



**Fourth Five-Year Review Report  
Pollution Abatement Services Superfund Site  
City of Oswego  
Oswego County, New York**



**Prepared by:**

**United States Environmental Protection Agency  
Region 2  
New York, New York  
January 2014**

**Approved by:**

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**Date:**

JAN. 9, 2014

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## **Executive Summary**

This is the fourth five-year review for the Pollution Abatement Services Superfund site, located in the City of Oswego, Oswego County, New York. The purpose of this five-year review is to review information to determine if the remedy is and will continue to be protective of human health and the environment. The triggering action for this statutory five-year review is the completion date of the previous five-year review.

The assessment of this five-year review is that the implemented actions at the site protect human health and the environment because contaminated on-site soils are contained by an impermeable cap, hydraulic control within the containment system is being maintained, institutional controls preventing well installation and groundwater use are in place and effective and all residents are connected to public water.

## Five-Year Review Summary Form

### SITE IDENTIFICATION

|  |                  |                            |
|--|------------------|----------------------------|
| <b>Site Name:</b> Pollution Abatement Services |                  |                            |
| <b>EPA ID:</b> NYD000511659                    |                  |                            |
| <b>Region:</b> 2                               | <b>State:</b> NY | <b>City/County:</b> Oswego |

### SITE STATUS

|                          |   |
|--------------------------|---|
| <b>NPL Status:</b> Final |   |
| <b>Multiple OUs?</b> Yes | <b>Has the Site achieved construction completion?</b> Yes |

### REVIEW STATUS

|   |
|---|
| <b>Lead agency:</b> EPA<br>If "Other Federal Agency" was selected above, enter Agency name: N/A |
| <b>Author name (Federal or State Project Manager):</b> Patricia Pierre                          |
| <b>Author affiliation:</b> EPA  |
| <b>Review period:</b> 12/23/2008 – 12/19/2013   |
| <b>Date of site inspection:</b> 11/14/2013  |
| <b>Type of review:</b> Statutory  |
| <b>Review number:</b> 4   |
| <b>Triggering action date:</b> 12/19/2008   |
| <b>Due date (five years after triggering action date):</b> 12/19/2013                           |

**Five-Year Review Summary Form (continued)**

**ISSUES AND RECOMMENDATIONS IN THE FIVE-YEAR REVIEW**

|                                  |   |                      |                 |                |
|----------------------------------|---|----------------------|-----------------|----------------|
| OUs 02, 03 &<br>04               | Issue Category: No Issues                           |                      |                 |                |
|                                  | Issue: No issues or recommendations are identified. |                      |                 |                |
|                                  | Recommendation: None                                |                      |                 |                |
| Affect Current<br>Protectiveness | Affect Future<br>Protectiveness                     | Party<br>Responsible | Oversight Party | Milestone Date |
|                                  |   |                      |                 |                |

**OPERABLE UNIT 02 PROTECTIVENESS STATEMENT**

Protectiveness Determination: Protective

Protectiveness Statement: The implemented containment remedy for OU2 is protective of human health and the environment because contaminated on-site soils are contained by an impermeable cap.

**OPERABLE UNIT 03 PROTECTIVENESS STATEMENT**

Protectiveness Determination: Protective

Protectiveness Statement: The implemented remedy for OU3 is protective of human health and the environment because hydraulic control within the containment system is being maintained, institutional controls preventing well installation and groundwater use are in place and effective and all residents are connected to public water.

**OPERABLE UNIT 04 PROTECTIVENESS STATEMENT**

Protectiveness Determination: Protective

Protectiveness Statement: The long-term monitoring remedy for OU4 is protective of human health and the environment.

**SITE-WIDE PROTECTIVENESS STATEMENT**

Protectiveness Determination: Protective

Protectiveness Statement: The site-wide remedial actions protect human health and the environment because contaminated on-site soils are contained by an impermeable cap; hydraulic control within the containment system is being maintained; institutional controls preventing well installation and groundwater use are in place and effective; and, all residents are connected to public water.

## **Introduction**

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

This fourth five-year review for the Pollution Abatement Services Superfund site, located in the City of Oswego, Oswego County, New York, was conducted by the United States Environmental Protection Agency (EPA) Remedial Project Manager (RPM) Patricia Pierre 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). After the completion of the remedial action, contaminants remained on-site; therefore, a statutory five-year review is required. This report will become part of the site file.

In accordance with Section 1.3.3 of the five-year review guidance, a subsequent 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 December 19, 2008.

The site is divided into four operable units (OUs). OU1 involved removal actions taken from 1973 to 1982 by the EPA and the New York State Department of Environmental Conservation (NYSDEC); this OU is not subject to five-year reviews. OU2 involved the containment of the landfill and contaminated groundwater. OU3 addressed contamination found in the groundwater outside of the containment system. The OU4 remedy called for no further action in combination with long-term monitoring of the PCB-contaminated sediments in White and Wine Creeks.

## **Site Chronology**

Table 1, which is attached, summarizes the significant site-related events from discovery to the present.

## **Background**

### *Physical Characteristics*

The site, located on 15 acres within the eastern city limits of the City of Oswego, New York, is bounded on the south by East Seneca Street and on the east, north and west by wetlands formed along the stream channels of White and Wine Creeks. Just to the north (downstream) of the site is the confluence of White and Wine Creeks. Wine Creek flows approximately 1,800 feet beyond the confluence (northward) to a channel and into Lake Ontario. Just east of this channel is a wetland which is located next to a residential area known as Smith's Beach. (See Figure 1)

The site is fenced-in and grass-covered. On-site structures include a 44,000-gallon concrete leachate collection tank and a small shed which houses the main discharge pump for the leachate collection system.

### *Site Geology/Hydrogeology*

The site is located in the eastern section of the Lake Ontario physiographic province. Several stratigraphic units of unconsolidated deposits have been defined at the site. Glacially-derived, sedimentary deposits range from till and lacustrine silt and clays to stratified sands and gravels. A surficial, anthropogenic fill layer of variable depth and composition covers most of the site and consists primarily of demolition debris brought onto the property before the Pollution Abatement Services (PAS) facility was in operation. This fill layer is underlain by a glacial till that varies in thickness from 15 feet to approximately 35 feet at the site. The exception to this is in an area outside the slurry wall and in the vicinity of White Creek, where fill is underlain by stratified sediment. A continuous dense till layer is purported to overlie the bedrock across the site, and is reportedly thickest (about 35 feet) in the southwestern portion of the site. The top of the bedrock unit, the Oswego Sandstone, is located approximately 50 feet below the ground surface near the center of the site.

In general, two aquifer systems exist in the region. Although the bedrock and overburden aquifer systems generally exhibit regional groundwater flow north toward Lake Ontario, local groundwater flow in the vicinity of the site is north westward toward the Wine Creek wetlands.

### *Land and Resource Use*

The site property is zoned for industrial use. The area between the site and Lake Ontario (to the north) is mostly undeveloped, and currently supports multiple land uses, including a cemetery, a wetland and commercial and residential areas. A permanent easement was acquired by NYSDEC to prevent the utilization of the groundwater underlying the site, to prevent development of the site for residential use and to allow access for maintenance and monitoring activities.

Both White and Wine Creeks are used by a wide variety of wildlife, including avian and fish species, the latter utilizing the streams for spawning. The lower reach of Wine Creek, near Lake Ontario, is used for seasonal recreational fishing. The area groundwater is classified as GA (drinking water source). However, residents within the Oswego City limits receive public water, and establishment of residential water supply wells within the contaminated area and City limits is prohibited by law.

### *History of Contamination*

The PAS facility, a high-temperature, liquid chemical waste incineration facility, operated from 1970 through 1977. Throughout its operational life, the facility experienced continuous operating problems, numerous air and water quality violations and mounting public opposition. Because the incinerator never operated properly, thousands of drums containing various chemical wastes accumulated on-site and tank loads of liquid waste were stored in on-site lagoons.

### *Initial Response*

Beginning in 1973, a series of incidents, including liquid waste spills and the overflow of liquid wastes from lagoons into White Creek, led to the involvement of EPA and the NYSDEC at the site. Response actions taken from 1973 to 1982 by EPA, NYSDEC and the Coast Guard resulted in an oil spill cleanup, the removal of the incineration facilities, drummed wastes, bulk liquid wastes and contaminated soils and the closure of two on-site lagoons.

