FIFTH FIVE-YEAR REVIEW REPORT FOR
LITTLE VALLEY SUPERFUND SITE
CATTARAUGUS COUNTY, NEW YORK

Prepared by

U.S. Environmental Protection Agency
Region 2
New York, New York

Evangelista, Pat

Digitally signed by Evangelista, Pat
Date: 2022.01.31 17:38:22 -05'00'

Pat Evangelista, Director
Superfund & Emergency Management Division

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LIST OF ABBREVIATIONS & ACRONYMS

bgs	below ground surface
BIA	Bush Industries Area
CCA	Cattaraugus Cutlery Area
CCHD	Cattaraugus County Health Department
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
CY	Cubic Yards
DCE	Dichloroethene
EPA	United States Environmental Protection Agency
FFS	Focused Feasibility Study
FYR	Five-Year Review
GAC	Granular Activated Carbon
GWQS	Groundwater Quality Standards
HHRA	Human-Health Risk Assessment
ICs	Institutional Controls
ISVE	In-Situ Soil Vapor Extraction
MCL	Maximum Contaminant Level
µg/l	Micrograms per Liter
MNA	Monitored Natural Attenuation
MW	Monitoring Well
NPL	National Priorities List
NYSDEC	New York State Department of Environmental Conservation
O&M	Operation and Maintenance
OU	Operable Unit
ppb	parts per billion
POET	Point-of-Entry Treatment system
PRP	Potentially Responsible Party
RA	Remedial Action
RAO	Remedial Action Objectives
RD	Remedial Design
RI	Remedial Investigation
ROD	Record of Decision
RPM	Remedial Project Manager
SSDS	Subslab Depressurization System
SVI	Soil Vapor Intrusion
TAGM	Technical and Administrative Guidance Memorandum
TCE	Trichloroethene
VOCs	Volatile Organic Compounds

Five-Year Review Summary Form

SITE IDENTIFICATION		
Site Name: Little Valley Superfund Site		
EPA ID: NY0001233634		
Region: 2	**State:** NY	**City/County:** Little Valley/Cattaraugus
SITE STATUS		
NPL Status: Final		
Multiple OUs? Yes	**Has the site achieved construction completion?** Yes	
REVIEW STATUS		
Lead agency: EPA ***[If "Other Federal Agency", enter Agency name]*:**		
Author name (Federal or State Project Manager): John DiMartino and Joel Singerman		
Author affiliation: EPA		
Review period: 5/12/2017 - 1/31/2022		
Date of site inspection: 7/7/2021		
Type of review: Policy		
Review number: 5		
Triggering action date: 5/11/2017		
Due date *(five years after triggering action date)*: 5/11/2022		

I. INTRODUCTION

The purpose of a five-year review (FYR) is to evaluate the implementation and performance of a remedy to determine if the remedy is and 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.

This is the fifth FYR for the Little Valley Superfund site. The triggering action for this policy review is the signature date of the previous FYR, which was May 11, 2017. This FYR has been prepared because, while the remedial action will not leave hazardous substances, pollutants, or contaminants on-site above levels that allow for unlimited use and unrestricted exposure, the remedy requires five or more years to complete.

The work at the site has been divided into two operable units (OUs). OU1 is an interim groundwater remedy consisting of the installation of point-of-entry treatment units (POETs) on private wells. OU2 addresses two source areas and contamination in the groundwater. Both OUs will be evaluated in this FYR.

The U.S. Environmental Protection Agency (EPA) conducted this FYR pursuant to the Comprehensive Environmental Response, Compensation, and Liability Act Section 121, consistent with the National Contingency Plan (40 CFR Section 300.430(f)(4)(ii)) and considering EPA policy.

The Little Valley site FYR team was led by John DiMartino (former EPA Remedial Project Manager (RPM)) and Joel Singerman (EPA section chief,).[1] Participants included Michael Scorca (EPA hydrogeologist), Paul Zarella (EPA hydrogeologist), Ula Kinahan (EPA human-health risk assessor), Abby DeBofsky (EPA ecological risk assessor), and Mike Basile (EPA community involvement coordinator).

The FYR began on April 22, 2021.

<u>Site Background</u>

The Little Valley site is comprised of a plume of trichloroethene (TCE)-contaminated groundwater that extends approximately eight miles along Route 353 between the Village of Little Valley and the northern edge of the City of Salamanca in Cattauragus County, New York (see Appendix A, Figure 1). The area overlying the TCE plume is bordered by steeply sloping wooded hillsides, which attain slopes of up to 25 percent and elevations of 2,200 feet above mean sea level.

The site is located in a rural, agricultural area, with a number of small, active and inactive industries and over 200 residential properties situated in the study area along Route 353, the main transportation route between Little Valley and Salamanca. The Village of Little Valley has a public water supply, while private residential wells supply drinking water for the properties situated along Route 353 in Salamanca.

[1] John DiMartino was the RPM until he left government service on August 12, 2021.

Appendix C, attached, summarizes the documents utilized to prepare this FYR.

Appendix D, attached, summarizes the site's topography, geology/hydrogeology, and land and resource use. For more details related to site background, physical characteristics, geology/hydrogeology, land/resource use, and history related to the site, please refer to:

https://cumulis.epa.gov/supercpad/cursites/csitinfo.cfm?id=0204016&msspp=med

II. RESPONSE ACTION SUMMARY

Basis for Taking Action

In 1982, the Cattaraugus County Health Department (CCHD) and the New York State Department of Environmental Conservation (NYSDEC), while investigating TCE contamination in the vicinity of a small manufacturing facility on Route 353, detected TCE in nearby private wells. In 1989, CCHD and the New York State Department of Health (NYSDOH) determined that a TCE contamination plume extended from the Village of Little Valley to the northern edge of the City of Salamanca. NYSDEC installed a number of monitoring wells in the area to investigate possible sources of the contamination. No sources were identified at that time.

Although CCHD issued health advisories to the exposed residents in 1989, affected well owners were not provided with alternate water sources. About six property owners independently installed granular activated carbon (GAC) filter systems and others purchased bottled water.

Between 1989 and 1995, CCHD and NYSDOH sampled 74 private wells in the area; 42 of these wells had TCE concentrations equal to or greater than the federal maximum contaminant level (MCL) of 5 micrograms per liter (µg/l).

In 1996, EPA listed the site on the National Priorities List (NPL).

Response Actions

Point-of-Entry Treatment Systems

Following the listing of the site on the NPL, EPA evaluated the residential well sample results and concluded that, if not addressed, the contaminated wells would continue to present a threat to public health though ingestion. EPA prepared a focused feasibility study (FFS) to develop, screen, and evaluate alternatives for an alternative water supply system for the affected and potentially affected residences at the site. Based upon the findings of the FFS, EPA issued a Record of Decision (ROD) on September 30, 1996. The remedial action objective (RAO) that was established for this OU was to prevent exposure of the public to contaminated groundwater. The selected remedy included the installation of air stripper treatment units[2] on all affected and potentially affected private wells to ensure that drinking water standards are met. The ROD also called for an evaluation of the efficacy of the treatment systems within five years of their installation and a determination as to whether or not a more permanent system (such as a water line) would be required.

Source Control and Groundwater Contamination

A remedial investigation/feasibility study (RI/FS), conducted from 1997 through 2005, investigated 10 potential source areas for the presence of TCE and/or TCE breakdown (*i.e.,* daughter) compounds. Based upon the data that were collected, five of these areas were identified as either current or likely past sources--Bush Industries Area (BIA); Cattaraugus Cutlery Area (CCA); Great Triangle Area (Drum Storage Area); Luminite Area; and Ninth Street Landfill Area. Based upon the soil data collected during the RI, CCA was determined to be a current localized source of groundwater contamination at the site. The RI also concluded that while it is likely that the Great Triangle, Luminite, and Ninth Street Landfill Areas were sources of groundwater contamination in the past, they were not acting as current sources.

Based upon the results of the RI/FS, on August 19, 2005, a ROD (2005 ROD) was signed for OU2. The following RAOs were established:

- Minimize or eliminate TCE migration from contaminated soils to the groundwater;
- Minimize or eliminate any contaminant migration from contaminated soils and groundwater to indoor air;
- Restore groundwater to meet state and federal standards for TCE within a reasonable time frame;
- Mitigate the migration of the affected groundwater; and
- Reduce or eliminate any direct contact or inhalation threat associated with TCE-contaminated soils and groundwater and any inhalation threat associated with soil vapor.

The selected remedy called for the excavation and off-site treatment/disposal of an estimated 220 cubic yards (CY) of TCE-contaminated soils located at CCA[3] and monitored natural attenuation (MNA) for the site-wide groundwater. The 2005 ROD also called for an evaluation of the potential for soil vapor intrusion (SVI) into structures within the study area and mitigation, if necessary. In addition, the ROD included institutional controls (ICs) in the form of informational devices (*e.g.*, notifications) to alert local government agencies that if there are any unimproved parcels where

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[2] Air strippers were selected because, based upon the maximum TCE concentrations that were present in the private wells at that time, they would be significantly less costly to maintain than activated carbon treatment units. The cost of operating carbon treatment units is largely a function of the useful life of the carbon (*i.e.,* how long the carbon can effectively treat the water before it needs to be replaced). The useful life of the carbon depends on the contaminant levels in the water that is passed through the treatment unit. The greater the contamination levels, the shorter the life of the carbon, which will require more frequent replacement of the carbon in the treatment unit.

