THIRD FIVE-YEAR REVIEW REPORT
VOLNEY MUNICIPAL LANDFILL SUPERFUND SITE
OSWEGO COUNTY, NEW YORK

Prepared by

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

August 2015

Approved by:

Date:

August 31, 2015

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Emergency and Remedial Response Division

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Executive Summary

This is the third five-year review for the Volney Municipal Landfill Superfund site, located in the Town of Volney, Oswego County, New York. The purpose of this five-year review is to review information to determine if the remedy is and will continue to be protective of human health and the environment. The triggering action for this statutory five-year review is the completion of the second five-year review on August 2, 2010.

The remedy selected in the Record of Decision, as modified by the Post-Decision Document and Explanations of Significant Differences, has been implemented and is functioning as intended and remains protective of human health and the environment. The landfill has been capped to prevent direct contact with landfill wastes, as well as to minimize infiltration of rainfall and snowmelt. Fencing around the site also serves to prevent direct contact with landfill wastes. Groundwater maximum contaminant levels have not yet been met, but the concentrations and number of contaminants continue to show a general decline. It is anticipated that maximum contaminant levels will be achieved in the future. Residential wells continue to show no impact from site-related contaminants. Institutional controls are in place to prevent groundwater use on-site, as well as to prohibit activities that would affect the integrity of the cap and surface water drainage.

Five-Year Review Summary Form

SITE IDENTIFICATION		
Site Name: Volney Municipal Landfill		
EPA ID: NYD980509376		
Region: 2	**State:** NY	**City/County:** Town of Volney/Oswego County

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

REVIEW STATUS
Lead agency: EPA ***[If "Other Federal Agency", enter Agency name]*:** N/A
Author name (Federal or State Project Manager): Thomas Mongelli
Author affiliation: EPA
Review period: 8/2/2010 - 7/9/2015
Date of site inspection: 6/9/2015
Type of review: Statutory
Review number: 3
Triggering action date: 8/2/2010
Due date *(five years after triggering action date)*: 8/2/2015

Issues/Recommendations

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

Protectiveness Statement(s)		
Operable Unit: OU1	*Protectiveness Determination:* Protective	*Addendum Due Date (if applicable):* N/A
Protectiveness Statement: The remedy at OU1 is protective of human health and the environment.		

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

Introduction

The purpose of a five-year review 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 and is functioning as intended by the decision documents. The methods, findings, and conclusions of reviews are documented in the five-year review. In addition, five-year review reports identify issues found during the review, if any, and document recommendations to address them.

This is the third five-year review for the Volney Municipal Landfill site, located in the Town of Volney, Oswego County, New York. This five-year review was conducted by the Environmental Protection Agency (EPA) Remedial Project Manager (RPM) Thomas Mongelli. The review was conducted 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 300.430(f)(4)(ii), and in accordance with the *Comprehensive Five-Year Review Guidance*, OSWER Directive 9355.7-03B-P (June 2001). This report will become part of the site file.

The triggering action for this statutory review is the completion date of the second five-year review on August 2, 2010. A five-year review is required at this site due to the fact that hazardous substances, pollutants or contaminants remain at the site above levels that allow for unlimited use and unrestricted exposure. The site consists of one operable unit, which is addressed in this five-year review.

Site Chronology

See Table 1 for the site chronology.

Background

Physical Characteristics

The Volney Municipal Landfill Superfund site is a closed landfill located in a rural area of the Town of Volney, Oswego County, New York. It is situated at the intersection of Silk Road and Howard Road. The site is bordered to the north by Potter Spring; to the east by Silk Road, Bell Creek and wetlands; to the south by a quarter midget race car track and the Oswego County Airport, and to the west and northwest by open space, wooded areas, wetlands and tributaries of Black Creek. (See Figure 1.) The site is approximately 2 miles northeast of the City of Fulton, 10 miles south of Lake Ontario, and 25 miles northwest of the City of Syracuse.

The site is approximately 85 acres in size and consists of a capped fill area of about 55 acres, which occupies a topological high. The capped area has evenly distributed gas vents for the landfill gas control system. Two major rip-rap swales divert surface water off the cap, which is drained from the site through conduits under Silk and Howard Roads. The fill area is fenced and there is an entrance gate midway along Silk Road in the east and another in the southwest corner of the site along Howard Road. A utility building is located inside the entrance gate on Silk Road. There is an aboveground, open 350,000-gallon concrete leachate collection tank located in the northeastern corner of the site, along Silk Road.

Surface drainage in the area is generally by low-gradient streams—Bell Creek and tributaries of Black Creek, which both eventually drain into the Oswego River, a major regional river that empties into Lake Ontario at Oswego, New York. Several ponds, marshes, and wetlands are within a mile of the site. Potter Spring, which forms part of the headwaters to Bell Creek, is, as was noted above, located immediately north of the site.

Existing flood insurance maps (Federal Emergency Management Agency, 1983) indicate that no portions of the site are located in either the 100- or 500-year flood zone, although the adjacent areas to the north and east (*i.e.*, Potter Spring and Bell Creek, respectively) are in a flood zone.

