PROPOSED REMEDIAL ACTION PLAN

Dewey Loeffel Site
Loeffel Environs
Operable Unit 03
Town of Nassau, Rensselaer County, New York
Site No. 442006
March 2001

SECTION 1 PURPOSE OF THE PROPOSED PLAN

This Proposed Remedial Action Plan (PRAP) identifies the preferred remedy, summarizes the other alternatives considered, and discusses the rationale for this preference. The New York State Department of Environmental Conservation ("NYSDEC") will select a final remedy for the site only after careful consideration of all comments submitted during the public comment period.

The NYSDEC has issued this PRAP as a component of the citizen participation plan developed pursuant to the New York State Environmental Conservation Law and 6 NYCRR Part 375. This document summarizes the information that can be found in greater detail in the records for the site available at the document repositories.

As more fully described in Sections 3 and 4 of this document (see pages 6 to 15), hazardous wastes were disposed at the Dewey Loeffel Site, # 442006. Hazardous wastes disposed include a wide variety of volatile organic compounds (VOCs), and polychlorinated biphenyls (PCBs). PCBs from the Dewey Loeffel disposal site migrated to the surface water system downgradient of the site (including to Nassau Lake, the Valatie Kill and tributary T11A of the Valatie Kill) prior to its capping in 1984, giving rise to significant threats to the public health and the environment, *viz.*,

- significant environmental damage associated with the releases of PCB from the site to the surface waters of the state;

- The releases of PCBs materially contribute to the need to recommend that human consumption of fish from Nassau Lake and the Valatie Kill be limited.

- The presence of hazardous waste in Operable Unit 3 of the Dewey Loeffel site poses a significantly increased risk to the public health due to the consumption of fish from Nassau Lake and the Valatie Kill.

1.1 Proposed remedial alternative

In order to restore areas impacted by past releases of PCBs from the Dewey Loeffel disposal site to mitigate significant threats to human health and the environment, the Department is proposing Alternative D, Total removal of contaminated sediments in T11A and removal of contaminated sediments in Area 28 of the Valatie Kill, with Monitored Natural Attenuation for Nassau Lake and the remainder of the Valatie Kill.

The elements of the proposed remedy would be:

1. A remedial design program to verify the components of the conceptual design and provide the details necessary for the construction, operation and maintenance, and monitoring of the remedial program. Any uncertainties identified during the RI/FS would be resolved.

2. The Interim Remedial Measure, proposed by GE and approved by NYSDEC (to remove contaminated soils and sediments from Mead Road Pond, the spoil banks adjacent to Mead Road Pond, the Low-lying Area, and the Northwest Drainage Ditch) would be implemented by GE and completed by August 2001.

3. The PCB contaminated sediments in T11A would be removed and disposed in a permitted disposal facility off-site.

4. The PCB contaminated sediments in Area 28 of the Valatie Kill would be removed and disposed in a permitted disposal facility off-site.

5. Appropriate site restoration activities would be done in the areas disturbed by the removals in T11A and the Valatie Kill.

6. Natural attenuation processes would be ongoing which may aid in the decrease of PCB concentrations in surface sediment and fish.

7. Since the remedy results in untreated hazardous waste constituents remaining in Operable Unit 3 of the Dewey Loeffel site, a long term monitoring program to evaluate the effectiveness of the proposed remedy would be instituted. There would be several elements to the monitoring program. They would include:

    - annual biota sampling in T11A, in the Valatie Kill, and in Nassau Lake, along with reference locations;

    - annual surficial sediment sampling in T11A, in the Valatie Kill and in Nassau Lake;

    - annual suspended sediment sampling in Nassau Lake;

- surface water sampling, especially during high flow events, in T11A, in the Valatie Kill, and in Nassau Lake.

This monitoring program would be designed to measure the concentrations of PCB in the various media (biota, sediment, water), and to determine the long-term trends in the PCB concentrations in these various media after remediation.

8. Institutional controls for the site would include advisories against consumption of fish from the impacted portion of the Valatie Kill and from Nassau Lake

9. An inspection program would be established to ensure that the dam which impounds Nassau Lake will continue to do so for as long as it is necessary, to contain the PCB contaminated sediments in Nassau Lake. If the dam is found to be deficient, then work will be done as appropriate to maintain the dam.

10. Remedy reviews would be conducted (at least every five years) to determine if the results of the remedy are protective of human health and the environment and if they meet the remedial goals listed below.

    The monitoring program will be designed to determine, in a statistically significant manner, if the advisories related to human consumption of fish contaminated with PCBs can be lifted or reduced. If after a reasonable period of time, (likely three to five years) the advisories can not be lifted or reduced, then an evaluation will be undertaken of whether or not there are additional feasible remedial actions which will allow for the advisories to be lifted or reduced.

    In a similar manner, the remedy reviews will also evaluate whether all of the goals of the remedial program have been met, and whether or not there are feasible remedial actions which will result in the other remedial goals being met.

    In order to determine which additional remedial actions would be implemented if the goals of this remedy are not met, a supplemental Feasibility Study would be performed in accordance with applicable guidance. Selection of the appropriate additional remedial actions would follow the NYSDEC remedy selection process, including public comment.

Remediation Goals

The above proposed remedy is intended to attain the remediation goals selected for this site in conformity with applicable standards, criteria, and guidance (SCGs). These remediation goals include:

- Eliminate, to the extent practicable, unacceptable human health exposures to PCBs present in soils/sediments in Operable Unit 3 of the Dewey Loeffel site.

- Eliminate, to the extent practicable, exceedances of applicable environmental quality standards related to releases of contaminants to the waters of the state.

- Eliminate, to the extent practicable, unacceptable human exposures to PCBs related to potential human consumption of fish and other wildlife, and eliminate to the extent practicable the need to recommend that human consumption of fish be limited.

- Eliminate, to the extent practicable, unacceptable wildlife exposures to PCBs related to consumption of contaminated biota by pisciverous (fish eating) wildlife.

The NYSDEC may modify the preferred alternative or select another alternative based on new information or public comments. Therefore, the public is encouraged to review and comment on all of the alternatives identified in this document.

1.2 Public Participation

To better understand the site and the alternatives evaluated, the public is encouraged to review the project documents which are available at the following repositories:

NYSDEC Central Office
50 Wolf Road, Room 228
Albany, New York
(518) 457-5637
Hours: M-F 8:30 am - 4:30 pm

Nassau Town Library
Nassau, New York

Project Manager: James Ludlam, P.E.
NYSDEC
50 Wolf Road
Albany, NY 12233-7010
Phone (518) 457-5637.

Written comments on this PRAP can be submitted to Mr. Ludlam at the above address.

DATES TO REMEMBER:

4/1/01 to 5/1/01: Public comment period on RI/FS Report, PRAP, and preferred alternative.

4/19/01: 3:00 pm to 5:00 pm, Availability Session (for informal question and answer); 7:00 pm to 9:00 pm, Public meeting at the St. Mary's Parish Hall, Rt. 20, Village of Nassau, New York.

SECTION 2 SITE LOCATION AND DESCRIPTION

The Dewey Loeffel site is a 19.6 acre inactive hazardous waste disposal site located in the Town of Nassau in southern Rensselaer County, New York (Figure 1). The Village of Nassau, New York is approximately four miles to the southwest.

Operable Unit 3, which is the subject of this Proposed Remedial Action Plan, consists of several areas which were contaminated with PCB as a result of the surface flow of contaminants from the Loeffel disposal site prior to its encapsulation in 1983-84. These areas are:

-the Northwest Drainage Ditch, which was the primary surficial drainage from the Loeffel disposal site to the northwest. It extends along the north side of Mead Road to the west, where it enters Mead Road Pond;

-the Low-Lying Area, which is a small wetland area that received runoff from the Northwest Drainage Ditch during times of high flow;

-Mead Road Pond, which is a small impoundment approximately 200 yards west of the western end of the Loeffel disposal site that received drainage from the disposal site;

-the Mead Road Pond Spoil Banks, which consist of soil/sediment that was removed from Mead Road Pond in the past, and are located on the slope to the south of Mead Road Pond along Mead Road;

-Tributary 11 A ("T11A") of the Valatie Kill, a small stream formed by the discharge from Mead Road Pond which leads approximately 1700 feet to the Valatie Kill (the actual map designation is T10, but is referenced in the site reports as T11A);

–the Valatie Kill, a stream which extends from north of China Hill Road (upgradient of the site) south past the confluence of T11A a distance of approximately 2.7 miles into Nassau Lake;

-Nassau Lake, a small (173 acre) man-made lake which was formed as an impoundment of the Valatie Kill.

The remedial action designated by NYSDEC as Operable Unit 1 was the implementation of the cap and slurry wall encapsulation remedy which was implemented in1983-84. For Operable Unit 2 NYSDEC has determined that an upgraded water management system must be installed at the disposal site, as well as the groundwater recovery and treatment program for the bedrock groundwater contamination beneath, and to the south of, the disposal site. (See the "Record of Decision, Dewey Loeffel Site, Operable Unit 2, Town of Nassau, Rensselaer County, Site Number 4-42-006", January 2001 for a description of this remedy.)

The Dewey Loeffel disposal site is located in a low area between two wooded hills with peak elevations of 876 and 778 feet above mean sea level (MSL). Topography in the area generally slopes downward from east to west. Elevations in the immediate vicinity of the Site range from approximately 610 to 660 feet above MSL.

Current surface drainage on the Dewey Loeffel disposal site is controlled by a series of drainage swales built into the vegetated landfill cap and side drainage around the edge of the landfill cap. From the disposal site, surface water flows into tributaries and streams which are part of the Nassau Lake drainage basin, a subpart of the Valatie Kill drainage basin.

The majority of surface water drains from the Loeffel site to the northwest (the "Northwest Drainage System") toward Mead Road Pond (see Figure 1). Water exiting Mead Road Pond flows via a small stream, the T11A tributary, which in turn flows into the Valatie Kill. The Valatie Kill flows in a south westerly direction to Nassau Lake, approximately 2.7 miles downstream. Surface water flowing to the southeast (the "Southeast Drainage System") from the Loeffel Site flows to a low-lying area and to a small unnamed tributary (undesignated by New York State) and then into Valley Stream. Valley Stream flows through Smith Pond and discharges to Nassau Lake. The Southeast Drainage System was not significantly impacted by hazardous wastes from the site, based upon the results of sediment and biota sampling.

Surface waters are described in detail in the "Loeffel Site Environs Feasibility Study (FS) Report: Surface Water, Sediment, and Biota" (BBL 1997a) and previously completed Loeffel Site environs Remedial Investigation (RI) documents (BBL, 1993, 1995, and 1997b).

SECTION 3 SITE HISTORY

3.1 Operational/Disposal History

The Loeffel site was used from 1952 to 1968 by the Loeffel Waste Oil Removal and Service Company as a private scavenger service and disposal facility for waste materials and later as a waste oil transfer station. The disposal and oil transfer site facilities consisted of a lower (1 acre) and upper (5 acres) lagoon in the western and central portion of the site, a 25- by 150- foot, 6 foot deep oil pit in the east central part of the site, four above-ground oil storage tanks (30,000 gallons each), and a drum disposal area located in the southern and eastern portions of the Site (O'Brien & Gere), 1981). Miscellaneous drums, construction debris, and junk automobiles were also present along the southeastern end of the site (O'Brien & Gere, 1981).

During disposal operations, hazardous waste materials were reportedly collected in 55 gallon drums and transported to the site. The contents of reusable drums were dumped either into the oil pit or into the upper lagoon. Unusable drums were dumped either on the perimeter of the upper lagoon or in the drum burial area. Drums were later covered with soil. The pit was used to store and separate recyclable oily wastes. The non-recyclable contents were pumped into the lagoon or onto the ground surface. Waste materials were reportedly also burned during facility operations.

NYSDEC has estimated that a total of 37,530 tons of waste materials were transported from General Electric (GE) manufacturing facilities to the Loeffel Waste Oil Removal and Service Company facility. NYSDEC has estimated that 8,790 tons of waste materials were deposited at the site from other industrial sources, including Bendix Corporation (now a part of Honeywell) and Schenectady Chemicals, Inc. (now Schenectady International) (O'Brien & Gere, 1981). The waste materials disposed at the site included solvents, waste oils, PCBs, scrap materials, sludges, and solids.

In 1966, the State of New York initiated legal action against the Loeffel Waste Oil Removal and Service Company, leading to a 1968 New York State Supreme Court Order and Judgment against the company to stop discharges from the disposal facility and to perform remedial activities. In October 1970, the Loeffel Waste Oil Removal and Service Company retained an engineering firm, C.T. Male and Associates, to develop remedial measures for the Loeffel waste disposal facility. Remedial actions consisted of covering and grading the drum disposal area, oil pit, and lagoon with soil, and construction of a system of drainage channels around the facility to control surface water runoff entering the disposal facility area. These remedial measures were completed in 1974. Fill material was reportedly excavated from a borrow pit southwest of the disposal facility.. The Loeffel Waste Oil Removal and Service Company reportedly continued to use the Site from 1974 to 1980 as a transfer station for waste oils utilizing the four 30,000 gallon above-ground storage tanks. According to Mr. Dewey Loeffel, these waste oils were transported to the facility from operations owned by a number of industrial companies and other entities.

On September 23, 1980, GE entered into an agreement with the NYSDEC, known as the Seven Sites Agreement (Agreement). The Agreement required GE, among other things, to perform field investigations to determine the conditions at the Loeffel Site and the nature and extent of hazardous wastes. Following these field investigations, GE submitted an engineering report, which included the data collected during the field investigations, identified alternative remedial programs, and recommended a remedial program from these alternatives. The report also included provisions for (1) maintenance and monitoring of the remediated site, (2) collection, treatment and disposal of any leachate generated at the remediated site, where appropriate, and, (3) the physical security of the remediated site (NYSDEC, 1980). Following approval of the final site remediation plan by NYSDEC, GE was required to pay NYSDEC $2.33 million, representing its estimated share of the costs of implementing the construction elements of the remedial program and the costs of operating, maintaining, and monitoring the Site.

The engineering report prepared by O'Brien & Gere Engineers, Inc. (O'Brien & Gere) on behalf of GE recommended an in-place containment alternative consisting of a low permeability cap with vegetative cover, surface water drainage swales, and a perimeter cutoff wall constructed to till or bedrock (O'Brien & Gere, 1981). During the design phase, it was determined that the cut-off wall should be extended to the bedrock and that a leachate collection system should be installed. The final remedial plans and specifications were submitted to NYSDEC in January 1983 for its subsequent use (O'Brien & Gere, 1983). Approximately 500 surface drums were removed from the eastern end of the Site in preparation for the remedial program. The four 30,000 gallon above-ground storage tanks were also removed that year [Camp, Dresser and McKee (CDM), 1985].

The NYSDEC approved remedy was constructed from September 1983 to November 1984. In October 1985, a final site inspection was conducted. Since the final inspection, operation, maintenance, and monitoring activities have been the responsibility of NYSDEC.