[3] Soils exceeding the New York State Technical and Administrative Guidance Memorandum No. 94-HWR-4046 (TAGM) objective of 700 micrograms per kilogram (μg/kg).

the underlying groundwater is contaminated with TCE above the MCL and the property is to be developed, the groundwater should not be used without appropriate treatment. Lastly, the ROD also made the interim alternate water supply remedy (OU1) as provided for in the 1996 ROD the final remedy for the water supply.

In 2005, in accordance with the selected remedy for the soil, EPA undertook pre-excavation soil sampling to define the boundaries of the soil contamination at CCA. The results from this sampling effort indicated that the volume of contaminated soil was substantially greater than originally estimated in the 2005 ROD, increasing from approximately 220 CY to approximately 3,000 CY.

Because EPA believed that the increased volume of contaminated soil at CCA would impact the feasibility, effectiveness, and overall cost effectiveness of the selected remedy, the remedial alternatives for the soil component of the remedy selected in the 2005 ROD were reevaluated in *Focused Feasibility Study Report, Presentation of Air Permeability Testing Results and Evaluation of Soil Remedial Alternatives Related to the Cattaraugus Cutlery Area, Little Valley Superfund Site, Cattaraugus County, New York, EPA, July 2006* (2006 FFS) report. Based upon the findings of the 2006 FFS and the results of a treatability study, it was determined that in-situ soil vapor extraction (ISVE) would be effective in addressing the contaminated soil at CCA.

On September 28, 2006, a ROD amendment was approved, changing the soil remedy selected in the 2005 ROD to ISVE. The 2006 ROD amendment also called for excavation and off-site treatment/disposal as a contingency remedy should operational data indicate that ISVE will not address all of the contaminated soils.

Status of Implementation

Point-of-Entry Treatment Systems

Of the approximately 200 private wells located in the study area, based upon sample results, air stripper treatment units were installed on 91 private wells by EPA's Removal Contractor in 1997. Subsequently, 1.5 cubic foot-GAC treatment units were added hydraulically downstream of each of the air strippers.

After five years of operation, it was determined that the air strippers were reaching the end of their useful life. Therefore, it was assumed that the maintenance requirements associated with these units would increase. Because of the significant reduction in contaminant concentrations in the private wells, EPA determined that GAC units alone would be able to effectively remove the contamination. EPA also determined that the GAC units alone would be as protective of public health as the combined air stripper/activated carbon treatment units. For these reasons, EPA decided to remove the air stripper treatment units and use only activated carbon treatment units to address the contamination in the private wells.

While the existing GAC units alone would adequately remove the TCE from the groundwater, under NYSDEC and NYSDOH standard operating procedures, the carbon in single carbon units must be replaced every two years. However, if two GAC treatment units are installed in series, the above-noted standard operating procedures allow the carbon to be replaced once sampling shows that the carbon in the primary tank (the first tank) is no longer effectively removing the contaminants (the secondary tank would remove any contaminants that pass through the primary tank, thereby continuing to protect the water supply). Because the long-term cost of installing an additional carbon unit on each well and the carbon replacement expenses related to two GAC units installed in series would be significantly less than the carbon replacement expenses associated with single carbon units, when the air strippers were removed, an additional carbon unit was installed on each well. The conversion was performed in 2002. All systems utilize pre-filtration for sediment removal, GAC for the removal of volatile organic compounds, and ultraviolet light for disinfection. This configuration provides a primary and secondary GAC unit and allows for monitoring water quality between these units.

In an April 2002 Explanation of Significant Differences (2002 ESD), EPA determined that it would be more appropriate to evaluate the need for a permanent alternative water supply during the selection of a final remedy for the site, which would address the source area(s) and the groundwater contamination. EPA also determined that because of the downward trend in contaminant concentrations in the private wells, GAC units alone would effectively remove the contamination. The 2005 ROD amendment selected the GAC units as the final drinking water remedy.

On October 3, 2002, the responsibility for maintaining the POETs and monitoring the private wells was transferred from EPA to NYSDEC.

In-Situ Soil Vapor Extraction System & Subsequent Excavation

ISVE works best in high permeability soils. Because of concerns about the viability of ISVE at CCA due to the predominance of silty soils, in spring 2006, EPA performed an air flow study to provide an indication as to whether or not ISVE could successfully be used to remediate volatile organic compound (VOC)-contaminated soils. The results indicated that ISVE could successfully treat the contaminated soils.

The ISVE system went into full-scale operation in fall 2006. Soil samples were collected during the course of the treatment. Based upon soil samples collected in 2013, it was determined that while the volume of soil that was still above the TAGM objective for TCE had been reduced to an estimated 20 CY, the ISVE system appeared to have reached asymptotic levels (possibly attributable to concrete slabs, footings, and piping that were discovered in the area which may have hindered ISVE performance).

In January 2014, to evaluate how to address the remaining areas of soil with elevated TCE concentrations at CCA, EPA prepared *Little Valley Superfund Site–Cattaraugus Cutlery Area, Evaluation of Options for Addressing Remaining Contaminated Soil.* This document evaluated three treatment options--continued ISVE treatment of the soil; soil excavation with off-site disposal; and soil excavation with on-site soil vapor extraction treatment in an ex-situ treatment cell. Based upon this evaluation, EPA and NYSDEC determined that excavation with off-site disposal would be the best option.

The soil excavation work, which was performed in summer 2014, removed approximately 25 CY (37 tons) of contaminated soil. The excavated soil was shipped to an approved landfill in Angelica, NY. Post-excavation soil samples indicated that TCE concentrations were below the TAGM soil cleanup objective of 700 µg/kg. The ISVE system was subsequently removed and the excavated areas were backfilled with clean fill meeting the requirements of NYSDEC's DER-10, Technical Guidance for Site Investigation and Remediation, Appendix 5.

An ESD was issued in September 2014 (2014 ESD), documenting EPA's decision to implement the contingency soil remedy. In addition, the 2014 ESD documented an EPA determination that an additional IC was needed to address the potential for SVI at properties that may be developed over the plume in the future. Specifically, the local governmental agencies are to be advised annually that if new structures are constructed over the TCE plume (including at CCA and Bush Industries properties), vapor mitigation measures should be implemented as part of the new construction or a property-specific evaluation should be performed to demonstrate that vapor intrusion will not be a concern at the property.

Soil Vapor Intrusion Mitigation

Concerns about TCE vapors from the groundwater entering the air inside homes in the study area prompted the 2005 ROD to call for an evaluation of the potential for SVI into structures within the study area and the installation of subslab depressurization systems (SSDS), if necessary.

To evaluate the possibility of SVI, in 2005, EPA tested under the foundations of 23 homes and the Luminite facility as a representative sample of the more than 300 residences and businesses overlying the contaminant plume. In 2006, EPA revisited 12 of the homes that were tested to sample the indoor air and also tested under the basement slabs of an additional four homes. Based upon these results, EPA collected subslab samples from an additional 82 homes in July 2006.[4] In August 2006, indoor air samples were collected from 25 additional homes and subslab samples were collected from beneath two homes.

Based upon the results of the SVI sampling effort, SSDSs were installed beneath two residences in 2006, one residence in 2010, and two residences in 2012.

In response to a request from NYSDEC and NYSDOH to further evaluate the southern extent of the SVI study area, EPA sent sampling request letters to nine residences in this area that had not been previously sampled.[5] Vapor sampling was performed in 2017 at four of these residences and

[4] Although soil vapor intrusion information packets and access agreements were provided to over 300 homeowners/tenants, a public meeting was held on June 14, 2006 to discuss the soil vapor intrusion program, and follow up letters were sent to those homeowners/tenants that failed to respond to the initial access agreement package, only 148 consented to the sampling program.

[5] In December 2016, a letter was mailed to nine residences provided by NYSDEC, explaining the soil vapor intrusion sampling program and requesting access to perform the sampling. Four homeowners responded affirmatively, three did not responds, and two letters were returned by the post office as "vacant/undeliverable." Follow-up letters were sent out in February 2017 to the three nonresponsive residences; no replies were received.

five that had been sampled previously. The analytical results showed no detections in the indoor air (basement and first floor) or the subslab samples above EPA's risk-based screening values.

Through 2017, EPA conducted SVI sampling at 139 residences plus a manufacturing facility and an NYSDEC facility.

Monitored Natural Attenuation

The 2005 ROD called for MNA of the TCE-contaminated groundwater underlying BIA, CCA, Great Triangle Area, and Ninth Street Landfill Area, as well as the site-wide groundwater plume.

