Statistics Summary

Project: Colonie, NY
Location: Albany

User Name: CB&I Federal Services, LLC
State: New York

Time Period: 11/30/2010 **to** 3/7/2016
Consolidation Period: No Time Consolidation
Consolidation Type: Median
Duplicate Consolidation: Average
ND Values: 1/2 Detection Limit
J Flag Values : Actual Value

Well	Source/Tail	Average Conc (mg/L)	Median Conc (mg/L)	Standard Deviation	All Samples "ND" ?	Ln Slope	Coefficient of Variation	Confidence in Trend	Concentration Trend
cis-1,2-DICHLOROETHYLENE									
MW-32S	S	9.5E-03	8.9E-03	5.9E-03	No	-6.4E-04	0.62	94.9%	PD
MW-34S	T	1.1E-03	9.6E-04	2.9E-04	No	-1.8E-04	0.26	92.5%	PD
MW-37S	T	3.5E-02	3.4E-02	1.1E-02	No	3.4E-04	0.32	98.0%	I
MW-41S	S	5.1E-03	5.1E-03	1.1E-03	No	-9.9E-05	0.21	80.8%	S
TETRACHLOROETHYLENE(PCE)									
MW-32S	S	1.2E-02	5.3E-03	1.5E-02	No	-8.4E-05	1.19	56.7%	NT
MW-34S	T	6.9E-04	7.1E-04	1.5E-04	No	-2.9E-04	0.22	100.0%	D
MW-37S	T	3.8E-04	3.8E-04	1.3E-04	No	1.4E-04	0.33	77.2%	NT
MW-41S	S	2.6E-02	2.6E-02	7.7E-03	No	-1.6E-04	0.30	80.8%	S
TRICHLOROETHYLENE (TCE)									
MW-32S	S	5.3E-03	3.0E-03	5.5E-03	No	-9.2E-05	1.04	57.8%	NT
MW-34S	T	5.6E-04	5.0E-04	1.7E-04	No	-1.5E-06	0.30	100.0%	D
MW-37S	T	4.9E-04	5.3E-04	1.4E-04	No	2.2E-04	0.29	92.0%	PI
MW-41S	S	7.2E-03	7.1E-03	1.9E-03	No	-2.1E-04	0.27	94.0%	PD
VINYL CHLORIDE									
MW-32S	S	5.5E-04	5.0E-04	2.1E-04	No	4.9E-05	0.38	61.7%	NT
MW-34S	T	2.2E-03	2.2E-03	6.3E-04	No	-3.0E-04	0.29	97.7%	D
MW-37S	T	5.8E-04	5.9E-04	1.7E-04	No	-1.8E-04	0.29	88.5%	S
MW-41S	S	8.3E-04	9.0E-04	2.3E-04	No	-4.9E-05	0.27	62.4%	S

MAROS Linear Regression Statistics Summary

Colonie, NY

Albany

User Name: CB&I Federal Services, LLC

State: New York

VINYL CHLORIDE

Well	Source/Tail	Average Conc (mg/L)	Median Conc (mg/L)	Standard Deviation	All Samples "ND" ?	Ln Slope	Coefficient of Variation	Confidence in Trend	Concentration Trend

Note: Increasing (I); Probably Increasing (PI); Stable (S); Probably Decreasing (PD); Decreasing (D); No Trend (NT); Non-detect (ND); Not Applicable (N/A) - Due to insufficient Data (< 4 sampling events); COV = Coefficient of Variation

MAROS Mann-Kendall Statistics Summary

Project: Colonie, NY
User Name: CB&I Federal Services, LLC
Location: Albany
State: New York

Time Period: 11/30/2010 to 3/7/2016
Consolidation Period: No Time Consolidation
Consolidation Type: Median
Duplicate Consolidation: Average
ND Values: 1/2 Detection Limit
J Flag Values : Actual Value

Well	Source/ Tail	Number of Samples	Number of Detects	Coefficient of Variation	Mann-Kendall Statistic	Confidence in Trend	All Samples "ND" ?	Concentration Trend
cis-1,2-DICHLOROETHYLENE								
MW-32S	S	9	9	0.62	-13	89.0%	No	S
MW-34S	T	9	9	0.26	-16	94.0%	No	PD
MW-37S	T	9	9	0.32	28	99.9%	No	I
MW-41S	S	9	9	0.21	-11	84.6%	No	S
TETRACHLOROETHYLENE(PCE)								
MW-32S	S	9	9	1.19	0	46.0%	No	NT
MW-34S	T	9	9	0.22	-16	94.0%	No	PD
MW-37S	T	9	8	0.33	3	58.0%	No	NT
MW-41S	S	9	9	0.30	-3	58.0%	No	S
TRICHLOROETHYLENE (TCE)								
MW-32S	S	9	9	1.04	1	50.0%	No	NT
MW-34S	T	9	1	0.30	4	61.9%	No	NT
MW-37S	T	9	9	0.29	12	87.0%	No	NT
MW-41S	S	9	9	0.27	-8	76.2%	No	S
VINYL CHLORIDE								
MW-32S	S	9	5	0.38	12	87.0%	No	NT
MW-34S	T	9	9	0.29	-14	91.0%	No	PD
MW-37S	T	9	9	0.29	-6	69.4%	No	S
MW-41S	S	9	9	0.27	5	65.7%	No	NT

Note: Increasing (I); Probably Increasing (PI); Stable (S); Probably Decreasing (PD); Decreasing (D); No Trend (NT); Not Applicable (N/A)-Due to insufficient Data (< 4 sampling events); Source/Tail (S/T)

The Number of Samples and Number of Detects shown above are post-consolidation values.

MAROS Power Analysis for Individual Well Cleanup Status

Project: Colonie, NY
User Name: CB&I Federal Services, LLC
Location: Albany
State: New York

From Period: 11/30/2010 **to** 3/7/2016

Well Name	Sample Size	Sample Mean	Sample Stdev.	Normal Distribution Cleanup Status	Lognormal Distribution Cleanup Status	Alpha Level	Expected Power
cis-1,2-DICHLOROETHYLENE	Cleanup Goal (mg/L) = 1.8				Target Level (mg/L) = 1.44		
MW-32S	9	9.52E-03	5.95E-03	Attained	Cont Sampling	0.05	0.8
MW-34S	9	1.09E-03	2.87E-04	Attained	Attained	0.05	0.8
MW-37S	9	3.46E-02	1.11E-02	Attained	Cont Sampling	0.05	0.8
MW-41S	9	5.08E-03	1.07E-03	Attained	Attained	0.05	0.8
TETRACHLOROETHYLENE(PCE)	Cleanup Goal (mg/L) = 0.0055				Target Level (mg/L) = 0.0044		
MW-32S	9	1.24E-02	1.48E-02	Cont Sampling	Cont Sampling	0.05	0.8
MW-34S	9	6.86E-04	1.49E-04	Attained	Attained	0.05	0.8
MW-37S	9	3.80E-04	1.27E-04	Attained	Attained	0.05	0.8
MW-41S	9	2.57E-02	7.70E-03	Cont Sampling	Not Attained	0.05	0.8
TRICHLOROETHYLENE (TCE)	Cleanup Goal (mg/L) = 0.018				Target Level (mg/L) = 0.0144		
MW-32S	9	5.30E-03	5.51E-03	Attained	Cont Sampling	0.05	0.8
MW-34S	9	5.56E-04	1.67E-04	Attained	Attained	0.05	0.8
MW-37S	9	4.94E-04	1.43E-04	Attained	Attained	0.05	0.8
MW-41S	9	7.23E-03	1.93E-03	Attained	Attained	0.05	0.8
VINYL CHLORIDE	Cleanup Goal (mg/L) = 0.0014				Target Level (mg/L) = 0.00112		
MW-32S	9	5.52E-04	2.11E-04	Attained	Attained	0.05	0.8
MW-34S	9	2.16E-03	6.35E-04	Not Attained	Not Attained	0.05	0.8
MW-37S	9	5.84E-04	1.67E-04	Attained	Attained	0.05	0.8
MW-41S	9	8.31E-04	2.26E-04	Attained	Attained	0.05	0.8

Note: N/C refers to "not conducted" because of insufficient data (N<4); S/E indicates the sample mean significantly exceeds the cleanup level and thus no analysis is conducted; Sample Size is the number of concentration data in a sampling location that are used in the analysis; Target Level is the expected mean concentration in wells after cleanup attainment, it is only used in individual well celanup status evaluation. The test for evaluating attainment status is from EPA (1992). Refer to Appendix A.6 of MAROS Manual for details.

MAROS Sampling Location Optimization Results

User Name:

State:

Sampling Events Analyzed: From 12/30/1899 **to** 12/30/1899

Parameters used:

Constituent	Inside SF	Hull SF	Area Ratio	Conc. Ratio
cis-1,2-DICHLOROETHY	0.3	0.1	0.9	0.85
TETRACHLOROETHYLE	0.3	0.1	0.9	0.85
TRICHLOROETHYLENE	0.3	0.1	0.9	0.85
VINYL CHLORIDE	0.3	0.1	0.9	0.85

Well Name	X (feet)	Y (feet)	Removable?	Average Slope Factor*	Minimum Slope Factor*	Maximum Slope Factor*	Eliminated?

Note: The Slope Factor indicates the relative importance of a well in the monitoring network at a given sampling event; the larger the SF value of a well, the more important the well is and vice versa; the Average Slope Factor measures the overall well importance in the selected time period; the State Plane (i.e., X and Y refer to Easting and Northing, respectively) or local coordinate systems may be used; wells that are NOT selected for analysis are not shown above.
* When the report is generated after running the Excel module, SF values will NOT be shown above.

MAROS Site Summary

Project: Colonie, NY
User Name: CB&I Federal Services, LLC
Location: Albany
State: New York

User Defined Site and Data Assumptions

Hydrogeology and Plume Information:

Groundwater Seepage Velocity:	22	ft/yr
Current Plume Length:	120	ft
Current Plume Width:	138	ft
Number of Tail Wells:	2	
Number of Source Wells:	2	

Downgradient Information:

Distance from Edge of Tail to Nearest:

Downgradient receptor:	40 ft
Downgradient property:	40 ft

Distance from Source to Nearest:

Downgradient receptor:	80 ft
Downgradient property:	80 ft

Contaminants of Concern (COC's)

cis-1,2-DICHLOROETHYLENE
TETRACHLOROETHYLENE(PCE)
TRICHLOROETHYLENE (TCE)
VINYL CHLORIDE

Well Summary

Well Name	Source / Tail / Delineation	Record Count	Sample Date Range Minimum	Sample Date Range Maximum	Priority Constituent
MW-08S	D	32	11/30/2010	8/25/2015	TETRACHLOROETHYLENE(PC
MW-30S	D	36	11/30/2010	3/7/2016	cis-1,2-DICHLOROETHYLENE
MW-32S	S	36	12/1/2010	3/8/2016	TETRACHLOROETHYLENE(PC
MW-34S	T	36	11/29/2010	3/6/2016	VINYL CHLORIDE
MW-37S	T	36	11/30/2010	3/6/2016	cis-1,2-DICHLOROETHYLENE
MW-41S	S	36	12/1/2010	3/7/2016	TETRACHLOROETHYLENE(PC
MW-42S	D	37	12/1/2010	3/7/2016	VINYL CHLORIDE

MAROS Spatial Moment Analysis Summary

Project: **User Name:**

Location: **State:**

	0th Moment	1st Moment (Center of Mass)			2nd Moment (Spread)		
Effective Date	Estimated Mass (Kg)	Xc (ft)	Yc (ft)	Source Distance	Sigma XX (sq ft)	Sigma YY (sq ft)	Number of Wells

MAROS Spatial Moment Analysis Summary

Project:	**User Name:**
Location:	**State:**

Note: The Sigma XX and Sigma YY components are estimated using the given field coordinate system and then rotated to align with the estimated groundwater flow direction. Moments are not calculated for sample events with less than 6 wells.

