FIVE-YEAR REVIEW REPORT
MOHONK ROAD INDUSTRIAL PLANT SUPERFUND SITE
HAMLET OF HIGH FALLS
ULSTER COUNTY, NEW YORK

Prepared by

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

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Date

213171

TABLE OF CONTENTS

EXECUTIVE SUMMARY

This is the first five-year review for the Mohonk Road Industrial Plant (MRIP) Site (Site), located in the Hamlet of High Falls, Towns of Marbletown and Rosendale, Ulster County, New York. The selected remedy for the Site includes the extraction and treatment of contaminated groundwater to beneficial use, monitored natural attenuation (MNA) for the far field plume, the formation of a community water district, the construction and implementation of a public water supply system, including a water treatment plant and distribution system, the excavation and disposal of contaminated soil, the installation of a soil vapor extraction system (SVE), the implementation of a groundwater monitoring program to evaluate the effectiveness of the remedy and the installation and ongoing monitoring and operations and maintenance (O&M) of subslab vapor mitigation systems.

Based upon a review of the Record of Decision, the Record of Decision Amendment, the remedial action reports, the operation, maintenance and monitoring reports, the preliminary close-out report and the Site inspection, the U.S. Environmental Protection Agency (EPA) concludes that the remedy implemented at the Site is functioning as intended by the decision documents and protects human health and the environment.

FIVE-YEAR REVIEW SUMMARY FORM

SITE IDENTIFICATION		
Site Name: Mohonk Road Industrial Plant		
EPA ID: NYD986950012		
Region: 2	**State:** NY	**City/County:** High Falls/Ulster

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

REVIEW STATUS
Lead agency: EPA **If "Other Federal Agency" was selected above, enter Agency name:** N/A
Author name (Federal or State Project Manager): Damian Duda
Author affiliation: EPA
Review period: 09/30/2008 – 03/31/2014
Date of site inspection: 12/06/2012
Type of review: Policy
Review number: 1
Triggering action date: 09/30/2008
Due date *(five years after triggering action date)*: 09/30/2013

FIVE-YEAR REVIEW SUMMARY FORM (continued)

Issues/Recommendations

OUs with No Issues nor Recommendations Identified in the Five-Year Review:

OU(s): 01	Issue Category: No Issue			
	Issue: No issue			
	Recommendation: . None			
Affect Current Protectiveness	**Affect Future Protectiveness**	**Implementing Party**	**Oversight Party**	**Milestone Date**
No	No	EPA	EPA	09/2013

Protectiveness Statement(s)

Operable Unit: 01	*Protectiveness Determination:* Protective	*Addendum Due Date (if applicable):* N/A
Protectiveness Statement: The remedy is protective of human health and the environment.		

Sitewide Protectiveness Statement (if applicable)

For sites that have achieved construction completion, enter a sitewide protectiveness determination and statement.	
Protectiveness Determination: Protective	*Addendum Due Date (if applicable):* N/A
Protectiveness Statement: The remedy currently protects human health and the environment.	

I. INTRODUCTION

This is the first five-year review (FYR) for the Mohonk Road Industrial Plant (MRIP) Site (Site), located in the Hamlet of High Falls, Towns of Marbletown and Rosendale, Ulster County, New York. The selected remedy for the Site includes the extraction and treatment of contaminated groundwater to beneficial use, monitored natural attenuation (MNA) for the far field plume, the formation of a community water district, the construction and implementation of a public water supply (PWS) system, including a water treatment plant and distribution system, the excavation and disposal of contaminated soil, the installation of a soil vapor extraction system (SVE), the implementation of a groundwater monitoring program to evaluate the effectiveness of the remedy and the installation and ongoing monitoring and operation and maintenance (O&M) of subslab vapor mitigation systems.

This review was conducted by Damian Duda, the U.S. Environmental Protection Agency (EPA) Region II Remedial Project Manager (RPM) for the Site, pursuant to Section 121(c) of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), as amended, 42 U.S.C. §§9601 *et seq.* and 40 CFR 300.403(f)(4)(ii). The FYR was completed, in accordance with the Comprehensive Five-Year Review Guidance, OSWER Directives 9355.7-02B-P (June 2001). The purpose of a FYR is to ensure that the implemented remedies protect human health and the environment and that they function as intended by the Site decision documents. This report will become part of the Site file.

A FYR is required as a matter of policy for the Site because, upon completion, hazardous substances, pollutants or contaminants will not remain above levels that allow for unlimited use and unrestricted exposure, but the remedy will require more than five years to complete. This review covers the period from September 2008 to February 2014. The trigger date for conducting this FYR is the signature date of the Preliminary Close-Out Report, September 30, 2008.

II. SITE CHRONOLOGY

The chronology of Site events is shown in Table 1.

III. BACKGROUND

Site Location and Physical Descriptions

The Site is located in the Hamlet of High Falls, the Towns of Marbletown and Rosendale, Ulster County, New York, approximately seven miles north-northwest of the Village of New Paltz and ten miles south-southwest of the City of Kingston (see Figure 1). The Site includes the original MRIP property at 186 Mohonk Road and all surrounding properties impacted by the contaminated groundwater plume emanating from the MRIP property. The original MRIP property consisted of approximately 14.5 acres with a 43,000-square-foot building in its southern

corner (see Figure 2). This property had been used for industrial and commercial activities since the early 1960s. These activities included metal finishing, wet spray painting and the manufacturing of store display fixtures, card punch machines and computer frames. Wastes from these operations were typically discharged into the on-property septic system. The current MRIP property now consists of approximately seven acres of the original 14.5 acres.

When the High Falls Water District (HFWD) was formed, the original MRIP property was subsequently divided into two parcels in order to be able to construct the HFWD's new PWS treatment plant and water tower. The HFWD now owns the remaining seven-plus acres of the original MRIP property.

Geology/Hydrogeology

Three distinct water bearing zones have been identified at the Site, including an overburden (till) flow zone, a bedrock interface flow zone (at the shallow soil/bedrock interface) and a bedrock flow zone (the bedrock aquifer). The till, which dominates in the vicinity of the Site, is a highly compacted silt and fine-grained sand matrix and does not transmit water readily. Regional groundwater flow is controlled by the structural geology of the area and is dominated by the orientation of the fractures within the bedrock aquifer in the Shawungunk Formation. Groundwater flow is primarily to the north-northeast with localized variations to the west and east towards Rondout Creek and Coxing Kill. Vertical flow gradients on the MRIP Property are clearly downward. However, artesian or upward groundwater flow has been reported in several residential wells and monitoring wells in the vicinity but outside of the MRIP Property.

The bedrock aquifer is designated as Class GA groundwater by the New York State Department of Environmental Conservation (NYSDEC) and is defined as follows: The best use of Class GA waters is as a source of potable water supply. Class GA waters are fresh groundwaters found in the saturated zone of unconsolidated deposits and consolidated rock or bedrock.

Land and Resource Use

The MRIP Property is currently zoned for light industrial use. The Town of Marbletown maintains it has no intent of modifying the zoning for the MRIP Property. The MRIP Property is currently used for non-industrial, commercial purposes. The most reasonably anticipated future use for the MRIP Property remains commercial and light industrial.

The Site is located in an area of chiefly residential development. Since the creation of the HFWD and the construction and implementation of the High Falls PWS treatment plant and distribution system, groundwater is no longer a source of potable water within the HFWD.

History of Contamination

The groundwater contamination was caused by one or more previous industrial operators of the MRIP Property. The MRIP Property contains a 43,000-square foot, single-story building. A septic field serving this building was used to dispose of hazardous substance-containing wastes, such as solvents and wastes from paint and metal-working operations. Drums, paint sludge and

other wastes were also buried in several locations on the MRIP Property. Volatile organic compounds (VOCs) were utilized by a series of prior owner/operators. From 1960 to 1972, Varifab, Inc. owned the MRIP Property and manufactured computer equipment utilizing solvents in its operations. From 1972 to 1975, R.C. Ballard Corporation owned the MRIP Property and conducted wet spray painting operations which also used solvents. For approximately six months, Mr. Richard C. Wilson owned the MRIP Property. The deceased Mr. Wilson's activities at the Site during his ownership are unknown. From 1976 until 1992, Mr. Daniel E. Gelles owned the MRIP Property. Subsequently, Daniel E. Gelles Associates, Inc. leased the MRIP Property and manufactured plastic and metal store display fixtures, which also used solvents in its processes. In 1992, industrial operations ceased, and Mr. Gelles conveyed the MRIP Property to Banco Popular de Puerto Rico in connection with mortgage foreclosure proceedings. None of the prior industrial owner and or operators were determined to be viable potentially responsible parties (PRPs).

In 1993, following the foreclosure, Kithkin Corporation (Kithkin) purchased the MRIP Property from Banco Popular. Kithkin converted the single industrial building on the property into primarily commercial use. Kithkin currently leases the property to several small tenants, including a real estate agency and a theatrical set design company.

The Site was added to the National Priorities List (NPL) on January 19, 1999.

Initial Response

NYSDEC began investigating the Site in 1994. From July 1994 through 1998, as an interim action to address immediate health threats, NYSDEC installed individual granular activated carbon filtration systems, *i.e.*, or point-of-entry treatment (POET) systems, at homes or businesses whose potable water supply exceeded the New York State (NYS) maximum contaminants levels (MCLs) of 5 micrograms per liter (µg/L) for individual VOCs. These systems typically consisted of two granular activated-carbon (GAC) units to remove VOCs, as well as particulate filters for sediment removal, and ultraviolet units for disinfection. Some residential POET systems were equipped with water softeners.

In August 1994, NYSDEC designated the Site as "Class 2" on the NYS Registry of Inactive Hazardous Waste Sites, identifying the Site as posing a significant threat to human health and the environment.

In the fall of 1996, NYSDEC conducted an Immediate Investigation Work Assignment (IIWA) at the Site to assess subsurface conditions within five suspected disposal areas. IIWA field activities consisted of the following:

- Collection of soil gas and subsurface soil samples;
- Installation of and collection of groundwater samples from five monitoring wells (MW-01 through MW-05) installed within overburden and bedrock;
- Collection of groundwater samples from the two supply wells at the MRIP property.
- Performance of a fracture trace and lineament study; and

- Collection of water and sludge samples from within an abandoned 1,000-gallon septic tank located north of the MRIP building.

Based on the findings of the IIWA, the following two sources of VOC contamination were identified on the MRIP property:

- Subsurface soil beneath the gravel driveway at the western end of the MRIP building, which exhibited elevated concentrations of tetrachloroethene (PCE), cis-1,2-dichloroethene (cis-1,2-DCE) and 1,1,1-trichloroethane (1,1,1-TCA); and
- The abandoned septic tank, containing sludge which exhibited elevated concentrations of 1,1,1-TCA (26 percent) and 1,1-dichloroethene (1,1-DCE) (1.8 percent).

Additionally, during the IIWA, an elevated concentration of 1,1,1-TCA at 82,000 µg/L was reported in monitoring well MW-4. In 1996, NYSDEC initiated a remedial investigation (RI) and feasibility study (FS) to characterize the nature and extent of on-property and off-property groundwater contamination. During May and June 1997, NYSDEC collected groundwater samples for VOC analysis from nine existing on-site monitoring wells, the in-service MRIP production well, 63 residential and business water supplies and seven upgradient background wells. Results indicated downgradient private water supplies contained 1,1,1-TCA concentrations ranging from non-detect to 880 µg/L, and total VOC concentrations ranging from 1.6 to 1077 µg/L. In addition, the groundwater in the bedrock aquifer beneath the MRIP property exhibited VOC concentrations above the EPA removal action levels (RALs), federal and NYS MCLs and New York State Department of Health (NYSDOH) Class GA Drinking Water Standards.

Between September 1997 and May 1998, RI field activities included excavation and sampling of test pits; hand augering inside the MRIP building; sampling of downgradient surface water bodies; installation of nine off-property monitoring wells; performance of borehole geophysical surveys; aquifer testing; and groundwater sampling from all monitoring wells for VOCs, metals and cyanide. In addition, the abandoned septic tank, its contents and surrounding contaminated soil were excavated and removed from the Site. Analytical results confirmed the presence of VOC-contaminated subsurface soils west of the MRIP building near the former septic tank.

Based on the findings of the RI, 1,1,1-TCA, 1,1-DCE, 1,1-dichloroethane (1,1-DCA), trichloroethene (TCE), PCE, ethylbenzene and xylenes were identified as contaminants of concern (COCs) in Site soils. Analytical data for groundwater samples collected during the RI indicated that the dissolved-phase VOC plume extends approximately one mile north-northeast from the MRIP property.

In response to a 1998 NYSDEC request, the EPA conducted a non-time-critical removal action (NTCRA) involving the construction of a groundwater extraction and treatment system designed to minimize the further migration of the most highly contaminated portion of the groundwater plume. The EPA issued a proposed response action document for this NTCRA on February 26, 1999. The EPA's Action Memorandum for the NTCRA was approved on June 4, 1999. The NTCRA groundwater extraction and treatment plant became operational in May 2000.

In December 1999, as part of the ongoing NTCRA to construct a groundwater extraction and treatment facility, the EPA excavated and disposed of contaminated soil, paint waste and debris from an area identified as a Paint Waste Pit #1. All visible waste was removed from the pit; the soil on the sidewalls and floor were screened with field instrumentation and sampled for laboratory analysis. Sampling results showed that the EPA soil action levels for the Site, identified in the 2000 Record of Decision (ROD), were not exceeded in any of the post-excavation samples. A total of 532 tons of soil and debris were excavated and disposed of off-site as nonhazardous waste. Additional soils from the excavation were stockpiled on the MRIP property. During October to December 2000, an additional approximately 2,036 tons of contaminated soil, paint waster and debris were excavated on the MRIP property. This soil, as well as the previously-stockpiled soil on the MRIP property, were disposed of off-site at permitted facilities. All excavated areas were backfilled with clean soil.

In Spring 2000, September 2002 and June 2005, the EPA installed five additional POET systems, respectively. Overall, 75 residential and commercial wells down-gradient of the MRIP property were found to have VOC concentrations above NYS MCLs (5 µg/L for individual VOCs).

Basis for Taking Action

The results of the baseline risk assessment indicated that the groundwater at the Site posed an unacceptable risk to human health. This assessment assumed that the POET systems, which were in operation at the time, were no longer in use. The assessment concluded that actual or threatened releases of hazardous substances from this Site, if not addressed by remedial actions or other active measures, presented a current or potential threat to human health and the environment.

A fish and wildlife impact assessment was performed to address the potential impacts from the Site to ecological resources. The assessment did not identify any existing pathways for significant exposures to fish or wildlife to Site-related contaminants. As a result, since EPA determined that no further study of fish and wildlife resources was deemed necessary, an ecological risk assessment was not performed.

An ecological impact assessment was also performed as part of the NTCRA, *i.e.*, the extraction and treatment system, for the Coxing Kill discharge, and concluded that the NTCRA discharge would not have an adverse impact on the Coxing Kill ecosystem.

IV. REMEDIAL ACTIONS

Remedy Selection

March 2000 Record of Decision

The remedial action objectives (RAOs) in the ROD included:

- Eliminate inhalation and ingestion of, and dermal contact with, contaminated groundwater associated with the Site that does not meet federal or state drinking water standards;
- Restore the bedrock aquifer to its most beneficial use, *i.e.*, as a source of potable water, and restore it as a natural resource;
- Prevent or minimize cross-media impacts from COCs in contaminated soil to the underlying groundwater, which will also eliminate potential future soil exposure (Site soil cleanup objectives for COCs would be based on NYSDEC's TAGM 4046 for groundwater protection); and
- Eliminate further off-MRIP property contaminated bedrock groundwater migration.

The selected remedy of the 2000 ROD included the following components:

- Extraction of contaminated groundwater in both the near field plume and the far field plume to restore the aquifer to its most beneficial use (as a potable water supply), treatment with an air stripper, and discharge of the treated water to the Rondout Creek and Coxing Kill. The near field plume refers to that portion of the groundwater plume with total VOC concentrations greater than 1000 µg/L while the far field plume refers to the component of the groundwater plume containing concentrations of 10 to 1000 µg/L total VOCs. The near field plume would be addressed through long-term operation of the groundwater extraction and treatment system. (The NTCRA became a remedial action with the ROD.) The far field groundwater plume would be addressed through the construction and the long-term operation of an additional extraction and treatment system;
- Construction of a PWS system to provide potable water to the residences and businesses in the Towns of Marbletown and Rosendale that have impacted or threatened private supply wells. The primary water supply for the system will be the New York City Catskill Aqueduct (NYCCA), as managed by the New York City Department of Environmental Protection (NYCDEP). The POET systems that were in use at the time would operate only until the new PWS supply system had become operational;
- Implementation of a groundwater monitoring program to evaluate the effectiveness of the selected remedy;
- Institutional controls may be employed to prevent future use of the bedrock aquifer in the impacted or threatened area;
- Excavation of VOC-contaminated soils from various areas of concern (AOCs) with concentrations above the cleanup criteria to prevent or minimize cross-media impacts from COCs in soil to the underlying groundwater; and
- Off-site disposal of the contaminated soil at appropriately permitted facilities.