After the performance of 10 years of MNA as a long-term response action pursuant to an MNA plan, as well as vapor intrusion sampling, SSDS monitoring and maintenance, and IC verification inspections, the responsibility for these actions was transferred to NYSDEC as operation and maintenance (O&M) on October 19, 2017.

Institutional Controls

Table 1, below, summarizes the implemented ICs.

Table 1: **Summary of Implemented Institutional Controls**

Media, engineered controls, and areas that do not support UU/UE based on current conditions	ICs needed?	ICs called for in the decision documents?	Impacted Parcel(s)	IC Objective	Title of IC Instrument Implemented and Date (or planned)
Groundwater	Yes	Yes	BIA/CCA/un-improved parcels in Towns of Little Valley & Salamanca where underlying groundwater with TCE above the MCL	Informational ICs to restrict groundwater use without treatment.	BIA and CCA property owners were informed in 2006 that the groundwater underlying their properties is contaminated and should not be used without treatment. Inspection of BIA/CCA during MNA sampling events to determine whether new wells were installed. CCHD issues annual letter to local

					government agencies.
Soil vapor intrusion	Yes	Yes	BIA/CCA/ unimproved parcels in Towns of Little Valley & Salamanca that may be developed in the future and contain a structure	Informational ICs to protect indoor air against potential soil vapor intrusion effects.	Inspection of BIA/CCA during MNA sampling events. CCHD issues annual letter to local government agencies.

It should be noted that all the property owners/renters with drinking water wells that are protected with POETs are aware of the fact that the groundwater they use is contaminated and should not be used without treatment. They are reminded of this on an annual basis when NYSDEC collects samples from their wells and/or provides maintenance related to their individual treatment units. Therefore, ICs to prevent human exposure to contaminated groundwater from these properties (until groundwater standards are met) were determined to be unnecessary.[6]

Systems Operation/Operation & Maintenance

Point-of-Entry Treatment Units

There are approximately 200 private wells located in the study area. POET systems were installed on 91 private residential wells.[7] Of the approximately 100 private wells that do not have POETs installed, data collected from 1989 through 2001 indicated that, with the exception of two wells that marginally exceeded the MCL of 5 µg/l at 6.24 and 6.8 µg/l, all of the wells had TCE concentrations well below the MCL (TCE was not detected in approximately half of the wells). In addition, no daughter products were detected. Because the TCE concentrations in the two wells were trending downward, further sampling in these wells, as well as the other wells without treatment systems, was discontinued.

NYSDEC assumed responsibility for the annual sampling of the private residential wells and the O&M of the POETs in 2002. Routine maintenance is conducted on the POETs during the annual sampling events, and repairs are performed, as needed. As part of the ongoing maintenance of the treatment units, NYSDEC evaluates the effectiveness of the treatment units by sampling the groundwater passing through the individual treatment systems. All systems utilize pre-filtration for sediment removal, GAC (two tanks in series) for the removal of VOCs, primarily TCE, and ultraviolet light for disinfection. Final (treated), intermediate, and raw (pre-treatment) water samples are collected in that order to minimize the possibility of cross-contamination.

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[6] Treatment units were installed on all affected and potentially affected private wells. The homes that do not have treatment units have no well installation restrictions.

[7] The well at a residence that is vacant is no longer sampled.

Inspections of the POETs are performed during the annual sampling events.

Two private wells are in use without treatment. The resident at ID 120 took his system offline. The POET at ID 162 is also no longer online. The POET at ID 109 has been rendered inoperable due to damage from freezing; it is, however, located in a dilapidated building that is not safe for entry. The property owner has been uncooperative. Untreated water is being provided to two mobile homes located on the property. NYSDEC's contractor samples the untreated water and provides the owners with the analytical results; the concentrations of TCE are below drinking water standards.

There are currently 84 active POETs at the site. After a review of the 2019-20 sampling results, NYSDEC, in consultation with NYSDOH, determined that POETs were no longer necessary at 27 residences because the concentration of TCE in the raw water at these locations was less than half of the MCL for the previous four sampling events. NYSDEC sent the homeowners a letter in January 2021, stating that they would no longer provide for the O&M and monitoring of the POET system at the property. The homeowners were advised they could either keep the POET system and assume responsibility for the O&M of said system or NYSDEC would remove the POET system and provide direct connection to their water supply well at no cost. Ten homeowners decided to keep the POETs, seven homeowners wanted them removed, and 10 homeowners did not respond (which NYSDEC interpreted as a request to keep their POET, which NYSDEC will no longer monitor or maintain).

Monitored Natural Attenuation

The groundwater MNA program consists of 34 monitoring wells (six at BIA; 13 at CCA; and 15 in the downgradient plume) near the source areas and downgradient within the valley (see Appendix A, Figures 1 and 2). The samples are analyzed for VOCs and MNA parameters.

An inspection of the monitoring wells is normally performed during the groundwater monitoring activities. Inspection activities conducted include ensuring that the monitoring wells are secured, locked, and in good condition.

Subsurface Depressurization Systems

Before transferring O&M responsibilities for the SSDSs to NYSDEC in October 2017, based upon the manufacturer's recommendation of a five-year useful life for the fans in the SSDS, the fans were replaced in four of the systems in January 2017 (the owner of the fifth residence did not respond to repeated attempts to schedule the maintenance appointment).

Through 2019, on an annual basis, letters were sent to the property owners with SSDSs to schedule routine inspections/maintenance visits. The last inspection was in January 2020. At that time, four of the five systems were inspected by NYSDEC's contractor. The fourth residence did not respond to multiple requests to schedule an inspection appointment. No one answered knocks on the door or telephone calls to the number on record. Based on an external inspection at the residence, the system appeared to not be operating (no sounds were heard).

Periodic inspections of the SSDSs are no longer conducted by NYSDEC. NYSDEC relies on the homeowner to contact them if their SSDS system stops operating. Letters are mailed each fall to all five homeowners to remind them to check the gauges and call NYSDEC if something appears to be amiss. There were no maintenance-related items to report for the four SSDS systems that were inspected in 2020. No further information is available about the system that did not appear to be operating in 2020.

Potential impacts on the site from climate change were assessed. The performance of the remedy is currently not at risk due to the expected effects of climate change in the region near the site.

III. PROGRESS SINCE THE LAST REVIEW

The protectiveness determinations from the last FYR are presented below in Table 2. There were no recommendations or suggestions identified in the 2017 FYR.

Table 2: **Protectiveness Determinations/Statements from 2012 Five-Year Review**

OU	Protectiveness Determination	Protectiveness Statement
1	Protective	The implemented actions for the alternate water supply are protective of human health and the environment. All exposure pathways that could result in unacceptable risk are being controlled by the operation of the POETs.
2	Protective	The implemented source control and groundwater actions at the site, including monitored natural attenuation and vapor mitigation systems, are expected to be protective upon completion. Currently, all exposure pathways that could result in unacceptable risks are being controlled and none are expected.
Sitewide	Protective	The implemented actions at this site are protective of human health and the environment.

IV. FIVE-YEAR REVIEW PROCESS

Community Notification, Involvement & Site Interviews

On Friday, August 6, 2021, EPA Region 2 posted a notice on its website indicating that it would be reviewing site cleanups and remedies at Superfund sites in New York, New Jersey, Puerto Rico and the U.S. Virgin Islands, including the Little Valley Superfund site. The announcement can be found at the following web address: https://www.epa.gov/superfund/R2-fiveyearreviews.

In addition to this notification, efforts will be made to reach out to local public officials to inform them of the results. The EPA Community Involvement Coordinator for the site, Mike Basile, arranged for a notice to be posted on the village website, as well as the EPA website, www.epa.gov/superfund/little-valley. This notice indicated that a FYR would be conducted at the Little Valley Superfund site to ensure that the site is protective of human health and the environment. Once the FYR is completed, the results will be made available at the following repository: EPA, 290 Broadway, 18th Floor, New York, New York, 10007; Town of Little Valley

Municipal Building, 201 3rd Street, Little Valley, New York, 14755; and Salamanca Public Library, 155 Wildwood Avenue, Salamanca, New York, 14779.

In addition, the final report will be posted on the EPA website noted above.

Data Review

Groundwater

NYSDEC's contractor performed three MNA sampling events during the study period in April/May 2018, November 2018, and June 2019. Because one of the wells (BIA-MW-D2) could not be located, only 33 of the 34 wells were sampled using passive diffusion bag (PDB) sampling techniques. In addition, low-flow sampling was conducted at four selected monitoring wells to compare results with samples collected via PDBs. Of the 33 water samples obtained using PDB sampling techniques and submitted for VOC analysis, the laboratory detected TCE or the associated breakdown compounds within 27 of the groundwater samples. Of the four monitoring wells also sampled using low-flow sampling techniques and submitted for the analysis of VOCs and the expanded parameter suite, the laboratory detected TCE or the associated daughter compounds within all four of the groundwater samples. The four monitoring wells sampled using the low-flow sampling techniques produced similar and relatively consistent results compared to the samples collected with the PDB sampling techniques.

