REVISED FINAL
REMEDIAL INVESTIGATION REPORT
OTTILIO LANDFILL
NEWARK, NEW JERSEY

VOLUME I OF II

Prepared for:

New Jersey Department of
Environmental Protection
Division of Site Remediation
CN-413
Trenton, NJ 080

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1.0 INTRODUCTION

1.1 Overview

In late 1986, SMC Environmental Services Group (SMC) was awarded a contract by the New Jersey Department of Environmental Protection (NJDEP) to complete a Remedial Investigation/Feasibility Study (RI/FS) of the Ottilio Landfill located in Newark, NJ. As part of the RI/FS, a Phase I Remedial Investigation (RI) was implemented at the Ottilio Landfill in 1987. The results of the Phase I RI identified several data gaps. Based on the Phase I observations and in consideration of the need to fill data gaps, additional site investigations were implemented as part of a Phase II RI. This report provides a summary of the site background information, the results of previous site investigations, and the activities implemented, and the results of the Phase II RI.

1.2 Site Location

The Ottilio Landfill, hereafter referred to as the Site, is located in Newark, New Jersey (Figure 1-1). The Site includes the eastern two-thirds of Lot 12 and all of Lot 16 of Tax Block 5001, and encompasses an area of approximately six (6) acres (Figure 1-2). Lawyers Ditch and the surrounding properties and their lot and block numbers are shown on Figure 1-3.

A Conrail Railroad line forms the eastern border of the site. The western border is formed by Deleet Merchandising (which occupies the western one-third of Lot 12) and New Jersey Millwork, Inc., both of which are accessible from Blanchard Avenue. The northern border of the Site is formed primarily by the Essex County Resource Recover facility (ECRR) and associated rail yard. Also, an access road, which services both the ECRR facility and the Essex Generation Station of Public Service Electric and Gas (PSE&G), completes the northern border. Raymond Boulevard serves as the primary southern border for the site.

The Site is accessible from Blanchard Avenue via the New Jersey Millwork and Deleet Merchandising properties, a utility access road off of Blanchard Avenue to the north, and from Raymond Boulevard along the southern property boundary. Chemical manufacturing dominates the industries around the site. The nearest residential area, the Ironbound Community, is located approximately 1/2 mile west of the site.

1.3 Site History and Background

The Site encompasses two separate but adjacent undeveloped lots (Lots 12 and 16, Tax Block 5001) and covers an area of approximately six (6) acres. The Site is relatively flat except for the central portion which is hummocky and represents the dumping of miscellaneous fill. Along the northern/northeastern property boundary and the northern half of the western property boundary, the Site drops off abruptly (about six to eight feet) representing the edge of the landfill material in these areas.

As indicated in Section 4.0, and based on the review of historical aerial photographs, there appears to have been some activity taking place on Lot 12 as early as 1961. On March 19, 1974, the City of Newark, New Jersey, Department of Engineering, investigated reports of illegal dumping on-site (G. B. Liss, 1974). There were a number of bulldozers observed working on the landfill at that time. A majority of the on-site activities were observed to be taking place on the northern portion (Lot 16) of the Site. The southern portion of the Site was identified as a "junk yard."

On March 26, 1974, the Site was visited by the NJDEP, Bureau of Solid Waste Management, in response to a report filed by the City of Newark, New Jersey (Norman Silvester, 1974). Based on this visit, the Site was determined to be in violation of several solid waste management regulations. A complaint on behalf of NJDEP was filed against three parties involved with the Site including T/A V. Ottilio & Sons, Deleet Merchandising, and Central Railroad of New Jersey (filed by John van Dalen, Deputy Attorney General of New Jersey). The complaint cited several violations by Carmen Ottilio and T/A V. Ottilio & Sons for engaging in the disposal of solid wastes, including chemicals, on Lots 12 and 16 of Tax Block 5001 in the City of Newark, New Jersey, without filing a registration statement and having the proper approval. The defendants were charged with illegal open dumping. In response to the charges, T/A V. Ottilio & Sons submitted for and were granted a conditional registration for the landfill in January 1975.

The conditions of the landfill registration included the following requirements:

- Landfilling of construction and demolition wastes only
- Before landfilling of construction and demolition wastes, the Site was to be prepared by removing all tires, barrels, oil drums, and similar materials, and grading the Site to a five percent grade.
- After grading, the Site was to be covered with two feet of clay soil.
- A fence and a locked gate were to be erected to prevent access to the Site.

- o Setback distances of 10 feet for the Transco pipeline and 50 feet for all other property boundaries were to be observed.

- o A gas venting system was to be installed.

- o Three ground water monitoring wells were to be installed.

It is uncertain how many of the conditions of the landfill registration were met.

On March 18, 1975, the United States Environmental Protection Agency (USEPA) and NJDEP made a site visit to investigate a report by PSE&G employees that oil was leaching from the Site into Lawyers drainage ditch (Clark K. Price, 1975). Numerous oil seeps have been previously noted on-site. Leachate and surface water runoff from the Site discharges into a drainage ditch which runs along the northern perimeter of the Site (between the ECRR facility and the edge of the fill), turns south in the area of the depression in the northeast corner of the Site for about 100 feet, and finally flows eastward into Lawyers drainage ditch which flows into the Passaic River, about 1,800 feet east of the Site. Site surface water that does not eventually discharge into the Passaic River is collected by the City of Newark's storm water sewers.

On April 8, 1975, USEPA made a second site visit to determine if anything had been done on-site to mitigate the oil release. USEPA personnel noted that the landfill had been graded and that dirt barriers had been built to deter illegal dumping on site. Filter fences were also installed to prevent migration of oil off site to Lawyer's Ditch. However, Mr. Ottilio refused to do anything about the 55-gallon drums previously noted on site, claiming that they were not his responsibility (NJDEP Hazardous Waste Site Dossier, 1980).

Although no official records have been found the landfill ceased operation and was abandoned in 1979 according to earlier reports.

USEPA's 1980 "Hazardous Waste Site Identification and Preliminary Assessment," document indicated that at one time hundreds of 55-gallon drums, with the potential of having thousands of gallons of liquid waste, were present on-site. There is no record regarding the fate of these drums. As indicated in Section 4.3, numerous buried 55-gallon drums have been identified at the site. These drums could be the source of organic and inorganic contamination identified on site.

In order to gather more data to accurately assess hazardous conditions at the Site, two USEPA field investigation teams (FIT) performed preliminary studies at the Site in 1982. Additionally, the NJDEP conducted investigations at the Site in early 1985. As discussed in Section 2.4, these studies indicated that the Site had the potential to cause adverse effects to the environment. As such, the NJDEP solicited

proposals to conduct a Remedial Investigation/Feasibility Study (RI/FS) at the site. In late 1986, NJDEP awarded SMC the contract to conduct the RI/FS.

As part of the RI/FS, a Phase I RI was implemented at the site in 1987. The Phase I included an investigation of surface and subsurface soil, surface water and sediment, and ground water quality conditions beneath the Site. Based on the Phase I site investigations, surface and subsurface soils within the landfilled area were identified as the primary contaminant source. These soils were found to be contaminated with volatile organic, base neutral/acid extractable, pesticide, metal and petroleum hydrocarbon compounds. The primary contaminant migration pathways identified during the Phase I investigation were ground water, surface water runoff and erosion, and to a lesser degree, airborne particulates via the wind/air. Based on the results of the Phase I, recommendations for additional site investigations were made. These additional site investigations were subsequently implemented in mid-1993 as part of the Phase II RI.

1.4 Overview and Objectives of the Phase II Remedial Investigation

The design of the Phase II RI was based upon the data obtained during the Phase I RI. The Phase I RI yielded data on the nature and potential extent of contamination in soil, sediment, surface water, ground water, and potential contamination migration pathways.

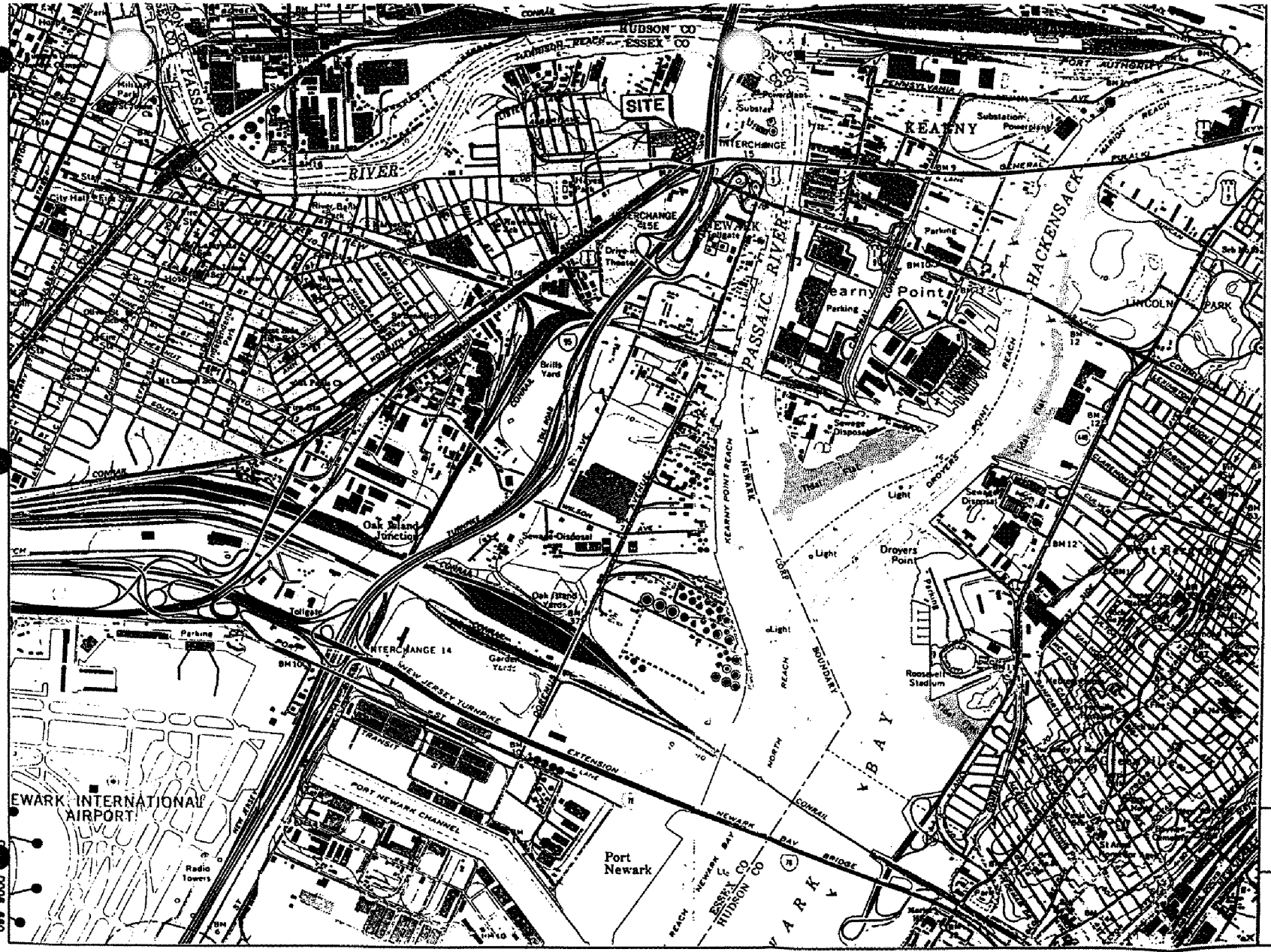
As a result of the validation of the analytical data generated during the Phase I RI, nearly 100 percent of the organic data (i.e., volatile organics compounds, base neutral/acid extractable compounds and the pesticides/PCBs) were rejected. The rejection of these data was based on the fact that manual integrations of internal standards, surrogates, and calibration standards were made by the contract laboratory which could not be appropriately documented. Based on strict adherence to NJDEP data validation guidelines, this was sufficient justification to reject all such data. Although nearly all of the Phase I organic data was rejected, it was subsequently used as part of the Phase I report preparation to identify potential contaminants of concern and to establish potential contaminant trends. As part of the implementation of the Phase II RI, a resampling program was implemented to verify the rejected Phase I organic data.

The objectives of the Phase II RI were to: 1) supplement data obtained during the previous Phase I RI, thereby filling existing data gaps so that a thorough evaluation of Site conditions could be completed; 2) further investigate the presence and extent of contaminants in the soil, sediment, surface water, ground water and air through on-site investigations and by conducting research of other available information; and 3) evaluate potential risks to public health and the environment associated with the Site. In an effort to achieve these objectives, the Phase II RI included the implementation of the following activities:

- Phase I Resampling Program
  - Recollection of the environmental samples and associated quality assurance/quality control (QA/QC) samples collected during the Phase I RI for organics analysis.
- Phase II Program

  Background Investigations
  - Essex County Resource Recovery (ECRR) project data review
  - Local industrial well inventory
  - Investigation of existing/potential underground utilities beneath and adjacent to the Site
  - Review of historical Site maps

  Phase II Field Investigations
  - Surface geophysical investigation
  - Investigation of the drainage ditches (surface water/sediment sampling)
  - Surface infiltration testing
  - Soil gas survey
  - Test pit excavations
  - Monitoring well installation and ground water sampling
  - Water level monitoring
  - Site surveying
  - Air emission investigation
  - Environmental risk assessment
  - ARARs assessment



APPROXIMATE BOUNDARY OF THE SITE

SOURCE: ELIZABETH N.J. AND JERSEY CITY QUADRANGLES, U.S.G.S. 7.5 MINUTE SERIES TOPOGRAPHIC MAP, 19

N

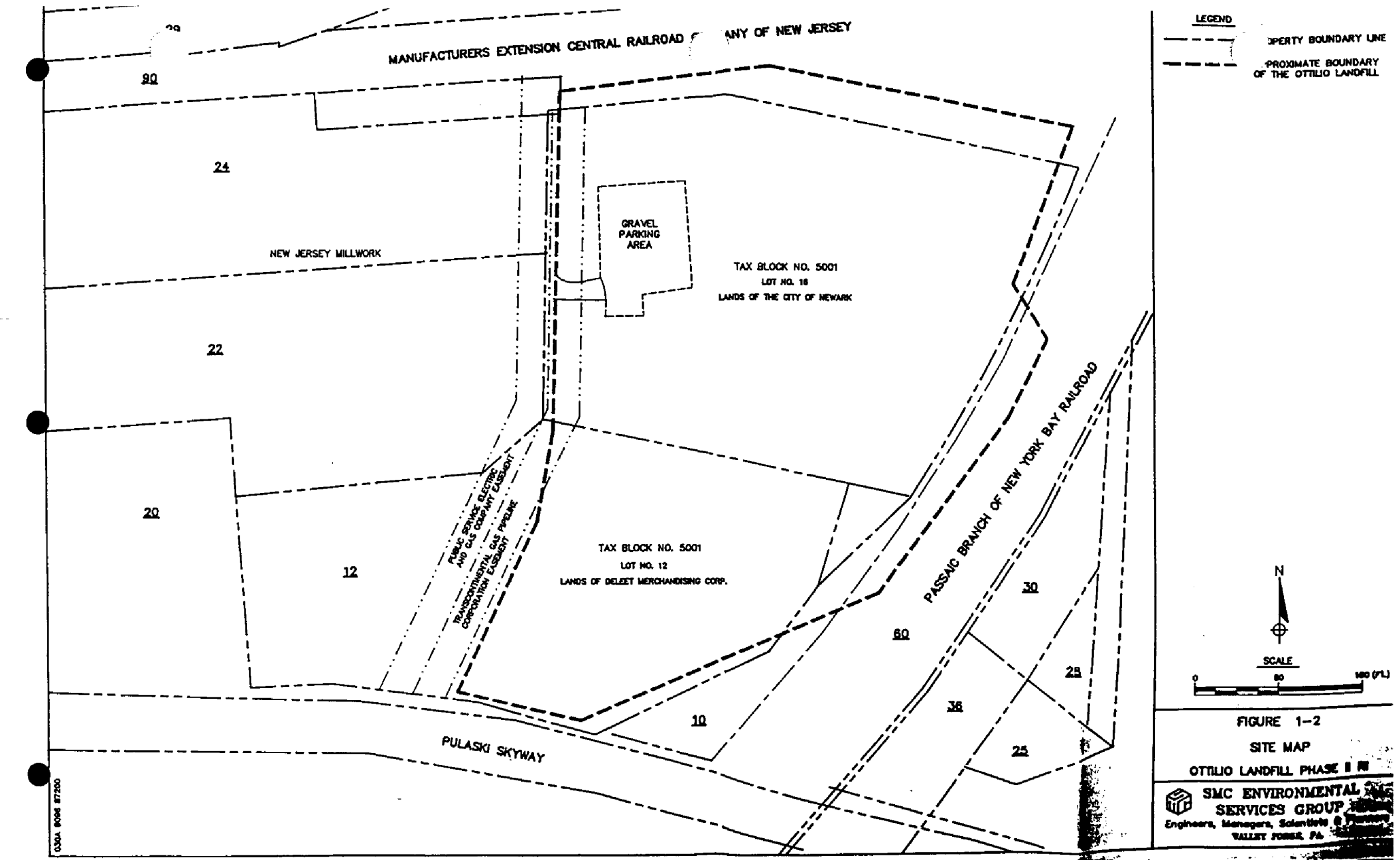
SCALE

0 1000 2000 (FT.)

FIGURE 1-1
LOCATION MAP
OTTILIO LANDFILL PHASE II RI

SMC ENVIRONMENTAL SERVICES GROUP
Engineers, Managers, Scientists & Planners
VALLEY FORGE, PA.

[redacted]



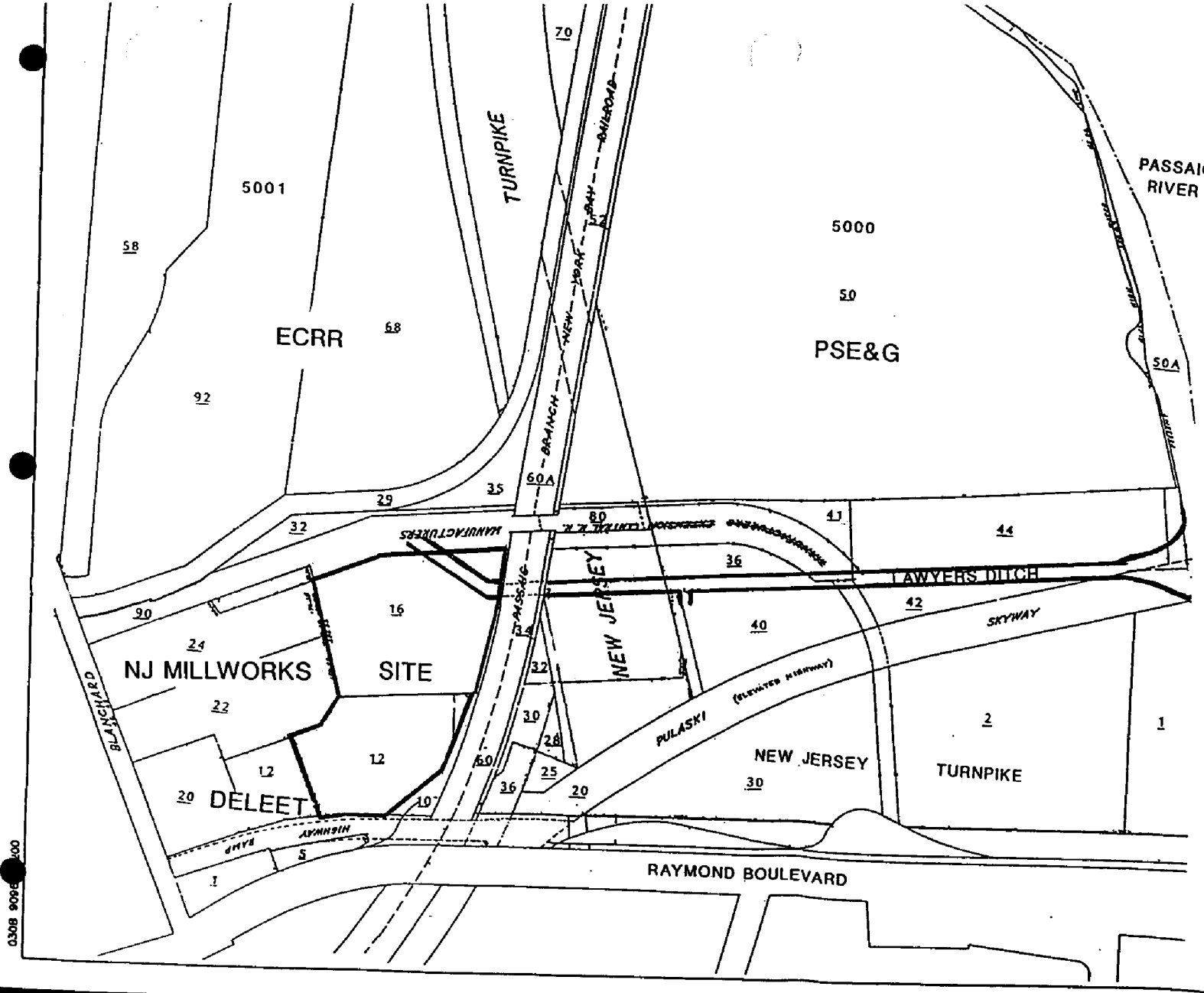


FIGURE 1-3
SURROUNDING AREA MAP
OTTILIO LANDFILL PHASE II

SMC ENVIRONMENTAL
SERVICES GROUP
Engineers, Managers, Scientists & Planner
VALLEY FORGE, PA.

SCALE: NTS | DATE: SEPT. 1986

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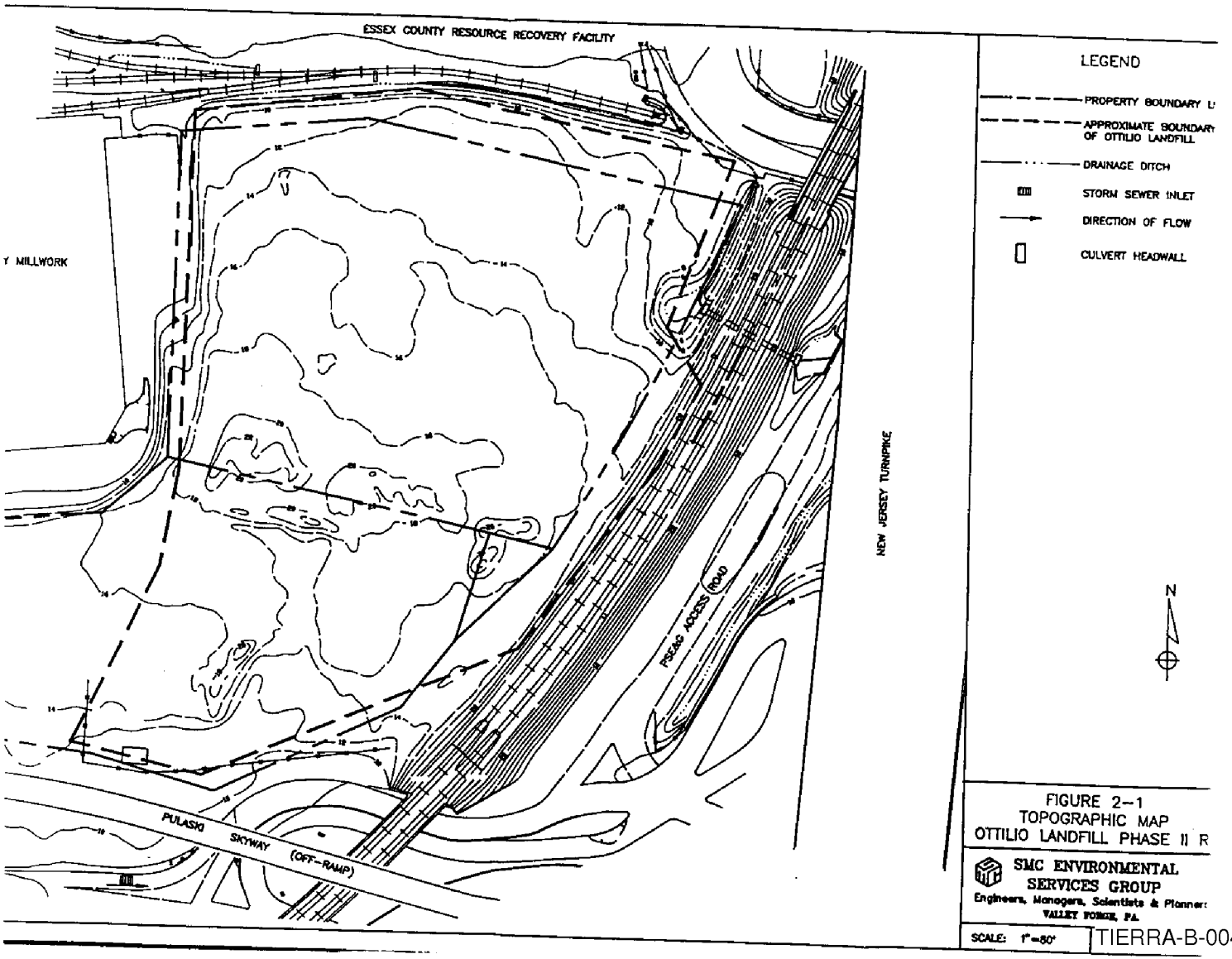

2.0 SITE FEATURES AND CONDITIONS

2.1 General Area Land Use

The Ottilio Landfill is located in a highly industrialized area of Newark with chemical manufacturing being the dominant industry.

Deleet Merchandising, Inc., a supplier of chemicals to the printing industry is located adjacent to the southwest portion of the Site on Blanchard Avenue and occupies the western one-third of Tax Lot 12 (see Figure 1-2). Review of the 1955 Elizabeth, New Jersey quadrangle topographic map (USGS, 1955) indicates that the building which currently houses Deleet Merchandising has been present since 1955. New Jersey Millwork, Inc., located adjacent to the northwest portion of the Site, specializes in wood milling and assembly. Review of aerial photographs and USGS topographic sheets (USGS, 1955 and 1981) indicates that the New Jersey Millwork building was built between 1970 and 1972. The Essex County Resource Recovery facility, built in 1990, is located to the north of the Site. The New Jersey Turnpike right-of-way is to the east of the Conrail Railroad line which borders the eastern portion of the Site. Additionally, the Essex Generation Station of PSE&G is located to the east/northeast of the Site beyond the New Jersey Turnpike; a paper recycling plant is located west of Blanchard Avenue; Raymond Boulevard is located just to the south of the Ottilio site and a car wash is located southwest of the Site.

The nearest residence to the Site is located approximately one-half (1/2) mile to the west (see Figure 1-1). The nearest community to the Site is the Ironbound Community located approximately one-quarter (1/4) mile to the west. Several hazardous waste sites are located within the proximity of the Ironbound Community. Four sites in particular--Diamond Shamrock, Syncon Resins Superfund site, Albert Steel Drum, and Ottilio Landfill--have been identified as hazardous waste sites close to or within the Ironbound Community. Pursuant to the requirements set forth in NJAC 7:26 E-4.8(B)4.vii, approximately 30 acres or 42 percent of the land area within a 1,000-foot radius of the site is covered by structures and other impermeable surface covers.

2.2 General Geology and Hydrogeology

2.2.1 Physiography and Topographic Setting

The Ottilio landfill is located in northeastern Newark, New Jersey and lies within the Piedmont Plateau physiographic province. The Site is approximately 2,000 feet south of a major meander in the Passaic River. The confluence of the Passaic River with Newark Bay is located about one (1) mile southeast of the Site. The landfill is located on unconsolidated soils resulting from deposition and reworking of glacial and fluvial sediments. The original topography of the site was generally

flat, and the Site consisted of undeveloped fresh water marshes (USGS, 1955). Topographic relief in the area varies from just above mean sea level (MSL) (USGS, 1981) to a maximum of twenty-five (25) feet near the southwestern section of Lot 16. Existing USGS topographic maps indicate that prior to landfilling operations, the original ground surface elevation near the Site, was approximately ten (10) feet above MSL. This suggests that activities in the vicinity of the landfill have resulted in an additional ten (10) to fifteen (15) feet of relief due to landfilling. On site, the greatest change in relief occurs along the northern boundary where the landfill is approximately eight (8) feet above the drainage ditch. This change in relief is also seen in the low land depression and ditch in the northeastern corner of the site. A topographic map of the Ottilio site, which was generated during the Phase I RI, is provided on Figure 2-1.

2.2.2 Surficial Soils

There are no known surficial undisturbed natural soils in the vicinity of the Ottilio Landfill. This is due to heavy industrialization in the northeastern Newark, New Jersey area. The Soil Conservation Service (SCS) office in Passaic County, New Jersey does not publish soil conservation reports for this area because of the lack of agricultural soils and heavy urbanization in Essex County.

The surface materials on the site are characterized as fill material covered with a dark brown to black silty soil with pieces of brick, wood, and concrete intermixed. Volunteer vegetation covers the entire site and consists primarily of tall weeds and some small (twenty feet tall) trees.

2.2.3 Subsurface Geology

The subsurface geology in the northeastern New Jersey area is primarily composed of Triassic-aged sedimentary rocks (Newark Group) overlain by Pleistocene-aged glacial deposits and recent sediments deposited primarily by the Pleistocene-Hackensack and Passaic Rivers (Herpers and Barksdale, 1951). Triassic-aged rocks beneath the Site are in three groups or formations. The lowest (oldest) unit, the Stockton formation, is composed of red, buff, or gray arkosic sandstone. The middle unit, the Lockatong formation, is composed of argillite which varies in color from gray to dull red. The uppermost unit is the Passaic (formerly called Brunswick) Formation composed mostly of soft red shale and red sandstone and would be the rock unit most likely affected by contamination from the Site.

The Passaic Formation underlies the entire Newark area (Herpers and Barksdale, 1951). Review of the lithologic logs developed during the Phase II subsurface investigation indicates the bedrock surface is primarily composed of the soft red shale facies of the Passaic Formation. Depth to bedrock in the area of the Site ranges from 55 to 65 feet below the ground surface. The bedrock is overlain by unconsolidated deposits primarily consisting of sand, silt, and organic silt (peat).

These deposits represent the Pleistocene-aged glacial sediments and more recent sediments primarily deposited by the Pleistocene Hackensack and Passaic Rivers.

Pleistocene deposits in the Newark area are generally glacial in origin. Herpers and Barksdale (1951) indicate that the thickness of glacial material in the eastern portion of Newark is up to 190 feet thick due to a buried valley in the area. Pleistocene deposits east of this valley are not as thick and in the vicinity of the Site are about 50 feet thick. Pleistocene deposits in Newark consist of stratified material with interbedded lenses of till. In the northeastern area of Newark, the stratified deposits consist of sands and gravels. Till in the northeastern Newark area consists of red clay, sand, and rock fragments. Pleistocene deposits beneath the Site consists primarily of fluvial sediments (i.e., silt, sand, and gravel).

2.2.4 Hydrogeologic Setting

2.2.4.1 Regional Hydrogeology

Herpers and Barksdale (1951) indicate that the glacial deposits in northeastern Newark yield large amounts of water due to high recharge rates and storage capacities. It is also generally agreed (Herpers and Barksdale 1951) that because of the lack of a substantial confining zone, recharge to rock formations in the area occurs directly from the glacial deposits.

The hydrogeology of the Passaic Formation is controlled by secondary porosity (joints and fractures). The permeability of the Passaic Formation decreases with depth due to the geostatic pressure of the overlying rock and unconsolidated material, forcing the fractures and joints in the rock to close. Only moderate quantities of water can be stored or transmitted in these fractures. Based on available literature (Herpers and Barksdale, 1951), the Passaic Formation appears to be hydraulically connected with the overlying unconsolidated material.

2.2.4.2 Local Hydrogeology

The hydrogeology at the Site is characterized by three (3) geologically different zones that are hydraulically connected and constituent one (1) single aquifer. The upper most shallow water bearing zone is located within the fill and overlies an organic silt zone. This organic silt layer does not appear to be of sufficient thickness or continuous enough to act as a confining zone for the underlying unconsolidated sand and bedrock zones. The underlying unconsolidated sand zone is approximately 50 feet thick and is underlain by bedrock.

Depth to water in the on-site wells ranges from approximately 5.0 feet to 15.0 feet below ground surface. Based on ground water level measurements obtained during the Phase I and II RIs, flow direction in the shallow landfill water bearing zone is radial in nature. Ground water flow in the unconsolidated sand and

bedrock zones is predominantly north to northeast, toward the Passaic River. However, in the southwestern portion of the Site, ground water flow in the sand and bedrock zones appears to be in a west/northwest direction. A downward vertical gradient exists between the shallow landfill water bearing zone and the sand zone resulting in the downward movement of shallow ground water.

2.2.5 Surface Drainage Features

Surface drainage at the Site has been somewhat modified as a result of previous landfilling operations. The site topographic map (Figure 2-1) indicates a topographic high exists in the center of the Site. Surface water north of this topographic high drains north and northeast, flowing into an intermittent drainage ditch located along the northern and northeastern property boundary. Water in this drainage ditch flows in an easterly direction to a permanent drainage ditch at the northeast corner of the Site. This drainage ditch flows in a southerly direction for about 100 feet, then turns to the east, and flows off-site to its eventual confluence with the Passaic River. Off-site, this drainage ditch is known as Lawyers ditch. Based on field observations, water levels in this drainage ditch along the northeastern property boundary are effected by tidal fluctuations. South of the topographic high, surface water flows in a southerly direction and towards Raymond Boulevard. There are no drainage swales or ditches in the southern half of the Site and surface water probably flows from the Site as overland flow.

As previously mentioned, the Site is situated approximately 2,000 feet west of the Passaic River. Surface water that flows from the Site discharges into the river via the drainage ditch in the northern portion of the Site or the City of Newark's storm water sewer system. Only one storm water sewer line has been identified immediately south of the Site (see Figure 2-1).

In accordance with NJAC 7:26E-4.8(b)4.iv, a copy of the freshwater wetlands maps for Elizabeth and Jersey City, New Jersey, were obtained from NJDEP and reviewed with respect to classification of adjacent wetlands. Based on this review, there are essentially four wetland/water classifications found on/or adjacent to the site. These classifications consist of the following: 392, 19, 01, and 424. These classifications are described as follows: 392 = R3UB1X which translates to Riverine, upper perennial unconsolidated bottom cobble/gravel, excavated; 19 = PEM1B which translates to Palustrine, emergent, persistent saturated; 01 = Upland, which primarily represents upland areas, but may include unclassified wetlands less than one acre in area, and non-photoidentifiable areas; 424 = UWL which translates to Upland, intermittently flooded/temporary, subtidal. A copy of these maps and the associated supplemental key are included in Appendix A.