<u>September 2008 ROD Amendment</u>

One component of the 2000 ROD selected remedy included installation of a far field plume extraction and treatment system. In September 2008, the EPA issued a ROD Amendment in which the far field treatment system component of the groundwater remedy was removed and replaced with a monitored natural attenuation (MNA) remedy.

The RAOs were updated to reflect activities completed to date and include:

- Restore the aquifer to its most beneficial use, *i.e.*, as a source of potable water, and restore it as a natural resource;
- Eliminate further off-MRIP property contaminated groundwater migration; and
- Eliminate inhalation and ingestion of, and dermal contact with, contaminated groundwater associated with the Site that does not meet state or federal drinking water standards.

The amended groundwater remedy includes:

- MNA within the far field plume to restore the aquifer to its most beneficial use (as a potable water supply) and continued extraction and treatment (air stripper and GAC adsorption) of contaminated groundwater in the near field plume on the MRIP property. The treated water discharges to the Coxing Kill. As stated above, the near field plume refers to that portion of the groundwater plume containing total VOC concentrations greater than 1,000 µg/L. The far field plume was updated to refer to that portion of the groundwater plume containing concentrations of five to 1,000 µg/L total VOCs;
- Implementation of a groundwater monitoring program to evaluate groundwater conditions and the effectiveness of the components of the remedy;
- Institutional controls in the form of existing governmental controls to prevent future use of the aquifer as a drinking water source in the impacted or threatened area. These institutional controls would no longer be necessary following the restoration of the groundwater to beneficial use; and
- Continued operation of a soil vapor extraction (SVE) system and vapor mitigation systems (discussed below).

Remedy Implementation

<u>Near Field Groundwater Extraction and Treatment System (NTCRA)</u>

On March 11, 1998, the EPA received a request from the NYSDEC to evaluate a proposed Interim Response Measure (IRM) at the MRIP Site as a removal action under CERCLA. The IRM objective was to minimize the further migration of the most highly contaminated portion of the groundwater plume in the bedrock aquifer. Throughout 1999, as part of the NTCRA, the EPA's removal branch conducted additional field work to characterize the Site. From Fall 1999 until Spring 2000, the NTCRA was constructed by the EPA's removal program. The EPA's removal program operated the extraction and treatment plant and performed trouble-shooting activities until February 2001 when EPA's remedial program assumed responsibility for system operations as a remedial action pursuant to the 2000 ROD. During the removal program's operation, approximately 6.1 million gallons of groundwater were extracted, treated and discharged to the Coxing Kill.

Groundwater to be treated is pumped from three extraction wells: 5R, 7R and ERT-1. Extraction well 5R is installed above the bedrock at 125 feet below ground surface (bgs); 7R and ERT-1 are installed in the bedrock aquifer at 180 feet bgs and 195 bgs, respectively.

The EPA operated the plant until September 2011 when the EPA transferred responsibility of the ongoing O&M of the near field extraction and treatment system to NYSDEC. Since 2001, over 100 million gallons of VOC-contaminated groundwater have been extracted, treated and discharged during the remedial program.

Contaminated Soils Excavation

As prescribed by the 2000 ROD, additional removal and disposal of contaminated soil was performed. Soil cleanup levels were also established in the 2000 ROD. Based on data collected by NYSDEC during the RI and by the EPA during the NTCRA, the following areas of known soil contamination on the MRIP property were identified as areas potentially requiring remedial action:

- AOC-A: subsurface soils contaminated with PCE and benzene, toluene, ethylbenzene and xylenes compounds beneath the gravel parking area west of the MRIP building and south of the EPA groundwater treatment building. AOC-A includes Areas 1A, 1B and D2, as defined in the ROD.
- AOC-B: a one-to-two-foot-thick paint waste and debris layer buried two to three feet below ground surface, south of Paint Waste Pit #1 and north of the MRIP building.
- AOC-C: Paint Waste and Debris Pit #2 located immediately east of Paint Waste Pit #1. AOC-C included the soil stockpiled in this area during the December 1999 NTCRA excavation of Paint Waste Pit #1.
- AOC-D: remaining overburden soils contaminated with 1,1,1-TCA in the vicinity of the former MRIP building septic tank. This AOC included Area 2B, as defined in the ROD.

During November-December 2000, the EPA excavated contaminated soil from AOC-A and contaminated soil, paint waste and debris from AOC-B and AOC-C. Prior to backfilling of AOCs-A, B and C with clean fill, analytical results for post-excavation soil samples indicated that no action levels were exceeded in soils remaining within the excavation. At AOC-B, all visible waste was removed from the paint waste layer and the area was backfilled with clean fill. At AOC-C, all visible waste was excavated, and one waste paint drum was transported for off-site disposal. Post-excavation soil samples collected from the sidewalls and floor indicated that no action levels were exceeded in soils remaining within the excavation.

During the remedial action, approximately 2,000 tons of contaminated soils, paint waste and debris were removed and disposed of off-site. A final inspection was conducted in March 2001, and a final remedial action report was issued on June 28, 2001.

Alternate Water Supply Remedy

Begun in Fall 2005, the alternate water supply (AWS) system, included the construction and operation of a new PWS system providing potable water to the residences and businesses in the Towns of Marbletown and Rosendale with impacted or threatened private supply wells.

The AWS included the use of the NYCCA as the new potable water supply source and was constructed in accordance with requirements provided to the EPA by the NYCDEP.

Implementation of the AWS remedy required the formation of a community water district in the Towns of Marbletown and Rosendale, the previously-mentioned HFWD. After its formation, the HFWD has entered into a use agreement with the NYCDEP.

Raw water is conveyed from the aqueduct through the Rondout Dewatering Chamber to a raw water storage tank that was constructed on the MRIP property. The raw water storage tank is constructed of steel and has a storage capacity of approximately 500,000 gallons. Gravity-fed water flows through the treatment plant from the raw water storage tank. Average daily flow is approximately 126,100 gallons per day. Backwash is diverted to the backwash pit and then pumped to the settlement lagoons and eventually pumped to the Roundout Creek. This discharge water is routinely tested as required, according to the requirements of the in-place NYSDEC State Pollution Discharge Elimination System (SPDES) permit. Finished water is then pumped from the plant to a nearby elevated storage tank with a 350,000 gallon capacity. Gravity fed water from the finished water storage tank feeds the distribution system of the HFWD. The distribution system consists of roughly 28,000 linear feet of installed primary main. A total of approximately 155 developed properties are connected to the HFWD distribution system. Prior to connection to the PWS, the NYSDEC interim remedial measure, *i.e.*, monitoring and O&M of the individual POET systems, would continue until the PWS system became operational. Prior to each residential connection to the PWS, any associated POET system would be removed, and the residential well would be disconnected from the home plumbing system. Connection of homes and businesses within the HFWD to the PWS was completed in November 2007.

Soil Vapor Extraction System

In November 2005, a remedial system evaluation for the groundwater remedy was performed. One recommendation was to further characterize the vadose zone in the area of the original septic tank which had been removed in 1997. This action was intended to consider either treatment and/or removal of potential residual VOC contaminants which may be contained in that zone.

Subsequently, in December 2006, in order to enhance the VOC removal provided by the extraction and treatment system, the EPA installed 18 SVE wells (SVE-1 through SVE-18) on the MRIP property immediately north of the commercial building and near the former underground septic tank and original septic field, targeting the COCs. All wells were connected to a portable SVE trailer on-site; the system was fully operational by February 2008.

Also, during this time, approximately 30 direct-push soil borings were performed, and soil samples were collected at various depths. The only detection above the NYS restricted use soil cleanup objectives (SCOs) for VOCs (protection of groundwater) was 1,1-DCA (SCO-270 µg/kg) which was detected at 330 µg/kg, respectively. In 2009, an additional five SVE wells (SVE-19 through SVE-23) were installed at deeper levels in the bedrock aquifer (approximately 55 bgs) and were able to capture more VOCs from the vadose zone (see Figure 3).

Historically, the water table levels in the Site area fluctuated frequently. Specifically, it became apparent that during periods of low water table, the SVE system recovered substantially more COCs than during periods of high water tables. In Spring 2010, the SVE system operation was

evaluated during a period of very low rainfall throughout the area which, in turn, reflected in a very low water table in the Site area. This evaluation showed excellent recovery results for the SVE operation where fracture zones remained open for high recovery levels. Some in-well sparging was also instituted to support recovery of recalcitrant VOCs, *e.g.*,1,1,1-TCA. Hence, during the period from 2006 until early 2011, whenever the water table was lower, there was substantial VOC recovery from the vadose zone. The effectiveness of the SVE system during the periods of a low water table was especially evident in the reduction of VOC-contaminant concentrations in extraction well MW-5R, located directly downgradient of the source area that was being remediated by the SVE system. During these periods of low water table, the SVE system achieved substantial recovery in VOC contaminants.

In July 2009, sampling showed detections of twenty-five different VOCs at concentrations above the reporting limits (RLs); however, most compounds were present at or near RLs. The primary VOCs present in the soil vapor samples included the Site COCs: 1,1,1-TCA, 1,1-DCE, 1,1-DCA and TCE. 1,1,1-TCA was detected in all samples, at concentrations ranging from 10 $\mu g/m^3$ in sample SVE-20 to 77,000 $\mu g/m^3$ in sample SVE-21. The concentration of 1,1,1-TCA in the sample collected from the point in the SVE system where all wells were contributing to flow was 1,800 $\mu g/m^3$. The highest concentrations of 1,1-DCE, 1,1-DCA and TCE were present in sample SVE-21 at concentrations of 7,600 $\mu g/m^3$, 790 $\mu g/m^3$, and 2,000 $\mu g/m^3$, respectively (see second part of Table 6).

In September 2011, prior to the transfer of Site operations to NYS, the EPA Removal Program evaluated the effectiveness of the SVE system in continuing to clean up the vadose zone of residual VOC contamination in the source area (the area of the former septic tank). During this period, high water tables were registered for the Site area. As a result, the EPA noted that the effectiveness of VOC recovery from the vadose zone had diminished dramatically. Subsequently, the EPA believed that the SVE had served its purpose in removing a substantial amount of residual VOC contamination from the source area vadose zone. As a result of this evaluation, the EPA terminated the operation of the SVE system, and, during late 2011/early 2012, the SVE system, including all piping, was eventually dismantled and removed from the Site. The newer SVE wells are currently capped and in place and may be used for future groundwater monitoring should the need arise.

Vapor Intrusion Study and Mitigation System

In February 2005, the EPA initiated a vapor intrusion investigation to determine if the subsurface groundwater contamination, originating from the MRIP property, was affecting the soil gas and indoor air at nearby residences and businesses. During February 14 and 15, 2005, sub-slab soil gas ports were installed in 23 locations (19 residential and 4 non-residential). In November and December 2005, sub-slab ports were installed in an additional 18 locations (13 residential and five non-residential). The soil vapor sampling determined that, since the concentrations of site-related contaminants when detected were below the health-based screening levels, no further vapor intrusion evaluation or action was deemed necessary in the residential properties.

However, after evaluating the soil gas data obtained in the large commercial building located on the MRIP property, the EPA recommended that appropriate vapor mitigation systems be

installed at various locations in the building to prevent exposure. Between January 29 and February 1, 2007, six sub-slab ventilation systems, with venting to the outside air, were installed in the sub-surface layer underneath the building's concrete floor slab. Subslab mitigation systems, SS-1 and SS-2, are located on the west side of the building; SS-3, SS-4 and SS-5 are located on the north side of the building; and SS-6 is located on the east side of the building (see Figure 4). Each subslab system includes three-inch polyvinyl chloride piping which penetrates the slab within the building and exits through the concrete-block walls approximately three-to-five feet above the slab where it connects to a blower. Systems SS-3 and SS-4 are piped together, and the unified extraction system includes two blowers. Each blower is mounted vertically on the outside of the building and has a two-inch diameter PVC outlet. These mitigation systems are currently operating as designed and are currently being maintained by NYSDEC.

The EPA performed vapor intrusion sampling and managed the O&M of the subslab mitigation systems until September 2011 when the EPA transferred responsibility for these actions to NYSDEC under the Site transfer agreement.

Institutional Controls

Institutional controls (ICs) are being relied upon to prevent the future use of the aquifer within the HFWD until cleanup levels have been attained. These ICs consist of existing ordinances of the Towns of Marbletown and Rosendale which prohibit the establishment or maintenance of a source of drinking or domestic water separate from the PWS system of the HFWD. These ICs would no longer be necessary following the restoration of groundwater to beneficial use.

An amended environmental protection easement and declaration of restrictive covenants with the owner of the MRIP property is in place and entered with Ulster County. The restrictions on the use of the property run with the land. These restrictions are binding on the owner and require the owner to refrain from installing or using any groundwater wells at the Site and from disturbing or interfering with all aspects of the ongoing groundwater remedy. Also, the restrictions require that if the owner expands the existing building or constructs a new building, the owner shall take appropriate steps to prevent any further vapor intrusion.

Operation, Maintenance and Monitoring

Currently, the extraction and treatment plant is being operated and maintained by NYSDEC via the September 2011 Site transfer agreement with the EPA Region 2. The ongoing operations consist of extraction of the contaminated groundwater, treatment through carbon filters and discharge of the treated groundwater to the Coxing Kill. As part of monitoring program, the influent and effluent concentrations of the extraction and treatment system, as well as extraction wells ERT-1, MW-5R and MW-7R, are routinely sampled.

The various monitoring wells throughout the Site area (both on-property and off-property) are sampled annually by the EPA through an Interagency Agreement with the United States Army Corps of Engineers (Army Corps) and its contractors, as part of the long-term response action for the MNA remedy, as identified in the September 2008 ROD Amendment.

As discussed above, the subslab mitigation systems on the MRIP building are currently being monitored and maintained by NYSDEC under the Site transfer agreement.

V. PROGRESS SINCE LAST FIVE-YEAR REVIEW

This is the first FYR to be conducted at the Site.

VI. FIVE-YEAR REVIEW PROCESS

Five-Year Review Team

The EPA FYR team consisted of Damian Duda (Remedial Project Manager), Sharissa Singh (Site hydrogeologist), Ursula Filipowicz (Site risk assessor), Brian Carr (Site attorney) and Sal Badalamenti (Site Section Chief).

Community Notification and Involvement

While community interest in the Site had been quite high during the early phases of this project, since the implementation of the remedies, community interest has been low. The EPA believes that the local community is informed of the current status of the Site. The Site owner is aware of the EPA and NYSDEC's activities. This FYR will be made available for the community in the local Site repository.

Document Review

Table 2, at the conclusion of this report, provides a list of all documents that were referenced during the preparation of this report.

Monitoring and Data Review

Extraction and Treatment Plant

As noted above, EPA operated the groundwater extraction and treatment plant from 2000 until NYSDEC took over the O&M of the groundwater extraction and treatment system in September/October 2011. During this period, the system operated fairly smoothly, and monthly monitoring of the groundwater effluent discharge indicated compliance with the requirements of the NYSDEC SPDES discharge permit. Tables 3 and 4 provides a summary of influent and effluent concentration for the COCs, as well as total VOCs, from 2000 until 2011. All VOC concentrations in the effluent have typically been below detection limits, and the total effluent VOC concentration never exceeded 2 µg/L between 2000 and 2011. Combined influent concentrations ranged from 73 µg/L up to 955 µg/L, with the highest single extraction well concentration of 2,070 µg/L total VOCs.
From November 2007 until September 2011, during the final years of the EPA operations, when the affected residents were connected to the HFWD and their contaminated residential wells were disconnected from the household plumbing system, the groundwater extraction and

treatment system had operated at an average flow rate of approximately 25 gallons per minute (gpm).

NYSDEC has provided quarterly Site status reports of their operations for 2012 and 2013. In late 2011/early 2012, NYSDEC and its contractor determined that the concentrations of VOCs in the influent were low enough to eliminate the use of the plant air stripper. Subsequently, the air stripper and the acid injection processes were removed from the treatment train and only carbon treatment was used to remove VOCs from the groundwater. Since this modification to the treatment process, NYSDEC and its contractor have reported that operating the extraction and treatment system through solely carbon treatment has reduced energy consumption at the Site. NYSDEC is considering additional remedy optimization techniques and will notify EPA if any further modifications to the system operations are enacted.