MNA sampling was not performed in 2020, as NYSDEC is evaluating the MNA program to determine the appropriate ongoing frequency of sampling moving forward.

Bush Industries Area

During the 2019 sampling event, out of the five BIA wells that were sampled, four exceeded the TCE MCL of 5 µg/l. Wells located in BIA had the highest TCE concentrations in the site area. TCE in the sample collected from monitoring well BIA-MW-2, located in the center of BIA between the main building and Eagle Street was 32 µg/l in 2019, down from 42 µg/l in 2015 (see Appendix A, Figure 3). 2018 and 2019 results for TCE in monitoring well BIA-MW-6, located approximately 275 feet east-southeast of monitoring well BIA-MW-2, were much higher than in 2015 (180 µg/l in 2018 and 100 µg/l in 2019, up from 1.2 µg/l in 2015 (Figure 4)). There were also sporadic detections of TCE breakdown compounds in monitoring well BIA-MW-2 during the review period, including vinyl chloride, 1,1-dichloroethene (DCE), and trans- and cis-1,2-DCE.

Monitoring well BIA-MW-D2, located in the central portion of BIA, historically had had the highest TCE concentration in the entire Little Valley monitoring network. It has not been sampled since 2015 because it cannot be located.

Cattaraugus Cutlery Area

At CCA, the TCE concentration exceeded the MCL in only three of the 13 monitoring wells during the most recent sampling event in 2019. TCE concentrations in the samples collected from monitoring well CCA-MW3 via PDB was 5.2 μg/l and 9.6 μg/l in the sample collected via low-flow. These results are down from the 33 μg/l result observed in 2015. The TCE concentration in monitoring well CCA-MW5 was 6.4 μg/l, a slight increase from 1.4 μg/l in 2015. Similarly, the TCE concentration in monitoring well CCA-MW10 was 10 μg/l in 2019, increasing from 1.4 μg/l in 2015. TCE was not detected in other wells in CCA during the review period. Figures 5 and 6 illustrate the variability and overall declining trend of TCE concentrations in monitoring well CCA-MW-3 and monitoring well CCA-MW-12, respectively, since 1998.

Groundwater Plume

All 15 downgradient plume monitoring wells were sampled in 2019. The TCE concentrations were relatively consistent during the review period and the overall trend of decreasing levels of TCE when compared to the historical contaminant levels is generally evident throughout the Little Valley site at all but a few monitoring wells.

Three of the monitoring wells in the downgradient area were non-detect for TCE and detections in the remaining 12 wells were all below the MCL for TCE. TCE in monitoring well GTA-PZ-32 in the Great Triangle Area exceeded the MCL during the 2018 sampling events (5.5 μg/l and 5.8 μg/l), but was just below the MCL (4.9 μg/l) during the 2019 sampling event (see Figure 7).

Natural attenuation of TCE via reductive dechlorination produces daughter products such as cis-1,2-DCE and vinyl chloride. As noted during the previous FYR, the presence of these daughter products at BIA, and to a lesser extent CCA, indicates that some dechlorination is occurring near the source areas. Further downgradient areas in the valley have shown limited detectable concentrations of daughter products. Other natural chemical and physical processes (dispersion, cometabolism, dilution, etc.) could contribute to the continued natural attenuation in the long, dilute plume. .

During the June 2019 sampling event, samples were analyzed for emerging contaminants (ECs), including per- and polyfluoroalkyl substances (PFAS) and 1, 4-dioxane. The sampling program included low-flow sampling techniques at six of the 33 monitoring wells, including one monitoring well at each of the previously determined Little Valley site study areas. All of the EC analytical results were below the New York Drinking Water Quality Council proposed MCL (to the NYSDOH) of 10 nanograms/liter for PFAS and 1 μg/L for 1,4-dioxane. Thus, no further EC sampling at any of the MNA wells was recommended following the event.

POET Systems on Residential Wells

During the review period, NYSDEC annually sampled the residential wells that have POETs installed. These wells are used to effectively enhance the groundwater monitoring network of the eight-mile-long dilute plume.

The results of a statistical analysis are shown on the table in the appendix and Figure 8. Overall, each of the statistical values (maximum, minimum, median, and average concentrations) for the grouped residential-well dataset has continued to show decreasing concentrations since 1997, with minor variability. For example, the maximum TCE concentration detected in the untreated residential wells has decreased from 30 µg/l in 1998 to 7.7 µg/l in 2020 and the median concentration has decreased from 9.5 µg/l in 1997 to 2.3 µg/l in 2020. Although there has been a general plateauing over the last 10 years, the results show an overall progression toward improvement of the groundwater quality. The general decreasing trend of these residential well (pre-treatment) results are consistent with the data from the POET systems, in which all residential wells show declines, with an average drop of 60% since 2002. Those declining concentrations in the POET results fit an exponential trend line which is characteristic of MNA declines.

During the August-September 2020 event, 84 POETs were sampled; the full suite of VOCs were analyzed using EPA Method 524.2. TCE concentrations in the raw untreated water ranged from not detected at three residences to a high of 7.7 µg/l at two residences, with just ten total residences above the MCL of 5 µg/l. Following this sampling event, 27 POETs were identified for cessation due to raw water concentrations of VOCs being consistently below the applicable MCLs.

Site Inspection

A FYR inspection of the site was conducted on July 7, 2021. In attendance were John DiMartino, Ula Kinahan, Abby DeBofsky, and two employees from EA Science and Technology, NYSDEC's consultant handling the MNA sampling program. No new drinking water wells were observed at CCA or BIA.

In past years, the CCA property was inaccessible because of a fence and buildings along the perimeter of the site property. It was observed during the inspection that all but one of the buildings had completely collapsed. This allows potential trespasser access. Further, the access gate was unlocked. Nevertheless, because the soil has been treated, there is no potential exposure to contaminants of concern.

During the inspection, all monitoring wells were located observed to be locked, accessible, and in good repair with the following exceptions--monitoring well BIA-MW-D2 could not be located (this well has not been located since NYSDEC assumed responsibility for O&M in 2017), monitoring well CCA-MW-4 did not have a cover, and monitoring well CCA-MW-8 was not locked (NYSDEC's contractor subsequently purchased a lock to remedy this).

V. TECHNICAL ASSESSMENT

QUESTION A: *Is the remedy functioning as intended by the decision documents?*

The remedy as identified in the 1996 ROD, 2005 ROD, and 2006 ROD Amendment, as modified by the 2002 and 2014 ESDs includes the installation of POETs on all affected drinking water wells; MNA of the TCE-contaminated groundwater underlying BIA, CCA, the Great Triangle Area, the Ninth Street Landfill Area, as well as the site-wide groundwater plume; treatment of TCE-contaminated soil in CCA by ISVE and excavation of residual contamination; soil vapor monitoring in the treatment areas and in adjacent residential areas; and ICs related to the utilization of groundwater at unimproved parcels that are developed in the future and the potential for vapor intrusion at properties that may be developed over the plume in the future.

The soil remedy was completed in 2014. Post-excavation samples indicate that TCE concentrations were below the ROD-selected TAGM soil cleanup objective of 700 µg/kg.

Of the 117 residential and monitoring wells sampled in 2019/2020, only 16 wells had TCE concentrations exceeding the MCL of 5 µg/l during the review period. The highest TCE concentration was 180 µg/l at BIA in 2019 (compared to 88 µg/l in 2015 at BIA). The maximum TCE concentration in the plume downgradient from the source areas in the raw water sample at one residential well was 7.7 µg/l in 2020 (compared to 7 µg/l in 2016). Daughter products were not detected.

The POETs continue to be effective in removing the TCE contamination from the residential wells. The treatment systems are monitored annually by NYSDEC and the GAC is replaced if breakthrough is detected.

CCHD issues an annual notice to the Little Valley and Salamanca governmental agencies, including the building code enforcement officers, stating that if any unimproved parcel where the underlying groundwater is contaminated with TCE above the MCL is developed, the groundwater should not be used without treatment. CCHD's annual notice also states that if new structures are constructed over the TCE plume (including at CCA and BIA), vapor mitigation measures should be implemented as part of the new construction or a property-specific evaluation should be performed to demonstrate that vapor intrusion will not be a concern at the property. In addition, EPA notified the BIA and CCA property owners that the underlying groundwater is contaminated and should not be used without treatment, and as part of the annual natural attenuation monitoring at these areas, the properties are inspected to verify that wells without treatment systems have not been installed.

A comprehensive SVI sampling program was conducted at the site. The program started with 23 homes and a commercial facility in 2005 and was expanded to eventually include a total of 139 homes plus a manufacturing facility and an NYSDEC facility. The sampling program resulted in the installation of five SSDSs, which were inspected annually (when access was granted) until 2020. Periodic inspections of the SSDSs are no longer conducted by NYSDEC. NYSDEC relies on the homeowner to contact them if their SSDS system stops operating.

