Five-Year Review Report
Pfohl Brothers Landfill Site
Town of Cheektowaga
Erie County, New York

Prepared by:

United States Environmental Protection Agency
Region 2
New York, New York

March 2011

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FIGURE

TABLES

Acronyms Used in this Document	
bgs	Below Ground Surface
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CIC	Community Involvement Coordinator
EPA	United States Environmental Protection Agency
IRM	Interim Remedial Measure
MCLs	Maximum Contaminant Levels
NPL	National Priorities List
μg/l	Micrograms per Liter
mg/l	Milligrams per liter
NYSDEC	New York State Department of Environmental Conservation
NYSDOH	New York State Department of Health
O&M	Operation & Maintenance
PAHs	Polycyclic aromatic hydrocarbons
PCBs	Polychlorinated biphenyls
PRGs	Preliminary Remediation Goals
PRP	Potentially Responsible Party
RD	Remedial Design
RI/FS	Remedial Investigation/Feasibility Study
ROD	Record of Decision
RPM	Remedial Project Manager
SVOCs	Semi-Volatile Organic Compounds
TOGs	Technical & Operational Guidance Series
VFPE	Very Flexible Polyethylene
VOCs	Volatile Organic Compounds
WQSGV	Water Quality Standards and Guidance Values

EXECUTIVE SUMMARY

This is the second five-year review for the Pfohl Brothers Landfill site, located in the Town of Cheektowaga, Erie County, New York. The implemented actions protect human health and the environment in the short term. The landfilled areas have been capped, removing direct contact (*i.e.*, ingestion or dermal contact of soil) exposures to the public. Institutional controls are in place to further prevent potential exposures to the public, including trespassers. The potential impacts to groundwater are being addressed through the caps that reduce or prevent percolation through the landfilled areas. Leachate from the leachate collection system is being discharged to a publicly-owned treatment works further reducing potential exposures to the population. In order for the remedy to be protective in the long term, additional data and information is needed.

Five-Year Review Summary Form

SITE IDENTIFICATION		
Site Name *(from WasteLAN)*: Pfhol Brothers Landfill Site		
EPA ID *(from WasteLAN)*: NYD980507495		
Region: 2	**State:** NY	**City/County:** Town of Cheektowaga/Erie County

SITE STATUS	
NPL Status: ■ Final ☐ Deleted ☐ Other (specify) Not on NPL	
Remediation Status (choose all that apply): ☐ Under Construction ☐ Operating ■Complete	
Multiple OUs? ■ YES ☐ NO	**Construction completion date:** 9/27/02
Are portions of the site in use or suitable for reuse? ■ YES ☐ NO ☐ N/A	

REVIEW STATUS	
Lead agency: ■ EPA ☐ State ☐ Tribe ☐ Other Federal Agency	
Author name: Pamela Tames	
Author title: Remedial Project Manager	**Author affiliation:** EPA
Review period: 3/19/2006 - 3/18/2011	
Date(s) of site inspection: 10/27/10	
Type of review: ☐ Post-SARA ☐ Pre-SARA ☐ NPL-Removal only ☐ Non-NPL Remedial Action Site ☐ NPL State/Tribe-lead ☐ Regional Discretion ☐ Policy ■ Statutory	
Review number: ☐ 1 (first) ■ 2 (second) ☐ 3 (third) ☐ Other (specify)	
Triggering action: ☐ Actual RA Onsite Construction at OU #1 ☐ Actual RA Start at OU # ☐ Construction Completion ■ Previous Five-Year Review Report ☐ Other (specify)	
Triggering action date *(from WasteLAN)*: 3/19/2006	
Due date *(five years after triggering action date)*: 3/19/2011	
Does the report include recommendation(s) and follow-up action(s)? ■ yes ☐ no **Acres in use or suitable for use:restricted:** 94 acres **unrestricted: 36 acres**	

Five-Year Review Summary Form (continued)

Other Comments on Operation, Maintenance, Monitoring, and Institutional Controls

This site has ongoing operation, maintenance and monitoring activities as part of the selected remedy. As was anticipated by the decision documents, these activities are subject to routine modification and adjustment. This report includes suggestions for improving, modifying, and/or adjusting these activities. This report did not identify any issue or make any recommendation for the protection of public health and/or the environment that was not included or anticipated by the site decision documents.

Protectiveness Statement

The implemented actions under Operable Unit 1 protect human health and the environment in the short term. The landfilled areas have been capped, removing direct contact (*i.e.*, ingestion or dermal contact of soil) exposures to the public. Institutional controls are in place to further prevent potential exposures to the public, including trespassers. The potential impacts to groundwater are being addressed through the caps that reduce or prevent percolation through the landfilled areas. Leachate from the leachate collection system is being discharged to a publicly-owned treatment works further reducing potential exposures to the population. The Operable Unit 2 remedy provided no further actions. In order for the remedy to be protective in the long term, additional data and information is needed.