From January 2013 until March 2013, the system operated at an average flow rate of approximately 30 gpm. Even though the treatment process removed the majority of the VOC contamination, some discharge limits were exceeded in March 2013 as a result of carbon breakthrough. Subsequently, NYSDEC shut down the plant for a few days in order to perform a carbon change-out. Subsequent n sampling showed non-detect discharge levels for VOCs. From April 2013 until October 2013, the plant operated at an average flow rate of approximately 22 gpm, though the pumping on a monthly basis varied considerably as shown below:

Date	Gallons pumped
April 2013	1,420,662
May 2013	1,327,658
June 2013	905,462
July 2013	830,765
August 2013	735,192
September 2013	537,604
October 2013	993,409

Also, during this period, the highest concentrations of the COCs for groundwater from the three extraction wells, as well as the month they were detected, were as follows:

Extraction Well	1,1-DCE (µg/L)	1,1-DCA (µg/L)	1,1,1-TCA (µg/L)	TCE (µg/L)
5R	24 (Oct)	10 (Oct)	72 (Oct)	7.2 (July)
7R	25 (Sept)	49 (Sept)	110 (Sept)	2.5 (July)
ERT-1	33 (Sept)	20 (Sept)	110 (Sept)	7.9 (July)

Between July and October 2013, NYSDEC reported that concentrations of 1,1-DCA and 1,1,1-TCA exceeded the plant effluent discharge limits during various periods. The effluent concentrations for 1,1-DCA ranged from 2.3 µg/L in July to 18 µg/L in September and for 1,1,1-TCA ranged from 3.7 µg/L in August to 65 µg/L in October. The plant was shut down during most of November and December 2013 after NYSDEC determined that the carbon breakthrough was occurring at a more rapid rate (a period of months rather than years) than designed. Historically, carbon treatment was used in conjunction with air stripping for treatment of the

VOCs. Since the treatment system was modified to use only carbon as a treatment method, some calcification may be occurring on the carbon particles which would decrease its effectiveness more expeditiously. Subsequently, in December 2013, a new type of virgin carbon (coconut-based) was purchased and put into use, replacing the regenerated coal-based carbon. The most recent data in January 2014 data showed non-detect for all VOCs in the effluent (see Table 5). NYSDEC will evaluate the carbon treatment process further during the remainder of 2014.

NYSDEC inspected the carbon tanks in late 2013. The inspection showed that some corrosion exists, but, at the present time, the overall condition of the tanks should not affect the overall capability of the carbon to treat the groundwater. NYSDEC is monitoring the carbon breakthrough issue closely and may consider decommissioning and replacing the tanks sometime in the future, if necessary. NYSDEC will apprise the EPA of any such operational issues at the plant, as well as any further modifications to the extraction and treatment system. NYSDEC will continue to ensure that the plant discharge limits are being met.

Vapor Intrusion Study and Mitigation System

The most recent (October 2009) indoor air sampling at the MRIP building indicated that detectable levels of TCE were found at some locations (see Tables 6 and 7); however, concentrations of VOCs in indoor air do not exceed risk-based levels for commercial/industrial exposure. The vapor mitigation systems are operating as designed.

With respect to continued monitoring of the indoor air in the MRIP building, as well as the continued O&M of the mitigation systems, there should be a reasonable effort made to secure an inventory of any materials utilized as part of the active commercial operations that are currently in place within the MRIP building which could affect indoor air readings.

Groundwater Monitoring

The comprehensive groundwater monitoring plan is currently being implemented by the EPA at the following monitoring wells:

- 17 conventional monitoring wells: MW-1B, 4, 5B, 6B, 8B, 9B, 10B, 11B, 11C, 12B, 13B, 14B, 15B, 16, ERT-2, ERT-3 and ERT-4;
- Five FLUTe®17 (1-3), 18 (intervals 1-3), 19 (intervals 1-3), 20 (intervals 1-3), 21 (intervals 1-6); and
- Three extraction wells, ERT 1, 5R and 7R.

Figure 5 shows the Site-related wells and the isoconcentration for total VOCs as of November 2013. Figures 6 through 9 show the November 2013 isoconcentration maps for each of the four COCs. Figure 10 shows an overlay of the isoconcentration for total VOCs in October 2008 and November 2013. As shown in Table 8 and the accompanying VOC contaminant trend graphs for each well, the highest concentrations of VOCs were found in the following Site source area wells:

Monitoring Well	1,1-DCE (µg/L)	1,1-DCA (µg/L)	1,1,1-TCA (µg/L)	TCE (µg/L)
ERT-4	68	18	840	78
MW-4	42	26	400	190
MW-5B	78	6.4	650	73

Also, monitoring wells: 1B, 8B, 9B, 10B, 13B, 18-1, 18-2, 19-1, 19-2, 20-1, 20-2 and 20-3 have shown non-detect or below MCLs for the COCs. The collective data over the past 14 years has shown a marked reducing trend in many of the monitoring wells, as shown in the data tables and graphs. The EPA will continue the long-term MNA sampling and will prepare trend analyses of the data.

Near Field Plume

The near field plume is defined as the portion of the groundwater plume with total VOC concentrations greater than 1,000 µg/L, which represents a source area close to where the extraction and treatment of contaminated groundwater is occurring. There are three different areas of the aquifer. The majority of the monitoring wells are installed in the bedrock. Most monitoring wells are open bore holes screened from a minimum depth of 15 feet bgs to a maximum depth of 200 feet bgs. Therefore, open bore holes intersect all three water bearing zones (the overburden, the bedrock interface and the bedrock aquifer) throughout the Site.

Over the last five years, the average analytical results showed that total VOC concentrations exceeded 1,000 µg/L in source area monitoring wells: ERT-4 at 2531 µg/L; MW-4 at 1778 µg/L; and MW-5B at 2435 µg/L. Specific COC concentrations have showed consistent downward trends from 2008 through 2012.

In November 2013, the most recent sampling round was conducted. The latest round of data results for ERT-4, MW-4, MW-5B, as well as ERT-1 (an extraction well), exhibited an anomalus uptick in COC concentrations. This uptick may have been the result of a rebound effect, since the sampling was conducted at the time when the treatment plant was in shutdown mode, and the extraction wells were not being pumped. Future monitoring will verify any potential increasing trend of these source area VOC concentrations.

Far Field Plume

The far-field plume is defined as the portion of the groundwater plume containing total VOC concentrations from 1,000 µg/L down to 5 µg/L total VOCs. EPA is implementing the MNA remedy within the far field plume.

As part of the EPA's overall yearly long-term groundwater monitoring plan and in order to show the complete progress of the MNA remedy, the EPA monitors three near field plume wells: MW-4, MW-5B, ERT-4, as well as the three extraction wells: MW-5R, MW-7R and ERT-1. A number of monitoring wells are located within the identified source area of groundwater contamination but are classified as being within the far field plume. These are former extraction wells ERT-2, ERT-3 and MW-6B.

Overall, the average concentrations of total VOCs for the last five years have ranged from 8.5 µg/L in MW-6B to 238 µg/L in ERT-1. Additionally, COC concentrations in extraction wells MW-5R and MW-7R, as well as ERT-2 and ERT-3, have showed consistent downward historical trends although a sharp uptick was found in the November 2013 sampling. COC concentrations in monitoring wells MW-6B and ERT-1 exhibited fluctuations associated with seasonal changes through concentrations were relatively consistent with historical results.

Monitoring wells located immediately downgradient of the near field plume are MW-11C, MW-11B, MW-12B, MW-15B, MW-16 and MW-9B. The average total VOC concentrations for the last five years in these wells ranged from 19 µg/L in MW-19 to 203 µg/L in MW-15B. COC concentrations in wells MW-11B, MW-11C, MW-12B and MW-15B have showed consistent downward historical trends. Monitoring well MW-16 exhibited fluctuations associated with seasonal changes. The lowest concentrations are typically detected in the spring and higher concentrations are typically detected in the summer and fall. Over the last five years, all COCs in monitoring well MW-9B were either below detection limits or below MCLs.

Cross-gradient wells MW-8B, MW-10B, MW-13B and all three ports of multiport wells MW-18 and MW-20 were either below detection limits or at MCLs for all COCs during the last five years; therefore, this indicated that the far field plume is delineated on the western and northeastern sides.

Monitoring wells MW-17, MW-18, MW-19, MW-20 and MW-21 are located in the outer part of the far field plume are multiport wells with specific intervals targeted within each water-bearing zone. Cross-gradient well MW-21 is located in the southeastern portion of the plume. It is an artesian well and contains six ports. COC concentrations found in ports 1, 2 and 3 exhibit seasonal fluctuations consistent with historical values. The maximum concentrations detected in these ports are slightly above MCLs. Ports 4, 5 and 6 of MW-21 exhibited consistent downward historical trends. The average of total VOC concentration over the past five years ranged from 19 µg/L in port 1 to 37 µg/L in port 6. All three ports of mid-plume/cross-gradient well MW-17 exhibit consistent downward historical trends. The average of total VOC concentrations over the past five years ranged from 88 µg/L in port 3 to 99 µg/L in port 1.

Monitoring well MW-14B has been generally consistent with downward trending since 2010 but has shown a slight upward trend from historic levels. From 1999 through 2008, total VOCs were less than 1 µg/L. Since 2008, the total VOCs have ranged from 1.2 µg/L to 5.3 µg/L.

Multiport well MW-19 is immediately downgradient of MW-14B and is located at the leading edge of the far field plume. Seasonal variations are noted in port 1, and all detections are either below detection limits or below MCLs. The latest sampling shows a slight uptick in ports 2 and 3; however, all COC concentrations are either at or below detection limits and/or below MCLs.

MNA appears to be occurring based on the decreasing contaminant trends in the mid-plume area:

- Stable or low contaminant concentrations in the far field plume;
- The presence of daughter products in the far field and/or the near field plume; and
- The presence of reducing conditions bounding the far field plume.

Overall, complete dechlorination of VOCs, *i.e.,* production of ethanes and/or ethenes, is occurring in monitoring wells MW-8B, MW-14B, MW-18 (ports 2 and 3), MW-19 (ports 1 and 3) and MW-20 port 3. Decreasing concentrations of 1,1-DCE and 1,1-DCA in the far field plume appear to be primarily related to non-destructive mechanisms, such as dilution, dispersion and advection.

Site Inspection and Interviews

An MRIP site visit and inspection was conducted on December 6, 2012. Prior to the Site walk-through, an overview meeting was held at the High Falls Fire Hall where Mr. Joe Sabanos of Aztech Technologies, Inc. (Aztech), NYSDEC's contractor, provided an overview of the recent operations at the Site, since the transfer to NYSDEC, via a powerpoint presentation to the attendees. The MRIP Site inspection was attended by Damian Duda, Sal Badalamenti, Sharissa Singh and Urszula Filipowicz from the EPA; Amy Darpinian from the Army Corps; Carl Hoffman, Bill Bennett and Sue Edwards from NYSDEC; Don Mayer, Mark Moese, Mark Howard and Walter Howard from AECOM (Army Corps contractor) and Carl Aldrich and Joe Sabanos from Aztech. Subsequently, the participants performed a walk-through inspection of the Site area. Some of the monitoring wells were located and inspected. No issues were documented during the Site inspection.

VII. TECHNICAL ASSESSMENT

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

Yes, the current remedy is functioning as designed. The extraction and treatment system is being operated by NYSDEC and continues to capture and to remove VOC contamination from the near field groundwater plume.

The latest November 2013 data from some of the source area monitoring wells showed an uptick in VOC concentrations which may be related directly to fluctuations in pumping rates of the extraction wells, seasonal variations and the temporary shutdown of the extraction and treatment plant during November. Historically, seasonal variations have impacted the rise and fall of VOC concentrations in some of the extraction wells and monitoring wells. Aside from NYSDEC's temporary shutdown of the extraction and treatment system in November and December 2013, the remedy is operating as designed.

The continued MNA monitoring continues to show that the capture zone of the extraction and treatment plant and the many years of groundwater data supports the assessment that the far field plume is contained within the HFWD. A review of groundwater quality data from the many monitoring wells and the various sampling intervals indicates that the plume of groundwater contamination is stable and that, in some areas, has shown some decrease in size (see Figure 10).

This FYR indicates that the extraction and treatment and MNA remedies are working. Evidence of reductive dechlorination (an MNA parameter) has been identified in localized anaerobic areas of both the near field and far field plumes. Some low levels of COCs are still detected in parts of the far field plume, and complete dechlorination of the COCs is not being observed in MW-21, located in the southeast portion of the far field plume.

The remedy identified in the 2000 ROD and the 2008 ROD Amendment included extraction and treatment of contaminated groundwater for plume capture, continued operation of the on-site SVE system, indoor air monitoring, as required, continued operation of the vapor mitigation systems, long-term groundwater monitoring and groundwater use restrictions. The SVE system was dismantled in late 2011/early 2012.

Based on the Site inspection and the data review, the operation of the extraction and treatment system and the comprehensive groundwater monitoring show that the remedy is functioning as designed and effectively removing VOC contamination. As intended by the decision documents, human health and ecological exposure pathways have been interrupted.

NYSDEC has worked to improve the efficiency of the extraction and treatment system, as well as ways to reduce costs. Adjustments to the remedial system will continue to be made, as appropriate. The treatment technology will continue to be evaluated to ensure that appropriate contaminant removal is accomplished in an efficient and cost effective manner.
NYSDEC will also continue the monitoring and O&M activities of the vapor mitigation systems in the MRIP building to ensure that indoor air levels remain below health-based guidelines and also document such activities. In order to confirm that risk levels are being maintained, indoor air sampling should be conducted during the 2014-15 winter heating season.
ICs continue to remain in place and continue to be effective.

The remedy will continue to function as intended as long as 1) the extraction and treatment system continues to operate, 2) the groundwater monitoring program for both the near field and far field plumes continues and 3) the vapor mitigation systems continue to operate.

If COC concentrations in the source area or those out in the far field plume show an increasing trend over the next few years, additional investigation may be warranted to ensure that both the near field and the far field plumes are being reduced and are not migrating beyond the current limits.

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?

The exposure assumptions and toxicity values used to estimate potential cancer risks and noncancer hazards follow the Risk Assessment Guidance for Superfund used by the EPA. Although specific parameters may have changed since the time of the risk assessment, the process used remains valid.

The groundwater cleanup levels for each of the Site's COCs were based on the NYS Class GA Groundwater standards. The cleanup level for each of the Site's COCs is 5 µg/L; current state standards for the groundwater COCs (1,1-TCA, 1,1-DCE, 1,1-DCA and TCE) have not changed

since the decision documents were issued. 1,4-dioxane, a chemical of interest at the Site, is covered under the current NYSDOH maximum contaminant level (MCL) of 50 µg/L identified for unspecified organic contaminants. The latest data (November 2013) indicate that the highest 1,4-dioxane level detected throughout both the near field and far field plumes was 10 µg/L, found in monitoring well ERT-3. In summary, both the soil and groundwater cleanup levels established by both the ROD and ROD Amendment remain valid and protective of human health.

Results of the baseline risk assessment indicated that the groundwater at the Site posed an unacceptable risk to human health. To address potential exposure to contaminated groundwater by nearby receptors, the groundwater remedy identified in the ROD documents called for the construction on a new PWS system to serve the impacted areas in High Falls. In addition, extraction and treatment of contaminated groundwater in the near field plume and MNA of the far field plume were implemented to achieve the RAOs for groundwater at the Site. Furthermore, source area soils were addressed through excavation and removal, as well as SVE in order to minimize cross-media impacts from COCs in the soil to the underlying groundwater.

The EPA excavated contaminated soil, paint waste and debris from several areas of concern at the Site. As stated in the 2008 ROD Amendment, prior to backfilling with clean fill, analytical results from post excavation soil samples indicated that no cleanup levels were exceeded in soils remaining within the excavation. Additionally, in 2007 and 2009, a 23-well SVE system was installed to extract and treat soil gas immediately north of the commercial building on the MRIP Property at the location of the former septic facility. The SVE system targeted subsurface vapor-phase COCs impacting shallow groundwater at the Site. In September 2011, with a substantial reduction in contaminant recovery concentrations, the SVE remediation system was removed from the Site. Given that the contaminated site soils and septic tank were excavated and removed from the Site and that affected residents in the vicinity of the Site have been connected to the PWS system, the human exposure pathways have been interrupted, and the remedy is protective of human health.

The following chemicals were identified as COCs in site soils: 1,1,1-TCA, 1,1-DCE, 1,1-DCA, TCE, 1,2-DCE, PCE, xylenes and ethylbenzene. Site soil cleanup objectives for these COCs were based on NYSDEC's TAGM 4046 for groundwater protection. The current state soil cleanup objectives are NYSDEC Subpart 375-6: Remedial Program Soil Cleanup Objectives. To ensure protectiveness, ROD established cleanup objectives were compared with current chemical-specific, risk based screening levels set at a cancer risk of 1×10^{-6} or a Hazard Index of 1. The RAOs as established in the ROD and ROD Amendment remain valid and are protective of human health.

