THIRD FIVE-YEAR REVIEW REPORT FOR THE ROSEN BROTHERS SCRAP YARD/DUMP SUPERFUND SITE CITY OF CORTLAND, CORTLAND COUNTY, NEW YORK

Prepared by:
United States Environmental Protection Agency
Region 2
New York, New York

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Approved by:

Walter E. Mugdan, Director
Emergency and Remedial Response Division

Date:

Sept. 30, 2013

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EXECUTIVE SUMMARY

This is the third five-year review for the Rosen Brothers Scrap Yard/Dump Superfund site. A protectiveness determination for the site cannot be made until further information is obtained. Specifically, further vapor intrusion data needs to be collected at residences downgradient of the site so that a protectiveness determination can be made by September 30, 2016.

Five-Year Review Summary Form

SITE IDENTIFICATION		
Site Name: Rosen Brothers Scrap Yard/Dump site		
EPA ID: NYD982272734		
Region: 2	**State:** NY	**City/County:** City of Cortland/Cortland 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" was selected above, enter Agency name:** Click here to enter text.
Author name (Federal or State Project Manager): Mark Granger
Author affiliation: EPA
Review period: 09/24/2008 – 09/24/2013
Date of site inspection: June 26, 2013
Type of review: Statutory
Review number: 3
Triggering action date: 9/24/2008
Due date *(five years after triggering action date)*: 9/24/2013

Five-Year Review Summary Form (continued)

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

OU(s): 01	**Issue Category: Soil-Vapor Intrusion**			
	Issue: Elevated soil vapors are present under the subslabs of several nearby structures.			
	Recommendation: Vapor intrusion investigations should continue in nearby structures. Based upon the results of these investigations, any measures deemed necessary to mitigate potential exposure should be performed.			
Affect Current Protectiveness	**Affect Future Protectiveness**	**Implementing Party**	**Oversight Party**	**Milestone Date**
No	yes	EPA.	EPA	9/2016

Protectiveness Statement(s)		
Include each individual OU protectiveness determination and statement. If you need to add more protectiveness determinations and statements for additional OUs, copy and paste the table below as many times as necessary to complete for each OU evaluated in the FYR report.		
Operable Unit: 01	***Protectiveness Determination:*** Protectiveness Deferred	***Addendum Due Date (if applicable):***
Protectiveness Statement: A protectiveness determination at OU1 cannot be made until further information is obtained. Specifically, vapor-intrusion investigations need to be completed at properties located downgradient of the site. It is expected that these actions will take approximately three years to complete, at which time a protectiveness determination will be made.		

Sitewide Protectiveness Statement (if applicable)	
For sites that have achieved construction completion, enter a sitewide protectiveness determination and statement.	
Protectiveness Determination: Protectiveness Deferred	***Addendum Due Date (if applicable):*** Click here to enter date.
Protectiveness Statement: A protectiveness determination at the site cannot be made until further information is obtained. Specifically, vapor-intrusion investigations should be completed at properties located downgradient of the site. It is expected that these actions will take approximately three years to complete, at which time a protectiveness determination will be made.	

I. Introduction

This five-year review was conducted pursuant to Section 121(c) of the Comprehensive Environmental Response, Compensation and Liability Act, 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 a five-year review is to ensure that a remedial action remains protective of public health and the environment and is functioning as designed. This document will become part of the site file.

This is the third five-year review for the Rosen Brothers Scrap Yard/Dump site. Since, after the completion of the remedial action, contaminants remain on-site, a statutory five-year review is required. In accordance with the Section 1.3.3 of the five-year review guidance, a subsequent statutory five-year review is triggered by the signature date of the previous five-year review report. The trigger for this five-year review is the date of the previous five-year review report, which is September 24, 2008.

Based upon this five-year review, a protectiveness determination for the site cannot be made until further information is obtained. Specifically, further vapor intrusion data needs to be collected at residences downgradient of the site so that a protectiveness determination can be made by September 30, 2016.

II. Site Chronology

Table 1 summarizes the site-related events from discovery to the present.

III. Background

The Rosen site is located at 136 Pendleton Street within the City of Cortland, Cortland County, New York (see **Figure 1**). This location is about 40 miles north of the City of Binghamton and 35 miles south of the City of Syracuse.

Physical Characteristics

The Rosen Brothers site, located on relatively flat terrain, is an abandoned scrap-metal processing facility which occupies approximately twenty acres on the southern side of the City of Cortland, New York. Access to the site is restricted from the surrounding environs by a seven-foot-high fence with two locked gates. To the east of the site are the building and parking lot of the former Kirby Company, Pendleton Street, a vacant lot and a small residential area consisting of approximately 13 apartment buildings. To the north is Perplexity Creek (an eastward-flowing, seasonally-intermittent stream), railroad tracks associated with the New York, Susquehanna & Western Railroad, several industries, Huntington Street, a small residential area consisting of approximately 20 houses and a school. To the west are a vacant lot, several industries, and South Main

Street. To the south is Perplexity Creek Tributary (a northeastward-flowing, seasonally-intermittent stream), Valley View Drive and the Cortland City Junior and Senior High Schools.

Perplexity Creek Tributary converges with Perplexity Creek at the northeast corner of the site. At this point, Perplexity Creek continues through a culvert for approximately 2,000 feet, then flows freely for approximately a one-half mile interval before emptying into the Tioughnioga River.

Site Geology/Hydrogeology

Surficial geology at the site is comprised of glacial sand and gravel overlain by a silt unit and a fill unit. The silt unit appears to overlay the sand and gravel unit across most of the site, ranging from two to six feet in thickness. For most of the site, the fill ranges in thickness from one to six feet, typically consisting of gravels, sands, and silts mixed with various materials such as slag, cinders, and ash. Other materials observed in the fill consist of metal, wire, brick, wood, glass, railroad ties, pipes, asphalt, plastics, and concrete.

There are two primary hydrogeologic units beneath the site – the upper outwash unit and the lower sand and gravel unit. In the southern portion of the site, the upper unit directly overlies the lower unit and they tend to act as one unit. In the northern portion of the site, the upper outwash and lower sand and gravel units become separated by a lower-permeability lacustrine unit, forming two distinct hydrogeologic units. The lacustrine unit also restricts the downward migration of contaminants from the upper outwash unit to the lower sand and gravel unit. The upper outwash unit is about 40 feet thick and the general direction of groundwater flow is toward the northeast.