I. Introduction

This is the second five-year review for the Pfohl Brothers Landfill site, located in the Town of Cheektowaga, Eric County, New York. Environmental Protection Agency (EPA) Remedial Project Manager (RPM) Pamela Tames conducted this review. 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). The purpose of five-year reviews is to ensure that implemented remedies protect public health and the environment and that they function as intended by the site decision documents. This report will become part of the site file.

A five-year review is required at this site because hazardous substances, pollutants, or contaminants remain at the site above levels that allow for unlimited use and unrestricted exposure.

This site is divided into two operable units. Operable Unit 1 consists of two landfilled areas (Area B and Area C) and is the subject of this five-year review. Operable Unit 2 consists of a soil borrow area (Area A) and off-site groundwater. A 1994 ROD chose no action for Operable Unit 2 and therefore, it is not subject to this five-year review.

This five-year review found that the implemented remedy is functioning as intended and continues to protect human health and the environment.

The trigger for this five-year review is the previous five-year review dated March 19, 2006.

II. Site Chronology

Table 1 (attached) summarizes the site-related events from discovery until the present.

III. Background

Site Location

The Pfohl Brothers Landfill site is a 130-acre inactive landfill located in a commercial/residential area in the Town of Cheektowaga, Erie County, New York, approximately one mile northeast of Buffalo International Airport. The site is bordered by wetlands, Aero Lake, Aero Creek, and the New York State Thruway to the north. The remaining boundaries consist of Transit Road to the east, a Niagara Mohawk Power easement and wetlands to the west, and residential yards (along the north side of Pfohl Road) and Conrail tracks to the south. In addition, the site is bisected by Aero

Drive. The road and wetlands divide the site into three distinct areas—Areas A[1], B, and C (see figure).

Physical Characteristics

The site consists of two capped fill areas. One fill area (approximately 70 acres) is located on Area B and the other (approximately 24 acres) is located on Area C. The two capped areas are individually fenced and there are two entrance gates along Aero Drive—one on the north side for Area B and another on the south side for Area C. A utility building is located inside the entrance gate on the north side of Aero Drive. The capped areas have evenly-distributed gas vents for the landfill gas control system. Several engineered drainage swales, ditches, and culverts divert surface water off the caps.

A portion of Area A was used as a borrow area by the New York Thruway Authority for road fill material. Aero Lake, a 40-acre man-made lake, was created from the borrow pit. The remainder of Area A contains the Thruway ramp and tollbooths, as well as a trucking firm.

Surface drainage in the area is generally to Aero Creek, Aero Lake, adjacent wetlands, and unnamed tributaries, which eventually drain into Ellicott Creek, a regional creek that empties into the Niagara River at the City of Tonawanda, New York. Several ponds, marshes, and wetlands are within a mile of the site.

Existing flood insurance maps (Federal Emergency Management Agency, 1983) indicate that the site is not in the Ellicott Creek Floodway. Changes to the flood elevation in Ellicott Creek did not occur as a result of site construction. The areas just outside the boundary of Area B (*i.e.*, Aero Lake, Aero Creek, and adjacent wetlands) are within the 100-year flood zone elevation of 696.8 feet, as are several areas within Area C located adjacent to Aero Drive, Transit Road, and Pfohl Road.

Vegetation patterns at the site are a mixture of herbaceous field, weed, and grass species. Both open field, wetland, 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 Pfohl Brothers Landfill is located in the Lake Erie Plain. The topographic setting consists of gently rolling hills and intervening flatlands 6 to 12 miles in width formed by Pleistocene glaciation. The region is underlain by gently dipping bedrock of

[1] Area A was the subject of a January 10, 1994 no action Record of Decision (ROD) (See Section IV. Remedial Actions, Remedy Selection, below). Therefore, Area A is not being reviewed.

sedimentary nature (*e.g.*, sandstones, siltstones, and shales). The advancement, melting and subsequent retreat of the glacier resulted in the deposition of till and lacustrine sediments in the vicinity of the site. The sediments consist of clay with discontinuous bands of silt and very fine sand.

The underlying bedrock, located approximately 20 feet below ground surface (bgs), consists of Onondaga Limestone and also serves as the principal aquifer within the area of the landfill. Most of the ground water flow occurs through rock fractures and interconnected cavities. Recharge to the aquifer occurs mainly through precipitation, which averages about 36 inches per year.

The landfill lies within the Erie-Niagara drainage basin and is surrounded by Aero Lake to the north and Ellicott Creek to the south. Data obtained from surface water level measurements in creeks and tributaries surrounding the landfilled areas imply that the aforementioned surface-water features act as hydraulic boundaries to groundwater flow and that groundwater from the landfilled areas discharges, in part, into nearby surface waters.

The regional groundwater flow in the unconsolidated aquifer is generally in a south-southwest direction and eventually discharges into both Aero Lake and Ellicott Creek. During the wet seasons, the groundwater moves radially outward from the site in all directions, except to the northeast, due to local groundwater mounding. During those times, Aero Lake and the wetlands surrounding the site serve as local discharge areas for the aquifer.

