FOURTH FIVE-YEAR REVIEW REPORT FOR ENDICOTT VILLAGE WELL FIELD SUPERFUND SITE BROOME COUNTY, NEW YORK

Prepared by

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Date 7/22/16

393233

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LIST OF ABBREVIATIONS & ACRONYMS

ARAR	Applicable or Relevant and Appropriate Requirement
CD	Consent Decree
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
COCs	Contaminants of Concern
DCE	1, 2-Dichloroethene
EPA	United States Environmental Protection Agency
ESD	Explanation of Significant Differences
FYR	Five-Year Review
ICs	Institutional Controls
MCLs	Maximum Contaminant Levels
NCP	National Oil and Hazardous Substances Pollution Contingency Plan
NPL	National Priorities List
OM&M	Operation, Maintenance, and Monitoring
OU	Operable Unit
PRP	Potentially Responsible Party
RAO	Remedial Action Objective
RD/RA	Remedial Design/Remedial Action
ROD	Record of Decision
RPM	Remedial Project Manage
TCE	Trichloroethene
VOCs	Volatile Organic Compounds

I. INTRODUCTION

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

The U.S. Environmental Protection Agency (EPA) is preparing this five-year review pursuant to the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) Section 121, consistent with the National Oil and Hazardous Substances Contingency Plan (NCP)(40 Code of Federal Regulations (CFR) Section 300.430(f)(4)(ii)), and considering EPA policy.

This is the fourth FYR for the Endicott Village Well Field Superfund site. The triggering action for this statutory review is the completion date of the previous FYR. The FYR has been prepared due to the fact that hazardous substances, pollutants, or contaminants remain at the site above levels that allow for unlimited use and unrestricted exposure (UU/UE).

The site consists of three separate phases called operable units (OUs). OU1 the Village of Endicott Ranney public water supply well. OU2 focuses on the identification and remediation of the source of contamination to the groundwater (Endicott Landfill). OU3 addresses the remediation of the groundwater by a supplemental purge well (SPW) to expedite cleanup of the aquifer and to reduce the potential threat to the Ranney well, as necessary. OU1 has been completed. OU2 and OU3 are in the operation and maintenance phase and are the subject of this review.

The Endicott Village Well Field Superfund site five-year review was led by Sherrel Henry, EPA Remedial Project Manager (RPM). Participants included Peter Mannino (EPA Western New York Remediation Section Chief), Ed Modica (EPA Hydrogeologist), Marian Olsen (EPA Human Health Risk Assessor), Mindy Pensak (EPA Ecological Risk Assessor), and Larisa Romanowski (EPA Community Involvement Coordinator (CIC)). Payson Long, representative for the New York State Department of Environmental Conservation (NYSDEC) also assisted in the preparation of this report. The Potential Responsible Parties (PRPs) were notified of the initiation of the five-year review. The review began on 2/16/2016.

Site Background

The site is located on South Grippen Street at the western end of the Village of Endicott (the Village), New York (see Site Map, Appendix B). It consists of the Ranney well, which is a municipal drinking water supply well, and its zone of influence on area groundwater. The site is composed primarily of flat to gently rolling open land associated with the En-Joie Golf Course, facilities of the Village's Sewage Treatment Plant (STP), and the Endicott Landfill. A portion of the landfill adjacent to the Tri-Cities Airport extends into an approximately 8-acre area designated by the Federal Aviation Administration (FAA) as the Controlled Activity Area (CAA), which includes the Runway Object Free Area. A 6-acre parcel on the landfill near the entrance to the STP is currently permitted for use by the Village to compost yard waste;

approximately two acres of the composting area are paved. Private homes are not located within the site. These or similar uses are expected to continue well into the future.

The Endicott Landfill accepted municipal refuse and industrial waste from approximately the late 1950s until 1977. The Ranney well operated without major problems until May 1981, when during a routine inspection, EPA detected vinyl chloride and trace amounts of other volatile organic compounds (VOCs) in the Ranney well, which provides approximately 47 percent of the total water supply to the Villages Municipal system. Subsequent sampling by EPA and the New York State Department of Health confirmed EPA's initial findings and, as a result, four of the lateral supply lines to the well were closed and diffused air aeration equipment was installed to reduce the levels of VOCs.

