REPORT

Five-Year Data Review Report

Niagara Mohawk
A **National Grid** Company

and General Motors Corporation

Pollution Abatement Services Superfund Site
Fourth Operable Unit
Oswego, New York

November 2003

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

Pollution Abatement Services Superfund Site
Oswego, New York
Fourth Operable Unit

Five-Year Data Review Report

This report presents a five-year data review for the fourth operable unit (OU4) of the Pollution Abatement Services (PAS) Superfund Site (the Site) located in Oswego, New York based on the first five years of polychlorinated biphenyl (PCB) long-term monitoring data. This report has been prepared by Blasland, Bouck & Lee, Inc. (BBL) at the request of the United States Environmental Protection Agency (USEPA) and on behalf of Niagara Mohawk, a National Grid Company (Niagara Mohawk) and General Motors Corporation (GM) (the Settling Defendants).

Section 1 provides an introduction. Section 2 presents an overview of the PCB long-term monitoring activities performed for OU4. Section 3 presents a summary of the PCB long-term monitoring results. Section 4 evaluates the PCB long-term monitoring data obtained over the past five years. Section 5 provides recommendations. Section 6 contains a list of references cited in this document.

1. Introduction

1.1 Purpose and Scope

This Five-Year Data Review Report is based on the first five years of annual monitoring data collected under the USEPA-approved *PCB Long-Term Monitoring Plan* (Plan) for the Site OU4 (BBL, 1999a) and the USEPA-approved modification to that Plan (BBL, 2001a). The annual monitoring described in the Plan is in response to the Consent Decree between USEPA, Niagara Mohawk, and GM that was lodged by the Court on December 15, 1998 (USEPA, 1998b), and the September 30, 1997 Record of Decision (ROD) for OU4 (USEPA, 1997). The ROD presents the remedial action selected by the USEPA to address the PCBs detected in the sediments of White and Wine Creeks and the adjacent wetlands. The USEPA-selected remedy presented in the OU4 ROD is long-term annual monitoring of PCB levels in sediments and fish in White and Wine Creeks and the adjacent wetlands.

The Consent Decree states that the USEPA will conduct reviews of whether the remedial action is protective of human health and the environment at least every five years (USEPA, 1998b). As stated in the ROD, long-term monitoring is being conducted at the Site to document that PCB 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 (USEPA, 1997).

1.2 Site Description

The Site, located on 15 acres near the eastern edge 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, which is approximately 0.5 miles north of the Site. Just east of this channel, Wine Creek connects with a wetland adjacent to the residential area known as Smith's Beach. Prior to passing through the Site, White and Wine Creeks are proximate to the East Seneca Street Dump (also referred to and operated as the Oswego County Landfill), and White Creek is proximate to the Niagara Mohawk Fire Training School. The Oswego Castings site is situated upstream of the wetland

adjacent to Smith's Beach, a residential area located on the shore of Lake Ontario.

The area between the Site and Lake Ontario (to the north) is mostly undeveloped and currently includes multiple land uses, including a cemetery, a wetland, and commercial and residential areas.

1.3 Site History and Enforcement Activities Summary

The PAS facility was a high-temperature, liquid-chemical waste incineration facility which operated from 1970 through 1977. 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 the USEPA and New York State Department of Environmental Conservation (NYSDEC) at the Site. Response actions taken from 1973 to 1982 by the USEPA, NYSDEC, and 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 onsite lagoons. According to the 1993 ROD for the Site (USEPA, 1993), these removal actions constitute the first operable unit (OU1).

From 1982 to 1984, the 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. Based on the results of this study, the USEPA signed a ROD in 1984 (OU2) (USEPA, 1984), which specified the following remedial actions: 1) limited excavation and offsite disposal of contaminated materials; 2) installation of a perimeter slurry wall; 3) site grading and capping in accordance with Resource Conservation and Recovery Act (RCRA) requirements; 4) installation of a leachate collection and treatment system; and 5) groundwater monitoring. The NYSDEC implemented the remedial actions identified in the 1984 ROD, with the exception of the onsite treatment system. Rather than installing an onsite treatment system, the leachate was collected by the NYSDEC from 1986 through 1991 and transported offsite to an approved RCRA treatment, storage, and disposal (TSD) facility.

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

In 1989, the NYSDEC began a long-term monitoring program for groundwater, surface water, and sediment in the vicinity of the Site. The results of 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.

In September 1990, an Administrative Order on Consent (AOC) was entered into between the USEPA and a group of potentially responsible parties (PRPs) to conduct a supplemental RI/FS to evaluate the integrity of the existing containment system at the Site, to determine the nature, extent, source, risk, and to identify and evaluate remedial alternatives for areas outside the containment system. The supplemental RI/FS concluded that chemicals detected in the groundwater outside the containment system were attributable to insufficient leachate removal from within the containment system, resulting in a downward hydraulic gradient located at the center of the containment system.

In October 1991, the USEPA and a group of PRPs entered into a leachate-removal AOC. This AOC required interim groundwater removal (IGR) of leachate from within the containment system on a periodic basis. IGR activities were extended by a second AOC entered into in 1994. 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 beneath the area of leachate collection well LCW-4 where the lodgement till is relatively thin. The supplemental RI Report noted that the highest

level of contaminants occurred in the vicinity of leachate collection well LCW-4 where downward hydraulic gradients existed prior to implementation of the IGR program. The report 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, the USEPA signed a ROD on December 29, 1993 for OU3 (USEPA, 1993). The 1993 ROD incorporated all of the existing components of the 1984 ROD for OU2, as well as several additional components. The selected remedy under the 1993 ROD included: 1) enhancing the present 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; 2) connecting downgradient residents in the Smith's Beach area, who were using residential wells, to the public water supply; and 3) implementing institutional controls on groundwater usage through deed restrictions that covered the Site, as well as downgradient locations, including the Smith's Beach area.

The 1993 ROD also called for several investigations related to the enhancement of the source control system. In addition, as there was some uncertainty related to the source of the PCBs detected in the sediments in the adjacent wetlands and White and Wine Creeks, the ROD called for a study to determine the sources of PCB and pesticide contamination.

In July 1994, an AOC was entered into by the USEPA and a group of PRPs to conduct a supplemental pre-remedial design study (SPRDS) (which was completed in 1996) related to the investigations specified in the 1993 ROD. In September 1994, an AOC was entered into between the USEPA and a group of PRPs to extend the routine leachate removal called for in the 1991 AOC, and, among other things, to connect downgradient residents in the Smith's Beach area, who were using residential wells, to the public water supply. The water-supply connections were completed in July 1995.

In September 1996, an Explanation of Significant Differences (ESD) was issued by the USEPA for OU3 (USEPA, 1996). The ESD explained the results of the additional investigations called for in the 1993 ROD and presented modifications as follows: 1) identified that bedrock pumping would adversely affect the containment system, streams, and wetlands; 2) modified the contingent remedy for the treatment of the leachate to provide for continued offsite treatment and disposal in lieu of discharge to the City of Oswego Waste Water Treatment Plant; and 3) identified that the Site was not the source of pesticides in surface water or a present source of PCBs in the creek or wetland sediments, and that other upstream sources of PCBs exist. On September 26, 1997, the USEPA and the Performing Settling Defendants signed a Consent Decree for the performance of the operation, maintenance, and long-term monitoring components of the groundwater remedy described in the 1993 ROD, as clarified by the 1996 ESD.

Based upon the results of the 1996 SPRDS, a Focused Feasibility Study (FFS) was completed in August 1997 to identify and evaluate remedial alternatives for the PCB-impacted sediments in the vicinity of the Site (ENVIRON, 1997). That FFS determined that PCB-impacted sediments do not pose a human health risk and that potential ecological risks to conservatively-selected receptor species (e.g., mink) are only marginal. In September 1997, the USEPA signed a ROD for the PCB-impacted sediments in the vicinity of the Site (OU4) (USEPA, 1997), which identified no further action with long-term PCB monitoring as the selected remedy.

In September 1998, the USEPA, Niagara Mohawk, and GM (the Settling Defendants) signed the OU4 Consent Decree, which was subsequently lodged by the Court on December 15, 1998 (USEPA, 1998b). The OU4 Consent Decree identified the scope of the remedy as long-term monitoring of PCBs in sediments and biota in White and Wine Creeks and the adjacent wetlands.

To date, two five-year data review reports have been completed for OU3. The first five-year data review report for OU3 was issued in June 1998 (USEPA, 1998a); and a second five-year data review report for OU3 was submitted to the USEPA in 2003 (de maximis, inc., 2003).

2. Overview of the PCB Long-Term Monitoring Activities

In accordance with the requirements set forth in the OU4 Consent Decree and the 1997 ROD for OU4 (USEPA, 1997), the Plan was developed by BBL (BBL, 1999a), the USEPA-approved Supervising Contractor identified in the OU4 Consent Decree. The Plan provides a detailed description of the requirements, methods, and procedures for monitoring the PCB levels in the sediments and biota (fish) in White and Wine Creeks and wetlands adjacent to the Site, and includes the following components: the methodology for the selection of a contractor(s); the methodology for the implementation of the Plan; a Quality Assurance Project Plan; and a Health and Safety Contingency Plan. The Plan was approved by the USEPA in a July 22, 1999 letter (USEPA, 1999). As identified in the Plan, the monitoring activities include sampling of surficial sediments (0 to 3 inch), subsurface sediments (3 to 6 inch and 6 to 12 inch), suspended sediment (trap), and biota (fish). In the third Annual Progress Report (BBL, 2000), BBL proposed that subsurface sediment samples not be collected in the future, and that future long-term monitoring events include the continued collection of surficial (0 to 3 inch) sediment, suspended sediment (trap), and biota (fish) samples in accordance with the Plan. USEPA approved this modification to the Plan on May 30, 2001, as documented in BBL's May 31, 2001 letter to the USEPA (BBL, 2001a).

2.1 Sample Locations

The Plan identified the collection of co-located sediment, sediment trap, and biota samples from five locations in White and Wine Creeks and the adjacent wetlands. The sample locations were identified by the 8-foot sections of iron pipe which were driven into the bank during the initial (1999) annual sampling round. These locations were determined based on the results of a probing exercise conducted by BBL in 1999 to locate prime sediment depositional areas, and have been sampled during each of the five annual sampling events. These locations (shown on Figure 1) are identified below.

Location 1: Upstream (east) of the Site, in White Creek, near historical sample location SS-1.

Location 2: Adjacent to and northeast of the Site, in White Creek, in the vicinity of Phase 2 SPRDS sample location White 11A.

Location 3: Adjacent to and north of the Site, in White Creek, approximately 50 feet downstream of historical sample location SS-3.

Location 4: North of the Site in White Creek, in the vicinity of Phase 2 SPRDS sample location White 12B.

Location 5: Downstream (northwest) of the Site, and downstream of the confluence of White and Wine Creeks, in the vicinity of historical sample location SS-4A.

2.2 Sediment Sampling

During the five annual sampling events conducted to date, sediment samples were collected by BBL at each of the aforementioned locations using a stainless steel corer. At each sample location, the corer was pushed into the sediment, and slowly pulled out. The sediment cores were extracted from the stainless steel tube onto an aluminum pan using a brass push rod. The sediment samples were homogenized, and placed in the appropriate sampling jars for shipment to the laboratory, in accordance with procedures identified in the Plan.

2.3 Sediment Trap Sampling

As part of the annual PCB monitoring activities, sediment traps were placed at each of the five sediment sampling locations by BBL. The sediment traps consisted of pre-cleaned sample jars placed in stainless steel pans. The traps were monitored periodically by BBL for the collection of sediment deposition. Sediment samples from the traps were retrieved from all locations by BBL, and placed in the appropriate sampling jars for shipment to the laboratory, in accordance with the procedures identified in the Plan.

2.4 Biota Sampling

Electrofishing of White and Wine Creeks was conducted each year by BBL using a backpack electrofishing unit. The objective of the electrofishing, as identified in the Plan, was to collect three composite fish samples from each location. The target species were minnows (e.g., creek chubs, fathead minnows, bluntnose minnows) and/or sticklebacks.