Land and Resource Use

Land use in the vicinity of the site consists of a mix of residential, commercial, and industrial properties. The Buffalo Niagara International Airport is located just one mile to the west of the site. Several residences are located to the southwest within 1,000 feet of the site boundary.

The New York State Thruway borders Area A to the north. A toll plaza and an access ramp for the Thruway are located in the southern half of Area A. Aero Lake, a 40-acre man-made lake formed from a borrow pit used during the construction of the Thruway, is located to the west of Area A and north of Area B. The 40-acre, 20-foot deep man-made Aero Lake is classified as Class D water and is used by local residents for fishing in the warmer months. Ellicott Creek, classified as Class B and Class C, depending on the section, may receive surface waters from a small unnamed creek located adjacent to Aero Lake and from adjacent drainage swales.

Thirty-six acres of the landfilled areas located on either side of Aero Drive and along Pfohl Road were excavated during the remedial action and are now available for redevelopment.

History of Contamination

Landfilling operations at the site were conducted from 1932 to 1971. The landfill was operated as a cut and fill operation, whereby waste and drums which were filled with substances that could be spilled out, were emptied into shallow 150-foot diameter pits. Most of the waste materials were disposed of in Areas B and C and consisted of municipal and industrial wastes. Steel and metal manufacturers, chemical and petroleum companies, utilities, and manufacturers of optical and furnace-related materials were among those firms whose wastes were reportedly disposed of in the pits.

Initial Response

In 1982, EPA contracted with Fred C. Hart Associates to perform a preliminary assessment of the site. Water and sediment samples were obtained from the site and analyzed for organics, inorganics, sulfide, cyanide, and ammonia. Although the investigation revealed the presence of benzene, chlorinated benzenes, and nitrogen compounds in water samples taken from a spring flowing from the landfilled areas, the site was not recommended for listing on the National Priorities List at that time.

Between 1983 and 1985, all of the residences near the site were connected to the municipal drinking water supply. Previously, these residents obtained their drinking water from private wells.

Basis for Taking Action

In February 1984, the property owner contracted with Ecology and Environment to conduct additional investigations at the site. The sample analyses revealed elevated levels of polycyclic aromatic hydrocarbons (PAHs), phenols, barium, lead, chromium, cadmium and nickel in the groundwater and soils. As a result of this work, the site was listed on the NYSDEC Registry as a Class 2 Inactive Hazardous Waste site in 1985. NYSDEC initiated a remedial investigation/feasibility study (RI/FS) in 1988, which identified significant surface water/sediment and groundwater contamination and ultimately led to the selection of a remedy to address Areas B and C. In 1992, NYSDEC initiated an off-site RI to study the influence of the landfilled areas on off-site groundwater contamination and to determine if Area A required remediation. Based upon the results of this investigation, it was determined that Area A was not used for the disposal of hazardous substances and significant levels of ground water contamination were not detected. In 1993, the site was proposed for inclusion on the National Priorities List (NPL); the site was included on the NPL in December 1994.

IV. Remedial Actions

Remedy Selection

Based upon the results of the above-noted investigations, on February 11, 1992 and January 10, 1994, RODs were signed for the site as follows[2]:

- Construction of a barrier wall containment system around the perimeter of the landfilled areas;
- Construction of a leachate collection and conveyance system;
- Construction of 6NYCRR Part 360 (regulations for Solid Waste Management Facilities) compliant landfill caps over the landfilled areas in Areas B and C;
- Treatment and disposal of the collected leachate either on- or off-site;
- Operation and maintenance of the caps and leachate collection system, and long-term groundwater monitoring;
- Institutional controls to restrict access to the landfilled areas in order to prevent the use of groundwater beneath the site and protect the integrity of the cap.
- An Interim Remedial Measure (IRM) to remove drums and phenolic tars within the 100-year flood plain and at concentrated areas of the site; and
- No action within Area A.

The objectives of Operable Unit 2 were to determine whether or not Area A required remediation and to determine whether the landfilled areas were a source of downgradient groundwater contamination. While drinking water standards downgradient from the landfills were met at the time of the ROD for this operable unit, the Operable Unit 2 monitoring wells were used for groundwater monitoring related to Operable Unit 1.

Remedy Implementation

The IRM was initiated by NYSDEC in 1992 and was later completed by eight potentially responsible parties (PRPs) under an NYSDEC Order of Consent. The goals of the IRM were to investigate the suspected drum areas and remove and properly dispose of surface and sub-surface drums, drum contents, spilled contents from those drums, if any, and surface radioactive materials in Areas B and C. In addition, visibly impacted soils from any other areas identified during investigative activities were to be excavated and disposed of off-site. Surface drums, drum contents, spilled drum contents, visibly impacted soils, and surface radioactive materials were also to be removed from areas within the 100-year floodplain and disposed of off-site.