Vegetation patterns at the site are a mixture of herbaceous field, weed, and grass species. Both open-field and forested habitats characterize the surrounding area. These habitats support a variety of avian and mammalian species. No New York State Department of Environmental Conservation (NYSDEC) Significant Habitat Areas are found on-site, and no endangered or threatened species were identified in this area.

Site Geology/Hydrogeology

The Volney Landfill is situated in the Lake Ontario section of the Interior Lowlands physiographic province. The topographic setting consists of gently rolling hills and intervening flatlands. The region is underlain by gently dipping bedrock of sedimentary nature (*e.g.*, sandstones, siltstones, and shales). Bedrock does not typically outcrop due to an overlying sequence of unconsolidated sediments, which primarily consists of glacial deposits. The glacial deposits include a nearly ubiquitous mantle of glacial till, which is locally formed into elongated ridges or drumlins. In the lower elevations, glacial till is covered with glacial meltwater deposits, glaciolacustrine, alluvium, and swamp deposits. Typically, drumlins form the hilltops in the region, although one underlies the lower part of the site in a northwest/southeast direction. The generalized sequence of unconsolidated stratigraphic units encountered beneath the site area in ascending order include: bedrock, lodgement till, glaciolacustrine fine sand and silt, sand and gravel, alluvium and swamp deposits, and artificial fill.

Data obtained from surface water level measurements at Potter Spring and in creeks and tributaries surrounding the landfill imply that the aforementioned surface-water features act as hydraulic boundaries to groundwater flow and that groundwater from the landfill discharges, in part, into nearby surface waters.

Groundwater in the vicinity of the site area occurs in the unconsolidated deposits and underlying bedrock aquifers. The sand and gravel unit is also recognized as the water table aquifer and elevation data indicate that the water table surface generally conforms to the topographic surface and is largely controlled by the slope and geology of the underlying lodgement till. The lodgement till is also believed to function as a low-permeability confining unit which separates the shallow aquifer from the underlying bedrock units.

Groundwater flow in the shallow aquifer is radial from the immediate boundary of the site and thereafter, the groundwater in the north and east flow eastward toward Bell Creek. Groundwater in the northwestern part of the site flows toward Potter Spring in the north and groundwater in the

southwestern and southern part of the site flows radially to the southwest and southeast. Groundwater flow in the bedrock is generally to the northeast and occurs under confined or artesian conditions with the low permeability till functioning as the overlying confining unit.

Land and Resource Use

Woodlands and farmlands are a prominent feature in the general vicinity of the site. A trailer park is located approximately 1,000 feet north of the site on Silk Road, and a few residences to the northeast are within 400 to 600 feet of the site boundary. A quarter midget race car track and the Oswego County Airport are located on the south side of Howard Road, and there are also some residences and light industry immediately to the west along Howard Road.

Prior to 1969, the property that the landfill now occupies was mined for sand and gravel, with the excavated area being subsequently used for the disposal of municipal and other refuse. Between 1981 and 2002, Oswego County, which owns the landfill, acquired the adjoining properties surrounding the landfill. Part of each of the County-owned parcels to the east and west of the landfill had been strip-mined over the years for cover material for the landfill operation, as well as for the construction of the remedy.

Oswego County has placed environmental easements on each of its six properties surrounding the landfill. The county has no plans to develop these properties which serve as a buffer around the landfill. Within 1,000 feet of the site, there are approximately 25 residences and light industry which formerly relied on groundwater for drinking water and other uses. A municipal water district was developed to eliminate the need for the withdrawal of groundwater in the area around the site. A water tower was erected approximately 1,750 feet to the west of the landfill on Howard Road. All but two of the properties in proximity to the landfill, a residence and the mobile home park, have been connected to the public water system. These wells are routinely sampled and have shown no signs of being impacted by the site.

History of Contamination

Landfilling operations were conducted at the site in a 55-acre unlined disposal area from 1969 to 1983. Most of the waste materials disposed of in the landfill consisted of residential, commercial, institutional, and light industrial wastes; however, approximately 8,000 drums from Pollution Abatement Services, a hazardous waste incineration facility located in Oswego, New York, were approved for disposal at the landfill by NYSDEC. While the approval applied only to discarded drums containing known and limited chemical residues, it was later reported that approximately 50 to 200 of these drums contained liquid waste of unknown volume and composition. The physical condition and locations of these drums in the landfill are unknown. The landfill was owned by the Oswego Valley Solid Refuse Disposal District Board from 1969 to 1975, when it was sold to Oswego County. During the late 1970s, leachate impacts to the groundwater resulted in groundwater quality standards being exceeded in monitoring wells located near the site. Residential wells closest to the site (no longer in service) do not appear to have been impacted by leachate.

Initial Response

In 1979, following the exceedance of groundwater standards, NYSDEC entered into an Administrative Order on Consent with Oswego County that required capping of the landfill top with a liner, capping the side slopes with compacted soil, installation of a gas collection system, and installation of a leachate collection system. This work was performed between 1979 and 1985. Off-site leachate disposal and groundwater monitoring were also initiated by Oswego County during the early 1980s. The Volney Municipal Landfill site was included on the Superfund National Priorities List in October 1984.