QUESTION B: *Are the exposure assumptions, toxicity data, cleanup levels, and RAOs used at the time of the remedy selection still valid?*

There have been no physical changes to the site that would adversely affect the protectiveness of the remedy. Land use assumptions, exposure assumptions and pathways, and clean up levels considered in the decision documents followed the Risk Assessment Guidance for Superfund used by the Agency and remain valid. Although specific parameters and toxicity data may have changed since the time the risk assessments were completed, the process that was used remains valid.

In 1996, a preliminary public health risk assessment for the site concluded that active measures were necessary to ensure TCE concentrations in private wells did not exceed the state and federal drinking water MCL of 5 µg/L. Additionally, as part of the RI, a baseline human health risk assessment (HHRA) was conducted to characterize potential risk stemming from exposure to contaminated soil and groundwater present at suspected source areas. The results of the HHRA found unacceptable risk to commercial workers from direct contact exposure to TCE-contaminated soils in CCA and to commercial workers from exposure to TCE-contaminated groundwater used as process water or commercial car washes.

The installation of the POET systems on all effected drinking water wells has eliminated direct contact exposures with contaminated groundwater at the site. A groundwater cleanup level of 5 µg/l was selected for the site. This level is consistent with the current state and federal MCL for TCE and, hence, remains protective of human health. In addition, the comprehensive SVI investigation, mitigation, and IC measures that are in place ensure that the vapor intrusion pathway remains incomplete in both the current and future timeframes at the site.

The soil remedy consisting of ISVE and residual contamination excavation has eliminated direct contact exposures to potential on-site receptors. NYSDEC's TAGM guidelines of 700 µg/kg was selected as the cleanup criteria for TCE-contaminated soils in CCA. Although the ROD-selected cleanup goal is higher than the State's current soil cleanup objective of 470 µg/kg (NYSDEC Subpart 375-6), it does not exceed EPA's risk-based regional screening level for residential soil and, therefore, remains protective of human health.

The RAOs established for the site in the two RODs remain valid and protective of human health.

The ecological risk assessment at the site determined that concentrations of TCE and its degradation products in surface water were below corresponding ecological screening values. While detections of TCE in surface soils exceed ecological screening values, detections were associated with developed portions of the area with limited wildlife habitat. As such, the exposure assumptions used at the time of the remedy related to ecological risk remain valid and are protective to ecological receptors.

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

Based on the evaluation of the potential human exposures at the site, there is no new information that could call into question the protectiveness of this remedy.

VI. ISSUES/RECOMMENDATIONS

While there are no recommendations identified in Table 3, below, there are some suggestions to improve performance of the MGMS noted below.

Table 3: Issues and Recommendations

Issues/Recommendations
OU(s) without Issues/Recommendations Identified in the Five-Year Review:
01 and 02

OTHER FINDINGS

- The CCA property has been inaccessible because of a fence and buildings along the perimeter of the site property. It was observed during the FYR inspection that all but one of the buildings had completely collapsed. This allows potential trespasser access. Further, the access gate was unlocked. To prevent trespassing, it is suggested that contiguous fencing be installed and that the gate remain locked.
- Monitoring well BIA-MW-D2, which exhibited the highest detections of TCE during the 2015 sampling event, has not been sampled in a number of years because it could not be located. It is suggested that the BIA property owner or its consultant be contacted to provide assistance in locating this well. If this well cannot be located, it is recommended to install another monitoring well at this location and include it within the future MNA program.
- In 2020, one of the residents with an SSDS did not respond to multiple requests to schedule an inspection and did not answer knocks on the door or telephone calls. Based on an external inspection at the residence, the system appeared to not be operating. If the subject house is still occupied, with the permission of the property owner, the SSDS should be inspected and brought back online if it is not currently operating.

VII. PROTECTIVENESS STATEMENT

Table 4, below, presents the operable unit and sitewide protectiveness statements.

Table 4: Protectiveness Statements

Protectiveness Statement(s)	
Operable Unit:	*Protectiveness Determination:*
OU1 (alternate water supply)	**Protective**
Protectiveness Statement: The remedy for OU1 is protective of human health and the environment.	

Protectiveness Statement(s)	
Operable Unit: OU2 (source control and groundwater)	*Protectiveness Determination:* **Protective**
Protectiveness Statement: The remedy for OU2 is protective of human health and the environment.	

Sitewide Protectiveness Statement
Protectiveness Determination: **Protective**
Protectiveness Statement: The sitewide remedy is protective of human health and the environment.

VIII. NEXT REVIEW

The next FYR report for the Little Valley Superfund site is required five years from the completion date of this review.