Following collection, the appropriate target fish were placed in labeled Ziploc®-type bags, and stored on ice prior to sample processing. Sample processing included dividing the fish into three composite samples per location. Individual fish lengths, numbers of individuals per sample, and total sample weight were recorded. The samples were then wrapped and shipped to the analytical laboratory, in accordance with the procedures detailed in the Plan.

2.5 Laboratory Analyses

Laboratory analyses of sediments included PCBs and total organic carbon (TOC), in accordance with the requirements set forth in the Plan. The sediment and sediment trap samples were analyzed for PCBs using USEPA SW-846 Method 8082 (USEPA, 1986), as referenced in the current NYSDEC Analytical Services Protocol (ASP), and for TOC using USEPA Region 2's Lloyd Kahn Method (USEPA, 1988). The sediment analyses were performed by Galson Laboratories (East Syracuse, New York) in 1999 through 2001 and Buck Laboratories (Cortland, New York) in 2002 and 2003. In 2002, the USEPA approved the use of Buck Laboratories, which was necessitated by the fact that Galson Laboratories stopped performing environmental-related analytical services.

The biota samples were analyzed by EnChem Inc. (Green Bay, Wisconsin) for PCBs using USEPA SW-846 Method 8082, as referenced in the current NYSDEC ASP, and for percent lipids using standard gravimetric techniques.

3. Long-Term PCB Monitoring Results

The results of the first five years of the long-term PCB monitoring program, together with the relevant conclusions, were presented to the USEPA in the five *Annual Progress Reports* (BBL, 1999b; BBL, 2000; BBL, 2001b; BBL, 2003a; BBL, 2003b) submitted to date. The data presented in these reports are summarized below.

- Surficial sediment PCB concentrations in White and Wine Creeks were low (and typically not detected). Maximum PCB concentrations were 0.17 milligrams per kilogram (mg/kg) in 1999, 0.015 mg/kg in 2000, 1.8 mg/kg in 2001, 3.1 mg/kg in 2002, and 0.45 mg/kg in 2003. Table 1 and Figure 1 present these data.

- PCBs were detected in only one of the subsurface sediment samples at a concentration of 0.25 mg/kg (in the 3- to 6-inch interval from Location 4 in 2002). Table 2 and Figure 1 present these data. As noted above, in May 2001 the USEPA approved discontinuing the sampling and PCB analysis of

subsurface sediment from the long-term monitoring plan, as these data are not necessary to meet the requirements set forth in the OU4 ROD and Consent Decree.

- PCB concentrations were also typically low in the suspended sediment (trap) samples. Maximum PCB concentrations were 1.2 mg/kg in 1999, 1.1 mg/kg in 2000, 1.4 mg/kg in 2001, 0.96 mg/kg in 2002, and 0.32 mg/kg in 2003. Table 3 and Figure 1 present these data.

- PCBs were also detected in fish tissue samples collected during the first five annual rounds of the long-term monitoring program. Maximum PCB concentrations were 0.52 mg/kg in 1999, 3.9 mg/kg in 2000, 3.4 mg/kg in 2001, 1.7 mg/kg in 2002, and 2.0 mg/kg in 2003. Table 4 and Figure 2 present these data.

4. Evaluation of Long-Term PCB Monitoring Data

The data from all five years of the PCB long-term monitoring were reviewed (in combination with the historical data collected in 1989 through 1996) to evaluate the occurrence of PCBs in biota and sediment of White and Wine Creeks. Specific evaluations included an assessment of temporal trends in PCB concentrations, and an evaluation of potential ecological affects.

4.1 Surficial Sediment Data

The surficial sediment data indicate that PCBs are frequently not detected or present at relatively low concentrations. Because a large portion of the surficial sediment PCB data over the last five years have been non-detect, it is difficult to statistically evaluate temporal trends in these data. Table 1 presents the data for 1999 through 2003. Figure 1 shows the data for all five years of the long-term monitoring program by location. Figure 3 presents the sediment data grouped on an annual basis. Table 5 and Figure 4 present the surficial sediment data collected from 1989 to 1996.

PCBs have not been detected at upstream Location 1 during the five annual sampling rounds of the long-term monitoring program. In addition, PCBs were not detected in seven out of eight samples collected in 1989 through 1996 at upstream location SS-1. The single detection at this location was in 1996 at 0.074 mg/kg.

The PCB concentrations in sediment samples from Locations 2, 3, 4, and 5 are relatively low, and are less than those detected by ENVIRON in 1996. For example, for Location 2, the PCB concentration in the vicinity of this location during the Phase 2 SPRDS investigation in 1996 (Location White 11A) was 11 mg/kg, yet the highest concentration detected in the five years of the long-term monitoring data from this location was only 0.072 mg/kg (in 2003). Likewise, the maximum PCB concentration detected in surficial sediment samples collected from 1989 through 1996 from Location 3 (SS-3) was 3.7 mg/kg in May 1991, yet the highest concentration detected at this location during the long-term monitoring program was only 1.8 mg/kg (2001). Similarly, at Location 4 (White 12B), the highest PCB concentration in surficial sediments detected as part of the PCB long-term monitoring program is 3.1 mg/kg (in 2002) and 5.9 mg/kg was detected in 1995/1996; however; the total PCB concentration at this location in 2003 was significantly lower (0.45 mg/kg). In addition, the maximum PCB concentration in surficial sediment samples from Location 5 (SS-4A) between 1990 and 1996 was 1.4 mg/kg in 1991, yet PCBs were not detected at this location during the long-term monitoring program in 1999, 2000, and 2002, with concentrations of 0.034 mg/kg in 2001 and 0.21 mg/kg in 2003. In 2003, the duplicate sample had a PCB concentration of only an estimated 0.047 mg/kg.

4.2 Subsurface Sediment Data

The PCB data for the subsurface sediment samples are shown in Table 2 and on Figure 1. As mentioned previously, USEPA approved modifying the Plan on May 30, 2001 to discontinue subsurface sediment sampling. However, subsurface (3 to 6 inches) sediment samples were inadvertently collected at Locations 2, 4, and 5 in 2002 and submitted to the laboratory for PCB analysis. PCBs were not detected in the 2002 samples from Locations 2 and 5, and the sample from Location 4 had a total PCB concentration of 0.25 mg/kg. Collectively, these data demonstrate that subsurface PCB data are not necessary to meet the requirements set forth in the OU4 ROD and Consent Decree.

4.3 Sediment Trap Data

The sediment trap data indicate that PCBs, if present, are detected at relatively low concentrations. Table 3 presents the sediment trap data for 1999 through 2003. Figure 1 shows the data for all five years of the long-term monitoring program by location. Figure 3 presents the sediment data grouped on an annual basis. During each of the five monitoring events, PCBs have not been detected in the sediment trap samples collected from upstream Location 1. PCB concentrations at most locations are generally lower in 2003 compared to earlier years, and concentrations over 1 mg/kg have not been detected in the last two annual monitoring rounds.

A linear regression model was used to evaluate the sediment trap data. This type of evaluation involves fitting a straight line to a set of data points to measure the effect of a single independent variable (in this case, that variable is time). The coefficient of correlation of the data (R^2) is the measured impact of that variable (i.e., the proportion of the total variation of the PCB concentration that can be attributed to differences in time). The closer R^2 is to 1.0, the stronger the relationship between the two variables. The regression model showed a significant decreasing trend in PCB concentrations for Location 3 (Figure 5). The R^2 value for Location 3 ($R^2 = 0.88$) confirms that PCB concentrations at this location have steadily decreased over time. Locations 2, 4, and 5 have relatively low PCB concentrations, and the R^2 values did not show any significant trends (Figure 5).

4.4 Biota Data

PCB concentrations detected in the most recent (2003) biota samples are generally lower than the PCB concentrations detected during the three or four previous annual sampling rounds, with the exception of Location 5. Please note that in 1999 low-flow conditions in White Creek prevented the collection of fish samples at Locations 2, 3, and 4. PCB concentrations are generally lowest in the samples collected from the upstream location (Location 1). Table 4 presents the data for 1999 through 2003. Figure 2 shows the data for all five years of the long-term monitoring program by location. Figure 3 presents the biota data grouped on an annual basis.

The arithmetic mean PCB concentrations in fish have steadily declined from 2000 to 2003, with respective arithmetic means of 2.3 mg/kg, 2.0 mg/kg, 0.91 mg/kg, and 0.66 mg/kg, respectively. In addition, the arithmetic mean PCB concentration in fish in 1999 was 0.43 mg/kg. Maximum fish PCB concentrations were 0.52 mg/kg, 3.9 mg/kg, 3.4 mg/kg, 1.7 mg/kg, and 2.0 mg/kg for 1999 through 2003, respectively. Please note that in 1999 fish were only collected from Locations 1 and 5 due to low-flow conditions in White Creek.

A statistical tool known as one-way analysis of variance (ANOVA) was used to evaluate differences between the annual biota data sets for each location. Specifically, the one-way ANOVA was used to identify temporal trends in biota wet-weight PCB concentrations. First, the individual data sets were tested for normality using the Shapiro-Wilk normality test, which indicated that the biota data for

Locations 1, 2, 3, and 4 were normally distributed. For these locations, the Bonferroni comparison of means test was used to determine if the arithmetic means of the fish data were significantly different between years for each location (Table 6). According to this evaluation, arithmetic mean fish PCB concentrations at Locations 1, 2, 3, and 4 are significantly different between 2003 and earlier years. Linear regression models were also run for Locations 1 through 4 that confirmed the decreasing trends in fish PCB concentrations over time (Figure 6). Because the biota data for Location 5 were not normally distributed and attempts to normalize these data were unsuccessful, the Kruskal-Wallis nonparametric ANOVA was used to evaluate these data. Based on this evaluation, no significant differences in arithmetic mean fish PCB concentrations were observed at Location 5 between 2000 and 2003 (Table 6). An evaluation of lipid-normalized data showed similar results for all locations.

4.5 Evaluation of Potential Ecological Affects

One objective of the long-term monitoring program, as specified in the OU4 Consent Decree, is to periodically evaluate potential ecological risks. Previously, a quantitative evaluation of ecological risks was presented in Appendix B of the *Focused Feasibility Study* (ENVIRON, 1997). According to the food web model used in the ecological risk assessment, an assumed fish total PCB concentration of 1.0 mg/kg resulted in hazard quotients (HQs) of 0.82 for mink and 0.67 for green heron, and an assumed fish total PCB concentration of 2.0 mg/kg resulted in HQs of 1.70 for mink and 1.39 for green heron. From a risk perspective, HQ values less than 1 represent minimal ecological risk, HQ values between 1 and 10 are considered to represent a level of risk that potentially may be manifested as effects on some individual organisms, and HQ values greater than 10 may be indicative of potential risk at the population level.

Using the assumptions presented in the ENVIRON (1997) risk assessment, the maximum PCB concentrations detected in fish samples from 2000 (3.9 mg/kg) and 2001 (3.4 mg/kg) would result in HQ values of approximately 3 for mink and 2 for heron. The maximum fish PCB concentration from 2002 (1.7 mg/kg) would result in HQ values of approximately 1.5 for mink and 1.2 for heron, and the maximum fish PCB concentration from 2003 (2.0 mg/kg) would result in HQ values of 1.7 for mink and 1.39 for heron. Based on the arithmetic mean fish PCB concentrations from 2000 to 2003 (see Section 4.4 for values), HQs would have been slightly higher than 1 in 2000 and 2001, but less than 1 in 2002 and 2003, indicating that the potential for ecological risks has declined over time. As stated previously, HQ values less than 1 represent minimal ecological risk and HQ values between 1 and 10 are considered to represent a level of risk that potentially may be manifested as effects on some individual organisms. Consistent with USEPA's previous findings (USEPA, 1997; 1998b), these data confirm that associated risk levels are relatively low.

4.6 Summary

To date, five rounds of annual sampling have been conducted for the PCB long-term monitoring program for OU4 of the Site. As specified in the ROD, these data include surficial and subsurface sediment data, sediment trap, and biota data. Data collected thus far, in combination with the historical PCB data, indicate the following:

- PCBs have not been detected in the annual surficial sediment and sediment trap samples collected the past five years from the upstream location (Location 1).