2.2.6 Local Water Usage

According to the Newark City Water Supply Division, the area surrounding the Site, including the Ironbound Community, receives its potable water from the North Jersey Water Supply Commission (NJWSC). The NJWSC obtains its water from the Wanaque Reservoir which is located in Passaic County in northern New Jersey. As indicated in Section 2.5.2, SMC conducted a well search covering a 1/2-mile radius around the Ottilio Landfill. Based on the results of this survey, there are no permitted potable water wells located within a 1/2-mile radius of the site. Any well located within this radius is reportedly used for either monitoring or industrial purposes.

2.3 Climatology

The climate of Essex County is largely continental with winds coming predominantly from the interior of North America. The summers are controlled by tropical air masses and the winters by polar continental air masses. From October to April, the prevailing winds are from the northwest and from May to September the prevailing winds are from the southwest.

Average annual precipitation in the area is approximately 45 inches. Rainfall amounts are generally uniform throughout the year and average three to five inches per month (Anderson & Faust, 1973). The average daily high temperature for the area is approximately 63°F; the average daily low temperature for the area is approximately 46°F.

2.4 Previous Investigations at the Ottilio Landfill

SMC reviewed site plans for the ECRR property located north of the Ottilio landfill developed by Gibbs & Hill, Inc., dated 1984. These site plans indicated that several soil borings were installed at the Ottilio site in 1974. This is the same year that the NJDEP completed its first site visit. However, SMC could not find any reports associated with the Gibbs & Hill, Inc. site plans. Therefore, SMC can not verify if any borings were installed at the Ottilio site in 1974.

Two USEPA Field Investigation Teams (FIT) have performed preliminary studies at the Site since 1982. The results of the two studies are presented in a FIT report compiled by Fred C. Hart Associates, 1982. During the investigations, sediment and water samples were collected from points along the north and northeast boundaries of the Site. Contaminants discovered in the samples during these FIT investigations included Pesticides, PCBs, volatile organics, polynuclear aromatic hydrocarbons (PAH), and heavy metals (specifically, lead and arsenic). An additional investigation at the Site was performed on April 26, 1985 by NJDEP, Division of Waste Management. The results of the 1985 study indicated that concentrations of volatile organic compounds (VOCs) are present in the soil and surface water on Site.

In late 1986, the NJDEP awarded SMC a contract to complete an RI/FS at the Site. As part of the RI/FS, a Phase I RI was implemented. This Phase I RI included the collection of forty-two (42) subsurface soil samples, twelve (12) surface soil samples, six (6) sediment and surface water samples, and six (6) ground water samples. The results of the Phase I RI are documented in a report entitled "Remedial Investigation/Feasibility Study (RI/FS), Phase I Remedial Investigation Report, Ottilio Landfill, Newark, New Jersey" dated February 1992. Conclusions drawn from the Phase I RI are summarized below.

Results of the Phase I investigation indicated that surface and subsurface soil/sediment at the Site is contaminated with semi-volatile organic compounds, metals, and total petroleum hydrocarbons (TPH). Elevated pesticide levels were also detected in the subsurface soil and, to a lesser degree, in the surface soil and sediment. The most highly contaminated soils were generally found in the first 10 to 12 feet below the ground surface. However, elevated contaminant levels were also detected in native soils beneath the Site; particularly in soils beneath the southeastern corner of the northern lot (Lot #16) and the northeastern corner of the southern lot (Lot #12).

In general, Phase I RI data indicated that the surface sediment at the Site is contaminated with semi-volatile organic compounds and metals. The contaminated sediments were detected in the drainage ditch at points along the northern and northeastern property boundary and at a point about 100 feet east of where the drainage ditch leaves the Site. The specific semi-volatile compounds and metals detected at elevated levels in the sediment are similar to those found in both the surface and subsurface soil. This similarity suggests that these media are the source of the contaminants.

Surface water sampled at the Site during the Phase I was contaminated with respect to elevated metals and certain other parameters (i.e., ammonia, chloride, total dissolved solids). The elevated metals include, for the most part, lead, silver and sodium. Each of these metals was detected at elevated levels in water samples collected at off-site locations with the highest levels detected immediately downgradient of a leachate seep. This suggests that surface flow in the drainage ditch is transporting contaminants off-site, towards the Passaic River. It appears that the elevated lead and silver levels are associated with past landfill operations. However, the elevated sodium and chloride levels, although likely associated with past landfill operations, may also be attributed to the urban setting (i.e., road salts) and possible salt water intrusion.

The sources of the contaminants detected in the surface water are most likely the contaminated surface and subsurface soils located within the landfill area, and, to a lesser degree, sediments within the drainage ditch. Additionally, leachate seeps located at the toe of the landfill along the northern central boundary and in the northeast corner of the Site discharge contaminants to surface water flowing in the

drainage ditch. These leachate seeps represent ground water discharge in these areas.

Ground water beneath the Site is contaminated with respect to elevated volatile organics, metals, and certain other parameters (i.e., ammonia, chloride, sulfate, total dissolved solids). Elevated volatile organics and the highest metals contamination were detected in the eastern portion of the northern lot (Lot #16). The primary source of these contaminants in the ground water appears to be the infiltration and downward percolation of rain water through the contaminated surface and subsurface soil at the Site. Downward migration of the contaminated shallow ground water also appears to be contaminating ground water in the underlying sand aquifer.

2.5 Background Investigations

As part of the background investigations, a background data review of environmental information generated at the ECRR facility and a review of historical site maps was completed. Also, an industrial well survey as well as the evaluation of adjacent underground utilities was completed as part of the background investigations.

In addition to the ECRR data review, SMC also reviewed available files at NJDEP's Bureau of Underground Storage Tanks regarding ground water investigations completed on the Deleet Merchandising property, which is located immediately adjacent to the southwestern portion of the Site. The discussion of the results of our review of the Deleet ground water data is provided in Section 4.13 along with a discussion of the ECRR ground water data, and comparison of these two (2) databases to the Ottilio ground water data.

SMC also contacted Mr. Russell Furnari, the Environmental Coordinator for the Essex Generation Station of PSE&G located east/northeast of the Site beyond the New Jersey Turnpike. SMC contacted Mr. Furnari in an attempt to obtain any available ground water quality information for the PSE&G facility. This information would have been used to establish ground water quality condition's hydraulically downgradient of the Ottilio site. However, with the exception of three (3) shallow wells installed adjacent to an underground storage tank located in the far northeastern portion of the site, Mr. Furnari indicated that there were no monitoring wells located on the PSE&G property. Therefore, SMC could not establish a baseline for off-site downgradient ground water quality.

2.5.1 Essex County Resource Recovery (ECRR) Project Data Review

Prior to initiation of the Phase II field work, a review of available environmental data generated at the Essex County Resource Recovery (ECRR) facility, located immediately north of the Ottilio Landfill, was undertaken. This review was

implemented in an effort to identify the type and level of contaminants present on the ECRR site, and to determine whether or not any of the wells previously installed at the ECRR facility could be used as part of the Ottilio Phase II RI. As discussed below, none of the ECRR wells were located in the appropriate positions which would allow their use in the Phase II RI.

The ECRR facility is located on a 25-acre site along the Passaic River directly north of the Ottilio Landfill as indicated on Figure 1-3 (Lots #68 and #92, Tax Block 5001). The property that currently comprises the ECRR facility was reportedly vacant until the mid 1960s when portions of the site were used for the storage of abandoned and junk automobiles. The property was originally acquired by the Newark Redevelopment and Housing Authority (NRHA) through condemnation proceedings. NRHA purchased the property for potential resale and development to Combustion Equipment Associates (CEA), which proposed a refuse processing facility on the Site. After the NRHA property purchase, the CEA experienced project funding problems and the proposed facility concept was abandoned (Versar, Inc., 1986). The NY/NJ Port Authority became involved with the site in the early 1980s and purchased the site from the NRHA with the intent to remediate and subsequently construct the Resource Recovery Facility. The facility is currently operating as a co-generation plant (i.e., trash to steam).

The remainder of this section provides a brief chronology of the environmental investigations and subsequent remedial activities which have been completed at the ECRR property. A majority of the information summarized below was provided to us in the forms of reports and miscellaneous project files by to us by Mr. Chuck King, Principal Management Engineer, Regional Development Department of the Port Authority of NY and NJ, at the ECRR facility during our site visit on January 13, 1993. A comparison of the types and levels of contaminants detected in the various media sampled at the ECRR property versus those detected at the Ottilio site is included in Section 4.13. A detailed discussion of the results of the analysis of samples collected on the ECRR property but near the Ottilio site, along with a Figure showing these locations is provided in Section 4.3. However, a summary of the sampling that was completed at the ECRR facility is provided below.

SMC reviewed site plans developed by Gibbs & Hill, Inc., dated 1984. These site plans indicate that several soil borings and test pits were installed at the ECRR site sometime in 1978. However, SMC could not find any reports associated with the Gibbs & Hill, Inc. site plans. Therefore, SMC can not verify if any investigations were completed at the site in 1978.

As reported by the Versar, Inc. (1986), the first documented site investigation was conducted by the Design Division's Environmental Unit and Geotechnical Section for the Port Authority of NY & NJ (Port Authority) in 1982. As part of this investigation, fourteen (14) ground water monitoring wells were installed at the site. Of these, nine (9) were completed as shallow wells (completed above the organic silt

layer), four (4) were completed as intermediate wells (completed below the organic silt layer) and one (1) was completed as a deep well (completed in the bedrock). Several soil samples were collected from each of the borings, and the wells were subsequently sampled. During this investigation, a visual inspection of the property revealed the following (Versar, 1986):

- o One hundred to two hundred drums, open and closed, some full, some empty and some partially full, the contents of which are unknown; located in the northern section of the site.

- o There is one (1) tank truck, the contents of which were unknown, located in the northwestern section of the site.

The results of the Port Authority's 1982 investigation were documented in a report dated February 1983. Based on a review of this report, none of the thirteen (13) subsurface soil samples contained any significant concentrations of PCBs (based on comparison to a total PCB level of 50 ppm), and only one (1) of the thirteen (13) samples displayed total petroleum hydrocarbons above the NJDEP's current soil cleanup criteria of 10,000 ppm. Also, none of these samples were characteristically hazardous based on the results of the E.P. Toxicity testing completed on each sample. However, there were a number of compounds detected in the subsurface soil at the ECRR site that exceeded then published NJDEP Cleanup Criteria (1982). The significant compounds and their highest on-site concentrations are as follows: Benzene (1.23 ppm), Toluene (8,000 ppm), Bis (2-Ethylhexyl) Phthalate (0.041 ppm) and Phenol (4.95 ppm). Results of ground water samples indicate that contaminated ground water was generally confined to the shallow system and some of the compounds detected exceeded then published N.J. ground water criteria (1982). The compounds most consistently detected in the ground water along with their highest concentrations are as follows: benzene (1,230 ppb), ethylbenzene (660 ppb), methylene chloride (2,590 ppb), chloroform (330 ppb) toluene (8,000 ppb), bis(2-Ethylhexyl)phthalate (57 ppb) and phenol (4,950 ppb). The most contaminated well was RR-2.

In about October 1983, the NJDEP met with the Port Authority to discuss on site contamination, existing data, further sampling needs, and appropriate mitigation measures.

In late 1983 to early 1984, the Port Authority implemented additional site investigations. These investigations included the: 1) collection of ambient air samples across the site and the screening of these samples with a photoionization organic vapor analyzer; 2) implementation of a ground penetration radar survey; 3) evaluation of ground water flow conditions; 4) resampling of the existing site wells; 5) collection of six surface soil samples; 6) collection of storm water samples from three different locations in the drainage ditch which bisected the site from north to south and drained

in a northerly direction; and 7) the collection of two (2) ground water samples from off-site industrial facilities located west/southwest of the site.

Results from this investigation, which were documented in a July 1984 report, indicate that no areas on-site displayed volatile organic vapors above 5 ppm in the ambient air. The ground penetrating radar survey did not identify any areas which possibly contained large amounts of buried drums. The direction of ground water flow in the shallow system was influenced by on-site topographic highs and the drainage ditch which bisected the site. Ground water in this system flowed towards the drainage ditch and in the intermediate system, it flowed primarily toward the north. The results of the resampling of the wells generally indicated the presence of the same parameters as were detected in these wells in 1982 but at lower concentrations. Well RR-2 was still the most contaminated. The surface soil samples all contained a few volatile organics, semi-volatile organics and metals. The most consistently detected compounds along with their highest concentration included: methylene chloride (395 ppm), ethylbenzene (6.05 ppm), benzo(a)-anthracene (2.87 ppm), benzo(a)pyrene (2.6 ppm), bis(2ethylhexyl)phthalate (22.6 ppm), arsenic (67 ppm), chromium (96 ppm), lead 510 ppm), zinc 1,300 ppm), and phenols (3,160 ppm). The storm water samples generally contained one (1) or more of the following compounds with the highest concentration of the compounds indicated in parentheses; benzene (15 ppb), 1,1,1-trichloroethane (15 ppb), copper (30 ppb), lead (590 ppb), mercury (0.6 ppb), silver (40 ppb), zinc (70 ppb). The two (2) off-site ground water samples, which appear to have been collected from wells located hydraulically upgradient of the site generally contained one (1) or more of the following compounds with the highest concentration of the compounds indicated in parentheses; 1,1-dichloroethane (12 ppb), 1,2-transdichloroethylene (121 ppb), tetrachloroethylene (17 ppb), trichloroethylene (447 ppb), copper (450 ppb), and zinc (1,500 ppb).

In October 1984, the NJDEP issued the NRHA a directive letter to initiate remedial measures on site regarding surface containers and subsurface contamination. The NRHA subsequently entered into an Administrative Consent Order in January of 1985 with the NJDEP to conduct necessary remedial measures.

In January 1985, the Cavanaugh Group was retained by the NRHA to begin remediation at the site. The objective of the site remediation was to sample, remove and properly dispose of all drums, tankers and cylinders located on site as well as all associated contaminated soil. The Cavanaugh group removed a total of 665 overpacked drums, 70 gas cylinders, 26 cubic yards of crushed drums and 88.7 tons of soil during remediation activities for disposal at a hazardous waste disposal facilities. An additional 5,885 cubic yards of soil and debris were removed for disposal at an ID 27 (Industrial Waste) landfill. During the site remediation activities, two (2) additional "hotspots" which contained contaminated soil were identified. These "hotspots" were not however remediated by the Cavanaugh Group.

Remediation activities were completed by June 1985. The results of the remedial activities were documented by the Cavanaugh Group in an undated report.

In November 1985, Weston, under the supervision of the NJDEP, arrived on the ECRR site in order to investigate the two (2) "hot spots" identified by the Cavanaugh Group, one located in the southwest portion of the site referred to by Weston as the "RR2/3 Area" and the other at the western edge of the Transco/ PSE&G easement line referred to by Weston as the "Tire Pit Area". Weston developed a test pit program to delineate the horizontal limits of the "hot spots". A total of fourteen (14) tests pits were excavated in the Weston designated RR2/3 Area. These fourteen (14) test pits were field identified as being clean. A total of twenty-four (24) clean and dirty test pits were excavated at the Weston designated Tire Pit Area covering a 400 square foot area. Samples collected during these activities detected compounds with high levels of contamination which also suggested that the contamination extended beyond the limits of the two "hotspots". The most consistently detected compounds along with their highest concentration are as follows: petroleum hydrocarbons (36,000 ppm), bis(2-ethylhexyl)phthalate (2,100 ppm), lead (917 ppm), benzene (140 ppm), ethylbenzene (1,600 ppm), toluene (8,500 ppm) and naphthalene (22,000 ppm). The results of these activities were documented in a report prepared by Weston dated January 1986.

In February 1986, Storch Engineers, under the supervision of the NJDEP, completed additional subsurface investigations at the site to identify the limits of the contaminated soil in the area of the two "hotspots". Storch Engineers developed a 50-foot grid system over the two areas and then excavated twenty-five (25) test pits in field determined locations. The test pits were sampled and results indicated that there were a number of compounds detected in the soil in the area of these test pits. The most consistently detected compounds and their highest concentrations are as follows: ethylbenzene (2.8 ppm), methylene chloride (4.19 ppm), 1,1,1-trichloroethane (.17 ppm), anthracene (7.48 ppm), benzo(a)anthracene (11 ppm), benzo(b)pyrene (7.87 ppm), bis(2-ethylhexyl)phthalate (279 ppm), di-n-butyl phthalate (4.08 ppm), fluoranthene (33.8 ppm) , pyrene 28 (ppm), Aroclor 1254/1260 (5.7 ppm), and benzo(b)fluoranthene (8.02 ppm).

In June 1986, Versar Inc. completed a Risk Assessment for the NJDEP by combining the results of the five (5) previous site investigations. The risk assessment concentrated on the two (2) hotspots which had not yet been remediated. The contaminants of concern used in Versar's Risk assessment included lead, arsenic, cadmium, chloroform, tetrachloroethylene, benzene, petroleum hydrocarbons, pyrene, benzo(a)pyrene, and bis(2-ethylhexyl)phthalate. Based on the results of the risk assessment, Versar concluded that inhalation posed the only significant exposure risk to human health or the environment. As a results of this evaluation Versar subsequently evaluated several remedial alternatives associated with the risk posed by the two (2) "hotspots".

In July 1986, the Engineering Department for the Port Authority of NY & NJ completed a subsurface investigation at the proposed site of the access roadway for the ECRR facility. The investigation consisted of the collection of surface and subsurface soil samples, ground water, surface water and sediment samples along the length of the proposed access road. Surface soil results revealed a number of compounds detected beneath the ECRR access road right-of-way (ROW) with high levels of contamination. The significant compounds and their highest concentrations are as follows; benzo(a)anthracene (3.1 ppm), benzo(a)pyrene (2.3 ppm), bis (2-ethylhexyl)phthalate (31 ppm), pyrene (5.7 ppm), 4,4' DDT (0.993 ppm) and 4,4' DDD (2.525 ppm). Subsurface soil results also indicated that there were a number of compounds detected in the subsurface soils beneath the ECRR access road right-of-way with high levels of contamination. The significant compounds and their highest concentrations are as follows: benzo(a)anthracene (2 ppm), benzo(a)pyrene (1.6 ppm), bis(2-ethylhexyl)phthalate (0.7 ppm), pyrene (27 ppm), 4,4' DDD (0.806 ppm) and PCB 1260 (1.055 ppm).

This investigation also included the collection of one (1) composite sediment and one (1) composite surface water sample collected at the point were the ECRR access road crosses Lawyers Ditch. Results of the sediment analysis revealed a number of compounds including benzene (84 ppb), chlorobenzene (50 ppb), ethylbenzene (20 ppb) and bis(2-ethylhexyl)phthalate (95,000 ppb). The surface water sample collected at the same location indicated that there were no measurable amounts of organics detected in the water sample; however, there were several inorganic compounds present in the sample. Ground water samples collected from three (3) newly installed monitoring wells along the ECRR access road right-of -way indicated the only measurable amount of organic contaminant detected was chloroform (17 ppb).

In the Port Authority's report dated July 1987, they indicate that the level and types of contaminants detected in the soils and sediments were consistent with the industrial nature of the surrounding area. There was no indication that any "hotspots" existed. Also, the types and levels of contaminants detected in the shallow ground water was consistent with the Newark metropolitan area.

In September 1988, the Engineering Department for the Port Authority of NY & NJ issued a Supplementary Environmental Subsurface Investigation to the initial program in 1987. This supplementary report focused on the investigation of subsurface soils along the proposed ECRR access road right-of-way. Based on this supplementary investigation, the Port Authority concluded that no "hotspots" occurred along the route of the proposed roadway, and that excavations along the right-of-way would not disturb material that could pose environmental or health hazards.

A comparison of data included on soil boring and monitoring well logs for both the ECRR site and Ottilio Landfill indicate general similarities between the geologic setting for the two sites. Each site consists of four (4) individual and well defined stratigraphic layers.

The ECRR site is generally covered with a layer of heterogeneous fill material, which ranges in thickness from five to twenty feet. This fill material is generally composed of silt, sand, and gravel intermixed with construction debris. The fill material is underlain by an organic layer consisting of silt and peat and ranges in thickness from five to twenty feet. This organic layer is generally thinnest along the southern portion of the site and thickens towards the north. A medium to fine grain sand sequence is located directly beneath the organic layer and ranges in thickness from fifteen to thirty feet.

This medium to fine grain sand sequence is underlain by a clayey silt layer, which ranges in thickness from five to twenty feet. The clayey silt layer is very dense and contains traces of rock fragments from the shale bedrock layer located directly beneath this layer. The shale bedrock is generally encountered at a depth of 60 to 80 feet beneath the surface of the site.

2.5.2 Local Industrial Well Inventory

All available information concerning industrial wells within a one-half mile radius of the Site were collected in an effort to better define local ground water flow conditions. The primary objective of this well inventory was to determine if off-site industrial wells are influencing ground water flow conditions at the Site. As part of these activities, an NJDEP computerized well search for the areas within a one-half mile radius of the Site was completed. The results of these search are discussed below and included in Appendix B.

SMC personnel visited the NJDEP offices in Trenton, NJ and completed a 1/2-mile radius well search around the Ottilio landfill. Results of this well search indicate that there are no residential wells or other water supply wells used for potable purposes located within the 1/2-mile radius. The only wells located within the 1/2-mile radius are used for ground water monitoring purposes or industrial (i.e., cooling, fire protection, etc.) uses. A copy of the Well Records obtained as part of the well search and a figure displaying the location of these wells in relation to the site are included in Appendix B. Originally, it was believed that the car wash located immediately southwest of the Site owned and operated a pumping well; however, upon further investigation and based on personal communications with a representative of the car wash on August 26, 1994, no pumping well exists at this location. The car wash representative also indicated that they have always obtained their water from the City of Newark.

2.5.3 Investigation of Existing/Potential Underground Utilities Beneath and Adjacent to the Site

Underground utility lines represent potential conduits for contaminant migration. As such, SMC completed an investigation to locate all underground utility lines (e.g., sewer, electrical, and gas lines) beneath and immediately adjacent to the Site. Relevant information pertaining to any underground utility, including the depth to the utility and any associated trench, nature of backfill, date(s) of installation, and slope of trenches was also obtained. Additionally, as part of this task, NJDEP's Bureau of Underground Storage Tanks (BUST) was contacted to determine whether or not any underground storage tanks exist on Deleet's property, which is located adjacent to the Ottilio site. The results of this investigation are described below.

SMC personnel placed a New Jersey One-Call before the start of field activities in order to locate all on- and off-site underground utilities. Results of this call are as follows: three (3) buried natural gas pipelines cross the Site along the western property boundary [two (2) of these pipelines belong to PSE&G and the third to Transco, Inc.]; one (1) active electrical line runs along the drainage ditch on the northern border of the site in a northeasterly direction; one (1) abandoned electrical line runs along the Passaic Branch of the New York Bay Railroad on the eastern border of the site; and one (1) U.S. Sprint fiber-optic underground cable is located along the eastern property boundary of Lot #12. All underground utilities were also confirmed in the field by representatives from their respective Companies. SMC is currently awaiting additional information from these Companies regarding the depth of the pipes and associated trenches, the type of backfill material used during construction, and the date(s) of installation, which will be submitted as addenda to this report when received.

Based on a telephone conversation with Mr. Lee Hendricks and Ms. Nancy Christoi at the NJDEP, Bureau of Underground Storage Tanks (BUST), there are reportedly forty-five (45) active underground storage tanks located on the adjacent Deleet Merchandizing property. The contents of these tanks varied in chemical composition. There were three (3) USTs located on the New Jersey Millwork property. These included two (2) 4,000-gallon diesel tanks and one (1) unleaded gasoline tank.

2.5.4 Review of Historical Site Maps

All available historical maps for the Site (tax, land use, wetlands, tidal/floodplain) were obtained and reviewed. Tax and land use maps were presented and discussed in Section 1.2. The wetlands, tidal/floodplain maps are discussed and presented in Section 2.2.5. Available aerial photographs covering the Site and adjacent properties were also examined and reviewed. The primary objectives of these efforts were to document historical site uses, fill history, and drainage patterns.

Seven (7) of the most representative historical aerial photographs of the Site were obtained and reviewed. These photos were from 1940 (the earliest aerial photograph available), 1951, 1961, 1972, 1974, 1979 and 1987. A copy of each aerial photograph is included in Appendix C. The results of the review of these photographs is provided below. Aerial photographs that are available for the Site but which were not reviewed include photos from 1954, 1977, and 1986.

1940 AERIAL PHOTOGRAPH

Some soil disturbance or evidence of possible dumping on the southern lot (Lot #12) is evident as white patches in the photo, with approximately 50% of the entire Site (Lots #12 and #16 combined) covered with natural vegetation. Lot #16 is undisturbed. A small stream is apparent from the approximate center of the site and extends toward the eastern boundary of the Site. The Deleet and New Jersey Millwork properties are relatively undeveloped with some excavating activities apparent on the New Jersey Millworks property, and small vehicle access roads are visible on the adjacent sites. An off-ramp for the General Pulaski Skyway runs east to west along the southern boundary of the Site. The right-of-way for the New Jersey Turnpike appears to have been cleared for future construction.

1951 AERIAL PHOTOGRAPH

Soil disturbance and possible dumping is evident on Lot #12. Lot #16 appears to be undeveloped and covered with natural vegetation. A small stream cuts across Lot #16 in a east-west direction, with several small drainage ways apparently feeding into the stream.

Evidence of soil and/or fill piles are visible throughout Lot #12, along with grading activities. The surface appears to have been nearly completely cleared of vegetation, except in the northeast corner of Lot #12. Several vehicles appear in the southeast corner of the Site. A dirt access road is visible along the western border of the Site. The General Pulaski Skyway is visible in the photo. An off-ramp to the Skyway appears along the southern border of the Site. Also, construction has begun on the New Jersey Turnpike and is apparent east of the Site. The structure currently occupying the Deleet property is visible in this photo. A smaller building is also visible on the present-day New Jersey Millwork property.

1961 AERIAL PHOTOGRAPH

Disturbance of the soil on Lot #12 is evident. Lot #16 is relatively undeveloped and covered with natural vegetation. Two small streams join in the northeastern portion of Lot #16 to form a small creek which flows easterly off-site and eventually into the Passaic River.

A large dirt mound is located in the middle of Lot #12 with grading taking place at other areas of Lot #12. Also piles of refuse or other debris can be seen in this area. Vegetation is noticeably missing and many vehicular tracks can be seen leading off the site in nearly all directions, including west towards the Deleet Property and north towards the future site of the Essex County Resource Recovery Facility.

1972 AERIAL PHOTOGRAPH

Landfilling activities are occurring on site during this time. There is natural vegetation on the northern, eastern, and western portions of Lot #16. On the northeastern corner of Lot #16, at the intersection of the railroad tracks, an electrical tower has been constructed. Directly south of the electrical tower, a swale or drainage ditch can be seen running for approximately 100 feet in a southwesterly direction. The small streams which were apparent in the 1961 photo have been graded over and only a small portion of the creek is visible near the east-central portion of Lot #16. Lot #16 appears to have been built-up forming slopes along the perimeter. The New Jersey Millwork building is also visible for the first time near the western portion of Lot #16.

Landfilling activities are occurring on Lot #12, but appear to be less active than Lot #16. There is volunteer vegetation growing on the western portion of Lot #12. The eastern portion of Lot #12 appears to be more heavily active. There is an earthen road extending from the Deleet property across Lot #12 and onto Lot #16. A number of abandoned automobiles have been stored on site near the southern portion of Lot #12. Also, piles of refuse and other discarded materials are present on site.

1974 AERIAL PHOTOGRAPH

Landfilling activities are occurring during this time. Lot #16 appears to be graded with no noticeable vegetation. There are a number of ditches and depressions appearing across the lot. Large areas of various debris are scattered around the lot. The small creek which existed near the east-central portion of Lot #16 on the 1972 aerial photograph, is still apparent at this time.

Landfilling activities on Lot #12 have increased since the 1972 aerial photograph. The western portion of Lot #12 is slightly vegetated with many small areas of debris scattered across the lot. There are many abandoned automobiles along the railroad tracks at the eastern border of Lot #12. The earthen road that extends from the Deleet property across Lot #12 and into Lot #16 is still evident in this aerial photograph and now extends to the northeast corner of Lot #16.

1979 AERIAL PHOTOGRAPH

It appears that landfilling activities have ceased at this time and grading of Lot #16 has occurred since the 1974 aerial photograph. There is very little vegetation in this area and the small creek near the eastern portion of the lot is no longer apparent. Many mounds of soil are evident in the southwestern corner of Lot #16.

Lot #12 has also been graded and is covered with volunteer vegetation. There are several piles of refuse or other debris located on the western portion of this lot. The earthen road which was apparent in the early aerial photographs appears to extend from the Deleet property into Lot #12 only. Additional buildings have been added to the Deleet property.

1987 AERIAL PHOTOGRAPH

All obvious signs of landfilling activities have been hidden by volunteer vegetation that covers nearly all of the landfill surface. A parking lot, for the New Jersey Millwork, has been added to the western portion of Lot #16. Debris/refuse is scattered around Lot #16 especially in the area of the New Jersey Millwork parking lot. The soil mounds that were first apparent in the 1979 aerial photograph, in the southwestern portion of Lot #16, are now covered by volunteer vegetation.

Volunteer vegetation has also covered nearly all of Lot #12. Two (2) earthen roads are apparent in this aerial photograph, one extending from the Deleet property east along the central portion of Lot #12 and a new road extending east from the New Jersey Millwork along the northwestern portion of Lot #12. Both roads seem to terminate in areas of various debris, refuse, and vegetated mounds. There are four (4) trailers, which were not evident in the 1979 aerial photograph, near the western portion of Lot #12. Additional buildings have been added to both the Deleet and the New Jersey Millwork properties.

6.0 SUMMARY OF ENVIRONMENTAL SITE CONDITIONS

This Section of the report provides a summary of the Ottilio Landfill environmental site conditions. This summary was developed based on the results of the original Phase I RI and the Phase II RI site characterization activities (including Phase I resampling) as presented in Section 4.0 and the results of the environmental risk assessment as presented in Section 5.0.

6.1 Site Hydrogeologic Conditions

Geologic Conditions

A total of five (5) stratigraphic units can be distinguished beneath the Site. These stratigraphic units are: 1) landfill cover - a brown silty loam with a trace of fill material; 2) landfill material - miscellaneous fill consisting of concrete, brick fragments, wood chips, organics and other debris; 3) black silt and organics - a black organic silt layer with an abundance of peat; 4) unconsolidated sediments - sequence of alternating red/brown silt and sand layers; and 5) bedrock - fine grained sandstone/shale (the Passaic Formation, formerly known as the Brunswick Formation).

The uppermost brown silty loam varies between 0 and 8 feet in thickness, and small amounts of fill material (concrete, brick fragments, wood chips) are intermixed within this unit. The upper unit comprises a cover for the bulk of the landfill, and is distinguished by its variable thickness and its minor fill content. Underlying the surficial cover is the landfill material. The landfill material varies widely in composition both horizontally and vertically. The materials of the landfill proper are grouped into two (2) units: 1) a brown silty loam cover material, and 2) a highly variable fill material consisting of concrete, brick fragments, wood chips, glass, steel, and plastic. Buried drums occur in various parts of the landfill. The landfill material ranges in thickness from less than 1-foot in the southern portion of the landfill to up to 15 feet in the central and northeastern portions of the landfill.

Below the fill material is a somewhat continuous layer of black silt, and sand, peat, and rooted organics consistent with marsh facies deposition. This layer is thickest in the northeast portion of the Site, where up to five (5) feet of the black organic silt was found, and appears to pinch out toward the southwest. The black organic silt zone overlies an unconsolidated sediment sequence consisting of mostly red/brown silt and sand layers. This unconsolidated sediment sequence ranges in thickness from approximately 50 feet in the southwest section of the Site to approximately 25 feet in the northeast section of the site. Generally, the last 10 feet of this unconsolidated sequence consists of red/brown silt and clay with decreasing amounts of sand. This

last 10 feet of silt and clay may represent the weathered bedrock surface. The bedrock which underlies the Site consists of red fine grained sandstone/shale of the Passaic Formation. Bedrock was generally found at a depth of between 55 and 65 feet below the ground surface (BGS).

Hydrologic Conditions

The hydrogeology at the Site is characterized by three (3) geologically different zones that are hydraulically connected and constituent one (1) single aquifer. The upper most shallow water bearing zone is located within the fill and overlies an organic silt zone. This organic silt layer does not appear to be of sufficient thickness or continuous enough to act as a confining zone for the underlying unconsolidated sand and bedrock zones. The underlying unconsolidated sand zone is approximately 50 feet thick and is underlain by bedrock.

A ground water mound exists in the shallow landfill water bearing zone in the central portion of the Site. The water table slopes away in all directions from the vicinity of this high, resulting in an elevation decrease in a radial pattern. The true extent of radial influence cannot be determined with the existing Ottilio RI wells.

The highest ground water elevation in the intermediate and deep wells was found in the south-central portion of the Site. The potentiometric surface in these two zones slopes generally toward the north and northeast from the vicinity of this high. Therefore, ground water flow in the unconsolidated sand zone and the upper portion of the bedrock appears to be toward the north/northeast.

Ground water flow in the shallow and intermediate zones at the Deleet Merchandising property located immediately west of the southwestern portion of the Site is toward the west. On the ECRR property located immediately north of the Site, ground water flow in the shallow zone was, prior to construction of the Resource Recovery facility, influenced by site topography and was somewhat radial in nature. However, ground water flow in the intermediate and bedrock zones at the ECRR site was toward the northeast.

A downward vertical gradient of between 0.007 and 0.04 exists between the shallow and intermediate wells. Between the deep and intermediate wells, the downward vertical gradient ranges from 0.002 to 0.01. These gradients indicate that the vertical direction of ground water movement in the fill and beneath the Site is generally downward. The ground water flow velocity in the unconsolidated sand zone is calculated to be approximately 8.0 feet per year. Based on this ground water flow velocity and the knowledge that landfill operations at the Site have been occurring for

about the past 35 years, contaminants in the ground water beneath the landfill could have migrated off-site a distance of at least 280 feet.

6.2 Summary of Contaminant Characterization

6.2.1 Test Pit Observations

A total of ten (10) test pits were installed at the Site. During the test pit installations, drums were encountered in TP-2, TP-4, TP-5, TP-6B, and TP-9. No drums were encountered in test pits TP-1, TP-3, TP-6A, TP-7, and TP-8. Evidence of drums was also seen at TP-10 however, no intact pieces were discernible due to the severity of corrosion.