Basis for Taking Action

A remedial investigation/feasibility study (RI/FS), which was conducted from 1985 to 1987 by NYSDEC, identified significant surface water/sediment and groundwater contamination resulting from the unlined fill area at the site. It was also determined that 25 single-family residences dependent on private wells and downgradient of the site were potential receptors of contaminated groundwater from the site. Based upon the results of the RI/FS, it was determined that groundwater contamination was the primary human health risk at the site. The RI/FS identified the following contaminants of concern (COCs) for the groundwater: vinyl chloride; 1,1-dichloroethane; 2-butanone; 1,1,1-trichloroethane (1,1,1-TCA); benzene; toluene; ethylbenzene; total xylenes; phenol; arsenic; beryllium; lead; manganese; mercury; nickel; selenium; thallium; and zinc. A Contamination Pathways RI/FS, completed in 2001, determined that surface water did not pose a threat to public health or the environment and did not require remediation. Potential environmental impacts were found to be limited in both type and degree. Since the landfill top had been previously capped and the entire site is fenced, the possibility of direct contact with waste materials was found to be minimal. However, a direct contact threat associated with the soil capped side slopes, as well as side slope leachate breakout, was identified.

Remedial Actions

Remedy Selection

A Record of Decision (ROD) was signed by EPA on July 31, 1987. The remedial action objectives identified in the ROD are as follows:

- Reduce the potential for human/animal direct contact with site waste;
- Minimize the migration of landfill leachate through surface and groundwater; and
- Minimize the potential for precipitation/infiltration contact with site wastes.

The selected remedy called for:

- Supplemental capping of the landfill side slopes with an impermeable membrane;
- Installation of a more extensive leachate collection system and a subsurface groundwater containment barrier (slurry wall);
- Treatment of the collected leachate either on- or off-site, to be determined by treatability studies;

- Operation and maintenance of the cap and leachate collection system, and long-term groundwater monitoring;
- An evaluation of the cost-effectiveness of the slurry wall (*i.e.*, in conjunction with a decision regarding on-site versus off-site leachate treatment and disposal); and
- A supplemental investigation to evaluate the potential for the migration of contaminants in the groundwater and to surface water and sediments of the creeks and wetlands surrounding the site.

After the signing of the ROD, it was learned that a quality assurance/quality control review of the analytical data associated with the RI data had not been performed. The EPA re-sampled the site in 1988 and, based upon the sampling results, concluded that hazardous substances were present at the site at levels that posed a risk to public health and the environment. On September 29, 1989, the EPA issued a Post-Decision Document (PDD), which reaffirmed the remedy selected in the ROD.

Studies at the site conducted from 1989 to 1990 provided information about off-site and on-site leachate treatment and disposal, as well as updated construction costs. The studies also concluded that before any cost-effectiveness decisions related to the slurry wall or leachate treatment could be made, additional testing was needed to resolve several critical issues concerning the hydrogeology at the site (*i.e.*, groundwater flow issues, possible artesian conditions, and the lack of any reduction in leachate collection volumes since the 1985 capping of the top of the landfill).

An Administrative Order on Consent was signed in 1993 for the performance of a pre-design study by a group of 33 potentially responsible parties (PRPs). Based upon the results of this pre-design study, which was completed in 1997, EPA determined that there was no definable contaminant groundwater plume at the site, only intermittent changes in contaminant concentrations in the groundwater migrating from the landfill area, and that natural attenuation was occurring in a sizable buffer zone between the landfill and eight downgradient residential wells. This conclusion was based upon the fact that site-related contamination had not been found in the downgradient private wells, with the closest well located approximately 450 feet from the landfill. In addition, it was determined that the installation of a slurry wall and a more extensive leachate collection drain system would not offer a significant protective benefit when considering its relatively high cost and the relatively low contaminant concentration of the leachate generated from the landfill. It was also determined that off-site treatment and disposal of the leachate would be more cost-effective than on-site treatment and disposal (*i.e.,* due to the low concentration of the leachate being generated and the significant cost to construct and operate an on-site treatment facility). Based upon these findings, an Explanation of Significant Differences (ESD) was issued by EPA on August 7, 1997, which concluded that a slurry wall would not be installed, the intermittent groundwater contamination would be extracted on an as-needed basis, and the extracted groundwater would be treated off-site.

A "Contamination Pathways" investigation to evaluate the potential for the migration of contaminants in the groundwater to outlying areas and to the surface waters and sediments of Bell Creek, Black Creek, and the wetlands surrounding the site, as called for in the ROD and PDD, commenced in 1990 under an Administrative Order on Consent with 37 PRPs. The investigation, however, was postponed while the pre-design study, noted above, was completed. The

Contamination Pathways investigation was reactivated in 1998 (concurrent with the initiation of the design). This investigation, which was completed in 2001, found that the groundwater in the more outlying areas from the site did not contain site-related contaminants and also that the level of site-related contaminants present in the surface water and sediments in the immediate area (inner perimeter) of the site did not pose a public health or ecological threat. Based upon the results of this investigation, an ESD was issued on October 19, 2001 which determined that intermittent groundwater extraction and treatment, in combination with natural attenuation, would adequately address the site-related groundwater contamination at the site (*i.e.*, in the immediate perimeter around the site); the surface water and sediments did not have to be remediated; and a supplemental groundwater remedy for the outlying areas at the site did not need to be implemented. In addition, to avoid any risk to human health, the ESD also called for implementing institutional controls (*i.e.*, deed restrictions) to prevent groundwater withdrawal in the areas adjacent to the site.