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[2]Remedial action objectives are specific goals to protect human health and the environment. These objectives are based on available information, standards, and risk-based levels established in the risk assessment. The following remedial action objectives for the site were identified: 1) reduce organic and inorganic contaminant loads to the surface water streams from leachate seeps and groundwater to assist in meeting Class B and D stream standards; 2) reduce carcinogenic and noncarcinogenic risks caused by dermal exposure to leachate seeps; 3) reduce carcinogenic risks caused by dermal absorption and ingestion of sediments; 4) prevent migration of contaminants from sediments that could result in surface water exceeding Class B or D stream standards; 5) reduce carcinogenic and noncarcinogenic risks caused by ingestion and dermal contact of landfill soils; 6) reduce risk or exposure to groundwater via ingestion and dermal contact; and 7) minimize migration of contaminants into uncontaminated groundwater.

OHM Corporation of Clarence Center, New York was selected as NYSDEC's contractor for the initial phase of the IRM and URS Consultants provided oversight. Drum removal and excavation activities were conducted between September 1992 and February 1993. A total of 2,928 drums containing wastes were removed, placed in metal overpack drums, and staged on-site for later off-site disposal. Another 1,619 empty drums were recovered and later reburied on-site. Fifteen drums containing low-level radioactive waste were overpacked and staged on-site for later disposal off-site. Four hundred forty cubic yards of visually-contaminated soil were excavated from Areas B and C and were staged on-site in roll-off containers for later disposal off-site.

An Order of Consent to complete the IRM was signed by NYSDEC and the PRPs on October 4, 1993. The PRPs selected IT Corporation as their contractor. Field work, which was performed from January 1994 to August 1995, included the excavation and off-site disposal of 392 cubic yards of visibly-contaminated soils previously staged by NYSDEC, the removal and off-site disposal of 1,724 drums and 990 cubic yards of visibly-contaminated soils and tar materials discovered during the final phase of the IRM, the rehabilitation of the site to pre-IRM conditions and the removal of all appropriate IRM support facilities.

Negotiations with the PRPs for the performance of the remedial design (RD)/remedial action related to the selected remedy resulted in 34 PRPs signing a Consent Decree on October 4, 1993. The Pfohl Brothers Landfill Site Steering Committee represented the PRP group. The Steering Committee retained Conestoga Rovers & Associates of Ontario, Canada to conduct the RD, solicit and obtain bids to construct the cap, and provide construction administration and resident engineering. The RD started in October 1994 and was approved by NYSDEC in April 2001 upon the execution of a second Order on Consent with the PRPs.

Non-intrusive construction activities, including mobilization and tree clearing, commenced on March 13, 2001. Intrusive construction work commenced on May 21, 2001. Sevenson Environmental Services, Inc. was chosen by the Steering Committee as the prime contractor for the construction work.

To facilitate future development along Pfohl Road and Aero Drive, approximately 36 acres of the landfilled areas, consisting of about 540,000 cubic yards of waste located along these roads (the edges of Areas B and C) were excavated and consolidated on the interior portions of Areas B and C. In addition, 9,200 cubic yards of contaminated soil and waste were excavated to protect the wetlands and consolidated on the interior portions of Areas B and C. Post-excavation soil samples showed that the remaining soils met New York State Technical and Administrative Guidance Memorandum No. 94-HWR-4046 January 24, 1994 (Revised) cleanup objectives. The excavated areas were backfilled with clean fill and top soil and were reseeded. Two caps totaling 94 acres were constructed over the consolidated wastes in conformance with New York State 6 NYCRR Part 360 closure requirements. Each cap consists of a six-inch gas venting layer overlain by a layer of filter fabric, a 40-mil thick very flexible polyethylene (VFPE) liner, a 24-inch barrier protection layer of clean soil, and topped with six inches of topsoil

capable of supporting vegetation. Forty-nine gas vents were installed to convey the gas from beneath the low permeability layer of the caps via the gas venting layer to the atmosphere.

The leachate collection system consists of an eight-inch diameter perforated collection pipe set in a granular material-filled trench, which runs along the 10,000-foot perimeter of the landfilled areas at a depth of approximately five to 22 feet bgs. An additional 1,000 feet of collection drain was installed eight to 14 feet bgs in the southwest interior of Area B to promote an upward gradient from the bedrock to the overburden within the confines of the perimeter barrier containment system. All of the collected leachate is discharged directly to the Buffalo Sewer Authority's Treatment Plant via the Town of Cheektowaga's sewer system via six collection wet wells and a force main that was connected to a sewer interceptor. Twenty-eight manholes were installed to facilitate monitoring and maintenance. A VFPE wall keyed into 24 inches of undisturbed clay at the bottom of the perimeter trench was installed as a vertical barrier to prevent the collection drain system from collecting clean off-site groundwater and dewatering the adjacent wetlands. The polyethylene wall was connected to the VFPE liner in the landfill caps.