The site overlies the Cortland-Homer-Preble aquifer, a sole source aquifer, which is used as a supply of potable water for the City of Cortland.

Land and Resource Use

The site was originally used as a steel mill and scrap yard; it is presently abandoned. In September 1998, the EPA entered into a Prospective Purchaser Agreement (PPA) with the City of Cortland for the purchase, leasing and redevelopment of the site. The PPA administratively cleared the way for the City of Cortland to take title to the property in order to effect redevelopment. The City of Cortland took title to the property in March 2003.

The area surrounding the site is characterized as residential, industrial, and commercial. Approximately 15,000 people live within a one-mile radius of the site. At present, all residences and businesses within the vicinity of the site and in downgradient areas receive water from the City of Cortland's municipal water-supply well. The City of Cortland's municipal water-supply well is located approximately two miles upgradient of the site.

History of Contamination

The area currently occupied by the site is the eastern half of a 40-acre parcel of land which was originally referred to as "Randall's Vacant Fields." In the late 1800's, the land was developed by Wickwire Brothers, Inc. (Wickwire) as an industrial facility for the manufacture of wire, wire products, insect screens, poultry netting, and nails. The eastern 20 acres of the property was used, primarily, as a scrap yard by Wickwire, supplying scrap metal for the steel mill (which was also located on the eastern half). An on-site pond was dammed and used as a cooling pond for water used in the manufacture of raw steel. This cooling pond was approximately three acres in size and had an estimated capacity of one million gallons. The entire facility was sold to Keystone Consolidated Industries, Inc. (Keystone) in 1968. Keystone closed the facility in 1971. Shortly thereafter, the facility was destroyed by fire.

In the early 1970's, Phillip and Harvey Rosen (Rosen Brothers) transferred their existing scrap-metal processing operation in the City of Cortland to the eastern portion of the Wickwire property. At this time, the Rosen Brothers began the demolition of the Wickwire buildings on the western portion of the property. The demolition debris (reportedly comprising more than a 1.5-million square feet of buildings) was used to fill in most of the cooling pond to or above grade, hence the cooling pond is hereinafter referred to as "the former cooling pond." In exchange for this work, Rosen Brothers was granted title to the eastern portion of the property. The western portion of the Wickwire property was cleared for the development of new industry in 1979, and has since been known as the Noss Industrial Park.

Rosen Brothers' scrap-metal operations included scrap-metal processing and automobile crushing. The site was used to stage large quantities of abandoned vehicles, appliances, steel tanks, drums, truck bodies, and other scrap materials. Municipal waste, industrial waste, and construction waste were allegedly intermittently disposed of in or on the former cooling pond. Drums were routinely crushed on-site, the contents spilling onto the ground surface. Philip Rosen and Rosen Brothers were cited for various violations throughout this period, including illegally dumping into Perplexity Creek Tributary, improperly disposing of waste materials, and operating a refuse disposal area without a permit. Operations on the site ceased in 1985 and the site was abandoned.

Initial Response

In 1986, the New York State Department of Environmental Conservation (NYSDEC) conducted a Phase II investigation, which included a site inspection, geophysical studies, installation of soil borings and monitoring wells, and sampling and analysis of groundwater, soils, sediments, and waste materials. The site inspection concluded that hazardous materials were present on the site, including several hundred full and/or leaking drums, transformers filled with polychlorinated biphenyls (PCBs), and pressurized cylinders of unknown content. The results of sampling efforts indicated elevated levels of 1,1,1-trichloroethane (1,1,1-TCA), PCBs, anthracene, pyrene, lead, and chromium in site-related soil, sediment, and groundwater.

The EPA performed a removal action at the site in 1987 to address immediate threats to the public health and the environment. This removal action included fencing the site, sampling, excavating visibly-contaminated soil, and securing and temporarily staging drums, tanks, cylinders, transformers, and the excavated soil.

Based on materials observed on the site and other evidence, the EPA issued Administrative Orders to Keystone and several other potentially responsible parties (PRPs) in 1988 and 1989, including, among others, Monarch Machine Tool Company (Monarch), Niagara Mohawk Power Corporation (Niagara Mohawk), and Overhead Door Corporation (Overhead Door), requiring them to remove the materials previously staged during the EPA removal action. This work was completed in April 1990.

These companies voluntarily undertook the demolition and removal of structurally unsound buildings and a 150-foot high smoke stack in December 1992. They also removed and recycled 200 tons of scrap materials in December 1993. In November 1994, the companies emptied and disposed of the contents of an abandoned underground storage tank and removed a small concrete oil pit. In August 1997, the EPA removed and recycled more than 500 tons of scrap metal and more than 20 tons of tires from the site.

Basis for Taking Action

On March 30, 1989, the site was added to the Superfund National Priorities List. Overhead Door, Monarch, and Niagara Mohawk agreed to conduct a remedial investigation and feasibility study (RI/FS) in accordance with an Administrative Order on Consent (Index Number II CERCLA-00204) with the EPA in January 1990. Keystone, Cooper Industries, Inc., and Potter Paint Co., Inc. assisted in the performance or funding of the RI/FS pursuant to the terms of a Unilateral Administrative Order (Index Number II CERCLA-00205) issued in February 1990. The companies completed the RI/FS in 1997. The RI detected the presence of elevated levels of PCBs, volatile organic compounds (VOCs), semi-volatile organic compounds, and inorganics in on-site soils and VOCs in the groundwater. The risk assessment concluded that the contaminated surface soils and groundwater at the site pose an unacceptable risk to human health due, primarily, to the presence of VOCs, SVOCs, PCBs, and metals. The ecological risk assessment concluded that metals and PCBs exceeded the available Lowest-Observed-Adverse-Effect Levels (LOAELs) and No-Observed-Adverse-Effect-Levels (NOAELs) for raccoons and deer mice. The primary route of exposure was bioaccumulation of contaminants through the food chain.

IV. Remedial Actions

Remedy Selection

Based upon the results of the RI/FS, in March 1998, the EPA signed a Record of Decision (ROD) selecting a remedy for the site. The following remedial action objectives (RAOs) were selected for the site:

- Prevent human contact with contaminated soils, sediments, and groundwater;
- Prevent ecological contact with contaminated soils and sediments;
- Mitigate the migration of contaminants from soils/fill to groundwater:
- Mitigate the off-site migration of contaminated groundwater;
- Restore groundwater quality to levels which meet federal and state drinking-water standards; and
- Control surface water runoff and erosion.