Two (2) drums were encountered in TP-2 near the surface of the landfill and contained a very small amount of liquid which appeared to be similar to hydraulic fluid. These drums appeared to be crushed and corroded and past leakage was apparent beneath the drums. Two (2) drums were encountered in TP-4 and were located at a depth of greater than six (6) feet below the ground surface (BGS). These drums appeared to contain a very thick, black, tar-like substance which exhibited very high volatile organic vapors (VOCs). Evidence of past leakage was apparent immediately beneath the drums. At least five (5) severely corroded drums were encountered in TP-5. As many as four (4) severely corroded drums were encountered in TP-6B, however, only two (2) of these drums appeared to contain any material. A yellowish powder was encountered in a plastic bag within a drum at approximately five (5) feet BGS. An unknown number of severely corroded drums were encountered during the excavation activities conducted at TP-9. Two (2) distinctly different materials were encountered in this test pit in two separate partially disintegrated drums: a very dark crimson to black, thick and extremely viscous material; a very bright orange, viscous material.

No other drummed material was encountered at the remaining anomalies. The majority of the landfill material encountered in the remaining test pits consisted primarily of construction debris (i.e., wood, siding, roof shingles, steel beams, reinforced concrete, etc.). A storage tank was excavated at TP-7; however, the tank was empty and no VOCs were detected inside the tank.

Several samples of the contents of the drums encountered in the various test pits were collected and subsequently analyzed. One (1) sample of the drummed material was collected from each of the following test pits; TP-2, TP-4, TP-5 and TP-6B. Two (2) samples were collected from TP-9, where two (2) separate and distinct drummed materials were unearthed during test pit excavation activities.

The Soil Cleanup Criteria (SCC) for total volatile organics of 1,000 ppm was exceeded in TP-2 and TP-9B. TP-5 and TP-6 revealed no volatile organic compounds above SCC. The sample collected from test pit TP-2 revealed the most elevated volatile organic concentrations of 70,629 ppm with toluene, ethylbenzene, and total xylenes being the volatile organic compounds most consistently detected.

Seven (7) semi-volatile organic compounds were detected above their respective SCC in TP-2 and TP-9B, with TP-2 containing the greatest number and most elevated concentrations of these compounds. No PCBs were detected above laboratory detection limits. Of the pesticides analyzed, delta-BHC, heptachlor epoxide, 4,4-DDT, and gamma-chlordane were detected above laboratory detection limits; however, no pesticides were detected above their respective cleanup criteria.

Samples collected from TP-2, TP-6 and TP-9A contained inorganic compounds above their respective SCC. Arsenic, cadmium, lead, and silver were detected in one (1) or each of the test pit samples above their respective SCC. No organic or inorganic compounds were detected above TCLP regulatory criteria. However, during the original Phase I RI, cadmium was detected above its TCLP regulatory criteria of 1.0 ppm in one (1) subsurface soil sample collected at a depth of ten (10) feet below the ground surface. The test pit and Phase I samples were determined, by RCRA characterization, to be non-ignitable, non-corrosive, and non-reactive to cyanide and sulfide.

6.2.2 Soil Gas Survey

The results of the original Phase I soil gas survey revealed methane levels across the site which range from non-detectable to greater than 1,000 ppm. The northern, western and eastern boundaries of the Site had elevated levels of methane. During the Phase II, the methane levels across the study area ranged from non-detectable (ND) to 23 ppm with one anomalous location exhibiting a methane concentration greater than 1,000 ppm. The highest concentration of methane, greater than 1,000 ppm, was detected at the soil gas sample station located at the southeast corner of the New Jersey Millwork building. The areas which displayed high methane levels were, prior to the landfill and development of this area, generally swampy, resulting in the natural production of methane gas. However, some or possibly all of the methane gas detected across the Site could be the result of the decay of the landfill material.

The results from the original Phase I survey, which are supported by the Phase II data, indicate the highest volatile organic vapor concentrations were found in a band running east-west across the central portion of the Site. In addition, two (2) isolated locations were present in the southwestern and southeastern border of the

Site. Total volatile organic levels (the levels detected on the PID) ranged from ND to 23 ppm over the study area. These areas had high volatile organic concentrations due to compounds other than the naturally occurring methane, making them suspect areas of hazardous volatile organic contamination.

No hydrogen sulfide was detected during the soil gas sample collection activities. However, as mentioned above, methane was detected at a station located near the southeast corner of the New Jersey Millwork building. The Lower Explosive Limit (LEL) for this station was 115 percent yielding a methane supersaturated atmosphere which is above the OSHA acceptable LEL of 20 percent. The remaining LEL readings were less than 7.5 percent, which is a relatively non-combustible atmosphere. At the request of the NJDEP, PSE&G and Transco were contacted to determine if the elevated levels of methane could be due to a possible leak from their adjacent underground pipelines. Transco and PSE&G have visited the Site and tested their lines and have determined that the elevated levels of methane are not coming from their lines.

6.2.3 Surface Soil Conditions

No volatile organic compounds were detected above their respective SCC in any of the surface soil samples collected across of the Site or in the two (2) off-Site surface soil samples.

There were numerous semi-volatile organic compounds detected in the surface soil samples. However, the average concentration for only six (6) of these compounds, benzo(a)anthracene, benzo(b)flouranthene, benzo(k)flouranthene, benzo(a)pyrene, indeno(1,2,3-cd)pyrene, and dibenz(a,h)anthracene exceeded their respective SCC. The surface soil sample collected at off-site well location MW-7, which is located southwest of the Site, did not display any semi-volatiles above SCC. The compounds benzo(a)anthracene and benzo(a)pyrene were, however, detected above their SCC in the off-Site surface soil sample collected at well location MW-5D, which is located north of the Site.

The average concentration for all pesticides including dieldrin, which was detected above its SCC in sample SS8, for the on-Site surface soils was below their respective SCC. However, the average concentration for the three (3) individual PCBs (i.e., aroclors 1248, 1254, and 1260) and the total PCB content for the on-Site surface soils exceeded applicable SCC. The samples which generally displayed PCBs above applicable SCC were collected from the southeastern and southcentral portion of the Site. No PCBs were detected in the off-Site soil sample collected southwest of the Site. However, aroclor-1248, aroclor-1254, and total PCBs in the off-Site surface soil sample

collected at well location MW-5D, which is located north of the Site, were present above the total PCB SCC of 0.49 ppm.

Several metals including antimony, arsenic, cadmium, and lead were detected above their respective SCC in several of the on-site surface soil samples. However, only the average concentration for antimony, cadmium, and lead exceeded their respective SCC. Cadmium was detected above its SCC in both of the off-Site surface soil samples, and arsenic and lead were also present above their respective SCC in the off-Site surface soil sample collected at well location MW-5D.

None of the on-Site and/or off-Site surface soil samples displayed either a total petroleum hydrocarbon (TPH) level or a total organic concentration (i.e., the sum of the volatile organic, semi-volatile organic, pesticide/PCB, and TPH results) above the SCC of 10,000 ppm.

6.2.4 Subsurface Soil

The average concentration for the volatile organics methylene chloride, benzene, toluene, and xylenes exceeded their respective SCC in the on-site subsurface soil samples collected from the within the landfill. A majority of the subsurface soil samples which exhibited these compounds above SCC were collected in the central and east-central portion of the Site near borings CB-2, CB-3, CB-5, and MW-4. A few volatile organic compounds were detected above SCC in the subsurface soil sample collected below the landfill in well MW-4I. However, the average concentration for each individual volatile organic compound in subsurface soil samples collected below the landfill and from off-Site locations was below its respective SCC.

The average concentration for the semi-volatiles benzo(a)anthracene, bis(2-ethylhexyl)phthalate, benzo(b)fluoranthene, benzo(k)fluoranthene, benzo(a)pyrene, and indeno(1,2,3-cd)pyrene for subsurface soil samples collected in the landfill exceeded their respective SCC. These compounds were widely distributed throughout the landfill. Only the average concentration for the compound benzo(a)anthracene exceeded its SCC in the subsurface soil samples collected below the landfill. However, none of the off-site subsurface soil sample displayed an average concentration for any of the semi-volatile compounds which exceeded their respective SCC.

The average concentration for the pesticides aldrin and dieldrin in samples collected from within the landfill exceeded their respective cleanup criteria. The samples which exhibited these pesticides above SCC were generally collected in, or adjacent to, core boring CB-3, which is located in the south-central portion of the Site. The average concentration for the individual PCBs as well as the average

concentration for total PCBs in the subsurface soil samples collected within the landfill exceed the total PCB SCC of 0.49 ppm. Elevated total PCB concentrations, within the landfill, were generally encountered in, or adjacent to, borings CB-2, CB-3, CB-4, CB-5, MW-4I and SB-2, which are located in the south-central portion of the Site. The average concentration for each individual pesticide/PCB detected in the subsurface soil samples collected from beneath the landfill and from off-Site locations was below its respective SCC.

Subsurface soil samples collected from within the landfill exhibited average concentrations for the metals antimony, cadmium, and lead above their respective SCC. Subsurface soil samples collected below the landfill exhibited an average concentration for arsenic and cadmium above their respective SCC. Also, the average concentration for cadmium and lead exceeded their respective SCCs in samples collected off-site. The off-site samples which exhibited these metals above their respective SCC were collected from borings MW-5D and MW-6D, which are located northeast and east of the landfill, respectively.

None of the on-Site and/or off-Site subsurface soil samples displayed either a total petroleum hydrocarbon (TPH) level or a total organic concentration (i.e., the sum of the volatile organic, semi-volatile organic, pesticide/PCB, and TPH results) above the SCC of 10,000 ppm.

6.2.5 Surface Water

As part of the Phase I resampling and Phase II sampling programs, surface water samples were collected at stations upstream, on-Site, and downstream along the drainage ditch/Lawyers Ditch.

Only one (1) volatile organic compound, methylene chloride, was detected above its surface water criteria in the upstream surface water sample. However, ten (10) volatile organic compounds were detected in the on-Site surface water samples above their respective cleanup criteria. These volatile organic compounds included vinyl chloride, methylene chloride, chloroform, 1,2-dichloroethene (total), trichloroethene, benzene, chlorobenzene, 1,1-dichloroethene, 1,2-dichloroethane, tetrachloroethene, and toluene. None of the downstream surface water samples displayed any of the volatile organic compounds above applicable criteria.

One (1) semi-volatile organic compound, bis(2-ethylhexyl)phthalate, was detected above surface water criteria in the upstream surface water sample. However, six (6) semi-volatile organic compounds were detected above their respective surface water criterion in the on-Site surface water samples. The compounds detected above criteria include bis(2-chloroethyl)ether, N-nitrosodiphenylamine, nitrobenzene,

pentachlorophenol, 2,6-dinitrotoluene, chrysene, and bis(2-ethylhexyl)phthalate. Bis(2-ethylhexyl)phthalate was detected above its surface water criterion in each of the on-site surface water samples, with the exception of LeSW1 and LSW3. None of the downstream surface water samples displayed any of the semi-volatile organic compounds above applicable criteria.

No pesticides/PCBs were detected above applicable criteria in any of the surface water samples. Total petroleum hydrocarbons were only detected above its surface water criteria in one of the on-Site surface water samples.

Three (3) inorganic compounds, antimony, arsenic, and lead, were detected above their respective surface water criteria in the upstream surface water sample. Each of the on-Site surface water samples contained at least three (3) inorganic compounds above their respective surface water criteria. The primary inorganics which were detected above their respective surface water criteria included antimony, arsenic, and lead and, to a lesser degree cadmium and mercury. During the original Phase I sampling, antimony, arsenic, cadmium, lead, and silver were detected above their respective surface criteria in the downstream sample. However, during the Phase I sampling, manganese was the only inorganic compound detected above its surface water criterion in the downstream surface water samples.

6.2.6 Sediments

As part of the Phase I resampling and Phase II sampling programs, sediment samples were collected at stations upstream, on-site, and downstream along the drainage ditch/Lawyers Ditch.

Concentrations of chemicals detected in sediment samples were compared with New Jersey sediment quality criteria and New Jersey sediment screening levels, available for selected organic chemicals and provided by NJDEP in a document entitled "Sediment Quality Criteria for Selected Organic Compounds". This document lists eleven (11) semi-volatile organic compounds to be used for comparing analytical results for the purpose of establishing sediment cleanup criteria. These eleven (11) compounds consist of: acenapthene, anthracene, benzo(a)anthracene, benzo(a)pyrene, chrysene, dibenz(a,h)anthracene, fluoranthene, 2-methylnaphthalene, naphthalene, phenanthrene, and pyrene.

Upstream Sediments

The two (2) upstream sediment samples were not analyzed for volatile organics. However, only the semi-volatile organic compound, pyrene, was detected above its cleanup criterion in the upstream sediment samples.

Of the pesticides/PCBs analyzed, DDT, dieldrin, endrin, heptachlor, lindane, chlordane, and PCBs are listed in the above-mentioned NJDEP sediment cleanup criteria guidance document. No pesticides/PCBs were detected in the upstream sediment samples above their respective sediment cleanup criterion.

Ten (10) inorganic compounds are listed in the NJDEP sediment criteria guidance document. These compounds consist of antimony, arsenic, cadmium, chromium, copper, lead, mercury, nickel, silver, and zinc. Three (3) inorganic compounds were detected in the upstream sediment samples above their respective sediment cleanup criterion. Lead was detected above its ER-M of 110 ppm in samples SE5-0-0.5 and SE7-0-0.5. Silver was detected above its ER-M of 2.2 ppm in sample SE7-0-0.5. Zinc was detected above its ER-M of 270 ppm in samples SE5-0-0.5 and SE7-0-0.5. The sample collected from SE5-1-1.5 revealed no detectable inorganic compounds and the sample collected from SE7-0-0.5 revealed the highest number of inorganic compounds detected in the upstream sediment samples above cleanup criteria.

The depositional environment associated with the upstream sediment sample stations consists primarily of podded to slow moving water with minimal amounts of sediment disturbance or deposition. Review of the organic and inorganic data reveals that the upper six inches of sediment in these areas appears to contain most of the contaminants detected.

On-Site Sediments

Nineteen (19) volatile organic compounds were detected in the on-site sediment samples above laboratory detection limits. These volatile organic compounds, detected in LoSSe1, include vinyl chloride, methylene chloride, acetone, carbon disulfide, 1,1-dichloroethane, 1,2-dichloroethene (total), chloroform, 1,2 dichloroethane, 2-butanone, dibromochloromethane, 1,1,1-trichloroethane, trichloroethene, benzene, 4-methyl-2-pentanone, toluene, chlorobenzene, ethylbenzene, styrene, and total xylenes.

The semi-volatile organic compounds detected in the on-Site sediment samples were compared to the available compounds in the NJDEP criteria. Acenaphthene and phenanthrene were detected in several of the sediment samples and are included in both of the cleanup criteria tables contained in the aforementioned NJDEP guidance document. Therefore, at the request of the NJDEP, the Computed Sediment Criterion (CSC) was applied to each of the compounds.

Total organic carbon (TOC) was not analyzed in the Phase I resampling sediments. Therefore, at the request of the NJDEP, sediment cleanup criteria for these

sediments were calculated using TOC values for the Phase II sediments located closest to the Phase I samples. Based on these calculations, no semi-volatile organic compounds were detected in the on-site Phase I resampling sediment samples above their respective cleanup criteria. However, each of the on-site Phase II sediment samples, with the exception of SE-4-1-1.5, contained at least one (1) of the aforementioned NJDEP's guidance document semi-volatile organic compounds above their respective cleanup criteria. The results of the sediment sample analysis reveal that sediment samples SE1-1-1.5 and SE3-0-0.5 exhibited the highest number of semi-volatile organic compounds while SE-4-1-1.4 revealed none of these compounds above cleanup criteria.

Chlordane, DDT, dieldrin, and endrin were detected above their respective criterion in at least two (2) of the on-Site sediment samples. Heptachlor was detected above its criterion in one (1) of the on-Site samples. Chlordane was the most commonly detected of these pesticides. The sample exhibiting the highest number of pesticides above cleanup criteria was SE4A-1-1.5 (the duplicate sample collected from SE-4) which revealed endrin, heptachlor, and chlordane and sample SE1-0-0.5 which revealed DDT, endrin, and chlordane. PCBs were detected above their criterion in samples SE8-0-0.5 and SE9-0-0.5.

Each of the on-site sediment samples contained at least one (1) of the inorganic compounds listed in the aforementioned NJDEP guidance document. The sediment samples collected from SE2-0-0.5, both samples from SE3, SE8-0-0.5, LSSe1, LSSe2, and both samples from SE9 revealed the highest number of inorganic compounds detected above cleanup criteria, with both samples collected from SE3 and samples LSSe1 and LSSe2 revealing the highest inorganic concentrations. With the exception of the sample collected from LSSe1, these high concentrations are most likely due to the fact that these sample stations are adjacent to an existing leachate seep at the north-central boundary of the landfill.

The depositional environment associated with the on-site sediment sample stations consists primarily of podded to slow moving water along the western half of the drainage ditch located along the northern boundary of the landfill. Minimal sediment deposition and/or disturbance occurs at these locations. Deposition is probably greater than that in the upstream locations. However, based on the fact that these sample stations are located closer to the landfill and exhibit relatively higher concentrations of contaminants, compared to upstream, it appears as though contaminants from the landfill are being deposited in the ditch sediment. The ditch along the eastern portion of the landfill is tidally influenced. This tidal influence as well as increased flow velocities account for more disturbance, reworking, and deposition of the contaminants in this area which are detected at higher concentrations than the stations located along the northern portion of the site.

Downstream Sediments

Four (4) volatile organic compounds were detected in the downstream samples above laboratory detection limits. These volatile organic compounds include methylene chloride, acetone, 2-butanone, and toluene.

No semi-volatile organic compounds were detected in the downstream Phase I sediment sample above their respective cleanup criteria. However, each of the downstream Phase II sediment samples, with the exception of SE14-0-0.5, contained at least one (1) of the aforementioned NJDEP's guidance document semi-volatile organic compounds above their respective cleanup criteria. The results of the sediment sample analysis reveal that sediment samples collected from the 1' to 1.5' interval at stations SE10, SE12, and SE13 revealed the highest number of semi-volatile organic compounds while samples collected from the 0' to 0.5' interval at these same stations revealed the least number compounds above cleanup criteria.

PCBs were detected above their sediment cleanup criterion in sample SE12-0-0.5. Chlordane was detected above its cleanup criterion in samples SE13-0-0.5 and SE14-0-0.5. No other pesticides/PCBs were detected in any of the remaining downstream sediment samples above their respective cleanup criteria.

Each of the downstream sediment samples contained at least one (1) of the inorganic compounds listed in the aforementioned NJDEP guidance document. The sediment sample collected from SE14-1-1.5 revealed the highest number of inorganic compounds detected above cleanup criteria. The samples collected from SE11 revealed the least number of inorganic compounds above their respective cleanup criteria.

The depositional environment associated with the downstream sediment sample stations consists primarily of moving water with greater velocities than that of the on-site sediment stations. Greater sediment deposition and/or disturbance occurs at these locations. All of Lawyers Ditch is tidally influenced. This tidal influence as well as the increased velocities and excessive distance account for more disturbance, reworking, and deposition of sediment, thereby allowing organic and inorganic contaminants to be volatilized and/or released from suspension before they reach the downstream stations.

6.2.7 Ground Water

Shallow Wells

Thirteen (13) volatile organic compounds were detected above their respective GWQC in the shallow wells located at the Site. These volatile organic compounds include acetone, vinyl chloride, methylene chloride, 1,1-dichloroethane, 1,2-dichloroethene, chloroform, 1,2-dichloroethane, chlorobenzene, ethylbenzene, 4-methyl-2-pentanone, benzene, toluene, and total xylenes. The sample collected from well MW-4S exhibited the most volatile organic compounds above their respective cleanup criteria. Methylene chloride was generally detected in each of the shallow wells above its GWQC and benzene was detected above its GWQC in several of the shallow wells.

The samples collected from well MW-4S contained the highest number of elevated semi-volatile organic compounds above their respective GWQC. The compounds bis(2-chloroethyl)ether, 1,4-dichlorobenzene, 1,2-dichlorobenzene, 2,4-dimethylphenol, N-nitrosodiphenylamine, bis(2-ethylhexyl)phthalate, and 4-methylphenol were detected in MW-4S above their respective GWQC. Bis(2-ethylhexyl)phthalate was detected above its GWQC in several of the shallow wells and piezometers.

Four (4) pesticides, beta-BHC, 4,4-DDE', 4,4'-DDT and alpha-chlordane, were detected above their respective GWQC in the sample collected from well MW-4S and heptachlor and aldrin were detected above their respective GWQC in piezometer P-6. These were the only shallow wells in which these or any other pesticides were detected above their respective GWQC. No PCBs were detected above the laboratory instrument detection limits in any of the shallow wells.

Each of the samples collected during the Phase I and Phase II sampling programs displayed at least four (4) metals which exceeded their respective GWQC. During the Phase I sampling program, aluminum, antimony, iron, lead, manganese, and sodium were detected in each of the samples above their respective GWQC. During the Phase II, only iron, manganese, and sodium (with the exception of well MW-8S) exceeded their respective GWQC. The elevated sodium levels may be associated with the fact that the Site is so close to the Passaic River which is characterized as brackish. This is further supported by the fact that the highest sodium levels during both the Phase I and Phase II were found in the sample collected from well MW-3S, which is the on-site well located closest to the Passaic River. Beryllium, cadmium, and arsenic were also detected above their respective GWQC in a majority of the samples collected at the Site during both the Phase I and Phase II sampling programs.

The only trend in the distribution of the metals across the Site is that the exterior wells located along the northeast, northwest and eastern portion of the Site (e.g., wells MW-2S, MW-3S, and MW-4S) generally displayed fewer metals and at lower concentrations than the remaining wells/piezometer. The four (4) piezometer and wells MW-1S and MW-8S, which are generally located in the south and south-central portion of the Site displayed the greatest number of metals above their respective GWQC. Also, comparison of the Phase I sample results for wells MW-1S through MW-4S with the results for these same wells during the Phase II shows a clear decrease in the concentration of a majority of the metals between the two sampling events.

Only one (1) volatile organic compound, methylene chloride, was detected above its GWQC in the shallow off-site wells. No semi-volatile organic, pesticides, or PCBs were detected above their respective GWQC in the shallow off-site wells. Five (5) inorganic compounds were detected above their respective GWQC in the sample collected from off-Site shallow upgradient well MW-7S and seven (7) inorganic compounds were detected in wells MW-5S and MW-6S.

Intermediate Wells

Ten (10) volatile organic compounds were detected above their respective cleanup criteria in well MW-4I during the Phase II sampling. These compounds include methylene chloride, acetone, vinyl chloride, 1,2-dichloroethene (total), 1,2-dichloroethane, benzene, toluene, chlorobenzene, ethylbenzene, and total xylenes. Methylene chloride was detected above its cleanup criteria in both wells MW-1I and MW-2I and chloroform was detected above its GWQC in well MW-2I. With the exception of well MW-2I, the total volatile organic concentration decreased from the shallow wells to the intermediate wells.

Two (2) semi-volatile organic compounds were detected above their respective GWQC. N-nitrosodiphenylamine was detected in the sample collected from MW-4I above its GWQC of 7 ppb and bis(2-ethylhexyl)phthalate was detected above its GWQC of 3 ppb in samples collected from MW-1I, MW-2I, and MW-4I. The total semi-volatile organic concentrations decreased from the shallow wells to the intermediate wells. No pesticides/PCBs were detected in the ground water samples collected from the intermediate wells.

Each of the intermediate ground water samples revealed at least three (3) inorganic compounds above their respective cleanup criteria. Overall, the inorganics most commonly detected above GWQC were: antimony, iron, manganese, and sodium. (During the original Phase I sampling, arsenic, cadmium, chromium, lead, nickel, and silver were also detected above their respective GWQC.) Samples collected from MW-

4I revealed the highest number of inorganic compounds detected above their respective GWQC.

With the exception of well MW-5I, methylene chloride was detected above its GWQC in each of the off-site intermediate wells. Chloroform was detected above its GWQC in well MW-7I and benzene was detected above its GWQC in well MW-5I. No semi-volatile organic compounds, pesticides, or PCBs were detected in well MW-7I and only bis(2-ethylhexyl)phthalate was detected above its respective GWQC well MW-5I.

Three (3) inorganic compounds were detected above cleanup criteria in upgradient well MW-7I, five (5) were detected above GWQC in well MW-6I and four (4) were detected above GWQC in well MW-5I. Manganese and sodium were two (2) of the metals detected above GWQC in each of the wells.

Deep Wells

During the Phase I resampling and Phase II sampling programs, two (2) volatile organic compounds, methylene chloride and 1,2-dichloroethane, were detected above their respective GWQC in on-Site deep well MW-1D. No semi-volatile organic compounds, pesticides, or PCBs were detected in MW-1D. Also, no volatile or semi-volatile organic compounds, pesticides, or PCBs were detected above their respective cleanup criteria in the original Phase I ground water sample collected from MW-1D.

The Phase II deep ground water sample collected from MW-1D revealed three (3) inorganic compounds, iron, manganese, and sodium above their respective GWQC. However, the sample collected from this well during the original Phase I RI exhibited the metals antimony, arsenic, cadmium, chromium, iron, lead, manganese, nickel, and sodium above their respective GWQC.

Methylene chloride was detected above its GWQC in off-site wells MW-6D and MW-7D and chloroform was detected above its GWQC in well MW-6D. No volatile organic compounds were detected above GWQC in well MW-5D. No semi-volatile organic compounds above GWQC were detected in MW-7D, while bis(2-ethylhexyl)phthalate exceeded its GWQC in both wells MW-5D and MW-6D. No pesticides or PCBs were detected in any of the off-site deep wells. Seven (7) inorganic compounds, including aluminum, antimony, arsenic, cadmium, iron, manganese, and sodium were detected above GWQC in MW-7D. Only manganese and sodium were detected above GWQC in well MW-6D while aluminum, arsenic, iron, lead, manganese, and sodium were detected in well MW-5D above its GWQC.

6.2.8 Air Monitoring Program

Eight (8) volatile organic compounds were detected in the four (4) air samples collected across the Site. These compounds consisted of methylene chloride, acetone, 2-butanone (MEK), 1,1,1-trichloroethane, benzene, tetrachloroethane, toluene, and xylene. The air sample stations located next to test pits which contained 55-gallon drums displayed the most and highest concentration of the various volatiles detected. There also appeared to be a good correlation between the volatile organics detected at the various air sampling stations with the adjacent surface soil/drum sample results. However, there was not a good correlation between the methane results generated during the soil gas survey and the methane results obtained during the air sampling program.

The results of this program indicate that low levels of airborne volatilized contaminants are escaping from the landfill surface. Although at low levels, particulate matter could become airborne and affect personnel working at adjacent properties. Also, if the landfill surface is disturbed, higher levels of various volatile organics, based on the results of the test pit excavations, could be expected to migrate out of the landfill.

6.2.9 Environmental Risk Assessment

Toxicity tests completed as part of the Phase II involved assessments of both sediment and surface water collected from each of the three ERAs along the drainage ditch and Lawyers Ditch. The results of these surface water-only and sediment/water toxicity tests showed no significant detectable toxicity, either acute or chronic, to the amphipod, Hyalella azteca. In short, adverse effects were not detected in either 96-hour water-only exposures or in 14-day sediment/overlying water toxicity tests.

Surface water contaminant concentrations were generally found to be below acute and chronic biological-effects based numerical criteria at each of the three ERAs. Chemical-specific acute and chronic hazard ratios for surface water were less than one for the four metals for which such criteria were available (As, Cr^{+3}, Pb and Zn), as were cumulative chronic hazard ratios (for all constituents combined). The lack of criteria for some surface water contaminants (e.g., carbazole) prevented complete comparisons as eluded to earlier.

Calculated hazard ratios for individual sediment contaminants, and, of course, for the cumulative sum of all constituents, strongly suggest that sediments from each ERA might be expected to elicit adverse biological effects. Cumulative hazard ratios indicate similar levels of sediment-related environmental risk at ERAs 1

(upstream) and 3 (downstream), and sediment contaminant concentrations and risk ratios were substantially highest at ERA-2 (on-Site). Sediment COCs presenting greatest potential environmental risk varied slightly among ERAs, and included both polycyclic aromatic hydrocarbons (e.g., phenanthrene, benzo(a)anthracene, chrysene) and metals (e.g., lead, silver, mercury, zinc). Hazard ratios calculated for sediment-associated COCs indicate that potential risks were relatively greatest at ERA-2, but that substantial potential risk existed at all stations (Cumulative Hazard Ratios, ERA-1 = 160, ERA-2 = 305, and ERA-3 = 180). In summary, analytical data suggested that adverse biological effects were likely associated with sediment contaminants at each ERA.

Quantitative sample data collected as part of the assessment of macrobenthic invertebrate indicate that taxa richness and total organism abundance were substantially lower at ERA-2 than at either the upstream or downstream stations. Benthic assemblages at ERA-2 were numerically, and virtually exclusively dominated by approximately equal proportions of oligochaetes and ptychopterid larvae (Diptera), both of which function as burrowing collectors (subsurface-deposit feeders). In contrast, while assemblages at ERA-1 and ERA-3 were also numerically dominated by oligochaetes (66 and 78%, respectively), data from core samples suggest that these stations supported greater numbers of different types of benthic organisms. Seven broad taxonomic groups were observed in benthic cores from ERA-1 and ten taxa were found in samples from ERA-3, while only four taxa were collected in cores from ERA-2. Total macroinvertebrate abundance was approximately one order of magnitude lower in core samples from ERA-2 (59) than in samples collected from ERA-1 (845) and ERA-3 (1044).

The apparent contradiction between the analytical and in situ macrobenthic community data on one hand, and the results of toxicity tests on the other poses the question, "Why were adverse biological effects observed in in situ benthic invertebrate communities but not in corresponding toxicity tests?". One possible explanation (hypothesis) for this relates to sediment organic carbon and contaminant bioavailability.

The total organic carbon (TOC) content of sediments from ERAs 1 and 2 was estimated to be approximately 20%, while TOC at ERA-3 was estimated to be approximately 3%. TOC estimates of 20% were quite high, suggesting that contaminants at these stations may have been sequestered in (bound to) the particulate organic carbon fraction, and therefore, less bioavailable. Sediment pore water is an important route of contaminant exposure for infaunal and epibenthic macroinvertebrates including Hyalella azteca, and organic carbon has been shown to mediate the bioavailability (and toxicity) of organic contaminants (e.g., fluoranthene) and selected metals (e.g., copper). Although pore water contaminant concentrations

were not measured in this study, results from the chemical analysis of overlying water indicated very little contaminant in the dissolved fraction, and this supports the organic carbon-mediating hypothesis.

If sediment TOC was responsible for significant contaminant binding in the drainage ditch and Lawyers Ditch, and contaminant concentrations in pore water and overlying water did not exceed biological effects levels, then why were adverse effects observed in in situ macrobenthic invertebrate communities? One potential explanation for this has to do with differences between exposure scenarios for instream organisms and laboratory test animals.

Over time, benthic assemblages in the drainage ditch and Lawyers Ditch were undoubtedly subjected to significant variations in water discharge resulting from storm events. The periodic resuspension of sediment and sediment-associated contaminants caused by storm flows would amount to a pulse-dose exposure and might be expected to lead to affects on resident communities. In contrast, animals exposed for 14-days under carefully controlled static conditions would not be subject to a similar exposure regime, perhaps never reaching threshold contaminant levels in the dissolved fraction, and therefore, might not exhibit observable adverse effects.

6.3 Sources/Areas of Contamination

6.3.1 Soils

Surface Soils

Surface soils across the Site contain several semi-volatile organic compounds and metals above their respective soil cleanup criteria. Although the presence of some of the semi-volatile compounds could be associated with the urban setting of the Site and adjacent highways, their presence at generally higher levels in the subsurface soils suggest that these compounds, at least partially, are the result of past landfilling operations. PCBs also exist in the surface soils above applicable SCC. However, unlike the semi-volatile organic compounds and the metals, the elevated PCB levels are generally restricted to the central and northeastern portion of the landfill. The presence of the PCBs at similar levels in the subsurface soils also suggest that the elevated PCB levels are the result of past landfilling operations.

The NJDEP defines a "hotspot" as any area in which a contaminant was detected at greater than 100 times its specific soil cleanup criteria. Based on this definition, there were no hotspot areas detected in the surface soils.

A few of the semi-volatile organic compounds and metals detected at the Site, were also found above applicable SCC in an off-site surface soil sample collected northeast of the Site on the ECRR property. PCBs were also found in this off-site sample above applicable SCC. The levels that these contaminants were found in the off-site sample were generally lower than the average concentration determined for these compounds for the on-site samples. Although this suggest that the landfill could be the source of these contaminants, it is likely that other sources, such as contamination previously detected on the ECRR property, the adjacent highways, and the urban setting of the Site, are contributing to this off-site contamination.

Erosion and stormwater runoff from the Site are likely transporting contaminants in the surface soils to the air and the adjacent drainage ditch and Lawyers Ditch. Also, infiltration of rainwater is likely leaching the semi-volatiles, metals, and PCBs into the underlying ground water.

Subsurface Soils

Based on results of the Phase I and Phase II remedial investigations, subsurface soil within the landfilled area appears to be the primary contaminant source. The average concentration for several volatile and semi-volatile organics, the pesticides aldrin and dieldrin, PCBs and the metals antimony, cadmium, and lead are above their respective SCC for subsurface soils. Although the distribution of the semi-volatiles and metals exceeding their respective SCC is rather uniform throughout the subsurface, the volatiles, pesticides, and PCBs exceeding their respective SCC are generally restricted to the central and northeastern portions of the Site, and to a lesser degree, the northwestern corner of the landfill. The most contaminated soil/material is generally found in the first ten (10) to twelve (12) feet below the ground surface.

Several 55-gallon drums were identified in test pits excavated across the Site. Sampling of material in these drums also identified the presence of several volatile and semi-volatile organic compounds and, to a lesser degree, a few metals, above applicable SCC. The results of TCLP analyses completed on the contents of these drums indicate that the material is not characteristically hazardous. However, one (1) subsurface soil sample collected during the original Phase I displayed cadmium above its TCLP regulatory level, indicating that this material was hazardous. Based on these results, the material within the landfill does not generally appear to be characteristically hazardous. However, there are likely some areas within the landfill which contain soil/fill material that is hazardous.

Based on NJDEP's definition, soil borings CB-3 and CB-5, located in the east-central portion of the site are "hotspots" as total xylenes and benzene were detected in samples collected from these borings at greater than 100 times their SCC.