FIVE-YEAR REVIEW SUMMARY FORM

SITE IDENTIFICATION		
Site Name: Endicott Well Field Superfund site		
EPA ID: NYD980780746		
Region: 2	**State:** NY	**City/County:** Endicott/Broome

SITE STATUS	
NPL Status: Final	
Multiple OUs? Yes	**Has the site achieved construction completion?** Yes

REVIEW STATUS
Lead agency: EPA ***[If "Other Federal Agency", enter Agency name]*:**
Author name (Federal or State Project Manager): Sherrel D. Henry
Author affiliation: EPA
Review period: 2/16/2016 - 7/15/2016
Date of site inspection: 5/4/2016
Type of review: Statutory
Review number: 4
Triggering action date: 9/29/2011
Due date *(five years after triggering action date)*: 9/29/2016

II. RESPONSE ACTION SUMMARY

Basis for Taking Action

After listing on the National Priorities List (NPL), in July 1987, contractors for NYSDEC, pursuant to a cooperative agreement with EPA, completed the OU1 Remedial Investigation and Feasibility Study (RI/FS) at the site that was intended to define the nature and extent of contamination and to identify the source(s) of contamination to the Ranney well. The RI indicated that the most probable source of contamination was the Endicott Landfill. However, additional data were required to evaluate further contaminant distribution and conclusively identify the source of contamination. Trichloroethene (TCE), 1,2-dichloroethene (DCE), vinyl chloride, and chloroethane were identified as the primary contaminants of concern (COCs) in groundwater exceeding Maximum Contaminant Levels (MCLs).

The results of the risk assessment conducted during the RI indicated that ingestion of contaminated groundwater at the site is the primary pathway of concern. The carcinogenic risk to adult residents from ingestion of contaminated groundwater is greater than EPA's acceptable risk range. The cancer risks were 1×10^{-3} for resident adults and 4×10^{-4} for children for the present and future use scenario. The Hazard Index (HI) for non-carcinogenic effects from ingestion of groundwater under a Reasonable Maximum Exposure to residents was 14 for the adult, 28 for the child, and 5 for future construction workers. The HI exceed the goal of protection of a HI = 1 established under the NCP. The excess cancer risk and non-cancer HI at the site are primarily due to vinyl chloride in groundwater and carcinogenic polynuclear aromatic hydrocarbon (PAHs), total polychlorinated biphenyls (PCBs), arsenic and beryllium in soil.

Ecological assessments of the adverse effects of the COCs on ecosystems was conducted during the RI using exposure and toxicity data to estimate the potential impact on the ecosystem. Surface water and sediment samples collected from the Susquehanna River, Nanticoke Creek, and Dead Creek showed no significant concentrations of VOCs. Therefore, it was determined that the site is not adversely impacting ecological receptors.

Response Actions

Based on the results of investigations conducted by NYSDEC, in July 1984, an existing purge well designed to pump approximately 600 gallons per minute (gpm) and three additional monitoring wells were installed on the En-Joie Golf Course to intercept and monitor groundwater contamination before it reached the Ranney well. Water from this purge well was pumped to the golf course pond system where it was aerated before it was ultimately discharged to Nanticoke Creek. In accordance with an Explanation of Significant Differences (ESD), operation of the existing purge well was discontinued on December 15, 1995.

The RI for OU1 did not determine the source(s) of the VOCs in the groundwater at the Ranney well. Therefore, in accordance with the 1987 Record of Decision (ROD), a supplemental RI/FS was initiated to investigate further the nature and extent of contamination in suspected source areas and to evaluate possible source control measures. On September 19, 1988, EPA, the

International Business Machines Corporation (IBM), the Village, and the Town of Union (the Town) signed an Administrative Order on Consent for performance of the supplemental RI/FS. The supplemental RI/FS activities were undertaken in two phases and were performed by IBM through its consultants, Lozier/Groundwater Associates, Inc.

The RI Report for the Phase I study was approved by EPA in November 1990. The results of Phase I indicated that additional remedial measures were needed to control the plume of contaminated groundwater emanating from the Endicott Landfill. Two Interim Remedial Measures (IRMs) were identified to protect public health and the environment. The appropriateness of these IRMs, which were designated as OU3, was evaluated under the nine remedy selection criteria of the NCP in a Technical Memorandum, dated January 1991.

Remedy Selection

OU1 ROD

The goal of the remedial action for the OU1 ROD, issued on March 31, 1987, was to provide a safe and reliable supply of drinking water to residents by requiring the installation of an air stripper at the Ranney well to prevent ingestion of contaminated groundwater. The major components of the selected remedy included the following:

- Constructing an air stripper at the Ranney well designed to treat the current use flow rate of approximately 3,700 gpm;
- Treatment of the contaminated Ranney well water to drinking water quality standards (i.e., MCLs) under the Safe Drinking Water Act;
- Continuing operation of the existing purge well system;
- Continuing the monitoring program designed to detect the presence of VOCs in the Ranney well water; and
- Performing a supplemental RI/FS to further investigate the nature and extent of contamination in suspected source areas, to evaluate possible source control measures for such areas, and to evaluate further the extent of aquifer contamination together with alternatives for aquifer restoration.