In 1989, the State of New York brought suit against GE in the U.S. District Court for the Northern District of New York seeking to hold GE liable for cleanup costs and natural resource damages relating to impacts of hazardous substances that had migrated from disposal site prior to construction of the cap and slurry wall at the disposal site. Subsequently, an RI Work Plan, a Sampling and Analysis Plan, and a Health and Safety Plan were developed on GE's behalf by BBL and submitted for NYSDEC review (BBL, 1992). NYSDEC approved these in July 1992. On September 23, 1992, GE and the State of New York entered into a Judicial Stipulation, under which GE agreed to conduct an RI in accordance with the approved work plan. GE also agreed to conduct an FS to assess potential remedial alternatives.

3.2 Remedial History

1974 - Remedial actions consisting of covering and grading the drum disposal area, oil pit and lagoon and construction of a system of drainage ditches were completed.

1982 - CECOS International, Inc. removed approximately 500 surface drums from the eastern portion of the site. The four 30,000 gallon above-ground tanks were also removed.

1984 - Construction of the containment system at the site is completed. The containment system consists of a slurry wall, a clay cap, and a leachate collection system. This remedial effort is referred to as Operable Unit 1.

The slurry wall is a trench, excavated from land surface down into unweathered bedrock, which was backfilled with a mixture of the excavated soil and bentonite clay. The slurry wall has a hydraulic conductivity which is significantly lower than the surrounding soils, which impedes groundwater flow into and out of the disposal site.

The clay cap was constructed over the entire disposal site, and ranges from 4.5 to 6 feet in thickness. The cap is designed to impede the recharge of rainfall and snowmelt into the disposal site.

The leachate collection system consists of a series of drainage pipes which were installed in the western third of the disposal site before the site was graded and capped. The pipes drain to a collection tank. Periodically, leachate is removed from the tank by a state contractor for appropriate off-site disposal.

As described above on page 5, Operable Unit 2 of this site is being addressed in a separate remedy selection process. A Record of Decision was issued in January 2001 which identified Disposal Site Hydraulic Containment with Downgradient Recovery and Treatment as the selected remedies for Operable Unit 2.

SECTION 4 CURRENT STATUS

In response to a determination that the disposal of hazardous waste at the site presents a significant threat to human health and the environment, GE has completed a Remedial Investigation and Feasibility Study (RI/FS).

The Commissioner may find that hazardous waste disposed at the site constitutes a significant threat to the environment if, after reviewing the available evidence and considering the factors the Commissioner deems relevant set forth in 6 NYCRR 375-1.4(b), the Commissioner determines that the hazardous waste disposed at the site or coming from the site results in, or is reasonably forseeable to result in,

- a bioaccumulation of contaminants in flora or fauna to a level that causes, or that materially contributes to, significant adverse ecotoxicological effects in flora or fauna or leads, or materially contributes, to the need to recommend that human consumption be limited (6 NYCRR 375-1.4[a][1][iii]);

- a determination by NYSDOH or by the Agency for Toxic Substances and Disease Registry, where the site is near private residences, recreational facilities, public buildings or property, school facilities, places of work or worship, or other areas where individuals or water supplies may be present, that the presence of hazardous waste on a site poses a significantly increased risk to the public health (6 NYCRR 375-1.4[a][1][vi]);

- significant environmental damage (6 NYCRR 375-1.4[a][2]).

In making a finding as to whether a significant threat to the environment exists, the Commissioner may take into account any or all of the following matters, as may be appropriate under the circumstances of the particular situation:

(1) the duration, areal extent, or magnitude of severity of the environmental damage that may result from a release of hazardous waste (6 NYCRR 375-1.4[b][1]);

(2) type, mobility, toxicity, quantity, bioaccumulation, and persistence of hazardous waste present at the site (6 NYCRR 375-1.4[b][2]);

(3) manner of disposal of the hazardous waste (6 NYCRR 375-1.4[b][3]);

(4) nature of soils and bedrock at and near the site (6 NYCRR 375-1.4[b][4]);

(5) groundwater hydrology at and near the site (6 NYCRR 375-1.4[b][5]);

(6) location, nature, and size of surface waters at and near the site (6 NYCRR 375-1.4[b][6]);

(7) levels of contaminants in groundwater, surface water, air, and soils at and near the site and areas known to be directly affected or contaminated by waste from the site, including, but not limited to, contravention of: ambient surface water standards set forth in Part 701 or 702 of this Title; ambient groundwater standards set forth in Part 703 of this Title; drinking water standards set forth in Subpart 5-1 and Part 170 of Title 10 of the Official Compilation of Codes, Rules and Regulations of the State of New York (6 NYCRR 375-1.4[b][7]);

(8) proximity of the site to private residences, recreational facilities, public buildings or property, school facilities, places of work or worship, and other areas where individuals may be present (6 NYCRR 375-1.4[b][8]);

(9) the extent to which hazardous waste and/or hazardous waste constituents have migrated or are reasonably anticipated to migrate from the site (6 NYCRR 375-1.4[b][9]);

(10) the proximity of the site to areas of critical environmental concern (as, wetlands or aquifers) (6 NYCRR 375-1.4[b][10]);

(11) the potential for wildlife or aquatic life exposure that could cause an increase in morbidity or mortality of same (6 NYCRR 375-1.4[b][11]);

(12) the integrity of the mechanism, if any, that may be containing the hazardous waste to assess the probability of a release of the hazardous waste into the environment (6 NYCRR 375-1.4[b][12]); and

(13) the climatic and weather conditions at and in the vicinity of the site (6 NYCRR 375-1.4[b][13]).

(For a more detailed discussion respecting NYSDEC's "significant threat" determinations and the rationale for NYSDEC's use of the above, and other, factors, in its decisionmaking, see the Draft Regulatory Impact Statement for 6 NYCRR Part 375, dated April 1991, at pages 19 to 25;

and the Hearing Report, Responsiveness Summary, and Revision to the Draft Regulatory Impact Statement for 6 NYCRR Part 375, dated March 1992, at pages II-7 to II-19.)

The bases for the determination that the site poses a significant threat to human health and the environment are founded on the following:

The hazardous wastes present contribute to or result in:

- contravention of the surface water standard for PCBs which was promulgated to protect humans who may consume fish (for concentrations of contaminants in surface water at the site, see Table 1);

- contravention of the surface water standard for PCBs promulgated to protect pisciverous wildlife (for concentrations of contaminants in surface water at the site, see Table 1);

- a bioaccumulation of contaminants in flora or fauna to a level that causes, or that materially contributes to, significant adverse ecotoxicological effects in flora or fauna or leads, or materially contributes, to the need to recommend that human consumption be limited (for concentrations of contaminants in fish, see Table 1).

- the potential for direct contact with PCB contaminated soil in the vicinity of Mead Road Pond.

The determination of significant threat associated with Operable Unit 3 of the Dewey Loeffel site is therefore based primarily on the significant environmental damage associated with impacts of PCBs released to the surface water system downgradient of the site, upon the need to recommend that human consumption of fish be limited due to releases of PCB to the surface water system downgradient of the site, and upon the significantly increased risk to public health.

4.1 Summary of the Remedial Investigation

The purpose of the RI was to define the nature and extent of any contamination resulting from previous activities at the site. GE conducted the RI under DEC oversight in four phases. Reports were submitted to New York State by GE in 1993, 1995, and 1997.

The RI included the following activities:

- collection and analysis of surface water samples in the vicinity of the disposal site (including the Northwest Drainage Ditch, the Low-lying Area and Mead Road Pond), in T11A, in the Valatie Kill, and in Nassau Lake; see Figure 2 for a map showing the locations of the Northwest Drainage Ditch, the Low-lying Area and Mead Road Pond;

- collection and analysis of sediment and biota samples in the southeast drainage.

- collection and analysis of sediment samples in the vicinity of the disposal site, in T11A, in the Valatie Kill, and in Nassau Lake;

- collection and analysis of soil samples in the vicinity of the disposal site, including from the spoil banks adjacent to Mead Road Pond;

- performance of sediment survey programs to determine sediment thickness in various locations between the disposal site and Nassau Lake;

- collection and analysis of suspended sediment samples from Nassau Lake;

- collection of geotechnical data in Nassau Lake;

- collection of biota samples in the surface water system between the disposal site and Nassau Lake, and in Nassau Lake;

- collection of air samples for PCB in the vicinity of Nassau Lake;

- collection of soil samples from flood prone areas in the vicinity of Nassau Lake.

To determine which media (surface water, sediment, etc.) contain contamination at levels of concern, the RI analytical data were compared to environmental Standards, Criteria, and Guidance (SCGs). Surface water SCGs identified for Operable Unit 3 of the Dewey Loeffel site are based on NYSDEC Ambient Water Quality Standards and Guidance Values. NYSDEC soil cleanup guidelines for the protection of groundwater (TAGM 4046), and background conditions were used as SCGs for soil.

Based on the results of the remedial investigation in relation to the SCGs and potential public health and environmental exposure routes, additional remediation work is required to supplement the previous remedial actions taken at the site. More complete information can be found in the Remedial Investigation (RI) reports for the site.

For results of chemical analyses of sediment, soil and water, see Table 1 (attached). Soil chemical concentrations are reported in parts per million (ppm). Concentrations in water are reported in parts per trillion (ppt). For comparison purposes, SCGs are given for each medium as appropriate.

4.1.1 Nature of Contamination

Operable Unit 3

Operable Unit 3 of the Dewey Loeffel site is contaminated with PCBs which were released from the disposal site prior to the its encapsulation.

As described in the RI Report, numerous biota, sediment, soil and surface water samples were collected at the site to characterize the nature and extent of contamination.

Soil samples were collected from the spoil banks in the vicinity of Mead Road Pond, and from near-shore areas along the Valatie Kill. Surface water and sediment samples were collected from the Northwest Drainage Ditch, Low-lying Area, Mead Road Pond, the spoil banks adjacent to Mead Road Pond, in T11A of the Valatie Kill, in and adjacent to the Valatie Kill between the T11A confluence and Nassau Lake, and at Nassau Lake. Fish samples were collected from T11A, the Valatie Kill, and Nassau Lake.

The investigations confirmed that the Loeffel disposal site was the original source of PCB found in the surface water system leading away from the site. The disposal site is no longer acting as a source of PCB to the surface water system. The remaining sources of PCB to the surface waters and biota in the system are the sediments in the Northwest Drainage Ditch, Mead Road Pond, T11A, the Valatie Kill, and in Nassau Lake. The soils adjacent to Mead Road Pond (the spoil banks) also are sources of PCB to the surface water system.

The transport of PCB through the surface water system between the disposal site and Nassau Lake is driven primarily by suspended sediment migration during high flow events. Concentrations of PCB in surface water in the Valatie Kill are typically below 82 parts per trillion, and below the detection limit of 22 parts per trillion in Nassau Lake.

Air sampling done at locations immediately adjacent to the shoreline of Nassau Lake did not contain detectable concentrations of PCB.

It does not appear that PCB is migrating in the Valatie Kill downstream of Nassau Lake, based upon water samples taken at the lake outlet.

The PCB concentrations resulting from fish sampling since 1979 do not indicate any significant pattern of increase or decrease over time in Nassau Lake. PCB concentrations vary significantly over time, with both increases and decreases from one sampling event to the next. PCB concentrations in yellow perch and largemouth bass from the mid-1990s are similar to the PCB concentrations in these species in the late 1970's and early 1980's.

The Southeast Drainage has not been significantly impacted by releases of PCB from the site.

4.1.2 Extent of Contamination

Table 1 summarizes the extent of contamination for the contaminants of concern in the soil and groundwater and compares the data with the applicable Standards, Criteria, and Guidelines (SCGs). The following are the media which were investigated and a summary of the findings of the investigation.

Soil/Sediment

The PCB contamination in soil exists primarily in the vicinity of the Mead Road Pond spoil banks, where sediments from Mead Road Pond were deposited in the past.

The PCB contamination in sediment extends from the area immediately adjacent to the disposal site, through Mead Road Pond, T11A and the Valatie Kill into Nassau Lake.

Soil and sediment samples were collected from the Northwest Drainage Ditch adjacent to the disposal site, in the Low-lying Area, in Mead Road Pond, in T11A, in the Valatie Kill, and in Nassau Lake. In general, the PCB concentrations were highest in the areas near Mead Road Pond, and declined with distance downstream. The PCB concentrations in the Northwest Drainage Ditch ranged from 0.24 to 34 ppm; in the low-lying area from 0.94 to 2.3 ppm; in Mead Road Pond from 0.12 to 170 ppm; in T11A from 0.2 to 71 ppm (averaging 21.1 ppm); in the Valatie Kill (except for Area 28) from non-detect to 8.3 ppm (averaging 1.67 ppm); in Area 28 from non-detect to 40 ppm (averaging 9.13); and in Nassau Lake from non-detect to 9.6 ppm, (averaging 2.3 ppm). PCB concentrations found in sediment samples in the Southeast Drainage ranged from non-detect to 1.4 ppm (averaging 0.54 ppm). PCB concentrations found in twenty five soil samples taken if flood-prone areas around Nassau Lake ranged from non-detect to 2.2 parts per million.

Table 1 contains a summary of the soil/sediment PCB data.

Surface Water

Surface water samples were collected from the Northwest Drainage Ditch, the Low-lying Area, Mead Road Pond, T11A, the Valatie Kill, and Nassau Lake. All of the samples were analyzed for PCBs.

The PCB contamination in surface water extends in the surface water system from the area immediately adjacent to the disposal site (the Low-lying Area, Northwest Drainage), through Mead Road Pond, T11A and the Valatie Kill into Nassau Lake.

In general, the PCB concentrations were highest in Mead Road Pond, and declined with distance downstream. The PCB concentrations in Mead Road Pond ranged from 71 to 260 parts per trillion; in the Northwest Drainage Ditch from non-detect to 82 parts per trillion; in the Low-lying Area all samples were non-detect; in the Valatie Kill the PCB concentrations ranged from non-detect (ND) at the detection limit of 22 parts per trillion to 82 parts per trillion; and in Nassau Lake none of the samples had a detectable concentration of PCB in water at 22 parts per trillion.

See Table 1 for a summary of the surface water PCB data and a list of the surface water standards for PCB.

Fish

Fish samples have been collected and analyzed for PCB since 1979, and has included at various times Nassau Lake, the Valatie Kill, T11A, and several other nearby locations in the drainage basin.

The overall geographic distribution of PCB in fish closely resembles the distribution of PCB in the sediments and surface water. The highest concentrations of PCB in fish are found in the areas with the highest sediment concentrations.

There is no consistent pattern of increase or decrease in fish PCB concentrations in Nassau Lake. Figures 3 and 4 show the PCB concentrations in fish from Nassau Lake since 1979. Figure 5 shows the PCB concentrations in fish from T11A in 1996, and Figure 6 shows the PCB concentrations in fish in the Valatie Kill at Mead Road (downstream of T11A) from 1979 to 1997.

In the southeast drainage, PCB concentrations in fish ranged from 0.024 to 0.07 ppm.

Air

A total of twelve air samples were obtained from three locations in the immediate vicinity of the Nassau Lake shoreline, and three samples were obtained from a reference location at Burden Lake. No detectable concentrations of PCB were found, at a detection limit of 0.004 micrograms per cubic meter.