- PCBs are frequently not detected in sediment samples (both surficial and subsurface) from White and Wine Creeks, and recently detected concentrations are lower than those detected as part of the 1996 Phase 2 SPRDS activities.

- PCBs have not been detected in sediment trap samples from upstream (Location 1). For other locations, sediment trap PCB concentrations are generally lower in 2003 compared to previous years.

The highest total PCB concentration detected in any of the sediment trap samples collected in 2003 was 0.32 mg/kg. As shown by a linear regression model, PCB concentrations in sediment trap samples from Location 3 have steadily decreased over the past five annual sampling rounds (1999 to 2003).

- Fish PCB concentrations are highest in samples from Locations 2, 3, and 4, but have declined steadily over the past four annual sampling rounds (2000 to 2003). Fish could not be collected from these locations in 1999 due to low-flow conditions. Based on an evaluation of temporal trends (one-way ANOVA), arithmetic mean fish PCB concentrations for Locations 1, 2, 3, and 4 are significantly lower in 2003 than 2000. The arithmetic mean PCB concentrations in fish have steadily declined from 2000 to 2003, with respective arithmetic means of 2.3 mg/kg, 2.0 mg/kg, 0.91 mg/kg, and 0.66 mg/kg, respectively.

- Based on the results of a previous site-specific ecological risk assessment (ENVIRON, 1997), current fish PCB concentrations in White and Wine Creeks do not represent a significant ecological risk. Based on the arithmetic mean PCB concentrations in fish from 2000 to 2003, HQ would have been slightly higher than 1 in 2000 and 2001, but less than 1 in 2002 and 2003, indicating that the potential for ecological risks has declined over time. These data confirm that associated risk levels are relatively low.

5. Recommendations

The long-term PCB monitoring data to date show that the no further action with long-term PCB monitoring remedy selected for OU4 is protective. No changes to the current monitoring program are recommended at this time. As specified in Paragraph 11 of the 1998 Consent Decree, the Settling Defendants shall continue to implement the PCB long-term monitoring plan until the USEPA, after consultation with the State of New York, notifies the Settling Defendants in writing that they may cease conducting such work. The annual sediment and biota monitoring event will continue to be conducted during the late spring/early summer (i.e., May through July), and will include collecting and analyzing surficial (0 to 3 inch) sediment deposits, suspended sediment (trap), and biota samples from the five specified locations in White and Wine Creeks.

6. References

Blasland, Bouck & Lee, Inc. (BBL). 1999a. *PCB Long-Term Monitoring Plan*. August 1999. Syracuse, NY.

BBL. 1999b. *Annual Progress Report, Period Covered: April 17, 1999 - December 31, 1999.* Letter from M. Cathy Geraci of BBL to the U.S. Environmental Protection Agency (USEPA) Chief, Central New York Remediation Section. December 20, 1999.

BBL. 2000. *Annual Progress Report, Period Covered: January 1, 2000 - December 31, 2000.* Letter from M. Cathy Geraci of BBL to the USEPA Chief, Central New York Remediation Section. December 1, 2000.

BBL. 2001a. Letter from M. Cathy Geraci of BBL to Patricia Simmons of the USEPA. May 31, 2001.

BBL. 2001b. *Annual Progress Report, Period Covered: January 1, 2001 - December 31, 2001.* Letter from M. Cathy Geraci of BBL to Patricia Simmons Pierre of the USEPA. December 17, 2001.

BBL. 2003a. *Annual Progress Report, Period Covered: January 1, 2002 – December 31, 2002.* Letter from M. Cathy Geraci of BBL to Patricia Simmons Pierre of the USEPA. January 30, 2003.

BBL. 2003b. *Annual Progress Report, Period Covered: January 1, 2003 – December 31, 2003.* Letter from M. Cathy Geraci of BBL to Patricia Simmons Pierre of the USEPA. November 2003.

de maximis, inc. 2003. *Five-Year Data Review Report – Pollution Abatement Services Superfund Site, Oswego, NY.*

ENVIRON. 1997. *Final Focused Feasibility Study for PCB-Impacted Sediments in the Vicinity of the PAS Superfund Site, Oswego, New York.* Arlington, VA. August 20, 1997.

USEPA. 1984. *Record of Decision Pollution Abatement Services, Oswego, New York – Operable Unit 2.* USEPA Region 2. New York, NY. June 6, 1984.

USEPA. 1986. *Test Methods for Evaluating Solid Waste.* SW-846. Third Edition. Office of Solid Waste and Emergency Response, Washington, DC. November 1986.

USEPA. 1988. *Determination of Total Organic Carbon in Sediment (Lloyd Kahn Method).* USEPA Region 2, Environmental Services Division. Edison, NJ. July 27, 1988.

USEPA. 1993. *Record of Decision Pollution Abatement Services, Oswego, New York – Operable Unit 3.* USEPA Region 2. New York, NY. EPA/ROD/R02-94/226. December 29, 1993.

USEPA. 1996. *Explanation of Significant Differences – Operable Unit 3 - Pollution Abatement Services, Oswego, New York.* USEPA Region 2. New York, NY. September 1996.

USEPA. 1997. *Record of Decision Pollution Abatement Services, Oswego, New York - Operable Unit 4.* USEPA Region 2. New York, NY. September 1997.

USEPA. 1998a. *Pollution Abatement Services Superfund Site Five-Year Review Report.* USEPA Region 2. New York, NY. June 1998.

USEPA. 1998b. *Pollution Abatement Services Superfund Site Operable Unit 4 Consent Decree.* USEPA Region 2. New York, NY. December 15, 1998.

USEPA. 1999. Letter from Patricia Simmons of USEPA to M. Cathy Geraci of BBL approving the *PCB Long-Term Monitoring Plan.* July 22, 1999.

Tables

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

Table 1

Pollution Abatement Services Superfund Site
Operable Unit 4
Oswego, New York
Five-Year Data Review Report

Surficial Sediment Sample Results for PCBs (1999 to 2003)

Location	Sample Identification	Total PCB Concentrations (mg/kg)				
		1999	2000	2001	2002	2003
1	PAS-SS-101	ND(0.02)	ND(0.021)	ND(0.022)	ND(0.41)	ND(0.044)
2	PAS-SS-201	ND(0.03)	0.015 J [0.013 J]	0.042 [0.047]	ND(0.052)	0.072
3	PAS-SS-301	ND(0.03)	ND(0.042)	1.8 D	0.50	0.040 J
4	PAS-SS-401	0.17 J	0.014 J	0.090	3.1 D	0.45
5	PAS-SS-501	ND(0.03)	ND(0.024)	0.034	ND(0.049) [ND(0.050)]	0.21 J [0.047 J]

Notes:

1. All samples collected from the 0- to 3-inch interval.
2. D = The compound was analyzed at a secondary dilution.
3. J = The compound was positively identified; however, the associated numerical value is an estimated concentration only.
4. ND = Not detected. Each PCB Aroclor was not detected above the laboratory quantitation limit shown in parentheses.
5. Duplicate results in brackets.
6. Total PCB concentrations represent total Aroclors.

Table 2

Pollution Abatement Services Superfund Site
Operable Unit 4
Oswego, New York
Five-Year Data Review Report

Subsurface Sediment Sample Results for PCBs (1999 to 2003)

Location	Sample Identification	Depth (in)	Total PCB Concentrations (mg/kg)		
			1999	2000	2002
1	PAS-SC-101	3 - 6	ND(0.02)	ND(0.021)	--
2	PAS-SC-201	3 - 6	ND(0.03)	ND(0.024)	ND(0.47)
3	PAS-SC-301	3 - 6	ND(0.03)	NA	--
	PAS-SC-301	6 - 12	ND(0.02)	NA	--
4	PAS-SC-401	3 - 6	ND(0.02)	ND(0.022)	0.25
	PAS-SC-401	6 - 12	NA	ND(0.023)	--
5	PAS-SC-501	3 - 6	ND(0.03) [ND(0.02)]	ND(0.023)	ND(0.042)
	PAS-SC-501	6 - 12	ND(0.02)	ND(0.021)	--

Notes:

1. NA = Not available. Samples were not collected due to site conditions (limited depth of sediment).
2. ND = Not detected. Each PCB Aroclor was not detected above the laboratory quantitation limit shown in parentheses.
3. Duplicate results in brackets.
4. No subsurface sediment samples were collected in 2001 and 2003 because the USEPA approved discontinuing the sampling and analysis of subsurface sediment from the long-term monitoring program in 2001. Subsurface samples were inadvertently collected and analyzed in 2002.
5. Total PCB concentrations represent total Aroclors.

Table 3

Pollution Abatement Services Superfund Site
Operable Unit 4
Oswego, New York
Five-Year Data Review Report

Sediment Trap Sample Results for PCBs (1999 to 2003)

Location	Sample Identification	Total PCB Concentrations (mg/kg)				
		1999	2000	2001	2002	2003
1	PAS-ST-101	ND(0.08)	ND(0.033)	ND(0.12)	ND(0.15)	ND(0.14)
2	PAS-ST-201	0.53	0.25	0.30 [0.25]	0.81 [0.50]	0.32
3	PAS-ST-301	1.2 [1.2]	0.62	0.42	ND(0.17)	0.059 J
4	PAS-ST-401	0.86	1.1	1.4	0.96	0.32 J
5	PAS-ST-501	0.06	0.42 [0.48]	0.081	0.19	0.25 J [0.33]

Notes:

1. ND = Not detected. Each PCB Aroclor was not detected above the laboratory quantitation limit shown in parentheses.
2. J = The compound was positively identified; however, the associated numerical value is an estimated concentration only.
3. Duplicate results in brackets.
4. Total PCB concentrations represent total Aroclors.

Table 4

Pollution Abatement Services Superfund Site
Operable Unit 4
Oswego, New York
Five-Year Data Review Report

Biota Sample Results for PCBs (1999 to 2003)

Location	Total PCB Concentrations (mg/kg)				
	1999	2000	2001	2002	2003
1	0.47 J	1.5	1.7	0.52	0.098
	0.43 J	1.1	1.1	0.32	0.26
	0.47 J	1.3	1.4	0.55	0.17
2	NA	3.3	2.4	0.87	0.39
	NA	2.8	2.2	1.3	0.30
	NA	3.6	2.3	1.1	0.46
3	NA	3.0	2.4	0.94	0.41
	NA	3.0	2.8	0.84	0.66
	NA	3.9	2.5	1.0	0.72
4	NA	3.0	2.5	0.93	0.95
	NA	3.3	3.4	1.2	1.2
	NA	2.7	2.8	1.7	0.25
5	0.52 J	0.79	0.98	0.96	0.70
	0.33 J	0.72	0.74	0.67	2.0
	0.35	0.81	1.4	0.73	1.3
Arithmetic Mean	0.43	2.3	2.0	0.91	0.66

Notes:

1. J = The compound was positively identified; however, the associated numerical value is an estimated concentration only.
2. NA = Not available. No samples were collected from these locations in 1999 due to low-flow conditions in White Creek.
3. Total PCB concentrations represent total Aroclors.

Table 5

Pollution Abatement Services Superfund Site
Operable Unit 4
Oswego, New York
Five-Year Data Review Report

Summary of Historical Total PCB Surficial Sediment Sample Concentrations (1989 to 1996)

Date	Location	Total PCB Concentration (mg/kg)
11/89	SS-1	ND
	SS-3	ND
11/90	SS-1	ND
	SS-4A	ND
5/91	SS-1	ND
	SS-3	3.7
11/91	SS-1	ND
	SS-3	1.9
	SS-4A	1.4
11/92	SS-1	ND
	SS-3	0.72
	SS-4A	0.14
5/94	SS-1	ND
	SS-3	1.4
	SS-4A	ND
11/94	SS-1	ND
	SS-3	0.74
	SS-4A	0.039
Phase 2 – SPRDS (1995/1996)	White 7	0.161
	White 8	ND(0.028)
	White 9A	0.095
	White 9B	0.014
	White 9C	0.043
	White 10	0.035
	White 11A	11.4
	White 11B	0.052
	White 11C	0.059
	White 12A	1.69
	White 12B	5.86
	White 12C	0.052
	White 13A	0.88
	White 13B	0.74
	White 13C	0.051
	White 13D	0.26
	Wine 1A	ND(0.029)
	Wine 1B	0.036
	Wine 1C	1.32
	Wine 2A	0.046
	Wine 2B	0.16

See Notes on Page 2.