Remedy Implementation

Negotiations with the PRPs for the performance of the remedial design (RD)/remedial action related to the selected remedy, as modified by the PDD and ESDs, resulted in 40 PRPs signing a Consent Decree on October 9, 1998, with the County of Oswego (as the "Owner Settling Defendant") representing the PRP group. The County of Oswego retained Barton & Loguidice of Syracuse, New York, to conduct the RD, solicit and obtain bids to construct the cap and provide construction administration and resident engineering. The RD started on June 24, 1998, and was approved on September 30, 1999.

Construction of the supplemental cap on the side slopes of the landfill, which commenced on August 9, 2000, was completed on September 12, 2001. The effort involved the installation of a 40-mil textured, low density polyethylene (LLDPE) liner, which was overlapped by the existing 40-mil polyvinyl chloride top liner by 5 feet. A gas venting system was also installed and the LLDPE liner was followed by (in ascending order) a 12-inch lateral drainage layer, Type I Geotextile, 12-inch protective soil cover layer, and 6 inches of top soil. Numerous other activities and improvements were also performed at the site, including abandoning monitoring wells that would be under the cap and would not be used in the long-term monitoring program, improvements to surface water drainage, upgrading the electric service to the site, and installation of new chain-link fencing. During the cap installation, a previously-unknown waste area was discovered in the northeast of the site, between the Silk Road entrance gate and the leachate collection tank. The area of waste was a little less than 1-acre and the cap was extended to include that area.

Because of the lack of a defined groundwater plume and the intermittent nature of the groundwater contamination, a groundwater extraction contingency plan was developed to determine when groundwater contaminant concentrations warranted groundwater collection. Monitoring well VBW-8D, located in the northeast of the site between the entrance gate and the leachate collection tank, was selected to trigger the extraction of the groundwater because it exhibited a large number of volatile organic compounds (VOCs) over time (although the types of VOCs and levels varied). The yield from VBW-8D declined significantly over time. When well redevelopment failed, a larger replacement well (VBW-8DR) was installed nearby. Since that time, with the exception of forced winter shutdowns because of the freezing of the pipelines leading to the leachate tank, the pumping of VBW-8DR has continued because of the unexpectedly high and sustained levels of VOCs experienced. It was concluded that VBW-8DR's proximity to the newly discovered waste

area and the greater drawdown was responsible for the consistent extraction of VOCs. Since the objective of remediating the site includes the cleanup of the groundwater in the shortest amount of time, it was decided to continue pumping VBW-8DR, since the contaminated groundwater from this on-site area appears largely responsible for contaminant migration into the adjacent off-site area.

System Operations/Operation and Maintenance

The Operation, Maintenance, and Monitoring Manual for the Volney Landfill site contains the procedures for inspecting and evaluating the landfill cap, off-site disposal of the collected leachate and extracted groundwater, provision and certification of institutional controls, decommissioning of monitoring wells, monitoring of groundwater and air quality in the immediate perimeter of the landfill, and long-term monitoring of downgradient groundwater wells. Repairs are made to the cap, drainage, and leachate collection systems, as necessary, to control the effects of settling, subsidence, erosion or other events that might interfere with the performance of the remedy.

The site is inspected on a quarterly basis as follows:

- The landfill cap is inspected for signs of erosion, excessive settlement, surface water ponding, seedling growth, impacts from terrestrial receptors (i.e., burrowing), and stressed vegetation;
- The surface water drainage system is inspected for signs of erosion and/or siltation, seedling growth, etc., in the swales, ditches, downchutes on the top and sides of the landfill, and the stone toe drain around the perimeter base;
- The landfill gas venting system is inspected for any damage to vents and extreme settlement around each vent and to determine if the vent is functioning (*i.e.*, odors) and the goosenecks are inspected for signs of blockages and any water is pumped out;
- Explosive gas readings are taken at the property boundary monitoring stations and at on-site structures;
- The site is inspected for any vectors and damage is reported;
- The groundwater monitoring wells are inspected for ease of locating, operation of locks, damage/vandalism, and the condition of the surface seals;
- The site access gates and fence are inspected for operational locks, vandalism, and damage;
- The manholes are inspected for signs of leakage, erosion, and if the pump station is operational;
- The leachate collection tank is inspected for cracking in the tank walls, signs of leakage or overflow, and volume (if the tank is more than 3/4 full, the leachate is removed);
- The utility building is inspected for vandalism, damage, and if secure;
- The access roads are inspected for ruts, puddles, and driveability; and
- The site is inspected for debris, litter and/or waste.