4.2 Interim Remedial Measures

Interim Remedial Measures (IRMs) are discrete sets of activities to address both emergency and non-emergency site conditions, which can be undertaken without extensive investigation or evaluation, to prevent, mitigate, or remedy environmental damage attributable to a site.

NYSDEC has recently approved GE's proposal to perform an IRM in the spring and summer of 2001 which will include removal of contaminated soils and sediments in the surface water drainage system near the Dewey Loeffel disposal site and Mead Road Pond. See Section 7.1.1 below for a full description of this IRM; and see Figure 2 for a map showing the IRM area..

4.3 Summary of Human Exposure Pathways

This section describes the types of human exposures that may present added health risks to persons at or around the site. A more detailed discussion of the health risks related to the disposal site and associated groundwater contamination can be found in Section 7 of the RI Report.

An exposure pathway is how an individual may come into contact with a contaminant. The five elements of an exposure pathway are 1) the source of contamination; 2) the environmental media and transport mechanisms; 3) the point of exposure; 4) the route of exposure; and 5) the receptor population. These elements of an exposure pathway may be based on past, present, or future events.

Completed pathways which exist at the site include:

- Incidental Ingestion, Inhalation, and Dermal Contact: This route of exposure is completed. For areas in the vicinity of the disposal site (Northwest Drainage Ditch, Mead Road Pond and spoil banks, and in T11A) there may be unacceptable dermal contact exposures to persons who frequent these areas. For the vicinity of the Valatie Kill and Nassau Lake, this route of exposure is completed, but there is minimal risk due to low exposure concentrations. This limited exposure does not warrant any advisory against residential or recreational use of the Valatie Kill or Nassau Lake.

- Direct Ingestion: This route of exposure is completed. People who consume fish from T11A, the Valatie Kill, or Nassau Lake would be exposed to unacceptable doses of PCB.

4.4 Summary of Environmental Exposure Pathways

This section summarizes the types of environmental exposures presented by the site.

Initial source conditions for exposure of PCBs (primarily of the more highly chlorinated forms as found in Aroclor 1260) to biota (fish and invertebrates) are associated with the northwest drainage area leading into Mead Road Pond and into Tributary 11A. Water concentrations are elevated, presumably reflecting the relatively high sediment/soil concentrations. Since this type of PCB is more highly bioaccumulable than less chlorinated forms, the subsequent levels found in the biota are greatly enhanced. As distance from the source increases, concentrations in various media including fish decrease through the Valatie Kill and into Nassau Lake. There may be a strong seasonal aspect to the fish data with higher concentrations observed in the spring indicating the potential for a water driven transport mechanism during periods of high flow such as spring runoff. Since fish and other biota respond to changes in exposure regimes in a short period of time, observed concentrations are highly variable through the years.

SECTION 5 ENFORCEMENT STATUS

The following is a chronology of the enforcement actions related to the Loeffel site.

In an agreement between GE and NYSDEC signed on September 24, 1980, and covering seven inactive hazardous waste disposal sites in northeastern New York State ("Seven Site Agreement"), among other things, GE committed to: (1) perform a field investigation at and around the Loeffel Site to determine the areal and vertical extent of contamination; (2) prepare an engineering report summarizing all data developed in the course of the field investigation and then recommending a remedial program; and (3) present a preliminary plan and schedule for implementation of the remedial program, and provide an estimate of the cost of such implementation.

GE subsequently hired a consulting engineering firm to conduct an investigation and prepare the various reports required by the Seven Site Agreement. After NYSDEC approved GE's final plan for implementation of a remedial program, GE paid NYSDEC $2.33 million towards remedial construction, monitoring and maintenance of the site, and obtained a qualified release from further legal liability. The State collected approximately $550,000 from two other entities whose wastes were disposed of at the site: Bendix Corporation, and Schenectady Chemicals, Inc. The total amount spent by NYSDEC for the initial cap and slurry wall installation remedy was $2,553,387.

In exchange for preparing the required reports and paying NYSDEC, GE was provided a release from any "claim, demand, remedy, or action whatsoever" against GE which NYSDEC may have "relating to or arising from GE's disposal of waste at the Loeffel site". However, the consent order included a "reservation of rights" clause which preserved NYSDEC's rights to sue GE with regard off-site impacts, as follows:

> Nothing herein shall be construed as barring, diminishing, adjudicating, and in any way affecting... [NYSDEC's] right to bring any action of any kind with respect to areas or resources that may have been affected as a result of the release or migration of hazardous waste from such sites.

In 1989, relying on the above-referenced reservation of rights, the State filed suit against GE under the Comprehensive Environmental Response, Compensation and Liability Act, 42 U.S. C. 9601 *et seq.*, as amended (the federal Superfund law), and State common law, based on the State's determination that PCBs and other wastes had migrated from the Loeffel Site prior to its encapsulation. The lawsuit seeks a court order requiring GE to (1) investigate the nature and extent of contamination, propose a remedy and then implement the final cleanup plan selected by the State; (2) reimburse the State for its costs; and (3) pay the State for damages to natural resources (e.g. fish, wildlife, surface and groundwater) that remain injured after remediation, as well as for temporary losses of resource use before all site remediation and restoration is completed.

In 1992, the parties entered into a stipulation approved in federal court obligating GE to: (1) conduct an expansive investigation of the extent of contamination in the drainage ways leading away from the Loeffel Landfill; and then (2) recommend a remedial program. See Section 3.1 for a discussion of GE's implementation of those obligations.

The State will also pursue a Natural Resources Damages claim for injuries to State trust resources, both for past injuries and for residual injuries which may exist after remediation.

SECTION 6 SUMMARY OF THE REMEDIATION GOALS

Goals for the remedial program have been established through the remedy selection process stated in 6 NYCRR 375-1.10. The overall remedial goal is to restore the site to pre-disposal conditions, to the extent feasible and authorized by law. At a minimum, the selected remedy must eliminate, or mitigate to the extent practicable through the proper application of scientific and engineering principles, all significant threats to the public health and to the environment presented by the hazardous waste disposed at the site.

The goals selected for this site, in conformity with applicable Standards, Criteria, and Guidance (SCGs), are:

- Eliminate, to the extent practicable, unacceptable human health exposures to PCBs present in soils/sediments in the surface water system downgradient of the site.

- Eliminate, to the extent practicable, exceedances of applicable environmental quality standards related to releases of contaminants to the waters of the state.

- Eliminate, to the extent practicable, unacceptable human exposures to PCBs related to potential human consumption of fish and other wildlife, and eliminate to the extent practicable the need to recommend that human consumption of wildlife be limited.

- Eliminate, to the extent practicable, unacceptable wildlife exposures to PCBs related to consumption of contaminated biota by pisciverous (fish eating) wildlife.

SECTION 7 SUMMARY OF THE EVALUATION OF ALTERNATIVES

The selected remedy must be protective of human health and the environment, be cost effective, comply with other statutory laws and utilize permanent solutions, alternative technologies or resource recovery technologies to the maximum extent practicable. Potential remedial alternatives for the Operable Unit 3 of the Dewey Loeffel site were identified, screened, and evaluated in a Feasibility Study and addendum. These evaluations are presented in the report entitled "Loeffel Site Environs, Feasibility Study Report: Nassau Lake Drainage Basin", BBL, May 1998", and Loeffel Site Environs, Revised Feasibility Study Report: Nassau Lake Drainage Basin", BBL, June 1999.

Six areas which have been impacted by past releases of PCB from the Dewey Loeffel disposal site (Northwest Drainage Ditch, or NWDD; Low-lying Area, or LLA; Mead Road Pond area (MRP); Tributary T11A of the Valatie Kill, or T11A; the Valatie Kill, or VK; and Nassau Lake, or NL) were treated separately for the development and evaluation of alternatives in the Feasibility Study documents.

7.1 Description of Alternatives

The evaluation of remedial alternatives in this PRAP will be presented in two sections. The first section will be the evaluation of remedial alternatives for NWDD, LLA, and MRP. The second section will be the evaluation of remedial alternatives for T11A, VK and NL.

7.1.1 Description of Alternatives for Northwest Drainage Ditch, Low-lying Area, and Mead Road Pond Area

Some of the areas impacted by past releases of PCB from the Dewey Loeffel disposal site (NWDD, LLA, and MRP) are the subject of an Interim Remedial Measure by GE. The evaluation of remedial alternatives for these areas in this document will assume that the IRM will be completed according to the approved work plan, and result in the complete removal of all soils and sediments which exceed 1 part per million in the areas addressed by the IRM. However, if the results of the work do not meet these goals of the IRM, then NYSDEC will conduct (or request that GE conduct) a revised evaluation of remedial alternatives for these areas and propose a revised remedy for these areas.

The IRM will consist of the removal of PCB contaminated soils and sediments in the following areas (see Figure 2) and quantities:

-Mead Road Pond (850 cubic yards to be removed)
-Mead Road Pond Inlet (25 cubic yards to be removed)
-Mead Road Pond Outlet (25 cubic yards to be removed)
-Mead Road Pond Spoil Banks (2,674 cubic yards to be removed)
-Northwest Drainage Ditch (1,092 cubic yards to be removed)
-Low-lying Area (252 cubic yards to be removed)

The total volume of soils and sediments to be removed is 4,918 cubic yards. NYSDEC estimates that the removals in the vicinity of Mead Road Pond will result in the removal of approximately 165 pounds of PCB; the removals in the Northwest Drainage Ditch will result in the removal of approximately 46 pounds of PCB; and the removals in the Low-lying Area will result in the removal of approximately 3 pounds of PCB. This amount of PCB removed represents approximately 44.7 percent of the PCB mass in Operable Unit 3.

The removals of soils and sediments will be accomplished by excavation in the dry after diversion of the impacted drainageways. The removed soils and sediments will be disposed in appropriate, permitted off-site disposal facilities.

Monitoring will be performed during the work to ensure that releases of contaminants are minimized, and to protect both site workers and the public. Any waters generated in the project will be treated prior to discharge. Air monitoring will be conducted during the project in accordance with NYSDEC guidance to determine when the appropriate dust control measures will be undertaken.

GE will perform the Interim Remedial Measure, with NYSDEC oversight. The project is scheduled to begin in April 2001, and is anticipated to take six months to complete.

7.1.2 Description of Alternatives for T11A, Valatie Kill, and Nassau Lake

After consideration of the various remedial alternatives that were developed and evaluated in the Feasibility Study prepared by GE for T11A, VK, and NL, NYSDEC has developed for evaluation, in this document, seven combinations of these remedial alternatives developed and evaluated in the Feasibility Study. These comprehensive remedial scenarios are described below, and are denoted Alternatives A through G.

The evaluation of remedial alternatives for the three areas in this document will also assume that the IRM will be completed according to the approved work plan, and result in the complete removal of all soils and sediments which exceed 1 part per million in the areas addressed by the IRM. However, if the results of the work do not meet these goals of the IRM, then NYSDEC will conduct (or request that GE conduct) a revised evaluation of remedial alternatives for the areas to be addressed by the IRM and may propose a revised remedy for these areas.

Combinations of alternatives which would have involved active remediation in downstream areas without upstream remediation were not considered, as they would have poor long-term effectiveness due to recontamination of the remediated area from continuing PCB sources upstream in the surface water system.

Each of these remedial alternatives is presented and evaluated with the assumption that the IRM (described above in section 7.1.1) will be completed according to the approved work plan, and result in the complete removal of all soils and sediments which exceed 1 part per million in the areas addressed by the IRM. However, if the results of the work do not meet these goals of the IRM, then NYSDEC will conduct a revised evaluation of remedial alternatives for T11A, the Valatie Kill, and Nassau Lake and may propose a revised remedy for T11A, the Valatie Kill, and Nassau Lake.

For those alternatives below which would result in untreated hazardous waste constituents remaining at the site, a post remedial monitoring program and remedial reviews would be conducted to determine if the remedy is protective of human health and the environment and meets the goals of the selected remedy.

Components of the monitoring program will be designed to determine, in a statistically significant manner, if the advisories related to human consumption of fish contaminated with PCBs can be lifted or reduced. If after the advisories can not be lifted or reduced a reasonable period of time, (likely three to five years), then an evaluation of whether or not there are additional feasible remedial actions which will allow for the advisories to be lifted or reduced.

In a similar manner, the remedial review will also evaluate whether the other goals of the remedial program have been met, and whether or not there are feasible remedial actions which will result in the other remedial goals being met.

In order to determine which additional remedial actions would be implemented if the goals of this remedy are not met, a Feasibility Study would be performed in accordance with applicable guidance. Selection of the appropriate additional remedial actions would follow the NYSDEC remedy selection process, including public comment.

Remedial Alternatives for T11A, the Valatie Kill, and Nassau Lake

Alternative A

No Action

Alternative A serves as a baseline for evaluation of the other action-related remedial alternatives in the detailed evaluation. Alternative A would not involve the implementation of any active remedial responses.

Present Worth:	$0
Capital Cost:	$0
Annual O&M:	$0
Time to Implement	n/a

Alternative B

No Further Action (Natural Attenuation and Monitoring)

Alternative B would not involve the implementation of any active remedial responses. Natural processes alone would be relied upon to attenuate the impacts of contaminants in the surface water and sediment. These natural processes, in T11A and the Valatie Kill, could include the mixing of clean sediments from upstream unimpacted areas; in Nassau Lake, these processes could include the slow burial of higher contaminated sediments with relatively cleaner sediments from upstream. The degree of improvement due to these natural processes is directly related to the degree of upstream source control, as the most important factor in this improvement is the PCB concentration in the sediments coming into the Valatie Kill and into Nassau Lake.

The monitoring program which would be implemented would include gathering the following data: annual biota sampling in T11A, in the Valatie Kill, and in Nassau Lake; annual surficial sediment sampling in T11A, in the Valatie Kill and in Nassau Lake; annual suspended sediment sampling in Nassau Lake; and surface water sampling, especially during high flow events, in T11A, in the Valatie Kill, and in Nassau Lake. This monitoring program would be designed to measure the concentrations of PCB in the various media (biota, sediment, water), and to determine what the long-term trends in the PCB concentrations are in these various media.

Institutional controls that would be in place under this alternative would include advisories against consumption of fish from the impacted portion of the Valatie Kill and from Nassau Lake, and an inspection program to ensure that the dam which impounds Nassau Lake will continue to do so for the forseeable future. If the dam is found to be deficient, then work will be done as appropriate to maintain the dam.

Present Worth*:	$986,000
Capital Cost	$0
Annual O&M (monitoring):	$100,000 for 5 years; $50,000 thereafter
Time to Implement	n/a

*The present worth calculation is used to present costs over time in today's dollars.

Alternative C:

Partial Removal and Partial Armoring of T11A, with Monitored Natural Attenuation for the Valatie Kill and Nassau Lake

This alternative targets the removal of sediments within two sections of Tributary T11A where samples containing PCB concentrations at or greater than 50 ppm were taken. Within these areas, sediments would be excavated across the entire width of the tributary to a depth of about 2 feet, which, based on current data, encompasses the depth of PCB containing material in these areas. In all, approximately 150 cy of sediments would be excavated, stabilized (as necessary), and transported off site for ultimate disposal at an appropriately permitted facility. Based upon data collected during the RI, the maximum PCB concentration observed in materials that would remain in Tributary T11A following implementation of this alternative would be 35 mg/kg.