Table 5

Pollution Abatement Services Superfund Site
Operable Unit 4
Oswego, New York
Five-Year Data Review Report

Summary of Historical Total PCB Surficial Sediment Sample Concentrations (1989 to 1996)

Date	Location	Total PCB Concentration (mg/kg)
11/96	SS-1	0.074
	SS-3	0.54
	SS-4A	0.159

Notes:

1. Data obtained from the *Focused Feasibility Study for PCB-Impacted Sediments in the Vicinity of the PAS Superfund Site,* Oswego, New York (ENVIRON, 1997).
2. SPRDS = Supplemental Pre-Remedial Design Study.
3. ND = Not detected. Each PCB Aroclor was not detected above the laboratory quantitation limit shown in
4. Total PCB concentrations represent total Aroclors.

Table 6

Pollution Abatement Services Superfund Site
Operable Unit 4
Oswego, New York
Five-Year Data Review Report

Comparison of Arithmetic Mean PCB Concentrations in Resident Fish (2000 to 2003)

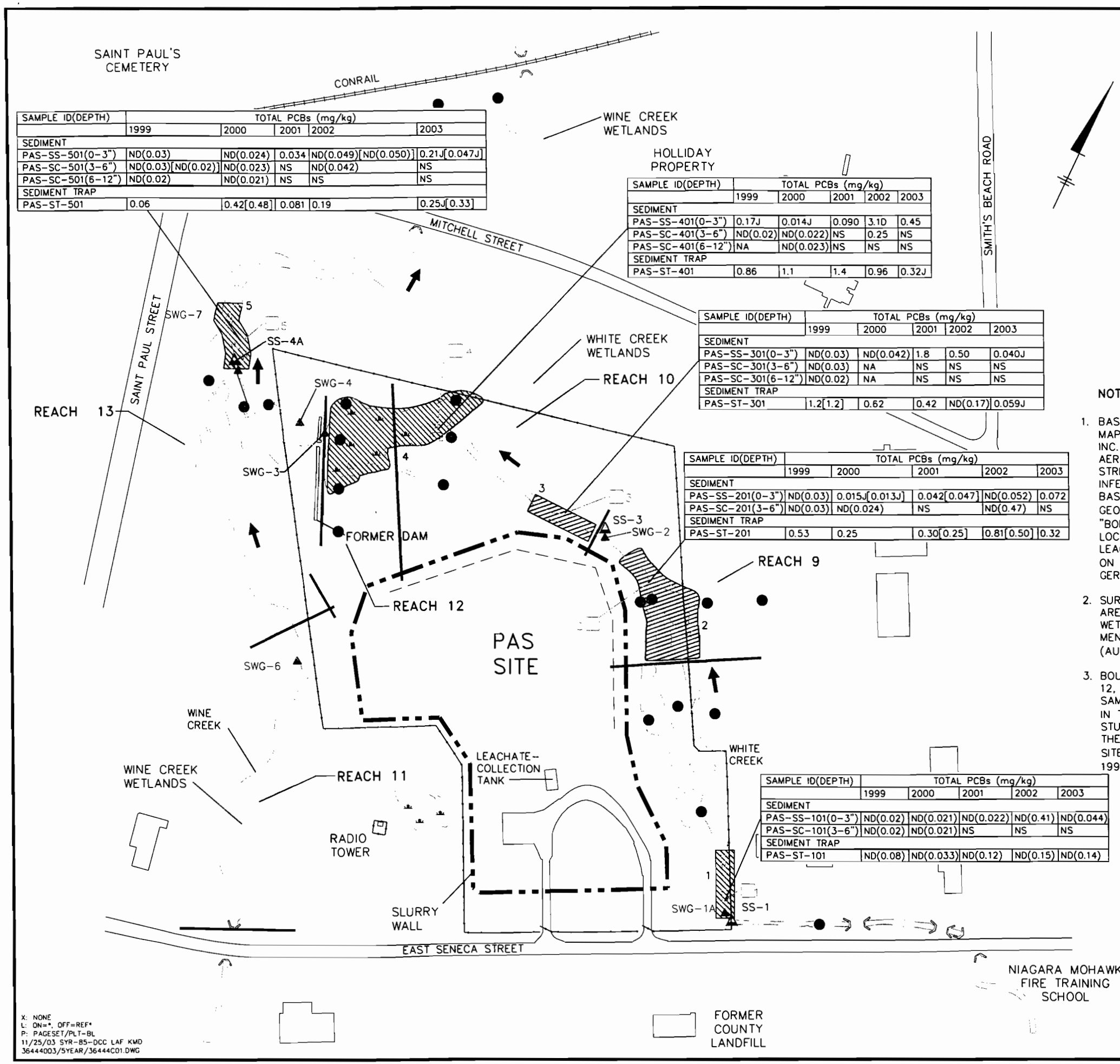
Location	Year	Arithmetic Mean of Total PCB Concentration (mg/kg)[1]
1	2000	1.3 (a)
	2001	1.4 (a)
	2002	0.46 (b)
	2003	0.18 (b)
2	2000	3.2 (a)
	2001	2.3 (b)
	2002	1.1 (c)
	2003	0.38 (d)
3	2000	3.3 (a)
	2001	2.6 (a)
	2002	0.93 (b)
	2003	0.60 (b)
4	2000	3.0 (a)
	2001	2.9 (a)
	2002	1.3 (b)
	2003	0.80 (b)
5	2000	0.77 (a)
	2001	1.0 (a)
	2002	0.79 (a)
	2003	1.3 (a)

Note:

1. A comparison of means test was used to evaluate statistically significant differences in mean concentrations between years for each sampling location. Means with the same letter(s) within the same location are not significantly different from one another. Conversely, means with different letters (i.e., do not share any of the same letters) within the same location are significantly different from one another.

Figures

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



SAMPLE ID(DEPTH)	TOTAL PCBs (mg/kg)				
	1999	2000	2001	2002	2003
SEDIMENT					
PAS-SS-501(0-3")	ND(0.03)	ND(0.024)	0.034	ND(0.049)[ND(0.050)]	0.21J[0.047J]
PAS-SC-501(3-6")	ND(0.03)[ND(0.02)]	ND(0.023)	NS	ND(0.042)	NS
PAS-SC-501(6-12")	ND(0.02)	ND(0.021)	NS	NS	NS
SEDIMENT TRAP					
PAS-ST-501	0.06	0.42[0.48]	0.081	0.19	0.25J[0.33]

SAMPLE ID(DEPTH)	TOTAL PCBs (mg/kg)				
	1999	2000	2001	2002	2003
SEDIMENT					
PAS-SS-401(0-3")	0.17J	0.014J	0.090	3.1D	0.45
PAS-SC-401(3-6")	ND(0.02)	ND(0.022)	NS	0.25	NS
PAS-SC-401(6-12")	NA	ND(0.023)	NS	NS	NS
SEDIMENT TRAP					
PAS-ST-401	0.86	1.1	1.4	0.96	0.32J

SAMPLE ID(DEPTH)	TOTAL PCBs (mg/kg)				
	1999	2000	2001	2002	2003
SEDIMENT					
PAS-SS-301(0-3")	ND(0.03)	ND(0.042)	1.8	0.50	0.040J
PAS-SC-301(3-6")	ND(0.03)	NA	NS	NS	NS
PAS-SC-301(6-12")	ND(0.02)	NA	NS	NS	NS
SEDIMENT TRAP					
PAS-ST-301	1.2[1.2]	0.62	0.42	ND(0.17)	0.059J

SAMPLE ID(DEPTH)	TOTAL PCBs (mg/kg)				
	1999	2000	2001	2002	2003
SEDIMENT					
PAS-SS-201(0-3")	ND(0.03)	0.015J[0.013J]	0.042[0.047]	ND(0.052)	0.072
PAS-SC-201(3-6")	ND(0.03)	ND(0.024)	NS	ND(0.47)	NS
SEDIMENT TRAP					
PAS-ST-201	0.53	0.25	0.30[0.25]	0.81[0.50]	0.32

SAMPLE ID(DEPTH)	TOTAL PCBs (mg/kg)				
	1999	2000	2001	2002	2003
SEDIMENT					
PAS-SS-101(0-3")	ND(0.02)	ND(0.021)	ND(0.022)	ND(0.41)	ND(0.044)
PAS-SC-101(3-6")	ND(0.02)	ND(0.021)	NS	NS	NS
SEDIMENT TRAP					
PAS-ST-101	ND(0.08)	ND(0.033)	ND(0.12)	ND(0.15)	ND(0.14)

LEGEND

- 1 — APPROXIMATE LONG-TERM MONITORING FISH SAMPLING LOCATION
- APPROXIMATE LONG-TERM MONITORING SEDIMENT SAMPLING LOCATION
- SS-1 — APPROXIMATE PREVIOUS SEDIMENT SAMPLING LOCATION
- SWG-1 — APPROXIMATE STREAM GAUGE LOCATION
- APPROXIMATE SPRDS PHASE II SEDIMENT SAMPLING LOCATION
- FENCE (SITE BOUNDARY)
- SLURRY WALL
- APPROXIMATE LOCATION OF SUBSURFACE LEACHATE COLLECTION TRENCH
- LAND AREAS SUBJECT TO FREQUENT, SHALLOW INUNDATION
- WETLAND AREAS DELINEATED BY MENZIE-CURA & ASSOCIATES, INC. (AUGUST 1992)
- REACH BOUNDARY
- DIRECTION OF WATER FLOW

NOTES:

1. BASE MAP ADAPTED FROM TOPOGRAPHIC MAP DEVELOPED BY LOCKWOOD MAPPING, INC. BASED ON AN APRIL 14, 1993 AERIAL PHOTOGRAPH; SOME STREAM-GAUGE LOCATIONS ARE INFERRED; LOCATION OF SLURRY WALL BASED ON SITE PLAN DRAWN BY DUNN GEOSCIENCE CORP. (DEC. 1984), TITLED "BORING, WELL & TEST PIT PLOT PLAN;" LOCATION OF SUBSURFACE LEACHATE-RECOVERY TRENCHES BASED ON SITE MAP PROVIDED BY O'BRIEN & GERE ENGINEERING INC.
2. SURFACE WATER IS SHOWN IN BLUE; AREAS SHADED GREEN REPRESENT WETLAND AREAS DELINEATED BY MENZIE-CURA & ASSOCIATES, INC. (AUGUST 1992).
3. BOUNDARIES FOR REACH 10 AND REACH 12, AS WELL AS SPRDS PHASE II SAMPLING LOCATIONS WERE PRESENTED IN THE "FINAL FOCUSED FEASIBILITY STUDY FOR PCB-IMPACTED SEDIMENTS IN THE VICINITY OF THE PAS SUPERFUND SITE, OSWEGO, NEW YORK" (ENVIRON, 1997).
4. ND = NOT DETECTED. EACH PCB AROCLOR WAS NOT DETECTED ABOVE THE LABORATORY QUANTITATION LIMIT SHOWN IN PARENTHESIS.
5. J = THE COMPOUND WAS POSITIVELY IDENTIFIED; HOWEVER, THE ASSOCIATED NUMERICAL VALUE IS AN ESTIMATED CONCENTRATION ONLY.
6. D = THE COMPOUND WAS ANALYZED AT A SECONDARY DILLUTION.
7. [ ] = DUPLICATE SAMPLE RESULTS.
8. NA = NOT AVAILABLE. SAMPLES WERE NOT COLLECTED DUE TO SITE CONDITIONS (LIMITED DEPTH OF SEDIMENT).
9. NS = CORE SEDIMENT SAMPLES WERE NOT COLLECTED.
10. TOTAL PCB CONCENTRATIONS REPRESENT TOTAL AROCLORS.

