FOURTH FIVE-YEAR REVIEW REPORT FOR
SARNEY FARM SUPERFUND SITE
DUTCHESS COUNTY, NEW YORK

Prepared by

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

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LIST OF ABBREVIATIONS & ACRONYMS

1,2-DCA	1,2-dichloroethane
AWQS	Ambient Water Quality Standards
ARAR	Applicable or Relevant and Appropriate Requirement
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
DCDOH	Dutchess County Department of Health
EPA	United States Environmental Protection Agency
FYR	Five-Year Review
ICs	Institutional Controls
MCLs	Maximum Contaminant Levels
NCP	National Oil and Hazardous Substances Pollution Contingency Plan
NPL	National Priorities List
NYSDEC	New York State Department of Environmental Conservation
OU	Operable Unit
O&M	Operation and Maintenance
PRP	Potentially Responsible Party
RAO	Remedial Action Objective
RI/FS	Remedial Investigation/Feasibility Study
ROD	Record of Decision
RPM	Remedial Project Manager
TI	Technical Impracticability
VOC	Volatile Organic Compound

I. INTRODUCTION

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

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

This is the fourth FYR for the Sarney Farm Superfund Site (Site). The triggering action for this policy review is the completion date of the previous FYR. The FYR has been prepared because the remedial action will not leave hazardous substances, pollutants or contaminants onsite above levels that allow for unlimited use and unrestricted exposure but requires five or more years to complete.

The site consists of three operable units (OUs): OU1 (drum excavation), OU2 (soils treatment), and OU3 (groundwater). OU1 and OU2 were completed in 1995 and 1997, respectively, and did not leave any wastes in place above health-based levels. OU3 calls for monitoring of the groundwater until defined standards are achieved, which was projected to take more than 30 years, and is the subject of this FYR.

The Sarney Farm Superfund Site FYR was led by Kevin Willis, RPM for the Site. EPA participants included Urszula Filipowicz, Human Health Risk Assessor, Abigail Debofsky, Ecological Risk Assessor, and Rachel Griffiths, Site Geologist. Pitney Bowes, Inc. and Cytek Industries, potentially responsible parties (PRPs) at the Site, were notified of the initiation of the FYR. The review began on September 24, 2020.

Site Background

Initially, Haul-A-Way, Inc., a former owner, was permitted to use a five-acre section of the property as a landfill for municipal wastes; but, eventually, industrial and municipal wastes were disposed at other locations on the property. Non-permitted hazardous wastes, including drums, were also disposed at the Site from 1965 until 1969. The disposal operations were curtailed by the Dutchess County Department of Health (DCDOH) in 1969. The Site was subsequently purchased in 1971 and used as a cattle farm for the following decade.

During the early 1980's, investigations by both the DCDOH and New York State Department of Environmental Conversation (NYSDEC) determined that groundwater contamination existed at the Site. The Site was proposed to be included on the National Priorities List (NPL) in 1984 and was listed on the NPL in 1986.

FIVE-YEAR REVIEW SUMMARY FORM

SITE IDENTIFICATION		
Site Name: Sarney Farm Superfund Site		
EPA ID: NYD980535165		
Region: 2	**State:** NY	**City/County:** Dutchess
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): Kevin Willis		
Author affiliation: EPA		
Review period: 7/1/2016 - 4/1/2021		
Date of site inspection: 3/31/2021		
Type of review: Policy		
Review number: 4		
Triggering action date: 7/1/2021		
Due date *(five years after triggering action date)*: 7/1/2021		

II. RESPONSE ACTION SUMMARY

Basis for Taking Action

In 1988, EPA initiated a Remedial Investigation/Feasibility Study (RI/FS) at the Site. During the RI, the Site investigation was subdivided into distinct areas of investigation where prior excavation activities appeared to have occurred. Five distinct areas were identified where excavations had occurred but only three areas were identified where drums and soil contamination were observed.

The RI/FS was completed in May 1990. As part of the RI/FS, EPA conducted a risk assessment. The risk assessment looked at agricultural and potential residential land use at the Site.

Under both land use scenarios, several pathways (direct contact, inhalation and ingestion) were evaluated for exposure to surface and subsurface soils; sediments and surface waters in the pond, streams, and wetland areas; and groundwater used for drinking and domestic purposes from the bedrock aquifer on the Site. Exposed populations included on-site and off-site residents, farm workers and construction workers. The risk assessment concluded that the majority of the risk was associated with

ingestion of groundwater containing vinyl chloride and 1,2-dichloroethane the primary contaminants at the Site. EPA has designated these contaminants as carcinogenic.

The ecological risk assessment concluded that the high functional ecological value of the marsh as wildlife habitat, in conjunction with relatively low levels (and numbers) of known contaminants, indicated that the adverse impacts caused by physical disturbance of the ecosystem (through remediation alternatives involving excavation of the wetlands) would significantly outweigh the potential benefits of subsequent surface water/sediment treatment.

Response Actions

EPA's initial response at the site was performed by EPA's Removal Program who assessed the Site in 1987 and installed a biodegradation/aeration treatment system. A french-drain system collected and treated leachate from the original dump site and areas to which contaminated leachate had migrated. This system remained active until the Site remediation began.

Following the RI/FS, a Record of Decision (ROD) was signed in September 1990. The selected remedy included:

- Excavation of contaminated soil and buried drums;
- Transportation of contaminated drums to an off-site treatment and disposal facility;
- On-site low temperature thermal treatment of contaminated soil;
- Grading of the excavated areas with the treated soil;
- Long-term monitoring program for surface water, groundwater, and residential wells to verify that contaminants are not migrating from the site, installation of additional monitoring wells (if necessary), and hydrogeological testing to ensure that the remedy is protective of human health and the environment.

There were no Remedial Action Objectives (RAOs) established in the ROD.

EPA chose a "No Further Action of the Site Groundwater" remedy with natural attenuation of VOC contaminated groundwater. The natural attenuation of the groundwater contamination (*e.g.*, biodegradation, dilution, dispersion) was expected to reduce the levels of contaminants in the groundwater to acceptable levels over time (approximately 30 years). Until that time, institutional controls would be used to prevent the use of contaminated groundwater.

Status of Implementation

During the RD, the selected remedy was divided into two OUs: Drum Excavation (OU1) and Soil Excavation and Treatment (OU2). While there was no active remedy selected for the groundwater, the activities related to the post-ROD groundwater investigation and monitoring were referred to as OU3.