In 1981, the site, which was ranked number seven on the original National Priorities List (NPL), was selected as one of the first sites in the nation to receive CERCLA Trust Fund monies for cleanup actions.

### *Basis for Taking Action*

From 1982 to 1984, NYSDEC performed a site investigation and remedial alternatives evaluation of the site, which was the initial remedial investigation/feasibility study (RI/FS) conducted at the site. The analytical data generated during the RI showed extensive and significant organic and inorganic soil and groundwater contamination on-site. In addition, contaminated surface water and groundwater were found to be migrating off-site.

The risk assessment identified benzene, vinyl chloride, and metals (*e.g.*, arsenic, manganese, and barium) as contaminants of concern (COCs) in the bedrock groundwater aquifer. The associated cancer risks from the ingestion of groundwater, by adults and children, assuming the aquifer is a drinking water source exceeded the risk range. The cumulative upper-bound cancer risk at the site from groundwater consumption is  $7 \times 10^{-4}$  for children and  $8 \times 10^{-4}$  for adults. Arsenic was a primary contributor to the risk.

The Hazard Indexes (HI) for this future exposure scenario was estimated at 26 for adults and an 15 for children. The main noncancer HI for adults was associated with exposures to arsenic and manganese and for the child was associated with arsenic, barium and manganese.

PCBs are the COC in the sediments in White and Wine Creeks and the adjacent wetlands. The human health risk assessment (1997) found cancer risks and noncancer hazards to adults and children from ingestion and dermal contact with sediments were within the acceptable risk range (*i.e.*,  $1.4 \times 10^{-6}$  for adults and  $8.8 \times 10^{-6}$  for children). The noncancer HIs from exposure to PCB-contaminated sediments were 0.23 and 1.08 for adults and children, respectively. The noncancer HI for the child slightly exceeded the goal of protection of one.

An ecological risk assessment was not conducted to support the OU2 source control ROD. However, an ecological risk assessment was conducted to support the OU4 ROD. The risk assessment concluded that the levels of PCBs that are present in the sediments in the depositional areas of White Creek in the vicinity of the site may pose an unacceptable risk to ecological receptors, as represented by the green backed heron and mink that might use the creek and adjacent wetlands as foraging areas. However, while the site was a source of PCB contamination before the construction of the containment facility, at present, there are several potential current sources of PCB contamination located upstream of the site. Therefore, it was determined that the

site did not pose an unacceptable risk to ecological receptors in the White Creek area.

## **Remedial Actions**

### *Remedy Selection and Implementation*

Based on the results of the RI/FS, EPA signed a ROD in 1984 for OU2. The remedial action objectives (RAOs) for this ROD were to reduce and minimize the downgradient migration of contaminants in the groundwater and to minimize any potential human health and ecological impacts resulting from the exposure to contaminants at and downgradient from the site. The selected remedy included the limited excavation and off-site disposal of contaminated materials, installation of a perimeter slurry wall, site grading and capping in accordance with Resource Conservation and Recovery Act (RCRA) requirements, installation of a leachate collection and treatment system and groundwater monitoring. NYSDEC implemented the remedial actions called for in the ROD, with the exception of the treatment system. Rather than installing an on-site treatment system, NYSDEC collected the leachate from 1986 through 1991 and transported it off-site to a RCRA-approved treatment/disposal facility.

In September 1991, EPA and a group of potentially responsible parties (PRPs) entered into an Interim Groundwater Removal (IGR) Administrative Order on Consent (AOC). This IGR AOC required the routine removal of leachate from within the containment system. The IGR AOC was extended by a second AOC entered into in 1994.

From 1984 to 1986, NYSDEC performed an environmental assessment of the area in the vicinity of the site, which included White and Wine Creeks. Based on the results of the environmental assessment, NYSDEC determined that no remediation of the creeks was required.

The long-term monitoring program, which was commenced in 1989 by NYSDEC, includes routine monitoring of the groundwater and sediment in the vicinity of the site. Results from soil gas and groundwater sampling, and down-hole camera investigations of the existing monitoring wells at the site, conducted between 1987 and 1990, indicated the presence of volatile organic compounds (VOCs) in the groundwater outside the slurry wall containment system.

Because groundwater contamination continued to be detected outside the containment system, in September 1990, an AOC was entered into between EPA and a group of PRPs to conduct a supplemental RI/FS to evaluate the integrity of the existing containment system; to determine the nature, extent and source of the contamination; to identify any threat to human health or the environment caused by the release of hazardous substances outside the containment system; and to identify and evaluate remedial alternatives. The supplemental RI report, issued in 1993, concluded that the contamination that was detected in the bedrock groundwater outside the containment system was attributable to the downward migration of contaminants through the lodgement till beneath the containment system, particularly in an area where the lodgement till is relatively thin. The supplemental RI report also noted that the highest level of contaminants occurred in the vicinity of a leachate collection well where downward hydraulic gradients existed

prior to implementation of the IGR program. The study concluded that the IGR program effectively reversed these downward hydraulic gradients and mitigated releases from this source. Based upon the results of the supplemental RI/FS, EPA signed a ROD on December 29, 1993. The RAOs for this ROD were to prevent potential future exposures to contaminated groundwater on-site, as well as off-site in the area between the site and Smith's Beach; restore groundwater quality to levels consistent with federal and state groundwater quality and drinking water standards and mitigate the off-site migration of contaminated groundwater. The 1993 ROD incorporated all of the existing components of the 1984 ROD, as well as, several additional items including: enhancing the source control system by optimizing the leachate extraction rate and other operating parameters in order to achieve, to the degree practicable, inward horizontal gradients in the overburden and upward vertical gradients from the bedrock toward the containment system; bedrock groundwater extraction and treatment; connecting downgradient residents in the Smith's Beach area who were using residential wells to the public water supply to ensure that potential future exposure to contaminants in the bedrock groundwater does not occur; and institutional controls on groundwater usage at and downgradient from the site.

In addition, the 1993 ROD identified discharging the extracted leachate and contaminated groundwater to the City of Oswego's Eastside Wastewater Treatment Plant as the preferred treatment and disposal option, with the construction of an on-site treatment system with discharge to White or Wine Creek or to groundwater as a contingent option, should the preferred treatment and disposal option be determined not to be feasible. The 1993 ROD also stated that the current method for handling the extracted leachate and groundwater via an off-site treatment facility would continue until a final treatment option is selected and implemented.

The 1993 ROD also called for several investigations related to the enhancement of the source control system. Further, since there was some uncertainty related to the source of the PCB contamination detected in the sediments in the adjacent wetlands and White and Wine Creeks, and the source of pesticides detected in the surface water of Wine Creek, the ROD called for a study to determine the sources of PCB and pesticide contamination.

In July 1994, an AOC was entered into by EPA and a group of PRPs to conduct a supplemental pre-remedial design study (SPRDS) related to the investigations called for in the 1993 ROD. In September 1994, an AOC between EPA and a group of PRPs was entered into to extend the routine leachate removal called for in the IGR AOC, and, among other things, to connect residents in the Smith's Beach area (who were using residential wells) to the public water supply as an added measure of protection. These residential connections to the public water supply were completed in 1995. The SPRDS, which was completed in 1996, concluded that the bedrock groundwater downgradient of the containment system flows northwest, rather than north toward the Smith's Beach area as was previously believed.

In September 1996, an Explanation of Significant Differences (ESD) was issued. The ESD explained the results of the additional investigations called for in the 1993 ROD and modified the contingent remedy for the treatment of the leachate to provide for continued off-site treatment and disposal. The 1996 ESD also required that a focused feasibility study (FFS) be conducted to evaluate remedial alternatives for the PCB-impacted sediments in the creeks and wetlands adjacent to the site.