All disturbed areas of the site were subsequently restored. A vegetative layer consisting of hardy, shallow rooted grasses was established on the surface of the landfill caps. The grass serves to stabilize the soil against erosion, minimize percolation of precipitation, promote evapotranspiration of soil moisture, and is aesthetically pleasing.

Due to meandering wetland boundaries, the construction of the landfill caps led to the permanent removal of 0.16 acre of wetlands along a portion of the western boundary of Area B. As mitigation, 0.50 acre of wetland was reestablished along the northern boundary of Area B, resulting in a net gain of 0.34 acre of wetland.

Based upon the results of a final inspection of the site conducted on September 26, 2002 by NYSDEC and EPA, it was determined that all construction activities had been completed and that the implemented remedy was consistent with the 1992 and 1994 RODs and the design documents.

An operation and maintenance (O&M) plan, which provides for a long-term monitoring program for the cover system, the drainage system, the groundwater, and the institutional controls, was approved in February 2006. The O&M activities at the site are being performed by the Town of Cheektowaga. Semi-annual O&M reports are reviewed by NYSDEC and EPA. A final Close-Out Report documenting the completion of the implementation of the site remedies was issued by EPA on December 10, 2007. The site was deleted from the National Priorities List effective September 22, 2008.

Institutional Controls Implementation and Other Measures

The 1992 ROD required the implementation of institutional controls to protect the integrity of the containment remedy and to prevent the use of contaminated groundwater. The restrictions were placed on Areas B and C in the form of Declarations

of Covenants and Restrictions and Grant of Access signed by each of the seven owners whose parcels make up the site. Five of the seven agreements were signed by the end of 2003 and the last two were signed in late 2005. Each Declaration requires that the owners agree to not use any on-site groundwater other than for monitoring the remedial action that no on-site surface water cisterns be constructed, that the capped areas not be accessed without prior written approval of NYSDEC, that on-site soil not be excavated, removed, or disturbed without NYSDEC written approval, and that trees and shrubs whose roots may breach the cap not be planted.

System Operations/Operation and Maintenance/Monitoring

The Operation, Maintenance, and Monitoring Manual for the Pfohl Brothers Landfill site contains the procedures for inspecting and evaluating the landfill caps, off-site disposal of the collected leachate and extracted groundwater, provision and certification of institutional controls, monitoring of groundwater, surface water and wetlands in the immediate perimeter of the landfilled areas, and long-term monitoring of downgradient groundwater wells. Repairs are to be 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 monthly basis as follows:

- The manholes and wetwells are inspected to determine that each one is free of obstructions, in good condition, and locked securely.

- The wetlands are inspected and checked for bare areas, washouts, dead/dying/undesirable plants, build-up of sediments, flow restrictions, the stability of erosion protection, and the general condition of the water budget and water levels.

The site is inspected on a quarterly basis as follows:

- The landfill caps are inspected for signs of erosion, bare areas, washouts, leachate seeps, length of grass, dead/dying grass and signs of burrowing animals;

- The surface water drainage system is inspected for signs of sediment build-up, erosion, obstructions, and dead/dying grass in the drainage ditches;

- The landfill gas venting system is inspected for any damage to the vents;

- The access roads are inspected for erosion, obstructions, potholes, puddles and debris;

- The integrity of the two landfill perimeter fences, gates, locks, and placement and condition of signs are checked;

- The utility building is inspected for vandalism, damage, and if secure; and

- The site is inspected for debris, litter and/or waste.

The leachate is collected in a trench collection system and is discharged to the Buffalo Sewer Authority's Treatment Plant via the Town of Cheektowaga's sewer system. Sampling of the leachate was performed monthly for the first two years and is now performed quarterly in accordance with the requirements of Discharge Permit No. 02-11-CH016 between the Buffalo Sewer Authority and the Town of Cheektowaga.

The inspections, maintenance, sampling, monitoring, data evaluation, and reporting costs ranged from $41,600 to $150,200 during the past five years. Maintenance repairs included replacement of deteriorated underground electrical cable, resurfacing of the stone perimeter roads on the north and south sides of Aero Drive, replacement of pumps, and a clean out of the force main piping.

V. Progress Since the Last Five-Year Review

The first five-year review for this site, which was approved on March 19, 2006, found the remedy to be protective of human health and the environment. The review made several suggestions for improving, modifying, and/or adjusting the ongoing operation, maintenance, and monitoring activities.

The prior five-year review noted that several monitoring wells were purged dry during sampling events. EPA suggested that the PRPs employ low-flow protocol or passive diffusion bags. Although the PRPs achieved some progress by employing low-flow sampling protocols, several wells continue to be purged dry during sampling events.

In order to determine if the off-site groundwater exhibited any traces of leachate, it was recommended that the leachate be analyzed for all constituents on an annual basis. It was also requested that the background cluster wells GW-18 and GW-6 be sampled. While the leachate is sampled quarterly as per the discharge permit and has consistently passed the discharge requirements, it is analyzed for only seven metals, pH and total suspended solids. A full leachate analysis performed in 2006 indicated that very low levels of a few VOCs, SVOCs and pesticides were present in the leachate. The deep background well, GW-18, could not be found. The shallow background well, GW-6, was sampled once since 2006.