Access to the removal areas would be from the MRP outlet and from the top of the ridge above T11A, and, given the difficult terrain, would require the use of specialized excavation equipment (e.g., vacuum-assisted removal equipment) capable of lifting the fine grained sediments in these areas. Prior to material removal, construction of a temporary access road on the ridge would be necessary, and construction of an access road would require placement of a geotextile and gravel, and clearing of trees and vegetation along the top of the ravine. To minimize the potential for downstream migration of materials being displaced from the excavation areas, removal of targeted materials would be conducted under dry or low-flow conditions. Although flow is predominantly intermittent, appropriate flow diversion and erosion control measures would be put in place, as necessary.

Following sediment removal, excavated areas would be backfilled with clean soil to within approximately 6 inches of the existing grade. To prevent erosion of the new bed materials, appropriately sized armoring would be placed over the clean soils to approximate the existing grade of Tributary T11A. At the completion of work, the temporary access road would be removed and the area restored.

No active remedial responses would be included in this alternative for the Valatie Kill or Nassau Lake. Natural processes would be relied upon to attenuate the impacts of contaminants in the surface water and sediment after the remedial work in T11A. These natural processes, in the Valatie Kill, could include the mixing of clean sediments from upstream unimpacted areas; in Nassau Lake, these processes could include the slow burial of higher contaminated sediments with relatively cleaner sediments from upstream. The degree of improvement due to these natural processes is directly related to the degree of upstream source control, as the most important factor in this improvement is the PCB concentration in the sediments coming into the Valatie Kill and into Nassau Lake.

The monitoring program which would be implemented would include gathering the following data: annual biota sampling in T11A, in the Valatie Kill, and in Nassau Lake; annual surficial sediment sampling in T11A, in the Valatie Kill and in Nassau Lake; annual suspended sediment sampling in Nassau Lake; and surface water sampling, especially during high flow events, in T11A, in the Valatie Kill, and in Nassau Lake. This monitoring program would be designed to measure the concentrations of PCB in the various media (biota, sediment, water), and to determine what the long-term trends in the PCB concentrations are in these various media.

Institutional controls that would be in place under this alternative would include advisories against consumption of fish from the impacted portion of the Valatie Kill and from Nassau Lake, and an inspection program to ensure that the dam which impounds Nassau Lake will continue to do so for as long as it is necessary, to contain the PCB contaminated sediments in Nassau Lake. If the dam is found to be deficient, then work will be done as appropriate to maintain the dam.

Present Worth:	$1,376,000
Capital Cost:	$390,000
Annual O&M (monitoring):	$100,000 for 5 years; $50,000 thereafter
Time to Implement	1 year

<u>Alternative D:</u>

Total removal of contaminated sediments in T11A and removal of contaminated sediments in Area 28 of the Valatie Kill, with Monitored Natural Attenuation for the remainder of the Valatie Kill and Nassau Lake

This alternative would include the total removal of contaminated sediments in T11A using the techniques described in Alternative C, along with the removal of contaminated sediments in one portion of the Valatie Kill.

The remedial activities in the Valatie Kill would be the removal of specific soils and the section of stream bed containing the highest concentrations of PCBs in the Valatie Kill. This removal would entail the excavation and off-site disposal of approximately 2,500 cy of soils and sediments from the streambed from the former impoundment at Area 28, a designated wetland. Within the specified removal areas, soils and the streambed would be mechanically excavated to depths ranging from 1 to 3 feet to achieve a concentration of 1 part per million PCB. Before removal activities, standing water within the proposed excavation areas would be removed (as necessary), treated on site, and discharged back into the Valatie Kill downstream of the excavation. To minimize the potential for downstream migration of materials being displaced from the excavation areas, removal of the contaminated sediments in Area 28 would be conducted under low-flow conditions. Appropriate flow diversion and erosion control measures would be put in place, as necessary. Additionally, some vegetative clearing would be performed to facilitate removal activities.

Restoration within the active portions of the Valatie Kill channel would consist of backfilling the excavation areas with clean soils followed by the placement of appropriately sized erosion control stone (e.g., cobbles). All other areas would be restored with a combination of clean soils, topsoil, and seed/tree plantings, as appropriate.

An estimated 38.3 pounds of PCB would be removed as a result of the sediment removals from T11A and Area 28 under this alternative; combined with the IRM activities, this alternative would result in the removal of approximately 52 % of the PCB mass in Operable Unit 3.

Natural processes would be relied upon to attenuate the impacts of remaining contaminants in the surface water and sediment after the remedial work in T11A and at Area 28 of the Valatie Kill. These natural processes, in the portion of the Valatie Kill outside of Area 28, could include the mixing of clean sediments from upstream unimpacted areas; in Nassau Lake, these processes could include the slow burial of higher contaminated sediments with relatively cleaner sediments from upstream. The degree of improvement due to these natural processes is directly related to the degree of upstream source control, as the most important factor in this improvement is the PCB concentration in the sediments coming into the Valatie Kill and into Nassau Lake.

The monitoring program which would be implemented would include gathering the following data: annual biota sampling in T11A, in the Valatie Kill, and in Nassau Lake; annual surficial sediment sampling in T11A, in the Valatie Kill and in Nassau Lake; annual suspended sediment sampling in Nassau Lake; and surface water sampling, especially during high flow events, in T11A, in the Valatie Kill, and in Nassau Lake. This monitoring program would be designed to measure the concentrations of PCB in the various media (biota, sediment, water), and to determine what the long-term trends in the PCB concentrations are in these various media.

Institutional controls that would be in place under this alternative would include advisories against consumption of fish from the impacted portion of the Valatie Kill and from Nassau Lake, and an inspection program to ensure that the dam which impounds Nassau Lake will continue to do so for as long as it is necessary, to contain the PCB contaminated sediments in Nassau Lake. If the dam is found to be deficient, then work will be done as appropriate to maintain the dam.

Present Worth:	$2,856,000
Capital Cost:	$1,870,000
Annual O&M (monitoring):	$100,000 for 5 years; $50,000 thereafter
Time to Implement	1 year

Alternative E:

Total removal of contaminated sediments in T11A and the Valatie Kill, with Monitored Natural Attenuation for Nassau Lake

This alternative would include the total removal of contaminated sediments in T11A as described in Alternative C, along with the total removal of contaminated sediments in the Valatie Kill.

Under this alternative, approximately 1 foot of material would be removed from in-stream areas of the VK between the Tributary T11A confluence and Nassau Lake. Given the relatively low water depths throughout most of the VK, the use of barge-mounted dredging methods (e.g., mechanical clamshells or hydraulic dredges) is not possible. Mechanical excavation in-the-dry would be the only method that could effectively remove materials. Since the relevant portion of the VK is nearly 2.7 miles, excavation of materials (approximately 35,000 cy) would be conducted in stages from upstream to downstream. Removal operations would be initiated by hydraulically isolating specific areas with sheetpiling or other hydraulic isolation measures. Standing water would be removed from these areas, treated, and returned to the VK downstream. Sediments would be mechanically excavated and transported to a nearby staging area using conventional construction equipment (e.g., backhoes and trucks). The destabilized sediments/soils remaining in the excavation would be capped or armored to mitigate erosion and transport of sediment and residual PCBs from the excavation. To accommodate sediment removal operations along the length of the VK, access agreements would be required from affected property owners; extensive areas of vegetation adjacent to the VK would be cleared and grubbed; and multiple staging areas and temporary access roads would have to be constructed.

An estimated 45.3 pounds of PCB would be removed as a result of the sediment removals from T11A and the Valatie Kill under this alternative; combined with the IRM activities, this alternative would result in the removal of approximately 54 % of the PCB mass in Operable Unit 3.

Natural processes would be relied upon to attenuate the impacts of contaminants in the surface water and sediment after the remedial work in T11A and the Valatie Kill. These natural processes in Nassau Lake could include the slow burial of higher contaminated sediments with relatively cleaner sediments from upstream. The degree of improvement due to these natural processes is directly related to the degree of upstream source control, as the most important factor in this improvement is the PCB concentration in the sediments coming into Nassau Lake.

The monitoring program which would be implemented would include gathering the following data: annual biota sampling in T11A, in the Valatie Kill, and in Nassau Lake; annual surficial sediment sampling in T11A, in the Valatie Kill and in Nassau Lake; annual suspended sediment sampling in Nassau Lake; and surface water sampling, especially during high flow events, in T11A, in the Valatie Kill, and in Nassau Lake. This monitoring program would be designed to measure the concentrations of PCB in the various media (biota, sediment, water), and to determine what the long-term trends in the PCB concentrations are in these various media..

Institutional controls that would be in place under this alternative would include advisories against consumption of fish from the impacted portion of the Valatie Kill and from Nassau Lake, and an inspection program to ensure that the dam which impounds Nassau Lake will continue to do so for as long as it is necessary, to contain the PCB contaminated sediments in Nassau Lake. If the dam is found to be deficient, then work will be done as appropriate to maintain the dam.

Present Worth:	$8,207,000
Capital Cost:	$7,221,000
Annual O&M (monitoring):	$100,000 for 5 years; $50,000 thereafter
Time to Implement	1 year

Alternative F:

Total removal of contaminated sediments in T11A, the Valatie Kill, and Nassau Lake

This alternative would include the removal of contaminated sediments in T11A and the Valatie Kill as described in Alternative E, along with the removal of contaminated sediments from Nassau Lake.

Alternative F includes removal of PCB-containing materials from NL and natural recovery with institutional controls and monitoring. To address PCB-containing materials in NL, two subalternatives were assessed as follows:

- Subalternative F1 involves the hydraulic dredging of approximately 560,000 cy (assumes 2 feet depth of removal) of sediment from NL; and
- Subalternative F2 involves the mechanical dredging of approximately 560,000 cy of sediment from NL.

Subalternative F1

Under Subalternative F1, sediments in NL would be removed by hydraulic dredging, by the use of a barge and cutterhead dredge. Dredging would be preceded by operations that would remove debris from the area. The cutterhead applies mechanical force to the sediment to dislodge the sediments so they can be pumped. A dredging rate of approximately 2,000 gpm is assumed. At this dredging production rate, two 10-to 12-inch cutterhead dredges would be used, each pumping at 1,000 gpm. Based on the operating depth of the dredge, approximately 75 percent of the lake bottom sediments could be removed through this method. An additional 15 percent could be removed through mechanical dredging, but approximately 10 percent of the lake bottom sediments would potentially remain, as the barge may not be able to reach the sediments. During remedial design, an evaluation would be made to determine if specialized dredging equipment or techniques were available that would allow for the removal of the remaining 10 percent of lake bottom.

To minimize sediment migration to other areas during dredging, each area would be bounded by a physical barrier such as silt curtains.

Temporary pipelines would be used to transport the dredged sediment/water slurry to a shore-base location for processing. Processing would include dewatering the slurry at a staging area near the lake and disposing of the sediments off site at an appropriately permitted facility. Water generated from the dewatering operations would be collected, treated on site, and discharged back into NL.

Based on the sediment settling data presented in the RI, water generated by sediment dewatering would contain a solids concentration of approximately 1 gram per liter (g/L). Consequently, the water would be treated by filtration (i.e., sand filter) and activated carbon before discharge back into NL. The solids captured in the filtration system would be collected during filter cleaning operations (e.g., back washing) and pumped to the dewatering system, if necessary.

The total area required for a dewatering facility is approximately 10 acres. Finding a suitable site in the mostly developed area around Nassau Lake may be difficult.

At a rate of 2,000 gpm with 10 percent solids, the time required to remove the 560,000 cy of sediment would be approximately seven years, including two years for design. Two years of lead time may be necessary to acquire land and to design and construct the dewatering facilities.

Dewatered material would be loaded onto dump trucks for transport to an appropriately permitted facility. Assuming a reduction of the in-situ volume of 560,000 cy by 50 percent due to dewatering, the volume of dewatered material to be disposed of is approximately 280,000 cy (or 600,000 tons at a density of 2.2 tons/cy). As there is a weight limit of 10 tons on the roads around NL, at best, a 2-ton truck would be able to transport no more than 8 tons per trip. Therefore, over the duration of the project, a minimum of approximately 75,000 truckloads of sediment would be transported through the area.

Subalternative F2

Under Subalternative F2, sediments in NL would be removed by mechanical dredging. Specifically, the following activities would take place: The mechanical dredging process for NL would require a crane, equipped with a 5-cy environmental clamshell bucket, stationed on a work barge to remove sediments and place them onto a delivery barge. The delivery barge would have the capability to transport approximately 200 cy.

As was the case under Subalternative F1, approximately 10 percent of the lake bottom would remain because the barge would potentially not be able to reach the shallowest 1 foot of the lake. During remedial design, an evaluation would be made to determine if specialized dredging equipment or techniques were available that would allow for the removal of the remaining 10 percent of lake bottom.

Dredged sediments would be transported by barge to the loading dock, where they transferred for disposal at an appropriately permitted facility off-site.

It is anticipated that the time frame for implementing mechanical dredging would be similar to that of hydraulic dredging, resulting in similar transport, staging, and sediment placement/dewatering scenarios. It should be noted that Subalternative F2 would not require a large primary settling lagoon, as in Subalternative F1. The primary settling would occur in the barge over several days, requiring the docking of up to eight barges concurrently during settling and before pumping the settled material to the dewatering facility or low-lying area. The dewatering facility or low-lying area could be located at the same places described under Subalternative F1. As is the case with Subalternative F1, with a 50 percent reduction in volume due to settling and dewatering, approximately 75,000 truckloads would be transported through the area.

An estimated 292 pounds of PCB would be removed as a result of the sediment removals from T11A (28.5 pounds), the Valatie Kill (16.8), and Nassau Lake (238 pounds)under these (F1 and F2) alternatives; combined with the IRM activities, this alternative would result in the removal of all available PCB mass in Operable Unit 3.

The monitoring program which would be implemented would include gathering the following data: annual biota sampling in T11A, in the Valatie Kill, and in Nassau Lake; annual surficial sediment sampling in T11A, in the Valatie Kill and in Nassau Lake; annual suspended sediment sampling in Nassau Lake; and surface water sampling, especially during high flow events, in T11A, in the Valatie Kill, and in Nassau Lake. This monitoring program would be designed to measure the concentrations of PCB in the various media (biota, sediment, water), and to determine what the long-term trends in the PCB concentrations are in these various media.

Institutional controls that would be in place under this alternative would include advisories against consumption of fish from the impacted portion of the Valatie Kill and from Nassau Lake, until the advisories can be lifted after remediation.

Subalternative F1:	
Present Worth Cost:	$172,617,000
Capital Cost:	$172,400,000
Annual O&M (monitoring):	$100,000
Time to Implement	up to 7 years

Subalternative F2:	
Present Worth Cost:	$147,274,000
Capital Cost:	$147,057,000
Annual O&M (monitoring):	$100,000
Time to Implement	up to 7 years

Alternative G:

Total removal of contaminated sediments in T11A and the Valatie Kill, with Capping of Nassau Lake sediments

This alternative would include the total removal of contaminated sediments in the T11A and the Valatie Kill as described in Alternative E, with capping of the sediments in Nassau Lake.