Based upon data collected between 1991 and 1996 that suggested that PCB sediment concentrations were decreasing (presumably due to the deposition of clean sediment and/or the downstream migration and subsequent dilution of contaminated sediment), and the evaluation of remedial alternatives in the FFS, a ROD for OU4 was signed on September 30, 1997. The RAO for this ROD was to minimize exposure of fish and wildlife to PCB-contaminated sediment in White Creek and adjacent wetlands, and the cleanup goal for PCBs in the sediments is 1 milligram per kilogram (mg/kg). This ROD called for no further action with long-term PCB monitoring. Long-term monitoring will be conducted to ensure that contaminant concentrations in the sediments and biota continue to be reduced over time and that further contamination of the area from upstream sources is not occurring.

Consent Decrees to carry out the remedy called for in the 1993 ROD as modified by the ESD, and the long-term monitoring called for in the 1997 ROD, were entered by the Court in 1998 and 1999, respectively.

In September 2010, EPA issued a second ESD for the site. This ESD noted that the discharge of leachate into the City of Oswego's wastewater treatment facility was now viable due to decreases in contaminant concentrations, and modified the remedy to allow for direct discharge of leachate from the site to the City of Oswego's Eastside Wastewater Treatment Plant instead of off-site treatment and disposal. The extracted leachate (between 10,000 and 20,000 gallons per month) is currently conveyed by force main to the treatment plant.

#### *Institutional Controls Implementation*

The 1993 ROD recommended institutional controls on groundwater usage through deed restrictions, at and downgradient from the site, up to and including the Smith's Beach area.

NYSDEC acquired a permanent easement for the property to prevent the utilization of the groundwater underlying the site proper, to prevent the development of the site for residential use, and to allow access for maintenance and monitoring activities. This easement was recorded by the Oswego County Clerk on April 7, 1987. All of the residential properties located in the vicinity of the site are within the Oswego City limits where the installation of wells is prohibited pursuant to Section 602.3 of the New York State Plumbing Code. There are two industrial properties located downgradient of the site. To prevent nonresidential exposure to contaminated groundwater at these properties, through the PRPs' efforts, Environmental Protection Easement and Declaration of Restrictive Covenants were recorded by the County Clerk on August 6, 2004 and March 1, 2006. New York State requires annual certification that institutional controls that are required by the RODs are in place and that remedy-related operation and maintenance (O&M) is being performed. This certification is included as an attachment in the annual O&M progress reports.

### *System Operations and Maintenance*

The primary objectives of the 1984 and 1993 RODs were to control the source of contamination at the site, to reduce and minimize the downgradient migration of contaminants in the groundwater and to minimize any potential human health and ecological impacts resulting from exposure to contamination at the site. This was effected by, among other things, the installation of a perimeter slurry wall and RCRA cap over the waste disposal area, leachate collection and treatment, groundwater collection and treatment and institutional controls. To ensure that the implemented remedy remains effective, a long-term monitoring program was designed with the goal of restoring the aquifer and evaluating the effectiveness of the containment remedy.

The slurry wall containment system includes a bentonite-clay slurry wall keyed into the underlying lodgement till; a cap, consisting of a synthetic liner, clay and vegetated soils; and a leachate collection system. The leachate collection system, which is used for collection and removal of leachate that accumulates within the containment system, consists of collection drains (gravel-filled trenches), four collection wells, a network of polyvinyl chloride (PVC) force mains, submersible pumps and controls and a leachate collection tank.

Leachate is collected within the containment system in two trench systems: a downgradient perimeter trench located inside the slurry wall at the northern boundary of the site and a cross-trench located near the center of the site. Three 14-inch-diameter leachate collection wells, equipped with submersible pumps and controls, are used to remove leachate collected in the downgradient perimeter trench. A fourth pumping well is used to remove leachate collected in the cross-trench at the center of the containment area. Accumulated leachate is pumped into 2-inch-diameter PVC force mains that discharge into a 44,000-gallon concrete leachate collection tank.

As part of the IGR program activities, performed initially by Blasland, Bouck & Lee Environmental Services (BBL Environmental), and subsequently by O'Brien & Gere and ARCADIS on behalf of the PRPs, about 10,000 gallons of leachate was extracted from within the containment system. Leachate removed from the site under the IGR program was transported to DuPont in Deepwater, New Jersey (1992 – 1996), CECOS in Niagara Falls, New York (1996 – 2005), Clean Harbors in Baltimore, Maryland and Bristol, Connecticut (2005 – 2007) and the City of Auburn Publicly Owned Treatment Works Facility in Auburn, New York (2007-2010). Monthly leachate removal activities are currently being conducted under the 1998 Consent Decree. Extracted leachate is now discharged directly to the Oswego Eastside Wastewater Treatment Facility.

The original leachate removal protocol stated that if water-level elevations collected two weeks after the primary leachate removal event indicate that an additional 10,000 gallons of leachate has accumulated, then a contingency removal event is to be scheduled. In an effort to streamline and improve the efficiency of the operational monitoring activities at the site, in 2003, EPA decided to eliminate the contingency removal event protocol from the O&M program since monitoring results indicated that the contingency removal events were not necessary to maintain hydraulic control within containment system. This modification was made with the provision that if during any future monthly leachate removal event more than 15,000 gallons of leachate is

available for removal, then the contingency removal event may be reinstated. The 2008 five-year review recommended that the monthly leachate contingency removal event protocol be reinstated in order to more maintain effective hydraulic control of the containment system. In January 2009, the leachate removal protocol was modified to increase the removal volume in the summer and fall months to what can be removed efficiently during a one-day event (up to 20,000 gallons). As of July 2013, a total of 3,947,384 gallons of leachate have been removed from the containment system.

Horizontal water-level gradients across the slurry wall are measured at six well pairs in conjunction with the monthly leachate removal.

Monitoring activities at the site include groundwater elevation measurements at selected locations in the vicinity of the containment system, and leachate quality monitoring from specified locations within the containment system. Long-term monitoring currently consists of the semiannual (May and November) sampling of three groundwater wells located at and downgradient of the site. Samples are analyzed for benzene, chlorobenzene, 1,1-dichloroethane, ethylbenzene, toluene and xylene. Although arsenic, barium, and manganese were identified as COCs in the risk assessment, the concentrations of these metals detected in the site wells were less than regional background concentrations and, therefore, determined not to be site-related. Stream sediment monitoring for VOCs was performed until 2000. It was discontinued because there were no detections of VOCs at any of the three sediment locations for two consecutive years. Biota and sediment monitoring for PCBs in the wetlands and creeks (related to OU4) was conducted annually until 2008 when the sampling frequency was reduced to biennial events due to declining PCB levels.

Routine maintenance at the site includes mowing the vegetated cap and maintaining the leachate collection system, perimeter fence and access road.

New York State requires annual certification that institutional controls required by RODs are in place, and that remedy-related O&M is being performed. This certification is included as an attachment to the annual O&M progress reports.

The annual O&M costs are approximately \$200,000.

### **Progress Since the Last Five-Year Report**

The previous five-year review for the site was completed on December 19, 2008. The five-year review concluded that the implemented containment remedies for OU2 and OU3 were protective of human health and the environment in the short-term. It also concluded that there were no exposure pathways that could result in unacceptable risks and none were expected, as long as the engineering and institutional controls were properly maintained and all residents are connected to public water. In order for the site to be protective in the long-term, the five-year review recommended that hydraulic control within the containment system be consistently maintained.

In response to the above-noted recommendation in the previous five-year review, the leachate removal protocol was modified in January 2009 to increase the removal volume in the summer and fall months to what can be efficiently removed during a one-day event (up to 20,000 gallons).

## **Five-Year Review Process**

### *Administrative Components*

EPA's five-year review team consisted of Patricia Simmons Pierre (RPM), Joel Singerman (Central New York Remediation Section Chief), Marian Olsen (Human Health Risk Assessor), Mindy Pensak (Ecological Risk Assessor), Michael Scorca (Hydrogeologist) and Michael Basile (Community Involvement Coordinator).

### *Community Involvement*

The EPA Community Involvement Coordinator for the site, Michael Basile, provided the clerk for the City of Oswego with a flyer for posting in the Town Hall. The flyer notified the public that the EPA would be conducting a five-year review of the site to assess whether the site is protective of public health and the environment and whether the implemented components of the remedy are functioning as designed. The flyer also indicated that once the five-year review is completed, the results will be made available in the local site repository. In addition, the flyer included the RPM's address and telephone number for questions related to the five-year review process or the site. The flyer was also displayed on the EPA webpage for the site.