0 200' 400'
GRAPHIC SCALE

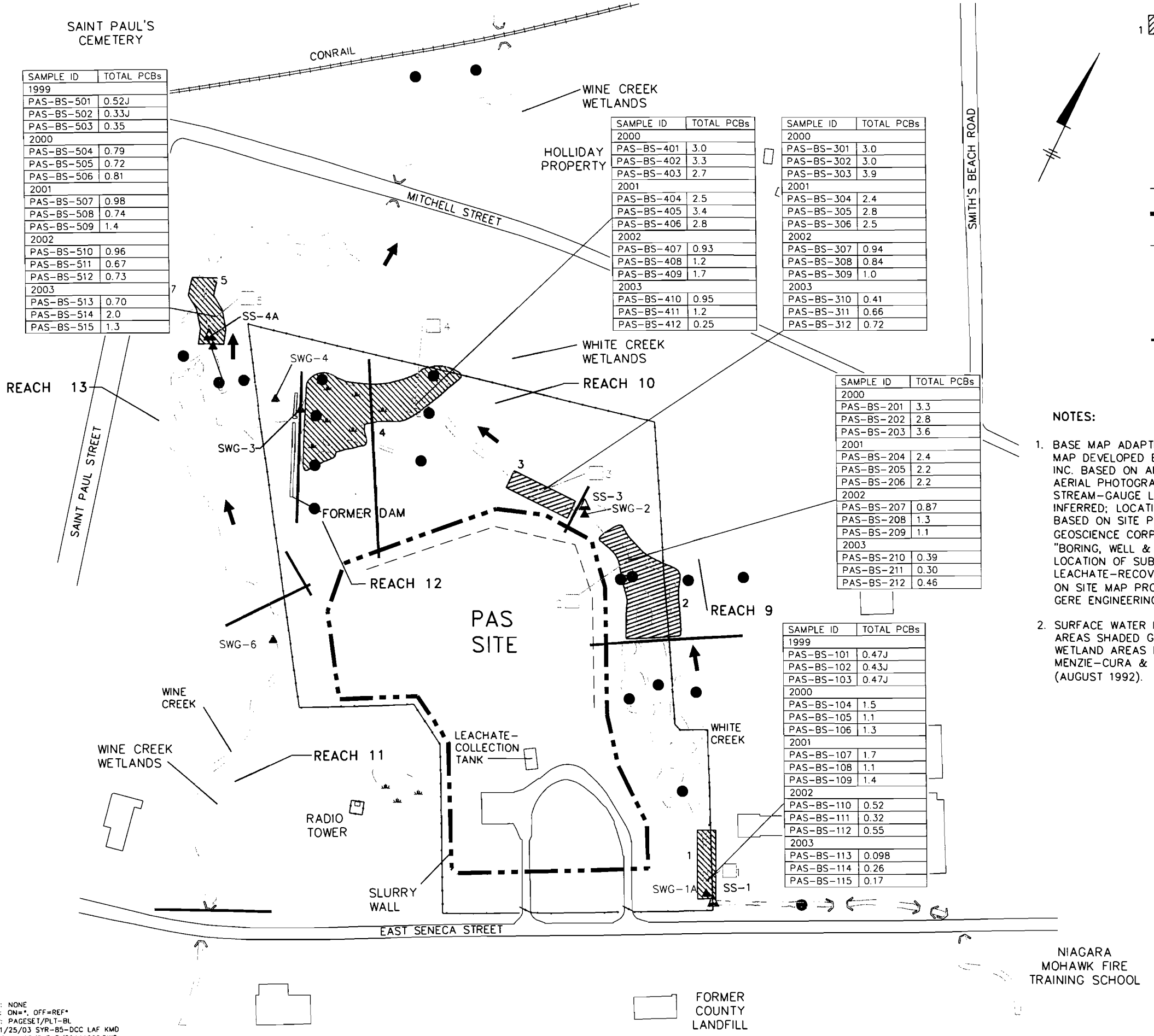
X: NONE
L: ON=*, OFF=REF*
P: PAGESET/PLT-BL
11/25/03 SYR-85-DCC LAF KMD
36444003/5YEAR/36444C01.DWG

POLLUTION ABATEMENT SERVICES SITE
OSWEGO, NEW YORK
FIVE-YEAR DATA REVIEW REPORT

PCB LONG-TERM MONITORING PROGRAM RESULTS FOR SEDIMENT (1999 TO 2003)

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

FIGURE 1



SAMPLE ID	TOTAL PCBs
1999	
PAS-BS-501	0.52J
PAS-BS-502	0.33J
PAS-BS-503	0.35
2000	
PAS-BS-504	0.79
PAS-BS-505	0.72
PAS-BS-506	0.81
2001	
PAS-BS-507	0.98
PAS-BS-508	0.74
PAS-BS-509	1.4
2002	
PAS-BS-510	0.96
PAS-BS-511	0.67
PAS-BS-512	0.73
2003	
PAS-BS-513	0.70
PAS-BS-514	2.0
PAS-BS-515	1.3

SAMPLE ID	TOTAL PCBs
2000	
PAS-BS-401	3.0
PAS-BS-402	3.3
PAS-BS-403	2.7
2001	
PAS-BS-404	2.5
PAS-BS-405	3.4
PAS-BS-406	2.8
2002	
PAS-BS-407	0.93
PAS-BS-408	1.2
PAS-BS-409	1.7
2003	
PAS-BS-410	0.95
PAS-BS-411	1.2
PAS-BS-412	0.25

SAMPLE ID	TOTAL PCBs
2000	
PAS-BS-301	3.0
PAS-BS-302	3.0
PAS-BS-303	3.9
2001	
PAS-BS-304	2.4
PAS-BS-305	2.8
PAS-BS-306	2.5
2002	
PAS-BS-307	0.94
PAS-BS-308	0.84
PAS-BS-309	1.0
2003	
PAS-BS-310	0.41
PAS-BS-311	0.66
PAS-BS-312	0.72

SAMPLE ID	TOTAL PCBs
2000	
PAS-BS-201	3.3
PAS-BS-202	2.8
PAS-BS-203	3.6
2001	
PAS-BS-204	2.4
PAS-BS-205	2.2
PAS-BS-206	2.2
2002	
PAS-BS-207	0.87
PAS-BS-208	1.3
PAS-BS-209	1.1
2003	
PAS-BS-210	0.39
PAS-BS-211	0.30
PAS-BS-212	0.46

SAMPLE ID	TOTAL PCBs
1999	
PAS-BS-101	0.47J
PAS-BS-102	0.43J
PAS-BS-103	0.47J
2000	
PAS-BS-104	1.5
PAS-BS-105	1.1
PAS-BS-106	1.3
2001	
PAS-BS-107	1.7
PAS-BS-108	1.1
PAS-BS-109	1.4
2002	
PAS-BS-110	0.52
PAS-BS-111	0.32
PAS-BS-112	0.55
2003	
PAS-BS-113	0.098
PAS-BS-114	0.26
PAS-BS-115	0.17

LEGEND

- APPROXIMATE LONG-TERM MONITORING FISH SAMPLING LOCATION
- APPROXIMATE LONG-TERM MONITORING SEDIMENT SAMPLING LOCATION
- SS-1 APPROXIMATE PREVIOUS SEDIMENT SAMPLING LOCATION
- SWG-1 APPROXIMATE STREAM GAUGE LOCATION
- APPROXIMATE SPRDS PHASE II SEDIMENT SAMPLING LOCATION
- FENCE (SITE BOUNDARY)
- SLURRY WALL
- APPROXIMATE LOCATION OF SUBSURFACE LEACHATE COLLECTION TRENCH
- LAND AREAS SUBJECT TO FREQUENT, SHALLOW INUNDATION
- WETLAND AREAS DELINEATED BY MENZIE-CURA & ASSOCIATES, INC. (AUGUST 1992)
- REACH BOUNDARY
- DIRECTION OF WATER FLOW

NOTES:

1. BASE MAP ADAPTED FROM TOPOGRAPHIC MAP DEVELOPED BY LOCKWOOD MAPPING, INC. BASED ON AN APRIL 14, 1993 AERIAL PHOTOGRAPH; SOME STREAM-GAUGE LOCATIONS ARE INFERRED; LOCATION OF SLURRY WALL BASED ON SITE PLAN DRAWN BY DUNN GEOSCIENCE CORP. (DEC. 1984), TITLED "BORING, WELL & TEST PIT PLOT PLAN;" LOCATION OF SUBSURFACE LEACHATE-RECOVERY TRENCHES BASED ON SITE MAP PROVIDED BY O'BRIEN & GERE ENGINEERING INC.
2. SURFACE WATER IS SHOWN IN BLUE; AREAS SHADED GREEN REPRESENT WETLAND AREAS DELINEATED BY MENZIE-CURA & ASSOCIATES, INC. (AUGUST 1992).
4. BOUNDARIES FOR REACH 10 AND REACH 12, AS WELL AS SPRDS PHASE II SAMPLING LOCATIONS WERE PRESENTED IN THE "FINAL FOCUSED FEASIBILITY STUDY FOR PCB-IMPACTED SEDIMENTS IN THE VICINITY OF THE PAS SUPERFUND SITE, OSWEGO, NEW YORK" (ENVIRON, 1997).
5. J = THE COMPOUND WAS POSITIVELY IDENTIFIED; HOWEVER, THE ASSOCIATED NUMERICAL VALUE IS AN ESTIMATED CONCENTRATION ONLY.
6. CONCENTRATIONS ARE REPORTED IN MILLIGRAMS PER KILOGRAM (mg/kg).
7. BIOTA DATA FOR 1999 ARE NOT AVAILABLE FOR LOCATIONS 2, 3, AND 4 BECAUSE SAMPLES WERE NOT COLLECTED DUE TO SITE CONDITIONS (LOW FLOW CONDITIONS IN WHITE CREEK LIMITED SAMPLE AVAILABILITY).
8. TOTAL PCB CONCENTRATIONS REPRESENT TOTAL AROCLORS.

0 200' 400'

GRAPHIC SCALE

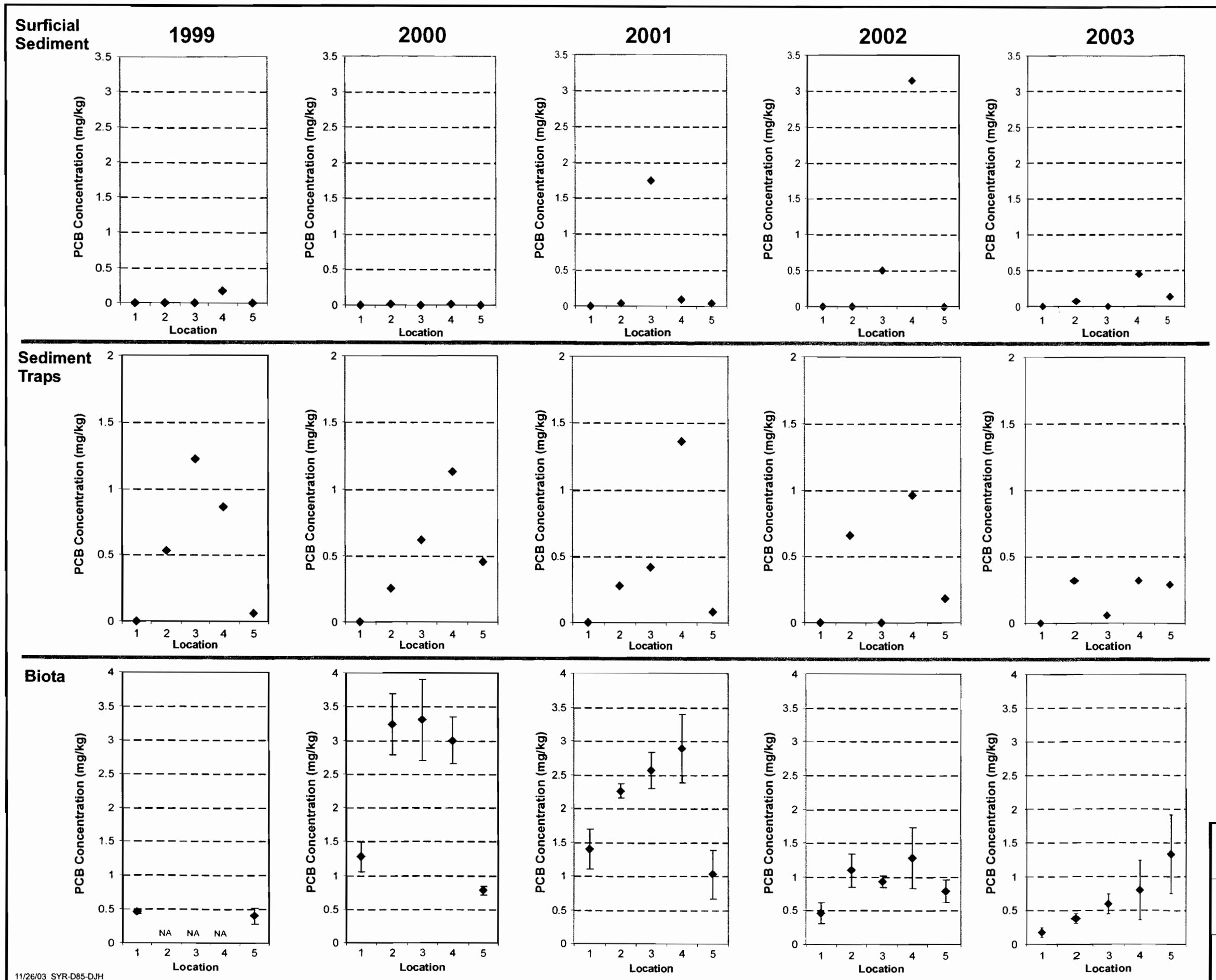
X: NONE
L: ON=*, OFF=REF*
P: PAGESET/PLT-BL
11/25/03 SYR-85-DCC LAF KMD
36444003/5YEAR/36444C02.DWG