In February of 2005, the EPA initiated a vapor intrusion investigation to determine if soil vapors from contaminated Site media were negatively impacting indoor air at locations in the vicinity of the Site. A total of 23 locations, including 19 residential and 4 non-residential properties, were sampled in February 2005. Subsequently, an additional 18 locations were sampled in November and December 2005, including 13 residential and 5 non-residential structures. The sampling determined that the concentrations of VOCs detected in sub-slab at all residential locations were below the risk-based screening levels and that no further evaluation and/or action were deemed

necessary. As part of this FYR, residential results of the 2005 sampling effort were compared to current risk-based screening levels. Consistent with past determinations, the results of the evaluation indicate no further action is necessary.

Samples obtained in the commercial building on the MRIP Property indicated the need to install one or more vapor mitigation systems. In early 2007, six vapor mitigation systems were installed to collect soil gas vapors underneath the building's concrete floor at various locations. These mitigation systems were last sampled in October 2009. The data from the sampling indicate that most indoor air concentrations are below risk-based levels for commercial/industrial exposures. Continued maintenance of the vapor mitigation systems is recommended to ensure the systems continue to operate as intended. As discussed above, NYSDEC has responsibility to continue the monitoring and O&M of these systems.

The September 2000 ROD identified the following RAOs for soil and groundwater:

1) Eliminate inhalation and ingestion of, and dermal contact with, contaminated groundwater associated with the Site that does not meet state or federal drinking water standards;
2) Restore the aquifer to its most beneficial use, *i.e.*, as a source of potable water, and restore it as a natural resource;
3) Eliminate further off-MRIP property contaminated groundwater migration and
4) Prevent or minimize cross-media impacts from COCs in contaminated soil to the underlying groundwater, which will also eliminate potential future exposure to this soil.

Based on the effectiveness of the removal and remedial activities that had occurred at the Site up to that point, specifically with respect to the cleanup of the contaminated soil, the 2008 ROD Amendment updated the RAOs to include only the first three shown above.

As reflected in the ecological risk assessment conducted as part of the RI/FS process and since the remedial actions conducted at the Site have resulted in the interruption of any exposure pathways to ecological receptors, there are currently no completed pathways for significant exposures of Site-related contaminants to ecological receptors, *i.e.*, fish and/or wildlife. The ecological risk assessment continues to be in effect. The EPA concludes that no further study of fish and wildlife resources is necessary, since the potential for exposure to ecological receptors has been eliminated.

As discussed above, the RAOs established for the Site remain valid and protective of human health and the environment.

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

No other information has come to light that could call into question the protectiveness of the remedy.

VIII. ISSUES, RECOMMENDATIONS AND FOLLOW-UP ACTIONS

The remedies have been implemented and are functioning as intended by the Site decision documents. There are no additional actions required. As expected by the decision documents, the O&M activities are subject to routine modifications and/or adjustments.

There are no recommendations nor follow-up actions necessary to protect human health or the environment.

IX. PROTECTIVENESS STATEMENT

OU-1 is protective of human health and the environment.

X. NEXT FIVE-YEAR REVIEW

The next FYR for the Site should be completed within five years of the signature of this document.

TABLES

Mohonk Road Five-Year Review

TABLE 1

Chronology of MRIP Site Events

Event	Date
Volatile organic compounds (VOCs) detected in residential wells.	1994
New York State Department of Environmental Conservation (NYSDEC) installed point-of-entry treatment (POET) systems on residential wells.	1994-1998
NYSDEC performed remedial investigation/feasibility study.	1996-1999
The EPA began non-time-critical removal action (NTCRA) [built groundwater extraction and treatment plant and excavated and disposed of contaminated soils].	1999-2000
The EPA issued Record of Decision (ROD) for Operable Unit One.	March 2000
Remedial Design for soils excavation/disposal.	September 2000
Remedial Action for soils excavation/disposal.	October 2000 - March 2001
Long Term Response Action (LTRA) begins.	May 2001
Interim Remedial Action Report - extraction and treatment of groundwater (OU1).	July 2001
Remedial design water treatment plant.	2004
Construction of water treatment plant.	September 2005 to May 2007
NYSDOH approval of completed water works.	September 2007
All POET systems removed and disposed of – all residences within the High Falls Water District hooked up to new potable water system.	December 2007
ROD Amendment for MNA.	September 2008
Transfer of operation and maintenance of ongoing extraction and treatment system and vapor mitigation systems to NYSDEC.	September 2011
Extraction and treatment system operations and vapor mitigation systems operations.	Ongoing
MNA sampling of the far field plume.	Ongoing

TABLE 2

Documents Reviewed for Five-Year Review

Record of Decision – Mohonk Road Industrial Plant (MRIP) Site, EPA	March 31, 2000
Final Remedial Action Report – Excavation and Off-Site Disposal of Contaminated Soils (OU1) – MRIP Site, EPA	June 2001
O&M Discharge Reports, MRIP Site, U.S. Army Corps and EPA	February 2001-September 2011
Remedial Action Report (Excavation and off-site disposal of contaminated soils) (OU1), MRIP Site, EPA and U.S. Army Corps	June 2001
Interim Remedial Action Report – Extraction and Treatment of Groundwater in the Near Field Plume (OU1) – MRIP Site, EPA and U.S. Army Corps	July 2001
Remedial System Evaluation, MRIP Site, Army Corps	November 2005
Subsurface Soil Sampling and Soil Vapor Well Installation, MRIP Site, EPA Environmental Response Team	April 2007
Remedial Action Report – Point-of-Entry Treatment Systems (Residential and Commercial Properties) (OU1) – MRIP Site, EPA and U.S. Army Corps	March 2008
Final Monitored Natural Attenuation Assessment, MRIP Site – U.S. Army Corps	April 2008
Remedial Action Report – Alternate Water Supply, MRIP Site, EPA and U.S. Army Corps	July 2008
Record of Decision Amendment (OU1) – MRIP Site, EPA	September 30, 2008
Quarterly Operations and Maintenance Reports – MRIP Site, Army Corps, Sevenson and AECOM	July – September 2011
Quarterly Site Status Reports – MRIP Site, NYSDEC and Aztech Technologies, Inc.	November 2012 - May 2013
Long Term Groundwater Monitoring Plan – U.S. Army Corps and AECOM	January 2013
Monitoring Well Sampling Data (including MNA data) Reports (1999-2013) – U.S. Army Corps and AECOM	November 2013

TABLE 3

MOHONK ROAD INDUSTRIAL PLANT SITE

GWTS ANALYTICAL DATA SUMMARY : 2000-2008

Mohonk Road Industrial Plant GWTS Analytical Data Summary																										
	1,1,1-TCA					TCE					1,1-DCA					1,1-DCE					Total VOCs				
	Eff	ERT1	MW5R	MW7R	Inf	Eff	ERT1	MW5R	MW7R	Inf	Eff	ERT1	MW5R	MW7R	Inf	Eff	ERT1	MW5R	MW7R	Inf	Eff	ERT1	MW5R	MW7R	Inf
12-Sep-00	<10	470	610	590	NS	<10	20	44	2	NS	<10	16	35	24	NS	<10	56	170	47	NS	<40	562	859	663	NS
11-Oct-00	<0.5	480	250	570	NS	<0.5	28	13	5	NS	<0.5	24	9	36	NS	<0.5	83	50	55	NS	<2	615	322	666	NS
6-Nov-00	<0.5	500	360	510	NS	<0.5	29	16	2	NS	<0.5	20	18	25	NS	<0.5	92	57	50	NS	<2	641	451	587	NS
30-Nov-00	<0.5	390	400	320	NS	<0.5	34	34	<3	NS	<0.5	29	23	27	NS	<0.5	87	120	47	NS	<2	540	577	394	NS
1-Mar-01	<1	589	308	362	NS	<1	35	18	6	NS	<1	26	10	24	NS	<1	115	66	56	NS	<4.0	765	402	448	NS
30-Apr-01	<1	1130	250	571	NS	<1	50	16	2	NS	<1	44	9	34	NS	<1	146	54	47	NS	<4.0	1370	329	654	NS
24-May-01	<1	336	340	386	NS	<1	22	21	3	NS	<0.4	18	156	25	NS	<0.4	66	71	37	NS	<2.8	442	588	451	NS
21-Jun-01	<1	407	635	523	NS	<1	23	32	3	NS	<0.4	21	25	28	NS	<0.4	84	144	46	NS	<2.8	535	836	600	NS
19-Jul-01	<0.3	259	600	362	NS	<0.3	21	41	4	NS	<0.4	17	33	32	NS	<0.4	57	145	41	NS	<1.4	354	819	439	NS
2-Aug-01	<0.3	400	237	498	NS	<0.3	23	12	2	NS	<0.4	16	10	32	NS	<0.4	63	47	37	NS	<1.4	502	306	569	NS
4-Oct-01	<0.3	271	358	452	NS	<0.3	18	10	4	NS	<0.4	18	31	42	NS	<0.4	50	45	41	NS	<1.4	357	444	539	NS
8-Nov-01	<0.3	437	345	324	NS	<0.3	22	11	10	NS	<0.4	22	21	19	NS	<0.4	81	50	44	NS	<1.4	562	427	397	NS
16-May-02	<0.3	468	430	271	NS	<0.3	29	26	6	NS	<0.4	27	22	19	NS	<0.4	89	93	29	NS	<1.4	613	571	325	NS
15-Jul-02	<0.3	1460	227	228	NS	<0.3	64	13	5	NS	<0.4	77	12	14	NS	<0.4	201	57	30	NS	<1.4	1802	309	277	NS
21-Nov-02	<0.3	608	330	270	NS	<0.3	31	17	5	NS	<0.4	28	12	18	NS	<0.4	106	62	31	NS	<1.4	773	421	324	NS
19-Dec-02	<0.3	584	180	315	NS	<0.3	33	9	7	NS	<0.4	28	7	17	NS	<0.4	118	39	40	NS	<1.4	763	235	379	NS
30-Jan-03	<0.3	464	312	104	NS	<0.3	27	5	6	NS	<0.4	25	21	5	NS	<0.4	102	43	29	NS	<1.4	618	381	144	NS
13-Feb-03	<0.3	NS	NS	NS	367	<0.3	NS	NS	NS	15	<0.4	NS	NS	NS	21	<0.4	NS	NS	NS	70	<1.4	NS	NS	NS	473
13-Mar-03	<0.3	NS	NS	NS	549	<0.3	NS	NS	NS	21	<0.4	NS	NS	NS	28	<0.4	NS	NS	NS	82	<1.4	NS	NS	NS	680
3-Apr-03	<0.3	619	288	324	NS	<0.3	30	15	6	NS	<0.4	27	11	19	NS	<0.4	105	60	38	NS	<1.4	781	374	387	NS
1-May-03	<0.3	NS	NS	NS	383	<0.3	NS	NS	NS	16	<0.4	NS	NS	NS	20	<0.4	NS	NS	NS	67	<1.4	NS	NS	NS	486
12-Jun-03	<0.3	NS	NS	NS	312	<0.3	NS	NS	NS	18	<0.4	NS	NS	NS	20	<0.4	NS	NS	NS	72	<1.4	NS	NS	NS	422
1-Jul-03	<0.3	322	116	365	NS	<0.3	21	8	4	NS	<0.4	18	5	24	NS	<0.4	72	30	43	NS	<1.4	433	159	436	NS
19-Aug-03	<0.3	NS	NS	NS	539	<0.3	NS	NS	NS	19	<0.4	NS	NS	NS	25	<0.4	NS	NS	NS	72	<1.4	NS	NS	NS	655
9-Sep-03	<0.3	NS	NS	NS	550	<0.3	NS	NS	NS	19	<0.4	NS	NS	NS	26	<0.4	NS	NS	NS	70	<1.4	NS	NS	NS	665
6-Oct-03	<0.3	NS	NS	NS	326	<0.3	NS	NS	NS	14	<0.4	NS	NS	NS	21	<0.4	NS	NS	NS	58	<1.4	NS	NS	NS	419
4-Nov-03	<0.3	NS	NS	NS	291	<0.3	NS	NS	NS	13	<0.4	NS	NS	NS	19	<0.4	NS	NS	NS	56	<1.4	NS	NS	NS	379
1-Dec-03	<0.3	NS	NS	NS	402	<0.3	NS	NS	NS	18	<0.4	NS	NS	NS	23	<0.4	NS	NS	NS	69	<1.4	NS	NS	NS	512
8-Jan-04	<0.3	NS	NS	NS	268	<0.3	NS	NS	NS	13	<0.4	NS	NS	NS	16	<0.4	NS	NS	NS	58	<1.4	NS	NS	NS	355
9-Feb-04	<1	242	248	272	NS	<1	16	11	3	NS	<1	15	18	24	NS	<1	61	52	37	NS	<4	334	329	336	NS
11-Mar-04	<0.3	NS	NS	NS	209	<0.3	NS	NS	NS	9.6	<0.4	NS	NS	NS	15.5	<0.4	NS	NS	NS	48.6	<1.4	NS	NS	NS	282.7
1-Apr-04	<0.3	NS	NS	NS	226	<0.3	NS	NS	NS	11.3	<0.4	NS	NS	NS	14.4	<0.4	NS	NS	NS	51.6	<1.4	NS	NS	NS	303.3
3-May-04	0.4	240	227	226	NS	<0.3	15.6	11.1	3.6	NS	<0.4	15.2	18.3	22.2	NS	<0.4	64.3	55.2	40.0	NS	0.4	335.1	311.6	291.8	NS
17-Jun-04	<0.3	NS	NS	NS	252	<0.3	NS	NS	NS	12.8	<0.4	NS	NS	NS	18.0	<0.4	NS	NS	NS	57.5	<1.4	NS	NS	NS	340.3
15-Jul-04	0.23	240	290	220	NS	<0.5	17	10	3.1	NS	0.1	17	19	21	NS	<0.5	59	61	25	NS	0.33	333	380	269.1	NS
13-Sep-04	0.92	NS	NS	NS	180	<0.5	NS	NS	NS	6.9	<0.5	NS	NS	NS	25.0	<0.5	NS	NS	NS	24	0.92	NS	NS	NS	235.9
7-Oct-04	1.9	370	230	210	NS	<0.5	22	14	5.6	NS	<0.5	23	9.8	18	NS	<0.5	75	52	27	NS	1.9	490	305.8	260.6	NS
18-Nov-04	<0.5	NS	NS	NS	590	<0.5	NS	NS	NS	26	<0.5	NS	NS	NS	41	<0.5	NS	NS	NS	94	<2.0	NS	NS	NS	751
13-Dec-04	<0.5	520	NS	110	NS	<0.5	32	NS	3	NS	<0.5	30	NS	22	NS	<0.5	110	NS	13	NS	<2.0	692	NS	148	NS
12-Jan-05	<0.5	NS	NS	NS	230	<0.5	NS	NS	NS	17	<0.5	NS	NS	NS	22	<0.5	NS	NS	NS	41	<2.0	NS	NS	NS	310
3-Feb-05	<0.5	NS	NS	NS	490	<0.5	NS	NS	NS	19	<0.5	NS	NS	NS	27	<0.5	NS	NS	NS	58	<2.0	NS	NS	NS	594
10-Mar-05	<0.5	410	280	270	NS	<0.5	27	20	5.6	NS	0.17	27	14	22	NS	<0.5	90	67	43	NS	0.17	554	381	340.6	NS
25-Apr-05	<0.5	NS	NS	NS	650	<0.5	NS	NS	NS	32	<0.5	NS	NS	NS	28	<0.5	NS	NS	NS	130	<2.0	NS	NS	NS	840
18-May-05	<0.5	NS	NS	NS	270	<0.5	NS	NS	NS	15	<0.5	NS	NS	NS	17	<0.5	NS	NS	NS	69	<2.0	NS	NS	NS	371
14-Jun-05	0.11	250	260	300	NS	<0.5	13	17	3.1	NS	<0.5	19	16	40	NS	<0.5	50	75	36	NS	0.11	332	368	379.1	NS
15-Jul-05	<0.5	NS	NS	NS	490	<0.5	NS	NS	NS	16	<0.5	NS	NS	NS	46	<0.5	NS	NS	NS	61	<2.0	NS	NS	NS	613
10-Aug-05	<0.5	NS	NS	NS	360	<0.5	NS	NS	NS	11	<0.5	NS	NS	NS	43	<0.5	NS	NS	NS	51	<2.0	NS	NS	NS	465
14-Sep-05	<0.5	NS	NS	130	NS	<0.5	NS	NS	3.5	NS	<0.5	NS	NS	20	NS	<0.5	NS	NS	18	NS	<2.0	NS	NS	171.5	NS
15-Nov-05	<0.5	300	NS	170	NS	<0.5	16	NS	3.5	NS	<0.5	15	NS	16	NS	<0.5	60	NS	20	NS	<2.0	391	NS	209.5	NS
7-Dec-05	<0.5	NS	NS	NS	340	<0.5	NS	NS	NS	13	<0.5	NS	NS	NS	21	<0.5	NS	NS	NS	53	<2.0	NS	NS	NS	427
12-Jan-06	<0.5	NS	NS	NS	780	<0.5	NS	NS	NS	29	<0.5	NS	NS	NS	49	<0.5	NS	NS	NS	97	<2.0	NS	NS	NS	955
15-Feb-06	<0.5	210	NS	130	NS	<0.5	12	NS	4.1	NS	<0.5	12	NS	17	NS	<0.5	45	NS	17	NS	<2.0	279	NS	168.1	NS
8-Mar-06	<0.5	NS	NS	NS	250	<0.5	NS	NS	NS	14	<0.5	NS	NS	NS	16	<0.5	NS	NS	NS	35	<2.0	NS	NS	NS	315
5-Apr-06	<0.5	NS	NS	NS	260	<0.5	NS	NS	NS	13	<0.5	NS	NS	NS	19	<0.5	NS	NS	NS	39	<2.0	NS	NS	NS	331
3-May-06	<0.5	360	NS	200	NS	<0.5	18	NS	4.8	NS	<0.5	17	NS	23	NS	<0.5	73	NS	24	NS	<2.0	468	NS	251.8	NS
6-Jun-06	<0.5	340	250	190	NS	<0.5	21	18	3.6	NS	<0.5	18	14	26	NS	<0.5	67	48	27	NS	<2.0	446	330	246.6	NS
12-Jul-06	<0.5	NS	NS	NS	740	<0.5	NS	NS	NS	28	<0.5	NS	NS	NS	55	<0.5	NS	NS	NS	110	<2.0	NS	NS	NS	933
9-Aug-06	<0.5	NS	NS	NS	360	<0.5	NS	NS	NS	19	<0.5	NS	NS	NS	22	<0.5	NS	NS	NS	66	<2.0	NS	NS	NS	467
6-Sep-06	<0.5	170	230	250	NS	<0.5	13	9.2	1.6	NS	<0.5	17	15	46	NS	<0.5	36	61	33	NS	<2.0	236	315.2	330.6	NS
17-Oct-06	<0.5	NS	NS	NS	240	<0.5	NS	NS	NS	11	<0.5	NS	NS	NS	20	<0.5	NS	NS	NS	41	<2.0	NS	NS	NS	312
1-Nov-06	<0.5	NS	NS	NS	300	<0.5	NS	NS	NS	11	<0.5	NS	NS	NS	28	<0.5	NS	NS	NS	45	<2.0	NS	NS	NS	384
14-Dec-06	<0.5	180	190	350	NS	<0.5	11	12	1.8	NS	<0.5	12	9.7	49	NS	<0.5	36	52	40	NS	<2.0	239	263.7	440.8	NS
11-Jan-07	<0.5	NS	NS	NS	260	<0.5	NS	NS	NS	8.2	<0.5	NS	NS	NS	30	<0.5	NS	NS	NS	46	<2.0	NS	NS	NS	344.2
23-Mar-07	<0.5	210	170	370	NS	<0.5	12	12	1.8	NS	<0.5	13	14	52	NS	<0.5	35	43	39	NS	<2.0	270	239	462.8	NS
20-Apr-07	<0.5	1700	290	780	NS	<0.5	61	13	2	NS	<0.5	89	12	140	NS	<0.5	220	49	62	NS	<2.0	2070	364	984	NS
4-May-07	<0.5	NS	NS	NS	620	<0.5	NS	NS	NS	19	<0.5	NS	NS	NS	55	<0.5	NS	NS	NS	84	<2.0	NS	NS	NS	778
14-Jun-07	<0.5	160	340	270	NS	<0.5	12	14	2.3	NS	<0.5	13	9.9	43	NS	<0.5	24	38	17	NS	<2.0	209	401.9	332.3	NS
19-Sep-07	<0.5	210	360	480	NS	<0.5	11	18	2	NS	<0.5	14	14	58	NS	<0.5	30	64	37	NS	<2.0	265	456	577	NS
30-Oct-07	<0.5	NS	NS	NS	420	<0.5	NS	NS	NS	8	<0.5	NS	NS	NS	68	<0.5	NS	NS	NS	59	<2.0	NS	NS	NS	555
14-Nov-07	<0.5	NS	NS	NS	160	<0.5	NS	NS	NS	8	<0.5	NS	NS	NS	16	<0.5	NS	NS	NS	32	<2.0	NS	NS	NS	216
5-Dec-07	<0.5	240	81	230	NS	<0.5	1.5	6.7	38	NS	<0.5	43	6.7	38	NS	<0.5	34	25	29	NS	<2.0	318.5	119.4	335	NS
3-Jan-08	<0.5	NS	NS	NS	46	<0.5	NS	NS	NS	2.5	<1	NS	NS	NS	7.2	<0.5	NS	NS	NS	17	<2.0	NS	NS	NS	72.7
6-Feb-08	<0.5	NS	NS	NS	200	<0.5	NS	NS	NS	7.7	<0.5	NS	NS	NS	14.0	<0.5	NS	NS	NS	39	<2.0	NS	NS	NS	260.7
5-Mar-08	<0.5	650	150	120	NS	<0.5	34	11	2	NS	<0.5	40	6	28	NS	<0.5	93	43	25	NS	<2.0	817	210	175	NS
3-Apr-08	<0.5	NS	NS	NS	200	0.7	NS	NS	NS	7.8	<0.5	NS	NS	NS	20	<0.5	NS	NS	NS	40	2.2	NS	NS	NS	267.8
1-May-08	<0.5	NS	NS	NS	81	<0.5	NS	NS	NS	8.1	<0.5	NS	NS	NS	8.2	<0.5	NS	NS	NS	24	<2.0	NS	NS	NS	121.3
4-Jun-08	<0.5	57	23	140	NS	<0.5	6.9	6.8	1.3	NS	<0.5	8.9	3	35	NS	<0.5	31	13	30	NS	<2.0	103.8	45.8	206.3	NS
2-Jul-08	<0.5	NS	NS	NS	63	<0.5	NS	NS	NS	5.1	<0.5	NS	NS	NS	11	<0.5	NS	NS	NS	29	<2.0	NS	NS	NS	108.1