### *Document Review*

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

### *Data Review*

Leachate samples are collected from two leachate extraction wells--LCW-2, located in the center of the perimeter trench and LCW-4, located in the cross-trench at the center of the containment area. A review of the long-term leachate quality data shows variability in total VOC concentrations in the leachate since remedy implementation; some of the variability could be related to seasonality. Total VOC concentrations in extraction well LCW-2 ranged from 99 micrograms per liter ( $\mu\text{g/L}$ ) to 1,030  $\mu\text{g/L}$  during this review period, while total VOCs at extraction well LCW-4 fluctuated between a low of 1,234  $\mu\text{g/L}$  to a high of 4,707  $\mu\text{g/L}$ .

Leachate removal is currently conducted at the site on a monthly basis. During this five-year review period, in order to more effectively maintain hydraulic control of the containment system, the leachate removal volume was increased from 10,000 to 20,000 gallons during months when regional groundwater elevations outside of the slurry wall containment system are seasonally low (summer and fall).

Groundwater samples are collected from the long-term monitoring network of three bedrock monitoring wells--M-21; LR-8 and LR-6 (see Figure 2). These samples are analyzed for benzene, chlorobenzene, 1,1-dichloroethane, ethylbenzene, toluene, and xylene.

Monitoring well M-21, which is 39 feet deep and located approximately 250 feet downgradient from the containment system, is the furthest downgradient monitoring well in the network (it is located immediately downgradient of the property line). Chlorobenzene was the only observed VOC above its Groundwater Quality Standard (GWQS) (5 µg/L) during the review period, ranging from 1.77 µg/L to 8.08 µg/L. Benzene concentrations have declined to less than 0.7 µg/L since the last five-year review.

In monitoring well LR-8, which is 39.7 feet deep and located approximately 125 feet downgradient from the site, the chlorobenzene concentrations have fluctuated during this review period between not detected to a high of 23.2 µg/L (November 2012). Benzene, the only other VOC detected above the GWQS in this well, has ranged from not detected to a high of 12.6 µg/L (November 2009).

In monitoring well LR-6, which is 57 feet deep and located immediately outside the slurry wall to the northwest, 1,1- dichloroethane is the only VOC detected above its GWQS (5 µg/L) since long-term monitoring began at the site. The detected concentrations of 1,1- dichloroethane have remained below the GWQS since May 2000.

Attachment 2 provides long-term groundwater monitoring concentration graphs for the monitoring wells discussed above.

Horizontal water level gradients across the slurry wall were measured at six well pairs during the review period. Well pair SWW1/SWW2 is located on the upgradient (south) side of the containment system. This well pair always shows inward water level gradients, with a head difference of about seven feet. Well pair SWW3/SWW4 is on the northeastern side of the capped area. Gradients in this well pair are often directed outward and water levels are always below the top of the wall. Well pair SWW5/SWW6 is located at the north corner of the containment system. The gradient direction in this well pair is occasionally outward and water levels are always below the top of the wall. Well pair SWW7/SWW8 is located on the southwest side of the containment system. Water level gradients are usually directed inward. Well pair SWW9/SWW10 is on the west side of the capped area. Gradients at this well pair are inward about 50 percent of the time and outward during remaining times; water levels are always below the top of the wall. Well pair SWW11/SWW12 is at the northwest corner of the capped area. Gradients at this well pair are most often outward, and water levels are always below the top of the wall. The gradient magnitudes at all of the well pairs vary, with larger gradients occurring during seasons with low regional water levels.

Although the gradients at some of the well pairs around the perimeter containment system are outward, since the groundwater levels remain below the top of the wall, it has been concluded that groundwater is effectively contained in the overburden. Groundwater data collected from

the bedrock downgradient of the site show non-detects for the majority of the VOCs. For those that were detected, the concentrations were decreasing during the review period. These two lines of evidence support the conclusion that the slurry wall and leachate and groundwater collection system are containing the wastes remaining on-site. In order to maintain the effectiveness of the remedy, the increased leachate removal during the summer and fall months should continue.

Currently, PCB long-term monitoring includes surficial sediment, subsurface sediment, sediment trap and biota sampling, at five locations, once every two years (see Figure 3). During the review period, samples were collected in 2010 and 2012. Overall, PCB sediment concentrations are much lower than those detected in earlier investigations. Concentrations greater than 1 ppm have been observed at Location 3, where there was an increase in concentrations between 2010 and 2012 (1.07 [2010] to 1.13 [2012]). However, concentrations at the other locations decreased from 2010 to 2012, and Location 1 remains not detected. The arithmetic mean PCB concentrations in fish tissue for each location were lower in 2012 than in 2010, and the arithmetic mean total PCB concentration decreased from 1.6 mg/kg in 2010 to 1.16 mg/kg in 2012. Sampling of sediment and biota will continue until the RAO has been met.

### *Site Inspection*

A site visit related to this five-year review was conducted on November 14, 2013 by Patricia Simmons Pierre of the EPA. Ms. Pierre was accompanied by Payson Long of the NYSDEC, Clay McClarnon of de maximis, Inc., and David Rigg of ARCADIS on behalf of the PRPs. No issues arose during the site visit.

### *Interviews*

Clay McClarnon of de maximis, Inc., and David Rigg of ARCADIS were interviewed in relation to this five-year review. Both indicated that the remedies are functioning as anticipated in the RODs.

### *Institutional Controls Verification*

The law which prevents the drilling of wells within the city limits remains in effect. Likewise, the permanent easement is still on file at NYSDEC's office and in effect and the Environmental Protection Easement and Declaration of Restrictive Covenants are still on file in the County Clerk's office and in effect. New York State requires annual certification that institutional controls required by RODs are in place and that remedy-related O&M is being performed. This certification is included as an attachment in the annual O&M progress reports.

## **Technical Assessment**

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

The primary objectives of the 1984 ROD and the 1993 ROD, as modified by the ESD, are to control the source of contamination at the site, reduce and minimize the downgradient migration of contaminants in the groundwater, restore groundwater quality to levels consistent with federal and state groundwater quality and drinking water standards and minimize any potential human

health and ecological impacts resulting from the exposure to contaminants at and downgradient from the site. Groundwater data collected downgradient of the containment wall indicate a decreasing trend in contaminant concentrations. Therefore, it can be concluded that the current containment system is effectively containing wastes on-site. In order to maintain the effectiveness of the remedy, the increased leachate removal during the summer and fall months should continue.

Exposures to remaining site wastes are also prevented by the implementation of institutional controls. To prevent the utilization of the groundwater underlying the site proper; to prevent the development of the site for residential use and to allow access for maintenance and monitoring activities, a permanent easement was acquired by NYSDEC. All of the residential properties located in the vicinity of the site are within the Oswego City limits where the installation of wells is prohibited pursuant to Section 602.3 of the New York State Plumbing Code Section. All of the private wells downgradient of the site to Smith's Beach were connected to public water. There are two industrial properties located downgradient of the site. To prevent nonresidential exposure to contaminated groundwater at these properties, through the PRPs' efforts, Environmental Protection Easement and Declaration of Restrictive Covenants were recorded by the County Clerk on August 6, 2004 and March 1, 2006.

The 1997 ROD called for no further remedial action, with long-term monitoring of the sediment and biota in the creeks and wetlands adjacent to the site. Overall, PCB sediment concentrations are much lower than those detected in earlier investigations. The arithmetic mean PCB concentrations in the fish tissue for each location were lower in 2012 than in 2010, and the arithmetic mean total PCB concentration decreased from 2010 to 2012. Further, the observed fish tissue PCB concentrations represent low ecological risk to potential receptors, such as mink and green heron, based upon current food chain modeling calculations. Sediment and biota monitoring will continue until the sediment goals in the 1997 ROD have been met.

*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, toxicity data, cleanup levels and remedial action objectives used at the time of the remedy remain valid. The groundwater containment system, RCRA cap, fence and institutional controls identified above continue to remain barriers to direct exposure to on-site contaminants.

The property is zoned industrial and there have been no changes in the physical conditions of the site that would affect the protectiveness of the remedy since the last five-year review.