OU3 ROD

The goal of the interim remedial action for the OU3 ROD, issued on March 29, 1991, was to expedite the cleanup of the groundwater aquifer and to reduce the potential threat to the Ranney well. The major components of the selected remedy included the following:

- Upgrading the existing purge well system with the installation of a supplemental purge well (SPW);
- Implementing a SPW monitoring program;
- Continuing operation and maintenance of the existing purge well system; and
- Conducting an aquifer pump test to determine treatment requirements.

OU2 ROD

The following remedial action objectives were established for the OU2 ROD issued on September 30, 1992:

- Groundwater control to prevent migration of the VOC-contaminated plume;
- Remediation of contaminated groundwater emanating from the Endicott Landfill to drinkable levels;
- Landfill waste containment and control of associated landfill gas; and
- Control and treatment of the leachate seep to levels acceptable for proper disposal[1].

The major components of the selected remedy included the following:

- Capping the majority of the landfill surface with a low permeability barrier cap;
- Capping with bituminous (asphalt) the 6-acre parcel of the landfill where the Village has a permitted yard waste composting facility and the 8-acre CAA of the Tri-Cities Airport regulated by the FAA;
- Performing an explosive gas investigation and installing a passive gas-venting system;
- Collecting, treating, and disposing of the leachate seep;
- Recommending that institutional controls in the form of deed restrictions be established on future uses of the landfill;
- Implementing site access restrictions;
- Performing long-term operation and maintenance of the landfill cap, gas-venting, and leachate systems;
- Performing long-term air and water quality monitoring;
- Continuing operation and maintenance of the groundwater collection and treatment measures already selected for the site; and
- Continuing groundwater monitoring.

ESD

All three RODs selected the continued operation of the existing purge well as a component of the remedies. Once the OU3 ROD was implemented, an aquifer pump test was conducted. Based on the results of the aquifer pump test, the Village notified EPA that it believed that the SPW alone, without the existing purge well, could achieve containment and capture of contaminated groundwater.

Subsequently, EPA gave approval to the Village to perform a pilot study to evaluate if pumping of the existing purge well could be discontinued when the SPW was fully operational. Based on the results of the pilot study, EPA issued an ESD on December 11, 1995 which allowed for discontinuing the operation of the existing purge well. EPA gave permission to the Village to discontinue operation of the existing purge well on December 15, 1995.

[1] After installation of the cap, leachate seeps were no longer present at the site. Therefore, collection of leachate was not warranted.

Status of Implementation

OU1 Remedial Actions

In 1988, EPA concluded consent decree (CD) negotiations with the Town and the Village related to the performance of the remedial design (RD), remedial construction, operation, maintenance, and monitoring of the remedy selected in the OU1 ROD. On January 10, 1989, the CD was entered in United States District Court for the Northern District of New York.

The remedial action (RA) was formally initiated on December 10, 1989 when the Village awarded the RA contract. The remedy was implemented in a manner consistent with the 1987 ROD and in accordance with the plans and specifications of the remedial design. Construction of the air stripping unit at the Ranney well was completed by the Village in the fall of 1991 and the air stripper has been in continuous operation since that time.

In a letter dated September 26, 1996, the Village requested that EPA allow it to discontinue operation of the air stripper. After a review of all available data, EPA determined that water from the Ranney well was meeting MCLs prior to treatment. Therefore, EPA gave permission to discontinue operation of the air stripper with the understanding that the Village will maintain the air stripper so that it can be restarted immediately in the event that MCLs are exceeded in the future. However, as a precautionary measure, the air stripper is still being operated by the Village.

OU3 Remedial Actions

Pursuant to a second CD entered in United States District Court for the Northern District of New York on March 25, 1992, the Village, the Town, Endicott Johnson Corporation (EJ), IBM and George Industries, Inc., agreed to perform the OU3 Remedial Design/Remedial Action (RD/RA).

To determine if the water pumped from the SPW could be treated by the STP, a temporary SPW pumping system and a discharge pipeline were constructed. Pumping of the SPW, with discharge to the STP, was initiated in August 1993. The permanent hook-up to the STP was completed in June 1995. EPA and NYSDEC determined that the remedy was implemented in a manner consistent with the 1991 ROD and in accordance with the plans and specifications of the RD. Groundwater level monitoring demonstrates that the SPW system is achieving containment and capture of contaminated groundwater.

The SPW Monitoring Plan was approved by EPA in March 1993. The approved monitoring plan includes flow readings and sampling and analyses of effluent from the SPW along with water elevation measurements in 25 monitoring wells to document the capture zone of the SPW. The monitoring results indicate that the SPW is performing as designed.

OU2 Remedial Actions

Pursuant to a third CD entered in United States District Court for the Northern District of New York on January 18, 1994, EJ, the Village, the Town and IBM agreed to perform the OU2 RD/RA.