MAROS Statistical Trend Analysis Summary

Project: **User Name:**

Location: **State:**

Time Period: **to**

Consolidation Period: Other

Consolidation Type: Maximum

Duplicate Consolidation: First

ND Values: Specified Detection Limit

J Flag Values : Fraction of Actual Value

Well	Source / Tail	Number of Samples	Number of Detects	Average Conc. (mg/L)	Median Conc. (mg/L)	All Samples "ND" ?	Mann-Kendall Trend	Linear Regression Trend
cis-1,2-DICHLOROETHYLENE								
MW-32S	S	9	9	9.5E-03	8.9E-03	No	S	PD
MW-34S	T	9	9	1.1E-03	9.6E-04	No	PD	PD
MW-37S	T	9	9	3.5E-02	3.4E-02	No	I	I
MW-41S	S	9	9	5.1E-03	5.1E-03	No	S	S
TETRACHLOROETHYLENE(PCE)								
MW-32S	S	9	9	1.2E-02	5.3E-03	No	NT	NT
MW-34S	T	9	9	6.9E-04	7.1E-04	No	PD	D
MW-37S	T	9	8	3.8E-04	3.8E-04	No	NT	NT
MW-41S	S	9	9	2.6E-02	2.6E-02	No	S	S
TRICHLOROETHYLENE (TCE)								
MW-32S	S	9	9	5.3E-03	3.0E-03	No	NT	NT
MW-34S	T	9	1	5.6E-04	5.0E-04	No	NT	D
MW-37S	T	9	9	4.9E-04	5.3E-04	No	NT	PI
MW-41S	S	9	9	7.2E-03	7.1E-03	No	S	PD
VINYL CHLORIDE								
MW-32S	S	9	5	5.5E-04	5.0E-04	No	NT	NT
MW-34S	T	9	9	2.2E-03	2.2E-03	No	PD	D
MW-37S	T	9	9	5.8E-04	5.9E-04	No	S	S
MW-41S	S	9	9	8.3E-04	9.0E-04	No	NT	S

Note: Increasing (I); Probably Increasing (PI); Stable (S); Probably Decreasing (PD); Decreasing (D); No Trend (NT); Not Applicable (N/A) - Due to insufficient Data (< 4 sampling events); No Detectable Concentration (ND)

The Number of Samples and Number of Detects shown above are post-consolidation values.

MAROS Sampling Frequency Optimization Results

Project: **User Name:**

Location: **State:**

The Overall Number of Sampling Events: 9

"Recent Period" defined by events: **From** Nov 2010 **To** Mar 2016
11/30/2010 3/7/2016

"Rate of Change" parameters used:

Constituent	Cleanup Goal	Low Rate	Medium Rate	High Rate
cis-1,2-DICHLO	1.8	0.9	1.8	3.6
TETRACHLORO	0.0055	0.00275	0.0055	0.011
TRICHLOROETH	0.018	0.009	0.018	0.036
VINYL CHLORID	0.0014	0.0007	0.0014	0.0028

Units: Cleanup Goal is in mg/L; all rate parameters are in mg/L/year.

Well	Recommended Sampling	Frequency Based on	Frequency Based on
cis-1,2-DICHLOROETHYLENE			
MW-32S	Biennial	Biennial	Biennial
MW-34S	Biennial	Biennial	Biennial
MW-37S	Biennial	Biennial	Biennial
MW-41S	Biennial	Biennial	Biennial
TETRACHLOROETHYLENE(PCE)			
MW-32S	Biennial	Biennial	Biennial
MW-34S	Biennial	Biennial	Biennial
MW-37S	Biennial	Biennial	Biennial
MW-41S	Biennial	Biennial	Biennial
TRICHLOROETHYLENE (TCE)			
MW-32S	Biennial	Biennial	Biennial
MW-34S	Biennial	Biennial	Biennial
MW-37S	Biennial	Biennial	Biennial
MW-41S	Biennial	Biennial	Biennial
VINYL CHLORIDE			
MW-32S	Biennial	Biennial	Biennial
MW-34S	Biennial	Biennial	Biennial
MW-37S	Biennial	Biennial	Biennial
MW-41S	Biennial	Biennial	Biennial

MAROS Sampling Frequency Optimization Results

Project:	**User Name:**
Location:	**State:**

Well	Recommended Sampling	Frequency Based on	Frequency Based on

Note: Sampling frequency is determined considering both recent and overall concentration trends. Sampling Frequency is the final recommendation; Frequency Based on Recent Data is the frequency determined using recent (short) period of monitoring data; Frequency Based on Overall Data is the frequency determined using overall (long) period of monitoring data. If the "recent period" is defined using a different series of sampling events, the results could be different.

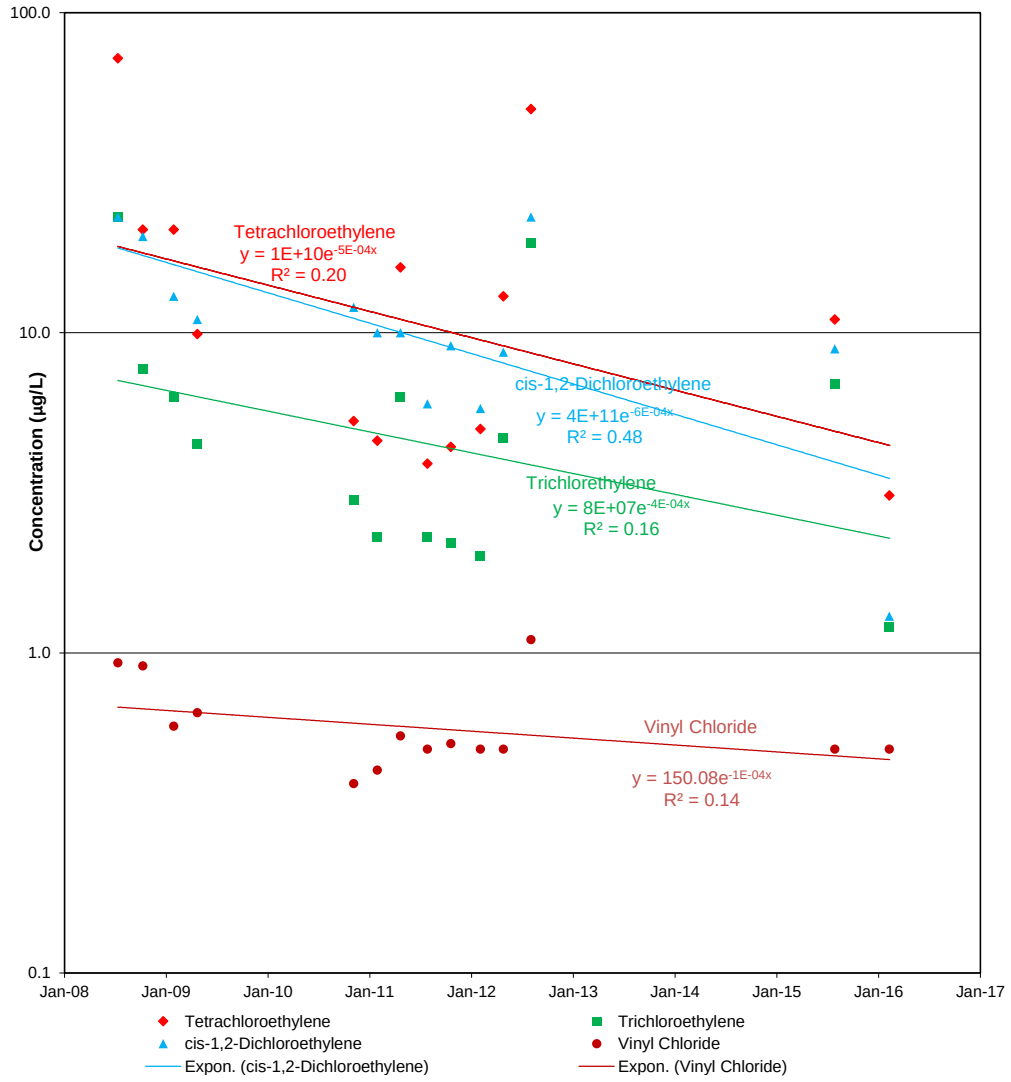
MAROS Well Score

Project: Colonie, NY
User Name: CB&I Federal Services, LLC
Location: Albany
State: New York

Well Name	Source / Tail / Delineation	Monitoring Objective Score	Total Number of Samples	Overall Detection Frequency (%)	Attained Cleanup Goals?	All Samples ND?	Well Score
MW-32S	S	1	36	89 %	NO	NO	**41**
MW-34S	T	1	36	78 %	NO	NO	**42**
MW-37S	T	1	36	97 %	YES	NO	**42**
MW-41S	S	1	36	100 %	NO	NO	**37**

