Hoffman, Carl (DEC)

From: Duda, Damian <Duda.Damian@epa.gov>
Sent: Friday, May 05, 2017 10:21 AM
To: Hoffman, Carl (DEC)
Subject: Katonah Municipal Well Five Year Review
Attachments: KMW 2017 FYR.pdf

Hi, Carl. The fifth KMW Five-Year Review (FYR) has been completed (attached). The installation of the new monitoring wells and the regular monitoring groundwater program in place has put this site back on track. The conclusions are pretty straightforward.

As indicated in the FYR, EPA will eventually be pursuing a modification to the original selected remedy, since the Town of Bedford expects to use this well only for sampling as part of the groundwater monitoring program. Its days as a public water supply source have come to an end.

Once we receive some additional rounds of groundwater data, we expect to begin our ROD modification process (expected to be a ROD Amendment). I will apprise you when we begin the process.

Thanks.

Damian J. Duda
EPA Superfund – Region 2 – NY
Project Manager – NY Branch
212-637-4269

FIFTH FIVE-YEAR REVIEW REPORT
KATONAH MUNICIPAL WELL SUPERFUND SITE
VILLAGE OF KATONAH, TOWN OF BEDFORD
WESTCHESTER COUNTY, NEW YORK

Prepared by

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

John Prince, Acting Director
Emergency and Remedial Response Division

May 1, 2017

Date

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LIST OF ABBREVIATIONS

AOC	Administrative Order on Consent
CD	Consent Decree
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
EPA	United States Environmental Protection Agency
FYR	Five-Year Review
gpm	Gallons per minute
KMW	Katonah Municipal Well
MCL	Maximum contaminant level
µg/l	Micrograms per liter
NPL	National Priorities List
NYC	City of New York
NYSDEC	New York State Department of Environmental Conservation
NYSDOH	New York State Department of Health
O&M	Operations and Maintenance
PCE	Tetrachloroethene
PRP	Potentially Responsible Party
ROD	Record of Decision
RI/FS	Remedial Investigation/Feasibility Study
RPM	Remedial Project Manager
TCE	Trichloroethene
UAO	Unilateral Administrative Order
VI	Vapor intrusion
VOC	Volatile organic compound
WCDOH	Westchester County Department of Health

I. INTRODUCTION

This is the fifth five-year review (FYR) for the Katonah Municipal Well site (KMW site), located in the Village of Katonah, Town of Bedford (Town), Westchester County, New York. The selected remedy for the KMW site, which was set forth in a Record of Decision (ROD) issued on September 25, 1987, by the Environmental Protection Agency (EPA), called for the construction of a new 370 gallons per minute (gpm) public water supply production well, fitted with an air stripper to ensure a potable water supply and for controlling contaminant migration through the pumping of the production well. Aquifer restoration to federal and/or state maximum contaminant levels (MCLs) is a secondary goal which may be achieved through the ongoing operation of the system.

This review was conducted by Damian Duda, the U.S. EPA Region 2 Remedial Project Manager (RPM) for the KMW 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 it functions as intended by the KMW site ROD. This FYR report will become part of the KMW site file.

This is a policy FYR for the KMW site; because, even though, upon completion, hazardous substances, pollutants or contaminants will not remain at the KMW site above levels that allow for unlimited use and unrestricted exposure, the remedy will take more than five years to complete. This review covers the period from September 2012 until March 2017. The trigger date for conducting this FYR is the date of the last FYR.

The project lead for the KMW site are the potentially responsible parties (PRPs) with oversight by EPA Region 2. The FYRs are being conducted by EPA.

Site Background

- The KMW site is located in the Village of Katonah in the Town of Bedford, Westchester County, New York on land owned by the City of New York (NYC). The KMW site is situated in the eastern part of the Village, on a narrow peninsula extending eastward into the Muscoot Reservoir, which supplies drinking water to NYC as part of the Croton Reservoir System.

- The peninsula rises approximately 10 feet above the normal level of the reservoir. The direction of the groundwater flow in the unconfined glacial stratified drift aquifer in which the KMW is screened is generally east-northeast and discharges into the Muscoot Reservoir.