APPENDIX A--FIGURES

Figure 1: Little Valley Project Location Map

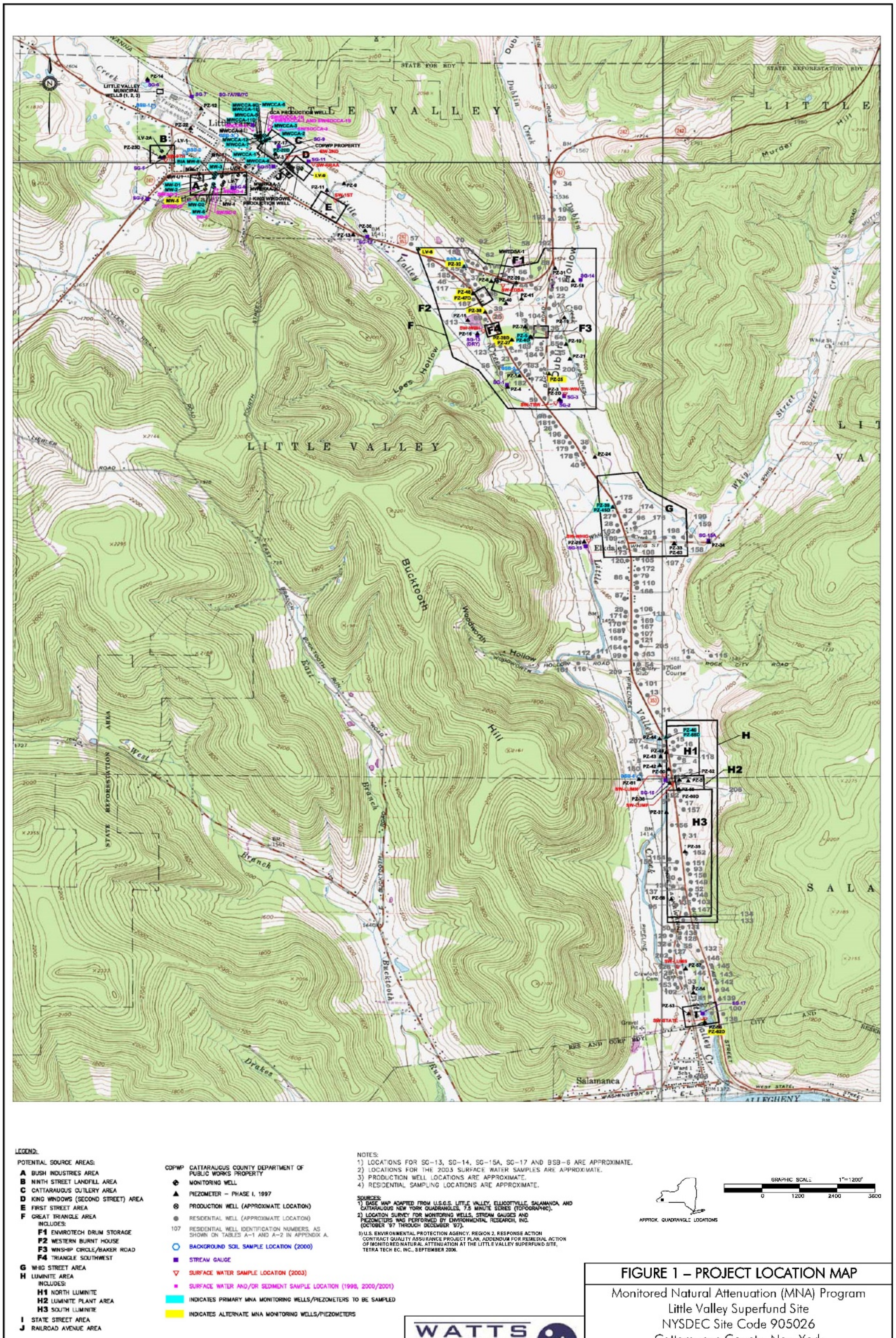


Figure 2: BIA Site Plan and Monitoring Well Locations

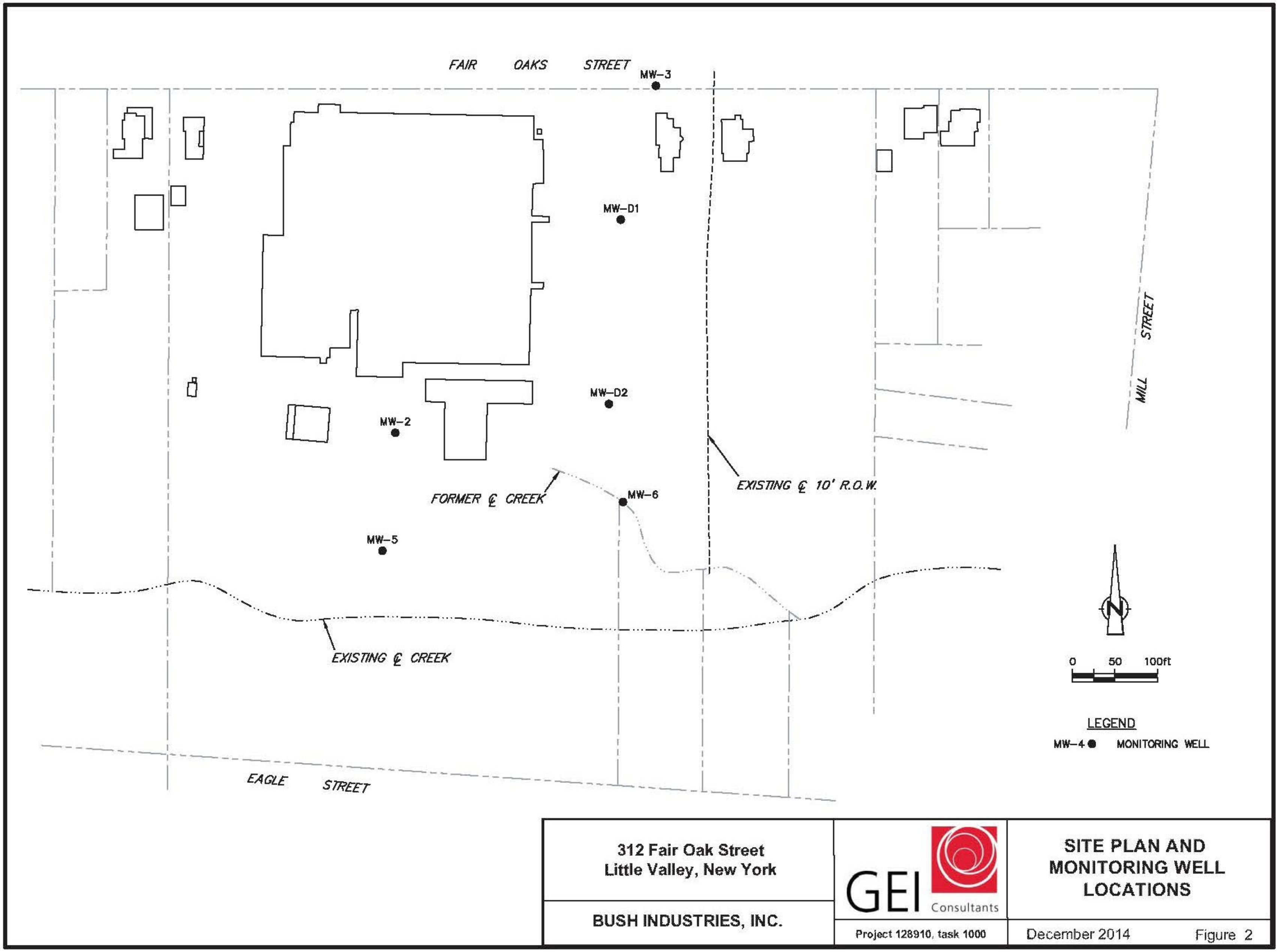


Figure 3: BIA-MW-2 TCE Historic Trends

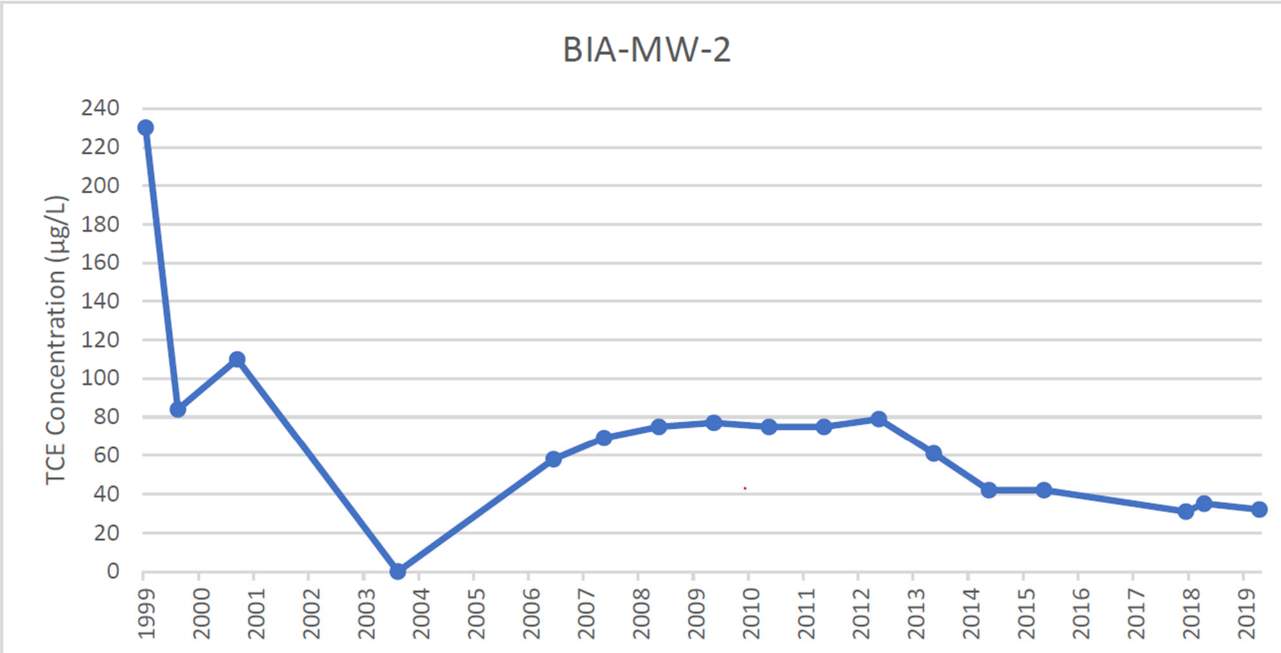


Figure 4: BIA-MW-6 TCE Historic Trends

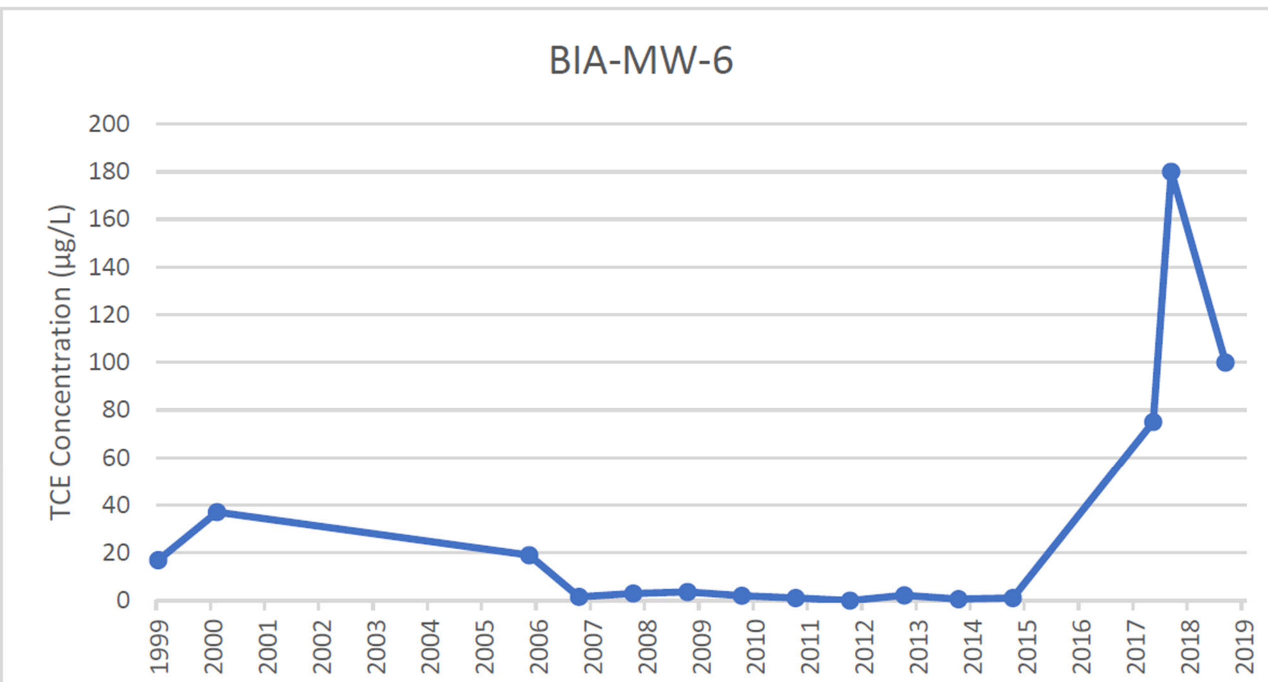


Figure 5: CCA-MW-3 TCE Historic Trends

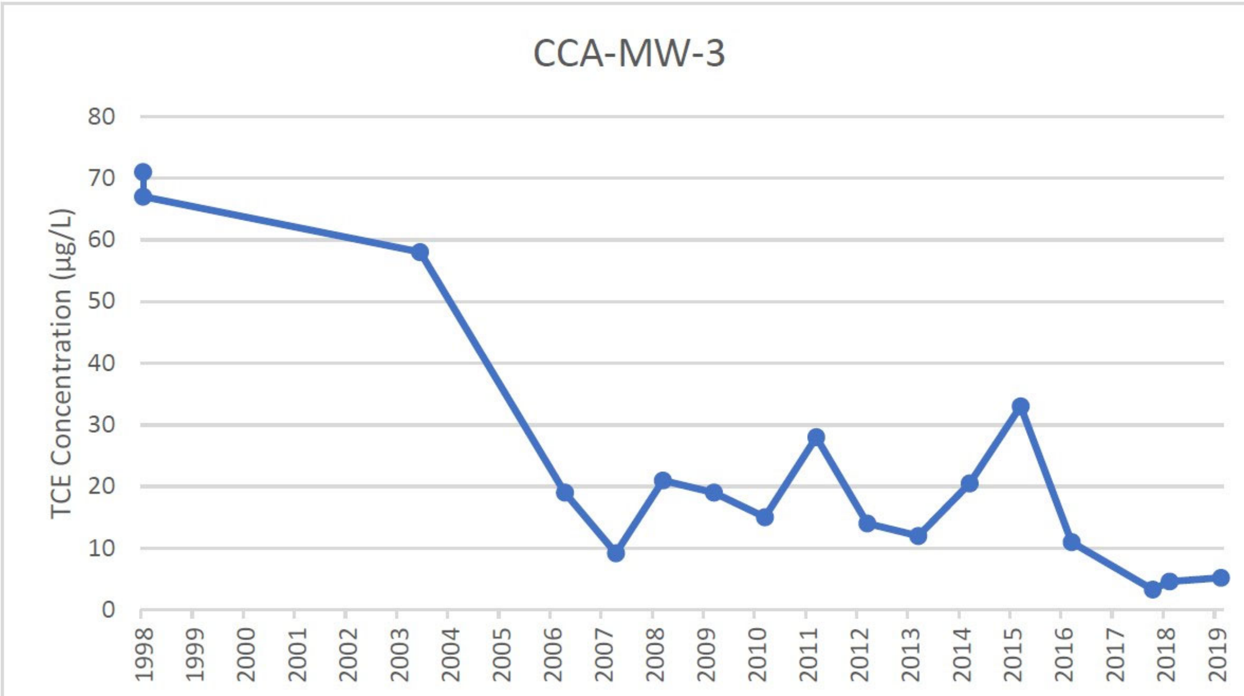


Figure 6: CCA-MW-12 TCE Historic Trends

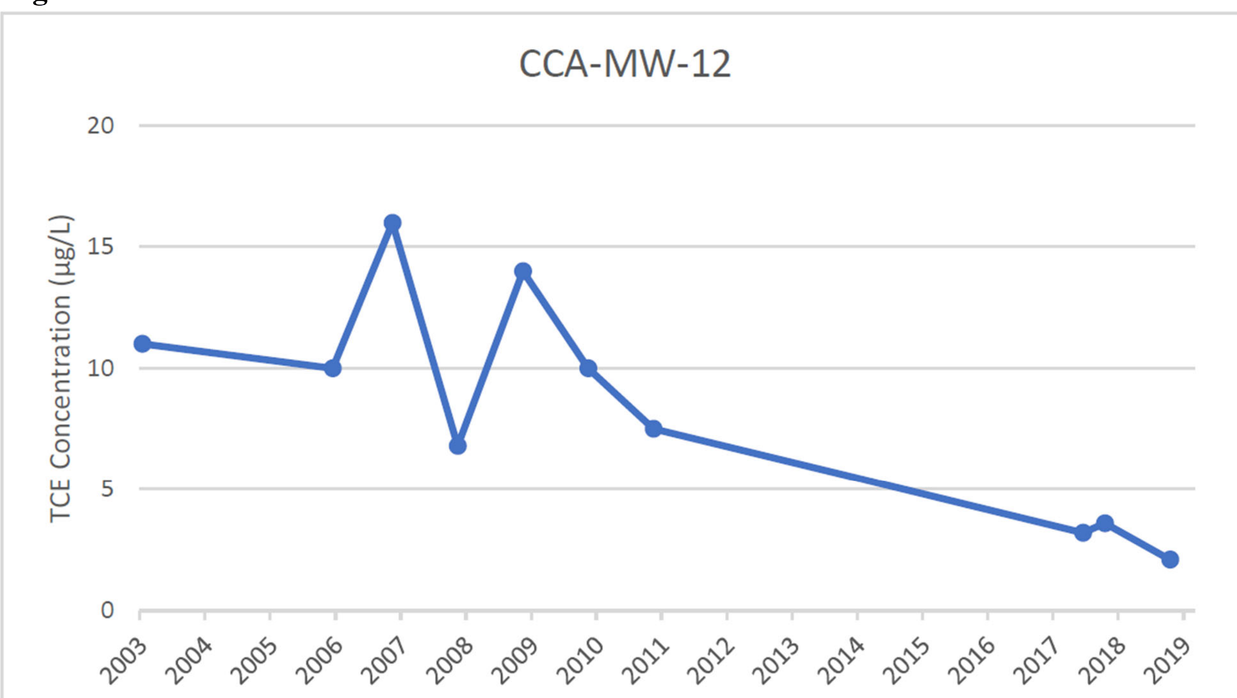


Figure 7: GTA-PZ-32 TCE Historic Trends

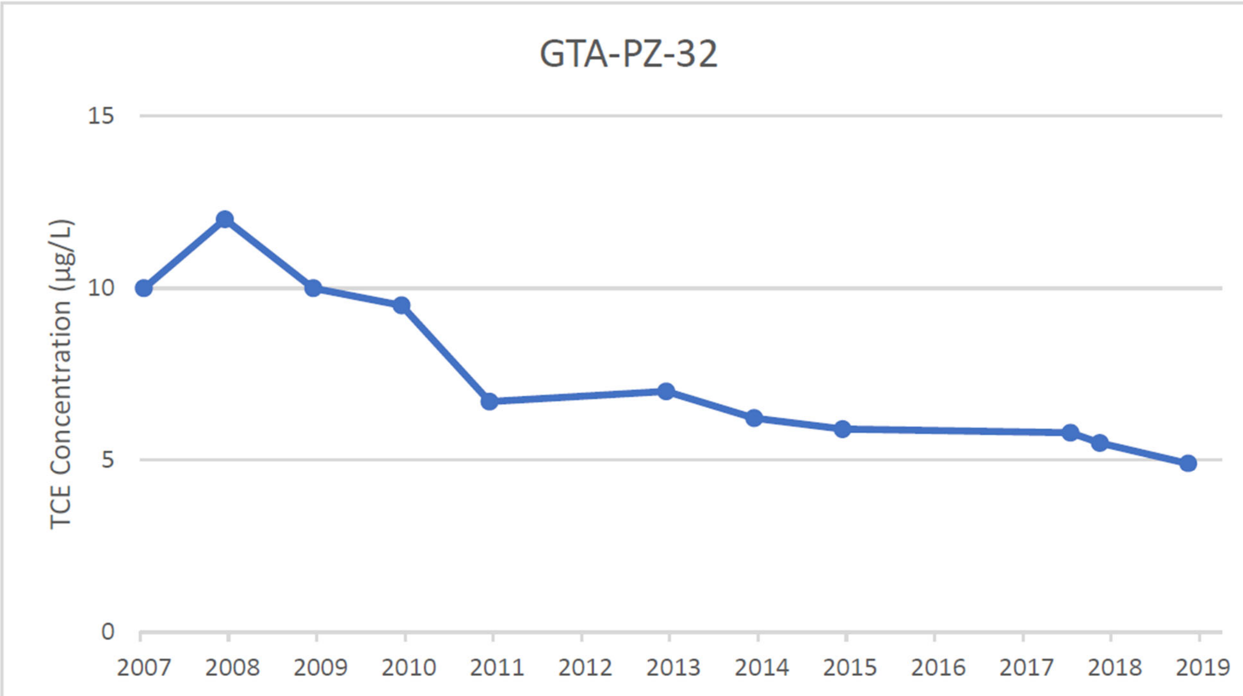
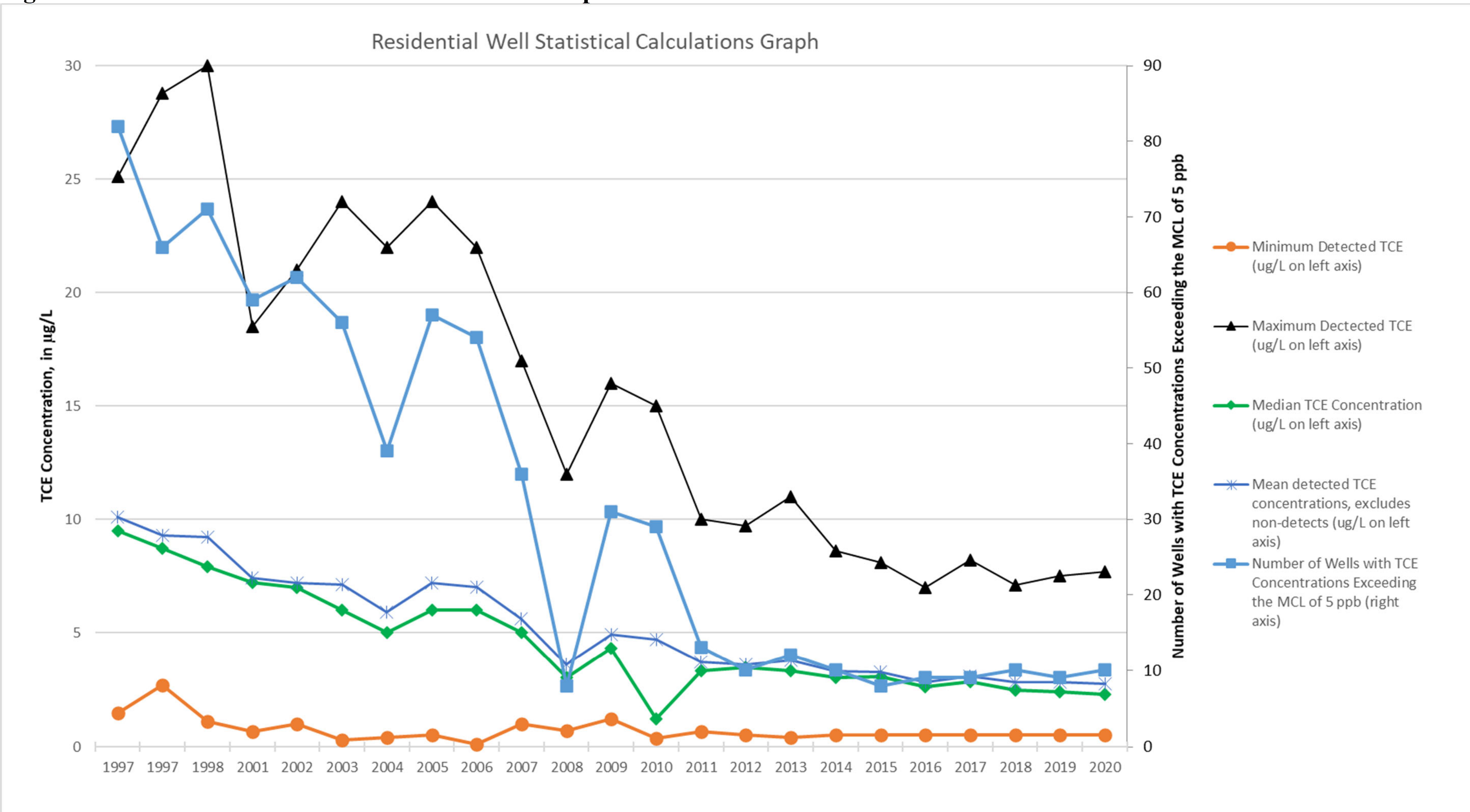


Figure 8: Residential Well Statistical Calculation Graph



APPENDIX B--TABLE

Summary of Statistical Calculations for Residential Wells with Treatment Systems Little Valley Superfund Site

Year	Number of Wells Sampled	Number of Wells with Detected TCE Concentrations	Number of Wells with TCE Concentrations Exceeding the MCL of 5 ug/L	Percentage of Wells with TCE Concentrations Exceeding the MCL of 5 ug/L	Minimum Detected TCE Concentration (ug/L)	Maximum Dectected TCE Concentration (ug/L)	Median TCE Concentration (ug/L)	Mean detected TCE concentrations, excludes non-detects (ug/L)
1997	88	86	82	93.20%	1.49	25.1	9.5	10.1
1997	77	74	66	85.70%	2.7	28.8	8.7	9.3
1998	90	88	71	78.90%	1.1	30	7.9	9.2
2001	75	72	59	78.70%	0.67	18.5	7.2	7.4
2002	87	84	62	71.30%	1	21	7	7.2
2003	85	80	56	65.90%	0.3	24	6	7.1
2004	89	88	39	43.80%	0.4	22	5	5.9
2005	90	89	57	63.30%	0.5	24	6	7.2
2006	90	89	54	60.00%	0.1	22	6	7
2007	89	88	36	40.40%	1	17	5	5.6
2008	87	86	8	9.30%	0.7	12	3	3.6
2009	89	88	31	34.83%	1.2	16	4.3	4.9
2010	89	88	29	32.58%	0.38	15	1.2	4.7
2011	89	87	13	14.60%	0.68	10	3.3	3.7
2012	88	85	10	11.36%	0.5	9.7	3.45	3.6
