Department of Environmental Conservation

Division of Hazardous Waste Remediation

Kessman/Cross County Sanitation Landfill Inactive Hazardous Waste Site

Site Number 3-40-011
Patterson (T)
Putnam County, New York

New York State Superfund

Record of Decision

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November 1994

New York State Department of Environmental Conservation

DECLARATION STATEMENT - RECORD OF DECISION

Kessman/Cross County Sanitation Inactive Hazardous Waste Site
Patterson(T), Putnam County, New York
Site No. 3-40-011

Statement of Purpose and Basis

The Record of Decision (ROD) presents the selected remedial action for the Kessman/Cross County Sanitation inactive hazardous waste disposal site which was chosen in accordance with the New York State Environmental Conservation Law (ECL). The remedial program selected is not inconsistent with the National Oil and Hazardous Substances Pollution Contingency Plan of March 8, 1990 (40CFR300).

This decision is based upon the Administrative Record of the New York State Department of Environmental Conservation (NYSDEC) for the Kessman/Cross County Sanitation Inactive Hazardous Waste Site and upon public input to the Proposed Remedial Action Plan (PRAP) presented by the NYSDEC. A bibliography of the documents included as a part of the Administrative Record is included in Appendix B of the ROD.

Assessment of the Site

Actual or threatened release of hazardous waste constituents from this site, if not addressed by implementing the response action selected in this ROD, presents a current or potential threat to public health and the environment.

Description of Selected Remedy

Based upon the results of the Remedial Investigation/Feasibility Study (RI/FS) for the Kessman/Cross County Sanitation Site and the criteria identified for evaluation of alternatives the NYSDEC has selected the remedy. The components of the remedy are as follows:

- Excavation and restoration of the upper one foot of approximately 1.6 acres of wetland sediments to the east of the site and the placement of these sediments in the landfill area beneath the cap.

- Construction of an approved 6NYCRR Part 360 cover for the landfill (capping) and long-term environmental monitoring. Placement of leachate collection system piping beneath the cap.

- Institutional controls, deed restrictions and fencing of the site restricting the future use of the land and groundwater at the site.

- Quarterly monitoring of surface water, groundwater and leachate.

- The implementation of a leachate collection system contingent on the assessment of the results of quarterly monitoring. Should monitoring results indicate that hazardous waste is migrating from under the cap due to leachate flow and significantly impacting the environment, then a leachate storage system could be attached to the leachate collection piping without having to disturb the cap.

New York State Department of Health Acceptance

The New York State Department of Health concurs with the remedy selected for this site as being protective of human health.

Declaration

The selected remedy is protective of human health and the environment, complies with State and Federal requirements that are legally applicable or relevant and appropriate to the remedial action to the extent practicable, and is cost effective. This remedy utilizes permanent solutions and alternative treatment or resource recovery technologies, to the maximum extent practicable. In keeping with the statutory preference for treatment as a principal element of the remedy, leachate will be collected and treated, if necessary. Hazardous wastes will remain on-site, however, since the landfill cannot be excavated and treated effectively due to the size of the landfill.

November 15, 1994
Date

Ann Hill DeBarbieri
Ann Hill DeBarbieri
Deputy Commissioner

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RECORD OF DECISION

KESSMAN/CROSS COUNTY SANITATION LANDFILL SITE
TOWN OF PATTERSON, PUTNAM COUNTY, NEW YORK
Site No.3-40-011
October, 1994

SECTION 1: <u>SITE LOCATION AND DESCRIPTION</u>

The Kessman/Cross County Sanitation Landfill Site (Site # 3-40-011) is located on the east side of Cornwall Hill Road, approximately 1 mile south of the Town of Patterson, Putnam County, New York (see Figure 1). The site is bounded on the east by the Great Swamp of Patterson, which is composed of more than 4,830 acres of protected wetland.

The site is approximately 10 acres in size. The site includes <u>7.2 acres</u> of landfill and 1.6 acres of wetland containing contaminated sediment. The approximately 1.2 acres remaining land and wetland were never landfilled and were not impacted by contaminant migration. It is located northwest of the intersection of Cornwall Hill Road and the north-south-trending Metro North railway line (see Figure 2).

Several single family residences are located north of the site on property formerly used for agricultural purposes. The present Patterson Municipal Landfill and the Patterson Town Garage are located to the southwest, and a maintenance and repair facility for heavy excavation equipment is due south of the site.

The present surface of the Kessman Landfill is approximately 440 feet above mean sea level (MSL), 10 to 12 feet above the original elevation of the Great Swamp of Patterson. The landfill and the wetland area bordering the site are relatively flat, in contrast to hills and ridges west and south of the site, which are more than 550 feet above MSL. The site is underlain by softer carbonate and dolomitic rocks and the alkaline soils derived from them.

SECTION 2: <u>SITE HISTORY</u>

2.1: <u>Operational/Disposal History</u>

The Kessman site was operated as a municipal landfill by the Town of Patterson on Kessman family property from approximately 1963 to 1972. In 1972, the landfill was sold to Cross County Sanitation, Inc. (CCS), a private carting company which operated the site from 1972 to 1974. Historical information collected by NYSDEC alleges that unknown types and quantities of industrial and hazardous wastes were disposed of at the landfill between 1972 and 1974. In 1974, NYSDEC forced the closure of the landfill and the property was repossessed by the Kessman family. Clean soil was obtained from nearby locations and used to cover the refuse after landfill operations ceased. The site has been commercially and agriculturally inactive since then and the cover soils support a thin layer of vegetation. In 1974, the Kessman family sold a property lot within the former landfill to Mr. Eugene Schiavonne. There is no structure built on this property.

2.2: Remedial History

A Phase I Site Assessment (SA) was performed at the Kessman site in 1983 by NYSDEC. During the Phase I SA, field personnel observed the presence of several leachate seeps on the north and east sides of the landfill that had discolored vegetation in the wetlands between the landfill and the MetroNorth Railroad embankment. Leachate seeps and staining had previously been observed by NYSDEC sanitary landfill inspectors before landfill operations ceased in 1974. The Phase I SA also reported that site workers had also seen an estimated 40 to 60 partially exposed 55-gallon drums in the landfill toe and the adjacent wetland. They reported that the drums were leaking and a strong chemical odor was present in the vicinity of the drum nests.

A Phase II Site Investigation (SI) was performed at the Kessman site in 1985 by NYSDEC. The SI field program consisted of a metal detector survey; collection of three surface water/sediment pairs and one leachate sample; excavation of two test pits with the collection of one composite test pit sample; installation of four monitoring wells and the sampling of one nearby domestic water well. Water table elevation measurements indicated that groundwater flow beneath the landfill is east toward the MetroNorth railroad embankment and Muddy Brook. Volatile organic compounds detected in these samples were benzene, toluene, chlorobenzene and ethylbenzene. Semivolatile organic compounds detected in these samples were 1,4-dichlorobenzene, naphthalene and phenol. Based on these results, the site was reclassified to Class 2 in 1985.

SECTION 3: CURRENT STATUS

The NYSDEC, under the State Superfund Program, initiated a Remedial Investigation/ Feasibility Study (RI/FS) in May 1991 to address the contamination at the site.

3.1 Interim Remedial Measures:

Interim Remedial Measures (IRMs) were conducted at the site based on findings as the RI progressed. An IRM is implemented when a source of contamination or exposure pathway can be effectively addressed before completion of the RI/FS.

A drum removal IRM began on October 25, 1993. Although 115 drums and contaminated soil were removed from the toe of the landfill, more drums and contaminated soil were found at the site than was originally estimated. In November 1993, NYSDEC's consultant's proposal to address this additional work greatly exceeded the contract amount set aside for the IRM. The work was suspended and scheduled to resume in the Spring of 1994.

The site was securely closed for the winter and all excavated drums and contaminated soil were overpacked and staged on-site in secure, fenced areas. Additionally, berms and plastic sheeting were placed around the areas of excavation to minimize surface water run-off from entering the excavated areas.

NYSDEC staff inspected the site several times and found all staged drums to be in excellent condition and not leaking. On April 1, 1994, one exposed drum located at the toe of the landfill in Test Pit 6 was emptied of its contents and secured to eliminate any possible discharge from it into the adjacent Great Swamp.

Following this action, three rounds of sampling were collected from the site to determine whether a situation existed that would require action prior to resuming the IRM:

- The first sampling event was conducted on April 14, 1994 and consisted of four surface water samples. Analyses showed all the samples were below the detectable limits.

- A subsequent site visit on April 26, 1994 revealed that the condition of the site appeared to have deteriorated. Leachate was now observed flowing from the buried drum area and entering the surface water. A sheen was also observed on the water surface directly adjacent to the landfill. It was decided that additional samples should be collected to evaluate the change in site conditions.

- On May 3, 1994, samples of soil, leachate and surface water were collected for analysis. The results of this analysis indicated that extremely high levels of toluene and PCB were found in the soil (930 and 2,970 parts per million respectively) and both contaminants were present in the surface water at the toe of the landfill (2,800 and 132 parts per billion respectively).

- Additional surface water samples were collected on May 18, 1994 at locations downgradient of the site in the wetland. The analysis of the samples confirmed the results of the April 14, 1994 sampling event that contaminants are not migrating from the Kessman Landfill site.

Drum Removal - Spring/Summer 1994

Although the sampling rounds confirmed that contaminants are not migrating from the site, DEC determined that the remaining drums should be removed immediately to eliminate any potential impact on New York City's drinking water supply reservoir system. On May 23, 1994, DEC initiated a spill response contract to remove the drums at the toe of the landfill. The drum removal began on May 31, 1994 and was completed on June 22, 1994. During this removal action, approximately 157 drums and 100 cubic yards of contaminated soil were excavated, overpacked and staged on site in a secured, fenced area.

During the drum removal, DEC used spill booms, silt fencing, filter fabric, hay bales and activated carbon all along the work zone to protect against spills and contaminant migration. This containment procedure has greatly reduced any potential contaminant migration from the work zone to the wetland.

A general contract was awarded in October 1994 to sample and properly dispose of all drums and contaminated soil currently staged on site. Disposal of the drums should be completed by the end of December, 1994.

3.2: Summary of the Remedial Investigation

The purpose of the RI was to define the nature and extent of any contamination resulting from disposal activities at the site.

The RI was conducted in two phases. The first phase was conducted between December 1991 and April 1992. The second phase field work was conducted between July 1993 and October 1993. A report entitled **Draft Remedial Investigation Report, May 1994** has been prepared describing the field activities and findings of the RI in detail. A summary of the RI follows:

The RI activities consisted of the following:

- Two ecological field surveys on site and in the Great Swamp wetland area to obtain a two-season ecological species lists.

- A baseline survey and grid layout on the landfill surface; a land survey and photogrammetric mapping of the site (approximately 10 acres) and surrounding area (approximately 650 acre; and an elevation/location survey of the new and selected existing subsurface explorations following completion of the well installations and sampling activities.

- Three surface geophysical surveys of the landfill, using terrain conductivity, magnetometry, and seismic refraction techniques.

- Test pit excavation of the three drum nests located on the toe of the landfill and exploration of other possible drum nests as indicated by anomaly interpretations from the surface geophysical surveys listed above.

- Collection of three surface and eight subsurface soil samples.

- Collection of 13 surface water and 13 sediment samples from the adjacent wetland (Great Swamp) area.

- Collection of five leachate samples from observed leachate seeps around the landfill perimeter.

- Installation of nine groundwater monitoring wells and six piezometers.

- Collection of several rounds of water level data from the piezometric wells to determine groundwater flow direction.

- Collection of two rounds of groundwater samples from eleven monitoring wells, and three private domestic wells.

- In-situ hydraulic conductivity testing in 11 monitoring wells.

Between July 1993 and October 1993, additional sediment and surface water samples were collected from the site to address identified data gaps in the 1991-1992 RI.