The key components of the selected remedy include:

- Excavation of all 1,1,1-TCA-contaminated soils above NYSDEC's recommended soil cleanup objective of 1 milligram per kilogram (mg/kg) identified in the Technical and Administrative Guidance Memorandum (TAGM) in two VOC hot-spot areas and PCB-contaminated soils above the TAGM objective of 10 mg/kg in two hot-spot areas. Clean or treated material would be used as backfill in the excavated areas.

- Consolidation of all excavated soils with PCB concentrations less than 50 mg/kg onto the former cooling pond. Those soils with PCB concentrations above 50 mg/kg would be sent off-site for treatment/disposal at a Toxic Substances Control Act-compliant facility. All excavated 1,1,1-TCA-contaminated soils would either be sent off-site for treatment/disposal or treated on-site to 1 mg/kg for 1,1,1-TCA and used as backfill in the excavations.

- Removal and consolidation onto the former cooling pond of nonhazardous debris located on surface areas where the site-wide surface cover will be installed and/or is commingled with the excavated soil.

- Placement of a cap meeting the requirements of New York State 6 NYCRR Part 360 (Part 360) regulations over the three-acre former cooling pond. Prior to the construction of the cap, the consolidated soils, nonhazardous debris, and existing fill materials would be regraded and compacted to provide a stable foundation and to promote runoff.

- Construction of a chain-link fence around the former cooling pond after it is capped.

- Placement of a surface cover over the remaining areas of the site (approximately 17 acres) to prevent direct contact with residual levels of contaminants in site soils. The nature of the surface cover would be determined during the remedial design phase.

- Monitored natural attenuation (MNA) to address the residual VOC groundwater contamination in downgradient areas. As part of a long-term groundwater monitoring program, sampling would be conducted in order to verify that the level and extent of groundwater contaminants are declining from baseline conditions and that conditions are protective of human health and the environment.

- Implementation of regrading and storm-water management improvements to protect the integrity of the cap/site-wide surface cover.

- Long-term monitoring to evaluate the remedy's effectiveness.

- Institutional controls in the form of deed restrictions and contractual agreements, as well as local ordinances, laws, or other government action, for the purpose of restricting the installation and use of groundwater wells at and downgradient of the site, restricting excavation or other activities which could affect the integrity of the cap/site-wide surface cover, and restricting residential use of the property in order to reduce potential exposure to site-related contaminants.

Remedy Implementation

On March 6, 1998, in anticipation of planned on-site redevelopment activities, the EPA issued a Unilateral Administrative Order to the entities noted above and several other entities to excavate approximately 1,000 cubic yards of PCB-contaminated soils from the two PCB-contaminated soil hot-spot areas noted above, backfill the excavation with clean fill, and install a surface cover on a five-acre portion of the site. A total of 850 cubic yards of the excavated soils with PCB concentrations less than 50 mg/kg was consolidated onto the former cooling pond and 150 cubic yards of the excavated soils (greater than 50 mg/kg PCBs) were shipped off-site for disposal. This work was performed from September to December 1998.

In September 1998, the EPA entered into a Consent Decree with fifteen PRPs to design and implement the remaining portions of the remedy selected in the ROD (*i.e.*, excavation of 1,1,1-TCA-contaminated soils, construction of the cooling pond cap and site-wide surface cover, and implementation of MNA of the groundwater). The Consent Decree was entered in May 1999. The remedial design (RD) for this effort was initiated in August 2001; it was approved by the EPA in April 2002.

From July 2002 to July 2003, approximately 900 cubic yards of 1,1,1-TCA-contaminated soils were excavated from the two hot spots, the excavations were backfilled with clean fill, and the excavated soils were shipped off-site for disposal. In addition, an 11.5-acre site-wide cover, consisting of a permeable geotextile overlain by a one-foot

protection/topsoil layer was installed and a 3.5-acre Part 360 cap was installed over the cooling pond.

The groundwater remedy called for in the ROD required the reduction of VOC concentrations in the groundwater to groundwater standards by source removal in combination with MNA. Quarterly groundwater sampling was initiated in May 2003 as part of the assessment of MNA. After four quarters, sampling continued at a frequency of twice per year for one year and was conducted annually thereafter.

Institutional Controls Implementation

The ROD called for institutional controls to restrict the installation and use of groundwater wells at and downgradient of the site, to restrict excavation or other activities which could affect the integrity of the cap/site-wide surface cover, and to restrict residential use of the property in order to reduce potential exposure to site-related contaminants. Through a PPA, deed restrictions which prevent disturbing the cap over the former cooling pond, prevent disturbing or digging beneath the site-wide geotextile layer without the EPA's prior authorization, prevent the installation of groundwater wells without the EPA's prior authorization, and prohibit residential use of the property were recorded on the deed for the property when the City of Cortland took title to the site on March 21, 2003.

Additionally, the Cortland County Sanitary Code (Article XII, §§ 1 and 2) restricts the installation of groundwater wells without a permit. Since the County is aware of the presence of groundwater contamination at and downgradient of the site, it is unlikely that a permit to install a well would be approved.

Operation and Maintenance

The operation and maintenance (O&M) manual for the site contains the procedures for inspecting and evaluating the cap and site-wide surface cover, maintaining the groundwater monitoring-well network, and long-term monitoring of groundwater. Repairs are to be made to the cap, drainage systems, and monitoring network, as necessary, to control the effects of settling, subsidence, erosion, vectors, or other events that might interfere with the performance of the remedy. Groundwater monitoring is being used to monitor the effectiveness of the MNA.

The site is inspected annually as follows:

- the Part 360 landfill cap is inspected for signs of erosion, excessive settlement, surface water ponding, seedling growth, and stressed vegetation;

- the surface water drainage system is inspected for signs of erosion and/or siltation, seedling growth, *etc.*, in the swales and ditches;

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

- the site is inspected for vectors;
- 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 access roads are inspected for ruts, puddles, and driveability; and
- the site is inspected for debris, litter, and/or waste.

The initial estimated annual inspection, maintenance, sampling, and monitoring costs are $40,000; these costs are broken down in **Table 2**.