OU1 – Drum Excavation

From March 1992 until March 1995, EPA completed the remedial action with the excavation of the buried drums and containers at the Site. A total of 674 55-gallon drums, 552 5-gallon pails, and 20,353 small "lab-pack" containers were excavated and disposed of off-site. Excavation commenced in Area 4 in September 1992. The quantities of buried materials which were excavated were considerably greater

than expected in this area. Area 4 excavation was completed in early March 1993. The drum excavation for Areas 1 and 2 was initiated in March 1994.

At the completion of excavation and removal operations, magnetometer and ground-penetrating radar (GPR) surveys of the areas were performed; this work confirmed that Areas 1, 2, and 4 and the adjacent areas did not contain any remaining metallic objects. Also, the GPR survey results did not indicate any additional areas where soil had been significantly disturbed.

All hazardous wastes recovered from the Site, including the consolidated lab packs, was disposed of at RCRA-permitted facilities. Off-site disposal operations concluded on March 17, 1995. The Buried Container Excavation and Disposal remedial action was described in an approved Remedial Action Report dated October 2, 1995.

OU2 – Soil Excavation and Treatment

Through evidence collected during the drum excavation activities, Pitney Bowes was identified as a PRP, as discussed above. Subsequently, EPA issued a Unilateral Administrative Order to Pitney Bowes, to conduct the soil remediation. The United States Army Corps of Engineers (USACE) provided oversight on behalf of EPA.

Mobilization to the Site began in July 1997. The lower field (near Areas 1 and 2) was cleared and compacted to support the low-temperature thermal desorption (LTTD) unit. Soil excavation started in August and was completed in November 1997. The initial boundaries of the excavations were located by survey based on the design drawings. A total of 7,300 cubic yards (cy) of soil were excavated during the RA including 1,230 cy from Area 1; 2,672 cy from Area 2; and 3,398 cy from Area 4. Area 3 did not require remediation as it did not have containers or soil contamination that exceeded cleanup levels.

Treated soil was backfilled into the excavation areas after post-excavation sampling results showed that cleanup levels in the excavated areas had been achieved. Approximately 1,100 cy of clean off-site backfill was placed in the excavations to bring the site back to original condition, *i.e.*, to grade.

At the completion of treatment operations, the LTTD unit was dismantled and decontaminated. All major components of the LTTD were transported off-site by December 19, 1997. Site restoration was completed by July 1998. The soil excavation and backfill portion of the remedial action was described in an approved Remedial Action Report dated September 1998.

OU3 – Post-ROD Groundwater Investigations

Significant investigations of the Site groundwater had been performed since the 1990 ROD to verify that the No Further Action groundwater remedy remained appropriate. The findings of these investigations were summarized in a September 2001 Post-ROD Groundwater Evaluation report and are discussed below.

The groundwater investigation began as part of the RD in early 1991. Nine monitoring wells were installed and sampled. Significant levels of VOC-contamination were identified migrating from Area 4. Additional wells were installed to characterize the groundwater flowing from Area 4 towards Cleaver Swamp. The surface water and sediment sampling in Cleaver Swamp verified that significant contamination was not present in the swamp and that the outflow from the swamp was not contaminated. An evaluation of the hydrogeology in this area indicated a very localized area of a

downward flow of the groundwater from the overburden into the bedrock aquifer necessitating further investigation of the extent of this contamination.

In 1992, to define the three-dimensional flow within the Site aquifer system more accurately, an additional five deep bedrock monitoring wells and eleven piezometers were installed at the Site. Multi-level samplers were installed into the monitoring wells to allow for discrete-zone sampling and hydrogeologic analysis of the local aquifer system. Groundwater was sampled and water levels were recorded on two separate events; one site-wide, comprehensive event and a second event focused on areas of potential concern. The general bedrock flow is to the west and southwest. Two additional deep bedrock wells were installed in this area with multi-level samplers. In addition, two short-term pumping tests were performed.

EPA determined that groundwater flow in the overburden generally follows the topography of the Site. . The analysis of the monitoring well data suggests that the remaining site-related contamination is migrating into Cleaver Swamp where it is attenuated by natural processes (which include biodegradation, dispersion, and volatilization) and, ultimately, poses no significant health-related exposure to the human health or the environment.

As a result of the groundwater investigation, EPA determined that the numerous monitoring wells, installed to characterize and to delineate the groundwater flow at the Site, showed no contamination over five years of sampling. Subsequently, EPA determined that these wells no longer needed to be sampled, and asked the PRP to abandon 11 monitoring wells, five multi-level monitoring wells and seven piezometers, in accordance with NYSDEC protocol. This abandonment effort was completed in 2008 (see **Figure 2**).

Institutional Controls (ICs) Summary Table

Table 1: Summary of Planned and/or Implemented ICs

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	East of Cleaver Swamp	Assure No Use of Contaminated Groundwater for Potable Use	New York State Sanitary Code 10 NYCRR Part 5, Subpart 5-2; (Deed notice restricting the use of groundwater-planned September 2021)

A deed restriction on the property indicates that hazardous wastes have been disposed on the property. This deed notice will be supplemented with a more specific restriction on the use of the groundwater at the Site. The existing restriction, as well as well permitting requirements under New York State NYCRR Part 5 Subpart 5-2, limit the potential for potable use of groundwater beneath the Site; these are complemented by annual monitoring of residential wells in the vicinity of the Site and together serve to ensure that human exposure to Site contaminants in groundwater is not a completed exposure pathway.

Systems Operations/Operation & Maintenance

Currently, the PRPs perform annual groundwater sampling of the monitoring well network on the Site property and nearby residential potable wells and prepare a data report for EPA's review. The report is also sent to the property owners.

Potential Site impacts from climate change have been assessed, and the performance of the remedy is currently not at risk due to the expected effects of climate change in the region and near the Site.

III. PROGRESS SINCE THE LAST REVIEW

This section includes the protectiveness determinations and statements from the last FYR, as well as the recommendations from the last FYR and the current status of those recommendations.

The protectiveness determinations from the last FYR are summarized in Table 2, below.