The analytical data obtained from the RI was compared to applicable New York State Standards, Criteria, and Guidance (SCGs) in determining remedial alternatives. Groundwater, drinking water and surface water SCGs identified for the Kessman site were based on NYSDEC Ambient Water Quality Standards and Guidance Values and Part V of NYS Sanitary Code. NYSDEC soil and sediment criteria were used to develop remediation goals for soil and sediment.

Based upon the results of the RI in comparison to the SCGs and potential public health and environmental exposure rates, certain areas and media of the site are contaminated (See Figure 3).

<u>Surface Soil Results</u>

One background soil sample at an off-site location (SS-3) and two surface soil samples (see SS-1 to SS-3 on Figure 4) were collected. One volatile, methyl ethyl ketone (24 ug/kg), and the SVOC bis(2-ethylhexyl)phthalate (360 ug/kg) were detected in the samples. Pesticides were detected in all the samples, including the background samples. No PCBs were detected in any of the samples. A summary of the laboratory analytical results for these samples is presented in Table 1.

<u>Test Pit Results</u>

Test pits on the landfill toe adjacent to the wetland were excavated at six locations in the landfill area of the Kessman site (see TP 1, 2, 6, 7/9, 8 and 11 on Figure 4). The purpose of the explorations was to visually define the extent of burial areas. Several 55-gallon metal drums, mostly in poor condition, were observed partially buried or lying on the ground surface. Three other test pits were excavated on top of the landfill, at locations based on interpretation and evaluation of the magnetometry/terrain conductivity anomaly maps.

Soil samples were collected from test pits for laboratory analysis for TCL organics and inorganics. The VOCs detected include toluene (360 ug/kg) and 1,1,1 trichloroethane. The SVOCs detected include nitrobenzene (210 ug/kg) and BEHP (180 ug/kg). Pesticides detected include 4,4'-DDE, 4,4'- DDT and chlordane.

Subsurface Soil Results

Eight subsurface soil samples were collected from piezometer borings to characterize refuse, marsh deposits, and glacio-lacustrine sand deposits beneath the landfill (see PZ-1A to PZ-3A on Figure 4). The soil samples from the piezometers were analyzed for TCL organics and inorganics. The VOCs detected include ethylbenzene (160 ug/kg), toluene (140 ug/kg) and xylene (270 ug/kg). The SVOCs detected include phenol (3,000 to 42,000 ug/kg) and naphthalene (82 to 88,000 ug/kg). Pesticides, PCBs and inorganic compounds were also detected in the samples. The analytical results for the samples are shown by media in Table 1.

Leachate

Five leachate samples representing shallow groundwater discharging to the surface at seeps, were collected to identify contaminants migrating to surface water (see LT-1 to LT-5 on Figure 4). The leachate samples were analyzed for TCL organics and inorganics, chemical oxygen demand (COD), total dissolved solids (TDS) and total suspended solids (TSS). The VOCs detected include benzene (1 to 15 ug/L) and xylenes (6 to 140 ug/L). The SVOCs detected include 1,4-dichlorobenzene (8 ug/L). The PCB Aroclor-1232 was detected at 4 ug/L. Pesticides and inorganic compounds were also detected in the samples. A summary of the laboratory analytical results from these samples is presented in Table 2.

Sediments

Thirteen sediment samples were collected concurrently with surface water samples during the 1992 RI field program (see SD-1 to SD-13 on Figure 5). Six sediment samples were collected with surface water samples during the 1993 additional RI sampling event (see SD-101 to SD-106 on Figure 6). The sediment samples were analyzed for TCL organics and inorganics, and TOC. The VOCs detected include MEK (2-butanone, 67 to 110 ug/kg), benzene (2 to 28 ug/kg) and chlorobenzene (23 ug/kg). The SVOCs detected include naphthalene (400 ug/kg). PCBs and inorganic compounds were also detected in the samples. A summary of the laboratory analytical results for these samples is presented in Table 1.

Surface Water

Thirteen surface water samples were collected during the 1992 RI field program for laboratory analysis (see SW-1 to SW-13 on Figure 5). Six surface water samples were collected for laboratory analysis in 1993 (see SW-101 to SW-106 on Figure 6). Surface water samples were analyzed for TCL organics and inorganics, total alkalinity, COD, TDS, and TSS. The VOCs detected include benzene (1 to 11 ug/L) and 1,2 dichloroethylene (76 ug/L). Semivolatiles, pesticides, PCBs and inorganic compounds were also detected in the samples. A summary of the laboratory analytical results for these samples is presented in Table 2.

Upgradient Groundwater

Groundwater analytical results were assessed to identify contaminants migrating off-site via groundwater migration pathways. Because the Great Swamp abuts the Kessman site, drill rig access was restricted and monitoring wells were not installed in the wetland beyond the downgradient edge of the site.

The domestic wells and monitoring wells were sampled to provide data on upgradient groundwater quality and provide data for risk assessment purposes (see DW-1 to DW-3 and MW-1A, MW-1B, MW-2, MW-101B and MW-101S on Figure 4). Upgradient wells are located downgradient of portions of the Patterson Town Landfill south of the Kessman site.

No VOCs were detected in the domestic wells. The SVOC BEHP (9 ug/L) was detected in domestic well DW-2. The pesticide endosulfan I (0.086 ug/L) was detected in domestic well DW-1. Seven TCL inorganics were detected including mercury (up to 0.33 ug/L).

The only VOC detected in the samples from the monitoring wells was chloroform (2 ug/L). The SVOC BEHP (8 ug/L) was also detected. The pesticides 4,4'-DDE (0.031 ug/L) and 4,4'-DDT (0.091 ug/L) were also detected. TCL inorganics were also detected in these samples. No PCBs were detected in these samples.

<u>On-Site Groundwater</u>

Six monitoring wells were sampled to provide data on groundwater quality beneath the landfill and provide data for risk assessment purposes (see MW-3A, 3B, 4A, 4B, 5A and 5B on Figure 4). A summary of the laboratory analytical results for these samples is presented in Table 2. The VOCs detected include benzene (4 ug/L) and chlorobenzene (4 ug/L). The SVOCs detected include diethylphthalate (14 ug/L). Inorganics were detected in the samples. No pesticides or PCBs were detected in these samples.

3.3 <u>Summary of Human Exposure Pathways</u>:

A baseline human health evaluation (HHE) was conducted to assess the potential risks to human health which might be related to chemicals originating from the site. In the HHE, the likelihood of noncarcinogenic effects is indicated by the Hazard Index (HI), while the risk of carcinogenic effects is presented as a probability. A hazard index greater than 1 indicates that adverse noncarcinogenic effects may occur.

Risk estimates for the potential exposure scenarios are based on contaminant levels if the site was unremediated. The risks for the following exposure scenarios are below or at NYSDOH target risk guidelines:

- potential risk to an individual ingesting fish from the Great Swamp area for 30 years;
- potential risk to a site worker through exposure to surface soil for 25 years, and
- potential risk to a child trespasser through exposure to surface soil for 10 years.

The carcinogenic risks for the remaining exposure scenarios presented in the risk assessment exceed NYSDOH guidelines of 10^{-6}. These include the following:

- potential risk to an unprotected site worker through ingestion of drinking water for 25 years ($8x10^{-5}$); this is based on the assumption that the site worker would ingest water while working at the site as part of long term operation and maintenance of the unremediated site;
- potential risk to a construction worker through exposure to surface and subsurface soil for 8 weeks ($1x10^{-5}$);
- potential risk to the child trespasser through exposure to leachate seeps for 10 years ($4x10^{-6}$);
- potential risk to a recreational user of the Great Swamp area through dermal contact with surface water for 30 years ($3x10^{-5}$), and
- potential risk to a recreational user of the Great Swamp area through dermal contact with sediment for 30 years ($2x10^{-5}$).

For all exposure scenarios, the noncancer risk was within NYSDOH guidelines (a HI less than or equal to one). Potential cancer risks, however, exceeded the NYSDOH guideline risk level for: use of the groundwater as drinking water, exposure to surface and subsurface soil, leachate seeps, surface water, and sediment of the Great Swamp. Arsenic contributed the majority of risk in the groundwater.

Carcinogenic PAHs contributed the majority of risk in the surface and subsurface soils. The majority of risk characterized for the leachate, surface water and sediment is attributed to PCBs.

Media and chemicals of concern (COCs) to public health are:

- Groundwater: bis(2-ethylhexyl)phthalate, 1,2-dichloroethane, benzene, toluene, 1,1-dichloroethane, arsenic, iron, magnesium, and sodium;

- Leachate: Aroclor-1232;

- Surface and Subsurface Soil: Benzo(a)pyrene and benzo(b)fluoranthene;

- Surface Water and Sediments: Aroclor-1016, Aroclor-1242, Aroclor-1248, Aroclor-1254.

Estimated risks are based on numerous assumptions that have been made about exposures that should result in estimates of the upper bound of risk. For all scenarios, exposure was assumed at maximum detected concentrations. It is unlikely that a person would be repeatedly exposed to maximum concentrations for 30 years.

3.4 <u>Summary of Environmental Exposure Pathways</u>:

To assess the potential effects of site-related contaminants detected in physical media at the Kessman Site, a Phase I habitat-based assessment (HBA) was conducted. The completed assessment fulfilled the requirements of the NYSDEC (1991) Fish and Wildlife Impact Assessment for Inactive Hazardous Waste Sites.

The objectives of the HBA are:

- to provide a characterization of the existing ecological habitats at the site;

- to identify those ecological habitats which may be located within pathways of contamination;

- to identify the types of fish and wildlife receptors which would utilize those habitats which may be located within pathways of contamination;

- to evaluate the potential acute, chronic, and bioaccumulation effects expected from site-related contamination;

- to identify areas where further sampling may be needed (i.e., to identify data gaps).

During Step I (Site Description), fish and wildlife resources potentially affected by site-related contaminants were identified. A characterization of the resources and their habitats was conducted to allow assessment of site-related impacts.

During Step II, the Contaminant-Specific Impact Analysis, impacts of site-related contaminants on fish and wildlife resources (NYSDEC, 1991) were determined. Step II included a pathways analysis; criteria-specific analyses for contaminants detected in media for which pathways to ecological receptors are complete; and an analysis of toxicological effects for contaminants that are retained followed the criteria-specific analysis.

Potential risks to aquatic, semi-terrestrial, and terrestrial receptors have been characterized at the Kessman site. Comparison of Chemicals of Potential Concern (CPC) concentrations detected in wetland surface water to aquatic Reference Toxicity Value (RTVs) indicate potential adverse impacts. Aquatic life may also be adversely impacted by exposure to contaminated leachate. Sediment contamination may be impacting some aquatic receptors in wetlands adjacent to the site. Selected, small, semi-terrestrial receptors may be impacted by regular foraging in nearby and on-site wetlands. No significant risks, however, were identified for terrestrial receptors.

Media and COCs to ecological receptors are:

- Surface water: chlorobenzene, benzene, 4-methylphenol, BEHP, PCBs, 4,4'-DDE, and all inorganics with the exception of arsenic, nickel, and cyanide.

- Sediment: PCBs, aldrin, endrin, and alpha-chlordane, arsenic, copper, iron, lead, manganese, mercury, nickel, and zinc.

- Leachate: benzene, chlorobenzene, PCE, 1,4-dichlorobenzene, BEHP, all detected pesticides/PCBs, and all detected inorganics with the exception of arsenic, nickel, and thallium.

SECTION 4: ENFORCEMENT STATUS

The Potential Responsible Parties (PRPs) for the site are Martin, Bernard and Albert Kessman, owners of the site. The Kessmans foreclosed on the property in 1974 when the previous owner, Cross County Sanitation, defaulted on its loan.

The PRPs refused to conduct the RI/FS at the site when requested by the NYSDEC. The PRPs were contacted in the Summer of 1994 to assume responsibility for the remedial program. PRPs refused to conduct the Remedial Design (RD) for the remedies outlined in the ROD. The State will then proceed with the RD using State Superfund monies. At the conclusion of the RD, the PRPs will again be contacted to assume responsibility for the remedial construction. If an agreement cannot be reached with the PRPs, the NYSDEC will evaluate the site for further action under the State Superfund. The PRPs are subject to legal actions by the State for recovery of all response costs the State has incurred.