V. Progress Since Last Five-Year Review

The second five-year review, which was conducted in September 2008, concluded that "The implemented remedial actions protect human health and the environment in the short-term. Currently, there are no exposure pathways that could result in unacceptable risks and none are expected, as long as the site use does not change and the implemented engineering, access and institutional controls are properly maintained. In order for the site to be protective in the long term, a vapor intrusion survey should be conducted at a school and residential properties located downgradient of the site." The second five-year review noted that although the concentrations of contaminants in the groundwater were decreasing over time, groundwater monitoring should continue in order to ensure that this downward trend continued until drinking-water standards are achieved. Additionally, the second five-year review noted that the vapor intrusion pathway should continue to be evaluated consistent with EPA guidance to ensure that this exposure pathway is not contributing to unacceptable risks or hazards at the site.

During the review period, the EPA continued the sampling of groundwater and subslab and indoor air at downgradient properties. Groundwater is currently sampled for VOCs in wells located both on and immediately downgradient of the site on a frequency of every other year. Soil vapor intrusion (SVI) sampling efforts have been conducted annually and will continue to be conducted at least annually until all potentially affected properties have been assessed. Further detail on the status of both groundwater and soil-vapor media is provided below.

VI. Five-Year Review Process

Administrative Components

The five-year review team consisted of Mark Granger (Remedial Project Manager

[RPM]), Edward Modica (hydrogeologist), Ula Filipowicz (human-health risk assessor) and Michael Clemetson (ecological risk assessor).

Community Involvement

The EPA Community Involvement Coordinator, Michael Basile, developed a website for the site and will link the completed five-year review to it. Once the five-year review is completed, the five-year review report will be placed in the local information repository and notification will be provided to local officials that the five-year review report is in the local repository and available on the EPA's website.

Document Review

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

Data Review

The groundwater remedy called for in the ROD required the reduction of VOC concentrations in the groundwater to groundwater standards by source removal in combination with MNA. Quarterly groundwater sampling for VOCs was initiated in May 2003 as part of the assessment of the status of MNA. This monitoring was performed quarterly for the first year after construction completion (2003), semiannually for the second year (2004) and annually through 2009. Groundwater samples have been collected every other year since 2010.

In contrast with the elevated contaminant concentrations detected in the RI-related samples (data collected from 1991 to 1996 had a maximum total VOC concentration of 5,400 micrograms per liter [μg/l]), the more-recent data consistently indicate the presence of extremely-low residual groundwater contaminants. Total VOC concentrations from the latest sampling event ranged from not detected to 15 μg/l for all site-related monitoring wells. Of the eleven wells included in the long-term monitoring program, nine wells either attained or retained historically-low concentrations of total VOCs in the most recent round of sampling. Notably, historically-low concentrations were reported for all three downgradient wells included in the long-term monitoring program.

Generally, water-quality data show that there has been a reduction in contaminant levels in groundwater beneath and downgradient of the site since sampling was initiated in 2003. In some wells, 1,1,1-TCA and dichloroethane (DCA) have not been detected in recent years. For example, monitoring well W-06,[1] located within a former 1,1,1-TCA hot-spot area, shows that 1,1,1-TCA and DCA were not detected for the last five years. Monitoring well W-08, located near northeastern corner of site and adjacent to the former PCB hotspot area, has shown an oscillatory pattern of contamination, but for the

[1] See Figure 1 for the location of the noted monitoring wells.

last five years the levels of 1,1,1-TCA have declined from 12 µg/l in 2008 to 6.3 µg/l in 2012 while DCA has not been detected.

Monitoring wells W-11 and W-12, located along the northern boundary adjacent to Perplexity Creek, show modest reductions in 1,1,1-TCA and DCA levels over the period of record, with monitoring well W-12 showing no detections for these constituents since 2009. TCE has also been detected in monitoring well W-12 since sampling was initiated, at an average concentration of 7.7 µg/l. Over the last few years the concentrations have increased slightly to about 11 µg/l.

Similar patterns of contamination are reported for monitoring wells located along Huntington Street (monitoring wells W-16, W-18 and W-19) which show an oscillating pattern but with a general decreasing trend in concentrations over time. Water-quality data for monitoring well W-19 indicates a progressive decrease in the level of DCA from a high of 14 µg/l in 2004 to not detected in 2012. 1,1,1-TCA has decreased from a maximum of 20 µg/l in 2003 to 13 µg/l in 2007, although there has been a slight uptick in the 1,1,1-TCA concentration (to 15 µg/l) over the last few sampling events.

Figures 2 and 3 graphically illustrate the above-noted sample results.

The current and historic data suggest that the remedial action has resulted in significant improvements in groundwater quality with respect to total site-related VOC concentrations. Although the data suggests that significant anaerobic biodegradation of the chlorinated VOCs is not occurring, it is likely that the reductions in VOC concentrations are the result of effective source removal in combination with natural attenuation via dilution and dispersion.

As noted above, SVI sampling efforts have been conducted annually since the previous five-year review. To date, a total of thirteen homes located in the area immediately downgradient of the site have been sampled. Additionally, several rounds of data have been collected from a nearby school and two commercial buildings in the vicinity of the site. The data indicate that investigations should continue in order to define the boundary of properties affected by site-related vapor-phase contaminants.

Site Inspection

On June 26, 2013 a five-year-review-related site inspection was conducted by the EPA RPM Mark Granger, along with technical team members Edward Modica and Ula Filipowicz. While observations made during the inspection indicated that the remedy-related infrastructure was in good repair, it was noted that vegetation is growing through some of the fencing, a gate and monitoring well had been vandalized and tire furrows were observed on the cap from a recent electrical-pole removal effort.

Interviews

No interviews were conducted during the review period.

Institutional Controls Verification

The ROD called for the application of institutional controls to prevent the utilization of the underlying groundwater, restrict activities which could affect the integrity of the cap/site-wide surface cover and prevent the future development of the site for residential use. Through a PPA, deed restrictions which prevent disturbing the cap over the former cooling pond, prevent disturbing or digging beneath the site-wide geotextile layer without the EPA's prior authorization, prevent the installation of groundwater wells without the EPA's prior authorization and prohibit residential use of the property were recorded on the deed for the property when the City of Cortland took title to the site in March 2003. No contravention of any of the institutional-control components was observed during the site-inspection.

Additionally, the Cortland County Sanitary Code (Article XII, §§ 1 and 2) restricting the installation of groundwater wells without a permit remains in effect.

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

Table 4 summarizes several observations and offers suggestions to resolve these observations.

VII. Technical Assessment

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

As specified in the ROD, the remedy for the site called for the excavation of contaminated soils from hotspots with off-site and on-site treatment/disposal, capping and fencing of the former cooling pond area, a surface cover for the remainder of the site, and MNA of groundwater via a well network installed as part of a long-term monitoring program. All components of the remedy have been successfully implemented and the remedy is functioning as intended by the decision documents.