As suggested in the 2006 five-year review, water level measurements are being collected from the bedrock wells, some of the groundwater data is presented in charts, the wetlands water level data is being reported in a separate section of the monitoring report, and the edge of the wetlands was marked so that the wetlands plants don't get mowed down again.

VI. Five-Year Review Process

Administrative Components

The five-year review team consisted of Pamela Tames (RPM), Michael Scorca (hydrogeologist), Charles Nace (human health risk assessor) and Mindy Pensak (ecological risk assessor).

Document Review

The documents, data and information reviewed in completing the five-year review are summarized in Table 2.

Data Review

Since the first five-year review was completed in 2006, groundwater monitoring data collected from six deep and twelve shallow perimeter monitoring wells indicate that no volatile organic compounds (VOCs), polychlorinated biphenyls (PCBs), dioxins, furans, or cyanide were detected above the Class GA water quality standards. The semivolatile organic compounds (SVOCs) bis(2-ethylhexyl)phthalate and phenol were detected sporadically above water quality standards in one well. It should be noted that four groundwater wells continue to be purged dry during sampling, possibly affecting the VOC sampling results. In a May 31, 2006 letter to NYSDEC, Jon Sundquist, Project Manager from URS Corporation, on behalf of the Town of Cheektowaga, agreed to the use of passive diffusion bags for sampling these wells but did not follow through. No radionuclides were detected above the EPA Maximum Contaminant Level (MCL) of 4 millirem/year exposure. In April 2007, NYSDEC approved the Town of Cheektowaga's request to eliminate radionuclides, 2,3,7,8-TCDD and 2,3,7,8-TCDF from their list of test parameters. Iron, magnesium, manganese, and sodium routinely exceeded Class GA standards in most wells. These inorganic constituents are common in landfill leachate, but also can be from other natural and man-made sources. During the RI, each of these constituents was also found to exceed groundwater criteria in samples from a local background well or regional aquifer wells. In addition, the elevated concentration of sodium in the shallow groundwater wells may be attributed to seasonal de-icing activities on the nearby New York State Thruway toll plaza and Transit Road, a major local roadway. Cadmium and chromium were only sporadically detected above Class GA standards. Continued monitoring will help to determine long-term trends of chemicals in the aquifer.

During the review period, all of the parameters in samples of the leachate that were collected quarterly in the groundwater collection system were below the limits set by the permit.

Surface water and sediment sampling was performed in the spring of 2004, 2005 and 2006 for pH, specific conductivity, temperature, and turbidity, as well as VOCs, SVOCs, PCBs, metals, and cyanide. At several locations, surface water samples exceeded the Class B standards for aluminum and iron. An additional round of surface water and sediment sampling was performed in the spring of 2008 for PCBs only. Surface water and sediment samples were collected from eight creek/drainage swale locations

surrounding the landfill. No PCBs were detected in the surface water samples and only one sediment sample (located closest to the Thruway) had a PCB concentration just over the wildlife bioaccumulation guidance value.

The results of the analyses of leachate in 2002 and 2006 contained only very low levels of a few VOCs, SVOCs and pesticides. Quarterly sampling of the pumped leachate indicates some elevated metals concentrations.

Groundwater level measurements inside the leachate trench collection system have been consistently lower than the water level elevations in the shallow groundwater wells located outside the barrier wall, indicating an inward horizontal gradient. There is, however, limited water level measurement data for the bedrock aquifer. Of the six monitoring well clusters on the perimeter of the facility, the three clusters on the northern part of the site generally had an upward flow gradient (monitoring wells GW-1, GW-3, and GW-8) and the other three indicated a downward flow gradient (GW-4, GW-7, and GW-35S/26D) during the review period. These will continue to be monitored to determine if this is an ongoing trend.

Community Involvement

The EPA Community Involvement Coordinator (CIC) for the Pfohl Brothers Landfill site, Michael Basile, published a notice in the *Buffalo News*, a local newspaper, on October 11, 2010, notifying the community of the initiation of the five-year review process. The notice indicated that EPA would be conducting a five-year review of the site to ensure that the site is protective of public health and the environment and that the implemented components of the remedy are functioning as designed. It was also indicated that once the five-year review is completed, the results will be made available in the local site repository. In addition, the notice included the addresses and telephone numbers for the RPM and CIC for questions related to the five-year review process or the Pfohl Brothers Landfill site.

Site Inspection

The need for ongoing five-years reviews stems from the presence of contaminated materials located beneath the landfill cap. A site inspection was conducted as part of this five-year review on October 27, 2010. Pamela Tames, Michael Scorca and Charles Nace of EPA, Jaspal Walia, David Szymanski, and Linda Ross of the New York State Department of Environmental Conservation, William Pugh and John Nych of the Town of Cheektowaga, and Jon Sundquist of URS attended the site inspection.