SECTION 5: SUMMARY OF THE REMEDIATION GOALS

Goals for the remedial program have been established through the remedy selection process stated in 6NYCRR 375-1.10. These goals are established under the guideline of meeting all standards, criteria, and guidance (SCGs) and protecting human health and the environment.

At a minimum, the remedy selected should eliminate or mitigate all significant threats to the public health and to the environment presented by the hazardous waste disposed at the site through the proper application of scientific and engineering principles.

The goals selected for this site are:

- Reduce, control, or eliminate the impact of the contamination present within the soils/waste on site (generation of leachate within the fill mass).

- Eliminate the threat to surface waters by eliminating any future contaminated surface run-off from the contaminated soils on site.

- Eliminate the potential for direct human or animal contact with the contaminated soils and sediments on site.

- Mitigate the impacts of contaminated groundwater to the environment.

- Prevent, to the extent possible, migration of contaminants in the landfill to groundwater.

- Provide for attainment of SCGs for groundwater quality at the limits of the area of concern (AOC).

SECTION 6: SUMMARY OF THE EVALUATION OF ALTERNATIVES

Potential remedial alternatives for the Kessman site were identified, screened and evaluated in the Feasibility Study. This evaluation is presented in the report entitled Kessman/Cross County Sanitation Landfill Site Feasibility Study Report, September 1994. A summary of the detailed analysis of all the alternatives which passed the screening are presented below.

6.1: Description of Alternatives

The potential remedies are intended to address the contaminated soils/wastes, sediments, surface water and groundwater at the site. To address these contaminated media, the remedial alternatives were grouped as Landfill Waste/Groundwater Alternatives (LF) and Sediment Alternatives (SD). In addition to a No Action Alternative, five Landfill Waste/Groundwater Alternatives and two Sediment Alternatives were retained after the screening evaluation.

LANDFILL

Alternative LF-1- No Action with Long-Term Monitoring

Present Worth	$437,000
Capital Cost	$52,000
Annual O&M	$25,000
Time to Implement	30 Years

Under the No Action Alternative, the existing conditions of the site would remain unchanged. Long-term monitoring would consist of periodic site inspection and sampling of groundwater, surface waters and sediment for VOAs, Semi-Volatiles, PCBs/Pesticides and Inorganics. Fencing of the site would be implemented to limit access to the site.

The no action alternative is evaluated as a procedural requirement and as a basis for comparison. It requires continued monitoring only, allowing the site to remain in an unremediated state.

This is an unacceptable alternative as the site would remain in its present condition, and human health and the environment would not be adequately protected.

Alternative LF-3 - Capping of Buried Wastes

Present Worth	$5,401,000
Capital Cost	$3,345,000
Annual O&M	$87,000
Time to Implement	6 months - 1 year

Alternative LF-3 consists of capping the wastes with a cover that would comply with 6NYCRR Part 360 and sound engineering design practices. This alternative would include a cap approximately 7.2 acres in size and environmental monitoring and institutional controls. Fencing of the site would be implemented to limit access to the site, the cap and any facilities constructed on the site.

Alternative LF-3A - Capping of Buried Wastes with Piping for Possible Future Leachate Collection System

Present Worth	$5,451,000
Capital Cost	$3,395,000
Annual O&M	$87,000
Time to Implement	6 months - 1 year

Alternative LF-3A consists of Alternative LF-3 in addition to the installation of a leachate collection system with the ability to attach a leachate storage and transfer facility/leachate treatment facility. Fencing of the site would be implemented to limit access to the site, the cap and any facilities constructed on the site.

Alternative LF-3B - Capping of Buried Wastes with Leachate Collection System

Present Worth	$14,108,000
Capital Cost	$3,793,000
Annual O&M	$671,000
Time to Implement	6 months - 1 year

Alternative LF-3B consists of Alternative LF-3 in addition to the installation of a leachate collection system, leachate storage and transfer facility/leachate treatment facility. Fencing of the site would be implemented to limit access to the site, the cap and facilities constructed on the site.

Alternative LF-5 - Vertical Subsurface Hydraulic Barrier/Cap/Groundwater Extraction, Treatment and Discharge

Present Worth	$18,816,000
Capital Cost	$8,474,000
Annual O&M	$134,000
Time to Implement	1 year - 2 years

Alternative LF-5 consists of capping the wastes, installing a slurry wall around the wastes, groundwater extraction and treatment, environmental monitoring and institutional controls. Fencing of the site would be implemented to limit access to the site, the cap and facilities constructed on the site.

Alternative LF-6 - Excavation and Off-Site Disposal of Landfilled Wastes

Present Worth	$129,239,000
Capital Cost	$128,164,000
Annual O&M	$70,000
Time to Implement	6 months - 1 year

Alternative LF-6 consists of excavating all wastes, off-site disposal and site restoration.

SEDIMENTS

The sediment that contained high levels of PCBs (2,970 ppm) was located adjacent to the drums. These drums and the contaminated soil/sediment adjacent to these drums were removed in May 1994, and over-packed and staged on-site in a secured fenced area, and will be disposed of in an off-site permitted facility by December 1994.

The following alternatives address the sediments within the swamp, which contain no higher than 12.2 ppm PCBs, far below the regulatory hazardous waste level of 50 ppm.

Alternative SD-1 - No Action with Long-Term Monitoring

Present Worth	$385,000
Capital Cost	0
Annual O&M	$25,000
Time to Implement	30 years

Under the No Action Alternative, the existing conditions of the site would remain unchanged. Long-term monitoring would consist of periodic site inspection and sampling of groundwater, surface waters and sediment for VOAs, Semi-Volatiles, PCBs/Pesticides and Inorganics.

The no action alternative is evaluated as a procedural requirement and as a basis for comparison. It requires continued monitoring only, allowing the site to remain in an unremediated state.

This is an unacceptable alternative as the site would remain in its present condition, and human health and the environment would not be adequately protected.

Alternative SD-4, Option A - Excavation and On-Site Disposal of Sediments

Present Worth	$933,000
Capital Cost	$626,000
Annual O&M	$20,000
Time to Implement	6 months - 1 year

Alternative SD-4, Option A consists of the excavation of approximately 2,600 cubic yards of contaminated sediments east of the landfill and west of the Metro North Railroad, restoration of the wetland and environmental monitoring. In Option A, these sediments would be dewatered and disposed of beneath the cap described in Alternative LF-3.

Alternative SD-4, Option B - Excavation and Off-Site Disposal of Sediments

Present Worth	$2,417,000
Capital Cost	$2,110,000
Annual O&M	$20,000
Time to Implement	6 months - 1 year

Alternative SD-4, Option B consists of the excavation of approximately 2,600 cubic yards of contaminated sediments east of the landfill and west of the Metro North Railroad, restoration of the wetland and environmental monitoring. In Option B, these sediments would be disposed of at an off-site facility.

6.2 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 (6NYCRR 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 contained in the Feasibility Study.

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.

LANDFILL

The No Action Alternative LF-1 would not comply with New York State SCGs, primarily resulting in the exceedance of NYS Groundwater Standards 6NYCRR Part 702. Alternatives LF-3, LF-3A, LF-3B and LF-5 (Capping; Capping and Piping; Capping, Piping, Collection and Treatment; and Capping/Slurry Wall, respectively) would most likely meet these SCGs for groundwater over a period of several years, and would most likely achieve compliance with NYS Regulations on State Pollutant Discharge Elimination System (SPDES-6NYCRR Parts 750-758). Alternative LF-6, excavation and off-site disposal, would comply with all SCGs.

SEDIMENTS

The No Action Alternative SD-1 would not comply with any SCGs, primarily resulting in exceedances of NYS Cleanup Criteria for Sediments. Alternatives SD-4A and SD-4B for excavation of the sediments and on-site and off-site disposal, respectively would comply with the SCGs for surface water and sediments.

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.

LANDFILL

The No Action Alternative LF-1 would not provide any additional protection of public health and the environment compared to present conditions.

Alternative LF-3 would protect public health by complying with the New York State Solid Waste Regulation (6NYCRR Part 360) for landfill closure. The low-permeability cap would prevent direct contact to the waste, enhance surface runoff and reduce the amount of water infiltrating through waste material. However, some groundwater may continue to flow through buried wastes, mostly municipal waste, and discharge to the wetland. Institutional controls and deed restrictions would prevent ingestion of groundwater on-site and disturbance of the cap. To ensure continued protection of public health and the environment, groundwater and surface water would be monitored.

Because this alternative would reduce infiltration through waste material, discharge of leachate and shallow groundwater to the wetland would be reduced. Therefore, surface water and sediment quality would improve over time.

Alternative LF-3A would provide the same protection as LF-3 but would include the installation of leachate collection piping. Should monitoring results indicate that hazardous waste is migrating from under the cap due to leachate flow and significantly impacting the environment, then a leachate storage system could be attached to the leachate collection piping without having to disturb the cap.

Alternative LF-3B would provide the same protection as LF-3 and LF-3A but would include a leachate collection system designed to capture leachate migrating from beneath the cap and pipe it to a storage tank onsite. The onsite storage tank would be emptied on a regular schedule with the leachate transported to a treatment facility.

Alternative LF-5 would protect public health and the environment by meeting the remedial action objectives. The low-permeability cap would reduce the amount of water infiltrating and passing through waste material, and the slurry wall would reduce the discharge of contaminated groundwater to the wetland. The groundwater extraction system would provide control of the groundwater table elevation and flow within the slurry wall. Extracted groundwater would be treated to the appropriate discharge limitations, providing a reduction of toxicity, mobility, and volume of contaminants in site groundwater.

By controlling groundwater and discharge to the wetland, this alternative would provide a reduction in contaminant concentrations in surface water, sediments, and leachate seeps. Institutional controls would limit future land use of the capped area to preserve the integrity of the containment system.

Because Alternative LF-6 would include removal of all wastes at the site, it would be expected to achieve the remedial action objectives. Therefore, it would provide protection of public health and the environment. Placement of the waste in a properly designed off-site facility would provide control of migration of chemicals from the wastes. The site could likely have unrestricted use because continuing sources of contamination would no longer exist at the site.

SEDIMENTS

Alternative SD-4 would provide protection of public health and the environment by meeting the remedial action objectives for sediment. This would be done by removing the upper one foot of the sediment from the wetland and placing it beneath the site cap or transported to an off-site facility permitted to accept the waste. Sediments within the wetlands contain PCBs no higher than 12.2 ppm, which are far below the regulatory hazardous waste level of 50 ppm. By removing the upper one foot of sediment and capping the landfill, it is likely that the remedial action would attain the remedial action objectives for surface water (see Table 3). This remedy is in addition to the removal of the sediment adjacent to the drums that contained extremely high levels of PCBs (2,970) in May 1994. The drums and contaminated sediment/soil are scheduled to be disposed off-site by December 1994.

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

LANDFILL

There are no significant short-term risks to the community or the environment associated with remedial alternatives LF-3, LF-3A, LF-3B, and LF-5 evaluated for the landfill. Increased truck traffic, dust and odors from remedial alternatives LF-3, LF-3A, LF-3B and LF-5 might be experienced. Dust and odor emissions can be minimized using proper controls during remedial work, excavation, transportation, and disposal. However, increased truck traffic, dust and odors due to the removal and transport of the 7 acre landfill (LF-6) to an off-site disposal facility may present significant short-term risks to the community or the environment. Some short-term effects would be expected including dust, odors, noise, and additional truck traffic during remedial action. Site restoration would be implemented to make the site suitable for its selected future use.

SEDIMENTS

There are no significant short-term risks to the community or the environment associated with any of the alternatives evaluated for the sediments. Truck traffic would increase for SD-4B if sediments were transported to an off-site facility. Due to the high moisture content of the sediments, nuisance dust is not expected to be a problem.

4. Long-term Effectiveness and Permanence. This criterion evaluates the long-term effectiveness of alternatives after implementation of the response actions. 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.