- The Village of Katonah is the residential community located near the KMW site and is moderately populated

- The KMW was a part of the Bedford Water and Storage Distribution District and was designed in the early part of the 20th century as an infiltration gallery, drawing water primarily from the reservoir, with some contribution from the aquifer underlying the Village. The former production well operated at an average pumping rate of 240 gpm before it was shut down in 1978. It had provided over sixty percent of the water supply for 6,200 people in the Village of Katonah and Village of Bedford Hills.

- During the Fall of 1978, the Westchester County Department of Health (WCDOH) sampled the water quality of several Westchester municipalities. This action followed the discovery of volatile organic compound (VOC) contamination of the well supplying drinking water to the Village of Brewster, New York. In 1978, the two initial rounds of groundwater sampling at the original KMW showed tetrachloroethene (PCE) concentrations of 75 and 90 micrograms per liter (µg/L). At the time, the New York State Department of Health (NYSDOH) guidelines required a limit of 50 µg/L for any single VOC.

- Historically, there were reports that PCE was used for cleaning mechanical equipment and parts and was subsequently disposed of in the original pump house floor drain. Soil collected from a sump inside the pump house adjacent to the original KMW showed contaminants of concern. In addition, the area surrounding the well and pump house had been historically used for the disposal of street cleaning debris. There were also some dry cleaning establishments in the Village of Katonah which were cited as potential upgradient sources of VOC contamination from septic tank discharges.

- The KMW site was referred to the New York State Department of Environmental Conservation (NYSDEC) for a preliminary assessment and site investigation.

- Subsequently, EPA and the NYSDEC entered into an agreement to establish EPA as the project lead for the KMW site in order to proceed into the remedial investigation and feasibility study (RI/FS) phase. **Table 1** provides a chronology of some key events for the KMW site.

FIVE-YEAR REVIEW SUMMARY FORM

SITE IDENTIFICATION		
Site Name: Katonah Municipal Well		
EPA ID: NYD980780795		
Region: 2	**State:** NY	**City/County:** Bedford/Westchester
SITE STATUS		
NPL Status: Deleted		
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:** Click here to enter text.		
Author name (Federal or State Project Manager): Damian Duda		
Author affiliation: EPA		
Review period: 09/25/2012 – 03/31/2017		
Date of site inspection: 12/07/2016		
Type of review: Policy		
Review number: 5		
Triggering action date: 09/25/2012		
Due date *(five years after triggering action date)*: 09/25/2017		

II. RESPONSE ACTION SUMMARY

Initial Response

In December 1978, the former KMW production well was taken out of service. At that time, the Town temporarily interconnected with the Bedford Correctional Facility Water System to restore the water supply to 6200 people dependent on the former production well.

In 1978, a source control effort was implemented at the KMW site by the WCDOH. The identified dry cleaners were required to pump out their septic systems and modify their disposal techniques for waste solvents. Additional source control measures were implemented by the Town through the promulgation of stringent aquifer protection ordinances that would regulate waste discharges to town aquifers.

The KMW site was proposed for inclusion on the National Priorities List (NPL) on October 1, 1984 and was listed on the NPL on June 1, 1986.

Basis for Taking Action

From June 1985 until July 1987, CDM, Inc. and CDM Federal Programs Corporation (CDM Federal), under contract to EPA, conducted a remedial investigation and feasibility study (RI/FS) at the KMW site.

The purpose of the RI/FS was to determine the nature and extent of contamination at the KMW site; to determine what threat the KMW site posed to public health and the environment; and, to evaluate remedial alternatives. The RI showed that, when the original KMW was pumping, groundwater flow from the peninsula area was intercepted by the well so that contamination did not discharge into the Muscoot Reservoir. The RI/FS indicated that PCE was the primary contaminant of concern and that the PCE present in the aquifer was characterized as residual contamination. The RI determined that there were no active sources releasing PCE into the aquifer and that there were no concerns regarding contamination of surface water or wetlands. The human health risk assessment concluded that based upon the results of the endangerment assessment contained in the RI report, ingestion of contaminated groundwater posed the greatest human health risk at the KMW site. The 1987 ROD indicated that there were no adverse ecological impacts due to site-related contaminants and that it was highly improbable that contaminated groundwater would discharge to either the Muscoot Reservoir or the Katonah Brook.