Attachment 2 – Attenuation Rate Calculations

In-Well Attenuation Rate Estimation at Monitoring Well MW-32S

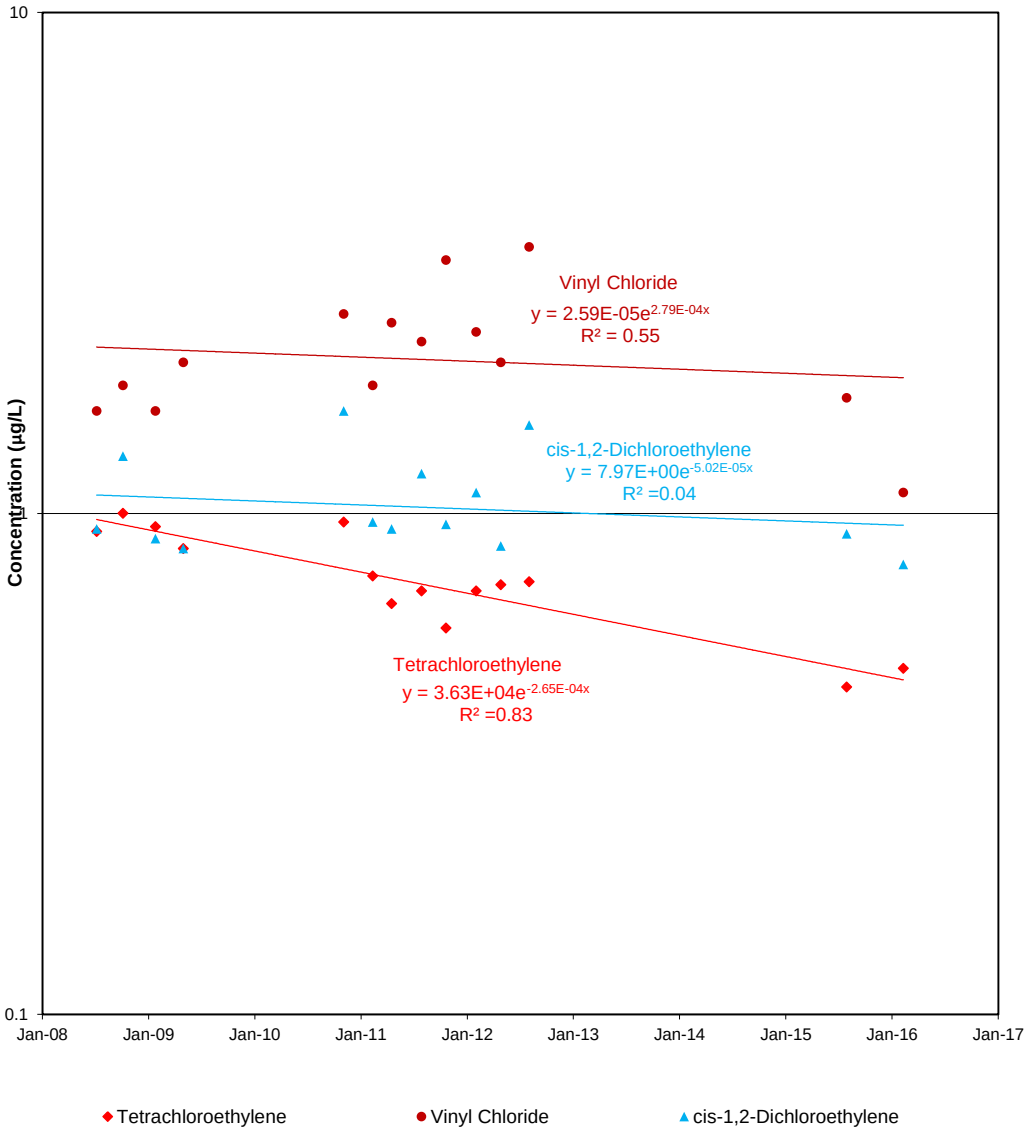


Constituent	Attenuation Rate Constant (day^{-1})	Attenuation Rate Constant ($year^{-1}$)	Attenuation Half-Life (days)	Attenuation Half-Life (years)	Average 2015-2016 Conc. (µg/L)	Target Cleanup Goal (µg/L)	Estimated Time to Meet Target Cleanup Goal (years)
Tetrachloroethylene	5E-04	0.18	1386	3.8	7.0	5.5	1.3
Trichloroethylene	4E-04	0.15	1733	4.7	4.1	18	2015-2016 average concentration is less than Target Cleanup Goal
Vinyl Chloride	1E-04	0.04	6931	19.0	0.5	1.4	2015-2016 average concentration is less than Target Cleanup Goal
cis-1,2-Dichloroethylene	6E-04	0.22	1155	3.2	5.1	1,800	2015-2016 average concentration is less than Target Cleanup Goal

Notes:

1. To present a focused evaluation, the time-trend plots are restricted to VOCs identified as constituents of concern (COCs) in the ROD.
2. 1,1-Dichloroethylene and trans-1,2-Dichloroethylene were historically analyzed as constituents of interest. However, they were not plotted because in general their concentrations at the site do not exceed their method reporting limits and their recent detections since August 2008 have been less than the groundwater screening criteria.
3. The estimated time to meet the Target Cleanup Goal was calculated as the time it would take the most recent detected concentration of the constituent to attenuate to a concentration that is less than the Target Cleanup Goal using the site-specific attenuation rate, and assuming first order degradation kinetics.
4. µg/L = micrograms per liter

In-Well Attenuation Rate Estimation at Monitoring Well MW-34S

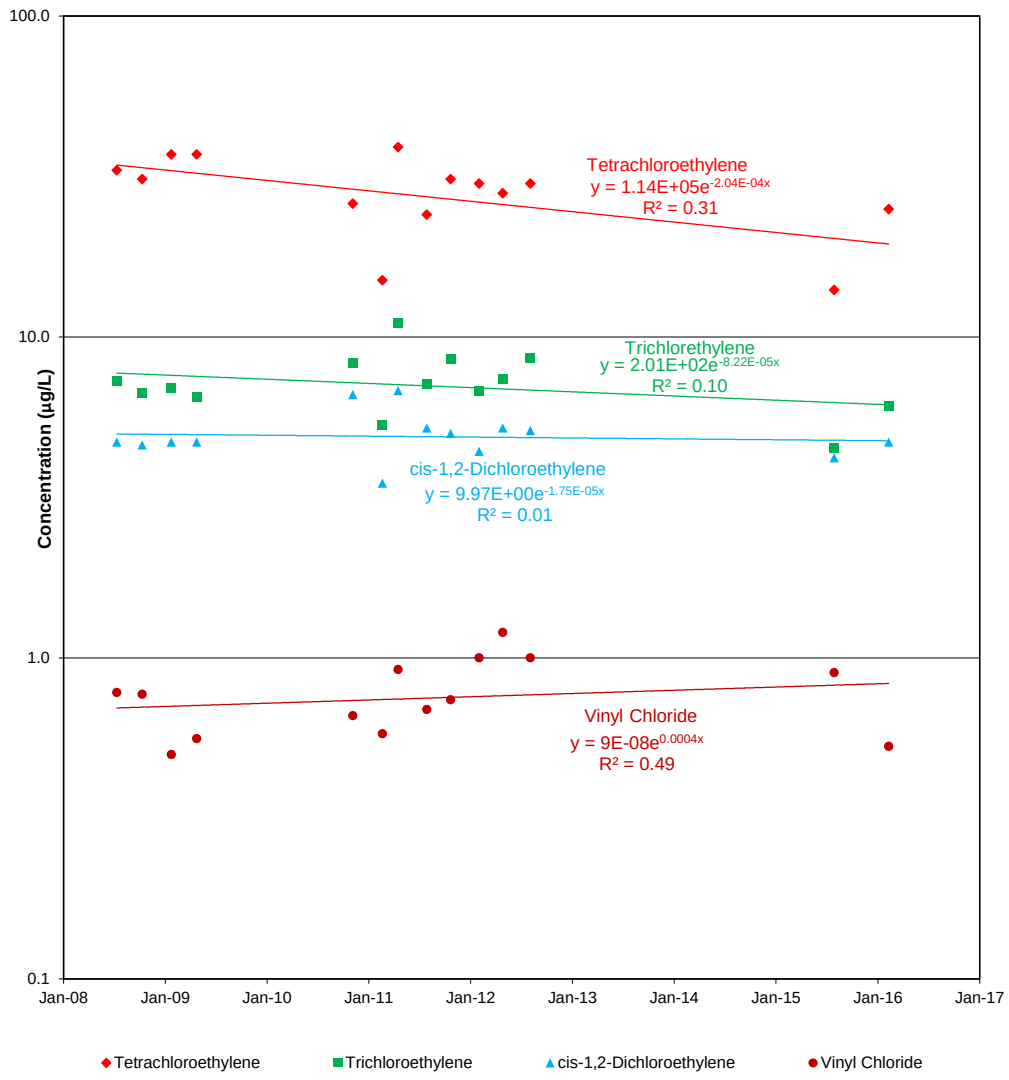


Constituent	Attenuation Rate Constant (day^{-1})	Attenuation Rate Constant ($year^{-1}$)	Attenuation Half-Life (days)	Attenuation Half-Life (years)	Average 2015-2016 Conc. (µg/L)	Target Cleanup Goal (µg/L)	Estimated Time to Meet Target Cleanup Goal (years)
Tetrachloroethylene	2.65E-04	0.10	2616	7.2	0.47	5.5	2015-2016 average concentration is less than Target Cleanup Goal
Vinyl Chloride	Slightly increasing historical trend, recently decreasing				1.4	1.4	2015-2016 average concentration meets the Target Cleanup Goal
cis-1,2-Dichloroethylene	5.02E-05	0.02	13808	37.8	0.85	1,800	2015-2016 average concentration is less than Target Cleanup Goal

Notes:

1. To present a focused evaluation, the time-trend plots are restricted to VOCs identified as constituents of concern (COCs) in the ROD.
2. Trichloroethylene is a COC but was not plotted because it's concentrations have been less than the method reporting limit since August 2008.
3. 1,1-Dichloroethylene and trans-1,2-Dichloroethylene were historically analyzed as constituents of interest. However, they were not plotted because in general their concentrations at the site do not exceed their method reporting limits and their recent detections since August 2008 have been less than the groundwater screening criteria.
4. µg/L = micrograms per liter