LANDFILL

Alternative LF-1 (No Action) would not provide long-term effectiveness and permanence. Untreated hazardous waste would be left at the site. Alternative LF-1 would not be able to control the source of the contamination and would result in unacceptable health and environmental impacts. Alternatives LF-3, LF-3A, and LF-3B use capping as a hydraulic barrier to nearly eliminate the infiltration of precipitation and, hence, greatly reduce the production of leachate. Capping is a proven isolation remedy whose reliability is enhanced by periodic inspection and maintenance of the cap. Alternative LF-5 would utilize a slurry wall and groundwater extraction and treatment in addition to a cap. The slurry wall is a proven technology and would be effective if it is keyed into clay or competent bedrock. However, the site has only fractured bedrock, sand and gravel which do not provide a good media in which to key the slurry wall. Alternative LF-6 would be an effective and permanent remedy with respect to this site.

SEDIMENTS

Alternative SD-1 (No Action) would not provide long-term effectiveness and permanence. Alternative SD-1 would not be able to control the source of the contaminants and would result in unacceptable health and environmental impacts. Alternatives SD-4A and SD-4B use excavation and proper disposal of sediments containing primarily low level PCBs and mercury to reduce the potential for further environmental transport and uptake.

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.

LANDFILL

Alternatives LF-1, LF-3, LF-3A and LF-6 perform no treatment on the waste, therefore, no reduction in toxicity, or volume of the wastes would be achieved. Alternatives LF-3, LF-3A and LF-6 would reduce mobility.

Alternatives LF-3B and LF-5 include a leachate and groundwater treatment component that would reduce the toxicity, mobility, and volume of contaminants. The other components of these alternatives would not reduce the toxicity, mobility, or volume of contaminants through treatment because they are containment technologies.

The groundwater treatment technologies would remove inorganic chemicals and concentrate them in a sludge requiring disposal. The mobility of the metals would be reduced, because precipitated metals (e.g., $Fe(OH)_3$, MnO_2, and others) are no longer soluble and, therefore, not mobile. The toxicity and mobility of organic chemicals would be reduced by sorption onto activated carbon and destruction in the regeneration process.

SEDIMENTS

Alternatives SD-1, SD-4A, and SD-4B would not perform treatment on the sediments, therefore, no reduction in toxicity or volume would be achieved. However, alternatives SD-4A and SD-4B would greatly reduce the mobility of contaminants.

6. Implementability. The technical and administrative feasibility of implementing each alternative is evaluated. Technically, this includes the difficulties associated with the construction, the reliability of the technology, and the ability to monitor the effectiveness of the remedy. Administratively, the availability of the necessary personnel and material is evaluated along with potential difficulties in obtaining specific operating approvals, access for construction, etc.

The technologies and construction methods employed in all of the alternatives are well established. Materials are readily available along with an adequate number of vendors for competitive bidding. There does not appear to be any unusual administrative difficulties with any of the alternatives.

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.

LANDFILL

The No Action Alternative LF-1 would be the least costly alternative ($437,000 Present Worth) followed by the capping Alternative LF-3 ($5,401,000 Present Worth). Alternative LF-3A ($5,451,000 Present Worth) adds the installation of leachate collection pipe to Alternative LF-3 for an additional $50,000. Alternative LF-3B ($14,108,000 present worth) adds a leachate storage and transfer facility/leachate treatment facility to Alternative LF-3A for an additional $8,657,000. The capping and slurry wall alternative LF-5 is $13.4 million more expensive ($18,816,000 Present Worth) than LF-3. Alternative LF-6 at $129,239,000 is much more expensive than any of the other alternatives.

SEDIMENTS

The No Action Alternative SD-1 would be the least costly alternative ($385,000 Present Worth). Alternative SD-4A would cost $933,000 to excavate and dispose of the contaminated sediments on-site. Alternative SD-4B would be the most costly at $2,417,000 (Present Worth) for excavation and off-site disposal. Increased costs for this alternative over SD-4A resulted primarily from higher transportation costs and disposal fees.

8. **Community Assessment** - Concerns of the community regarding the RI/FS reports and the Proposed Remedial Action Plan (PRAP) have been evaluated. A Responsiveness Summary that describes the public comments received and the NYSDEC and NYSDOH's responses to these comments is presented in Appendix A. Remedies presented in the PRAP are selected for implementation.

SECTION 7: SUMMARY OF THE SELECTED REMEDY

Based upon the results of the RI/FS, and the evaluation presented here, the NYSDEC is selecting the following alternatives as the remedy for this site:

LANDFILL

Alternative LF-3A - Capping and piping for possible leachate collection is selected because it will be protective of human health and the environment and will provide the best balance of the evaluation criteria.

Alternative LF-3A (capping and piping for possible leachate collection) will comply with SCGs and will provide protection of public health and the environment, and will be cost-effective. Institutional controls, deed restrictions, fencing and environmental monitoring will be implemented as part of this alternative to provide the required performance. Although this alternative is not considered a permanent remedy, it would provide the best mix of advantages and disadvantages with respect to the balancing criteria. If the monitoring results indicate that hazardous waste is migrating from under the cap due to leachate flow and impacting the environment significantly, then leachate collection would be implemented. If the cap alone provides an adequate barrier to infiltration of precipitation and reduces the production of leachate, leachate collection will not be necessary.

Under the selected remedy, LF-3A, groundwater will not be treated. The rationale for no action on groundwater is as follows. The bedrock groundwater exceeded NYSDEC standards for site-related chemicals in only one well (MW-4A). The presence of this contamination is not easily explained based on available hydrogeological data and suggests an upgradient source that may not be related to the site.

Pursuing groundwater remediation would not be cost effective because source removal (landfill excavation) is not proposed. The risk from groundwater determined by the baseline human health evaluation is based on the assumption that a site worker would ingest water while working at the unremediated site as required for operation and maintenance for 25 years. Institutional controls in the form of deed restrictions are appropriate to prevent the use of either shallow or bedrock groundwater for drinking purposes.

Groundwater in the overburden would likely remain in contact with the waste; however, the cap would significantly reduce infiltration, leachate production, groundwater elevations and, therefore, groundwater contamination at the site.

Removal of buried drums from the toe of the landfill has significantly reduced the volume of wastes at the site and complements the selected capping remedy.

SEDIMENTS

Alternative SD-4A is selected because it will be protective of human health and the environment and will provide the best balance of the evaluation criteria.

The selected remedy, Alternative SD-4A, includes excavation and restoration of the upper one foot of approximately 1.6 acres of wetland sediments and the placement of these sediments in the landfill area beneath the cap.

Alternative SD-4A will need to be performed before the landfill is capped. Relocation of sediments to the landfill will, therefore, also be considered in the design of the cap.

Removal of sediment/soil that contained high levels of PCBs, adjacent to the drums at the toe of the landfill, has greatly reduced the volume of wastes at the site and complements the selected remedy for the sediments.

The estimated present worth cost to implement the selected remedies LF-3A and SD-4A is $5,451,000 and $933,000, respectively, totalling $6,384,000. The cost to construct the remedy is estimated at $4,021,000 and the estimated operation and maintenance cost is $2,363,000 for 30 years.

The elements of the selected remedy are as follows:

1. Excavation and restoration of the upper one foot of approximately 1.6 acres of wetland sediments to the east of the site and the placement of these sediments in the landfill area beneath the cap.

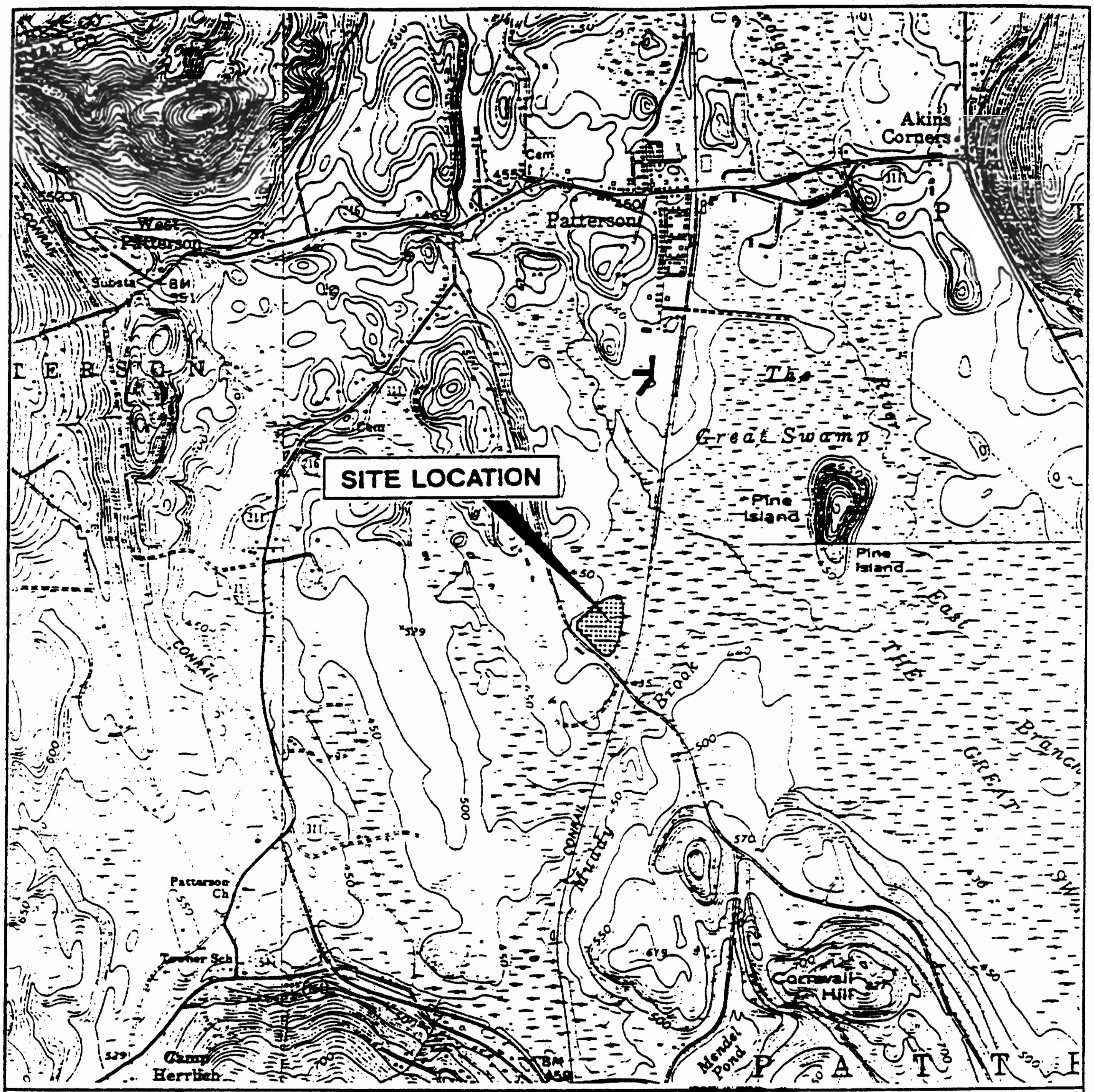
2. Construction of an approved 6NYCRR Part 360 cover for the landfill (capping) and long-term environmental monitoring. Placement of a leachate collection system piping beneath the cap.

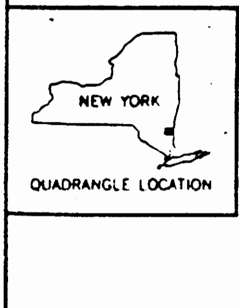
3. Institutional controls, deed restrictions and fencing of the site to restrict the future use of the land and ground water at the site.

4. Quarterly monitoring of the surface water, groundwater and leachate.

5. The implementation of a leachate collection system contingent on the assessment of the results of quarterly monitoring. Should monitoring results indicate that hazardous waste is migrating from under the cap due to leachate flow and significantly impacting the environment, then a leachate storage system could be attached to the leachate collection piping without having to disturb the cap.