The implemented remedy consists of a landfill cover system, a gas venting system, a leachate seep collection system, long-term Operation and Maintenance (O&M) and institutional controls.

The purpose of the cover system is to reduce the vertical migration of water through the landfill, to minimize the potential for leaching of site contaminants into the groundwater. Two types of covers were constructed on the landfill, bituminous and soil. In July 1996 construction was completed for a bituminous cover on approximately 10 acres of the landfill which lie primarily in the FAA controlled Activities Area and beneath the Village's yard waste composting facility. In addition, in September 1996, construction of a low-permeability soil cover on approximately 62 acres of the landfill was completed with placement of the topsoil material. The soil cap was placed on the area which lies predominantly within 1,000 feet of the Susquehanna River. To address potential post-closure issues associated with the presence of landfill gases, including the possibility of migration, a passive gas collection and venting system was completed at the site on June 6, 1996. The gas collection system is comprised of a 12-inch layer of sand and gravel with a permeability of 1×10^{-3} cm/sec. The passive venting was installed beneath the barrier material and asphalt cap over the entire extent of the landfill. The purpose of the gas vent layer is to prevent the local buildup and migration of landfill gasses, by conveying them to a venting location.

Between April 18, 1996 and April 22, 1996, a groundwater/leachate interception trench measuring 100-feet long by 20- feet wide by 28- feet deep was installed five feet west of the leachate seep limit along the Susquehanna River bank. A 44-foot wide by 100-foot long, factory-seamed barrier of geomembrane was installed into the trench. However, once the cap was installed, no more leachate was being generated. Therefore, the operation of the leachate management portion of the remedy was never implemented.

The O&M plan, approved by EPA in August 1995, provides for long-term maintenance of the landfill cap and gas venting system.

Institutional Control Summary Table

Table 1: Summary of Planned and/or Implemented ICs

Media, engineered controls, and areas that do not support UU/UE based on current conditions	ICs Needed[2]	ICs Called for in the Decision Documents	Impacted Parcel(s)	IC Objective	Title of IC Instrument Implemented and Date (or planned)
Landfill	Yes	Yes	Endicott Landfill	Recommending that institutional controls in the form of deed restrictions be established on future uses of the landfill.	Environmental Easement/ Restrictive Covenants, planned for September 2017.
Groundwater	No	No	Groundwater between the Endicott Landfill and the Ranney Well	Restrict future groundwater use at the site	ICs in the form of existing state and local regulations will be relied upon to restrict future groundwater use at the site. Specifically, the New York State Department of Health (NYSDOH) State Sanitary Code regulates and prevent the installation of wells at a hazardous waste in the state.

Systems Operations/Operation & Maintenance)

Operation, maintenance, and monitoring (OM&M) activities are currently carried out by the Village on behalf of the PRPs in accordance with the O&M Plan. Pursuant to the three RODs, as amended by the ESD and as otherwise approved by EPA, the necessary O&M activities currently include:

- Quarterly groundwater quality monitoring at the SPW to determine if the levels of contamination are at or below MCLs;
- Sampling of effluent from the SPW;
- Groundwater elevation monitoring at 27 monitoring wells to determine if changes occur in the direction of groundwater flow;
- Inspection of the landfill to insure that no erosion damage has occurred; and

[2] The OU2 ROD recommended that the Village implement institutional controls in the form of deed restrictions on future uses of the landfill as discussed in the IC Implementation section on Page 14, below. EPA believes that measures more effective than deed restrictions are in place to control future uses of the landfill; nonetheless EPA has asked the Village to place an Environmental Easement on the property).

- Submittal of quarterly reports.

The OM&M program also includes routine inspections of the capped area and maintenance of the established vegetation cover within the capped area.

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

III. PROGRESS SINCE THE LAST REVIEW

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

Table 2: Protectiveness Determinations/Statements from the 2011 FYR

OU #	Protectiveness Determination	Protectiveness Statement
1	Protective	The implemented action for the drinking water supply protects human health and the environment.
2	Protective	The implemented actions for source control (landfill) protect human health and the environment.
3	Protective	The implemented action for groundwater containment protects human health and the environment.
Sitewide	Protective	The remedy for the site protects human health and the environment.

There were no issues and recommendations identified in the last FYR. However, there were suggested modifications pertaining to operation, maintenance and monitoring at the site. Specifically, the following suggestions were included in the last FYR:

- For at least one water level sampling event per year, potentiometric data should be contoured to confirm that there is hydraulic containment.
- At least one comprehensive analytical sampling event should be performed prior to the next FYR.
- The potholes and subsided areas should be repaired to prevent pooling of surface water.