Soil and groundwater uses at the site are not expected to change during the next five years. The land use considerations and potential exposure pathways considered in the baseline human health risk assessment remain valid, and the ecological exposure scenarios remain the same.

Since there are no residential/commercial buildings on-site and none are expected in the future, and there are no residential/commercial buildings located within 100 feet of monitoring well M-21 (located immediately downgradient of the property line), vapor intrusion is not considered a

completed pathway at the present time. In the unlikely event of future on-site construction, further evaluation of this pathway may be necessary. This further evaluation may include site-specific considerations, such as the type of building, the location of the building relative to the maximum detected concentrations and the subsurface characteristics at the site.

The 1993 ROD identified benzene and vinyl chloride a primary risk drivers. Since the last five year review, there have been no changes to the toxicity values for these chemicals.

Although biota sediment accumulation factors have been updated since the 1997 ROD was issued, site-specific fish tissue data were used to assess the risk to ecological site receptors (green heron and mink). Current food chain modeling indicates no unacceptable risk to these receptors based on recent PCB sediment data.

The groundwater applicable or relevant and appropriate requirements (ARARs) established in the 1993 ROD included Maximum Contaminant Levels (MCLs) and non-zero Maximum Contaminant Level Goals established under the Safe Drinking Water Act, for drinking water sources. These values remain valid. State ARARs include the state MCLs (NYCRR, Title 10, Part 5-1) and New York State Groundwater Quality Standards (NYCRR, Title 6, Parts 701-703) identified in the 1993 ROD as remedial goals (see Table 2). These ARARS remain protective for the consumption of groundwater.

The groundwater risks identified in the 1993 ROD focused on potential future use of the aquifer as a potable or drinking water source by residents and workers. Residents in the area currently receive public water. Establishment of residential water supply wells within the contaminated area and city limits is prohibited by law. In addition, environmental easements were established at two downgradient properties to prevent the installation of wells. At the current time, exposure through consumption of groundwater at the site and the downgradient properties is not a completed exposure pathway.

The selected soil remedy was designed to reduce the risk to human health and the environment due to contaminants leaching from the waste disposal area. As such, specific ARARs were not established for the soils at the site although the cap, designed in 1984, was constructed under RCRA requirements, and serves to interrupt exposures.

The 1997 ROD identified a clean-up level of 1 mg/kg for PCBs in the creeks and associated wetlands. This value remains protective of ecological receptors at the site.

The RAOs for OU2 and OU3 were to reduce, minimize and mitigate the downgradient migration of contaminants in the groundwater from the site, minimize any potential human health and ecological impacts resulting from the exposure to contaminants at, and downgradient from, the site; prevent potential future exposures to contaminated groundwater on-site, as well as off-site in the area between the site and Smith's Beach; and restore groundwater quality to levels consistent with federal and state groundwater quality and drinking water standards. The RAO for the 1997 ROD was to minimize exposure of fish and wildlife to PCB-contaminated sediment in White Creek and adjacent wetlands. These RAOs continue to be valid.

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

There is no information that calls into question the protectiveness of the selected remedies.

*Technical Assessment Summary*

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

- The leachate monitoring/collection system is operating properly.
- The cap and vegetative cover are intact and in good condition.
- The fence around the site is intact and in good repair.
- The long-term groundwater monitoring network wells are functional.
- There is no evidence of trespassing, vandalism or damage (to the cap and vegetative cover, long-term monitoring wells, or fence).
  
- Long-term leachate-quality data indicates an overall stable trend in total VOC concentrations (with possible seasonal variability) since remedy implementation.
- VOC concentrations in monitoring wells M-21 and LR-8 (located south of Mitchell Street) have remained relatively low over the past five years, but remain above GWQSS for benzene and chlorobenzene.
- VOC concentrations in monitoring well LR-6 (located immediately outside the containment system to the northwest) are below GWQSSs.
- PCB levels in creek and wetland sediment and biota remain relatively low and do not pose a risk to human health or upper trophic level receptors (mink and green heron).
- There are no drinking water wells within the plume of contamination and none are expected to be drilled because of existing local requirements.
- Wetlands and surface waters are not degraded by site contaminants, and site remedies are expected to be in place to prevent contaminants from reaching and contaminating wetlands and surface waters.
- In order to maintain the effectiveness of the remedy, the increased leachate removal during the summer and fall months should continue.

## **Recommendations and Follow-Up Actions**

There are no recommendations or follow-up actions stemming from this five-year review which affect the protectiveness of the remedy.

In order to maintain the effectiveness of the remedy, the five-year review recommends that the increased leachate removal during the summer and fall months continue. This recommendation does not affect the current protectiveness of the remedy.

## **Protectiveness Statement**

The implemented containment remedy for OU2 is protective of human health and the environment because contaminated on-site soils are contained by an impermeable cap.

The implemented remedy for OU3 is protective of human health and the environment because hydraulic control within the containment system is being maintained, institutional controls preventing well installation and groundwater use are in place and effective and all residents are connected to public water.

The long-term monitoring remedy for OU4 is protective of human health and the environment.

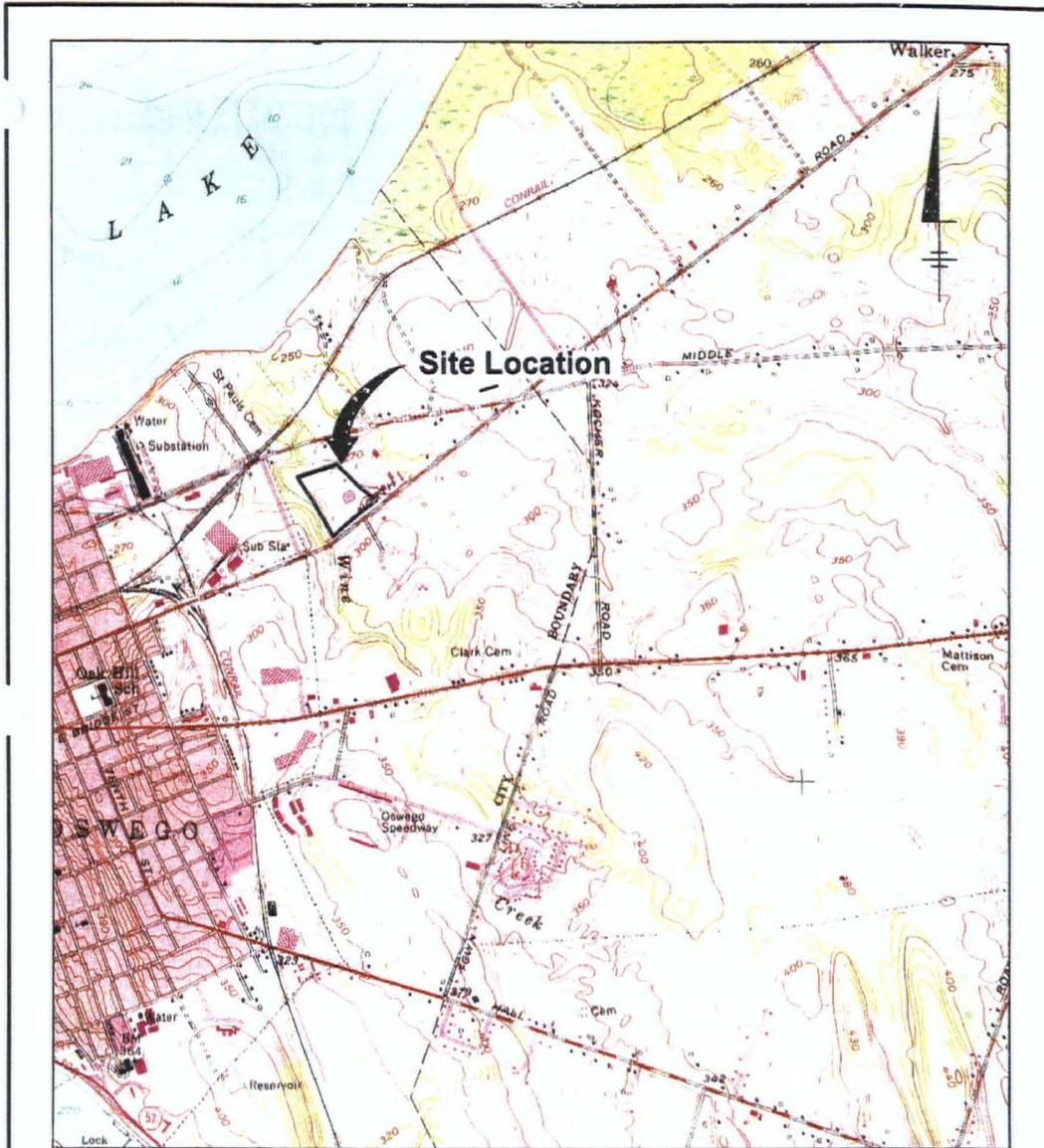
The site-wide remedial actions protect human health and the environment because contaminated on-site soils are contained by an impermeable cap, hydraulic control within the containment system is being maintained, institutional controls preventing well installation and groundwater use are in place and effective and all residents are connected to public water.