Interviews

No interviews were conducted for this review.

Institutional Controls Verification

The 1992 ROD required the implementation of institutional controls to protect the integrity of the containment remedy and to prevent the use of contaminated groundwater. Restrictions in the form of Declarations of Covenants and Restrictions and Grant of Access have been obtained from all seven owners of the lots affected by the Pfohl Brothers Landfill to protect the remedy. These agreements prohibit the use of groundwater, excavation activities that would affect the integrity of the cap, and activities that would alter surface water drainage. New York State requires annual certifications that institutional controls are in place and that remedy related O&M is being performed. In February 2011, NYSDEC verified that the institutional controls are in place and that remedy-related O&M is being performed. The next annual verification will be performed in February 2012.

Other Comments on Operation, Maintenance, Monitoring, and Institutional Controls

Table 3 (attached) summarizes several observations and offers suggestions to resolve the issues.

VI. Technical Assessment

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

Based on the current condition of the landfill cap which prevents leachate seeps from reaching the adjacent wetlands and other areas beyond its footprint, the good condition of the perimeter fencing, the current operation of the leachate collection system that was observed during the site visit, and the existence of institutional controls which restrict development on top of the cap, it has been concluded that the remedy is functioning as intended and exposure pathways have been eliminated. An analysis of groundwater, surface water, and sediment samples taken during the previous five-year period indicate that the exceedances of metals in the water samples correspond to those also found in the local background well. Small amounts of other constituents (mostly SVOCs) were found sporadically. Other components such as sodium are likely due to the location of the nearby New York State Thruway toll plaza and Transit Road, a major local roadway, and copious use of road salt during the long winter season.

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

Human Health

The previous five-year review indicated that the Pfohl Brother's 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. Potential exposure to contaminated groundwater has also been eliminated. A leachate collection system is working to prevent contaminated groundwater from moving off-site.

There are currently no complete exposure pathways due to the remedial actions that have been completed (i.e., landfill caps, leachate collection system, and vertical barriers) and due to no off-site contamination being present. Therefore, the current exposure parameters and toxicity values that would be used are not relevant, as a current evaluation would not quantify risks or hazards. Since there is no current or expected future exposure to the contaminants located within the landfill, it can be concluded that the exposure parameters and toxicity values that were used are still valid in reference to the protectiveness of the remedy.

The cleanup levels that were chosen for the on-site groundwater were the MCLs. These levels are still valid. NYSDEC's Division of Hazardous Waste Remediation, Technology Section, Draft Soil Cleanup Guideline Values were used as soil cleanup objectives. Although some of the soil cleanup objectives have changed since the ROD, the entire surface of the landfilled areas were capped. Therefore, the updated soil cleanup objectives are still valid.

An exposure pathway that was not considered in the original assessment is vapor intrusion into indoor air. However, since the VOCs in the groundwater are located within the containment system and are at a great distance from the residences, the potential for soil vapor intrusion issues related to this site is highly unlikely.

The information contained in the previous five-year review is still accurate and valid.

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

No, there does not appear to be any other information that could call into question the protectiveness of the remedy.

Technical Assessment Summary

Based upon the results of the five-year review, it has been concluded that:

- The caps and vegetative covers are intact and in good condition;
- The landfill gas system is operating properly;
- The monitoring wells are securely locked and functional;
- The leachate collection system is functional;
- There is no evidence of trespassing or vandalism; and
- No additional measures are needed to protect public health.

VIII. Issues, Recommendations, and Follow-Up Actions

Table 4 (attached) summarizes a recommendation stemming from this 5-year review.

IX. Protectiveness Statement

The implemented actions under Operable Unit 1 protect human health and the environment in the short term. The landfilled areas have been capped, removing direct contact (*i.e.*, ingestion or dermal contact of soil) exposures to the public. Institutional controls are in place to further prevent potential exposures to the public, including trespassers. The potential impacts to groundwater are being addressed through the caps that reduce or prevent percolation through the landfilled areas. Leachate from the leachate collection system is being discharged to a publicly-owned treatment works further reducing potential exposures to the population. The Operable Unit 2 remedy provided no further actions. In order for the remedy to be protective in the long term, additional data and information is needed to ensure that the remedy is fully functioning as intended.

X. Next Review

Since hazardous substances, pollutants or contaminants remain at the site which do not allow for unlimited use or unrestricted exposure, in accordance with 40 CFR 300.430 (f) (4) (ii), the remedial action for the site shall be reviewed no less often than every five years. EPA will conduct another five-year review within five years of the signature date below.