Since 2010, approximately 960,000 gallons of leachate have been removed from the leachate collection tank and transported to the City of Fulton Wastewater Treatment Plant. During the June

9, 2015, site inspection, the leachate collection tank was observed to be empty in preparation for maintenance scheduled to be completed by the end of August 2015.

The inspections, maintenance, sampling, monitoring, data evaluation, and reporting costs are approximately $165,000 on an annual basis.
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.

Progress Since Last Five-Year Review

The second five-year was completed on August 2, 2010. It concluded that:

"The remedy currently protects human health and the environment in the short-term because the landfill has been capped, removing direct contact (*i.e.*, ingestion or dermal contact of soil) exposures to the public and ecological receptors and reducing percolation through the landfill. In addition, institutional controls are in place to further prevent potential exposures to the public. Area residents and businesses are on public water, thus, reducing potential direct contact exposures. In order for the remedy to be protective in the long-term, measures need to be taken to permanently address the leachate seep."

The second five-year review noted that leachate was sporadically seeping from the cap along the western side of the landfill, creating wet areas. Samples taken directly from the seep showed the presence of several metals and conventional leachate parameters. At the time of the five-year review, the seep was being addressed on an interim basis by pumping from a gas vent in the area. The five-year review recommended that this leachate continue to be periodically sampled to determine if any danger was posed to wildlife or the public and if the leachate persisted or worsened, a larger-scale solution should be designed and implemented.

Because the leachate seep did not abate, a permanent pumping system was designed and constructed in 2013. The first full season of pumping from the seep occurred in 2014. While still present, the seep appears to have stopped expanding, and the flow has diminished since the start of pumping operations. The system is operated seasonally due to freezing conditions in the winter. Approximately 53,000 gallons of leachate are estimated to have been collected from the western slope area.

The second five-year review also noted that although an institutional control protecting the integrity of the cap was in place, it was not required by the ROD, PDD, or the 1997 or 2001 ESDs. The five-year review recommended that the institutional control protecting the integrity of the cap be incorporated into the remedy through an ESD.

An ESD was finalized on January 3, 2011 which memorialized an institutional control prohibiting activities that would compromise the integrity of the landfill cap. Notice of the ESD was published in *The Palladium Times* on January 7, 2011.

Five-Year Review Process

Administrative Components

The five-year review team included Thomas Mongelli (EPA-RPM), Michael Scorca (EPA-Hydrologist), Abbey States (EPA-Human Health Risk Assessor), Mindy Pensak (EPA-Ecological Risk Assessor) and Michael Basile (EPA-Community Involvement Coordinator). This is a PRP-lead site.

Community Involvement

A public notice announcing the commencement of the five-year review was created and distributed to local officials for posting on the town's website as well as physical posting on a bulletin board in the town hall. The notice was also placed on the EPA's website, which was established as part of this five-year review.

Once the five-year review is completed, the results will be made available at the local site repository, which is at the Fulton Public Library, 160 South First Street, Fulton, New York 13069, as well as on the EPA's website. In addition, efforts will be made to reach out to local public officials to inform them of the results.

Document Review

The documents, data and information which were reviewed in completing this five-year review are summarized in Table 3.

Data Review

The current monitoring well network includes 15 shallow wells screened in the unconsolidated geologic units, five wells screened in the bedrock unit, three leachate sampling points and five residential wells.

Groundwater monitoring data from this five-year review period exceeded NYSDEC Water Quality Standards and Guidance Values (WQSGVs) (TOGS 1.1.1) or EPA Maximum Contaminant Levels (MCLs)[1] for a number of contaminants in several groundwater monitoring wells. The number of VOCs that were detected and their concentrations have, however, decreased since the initiation of the groundwater component of the remedy. A total of ten VOCs were observed above their respective WQSGVs in at least one on-site monitoring well during the past five years. The WQSGV for benzene was exceeded in four monitoring wells with a maximum observed concentration of 34 micrograms per liter (µg/L). Acetone and xylene were each exceeded in three monitoring wells with a maximum observed concentrations of 2,600 µg/L and 7.9 µg/L, respectively. Chlorobenzene was exceeded in two monitoring wells at a maximum observed concentration of 42 µg/L, and toluene, ethylbenzene, 2-butanone, methylene chloride, and bis(2-ethylhexyl)phthalate were all exceeded in one well with maximum observed concentrations of 57

[1] WQSVs and MCLs are the highest levels of a contaminant that are allowed in drinking water. They are promulgated standards that apply to public water systems and are intended to protect human health by limiting the levels of contaminants in drinking water.

µg/L, 5.3 µg/L, 5,400 µg/L, 19 µg/L, and 8.6 µg/L, respectively. Figure 1 depicts the monitoring well locations and Table 2b a lists the observed WQSGV exceedances. Groundwater contamination appears to be sporadic and limited to the landfill property and the immediate surrounding area.

The residential wells continue to exhibit concentrations of COCs that are below federal MCLs and NYSDEC WQSGVs.