## **Next Review**

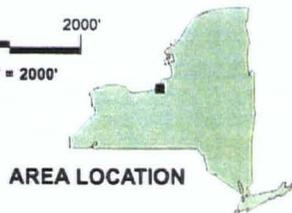
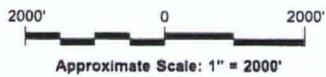
The next five-year review for the site will be completed five years from the date of this review.

**Attachment 1: Figures**

**Figure 1: Site Location Map**



REFERENCE: BASE MAP USGS QUAD., OSWEGO EAST, NY, 1978.



AREA LOCATION

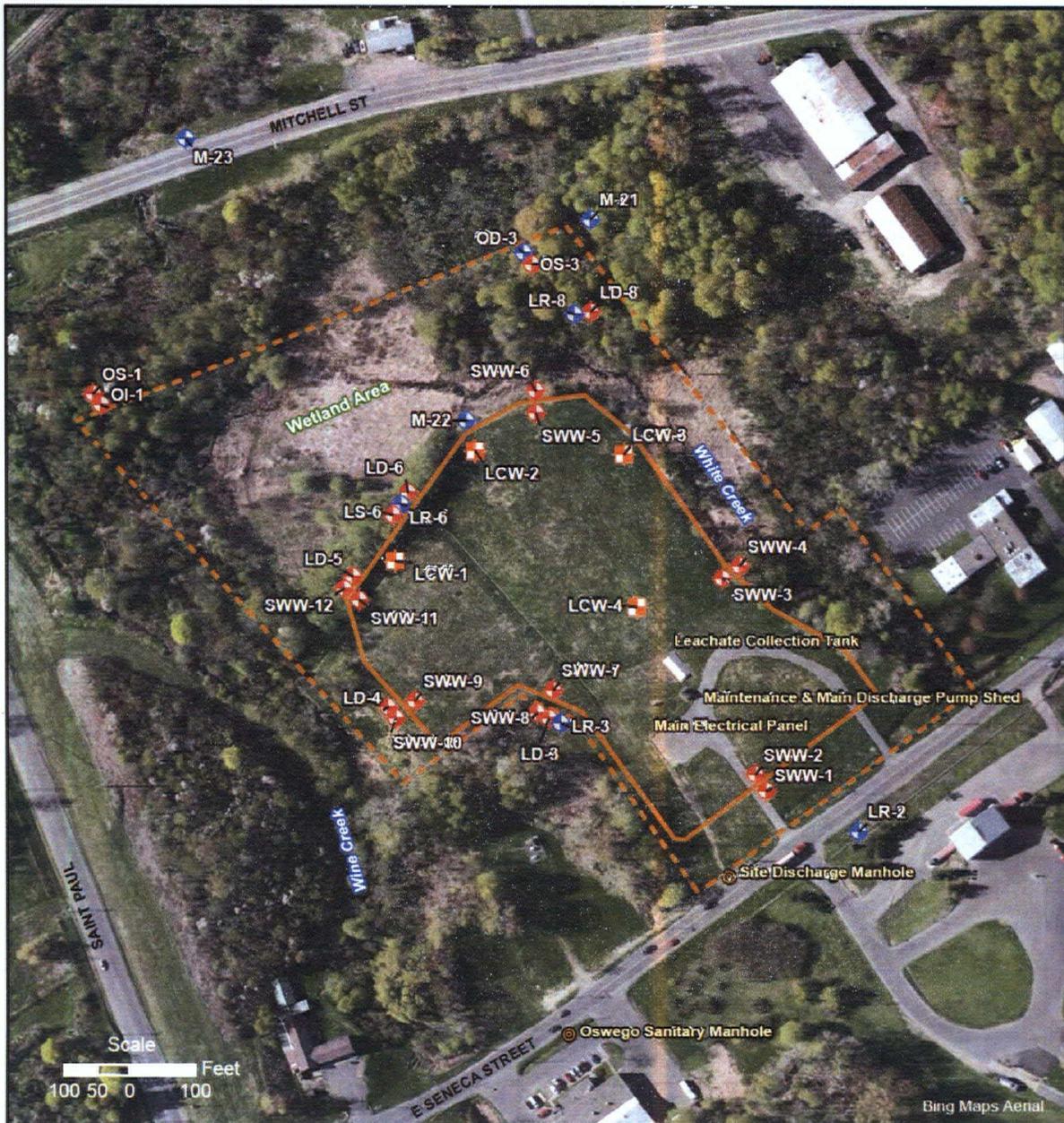
POLLUTION ABATEMENT SERVICES SITE  
OSWEGO, NEW YORK  
OPERATION AND MAINTENANCE AND  
LONG-TERM MONITORING PLAN