Response Actions

EPA issued its Record of Decision (ROD) for the KMW site on September 25, 1987. The selected remedial action (RA) consisted of: 1) constructing a new 370 gpm production well, fitted with an air stripper and a disinfection unit; 2) controlling contaminant migration through pumping of the production well and treatment of the extracted groundwater; 3) filling and sealing the former production well to prevent the further migration of contaminants into the aquifer; 4) monitoring treated water to detect the presence of identified contaminants; and, 5) conducting general cleanup of the peninsula area to remove construction debris.

Status of Implementation

The PRPs are the Town, the three identified dry-cleaning establishments and the KMW property owner. NYC owns the KMW property; the Town owns the KMW and its appurtenances. The dry cleaners had previously revamped their waste disposal practices by no longer discharging into their septic facilities. On June 17, 1988, EPA issued an Administrative Order on Consent (AOC)

for the remedial design (RD) to the Town. The remaining PRPs declined to sign the AOC. On September 9, 1988, EPA issued a Unilateral Administrative Order (UAO) to the non-consenting PRPs to assist the Town in the completion of the RD. The RD was completed in March 1990. The non-consenting PRPs did not comply with this UAO and later reimbursed their share of the response costs in a separate Consent Decree entered on March 18, 1993.

In August 1991, the construction of the new well was completed, and the old well was backfilled to grade with native material. In February 1992, the air stripper was installed on the new KMW. In April 1992, the remaining RA work was completed: 1) the pump house was constructed; 2) all instrumentation and control panels were installed; and 3) general cleanup activities of construction debris on the peninsula were completed. In a letter dated May 26, 1992, James J. Hahn Engineering (Hahn Engineering), the Town's contractor, provided certification that the construction was substantially complete and complied with the approved plans and specifications.

On July 7, 1992, the EPA issued a Preliminary Close-Out Report indicating that construction completion had been attained. On March 31, 1993, EPA approved the RA Report signifying that the system was operational and functional. In March 2000, the KMW site was deleted from the NPL.

During 2012-2013, subsequent to EPA's fourth FYR, the Town implemented its decision to connect to an alternate water supply source, *i.e.*, the NYC Delaware Aqueduct system, as the primary source of its public water supply. The Town determined that the aquifer from which the KMW was drawing groundwater showed an increase in additional contaminants of nitrates, manganese and chlorides in the raw water so it would be no longer viable as a source of public water. The Town built the Consolidated Water District Filtration Plant to treat the NYC water supply. In June 2013, the Town began distribution of the NYC drinking water to the various communities. Since that time, the KMW has not been operational as a source of public water and, since it has not been pumping, it is no longer a mechanism to prevent further migration of contaminants into the aquifer. The KMW continues to be sampled as part of the groundwater sampling program, as well as the four new monitoring wells which were installed from October through December 2014.

Institutional Controls (ICs) Summary

The 1987 ROD and the 1988 Consent Decree did not call for the placement of institutional controls. EPA Region 2 believes that the actions identified in the ROD were adequate to address the current groundwater use, as well as the reasonably anticipated future groundwater use. In addition, there are extra layers of protection provided by local government agencies. NYC owns the KMW site property and has a comprehensive Long-Term Watershed Protection Program in place to protect its water supply reservoirs and distribution systems. The Town owns the KMW. Lastly, any well drilling in the area is governed by the Westchester County Sanitary Code: Article VII, Water Supplies, Section 873.700, which states that "any new well construction must be permitted."

Operation, Maintenance and Monitoring

Currently, the KMW is no longer a part of the Bedford Water and Storage Distribution District. As previously discussed, the Town maintains the KMW and performs the ongoing groundwater sampling program. The KMW is only pumped when being sampled. Currently, the Town's contractor, The Chazen Companies, samples the groundwater from the KMW and the four new monitoring wells on a biannual basis (quarterly sampling is no longer required). The groundwater sampling was performed mostly quarterly from December 2014 through September 2016. All sampling is conducted in accordance with an EPA-approved Quality Assurance Project Plan (QAPP).

There have been no changes at the KMW Site as the result of natural disasters or climate change impacts.

III. PROGRESS SINCE LAST FIVE-YEAR REVIEW

The fourth FYR, completed in September 2012, concluded that the selected remedy at the KMW site was implemented, in accordance with the requirements of the ROD, and was determined to be short-term protective of human health and the environment, as presented below.