Several monitoring wells surrounding the landfill property that are screened in the overburden (shallow) unit show little or no significant groundwater impacts from the landfill, including MW-3S (20 feet deep), MW-10S (13 feet deep), MW-11 (32.5 feet deep), SGW-27A 20 feet deep) and SGW-30B (34 feet deep).

Other shallow monitoring wells have been affected to some degree by the landfill, generally with landfill leachate indicators, such as ammonia, iron, chloride, alkalinity, sodium, specific conductivity, and calcium. However, these wells (including SHW-1 28.5 feet deep, SHW-3 43 feet deep, SHW-4 48 feet deep, SHW-8 38 feet deep and GW-3C 34.5 feet deep) have shown a general slow decline or a more stable trend in concentrations during the past five years. Shallow well GW-9R (32 feet deep) exhibited an increasing trend in ammonia concentrations, but field specific conductivity measurements, which are a general indicator of dissolved ions, have declined in samples since 2011.

Two monitoring wells screened in the bedrock (BRW-6 107 feet deep, and BRW-7 106 feet deep) are located on Howard Road near the south boundary of the landfill. Effects from the landfill have lessened over time as indicated by generally declining specific conductivity and pH measurements. Three other bedrock monitoring wells are located to the northeast of the landfill, about 400 feet east of Silk Road. Monitoring wells MW-6BR (100.5 feet deep), MW-7BR (115 feet deep), and MW-8BR (149 feet deep) have significantly high specific conductivity and ammonia concentrations. Due to their greater distance from the landfill, the effects of the capping remedy could take longer to be observed at these monitoring wells.

Site Inspection

An inspection of the site was conducted on June 9, 2015. In attendance were Thomas Mongelli, the EPA RPM, Payson Long and Sue Edwards of NYSDEC, Andrew Barber and Scott Nostrand of Barton & Loguidice, contractor for the PRPs, and Evan Walsh and Chris Williams of the Oswego County Health Department. The purpose of the inspection was to assess the protectiveness of the remedy.

Based upon observations made during the site inspection, it was concluded that the landfill cap appeared to be in good condition with no areas of erosion observed. The western slope seep pumping system was observed to be operational and working as intended. As mentioned above, the leachate tank was observed to be undergoing preventative maintenance. The tank has been emptied and, since the time of the inspection, cleaned of all accumulated solids. Oswego County has solicited bids for repair of the upper joint sealant of the concrete tank joints, and for cleaning, repainting, and caulking of the tank door. Leachate is being bypassed to a temporary holding tank during the construction period. The temporary tank is located immediately adjacent to the leachate

tank; the leachate is periodically emptied from the temporary tank and treated at the City of Fulton Wastewater Treatment Plant.

Interviews

No interviews were conducted as part of this five-year review.

Institutional Controls Verification

The 2001 ESD required the implementation of institutional controls to prevent the use of contaminated groundwater downgradient from the landfill. At the time of the ESD, Oswego County owned five parcels of land surrounding the landfill; a 45-acre parcel located to the east along Silk Road was acquired in October 2002. In June 2003, Oswego County subsequently granted three environmental easements regarding the landfill parcel and the six county-owned parcels surrounding the landfill portion of the property. These easements include prohibitions on the use of groundwater, any activity that would affect the integrity of the landfill cap, and any activities that would alter surface water drainage.

On March 23, 2005, the Town of Volney requested an easement from Oswego County to install a waterline[2] through the County-owned parcel on the west side of the landfill, which was one of the parcels previously subject to the environmental easements placed on the parcels adjacent to the landfill in June 2003. EPA and NYSDEC's approval to proceed with the waterline easement was granted on May 17, 2005; however, a review of the easement led to the discovery of a number of discrepancies in the easements. One discrepancy was the failure to include a parcel of land in the easement that was owned by National Grid (in the southwest corner of the landfill). Subsequently, Oswego County reached an agreement with National Grid, whereby National Grid abandoned its (uncontaminated) well after it connected its Howard Road facility to the new Town of Volney water system, and National Grid then granted an easement prohibiting the further use of groundwater on the property. The easement was recorded with the Oswego County Clerk on January 9, 2009. The other discrepancies in the easements were related to how some of the parcels were mapped. These discrepancies were addressed by Oswego County by providing a revised parcel description for the parcel which contains the quarter midget race car track and a revised master map for the three easements. A 2011 ESD documented the incorporation of the aforementioned easements into the selected remedy

Technical Assessment

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

The ROD, as modified by the PDD and ESDs, called for, among other things, the installation of a supplemental cap on the sideslopes, surface water controls, contaminated groundwater extraction, as needed, collection and off-site treatment of leachate, and institutional controls. The purpose of the response action was to reduce the risk to human health and the environment due to contaminants leaching from the landfill mound. The purpose of capping of the landfill was to

[2] The waterline installation was conducted by the Town of Volney independent of the remedy at the site. Residential wells have not shown any impacts from landfill leachate, nor are they expected to in the future.

minimize the infiltration of rainfall and snowmelt into the landfill, thereby reducing the potential for contaminants leaching from the landfill into the groundwater and negatively impacting groundwater quality, as well as impacting surface waters and sediments of adjacent Bell Creek, Black Creek, and nearby wetland habitats. Capping was also intended to prevent direct contact exposure to hazardous contaminants. The purpose of extracting and treating the contaminated groundwater, as needed, was to control its migration and assure that groundwater beyond the site boundary meets MCLs in the shortest possible time.