In-Well Attenuation Rate Estimation at Monitoring Well MW-41S



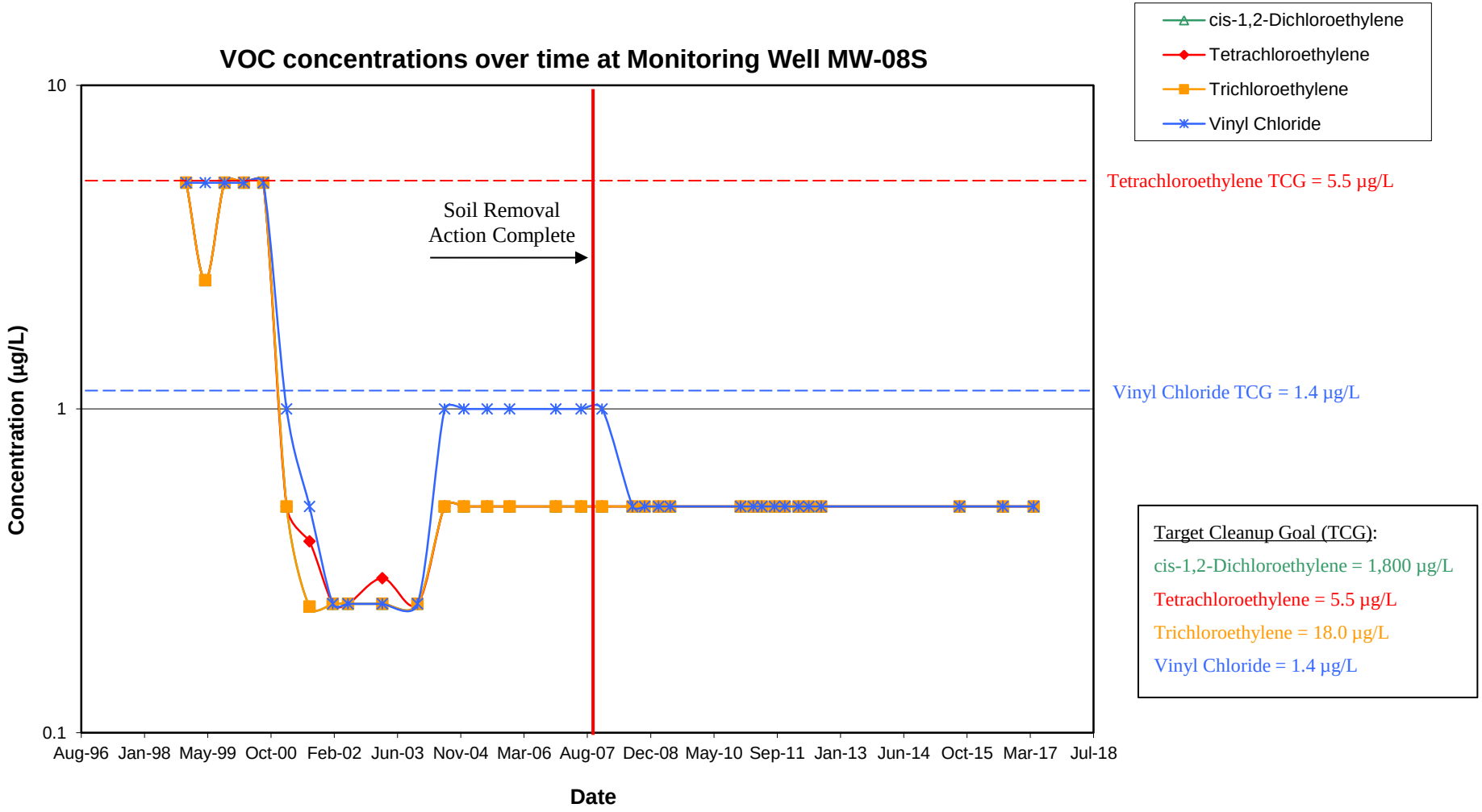
Constituent	Attenuation Rate Constant (day^{-1})	Attenuation Rate Constant ($year^{-1}$)	Attenuation Half-Life (days)	Attenuation Half-Life (years)	Average 2015-2016 Conc. (µg/L)	Target Cleanup Goal (µg/L)	Estimated Time to Meet Target Cleanup Goal (years)
Tetrachloroethylene	2.04E-04	0.07	3,398	9.3	19.5	5.5	17.0
Trichloroethylene	8.22E-05	0.03	8,432	23.1	5.3	18	2015-2016 average concentration is less than Target Cleanup Goal
Vinyl Chloride	Slightly increasing trend, not attenuating				0.6	1.4	2015-2016 average concentration is less than Target Cleanup Goal
cis-1,2-Dichloroethylene	1.75E-05	0.01	39,608	108.5	4.5	1,800	2015-2016 average concentration is less than Target Cleanup Goal

Notes:

1. To present a focused evaluation, the time-trend plots are restricted to VOCs identified as constituents of concern (COCs) in the ROD.
2. 1,1-Dichloroethylene and trans-1,2-Dichloroethylene were historiclly analyzed as constituents of interest. However, they were not plotted because in general their concentrations at the site do not exceed their method reporting limits and their recent detections since August 2008 have been less than the NYSDEC groundwater screening criteria.
3. The estimated time to meet the Target Cleanup Goal was calculated as the time it would take the most recent detected concentration of the constituent to attenuate to a concentration that is less than the Target Cleanup Goal using the site-specific attenuation rate, and assuming first order degradation kinetics.
4. µg/L = micrograms per liter

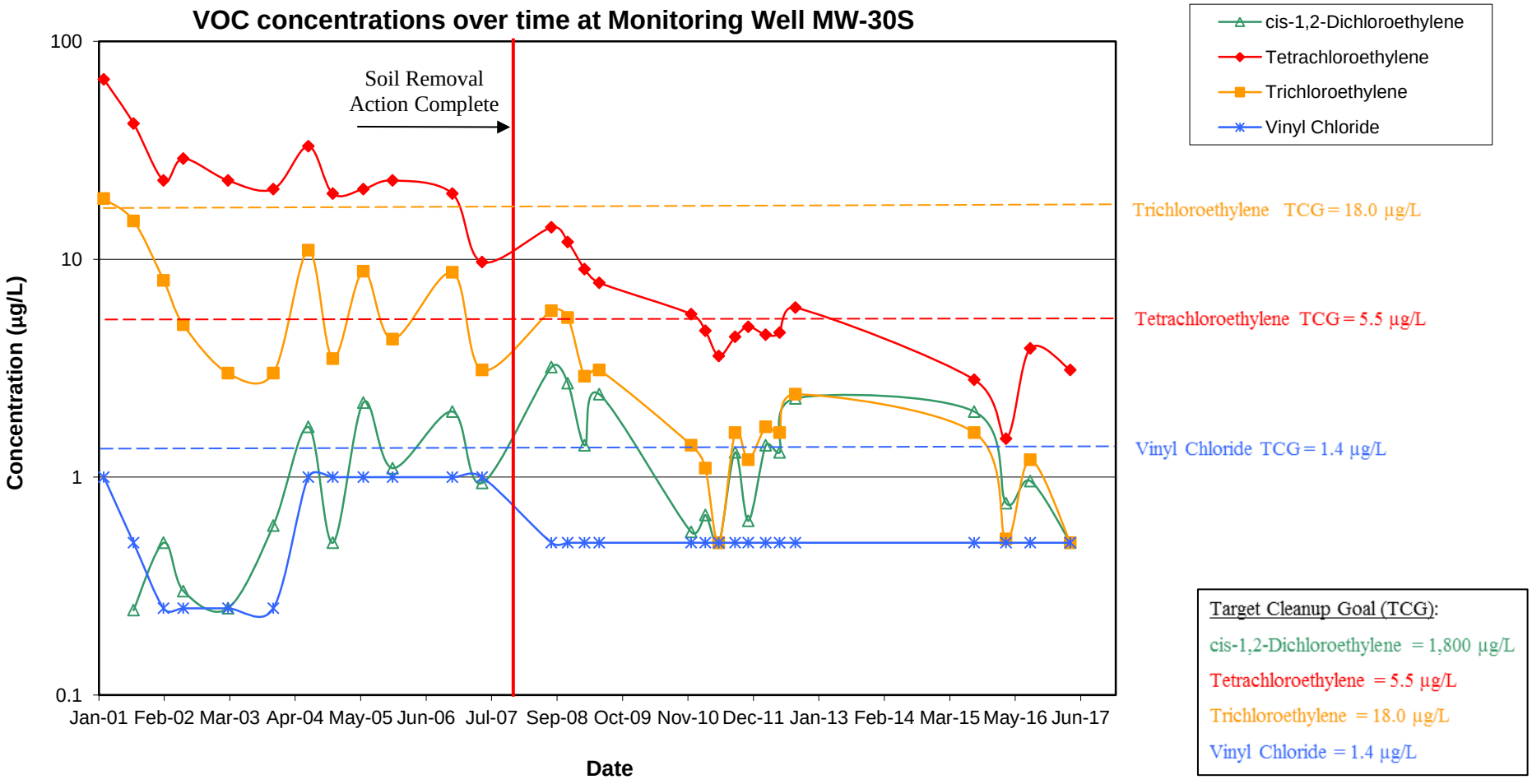
VOC Time-Series Plots

Time-Series Data Plot



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).

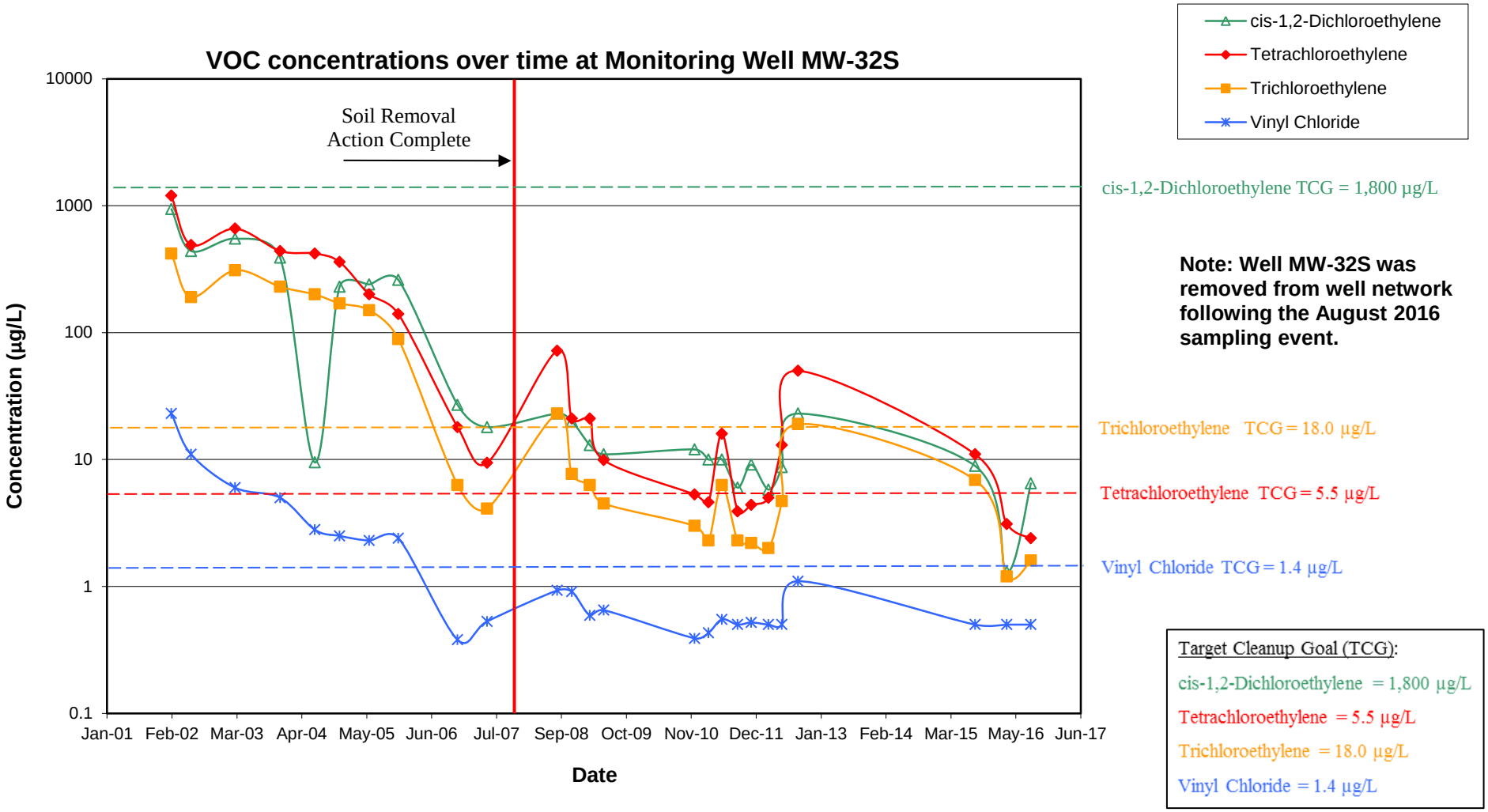
Time-Series Data Plot



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).