The first two suggestions were implemented and will become part of the O&M activities at the site. The temporary measures to address the potholes and subsided areas have not been affective. Therefore, a permanent solution will need to be developed.

IV. FIVE-YEAR REVIEW PROCESS

Community Notification, Involvement

On November 19, 2015, EPA Region 2 posted a notice on its website indicating that it would be reviewing site cleanups and remedies at 32 Superfund sites and four federal facilities in New York and New Jersey, including the Endicott Village Well Field Superfund site. The announcement can be found at the following web address: http://www.epa.gov/sites/production/files/2015-11/documents/fy_16_fyr_public_website_summary.pdf.

In addition to this notification, a notice of the commencement of the FYR was posted on the EPA's Region 2 website and sent to local public officials. The notice was provided to the Village and the Town on April 5, 2016 with a request that the notice be posted in the respective municipal offices and on the Town of Union webpage. The purpose of the public notice was to inform the community that the EPA would be conducting the fourth five-year review to ensure that the remedy implemented at the site remains protective of public health and is functioning as designed. In addition, the notice included the RPM and the CIC address and telephone numbers for questions related to the FYR process or the site. Once the FYR is completed, the results will be made available on EPA's Endicott Village Well Field site webpage and at the local site repository located at the Village of Endicott Clerk's Office, Municipal Building, 1009 East Main Street, Endicott, New York. In addition, efforts will be made to reach out to stakeholders and local public officials to inform them of the results.

Data Review

Groundwater Quality Data

Long-term groundwater monitoring at the site has been conducted since 1997. The objective of monitoring the SPW is to determine concentrations of contaminants of concern (principally VOCs) relative to their respective MCLs. The long-term monitoring data indicate that VOC concentrations in the SPW, which is down-gradient of the landfill, have been declining since 1995, and have generally stabilized over the last five years. Analysis of sampled influent for the period between 2012 and 2015 indicates that most VOC constituents were either not detected or detected at low-level concentrations below the MCLs. However, some VOC constituents continued to persist in the influent, vinyl chloride and 1,2-DCE were detected, on average, at concentrations of 23.5 parts per billion (ppb) and 15.9 ppb, respectively; and to a lesser degree, 1,1-dichloroethane (DCA) and chlorobenzene were detected, on average, at concentrations of 2.6 ppb and 2.7 ppb, respectively.

Although not part of the sampling activities currently required at the site, a select grouping of wells (see Figure 2-Well Location Map, Appendix B) were sampled in August 2014 to determine to what extent the groundwater VOC plume had receded compared to the plume identified in the RI/FS. The data demonstrated that the chlorinated plume which used to extend from the Endicott Landfill to the Ranney well has receded significantly. However, this sampling event showed that there are still low levels of VOCs being observed in groundwater in a few monitoring wells.

Benzene and chloroethane were observed at concentrations of 3.1 ppb and 26.9 ppb, respectively, in monitoring well MW-21 (located about 1,000 feet west of the SPW); whereas chloroethane and vinyl chloride were observed at concentrations of 10.2 ppb and 9.5 ppb, respectively, in well MW-22D (located about 500 feet south of MW-21). In well MW-7D, a well located near the west bank of the Susquehanna River about 2,000 feet south-southwest of the SPW, concentrations of benzene and chloroethane were reported at 4.8 ppb and 488 ppb, respectively. However, the groundwater flow paths passing through each of these wells appear to be converging on the SPW, an indication of capture. Therefore, the composite effect of the combined remedies indicates that the remedies are performing to contain the plume and groundwater quality continues to move towards the restoration goal.

Groundwater Level Data

The objective of the groundwater elevation monitoring program is to access whether changes have occurred in the direction of groundwater flow and document the capture zone of the SPW. It should be noted that maintaining a hydraulic cone-of-depression around the SPW is necessary to entrain contaminated groundwater that may still emanate from the landfill area and also to prevent groundwater from flowing toward the Ranney well. Since water levels within the aquifer fluctuate seasonally, the program includes quarterly data collection from 27 monitoring wells. The results of the groundwater level elevation monitoring indicate that the direction of groundwater flow has not changed since the RI, that a hydraulic cone-of-depression appears to be consistently maintained over the SPW regardless of seasonal water-level fluctuations, and that there is containment of the groundwater plume from the Endicott Landfill. Containment is also demonstrated by weekly groundwater-quality monitoring results, taken by the Village at the Ranney well, which continues to show readings below MCLs prior to treatment by the air stripper.

Landfill Cap Inspection

For inspections of the landfill, NYSDEC and EPA rely on the checklist post-closure reports which are submitted by the Village on a quarterly basis. Over the years, both NYSDEC and EPA have found these reports to be factually accurate. The Village's most recent quarterly checklist, dated January 2016, indicates that several of the paved areas of the landfill cap have developed cracks and subsidence features and that pooling of water has or can occur.