Additional "hotspots" were also identified during the excavation and sampling of on-site test pits. These "hotspots" include test pits; TP-2, TP-4 and TP-9, which are located in the central portion of the landfill.

Although native soils beneath the Site have been impacted as a result of past landfilling operations, especially in the northeastern portion of the Site, only the average concentration for the semi-volatile organic compound benzo(a)anthracene and the metals arsenic and lead were detected above applicable SCC. The presence of these analytes above SCC is the result of past landfilling operations.

Although one (1) of the semi-volatile organic compounds and a few metals detected at the Site were also found above applicable SCC in off-site surface soil samples collected northeast and east of the Site, the landfill does not appear to be the source of these contaminants. This is supported by the fact that one (1) of the off-site subsurface soil samples displayed the metals chromium and vanadium above applicable SCC. These metals were not detected in any on-Site surface or subsurface soil sample above applicable SCC. Also, no volatile organic compounds, pesticides, and/or PCBs were detected above applicable SCC in any of the off-site subsurface soil samples as they were in on-Site subsurface soil samples.

Infiltration of rainwater through the subsurface soils is likely leaching contaminants into the underlying ground water. Also, the ground water is in direct contact with the landfill material across most of the Site. This results in direct contamination of the ground water.

6.3.2 Surface Water

Surface water on-Site in the drainage ditch has been impacted by the landfill. Based on the analytical results of surface water samples collected from upstream, on-Site, and downstream locations, on-Site surface water in the drainage ditch reveals the highest concentration of various contaminants generally decreasing upstream and downstream. Although the presence of a few organic compounds and metals in the upstream surface water may have contributed somewhat to the elevated contaminant levels detected in the on-Site surface water, the primary source of the contaminants detected in the on-Site surface water is the landfill. The erosion of surface soils, stormwater runoff from the Site, leachate seeps into the drainage ditch, and leaching of contaminants from the sediments are transporting these contaminants to the surface water.

Although a few metals were detected downstream in Lawyers Ditch during the original Phase I sampling, no metals or any other contaminants associated with the Site were detected above applicable criteria in downstream surface waters. This

suggest that the contaminants present in the on-Site surface waters are being diluted below applicable criteria before the water migrates downstream.

6.3.3 Sediments

The results of the analysis of the sediment samples indicate that the on-Site sediments generally contain the most contaminants above applicable criteria. The upstream sediment samples also contain a semi-volatile organic compound and a few metals above applicable criteria. Although the presence of these compounds above applicable criteria may have contributed somewhat to the elevated contaminant levels detected in the on-Site sediments, the primary source of the contaminants detected in the on-Site sediments is the landfill. This is confirmed by the fact that the sediment samples collected at the leachate seeps are generally the most contaminated. The erosion of surface soils, stormwater runoff from the Site, and leachate seeps into the drainage ditch are transporting these contaminants to the sediments.

The presence of similar semi-volatiles and metals in the downstream sediment samples indicate that the landfill has had an impact on downstream sediment quality conditions. However, the higher average concentration of some of the semi-volatile organics, such as benzo(a)anthracene, pyrene, and flouranthene, in the downstream sediment suggests that other off-site non-point sources (i.e., NJ Turnpike, ECRR access Road, junk yard located south of the eastern end of Lawyers Ditch) may also be impacting the downstream sediments.

Based on the results of the environmental risk assessment, environmental risks are significantly greater in the on-Site sediments than they are in either the upstream or downstream sediments. This again suggest that the landfill is having a negative impact on the on-Site sediments.

6.3.4 Ground Water

Chemical analytical data generated during the Phase I and Phase II sampling programs suggest that past landfilling operations have impacted ground water quality. Contaminants present in the ground water, which include various volatile organics, semi-volatile organics, and metals, are emanating from the Site both radially and vertically downward, similar to ground water flow. Although the landfill has had some impact on the on-Site intermediate and deep zones, there are fewer contaminants at lower concentrations present in these zones than in the shallow zone. The contaminants which are present in the intermediate and deep zones above GWQC are emanating from the shallow on-site water bearing zone. The highest levels of ground water contamination were detected along the east-central portion of the Site in the area of wells MW-4S and MW-4I.

Although a few contaminants associated with the landfill, specifically organic compounds, appear to have migrated off-site, there is considerable dilution and/or natural attenuation occurring. This is particularly true when the Phase II ground water organic results for on-site intermediate well MW-4I are compared with those for off-site and downgradient well MW-6I. The on-site shallow and intermediate wells located at well triplet MW-4 are the most contaminated wells at the Site. Shallow and intermediate wells MW-6S and MW-6I are located downgradient of these on-Site wells. The compounds detected in on-Site wells MW-4S/MW-4I above GWQC, specifically for the volatile and semi-volatile organics, are not generally found in downgradient wells MW-6S/MW-6I. Based on a ground water flow velocity of 8.0 feet per year, the volatiles and semi-volatiles present in wells MW-4S/MW-4I should have migrated off-Site to wells MW-6S/MW-6I. The fact that these compounds have not generally been found in these wells above GWQC suggest that either the contaminants are being diluted below applicable GWQC prior to their arrival at these wells or they are decreasing due to natural attenuation. Based on the metals results, a source other than the Ottilio Landfill may also be impacting wells MW-6S/MW-6I.

There were slightly more inorganics above GWQC in wells MW-6S/MW-6I than were found in on-Site well MW-4S/MW-4I. Also, the off-site shallow well MW-5S, displayed more metals and at higher concentrations than were found in the on-Site and upgradient shallow well MW-3S. Based on the metals results, it appears as though a source, other than the Ottilio landfill, may be also impacting the off-site wells. Another possible explanation is that a slug of water with higher metals concentrations has moved off-Site and was detected in wells MW-5S and MW-6S/MW-6I.

Natural attenuation of contaminants is not only obvious between on-site and off-site wells, it is also occurring from one sampling episode to the next. As an example, during the original Phase I sampling, which was completed in October of 1987, there were 17 organic compounds detected above GWQC in well MW-4S. However, during the Phase II sampling, which was completed in July of 1993, only twelve (12) organic compounds were detected above GWQC in well MW-4S.

Based on the fact that organic and inorganic levels have been detected above GWQC at each of the three (3) off-site well locations, background ground water quality has not been established and the off-site extent of the impact of the landfill has not been defined. Also, since a baseline for background ground water quality has not been established, it is also difficult, especially for the inorganics, to determine what particular contaminant or portion thereof detected in an off-site well is the result of the landfill or possibly another off-site source, or if the presence of the contaminant reflects regional ground water conditions. Therefore, additional off-site wells may be required as part of any selected remedial alternative for the Site.

The contaminant characteristics of the ground water differ somewhat from the contaminant characteristics of the surface and subsurface soils. In the ground water, the primary contaminants are volatile organics and inorganic compounds as compared to semi-volatile organic compounds, pesticides/PCBs and inorganic compounds which are the primary contaminants in surface and subsurface soils.

6.4 Pathways for Contaminant Migration

In general, potential contaminant migration pathways at the Site include airborne particulates and volatile organic vapors from exposed contaminated surface soil, ground water, surface water runoff, and associated erosion of surface soil and sediment. The primary contaminant migration pathways identified during the Phase I and II RI's are ground water, surface water runoff and erosion. Additionally, particulates transported via wind/air also offer what may be considered a secondary migration pathway. As surface soil at the Site is contaminated with inorganic and semi-volatile compounds, pesticides and PCBs, any disruption of the soils by either human activities or storm events would provide the opportunity for these contaminants to be transported off-site. Furthermore, elevated levels of organic vapors detected in ambient air in the northeastern corner of the Site could also be transported from the Site via wind/air. Potential receptors of periodic airborne particulate or volatile organic vapors include people working in nearby industries south and west of the Site, and workers on-site.

6.4.1 Ground Water

As previously indicated, since shallow ground water flow in the fill is radial in nature, contaminated ground water migrates away from the Site laterally in all directions. As part of the Phase II activities, wells were installed at off-site locations. Analytical results from well MW-6S indicates that contaminated ground water has migrated from the Site. The other component of ground water flow in the fill is vertically downward into the underlying unconsolidated sand zone. Based on the results from the six (6) wells (MW-1I, 2I, 4I, 5I, 6I, and 7I) installed in the intermediate ground water zone, it appears that contaminants from the landfill have migrated into this zone. As previously mentioned, results from the Phase II studies indicate that ground water flow in the sand zone is toward the north/northeast and the Passaic River. Based on a flow velocity of 8.0 feet per year and the dilution/natural attenuation of the various contaminants which is occurring, it is very unlikely that contaminants from the Site will ever reach the Passaic River.

Elevated contaminant levels were detected in each of the deep wells installed at and adjacent to the Site. The contaminants detected in well MW-6D are likely the result of the landfill. However, it is possible that some or all of the

contaminants detected in the well MW-7D could be the result of other off-site sources or the landfill. In addition to ground water contaminant migration in the fill and the underlying sand zone, contaminated ground water is discharging at the toe of the landfill in the drainage ditches located along the central-northern boundary and the northeastern corner of the Site as evidenced by leachate seeps in these areas.

6.4.2 Surface Water Runoff

Another contaminant migration pathway of concern is surface water runoff and the associated erosion of surface soil and sediment. As indicated earlier, surface water in the northern portion of the Site drains north and northeast into a drainage ditch located along the northern property boundary. Surface water, and any associated contaminants which have leached/eroded from the surface soil, flows in an easterly direction to a drainage ditch at the northeastern corner of the Site. Surface water in this drainage ditch flows in a southerly direction for approximately 200 feet, then turns to the east, and flows off-site in Lawyers Ditch to its eventual confluence with the Passaic River. In addition to contaminated surface water, contaminated sediment and soil (eroded from the landfill) transported with the surface water would also be moved off-site and ultimately discharged into the Passaic River.

In the southern portion of the Site, surface water flows in a southerly direction toward Raymond Boulevard. There are no drainage swales or ditches in the southern half of the Site and surface water probably flows from the Site as overland flow. As surface soils at the Site are contaminated, surface water migrating from the southern portion of the Site would transport these contaminants to off-site locations.

6.5 Potential Impact on the Environment and Human Health

Based on the Phase I and II remedial investigations implemented at the Ottilio Landfill, several conditions were identified which may pose a threat to human health and the environment. These conditions include:

1) A ground water contaminant plume which originates on-Site, is migrating laterally away from the Site and vertically downward.

2) Surface water runoff transports contaminated surface soil and sediment off-site by erosion during storm events. As a result of overland flow, surface water becomes contaminated as it migrates across the Site. Along with leachate (which discharges into the drainage ditch), contaminated surface water and its associated suspended load eventually discharge into the Passaic River.

3) Surface soils at the Site contain numerous semi-volatile organic compounds and metals and PCBs above applicable SCC.

4) As a secondary contaminant migration pathway, airborne contaminants (i.e., semi-volatile and inorganic compounds, and particulates) may be transported off-site via wind/air.

In summary, airborne particulate and volatile organic vapor contamination will generally affect on-site workers and possibly workers immediately surrounding the landfill at the ECRR facility. However, at appropriate wind speeds, contaminant particulates may be carried off-site and into contact with the general public. Direct human contact with leachate from the landfill is possible in the drainage ditch.

Contaminated ground water is located beneath the landfill and is migrating off-site. However, human contact with ground water is limited as drinking water in the area is supplied by municipal sources. Surface water runoff and eroded surface soils may come into contact with people working nearby or on-Site. However, most of this contamination is expected to eventually discharge to the Passaic River or into the Newark storm sewers.

As the closest residential community, the Ironbound section, which is located about one-quarter mile west of the Site, is not hydraulically downgradient of the Site and the prevailing winds are generally not in that direction, it is unlikely that it is being impacted by contamination from the Ottilio Landfill.

The results of laboratory-based toxicity tests conducted on sediments and overlying water collected from each of the ERAs along the drainage ditch and Lawyers Ditch showed no significant detectable toxicity, either acute or chronic. Calculated hazard ratios and quantitative and qualitative benthic macroinvertebrate collections strongly suggest that sediments from each ERA station might be expected to elicit adverse biological effects. However, sediment contaminant concentrations and risk ratios were substantially highest at on-Site station ERA-2.

6.6 Conclusions

Based on the Phase I and Phase II site investigations, past landfilling operations have impacted the immediate area and environment and present on-going environmental problems by degrading both the ground water quality beneath the Site and surface water flowing from the Site. The primary contaminant migration pathways appear to be ground water, surface water and, to a lesser degree, airborne particulates. The analytical results of off-site wells installed as part of the Phase II investigation indicate that contaminated ground water has migrated off-site. The source of the ground water plume is contaminated surface and subsurface soils located within the

landfill. Because contaminants have been detected in all wells, the areal extent of the contaminant plume has not been determined.

The results of the Environmental Risk Assessment indicate that instream benthic macroinvertebrate communities at each of three stations (ERAs) sampled along Lawyer's Ditch appear to have been adversely affected by Site-related sediment-associated contaminants and/or other (e.g., non-point) factors. Based on the weight of the evidence derived from analytical work leading to COC hazard ratios, laboratory-based toxicity tests, and macrobenthic community assessments, chemical and biological conditions were clearly worse and environmental risks were significantly greater at ERA-2 than at stations upstream or downstream from ERA-2. Sediment organic carbon and/or other factors (e.g., acid-volatile sulfides) mediated the bioavailability and mitigated the toxicity of sediment-associated contaminants in laboratory-based toxicity tests; however, this condition did not appear to be operating to the same extent in situ.

SFS 00148A

State of New Jersey

DEPARTMENT OF ENVIRONMENTAL PROTECTION
DIVISION OF WASTE MANAGEMENT
120 Rt. 156, Yardville, N.J. 08620

DR. MARWAN M. SADAT, P.E.
DIRECTOR

LINO F. PEREIRA
DEPUTY DIRECTOR

MAR 2 0 1984

V. Ottilio & Sons
55 Preakness Avenue
Patterson, N.J

Dear Sir:

The Division of Waste Management has determined that the following conditions on property operated by V. Ottilio & Sons, located at Block 5001, Lots 12 and 16, in the City of Newark, State of New Jersey, constitute a danger to the environment and to the public health, safety and welfare and are violative of the laws of the State of New Jersey:

> During the course of an investigation conducted from March 11, 1980 through March 12, 1984, it was determined that an undetermined amount of hazardous substances including but not limited to PCBs, Aldrin, Dieldrin and Heptachlor was discharged prior to March 11, 1980, onto the ground from which it might flow or drain into the waters of the State.

You are therefore directed, pursuant to Section f of the Spill Compensation and Control Act as amended N.J.S.A. 58:10-23.11 et seq., to initiate at once the following remedial measures at the site:

1. Establish site security measures and conduct a complete site investigation and sampling program, followed by a remedial action feasibility study. These activities are required to fully characterize the site conditions and provide for selection of remedial measures to decontaminate the site and mitigate contaminants released to off-site areas.

2. Following NJDEP approval of above studies, the selected remedial alternative will be developed into a final design to meet predetermined remedial objectives.

3. Following the design phase, implementation of the remedial alternative(s) will be accomplished in accordance with the final design provided all necessary permits and approvals are obtained.

4. The Departmental contact in this matter is Steven Croce, at

Hazardous Site Mitigation Administration
8 East Hanover Street
Trenton, NJ 08625

5. Submit copies of any correspondence to:

Department of Environmental Protection
Division of Waste Management
Bureau of Compliance & Enforcement
David J. Shotwell, Chief
120 Route 156
Yardville, NJ 08620

In addition, you must notify the Department of Environmental Protection (DEP) upon the commencement of any remedial action taken in this regard.

Failure by you to respond to this notice within ten (10) days of its receipt by you may result in the Department of Environmental Protection itself performing the cleanup operations specified herein. Should you fail to respond to this notice and fail to initiate cleanup operations as required by this letter, the DEP may commence legal action against you seeking penalties and reimbursement for all costs incurred. Specifically, failure to comply with this directive may increase your liability to the DEP in an amount equal to three times the costs of all expenses incurred in this operation and may cause a first priority claim and lien to be placed upon all of your real and personal property in the amount of the DEP's costs, in accordance with the Spill Compensation and Control Act.

Should you have any questions, please contact Steven Croce at (609) 984-3074.

Very truly yours,

Joseph A. Rogalski
Assistant Director
Field Operations - Enforcement
and Compliance

FO1:F013:kas

CARELLA, BAIN, GILFILLAN & RHODES, P.A.
Attorneys for Plaintiff
Gateway 1
Newark, N.J. 07102
(201) 623-1700

SUPERIOR COURT OF NEW JERSEY
CHANCERY DIVISION: ESSEX COUNTY
DOCKET NO. C-

C.4092-75

PASSAIC VALLEY SEWERAGE COMMISSIONERS,

Plaintiff,

-vs-

CENTRAL RAILROAD COMPANY OF NEW JERSEY, R.P. TIMPANY TRUSTEE IN BANKRUPTCY, and NEWARK LANDFILL DEVELOPMENT CO.,

Defendants.

Civil Action

COMPLAINT

Plaintiff, Passaic Valley Sewerage Commissioners, a public body whose offices are at 600 Wilson Avenue, New Jersey, who are organized under the laws of the State of New Jersey pursuant to N.J.S.A. 58:14-1 et. seq., by way of Complaint against Defendants say:

FIRST COUNT

1. Defendant, Central Railroad Company of New Jersey is a corporation organized under the laws of the State of New Jersey whose principal offices are 1100 Raymond Boulevard, Newark, New Jersey. (Hereinafter "CNJ") R.P. Timpany being the Trustee in Bankruptcy of said CNJ.

2. Jurisdiction of this matter lies in this Court pursuant to N.J.S.A. 58:14-7. Venue in this Court is proper pursuant to R.4:3-2(a) of the New Jersey Court Rules, 1969, all parties residing in this County.

3. Defendant CNJ is the owner of property located at Block 5051, Lot 58 in the City of Newark, New Jersey, which drains into the Passaic River through the Lawyers' Ditch, a tributary of the Passaic River.

4. On January 14 and January 28, 1976, Plaintiff conducted an inspection of the property in the tributary referred to supra., and determined that said tributary was being polluted with foul smelling and oily substances emanating from the property owned by Defendant.

5. On January 29, 1976, Plaintiff notified Defendant CNJ of the results of Plaintiff's inspection and demanded that the pollution be stopped.

6. Subsequent inspections made by Plaintiff on February 20, March 11 and March 24, 1976 revealed that the pollution problem had not abated, and Plaintiff again notified Defendant CNJ on March 26, 1976 that the problem had not abated and further demanded that the pollution be stopped.

7. Subsequent inspections were made by Plaintiff on March 30, April 6, and April 13, 1976; these inspections revealed that the pollution had not abated.

8. On April 26, 1976, Plaintiff again notified Defendant CNJ of the pollution and demanded that Defendant CNJ put an immediate stop to the pollution.

9. A subsequent inspection was made on May 10, 1976 by Plaintiff, and the pollution at that time had not abated. Furthermore, upon information and belief, the problem has still not abated.

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10. Defendant CNJ has discharged, continues to discharge and permits to be discharged polluting matter into the waters of the Lawyers' Ditch, a tributary of the Passaic River, in violation of N.J.S.A.58:14-7.

11. Defendant has discharged, continues to discharge, and permits to be discharged into the Lawyers' Ditch, a tributary of the Passaic River, waste matter which creates odors, gases and fumes on the surface of said tributary in violation of N.J.S.A. 58:14-8.

12. Defendant has discharged, continues to discharge, and permits to be discharged into the Lawyers' Ditch, a tributary of the Passaic River, waste matter which creates odors, gases and fumes on the surface of said tributary in violation of N.J.S.A. 58:14-8.

WHEREFORE, Plaintiff demands a final Order of Judgment against Defendant, CNJ, R.P. Timpany Trustee in Bankruptcy as follows:

A. That Defendant be enjoined both pendente lite and perpetually from discharging or permitting to be discharged any pollutant material into the Lawyers' Ditch, a tributary of the Passaic River;

B. That Defendant be assessed penalties pursuant to N.J.S.A. 58:14-8 running from February 9, 1976 as to Defendant CNJ, R.P. Timpany Trustee in Bankruptcy.

C. That Plaintiff be awarded costs of suit, including reasonable attorneys' fees.

D. Such other relief as the Court may deem just and equitable.

SECOND COUNT

1. Plaintiff repeats each and every allegation of the First Count and makes the same Paragraph 1 hereof as though set forth fully and at length.

2. Defendant Newark Landfill Development Company leases Block 5051, Lot 58 from Defendant CNJ.

3. Jurisdiction of this matter lies in this Court pursuant to N.J.S.A. 58:14-7. Venue in this Court is proper pursuant to R.4:3-2(a) of the New Jersey Court Rules, 1969, all parties residing in this County.

4. Defendant Newark Landfill Development Company has dumped foul smelling and oily substances on Block 5051, Lot 58 which substances have been polluting the Lawyers' Ditch, a tributary of the Passaic River.

5. Defendant Newark Landfill Development Company was put on notice by Defendant CNJ at least as early as February 6, 1975, of the matters stated in Count One of this Complaint.

6. Defendant Newark Landfill Development Company has discharged, continues to discharge and permits to be discharged polluting matters into the waters of the Lawyers' Ditch, a tributary of the Passaic River, in violation of N.J.S.A. 58:14-7.

7. Defendant Newark Landfill Development Company has discharged and continues to discharge, and permits the discharge into the Lawyers' Ditch, a tributary of the Passaic River, waste matter which creates odors, gases, and fumes on the surface of said tributary in violation of N.J.S.A. 58:14-8.

8. Defendant Newark Landfill Development Company has discharged, continues to discharge, and permits to be discharged into the Lawyers' Ditch, a tributary of the Passaic River, waste

matter which results in the presence of oil or grease on the surface of the waters of said tributary in violation of N.J.S.A. 58:14-8.

WHEREFORE, Plaintiff demands a final Order of Judgment against Defendant Newark Landfill Development Co. as follows:

A. That Defendant be enjoined both pendente lite and perpetually from discharging or permitting to be discharged any pollutant material into the Lawyers' Ditch, a tributary of the Passaic River;

B. That Defendants be assessed penalties pursuant to N.J.S.A. 58:14-8 running from February 16, 1976 as to Defendant Newark Landfill Development Co.

C. That Plaintiff be awarded costs of suit, including reasonable attorneys' fees.

D. Such other relief as the Court may deem just and equitable.

CARELLA, BAIN, GILFILLAN & RHODES, P.A.

BY: Charles C. Carella
CHARLES C. CARELLA
CHIEF COUNSEL
PASSAIC VALLEY SEWERAGE COMMISSIONERS

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FILED

JUN 11 1976

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MU-9

CARELLA, BAIN, GILFILLAN & RHODES, P.A.
Attorneys for Plaintiff
17 Academy Street
Newark, N.J. 07102
(601) 623-1700

SUPERIOR COURT OF NEW JERSEY
CHANCERY DIVISION: ESSEX COUNTY
DOCKET NO. C. 4092-75

C

PASSAIC VALLEY SEWERAGE COMMISSIONERS,

Plaintiff,

CENTRAL RAILROAD COMPANY OF NEW JERSEY, and NEWARK LANDFILL DEVELOPMENT CO.,

Defendants.

Civil Action
NOTICE OF MOTION

TO: CENTRAL RAILROAD COMPANY OF NEW JERSEY
1100 Raymond Boulevard
Newark, New Jersey 07102
Attn: Robert D. Tinpany, Trustee
John F. Heinbuch, Esq.
General Attorney
E. H. Wright, Vice President-Engineering

NEWARK LANDFILL DEVELOPMENT CO.
118 Stockton Street
Newark, N.J.
Attn: Nathan Raff

SIRS:

PLEASE TAKE NOTICE, that on the 25th day of JUNE, 1976 at 9:00 o'clock in the forenoon or as soon thereafter as counsel may be heard, Plaintiff in the above action will move the Superior Court, Essex County, Chancery Division, at the Essex County Court House, Newark, New Jersey for an ORDER preliminarily enjoining defendants from discharging or causing to be discharged pollutant matter into the Lawyers' Ditch, a tributary of the Passaic River. In support of its motion Plaintiff will rely upon the affidavit of Mr. Seymour A. Lubetkin, filed herewith

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and upon oral argument.

CARELLA, BAIN, GILFILLAN & RHODES, PA

Charles C. Carella

CHARLES C. CARELLA, ESQ.
CHIEF COUNSEL
PASSAIC VALLEY SEWERAGE COMMISSIONERS

Dated: June 9, 1976

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CARELLA, BAIN, GILFILLAN & RHODES,P.A.
Attorneys for Plaintiff
17 Academy Street
Newark,N.J. 07102
(201) 623-1700

SUPERIOR COURT OF NEW JERSEY
CHANCERY DIVISION:ESSEX COUNTY
DOCKET NO. C-

PASSAIC VALLEY SEWERAGE COMMISSIONERS,

Plaintiff,

-vs-

CENTRAL RAILROAD COMPANY OF NEW JERSEY and NEWARK LANDFILL DEVELOPMENT CO.,

Defendants.

PROOF OF MAILING

I hereby certify that the original of the within Notice of Motion was forwarded to the Clerk, Superior Court of New Jersey, State House Annex, Trenton,N.J. 08625.

CHARLES C. CARELLA

I hereby certify that a copy of the within Notice of Motion was sent to the Clerk of Essex County in accordance with Rule 4:4-6B.

I hereby certify that I am attorney for the Plaintiff herein and that on the 9th day of June, I served upon Central Railroad Company of New Jersey at 1100 Raymond Boulevard,Newark, New Jersey and Newark Landfill Development Co., at 118 Stockton Street, Newark, New Jersey copy of Notice of Motion by mailing the copy of same addressed as aforesaid, first class mail, postage prepaid.

Dated: June 9, 1976

CHARLES C. CARELLA

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CARELLA, BAIN, GILFILLAN & RHODES,P.A.
Attorneys for Plaintiff
17 Academy Street
Newark,New Jersey 07102
(201) 623-1700

PASSAIC VALLEY SEWERAGE COMMISSIONERS, Plaintiff, -vs- CENTRAL RAILROAD COMPANY OF NEW JERSEY, and NEWARK LANDFILL DEVELOPMENT CO., Defendants.	SUPERIOR COURT OF NEW JERSEY CHANCERY DIVISION:ESSEX COUNTY DOCKET NO. C- CIVIL ACTION AFFIDAVIT OF SEYMOUR A. LUBETKIN

STATE OF NEW JERSEY)
: SS
COUNTY OF ESSEX)

SEYMOUR A. LUBETKIN, of full age and being duly sworn according to law upon his oath deposes and says:

1. I am Chief Engineer of the Passaic Valley Sewerage Commissioners.

2. The Passaic Valley Sewerage Commissioners take periodic samplings of water in the Passaic River, its tributaries, and in certain lands which drain on to the Passaic River through its tributaries.

3. The Lawyers' Ditch is a tributary in the Passaic River in Newark,New Jersey. Upon information and belief the Central Railroad Company of New Jersey is the record owner of Block 5051 Lot 58 which is connected to the Passaic River by said Lawyers' Ditch. Attached hereto as Exhibit A is a map drawn by Public

Service Electric & Gas Company, which I believe correctly reflects the geographical positions of the lot in question, the Lawyers' Ditch, and the Passaic River.

4. The Passaic Valley Sewerage Commissioners first detected a pollution problem in the Lawyers' Ditch in 1974 and this pollution problem was abated on or about the summer of 1975.

5. In January of 1976, the Passaic Valley Sewerage Commissioners, through their inspectors Frank P. D'Ascensio and John McLaughlin, detected pollution in the Lawyers' Ditch. Copies of their reports of January 14 and January 28, 1976 are attached hereto as Exhibits B and C respectively.

6. On January 29, 1976, Mr. D'Ascensio notified the Central Railroad Company of New Jersey of the results of the inspection and demanded that the pollution cease. A copy of the letter wherein such notification was given is attached hereto as Exhibit D.

7. Subsequent inspections were made on February 20, March 11 and March 24, 1976, copies of which are attached hereto as Exhibits E, F, and G respectively, which show that the pollution problem has not abated.

8. On March 26, 1976, I personally wrote a letter to Mr. E.H. Wright, Vice President-Engineering of the Central Railroad Company of New Jersey, informing him that the pollution problem had not abated and that the Passaic Valley Sewerage Commissioners demanded that the pollution cease. A copy of this letter is attached

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9. Subsequent inspections were made on March 30, April 6, and April 13, 1976, copies of which are attached hereto as Exhibits I,J & K respectively. These inspections reveal that the pollution problem has still not abated.

10. Notwithstanding these notifications, the Central Railroad of New Jersey has taken no action to stop the pollution problem. The nature of the pollution is primarily the discharge into the Lawyers' Ditch of oily and foul smelling substances, and unless the Central Railroad Company of New Jersey is enjoined from discharging or permitting to be discharged polluting material into the Lawyers' Ditch, Plaintiff will be unable to continue its duties in monitoring and preventing irreparable damage to marine life and to shores to which the Passaic River ultimately carries its waters.

Seymour A. Lubetkin

SEYMOUR A. LUBETKIN

Sworn and Subscribed to
before me this 7th day of
June
~~May~~, 1976.

Louis J. Capone

LOUIS J. CAPONE
NOTARY PUBLIC OF NEW JERSEY
My Commission Expires Mar. 2, 1981

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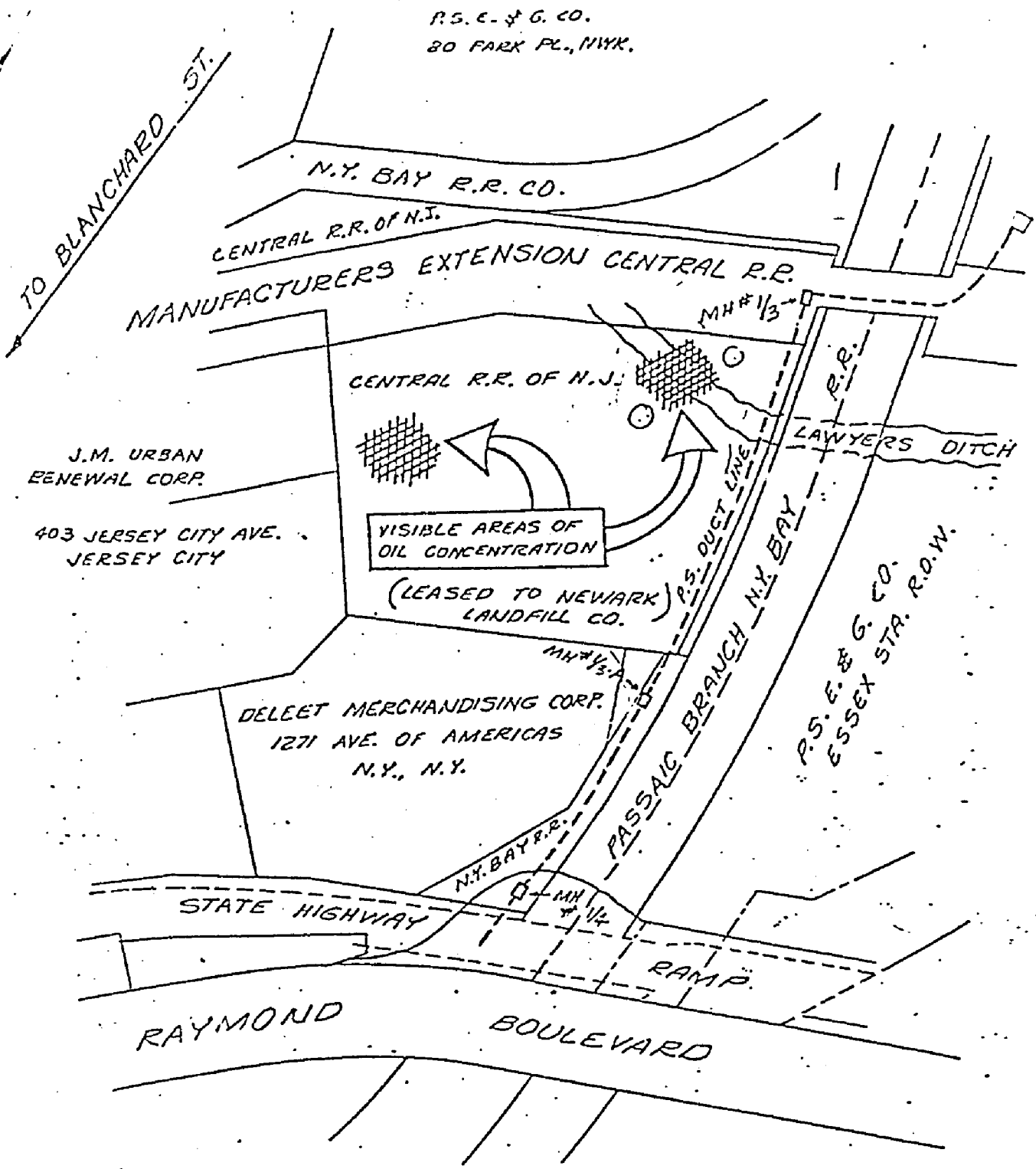

EXHIBIT A

12

SUBJECT PUBLIC SERVICE E. & G. CO. DUCT LINE AND RELATED PROP. CONFIGURATION IN AREA OF OIL SPILLAGE N/O RAYMOND BL. W/O P.S. E. & G. CO., R.O.W. (ESSEX GEN. STA.) CITY OF NEWA.