Time-Series Data Plot

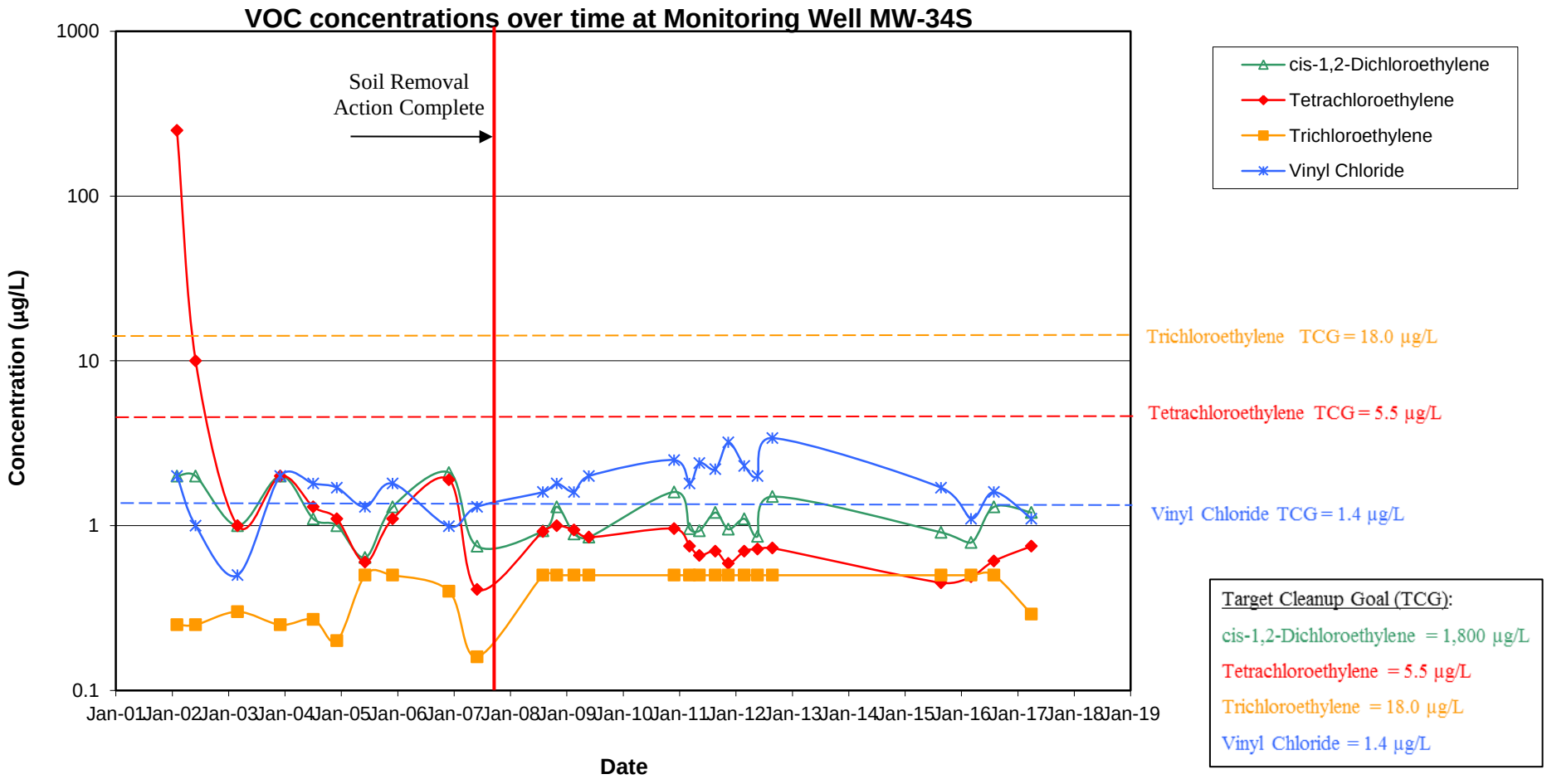


Note: Well MW-32S was removed from well network following the August 2016 sampling event.

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).

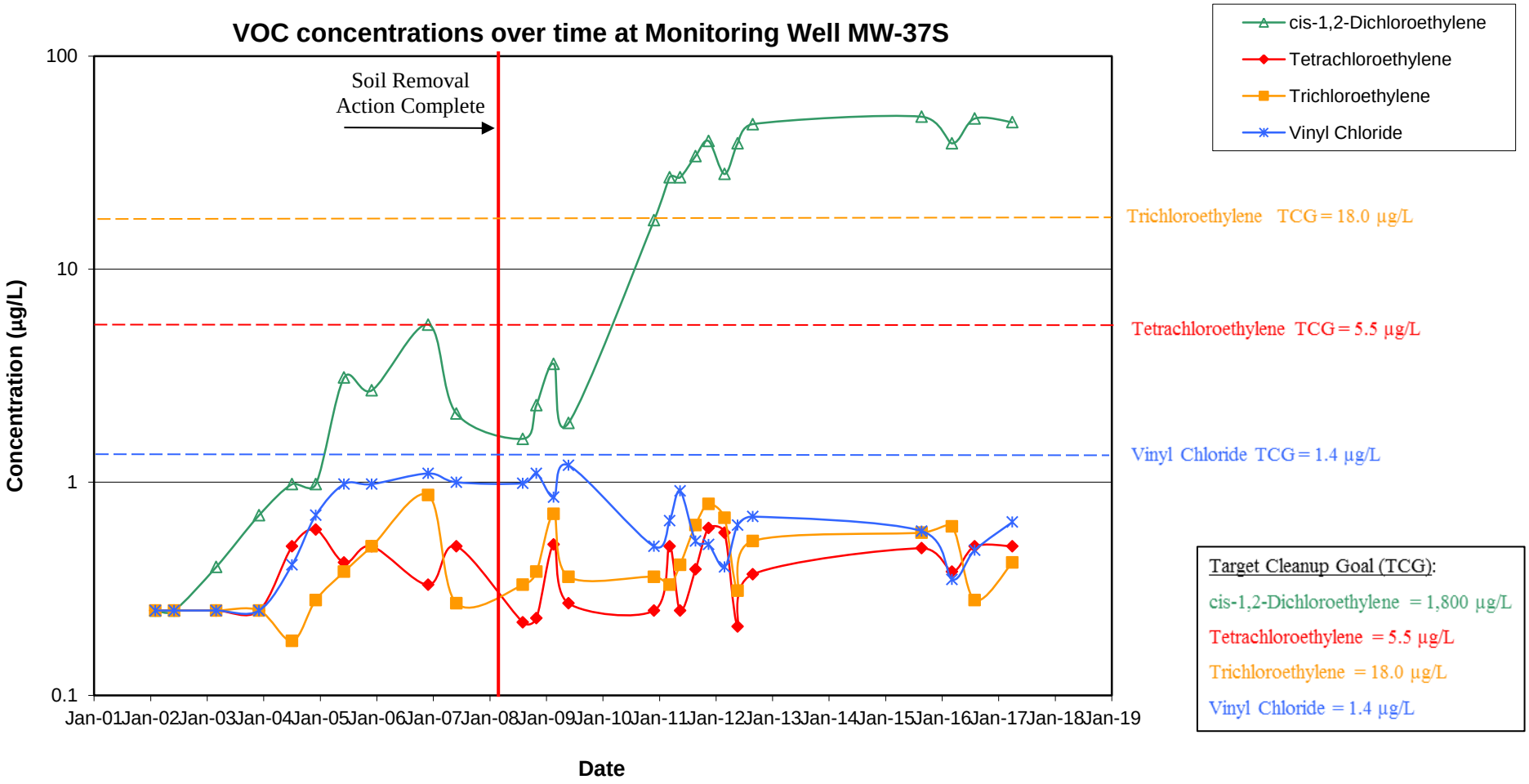
Time-Series Data Plot



Notes:

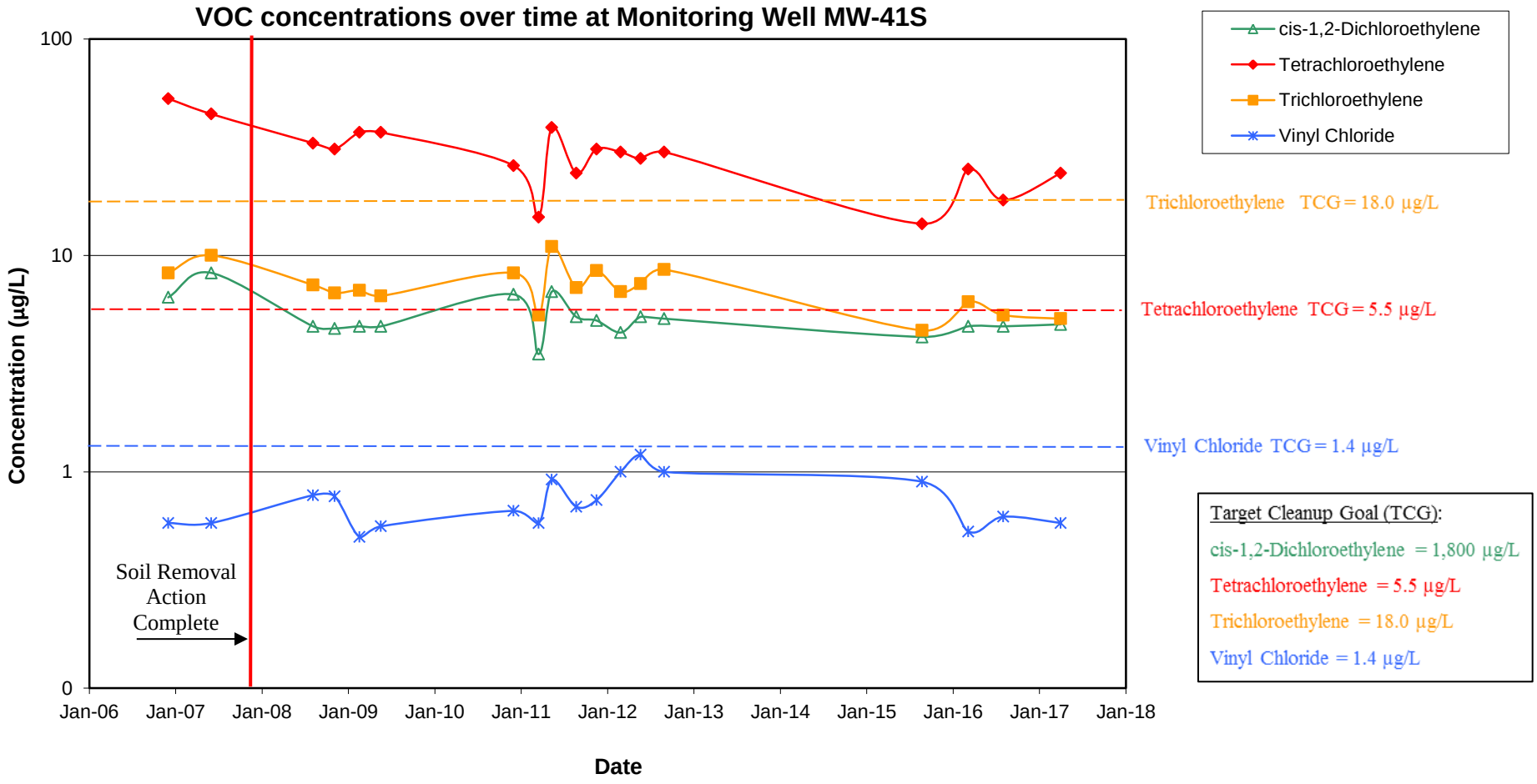
1. Time-trend plots include the four volatile organic compounds (VOCs) identified as constituents of concern (COCs) in the Groundwater Record of Decision (ROD).
2. VOCs not detected at the method reporting limit of 1.0 µg/L were plotted as one half of the method reporting limit (i.e., 0.5 µg/L).