### SITE LOCATION MAP

**BBL** BLASLAND, BOUCK & LEE, INC.  
engineers & scientists

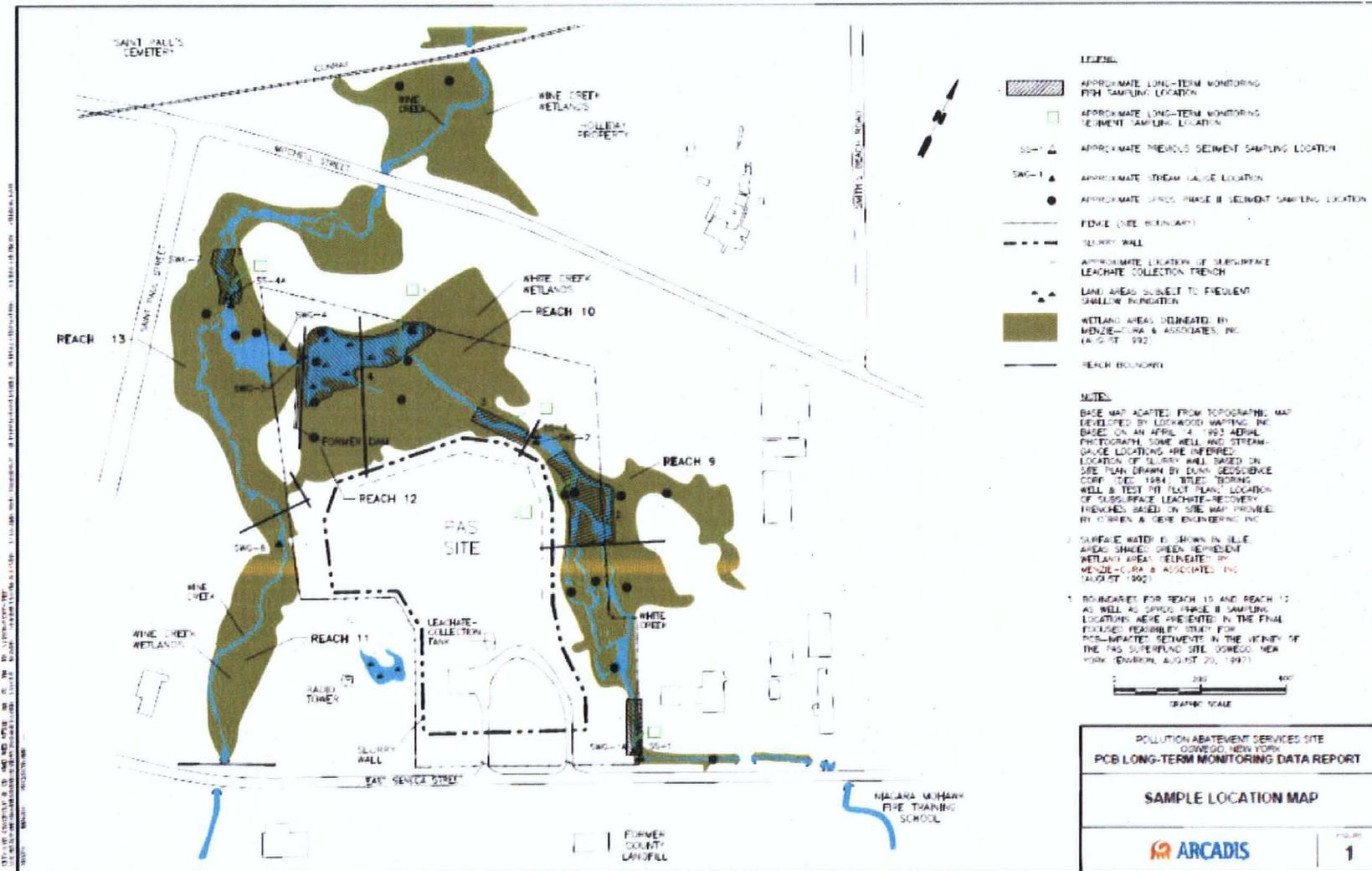
FIGURE  
**1**

**Figure 2: Site Plan and Well Location Map**



|  |  |   |
|--|--|---|
| <p><b>LEGEND</b></p>   | <p><b>EXISTING SITE WELLS</b></p>  |   |
| <p><b>Sample Locations</b></p> <ul style="list-style-type: none"> <li> Bedrock Monitoring Well</li> <li> Leachate Collection Well (Overburden)</li> <li> Overburden Monitoring Well</li> <li> Manhole</li> <li> Fence (Site Boundary)</li> <li> Slurry Wall</li> </ul> | <p>PAS Site, Oswego, New York</p>  |   |
|  | <p></p> <p>Project No.: 3131<br/>         Plot Date: 4 May 2012<br/>         Arc Operator: BJAR<br/>         Reviewed by:</p> | <p style="text-align: center;"><b>Figure 1</b></p> <p style="text-align: center;"><br/> <small>117 Sandana Boulevard North<br/>         Saint Paul, Minnesota 55108<br/>         Main Phone: (651) 943-4224<br/>         www.ddmsinc.com</small></p> |

**Figure 3: Sampling Locations in White and Wine Creeks**



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- LEGEND**
- APPROXIMATE LONG-TERM MONITORING PCB SAMPLING LOCATION
  - APPROXIMATE LONG-TERM MONITORING SEDIMENT SAMPLING LOCATION
  - APPROXIMATE PREVIOUS SEDIMENT SAMPLING LOCATION
  - APPROXIMATE STREAM GAUGE LOCATION
  - APPROXIMATE SPREAD PHASE II SEDIMENT SAMPLING LOCATION
  - FENCE (SITE BOUNDARY)
  - SLURRY WALL
  - APPROXIMATE LOCATION OF SUBSURFACE LEACHATE COLLECTION TRENCH
  - LAND AREA SUBJECT TO FREQUENT SHALLOW FLOODING
  - WETLAND AREAS DELINEATED BY MENZIE-CORRA & ASSOCIATES, INC. (AUGUST 1992)
  - REACH BOUNDARY

**NOTES**

BASE MAP ADAPTED FROM TOPOGRAPHIC MAP DEVELOPED BY LOCKWOOD WAPPING, INC. BASED ON AN APRIL 24, 1983 AERIAL PHOTOGRAPH. SOME WELL AND STREAM-GAUGE LOCATIONS ARE INFERRRED. LOCATION OF SLURRY WALL BASED ON SITE PLAN DRAWN BY EDWIN GEORGINO, CORP. (DEC. 1984). TYPED "BORING WELL & TEST PIT LOG PLAN" LOCATION OF SUBSURFACE LEACHATE-RECOVERY TRENCHES BASED ON SITE MAP PROVIDED BY CORBIN & COTE ENGINEERING, INC.

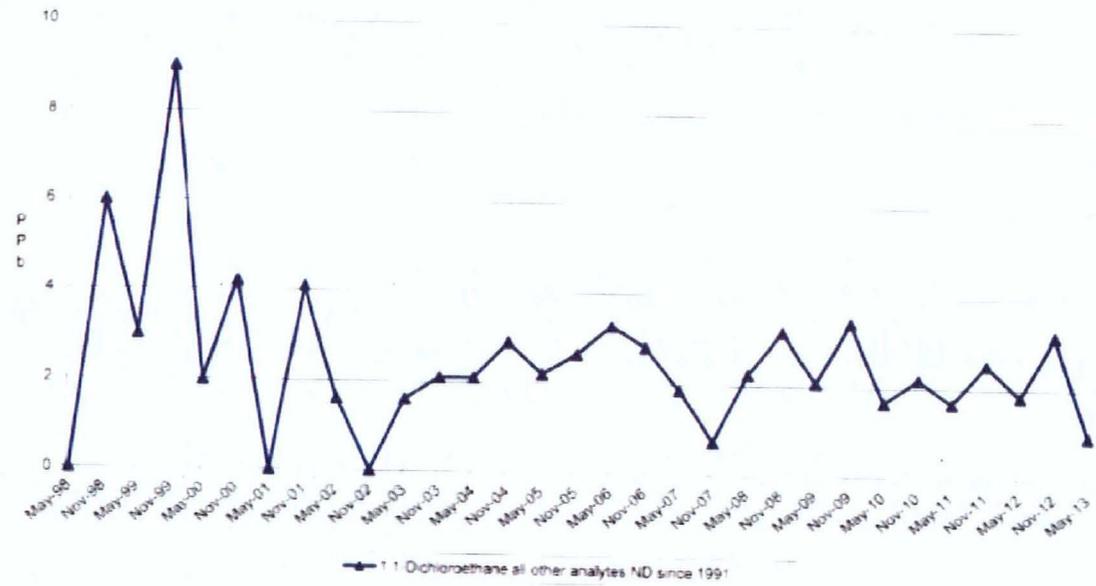
1. SURFACE WATER IS SHOWN IN BLUE AREA. SHADY GREEN REPRESENT WETLAND AREAS DELINEATED BY MENZIE-CORRA & ASSOCIATES, INC. (AUGUST 1992).

2. BOUNDARIES FOR REACH 10 AND REACH 12 AS WELL AS SPREAD PHASE II SAMPLING LOCATIONS WERE PRESENTED IN THE FINAL POLYMERIZABLE STUDY FOR PCB-IMPACTED SEDIMENTS IN THE VICINITY OF THE P&S SUPERFUND SITE, OSWEGO, NEW YORK (VERSION AUGUST 20, 1997).