LOCATION -- ESSEX	DRAWN BY J. H.	CHECKED	APPROVED
	DATE 2-7-75	SCALE NONE	TITLE DIV. DISTR.
NUMBER	PUBLIC SERVICE ELECTRIC AND GAS COMPANY ELECTRIC DEPARTMENT		DRAWING NUMBER OE-11-1

STANDARD METHODS OF ANALYSIS

RESULTS EXPRESSED IN MILLIGRAMS PER LITER (mg/l)

DATE OF SAMPLE Jan. 14, 1976 TIME 1:40p.m. SAMPLE No. A-131

SAMPLE OF Lawyers Ditch - Newark - 50 yards East of N.J. Turnpike

TAKEN BY E.D. Ascenzio

TOTAL SOLIDS		TURBIDITY (J.T.U.)	284
TOTAL VOLATILE		pH	7.4
TOTAL MINERAL		FLAMMABLE	
SUSPENDED SOLIDS	109 mjf	EXPLOSIMETER (PERCENT)	
SUSPENDED VOLATILE	33 mjf	ORTHOPHOSPHATE (DISSOLVED)	
SUSPENDED MINERAL	76 mjf	TOTAL PHOSPHATES	
DISSOLVED SOLIDS		TEMPERATURE °F	
SETTLEABLE SOLIDS (ml/L)		COLIFORMS PER ml	
TOTAL NITROGEN		FECAL COLIFORMS PER 100 ml	
AMMONIA NITROGEN		THRESHOLD ODOR NUMBER	
ORGANIC NITROGEN		GREASE AND OIL	
NITRATE NITROGEN		TOTAL ORGANIC CARBON	105
NITRITE NITROGEN			
CHLORIDES AS CHLORINE	905 wp		
ALKALINITY AS $CaCO_3$			
CHEMICAL OXYGEN DEMAND	482 wp		
BIOCHEMICAL OXYGEN DEMAND			
CHLORINE DEMAND			
CHLORINE RESIDUAL			

DESCRIPTION:
Blackish-Gray Turbid Liquid
Black & Gray Suspended Matter
Black & Gray Sediment
Obnoxious Odor

REMARKS:

Alexander S. Goldberg
ALEXANDER S. GOLDBERG
DIRECTOR OF SANITATION CONTRO

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EXHIBIT B

LABORATORY REPORT

STANDARD METHODS OF ANALYSIS

RESULTS EXPRESSED IN MILLIGRAMS PER LITER (mg/l)

DATE OF SAMPLE Jan. 28, 1976 TIME 10:20 a.m. SAMPLE No. A-270

SAMPLE OF Lawyers Ditch Raymond Blvd. Newark

TAKEN BY J. McLaughlin

TOTAL SOLIDS		TURBIDITY (J.T.U.) ✓	22
TOTAL VOLATILE		pH	7.1
TOTAL MINERAL		FLAMMABLE	
SUSPENDED SOLIDS ✓	118 mjf	EXPLOSIMETER (PERCENT)	
SUSPENDED VOLATILE	52 mjf	ORTHOPHOSPHATE (DISSOLVED)	
SUSPENDED MINERAL	66 mjf	TOTAL PHOSPHATES	
DISSOLVED SOLIDS		TEMPERATURE °F	49
SETTLEABLE SOLIDS (ml/L)		COLIFORMS PER ml	
TOTAL NITROGEN		FECAL COLIFORMS PER 100 ml	
AMMONIA NITROGEN		THRESHOLD ODOR NUMBER	
ORGANIC NITROGEN		GREASE AND OIL	
NITRATE NITROGEN		TOTAL ORGANIC CARBON ✓	450
NITRITE NITROGEN			
CHLORIDES AS CHLORINE	640 wp		
ALKALINITY AS $CaCO_3$			
CHEMICAL OXYGEN DEMAND ✓	992 wp		
BIOCHEMICAL OXYGEN DEMAND			
CHLORINE DEMAND			
CHLORINE RESIDUAL			

DESCRIPTION:
Dark Gray Opaque Liquid
Gray Suspended Matter
Gray Sediment
Industrial Odor

REMARKS: Rej.

Alexander S. Goldberg

ALEXANDER S. GOLDBERG
DIRECTOR OF SANITATION CONTROL

EXHIBIT C 14

STREAM CONTAMINATION REPORT

District No. 10 Date: Jan. 28, 1976 Time: 10:20 A.M.

Weather:

Company Name: Lawyer's Ditch

Address: Raymond Blvd, Newark, N.J.

Name and Title of Person Contacted:

Telephone:

Nature of Business:

No. of Outlets:

Method of Waste Disposal: Sanitary Sewer ______ Combined Sewer ______

Storm Sewer, River, or Ditch Ditch

If NPDES Permit Is Required: Draft Permit ______ Final Permit ______

Violation: Dark gray opaque liquid

1. Color Dense gray opaque liquid
2. Odor Industrial odor
3. Turbidity Gray suspended matter
4. Estimated Flow (G.P.M.) ?
5. Collection on Banks Debris
6. Surface Scum, Foam or Oil Very slight oily film
7. Approximate Distance Extending Into Stream or River; Width Upstream or Downstream Lawyer's Ditch empties into Passaic River
8. pH Reaction with Test Paper pH 7 Sample Taken Yes 1-23-76, 10:20.
9. Why Sample Not Taken

(Complete narrative on reverse side)

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Exhibit C [Continued]

TIERRA-B-004215

Remarks:

A pollutant liquid from the landfill property owned by Central Railroad of N.J. again is entering Lawyer's Ditch. This previously occured last March 1975.

At the time a tenant of the said property erected wire mesh barricades with layers of straw near the culvert pipes. As the straw became saturated with the polluting material it was put into drums + removed, with clean straw replaced into barricade.

Now it appears the same polluting liquid has emptied somehow and is flowing through and into Lawyer's Ditch.

I have reported this matter to Chief Insp. Cuccinello and Frank D'Lasseri, P.V.S.C.

Communique to be sent to:

The Central Railroad Co. of N.J.
1100 Raymond Blvd.
Newark, N.J. 07102
Att. Mr. C.H. Allen, Vice Pres. - Engineering.

Respectfully,
John R. McLaughlin

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Exhibit C [Continued]

PASSAIC VALLEY SEWERAGE COMMISSIONERS
600 WILSON AVENUE
NEWARK, N.J. 07105
(201) 344-1800

January 29, 1976

C.H. Allen
Vice President - Engineering
Central Railroad Company of New Jersey
1100 Raymond Boulevard
Newark, New Jersey 07102

009 - 252

Dear Mr. Allen:

This letter is in reference to an intermittant pollution of Lawyer's Ditch, a tributary of the Passaic River, previously traced to Block 5051, lot 58 which is owned by the Central Railroad of N.J. The Central Railroad agreed to halt the pollution by, among other things, placing absorbent material, such as straw, in the ditch to remove the oily film being discharged into the ditch. Recent inspections have shown that the absorbent material is not being removed when it is saturated, as required, and pollution of Lawyer's Ditch is again occurring. This was confirmed by samples taken on January 14 and 28.

You are hereby again directed to cease pollution of Lawyer's Ditch, a tributary of the Passaic River, and you are also directed to reply to this letter at once, submitting a program of abatement.

Very truly yours,

PASSAIC VALLEY SEWERAGE COMMISSIONERS

Frank P. D'Ascensio
Supervisor of Industrial Waste

FPD:rv
cc: S.A. Lubetkin
E. Moller
A. Goldberg
L. Cuccinello
J. McLaughlin

EXHIBIT D 17

LABORATORY REPORT

STANDARD METHODS OF ANALYSIS

RESULTS EXPRESSED IN MILLIGRAMS PER LITER (mg/l)

DATE OF SAMPLE Feb. 20, 1976 TIME 1:30p.m. SAMPLE No. B-237

SAMPLE OF Lawyers Ditch - Newark -

TAKEN BY J. McLaughlin

TOTAL SOLIDS		TURBIDITY (J. T. U.)	284
TOTAL VOLATILE		pH	7.0
TOTAL MINERAL		FLAMMABLE	
SUSPENDED SOLIDS	67 mjf	EXPLOSIMETER (PERCENT)	
SUSPENDED VOLATILE	48 mjf	ORTHOPHOSPHATE (DISSOLVED)	
SUSPENDED MINERAL	19 mjf	TOTAL PHOSPHATES	
DISSOLVED SOLIDS		TEMPERATURE °F	No Temp.
SETTLEABLE SOLIDS (ml/L)		COLIFORMS PER ml	
TOTAL NITROGEN		FECAL COLIFORMS PER 100 ml	
AMMONIA NITROGEN		THRESHOLD ODOR NUMBER	
ORGANIC NITROGEN		GREASE AND OIL	
NITRATE NITROGEN		TOTAL ORGANIC CARBON	440
NITRITE NITROGEN		Hydrogen Sulfide	Positive (A.
CHLORIDES AS CHLORINE	855 wp		
ALKALINITY AS $CaCO_3$			
CHEMICAL OXYGEN DEMAND	954 wp		
BIOCHEMICAL OXYGEN DEMAND			
CHLORINE DEMAND			
CHLORINE RESIDUAL			

DESCRIPTION:

Gray Opaque Liquid
Gray & Black Suspended Matter
Gray & Black Sediment
Hydrogen Sulfide Odor

REMARKS: Kg

ALEXANDER S. GOLDBERG
DIRECTOR OF SANITATION CONTRO

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EXHIBIT E

STREAM CONTAMINATION REPORT

District No. 10 Date: Feb. 27, 1976 Time: _____

Weather: _____

Company Name: Lawrence Ditch

Address: Inward bid Newark N.J.

Name and Title of Person Contacted: C.H. Allen, V.P. Engineering

E.H. Wright, Vice-Pres-Engineering Telephone: —

Nature of Business: Railroad property used by:

Newark Industrial Development Co.

No. of Outlets: 118 Stockton ST. Newark N.J. 07105

Method of Waste Disposal: Sanitary Sewer _____ Combined Sewer _____

Storm Sewer, River, or Ditch Ditch

If NPDES Permit Is Required: Draft Permit _____ Final Permit _____

Violation: Dark tan opaque liquid flow from vents

Caldwell into Lawrence Ditch, a tributary of the Passaic R.

1. Color Dark grey opaque liquid
2. Odor H_2S
3. Turbidity Dark grey
4. Estimated Flow (G.P.M.) ?
5. Collection on Banks Dark grey sediment
6. Surface Scum, Foam or Oil Slight visible film
7. Approximate Distance Extending Into Stream or River; Width Upstream or Downstream South of Lawrence Ditch
8. pH Reaction with Test Paper pH 7 Sample Taken Feb 27, 76
9. Why Sample Not Taken _____

(Complete narrative on reverse side)

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Exhibit E Con

Remarks:

Frequent inspections of Lawyer's Ditch have shown that the absorbent material is not being removed when saturated, as required, thus permitting pollutants to pass through Lawyer's Ditch and into the Passaic River.

Sample taken Feb. 20, 1976 @ 1:30 P.M. was dark grey opaque, H_2S odor, and slight oily film.

Respectfully,

John K. McLaughlin

Exhibit E [Continued]

DEPARTMENT OF SANITATION CONTROL

LABORATORY REPORT

STANDARD METHODS OF ANALYSIS

RESULTS EXPRESSED IN MILLIGRAMS PER LITER (mg/l)

DATE OF SAMPLE Mar.11,1976 TIME 11:30a.m. SAMPLE No. C-154

SAMPLE OF Lawyers Ditch - Newark -

TAKEN BY J.McLaughlin

TOTAL SOLIDS		TURBIDITY (J.T.U.)	244
TOTAL VOLATILE		pH	7.4
TOTAL MINERAL		FLAMMABLE	
SUSPENDED SOLIDS	75 mjf	EXPLOSIMETER (PERCENT)	
SUSPENDED VOLATILE	32 mjf	ORTHOPHOSPHATE (DISSOLVED)	
SUSPENDED MINERAL	43 mjf	TOTAL PHOSPHATES	
DISSOLVED SOLIDS		TEMPERATURE °F	No Temp.
SETTLEABLE SOLIDS (ml/L)		COLIFORMS PER ml	
TOTAL NITROGEN		FECAL COLIFORMS PER 100 ml	
AMMONIA NITROGEN		THRESHOLD ODOR NUMBER	
ORGANIC NITROGEN		GREASE AND OIL	
NITRATE NITROGEN		TOTAL ORGANIC CARBON	140
NITRITE NITROGEN			
CHLORIDES AS CHLORINE	855 wp		
ALKALINITY AS $CaCO_3$			
CHEMICAL OXYGEN DEMAND	396 wp		
BIOCHEMICAL OXYGEN DEMAND			
CHLORINE DEMAND			
CHLORINE RESIDUAL			

DESCRIPTION:
Black Opaque Liquid
Black Suspended Matter
Black Sediment
Obnoxious Odor

REMARKS:

Alexander S. Goldberg

ALEXANDER S. GOLDBERG
DIRECTOR OF SANITATION CONTRO

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EXHIBIT F

STREAM CONTAMINATION REPORT

District No. 10 Date: March 8-12, 1976 Time: ____

Weather: ____

Company Name: Lawyer's Ditch

Address: Raymond Blvd. Newark, N.J.

Name and Title of Person Contacted: E. H. Wright, Vice-Pres. [illegible]

Telephone: —

Nature of Business: Richland Property use by Newark Landfill Development Co.

No. of Outlets: 118 Stockton St. Newark 07105

Method of Waste Disposal: Sanitary Sewer ____ Combined Sewer ____
Storm Sewer, River, or Ditch: Ditch

If NPDES Permit Is Required: Draft Permit ____ Final Permit ____

Violation: Black grey opaque liquid flows from beneath landfill into Lawyer's Ditch, a tributary of Passaic R.

1. Color: black grey opaque liquid
2. Odor: H_2S
3. Turbidity: black grey
4. Estimated Flow (G.P.M.): ?
5. Collection on Banks: black grey sediment
6. Surface Scum, Foam or Oil: slight oily film
7. Approximate Distance Extending Into Stream or River; Width Upstream or Downstream: length of Lawyer's Ditch
8. pH Reaction with Test Paper: pH 7 Sample Taken: 3-11-76 11:55 a.m.
9. Why Sample Not Taken ____

(Complete narrative on reverse side)

Exhibit F [Continued]

remarks.

Last up to date inspection of this location Mar. 11, 1976 by myself shows no evidence of saturated straw having been removed or replaced. Dark grey liquid continues to pass through straw barricade, also containing slight oily film.

Respectfully,
John R. McLaughlin

Exhibit F [Continued]

DEPARTMENT OF SANITATION CONTROL

LABORATORY REPORT

STANDARD METHODS OF ANALYSIS

RESULTS EXPRESSED IN MILLIGRAMS PER LITER (mg/l)

DATE OF SAMPLE Mar. 24, 1976 TIME 10:25a.m. SAMPLE No. C-320

SAMPLE OF Lawyers Ditch - Newark -

TAKEN BY J. McLaughlin

TOTAL SOLIDS		TURBIDITY (J.T.U.)	1760
TOTAL VOLATILE		pH	7.1
TOTAL MINERAL		FLAMMABLE	
SUSPENDED SOLIDS	1240 mjf	EXPLOSIMETER (PERCENT)	
SUSPENDED VOLATILE	368 mjf	ORTHOPHOSPHATE (DISSOLVED)	
SUSPENDED MINERAL	872 mjf	TOTAL PHOSPHATES	
DISSOLVED SOLIDS		TEMPERATURE °F	50
SETTLEABLE SOLIDS (ml/L)		COLIFORMS PER ml	
TOTAL NITROGEN		FECAL COLIFORMS PER 100 ml	
AMMONIA NITROGEN		THRESHOLD ODOR NUMBER	
ORGANIC NITROGEN		GREASE AND OIL	
NITRATE NITROGEN		TOTAL ORGANIC CARBON	400 ±
NITRITE NITROGEN			
CHLORIDES AS CHLORINE	380 wp		
ALKALINITY AS $CaCO_3$			
CHEMICAL OXYGEN DEMAND	1052 wp		
BIOCHEMICAL OXYGEN DEMAND			
CHLORINE DEMAND			
CHLORINE RESIDUAL			

DESCRIPTION:
Black Opaque Liquid
Black Suspended Matter
Black Sediment
Obnoxious Odor

REMARKS:

ALEXANDER S. GOLDBERG
DIRECTOR OF SANITATION CONTROL

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EXHIBIT G

STREAM CONTAMINATION REPORT

District No. 10 Date: Mar. 24, 1976 Time: ______

Weather: ______

Company Name: Lawyer's Ditch

Address: Raymond Blvd, Newark, N.J.

Name and Title of Person Contacted: E. H. Wright, V.P. Engineering, Penn Central R.R.

______ Telephone: ______

Nature of Business: Penn Central R.R. property used by Newark Land Development Co, 118 Stockton St Newark, N.J. 07105

No. of Outlets: One

Method of Waste Disposal: Sanitary Sewer ______ Combined Sewer ______
Storm Sewer, River, or Ditch Ditch

If NPDES Permit Is Required: Draft Permit ______ Final Permit ______

Violation: Black gray organic liquid flows from beneath landfill into Lawyer's Ditch a tributary of Passaic River

1. Color black gray
2. Odor H_2S
3. Turbidity black gray
4. Estimated Flow (G.P.M.) ?
5. Collection on Banks black gray sediment
6. Surface Scum, Foam or Oil Trace of oil
7. Approximate Distance Extending Into Stream or River; Width Upstream or Downstream Length of Lawyer's Ditch
8. pH Reaction with Test Paper pH 7 ______ Sample Taken Bkr 3-24-76
9. Why Sample Not Taken ______

(Complete narrative on reverse side)

Exhibit G [continued]

Remarks:

Still, no attempt has been made to remove the saturated absorbent material from the area.

On Mar. 24, 1976 I observed P.S.E.+G. Co. Electric Division directing bulldozer operation in search of manhole containing electric lines on landfill property.

During bulldozer operation I observed numerous 55 gal drums being upturned, which had been buried beneath landfill. Black opaque sludge like substance visible. While bulldozer was pushing through sludge, one drum exploded to a height of approximately 20 ft.

At this moment I gathered my sampling kit and left with sample to deliver to P.V.S.C. laboratory.

Respectfully,
John K. McLaughlin

Exhibit G [continued]

PASSAIC VALLEY SEWERAGE COMMISSIONERS
600 WILSON AVENUE
NEWARK, N.J. 07105
(201) 344-1800

March 26, 1976

009-283

Mr. E. H. Wright,
Vice President - Engineering
Central Railroad Company of New Jersey
1100 Raymond Boulevard
Newark, New Jersey 07102

Dear Mr. Wright:

Despite the fact that on January 29, 1976 you were directed to cease the pollution of Lawyer's Ditch by Mr. Frank D'Ascensio, PVSC Supervisor of Industrial Waste, and despite the fact that we received a copy of a letter dated February 6, 1976 from you to the Newark Landville Development Company instructing them to cease pollution as of this date, nothing has been done and oil continues to flow into Lawyer's Ditch from your property.

You are hereby put on notice that if this pollution does not cease by April 8, 1976, you will leave me no recourse but to recommend that this matter be turned over to the Commissioners' legal department for whatever action they deem necessary to halt the pollution.

Very truly yours,

PASSAIC VALLEY SEWERAGE COMMISSIONERS

S. A. Lubetkin,
Chief Engineer

SAL/kl
Certified Mail
cc: PVSC
Messrs. Carella, D'Ascensio, Goldberg, Cuccinello, and Jacangelo (NJDEP)

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EXHIBIT H

PASSAIC VALLEY SEWERAGE COMMISSIONERS
DEPARTMENT OF SANITATION CONTROL

LABORATORY REPORT

STANDARD METHODS OF ANALYSIS

RESULTS EXPRESSED IN MILLIGRAMS PER LITER (mg/l)

DATE OF SAMPLE Mar. 30, 1976 TIME 11:30a.m. SAMPLE No. C-406

SAMPLE OF Lawyers Ditch -Newark-

TAKEN BY J. McLaughlin

TOTAL SOLIDS		TURBIDITY (J.T.U.)	288
TOTAL VOLATILE		pH	7.4
TOTAL MINERAL		FLAMMABLE	
SUSPENDED SOLIDS	288 mjf	EXPLOSIMETER (PERCENT)	
SUSPENDED VOLATILE	70 mjf	ORTHOPHOSPHATE (DISSOLVED)	
SUSPENDED MINERAL	218 mjf	TOTAL PHOSPHATES	
DISSOLVED SOLIDS		TEMPERATURE °F	52
SETTLEABLE SOLIDS (ml/L)		COLIFORMS PER ml	
TOTAL NITROGEN		FECAL COLIFORMS PER 100 ml	
AMMONIA NITROGEN		THRESHOLD ODOR NUMBER	
ORGANIC NITROGEN		GREASE AND OIL	
NITRATE NITROGEN		TOTAL ORGANIC CARBON	38 ea
NITRITE NITROGEN			
CHLORIDES AS CHLORINE	1205 wp		
ALKALINITY AS $CaCO_3$			
CHEMICAL OXYGEN DEMAND	140 wp		
BIOCHEMICAL OXYGEN DEMAND			
CHLORINE DEMAND			
CHLORINE RESIDUAL			

DESCRIPTION:
Black Opaque Liquid
Black Suspended Matter
Black Sediment (Heavy)
Obnoxious Odor

REMARKS:

ALEXANDER S. GOLDBERG
DIRECTOR OF SANITATION CONTROL

EXHIBIT I

DEPARTMENT OF SANITATION CONTROL

LABORATORY REPORT

STANDARD METHODS OF ANALYSIS.

RESULTS EXPRESSED IN MILLIGRAMS PER LITER (mg/l)

DATE OF SAMPLE April 6, 1976 TIME 2:30p.m. SAMPLE No. B-75

SAMPLE OF Lawyers Ditch - Newark -

TAKEN BY J. McLaughlin

TOTAL SOLIDS		TURBIDITY (J. T. U.)	225
TOTAL VOLATILE		pH	7.4
TOTAL MINERAL		FLAMMABLE	
SUSPENDED SOLIDS	104 mjf	EXPLOSIMETER (PERCENT)	
SUSPENDED VOLATILE	42 mjf	ORTHOPHOSPHATE (DISSOLVED)	
SUSPENDED MINERAL	62 mjf	TOTAL PHOSPHATES	
DISSOLVED SOLIDS		TEMPERATURE °F	56
SETTLEABLE SOLIDS (ml/L)		COLIFORMS PER ml	
TOTAL NITROGEN		FECAL COLIFORMS PER 100 ml	
AMMONIA NITROGEN		THRESHOLD ODOR NUMBER	
ORGANIC NITROGEN		GREASE AND OIL	
NITRATE NITROGEN		TOTAL ORGANIC CARBON	270
NITRITE NITROGEN			
CHLORIDES AS CHLORINE	430 wp		
ALKALINITY AS $CaCO_3$			
CHEMICAL OXYGEN DEMAND	524 wp		
BIOCHEMICAL OXYGEN DEMAND			
CHLORINE DEMAND			
CHLORINE RESIDUAL			

DESCRIPTION:
Cloudy Grayish Liquid
Fine Black Suspended Matter
Black Sediment (Heavy)
Obnoxious Odor

REMARKS: Re

Alexander S. Goldberg

ALEXANDER S. GOLDBERG
DIRECTOR OF SANITATION CONTR

EXHIBIT J 29

DEPARTMENT OF SANITATION CONTROL

LABORATORY REPORT

STANDARD METHODS OF ANALYSIS

RESULTS EXPRESSED IN MILLIGRAMS PER LITER (mg/l)

DATE OF SAMPLE April 13, 1976 TIME 2:30p.m. SAMPLE No. D-135

SAMPLE OF Lawyers Ditch Newark

TAKEN BY J. McLaughlin

TOTAL SOLIDS		TURBIDITY (J.T.U.)	2,000
TOTAL VOLATILE		pH	7.1
TOTAL MINERAL		FLAMMABLE	
SUSPENDED SOLIDS	240 mjf	EXPLOSIMETER (PERCENT)	
SUSPENDED VOLATILE	78 mjf	ORTHOPHOSPHATE (DISSOLVED)	
SUSPENDED MINERAL	162 mjf	TOTAL PHOSPHATES	
DISSOLVED SOLIDS		TEMPERATURE °F	56
SETTLEABLE SOLIDS (ml/L)		COLIFORMS PER ml	
TOTAL NITROGEN		FECAL COLIFORMS PER 100 ml	
AMMONIA NITROGEN		THRESHOLD ODOR NUMBER	
ORGANIC NITROGEN		GREASE AND OIL	
NITRATE NITROGEN		TOTAL ORGANIC CARBON	-
NITRITE NITROGEN			
CHLORIDES AS CHLORINE	520 wp		
ALKALINITY AS $CaCO_3$			
CHEMICAL OXYGEN DEMAND	1108 wp		
BIOCHEMICAL OXYGEN DEMAND			
CHLORINE DEMAND			
CHLORINE RESIDUAL			

DESCRIPTION:
Black Opaque Liquid
Black Sediment (Thick)
Solvent Odor

REMARKS:

ALEXANDER S. GOLDBERG
DIRECTOR OF SANITATION CONTROL

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EXHIBIT K

State of New Jersey

Department of Environmental Protection

Christine Todd Whitman
Governor

Robert C. Shinn, Jr.
Commissioner

MEMORANDUM

MAR 25 1996

TO: Richard J. Gimello, Assistant Commissioner
Site Remediation Program

FROM: Anthony J. Farro, Director
Division of Publicly Funded Site Remediation

SUBJECT: Ottilio Landfill Site
Newark, Essex County, New Jersey
Final Decision Document (DD)

Attached is the Final Decision Document (DD) for the Ottilio Landfill Site located in Newark, New Jersey for your review and signature. FYI, I have attached a copy of the briefing memo provided to you and Commissioner Shinn on January 4, 1996 outlining the background and status of the site, as well as relevant issues raised during the public comment period. The briefing memo also delegated the signing of the Final Decision Document to you.

If you have any questions regarding the Document, please contact me at your earliest convenience.

BAA000010

RECEIVED
APR 30 1996

Attachments (2)
cc: E. Putnam, RPDE
R. Soboleski, BSM
R. Collier, BSM
L. Sanders, BSM
D. Barskey, BEERA
D. Kaplan, BGWPA
D. Kakas, BCR
M. Mumford, BCR

Vicky

State of New Jersey
Department of Environmental Protection

Christine Todd Whitman
Governor

Robert C. Shinn, Jr.
Commissioner

MEMORANDUM

JAN 04 1996

TO: Robert C. Shinn, Jr., Commissioner
Department of Environmental Protection

FROM: Richard J. Gimello, Assistant Commissioner
Site Remediation

SUBJECT: Ottilio Landfill
Newark, Essex County, NJ
Decision Document Briefing

INTRODUCTION

This briefing has been prepared to provide you with a site status and to inform you of the relevant issues raised during the public meeting prior to finalizing the Ottilio Landfill Decision Document. Attached is a copy of the Proposed Decision Document (PDD) for additional information. Per our agreement, unless you indicate you wish to become involved, I will sign the site Decision Document (DD).

EXECUTIVE SUMMARY

A Public Meeting was held on December 7, 1995 at Newark City Hall in Newark, New Jersey. At the meeting the Department presented its findings from the Remedial Investigation (RI), the alternatives developed and evaluated in the Remedial Alternatives Analysis (RAA), and the proposed remedy for cleaning up contaminated soils, groundwater, and sediments at the Ottilio Landfill site. Meeting attendees included one Newark City official and representatives from a local community/environmental advocacy group. No substantive community opposition to the Department's Preferred Remedial Alternative was voiced at the meeting.

REMEDIAL INVESTIGATION (RI) SUMMARY

The Department's RI investigation included sampling and analysis of soils, groundwater, wetland areas/sediments, surface water, and air. Results indicated that landfill soils contained concentrations of organic and inorganic compounds above the Department's residential and non-residential cleanup standards.

Groundwater\leachate beneath the landfill is contaminated with volatile organics and metals exceeding groundwater quality criteria.

An Ecological Risk Assessment was conducted to assess the environmental impact that the landfill has had on the on-site wetland areas/sediments and surface water. These areas have been adversely impacted by uncontrolled leachate discharge and stormwater runoff from the landfill; posing a significant risk to ecological receptors.

A soil gas survey and air pathway analysis were conducted at the site. Findings show that very low levels of volatile organics are being emitted from the landfill surface.

REMEDIAL ALTERNATIVE ANALYSIS (RAA) SUMMARY

The RAA identified the following environmental media/areas of concern as warranting remediation: landfill soils, leachate, and wetland areas/sediments. The purpose of the RAA was to develop, screen, and evaluate various remedial alternatives to:

1. Prevent human and environmental exposure to contaminated soils
2. Control landfill leachate discharge
3. Protect adjacent wetland areas, surface water bodies, and other surrounding ecological resources

A total of nine soil, fifteen groundwater, two surface water, seven sediment, and six air alternatives passed initial screening and were evaluated in greater detail in the RAA. The attached PDD lists these alternatives on page 6.

ISSUES

No substantive community opposition to the Department's Preferred Remedial Alternative was voiced at the public meeting. The proposed cleanup measures for the Ottilio Landfill site are consistent with past Department actions and current policy/guidelines.

PREFERRED REMEDY

After detailed evaluations we propose the following Preferred Remedial Alternative for addressing contaminated soils, leachate, and wetland areas/sediments. (Note: All costs are present worth and include 30 years of operation, maintenance, and monitoring):

SOILS

Alternative LS-5B: Solid Waste Cap
Estimated Cost: $ 10,922,476

LEACHATE

Alternative G/L-3B & G/L-7A: Leachate Collection Using Interceptor Trenches & Off-Site Treatment at TSD Facility (with Landfill Cap)

Estimated Cost: $ 6,200,559

WETLAND AREAS/SEDIMENTS

Alternative Sed-4A: Total Excavation with On-Site Disposal
Estimated Cost: $ 268,059

The total estimated present worth cost for the remedy is: $ 17,557,519

RECOMMENDATION

Based on the information available at this time, the Site Remediation Program (SRP) believes that the above Preferred Remedial Alternative will be protective of human health and the environment, comply with the Technical Requirements for Site Remediation (N.J.A.C 7:26E), the Spill Compensation and Control Act (N.J.S.A. 58:10-23.a, et. seq.), the Solid Waste Management Act (N.J.S.A. 13:1E-1, et. seq.), and the Water Pollution Control Act (N.J.S.A. 58:10A-1 et. seq., 50:10B).

Attachments (1)
cc: A. Farro
E. Putnam
R. Soboleski
R. Collier
L. Sanders

FINAL DECISION DOCUMENT
OTTILIO LANDFILL SITE
CITY OF NEWARK, ESSEX COUNTY, NJ

INTRODUCTION

This final Decision Document (DD) identifies the remedial alternatives to address the Ottilio Landfill located in the City of Newark, Essex County, New Jersey. It is being issued by the New Jersey Department of Environmental Protection (NJDEP).

This DD outlines all of the remedial alternatives which were evaluated for the remediation of soils, ground water/leachate, surface water, sediment, and air and provides the rationale used by the NJDEP to select a Site remedial action.

NJDEP is issuing this DD as part of its responsibilities under the Department's "Technical Requirements for Site Remediation" (N.J.A.C. 7:26E); the Spill Compensation and Control Act (N.J.S.A. 58:10-23.a., et. seq.); Solid Waste Management Act (N.J.S.A 13:1E-1 et seq.); the Water Pollution Control Act (N.J.S.A. 58:10A-1 et seq.); N.J.S.A. 58:10B; and the regulations promulgated under each of these acts. This DD summarizes information which can be found in the following documents which have been placed in public repositories to provide information to the public about the investigations conducted at the site and the selected remedies:

- Remedial Investigation/Feasibility Study (RI/FS) Phase I Remedial Investigation Report, dated February 3, 1992
- Remedial Investigation (RI) Report (Phase II), dated September 15, 1995
- Remedial Alternatives Analysis (RAA) Report, dated November 1995

The above-listed documents have been established for public viewing at the locations listed below:

Newark City Hall
Clerk's Office
920 Broad Street, Room 306
Newark, NJ 07102

Newark Public Library
New Jersey Division
5 Washington Street
PO Box 630
Newark, NJ 07101

New Jersey Department of Environmental Protection
401 East State Street
CN 413
Trenton, NJ 08625-0413

COMMUNITY ROLE IN THE SELECTION PROCESS

NJDEP solicited community input on the proposed remedial actions for the Ottilio Landfill site. A public meeting to present the RI and RAA findings as well as present the preferred remedy for the site was held on December 7, 1995 at the Newark City Hall. NJDEP also established a public comment period of thirty (30) days, from November 21, 1995 to December 20, 1995 to encourage public participation in the selection process. All comments received verbally during the public meeting and in writing during the public comment period were summarized and responded to in the Responsiveness Summary section of the Ottilio Landfill Decision Document. This DD formalizes the selected remedy.

SITE BACKGROUND

The Ottilio Landfill (Site) is located in an industrial area dominated by chemical manufacturing facilities in the City of Newark, Essex County, New Jersey. The Site is approximately six (6) acres in size and encompasses two adjacent lots (lots 12 and 16, Tax Block 5001) and smaller portions of lots 10, 60, 90, and an unnumbered triangular lot. The eastern and western site boundaries are defined by a Conrail Railroad line (to the east), by Deleet Merchandising (which occupies the western one-third of lot 12), and New Jersey Millwork, Inc. to the west. Along the northern boundary is the Essex County Resource Recovery facility (ECRR) and associated rail lines, and a road providing access to both the ECRR facility and the Essex Generation Station of Public Service Electric and Gas (PSE&G). The southern border is bounded primarily by Raymond Boulevard.

Access to the Site is primarily obtained via one of three main routes: Blanchard Avenue via the New Jersey Millwork and Deleet Merchandising properties; a utility access road off of Blanchard Avenue to the north; or from Raymond Boulevard along the southern property boundary.

The nearest residential area, the Ironbound Community, is located approximately one-half mile west of the site. Approximately 30 acres (or 42 percent) of the land area within a 1,000-foot radius of the landfill is covered by structures (e.g., buildings) and other impermeable surfaces (i.e., paved areas).

The Site is relatively flat except for the central portion which is hummocky as a result of landfilling activities. Along the northern/northeastern property boundary and the northern half of the western property boundary, the Site drops off abruptly (about six to eight feet) representing the edge of the landfill material in these areas.

There is aerial photographic evidence suggesting that some dumping may have occurred on lot 12 as early as 1951 and possibly as far back as 1940. During this same time period, lot 16 was relatively undeveloped and was covered with natural vegetation; and two small streams located in the northeastern portion of lot 16 combined to form a small creek which flowed easterly off-site and eventually into the Passaic River. The portion of the creek

which is located downgradient of the Site is presently referred to as Lawyer's Ditch. By 1961 landfilling activities clearly appeared to be occurring on lot 12, while lot 16 was still relatively undeveloped. In the 1972 and 1974 aerial photographs, landfilling activities are clearly evident across the entire Site and the two streams previously located in the northeastern corner of lot 16 have been graded over. By 1979, the Site appeared to be filled and graded suggesting that landfilling operations had ceased and that the Site was abandoned.

On March 19, 1974, the City of Newark, New Jersey, Department of Engineering, investigated reports of illegal dumping on-site (G. B. Liss, 1974). Most of the on-site activities appeared to be taking place on the northern portion (lot 16) of the Site. The southern portion of the Site was identified as a "junk yard."