Time-Series Data Plot



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).

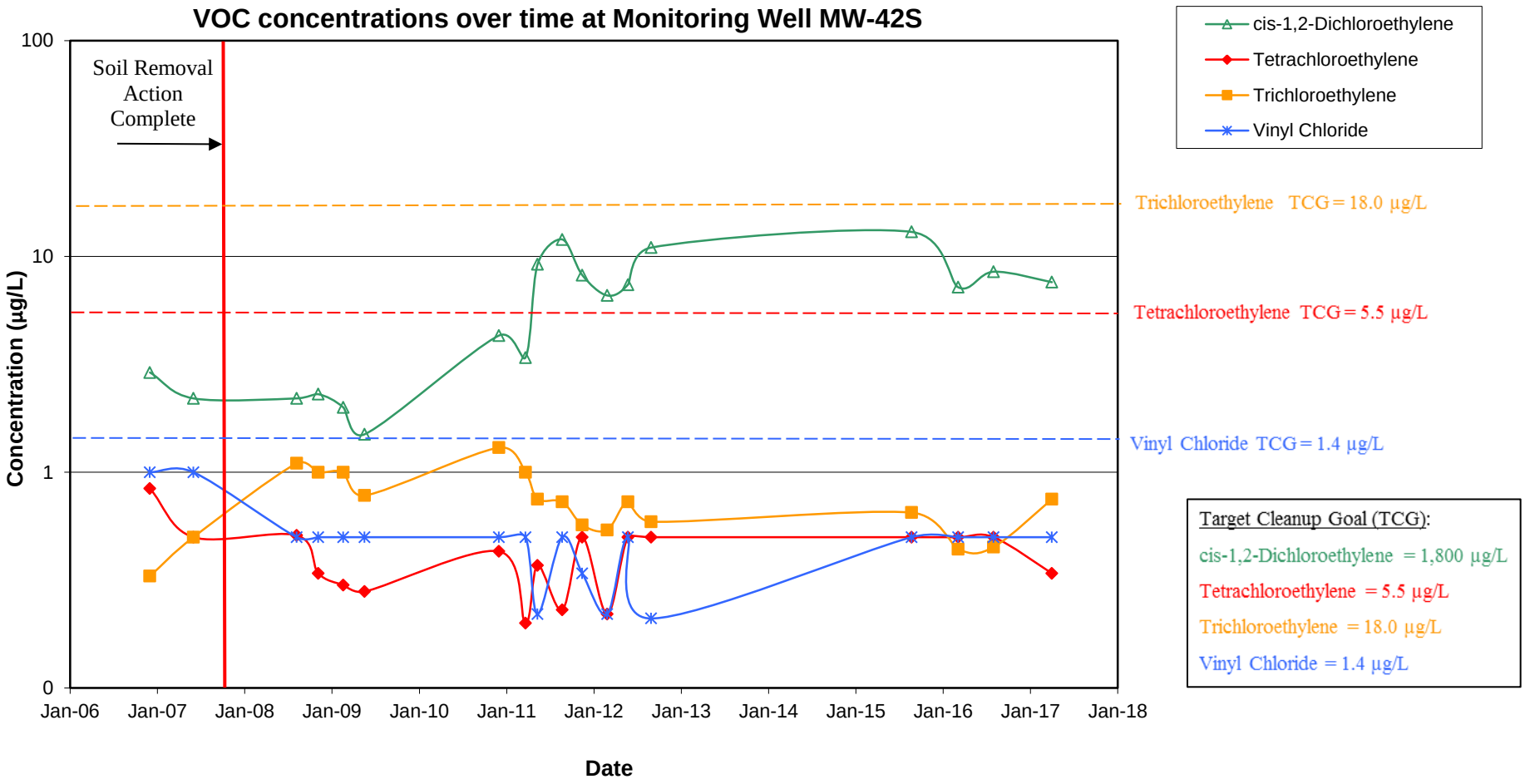
Time-Series Data Plot



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).

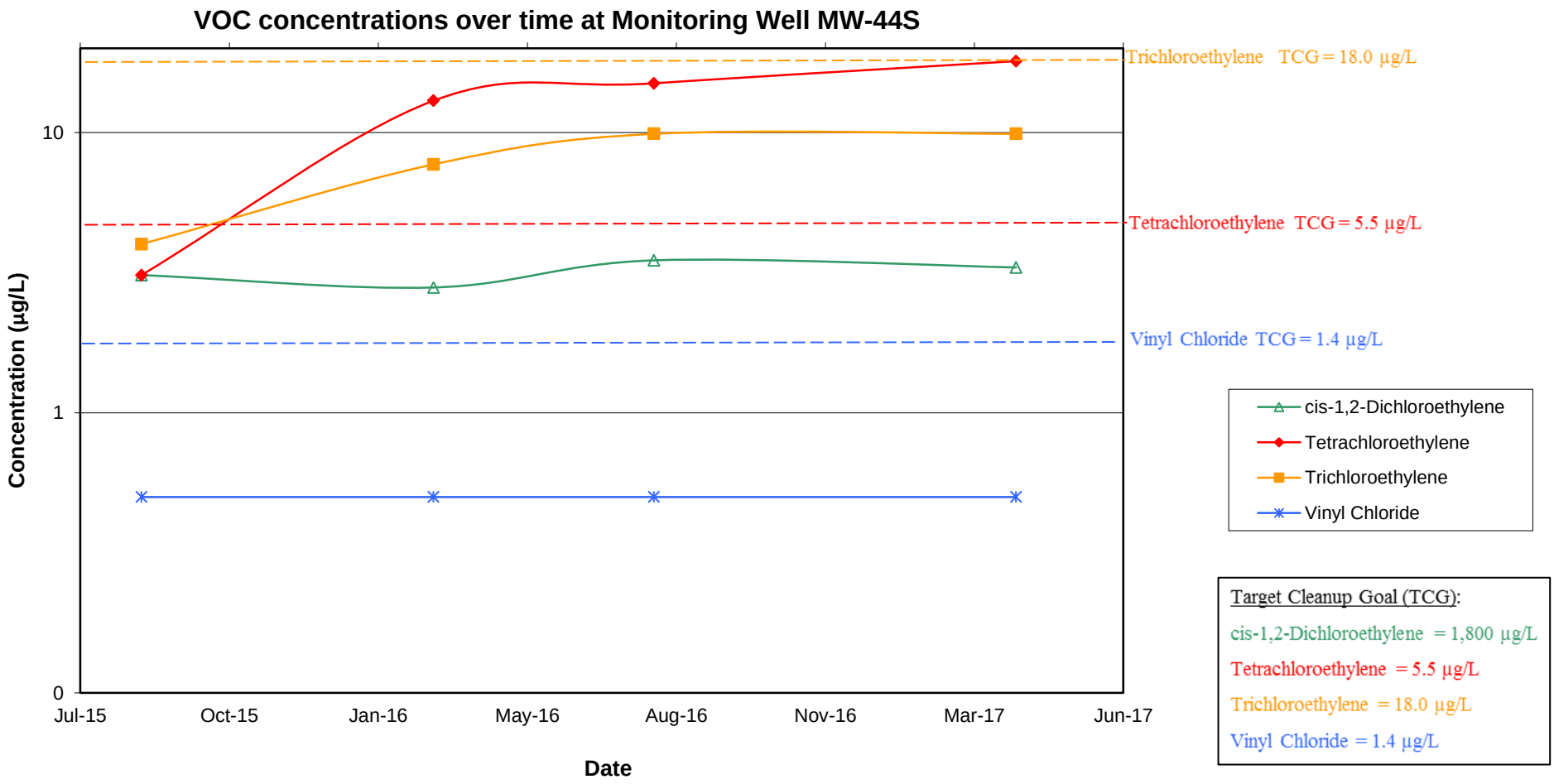
Time-Series Data Plot



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).

Time-Series Data Plot



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 – FIVE-YEAR REVIEW SITE INSPECTION CHECKLIST

Five-Year Review Site Inspection Checklist

I. SITE INFORMATION	
Site name: Colonie FUSRAP Site	**Date of inspection:** 4-4-17
Location and Region: Town of Colonie, Albany County	**EPA ID:** NYD002084721
Agency, office, or company leading the five-year review: U.S. Army Corps of Engineers (USACE)	**Weather/temperature:** Cloudy 45°F

Remedy Includes: (Check all that apply)

- ☐ Landfill cover/containment
- ☐ Access controls
- ☐ Institutional controls
- ☐ Groundwater pump and treatment
- ☐ Surface water collection and treatment
- ☐ Other _____
- ✓ Monitored natural attenuation
- ☐ Groundwater containment
- ☐ Vertical barrier walls

Attachments: ✓ Inspection team roster attached ✓ Site map attached

II. INTERVIEWS (Check all that apply)

1. **O&M site manager** ____NA____ _____ _____ _____
   Name Title Date
   Interviewed ☐ at site ☐ at office ☐ by phone Telephone no. _____
   Problems, suggestions; ☐ Report attached _____

2. **O&M staff** _____NA_____ _____ _____
   Name Title Date
   Interviewed ☐ at site ☐ at office ☐ by phone Telephone no. _____
   Problems, suggestions; ☐ Report attached _____

3. **Local regulatory authorities and response agencies** (i.e., State and Tribal offices, emergency response office, police department, office of public health or environmental health, zoning office, recorder of deeds, or other city and county offices, etc.) Fill in all that apply.