TABLE 4

MOHONK ROAD INDUSTRIAL PLANT SITE

GWTS ANALYTICAL DATA SUMMARY : 2008-2011

	1,1,1-TCA					TCE					1,1-DCA					1,1-DCE					Total VOCs				
	Eff	ERT1	MW5R	MW7R	Inf	Eff	ERT1	MW5R	MW7R	Inf	Eff	ERT1	MW5R	MW7R	Inf	Eff	ERT1	MW5R	MW7R	Inf	Eff	ERT1	MW5R	MW7R	Inf
13-Aug-08	<0.5	NS	NS	NS	150	<0.5	NS	NS	NS	9.6	<0.5	NS	NS	NS	19	<0.5	NS	NS	NS	36	<2.0	NS	NS	NS	214.6
10-Sep-08	<0.5	110	NS	230	NS	<0.5	9.5	NS	1.8	NS	<0.5	26	NS	150	NS	<0.5	26	NS	22	NS	<2.0	171.5	NS	403.8	NS
15-Oct-08	<0.5	NS	NS	NS	100	<0.5	NS	NS	NS	7.5	<0.5	NS	NS	NS	12	<0.5	NS	NS	NS	29	<2.0	NS	NS	NS	148.5
12-Nov-08	<0.5	NS	NS	NS	69	<0.5	NS	NS	NS	7.2	<0.5	NS	NS	NS	12	<0.5	NS	NS	NS	32	<2.0	NS	NS	NS	120.2
10-Dec-08	<0.5	63	55	52	NS	<0.5	11	7.7	3.8	NS	<0.5	14	10	16	NS	<0.5	37	17	24	NS	<2.0	125	89.7	95.8	NS
7-Jan-09	<0.5	NS	NS	NS	99	<0.5	NS	NS	NS	9	<0.5	NS	NS	NS	17	<0.5	NS	NS	NS	38	<2.0	NS	NS	NS	163
18-Feb-09	<0.5	NS	NS	NS	340	<0.5	NS	NS	NS	13	<0.5	NS	NS	NS	39	<0.5	NS	NS	NS	46	<2.0	NS	NS	NS	438
12-Mar-09	<0.5	480	510	210	NS	<0.5	24	28	3.3	NS	<0.5	26	29	35	NS	<0.5	67	94	20	NS	<2.0	597	661	268.3	NS
8-Apr-09	<0.5	NS	NS	NS	170	<0.5	NS	NS	NS	8.2	<0.5	NS	NS	NS	22	<0.5	NS	NS	NS	36	<2.0	NS	NS	NS	236.2
6-May-09	<0.5	NS	NS	NS	190	<0.5	NS	NS	NS	8.7	<0.5	NS	NS	NS	23	<0.5	NS	NS	NS	38	<2.0	NS	NS	NS	259.7
3-Jun-09	<0.5	300	180	110	NS	<0.5	17	14	4	NS	<0.5	22	11	26	NS	<0.5	63	38	18	NS	<2.0	402	243	158	NS
1-Jul-09	<0.5	NS	NS	NS	240	<0.5	NS	NS	NS	9.9	<0.5	NS	NS	NS	20	<0.5	NS	NS	NS	58	<2.0	NS	NS	NS	327.9
12-Aug-09	<0.5	NS	NS	NS	130	<0.5	NS	NS	NS	8.8	<0.5	NS	NS	NS	14	<0.5	NS	NS	NS	31	<2.0	NS	NS	NS	183.8
9-Dec-09	<0.5	140	210	140	NS	<0.5	13	15	2.1	NS	<0.5	15	14	36	NS	<0.5	38	44	18	NS	<2.0	206	283	196.1	NS
6-Jan-10	<0.5	NS	NS	NS	110	<0.5	NS	NS	NS	7.5	<0.5	NS	NS	NS	18	<0.5	NS	NS	NS	28	<2.0	NS	NS	NS	163.5
16-Apr-10	<0.5	NS	NS	NS	200	<0.5	NS	NS	NS	11	<0.5	NS	NS	NS	30	<0.5	NS	NS	NS	31	<2.0	NS	NS	NS	272
12-May-10	<0.5	NS	NS	NS	130	<0.5	NS	NS	NS	6.9	<0.5	NS	NS	NS	23	<0.5	NS	NS	NS	28	<2.0	NS	NS	NS	187.9
9-Jun-10	<0.5	130	140	150	NS	<0.5	11	11	1.6	NS	<0.5	13	8.3	40	NS	<0.5	37	38	23	NS	<2.0	191	197.3	214.6	NS
8-Jul-10	<0.5	NS	NS	NS	80	<0.5	NS	NS	NS	4.8	<0.5	NS	NS	NS	19	<0.5	NS	NS	NS	18	<2.0	NS	NS	NS	121.8
4-Aug-10	<0.5	NS	NS	NS	100	<0.5	NS	NS	NS	4.7	<0.5	NS	NS	NS	21	<0.5	NS	NS	NS	27	<2.0	NS	NS	NS	152.7
1-Sep-10	<0.5	50	NS	77	NS	<0.5	5.9	NS	1.2	NS	<0.5	8.5	NS	22	NS	<0.5	22	NS	23	NS	<2.0	86.4	NS	123.2	NS
13-Oct-10	<0.5	NS	NS	NS	60	<0.5	NS	NS	NS	3.9	<0.5	NS	NS	NS	14	<0.5	NS	NS	NS	24	<2.0	NS	NS	NS	101.9
10-Nov-10	<0.5	NS	NS	NS	51	<0.5	NS	NS	NS	5	<0.5	NS	NS	NS	15	<0.5	NS	NS	NS	30	<2.0	NS	NS	NS	101
8-Dec-10	<0.5	43	NS	56	NS	<0.5	7	NS	2.9	NS	<0.5	11	NS	15	NS	<0.5	29	NS	26	NS	<2.0	90	NS	99.9	NS
5-Jan-11	<0.5	NS	NS	NS	62	<0.5	NS	NS	NS	6.6	<0.5	NS	NS	NS	13	<0.5	NS	NS	NS	29	<2.0	NS	NS	NS	110.6
3-Feb-11	<0.5	NS	NS	NS	59	<0.5	NS	NS	NS	5.6	<0.5	NS	NS	NS	12	<0.5	NS	NS	NS	25	<2.0	NS	NS	NS	101.6
16-Mar-11	<0.5	410	46	71	NS	<0.5	28	3.3	2.8	NS	<0.5	36	1.8	18	NS	<0.5	72	9.5	18	NS	<2.0	546	60.6	109.8	NS
13-Apr-11	<0.5	NS	NS	NS	92	<0.5	NS	NS	NS	6.8	<0.5	NS	NS	NS	17	<0.5	NS	NS	NS	27	<2.0	NS	NS	NS	142.8
11-May-11	<0.5	NS	NS	NS	100	<0.5	NS	NS	NS	9.6	<0.5	NS	NS	NS	19	<0.5	NS	NS	NS	34	<2.0	NS	NS	NS	162.6
8-Jun-11	<0.5	110	110	120	NS	<0.5	10	10	2.5	NS	<0.5	13	13	31	NS	<0.5	39	38	25	NS	<2.0	172	171	178.5	NS
6-Jul-11	<0.5	NS	NS	NS	65	<0.5	NS	NS	NS	5.1	<0.5	NS	NS	NS	13	<0.5	NS	NS	NS	25	<2.0	NS	NS	NS	108.1
4-Aug-11	<0.5	NS	NS	NS	33	<0.5	NS	NS	NS	4.2	<0.5	NS	NS	NS	14	<0.5	NS	NS	NS	26	<2.0	NS	NS	NS	77.2
1-Sep-11	<0.5	160	46	85	NS	<0.5	12	2.8	3.0	NS	<0.5	20	1.8	23	NS	<0.5	43	7.8	27	NS	<2.0	235	58.4	138	NS

TABLE 5

VOC CONCENTRATIONS OF CONTAMINANTS OF CONCERN

JANUARY 2014

LOCATION	1,1-DCA	1,1-DCE	TCE	1,1,1-TCA	1,4-Dioxane
Extraction Well-5R	12	35	11	130	ND
Extraction Well-7R	21	9.0	2.2J	56	ND
Extraction Well-ERT-1	37	46	23	240	ND
Combined Influent	22	39	13	150	ND
Effluent	ND	ND	ND	ND	ND

Concentration in µg/L
J - Estimated

TABLE 6

Summary of Analytical Results for Specific Volatile Organic Compounds in Soil Vapor
Mohonk Road Industrial Plant Superfund Site
High Falls, New York

(All results in micrograms per cubic meter)

Compound	Sub-Slab Depressurization System Sample Location					
	SS-01	SS-03	SS-04	SS-05	SS-06	SS-07
vinyl chloride	34	3.1	3.2	32	31	4.5
1,1-dichloroethene	700	3.2	0.64 U	0.66 U	0.66 U	1.9
1,1-dichloroethane	50	27	0.64 U	0.66 U	0.66 U	11
cis-1,2-dichloroethene	16 U	0.66 U	0.64 U	0.66 U	0.66 U	18
trans-1,2-dichloroethene	16 U	0.66 U	0.64 U	0.66 U	0.66 U	1.2
1,1,1-trichloroethane	2,200	170	0.71	2.5	1.1	75
carbon tetrachloride	16 U	0.66 U	0.64 U	0.66 U	0.66 U	0.73 U
trichloroethene	260	11	0.64 U	0.88	0.66 U	290
toluene	16 U	2.1	0.64 U	24	23	0.73 U
tetrachloroethene	16 U	2.1	0.64 U	0.66 U	0.66 U	30

Compound	Soil Vapor Extraction System Sample Location					
	SVE-19	SVE-20	SVE-21	SVE-22	SVE-23	COMP-INTAKE
vinyl chloride	0.69 U	0.71 U	450 U	3.3 U	2.7 U	5.8 U
1,1-dichloroethene	11	1.7	7,600	150	87	170
1,1-dichloroethane	0.69 U	0.71 U	790	8.0	2.9	18
cis-1,2-dichloroethene	0.69 U	0.71 U	450 U	3.3 U	2.7 U	5.8 U
trans-1,2-dichloroethene	0.69 U	0.71 U	450 U	3.3 U	2.7 U	5.8 U
1,1,1-trichloroethane	65	10	77,000	920	660	1,800
carbon tetrachloride	0.69 U	0.71 U	450 U	3.3 U	2.7 U	5.8 U
trichloroethene	2.0	0.71 U	2,000	38	2.7 U	43
toluene	0.69 U	0.71 U	450 U	3.3 U	2.7 U	5.8 U
tetrachloroethene	0.69 U	0.79	450 U	3.3 U	2.7 U	8.4

U = Indicates compound not detected above reporting limit. Reporting limit value is presented.