2013	89	86	12	13.48%	0.42	11	3.3	3.78
2014	85	82	10	11.76%	0.5	8.6	3	3.3
2015	84	82	8	9.76%	0.5	8.1	3.05	3.26
2016	85	82	9	10.58%	0.5	7	2.5	2.82
2017	86	84	9	10.34%	0.5	8.2	2.85	3.08
2018	86	84	10	11.63%	0.5	7.1	2.45	2.83
2019	82	77	9	10.98%	0.5	7.5	2.4	2.81
2020	84	81	10	11.90%	0.5	7.7	2.3	2.76

APPENDIX C – REFERENCE LIST

Documents, Data, and Information Reviewed in Completing the Five-Year Review	
Document Title, Author	**Submittal Date**
Record of Decision (Operable Unit One), EPA	1996
First Five-Year Review Report for Little Valley Superfund Site, EPA	2002
Remedial Investigation and Feasibility Study, Little Valley Superfund Site, Cattaraugus County, New York, Tetra Tech FW, Inc.	2005
Record of Decision (Operable Unit Two), EPA	2005
Amendment to Record of Decision (Operable Unit Two), EPA	2006
Second Five-Year Review Report for Little Valley Superfund Site, EPA	2007
Third Five-Year Review Report for Little Valley Superfund Site, EPA	2012
Fourth Five-Year Review Report for Little Valley Superfund Site, EPA	2017
Explanation of Significant Differences, EPA	2014
Annual Sampling Reports for GAC Water Treatment Systems (POETs), Little Valley, AECOM, and ARCADIS (2020), NYSDEC	2017-2020
MNA Sampling Report, Little Valley Superfund Site, AECOM/Watts	2018 and 2019
MNA and Emerging Contaminant Sampling Report, Little Valley Superfund Site, AECOM/Watts	2019
Inspection and Maintenance of Sub Slab Depressurization Systems, Little Valley Superfund Site, HDR	2020
MNA Well Inspection Report, EA Science and Technology	2021
EPA guidance for conducting five-year reviews and other guidance and regulations to determine if any new Applicable or Relevant and Appropriate Requirements relating to the protectiveness of the remedy have been developed since EPA issued the ROD.	