Agency _____NA_____
Contact _____ _____ _____ _____
Name Title Date Phone no.
Problems; suggestions; ☐ Report attached _____
_____

Agency _____NA_____
Contact _____ _____ _____ _____
Name Title Date Phone no.
Problems; suggestions; ☐ Report attached _____
_____

Agency _____NA_____
Contact _____ _____ _____ _____
Name Title Date Phone no.
Problems; suggestions; ☐ Report attached _____
_____

Agency _____NA_____
Contact _____ _____ _____ _____
Name Title Date Phone no.
Problems; suggestions; ☐ Report attached _____
_____

4. **Other interviews** (optional) ☐ Report attached. NA

III. ON-SITE DOCUMENTS & RECORDS VERIFIED (Check all that apply)

1. **O&M Documents**
   - ☐ O&M manual — ☐ Readily available — ☐ Up to date — ☐ N/A
   - ☐ As-built drawings — ☐ Readily available — ☐ Up to date — ☐ N/A
   - ☐ Maintenance logs — ☐ Readily available — ☐ Up to date — ☐ N/A

   Remarks: NA

2. **Site-Specific Health and Safety Plan** — ✓ Readily available — ☐ Up to date — ☐ N/A
   - ☐ Contingency plan/emergency response plan — ☐ Readily available — ☐ Up to date — ☐ N/A

   Remarks: Carried by site personnel during periodic monitoring and other site visits.

3. **O&M and OSHA Training Records** — ✓ Readily available — ☐ Up to date — ☐ N/A

   Remarks: Carried by site personnel during periodic monitoring and other site visits.

4. **Permits and Service Agreements**
   - ☐ Air discharge permit — ☐ Readily available — ☐ Up to date — ☐ N/A
   - ☐ Effluent discharge — ☐ Readily available — ☐ Up to date — ☐ N/A
   - ☐ Waste disposal, POTW — ☐ Readily available — ☐ Up to date — ☐ N/A
   - ☐ Other permits _____ — ☐ Readily available — ☐ Up to date — ☐ N/A

   Remarks: NA

5. **Gas Generation Records** — ☐ Readily available — ☐ Up to date — ☐ N/A

   Remarks: NA

6. **Settlement Monument Records** — ☐ Readily available — ☐ Up to date — ☐ N/A

   Remarks: NA

7. **Groundwater Monitoring Records** — ✓ Readily available — ☐ Up to date — ☐ N/A

   Remarks: Available locally in the Administrative Record at the William K. Sanford Town Library, 629 Albany Shaker Road, Loudonville, New York 12211.

8. **Leachate Extraction Records** — ☐ Readily available — ☐ Up to date — ☐ N/A

   Remarks: NA

9. **Discharge Compliance Records**
   - ☐ Air — ☐ Readily available — ☐ Up to date — ☐ N/A
   - ☐ Water (effluent) — ☐ Readily available — ☐ Up to date — ☐ N/A

   Remarks: NA

10. **Daily Access/Security Logs** — ☐ Readily available — ☐ Up to date — ☐ N/A

    Remarks: NA

IV. O&M COSTS

1. **O&M Organization**

☐ State in-house ☐ Contractor for State
☐ PRP in-house ☐ Contractor for PRP
☐ Federal Facility in-house ☐ Contractor for Federal Facility
☐ Other: NA

2. **O&M Cost Records** - NA

☐ Readily available ☐ Up to date
☐ Funding mechanism/agreement in place
Original O&M cost estimate _____ ☐ Breakdown attached

Total annual cost by year for review period if available

From _____ To _____ _____ ☐ Breakdown attached
Date Date Total cost

From _____ To _____ _____ ☐ Breakdown attached
Date Date Total cost

From _____ To _____ _____ ☐ Breakdown attached
Date Date Total cost

From _____ To _____ _____ ☐ Breakdown attached
Date Date Total cost

From _____ To _____ _____ ☐ Breakdown attached
Date Date Total cost

3. **Unanticipated or Unusually High O&M Costs During Review Period**

Describe costs and reasons: NA

V. ACCESS AND INSTITUTIONAL CONTROLS ✓ Applicable ☐ N/A

A. Fencing

1. **Fencing damaged** ✓ Location shown on site map ✓ Gates secured ☐ N/A

Remarks LARGE TREE FALLEN OVER FENCE ON WEST SIDE. FENCE PARTIALLY LEANING IN NE CORNER BY BAR PARKING LOT. LOWER RAIL DISCONNECTED ON WEST SIDE WHERE CREEK RUNS UNDER FENCE.

B. Other Access Restrictions

1. **Signs and other security measures** ✓ Location shown on site map ☐ N/A

Remarks: Signage locations are - NUMEROUS NO TRESPASSING SIGNS LOCATED ALONG FENCE PERIMETER.

C. Institutional Controls (ICs)

1. **Implementation and enforcement**

Site conditions imply ICs not properly implemented ☐ Yes ✓ No ☐ N/A
Site conditions imply ICs not being fully enforced ☐ Yes ✓ No ☐ N/A

Type of monitoring (*e.g.*, self-reporting, drive by): Periodic, during groundwater monitoring and site upkeep visits
Frequency: Two times per year monitoring plus additional once per month during seasonal site upkeep visits May through October and as needed
Responsible party/agency: USACE
Contact: James T. Moore Project Manager
Name Title Date Phone no.

Reporting is up-to-date ✓ Yes ☐ No ☐ N/A
Reports are verified by the lead agency ✓ Yes ☐ No ☐ N/A

Specific requirements in deed or decision documents have been met ☐ Yes ☐ No ✓ N/A
Violations have been reported ✓ Yes ☐ No ☐ N/A
Other problems or suggestions: ✓ Report attached
Perimeter fencing damage, Other? - SEE FENCING SECTION

2. **Adequacy** ✓ ICs are adequate ☐ ICs are inadequate ☐ N/A
Remarks

D. General

1. **Vandalism/trespassing** ☐ Location shown on site map ☐ No vandalism evident
Remarks FEW BEER/LIQUOR BOTTLES THROWN/BROKEN ON ASPHALT NEAR NE CORNER. MINIMAL TRASH/DEBRIS IN CORNER NEAR MW-08S.

2. **Land use changes on site** ✓ N/A
Remarks

3. **Land use changes off site** ☐ N/A
Remarks NONE

VI. GENERAL SITE CONDITIONS

A. Roads ☐ Applicable ✓ N/A

1. **Roads damaged** ☐ Location shown on site map ☐ Roads adequate ☐ N/A
Remarks GRAVEL ROAD OK BUT GETS SOFT WHEN WET TOWARDS REAR GATE.

B. Other Site Conditions

Remarks GROUND VERY SOFT/WET AFTER SNOW/RAIN. VEHICLES LIKELY TO GET STUCK IN MUD. (OFF OF GRAVEL ROAD).

VII. LANDFILL COVERS ☐ Applicable ✓ N/A

A. Landfill Surface

1. **Settlement** (Low spots) ☐ Location shown on site map ☐ Settlement not evident
   Areal extent_____ Depth_____
   Remarks_____

2. **Cracks** ☐ Location shown on site map ☐ Cracking not evident
   Lengths_____ Widths_____ Depths_____
   Remarks_____

3. **Erosion** ☐ Location shown on site map ☐ Erosion not evident
   Areal extent_____ Depth_____
   Remarks_____

4. **Holes** ☐ Location shown on site map ☐ Holes not evident
   Areal extent_____ Depth_____
   Remarks_____

5. **Vegetative Cover** ☐ Grass ☐ Cover properly established ☐ No signs of stress
   ☐ Trees/Shrubs (indicate size and locations on a diagram)
   Remarks_____

6. **Alternative Cover (armored rock, concrete, etc.)** ☐ N/A
   Remarks_____

7. **Bulges** ☐ Location shown on site map ☐ Bulges not evident
   Areal extent_____ Height_____
   Remarks_____

8. **Wet Areas/Water Damage** ☐ Wet areas/water damage not evident
   ☐ Wet areas ☐ Location shown on site map Areal extent_____
   ☐ Ponding ☐ Location shown on site map Areal extent_____
   ☐ Seeps ☐ Location shown on site map Areal extent_____
   ☐ Soft subgrade ☐ Location shown on site map Areal extent_____
   Remarks_____

9. **Slope Instability** ☐ Slides ☐ Location shown on site map ☐ No evidence of slope instability
Areal extent_____
Remarks_____

B. Benches ☐ Applicable ✓ N/A
(Horizontally constructed mounds of earth placed across a steep landfill side slope to interrupt the slope in order to slow down the velocity of surface runoff and intercept and convey the runoff to a lined channel.)

1. **Flows Bypass Bench** ☐ Location shown on site map ☐ N/A or okay
Remarks_____

2. **Bench Breached** ☐ Location shown on site map ☐ N/A or okay
Remarks_____

3. **Bench Overtopped** ☐ Location shown on site map ☐ N/A or okay
Remarks_____

C. Letdown Channels ☐ Applicable ✓ N/A
(Channel lined with erosion control mats, riprap, grout bags, or gabions that descend down the steep side slope of the cover and will allow the runoff water collected by the benches to move off of the landfill cover without creating erosion gullies.)

1. **Settlement** ☐ Location shown on site map ☐ No evidence of settlement
Areal extent_____ Depth_____
Remarks_____

2. **Material Degradation** ☐ Location shown on site map ☐ No evidence of degradation
Material type_____ Areal extent_____
Remarks_____

3. **Erosion** ☐ Location shown on site map ☐ No evidence of erosion
Areal extent_____ Depth_____
Remarks_____

4. **Undercutting** ☐ Location shown on site map ☐ No evidence of undercutting
Areal extent_____ Depth_____
Remarks_____

5. **Obstructions** Type_____ ☐ No obstructions
☐ Location shown on site map Areal extent_____
Size_____
Remarks_____

6. **Excessive Vegetative Growth** Type_____
☐ No evidence of excessive growth
☐ Vegetation in channels does not obstruct flow
☐ Location shown on site map Areal extent_____
Remarks_____

D. Cover Penetrations ☐ Applicable ✓ N/A

1. **Gas Vents** ☐ Active ☐ Passive
☐ Properly secured/locked ☐ Functioning ☐ Routinely sampled ☐ Good condition
☐ Evidence of leakage at penetration ☐ Needs Maintenance
☐ N/A
Remarks_____

2. **Gas Monitoring Probes**
☐ Properly secured/locked ☐ Functioning ☐ Routinely sampled ☐ Good condition
☐ Evidence of leakage at penetration ☐ Needs Maintenance ☐ N/A
Remarks_____

3. **Monitoring Wells** (within surface area of landfill)
☐ Properly secured/locked ☐ Functioning ☐ Routinely sampled ☐ Good condition
☐ Evidence of leakage at penetration ☐ Needs Maintenance ☐ N/A
Remarks_____

4. **Leachate Extraction Wells**
☐ Properly secured/locked ☐ Functioning ☐ Routinely sampled ☐ Good condition
☐ Evidence of leakage at penetration ☐ Needs Maintenance ☐ N/A
Remarks_____

5. **Settlement Monuments** ☐ Located ☐ Routinely surveyed ☐ N/A
Remarks_____

E. Gas Collection and Treatment ☐ Applicable ✓ N/A

1. **Gas Treatment Facilities**
   ☐ Flaring ☐ Thermal destruction ☐ Collection for reuse
   ☐ Good condition ☐ Needs Maintenance
   Remarks _____

2. **Gas Collection Wells, Manifolds and Piping**
   ☐ Good condition ☐ Needs Maintenance
   Remarks _____