The soil excavation consisted of removing all soils contaminated with 1,1,1-TCA and PCBs from two on-site hotspots above the TAGM soil cleanup objective of 1 mg/kg and 10 mg/kg, respectively. Contaminated soils with concentrations above 50 mg/kg were sent off-site to a Toxic Substances Control Act-compliant facility for treatment/disposal, whereas PCB-contaminated soils with concentrations less than 50 mg/kg were consolidated over the former cooling pond area and were subsequently graded and capped. Excavated 1,1,1-TCA-contaminated soils were either sent off-site for treatment or treated on-site (to 1 mg/kg for 1,1,1-TCA) and used as backfill in the excavations. Post-excavation sampling confirmed that the remaining soils met the soil cleanup objectives.

An engineered cap, meeting the requirements of New York State 6 NYCRR Part 360, was installed over the former cooling pond. Prior to the installation of the cap, consolidated soils, nonhazardous debris (that were removed from the site's remaining

surface area) and existing fill material were regraded and compacted on the area to be capped. A chain-link fence was constructed around the area after capping. A surface cover was also placed over the remaining part of the site to prevent direct contact with residual levels of contaminants in on-site soils. Institutional controls in the form of deed restrictions were also put into effect.

Source removal has mitigated much of the potential impact to groundwater. The ROD specifies MNA to assess residual groundwater contamination in the downgradient areas of the site. To help implement MNA, a long-term monitoring program was put in place to verify that the level and extent of contamination in groundwater decrease over time from baseline conditions. Water quality data derived from groundwater samples taken since the initiation of the program in 2003 show progressive decreases in levels of 1,1,1-TCA and DCA. In several wells, 1,1,1-TCA and DCA have not been detected in sampling events for the last few years. Further, as noted above, of the 11 wells included in the long-term monitoring program, nine wells either attained or retained historically-low concentrations of total VOCs in the most recent round of sampling. Notably, historically-low concentrations were reported for all three downgradient wells included in the long-term monitoring program.

In addition, all residences and businesses within the immediate vicinity of the site and in the downgradient area receive drinking water from the City of Cortland's municipal water supply well, which is located approximately two miles upgradient of the site.

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

The exposure assumptions and toxicity values used to estimate potential cancer risks and noncancer hazards follow the Risk Assessment Guidance for Superfund used by the EPA. Although specific parameters may have changed since the time of the risk assessment, the process used remains valid. Risks from exposure to contaminated media through ingestion, dermal contact, and inhalation were evaluated in the risk assessment. Receptors assessed included potential trespassers, future off-site residents, future excavation workers, and future industrial workers.

The results of the risk assessment indicated unacceptable risk and hazard related to ingestion, dermal contact and/or inhalation of vapors from surface soils and groundwater at the site. As noted above, as part of the selected remedy, contaminated soils from hot-spot areas identified during the RI were removed from the site or consolidated on the former cooling pond area (more specifically, PCB-contaminated soils less than 50 mg/kg were consolidated to the former cooling pond area, while soils with PCB contamination above 50 mg/kg were disposed of off-site). To further reduce potential exposure to contaminated soils, a cap and fence were constructed in the former cooling pond area. In addition, a site-wide surface cover was constructed on the remainder of the site property, eliminating the direct contact pathway to any residual soil contamination.

With respect to soil cleanup values, the ROD called for the excavation of 1,1,1-TCA contaminated soils above 1 mg/kg and PCB-contaminated soils above 10 mg/kg in varying hot-spot areas of the site. The current NYSDEC Soil Cleanup Objectives for unrestricted use are 0.68 mg/kg and 0.1 mg/kg, for 1,1,1-TCA and PCBs, respectively. To ensure the cleanup levels selected at the time of the ROD remain protective of human health, a comparison to the EPA's residential risk-based screening levels (RSLs) set at a target cancer risk of 1×10^{-6} or a HI of 1, was conducted. The current residential RSL values for 1,1,1-TCA and PCBs (high risk) are 870 (n) mg/kg and 0.22 (c) mg/kg, respectively. Although the ROD established soil cleanup objectives are higher than current state soil cleanup standards, they do not exceed the 1×10^{-4} cancer risk or a noncancer HI of 1 and hence remain protective. With respect to groundwater cleanup values, the groundwater component of the ROD called for restoration to levels that meet federal and state drinking water standards. The remaining low-level VOC contamination in groundwater mainly consists of 1,1,1-TCA, 1,1-DCA, and TCE exceedances. The ROD established cleanup levels for these constituents in groundwater was 5 µg/L. Current NYSDEC Groundwater Quality standards for these constituents remain at 5 µg/L. In conclusion, soil and groundwater cleanup values selected in the ROD remain valid and protective of human health.

SVI is evaluated when soils and/or groundwater are known or suspected to contain VOCs. The SVI pathway was originally assessed at the site in 1996 using the 1992 Air/Superfund National Technical Guidance Study Series document titled *Assessing Potential Indoor Air Impacts for Superfund Sites*. The results of the evaluation at that time indicated that SVI was not contributing to unacceptable risks or hazards in structures that were off-site. While current and historic data have shown significant improvements in groundwater quality with respect to VOCs at the site, since the 2002 the EPA *Draft Guidance for Evaluating the Vapor Intrusion to Indoor Air Pathway from Groundwater and Soils* document replaced the 1992 AIR/Superfund National Technical Guidance Study Series documents, SVI was re-evaluated as a potential exposure pathway. Although contaminant concentrations in site groundwater are fairly low, results of the SVI investigations have indicated that elevated concentrations of vapor have collected beneath the slabs of several nearby structures. To date, a total of thirteen homes located in the area immediately downgradient of the site have been sampled. Additionally, several rounds of data have been collected from a nearby school and two commercial buildings in the vicinity of the site. To ensure protectiveness, the data indicate that the SVI investigation should be continued and include any additional structures identified as part of the on-going investigations, and that any actions deemed necessary to mitigate or lessen potential exposure be taken.

With respect to ecological risk, the primary ecological RAO is to "prevent ecological contact with contaminated soils and sediments". The 20-acre cap/site-wide surface cover minimizes the exposure of ecological receptors to site-related contaminants and eliminates the migration of site-related contaminants to Perplexity Creek surface water and sediment.