APPENDIX D – TOPOGRAPHY, SITE GEOLOGY/HYDROGEOLOGY, AND LAND AND RESOURCE USE

The nearest surface water bodies associated with the site are the Little Valley Creek and its tributaries. Little Valley Creek flows southeast, then south through the Little Valley site for approximately eight miles before joining the Allegheny River. Typical stream flow at Little Valley Creek ranges from 20 to 80 cubic feet per second (cfs) during normal precipitation periods and one to ten cfs during severe drought conditions. During periods of dry hydrologic conditions, the upper reach of the stream channel of Little Valley Creek can be dry between storm events since the local water table can drop below the streambed.

The site geology consists of a U-shaped glacial valley filled with glacially-derived outwash deposits that are frequently overlain by more recent alluvial deposits. The glacial-derived deposits of Little Valley are predominately coarse sand and gravel with isolated lenses of silt and clay. Typically, there are five to thirty feet of alluvial silt and fine sand over the gravel. In some areas, the sand and gravel aquifer is overlain by glaciolacustrine silty clay or clay. These thin lenses are not laterally or vertically extensive.

The water table in the valley ranges from near the surface to 50 feet below the ground surface. In general, the water table is deepest in the upper (northern) portion of the valley and gets closer to the ground surface as one moves down the valley toward the Allegheny River. The overall groundwater flow direction is from north to south, following the slope of the valley topography. The highly permeable sand and gravel aquifer combined with the observed groundwater gradients result in relatively high estimates of groundwater-flow velocity.