On March 26, 1974, the Site was inspected by the NJDEP, Bureau of Solid Waste Management, in response to a report filed by the City of Newark, New Jersey (Norman Silvester, 1974). Based on this visit, the Site was determined to be in violation of several solid waste management regulations. A complaint was filed by John van Dalen, Deputy Attorney General of New Jersey, on behalf of NJDEP against t/a V Ottilio & Sons, Deleet Merchandising, and Central Railroad of New Jersey. The complaint cited several violations by Carmen Ottilio and t/a V Ottilio & Sons for engaging in the disposal of solid wastes (including chemicals) on lot 12 and lot 16 of Tax Block 5001 in the City of Newark, New Jersey, without filing a registration statement and having the proper approval. As a result of these observations, the defendants were charged with illegal open dumping.

In response to the charges, t/a V Ottilio & Sons submitted for and was granted a conditional registration for the landfill in January 1975. The landfill registration permitted only landfilling of construction and demolition wastes provided that the following conditions were met first: all tires, barrels, oil drums, and similar materials were to be removed from the Site; the Site was to be graded to a five percent grade, and after grading, the Site was to be covered with two feet of clay soil; a fence and a locked gate were to be erected to prevent access to the Site; setback distances of 10 feet for the Transco pipeline and 50 feet for all other property boundaries were to be observed; and a gas venting system and three ground water monitoring wells were to be installed. Ottilio did not satisfy all of the conditions of the permit.

On March 18, 1975, the United States Environmental Protection Agency (USEPA) and NJDEP made a site visit to investigate a report by PSE&G employees that oil was leaching from the Site into Lawyer's ditch (Clark K. Price, 1975). Numerous other oil seeps had also been previously noted on-site and reported to regulators by various individuals.

On April 8, 1975, USEPA made a second site visit to determine if anything had been done to mitigate the oil release on the Site. USEPA personnel noted that the landfill had been graded and that dirt barriers had been built to deter illegal dumping on Site. Filter fences were also installed to prevent migration of oil to Lawyer's ditch. However, Mr. Ottilio

refused to do anything about the 55-gallon drums previously noted on site. Mr. Ottilio claimed that these drums were not his responsibility (NJDEP Hazardous Waste Site Dossier, 1980).

Although no official records have been found, files suggest that the landfill ceased operation and was abandoned in 1979. In order to gather more data to accurately assess hazardous conditions at the Site, two USEPA field investigation teams (FIT) performed preliminary studies at the Site in 1982. Additionally, the NJDEP conducted investigations at the Site in early 1985. These studies indicated that the Site had the potential to cause adverse effects to the environment.

USEPA's 1980 "Hazardous Waste Site Identification and Preliminary Assessment" document indicated that at one time hundreds of 55-gallon drums, with the potential of having thousands of gallons of liquid waste, were present on-site. There is no record regarding the fate of these drums. The Remedial Investigation (RI) Report (September 15, 1995) for this Site identified numerous buried 55-gallon drums have been disposed at the Site. These drums could be the source of organic and inorganic contamination identified at the Site.

The Phase I RI was implemented at the Site in 1987. Based on the Phase I site investigations, surface and subsurface soils within the landfilled area were identified as the primary contaminant sources. These soils were found to be contaminated with volatile organic, base neutral/acid extractable, pesticide, metal, and petroleum hydrocarbon compounds. The primary contaminant migration pathways identified during the Phase I investigation were ground water, surface water runoff, and erosion; to a lesser degree, airborne particulates and vapors via wind were also found to be a possible source of contaminant migration.

Additional site investigations were implemented in mid-1993 as part of the Phase II Remedial Investigation (RI). The Phase II RI concluded that past landfilling operations have impacted the immediate area and environment, and represent a continuing source of environmental problems by degrading both the ground water quality beneath the Site, the sediment in Lawyer's Ditch, and surface water flowing from the Site.

REMEDIAL INVESTIGATION SUMMARY

The Phase I and Phase II Ottilio Landfill Remediation Investigations (RIs) included geophysical surveys, aerial photographic reviews, test borings, and monitoring well installations; as well as the collection of ground water/leachate, surface water, sediment, soil, and air samples. In addition to the sediment sampling, an environmental risk assessment (ERA) was conducted as part of the Phase II RI. The sediment samples collected for the ERA were submitted for laboratory-based toxicity testing and quantitative and qualitative benthic macroinvertebrate samples were collected.

Results from the Phase I and Phase II RIs show that subsurface soils within the landfill area

contain grossly elevated (i.e., 10 times the respective cleanup standard) concentrations of organic and inorganic compounds. These soils appear to be the primary source of contamination migrating to other areas of the Site. The most elevated levels of contaminants were detected along the eastern, central, and southeastern areas of lot 16; and the northeastern portion of lot 12. To a lesser extent, contaminated soils were also found in the northwest areas of lot 16. These results were consistent with the results of the electromagnetic conductivity and soil gas surveys which indicated anomalies in many of these areas. Test pit excavations also revealed that several of these areas contained buried, disintegrated drums containing many unknown substances.

Ground water beneath the Site is contaminated with volatile organics, metals, and certain landfill parameters (i.e., ammonia, chloride, sulfate, and total dissolved solids). Elevated volatile organics and the highest metals (inorganics) contamination were detected in the eastern portion of the northern lot (lot 16) in well MW-4. The primary source of these contaminants in the ground water appears to be the infiltration and downward percolation of rain/surface water through the contaminated surface and subsurface soil at the Site. Downward migration of the contaminated shallow ground water also appears to be contaminating ground water in the underlying unconsolidated sand zone, and to lesser extent, in the bedrock zone.

Although a few organic compounds associated with the landfill appear to have migrated off-site, there is considerable dilution and/or natural attenuation occurring. This is particularly apparent when the Phase II ground water organic results for on-site intermediate depth well MW-4I are compared with those for off-site and downgradient intermediate depth well MW-6I. Reduction of contaminants through dilution and natural attenuation is not only obvious between on-site and off-site wells, it is also occurring from one sampling episode to the next. Baseline for background ground water quality has not been established. Therefore, it is difficult to determine what particular contaminants are due to the landfill or another possible off-site source, or if the presence of the contaminants reflect regional ground water conditions.

The potential contaminant migration pathways identified for the Site prior to the completion of the RIs were airborne particulates and volatile organic vapors from exposed contaminated surface soil, ground water, surface water runoff, and associated erosion of surface soil and sediment. The results of the Phase I and Phase II RIs indicate the primary contaminant migration pathways are ground water, surface water runoff and erosion. Since surface soil at the Site is contaminated with inorganic and semi-volatile compounds (including pesticides and PCBs), any disruption of the soils by either human activities or storm events may mobilize these contaminants off-site. Particulates and organic vapors transported via wind may be considered a secondary migration pathway.

Potential receptors of periodic airborne particulate or volatile organic vapors include people working in nearby industries south and west of the Site and visitors on-site.

Ground water underlying the Site occurs in three separate zones: a shallow fill zone, an intermediate unconsolidated sand zone, and a deep bedrock zone. Shallow ground water flow in the fill is radial in nature and contaminated ground water migrates away from the Site laterally in all directions. As part of the Phase II activities, wells were installed to monitor shallow ground water quality and flow at off-site locations. All of the off-site wells exceeded the Class II-A Ground Water Standards during the Phase II RI in at least one parameter. The other component of ground water flow in the fill is vertically downward into the underlying unconsolidated sand zone. Based on the results from the six (6) wells (MW-1I, 2I, 4I, 5I, 6I, and 7I) installed in the intermediate sand zone, it appears that contaminants from the landfill have migrated into this zone. Ground water flow information obtained during the Phase II studies indicate that ground water flow in the sand zone is toward the north/northeast and the Passaic River. Based on the dilution/natural attenuation observed in contaminant levels between wells MW-4 and MW-6, it appears unlikely that the Site is impacting the River at this time.

Surface water on-site in the drainage ditch has been impacted by the landfill. The concentration of contaminants generally decreases both upstream and downstream of the Site. The primary source of contaminants detected in the on-site surface water is the landfill. Most contaminants present in the on-site surface waters are being diluted below applicable criteria before the water migrates downstream. The erosion of surface soils, storm water runoff from the Site, leachate seeps into the drainage ditch, and leaching of contaminants from the sediments are transporting the contaminants to the surface water.

On-site sediment samples contained higher contaminant levels than either upgradient or downgradient sediments. The primary source of the contaminants detected is the landfill. This is confirmed by the fact that the sediment samples collected at the leachate seeps are generally the most contaminated. In addition, based on the result of the environmental risk assessment (ERA), which was conducted as part of the Phase II RI, environmental risks are significantly greater in the on-site sediments than they are in either the upgradient or downgradient sediments. The erosion of surface soils, storm water runoff from the Site, and leachate seeps into the drainage ditch are transporting the contaminants to the sediments. Refer to Figure 5 for extent of sediment contamination.

An air pathway analysis was implemented at the Site as part of the RI. Four air monitoring stations were established at the Site. Samples collected at each of the locations were analyzed for methane and TCL volatile organics. The results of the analysis indicated that low levels of airborne volatilized contaminants are escaping from the landfill surface. The air sampling locations located adjacent to the test pit areas, which contained 55-gallon drums, displayed the most and highest concentrations of the various volatiles detected.

SCOPE AND ROLE OF ACTIONS

This Decision Document addresses the remediation of the following areas of concern at the Ottilio Landfill:

- Soil (On-site)
- Ground Water/Leachate
- Surface Water Runoff
- Sediment (On-site)
- Air

Remedial technologies identified during the RAA screening process were developed to address the remedial action objectives for protecting human health and the environment. These objectives have been defined by the various contaminant medium as follows:

Soil (On-site)
- meet NJDEP impact to ground water quality standards
- meet NJDEP residential soil cleanup criteria/standards
- meet NJDEP non-residential soil cleanup criteria/standards
- reduce storm water infiltration
- prevent direct contact with contaminants of concern
- prevent erosion
- prevent airborne dust

Ground Water/Leachate
- meet NJDEP Class II-A ground water quality standards
- prevent exceedances of surface water quality standards in Lawyer's Ditch
- prevent discharge to surface water and sediment
- meet POTW (Publicly Owned Treatment Works) pretreatment standards
- meet industrial wastewater treatment plant requirements

Surface Runoff Water
- meet NJDEP surface water quality standards
- prevent direct contact or ingestion of contaminated surface water

Sediment (On-site)
- meet NJDEP sediment quality criteria based on the use of National Oceanographic Atmospheric Administration sediment screening guidelines
- prevent direct contact or ingestion of contaminated sediment
- protect ecological resources in the area

Air
- control emissions
- treat emissions

SUMMARY OF REMEDIAL ALTERNATIVES

The RAA was developed in accordance with Public Law 1993, Chapter 139 (N.J.S.A. 58:10B-1 et. seq., June 16, 1993) and with Subchapter 5 - Remedial Alternative Analysis of the "Technical Requirements for Site Remediation" [N.J.A.C. 7:26E-5.2(d)]. This statute and regulation require that each selected site remedy be protective of human health and the environment, be cost effective, comply with other statutory laws and utilize permanent solutions and alternative treatment technologies.

The RAA report developed several alternatives for each of the areas of concern. These alternatives were evaluated against the broad criteria of effectiveness, implementability, timeliness, and cost. Those alternatives which passed this initial screening were then evaluated in detail against the following criteria, which are summarized from the criteria as specified in N.J.A.C. 7:26E-5.2(d):

- overall protectiveness of human health and the environment
- ability of the alternative to reduce the toxicity, mobility, or volume of contaminants through treatment;
- implementability of the alternative;
- long-term effectiveness of the alternative;
- short-term effectiveness of the alternative; and,
- the cost of the alternative.

As presented in the RAA Report, Section 6, "Detailed Analysis of Remedial Action Alternatives", the detailed analysis was performed on the following:

Soils Alternatives

Alternative LS-1: No Action
Alternative LS-2: Limited Action
Alternative LS-3: Hotspot Removal and Off-site Disposal
Alternative LS-4A: Partial Excavation with Off-site Disposal
Alternative LS-4B: Total Excavation with Off-site Disposal
Alternative LS-5A: Asphalt Type Landfill Cap
Alternative LS-5B: Solid Waste Type Landfill Cap
Alternative LS-5C: Hazardous Waste Type Landfill Cap
Alternative LS-5D: Hybrid of Solid Waste/Hazardous Waste Type Landfill Cap

Ground Water/Leachate Alternatives

Alternative G/L-1: No Action
Alternative G/L-2: Limited Action
Alternative G/L-3A: Leachate Collection Using Interceptor Trench Without Landfill Cap
Alternative G/L-3B: Leachate Collection Using Interceptor Trench With Landfill Cap
Alternative G/L-3C: Leachate/Ground Water Collection Using Interceptor Trench

Without Landfill Cap
Alternative G/L-3D: Leachate/Ground Water Collection Using Interceptor Trench With Landfill Cap
Alternative G/L-4A: Extraction Wells Without Landfill Cap
Alternative G/L-4B: Extraction Wells With Landfill Cap
Alternative G/L-5: On-Site Treatment of Inorganics
Alternative G/L-6A: On-Site Treatment of Organics - Air Stripping
Alternative G/L-6B: On-Site Treatment of Organics - Chemical Oxidation
Alternative G/L-7A: Off-Site Treatment at TSD (Treatment, Storage, and Disposal) Facility (With Landfill Cap)
Alternative G/L-7B: Off-Site Treatment at TSD Facility (Without Landfill Cap)
Alternative G/L-8A: Effluent Discharge to Surface Water
Alternative G/L-8B: Effluent Discharge to POTW (Publicly Owned Treatment Works)

Surface Water Alternatives
Alternative SW-1: No Action
Alternative SW-2: Limited Action

Sediment Alternatives
Alternative Sed-1: No Action
Alternative Sed-2: Limited Action
Alternative Sed-3: Hotspot Excavation
Alternative Sed-4A: Total Excavation With On-Site Disposal
Alternative Sed-4B: Total Excavation With Off-Site Disposal
Alternative Sed-5A: Stabilization With On-Site Disposal
Alternative Sed-5B: Stabilization With Off-Site Disposal

Air Alternatives
Alternative Air-1: No Action
Alternative Air-2: Limited Action
Alternative Air-3A: Passive Collection
Alternative Air-3B: Active Collection
Alternative Air-4A: Vent Discharge
Alternative Air-4B: Flare Discharge

A summary and comparison of the alternatives was presented in RAA report, Section 7, "Summary and Comparison of Alternatives" and has also been included in the "Comparison of Alternatives" section of this document.

For ease of reading purposes, the following section provides a description only for the "No Action Alternative"; the "Limited Action Alternative"; and the preferred remediation alternative for each area of concern. As stated above, please consult the RAA report, Section 7, for an in depth discussion of all other alternatives for which a detailed analysis

was performed. The "No Action Alternative" serves as a point of comparison with other remedial alternatives and has been retained as an alternative for that specific purpose. Otherwise, in the initial screening process, the No Action Alternative would have been eliminated since it is not protective of human health and the environment as required by N.J.A.C. 58:10 et seq. It should be noted that present worth costs are based on a time period of 30 years with an interest rate of 5 percent.

Soils Remediation Alternatives

The RI remedial investigations indicate that the subsurface soil within the landfilled area appear to be the primary contaminant source. The most highly contaminated soils were found within the first 10 to 12 feet below the ground surface. It is also apparent that past landfilling operations have affected native soils beneath the Site. The surface soil is contaminated with metals and semi-volatile compounds (including pesticides and PCBs) and any disruption of the soils would provide the opportunity for off-site contamination.

Alternative LS-1: **No Action**

Estimated Capital Cost:	$ 0
Estimated Annual O&M Cost:	$ 0
Estimated Present Worth:	$ 0
Estimated Construction Time:	None

Under this alternative, no remedial measures would be implemented for the contaminated soils. The existing contamination and migration pathways would remain in place and the leachate from the landfill soils would continue to impact the ground water and surface water at the Site.

Alternative LS-2: **Limited Action**

Estimated Capital Cost:	$ 53,325
Estimated Annual O&M Cost:	$ 96,749
Estimated Present Worth:	$ 1,540,606
Estimated Construction Time:	None
Estimated Implementation Time:	30 Years

The Limited Action Alternative would include long-term monitoring; installation of security fencing; and posting of signs along the perimeter of the landfill. A Declaration of Environmental Restriction would be implemented. No remediation or treatment would be implemented. This is a nonpermanent remedy.

Alternative LS-5B: **Solid Waste Type Landfill Cap**

Estimated Capital Cost:	$ 4,057,425
Estimated Annual O&M Cost:	$ 446,580
Estimated Present Worth:	$ 10,922,476
Estimated Construction Time:	1 Year
Estimated Implementation Time:	30 Years

Alternative LS-5B, the selected remedial alternative, involves the installation of an impermeable solid waste type landfill cap on the landfill to cover the contaminated soils. The installation of the cap would prevent storm water infiltration and minimize leachate generation. The major items of work for this alternative include: installation of erosion and sediment control devices and storm water runoff controls; permitting; grading, including drainage swales/ditches; clearing and grubbing; possible relocation of existing underground utilities; long-term monitoring; installation of the solid waste type landfill cap; landscaping; and planting. It should be noted that additional site investigations and sampling will be necessary prior to establishing the exact limits and specifications for the final cap. A Declaration of Environmental Restriction would be implemented. This is a nonpermanent protective remedy.

Ground Water/Leachate Remediation Alternatives

The RI remedial investigations indicate that the primary source of ground water contamination appears to be from the infiltration of rain/surface water and the subsequent downward percolation of water through the contaminated surface and subsurface soil at the Site. Downward migration of the contaminated shallow ground water also appears to be contaminating ground water in the underlying unconsolidated sand zone, and to a limited extent in the bedrock.

A few organic compounds have migrated off-site; however, there is considerable dilution and/or natural attenuation occurring. Since a baseline for background ground water quality has not been established, it is difficult to determine what particular contaminant or portion thereof detected in an off-site well is the result of the landfill or possibly another off-site source, or if the presence of the contaminant reflects regional ground water quality.

The NJDEP requires (N.J.A.C. 7:9-6 et seq.) implementation of a Classification Exception Area (CEA) and Well Restriction Area (WRA) where contamination remains above the Ground Water Quality Standards after implementation of remedial actions. The CEA and WRA are required for all of the ground/water leachate alternatives. A CEA and WRA are required by N.J.A.C. 7:9-6 et seq., where contaminant levels remain above the Ground Water Quality Standards (GWQS).

Alternative G/L-1: **No Action**

Estimated Capital Cost:	$ 0
Estimated Annual O&M Cost:	$ 0
Estimated Present Worth:	$ 0
Estimated Construction Time:	None

This alternative includes no action to remove either the ground water and/or leachate from the site. The ground water/leachate would continue to migrate from the landfill off-site. Degradation of existing ground water and surface water pathways would continue. Natural attenuation and leaching of contaminates will be the primary mechanism for remediation. There would be no maintenance of the wells.

Alternative G/L-2: **Limited Action**

Estimated Capital Cost:	$ 163,650
Estimated Annual O&M Cost:	$ 156,846
Estimated Present Worth:	$ 2,574,771
Estimated Construction Time:	None
Estimated Implementation Time:	30 Years

The Limited Action Alternative would include long-term monitoring; installation of security fencing; and posting of signs along the perimeter of the landfill. No remedial action or treatment would be implemented. A CEA, and WRA would be required. This is a nonpermanent remedy.

Alternative G/L-3B & G/L-7A: **Leachate Collection Using Interceptor Trenches & Off-Site Treatment at TSD Facility (With Landfill Cap)**

Estimated Capital Cost:	$ 592,080
Estimated Annual O&M Cost:	$ 364,838
Estimated Present Worth:	$ 6,200,559
Estimated Construction Time:	9 Months
Estimated Implementation Time:	30 Years

This alternative, the selected remedial alternative, is a combination of two separate alternatives: Alternative G/L-3B, Leachate Collection Using Interceptor Trenches (With Landfill Cap) and Alternative G/L-7A, Off-Site Treatment at TSD (Treatment, Storage and Disposal) Facility (With Landfill Cap). These two alternatives were combined to provide a means of collecting (Alternative G/L-3B) and disposing (Alterative G/L-7A) of leachate. The combined alternative for collection and disposal of leachate should be combined with the capping alternative LS-5B to minimize the off-site migration of leachate.

It should be noted that additional sampling will be required to fully delineate the extent of

the ground water plume. Currently, with the capping of the landfill, the ground water/leachate flow is expected to be primarily towards the northeast, and a 4 to 6 foot deep trench would be installed around the north and eastern perimeter of the landfill. The trench would be installed at an elevation above the shallow groundwater level, limiting the collection of contaminants to landfill leachate flow. This alternative would include construction of the trench [30 mil HDPE (high density polyethylene) liner, a 6-inch sand bed, followed by a 4-inch PVC perforated pipe, wrapped in geotextile, backfilled with gravel and compacted with 12 inches of topsoil); 3 manholes, 2 wet wells, and an on-site bulk unloading area. It is expected that the volume of leachate flow from the capped landfill will become progressively reduced over time. Additional treatability studies will need to be undertaken prior to transport of leachate to the TSD facility. A Declaration of Environmental Restriction, a CEA, and WRA would be required. This is a nonpermanent remedy.

Surface Water Remedial Alternatives

The RI remedial investigations indicate that the primary source of contaminants detected in the on-site surface water is the landfill. Contaminants present in the on-site surface waters are being diluted below applicable criteria before the water migrates downstream. The erosion of surface soils, storm water runoff from the Site, leachate seeps into the drainage ditch, and leaching of contaminants from the sediments are transporting the contaminants to the surface water.

It should be noted that with the implementation of the selected soils remedial alternative, Alternative LS-5B (Solid Waste Type Landfill Cap), the existing landfill soils would be covered with a solid waste type landfill cap and the Site would be graded. Storm water runoff and surface water would not be coming in contact with the contaminated soils. Therefore, with the implementation of Alternative LS-5B, there would be no need to implement an alternative for surface water.

Sediment Remediation Alternatives

The environmental risk assessment (ERA) conducted during the RI characterized the potential risks to ecological resources from hazardous substances associated with sediments and surface water in the vicinity of the Site. The ERA focused on potential risks to aquatic biological communities/assemblages associated with the on-site ditch, as well as portions of the ditch located upgradient and downgradient of the Site. Due to the following factors, only sediments found in the on-site portion of the ditch were retained for the RAA: (1) upstream sediments are deposited from flows across adjacent industrial sites and contain contaminants emanating from other sources and (2) sediments located downstream in Lawyer's ditch appear to have also been impaired by other downstream non-point sources. By addressing the contaminants in the on-site drainage ditch, the downgradient concerns for the sediments from the Site should be minimized.

Alternative Sed-1: No Action

Estimated Capital Cost: $ 0
Estimated Annual O&M Cost: $ 0
Estimated Present Worth: $ 0
Estimated Construction Time: None

This alternative includes no action to remove or remediate on-site sediments. Natural attenuation will be the primary mechanism for remediation.

Alternative Sed-2: **Limited Action**

Estimated Capital Cost: $ 53,325
Estimated Annual O&M Cost: $ 13,724
Estimated Present Worth: $ 264,304
Estimated Construction Time: None
Estimated Implementation Time: 30 Years

The Limited Action Alternative would include long-term monitoring for the on-site ditch; installation of security fencing; and posting of signs along the perimeter of the landfill. No remedial action or treatment would be implemented. A Declaration of Environmental Restriction would be required. This is a nonpermanent remedy.

Alternative Sed-4A: **Total Excavation With On-Site Disposal**

Estimated Capital Cost: $ 112,412
Estimated Annual O&M Cost: $ 10,125
Estimated Present Worth: $ 268,059
Estimated Construction Time: 6 Months
Estimated Implementation Time: 30 Years

Alternative Sed-4A, the selected remedial alternative, consists of the total excavation of sediments from the on-site drainage ditch and disposal of sediments by consolidation within the landfill. Post-excavation sampling would be performed to evaluate the effect of sediment removal. Based on the data gathered to date, it is estimated that a volume of 600 cubic yards of sediment would be removed from the on-site drainage ditch. Additional sampling and characterization of sediments in the on-site ditch may be necessary prior to depositing excavated sediments in the landfill. A Declaration of Environmental Restriction would be required. This is a nonpermanent remedy.

Air Remediation Alternatives

The remedial action activities at the Ottilio landfill site are likely to result in emissions of both particulate matter as well as volatile organic chemicals. Potential activities which could

result in air emissions are: soil excavation and grading; drilling; trenching; sediment removal/dredging; and pretreatment of excavated material (e.g., crushing of oversized material screening, etc.). In most cases, particulate emissions occur only during the implementation of the selected remedial action. Appropriate dust suppression measures will be taken. Uncontrolled vapor emissions may occur during installation of remedial actions as a result of exposing contaminated material to the atmosphere. These releases are generally intermittent in nature and should be monitored at regular intervals to protect field workers, supervisors, and equipment operators.

In light of the fact that the landfill capping alternative has been selected, a landfill gas collection and venting system must be installed to insure that pockets of pressure are not allowed to build up in the landfill.

Alternative Air-1: **No Action**

Estimated Capital Cost:	$ 0
Estimated Annual O&M Cost:	$ 0
Estimated Present Worth	$ 0
Estimated Construction Time	None

Under this alternative, no remedial measures would be taken for air emissions from the landfill surface. There would be no maintenance. This alternative could not be selected in combination with the landfill cap alternative. The No Action alternative was retained here for comparison purposes.

Alternative Air-2: **Limited Action**

Estimated Capital Cost:	$ 49,275
Estimated Annual O&M Cost:	$ 4,320
Estimated Present Worth:	$ 115,684
Estimated Construction Time:	None
Estimated Implementation Time:	30 Years

The Limited Action Alternative would include semi-annual air pathway sampling; installation of security fencing; and posting of signs along the perimeter of the landfill. No remedial action or treatment would be implemented. A Declaration of Environmental Restriction would be required. This alternative could not be selected in combination with the landfill cap alternative. The Limited Action alternative was retained for comparison purposes.

Alternative Air-3A & Air-4A: **Passive Collection System and Vent Discharge**

Estimated Capital Cost:	$ 81,675
Estimated Annual O&M Cost:	$ 5,513

Estimated Present Worth: $ 166,425
Estimated Construction Time: 1 Year
Estimated Implementation Time: 30 Years

This alternative, the selected remedial alternative, is a combination of two alternatives: Air-3A, Passive Collection and Air-4A, Atmospheric Discharge. The combination of these two alternatives were combined to provide a means of collecting (Alternative Air-3A) and atmospheric discharge of gases from a capped landfill (Alternative Air-4A). This alternative consists of installing a series of perforated vent pipes which are connected to a header collection pipe. The air collected from the landfill will be discharged to the atmosphere. This alternative was selected in combination with the landfill cap alternative. A Declaration of Environmental Restriction would be required.

CRITERIA FOR EVALUATION

The Remedial Alternative Analysis (RAA) was developed in accordance with criteria from Subchapter 5 - Remedial Alternative Analysis of the "Technical Requirements for Site Remediation" [N.J.A.C. 7:26E-5.2(d)] and other statutory and regulatory requirements (SRRs) as indicated in Table 1.7. This section compares the performance of the remedial alternatives under consideration with the following criteria: (1) The ability of the alternative to reduce the toxicity, mobility or volume of contaminants through treatment; (2) The implementability of the alternative including; (3) The long-term effectiveness and permanence of the alternative; (4) The short-term effectiveness of the alternative; (5) The cost of the alternative; and (6) community concerns.

EVALUATION OF ALTERNATIVES

The NJDEP is required to select the remedial alternatives which offer the optimum balance among the criteria listed above.

SUMMARY AND COMPARISON OF ALTERNATIVES

The alternatives under consideration will be discussed with respect to five of the six above-listed evaluation criteria. The evaluation of the sixth criteria, Community Acceptance, was evaluated upon the completion of the public comment period and is summarized in the Responsiveness Summary section of the Decision Document.

Table 1.8 (attached at the end of the DD) provides a summary and comparison (including reduction of toxicity, mobility, and volume; implementability; long- and short-term effectiveness; and estimated costs) of all the remedial alternatives retained in the final RAA.

COST

The capital and operating and maintenance costs for all of the remedial alternatives are indicated in Table 1.8. For each remedial alternative, the table indicates the capital costs; operation and maintenance (O&M) costs; and the net present worth (based on a 30-year period with an interest rate of 5 percent).

THE SELECTED ALTERNATIVES

After careful consideration, NJDEP selected remedial alternatives for soils, groundwater/leachate, sediment, and air. The rationale for selection of each alternatives is presented in this section. The RI and RAA reports should be consulted for more detailed information. The selected alternatives to remediate the Ottilio landfill site are as follows:

The Selected Alternative for each area of concern consists of the following:

- Soils - Alternative LS-5B: Solid Waste Type Landfill Cap
- Ground Water/Leachate - Alternative G/L-3B & G/L -7A: Leachate Collection Using Interceptor Trench (With Landfill Cap) and Treatment at TSD (Treatment, Storage, and Disposal) Facility (With Landfill Cap)
- Sediments - Alternative Sed-4A: Total Excavation With On-Site Disposal
- Air - Alternative Air-3A & Air-4A: Passive Collection and Vent Discharge

Selected Alternative Remedy Cost:

Capital Cost:	$ 4,843,592
O&M Cost:	$ 827,056
Net Present Worth Cost:	$ 17,557,519

It should be noted that the selected remedy alternative cost, which is a summation of the individual media alternative costs, does contain some repetition of costs. For example, similar long-term monitoring and fencing costs are included with Alternatives LS-5B; G/L-3B & G/L-7A; and Sed-4. Also, Alternative LS-5B includes the grading and capping of the on-site ditch; this overlaps with proposed items of work cited in Alternative Sed-4. It should also be noted the SW Alternatives (SW-1: No Action and SW-2: Limited Action) do not appear in the selected remedy; this is due to the fact that the selected remedy includes capping of the landfill and the storm water monitoring included in SW-2 would not be applicable.

SUMMARY OF THE SELECTED ALTERNATIVES

The following summarizes the selected alternative for each area of concern at the Site. It should be noted that NJDEP will obtain the permits necessary for the implementation and O&M of the selected remedy. Applicable permits will be identified during the design stage.

The "long-term monitoring" associated with all of the alternatives, except for Air, may involve semi-annual monitoring of existing and proposed on-site and off-site wells and leachate and surface water/sediment quality sampling to assess the migration and concentration of contaminants. The samples would be analyzed for Target Compound List (TCL) organics and Target Analyte List (TAL) metals. Monitoring for air would involve the monitoring of the venting system.

Selected Alternative for Soils

It should be noted that there are a limited number of technologies (and therefore, alternatives) available to treat the landfill soils based on the existing composition of the landfill, which is composed of construction rubble and debris (e.g., large pieces of broken concrete and wood), other large buried objects (e.g., steel drums), and general undecomposed refuse and soil. In addition, the water table exists at a relatively shallow depth at the Site and waste material is located below the water table. The combination of the non-homogenous mixture of soils with waste material and the shallow depth of ground water rules out the possibility of effectively incorporating any in-situ treatment methods, which may otherwise be viable treatment technologies for removal of contaminants in homogeneous, granular-type soil conditions.

In order to consider the implementation of any soils treatment alternatives, the landfill material would need to be excavated and separated (screened) to facilitate the ex-situ treatment. Due to the limited amount of on-site space for erection of treatment facilities, the excavated soil would most likely be transported to an off-site facility for treatment and/or disposal. Treated soil would either be disposed off-site or transported back to the site for use as backfill. The construction debris, rubble, and other objects, would need to be characterized and disposed of separately. In addition to the treatment process costs, the treatment alternatives would include extensive labor costs and transportation costs incurred for screening, loading, and transporting the materials to a treatment facility and disposal location.

Therefore, it appears that total excavation alternative, including off-site disposal, is the only feasible permanent remedy considering the broad spectrum of contaminants and the presence of waste material below the water table.

Additional factors which were considered in choosing the preferred remedial alternative include the following: the site is currently zoned industrial and will remain as an industrial area, i.e, non-residential; it is expected that the future use of the site will be industrial; there

are no permitted potable wells on-site or within ¾-mile of the Site; and ground water sampling indicated that other sources (i.e., other than the landfill soils) may also be impacting the off-site ground water quality.

The selected remedial alternative for soils at the Ottilio Landfill Site is Alternative LS-5B: Solid Waste Type Landfill Cap. Activities for this alternative include grading of the landfill surface and on-site ditch area for the installation of a solid waste type landfill cap to provide a cover for the contaminated soils. In addition, this alternative would include seeding and mulching, landscaping, long-term monitoring, and installation of controls such as posting signs, maintenance of fencing, and a Declaration of Environmental Restriction (DER).

The installation of the cap would meet the remedial action objectives of reducing storm water infiltration; prevent direct contact with contaminant of concern; and prevent erosion and airborne dust. This selected remedy for soils is a non-permanent protective remedy. The selection of this alternative is based on the following: the cost of the permanent remediation alternative (Alternative LS-4B: Total Excavation), net present worth of $29.4 million, is more than 2 times the cost of the preferred non-permanent remediation alternative (Alternative LS-5B: Solid Waste Type Landfill Cap), net present worth of $11.7 million. It should also be noted that the selection of the capping alternative complies with the USEPA's presumptive use of a containment technology as the preferred remedy for landfills (OSWER Directive 9355.3-11FS).

Selected Alternative for Ground Water/Leachate

The selected remedial alternative for the ground water/leachate at the Ottilio Landfill Site is Alternative G/L-3B & G/L-7A: Leachate Collection Using Interceptor Trench with Off-Site Disposal at a treatment, storage, and disposal (TSD) facility. Activities for this alternative include installation of a 4 to 6 foot deep trench around the northern and eastern perimeter of the landfill to collect the leachate; installation of a bulk unloading area; long-term monitoring, and leachate transport to a TSD facility. A Declaration of Environmental Restriction (DER), Classification Exception Area (CEA), and Well Restriction Area (WRA) would be implemented.

The selected remedial alternative would meet the remedial action objectives of preventing exceedances of surface water quality standards in Lawyer's Ditch and prevent discharge to surface water and sediment. The selected remedy for groundwater/leachate is an on-site non-permanent remedy. Since a portion of the landfill is located below the water table, the only permanent remedial alternative for ground water/leachate would include the removal of the source (landfill soils and material) of contamination for the ground water/leachate. The cost for total excavation of the soils (Alternative LS-4B: Total Excavation) is $29.4 million, is more than 2 times the cost of the non-permanent remedial alternative, Alternative G/L-3B & G/L-7A: Leachate Collection Using Interceptor Trench with Off-Site Disposal at a TSD Facility Other considerations include the currently industrial zoning of the Site; probable future industrial, i.e, non-residential use of the Site; there are no permitted

potable wells on-site or within 1/2-mile of the Site; and ground water sampling indicated that other sources may also be impacting the off-site ground water quality.