As noted above, the following RAOs were established for the site: prevent human

contact with contaminated soil, sediment, and groundwater; prevent ecological contact with contaminated soils and sediments; mitigate the migration of contaminants from soils/fill to groundwater; mitigate the off-site migration of contaminated groundwater; restore groundwater quality to levels which meet federal and state drinking standards; and control surface-water runoff and erosion. The RAOs for the site remain valid and protective of human health and the environment.

The site-wide surface cover component of the ROD was designed to allow for commercial/industrial redevelopment of the property; the property is owned by the City of Cortland and is zoned for commercial/industrial use. The City of Cortland has indicated that there are plans in place to complete construction of a trans-modal rail spur on the northern five acres of the property in 2014. It appears that the spur construction will be strictly surficial and will not affect the integrity of the cap/site-wide surface cover.

***Question C**: Has other information come to light which could affect protectiveness of remedy?*

A protectiveness determination for the site cannot be made until further information is obtained. Specifically, further vapor intrusion data needs to be collected at residences downgradient of the site so that a protectiveness determination can be made by September 30, 2016.

Technical Assessment Summary

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

- site soils in the two PCB and two TCA soil hot spots have been excavated and disposed of and remaining soils are below protective levels;
- while no animal borrows were noted on the cap, there were tire tracks near the gate that will need refurbishing as part of the ongoing maintenance at the site.
- the site-wide cover is intact and in good condition with strong vegetation;
- while the fence around the site perimeter and across the northern perimeter of the Part 360 cap are intact, the gate in the northwest corner will need to be secured in order to preclude the potential for trespassing;
- while the groundwater monitoring wells in the long-term monitoring network are all functional, one of the wells that are infrequently sampled has been vandalized;
- there are no drinking water wells within the plume of contamination and none are expected to be drilled because of existing local and state requirements;
- the landfill gas system is operating properly;

- the storm water management system is in good repair; and
- no additional measures are needed to protect public health.

Based on the five-year review inspection and on the annual O&M inspection, some minor repairs will be required as part of routine maintenance of site-related facilities. **Table 4** includes suggestions for addressing these items.

VIII. Recommendations and Follow-Up Actions

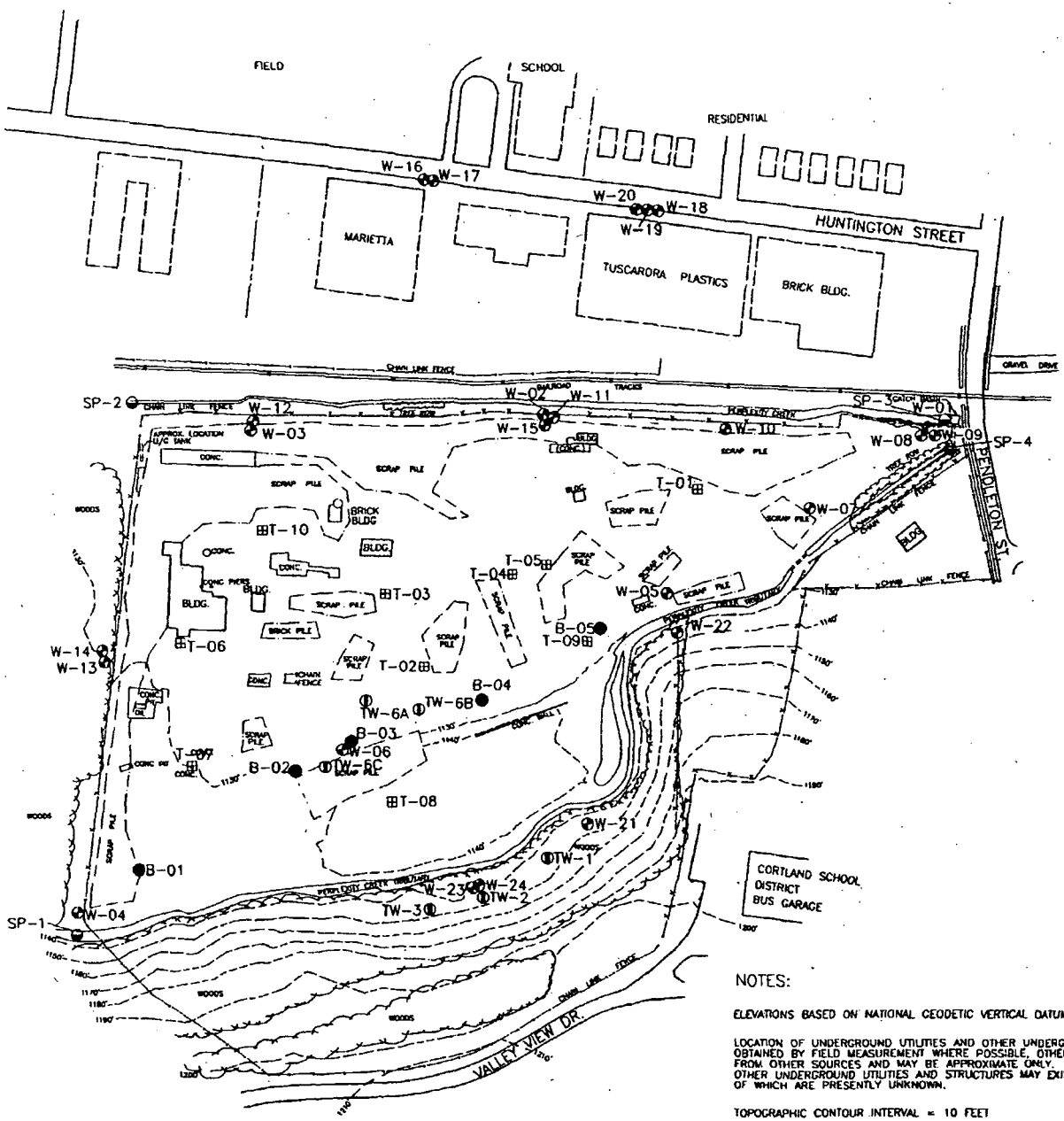
Table 5 (attached) contains recommendations and follow-up actions which should ensure long-term protectiveness.

IX. Protectiveness Statement

A protectiveness determination at the site cannot be made until further information is obtained. Specifically, vapor-intrusion investigations should be completed at properties located downgradient of the site. It is expected that these actions will take approximately three years to complete, at which time a protectiveness determination will be made.

X. Next Review

The next five-year review for the site will be completed five years from the date of this review.