Table 2: Protectiveness Determinations/Statements from the 2016 FYR

OU #	Protectiveness Determination	Protectiveness Statement
01	Short-term Protective	The implemented remedies at the Sarney Farm Superfund site currently protect human health and the environment in the short term by controlling exposure pathways that could result in unacceptable risks. In order to ensure that the remedy will be protective in the long term, prior to the completion of the fourth five-year review, EPA will further evaluate existing and emerging technologies to determine if any can be pragmatically used to expedite the restoration of the groundwater. If it is determined that no such technologies are available to restore groundwater within a reasonable timeframe, a determination will be made as to whether a Technical Impracticability waiver is appropriate for a portion of the site.
Sitewide	Short-term Protective	The implemented remedies at the Sarney Farm Superfund site currently protect human health and the environment in the short term by controlling exposure pathways that could result in unacceptable risks. In order to ensure that the remedy will be protective in the long term, prior to the completion of the fourth five-year review, EPA will further evaluate existing and emerging technologies to determine if any can be pragmatically used to expedite the restoration of the groundwater. If it is determined that no such technologies are available to restore groundwater within a reasonable timeframe, a determination will be made as to whether a Technical Impracticability waiver is appropriate for a portion of the site.

The previous FYR had issues and recommendations. Table 3 summarizes how the issues were addressed.

Table 3: Status of Recommendations from the 2016 FYR

OU #	Issue	Recommendations	Current Status	Current Implementation Status Description	Completion Date (if applicable)
3	Contaminant levels in groundwater are declining more slowly than expected.	(1) EPA will further evaluate existing and emerging technologies to determine if any can be pragmatically used to expedite the restoration of the groundwater; if it is determined that no such technologies are available to restore groundwater within a reasonable timeframe, a determination will be made as to whether a Technical Impracticability waiver is appropriate for a portion of the site. (2) Implement the additional sampling that EPA has directed the PRP to perform, which includes: additional sampling of Cleaver Swamp surface water and sediment, sampling for MNA parameters and additional sampling for 1,4-dioxane.	Ongoing	(1) Technical Impracticability Waiver being evaluated. Draft document in internal review; however recent data suggests it may not be necessary (see below) (2) PRP has modified the sampling effort to include MNA parameters and Emerging Contaminants. One round of surface water and sediment data was collected in the five-year period. The results are discussed below.	3/16/2022

The FYR also noted that future residential well sampling events should use reporting limits that meet the current New York State Drinking Water standard of 0.6 ug/L for 1,2-DCA.

IV. FIVE-YEAR REVIEW PROCESS

Community Notification, Involvement & Site Interviews

On October 1, 2020, 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 Sarney Farm Superfund site. The announcement can be found at the following web address: https://www.epa.gov/aboutepa/fiscal-year-2021-five-year-reviews.

In addition to this notification, a public notice was made available by posting the announcement on the Town of Dover website and the Town of Amenia's website on 12/2/2020, stating that there was a FYR and inviting the public to submit any comments to the U.S. EPA. The results of the review and the report will be made available at www.epa.gov/superfund/sarney-farm and the site information repositories located at the Dover Town Hall and the Amenia Town Hall.

EPA interviewed the daughter of the property owner to discuss any concerns she may have regarding the Site or this FYR report. Concerns were raised regarding the need to limit the size of the Site to the area where groundwater contamination remains and release the land parcels that are in the Sarney Trust but not contaminated.

Data Review

The main area of contaminated groundwater is located between Area 4 and Cleaver Swamp and is approximately one acre in size (see **Figure 2**). In the 2001 Post-ROD Groundwater Evaluation Report, the observed overburden monitoring well water elevations suggested flow was moving toward the swamp area. The general bedrock flow is to the west and southwest into Cleaver Swamp and strongly influenced by topographic effects and the patterns of the most transmissive fractures.

Since concentrations of COCs found in the overburden monitoring wells were all well below cleanup goals, all overburden monitoring wells were decommissioned in 2007. Currently, groundwater sampling is conducted on an annual basis in the 3rd quarter of each year. The monitoring well network consists of bedrock multi-level monitoring wells: MW-7D (shallow [S] and deep [D]), MW-9D (shallow [D3], intermediate [D2], deep [D1]), and MW-10D (shallow [D3], intermediate [D2], deep [D1]), and five private residential water supply wells ranging from 10.5 to 325 feet below ground surface.

The groundwater contaminant observed most frequently and at the highest concentrations has been 1,2-dichloroethane (1,2-DCA). The only other contaminants that have been detected during this FYR period have been 1,1-dichloroethane, trichloroethene, tetrachloroethene, benzene, cis-1,2-dichloroethene (cis-1,2-DCE), and 1,4-dioxane. Of these VOCs, only cis-1,2-DCE exceeded NYSDEC Class GA Ambient Water Quality Standards (AWQS). Concentrations of cis-1,2-DCE were below the EPA maximum contaminant level (MCL) of 70 ug/L but above the AWQS of 5 ug/L at MW-7D shallow and deep zones, and MW-9D intermediate and deep zones with a maximum concentration of 8.4 ug/L at MW-9D intermediate zone in August 2016. Analysis for 1,4-dioxane occurred in 2017 and 2018, and the maximum sitewide detection during the review period was 13 ug/L at MW-9D deep zone in August 2018, exceeding the NYSDEC MCL of 1 µg/L.

The wells located immediately west of Area 4 (MW-7D, MW-9D) have shown generally declining 1,2-DCA concentrations since 2005, with consistent decreases from 2015-2019, though concentrations remain above the EPA MCL of 5 ug/L. In MW-7D-S, 1,2-DCA concentrations have consistently decreased from 61 ug/L in 2015 to 37 ug/L in 2019, mirroring a similar decrease in MW-7D-D from 79 ug/L in 2015 to 36 ug/L in 2019. At MW-9D, concentrations of 1,2-DCA have shown notable decreases from 2015 to 2019 in all monitored depth zones. From 2015 to 2019, concentrations of 1,2-DCA decreased from 86 ug/L to 53 ug/L in MW-9-D3, 92 ug/L to 60 ug/L in MW-9-D2, and 73 ug/L to 56 ug/L ug/L in MW-9-D1. Concentration trends of 1,2-DCA for each sampling interval of MW-7D and MW-9D can be seen on **Figures 3 and 4**, respectively.