Selected Alternative for Sediments

The selected remedial alternative for the sediments is Alternative Sed-4A: Total Excavation (On-Site Disposal). This alternative includes the removal of contaminated sediments from the entire length (approximately 800 feet) of the on-site drainage ditch. It is estimated that the excavation would be approximately 10 feet in width and 2 feet in depth; the total excavation would encompass 600 cubic yards of material. It should be noted that additional sampling (or possibly treatability testing) may be necessary to the verify the quantity (or treatability) of excavated sediments which will be consolidated within the landfill. The sediments would be consolidated on-site, i.e., placed within the landfill. Long-term monitoring would be performed to evaluate the effect of sediment removal. It should be noted that the cost of Alternative Sed-4A: Total Excavation with On-Site Disposal, with a net present worth cost of $268,059, is less than Alternative Sed-3A: Hot Spot Excavation with On-site Disposal, with a net present worth of $364, 459. The reason why Alternative Sed-3A: Hot Spot Excavation is more expensive is due to the installation of fencing and signs along the perimeter of the on-site drainage ditch; whereas, Alternative Sed-4A: Total Excavation of sediment would not require the installation of fencing and signs.

The selected remedial alternative would meet the remedial action objectives of meeting NJDEP sediment quality criteria and surface water quality standards; preventing direct contact or ingestion with contaminants of concern; and protecting ecological resources in the area. Since the sediments will be disposed of on-site, Alternative Sed-4A would be an on-site non-permanent remedy. The selection of this alternative is based on the following: the consolidation of sediments within the landfill meets the remedial objectives for this medium; the excavated sediments can be easily consolidated within the landfill and would then be treated as landfill soils and would be capped the Site is currently zoned industrial and will remain as an industrial area, i.e, non-residential; it is expected that the future use of the site will be industrial.

Selected Alternative for Air

The selected alternative for remediating the air impacted by the Ottilio Landfill site is Alternatives Air-3A & Air-4A: Passive System - Collection and Discharge. This alternative would include the collection of landfill gas with the installation of a series of perforated vent pipes (surrounded by gravel and geotextile to prevent clogging), connected to a header collection pipe. The landfill gases would be released to the atmosphere. This alternative has been selected because a landfill venting system must be installed with a landfill cap. It should be noted that the final remedial design of the gas collection and discharge system may require additional sampling and testing of landfill gases.

Based on the information available at this time, the State of New Jersey believes that the selected remedial alternatives described above will protect human health, and the environment.

Approved by:

3/26/91

Robert C. Shinn, Jr. Date
Commissioner
New Jersey Department of Environmental Protection

TABLE 1.8

COMPARISON OF SOILS ALTERNATIVES

REMEDIAL ACTION ALTERNATIVE	REDUCTION OF TOXICITY, MOBILITY AND VOLUME	IMPLEMENTABILITY	EFFECTIVENESS LONG- AND SHORT-TERM	ESTIMATED COST (1995$)
ALTERNATIVE LS-1: NO ACTION	THE ONLY REDUCTION WOULD BE BY NATURAL PROCESSES (5)	NO IMPLEMENTATION REQUIRED NA	**LONG-TERM:** NO ACTIVE TREATMENT OF CONTAMINANTS, AND NO MONITORING OF SITE. (6) **SHORT-TERM:** NO MITIGATION OF OFF-SITE MIGRATION OF CONTAMINANT. (6)	THERE ARE NO CAPITAL OR O&M COSTS ASSOCIATED WITH THIS ALTERNATIVE (1)
ALTERNATIVE LS-2: LIMITED ACTION	NO TREATMENT OR REMOVAL OF SOILS. CONTAMINATED SOILS WOULD CONTINUE TO IMPACT GROUND WATER AND SURFACE WATER. SOME NATURAL ATTENUATION WOULD OCCUR. (5)	THIS OPTION IS EASILY IMPLEMENTED (1)	**LONG-TERM:** WOULD PREVENT DIRECT CONTACT WITH CONTAMINANT. MIGRATION OF CONTAMINANT WOULD CONTINUE (5) **SHORT-TERM:** NO MITIGATION OF IMPACTS OF SOILS ON SURFACE AND GROUND WATERS TO SURROUNDING COMMUNITY (5)	**CAPITAL COST** $53,325 **ANNUAL O&M COST** $96,749 **PRESENT WORTH** $1,540,606 (2)
ALTERNATIVE LS-3: HOTSPOT REMOVAL AND OFF-SITE DISPOSAL	REMOVAL OF HOTSPOT AREAS OF SOIL AND BACKFILL WOULD ELIMINATE THE MOST HIGHLY CONTAMINATED AREAS. CONTAMINANTS IN REMAINING SOILS WILL REDUCE OFF-SITE MIGRATION OF CONTAMINANTS INTO SURFACE WATER AND GROUND WATER. (4)	WOULD REQUIRE STANDARD EQUIPMENT FOR REMOVAL. APPROVED PERMITS/MANIFESTS/ WORK PLANS REQUIRED FOR OFF-SITE DISPOSAL. (2)	**LONG-TERM:** WOULD REMOVE GREATEST CONCENTRATION OF CONTAMINANT. REMAINING SOILS WOULD CONTINUE LEACHING TO GROUND WATER/SURFACE WATER (4) **SHORT-TERM:** WORK CAN BE EFFECTIVELY COMPLETED WITH STANDARD EQUIPMENT. VERIFICATION SAMPLING REQUIRED. (4)	**CAPITAL COST** $2,902,550 **ANNUAL O&M COST** $149,850 **PRESENT WORTH** $5,206,119 (3)

RANKING SHOWN IN BOLD NUMBERS: (1), (2) ETC. ITEMS RANKED NUMERICALLY WITH (1) BEST MEETING CRITERIA.

TABLE 1.8 (Continued)

COMPARISON OF SOILS ALTERNATIVES

REMEDIAL ACTION ALTERNATIVE	REDUCTION OF TOXICITY, MOBILITY AND VOLUME	IMPLEMENTABILITY	EFFECTIVENESS LONG- AND SHORT-TERM	ESTIMATED COST
ALTERNATIVE LS-4: PARTIAL & TOTAL EXCAVATION WITH OFF-SITE DISPOSAL	WOULD REDUCE/ELIMINATE THE GENERATION OF CONTAMINATION TO SURFACE WATER AND GROUND WATER PARTIAL (3) TOTAL (1)	EXTENSIVE PERMITTING WOULD BE REQUIRED. EXCAVATION AND DISPOSAL CAN BE COMPLETED BY CONVENTIONAL MEANS (5)	LONG-TERM: THE SOURCE OF OFF-SITE CONTAMINANT FLOW WOULD BE REDUCED/ELIMINATED. EFFECTIVENESS WILL BE MONITORED. PARTIAL (3) TOTAL (1) SHORT-TERM: WORKERS CAN BE EASILY PROTECTED DURING EXCAVATION ACTIVITIES. SECURITY MEASURES SHOULD BE IMPLEMENTED FOR STOCKPILING AND OFF-SITE DISPOSAL AND EROSION AND AIR EMISSION MEASURES. IMPLEMENTED PARTIAL (3) TOTAL (1)	<u>OPTION A: PARTIAL</u> CAPITAL COST $15,021,371 ANNUAL O&M COST $220,050 PRESENT WORTH $16,404,089 (8) <u>OPTION B: TOTAL</u> CAPITAL COST $25,567,640 ANNUAL O&M COST $247,050 PRESENT WORTH $29,365,416 (9)
ALTERNATIVE LS-5A: ASPHALT LANDFILL CAP	WOULD PROVIDE AN EFFECTIVE MEANS OF REDUCING THE GENERATION OF CONTAMINANT TO GROUND WATER AND SURFACE RUN-OFF. SOIL WILL CONTINUE TO GENERATE CONTAMINATED LEACHATE. NO REDUCTION OF TOXICITY OR VOLUME (2)	PERMITTING WILL BE REQUIRED FOR DESIGN AND CONSTRUCTION. CAN BE EASILY IMPLEMENTED WITH CONVENTIONAL CONSTRUCTION METHODS. PAVING WOULD HAVE TO BE COMPLETED IN SEASON. (4)	LONG-TERM: WOULD NOT REDUCE TOXICITY. OF EXISTING SOILS, BUT REDUCE THE GENERATION OF CONTAMINANTS FROM DIRECT CONTACT WITH SOILS. (2) SHORT-TERM: COMPLETED WITH CONVENTIONAL CONSTRUCTION METHODS. WORKERS AND SITE WILL REQUIRE PROPER EROSION CONTROL AND AIR DISPERSION METHODS. (2)	CAPITAL COST $4,786,180 ANNUAL O&M COST $446,580 PRESENT WORTH $11,653,231 (7)

RANKING SHOWN IN BOLD NUMBERS: (1), (2) ETC. ITEMS RANKED NUMERICALLY WITH (1) BEST MEETING CRITERIA.

TABLE 1.8 (Continued)

COMPARISON OF SOILS ALTERNATIVES

REMEDIAL ACTION ALTERNATIVE	REDUCTION OF TOXICITY, MOBILITY AND VOLUME	IMPLEMENTABILITY	EFFECTIVENESS LONG- AND SHORT-TERM	ESTIMATED COST
ALTERNATIVE LS-5B: SOLID WASTE CAP	WOULD GREATLY REDUCE THE GENERATION OF CONTAMINATES TO SHALLOW GROUND WATER AND LEACHATE BY PRECIPITATION. EXISTING CONTAMINATES IN SOIL WOULD CONTINUE TO MIGRATE OFF-SITE (2)	PERMITTING WOULD BE REQUIRED FOR DESIGN AND CONSTRUCTION. CAN BE IMPLEMENTED WITH CONVENTIONAL CONSTRUCTION METHODS. (3)	LONG-TERM WOULD NOT REDUCE TOXICITY OF CONTAMINANTS IN LANDFILL. WILL REDUCE GENERATION OF ADDITIONAL CONTAMINATION MIGRATION OFF-SITE. EFFECTIVENESS WILL BE MONITORED. (2) SHORT-TERM SOIL AND EROSION CONTROL MEASURES MUST BE MONITORED TO PREVENT OFF-SITE MIGRATION OF SOIL. MONITORING OF WATER AND AIR WILL BE NECESSARY. (2)	CAPITAL COST $4,057,425 ANNUAL O&M COST $446,580 PRESENT WORTH $10,992,476 (4)
ALTERNATIVE LS-5C: HAZARDOUS WASTE CAP	THE GENERATION OF CONTAMINATES WILL BE GREATLY REDUCED TO GROUND WATER AND LEACHATE. EXISTING LEACHABLE CONTAMINANTS IN SOIL WOULD CONTINUE TO MIGRATE OFF-SITE. (2)	PERMITTING WOULD BE REQUIRED FOR DESIGN AND CONSTRUCTION. CAN BE IMPLEMENTED USING CONVENTIONAL EQUIPMENT AND UTILIZATION OF ENVIRONMENTAL CONSTRUCTION CONTRACTOR. (3)	LONG-TERM REDUCTION OF CONTAMINANTS IN GROUND WATER AND LEACHATE TO OFF-SITE RECEPTORS. OFF-SITE MONITORING WILL BE REQUIRED TO CONFIRM EFFECTIVENESS. (2) SHORT-TERM PROPER CONSTRUCTION TECHNIQUES REQUIRED. MONITORING OF AIR AND WATER AS WELL AS PROPER EROSION AND SEDIMENT CONTROL MEASURES MUST BE IMPLEMENTED (2).	CAPITAL COST $4,512,690 ANNUAL O&M COST $446,580 PRESENT WORTH $11,377,741 (6)

RANKING SHOWN IN BOLD NUMBERS: (1), (2) ETC. ITEMS RANKED NUMERICALLY WITH (1) BEST MEETING CRITERIA.

TABLE 1.8 (Continued)

COMPARISON OF SOILS ALTERNATIVES

REMEDIAL ACTION ALTERNATIVE	REDUCTION OF TOXICITY, MOBILITY AND VOLUME	IMPLEMENTABILITY	EFFECTIVENESS LONG- AND SHORT-TERM	ESTIMATED COST
ALTERNATIVE LS-6D: HYBRID OF SOLID WASTE/HAZARDOUS WASTE CAP	EXPOSURE TO CONTAMINATES WOULD BE REDUCED DUE TO THE DECREASED GENERATION OF POLLUTANTS. CONTAMINATION EXISTING IN SOIL WOULD CONTINUE TO MIGRATE TO OFF-SITE RECEPTORS. (2)	CAN BE IMPLEMENTED WITH CONVENTIONAL ENVIRONMENTAL MEANS (3)	LONG-TERM WILL NOT REDUCE THE EXISTING TOXICITY OF CONTAMINANTS, BUT WILL DECREASE THE OFF-SITE MIGRATION OF CONTAMINANTS BY REDUCING THE GENERATION OF POLLUTANTS. EFFECTIVENESS WILL BE MONITORED BY AIR AND GROUND WATER SAMPLING (2) SHORT-TERM PROPER SOIL EROSION CONTROL TECHNIQUES WILL BE REQUIRED TO REDUCE OFF-SITE EXPOSURE. CONSTRUCTION PERSONNEL WILL REQUIRE PROPER TRAINING (2)	CAPITAL COST $4,414,395 ANNUAL O&M COST $446,580 PRESENT WORTH $11,279,446 (5)

RANKING SHOWN IN **BOLD NUMBERS: (1), (2)** ETC. ITEMS RANKED NUMERICALLY WITH **(1)** BEST MEETING CRITERIA.

TABLE 1.8 (Continued)

COMPARISON OF GROUND WATER/LEACHATE ALTERNATIVES

REMEDIAL ACTION ALTERNATIVE	REDUCTION OF TOXICITY, MOBILITY AND VOLUME	IMPLEMENTABILITY	EFFECTIVENESS LONG- AND SHORT-TERM	ESTIMATED COST
ALTERNATIVE G/L-1: NO ACTION	MIGRATION OF CONTAMINANTS CONTINUE. NO REDUCTION IN TOXICITY OR VOLUME. NATURAL ATTENUATION OF CONTAMINANTS OF GROUND WATER IS EXPECTED. (3)	REQUIRES NO IMPLEMENTATION. NA	LONG-TERM CONTAMINANTS WOULD CONTINUE TO MIGRATE OFF-SITE. SOME NATURAL ATTENUATION OF GROUND WATER/LEACHATE. (5) SHORT-TERM WILL NOT BE EFFECTIVE IN MITIGATING CONTAMINANTS. (5)	NO CAPITAL OR O&M COSTS (1)
ALTERNATIVE G/L-2: LIMITED ACTION	IS LIMITED TO MONITORING AND EVALUATION OF EXISTING GROUND WATER/LEACHATE CONDITIONS. MOBILITY AND TOXICITY CONTINUE. NATURAL ATTENUATION OF CONTAMINANTS OF GROUND WATER IS EXPECTED. (2)	IS EASILY IMPLEMENTABLE. WILL REQUIRE AUTHORIZATION FROM ADJACENT PROPERTY OWNERS. (1)	LONG-TERM WOULD PROVIDE A MECHANISM TO MONITOR OFF-SITE MOBILITY OF CONTAMINANTS AND NATURAL ATTENUATION, BUT WILL NOT REDUCE EFFECTS OF POLLUTANTS. (4) SHORT-TERM WILL NOT BE EFFECTIVE AT REDUCING CONTAMINANT TOXICITY AND VOLUME. (4)	CAPITAL COST $163,650 ANNUAL O&M COST $156,846 PRESENT WORTH $2,574,771 (2)

RANKING SHOWN IN BOLD NUMBERS: (1), (2) ETC. ITEMS RANKED NUMERICALLY WITH (1) BEST MEETING CRITERIA.

TABLE 1.8 (Continued)

COMPARISON OF GROUND WATER/LEACHATE ALTERNATIVES

REMEDIAL ACTION ALTERNATIVE	REDUCTION OF TOXICITY, MOBILITY AND VOLUME	IMPLEMENTABILITY	EFFECTIVENESS LONG- AND SHORT-TERM	ESTIMATED COST
ALTERNATIVE G/L-3: COLLECTION USING INTERCEPTOR TRENCHES OPTION A: LEACHATE TRENCH WITHOUT CAP OPTION B: LEACHATE TRENCH WITH CAP OPTION C: GROUND WATER/LEACHATE TRENCH WITHOUT CAP OPTION D: GROUND WATER/LEACHATE TRENCH WITH CAP	WOULD INTRODUCE SOURCE CONTROL FOR BOTH LEACHATE AND SHALLOW GROUND WATER. WOULD REDUCE THE MOBILITY OF OFF-SITE TRANSPORT OF CONTAMINANTS. IF NOT TREATED, WILL NOT REDUCE TOXICITY/VOLUME OF POLLUTANTS. WOULD REDUCE MOBILITY OF CONTAMINATES NA	THE OPTIONS REQUIRING TOTAL PERIMETER TRENCHING (OPTIONS A & C) ARE MORE DIFFICULT DUE TO UTILITY CROSSINGS. LOCAL AND UTILITY COMPANY PERMITS WILL BE REQUIRED. SITE WORK PLANS AND PROPERTY OWNER APPROVAL MUST BE OBTAINED. **(2)**	**LONG-TERM** WOULD PROVIDE AN EFFECTIVE BARRIER TO OFF-SITE TRANSPORT OF LEACHATE AND/OR SHALLOW GROUND WATER. EFFECTIVENESS WILL BE MONITORED. **(3)** **SHORT-TERM** WILL REDUCE OFF-SITE MIGRATION OF CONTAMINANTS IMMEDIATELY. CAN UTILIZE STANDARD CONSTRUCTION MATERIALS AND EQUIPMENT. **(3)**	OPTION A: LEACHATE TRENCH W/O CAP CAPITAL COST $581,520 ANNUAL O&M COST $185,053 PRESENT WORTH $3,426,241 *COLLECTION (3)* OPTION B: LEACHATE TRENCH W/CAP CAPITAL COST $487,680 ANNUAL O&M COST $178,718 PRESENT WORTH $3,235,029 *COLLECTION (2)* OPTION C: GROUND WATER/LEACHATE TRENCH W/O CAP CAPITAL COST $785,400 ANNUAL O&M COST $198,815 PRESENT WORTH $3,841,676 *COLLECTION (6)* OPTION D: GROUND WATER/LEACHATE TRENCH W/CAP CAPITAL COST $584,730 ANNUAL O&M COST $185,269 PRESENT WORTH $3,432,782 *COLLECTION (4)*

RANKING SHOWN IN BOLD NUMBERS: (1), (2) ETC. ITEMS RANKED NUMERICALLY WITH (1) BEST MEETING CRITERIA.

9097:PLT62J.WP\2

TABLE 1.8 (Continued)

COMPARISON OF GROUND WATER/LEACHATE ALTERNATIVES

REMEDIAL ACTION ALTERNATIVE	REDUCTION OF TOXICITY, MOBILITY AND VOLUME	IMPLEMENTABILITY	EFFECTIVENESS LONG- AND SHORT-TERM	ESTIMATED COST
ALTERNATIVE G/L-4: COLLECTION USING EXTRACTION WELLS **OPTION A:** EXTRACTION WELLS WITHOUT CAP **OPTION B:** EXTRACTION WELLS WITH CAP	EACH OPTION WILL PREVENT MIGRATION OF CONTAMINANTS IN LEACHATE AND/OR SHALLOW GROUND WATER TO OFF-SITE RECEPTORS. IF NOT TREATED, WILL NOT REDUCE TOXICITY/VOLUME OF POLLUTANTS. WOULD REDUCE MOBILITY OF CONTAMINATES NA	CAN BE IMPLEMENTED WITH COMMON DRILLING AND PIPING TECHNIQUES. PERMITS WILL BE REQUIRED FROM UTILITY COMPANIES AND OFF-SITE PROPERTY OWNERS. CARE MUST BE TAKEN FOR DRILLING NEAR EXISTING UTILITIES. **(3)**	**LONG-TERM** CAN EFFECTIVELY REDUCE THE MIGRATION OF SHALLOW GROUND WATER AND/OR LEACHABLE CONTAMINANTS OFF-SITE. **(2)** **SHORT-TERM** CAN BE INSTALLED USING STANDARD DRILLING AND PIPING TECHNIQUES USING QUALIFIED WORKERS. **(2)**	<u>OPTION A: EXTRACTION WELLS W/O CAP</u> **CAPITAL COST** $621,720 **ANNUAL O&M COST** $187,766 **PRESENT WORTH** $3,508,154 ***COLLECTION (5)*** <u>OPTION B: EXTRACTION WELLS W/CAP</u> **CAPITAL COST** $432,270 **ANNUAL O&M COST** $174,978 **PRESENT WORTH** $3,122,123 ***COLLECTION (1)***
ALTERNATIVE G/L-5: ON-SITE TREATMENT OF INORGANICS	WILL EFFECTIVELY REDUCE THE TOXICITY OF EXTRACTED INORGANICS FROM THE WASTE STREAM. DISPOSAL OF CONCENTRATED SLUDGE WILL BE REQUIRED. **(1)**	CAN BE READILY IMPLEMENTED WITH STANDARD PRECIPITATION/ FILTRATION EQUIPMENT. INSTALLATION OF TREATMENT SYSTEM CAN BE ACCOMPLISHED USING COMMON CONSTRUCTION TECHNIQUES. **(3)**	**LONG-TERM** WILL BE EFFECTIVE AT REMOVING ORGANIC WASTE FROM THE INFLUENT. MONITORING OF REMEDY CAN BE EASILY IMPLEMENTED. **(1)** **SHORT-TERM** WILL REDUCE LEVELS OF ORGANICS TO DISCHARGE REQUIREMENTS. START-UP EFFECTIVENESS CAN BE EASILY MONITORED. **(1)**	**CAPITAL COST** $674,590 **ANNUAL O&M COST** $275,870 **PRESENT WORTH** $4,915,401 ***INORGANICS TREATMENT (1)***

RANKING SHOWN IN BOLD NUMBERS: (1), (2) ETC. ITEMS RANKED NUMERICALLY WITH (1) BEST MEETING CRITERIA.

TABLE 1.8 (Continued)

COMPARISON OF GROUND WATER/LEACHATE ALTERNATIVES

REMEDIAL ACTION ALTERNATIVE	REDUCTION OF TOXICITY, MOBILITY AND VOLUME	IMPLEMENTABILTY	EFFECTIVENESS LONG- AND SHORT-TERM	ESTIMATED COST
ALTERNATIVE G/L-6: ON-SITE TREATMENT OF ORGANICS **OPTION A:** AIR STRIPPING **OPTION B:** CHEMICAL OXIDATION	EACH OPTION WILL REDUCE THE LEVEL OF INORGANICS IN THE EXTRACTED INFLUENT, THEREBY REDUCING THE MIGRATION OF CONTAMINANTS TO OFF-SITE LOCATIONS. WILL REDUCE THE TOXICITY AND VOLUME OF POLLUTANTS. **(1)**	EACH OPTION MUST HAVE A METALS REMOVAL STEP PRIOR TO ORGANIC REMOVAL. EACH CAN BE IMPLEMENTED WITH AVAILABLE TREATMENT EQUIPMENT AND STANDARD CONSTRUCTION TECHNIQUES. **(3)**	**LONG-TERM** BOTH OPTIONS WILL EFFECTIVELY REMOVE ORGANICS FROM THE WASTE STREAM. CARBON POLISHING WILL BE REQUIRED. MONITORING OF SYSTEM WILL BE REQUIRED FOR FIELD ADJUSTMENTS. **(1)** **SHORT-TERM** AN IMMEDIATE REDUCTION OF OFF-SITE MIGRATION OF CONTAMINANTS. START-UP EFFECTIVENESS CAN BE READILY MONITORED. **(1)**	**OPTION A:** **AIR STRIPPING** **CAPITAL COST** $165,000 **ANNUAL O&M COST** $104,693 **PRESENT WORTH** $1,774,385 ***ORGANICS TREATMENT (1)*** **OPTION B:** **CHEMICAL OXIDATION** **CAPITAL COST** $379,575 **ANNUAL O&M COST** $267,719 **PRESENT WORTH** $4,495,088 ***ORGANICS TREATMENT (2)***
ALTERNATIVE G/L-7: OFF-SITE TREATMENT AT TSD FACILITY	WILL REMOVE CONTAMINANTS FROM THE SITE TO THE TREATMENT/DISPOSAL FACILITY. WILL NOT REDUCE TOXICITY OR VOLUME OF SOURCE AREA. **(1)**	WILL REQUIRE INSTALLATION OF ON-SITE BULK UNLOADING STATION AND OBTAINING CONTRACTS WITH TRANSPORTER AND TSD FACILITY. STORAGE FACILITY CAN BE CONSTRUCTED WITH STANDARD MATERIALS AND EQUIPMENT. **(3)**	**LONG-TERM** WILL EFFECTIVELY REMOVE CONTAMINATES FROM THE WASTE STREAM. **(1)** **SHORT-TERM** CONSTRUCTION OF BULK FACILITY IS EASILY IMPLEMENTED. START-UP AND TRAINING OF OPERATORS IS IMPORTANT **(1)**	**OPTION A:** **WITH LANDFILL CAP** **CAPITAL COST** $104,400 **ANNUAL O&M COST** $186,120 **PRESENT WORTH** $2,966,530 ***DISCHARGE (4)*** **OPTION B:** **WITHOUT LANDFILL CAP** **CAPITAL COST** $104,400 **ANNUAL O&M COST** $447,120 **PRESENT WORTH** $6,977,752 ***DISCHARGE (5)***

RANKING SHOWN IN BOLD NUMBERS: (1), (2) ETC. ITEMS RANKED NUMERICALLY WITH (1) BEST MEETING CRITERIA.

TABLE 1.8 (Continued)

COMPARISON OF GROUND WATER/LEACHATE ALTERNATIVES

REMEDIAL ACTION ALTERNATIVE	REDUCTION OF TOXICITY, MOBILITY AND VOLUME	IMPLEMENTABILTY	EFFECTIVENESS LONG- AND SHORT-TERM	ESTIMATED COST
ALTERNATIVE G/L-8: EFFLUENT DISCHARGE TO SURFACE WATER AND POTW OPTION A: SURFACE WATER OPTION B: POTW	EACH OPTION WILL DISCHARGE PRE-TREATED WASTEWATER WHICH WILL MEET DISCHARGE REQUIREMENTS TO SURFACE WATER OR LOCAL POTW. THERE WOULD BE NO HARMFUL ENVIRONMENTAL OR HUMAN EFFECTS FOR THIS ALTERNATIVE. **(1)**	BOTH OPTIONS WILL REQUIRE OBTAINING DISCHARGE PERMITS FOR SURFACE WATER AND POTW. CONSTRUCTION, OPERATION AND MONITORING OF EFFLUENT IS EASILY IMPLEMENTED. **(4)**	LONG-TERM THE EFFECTIVENESS OF THE SURFACE WATER OPTION WILL DEPEND ON THE OPERATION OF THE PRE-TREATMENT PROCESS TO MEET STRINGENT EFFLUENT LIMITS. THE POTW OPTION WILL NOT REQUIRE THE SAME LEVEL OF TREATMENT BECAUSE OF THE TREATMENT CAPABILITY OF THE POTW. LONG-TERM DISPOSAL PRICING FOR THE POTW CAN BE ESCALATED. **(1)** SHORT-TERM EACH OPTION WILL EFFECTIVELY REMOVE PRE-TREATED EFFLUENT OFF-SITE. OPERATION OF DISCHARGE MONITORING FACILITY IS IMPORTANT. **(1)**	<u>OPTION A:</u> <u>SURFACE WATER</u> **CAPITAL COST** $86,346 **ANNUAL O&M COST** $19,757 **PRESENT WORTH** $390,056 ***DISCHARGE (1)*** <u>OPTION B: POTW</u> <u>LEACHATE:</u> **CAPITAL COST** $53,220 **ANNUAL O&M COST** $35,332 **PRESENT WORTH** $596,364 ***DISCHARGE (2)*** <u>GROUND WATER/LEACHATE:</u> **CAPITAL COST** $53,220 **ANNUAL O&M COST** $42,015 **PRESENT WORTH** $645,871 ***DISCHARGE (3)***

RANKING SHOWN IN BOLD NUMBERS: (1), (2) ETC. ITEMS RANKED NUMERICALLY WITH (1) BEST MEETING CRITERIA.

TABLE 1.8 (Continued)

COMPARISON OF SURFACE WATER RUNOFF ALTERNATIVES

REMEDIAL ACTION ALTERNATIVE	REDUCTION OF TOXICITY, MOBILITY AND VOLUME	IMPLEMENTABILITY	EFFECTIVENESS LONG AND SHORT TERM	ESTIMATED COST
ALTERNATIVE SW-1 NO ACTION	THIS ALTERNATIVE WOULD NOT REDUCE THE TOXICITY, MOBILITY AND VOLUME OF RUNOFF WATER (2)	NO FIELD ACTIONS WOULD BE IMPLEMENTED UNDER THIS ALTERNATIVE NA	LONG TERM: STORMWATER RUNOFF WOULD CONTINUE TO MIGRATE OFF-SITE. THERE WOULD BE NO MONITORING OF THIS ALTERNATIVE. (2) SHORT TERM: THERE IS NO MITIGATION OF ENVIRONMENTAL EFFECTS IN THE SHORT-TERM (2)	THERE ARE NO COSTS ASSOCIATED WITH THIS ALTERNATIVE (1)
ALTERNATIVE SW-2 LIMITED ACTION	THERE WOULD BE NO MITIGATION OF EXISTING STORMWATER RUNOFF UNDER THIS ALTERNATIVE, CONTAMINANTS WOULD CONTINUE TO MIGRATE OFF-SITE (1)	RESISTANCE TO DEED RESTRICTIONS MAY DELAY INSTALLATION OF CONSTRUCTION FENCE. PERIMETER ACTIVITIES ARE EASILY IMPLEMENTED. SITE CONTROL (1)	LONG TERM: DOES NOT MITIGATE OFF-SITE FLOW OR RUN-OFF OF SURFACE WATER (1) SHORT TERM: THERE WOULD BE NO MITIGATION OF OFF-SITE CONTAMINANTS WITH THIS ALTERNATIVE, CONSTRUCTION AND MONITORING ACTIVITIES ARE EASILY IMPLEMENTED (1)	CAPITAL COST: $53,325 ANNUAL O&M COST: $13,724 PRESENT WORTH: $264,304 (2)

RANKING SHOWN IN BOLD NUMBERS: (1), (2) ETC. ITEMS RANKED NUMERICALLY WITH (1) BEST MEETING CRITERIA.

TABLE 1.8 (Continued)

COMPARISON OF SEDIMENT ALTERNATIVES

REMEDIAL ACTION ALTERNATIVE	REDUCTION OF TOXICITY, MOBILITY AND VOLUME	IMPLEMENTABILITY	EFFECTIVENESS LONG AND SHORT TERM	ESTIMATED COST
ALTERNATIVE SED-1 NO ACTION	THERE IS NO ACTIVE TREATMENT OF CONTAMINANTS UNDER THIS ALTERNATIVE. SOME NATURAL ATTENUATION MAY TAKE PLACE (4)	NO SITE ACTIVITIES TAKE PLACE NA	LONG TERM: THE EFFECTIVENESS IS LIMITED TO NATURAL BIOLOGICAL PROCESSES. NO MONITORING IS INCLUDED WITH THIS REMEDY. (4) SHORT TERM: THERE IS NO TREATMENT WITH THIS ALTERNATIVE, THEREFORE THE EFFECTIVENESS IS NEGLIGIBLE. (4)	THERE ARE NO SITE COSTS ASSOCIATED WITH THIS ALTERNATIVE (1)
ALTERNATIVE SED-2 LIMITED ACTION	THERE IS NO DIRECT REDUCTION OF TOXICITY, MIGRATION, OR VOLUME WITH THIS ALTERNATIVE. DIRECT CONTACT WITH THE SEDIMENT WOULD BE REDUCED DUE TO FENCING (3)	THIS ALTERNATIVE IS EASILY IMPLEMENTED WITH STANDARD CONSTRUCTION MATERIALS AND METHODS. PERMISSION FROM PROPERTY OWNERS WOULD BE REQUIRED PRIOR TO INSTALLATION OF SITE SECURITY MEASURES (1)	LONG TERM: WOULD REDUCE DIRECT CONTACT WITH CONTAMINATED SEDIMENTS. NATURAL ATTENUATION WOULD BE MONITORED (3) SHORT TERM: INSTALLATION OF SECURITY BARRIER COULD BE EASILY CONSTRUCTED. SURFACE WATER WOULD CONTINUE TO CONTACT CONTAMINATED SEDIMENTS (3)	CAPITAL COST: $53,325 ANNUAL O&M COST: $13,724 PRESENT WORTH: $264,304 (4)

RANKING SHOWN IN BOLD NUMBERS: (1), (2) ETC. ITEMS RANKED NUMERICALLY WITH (1) BEST MEETING CRITERIA.

TABLE 1.8 (Continued)

COMPARISON OF SEDIMENT ALTERNATIVES

REMEDIAL ACTION ALTERNATIVE	REDUCTION OF TOXICITY, MOBILITY AND VOLUME	IMPLEMENTABILITY	EFFECTIVENESS LONG AND SHORT TERM	ESTIMATED COST
ALTERNATIVE SED-3 HOTSPOT EXCAVATION	THIS WOULD REDUCE THE HIGHLY CONCENTRATED SOURCE OF CONTAMINATED SEDIMENT AND THE TOXICITY OF CONTAMINANTS EMANATING FROM THE LANDFILL. REMAINING SEDIMENTS WOULD CONTINUE TO BE A SOURCE FOR OFF-SITE POLLUTION. **(2)**	THIS ALTERNATIVE WOULD INVOLVE COMMON ENVIRONMENTAL CONSTRUCTION TECHNIQUES. OFF-SITE DISPOSAL WILL REQUIRE LICENSED TRANSPORTERS, DISPOSAL FACILITY, AND AN APPROVED CONSTRUCTION WORK PLAN. OFFSITE **(2)** ONSITE **(3)**	**LONG TERM:** WOULD REMOVE HIGHLY CONTAMINATED SEDIMENTS FROM THE LANDFILL. WOULD NOT ADDRESS REMAINING SEDIMENTS. VERIFICATION SAMPLING AND MONITORING WILL BE CONDUCTED. **(2)** **SHORT-TERM:** ADEQUATE SECURITY MEASURES AND PROPERLY TRAINED PERSONNEL MUST BE UTILIZED FOR SEDIMENTS REMOVAL, STOCKPILE AND OFF-SITE DISPOSAL. **(2)**	<u>OPTION A: ON-SITE</u> **CAPITAL COST:** $102,478 **ANNUAL O&M COST:** $17,042 **PRESENT WORTH:** $364,459 **(6)** <u>OPTION B: OFF-SITE</u> **CAPITAL COST:** $208,893 **ANNUAL O&M COST:** $24,231 **PRESENT WORTH:** $581,478 **(7)**

RANKING SHOWN IN BOLD NUMBERS: (1), (2) ETC. ITEMS RANKED NUMERICALLY WITH (1) BEST MEETING CRITERIA.