LEGEND

- MONITORING WELL
- TEST BORING
- TEST PIT
- TEMPORARY WELL
- STREAM MONITORING POINT

SCALE

200' 0 200'

NOTES:

ELEVATIONS BASED ON NATIONAL GEODETIC VERTICAL DATUM OF 1929.

LOCATION OF UNDERGROUND UTILITIES AND OTHER UNDERGROUND STRUCTURES OBTAINED BY FIELD MEASUREMENT WHERE POSSIBLE, OTHERWISE OBTAINED FROM OTHER SOURCES AND MAY BE APPROXIMATE ONLY. OTHER UNDERGROUND UTILITIES AND STRUCTURES MAY EXIST, THE LOCATIONS OF WHICH ARE PRESENTLY UNKNOWN.

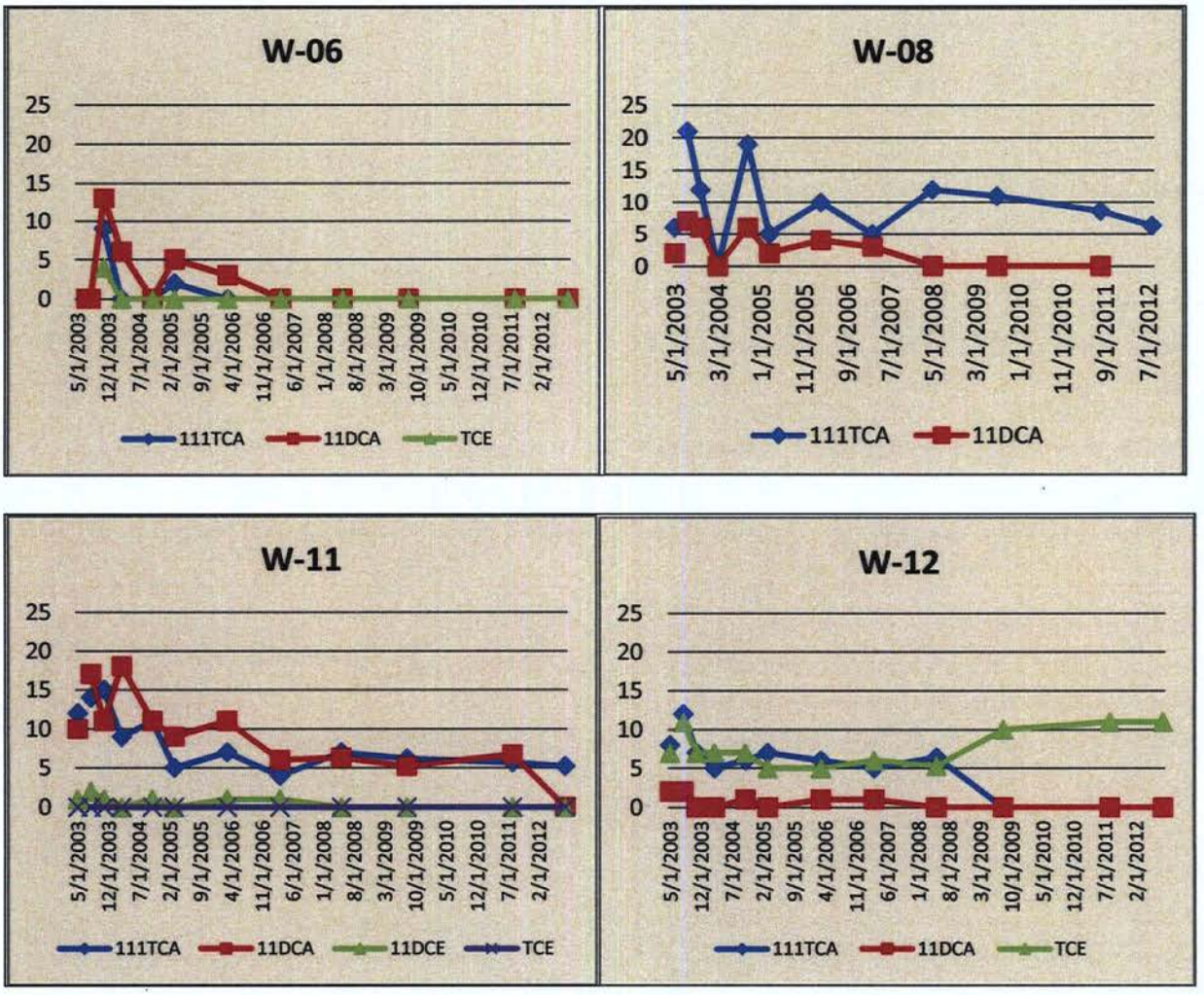
TOPOGRAPHIC CONTOUR INTERVAL = 10 FEET

BLASLAND, BOUCK & LEE, INC.
ENGINEERS & SCIENTISTS

ROSEN SITE
CORTLAND, NEW YORK
REMEDIAL INVESTIGATION REPORT

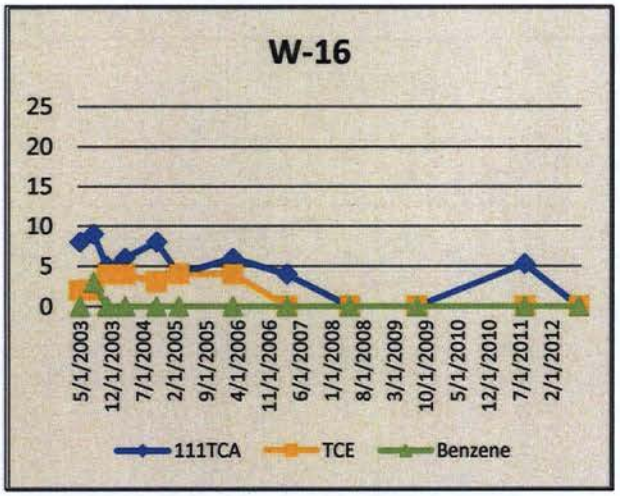
Figure 1

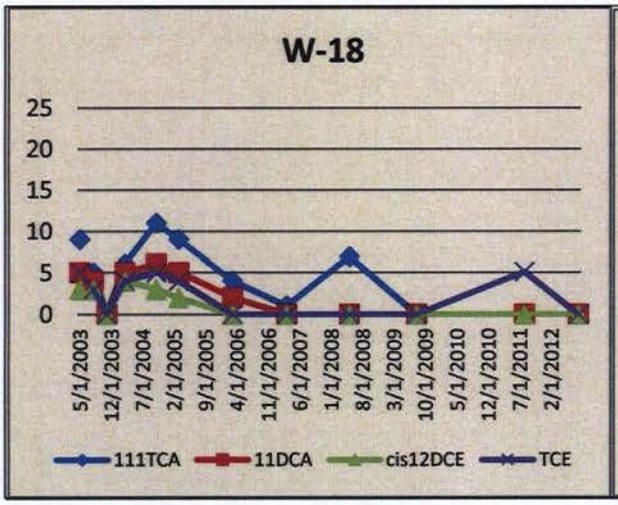
Figure 2: Groundwater VOC Trends in Select On-Site Monitoring Wells