Quarterly inspections of the landfill cap indicate that it continues to function as intended to prevent infiltration of rain and snowmelt into the waste material. The cap, along with the perimeter fencing continue to serve as a barrier preventing human and animal contact with the waste. Leachate continues to be pumped from the western slope seep resulting in a reversal of seep expansion.

While it appears that the remedy is functioning as intended by the decision documents, the remedy has not yet resulted in the restoration of groundwater. Groundwater MCLs will be met when the contaminants in the waste materials are no longer leached into the groundwater; however, it takes time after capping (*i.e.*, years, in the case of large landfills) for the moisture in the waste materials to download from the waste. Over the past five years, there have been 17 instances of a VOC exceeding its MCL. This is a much lower number of exceedances compared to the number of exceedances identified prior to construction of the cap. Nineteen (out of 30) wells did not exhibit any VOC exceedances during the review period. Of the 17 instances of a VOC exceeding its MCL, seven occurred in only one of nine sampling events for that particular well location.
Institutional controls are currently in place to restrict groundwater use, excavation that would affect the integrity of the cap, and activities that would alter surface water drainage on the landfill as well as all of the surrounding properties.

Question B: Are the exposure assumptions, toxicity data, cleanup levels, and remedial action objectives used at the time of the remedy still valid?

Land-use considerations used in the baseline human health risk assessment are still valid. The exposure assumptions and toxicity values that were used to estimate the potential risks and hazards to human health and the environment followed the general risk assessment practice at the time the risk assessment was performed. Although the risk assessment process has been updated and specific parameters and toxicity values may have changed, the risk assessment process that was used is still consistent with current practice and the need to implement a remedial action remains valid.

There are no changes in the physical conditions of the site or site usage that would affect the protectiveness of the selected remedy, and there are no significant changes in site use expected over the next five years. The Volney Landfill has been capped and the cap is being maintained, removing direct contact (*i.e.*, ingestion or dermal contact with soil) exposures to the public as well as ecological receptors. A fence is in place to prevent further potential exposures to trespassers. Additionally, the County has purchased surrounding properties, which provide a buffer around the landfill. The 2001 Contamination Pathways RI/FS determined that surface water and sediments did not present unacceptable risk to human health or the environment and do not require remediation.

Potential exposure to groundwater contaminated by the landfill has been eliminated. Samples collected from five residential potable water wells located closest to the site continue to show no contamination above risk based levels from the site reaching these wells. Since institutional controls prevent the installation of additional potable wells in the area adjacent to the landfill, the contamination pathway is incomplete. Though residential monitoring well RW-7 continues to meet or slightly exceed the arsenic MCL of 0.01 milligram per liter, this contaminant is likely due to the local bedrock conditions and is not site-related, as determined by the 2001 Contamination Pathways RI and supported by the absence of other landfill-related contaminants. EPA and Oswego County Health Department have communicated these results and potential treatment options to the resident.

One potential exposure pathway that was not evaluated at the time of the ROD is vapor intrusion. The maximum detected groundwater concentrations of benzene and ethylbenzene exceeded screening levels determined by the OSWER Vapor Intrusion Screening Level calculator (set at a cancer risk of 10^{-4} and a hazard quotient of 1). However, vapor instrusion is not expected to be an issue at the site as the exposure pathway is incomplete. There are no buildings located on the landfill except for a maintenance building which is not regularly occupied, and the nearest residential buildings are not located in the vicinity of monitoring wells with VOC exceedances. Since the landfill and the surrounding properties have been purchased by Oswego County, future construction is unlikely.

While state and federal groundwater standards have not been achieved, the protectiveness of the remedy is not impacted. It is anticipated that groundwater standards will be reached in the future and these standards are still valid.

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

The EPA has determined that 1,4-dioxane may be present in the groundwater at sites where 1,1,1-TCA, which was identified as a COC in the RI, is also detected. The presence of this chemical at the Volney landfill site was not evaluated, because analysis for this chemical was not performed at the time of the RI.

Technical Assessment Summary

The remedy selected in the ROD, as modified by the PDD and ESDs, has been implemented and is functioning as intended. The landfill has been capped to prevent direct contact with landfill wastes, as well as to minimize infiltration of rainfall and snowmelt. Fencing around the site also serves to prevent direct contact with landfill wastes. Groundwater MCLs have not yet been met, but the concentrations and number of contaminants continue to show a general decline. It is anticipated that MCLs will be achieved in the future. Residential wells continue to show no impact from site-related contaminants. Institutional controls are in place to prevent groundwater use on-site, as well as to prohibit activities that would affect the integrity of the cap and surface water drainage. The presence of 1,4-dioxane has not been evaluated, but inclusion in the next sampling event is warranted based on the former presence of 1,1,1-TCA at the site.