Alternative G includes in-place containment of NL sediments with institutional controls and monitoring and natural recovery. The objective of isolating PCB-containing materials in-place is to enhance the natural recovery of fish and reduce the time over which the site-specific fish consumption advisory needs to remain in place. Two subalternatives, both designed to reduce surficial PCB levels and hence PCB levels in fish, were considered:

- Subalternative G1 involves the placement of a "thin cap" over NL sediments constructed by particle broadcasting, an approach more aptly described as enhanced natural recovery; and
- Subalternative G2 involves the construction of an approximately 20-inch-thick engineered cap.

In developing Alternative G, factors such as transportation and material staging limitations, rate of cover placement, and time to implement the process were considered. Transportation of the geologic material would require truck travel to and from the stone quarry along Nassau/Averill Road to Gilmore-Colloton Park (or travel from another material source a greater distance away). Material would be staged at Gilmore-Colloton Park before being loaded onto a barge that would transport the material to the construction area, which would cover approximately 40,000 square feet at any one time. At the construction area, a crane stationed on a work barge would disperse the material into the lake and cover the bottom.

Subalternative G1

Under Subalternative G1, enhanced natural recovery would involve the addition of fine particles such as a silty sand to the water column and subsequent particle settling to form a layer with a design thickness of 2 inches. The design provides for some degree of biological isolation, although not complete isolation. Physical process activities of fish and burrowing organisms could still result in mixing of cap materials with sediments and resulting exposure to PCBs.

Since placement of the silty sand via particle broadcasting is not precise, it is assumed that 6 inches of capping material would be placed to achieve a minimum of a 2-inch cap thickness over the lake. This alterative would result in a permanent 2 to 6 inch reduction in water depth over most of the lake.

Particles of silty sand would be broadcast at, or near, the water surface from a barge and allowed to settle to the lake bottom. This clean material would cover and, to a certain extent, mix with the surface sediments to reduce surficial PCB concentrations, and would provide for the continued long-term reduction of surficial PCB concentrations through natural deposition. During particle broadcasting, a typical barge (e.g., 45 feet by 90 feet) would travel back and forth from the loading dock to the work area to allow adequate coverage of the lake bottom. A second barge would be located on site for purposed of backup and reloading so that the particle broadcasting operation would occur continuously in the lake. Installation of the cap would be difficult in shallow areas of the lake near the shore, as the barge may not be able to reach these areas, or the cap installation would result in complete displacement of the water column, creating new dry land.

Particle broadcasting within the entire lake would be completed within three years once the necessary equipment is selected and mobilized. Approximately 140,000 cy of material would be placed at a rate of about 400 cy per day. One year may be required to get access to property and construct the staging area.

Subalternative G2

Subalternative G2, an engineered cap, involves the placement of layers of various geologic materials (e.g., clean silt, sand, gravel) over in-situ sediment. This would result in at least 565,000 cy (850,000 tons, assuming a density of 1.5 tons/cy) of geologic materials (sand and gravel) placed in a nominal 2-foot layer over the 173-acre lake. Engineered caps are designed to isolate PCB-containing materials and reduce PCB bioavailability. They are more specifically designed to protect against chemical migration as well as to isolate burrowing organisms from PCB-containing sediment or cap material. EPA (1995) guidance on engineered capping indicates that a cap thickness of 20 inches assures restriction of direct contact of biota with the PCB-containing sediment, as well as the protection of surface water from chemical migration. The guidance also indicates that site-specific design analyses could show that thinner designs or composite designs may also achieve the design objectives. To achieve this 20-inch nominal layer thickness, approximately 24 inches of material would be placed on the lake bottom. This alterative would result in a permanent 20 inch reduction in water depth over most of the lake.

Subalternative G2, the engineered cap would include transport of materials by more than 100,000 two-ton truck trips with a maximum 8-ton load, given the 10-ton weight limit on Village of Nassau roads, and a staging area of 10 acres.

The placement of the capping material would be performed by a crane equipped with a clamshell stationed on a work barge. The crane would reach over to the material contained in the delivery barge, pick the material up, and transfer it to the lake bottom. The anticipated rate of material placement would be approximately 335 to 500 cy per day for this type of operation. However, the barges would be unable to reach the shallowest 1 foot of the lake, so approximately 10 percent of the lake bottom would remain uncovered by the capping material.

Cap materials, which would actually be specified in a final design, are currently assumed to be a sandy soil.

Considering a construction season of 180 days per year, such a project would take approximately eight years to complete.

An estimated 45.3 pounds of PCB would be removed as a result of the sediment removals from T11A and the Valatie Kill under this alternative; combined with the IRM activities, this alternative would result in the removal of approximately 54 % of the PCB mass in Operable Unit 3. An additional 238 pounds of PCB would be capped in Nassau Lake, representing 46 % of the PCB mass in Operable Unit 3.

The monitoring program which would be implemented would include gathering the following data: annual biota sampling in T11A, in the Valatie Kill, and in Nassau Lake; annual surficial sediment sampling in T11A, in the Valatie Kill and in Nassau Lake; annual suspended sediment sampling in Nassau Lake; and surface water sampling, especially during high flow events, in T11A, in the Valatie Kill, and in Nassau Lake. This monitoring program would be designed to measure the concentrations of PCB in the various media (biota, sediment, water), and to determine what the long-term trends in the PCB concentrations are in these various media.

Institutional controls that would be in place under this alternative would include advisories against consumption of fish from the impacted portion of the Valatie Kill and from Nassau Lake, and an inspection program to ensure that the dam which impounds Nassau Lake will continue to do so for the forseeable future. If the dam is found to be deficient, then work will be done as appropriate to maintain the dam.

Subalternative G1:	
Present Worth:	$20,576,000
Present Worth Capitol Costs:	$18,171,000
Present Worth O & M:	$986,000
Time to Implement:	up to 3 years

Subalternative G2:	
Present Worth:	$51,019,000
Present Worth Capitol Costs:	$38,206,000
Present Worth O & M:	$986,000
Time to Implement:	up to 8 years

7.2 Evaluation of Remedial Alternatives

The criteria used to compare the potential remedial alternatives are defined in the regulation that directs the remediation of inactive hazardous waste sites in New York State (6 NYCRR Part 375). For each of the criteria, a brief description is provided followed by an evaluation of the alternatives against that criterion. A detailed discussion of the evaluation criteria and comparative analysis is presented below.

7.2.1. Compliance with New York State Standards, Criteria, and Guidance (SCGs).

Compliance with SCGs addresses whether or not a remedy will meet applicable environmental laws, regulations, standards, and guidance.

Alternative A
This alternative would not meet SCGs for the forseeable future. There would be no remedial work done to address the ongoing violations of SCGs.

Alternative B
This alternative would not meet SCGs for the forseeable future. There would be no remedial work done to address the ongoing violations of SCGs.

Alternative C
This alternative would not meet SCGs for the forseeable future. The remaining contaminated sediments in T11A and the Valatie Kill would continue to act as sources of PCB to the surface water system.

Alternative D
This alternative would reduce or eliminate in the T11A sediments as an ongoing source of PCB resulting in violations of SCGs, as the contaminated sediments in T11A would be removed. The remaining sediments in the Valatie Kill and Nassau Lake would continue to act as sources of PCB.

Alternative E
This alternative would reduce or eliminate the T11A and Valatie Kill sediments as an ongoing source of PCB resulting in violations of SCGs, as the contaminated sediments in T11A and the Valatie Kill would be removed. The remaining sediments in Nassau Lake would continue to act as sources of PCB.

Alternative F
This alternative would reduce or eliminate the T11A, Valatie Kill and Nassau Lake sediments as an ongoing source of PCB resulting in violations of SCGs, as the contaminated sediments in T11A, the Valatie Kill and Nassau Lake would be removed.

Alternative G
This alternative would reduce or eliminate the T11A, Valatie Kill and Nassau Lake sediments as an ongoing source of PCB resulting in violations of SCGs, as the contaminated sediments in T11A and the Valatie Kill would be removed, and the sediments in Nassau Lake capped.

7.2.2. Protection of Human Health and the Environment.

This criterion is an overall evaluation of the health and environmental impacts to assess whether each alternative is protective.

Alternative A
This alternative would not be protective of human health and the environment. No remedial work would be done. An advisory against human consumption of fish from the impacted areas would be required for the forseeable future.

Alternative B
This alternative would not be protective of human health and the environment. No remedial work would be done. An advisory against human consumption of fish from the impacted areas would be required for the forseeable future.

Alternative C
This alternative would not be protective of human health and the environment. No remedial work would be done. An advisory against human consumption of fish from the impacted areas would be required for the forseeable future.

Alternative D
This alternative would be protective for T11A, as the contaminants would be completely removed. This alternative may be protective in the Valatie Kill or Nassau Lake, as the upstream removals, combined with natural attenuation, may result in the remedy being protective.

Alternative E
This alternative would be protective for T11A and the Valatie Kill, as the contaminants would be completely removed. This alternative may be protective in Nassau Lake as the upstream removals, combined with natural attenuation, may result in the remedy being protective..

Alternative F
This alternative would be protective for T11A, the Valatie Kill, and Nassau Lake as the contaminants would be completely removed.

Alternative G
This alternative would be protective for T11A, the Valatie Kill, and Nassau Lake as the contaminants would be completely removed (in T11A and the Valatie Kill) and made partially (with particle broadcasting) or completely (with an engineered cap) unavailable to the environment in Nassau Lake.

7.2.3. Short-term Effectiveness. The potential short-term adverse impacts of the remedial action upon the community, the workers, and the environment during the construction and/or implementation are evaluated. The length of time needed to achieve the remedial objectives is also estimated and compared against the other alternatives.

<u>Alternative A</u>
This alternative has high short-term effectiveness, as no remedial work would be required.

<u>Alternative B</u>
This alternative has high short-term effectiveness, as no remedial work would be required.

<u>Alternative C</u>
This alternative has good short-term effectiveness. Work to access the T11A area would be required, but restoration of the area can be done effectively. There would be low adverse community impacts, and some low risks to workers. A limited amount of additional truck traffic would be required, due to the removals and armoring in T11A.

<u>Alternative D</u>
This alternative has good short-term effectiveness. Work to access the T11A area and Area 28 on the Valatie Kill would be required, but restoration of the areas can be done effectively. There would be low adverse community impacts, or risks to workers. A greater, but still moderate amount of additional truck traffic would be required, due to the removals in T11A and Area 28 of the Valatie Kill . There would be some low risks to workers.

<u>Alternative E</u>
This alternative has good short-term effectiveness. Work to access the T11A area and the Valatie Kill would be required, but restoration of the areas can be done effectively. There would be moderate adverse community impacts, as some of the work along the Valatie Kill would be in the vicinity of homes. Additional truck traffic would be greater than for alternatives A through D, due to the removals in T11A and in the Valatie Kill. There would be some low risks to workers.

<u>Alternative F</u>
This alternative has moderate short-term effectiveness. Work to access the T11A area and the Valatie Kill would be required, but restoration of the areas can be done effectively. There would be some community impacts, as some of the work along the Valatie Kill and in Nassau Lake would be in the vicinity of homes. Additional truck traffic would be significantly greater than for alternatives A through E, due to the removals in Nassau Lake. There would be some low risks to workers. The recreational use of Nassau Lake would likely be reduced during remedy implementation. The duration of the remedial work would be longest for the total removal alteratives.

Alternative G

This alternative has moderate to low short-term effectiveness. Work to access the T11A area and the Valatie Kill would be required, but restoration of the areas can be done effectively. There would be some community impacts, as as some of the work along the Valatie Kill and in Nassau Lake would be in the vicinity of homes. Additional truck traffic would be greater than for alternatives A through E, due to the transport of capping materials for Nassau Lake. There would be some low risks to workers. The magnitude of impacts in the vicinity of Nassau Lake would be greater, as the impacts on nearby residents and on recreational use of the lake would be the same, and the time to implement the remedy would be greater than for alternatives A through E.

7.2.4. Long-term Effectiveness and Permanence. This criterion evaluates the long-term effectiveness of the remedial alternatives after implementation. If wastes or treated residuals remain on site after the selected remedy has been implemented, the following items are evaluated: 1) the magnitude of the remaining risks, 2) the adequacy of the controls intended to limit the risk, and 3) the reliability of these controls.

Alternative A

This alternative would have poor long-term effectiveness. The remaining risks would be the same as at the present time, and there would be no controls on these risks.

Alternative B

This alternative would have poor long-term effectiveness. The remaining risk would be the same as at the present time, and the only controls on this risk would be the advisory against consumption of contaminated fish, and the monitoring of water, sediment and biota. These effectiveness of these controls would be directly related to how well the public follows the advisories against consuming fish from the Valatie Kill and Nassau Lake.

Alternative C

This alternative would have poor long-term effectiveness. There would be some risk reduction in the vicinity of T11A as some areas would no longer be a source of exposure to contaminants. The remaining risk related to the Valatie Kill and Nassau Lake will less than before remedial work; however, the remaining sources of PCB exposure may continue to pose unacceptable risk to people and animals that eat fish The remaining risk would be the same as at the present time in the Valatie Kill and Nassau Lake. The only controls on this risk would be the advisory against consumption of contaminated fish, and the monitoring of water, sediment and biota. These effectiveness of these controls would be directly related to how well the public follows the advisories against consuming fish from the Valatie Kill and Nassau Lake.

Alternative D

This alternative would have high long-term effectiveness for T11A. T11A would no longer be a source of exposure to contaminants. Area 28 in the Valatie Kill would no longer be a source of exposure to contaminants.

The long-term effectiveness of this alternative is uncertain for the rest of the Valatie Kill, and Nassau Lake, as it is difficult to accurately predict future PCB concentrations in sediment and fish in the Valatie Kill and Nassau Lake.

The remaining risk related to the Valatie Kill and Nassau Lake will less than before remedial work; however, the remaining sources of PCB exposure may continue to pose unacceptable risk to people and animals that eat fish. The only controls on this risk would be the advisory against consumption of contaminated fish, and the monitoring of water, sediment and biota. These effectiveness of these controls would be directly related to how well the public follows the advisories against consuming fish from the Valatie Kill and Nassau Lake.

Alternative E

This alternative would have moderate long-term effectiveness. T11A and the Valatie Kill would no longer be sources of exposure to contaminants.

The long-term effectiveness of this alternative is uncertain for Nassau Lake, as it is difficult to accurately predict future PCB concentrations in sediment and fish in Nassau Lake.

The remaining risk related to contaminants in Nassau Lake will be less than before remedial work; however, this remaining source of PCB exposure may continue to pose unacceptable risk to people and animals that eat fish. The only controls on this risk would be the advisory against consumption of contaminated fish, and the monitoring of water, sediment and biota. These effectiveness of these controls would be directly related to how well the public follows the advisories against consuming fish from Nassau Lake.

Alternative F

This alternative would have high long-term effectiveness. T11A, the Valatie Kill and Nassau Lake would no longer be a source of exposure to contaminants.

Alternative G

This alternative could have high long-term effectiveness for T11A and the Valatie Kill, which would no longer be sources of exposure to contaminants.