TABLE A

Protectiveness Determinations/Statements from the 2012 FYR

Protectiveness Statement		
Operable Unit: 01	*Protectiveness Determination:* Short-term Protective	*Addendum Due Date (if applicable):* Click here to enter date.
Protectiveness Statement: The remedy currently protects human health and the environment because the KMW distribution water meets current drinking water standards; monitoring well data show no exceedances of drinking water standards; local residents are connected to the municipal water supply and are not exposed to the groundwater contaminants; and, local ordinance requires that all residences in the vicinity connect to the municipal water supply system. However, in order for the remedy to be protective in the long-term, a more comprehensive monitoring well network, including the installation of new monitoring wells, should be developed to delineate the PCE plume further and confirm that the plume continues to be contained while being remediated.		

Sitewide Protectiveness Statement (if applicable)	
For sites that have achieved construction completion, enter a sitewide protectiveness determination and statement.	
Protectiveness Determination: Short-term Protective	*Addendum Due Date (if applicable):* Click here to enter date.
Protectiveness Statement: The remedy currently protects human health and the environment because the KMW distribution water meets current drinking water standards; monitoring well data show no exceedances of drinking water standards; local residents are connected to the municipal water supply and are not exposed to the groundwater contaminants; and, local ordinance requires that all residences in the vicinity connect to the municipal water supply system. However, in order for the remedy to be protective in the long-term, a more comprehensive monitoring well network, including the installation of new monitoring wells, should be developed to delineate the PCE plume further and confirm that the plume continues to be contained while being remediated.	

Although the fourth FYR determined that the remedy was functioning as intended, it did include several recommendations, as discussed in **Table B** below.

TABLE B
Issues, Recommendations and Follow-Up Actions

Issue	Fourth FYR Recommendations and Follow-Up Actions	Current Status	Current Implementation Status Description	Completion Date
Current network of monitoring wells is incomplete and does not provide an accurate assessment of the current PCE plume.	Use existing wells and install new wells, both upgradient and downgradient of the KMW, to develop a mapped monitoring well network to delineate PCE plume more accurately and to confirm that the plume continues to be contained while being remediated. Ensure monitoring well network is filed with NYSDEC identification numbers.	Completed	The former monitoring wells were formally abandoned. Four new monitoring wells (MW-11R, MW-1S, MW-2S and MW4R) were installed during October – December 2014 to delineate the PCE plume more directly. The KMW is not operating; however, the latest data indicate that the plume is not expanding.	December 2014

As discussed previously, during the 2102 – 2013 timeframe, the town decided to connect to an alternate water supply source, *i.e.*, the NYC Delaware Aqueduct system, as the primary source of its public water supply. The KMW is no longer a source of drinking water, and pumping, for that purpose, was terminated in 2013. The remedy is now limited to biannual groundwater sampling to evaluate natural attenuation of the plume.

IV. FIVE-YEAR REVIEW PROCESS

Community Notification and Involvement and Site Interviews

EPA published a notice in February 2016 on the KMW Superfund Site webpage [www.epa.gov/superfund/katonah-well], announcing to the community that the FYR process had begun. The notice indicated that EPA would be conducting a FYR of the remedy for the KMW site to ensure that the implemented remedy remains protective of human health and the environment. The notice also indicated that once the FYR was completed, the results would be made available at the KMW Superfund Site webpage. The notice included the RPM's contact information for questions related to the FYR process or the KMW site.

In addition to this notification, on November 14, 2016, EPA Region 2 posted a notice on its website indicating that it would be reviewing site cleanups and remedies at 38 Superfund sites in New York and New Jersey, including the KWW site. The announcement can be found at the following web address: https://www.epa.gov/sites/production/files/2016-11/documents/five_year_reviews_fy2017_final.pdf.

No interviews were conducted as part of this FYR. No comments have been received from the public or from any stakeholders during this review.

Data Review

During October-November 2014, four new soil borings were advanced and sampled, as outlined in the 2014 Supplemental Site Investigation Work Plan. These were completed as new groundwater monitoring wells (MW-4R, MW-11R, MW-1S and MW-2S) (see Figure 1). Soil samples from the deeper zone of the 4R location had low (<0.01 milligrams per kilograms (mg/kg) levels of PCE, and no PCE was detected in the 11R, 1S and 2S borings. MW-1S and MW-11R are screened in the same interval of the aquifer as the KMW, and MW-4R and MW-2S are screened approximately 12 feet below the KMW.