POLLUTION ABATEMENT SERVICES SITE
OSWEGO, NEW YORK
FIVE-YEAR DATA REVIEW REPORT

PCB LONG-TERM MONITORING PROGRAM RESULTS FOR BIOTA (1999 TO 2003)

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

FIGURE 2



NOTES:

1. Total PCB concentrations represent total Aroclors.
2. Data points represent the single sample for sediment and sediment trap data and arithmetic means for biota data collected at each location within each year. For biota, error bars represent 2 standard errors.
3. NA = Not available. Samples were not collected due to site conditions (low flow conditions in White Creek limited biota sample availability).

11/26/03 SYR-D85-DJH
36644003/36644g04.cdr

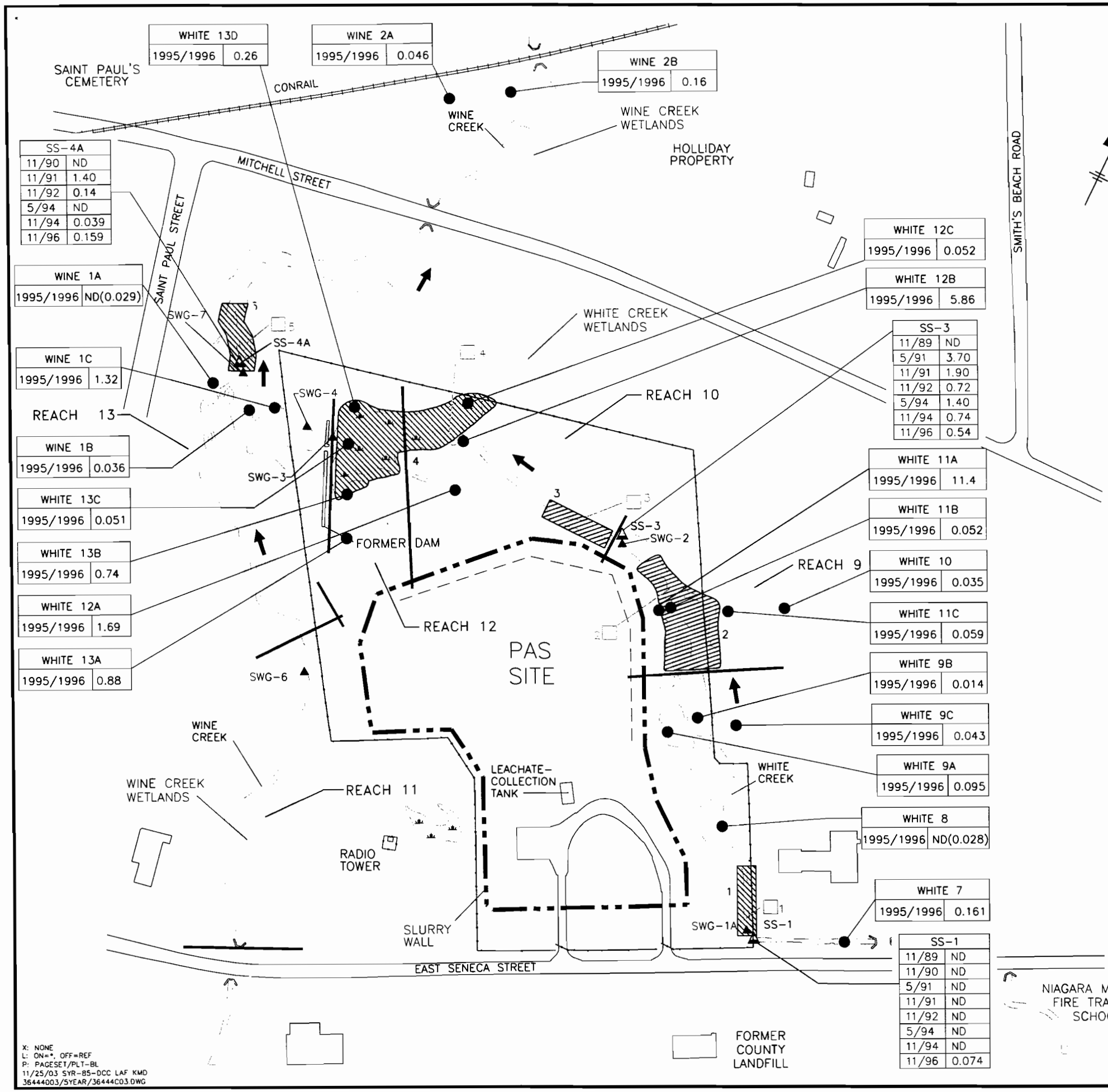
POLLUTION ABATEMENT SERVICES SITE
OSWEGO, NEW YORK

FIVE-YEAR DATA REVIEW REPORT

PCB CONCENTRATIONS IN SURFICIAL SEDIMENT, SEDIMENT TRAP, AND BIOTA SAMPLES (1999 TO 2003)

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

FIGURE 3



LEGEND:

- APPROXIMATE LONG-TERM MONITORING FISH SAMPLING LOCATION
- APPROXIMATE LONG-TERM MONITORING SEDIMENT SAMPLING LOCATION
- SS-1 — APPROXIMATE PREVIOUS SEDIMENT SAMPLING LOCATION
- SWG-1 — APPROXIMATE STREAM GAUGE LOCATION
- APPROXIMATE SPRDS PHASE II SEDIMENT SAMPLING LOCATION
- FENCE (SITE BOUNDARY)
- SLURRY WALL
- APPROXIMATE LOCATION OF SUBSURFACE LEACHATE COLLECTION TRENCH
- LAND AREAS SUBJECT TO FREQUENT, SHALLOW INUNDATION
- WETLAND AREAS DELINEATED BY MENZIE-CURA & ASSOCIATES, INC. (AUGUST 1992)
- REACH BOUNDARY
- WHITE 12B / 1995/1996 5.86 — SAMPLE IDENTIFICATION; TOTAL PCB CONCENTRATION (mg/kg); SAMPLE DATE
- DIRECTION OF WATER FLOW

NOTES:

1. BASE MAP ADAPTED FROM TOPOGRAPHIC MAP DEVELOPED BY LOCKWOOD MAPPING, INC. BASED ON AN APRIL 14, 1993 AERIAL PHOTOGRAPH SOME STREAM-GAUGE LOCATIONS ARE INFERRED; LOCATION OF SLURRY WALL BASED ON SITE PLAN DRAWN BY DUNN GEOSCIENCE CORP. (DEC. 1984), TITLED "BORING, WELL & TEST PIT PLOT PLAN;" LOCATION OF SUBSURFACE LEACHATE-RECOVERY TRENCHES BASED ON SITE MAP PROVIDED BY O'BRIEN & GERE ENGINEERING INC.
2. SURFACE WATER IS SHOWN IN BLUE; AREAS SHADED GREEN REPRESENT WETLAND AREAS DELINEATED BY MENZIE-CURA & ASSOCIATES, INC. (AUGUST 1992).
3. SAMPLING LOCATIONS AND PCB RESULTS WERE PRESENTED IN THE "FINAL FOCUSED FEASIBILITY STUDY FOR PCB-IMPACTED SEDIMENTS IN THE VICINITY OF THE PAS SUPERFUND SITE, OSWEGO, NEW YORK" (ENVIRON, 1997).
4. ND= NOT DETECTED. EACH PCB AROCLOR WAS NOT DETECTED ABOVE THE LABORATORY QUANTITATION LIMITS SHOWN IN PARENTHESES.
5. TOTAL PCB CONCENTRATIONS REPRESENT TOTAL AROCLORS.

0 200' 400'