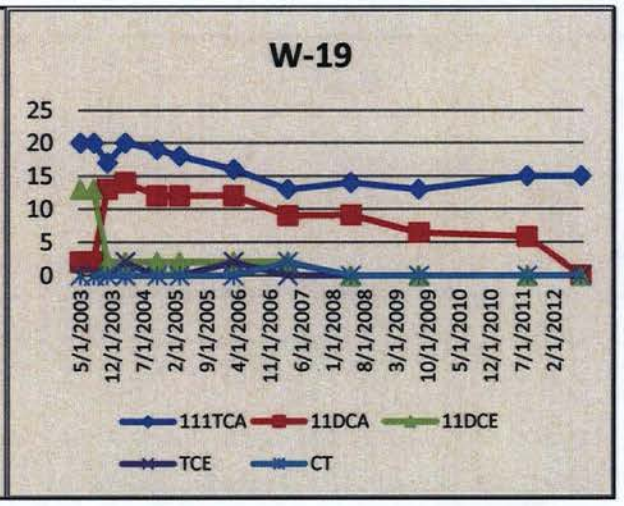


All concentrations are reported in micrograms per liter (µg/l).

Figure 3: Groundwater VOC Trends in Select Off-Site Monitoring Wells







All concentrations are reported in micrograms per liter (µg/l).

Table 1: Chronology of Site Events	
Event	**Date(s)**
Land developed as an industrial facility for the manufacture of wire, wire products, insect screens, poultry netting, and nails	1800's
Property sold to Keystone Consolidated Industries, Inc.	1968
Rosen Brothers scrap metal facility begins operation on the property	1970's
NYSDEC investigation of site detects contamination	1986
The EPA fences the site, samples, excavates visibly-contaminated soil, and secures and temporarily stages drums, tanks, cylinders, transformers, and the excavated soil	1987
The EPA issues an Administrative Order to PRPs requiring them to remove the materials previously staged by the EPA.	1988 and 1989
Site added to the Superfund National Priorities List	1989
PRPs complete removal work	1990
The EPA issues Administrative Orders to PRPs for the performance of a remedial investigation and feasibility study	1990
PRPs voluntarily demolish and remove structurally unsound buildings and smoke stack, remove and recycle 200 tons of scrap materials, empty and dispose of contents of abandoned underground storage tank, and remove small concrete oil pit	1992-4
The EPA removes and recycles more than 500 tons of scrap metal and more than 20 tons of tires	1997
The EPA signs Record of Decision	1998
The EPA issues a Unilateral Administrative Order to PRPs to undertake several components of the selected remedy (the excavation of the two PCB hot-spot areas and installation of five acres of site-wide surface cover) in order to facilitate the redevelopment of this portion of the property	1998
The EPA enters into a Prospective Purchaser Agreement with the City of Cortland for the purchase, lease, and redevelopment of the five-acre portion of the site	1998
The EPA enters into a Consent Decree with PRPs to design and implement the remaining portions of the remedy selected in the ROD	1998
Consent Decree entered by the Court	1999
Remedial design performed	2001-2
Source-areas excavation and site-wide cover system construction complete; Preliminary Close-Out Report finalized; First Five-Year Review	2003
Initiate O&M, including routine groundwater monitoring and annual inspections	2003
Second Five-Year Review	2008

Table 2: Annual Monitoring Costs	
Estimated Costs for Contract Performance	**Cost per Year**
Sampling and analysis	$20,000
Site inspection/maintenance	$20,000
Total estimated cost	$40,000

Table 3: Documents, Data and Information Reviewed in Completing the 3rd Five-Year Review

Document Title (Author)	Submittal Date
Record of Decision, EPA	1998
Draft Guidance for Evaluating the Vapor Intrusion to Indoor Air Pathway from Groundwater and Soils, EPA	2002
Remedial Action Report, Barton & LoGiudice, P.C.	2003
Preliminary Close-Out Report, EPA	2003
First Five-Year Review Report, EPA	2003
Groundwater Data Reports, Buck Environmental Labs	2003 through 2008
Second Five-Year Review Report, EPA	2008
Groundwater Data Reports, Microbac Laboratories, Inc.	2009 through 2012
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 the EPA issued the ROD	

Table 4: Other Comments on Operation, Maintenance, Monitoring, and Institutional Controls	
Comment	**Suggestion**
Off-property vegetation continues to grow on fencing located along the northern and western sides of the property. The vegetation could impact the integrity of the fence if left unaddressed.	Trim back off-property vegetation from the fencing.
The gate in the northwest corner has been compromised such that it no longer precludes access to the site.	Secure the northwest-corner gate.
One of the monitoring wells that is infrequently sampled has been vandalized.	Repair and secure the monitoring well so that it remains available for sampling in the future. If this well is no longer necessary, properly abandon this well.
The area of the cap where vehicle tracks have created furrows on the surface should be inspected (and restored, as necessary) to assure that the cap permeability and drainage characteristics have not been compromised in that area.	Inspect the area of the cap where vehicle tracks have created furrows on the surface and restore, as necessary.
Monitoring of water-quality trends should continue in on- and off-site wells.	Continue groundwater monitoring on the current every-other-year schedule.
A follow-up round of sediment sampling should be performed in Perplexity Creek.	Perform sediment sampling in Perplexity Creek.

Table 5: Issues, Recommendations, and Follow-Up Actions						
Issue	**Recommendations and Follow-Up Actions**	**Party Responsible**	**Over-sight Agency**	**Milestone Date**	**Affects Protectiveness (Y/N)**	
					Current	**Future**
Levels of VOCs in soil vapors are elevated beneath the subslabs of several nearby structures.	Vapor intrusion investigations should be continued in nearby structures along with any actions deemed necessary to mitigate or lessen potential exposure.	EPA	EPA	03/16	N	Y