Multiport monitoring well MW-10D is geographically located between MW-9D and a residential well on Benson Hill Road south of Cleaver Swamp. Concentrations of 1,2-DCA during this FYR period are

stable below the MCL at the MW-10-D3 shallow zone and decreasing in MW-10-D2 from 37 ug/L to 24 ug/L and MW-10-D1 from 31 ug/L to 21 ug/L. Concentration trends of 1,2-DCA for each depth zone of MW-10D can be seen on **Figure 5**.

Residential well sampling is performed at five homes nearby that are side and downgradient of the site in order to ensure that local residents are not being adversely impacted by groundwater contamination. These residences are situated within one-half mile of the Site along Benson Hill Road. The residential sampling has not indicated any site-related contaminants in excess of state or federal guidelines in any residential well from 2015 to 2019. Since there have been no historic detections in the residential wells, it is indicative that these wells are not in hydraulic connection with contamination in upgradient fractured bedrock.

An annual sampling plan has been enacted throughout the past five years. Ten monitoring points at three locations on-site and five residential wells are sampled during low water table periods to ensure that the groundwater contamination at the Site followed the expected trends. In addition to contaminant data, monitored natural attenuation parameters have been collected for the past five years and indicate that geochemical conditions on site are favorable to reductive dechlorination.

Per the 2016 FYR recommendations, a co-located surface water and sediment sample were collected from Cleaver Swamp immediately adjacent to the MW-9D cluster. Concentrations of methylene chloride in the sediment sample and acetone in the surface water sample were determined to be laboratory contaminants. Benzene and toluene were detected in the surface water sample at 0.23 ug/L and 0.51 ug/L, respectively. The detected concentrations are below the NYSDEC AWQS for the most stringent surface water class.

In summary, the concentrations of 1,2-DCA in the bedrock are continuing to decrease via reductive dechlorination, though the rate of decline has slowed as the concentrations approach the EPA MCL. Seven of the eight sampling locations have concentrations of 1,2-DCA above the EPA MCL of 5 ug/L. The monitored natural attenuation parameters collected at the Site indicate methanogenesis may be a primary driver of 1,2-DCA reductive dechlorination. Overall, groundwater concentration levels appear to be in decline, though somewhat slower than expected.

Emerging contaminants sampling was performed during this FYR period to evaluate the presence of per- and polyfluoroalkyl substances compounds (PFAS) and 1,4-dioxane in site groundwater. PFAS sampling occurred on February 11, 2019 at MW-7D-D and MW-7D-S. Results indicate low detections of PFAS, with a maximum concentration of 8.1 nanograms per liter of perfluorooctanoic acid (PFOA). Analysis for 1,4-dioxane occurred during the August 2017 and August 2018 annual sampling events. Concentrations of 1,4-dioxane are more prevalent, with a maximum detection of 13 ug/L, which exceeds the NYSDEC drinking water MCL of 1 µg/L.

Site Inspection

The Site inspection of the Sarney Farm Superfund Site was conducted on March 31, 2021. In attendance was Rachel Griffiths, EPA Site Geologist. The purpose of the inspection was to assess the protectiveness of the remedy. The Site appeared undisturbed and the monitoring wells were in good condition.

V. FIVE-YEAR REVIEW PROCESS

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

The selected remedy for contaminated groundwater was no further action with natural attenuation of VOCs.

As discussed previously, the primary VOC of concern at the Site is 1,2-DCA. Groundwater concentrations of 1,2-DCA found in the bedrock multi-level wells have decreased since the soil remediation. During the last FYR it was noted that concentrations were not decreasing as quickly as originally expected in the original ROD. At the 30-year point, VOC concentrations remain above remedial goals in seven of the eight monitored locations; however, concentrations in recent years have declined more significantly than in previous five-year periods. Additionally, MNA data collected in the last five years supports that reductive dechlorination is occuring through methanogenesis.

While concentrations of 1,2-DCA continue to be detected above the EPA MCL of 5 µg/L in the majority of groundwater sampling locations, concentrations have declined steadily throughout this FYR period. Geochemical analysis indicates that conditions conducive to reductive dechlorination are present, which is likely a contributing factor in the decreasing 1,2-DCA concentrations. Although VOC-contamination continues to be detected in on-site bedrock monitoring wells, data collected from the five nearby residential wells (also in bedrock) do not show any detections of 1,2-DCA. To ensure residents in the vicinity of the site are not exposed to onsite contamination, annual monitoring of the potable wells will continue. Institutional controls are in place that prevent groundwater use on the Site. As stated above, although residences in the area downgradient of the Site use groundwater for drinking water purposes, routine sampling is conducted, and, to date, Site contamination has not impacted these wells.

It is likely that a limited source of contamination remains in the bedrock beneath a small area of the Site. Concentrations have declined steadily throughout the review period. Geochemical analysis indicates that conditions conducive to reductive dechlorination are present, which is likely a contributing factor in the decreasing 1,2-DCA concentrations. As a result, EPA will defer consideration of a Technical Impracticability (TI) waiver in favor of further evaluating groundwater trends over the next five years.

Question B: Are the exposure assumptions, toxicity data, cleanup levels, and remedial action objectives (RAO) 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 cleanup levels considered in the decision document followed the Risk Assessment Guidance for Superfund used by the Agency and remain valid. Although specific parameters may have changed since the time the human health risk assessment was completed, the process that was used remains valid.

A deed restriction on the property indicates that hazardous wastes have been disposed on the property. This deed notice will be supplemented with a more specific restriction on the use of the groundwater at the Site. The existing restriction, as well as well permitting requirements under New York State NYCRR Part 5 Subpart 5-2, limit the potential for potable use of groundwater beneath the Site; these are complemented by annual monitoring of residential wells in the vicinity of the Site and together serve to ensure that human exposure to Site contaminants in groundwater is not a completed exposure pathway. Additionally, the past removal of drums and thermal treatment of contaminated soils has eliminated

direct contact exposures (*i.e.*, ingestion and dermal contact) by potential receptors as well as removed the source area impacting the groundwater beneath the Site. Soil cleanup goals established at the time of the ROD remain valid. State and federal MCLs were selected as the groundwater cleanup criteria which remain valid.

The overall objectives of the response action, as identified in the ROD, are in place to reduce the concentrations of contaminant in the soils to levels which are protective of human health and the environment and to prevent current and future exposure to the contaminated groundwater and are still appropriate.