TABLE 7

Summary of Analytical Results for Specific Volatile Organic Compounds in Indoor Air and Sub-Slab Soil Gas
Mohonk Road Industrial Plant Superfund Site
High Falls, New York

(All results in micrograms per cubic meter)

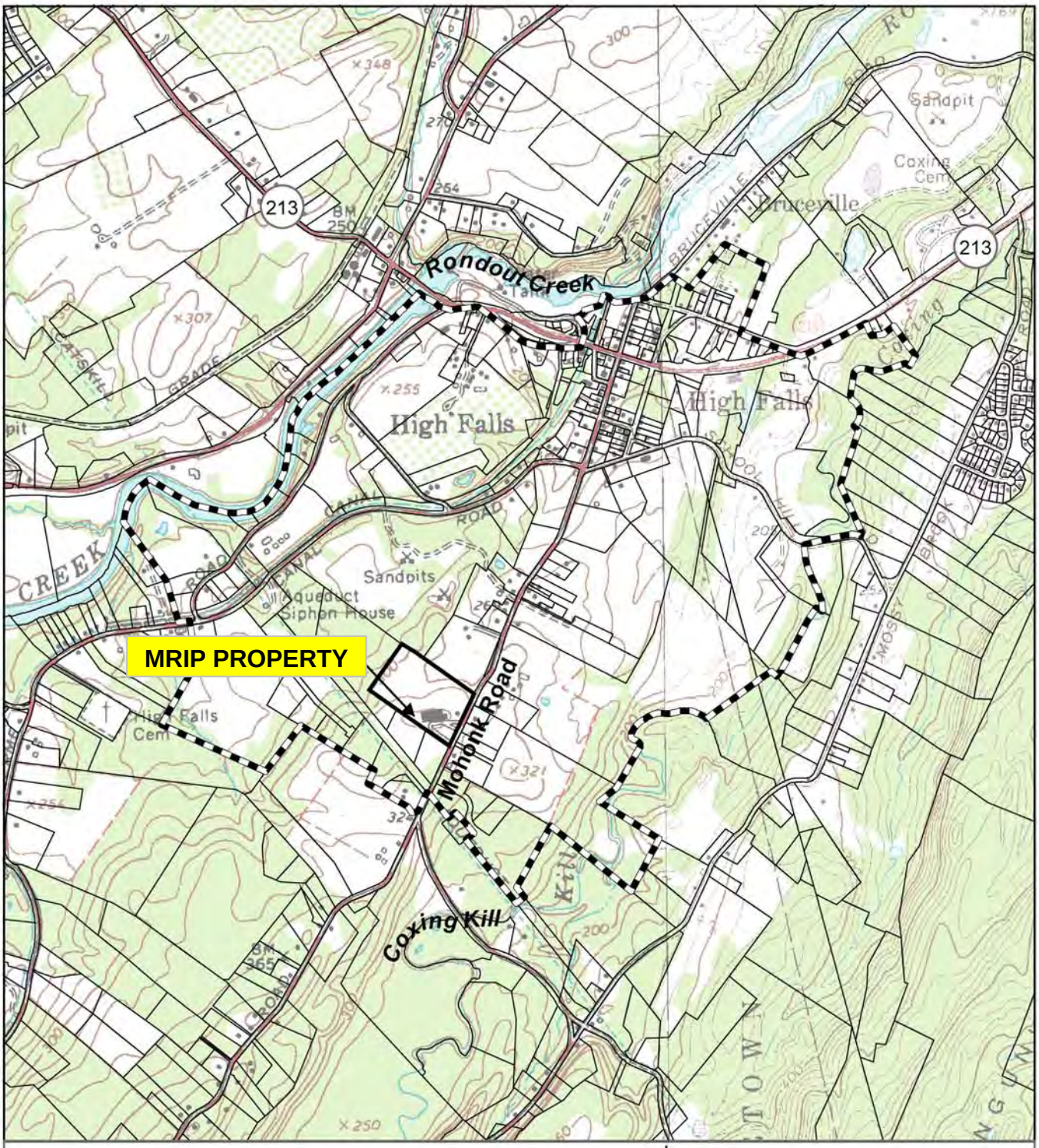
	Indoor Air Sample Location								
					Collocated Sample Pair				
Compound	IA-01	IA-02	IA-03	IA-04	IA-05	IA-05COL	AMBIENT #1	AMBIENT #2	AMBIENT #2 COL
vinyl chloride	0.15 U	0.17 U	0.14 U	0.18 U	0.16 U	0.16 U	0.16 U	0.15 U	0.17 U
1,1-dichloroethene	0.15 U	0.17 U	0.14 U	0.18 U	0.16 U	0.16 U	0.16 U	0.15 U	0.17 U
1,1-dichloroethane	0.15 U	0.17 U	0.14 U	0.18 U	0.16 U	0.16 U	0.16 U	0.15 U	0.17 U
cis-1,2-dichloroethene	0.15 U	0.17 U	0.14 U	0.18 U	0.16 U	0.16 U	0.16 U	0.15 U	0.17 U
trans-1,2-dichloroethene	0.15 U	0.17 U	0.14 U	0.18 U	0.16 U	0.16 U	0.16 U	0.15 U	0.17 U
1,1,1-trichloroethane	1.3	0.65	0.86	0.54	1.3	0.74	0.16 U	0.15	0.17 U
carbon tetrachloride	0.52	0.43	0.51	0.46	0.50	0.42	0.52	0.53	0.43
trichloroethene	2.0	0.28	0.14 U	0.53	2.0	0.16 U	0.16 U	0.15 U	0.17 U
toluene	100	73	160	93	190	160	1.4	2.2	1.6
tetrachloroethene	9.4	0.20	0.14 U	0.18 U	0.17	0.16 U	0.16 U	0.15 U	0.17 U

	Sub-Slab Soil Gas Sample Location							
Compound	PORT #1	PORT #2	PORT #3	T2-001	T2-002	T2-003	T2-004	T2-005
vinyl chloride	0.17 U	0.36	7.9 U	0.80 U	0.16 U	2.4 U	0.13 U	0.15 U
1,1-dichloroethene	5.3	4.3	30	2.5	5.0	2.4 U	0.32	0.15 U
1,1-dichloroethane	8.5	46	100	45	2.2	2.5	0.13 U	0.15 U
cis-1,2-dichloroethene	0.17 U	0.16 U	36	100	0.16 U	2.4 U	0.13 U	0.15 U
trans-1,2-dichloroethene	0.17 U	0.16 U	7.9 U	9.9	0.16 U	2.4 U	0.13 U	0.15 U
1,1,1-trichloroethane	360	440	1,200	200	460	2,100	140	75
carbon tetrachloride	11	0.83	7.9 U	0.80 U	15	2.4 U	0.32	0.54
trichloroethene	13	19	7,000	540	4.8	31	0.13 U	0.15 U
toluene	1.5	1.2	39 U	4.0 U	1.1	12 U	1.2	2.5
tetrachloroethene	17	34	110	12	5.8	6.9	1.6	0.15 U

U = Indicates compound not detected above reporting limit. Reporting limit value is presented.

FIGURES

Mohonk Road Five-Year Review



High Falls Water District

Tax Parcel

N

1:18,000

1 inch equals 1,500 feet

0 375 750 1,500 2,250 3,000 Feet

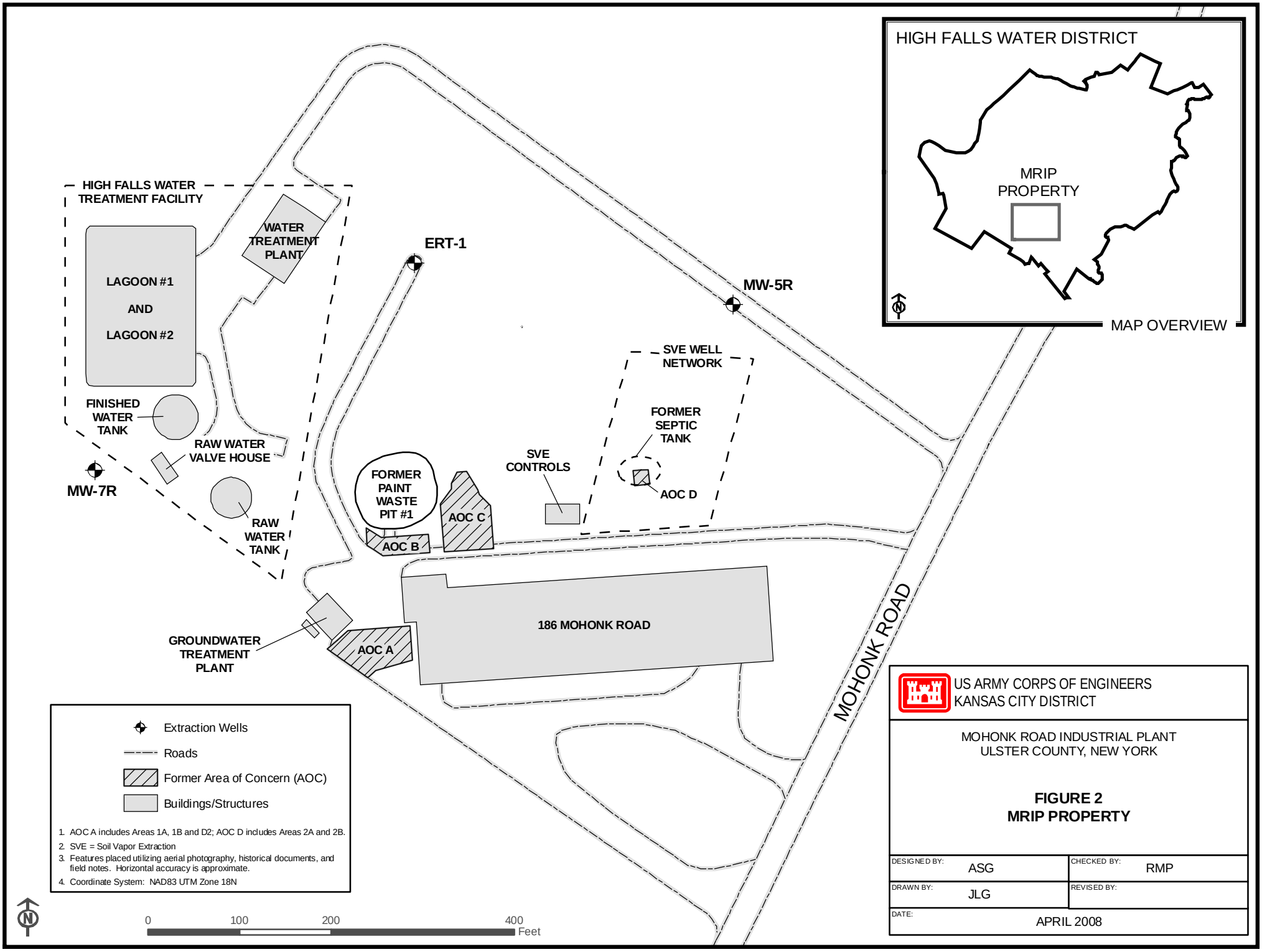
Figure 1

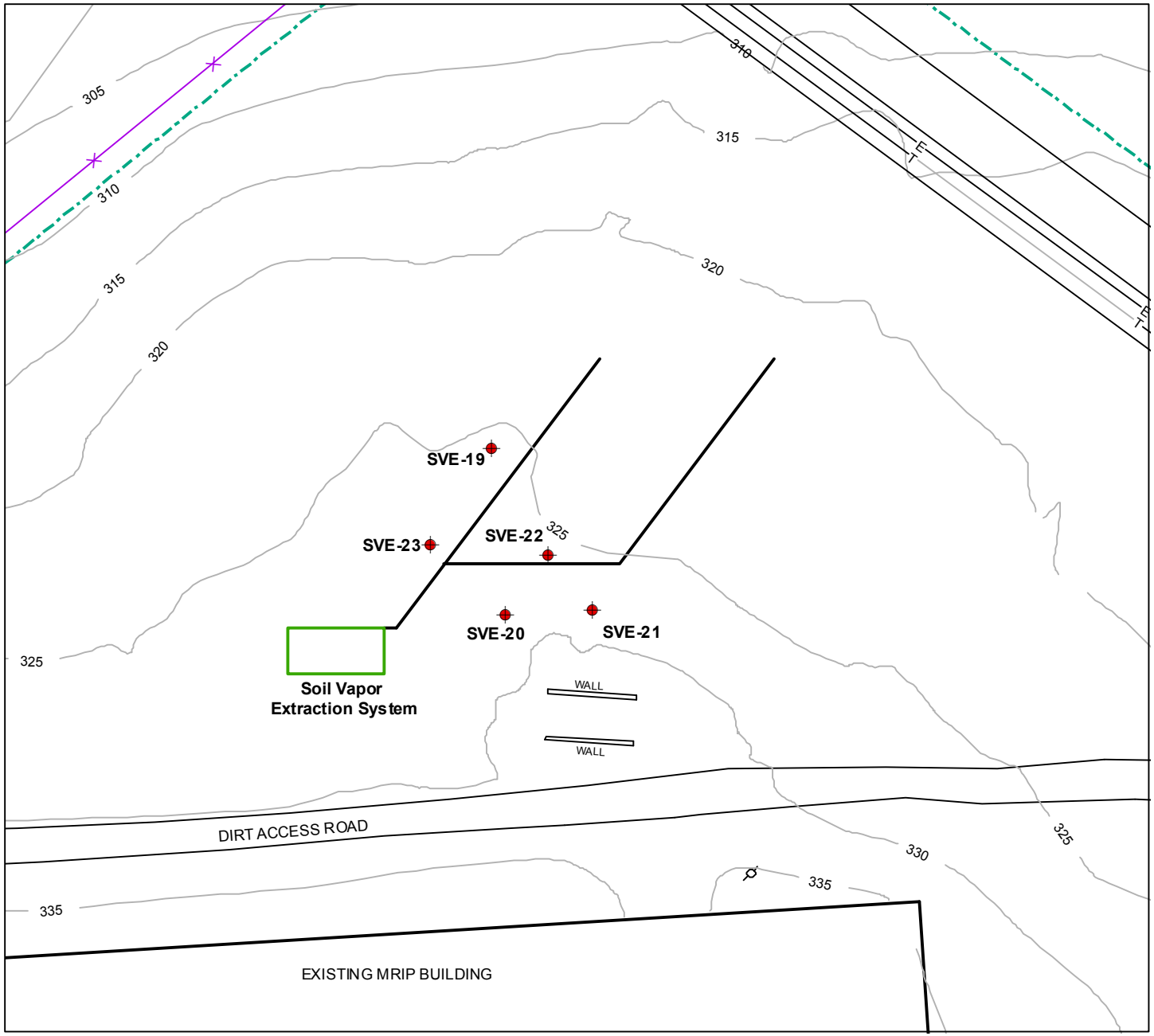
Site Location Map

Mohonk Road Industrial Plant

(MRIP)

High Falls, New York


HIGH FALLS WATER DISTRICT
MRIP PROPERTY
MAP OVERVIEW
HIGH FALLS WATER TREATMENT FACILITY
LAGOON #1 AND LAGOON #2
WATER TREATMENT PLANT
FINISHED WATER TANK
RAW WATER VALVE HOUSE
MW-7R
RAW WATER TANK
ERT-1
MW-5R
SVE WELL NETWORK
FORMER SEPTIC TANK
AOC D
SVE CONTROLS
FORMER PAINT WASTE PIT #1
AOC C
AOC B
186 MOHONK ROAD
GROUNDWATER TREATMENT PLANT
AOC A
MOHONK ROAD
Extraction Wells
Roads
Former Area of Concern (AOC)
Buildings/Structures
1. AOC A includes Areas 1A, 1B and D2; AOC D includes Areas 2A and 2B.
2. SVE = Soil Vapor Extraction
3. Features placed utilizing aerial photography, historical documents, and field notes. Horizontal accuracy is approximate.
4. Coordinate System: NAD83 UTM Zone 18N
0 100 200 400 Feet
US ARMY CORPS OF ENGINEERS
KANSAS CITY DISTRICT
MOHONK ROAD INDUSTRIAL PLANT
ULSTER COUNTY, NEW YORK
FIGURE 2
MRIP PROPERTY
DESIGNED BY: ASG
CHECKED BY: RMP
DRAWN BY: JLG
REVISED BY:
DATE: APRIL 2008
K:\MissionProjects\htw\mrip\GIS\arcgismaps\ProposedPlan_2008\FIG2_Treatment8x11BW_28APR08.mxd