Site Inspection

The inspection of the site was conducted on 5/4/2016. In attendance were Sherrel Henry, EPA RP, Edward Modica, Hydrogeologist, Payson Long, NYDEC Project Manager and Philip Grayson, Project Manager for the Village on behalf of the PRPs. The purpose of the inspection was to assess the protectiveness of the remedy. During the site inspection, it was observed that several areas of the paved landfill cap have settled, as evidenced by cracks and subsidence allowing pooling of water to occur.

V. TECHNICAL ASSESSMENT

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

Question A Summary:

According to the three RODs, the remedy for the site calls for the installation of an air stripper (OU1) for the protection of the public water supply system, installation of an engineered landfill cap (OU2), and treatment of the groundwater plume (OU3) by the SPW. The objectives of the implemented remedies are to control the source of contamination at the site, to minimize the migration of contaminants into the groundwater and surface water, to minimize any potential human health impacts resulting from the exposure to contamination at the site, and to restore the aquifer.

The SPW continues to operate and based on groundwater level data, the SPW is effectively capturing the plume emanating from the landfill. Groundwater data collected for the well shows that VOC concentrations in the SPW are lower than they were during the RI/FS; however they have remained relatively stable over the last five years. Specifically, four compounds (chloroethane, 1,2-DCE, TCE and vinyl chloride) remain above MCLs and New York State Water Quality Standards (NYSWQS). In 2014, a comprehensive sampling event was conducted to evaluate the extent of the plume. Monitoring wells demonstrate that the VOC exceedences still exist between the landfill and the SPW, but the water level measurements provide assurance that effective capture is occurring. To provide a more comprehensive understanding of plume size and progress towards restoration, it is suggested that potential modifications be made to the existing sampling program to collect adequate groundwater quality data from monitoring wells located between the landfill and the Ranney well.

In general the landfill cap is well-maintained, mowed, and operating as designed. Several areas of the paved landfill cap, however, have settled, as evidenced by cracks and subsidence noted during inspection, allowing pooling of precipitation to occur. Some of these areas are associated with truck traffic and some are associated with the end of the 8-acre area designated by the FAA as the CAA, which includes the Runaway Object Free Area.

IC Implementation

The OU2 ROD recommended, but did not require, that the Village implement institutional controls in the form of deed restrictions on future uses of the landfill. EPA believes that the Village's ownership and participation in the CD satisfies IC requirements the ROD related to future uses of the landfill. The Village is legally required by the CD to regularly maintain the landfill in accordance with the O&M Plan, to regularly report to EPA on the status of its work under the CD, and to advise EPA of any changes in any conditions, including ownership. Unlike deed restrictions, the CD is legally enforceable. The landfill is also independently regulated by the NYSDEC's programs. In addition, the landfill's status as an NPL site is information which is publicly available and accessible by means more broadly accessible than the deed restrictions. Current state and county requirements prevent the installation of wells at a hazardous waste site. Finally, access restrictions including fencing and signs exist at the landfill. Although EPA

believes that measures more effective than deed restrictions are in place to control future uses of the landfill; EPA has asked the Village to place an Environmental Easement on the property to strengthen controls on future use of the landfill.

Institutional controls for groundwater were not identified in the OU2 ROD and Consent Decree. However, existing state and local regulations that prevent the installation of wells at a hazardous waste site currently address contaminated groundwater. Application of these regulations should minimize the potential for exposure to contaminated groundwater.

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

Question B Summary:

There have been no changes in the physical conditions of the site over the past five years that would change the protectiveness of the remedy. The site has limited access based on its location within an industrial area, fencing, the presence of the Tri-Cities Airport and Airport Road that borders the site to the west, the eastern boundary of the En-Joie Golf Course to the east, and the Susquehanna River to the South. In addition the caps placed over the Endicott Landfill provides an additional barrier to exposure.

Soil and groundwater use at the site did not change during the past five years, the period of time considered in this review. Changes in the land use are not expected to change during the next five years. The risk assessment in 1987 identified ingestion of groundwater by area residents as the principle route of exposure. The main contaminants of concern identified at the site included: TCE, 1,2-DCE, vinyl chloride, and chloroethane in groundwater.

The ROD established the MCLs as the cleanup criteria for the contaminants of concern identified above. The toxicity value for TCE updated on the Agency's consensus database for toxicity information, the Integrated Risk Information System (IRIS) on 9/28/2011. The toxicity value for *cis*-1,2-DCE was updated in 2010. Chloroethane was identified for review by the IRIS program but was removed from the list of chemicals for evaluation. The changes in toxicity values do not change the overall protectiveness of the remedy. The MCLs remain protective.