3. **Gas Monitoring Facilities** (*e.g.*, gas monitoring of adjacent homes or buildings)
   ☐ Good condition ☐ Needs Maintenance ☐ N/A
   Remarks _____

F. Cover Drainage Layer ☐ Applicable ✓ N/A

1. **Outlet Pipes Inspected** ☐ Functioning ☐ N/A
   Remarks _____

2. **Outlet Rock Inspected** ☐ Functioning ☐ N/A
   Remarks _____

G. Detention/Sedimentation Ponds ☐ Applicable ✓ N/A

1. **Siltation** Areal extent _____ Depth _____ ☐ N/A
   ☐ Siltation not evident
   Remarks _____

2. **Erosion** Areal extent _____ Depth _____
   ☐ Erosion not evident
   Remarks _____

3. **Outlet Works** ☐ Functioning ☐ N/A
   Remarks _____

4. **Dam** ☐ Functioning ☐ N/A
   Remarks _____

H. Retaining Walls ☐ Applicable ✓ N/A

1. **Deformations** ☐ Location shown on site map ☐ Deformation not evident
   Horizontal displacement_____ Vertical displacement_____
   Rotational displacement_____
   Remarks_____

2. **Degradation** ☐ Location shown on site map ☐ Degradation not evident
   Remarks_____

I. Perimeter Ditches/Off-Site Discharge ☐ Applicable ✓ N/A

1. **Siltation** ☐ Location shown on site map ☐ Siltation not evident
   Areal extent_____ Depth_____
   Remarks_____

2. **Vegetative Growth** ☐ Location shown on site map ☐ N/A
   ☐ Vegetation does not impede flow
   Areal extent_____ Type_____
   Remarks_____

3. **Erosion** ☐ Location shown on site map ☐ Erosion not evident
   Areal extent_____ Depth_____
   Remarks_____

4. **Discharge Structure** ☐ Functioning ☐ N/A
   Remarks_____

VIII. VERTICAL BARRIER WALLS ☐ Applicable ✓ N/A

1. **Settlement** ☐ Location shown on site map ☐ Settlement not evident
   Areal extent_____ Depth_____
   Remarks_____

2. **Performance Monitoring** Type of monitoring_____
   ☐ Performance not monitored
   Frequency_____ ☐ Evidence of breaching
   Head differential_____
   Remarks_____

IX. GROUNDWATER/SURFACE WATER REMEDIES ✓ Applicable ☐ N/A

A. Groundwater Extraction Wells, Pumps, and Pipelines ✓ Applicable ☐ N/A

1. **Pumps, Wellhead Plumbing, and Electrical**
   ☒ Good condition ☒ All required wells properly operating ☐ Needs Maintenance ☐ N/A
   Remarks

2. **Extraction System Pipelines, Valves, Valve Boxes, and Other Appurtenances**
   ☐ Good condition ☐ Needs Maintenance
   Remarks NA

3. **Spare Parts and Equipment**
   ☒ Readily available ☐ Good condition ☐ Requires upgrade ☐ Needs to be provided
   Remarks REPLACEMENT PUMPS (3) IN SHED.

B. Surface Water Collection Structures, Pumps, and Pipelines ☐ Applicable ✓ N/A

1. **Collection Structures, Pumps, and Electrical**
   ☐ Good condition ☐ Needs Maintenance
   Remarks

2. **Surface Water Collection System Pipelines, Valves, Valve Boxes, and Other Appurtenances**
   ☐ Good condition ☐ Needs Maintenance
   Remarks

3. **Spare Parts and Equipment**
   ☐ Readily available ☐ Good condition ☐ Requires upgrade ☐ Needs to be provided
   Remarks

C. Treatment System ☐ Applicable ✓ N/A

1. **Treatment Train** (Check components that apply)
   ☐ Metals removal ☐ Oil/water separation ☐ Bioremediation
   ☐ Air stripping ☐ Carbon adsorbers
   ☐ Filters_____
   ☐ Additive (*e.g.*, chelation agent, flocculent)_____
   ☐ Others_____
   ☐ Good condition ☐ Needs Maintenance
   ☐ Sampling ports properly marked and functional
   ☐ Sampling/maintenance log displayed and up to date
   ☐ Equipment properly identified
   ☐ Quantity of groundwater treated annually_____
   ☐ Quantity of surface water treated annually_____
   Remarks_____

2. **Electrical Enclosures and Panels** (properly rated and functional)
   ✓ N/A ☐ Good condition ☐ Needs Maintenance
   Remarks_____

3. **Tanks, Vaults, Storage Vessels**
   ✓ N/A ☐ Good condition ☐ Proper secondary containment ☐ Needs Maintenance
   Remarks_____

4. **Discharge Structure and Appurtenances**
   ✓ N/A ☐ Good condition ☐ Needs Maintenance
   Remarks_____

5. **Treatment Building(s)**
   ✓ N/A ☐ Good condition (esp. roof and doorways) ☐ Needs repair
   ☐ Chemicals and equipment properly stored
   Remarks_____

6. **Monitoring Wells** (pump and treatment remedy)
   ☐ Properly secured/locked ☐ Functioning ☐ Routinely sampled ☐ Good condition
   ☐ All required wells located ☐ Needs Maintenance ☐ N/A
   Remarks_____

D. Monitoring Data

1. Monitoring Data
   ✓ Is routinely submitted on time ✓ Is of acceptable quality

2. Monitoring data suggests:
   ✓ Groundwater plume is effectively contained ✓ Contaminant concentrations are declining

D. Monitored Natural Attenuation

1. **Monitoring Wells** (natural attenuation remedy)

☒ Properly secured/locked ☒ Functioning ☒ Routinely sampled ☒ Good condition
☒ All required wells located ☐ Needs Maintenance ☐ N/A

Remarks: 1) List above checklist items for each monitoring well (use a separate form as needed).
2) Evidence of any nearby residences using groundwater wells?

1) ABOVE CHECKLIST APPLIES TO ALL WELLS ON/OFF SITE.
2) NA

X. OTHER REMEDIES - NA

If there are remedies applied at the site which are not covered above, attach an inspection sheet describing the physical nature and condition of any facility associated with the remedy. An example would be soil vapor extraction.

XI. OVERALL OBSERVATIONS

A. Implementation of the Remedy

Describe issues and observations relating to whether the remedy is effective and functioning as designed. Begin with a brief statement of what the remedy is to accomplish (i.e., to contain contaminant plume, minimize infiltration and gas emission, etc.).

MONITORED NATURAL ATTENUATION OF SELECT VOCS - NO ISSUES, APPEARS TO BE FUNCTIONING AS DESIGNED.

B. Adequacy of O&M - NA

Describe issues and observations related to the implementation and scope of O&M procedures. In particular, discuss their relationship to the current and long-term protectiveness of the remedy.

GW SAMPLING HAS BEEN CONDUCTED TO MONITOR NATURAL ATTENUATION. NO ISSUES W/ SAMPLING OTHER THAN OCCASIONAL WEATHER-RELATED SCHEDULE DELAYS.

C. Early Indicators of Potential Remedy Problems

Describe issues and observations such as unexpected changes in the cost or scope of O&M or a high frequency of unscheduled repairs, that suggest that the protectiveness of the remedy may be compromised in the future.

NONE - MINOR SCHEDULE DELAYS HAVE NOT IMPACTED PROTECTIVENESS OF REMEDY.

D. Opportunities for Optimization

Describe possible opportunities for optimization in monitoring tasks or the operation of the remedy.

CONSTRUCTION OF GRAVEL ROAD TO ALL WELLS WOULD SOMEWHAT INCREASE EFFICIENCY OF SAMPLING OPERATIONS, AND REDUCE POSSIBILITY OF VEHICLES GETTING STUCK.

APPENDIX F – INTERVIEW RECORD

INTERVIEW RECORD

Site Name: Colonie FUSRAP Site	**EPA ID No:** NYD002084721	
Subject: FYR Interview – Groundwater Operable Unit	**Time:** 11:47 a.m.	**Date:** 05/10/2017
Type: ✓ Telephone □ Visit □ Other **Location of Visit:**	□ Incoming ✓ Outgoing	

Contact Made By:

Name: Mark Hardner (MH)	**Title:** Project Manager / Geologist	**Organization:** CB&I Federal Services

Individual Contacted:

Name: Kent Johnson (KJ)	**Title:** Geologist	**Organization:** NYSDEC
Telephone No: (518) 402-9813 **E-mail Address:** kent.johnson@dec.ny.gov	**Street Address:** 625 Broadway **City, State, Zip:** Albany, New York, 12233	

Summary of Conversation

Mark Hardner (MH): What is your overall impression of the project?

Kent Johnson (KJ): Good. The project has come a long way, first with the soil removal and dewatering operations – during which the volatile organic compound (VOC) concentrations in groundwater dropped precipitously – and now with the continued reductions in VOC concentrations in groundwater.

MH: Have you been to the Site recently, and if so, what are your overall thoughts regarding its condition?

KJ: I have driven by the Site and it looks fine, as long as maintenance (such as mowing) is kept up.

MH: Do you believe that the groundwater remedy is functioning as intended by the decision documents?

KJ: Yes, the groundwater remedy is functioning as intended. There are currently just two wells with one VOC out of compliance.

MH: Have there been routine communications or activities (site visits, inspections, reporting activities) conducted by your office regarding the site?

KJ: No, but the U.S. Army Corps of Engineers has that covered and keeps us well informed as to site activities and results.

MH: Have there been any complaints, violations, or other incidents related to the site requiring a response by your office? If so, please give details.

KJ: No, there have been no complaints or other incidents requiring response.

INTERVIEW RECORD

Site Name: Colonie FUSRAP Site	**EPA ID No:** NYD002084721	
Subject: FYR Interview – Groundwater Operable Unit	**Time:** 11:47 a.m.	**Date:** 05/10/2017
Type: ✓ Telephone □ Visit □ Other **Location of Visit:**	□ Incoming ✓ Outgoing	

Contact Made By:

Name: Mark Hardner (MH)	**Title:** Project Manager / Geologist	**Organization:** CB&I Federal Services

Individual Contacted:

Name: Kent Johnson (KJ)	**Title:** Geologist	**Organization:** NYSDEC
Telephone No: (518) 402-9813 **E-mail Address:** kent.johnson@dec.ny.gov	**Street Address:** 625 Broadway **City, State, Zip:** Albany, New York, 12233	

Summary of Conversation

MH: Are you aware of any events, incidents, or activities at the site such as vandalism, trespassing, or emergency responses from local authorities? If so, please give details.

KJ: There have been no events, incidents, or other activities reported by local authorities.

MH: Do you feel well informed about the Site's activities and progress?

KJ: Yes, we are well informed as to the Site's activities and progress through regular LTM reports and other communications.

MH: Do you have any recommendations or suggestions regarding the Site in general, or regarding the groundwater remedy?

KJ: No, just to continue with the long-term groundwater monitoring program current remedy and review results (particularly of the two wells currently out of compliance) until all wells are in compliance, and continue monitoring after that to ensure the cleanup goals are met and maintained.

End of Interview