Legend

Bedrock Well / Sample Location

N
W E
S
True North

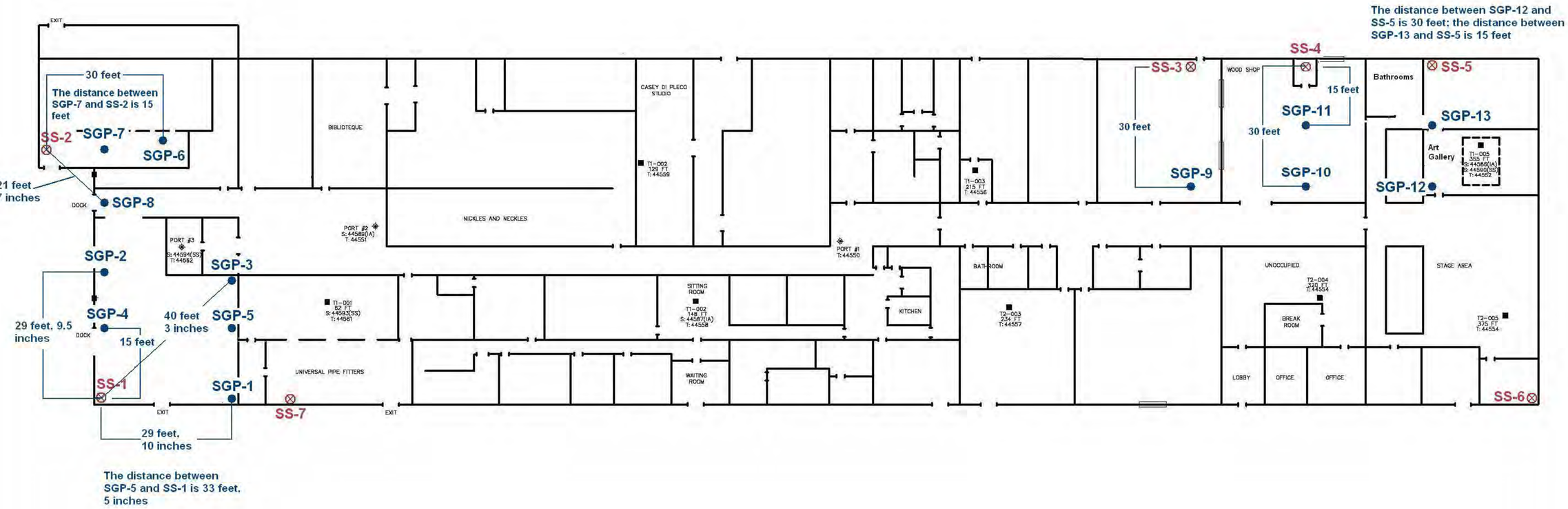
30 0 30 60
Feet

Map created using existing ACAD Drawing
Produced by "US Army Corps of Engineers, Kansas City District"
and survey GPS Data recorded in Lat., Lon., Decimal Degrees, WGS84
Map Creation Date: October 2009
Coordinate system: New York State Plane East
FIPS: 3101
Datum: NAD83
Units: Feet

Data: g:\arcviewprojects\reac4\00-122
MXD file: g:\arcinfoprojects\reac4\EAC00122_Mohonk\122_SVE_System.mxd

U.S EPA Environmental Response Team
Response Engineering and Analytical Contract
EP-C-04-032
W.A.# 0-122

Figure **3**
Groundwater and Soil Vapor
Extraction System
Sample Location Map
Mohonk Road Industrial Plant Site
High Falls, New York



LEGEND:

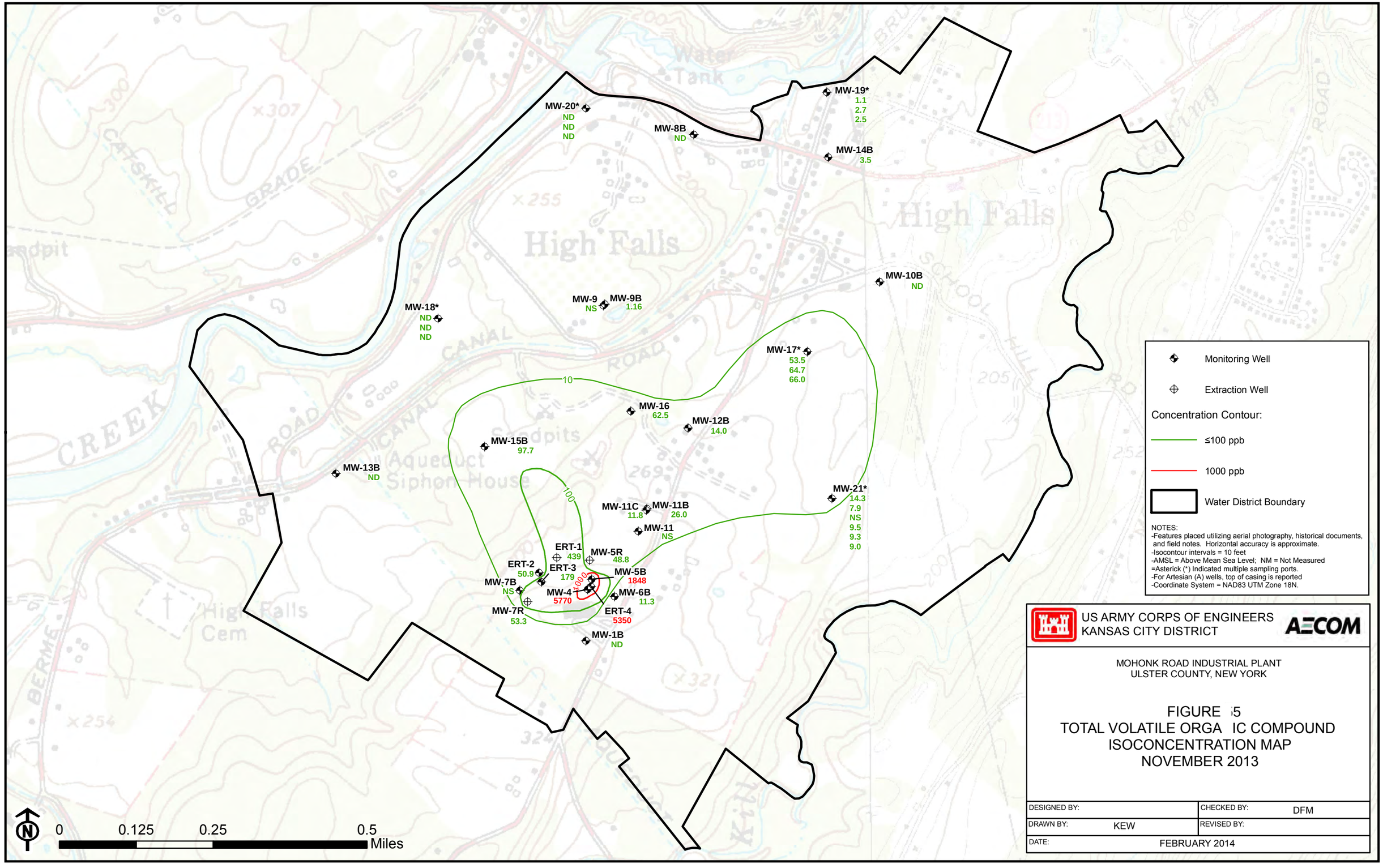
- Soil Gas Port (Installed August 2009)
- Sub-Slab
- Existing Soil Gas Ports

DRAWING STATUS	DRAFT	FINAL ☒
PROPOSAL NO. : 33-64-060024		
PROJECT MANAGER: John Lee		
SCALE: NOT TO SCALE		
REVISION NO.: 0	REV DATE:	
CADD ID: 060024A001	PLOT DATE:	02/13/07
DRN BY: A.R.W.	DRN DATE:	02/13/07
CHK BY: T.W.	CHK DATE:	02/13/07
APPVD BY: T.W.	APPVD DATE:	02/13/07
UPDATED BY: RD	UPDATE DATE:	8/28/2009

FIGURE 4

WRS COMPASS
221 HOBBS STREET, SUITE 108, TAMPA, FLORIDA 33619
PH:(813) 684-4400 FAX:(813) 684-9177

Mohonk Road Industrial Plant
Sub Slab and Soil Gas Ports Location Map With Distances
186 Mohonk Road
High Falls, New York 12440



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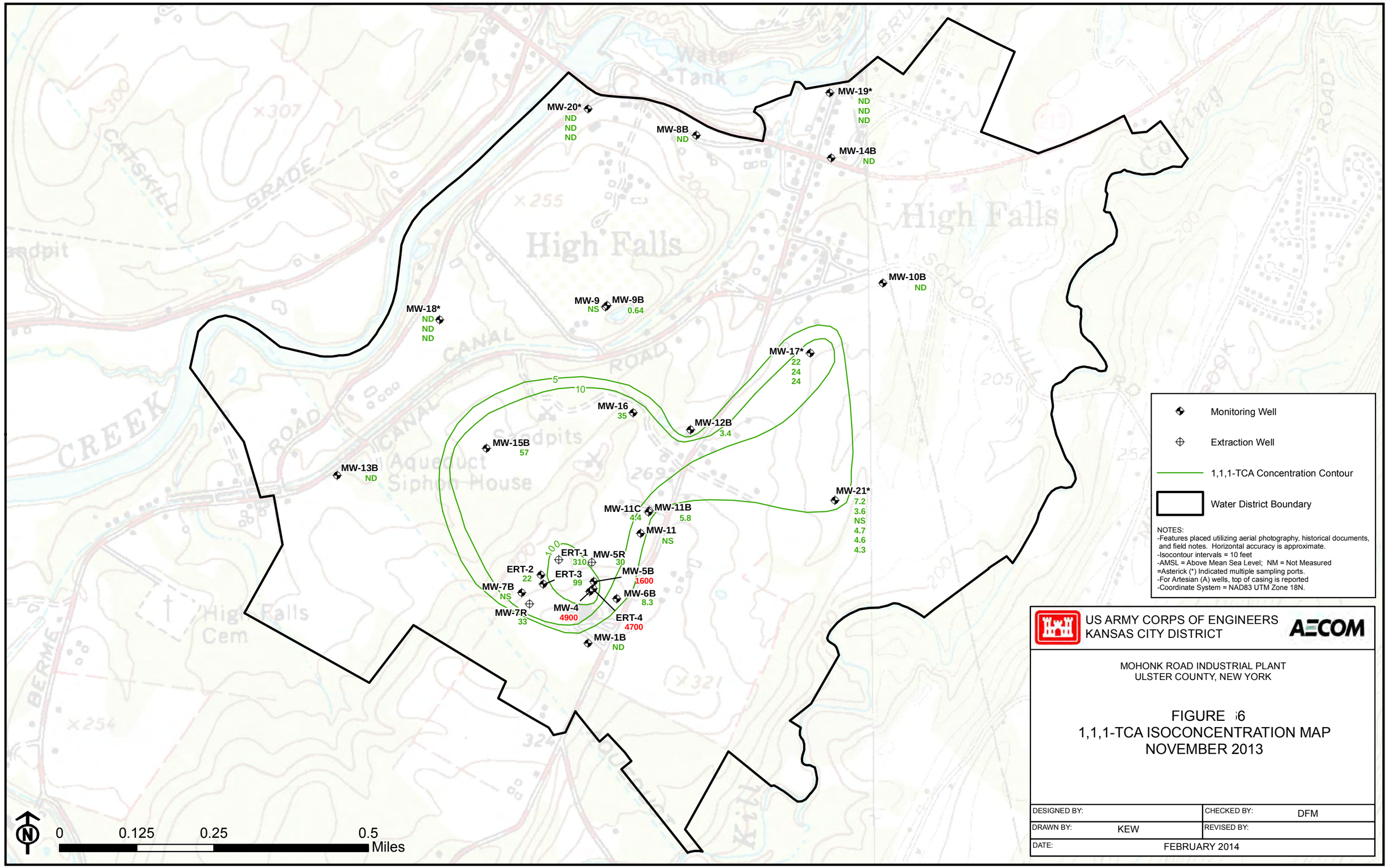
KANSAS CITY DISTRICT

AECOM

MOHONK ROAD INDUSTRIAL PLANT
ULSTER COUNTY, NEW YORK

FIGURE 5
TOTAL VOLATILE ORGANIC COMPOUND
ISOCONCENTRATION MAP
NOVEMBER 2013

DESIGNED BY:	CHECKED BY: DFM
DRAWN BY: KEW	REVISED BY:
DATE: FEBRUARY 2014	



NOTES:
-Features placed utilizing aerial photography, historical documents, and field notes. Horizontal accuracy is approximate.
-Isocontour intervals = 10 feet
-AMSL = Above Mean Sea Level; NM = Not Measured
=Asterick (*) Indicated multiple sampling ports.
-For Artesian (A) wells, top of casing is reported
-Coordinate System = NAD83 UTM Zone 18N.

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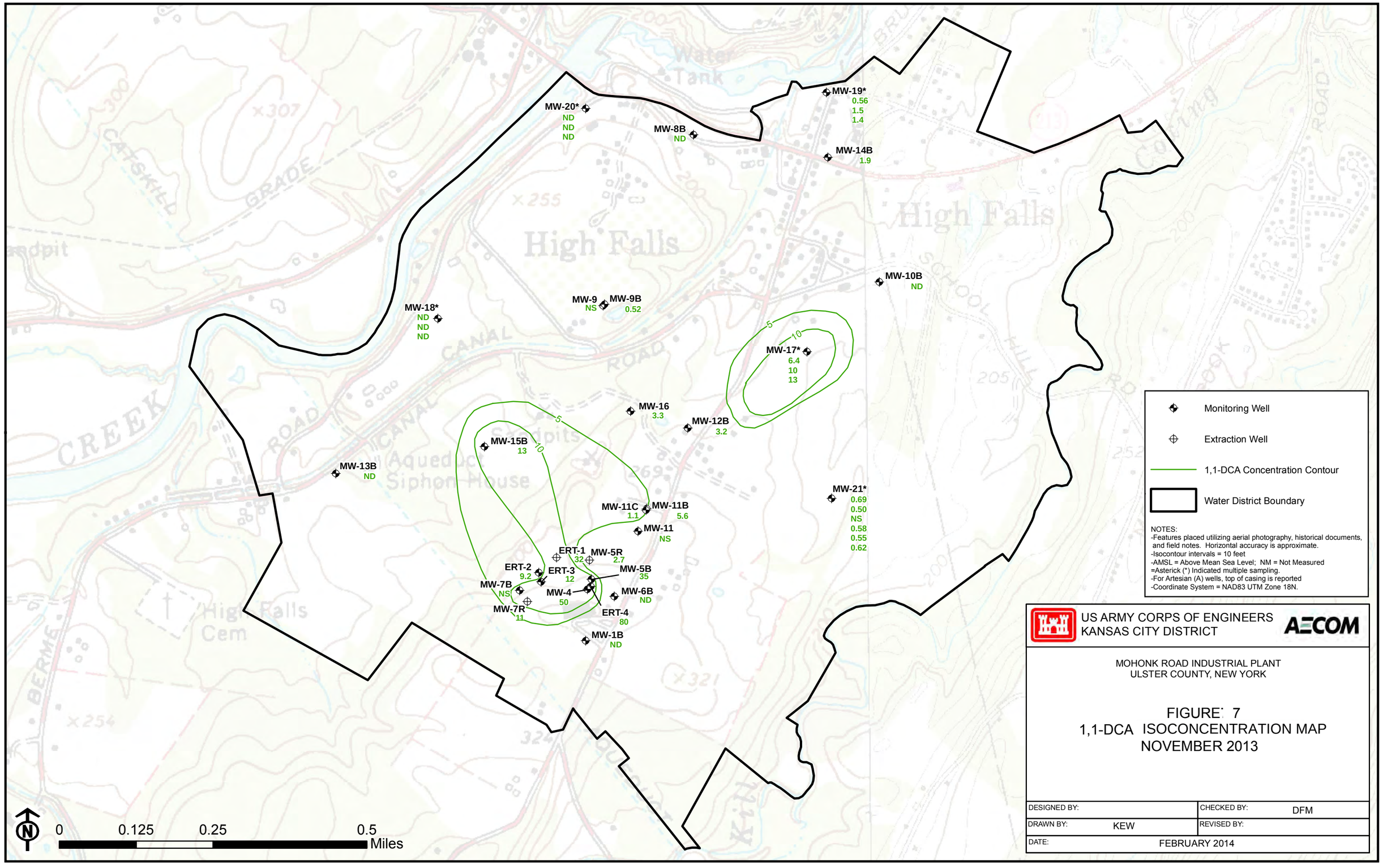
KANSAS CITY DISTRICT