In addition, based on the presence of 1,1,1-trichloroethane in the groundwater additional sampling was conducted during the previous FYR for the presence of 1,4-dioxane in groundwater. Samples were collected from 10 wells including the SPW. 1,4-dioxane was not detected in any of the wells. Since the previous FYR, no additional analysis of 1, 4-dioxane has been conducted.

Soil vapor intrusion based on groundwater concentrations was evaluated during the previous FYR. Since the previous FYR, the Vapor Intrusion Screening Level (VISL) Calculator was developed to evaluate potential vapor intrusion based on various media including groundwater concentrations. Comparison of the maximum concentrations of TCE in groundwater to the calculated risk based concentration in groundwater using the VISL Calculator found the concentration of TCE was below the calculated groundwater concentration based on risk. *Cis*-1,2-DCE was not evaluated based on a lack of an inhalation toxicity value.

Ecological risk assumptions

Ecological assessments of the adverse effects of contaminants on ecosystems were conducted using exposure and toxicity data to estimate the potential impact on the ecosystem. Surface water and sediment samples collected from the Susquehanna River, Nanticoke Creek, and Dead Creek showed no significant concentrations of VOCs. Therefore, it appears that the site is not adversely impacting ecological receptors.

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 would call into question the protectiveness of the remedy. There have been no changes at the site resulting from natural disasters or climate change impacts.

VI. ISSUES/RECOMMENDATIONS

This report did not identify any issue or make any recommendation for the protection of public health or the environment which was not included or anticipated by the Site decision documents. However, this report includes suggestions for improving, modifying, and/or adjusting some of these activities (see Other Findings, below).

Other Findings

In addition, the following are recommendations that were identified during the FYR and may improve management of OMO&&M, but do not affect current and/or future protectiveness:

- Update monitoring plan to ensure that:
    - For at least one water level measurement event per year, potentiometric data are contoured to confirm that there is hydraulic containment;
    - Appropriate analytical data is collected between the landfill and the SPW to evaluate plume extent and progress towards restoration
- Develop permanent solution to address potholes and subsided areas
- Implement an Environmental Easement/ Restrictive Covenants to control future use of the landfill (planned for September 2017)

VII. PROTECTIVNESS STATEMENT

Protectiveness Statement(s)		
Operable Unit: OU3	*Protectiveness Determination:* Protective	*Planned Addendum Completion Date:* Click here to enter a date
Protectiveness Statement: The remedy at OU3 is protective of human health and the environment.		

Protectiveness Statement(s)		
Operable Unit: , OU2,	*Protectiveness Determination:* Protective	*Planned Addendum Completion Date:* Click here to enter a date
Protectiveness Statement: The remedy at OU2 is protective of human health and the environment.		

Sitewide Protectiveness Statement	
Protectiveness Determination: Protective	*Planned Addendum Completion Date:* Click here to enter a date
Protectiveness Statement: The remedies implemented for the site are protective of human health and the environment.	

VIII. NEXT REVIEW

The next FYR report for the Endicott Village Well Field Superfund site is required five years from the completion date of this review.