The long-term effectiveness of the capping of sediments in Nassau Lake would be good, as it would likely reduce (in the case of particle broadcasting) or eliminate (in the case of an engineered cap) these sediments as a source of exposure to contaminants. However, the cap would require substantial monitoring and maintenance to ensure that scour or boat traffic would not damage the cap. Also, there would likely be restrictions on boat use in the lake, both to protect the cap and because there would be large areas of the lake which would no longer have sufficient water depth to allow for boating.

7.2.5. Reduction of Toxicity, Mobility or Volume. Preference is given to alternatives that permanently and significantly reduce the toxicity, mobility or volume of the wastes at the site.

Alternative A
This alternative would not reduce the toxicity, mobility, or volume of wastes at the site.

Alternative B
This alternative would not reduce the toxicity, mobility, or volume of wastes at the site.

Alternative C
This alternative would result in a small reduction in the volume and mobility of the contaminated sediments in the portions of T11A that would be removed and landfilled.

Alternative D
This alternative would result in the reduction in the volume and mobility of the contaminated sediments in T11A and in Area 28 of the Valatie Kill that would be removed and landfilled.

Alternative E
This alternative would result in the reduction in the volume and mobility of the contaminated sediments in T11A and in the Valatie Kill, as more sediment would be removed and landfilled.

Alternative F
This alternative would result in the largest reduction in the volume and mobility of the contaminated sediments that would be removed and landfilled.

Alternative G
This alternative would result in the same reduction in the volume and mobility of the contaminated sediments that would be removed and landfilled in T11A and the Valatie Kill, and would reduce the mobility of the PCB contaminated sediments in Nassau Lake.

7.2.6. Implementability. The technical and administrative feasibility of implementing each alternative are evaluated. Technical feasibility includes the difficulties associated with the construction and the ability to monitor the effectiveness of the remedy. For administrative feasibility, the availability of the necessary personnel and material is evaluated along with potential difficulties in obtaining specific operating approvals, access for construction, etc..

Alternative A
This alternative has the highest implementability, as no work would be done.

Alternative B
This alternative has high Implementability, as no remedial work would be done. Monitoring is technically implementable. Personnel and materials are available. There would be little difficulty associated with approvals or access.

Alternative C

This alternative is implementable. Some work would be necessary to physically access T11A. Personnel and materials are available. Monitoring is technically implementable. It is anticipated that there will be little difficulty associated with approvals or access, but private property would need to be accessed.

Alternative D

This alternative is implementable. Some work would be necessary to physically access the length of T11A, and Area 28 of the Valatie Kill. Personnel and materials are available. Monitoring is technically implementable. It is anticipated that there will be little difficulty associated with approvals or access, but private property would need to be accessed

Alternative E

This alternative is implementable. Some work would be necessary to physically access T11A and the length of the Valatie Kill. Personnel and materials are available. Monitoring is technically implementable. It is anticipated that there will be moderate difficulty associated with approvals or access, as additional private property would need to be accessed.

Alternative F

This alternative is implementable. Some work would be necessary to physically access T11A and the length of the Valatie Kill, as well as Nassau Lake. Personnel and materials are available. Monitoring is technically implementable. It is anticipated that there will be greater difficulty associated with approvals or access than for alternatives A through E, as additional private property would need to be accessed

Alternative G

The engineered cap sub-alternative for Nassau Lake has low Implementability. It is anticipated that there will be greater difficulty associated with approvals or access than for alternatives A through E, as additional private property would need to be accessed

The installation of a twenty-inch thick cap over the sediments in Nassau Lake would significantly reduce the water depth in much of the lake, for which would be difficult to get approvals such as Army Corps of Engineers permits.

The particle broadcasting cap sub-alternative is implementable. Personnel and materials are available. Monitoring is technically implementable. It is anticipated that there will be moderate difficulty associated with approvals or access, as additional private property would need to be accessed.

The Implementability of the T11A and Valatie Kill portions of this alternative would be the same as for alternatives E and F.

7.2.7. Cost. Capital and operation and maintenance costs are estimated for each alternative and compared on a present worth basis. Although cost is the last balancing criterion evaluated, where two or more alternatives have met the requirements of the remaining criteria, cost effectiveness can be used as the basis for the final decision. The costs for each alternative are presented in Table 2.

This final criterion is considered a modifying criterion and is taken into account after evaluating those above. It is evaluated after public comments on the Proposed Remedial Action Plan have been received.

7.2.8. **<u>Community Acceptance</u>** - Concerns of the community regarding the RI/FS reports and the Proposed Remedial Action Plan are evaluated. A "Responsiveness Summary" will be prepared that describes public comments received and how the Department will address the concerns raised. If the selected remedy differs significantly from the proposed remedy, notices to the public will be issued describing the differences and reasons for the changes.

SECTION 8: SUMMARY OF THE PROPOSED REMEDY

Section 8.1

Northwest Drainage Ditch, Low-lying Area, and Mead Road Pond Area

The selected remedy for Northwest Drainage Ditch, Low-lying Area, and Mead Road Pond Area should, at a minimum, eliminate or mitigate all significant threats to the public health or the environment presented by the hazardous waste present at the site. The State believes that the remediation that will be in place, which is described in Section 7.1.1, would accomplish this objective provided that it will be completed according to the approved work plan, and result in the complete removal of all soils and sediments which exceed 1 part per million in the areas addressed by the IRM.

Based on the results of the investigations and the IRMs that will have been performed at Northwest Drainage Ditch, Low-lying Area, and Mead Road Pond Area, the NYSDEC is proposing No Further Action as the preferred remedial alternative for Northwest Drainage Ditch, Low-lying Area, and Mead Road Pond Area. If the IRM does not result in meeting the remediation goals for the site, then NYSDEC will conduct a revised evaluation of remedial alternatives for these areas and propose a revised remedy for these areas.

Section 8.2

T11A, the Valatie Kill, and Nassau Lake

For T11A, the Valatie Kill and Nassau Lake, based upon the results of the RI/FS, and the evaluation presented in Section 7, the NYSDEC is proposing Alternative D, total removal of contaminated sediments in T11A and removal of contaminated sediments in Area 28 of the Valatie Kill, with monitored natural attenuation for the remainder of the Valatie Kill and Nassau Lake.

The basis for proposing Alternative D is:

-The areas in the vicinity of the site which will be addressed under the IRM will meet the remedial goals for the site once the IRM is completed.

-the proposed remedy will result in T11A meeting the remedial goals for the site.

-the proposed remedy will result in the elimination of the largest reservoir of contaminants in the Valatie Kill, at Area 28, which contains approximately 58 % of the PCB mass in the Valatie Kill.

-implementation of alternative D may be sufficient to meet the remedial goals for the site in the entire Valatie Kill and Nassau Lake; however, it is difficult to accurately predict future PCB concentrations in sediment and fish in the Valatie Kill and Nassau Lake after implementation of the upstream source control measures.

-natural attenuation may aid in reducing PCB concentrations beyond the reductions which will result from the removals in the IRM area, in T11A, and in Area 28 in the Valatie Kill. The degree of improvement due to these natural processes is directly related to the degree of contaminated sediment removal upstream, as the most important factor in this improvement is the PCB concentration in the sediments entering the impacted portions of the Valatie Kill, and Nassau Lake.

-the proposed remedy allows for consideration of future remedial work in Operable Unit 3 if the remedial goals for the site are not met. The proposed monitoring would be used to evaluate the efficacy of the remediation.

Alternative D may meet SCGs to the extent practicable and be protective of human health and the environment. Alternative D has good short-term effectiveness, reduces the mobility and volume of contaminants, is implementable, and is cost-effective.

Alternative D will have good long-term effectiveness for T11A, and may have good long-term effectiveness for the Valatie Kill and Nassau Lake.

Alternatives A, B, and C are not protective of human health and the environment, and will not comply with SCGs.

Alternatives E, F, and G may not be necessary to achieve the remedial goals for the site and may therefore not be cost effective. The environmental benefits of the source control measures (reductions in PCB concentrations in water, sediment and fish, especially in the Valatie Kill and Nassau Lake due to removal of PCB contaminated sediment in upstream areas) can not be accurately predicted or quantified at this time, and the proposed remedial alternative may be sufficient to meet the remedial goals for the site. The annual monitoring program, along with the institutional controls and reviews of the remedy will determine if additional remedial work will be appropriate and necessary to meet the remedial goals for the site.

Alternatives F and G would result in some loss of use of the lake for recreational purposes, and would involve some disruption for lake residents.

Alternative E would result in the removal of an additional 7 pounds of PCB (1.4 % of the total), but would cost significantly more ($8.2 million versus $2.85 million); as such, Alternative E may not be cost-effective.

Alternative G2 would have significant negative impacts due to the installation of the engineered cap in Nassau Lake, and may not be implementable.

The estimated present worth cost to implement the proposed remedy is $2,856,000. The cost to construct the remedy is estimated to be $1,870,000, and the estimated present worth operation and maintenance (monitoring) cost is $986,000

The elements of the proposed remedy (assuming that the IRM work meets the remedial goals for the site) are as follows:

1. A remedial design program to verify the components of the conceptual design and provide the details necessary for the construction, operation and maintenance, and monitoring of the remedial program. Any uncertainties identified during the RI/FS would be resolved.

2. The NYSDEC approved Interim Remedial Measure (to remove contaminated soils and sediments from Mead Road Pond, the spoil banks adjacent to Mead Road Pond, the Low-lying Area, and the Northwest Drainage Ditch) would be implemented and completed..

3. The PCB contaminated sediments in T11A would be removed mechanically and disposed in a properly permitted facility off-site.

4. The PCB contaminated sediments in Area 28 of the Valatie Kill would be mechanically removed and disposed in a properly permitted facility off-site.

5. Appropriate site restoration activities would be done in the areas disturbed by the removals in T11A and the Valatie Kill.

6. Natural processes would be ongoing which may aid in the decrease of PCB concentrations in surface sediment and fish.

7. Since the remedy results in untreated hazardous waste constituents remaining in Operable Unit 3 of the Dewey Loeffel site, a long term monitoring program would be continued. There would be several elements to the monitoring program. They would include:

    - annual biota sampling in T11A, in the Valatie Kill, and in Nassau Lake, along with reference locations;

- annual surficial sediment sampling in T11A, in the Valatie Kill and in Nassau Lake;

- annual suspended sediment sampling in Nassau Lake;

- surface water sampling, especially during high flow events, in the vicinity of the disposal site, in T11A, in the Valatie Kill, and in Nassau Lake.

This monitoring program would be designed to measure the concentrations of PCB in the various media (biota, sediment, water), and to determine what the long-term trends in the PCB concentrations are in these various media.

This program would allow the effectiveness of the remedy to be monitored and would be a component of the operation and maintenance for the site.

8. Institutional controls for the site would include advisories against consumption of fish from the impacted portion of the Valatie Kill and from Nassau Lake

9. An inspection program would be established to ensure that the dam which impounds Nassau Lake will continue to do so for as long as it is necessary, to contain the PCB contaminated sediments in Nassau Lake. If the dam is found to be deficient, then work will be done as appropriate to maintain the dam.

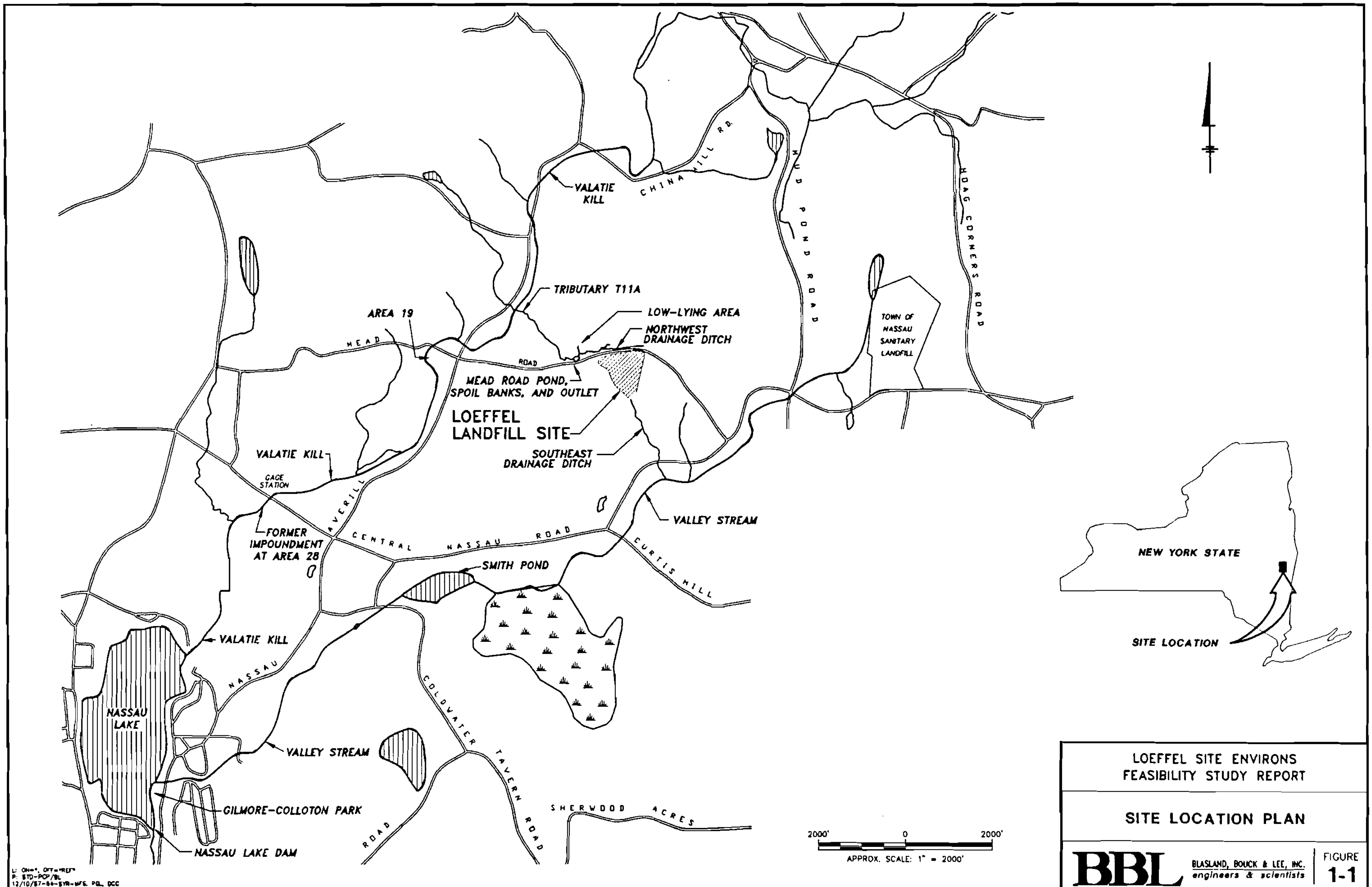
10. Remedial reviews would be conducted to determine if the remedy is protective of human health and the environment and meets the goals of the selected remedy.

    The monitoring program will be designed to determine, in a statistically significant manner, if the advisories related to human consumption of fish contaminated with PCBs can be lifted or reduced. If after five years the advisories can not be lifted or reduced, then an evaluation of whether or not there are additional feasible remedial actions which will allow for the advisories to be lifted or reduced.