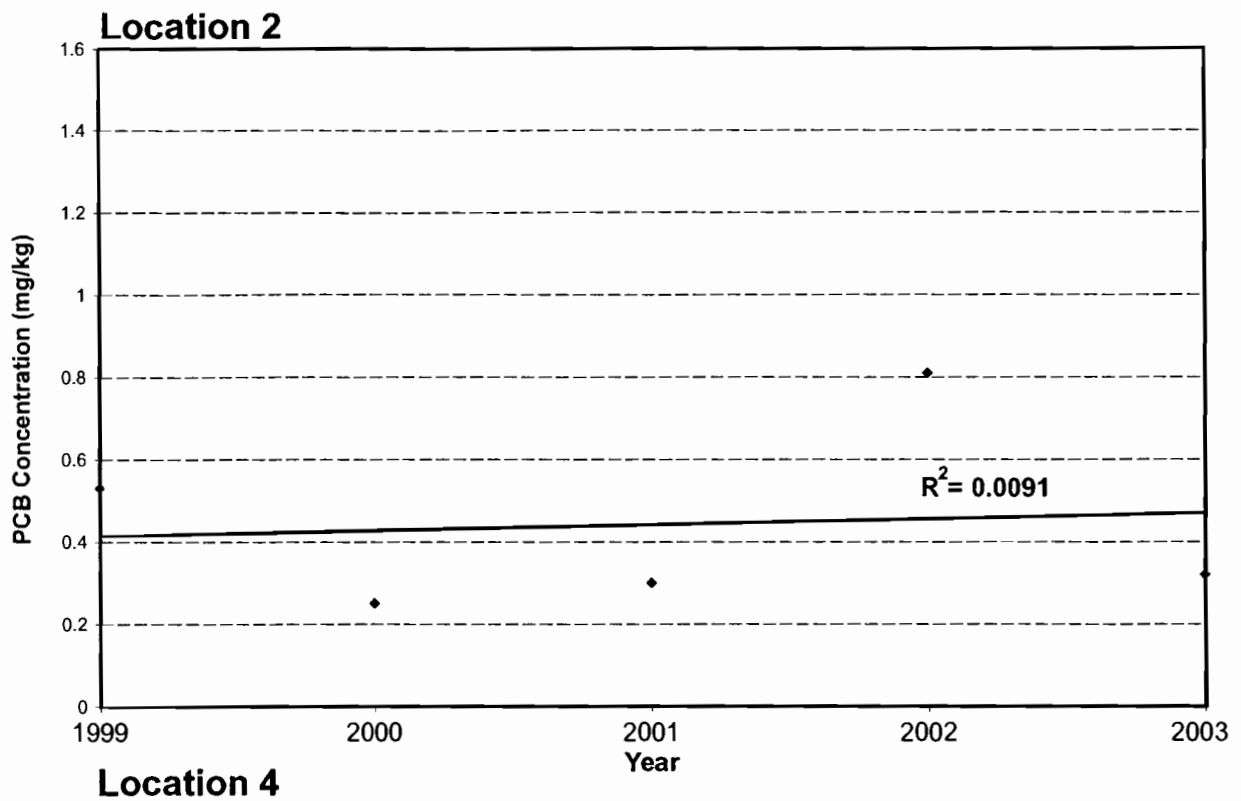
GRAPHIC SCALE

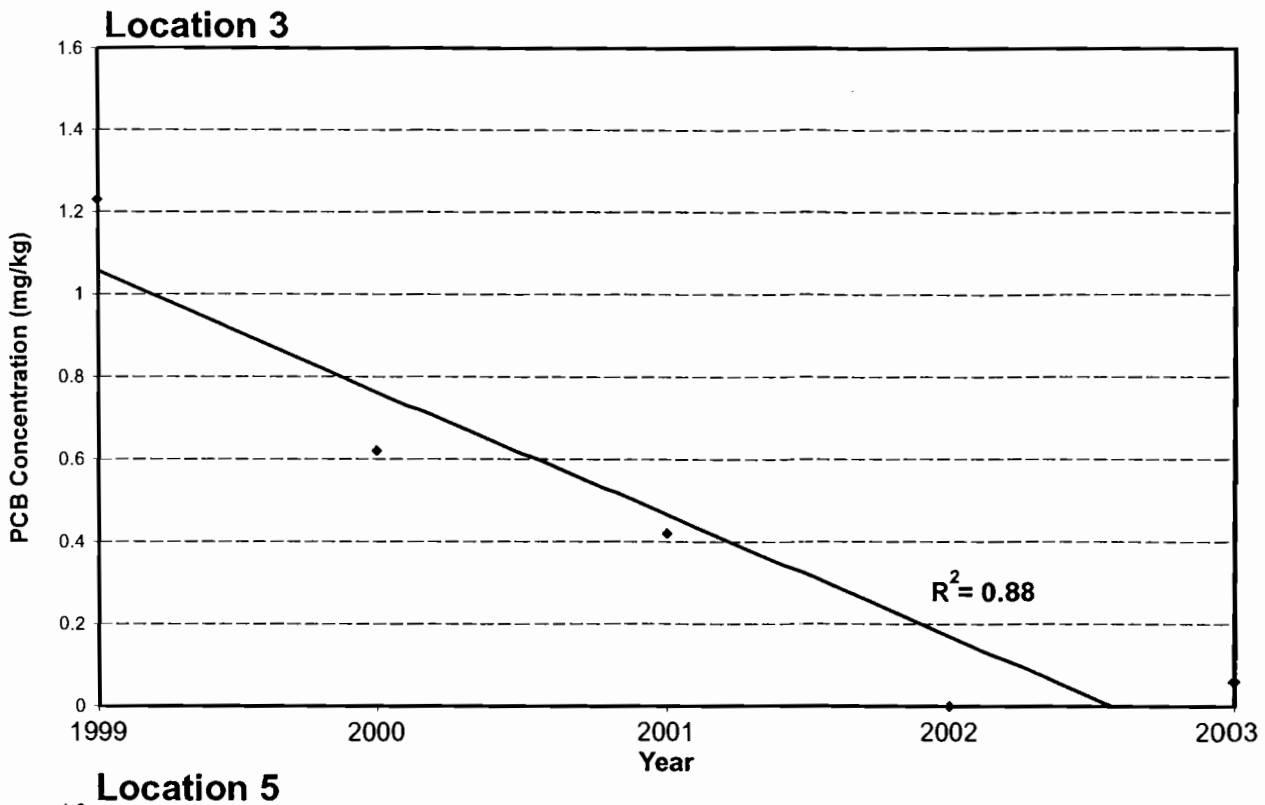
POLLUTION ABATEMENT SERVICES SITE
OSWEGO, NEW YORK
FIVE-YEAR DATA REVIEW REPORT

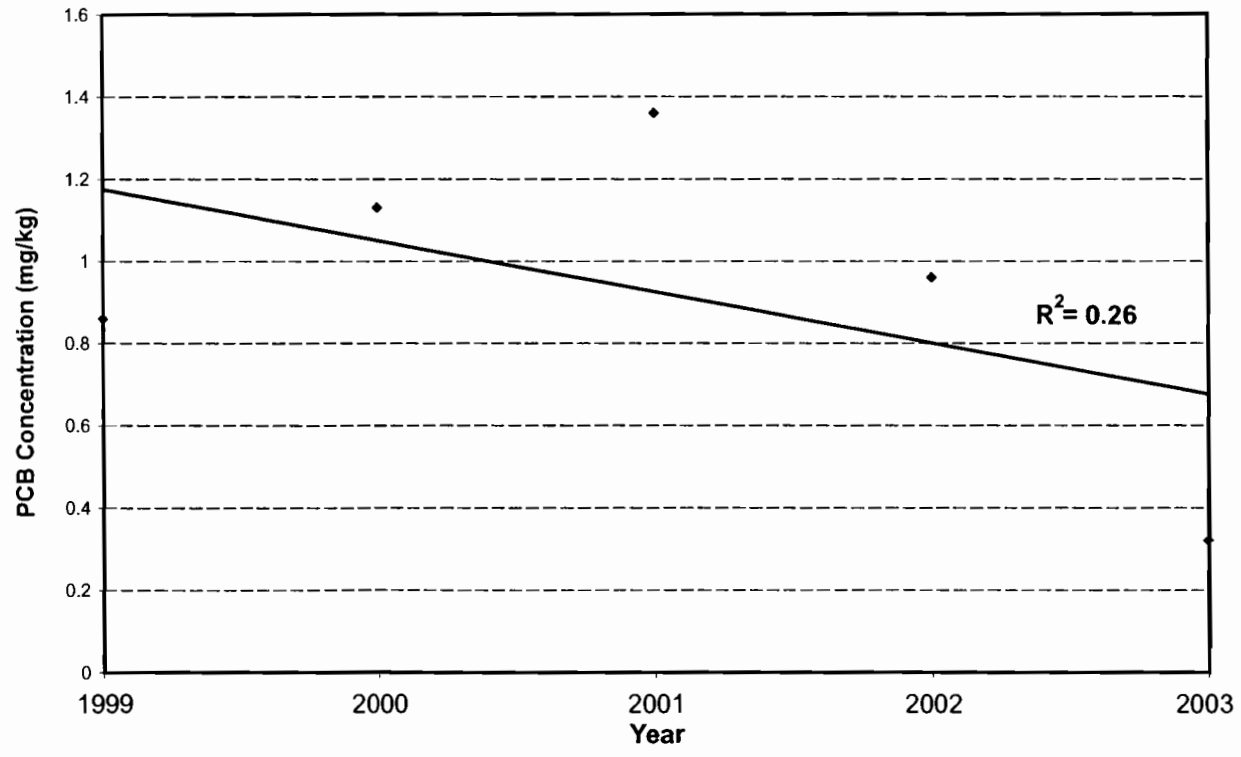
HISTORICAL PCB SEDIMENT MONITORING RESULTS (1989 TO 1996)

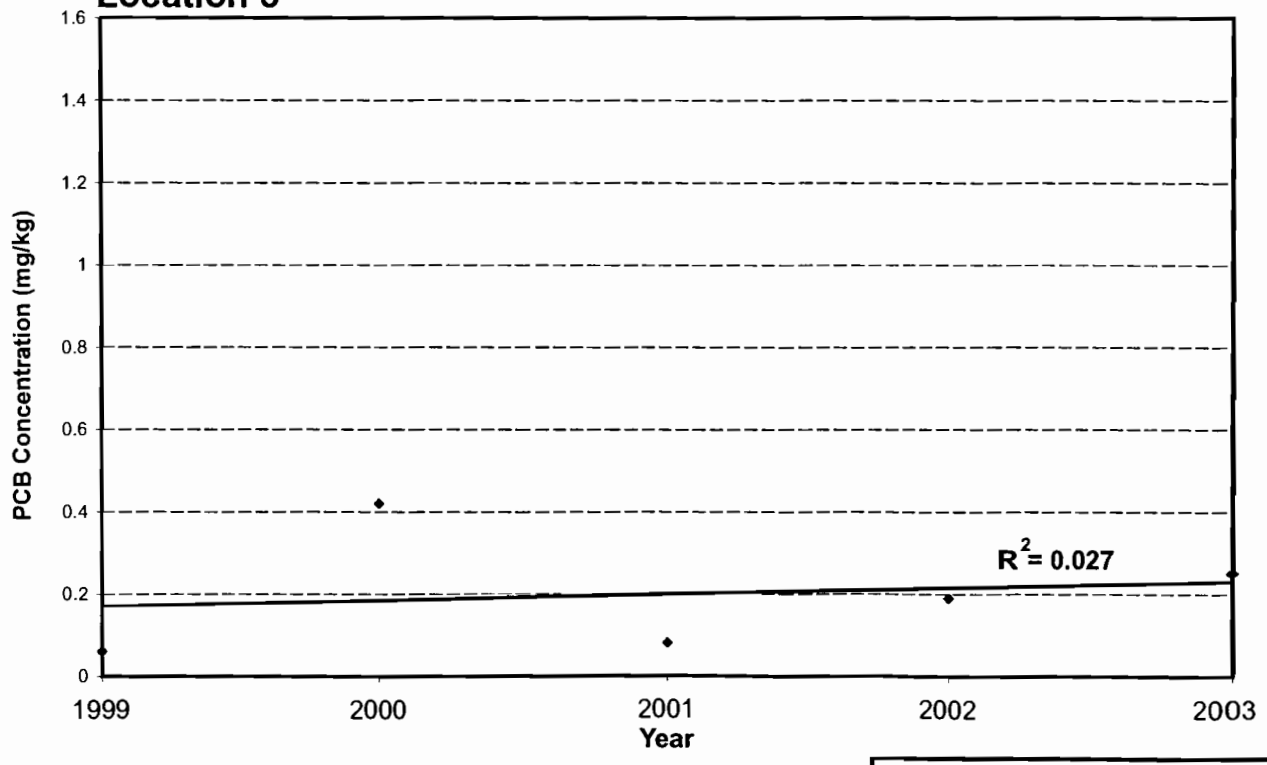
BBL BLASLAND, BOUCK & LEE, INC. engineers & scientists

FIGURE 4









NOTES:

1. These graphs depict the results of the linear regression model used to evaluate statistically significant trends in sediment trap PCB concentrations over time.
2. R^2 is the coefficient of correlation. The closer that R^2 is to 1.0, the stronger the relationship between the two variables.