Approved:

for Walter E. Mugdan, Director
Emergency and Remedial Response Division

3/18/11
Date

Table 1: Chronology of Site Events	
1932-1971	Operation of landfill
1985	Listed as a Class 2 site in the New York State Registry of Inactive Hazardous Waste Disposal Sites
1994	Site placed on National Priorities List
1988-1991	Remedial Investigation/Feasibility Study
1992-1993	Interim Remedial Measure initiated by NYSDEC
1993-1995	Interim Remedial Measure completed by PRPs under an Order of Consent
1992	Record of Decision for Areas B and C
1994	Record of Decision for Area A
1993	Consent Decree for Remedial Design
1998	Remedial Design
2001	Consent Decree for Remedial Action
2001-2002	Remedial Action
2002	Preliminary Site Close-Out Report
2003-2005	Declaration of Covenants and Restrictions and Grant of Access signed by each of the seven owners whose parcels make up the site.
2006	First Five-Year Review
2007	Site Closeout Report
2008	Site deleted from the National Priorities List

Table 2: Documents, Data, and Information Reviewed in Completing the Five-Year Review	
Document Title, Author	**Date**
Remedial Investigation/Feasibility Study, Camp, Dresser & McKee	1992
Off-Site Remedial Investigation, NYSDEC	1993
Record of Decision, NYSDEC	1992
Record of Decision, NYSDEC	1994
Drum and soil Interim Remedial Measure Final Remediation Report, URS	1996
Interim Remedial Measures Completion Report, Conestoga-Rovers & Associates	1995
Final (100%) Design Documents, Conestoga-Rovers & Associates	1999
Remedial Action Report, Conestoga-Rovers & Associates	2003
Final Close-Out Report, EPA	2007
OM&M Inspection Semi-Annual Summary Report, URS	10/2006
OM&M Inspection Semi-Annual Summary Report, URS	3/2007
OM&M Inspection Semi-Annual Summary Report, URS	9/2007
OM&M Inspection Semi-Annual Summary Report, URS	3/2008
OM&M Inspection Semi-Annual Summary Report, URS	8/2008
OM&M Inspection Semi-Annual Summary Report, URS	8/2009
OM&M Inspection Semi-Annual Summary Report, URS	2/2010
OM&M Inspection Semi-Annual Summary Report, URS	8/2010
Superfund First Five-Year Review Report – Pfohl Brothers Landfill, Town of Cheektowaga, NY	2006
EPA guidance for conducting five-year reviews and other guidance and regulations to determine if any new Applicable or Relevant and Appropriate Requirements relating to the protectiveness of the remedy have been developed since EPA issued the ROD.	

Table 3: Other Comments on Operation, Maintenance, Monitoring, and Institutional Controls	
Comment	**Suggestion**
Current sample collection methods that purge a number of wells dry during sampling may affect VOC sample results.	Well sampling should employ passive diffusion bags for VOC sample analyses in those wells that usually are purged dry during low-flow sampling as agreed to in the Town of Cheektowaga's May 31, 2006 letter to NYSDEC.
It is difficult to determine if the off-site groundwater exhibits traces of leachate without having a full scan of the leachate for comparison. In addition, without current background data, the source of the metals in the perimeter monitoring wells cannot be confirmed to be due to background sources	The leachate should be sampled annually for all of the site's chemicals of concern for comparison with the off-site sampling results. This has not been performed since 2006. The background wells should be sampled on a regular basis, for comparison. Since GW-18 cannot be located, another background well should be used in addition to GW-6.
Trends in the data are inconsistent.	It would be useful to provide the chemical, field parameter, and location data in EPA Region 2 electronic data deliverable format (EDD) in every semi-annual report so that more advanced analysis of the data could be conducted. This website has more detailed information about submitting data: http://www.epa.gov/region02/superfund/medd.htm, If the data were compiled into tables and graphs showing monthly values, it could help show if there is a trend of decreasing leachate production due to lowered infiltration. It should also be determined if the water table is still in contact with the landfill waste that was left in place or has dropped below it.
The quarterly leachate discharge monitoring samples for metals are listed as composites. It is assumed that the leachate samples collected every three years and analyzed for VOCs are similarly collected.	Steps should be taken to obtain a direct leachate sample that would not be prone to volatilizing VOCs.
The vertical gradients in well clusters 4 and 7 are very large and trend downward instead of upward, which is preferred.	The large downward gradients in these well clusters may mean that the deep wells are not functioning properly and need to be redeveloped and/or repaired. If they cannot be repaired, these well clusters should be replaced with wells that better reflect actual aquifer conditions adjacent to the landfill.
It was pointed out during the site visit that phragmites were taking over the wetlands.	A phragmites eradication program should be put into place so that the native fauna can prosper.

Table 4: Issues, Recommendations, and Follow-Up Actions

Issue	Recommendations and Follow-Up Actions	Party Responsible	Over-sight Agency	Mile-stone Date	Affects Protectiveness (Y/N)	
					Current	Future
This site has ongoing operation, maintenance, and monitoring activities as part of the remedy. As was anticipated by the decision documents, these activities are subject to routine modification and adjustment. This report includes suggestions for improving, modifying and/or adjusting these activities.	NYSDEC should forward the suggestions presented in Table 3 to the PRPs and obtain a timetable for their implementation.	PRPs	NYSDEC	4/30/11	N	N