During the 2014-2016 period, groundwater elevation measurements show that the KMW site water table is very close to flat when the KMW is not pumping.

All of the KMW site wells were sampled for VOCs five times during this FYR period: once in 2014, three times in 2015 and once in 2016 **(Table 3A)**. For comparison of the KMW sampling results, PCE values from the previous FYR period are shown in **Table 3B**. The federal Safe Drinking Water Act maximum contaminant level (MCL) for PCE is 5 µg/L. PCE concentration in the KMW ranged from 3.8 to 5.7 µg/L during this FYR period. MW-4R exceeded the MCL for PCE in every event except for June 2015. In June 2015, the KMW was pumped and sampled before the monitoring wells. This resulted in a reduced PCE concentration in MW-4R as compared to earlier events. The other three monitoring wells have consistently had PCE concentrations less than 1 µg/L. TCE is consistently less than 1 µg/L and below the detection limit and the federal and state MCL of 5 µg/L in all monitoring wells. Other VOCs were detected, including 1,2,4-trichlorobenzene, chloroform and toluene; all were found to be below federal and state MCLs.

In March 2015, the groundwater geochemistry was evaluated using the Technical Protocol for Evaluating Natural Attenuation of Chlorinated Solvents in Ground Water (EPA, 1998). Two of the monitoring wells scored "Inadequate evidence for anaerobic biodegradation of chlorinated organics". The KMW and the other two monitoring wells scored "Limited evidence for anaerobic biodegradation of chlorinated organics". These samples also showed no significant concentrations of breakdown products of PCE. Based on the results of this evaluation, anaerobic biodegradation of PCE is not an active process at the KMW site. However, based on the historic decreasing trends, concentrations of PCE are expected to continue to decline.

Site Inspection

A KMW site visit and inspection was conducted on Wednesday, December 7, 2016. Specifically, the KMW and its pump house were inspected. Also, a walk-through inspection was completed in the area immediately surrounding the KMW site, specifically performing a reconnaissance of the new monitoring wells in the vicinity of the KMW pump house. The newly installed monitoring wells, MW-1S, MW-2S, MW4R and MW-11R, which are part of the operation and maintenance (O&M) groundwater sampling plan, were located, inspected and determined to be functional.

The KMW Site inspection was attended by Damian Duda, Kathryn Flynn, Ursula Filipowicz, Chuck Nace and Sharon Kivowitz from EPA, Jim Hahn (Hahn Engineering), Kevin McGrath (The Chazen Companies), Bill Nickson and Kevin Winn from the Town, Carl Hoffman from NYSDEC and Steve Karpinski from NYSDOH.

V. TECHNICAL ASSESSMENT

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

The selected remedy identified in the 1987 ROD consisted of the installation of a municipal water supply well with an air stripper treatment system to treat PCE groundwater contamination. The remedy of extraction and treatment of PCE-contaminated groundwater was originally designed to provide the Town with a reliable public water supply, to prevent contaminant migration and discharge to the Muscoot Reservoir and to provide aquifer restoration and containment.

Prior to the last FYR, the Town noticed a marked increase in concentrations of nitrates, manganese and chlorides in the raw water of the KMW which, in addition to the PCE, posed an additional threat to the quality of the drinking water. These contaminants are not considered site-related and are presumably being introduced to the groundwater because of the area's increase in population and thus the increase in the use of septic systems in the area. This additional contamination further supported the Town's decision to connect to a new water supply source and cease the use of the KMW as a water supply source.

During this current FYR period, the Town permanently connected to a new water supply source, *i.e.*, the NYC Delaware Aqueduct system. Also, during this FYR period, the Town implemented EPA's recommendations from the last FYR. These included the installation of four new

monitoring wells and the development of a more comprehensive groundwater monitoring program using these wells and the KMW. EPA now has a much better understanding of the groundwater contamination and water level scenarios in the area of the KMW.