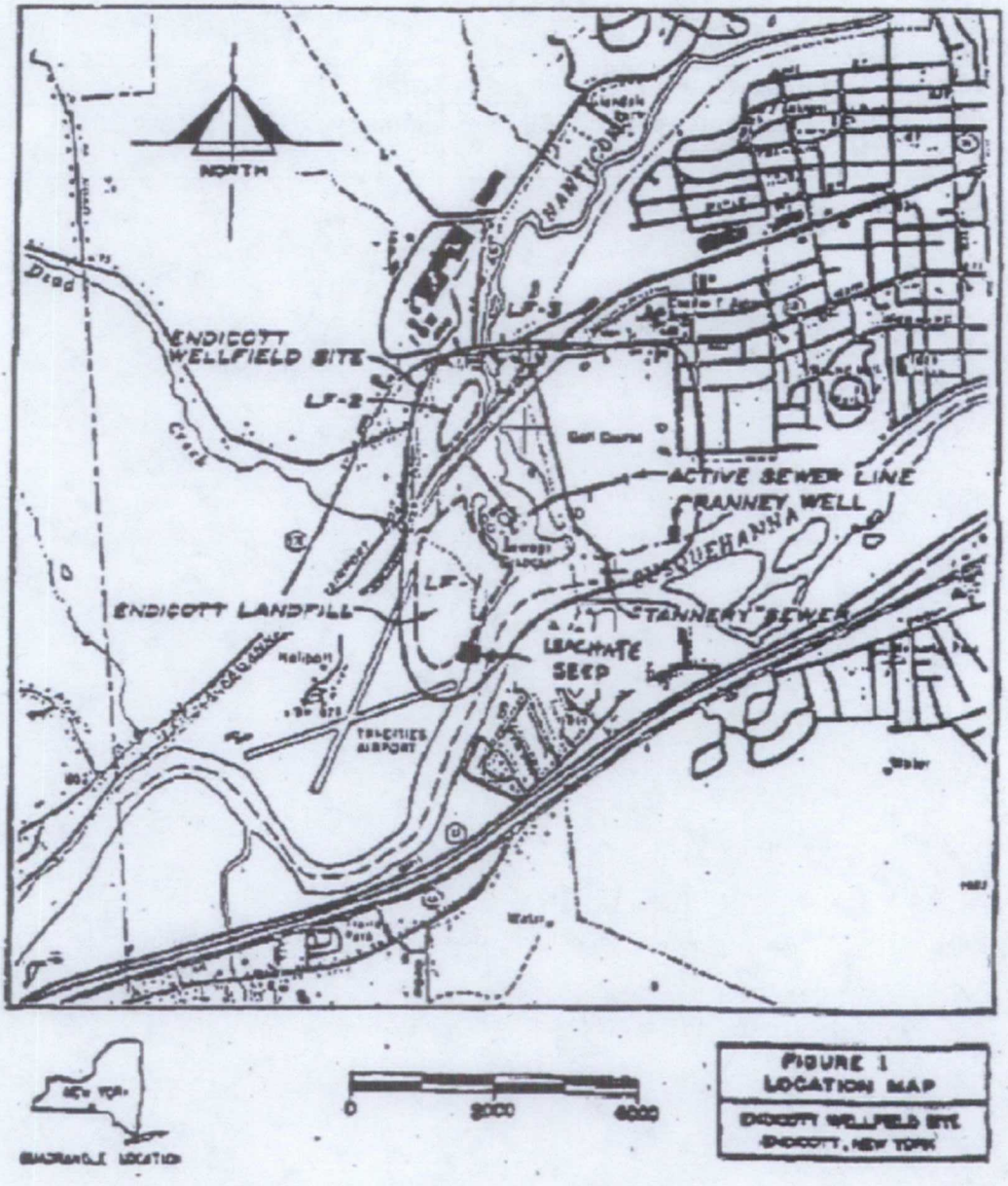
APPENDIX A – REFERENCE LIST

Documents, Data, and Information Reviewed in Completing the Five-Year Review:

Document Title, Author	Date
OU1 Record of Decision, Endicott Village Well Field site, EPA	March 31, 1987
OU3 Record of Decision, Endicott Village Well Field site, EPA	March 29, 1991
OU2 Record of Decision, Endicott Village Well Field site, EPA	September 30, 1992
OU2 Remedial Action Report, PRP	May 1997
Quarterly Reports, Endicott Village Well Field site, PRP	January 2012 – January 2016

APPENDIX B –FIGURES

Figure 1: Site Location



Endicott Landfill

Sample Date	8/28/2014	9/9/2014	9/9/2014	8/27/2014	8/26/2014	8/28/2014	8/27/2014	8/27/2014	8/27/2014	8/28/2014	8/28/2014	8/28/2014	8/27/2014	8/11/2014	8/28/2014
Collected By	MPC	SLC	SLC	SL	MPC	MPC	SL	SL	SL	MPC	MPC	MPC	SL	JF	MPC
Parameter (units expressed in ug/L)	EW3D	EW14	MW6D	MW7D	MW12	MW13D	MW21	MW22D	MW22D_2 (duplicate of MW22D)	MW29	MW35	SPW	Rinse Blank	Trip Blank	Trip Blank
Benzene	<1.00	<1.00	<1.00	4.75	<1.00	<1.00	3.09	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00
Chloroethane (Ethyl chloride)	<1.00	<1.00	<1.00	488	<1.00	<1.00	26.9	10.2	10.5	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00
cis-1,2-Dichloroethene	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	3.22	29.3	<1.00	<1.00	<1.00
Trichloroethene	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00
Vinyl chloride	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	9.45	11.3	<1.00	<1.00	28.5	<1.00	<1.00	<1.00

Analyte detected

Legend

Well Locations

Groundwater Contour Line

Scale: 1 in = 300 ft (0, 150, 300 Feet)

Prepared for: Village of Endicott

Map Reference: This exhibit is based on the ESRI USA Topographic Map. ESRI.com USGS Topographic 7.5' Quadrangle: Endicott, NY.

Note: Groundwater Elevations in Feet

FIGURE 2
GROUNDWATER CONTOUR MAP
Groundwater Elevation Assessment for 8/2014
Village of Endicott
Endicott, New York

Project #: 14-259-WJ			
Drawn by:	Checked by:	Date:	Revision:
EDC	TME	11/13/2014	1

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