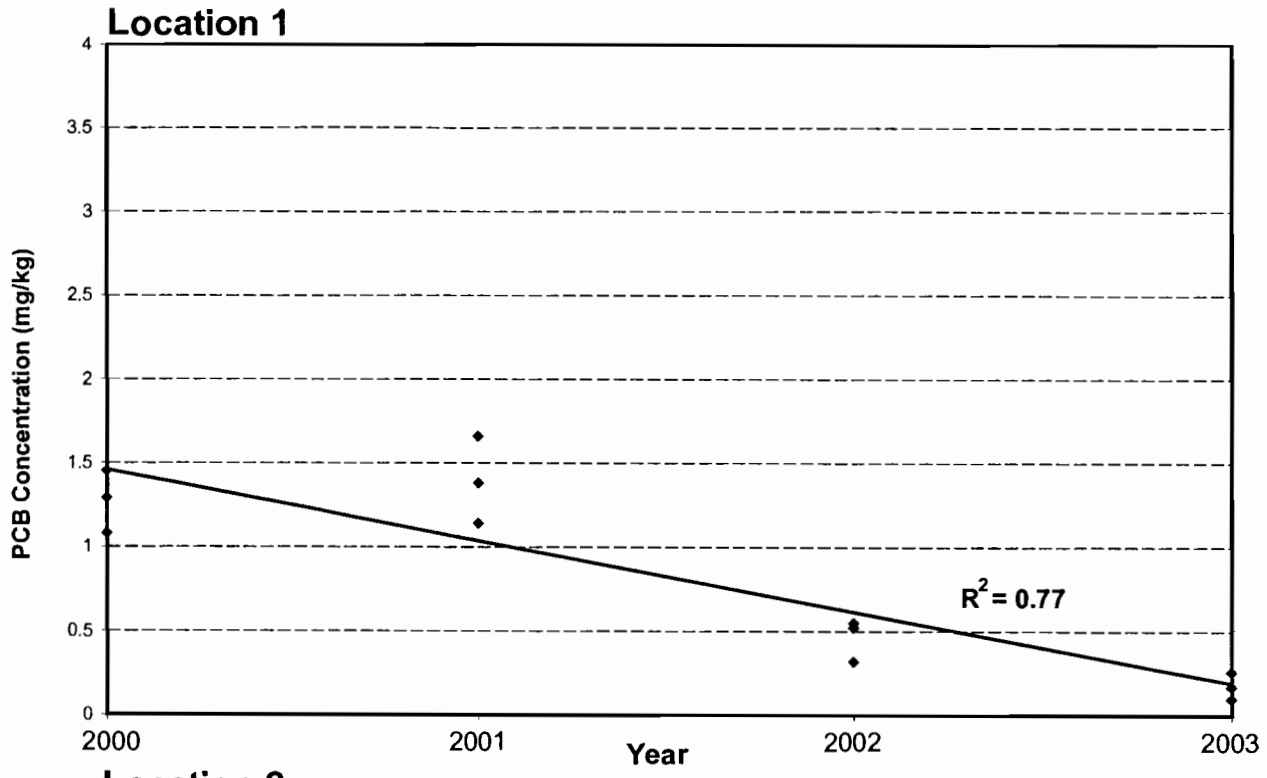
POLLUTION ABATEMENT SERVICES SITE
OSWEGO, NEW YORK
FIVE-YEAR DATA REVIEW REPORT

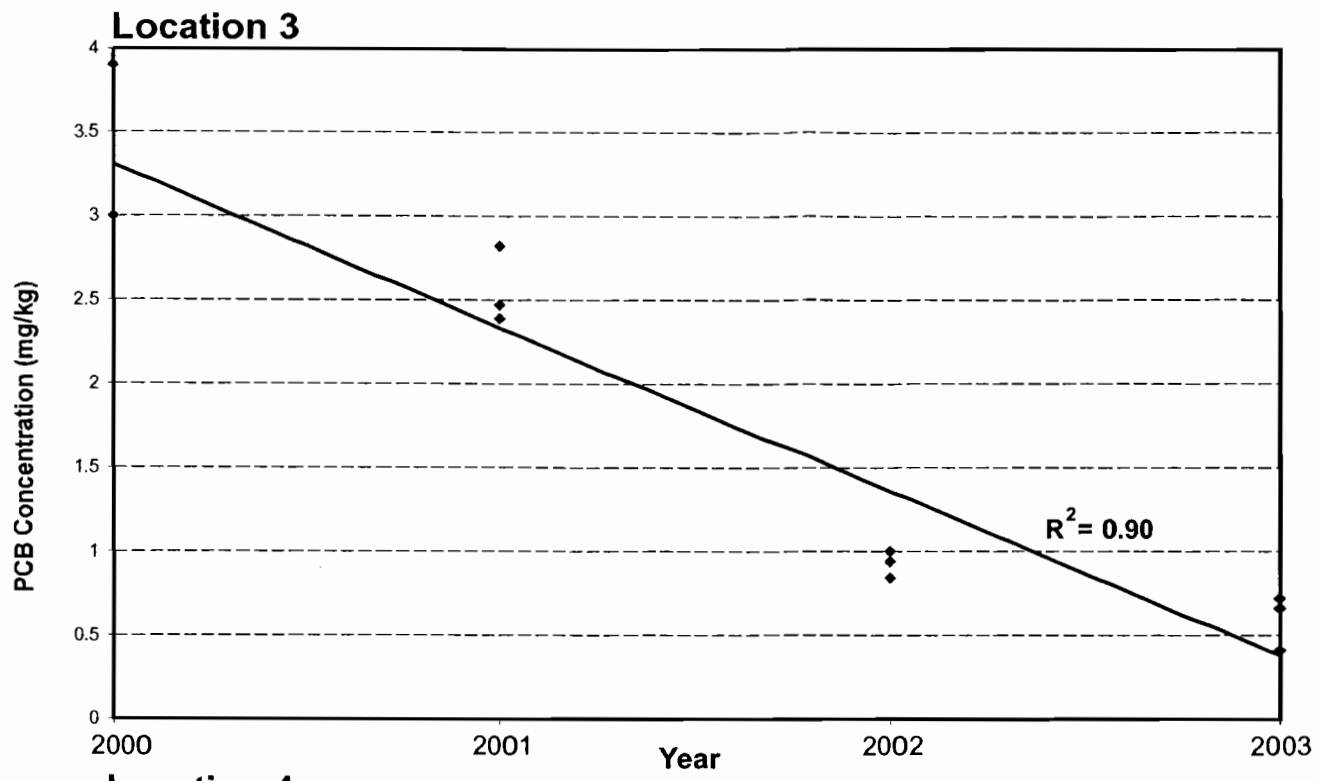
LINEAR REGRESSION MODEL RESULTS FOR SEDIMENT TRAP PCB CONCENTRATIONS

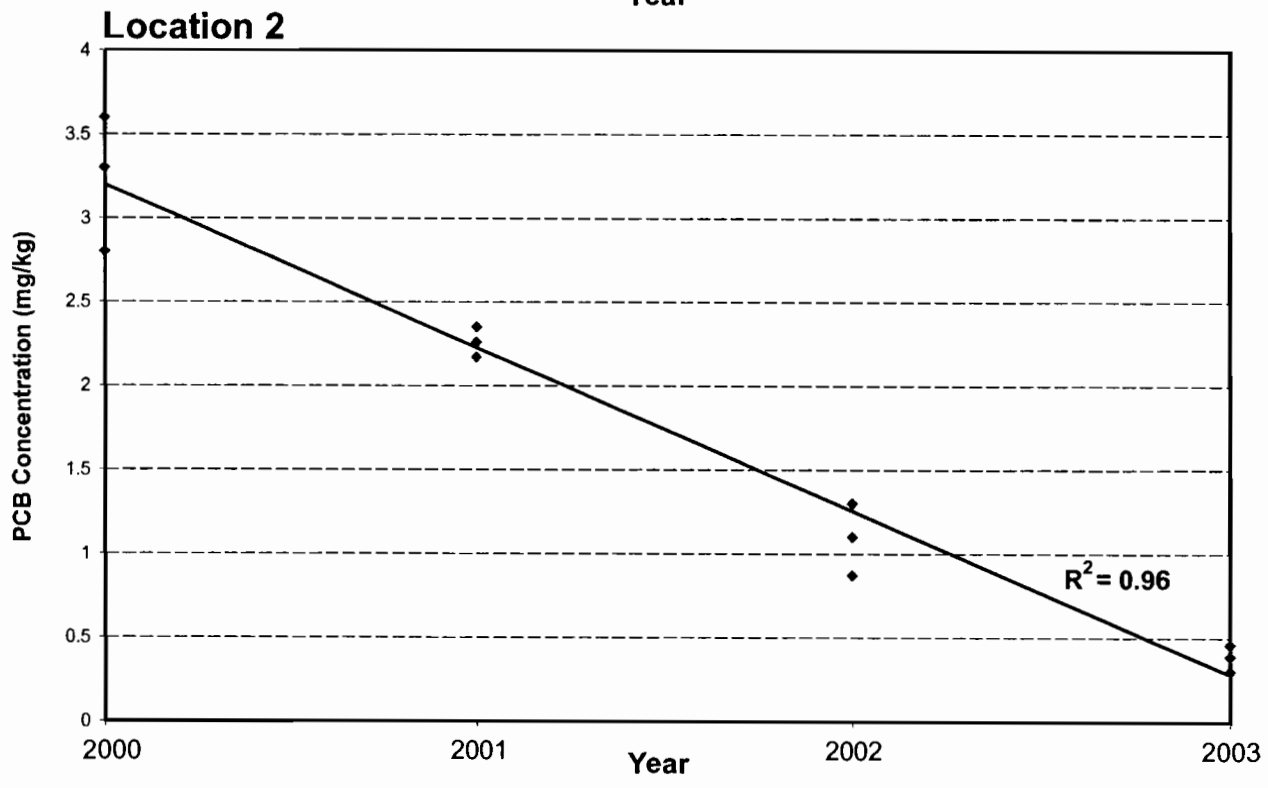
BBL
BLASLAND, BOUCK & LEE, INC.
engineers & scientists

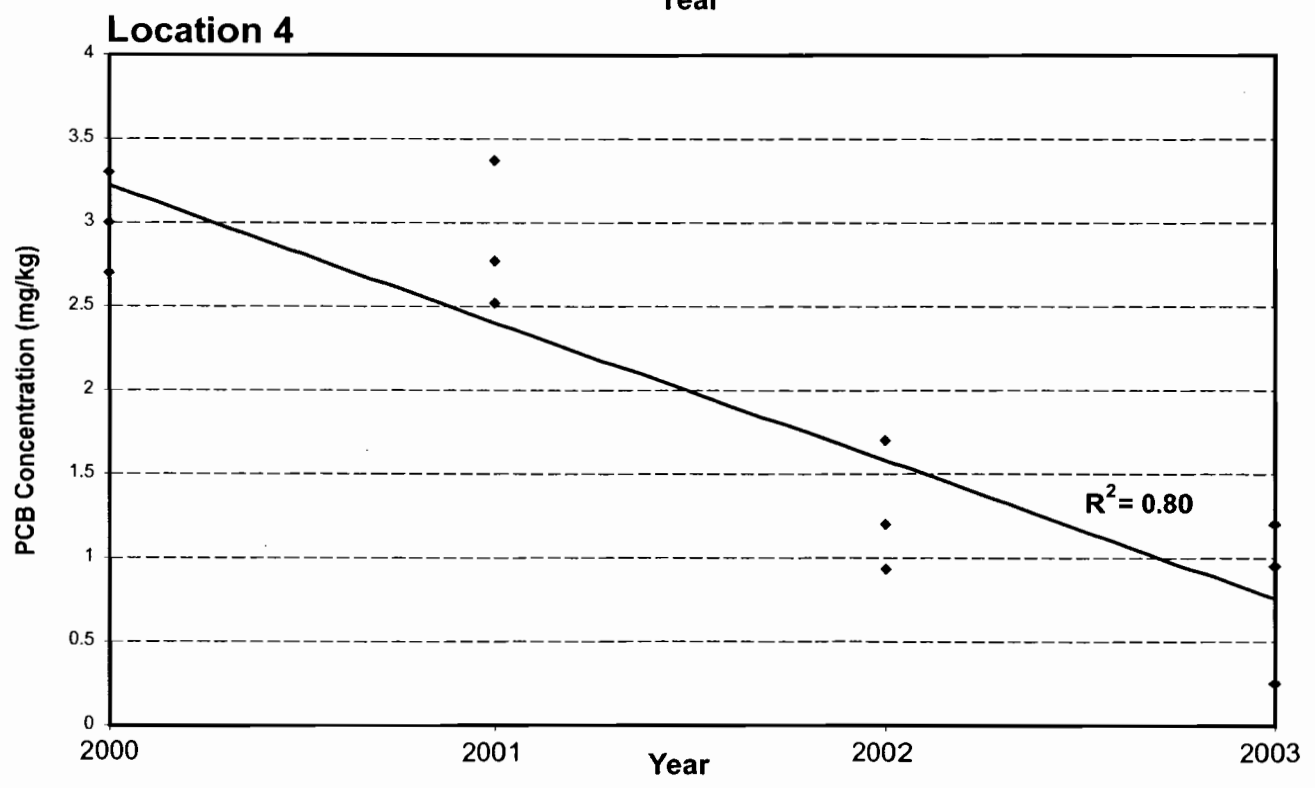
FIGURE 5

11/06/03 SYR-D85-DJH
36644003/36644g03.cdr









NOTES:

1. These graphs depict the results of the linear regression model used to evaluate statistically significant trends in resident fish PCB concentrations over time.
2. R^2 is the coefficient of correlation. The closer that R^2 is to 1.0, the stronger the relationship between the two variables.

POLLUTION ABATEMENT SERVICES SITE
OSWEGO, NEW YORK
FIVE-YEAR DATA REVIEW REPORT

LINEAR REGRESSION MODEL RESULTS FOR RESIDENT FISH PCB CONCENTRATIONS

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

FIGURE 6

11/25/03 SYR-D85-DJH
36644003/36644g06.cdr