The potential for vapor intrusion into indoor air was not evaluated at the time of the ROD; however, it was assessed during the previous FYR and deemed not to be a concern. As part of this FYR, the maximum concentrations of 1,2-DCA of 92 parts per billion detected onsite was compared to the current chemical-specific groundwater vapor intrusion screening levels (VISLs) for 1,2-DCA. These screening values reflects groundwater levels associated with an indoor air concentration that represents a cancer risk ranging from 1×10^{-4} and 1×10^{-6} or a non-cancer hazard quotient of 1. The maximum concentration of 1,2-DCA detected in monitoring wells did not exceed the non-carcinogenic VISL and fell within an acceptable risk range for the cancer endpoint. Furthermore, there are no buildings overlying the affected plume area at this time; therefore, the vapor intrusion pathway remains incomplete.

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

No.

VI. ISSUES/RECOMMENDATIONS

Issues/Recommendations
OU(s) without Issues/Recommendations Identified in the Five-Year Review:
OU 1 and OU2

OTHER FINDINGS

As part of the long-term monitoring plan for monitoring wells and residential wells, EPA recommends 1,4-dioxane should continue to be monitored.

Since the 1990 ROD estimated a 30-year time frame in order to reach MCLs, EPA expects to reevaluate the cleanup time frame using the most recent data. As noted above, concentrations of 1,2-DCA have declined steadily throughout the last five years. Geochemical analysis indicates that conditions conducive to reductive dechlorination are present, which is likely a contributing factor in the decreasing 1,2-DCA concentrations. As a result, EPA will defer consideration of a TI waiver in favor of further evaluating groundwater trends over the next five years, and developing a new estimate of cleanup time frames.

VII. PROTECTIVENESS STATEMENT

Protectiveness Statement(s)		
Operable Unit: 1	*Protectiveness Determination:* Protective	*Planned Addendum Completion Date:* Click here to enter a date
Protectiveness Statement: OU1 The implemented remedies at the Sarney Farm Superfund site currently protect human health and the environment.		

Sitewide Protectiveness Statement	
Protectiveness Determination: Protective	*Planned Addendum Completion Date:* Click here to enter a date
Protectiveness Statement: Sitewide The implemented remedies at the Sarney Farm Superfund site currently protect human health and the environment.	

VIII. NEXT REVIEW

The next FYR report for the Sarney Farm Superfund Site is required five years from the completion date of this review.

APPENDIX A – TABLES

Table 3: Chronology of Site Events	
Event	**Date**
Initial discovery of problem or contamination	1980
NPL listing	June 10, 1986
Removal actions	September 1987
Remedial Investigation/Feasibility Study completed	September 27, 1990
ROD signature	September 27, 1990
Superfund State Contract	September 24, 1991
Administrative Order on Consent With Sarney Trust	May 13, 1992
Unilateral Administrative Order issued	September 27, 1996
Remedial design started	March 31, 1992
Remedial design completed	March 30, 1995
Actual remedial action started	March 30, 1995
Construction started	November 30, 1992
Construction completed	September 29, 1998
Annual Groundwater Sampling	2001 -2020

Table 4: Documents, Data, and Information Reviewed in Completing the Five-Year Review	
Document Title, Author	**Submittal Date**
Remedial Investigation/Feasibility Study, Ebasco, Inc.	1987
Record of Decision, EPA	1990
Final Remedial Design Report, USACE	1999
Post-ROD Groundwater Evaluation, QST	2001
Remedial Action Report, EPA	2001
Preliminary Close-Out Report, EPA	2002
Annual Groundwater Sampling Reports,	2001-2021
Five-year Groundwater Evaluation Report, Mactec	2006, 2011, 2016
EPA Five -Year Review Reports	2006, 2011, 2016

APPENDIX B – FIGURES

Figure 1:

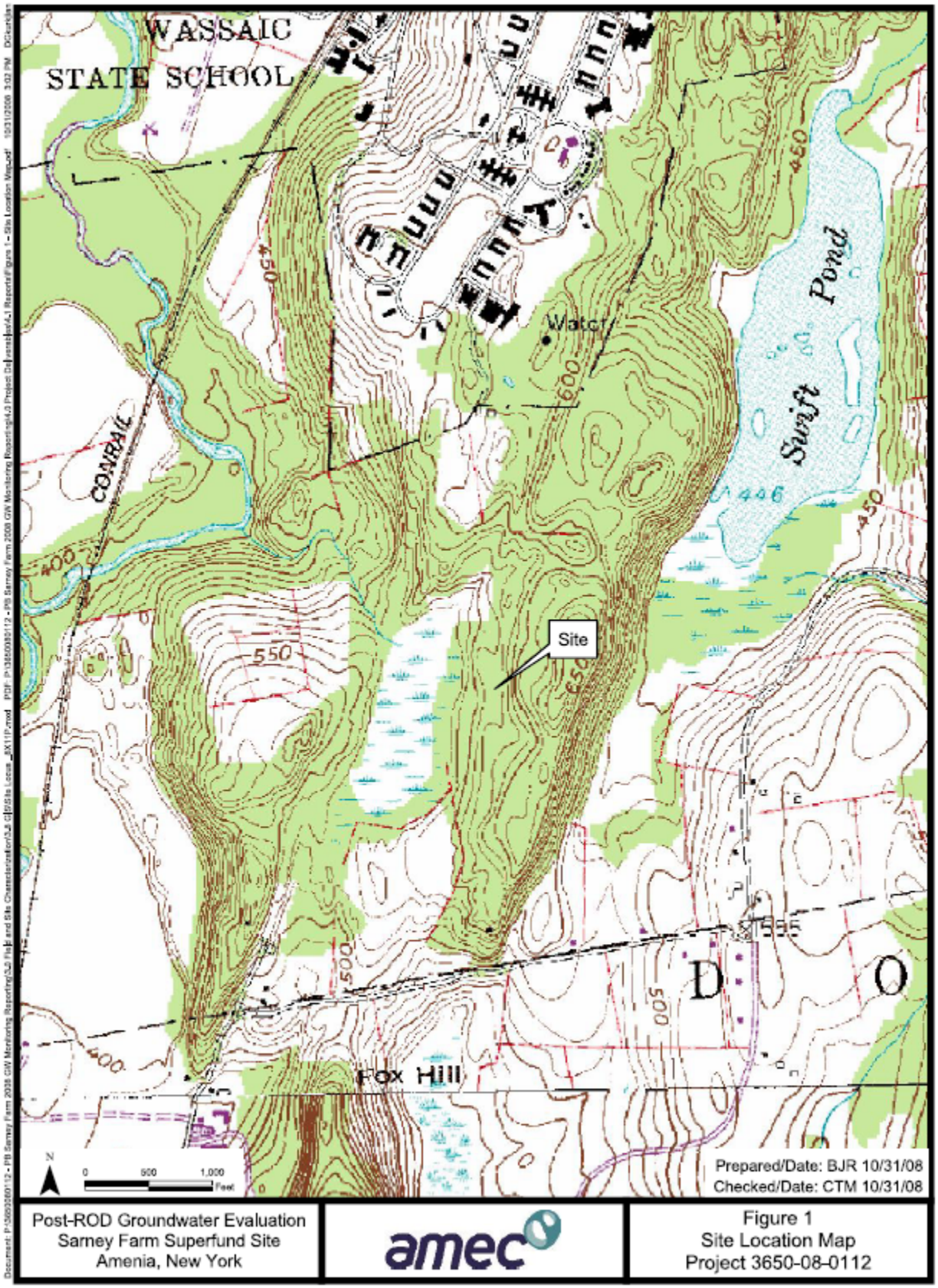
WASSAIC
STATE SCHOOL
Swift Pond
Water
Site
Fox Hill
CONRAIL
Prepared/Date: BJR 10/31/08
Checked/Date: CTM 10/31/08
Post-ROD Groundwater Evaluation
Sarney Farm Superfund Site
Amenia, New York
amec
Figure 1
Site Location Map
Project 3650-08-0112