Since the installation of the new monitoring wells, the data have shown that PCE concentrations in the groundwater plume have been substantially reduced, both in the KMW and the four monitoring wells (see **Tables 3A** and **3B** (KMW only)).

The groundwater monitoring that has been conducted over the past five years indicates that there is still some residual PCE in the groundwater in the vicinity of the KMW; however, the data show a substantial reduction in PCE-concentrations during the current FYR period. The most recent data from 2016 shows only one well (MW-4R) with PCE concentration above the MCL, and the plume is stable. Groundwater will continue to be monitored until the PCE cleanup level has been met.

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?

Human Health

Land use assumptions, exposure assumptions and pathways and clean up levels considered in the 1987 ROD followed risk assessment guidance used by the Agency at the time, and they remain valid. Although specific parameters may have changed since the time the risk assessment was completed, the general process used remains valid.

Based on the conclusions of the risk assessment conducted as part of the RI, EPA determined that ingestion of groundwater contaminated with PCE posed the greatest risk to human health at the KMW site. A promulgated MCL for PCE did not exist at the time the ROD was signed so it selected a target treatment level for PCE as less than 1 µg/L or non-detect for water distributed from the KMW. As discussed above, the current promulgated MCL for PCE is 5 µg/L. As such, even though the current MCL for PCE is higher than the cleanup level established in the ROD, the current MCL remains protective of human health.

Currently, and for the foreseeable future, exposure to contaminated groundwater at the KMW site remains an incomplete exposure pathway since residents in the vicinity of the KMW site are connected to the Town's municipal water supply which is no longer drawing water from the KMW. Furthermore, local ordinance requires that all residences in the vicinity tie into the municipal water supply system.

An exposure pathway not evaluated at the time of the ROD was the potential for vapor intrusion (VI) into indoor air. This pathway was evaluated during the prior FYRs and deemed to be insignificant or not complete. As part of this review, the maximum detected groundwater concentration of PCE (11 µg/L found in MW-4R in March of 2015) was compared to the chemical-specific target groundwater screening values for PCE. The screening values provide groundwater levels associated with an indoor air concentration that represents a cancer risk ranging from 1×10^{-4} and 1×10^{-6} or a noncancer hazard quotient equal to 1. Concentrations

higher than these screening values indicate the potential for vapor intrusion. The maximum PCE concentration detected in groundwater did not exceed the cancer or noncancer based VI screening value. Consistent with past conclusions, the VI pathway is not a concern at the KMW site.

Ecological

The 1987 ROD indicated that there were no adverse ecological impacts due to site-related contaminants and that it was highly improbable that contaminated groundwater would discharge to either Muscoot Reservoir or Katonah Brook. The previous FYRs indicated that the supply well draws water from the nearby reservoir, which draws contaminated groundwater away from surface water bodies limiting the potential for discharge to surface water, resulting in no exposures to ecological receptors. During the last FYR, EPA assessed the potential impacts of the cessation of pumping at the KMW supply well which could lead to contaminated groundwater could be discharging to the reservoir. The review examined if there would be the potential for adverse effects to aquatic organisms from groundwater discharge to the reservoir by comparing the concentration of PCE in the groundwater to freshwater aquatic criterion for PCE (45 µg/L). The groundwater concentrations were below the criterion, and it was concluded that, even if there were discharge to the surface water, there would be no adverse impacts to ecological receptors. A similar comparison was evaluated for this FYR. The current concentrations of PCE (maximum value 11 µ/L) in the groundwater are less than the freshwater aquatic criterion; therefore, even if the groundwater is discharging to the reservoir, there should be no adverse effects to aquatic receptors in the reservoir. The cleanup values and remedial objectives, as they pertain to ecological risk, are still valid.

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

No.

VI. ISSUES, RECOMMENDATIONS AND OTHER FINDINGS

Issues/Recommendations
OU(s) without Issues/Recommendations Identified in the Five-Year Review:
OU1

VII. PROTECTIVENESS STATEMENT

Protectiveness Statement(s)	
Operable Unit: OU1	*Protectiveness Determination:* Protective
Protectiveness Statement: The remedy implemented at the KMW site is protective of human health and the environment.	

Sitewide Protectiveness Statement (if applicable)	
For sites that have achieved construction completion, enter a sitewide protectiveness determination and statement.	
Protectiveness Determination: Protective	*Addendum Due Date (if applicable):* Click here to enter date.
Protectiveness Statement: The remedy implemented at the KMW site is protective of human health and the environment.	