    In a similar manner, the remedial review will also evaluate whether the other goals of the remedial program have been met, and whether or not there are feasible remedial actions which will result in the other remedial goals being met.

    In order to determine which additional remedial actions would be considered if the goals of this remedy are not met, a Feasibility Study would be performed in accordance with applicable guidance. Selection of the appropriate additional remedial actions would follow the NYSDEC remedy selection process, including public comment.

Figure 1: Site Location Map

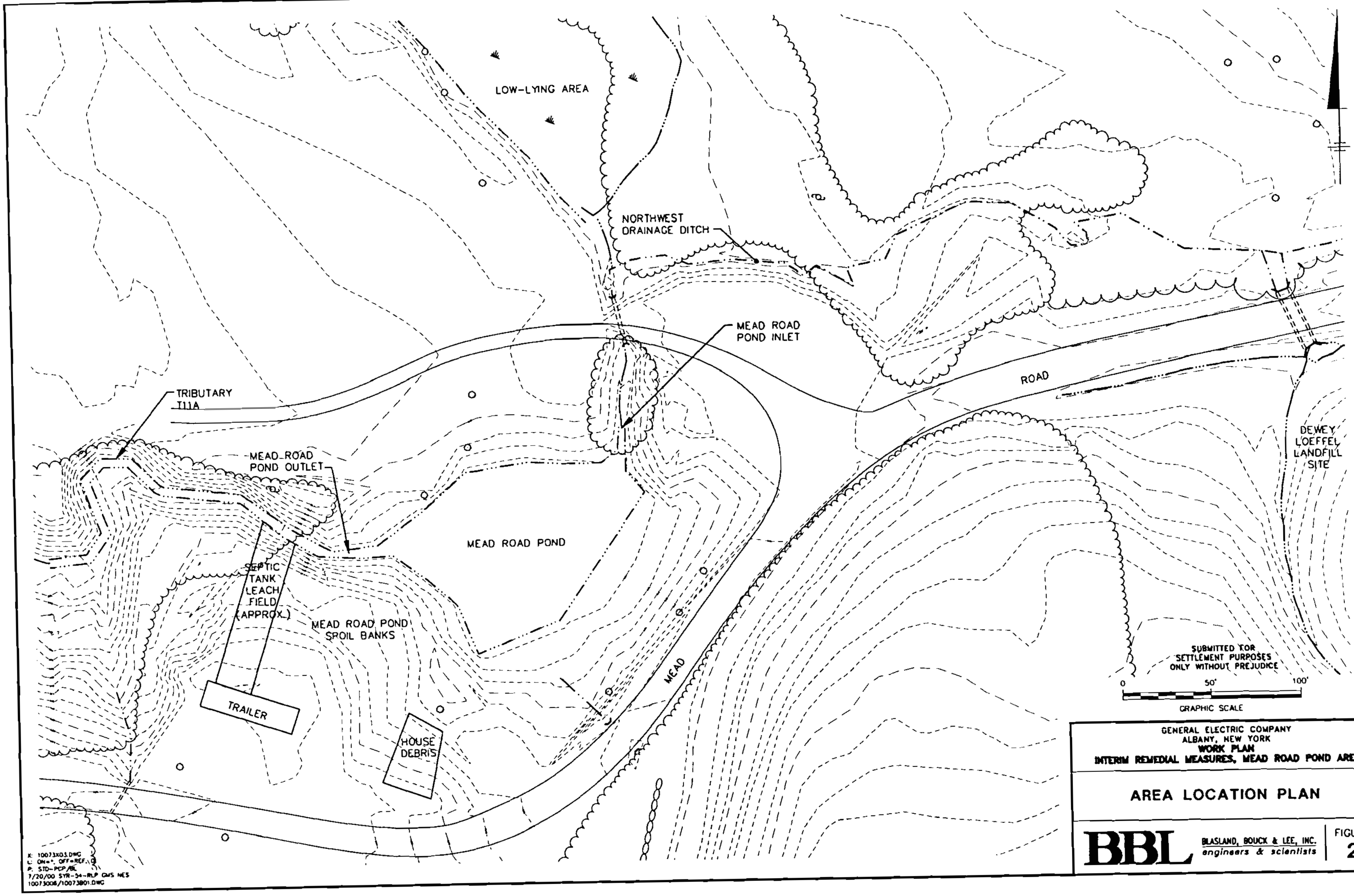


LOEFFEL SITE ENVIRONS
FEASIBILITY STUDY REPORT

SITE LOCATION PLAN

FIGURE 1-1

Figure 2: Location map for Northwest Drainage Ditch, Low-Lying Area, and Mead Road Pond



GENERAL ELECTRIC COMPANY
ALBANY, NEW YORK
WORK PLAN
INTERIM REMEDIAL MEASURES, MEAD ROAD POND AREA

AREA LOCATION PLAN

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

FIGURE 2

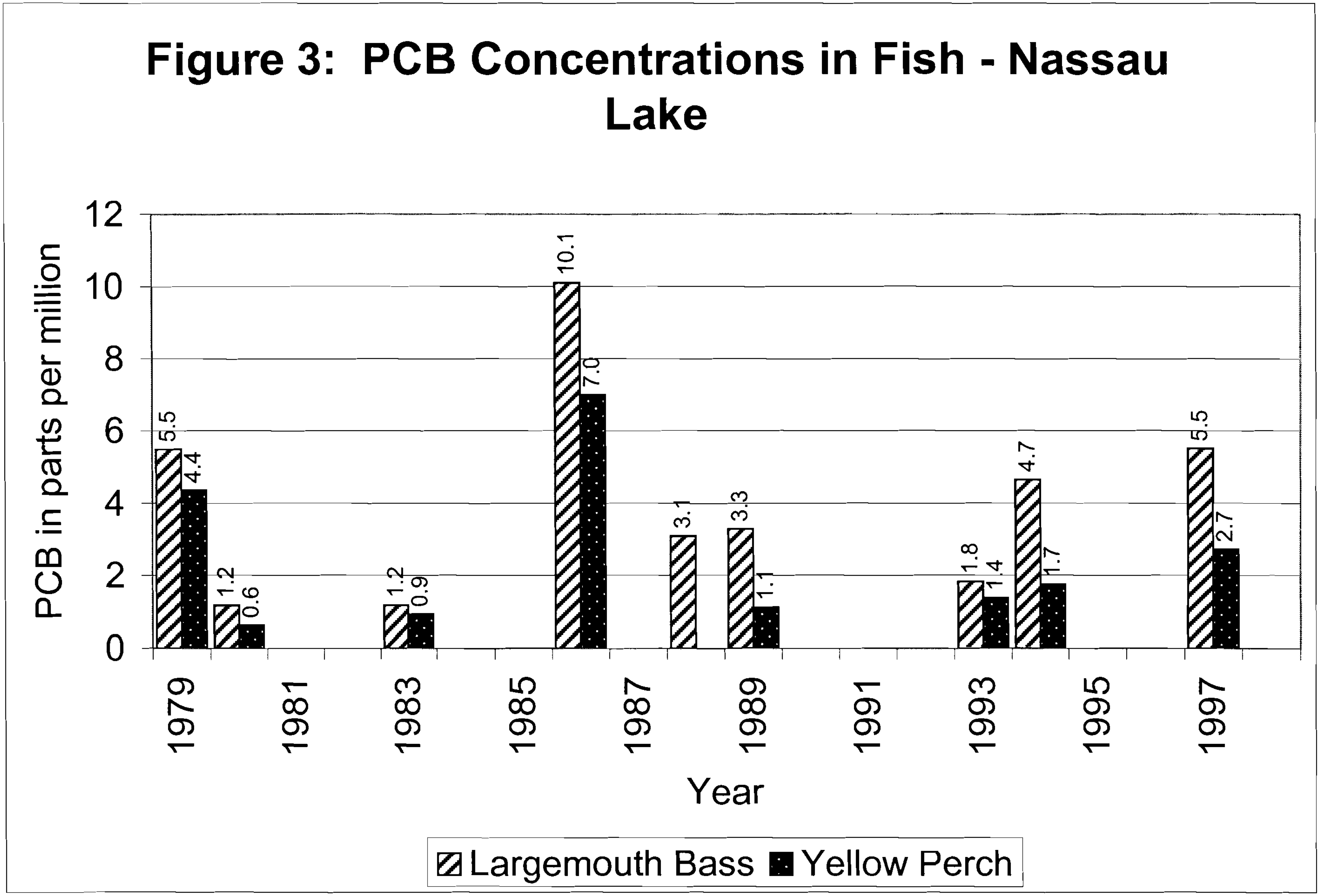
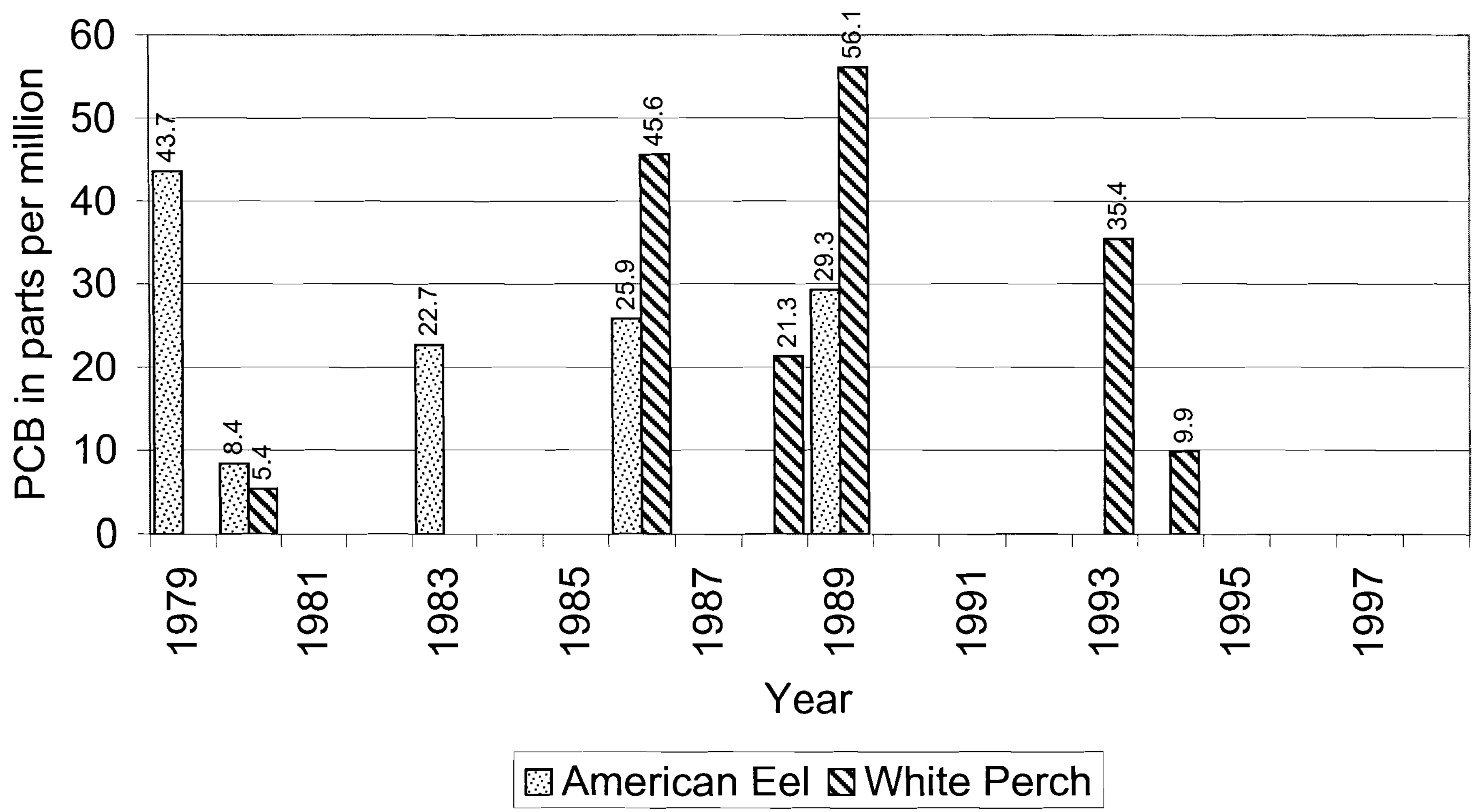


Figure 3: PCB Concentrations in Fish - Nassau Lake
PCB in parts per million
12
10
8
6
4
2
0
5.5
4.4
1.2
0.6
1.2
0.9
10.1
7.0
3.1
3.3
1.1
1.8
1.4
4.7
1.7
5.5
2.7
1979
1981
1983
1985
1987
1989
1991
1993
1995
1997
Year
Largemouth Bass
Yellow Perch

Figure 4: PCB Concentrations in Fish - Nassau Lake



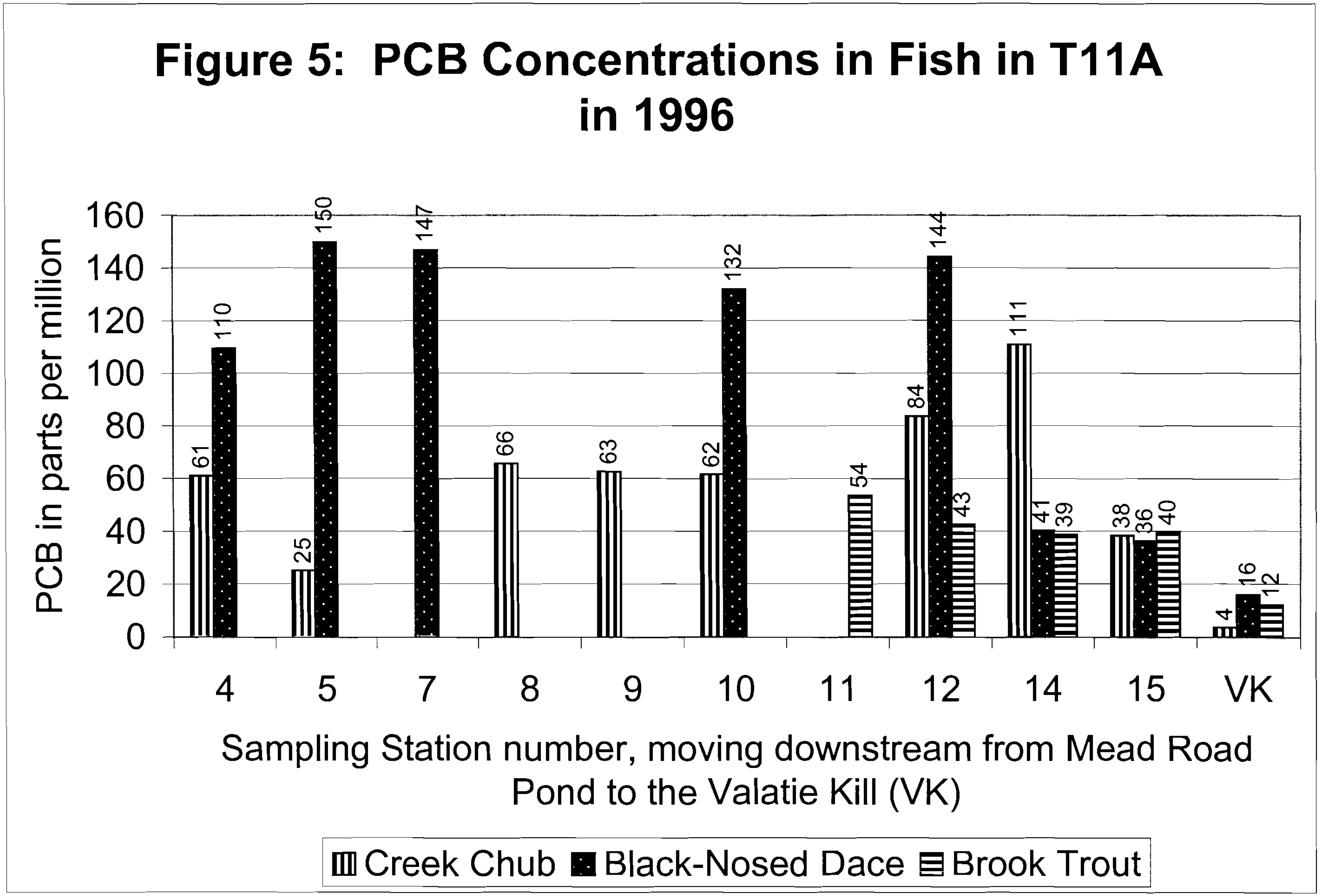


Figure 5: PCB Concentrations in Fish in T11A in 1996
PCB in parts per million
160
140
120
100
80
60
40
20
0
61
110
25
150
147
66
63
62
132
54
84
144
43
111
41
39
38
36
40
4
16
12
4
5
7
8
9
10
11
12
14
15
VK
Sampling Station number, moving downstream from Mead Road Pond to the Valatie Kill (VK)
Creek Chub
Black-Nosed Dace
Brook Trout