Issues, Recommendations and Follow-Up Actions

While it does not affect the protectiveness of the remedy, analysis for 1,4-dioxane should be included during the next groundwater monitoring event. See Table 4.

Protectiveness Statement

The remedy at OU1 is protective of human health and the environment.

The sitewide remedy is protective of human health and the environment.

Next Review

The next five-year review report for the Volney Municipal Landfill Superfund site is required five years from the completion date of this review.

Tables

Table 1: Chronology of Site Events	
Event	**Date(s)**
Operation of Landfill	1969-1983
NYSDEC/Oswego County Consent Order	1979
Final NPL Listing	1986
Remedial Investigation/Feasibility Study Complete	1987
ROD	1987
Post-Decision Document	1989
Consent Order to conduct the Contamination Pathways Investigation	1990
Consent Order to conduct the Supplemental Pre-Remedial Design Study	1993
Supplemental Pre-Remedial Design Study	1993-1997
ESD related to the performance of intermittent groundwater collection and off-site treatment, rather than expanding the leachate collection system	1997
Consent Decree for performance of the RD/RA	1998
RD Start	1998
RD Complete	1999
RA Start	2000
RA Construction Completion	2001
ESD related to intermittent groundwater extraction and treatment and institutional controls	2001
Preliminary Close-out Report	2002
First FYR	2005
Second FYR	2010

Table 2a: Remediation Goals for Groundwater from the ROD		
Contaminants of Concern	**Enforceable Limit (in µg/L)**	**Source of Enforceable Limit**
Arsenic	25	703.5[3]
Benzene	ND	703.5
Phenol (Total)	1	703.5
Selenium	10	141.11 (MCL)[4]
Vinyl Chloride	1	MCL[5]

Table 2b: List of Groundwater Exceedances Since the Last Five-Year Review			
Monitoring Well	**Contaminant**	**Current WQSGV[6] (µg/L)**	**Maximum Observed Concentration (µg/L)**
VBW-8D	2-Butanone	50	5400
	Acetone	50	2600
	Toluene	5	57
SHW-1	Benzene	1	17
SHW-3	Benzene	1	34
	Ethylbenzene*	5	5.3
SHW-4	Benzene	1	4.2
GW-3C	Benzene	1	4.1
GW-9R	Chlorobenzene	5	42
SGW-27A	Chlorobenzene*	5	28
MW-6BR	o-Xylene*	5	6.5
MW-7BR	o-Xylene*	5	7.9
MW-8BR	Acetone	50	73
	o-Xylene*	5	7.1
OVL-2 (Leachate)	Acetone*	50	72
	Bis(2-ethylhexyl)Phthalate	5	8.6
	Methylene Chloride*	5	19

*Single exceedance since the previous five-year review report.

[3] 6 NYCRR Water Quality Regulations, Part 703.5 – Classes and Quality Standards for Groundwater
[4] 40 CFR Part 141 EPA National Primary Drinking Water Regulations (NPDWR) Subpart B, Maximum Contaminant Levels (MCLs) for Inorganic Chemicals
[5] 40 CFR Part 141 EPA NPDWR, MCLs for Organic Chemicals, Proposed in Federal Register (11/13/85)
[6] NYSDEC TOGS 1.1.1 Ambient Water Quality Standards and Guidance Values and Groundwater Effluent Limitations

Table 3: Documents, Data and Information Reviewed in Completing the Five-Year Review	
Document Title, Author	**Submittal Date**
Migration of Pollutants in Groundwater from the Oswego County Landfill Volney, New York, Scrudato and Hinriches, SUNY (Oswego)	1982
Engineering Investigations and Evaluations at Inactive Hazardous Waste Sites, Engineering-Science, Inc.	1983
Hydrogeologic Investigation of the Oswego Valley Landfill Site, Geraghty & Miller	1985
Remedial Investigation/Feasibility Study, URS Co.	1987
Record of Decision, EPA	1987
Post-Decision Document, EPA	1989
Design Data Evaluation Report, McLaren/Hart Inc.	1997
Explanation of Significant Differences, EPA	1997
Final Design Report, Barton & Loguidice, P.C. (B&L)	1999
Contamination Pathways Remedial Investigation Report, B&L	2000
Remedial Action Report, B&L	2001
Explanation of Significant Differences, EPA	2001
Preliminary Close-Out Report, EPA	2002
Operation, Maintenance, and Monitoring Manual, B&L	2002
1st Five-Year Review, EPA	2005
2nd Five-Year Review, EPA	2010
OM&M Quarterly Inspection Reports, Oswego County/B&L	2010-2014

Table 4: Other Comments on Operation, Maintenance, Monitoring, and Institutional Controls	
Comment	**Suggestion**
The EPA has determined that 1,4-dioxane may be present in the groundwater at sites where 1,1,1-TCA is also detected. The presence of this chemical at the Volney Landfill site was not evaluated, because the EPA was not aware of it at the time of the RI.	Groundwater samples should be analyzed for 1,4-dioxane during the next sampling event. If present, 1,4-dioxane should continue to be analyzed.

Figure 1: Site Map