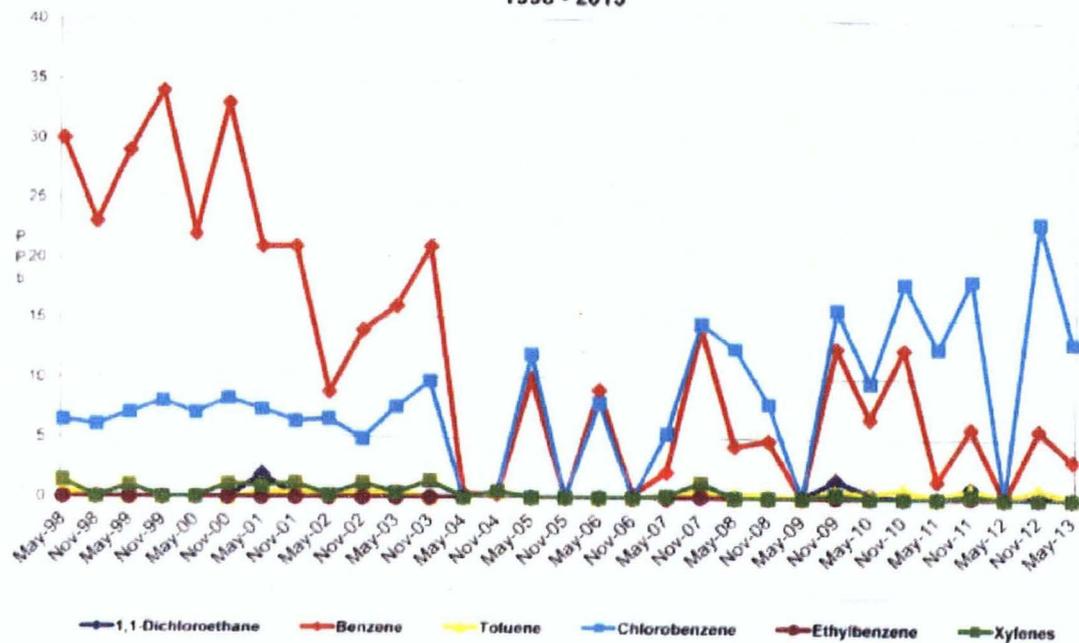
GRAPHIC SCALE

**Attachment 2: Long-Term Groundwater Monitoring Concentration Graphs**

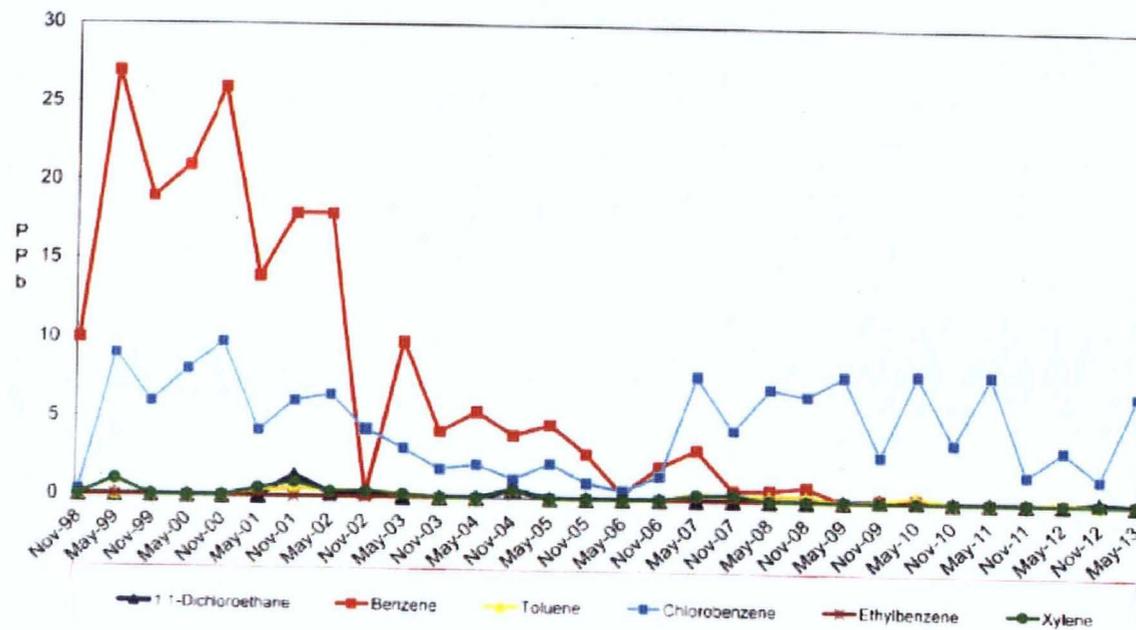
Long Term Groundwater Monitoring at LR-6  
PAS Oswego Superfund Site Groundwater  
1998 - 2013



Long Term Groundwater Monitoring at LR-8  
 PAS Oswego Superfund Site Groundwater  
 1998 - 2013



Long Term Groundwater Monitoring at M-21  
 PAS Oswego Superfund Site Groundwater  
 1998 - 2013



**Attachment 3: Tables**

**Table 1: Chronology of site Events**

| <b>Event</b>   | <b>Date</b> |
|--|-------------|
| Remedial response actions taken by EPA, NYSDEC and the Coast Guard   | 1973 -1982  |
| PAS site selected as one of the first sites in the nation to receive CERCLA Trust Fund monies for cleanup actions  | 1981        |
| <i>site Investigation and Remedial Alternatives Evaluation</i> (initial remedial investigation/feasibility study for the site) conducted by NYSDEC   | 1982 - 1984 |
| PAS site listed on the NPL   | 1983        |
| ROD calling for, among other things, the installation of a perimeter slurry wall and RCRA cap and the construction of an on-site groundwater (leachate) treatment system signed by EPA                               | 1984        |
| Environmental assessment of area in the vicinity of the site including White and Wine Creeks conducted by NYSDEC   | 1984 - 1986 |
| NYSDEC implemented the remedial actions identified in the 1984 ROD with the exception of the construction of the on-site treatment system  | 1986        |
| NYSDEC collected leachate and transported it off-site to an approved RCRA treatment/disposal facility  | 1986 - 1991 |
| Supplemental RI/FS to evaluate the integrity of the existing containment system at the site, conducted by PRPs   | 1990 -1993  |
| AOC for leachate collection and off-site disposal signed by EPA and PRPs   | 1991        |
| ROD calling for, among other things, the enhancement of the present source control system and several investigations related to the enhancement of the source control system signed by EPA                           | 1993        |
| 1991 AOC extended by a second AOC  | 1994        |
| Supplemental Pre-Remedial Design Study, related to the investigations called for in the 1993 ROD, conducted by PRPs  | 1994 -1996  |
| Explanation of Significant Differences explaining the results of the additional investigations called for in the 1993 ROD and providing for the continued off-site treatment and disposal of leachate, issued by EPA | 1996        |
| FFS related to the PCB-impacted in White and Wine Creeks conducted by PRPs   | 1996        |
| Consent Decree for the performance of the remaining components of the 1993 signed by EPA and PRPs  | 1997        |
| ROD calling for no further action with long-term monitoring of the PCB-impacted in the vicinity of the site signed by EPA  | 1997        |
| Consent Decree for the implementation of long-term monitoring program called for in the 1997 ROD signed by EPA and PRPs  | 1998        |
| First Five-Year Review conducted by EPA  | 1998        |
| Second Five-Year Review conducted by EPA   | 2003        |
| Third Five-Year Review conducted by EPA  | 2008        |
| ESD modifying remedy to allow for direct discharge of leachate from the site to the City of Oswego's Eastside Wastewater Treatment Plant instead of off-site treatment and disposal, issued by EPA                   | 2010        |

**Table 2: Remediation Goals for Groundwater (all in µg/L)  
OU2 and OU3 RODs**

| Contaminant of Concern | New York State Groundwater Quality Standard | Site Cleanup Level |
|------------------------|---|--------------------|
| Benzene                | 0.7   | 0.7                |
| Toluene                | 5   | 5                  |
| Ethylbenzene           | 5   | 5                  |
| Xylenes (Total)        | 5   | 5                  |
| Chlorobenzene          | 5   | 5                  |
| 1,1- Dichloroethane    | 5   | 5                  |

**Table 3: Documents, Data and Information Reviewed**

|  |
|--|
| Record of Decision, EPA, June 1984   |
| Record of Decision, EPA, December 1993   |
| Record of Decision, EPA, September 1997  |
| Consent Decree, United States v. Agway, Inc., et al, Civil Action No. 98-CV-0112, September 1997   |
| Consent Decree, United States v. General Motors Corporation and Niagara Mohawk Power Corporation, Civil Action No. 98-CV-1927, December 1998 |
| PCB Long-Term Monitoring Plan, Blasland, Bouck & Lee, August 1999  |
| Five-Year Review Reports, EPA, December 2003 and December 2008   |
| Operation, Maintenance, and Long-Term Monitoring Plan, de maximis, inc., July 2013   |
| Annual Operation, Maintenance, and Monitoring Progress Reports, de maximis, inc., 2009 to 2013   |
| PCB Long-Term Monitoring: 5-Year Review, 2013  |
| Annual PCB Long-Term Monitoring Progress Reports, ARCADIS, 2008 to 2012  |
| Five-Year Data Review Report, de maximis, inc., August 2013  |
| EPA Guidance for Conducting Five-Year Reviews  |