The remedy will leave untreated hazardous waste at the site. As a result, a long-term monitoring program will be instituted. This program will determine the effectiveness of the selected remedy and any subsequent actions to be implemented. This long-term monitoring program will be a component of the operations and maintenance plan for the site and will be developed as part of the design tasks for each particular element of the remedy.





SOURCE: USGS TOPOGRAPHIC 7.5-MINUTE SERIES;
PAWLING, NY-CT, 1958 (PHOTOREVISED 1971, PHOTOINSPECTED 1976),
BREWSTER, NY-CT, 1958 (PHOTOREVISED 1984),
POUGHQUAG, NY, 1960 (PHOTOREVISED 1981), AND
LAKE CARMEL, NY, 1960 (PHOTOREVISED 1981).

N

SCALE IN FEET

0 2000 4000

Figure 1

SITE LOCATION MAP
KESSMAN/CROSS COUNTY
SANITATION LANDFILL SITE

ABB Environmental Services

06873-07

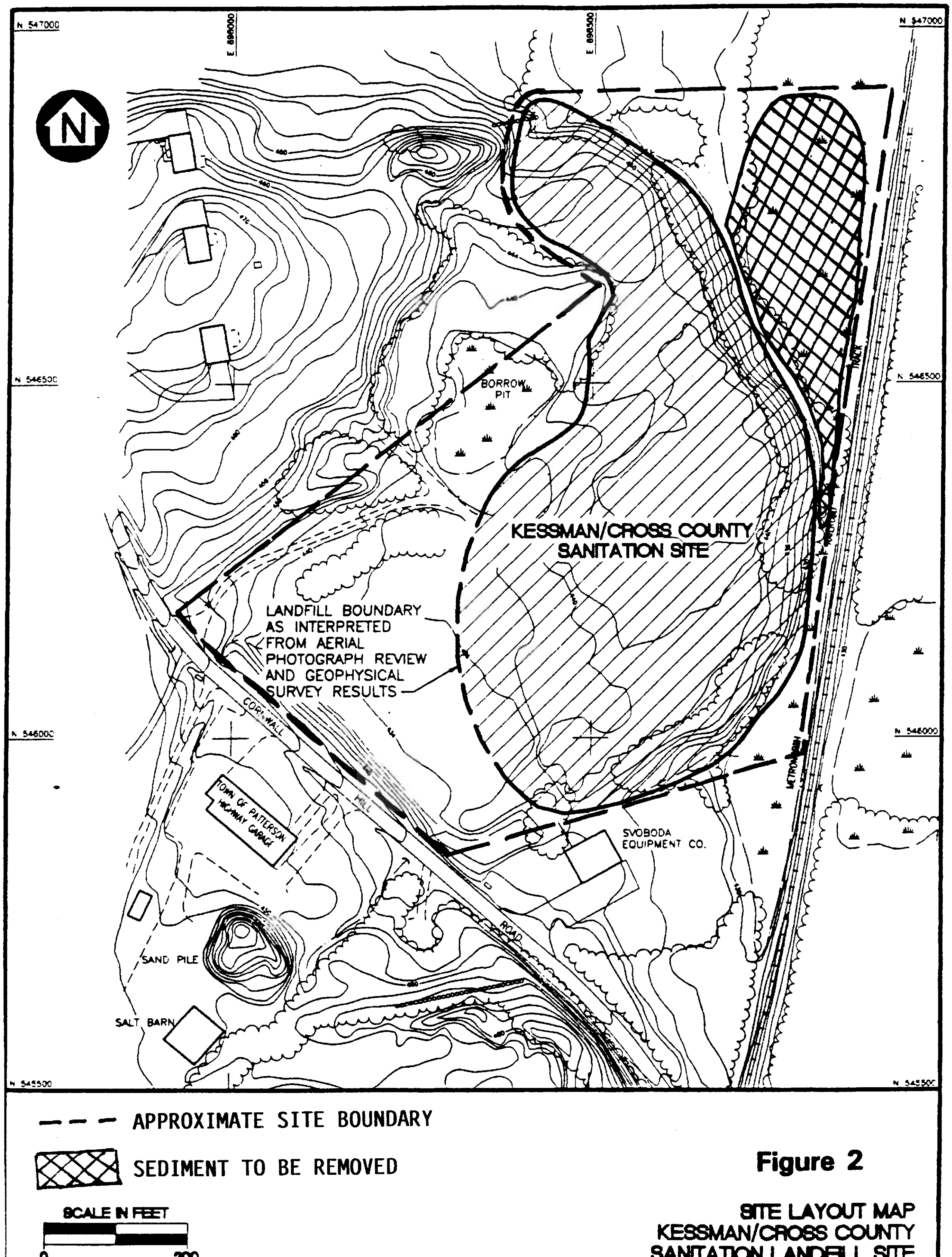


Figure 2

SITE LAYOUT MAP
KESSMAN/CROSS COUNTY
SANITATION LANDFILL SITE

ABB ENVIRONMENTAL SERVICES

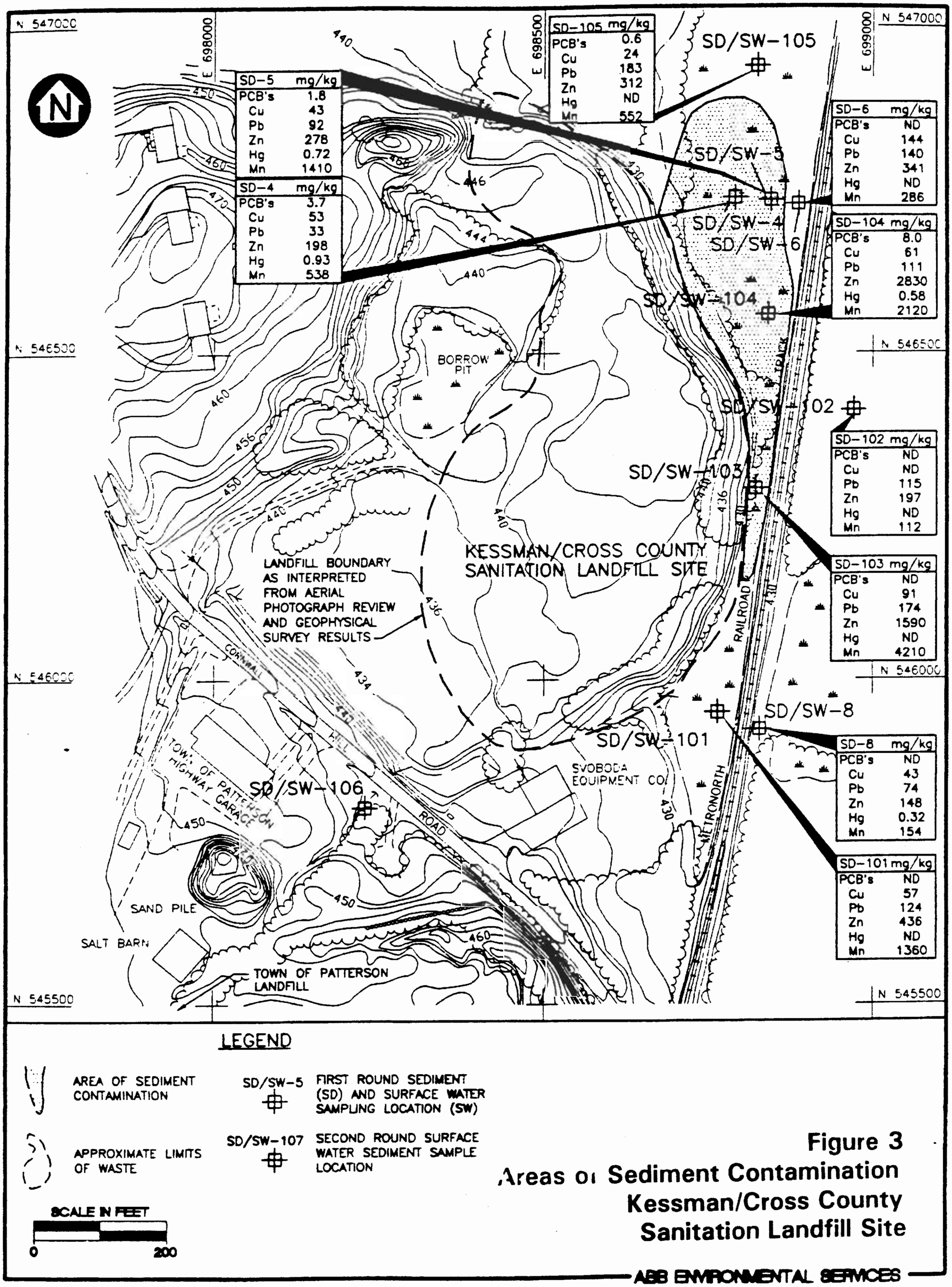


Figure 3
Areas of Sediment Contamination
Kessman/Cross County
Sanitation Landfill Site