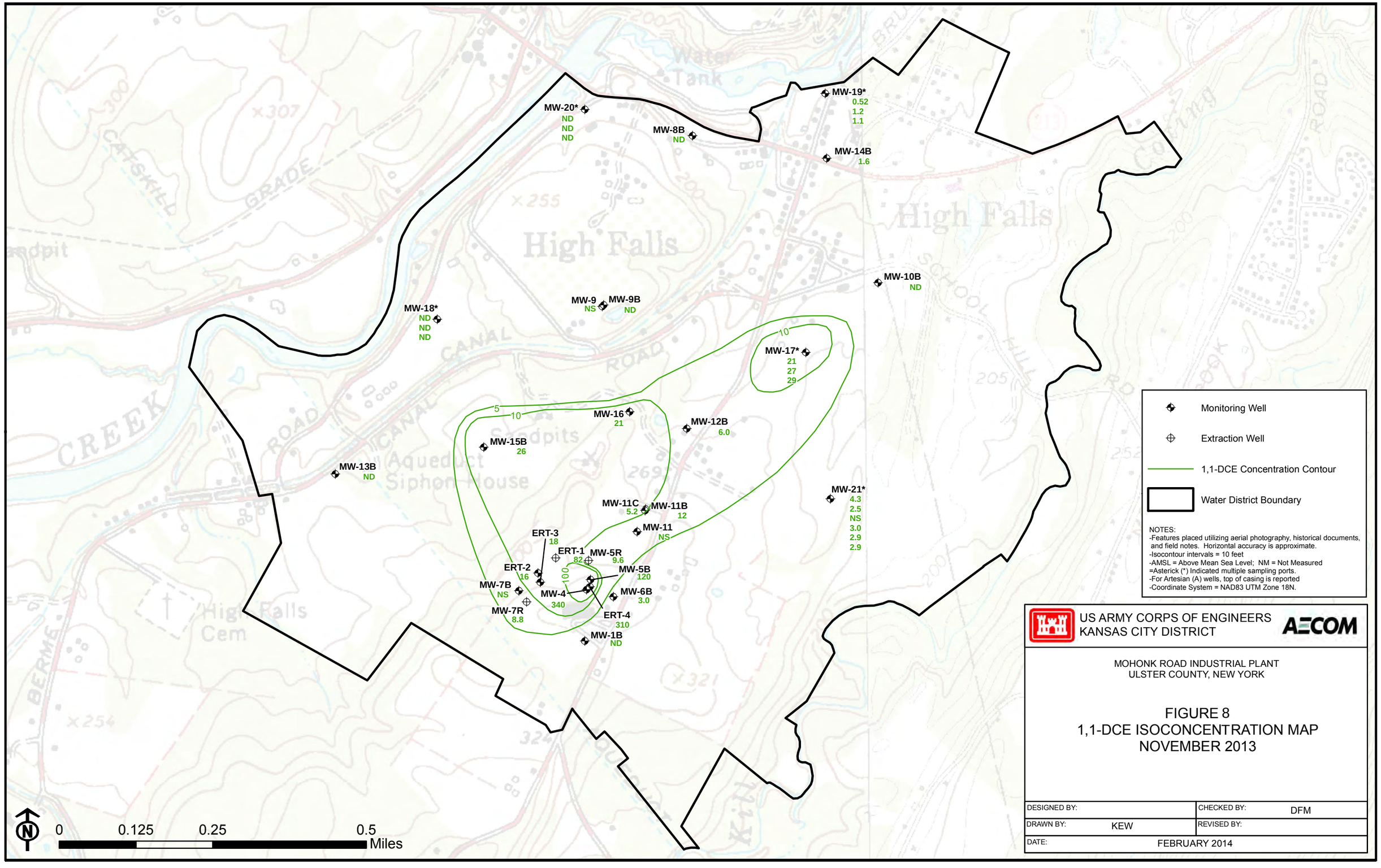
AECOM

MOHONK ROAD INDUSTRIAL PLANT
ULSTER COUNTY, NEW YORK

FIGURE 6
1,1,1-TCA ISOCONCENTRATION MAP
NOVEMBER 2013

DESIGNED BY:		CHECKED BY:	DFM
DRAWN BY:	KEW	REVISED BY:	
DATE:	FEBRUARY 2014		


MW-20*
ND
ND
ND
MW-8B
ND
MW-19*
0.56
1.5
1.4
MW-14B
1.9
MW-10B
ND
MW-18*
ND
ND
ND
MW-9
NS
MW-9B
0.52
MW-17*
6.4
10
13
MW-16
3.3
MW-12B
3.2
MW-15B
13
MW-13B
ND
MW-21*
0.69
0.50
NS
0.58
0.55
0.62
MW-11C
1.1
MW-11B
5.6
MW-11
NS
ERT-1
32
MW-5R
2.7
ERT-2
9.2
ERT-3
12
MW-5B
35
MW-7B
NS
MW-4
50
MW-6B
ND
MW-7R
11
ERT-4
80
MW-1B
ND
High Falls
Water Tank
CATSKILL
GRADE
CREEK
ROAD
CANAL
Aqueduct Siphon House
SCHOOL
HILL
ROAD
High Falls Cem
BERME
5
10
0
0.125
0.25
0.5
Miles
N
Monitoring Well
Extraction Well
1,1-DCA Concentration Contour
Water District Boundary
NOTES:
-Features placed utilizing aerial photography, historical documents, and field notes. Horizontal accuracy is approximate.
-Isocontour intervals = 10 feet
-AMSL = Above Mean Sea Level; NM = Not Measured
=Asterick (*) Indicated multiple sampling.
-For Artesian (A) wells, top of casing is reported
-Coordinate System = NAD83 UTM Zone 18N.
US ARMY CORPS OF ENGINEERS
KANSAS CITY DISTRICT
AECOM
MOHONK ROAD INDUSTRIAL PLANT
ULSTER COUNTY, NEW YORK
FIGURE: 7
1,1-DCA ISOCONCENTRATION MAP
NOVEMBER 2013
DESIGNED BY:
CHECKED BY: DFM
DRAWN BY: KEW
REVISED BY:
DATE: FEBRUARY 2014



NOTES:
-Features placed utilizing aerial photography, historical documents, and field notes. Horizontal accuracy is approximate.
-Isocontour intervals = 10 feet
-AMSL = Above Mean Sea Level; NM = Not Measured
=Asterick (*) Indicated multiple sampling ports.
-For Artesian (A) wells, top of casing is reported
-Coordinate System = NAD83 UTM Zone 18N.

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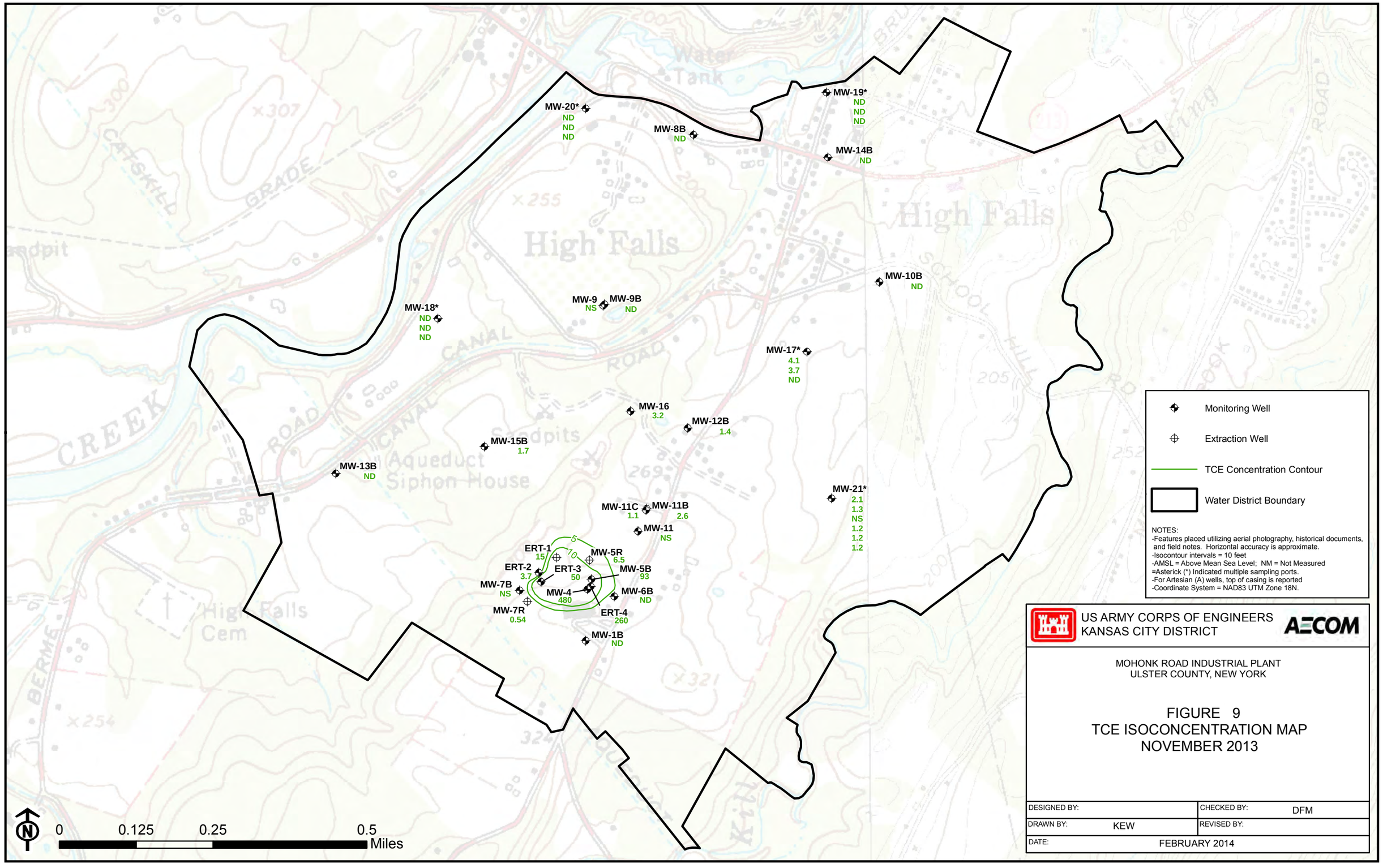
KANSAS CITY DISTRICT

AECOM

MOHONK ROAD INDUSTRIAL PLANT
ULSTER COUNTY, NEW YORK

FIGURE 8
1,1-DCE ISOCONCENTRATION MAP
NOVEMBER 2013

DESIGNED BY:		CHECKED BY:	DFM
DRAWN BY:	KEW	REVISED BY:	
DATE:	FEBRUARY 2014		



NOTES:
-Features placed utilizing aerial photography, historical documents, and field notes. Horizontal accuracy is approximate.
-Isocontour intervals = 10 feet
-AMSL = Above Mean Sea Level; NM = Not Measured
=Asterick (*) Indicated multiple sampling ports.
-For Artesian (A) wells, top of casing is reported
-Coordinate System = NAD83 UTM Zone 18N.

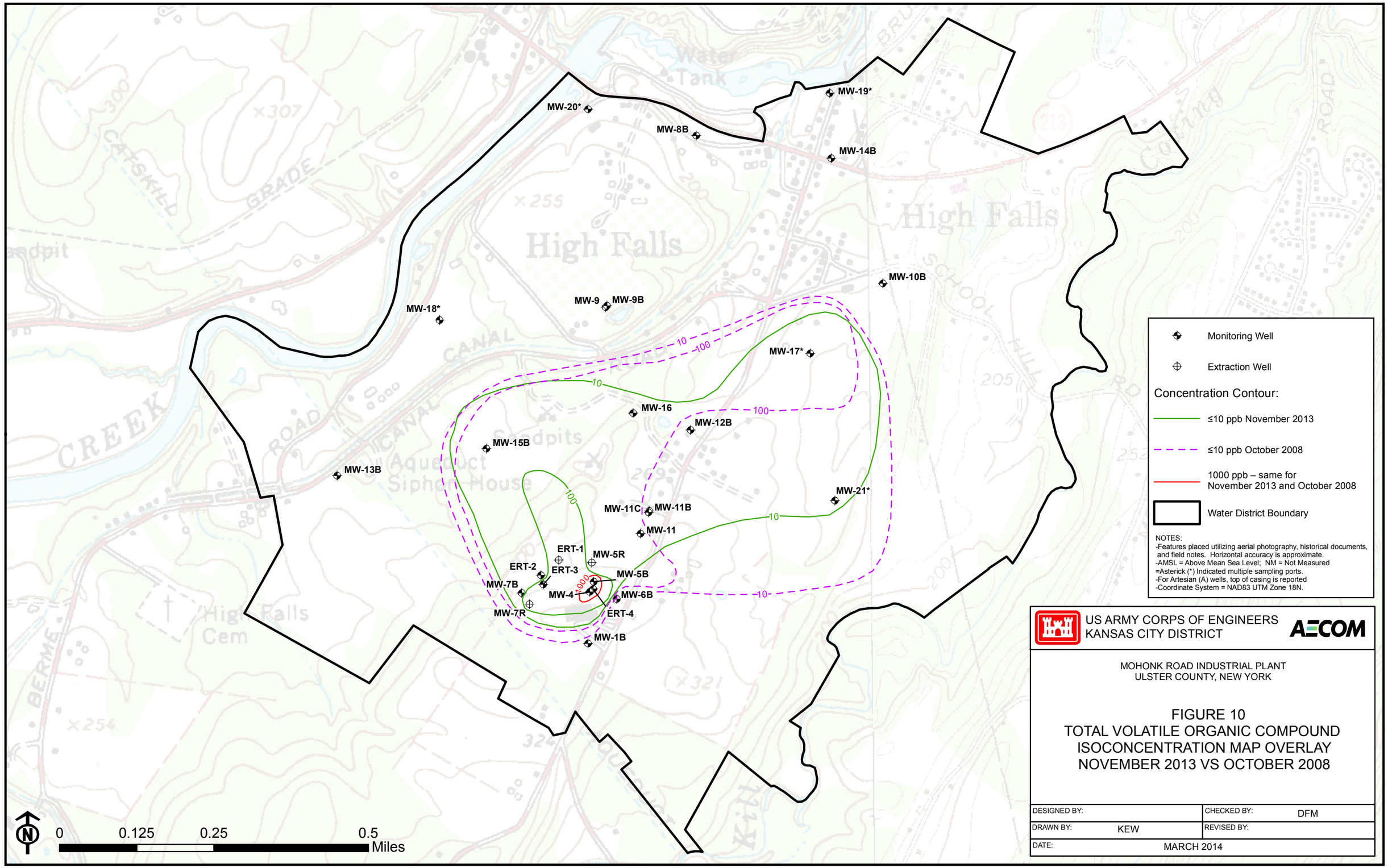
US ARMY CORPS OF ENGINEERS
KANSAS CITY DISTRICT

AECOM

MOHONK ROAD INDUSTRIAL PLANT
ULSTER COUNTY, NEW YORK

FIGURE 9
TCE ISOCONCENTRATION MAP
NOVEMBER 2013

DESIGNED BY:		CHECKED BY:	DFM
DRAWN BY:	KEW	REVISED BY:	
DATE:	FEBRUARY 2014		


MW-20*
MW-8B
MW-19*
MW-14B
MW-10B
MW-9
MW-9B
MW-18*
MW-17*
MW-16
MW-12B
MW-15B
MW-13B
MW-21*
MW-11C
MW-11B
MW-11
ERT-1
MW-5R
ERT-2
ERT-3
MW-5B
MW-7B
MW-4
MW-6B
MW-7R
ERT-4
MW-1B
10
100
1000
High Falls
Monitoring Well
Extraction Well
Concentration Contour:
≤10 ppb November 2013
≤10 ppb October 2008
1000 ppb – same for November 2013 and October 2008
Water District Boundary
NOTES:
-Features placed utilizing aerial photography, historical documents, and field notes. Horizontal accuracy is approximate.
-AMSL = Above Mean Sea Level; NM = Not Measured
=Asterick (*) Indicated multiple sampling ports.
-For Artesian (A) wells, top of casing is reported
-Coordinate System = NAD83 UTM Zone 18N.
US ARMY CORPS OF ENGINEERS
KANSAS CITY DISTRICT
AECOM
MOHONK ROAD INDUSTRIAL PLANT
ULSTER COUNTY, NEW YORK
FIGURE 10
TOTAL VOLATILE ORGANIC COMPOUND
ISOCONCENTRATION MAP OVERLAY
NOVEMBER 2013 VS OCTOBER 2008
DESIGNED BY:
CHECKED BY: DFM
DRAWN BY: KEW
REVISED BY:
DATE: MARCH 2014
N
0
0.125
0.25
0.5
Miles