Figure 2:

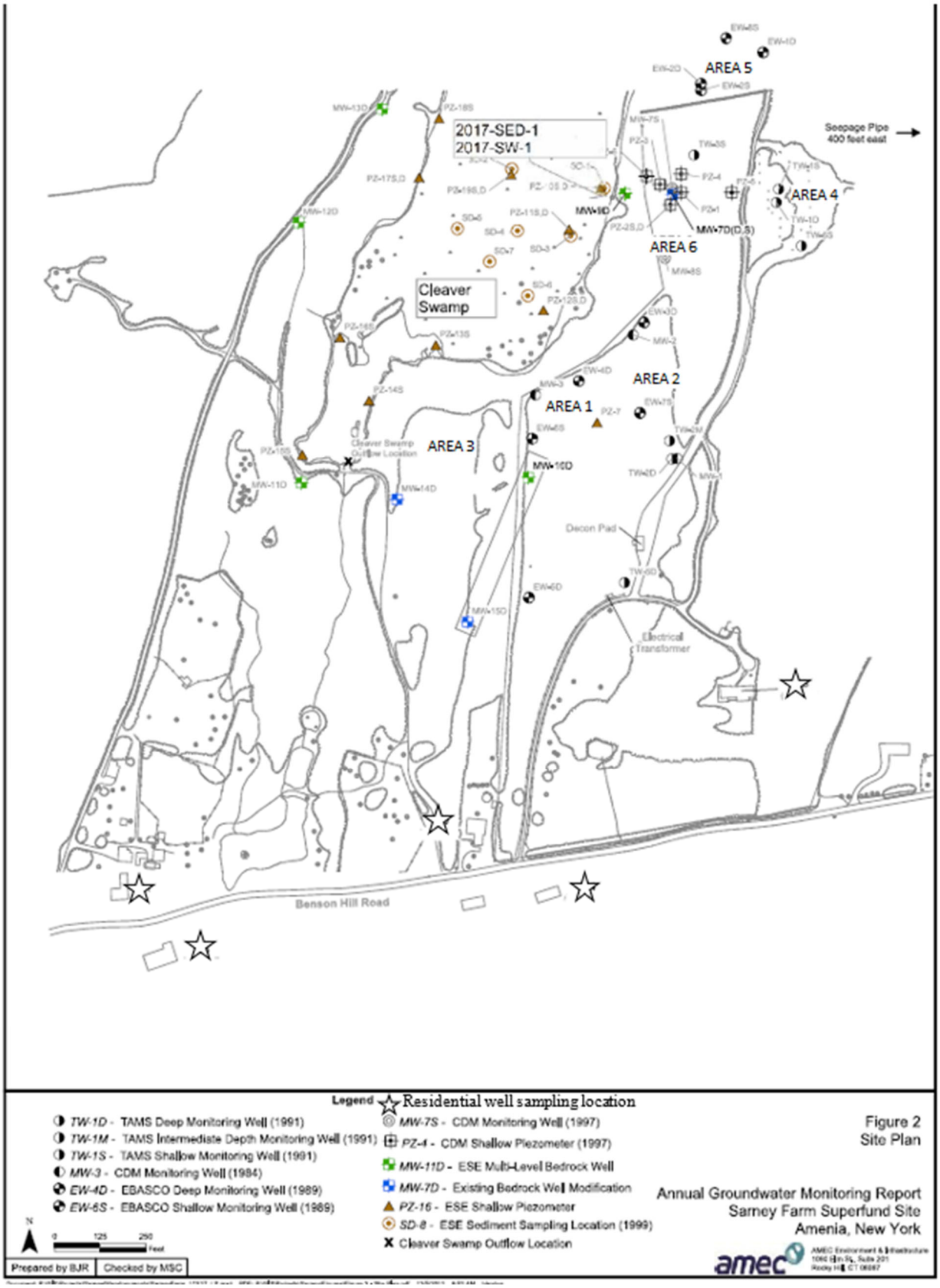
AREA 5
AREA 4
AREA 6
AREA 2
AREA 1
AREA 3
2017-SED-1
2017-SW-1
Seepage Pipe
400 feet east
Cleaver
Swamp
Cleaver Swamp
Outflow Location
MW-10D
MW-7D(D,S)
Decon Pad
Electrical
Transformer
Benson Hill Road
Legend
Residential well sampling location
TW-1D - TAMS Deep Monitoring Well (1991)
TW-1M - TAMS Intermediate Depth Monitoring Well (1991)
TW-1S - TAMS Shallow Monitoring Well (1991)
MW-3 - CDM Monitoring Well (1984)
EW-4D - EBASCO Deep Monitoring Well (1989)
EW-6S - EBASCO Shallow Monitoring Well (1989)
MW-7S - CDM Monitoring Well (1997)
PZ-4 - CDM Shallow Piezometer (1997)
MW-11D - ESE Multi-Level Bedrock Well
MW-7D - Existing Bedrock Well Modification
PZ-16 - ESE Shallow Piezometer
SD-8 - ESE Sediment Sampling Location (1999)
Cleaver Swamp Outflow Location
N
0
125
250
Feet
Prepared by BJR
Checked by MSC
Figure 2
Site Plan
Annual Groundwater Monitoring Report
Sarney Farm Superfund Site
Amenia, New York
amec