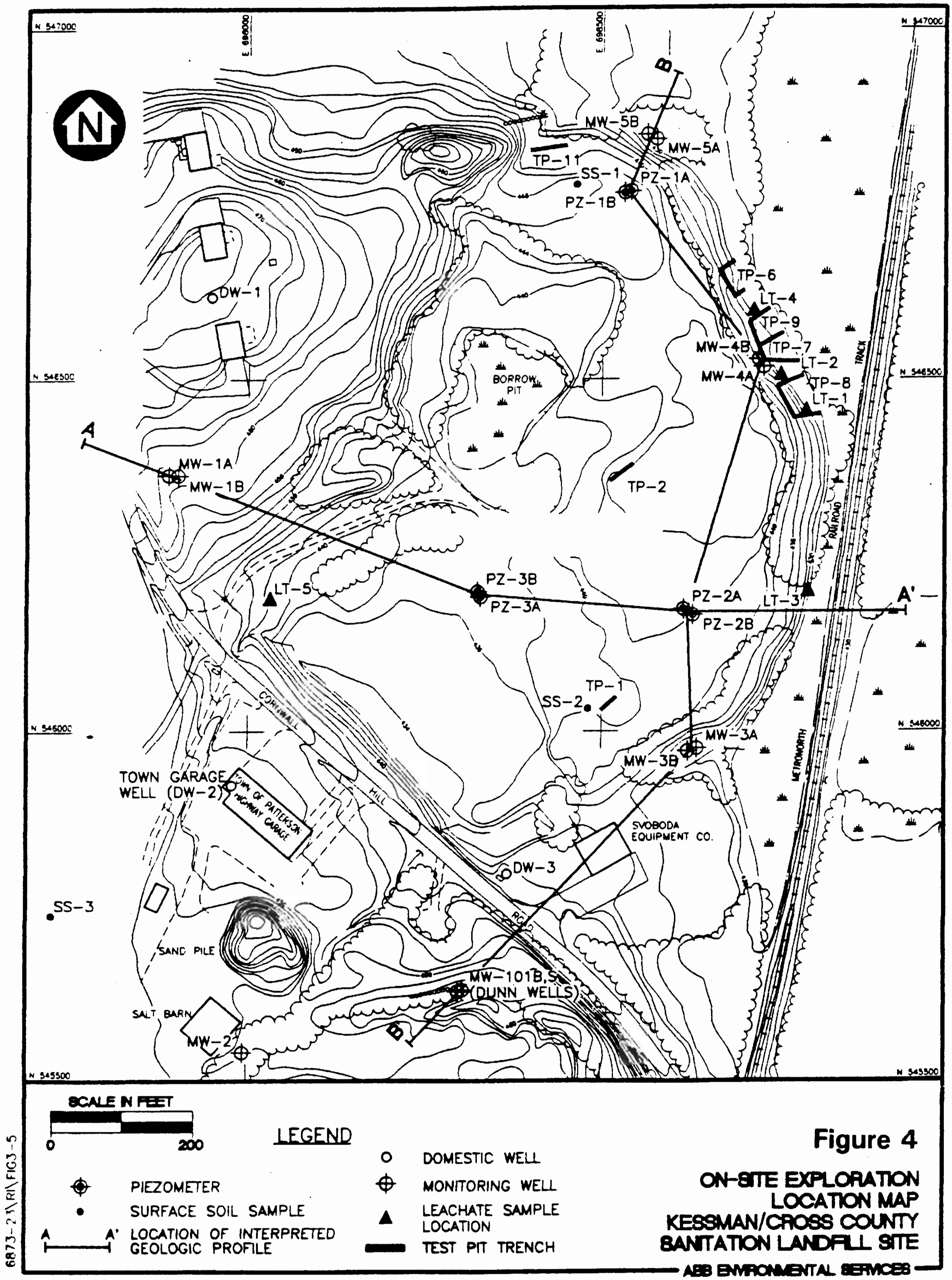


Figure 4
ON-SITE EXPLORATION LOCATION MAP
KESSMAN/CROSS COUNTY SANITATION LANDFILL SITE

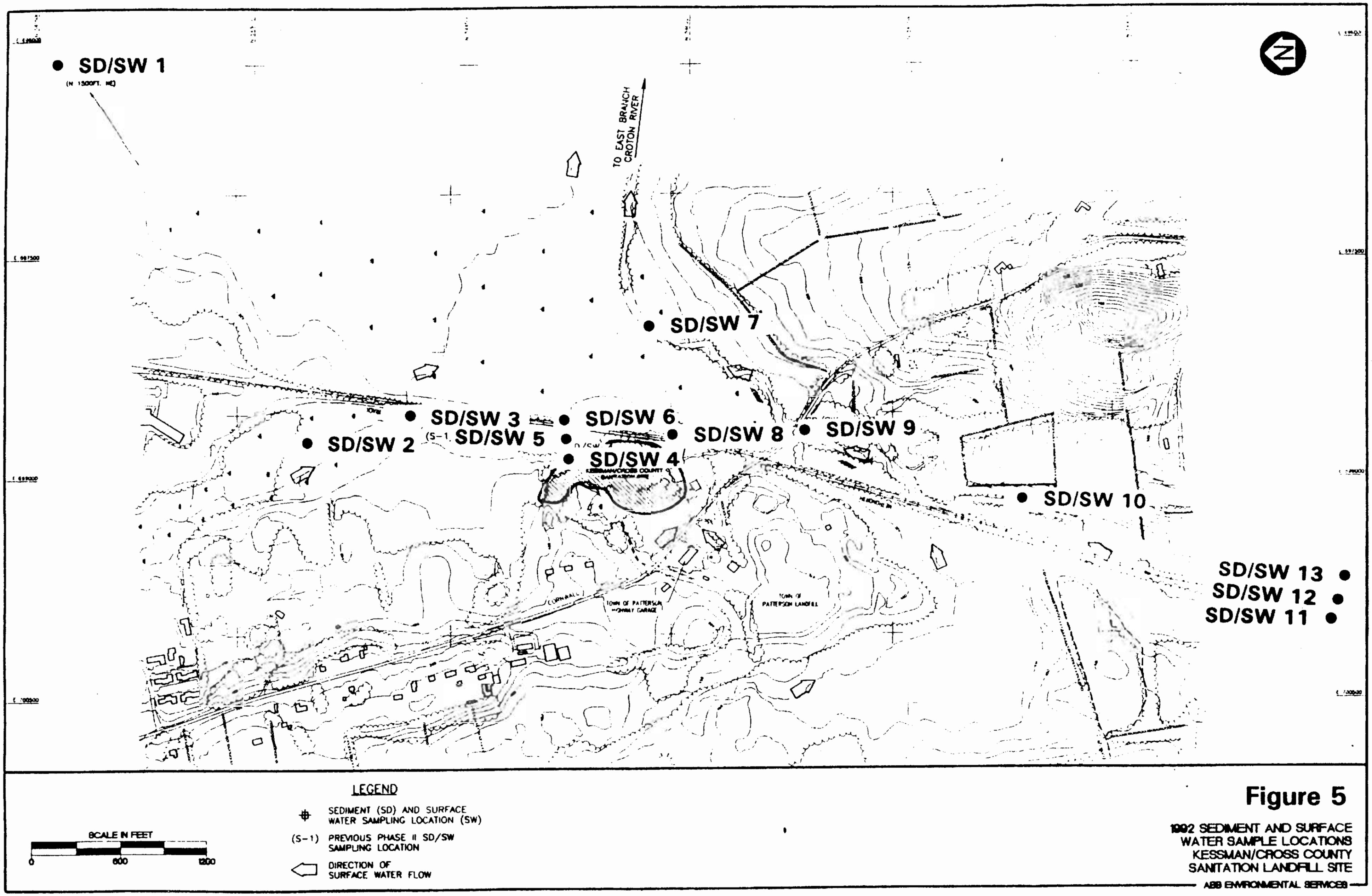
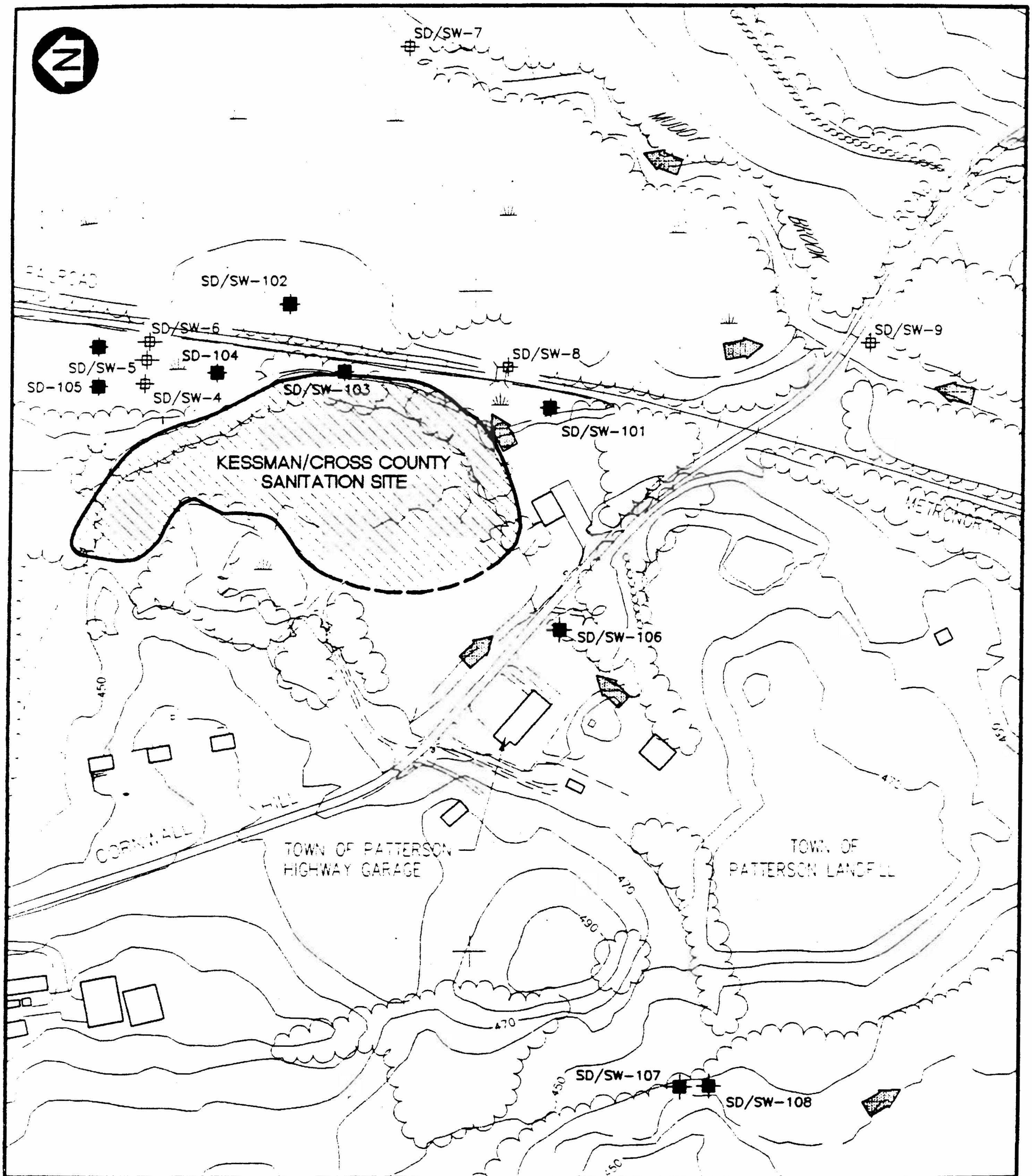


Figure 5

1992 SEDIMENT AND SURFACE WATER SAMPLE LOCATIONS KESSMAN/CROSS COUNTY SANITATION LANDFILL SITE

ABB ENVIRONMENTAL SERVICES



LEGEND

DIRECTION OF SURFACE WATER FLOW

CENTER OF STREAM

SCALE IN FEET

0 300 600

SD/SW-5 SEDIMENT (SD) AND SURFACE WATER (SW) SAMPLING LOCATION 1992

SD/SW-107 SEDIMENT (SD) SAMPLE LOCATION 1993 AND SURFACE WATER (SW)

Figure 6

1993 SEDIMENT AND SURFACE WATER SAMPLE LOCATIONS KESSMAN/CROSS COUNTY SANITATION LANDFILL SITE

ABB ENVIRONMENTAL SERVICES

KESSMAN/CROSS COUNTY LANDFILL SITE (3-40-011)

SUMMARY OF SOIL AND SEDIMENT CONTAMINENT LEVELS

TABLE1

Contaminant	Soil Site Background Level	Surface Soils Minimum Detected	Surface Soils Maximum Detected	Subsurface Soils Minimum Detected	Subsurface Soils Maximum Detected	Sediment Minimum Detected	Sediment Maximum Detected
VOCs (ppb or ug/kg)							
Chloroethane	NA	-	-	-	-	-	-
1.1 Dichloroethene	NA	-	-	-	-	-	-
1.2-Dichloroethene	NA	-	-	-	-	-	-
1,2-Dichloroethene (total)	NA	-	-	-	-	-	-
2-Butanone (MEK)	16.0	24.0	24.00	12.0	160.0	67.0	110.0
4-Methyl-2-Pentanone	NA	-	-	-	-	-	-
1.1.1-Trichloroethane	NA	-	-	-	-	-	-
1.1.2.2-Tetrachloroethane	NA	-	-	-	-	-	-
Acetone		-	-	220.0	230.0	-	-
Benzene	ND	-	-	5.0	5.0	2.0	28.0
Chloroform	-	-	-	-	-	-	-
Chlorobenzene	ND	-	-	35.0	35.0	23.0	23.0
Methylene Chloride	NA	-	-	-	-	-	-
Ethylbenzene	NA	-	-	160.0	160.0	-	-
Tetrachloroethene	NA	-	-	2.0	21.0	-	-
Toluene	ND	-	-	140.0	140.0	5.0	5.0
Trichloroethene	NA	-	-	2.0	2.0	-	-
Xylenes	NA	-	-	270.0	270.0	-	-
2-Hexanone	NA	-	-	-	-	-	-
Vinyl Chloride	NA	-	-	-	-	-	-
SVOCs (ppb or ug/kg)							
Acenaphthalene		-	-	1600.0	1600.0	-	
1,3-Dichlorobenzene	ND	-	-	-	-	170.0	170.0
1,4-Dichlorobenzene	ND	-	-	-	-	170.0	170.0
4-Methylphenol	ND	-	-	1700.0	12000.0	140.0	140.0
Naphthalene	ND	-	-	82.0	88000.0	400.0	400.00
2-Methynaphthalene	ND	-	-	27000.0	27000.0	200.0	670.0
Dibenzofuran	ND	-	-	18000.00	18000.00	48.0	48.0
Fluorene	ND	-	-	-	-	38.0	38.0
Phenanthrene	300.0	-	-	73.0	140000.0	170.0	690.0
Anthracene	ND	-	-	33000.0	33000.0	170.00	690.00
Fluoranthene	700.0	-	-	100.0	84000.0	40.0	980.0
Pyrene	760.0	-	-	63.00	170000.0	58.0	1300.0
Benzo(a)Anthracene	320.0	-	-	37.0	9900.0	230.0	620.0
Chrysene	420.0	-	-	62000.0	62000.0	39.0	740.0
bis(2-Ethy/hexyl)Phalate	ND	360.00	360.00	150.0	41000.0	280.0	280.0
Phenol	NA	-	-	3000.0	42000.0	-	-
2,4DimethylPhenol	NA	-	-	1500.0	1500.0	-	-
Acenaphthene	NA	-	-	1800.0	1800.0	-	-
Di-n-butylphthalete	NA	-	-	2100.0	2100.0	-	-
Butylbenzylphalate	NA	-	-	44.0	38000.0	-	-
Di-n-octylphthalate	NA	-	-	1900.0	1900.0	-	-
Benzo(b)fluoranthene	NA	-	-	41.0	61000.0	-	-