VIII. NEXT FIVE-YEAR REVIEW

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

APPENDIX A - TABLES

TABLE 1

Chronology of KMW Site Events

Event	Date
Volatile organic compounds (VOCs) detected in original Katonah Municipal Well (KMW) by Westchester County Department of Health (WCDOH)	1978
Original KMW taken out of service by WCDOH	1979
KMW site referred to New York State Department of Environmental Conservation (NYSDEC) for a Preliminary Assessment/Site Inspection (PA/SI)	1984
As a result of the PA/SI, KMW site placed on National Priorities List	1984
EPA performs Remedial Investigation/Feasibility Study at the KMW site	1985-1987
Record of Decision	1987
Administrative Order on Consent for Remedial Design	1988
Unilateral Administrative Order for Remedial Design	1988
Remedial Design completed	1990
Consent Decree issued for Remedial Action	1990
Construction of the new KMW and treatment appurtenances completed	1992
Preliminary Close-Out Report	1992
Remedial Action Report – new KMW operational and functional	1993
First Five-Year Review Report	1997
Close-Out Report	1999
NPL deletion	2000
Second Five-Year Review Report	2002
Third Five-Year Review Report	2007
Fourth Five-Year Review Report	2012
Installation of New Monitoring Wells	2014

TABLE 2

Documents Reviewed for the 2017 Five-Year Review

Remedial Investigation Report, CDM., Federal Programs Corporation, Volumes I - III, July 15, 1987.
Draft Feasibility Study Report, CDM. Federal Programs Corporation, July 15, 1987.
Record of Decision, EPA, September 25, 1987.
Draft Project Operations Plan, Hahn Engineering, June 1988.
Administrative Order on Consent, EPA, Index Number II CERCLA-80209, June 10, 1988.
Administrative Order, EPA, September 9, 1988.
Revised Remedial Design Work Plan, Hahn Engineering, October 1988.
Consent Decree, EPA, July 7, 1989.
Project Management Plan and Remedial Design Report, Hahn Engineering, March 22, 1990.
Operations and Maintenance Manual, Hahn Engineering, June 1992.
Superfund Preliminary Site Close-Out Report, EPA, July 7, 1992.
Remedial Action Report, EPA, March 31, 1993.
Five-Year Review Reports, EPA, September 1997, September 2002, September 2007 and September 2012.
Quarterly/Annual Water Quality Monitoring Reports, Environmental Planning Management, Inc., June 2007 through December 2011.
Supplemental Site Investigation Work Plan, Environmental, Planning & Management, Inc. (EPM), June 2014
Five Quarterly Groundwater Monitoring Reports, The Chazen Companies, December 2014 through September 2016.

TABLE 3A

PCE Concentrations (in µg/L)
Katonah Municipal Well and Four Monitoring Wells
[December 2014 through September 2016]

Date	MW-11R	MW-1S	KMW	MW-4R	MW-2S
4-Dec-14	0.53	0.55	4.4	9.3	<0.2
10-Mar-15	0.74	0.71	5.7	11	<0.2
5-Jun-15	0.65*	0.55*	4.1	0.23*	<0.2*
10-Sep-15	<2.5	<2.5	5	7.2	<2.5
21-Sep-16	0.83E	0.56E	3.8E	5.7E	<0.2