Figure 6: PCB concentrations over time in fish in the Valatie Kill at Mead Road 1979-97

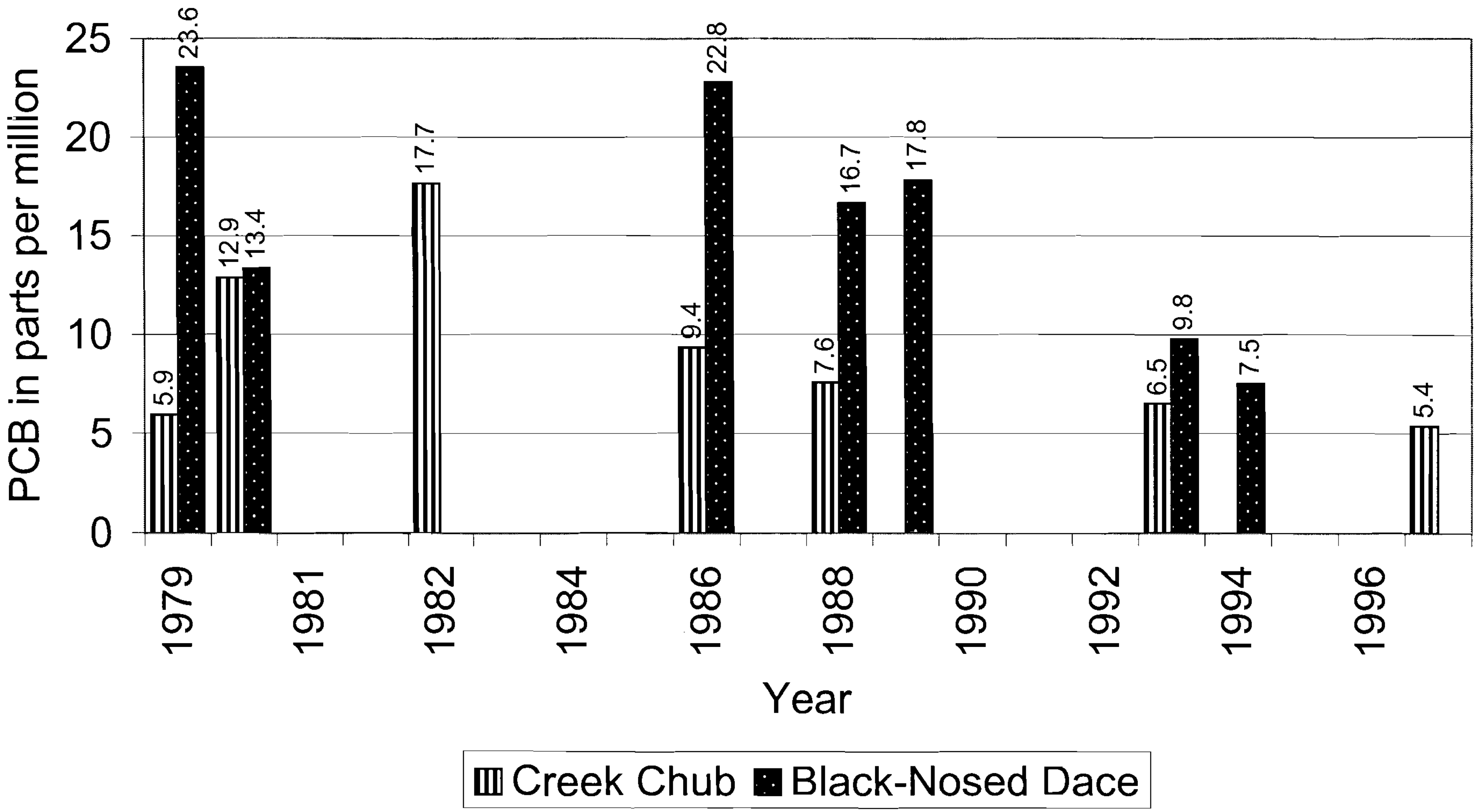


Table 1
Nature and Extent of Contamination

MEDIA	LOCATION	CONTAMINANT OF CONCERN	CONCENTRATION RANGE (ppt for water, ppm for soil; micrograms per cubic meter for air)	SCG (ppt for water*, ppm for soils / sediments; micrograms per cubic meter for air)
Surface Water	Northwest Drainage Ditch	PCB	Non-detect (ND) to 82	0.001
Surface Water	Low-Lying Area	PCB	ND	0.001
Surface Water	Mead Road Pond	PCB	71 to 260	0.001
Surface Water	T11A	PCB	110	0.001
Surface Water	Valatie Kill	PCB	ND to 82	0.001
Surface Water	Nassau Lake	PCB	ND	0.001
Soil/Sediment	Southeast Drainage	PCB	ND to 1.4	1
Soil/Sediment	Northwest Drainage Ditch	PCB	0.24 to 34	1
Soil/Sediment	Low-Lying Area	PCB	0.94 to 2.3	1
Soil/Sediment	Mead Road Pond	PCB	0.12 to 170	1
Soil/Sediment	T11A	PCB	0.2 to 71	1
Soil/Sediment	Valatie Kill	PCB	ND to 8.3	1
Soil/Sediment	Area 28	PCB	ND to 40	1
Soil/Sediment	Nassau Lake	PCB	ND to 9.6	1
Air	Nassau Lake	PCB	ND**	0.002
Soil/Sediment	Flood-prone areas	PCB	ND to 2.2	1

*There are three New York State surface water standards for PCB. They are:
The H(WS) standard, promulgated to protect sources of human water supply; 90 parts per trillion
The "W" standard, promulgated to protect pisciverous wildlife; 0.12 parts per trillion
The H(FC) standard, promulgated to protect people who consume fish; 0.001 parts per trillion

**The detection limit for the air PCB analyses was 0.004 micrograms per cubic meter.

Table 2: Costs of Remedial Alternatives

Alternative	Capital Cost	30 Year O&M Present Worth	Capital Cost + Present Worth O&M Cost
A) No Action	n/a	n/a	n/a
B) No Further Action	n/a	$986,000	$986,000
C) Partial removal and partial armoring of T11A, with monitored natural attenuation for the Valatie Kill and Nassau Lake	$390,000	$986,000	$1,376,000
D) Total removal of contaminated sediments in T11A and removal of contaminated sediments in Area 28 of the Valatie Kill, with monitored natural attenuation for the rest of the Valatie Kill and Nassau Lake	$1,870,000	$986,000	$2,856,000
E) Total removal of contaminated sediments in T11A and the Valatie Kill, with monitored natural attenuation for the rest of the Valatie Kill and Nassau Lake	$7,221,000	$986,000	$8,207,000
F) Total removal of contaminated sediments in T11A and the Valatie Kill, and Nassau Lake	F1) $172,400,000 F2) $147,057,000	F1) $217,000 F2) $217,000	F1) $172,617,000 F2) $147,274,000
G) Total removal of contaminated sediments in T11A and the Valatie Kill, and capping in Nassau Lake	G1) $18,171,000 G2) $38,215,000	G1) $986,000 G2) $986,000	G1) $19,157,000 G2) $39,201,000

Table 3: PCB mass identified in Operable Unit 3, Dewey Loeffel Site

Location	PCB mass in pounds	Percentage of total mass
Northwest Drainage Ditch	46	9.0 %
Low-lying Area	3	0.6 %
Mead Road Pond Spoil Banks	167.7	32.8 %
Mead Road Pond	7.2	1.4 %
Mead Road Pond Outlet	4.6	0.9 %
T11A	28.5	5.6 %
Area 28 in the Valatie Kill	9.8	1.9 %
Valatie Kill (outside Area 28)	7.0	1.4 %
Nassau Lake	238.2	46.5 %
Totals	512*	100 %

*Represents approximately 43 gallons of pure PCB oil.

Preliminary Cost Estimates for Remediation of Tributary T11A and the Valatie Kill

PRELIMINARY COST ESTIMATE
REMEDIATION OF TRIBUTARY T11A
Total Removal of Contaminated Sediments in T11A
Loeffel Site Environs

Remedial Component	Quality	Units	Unit Cost	Item Cost	Comments
1. Mobilization/Demobilization	1	Lump Sum	50,000	50,000	
2. Access Area Development	1	Lump Sum	50,000	50,000	Includes cost for land clearing, preparation of equipment staging/handling area, and temporary access roads.
3. Site Preparation/Erosion Control	1	Lump Sum	25,000	25,000	Includes site clearing, silt containment system, and erosion control measures.
4. Temporary Flow Diversion	1	Lump Sum	20,000	20,000	Includes temporary measures to reroute active portions of Tributary T11A during remediation.
5. Removal (TSCA Sediment)	150	Cubic Yard	80	12,000	Includes cost for excavating, placing in staging area and loading (depth of excavation = 2 ft.).
6. Material Stabilization (TSCA)					
a. Stabilization Agent	45	Ton	60	2,700	Assumes 20 % additive by weight.
b. Material Handling	180	Cubic Yard	5	900	Assumes mechanical addition of stabilization agent, then loading onto trucks.
7. Disposal (TSCA)	270	Ton	145	39,150	Assumes 1 cy = 1.5 Tons
8. Removal (Non- TSCA Sediments)	525	Cubic Yard	35	18,375	Includes cost for excavating, placing in staging area and loading (depth of excavation = 2 ft.). Assumes 50% over excavation volume.
9. Material Stabilization (Non-TSCA)					
a. Stabilization Agent	160	Ton	60	9,600	Assumes 20% additive by weight. Assumes 1 cy =1.5 tons

Remedial Component	**Quality**	**Units**	**Unit Cost**	**Item Cost**	**Comments**
10. Disposal (Non-TSCA)	945	Ton	75	70,875	Includes transportation Cost.
11. Restoration of Access Areas	1	Lump Sum	15,000	15,000	Costs for restoring areas affected by construction activities.
12. Tributary T11A Restoration a. Tree Plantings	50	Tree	300	15,000	
13. Construction Oversight	6	Week	10,000	60,000	
SUBTOTAL 15% Engineering 30% Contingency TOTAL				391,750 58,765 117,525 568,040	
ROUNDED TOTAL COST				**569,000**	

Notes/Assumptions:

See applicable references from FS

PRELIMINARY COST ESTIMATE Remediation of Valatie Kill Total Removal of Contaminated Sediments in Valatie Kill (T11A to Nassau Lake) Loeffel Site Environs					
Remedial Component	**Quantity**	**Units**	**Unit Cost**	**Item Cost**	**Comments**
1. Mobilization/Demobilization	1	Lump Sum	125,000	125,000	
2. Access Area Development	1	Lump Sum	50,000	50,000	Includes cost for land clearing, preparation of equipment staging/handling area.
3. Temporary Access Roads	1480	Cubic Yards	15	22,200	Assumes 4000 feet long, 20 feet wide, 6 inch deep in gravel.
4. Site Preparation/Erosion Control	26	Each	10,000	260,000	Includes site clearing, silt containment system, and erosion control measures.
5. River Cell Containment Measures	26	Each	20,000	520,000	Includes portable methods to isolate individual sections of the river prior to excavation.
6. Dewatering	26	Each	30,000	780,000	Includes costs for dewatering isolated river cells prior to excavation.
7. Water treatment	12	Mo.	50,000	600,000	Assumes 2 construction seasons at 6 mo. Each
8. Removal	3000	Cubic Yards	35	105,000	Includes cost for excavating, placing in staging area and loading.

9. Material Stabilization a. Stabilization Agent b. Material Handling	900 3000	Ton Cubic Yard	60 6	54,000 18,000	Assumes 20% additives by wight; yes type. Assumes mechanical addition of stabilization agent, then loading onto trucks.
10. Disposal (Non-TSCA)	5400	Ton	75	405,000	
11. Restoration a. Rip-rap b. hydroseeding	3000 2500	Ton Square Feet	20 0.05	60,000 1250	9 inches thick
12. Restoration of Access Areas	26	Each	10,000	260,000	Costs for restoring areas affected by construction activities.
13. Capital construction cost to remediate Area 28	1	LS	806,900	806,900	per FS (YKZ)
14. Construction Oversight	52	Weeks	10,000	520,000	
SUBTOTAL 15% Engineering 30% Contingency				4,587,350 688,100 1,376,200	
TOTAL				6,651,650	
Institutional Controls = Present worth TOTAL COST ROUNDED TOTAL COST					

Notes/Assumptions:

See applicable references in FS

Remedial Component	Quantity	Units	Unit Cost	Item Cost	Comments
9. Material Stabilization a. Stabilization Agent b. Material Handling	900 3000	Ton Cubic Yard	60 6	54,000 18,000	Assumes 20% additive by weight; yes type. Assumes mechanical addition of stabilization agent, then loading onto trucks.
10. Disposal (Non-TSCA)	5400	Ton	75	405,000	
11. Restoration a. Rip-rap b. hydroseeding	3000 2500	Ton Square Feet	20 0.05	60,000 1250	9 inches thick
12. Restoration of Access Areas	26	Each	10,000	260,000	Costs for restoring areas affected by construction activities.
13. Capital construction cost to remediate Area 28	1	LS	806,900	806,900	per FS (VK2)
14. Construction Oversight	52	Weeks	10,000	520,000	
SUBTOTAL 15% Engineering 30% Contingency				4,587,350 688,100 1,376,200	
TOTAL				6,651,650	
ROUNDED TOTAL COST				**6,652,000**	

Notes/Assumptions:

See applicable references in FS