SB = Site Background
ND = Non-Detect
- = Non-Detect
NA = Not Analyzed

KESSMAN/CROSS COUNTY LANDFILL SITE (3-40-011)

SUMMARY OF SOIL AND SEDIMENT CONTAMINENT LEVELS

TABLE1 (continued)

Contaminant	Soil Site Background Level	Surface Soils Minimum Detected	Surface Soils Maximum Detected	Subsurface Soils Minimum Detected	Subsurface Soils Maximum Detected	Sediment Minimum Detected	Sediment Maximum Detected
Benzo(K)fluoranthene	NA	-	-	400.0	40000.0	-	-
Benzo(a)pyrene	NA	-	-	400.0	40000.0	-	-
Ideno(1,2,3-c,d)pyrene	NA	-	-	20000.0	20000.0	-	-
Benzo(g,h,i)perylene	NA	-	-	12000.0	12000.0	-	-
Pesiticides/PCBs (ppb or ug/kg)							
4,4'-DDD	-	-	-	4.3	710.00	18.0	97.000
4,4'-DDE	33	42.0	54.0	0.5	1100.0	13.0	210.0
4,4'-DDT	16	24.0	53.0	5.8	12.0	37.0	37.0
Aldrin	ND	-	-	67.0	67.0	120.0	150.0
Aroclor-1016	ND	-	-	-	-	220.0	2800.0
Aroclor-1232	-	-	-	3500.0	3500.0	-	-
Aroclor-1242	ND	-	-	-	-	8000.0	8000.0
Aroclor-1248	ND	-	-	-	-	580.0	580.0
Aroclor-1254	ND	-	-	590.0	590.0	880.0	880.0
Aroclor-1260	ND	-	-	-	-	-	-
Total Aroclor (PCBs)	0.0	0.0	0.0	4090.0	4090.0	9680.0	12260.0
Diedrin	ND	-	-	-	-	33.0	33.0
Endosulfan I	-	-	-	-	-	-	-
Endrin	-	-	-	-	-	29.0	29.0
alpha-Chlordane	ND	-	-	5.9	6.9	14.0	14.0
gamma-Chlordane	-	-	-	5.5	6.5	-	-
Lindane (gamma BHC)	-	-	-	-	-	-	-
Inorganics (ppm or mg/kg)							
Aluminum	27300.0	123300.0	15800.0	9000.0	16700.0	9050.0	28900.0
Antimony	ND	-	-	-	-	-	-
Arsenic	12.0	2.9	3.0	2.0	4.1	3.2	12.9
Barium	600	26.4	34.9	20.3	324.0	79.7	748.10
Beryllium	1.75	-	-	0.19	0.29	0.62	0.88
Cadium	ND	-	-	-	-	-	-
Calcium	35000.0	2980.0	6450.0	1870.0	42100.0	4240.0	119000.00
Chromium	40.0	12.9	18.8	9.8	26.1	13.9	40.3
Cobalt	60.0	6.4	8.9	6.8	15.0	6.9	25.0
Copper	33.0	16.2	17.1	5.8	31.40	24.3	144.0
Iron	36800.0	18200.0	22400.0	14600.0	34200.0	13300.0	254000.0
Lead	69.7	9.3	13.8	8.5	66.2	32.5	183.0
Magnesium	21900.0	10300.0	10800.0	6730.0	26300.0	4980.0	16300.0
Manganese	5000	358.0	547.0	255.0	3520.0	112.0	4210.0
Mercury	0.21	-	-	0.27	0.27	0.3	0.93
Nickel	29.3	12.7	25.5	9.2	22.2	9.5	58.4
Potassium	43000.0	1110.0	1790.0	1130.0	3870.0	735.0	2020.0
Selenium	1.6	0.96	0.96	-	-	1.3	6.7
Silver	ND	-	-	-	-	8.8	8.8
Sodium	8000.0	65.1	128.0	120.0	281.0	189.0	22100.0
Thallium	ND	-	-	0.43	0.93	-	-
Vanadium	60.0	19.3	27.5	12.5	25.9	22.7	59.6
Zinc	208.0	32.0	49.0	35.2	140.0	146.0	2830.3

SB = Site Background
ND = Non-Detect
- = Non-Detect
NA = Not Analyzed

KESSMAN/CROSS COUNTY LANDFILL SITE (3-40-011)

SUMMARY OF WATER /LEACHATE CONTAMINANT LEVELS

TABLE 2

Contaminant	Surface Water Standard	Surface Water Minimum Detected	Surface Water Maximum Detected	Ground-Water Standard	Groundwater Minimum Detected	Groundwater Maximum Detected	Leachate Minimum Detected	Leachate Maximum Detected
VOCSs (ppb or ug/kg)								
Chloroethane		9.0	17.0	50.0				
Chloromethane				5.0				
1,1-Dichloroethane		5.0	24.0	5.0	10.0	14.0	4.0	5.0
1,2-Dichloroethane				5.0	4.0	5.0		
1,2-Dichloroethene (total)		76.0	76.0	5.0				
2-Butanone (MEK)				50.0				
4-Methyl-2-Pentanone				50.0	10.0	16.0		
1.1.1-Trichloroethane		3.0	3.0	5.0				
1.1.2.2-Tetrachloroethane				5.0				
Acetone								
Benzene	6.0	1.0	11.0	0.7	1.0	2.0	1.0	15.0
Chloroform				7.0	3.00	3.00		
Chlorobenzene	5.0	6.0	6.0	5.0				
Methylene Chloride				5.0			9.0	17.0
Ethylbenzene		3.0	3.0	5.0			3.0	10.0
Tetrachloroethene	1.0			5.0	2.0	2.0	14.0	14.0
Toluene		7.0	14.0	5.0	6.0	6.0	53.0	53.0
Trichloroethene	11.0			5.0				
Xylenes		2.0	9.0	5.0			6.0	140.0
2-Hexanone								
Vinyl Chloride		6.0	6.0	2.0				
SVOCs (ppb or ug/kg)								
1,4 Dichlorobenzene	5.0	2.0	2.0	4.7			8.0	8.0
4-methylphenol		5.0	7.0	+			3.00	5.0
Naphthalene		1.0	4.0	10G			2.0	8.0
Diethylphalate	0.6	2.0	10.0	50G	4.0	5.0	4.0	4.0
BEHP		2.0	10.0	50.0	2.0	24.0	3.0	3.0
2.4-Dimethylphenol							2.0	3.0
Pesiticides/PCBs (ppb or ug/kg)								
4,4'-DDD	0.001			ND				
4,4'-DDE	0.001	0.015	0.075	ND			0.052	0.10
4,4'-DDT	0.03			ND			0.044	0.12
Aldrin	0.001			ND			0.064	0.064
Arcolor-1016	(1)			0.1				
Arcolor-1232	(1)			0.1			3.0	4.3
Arcolor-1242	(1)			0.1				
Arcolor-1248	(1)	1.1	1.1	0.1				
Arcolor-1254	(1)	0.51	0.51	0.1				
Arcolor-1260	(1)			0.1				
Total Aroclor (PCBs)	0.001	1.6	1.6	0.1	0.0	0.0	3.0	4.3
Diedrin	0.001			ND			0.056	0.056
Endosulfan I	0.001							

KESSMAN/CROSS COUNTY LANDFILL SITE (3-40-011)

SUMMARY OF WATER /LEACHATE CONTAMINANT LEVELS

TABLE 2 (CONTINUED)

Contaminant	Surface Water Standard	Surface Water		Ground-Water Standard	Groundwater		Leachate	
		Minimum Detected	Maximum Detected		Minimum Detected	Maximum Detected	Minimum Detected	Maximum Detected
Endrin	1.0	-	-	ND	-	-	-	-
alpha-Chlordane	0.002	-	-	0.1	-	-	-	-
gamma-Chlordane	0.002	-	-	0.1	0.00500	0.00500	-	-
Lindane (gamma BHC)	0.0174	-	-	ND	-	-	-	-
Inorganics (ppm or mg/kg)								
Aluminum	100.0	242.0	23900.0	-	194.00	217.00	6420.0	105000.0
Antimony	NA	-	-	36	-	-	-	-
Arsenic	190.0	1.4	14.1	25	1.20	12.5	1.7	6.7
Barium	NA	21.0	1390.0	1000	39.0	96.0	323.0	1490.00
Beryllium	11/1100	-	-	3G	-	-	-	-
Cadmium	@	5.3	6.8	10	-	-	4.80	7.50
Calcium	NA	29200.0	219200.0	-	45100.0	71000.0	102000.0	216000.00
Chromium	@	12.7	24.2	50	6.0	7.2	15.7	105.0
Cobalt	5	15.0	24.9	-	-	-	13.7	43.9
Copper	@	5.7	57.8	200	-	-	6.3	189.0
Iron	300	125.0	305000.0	300	1260.0	2410.0	67200.0	161000.0
Lead	@	2.5	125.0	25	1.4	2.7	12.5	150.0
Magnesium	NA	8660.0	89400.0	35000G	34700.0	55700.0	63300.0	113000.0
Manganese	NA	33.2	3300.0	300	19.4	76.6	353.0	4000.0
Mercury	12G	0.23	0.44	2	-	-	0.340	1.30
Nickel	@	22.5	27.0	-	19.0	37.4	29.1	83.10
Potassium	NA	2050.0	25800.0	-	10300.0	14700.0	7800.0	31800.0
Selenium	1	-	-	10	2.70	2.70	-	-
Silver	1	-	-	50	5.1	5.1	4.2	4.2
Sodium	NA	2430.3	1910000.0	20000	5060.0	62300.0	18700.0	194000.0
Thallium	8	-	-	4G	-	-	2.6	2.6
Vanadium	14	7.1	38.4	-	6.9	6.9	11.4	158.0
Zinc	30	35.9	492.0	300	4.0	11.4	46.1	173.0
Cyanide	5.2	14.4	14.4	100	-	-	-	

Exceedence of Standard = [boxed cell]
SB = Site Background
ND = Non-Detect
\- = Non-Detect
NA = Not Analyzed
G= Guidance values taken from NYS Division of Water Technical and Operational Guidence Series (Ambient Water Quality Standards and Guidance Values, Nov 15, 1991)
@ = Value varies with water hardness
\+ = Total phenols limit of 1.0 ug/L
(1) = See 'Total Aroclor' below

Table 3

Remedial Action Objectives

Kessman/Cross County Sanitation Landfill Site
Feasibility Study

Medium	Objectives
Landfilled Wastes	• Comply with New York State landfill closure requirements • Prevent landfilled wastes from being a continuing source of groundwater contamination
Groundwater	• Prevent on-site ingestion of groundwater exceeding drinking water standards • Prevent off-site migration of groundwater exceeding drinking water standards and New York State class GA groundwater quality standards
Leachate	• Prevent the discharge of contaminated leachate to the wetland
Surface Water	• Restore and maintain surface water quality to meet New York State class D surface water quality standards • Prevent surface water from acting as a source of sediment contamination
Sediments	• Prevent sediments from acting as a continuous source of surface water contamination • Prevent ecological exposure to sediments presenting ecological risk

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APPENDIX A

RESPONSIVENESS SUMMARY
KESSMAN/CROSS COUNTY SANITATION SITE
SITE NO. 3-40-011

This document summarizes the comments and questions received by the New York Department of Environmental Conservation (NYSDEC) regarding the Proposed Remedial Action Plan (PRAP) for the subject site. A public comment period was held between July 29, 1994 and September 23, 1994 to receive comments on the proposal. A public meeting was held on August 18, 1994 in the Patterson Town Hall to present the results of the investigations and to describe the PRAP.