Figure 3 :

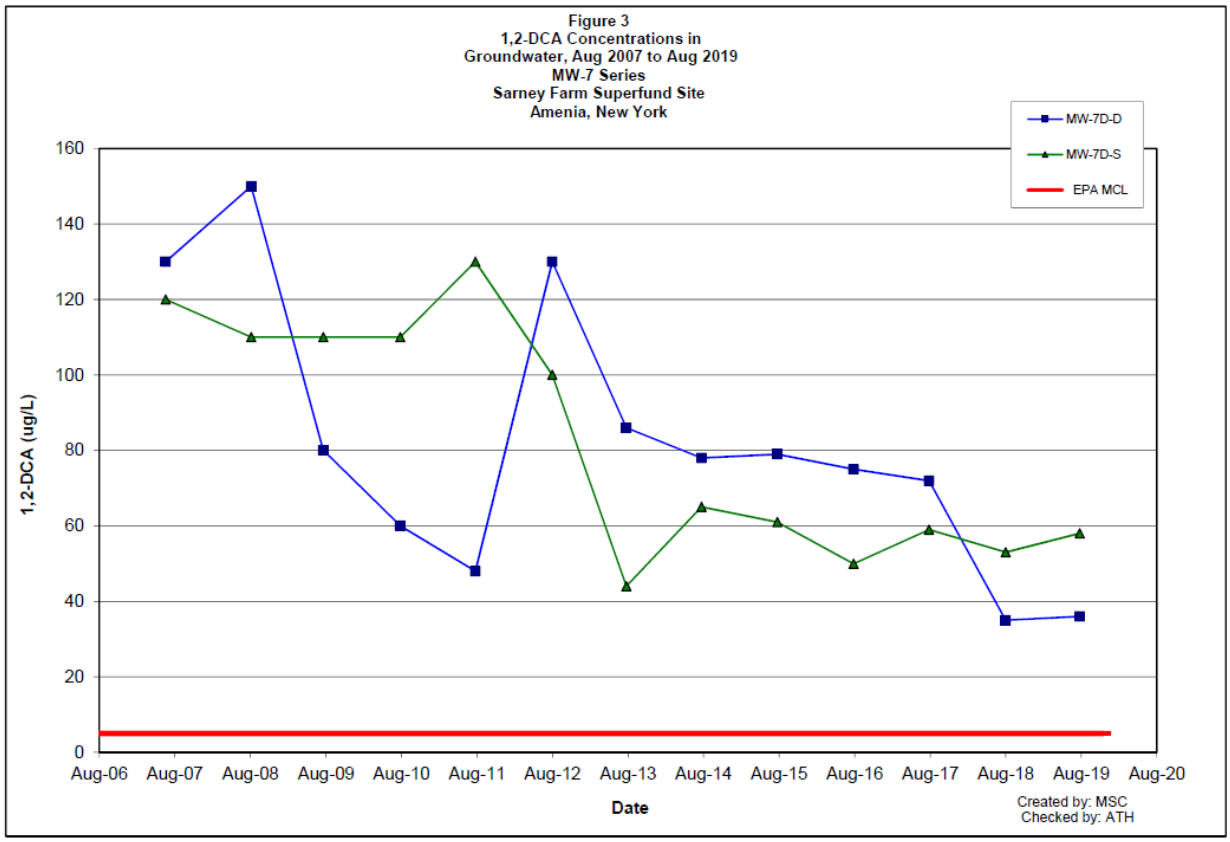
Figure 3
1,2-DCA Concentrations in
Groundwater, Aug 2007 to Aug 2019
MW-7 Series
Sarney Farm Superfund Site
Amenia, New York
MW-7D-D
MW-7D-S
EPA MCL
1,2-DCA (ug/L)
160
140
120
100
80
60
40
20
0
Aug-06
Aug-07
Aug-08
Aug-09
Aug-10
Aug-11
Aug-12
Aug-13
Aug-14
Aug-15
Aug-16
Aug-17
Aug-18
Aug-19
Aug-20
Date
Created by: MSC
Checked by: ATH

Figure 4:

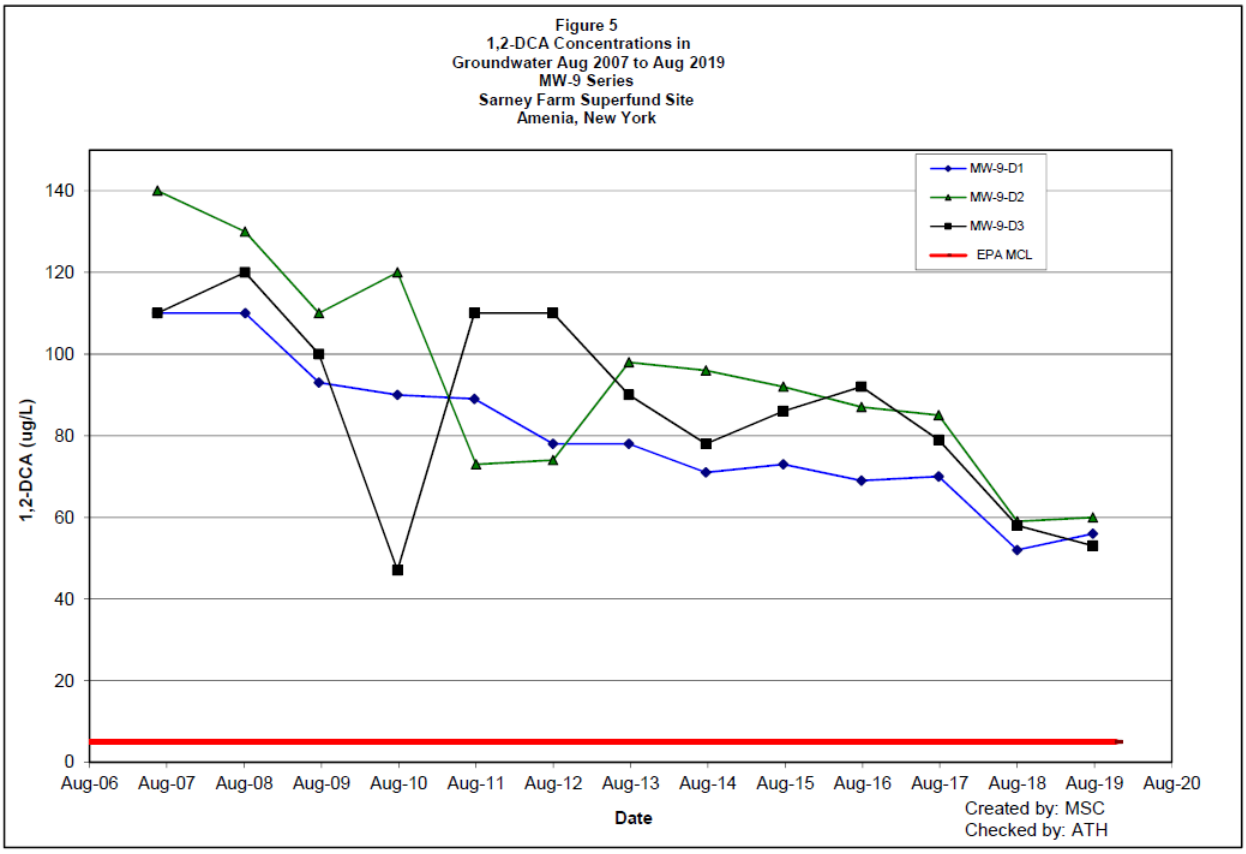
Figure 5
1,2-DCA Concentrations in
Groundwater Aug 2007 to Aug 2019
MW-9 Series
Sarney Farm Superfund Site
Amenia, New York
MW-9-D1
MW-9-D2
MW-9-D3
EPA MCL
1,2-DCA (ug/L)
0
20
40
60
80
100
120
140
Aug-06
Aug-07
Aug-08
Aug-09
Aug-10
Aug-11
Aug-12
Aug-13
Aug-14
Aug-15
Aug-16
Aug-17
Aug-18
Aug-19
Aug-20
Date
Created by: MSC
Checked by: ATH

Figure 5:

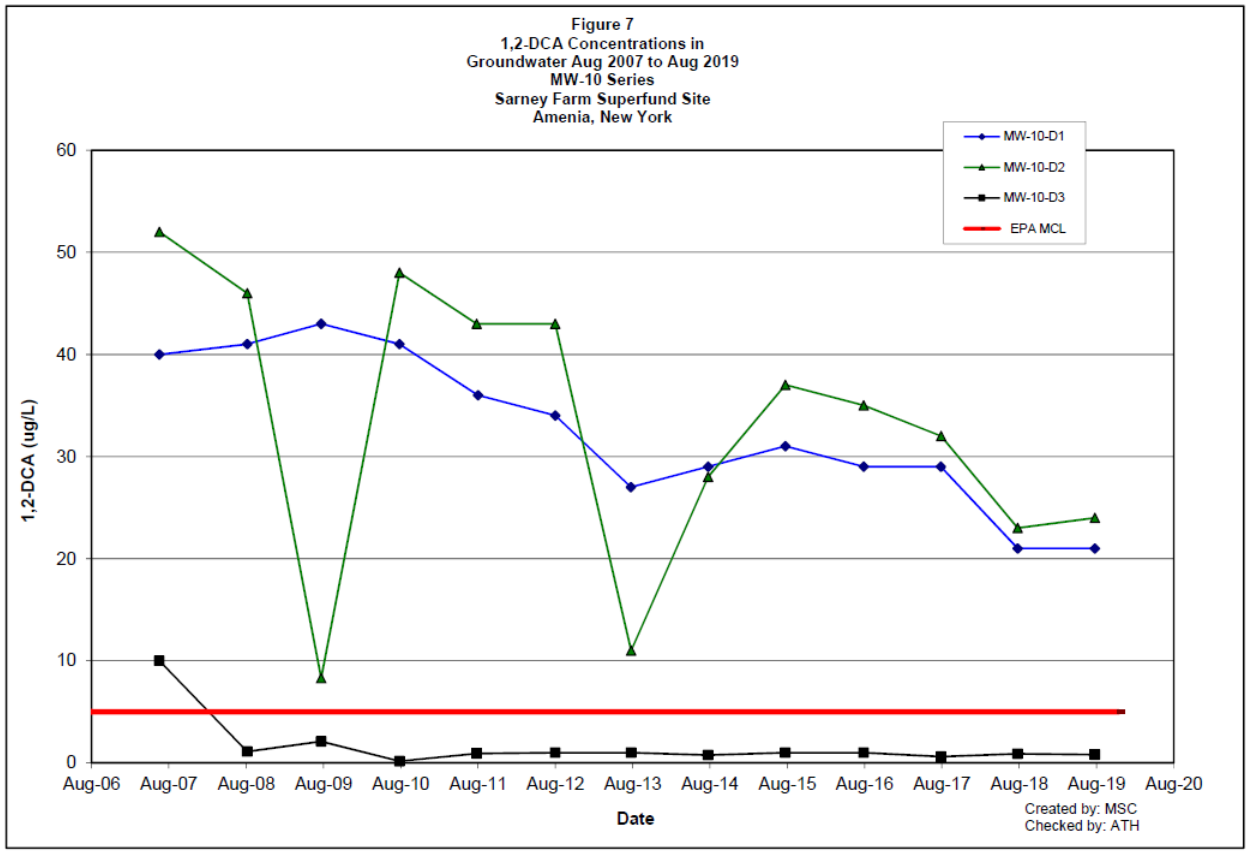
Figure 7
1,2-DCA Concentrations in
Groundwater Aug 2007 to Aug 2019
MW-10 Series
Sarney Farm Superfund Site
Amenia, New York
MW-10-D1
MW-10-D2
MW-10-D3
EPA MCL
1,2-DCA (ug/L)
60
50
40
30
20
10
0
Aug-06
Aug-07
Aug-08
Aug-09
Aug-10
Aug-11
Aug-12
Aug-13
Aug-14
Aug-15
Aug-16
Aug-17
Aug-18
Aug-19
Aug-20
Date
Created by: MSC
Checked by: ATH