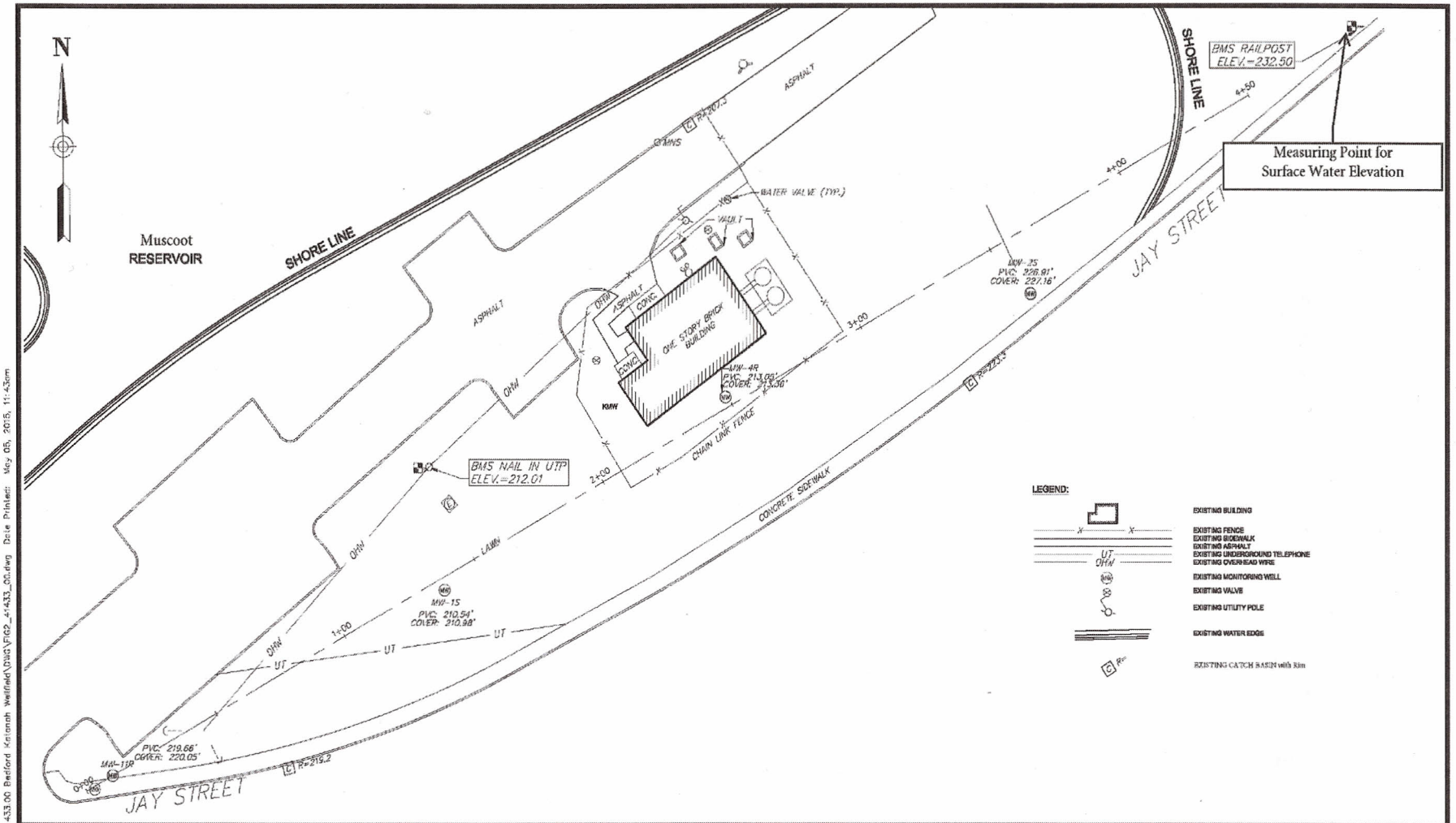
*June 2015 results from monitoring wells are anomalous because the wells were sampled after the KMW was sampled. [According to the QAPP, the KMW should be the last well sampled.]
"E" = Result estimated due to behavior during initial calibration verification.

TABLE 3B

PCE Concentrations (in µg/L)
Katonah Municipal Well
June 2007 through December 2011

Date	Influent (µg/L)
June 2007	25.9
October 2007	40.4
December 2007	26
March 2008	16
June 2008	23
September 2008	15.3
December 2008	34.1
November 2009	23
December 2010	29.3
December 2011	22.2

APPENDIX B - FIGURE



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Phone: (518) 273-0055

North Country Office:
375 Bay Road
Queensbury, New York 12804
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BEDFORD KATONAH WELLFIELD

SITE LAYOUT

BEDFORD HILLS, NY 10607

designed CJB	checked
date 2/13/15	scale 1" = 30'
project no. 41433.00	
sheet no. FIG 1	

Drawing Name: X:\41400-41499\41433.00 Bedford Katonah Wellfield\Dwg\FIG2_41433_00.dwg Date Printed: May 05, 2015, 11:43am