This Responsiveness Summary is comprised of verbal comments and questions obtained from the August 18, 1994 public meeting official transcript and written comments received during the comment period. A copy of the public meeting official transcript is available in each document repository. The following written comments were received during the comment period and are available in the document repository:

Ms. Edie Keasbey, August 18, 1994
Mr. Robert J. Bondi, August 19, 1994
Dr. Marian H. Rose, August 25, 1994
Ms. Antonia Bryson, Deputy Commissioner, NYCDEP, September 9, 1994
Ms. Edie Keasbey, September 21, 1994

The following comments and questions are taken directly or paraphrased from the official transcript of the public meeting or from written comments received during the comment period.

1 C Do we have to worry about contaminants migrating past the railroad tracks, into the Great Swamp and being carried away?

R While this has been a concern, samples taken during the RI/FS by both NYSDEC and ABB show contaminants have not migrated beyond the railroad tracks. Remedial measures taken in October 1993 and May 1994 have removed the drums and contaminated soil. These wastes represent the most significant source of contamination which could have migrated from the site. The selected remedy will further inhibit the migration of any contamination toward the Great Swamp.

NYSDEC will continue monitoring surface water downgradient of the site and will install wells downgradient of the site to monitor groundwater.

2 C Why is NYSDEC placing sediment that they themselves say contains extremely high levels of PCBs beneath the proposed landfill cap? Will these contaminants be able to migrate from beneath the cap and again pose a threat to the Croton Reservoir System?

R The sediment that contained extremely high levels of PCBs (2,970 ppm) was located adjacent to the drums which were removed in May 1994. The soil/sediment adjacent to these drums was also removed at that time. These drums and contaminated soil/sediment are scheduled to be disposed off-site before December 1994.

Sediments within the swamp that will be excavated and placed beneath the cap contain levels no higher than 12.2 ppm PCBs. These levels in the sediment are far below the regulatory hazardous waste level of 50 ppm. NYSDEC allows waste with PCB levels below 50 ppm to be disposed of in non-hazardous waste landfills.

The sediment containing PCBs which will be placed beneath the cap will be low level PCB wastes and is considered non-hazardous. The sediment will be placed over the existing landfill and beneath the proposed cap. The sediment will not be in contact with the groundwater so any flow of groundwater through the landfill will not effect the PCB wastes. The cap will prevent precipitation from washing through the waste.

As determined during the remedial investigation for the Kessman Site, and sampling of surface waters from downstream locations in Muddy Brook in April and May 1994, specific site contaminants are not migrating off-site. Furthermore, the removal of contaminated sediments with disposal on the landfill prior to capping also reduces the potential for site contaminants to migrate off-site. In addition, the Interim Remedial Measure already performed to remove drums and contaminated soils has greatly reduced the potential for future exposures to hazardous waste at this site.

Proposed measures to further reduce potential future exposures include: closing the landfill with a cap (i.e. cover/barrier) to prevent human contact with landfill wastes and contaminated sediments; posting and fencing to restrict access and deter trespassers; monitoring of existing private drinking water wells nearest the site; monitoring of surface water downgradient of the site; installation of monitoring wells downgradient of the site to monitor groundwater and implementing institutional controls (i.e. deed restrictions/notifications to limit potential future use of the site). These remedies will effectively and permanently serve to isolate the contaminants from humans, wildlife, the environment and the Croton Reservoir Water Supply System.

3 C Why is NYSDEC going to implement the Alternative SD-4A (placement of the sediments under the cap) and not SD-4B (removal of the sediments from the site to an off-site landfill)?

R The sediments are primarily contaminated with low levels of PCBs and mercury. This does not necessitate the removal of this waste to an off-site facility. The response to Comment 2 also addresses why this is an effective remedy.

4 C How can the landfill cap and the future implementation of the leachate collection system stop the migration of the groundwater flow from the site?

R Part of the selected remedy includes a future leachate collection system which consists of a leachate collection pipe, a sump, a collection/storage tank, pumps and hydraulic barrier material.

If some leachate generation still persists after the implementation of the landfill cap, and the implementation of the leachate collection system becomes necessary, the leachate from beneath the landfill would migrate to the drain. The leachate would then be pumped out of the drain for off-site treatment and disposal.

5 C Why is NYSDEC not proposing the slurry wall alternative? Was the slurry wall, option LF-5, grouped with groundwater extraction simply to make it too expensive to implement?

R In order for a slurry wall containment system to work effectively, it must be combined with a continuously operating groundwater extraction system. The groundwater extraction system is necessary to ensure that the groundwater level within the containment system is lower than the groundwater level outside the slurry wall so that contaminated groundwater does not migrate from the landfill. Without the groundwater extraction system, contaminated groundwater may migrate off-site and could be detrimental to the slurry wall.

In addition, for the slurry wall to be effective, it should be keyed into clay or competent bedrock. However, since the site has only fractured bedrock, sand and gravel present beneath the landfill, a slurry wall cannot be effectively keyed into an impermeable barrier.

6 C Why isn't NYSDEC designing a Hazardous Waste landfill capping system for use at the site?

R A Hazardous Waste Landfill cap per 6 NYCRR Part 373 is very similar to a Part 360 landfill cap. Both provide a barrier to precipitation, a gas venting layer, and a vegetative cover to protect the cap. A Hazardous Waste Landfill would primarily be used for the containment of highly concentrated hazardous waste. The wastes remaining at the site will be primarily municipal waste.

7 C The Feasibility Study indicates that even after the cap is installed, wastes will still be in contact with groundwater. Should the soil/sediment which NYSDEC wants to remove from the swamp and place beneath the cap therefore be taken offsite instead? Is NYSDEC simply using these wastes to achieve the desired grade for the cap?

R The wastes contacting the groundwater as described in Table 3-3 of the Feasibility study are primarily municipal wastes and not the PCB or mercury containing wastes of concern. The soils/sediments containing PCBs and mercury will be placed on top of the landfill wastes far above the present groundwater table. Once the cap is placed over the site, the groundwater table will drop even further away from these wastes.

NYSDEC is not using the contaminated soil/sediments simply to achieve a desired grade, however this is a minor benefit of containing the contaminated soil/sediments onsite. The remainder of the material required to achieve the desired grade will be clean soil which will be brought to the site from local sources.

8 C A more permanent solution would be to erect a containment building to hold contaminated sediments, drums and remaining debris at the site.

R Drums and sediments containing high levels of PCBs have been removed from the landfill in October 1993 and May 1994, staged on-site and will be disposed of off-site by December 1994. Storage of wastes within a building would require the removal of the wastes from the 7 acre landfill, temporary storage on-site until the containment building was built and placement of the wastes within the building. The construction of such a large building and the removal and placement of the wastes within it would create dust emissions during handling, and surface runoff of wastes to the swamp, wetland and possibly to the Croton Reservoir watershed.

9 C Why is NYSDEC only capping approximately 7 acres of the site when the Proposed Remedial Action Plan says the Kessman Site is 10 acres in size?

R The entire property is indeed 10 acres. However, the wastes comprise only 7 acres of landfill. Only the wastes are addressed by the selected remedy.

10 C Is NYSDEC going to use the expanded parameters list as required by 6 NYCRR Part 360 as amended in October 1993 when monitoring for chemicals onsite in wells or leachate?

R The site will be monitored for the full Target Compound List/Target Analyte List. This analytical procedure will include all the compounds present in the 6 NYCRR Part 360 expanded parameters list.

11 C Has funding been set aside for the project and where does it come from? Will we in Patterson be paying for it?

R Funding for the project can come from two sources: potentially responsible parties (PRP) and the Environmental Quality Bond Act (State Superfund).

The State Superfund has been used thus far to perform the RI/FS, the IRMs and will be used to fund the Remedial Design. The State Superfund will also pay for the Remedial Construction if no financially viable PRP is located. The NYSDEC will continue to pursue the parties responsible for the contamination in order to recoup the expenditures.

12 C What comments did the NYSDEC Division of Fish and Wildlife provide on the PRAP?

R The Division of Fish and Wildlife agrees that the Department's proposed remedy of excavating the upper one foot of the sediments combined with confirmatory sampling should remove contaminants from the swamp and therefore is more protective of wildlife and the environment.

13 C Why can't you remove all the waste?

R This is Alternative LF-6. This alternative would cost approximately $130 million and is not cost-effective. In addition, the risks associated with excavating and transporting this much waste also make this alternative infeasible. These risks include but are not limited to increased truck traffic, odors and dust.

14 C Will there be another public hearing when NYSDEC has a final design?

R Before the design is complete, it will be presented to the public at a public information meeting.

15 C What further investigation will be performed at well MW-4A to determine its source of contamination?

R NYSDEC will be doing further investigation at this well location to determine what chemicals are still there and their sources.

16 C Has NYSDEC made a further analyses of groundwater travel times from the site?

R The NYSDEC has not further analyzed travel times of contaminants. The remedy suggested by Alternative LF-3A and many of the other Alternatives would significantly alter the travel time or change the flow direction of the contaminants back toward the site. Further analyses of the travel time of contaminants would not be useful.

The sampling of surface water and sediments within the Great Swamp and Muddy Brook indicate no contaminant migration has reached these points from the Kessman site.

17 C Who would be responsible for the long-term monitoring of private drinking water wells?

R The NYSDOH has expressed concern that the four drinking water wells close to the site should still be monitored and has indicated that they would continue to monitor them. Even though these are upgradient wells and should not encounter contaminant migration from this site, the NYSDEC will include the monitoring of these wells in the Operations and Maintenance Plan for this site developed during the Remedial Design. The Operation and Maintenance Plan will also determine the frequency of monitoring for these wells.

APPENDIX B

KESSMAN LANDFILL SITE
ID: 3-40-011

ADMINISTRATIVE RECORD

1. Remedial Investigation/Feasibility Study Health & Safety Plan Part II, Kessman Landfill Site, E.C. Jordan Co., August 1991.

2. Final Remedial Investigation/Feasibility Study Quality Assurance Project Plan, Kessman Landfill Site, E.C. Jordan Co., November 1991.

3. Final Remedial Investigation/Feasibility Study Work Plan, Kessman/Cross County Sanitation Landfill Site, ABB Environmental Services, November 1991 (Rebudgeted September 1993)

4. Remedial Investigation Report Volume I, Kessman/Cross County Sanitation Landfill Site, E.C. Jordan Co., November 1992.

5. Remedial Investigation Report Volume II - Appendices A-F, Kessman/Cross County Sanitation Landfill Site, E.C. Jordan Co., November 1992.

6. Phase I Feasibility Study Report, Kessman/Cross County Sanitation Landfill Site, December 1992.

7. Phase II Feasibility Study Report, Kessman/Cross County Sanitation Landfill Site, ABB Environmental Services, January 1993.

8. Phase II RI Sediment/Surface Water Sampling Data Summary Report, Kessman/Cross County Sanitation Landfill Site, ABB Environmental - September 1993.

9. Drum Removal IRM Work Plan, Kessman/Cross County Sanitation Landfill Site, ABB Environmental Services, September 1993.

10. Remedial Investigation Report Volume I, Kessman Cross County Sanitation Landfill Site, ABB Environmental Services, September 1994.

11. Remedial Investigation Report Volume II - Appendices A - F, Kessman/Cross County Sanitation Landfill Site, ABB Environmental Services, September 1994.

12. Feasibility Study Report, Kessman/Cross County Sanitation Landfill Site, ABB Environmental Services, September 1994.

13. Proposed Remedial Action Plan, Kessman/Cross County Sanitation Landfill Site, New York State Department of Environmental Conservation, July 1994.