TABLE 1.8 (Continued)

COMPARISON OF SEDIMENT ALTERNATIVES

REMEDIAL ACTION ALTERNATIVE	REDUCTION OF TOXICITY, MOBILITY AND VOLUME	IMPLEMENTABILITY	EFFECTIVENESS LONG AND SHORT TERM	ESTIMATED COST
ALTERNATIVE SED-4 TOTAL EXCAVATION	OFF-SITE AND ON-SITE DISPOSAL WOULD REMOVE THE CONTAMINATED SEDIMENTS FROM THE ON-SITE DITCH SITE, THEREBY REDUCING THE TOXICITY AND VOLUME OF MATERIAL IN THE ON-SITE DITCH. EXCAVATED SEDIMENTS WOULD BE RELOCATED EITHER TO AN APPROVED OFF-SITE LANDFILL OR CONSOLIDATION WITHIN THE LANDFILL. WOULD NOT ADDRESS CONTAMINATED SEDIMENTS IN THE DOWNSTREAM PORTIONS OF THE DRAINAGE DITCH. **(1)**	WOULD REQUIRE LICENSED TRANSPORTERS, APPROVED DISPOSAL FACILITY, AND AN APPROVED WORK PLAN, AND SITE PERMITS. CAN BE COMPLETED WITH CONVENTIONAL CONSTRUCTION METHODS. ONSITE **(2)** OFFSITE **(3)**	LONG TERM: REDUCE RISK TO THE ENVIRONMENT AND THE PUBLIC. DOWNSTREAM AND OFF-SITE CONDITIONS WILL BE MONITORED DURING POST-REMEDIATION. **(1)** SHORT TERM: SEDIMENTS MUST BE PROPERLY EXCAVATED, STOCKPILED AND TRANSPORTED OFF-SITE BY QUALIFIED PERSONNEL. ON-SITE SAMPLING WILL ASSESS EFFECTIVENESS OF REMEDIATION. **(1)**	<u>OPTION A: ON-SITE</u> CAPITAL COST: $112,412 ANNUAL O&M COST: $10,125 PRESENT WORTH: $268,659 **(5)** <u>OPTION B: OFF-SITE</u> CAPITAL COST: $497,978 ANNUAL O&M COST: $10,125 PRESENT WORTH: $653,625 **(8)**

RANKING SHOWN IN BOLD NUMBERS: **(1)**, **(2)** ETC. ITEMS RANKED NUMERICALLY WITH **(1)** BEST MEETING CRITERIA.

TABLE 1.8 (Continued)

COMPARISON OF SEDIMENT ALTERNATIVES

REMEDIAL ACTION ALTERNATIVE	REDUCTION OF TOXICITY, MOBILITY AND VOLUME	IMPLEMENTABILITY	EFFECTIVENESS LONG AND SHORT TERM	ESTIMATED COST
ALTERNATIVE SED-5 STABILIZATION	WOULD REDUCE THE MOBILITY AND TOXICITY OF EXISTING SEDIMENTS. TOTAL VOLUME OF MATERIAL WOULD INCREASE DUE TO THE ADDITION OF STABILIZED MATERIAL (1)	CAN BE IMPLEMENTED ON OR OFF-SITE USING CONVENTIONAL STABILIZATION METHODS. A TREATABILITY TEST WOULD BE REQUIRED TO ATTAIN THE PROPER MIX. PERMITS TO REMEDIATE AND AN APPROVED WORK PLAN WOULD BE REQUIRED PRIOR TO EXCAVATION. (4)	LONG TERM: WOULD REDUCE THE RISK OF DIRECT CONTACT AND LEACHING OF MATERIAL TO SURROUNDING ECOSYSTEM. RUNOFF WOULD BE MONITORED FOR OFF-SITE EFFECTIVENESS (1) SHORT TERM: PROPER EXCAVATION AND DISPOSAL PROCEDURES WILL BE REVIEWED PRIOR TO SEDIMENT REMOVAL AND RESTORATION. SITE SAMPLING WILL VERIFY WORK. (1)	OPTION A: HOT SPOT EXCAVATION: (OFF-SITE) CAPITAL COST: $89,667 ANNUAL O&M COST: $10,125 PRESENT WORTH: $245,314 (ON SITE) CAPITAL COST: $15,309 ANNUAL O&M COST: $10,125 PRESENT WORTH: $170,966 (2) OPTION B: TOTAL EXCAVATION: (OFF-SITE) CAPITAL COST: $472,246 ANNUAL O&M COST: $10,125 PRESENT WORTH: $627,893 (ON-SITE) CAPITAL COST: $80,627 ANNUAL O&M COST: $10,125 PRESENT WORTH: $236,274 (3)

RANKING SHOWN IN BOLD NUMBERS: (1), (2) ETC. ITEMS RANKED NUMERICALLY WITH (1) BEST MEETING CRITERIA.

TABLE 1.8 (Continued)

COMPARISON OF AIR ALTERNATIVES

REMEDIAL ACTION ALTERNATIVE	REDUCTION OF TOXICITY, MOBILITY AND VOLUME	IMPLEMENTABILITY	EFFECTIVENESS LONG AND SHORT TERM	ESTIMATED COST
ALTERNATIVE AIR-1 NO ACTION	THERE WOULD BE NO TREATMENT OR COLLECTION OF SITE AIR EMISSIONS. UNDER THIS ALTERNATIVE EXISTING EMISSIONS WOULD CONTINUE (2)	THIS REMEDY REQUIRES NO ON-SITE ACTIVITIES (NA)	LONG TERM: WOULD NOT BE EFFECTIVE AT REMOVING/TREATING AIR EMISSIONS AT THE SITE. NO SITE MONITORING WOULD BE CONDUCTED. (3) SHORT TERM: EXISTING CONDITIONS AT THE SITE WOULD CONTINUE. NO MITIGATION OF EMISSIONS (3)	THERE ARE NO COSTS ASSOCIATED WITH THIS ALTERNATIVE. (1)
ALTERNATIVE AIR-2 LIMITED ACTION	THE EXISTING AIR EMISSIONS WOULD TAKE PLACE WITH LIMITED MONITORING. THERE WOULD BE NO REDUCTION OF EMISSION EXCEPT BY NATURAL VOLATILIZATION (2)	THIS ALTERNATIVE IS EASILY IMPLEMENTED USING STANDARD EMISSIONS EQUIPMENT. (1)	LONG TERM: WOULD NOT REDUCE AIR EMISSIONS FROM THE SITE, BUT WOULD MONITOR THE OFF-SITE EFFECTS OF EMISSIONS. (2) SHORT TERM: WILL MONITOR FOR CHANGES IN AIR EMISSIONS AT SITE. THERE WOULD BE NO ACTIVE TREATMENT (2)	CAPITAL COST: $49,275 ANNUAL O&M COST: $4,320 PRESENT WORTH: $115,684 (3)
ALTERNATIVE AIR-3 COLLECTION	REDUCTION OF AIR EMISSION WOULD BE TO LANDFILL GASES THAT WOULD BE COLLECTED. THIS WOULD REDUCE THE UNCONTROLLED RELEASE OF THESE GASES. (1)	INSTALLATION OF AN ACTIVE OR PASSIVE COLLECTION SYSTEM WOULD REQUIRE PERMITTING FROM LOCAL AND STATE OFFICIALS. STANDARD MATERIALS AND CONSTRUCTION TECHNIQUES WOULD BE UTILIZED. (2)	LONG TERM: WOULD PREVENT PRESSURIZED GAS POCKETS FROM ACCUMULATING IN THE LANDFILL, AND WILL CENTRALIZE GAS COLLECTION. EFFECTIVENESS WILL BE MONITORED. (1) SHORT TERM: INSTALLATION CAN BE COMPLETED EASILY. MONITORING OF SYSTEM WILL INSURE EFFECTIVENESS. (1)	OPTION A: PASSIVE SYSTEM CAPITAL COST: $81,675 ANNUAL COST: $5,513 PRESENT WORTH: $166,425 (4) OPTION B: ACTIVE SYSTEM CAPITAL COST: $95,175 ANNUAL COST: $6,424 PRESENT WORTH: $193,933 (5)

RANKING SHOWN IN BOLD NUMBERS: (1), (2) ETC. ITEMS RANKED NUMERICALLY WITH (1) BEST MEETING CRITERIA.

9097:TABLE1D.WPW

TABLE 1.8 (Continued)

COMPARISON OF AIR ALTERNATIVES

REMEDIAL ACTION ALTERNATIVE	REDUCTION OF TOXICITY, MOBILITY AND VOLUME	IMPLEMENTABILITY	EFFECTIVENESS LONG AND SHORT TERM	ESTIMATED COST
ALTERNATIVE AIR-4 DISCHARGE	IMPROVEMENT OF AIR EMISSIONS WOULD BE LIMITED TO GAS GENERATED FROM THE LANDFILL. THIS WOULD REDUCE UNCONTROLLED AIR EMISSION **(1)**	PROBABLE PUBLIC OPPOSITION AND STRINGENT PERMITTING REQUIREMENTS. **(2)**	**LONG TERM:** EFFECTIVENESS WOULD DEPEND IN PROPER OPERATION OF FLARE SYSTEM. MONITORING OF SYSTEM WILL BE CONDUCTED. **(1)** **SHORT TERM:** WILL DEPEND ON PROPER INSTALLATION OF EQUIPMENT, START-UP AND MONITORING WILL INSURE EFFECTIVENESS. **(1)**	**CAPITAL COST:** $33,750 **ANNUAL COST:** $2,278 **PRESENT WORTH:** $68,770 **(2)**

RANKING SHOWN IN BOLD NUMBERS: (1), (2) ETC. ITEMS RANKED NUMERICALLY WITH (1) BEST MEETING CRITERIA.

118A

PASSAIC VALLEY SEWERAGE COMMISSIONERS
600 WILSON AVENUE
NEWARK, N.J. 07105
(201) 344-1800

RECEIVED
AUG 2 - 1976

July 26, 1976

Passaic Valley Sewerage Commissioners
600 Wilson Avenue
Newark, New Jersey 07105

See p. 5

Re: Monthly Report
June 1976

Gentlemen:

The following is my report which covers the month of June 1976, and consists of three parts:

KLL028448

Violation - Conrail (Formerly Central Railroad of N.J.)
January 14 - June 30, 1976 (J. McLaughlin)

During 1974 and 1975 there was trouble with oil coming from saturated land owned by the Central Railroad Company of New Jersey going into Lawyer's Ditch (see 1975 Annual Report, page 97). Since it seemed inpractical to remove all the saturated ground, PVSC accepted the placing of straw filters across twin 48" outlets to Lawyer's Ditch, as long as they were maintained and cleaned.

On January 28, Inspector McLaughlin, following up on a polluting samples taken by Supervisor of Industrial Waste, F. D'Ascensio, on January 14, 1976, reported that pollution was flowing through the filters. The samples taken both days (January 14 and 28) were highly polluting with very high C.O.D.'s and T.O.C.'s. On January 29, 1976, Mr. D'Ascensio wrote to the Central Railroad Company informing them of the violation and directed them to cease pollution and submit a program of abatement.

PVSC later received a copy of a letter from Central Railroad to Newark Landfill Development Company, dated February 6, 1976, enclosing a copy of PVSC's letter and stating that the letter related to pollution originating from a parcel of railroad property used by their concern. The letter also requested that they immediately remove the saturated material, and in the future remove it before it became saturated.

Despite this, as of the end of February the situation had not improved. In fact, the sample of February 20, 1976, showed a C.O.D. of 954 mg/l, a T.O.C. of 440 mg/l, and hydrogen sulfide was present.

Inspections made throughout March by Inspector McLaughlin verified that no action had been taken to eliminate the pollution. Mr. Lubetkin finally wrote to Central Railroad on March 26, 1976 again directing them to eliminate the pollution before April 8, 1976 or PVSC would have to take legal action to force compliance. On March 30, 1976, Mr. John Heimbuch, attorney for Central Railroad, wrote to Mr. N. Raff of Newark Landfill Development Co. enclosing a copy of PVSC's letter requesting they take appropriate steps to correct the situation within the time limit stated.

On April 8, 1976, Mr. Lubetkin reported to the Commissioners that he was unable to get the Central Railroad to clean up the cause of the pollution and the matter was referred to Chief Counsel Carella to take whatever action was necessary to halt the pollution.

On April 26 Mr. Carella wrote to Trustee R.D. Timpany, General Attorney J.F Heimbuch and E. H. Wright, Vice President of Engineering, of Central Railroad giving notice that suit would be instituted in five days if the pollution was not halted.

Violation - Conrail (con't.)

Nothing was done to correct the situation, therefore, PVSC took legal action against Central Railroad Company of N.J. and Newark Landfill Development Company.

On June 28, Mr. Lubetkin was contacted by representatives of Central Railroad on this matter who referred Mr. Lubetkin to Mr. Michael Ottilio, of V. Ottilio and Sons, 555 Preakness Avenue, Paterson, who was directed to cooperate with PVSC to eliminate the pollution.

Mr. Ottilio was contacted and he accompanied Mr. Lubetkin and other PVSC personnel on a tour of the property in question at about 2 p.m. that same day. Mr. Ottilio stated that, although he was not responsible for the pollution, since he was operating the landfill on the Central Railroad property, he was anxious to do whatever was necessary in order to abate the pollution. In order to determine a method to control the pollution, the River Inspection Department was directed to conduct a complete survey in the area of Blanchard Street, which is located just west of the Central Railroad property, to see if any company might be pumping illegally into this area through an underground line. In addition, an hour by hour log of flows would be kept to try and determine the variability of the flows.

On June 29 at 10:10 a.m. Messrs. Goldberg and Rys visited the property and observed that the level of the water was above the two 48" drain pipes which are located at the eastern end of the dumpsite and pass under the railroad. Since this practically coincided with the time of high tide,and at about 2:30 p.m. (the time of low tide) the level had dropped to only 3 or 4 inches, it was obvious that Lawyer's Ditch was tidal.

This latest data indicated that the tidal action is taking the polluting material from the filled in area and, with the water acting as a carrier, moving it to the Passaic River. Thus as the tide ebbed and flowed, some of the organic material previously buried at the dumpsite or material which might be decomposing would leach out, causing the pollution. Preliminary laboratory analysis of both samples taken on June 29 seemed to verify this conclusion. The chloride content of the sample taken at high tide was 1800 mg/l, which is normal for this part of the Passaic River. However, the sample taken at low tide was 1755 mg/l showing little dilution from flow.

PVSC will direct the installation of an earth barrier to attempt to act as a filter, slowing the flow of tidal water into the dump site and filtering the flow of liquid out, hoping to control the pollution. If this fails, we will have to look for other alternates.

Is your RETURN ADDRESS completed on the reverse side?

SENDER:
- Complete items 1 and/or 2 for additional services.
- Complete items 3, 4a, and 4b.
- Print your name and address on the reverse of this form so that we can return this card to you.
- Attach this form to the front of the mailpiece, or on the back if space does not permit.
- Write "*Return Receipt Requested*" on the mailpiece below the article number.
- The Return Receipt will show to whom the article was delivered and the date delivered.

I also wish to receive the following services (for an extra fee):
1. ☐ Addressee's Address
2. ☐ Restricted Delivery

Consult postmaster for fee.

3. Article Addressed to: Willet Kreutzberg Corp. Attn: Barry Kerman 26 Riverside Dr. Newark, NJ 07105

4a. Article Number P 170 080 012

4b. Service Type
☐ Registered ☒ Certified
☐ Express Mail ☐ Insured
☐ Return Receipt for Merchandise ☐ COD

7. Date of Delivery 9-6-95

5. Received By: (Print Name)

8. Addressee's Address (Only if requested and fee is paid)

6. Signature: (Addressee or Agent) X

PS Form **3811**, December 1994 Domestic Return Receipt

Thank you for using Return Receipt Service.

Is your RETURN ADDRESS completed on the reverse side?

SENDER:
- Complete items 1 and/or 2 for additional services.
- Complete items 3, 4a, and 4b.
- Print your name and address on the reverse of this form so that we can return this card to you.
- Attach this form to the front of the mailpiece, or on the back if space does not permit.
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4a. Article Number P 170 080 013

4b. Service Type
☐ Registered ☐ Certified
☐ Express Mail ☐ Insured
☐ Return Receipt for Merchandise ☐ COD

7. Date of Delivery 9-6-95

5. Received By: (Print Name) Robert Kreutzberg

8. Addressee's Address (Only if requested and fee is paid)

6. Signature: (Addressee or Agent) X Robert Kreutzberg

PS Form **3811**, December 1994 Domestic Return Receipt

Thank you for using Return Receipt Service.

P 170 080 012

US Postal Service
Receipt for Certified Mail
No Insurance Coverage Provided.
Do not use for International Mail (See reverse)

Sent to: Willet Kreutzberg
Street & Number: Barry Kerman
Post Office, State & ZIP Code: 26 Riverside Dr. Newark, NJ 07105
Postage: $
Certified Fee
Special Delivery Fee
Restricted Delivery Fee
Return Receipt Showing to Whom & Date Delivered
Return Receipt Showing to Whom, Date, & Addressee's Address
TOTAL Postage & Fees: $
Postmark or Date: 9-8-95

PS Form **3800**, April 1995

P 170 080 013

US Postal Service
Receipt for Certified Mail
No Insurance Coverage Provided.
Do not use for International Mail (See reverse)

Sent to: Willet Kreutzberg
Street & Number: Attn: Barry Kerman
Post Office, State & ZIP Code: 26 Riverside Dr. Newark, NJ 07105
Postage: $
Certified Fee: Return Receipt Requested
Special Delivery Fee: Restricted Delivery
Restricted Delivery Fee
Return Receipt Showing to Whom & Date Delivered
Return Receipt Showing to Whom, Date, & Addressee's Address
TOTAL Postage & Fees: $
Postmark or Date: 9-5-95

PS Form **3800**, April 1995

BAA000011

State of New Jersey

Christine Todd Whitman
Governor

Department of Environmental Protection

Robert C. Shinn, Jr.
Commissioner

AUG - 8 1996

CERTIFIED MAIL
RETURN RECEIPT REQUESTED
NO. P170 080 012

Deleet Merchandising Corporation
Barry Kronman
26 Blanchard Street
Newark, New Jersey 07105

P170 080 013

V. Ottilio & Sons Demolition, Inc.
c/o Ronald M. Pflug
266 Harristown Road
Glen Rock, New Jersey 07452

Dear Sirs:

Re: Ottilio Landfill Site
Blanchard Street, Newark, Essex County
Directive and Notice to Insurers

Enclosed find for service upon you a Directive and Notice to Insurers for you to arrange for the cleanup and removal of the discharges at the referenced site. The Department issues this Directive and Notice to Insurers pursuant to the Spill Compensation and Control Act, N.J.S.A. 58:10-23.11 et seq.

You must respond to the Department in writing pursuant to N.J.A.C. 7:26C-2.5(g) within the timeframe set forth in this Directive.

If you wish to conduct a review of the files the Department utilized to develop the Directive, please submit a written request, using the attached model, to Richard Yarsinsky immediately so the Department may expedite the review. You may fax your request for a file review to Mr. Yarsinsky at (609) 633-1454.

If you have any questions, please do not hesitate to contact Vicky Galofre of my staff at (609) 633-0719 regarding this matter.

Sincerely,

Ronald T. Corcory, Assistant Director
Responsible Party Cleanup Element

RTC/vmg
Enclosure(s)

c: Vicky Galofre (w/enclosure)
Brendan Ruane, DAG (w/enclosure)
Rodney Murray, BSCM (w/enclosure)
Luis Sanders, BSM (w/enclosure)
Colleen Kokas, ECA (w/enclosure)

MODEL

CERTIFIED MAIL
RETURN RECEIPT REQUESTED
No.

Richard Yarsinsky
NJDEP
401 East State Street
CN 028
Trenton, New Jersey 08625-0028

Dear Mr. Yarsinsky:

Re: (site name)
(street address)
EXPEDITED FILE REVIEW

This letter serves to request on behalf of (name of Directive recipient requesting file review) a review of the Department's files used to develop the Directive issued by the Department on (date). (name of Directive recipient requesting file review) must respond to the Directive by (date), as a result, it is important that I review the files associated with this case as soon as possible.

Please contact me at (phone number) to arrange a convenient time for the file review.

Sincerely,

(Directive recipient requesting file review)

State of New Jersey

Christine Todd Whitman
Governor

Department of Environmental Protection

Robert C. Shinn, Jr.
Commissioner

1996 3-- Directive Number

IN THE MATTER OF	:	
THE OTTILIO LANDFILL SITE	:	DIRECTIVE
AND	:	AND
DELEET MERCHANDISING CORPORATION,	:	NOTICE TO INSURERS
AND	:	
V. OTTILIO & SONS DEMOLITION, INC.,	:	
Respondents	:	

This Directive and Notice to Insurers is issued pursuant to the authority vested in the Commissioner of the New Jersey Department of Environmental Protection (hereinafter "the Department" or "NJDEP") by N.J.S.A. 13:1D-1 et seq. and the Spill Compensation and Control Act, N.J.S.A. 58:10-23.11 et seq., and duly delegated to the Assistant Director of the Responsible Party Cleanup Element within the Division of Responsible Party Site Remediation pursuant to N.J.S.A. 13:1B-4. This Directive and Notice to Insurers is issued in order to notify the above-captioned Respondents that the Department, pursuant to the Spill Compensation and Control Act, has determined that it is necessary to cleanup and remove discharges, and in order to notify the Respondents that the Department believes them to be responsible for the discharges.

FINDINGS

1. The property that is the subject of this Directive and Notice to Insurers is located at the rear of 18-60 Blanchard Street, Newark, Essex County, New Jersey, said property being also known and designated as Block 5001, the eastern two thirds of Lot 12 and Lot 16 on the tax maps of the City of Newark (hereinafter "the Site").

2. The Site is comprised of approximately 6 acres of real property and is bounded to the North by the Essex County Resource Recovery Facility, to the South by Raymond Boulevard, to the East by Conrail Railroad lines and a Public Service Electric and Gas Company (PSE&G) generating facility, and to the West by Deleet Merchandising Corporation and New Jersey Millwork, Inc. (See Attachment 1). A drainage ditch runs along the northern and northeastern boundary of the Site. The drainage ditch eventually flows into Lawyer's Ditch which flows into the Passaic River. The depth to groundwater in the monitoring wells at the Site ranges from five feet to fifteen feet and groundwater flow is predominantly north to northeast toward the Passaic River.

3. V. Ottilio & Sons, Incorporated (Ottilio) was a New Jersey corporation with its principal offices located at 26 Blanchard Street, Newark, New Jersey, said property being also known and designated as Block 5001, Lot 16 on the tax maps of the City of Newark.

4. In February of 1973, Ottilio filed an application with the Secretary of State to conduct business in New Jersey and was, at all relevant times hereto, been engaged in the collection and hauling of solid waste. Ottilio disposed of waste at several locations including Little Ferry and locations throughout Newark including an area at the foot of the Port of Newark.

5. In 1974, Ottilio leased Block 5001, Lot 16 from the Central Railroad Company of New Jersey to operate a landfill.

6. Deleet Merchandising Corporation (Deleet), is a Delaware corporation with its principal offices located at 26 Blanchard Street, Newark, New Jersey, said property being also known and designated as Block 5001, Lot 12 on the tax maps of the City of Newark. Deleet's predecessor, Deleet Merchandising Corporation of New York, purchased the property located at 26 Blanchard Street, Block 5001, Lot 12, in June of 1970. Deleet currently owns Block 5001, Lot 12.

7. The Central Railroad Company of New Jersey, was a New Jersey corporation which owned Block 5001, Lot 16 until 1981 when it was acquired by the City of Newark in lieu of tax foreclosure. The City of Newark currently owns Block 5001, Lot 16.

8. In September of 1971, Deleet filed an application with the Secretary of State to conduct business in New Jersey and was at all relevant times hereto, engaged in supplying chemical products to the printing industry.

9. A March 1971 aerial photograph shows Lot 12 to be level with roads and access lanes extending from the south side of the lot and ending along a ridge line running along the north side of the lot. The aerial photograph also shows Lot 16 to be open and marshy.

10. A 1972 aerial photograph shows landfilling activities on Lots 12 and 16, said activities being evidenced by soil disturbances, soil and/or fill piles, debris and refuse piles, abandoned automobiles, and grading activities. The photograph also shows an earthen road extending from the Deleet property across Lot 12 onto Lot 16.

11. On August 24, 1972, the Newark Division of Inspections instructed Deleet to discontinue the illegal dumping in the rear of Lot 12.

12. On March 26, 1974, the Department conducted an inspection of the Site and observed uncovered refuse, chemical drums, and piles of debris. The Department also observed a bulldozer, with the words "V. Ottilio & Sons" printed on it, operating at the Site.

13. A 1974 aerial photograph shows ongoing landfilling activities on Lots 12 and 16, said activities being evidenced by grading and debris.

14. On June 14, 1974, the Department filed a complaint with the New Jersey Superior Court against Deleet and Ottilio for, including but not limited to, the illegal disposal of solid and chemical waste without registration or approval and disposal of solid waste in violation of sanitary landfill design requirements.

15. In September of 1974, Ottilio filed an application with the Department to operate a solid waste storage and disposal facility on Lot 16. According to the application Ottilio leased Lot 16 from the former Central Railroad Company of New Jersey.

16. In November of 1974, the June 14, 1974 complaint filed by the Department was dismissed and the Superior Court stipulated that Ottilio remove tires and drums from the Site and grade Lot 16.

17. On January 2, 1975, the Department issued Ottilio a conditional permit to operate a solid waste disposal facility at Block 5001, Lot 16. The conditions stipulated in the permit included; installation of a two foot compacted clay layer to cover the entire surface area of Lot 16; installation of a fence around Lot 16; installation of a gas venting system at Lot 16; and installation and sampling of monitoring wells at Lot 16.

18. On April 2, 1975, the Department conducted an inspection of the Site as a result of a complaint made by an employee of PSE&G that oil was running off the Site and flowing into Lawyer's Ditch. During this inspection the Department observed a black, odorous, oily substance that had accumulated in a small pond in the east corner of Lot 16. The Department also observed that Ottilio had not yet complied with the conditions stipulated in the permit listed in the paragraph above.

19. In March and July of 1978, the Department conducted inspections of the Site and observed that the landfill had apparently ceased operation.

20. A 1979 aerial photograph shows that landfilling activities apparently ceased at the Site evidenced by the apparent non-disturbance of the ground surface at the Site. The photograph also shows many soil piles, refuse piles, and debris scattered throughout the Site.

21. In 1982, the United States Environmental Agency (USEPA) conducted preliminary studies of the Site. The USEPA studies involved sediment and surface water sampling, the results of which revealed the presence of pesticides, polychlorinated biphenyl, volatile organic compounds, polynuclear aromatic hydrocarbons, and heavy metals in the sediments and surface water at the Site.

22. In 1987, the Department initiated a remedial investigation and feasibility study of the Site to delineate the extent of contamination (Phase I RI/FS).

23. The Phase I RI/FS involved the sampling of the soil, leachate, and groundwater at the Site, the results of which revealed the presence of contaminants at concentrations exceeding the Department's cleanup criteria. The contaminants detected, the media (i.e. soil, groundwater, and leachate) in which they were detected, their highest concentrations in parts per million (ppm) and parts per billion (ppb), and the relevant cleanup criteria are shown in the following table:

Soil:

Contaminant	Concentration	Soil Cleanup Criteria
Arsenic	141.0 ppm	20.0 ppm
Lead	4381.0 ppm	600.0 ppm
Zinc	4873.0 ppm	1500.0 ppm

Leachate:

1,2-dichloroethene	3000.0 ppm
Vinyl chloride	5000.0 ppm
Benzene	3200.0 ppm
Nitrobenzene	43.0 ppm
Total xylenes	14,000.0 ppm

Groundwater:

		Groundwater Quality Standard
Arsenic	748.0 ppb	.8 ppb
Benzene	160.0 ppb	1.0 ppb
Chlorobenzene	8.0 ppb	4.0 ppb
Barium	2680.0 ppb	2000.0 ppb
1,2-Dichloroethane	25.0 ppb	2.0 ppb

24. Based upon the results of the Phase I RI/FS, the Department determined that a second remedial investigation and feasibility study (Phase II RI/FS) was needed to further delineate the contamination at the Site and in 1993 initiated the Phase II RI/FS. During inspections conducted as part of the Phase II RI/FS the Department observed 55 gallon drums which contained a thick black, tar like substance and others which contained a bright orange, viscous substance.

25. The Phase II RI/FS involved the sampling of soils, sediment, groundwater, and surface water at the Site, the results of which revealed the presence of contaminants at concentrations exceeding the Department's cleanup criteria. The contaminants detected, the media (i.e. soils, sediments, groundwater, and surface water) in which they were detected, their highest concentrations, and the relevant cleanup criteria are shown in the following table:

Soil:

Contaminant	Concentration	Soil Cleanup Criteria
Methylene chloride	6400.0 ppm	1.0 ppm
Acetone	9500.0 ppm	100.0 ppm
Toluene	40,000.0 ppm	500.0 ppm
2,6-Dinitrotoluene	210.0 ppm	1.0 ppm
Total Xylenes	8500.0 ppm	10.0 ppm
Lead	758.0 ppm	400.0 ppm

Surface water:

		Surface Water Cleanup Criteria
Antimony	158.0 ppb	12.2 ppb
Arsenic	64.0 ppb	.017 ppb
Lead	522.0 ppb	5.0 ppb
Mercury	2.1 ppb	.14 ppb*

*USEPA criteria

Groundwater:

		Groundwater Quality Standard
Toluene	48,000.0 ppb	1000.0 ppb
Chlorobenzene	1800.0 ppb	4.0 ppb
1,4-Dichlorobenzene	100.0 ppb	75.0 ppb
Total Xylenes	4700.0 ppb	40.0 ppb
Arsenic	115.0 ppb	.8 ppb
Aluminum	1610.0 ppb	200.0 ppb
Barium	2720.0 ppb	2000.0 ppb
Chromium	1580.0 ppb	100.0 ppb

Sediment:

		Location
Lead	1520.0 ppb	Drainage ditch on the Site

26. To cleanup and remove the discharges the Department has determined that it is necessary to conduct a Departmentally approved remediation at the Site, the principal components of which are:

Install a solid waste landfill cap at the Site;

Install a 4 to 6 foot trench around the northern and eastern perimeter of the Site to collect leachate from the Site;

Treat leachate at a Treatment, Storage, and Disposal Facility;

Excavate and dispose of sediments from the on-Site drainage ditch;

Install a gas collection system to collect and vent air from the landfill to prevent buildup of gas pressure; and

Operate and Maintain the landfill cap, the leachate collection trench, and the gas collection/vent system.

27. The substances referenced in the paragraph(s) above are hazardous substances pursuant to the Spill Compensation and Control Act, N.J.S.A. 58:10-23.11b.

28. Respondents are responsible for the hazardous substances at the Site which were discharged to the lands and waters of the State.

29. Pursuant to N.J.S.A. 58:10-23.11gc, Respondents are strictly liable, jointly and severally, without regard to fault, for all cleanup and removal costs.

30. Pursuant to N.J.S.A. 58:10-23.11f, whenever any hazardous substance is discharged, the Department may, in its discretion, act to clean up and remove or arrange for the cleanup and removal of such discharge, or may direct any person in any way responsible for the hazardous substance to clean up and remove, or arrange for the cleanup and removal of the discharge.

DIRECTIVE

31. The Department hereby directs Respondents to arrange for the cleanup and removal of the discharges at the Site by paying the Department $18,307,519.00 within thirty (30) calendar days after receipt of this Directive and Notice to Insurers to conduct the remediation identified in paragraph 27 at the Site in order to protect human health and the environment.

NOTICE

32. If Respondents fail to pay the Department to conduct the remediation, within thirty (30) calendar days after Respondents' receipt of this Directive and Notice to Insurers, the Department may at its discretion, conduct the remediation using public funds. Further, if Respondents fail to pay the Department in the amount and manner set forth above, the Department may commence suit against Respondents seeking reimbursement for all costs incurred.

33. Failure to comply with this Directive and Notice to Insurers will increase Respondents' potential liability to the Department in an amount equal to three (3) times the cost of arranging for the cleanup and removal of the discharge and may cause a lien to be placed on Respondents' real and personal property pursuant to the Spill Compensation and Control Act, N.J.S.A. 58:10-23.11f, including a first priority lien on the property subject of the discharge.

34. Pursuant to N.J.S.A. 58:10-23.11u the Department may issue an order to require compliance with the Spill Compensation and Control Act. Failure by Respondents to comply with this Directive may result in the issuance of an order by the Department, which will subject each Respondent to penalties of up to $50,000 per day and each day of violation constitutes an additional, separate and distinct violation of the Spill Compensation and Control Act, N.J.S.A. 58:10-23.11 et seq.

RESERVATION OF RIGHTS

35. In the event that the costs of completing the activities described in this Directive and Notice to Insurers exceed the current estimates, the Department reserves the right to direct Respondents to pay such costs and to seek full reimbursement and damages for all such costs. In the event that the costs of completing the activities described in the Directive and Notice to Insurers are less than the estimate specified above, the Department will rebate the

unexpended funds to those parties that complied with the Directive and Notice to Insurers on a proportional basis.

36. The Department reserves the right to direct Respondents to take or arrange for the taking of any and all additional remediation which the Department determines to be necessary to protect the public health and safety or the environment and to seek full reimbursement and treble damages for all costs incurred in taking such additional remediation.

37. Respondents are advised that the discharges referenced in this Directive and Notice to Insurers may also constitute violations of the Water Pollution Control Act, N.J.S.A. 58:10A-1 et seq., and the Solid Waste Management Act, N.J.S.A. 13:1E-1 et seq., and that Respondents may, therefore, be subject to the penalties prescribed for violations of these Acts. The Department reserves all rights and remedies under those Acts as well as any other rights and remedies under any applicable law.

NOTICE TO INSURERS

38. BE ON NOTICE THAT, pursuant to N.J.S.A. 58:10-23.11s, any claims for costs of cleanup or civil penalties by the State and any claim for damages by any injured person, may be brought directly against the bond, insurer or any other person providing evidence of financial responsibility. Respondents are therefore urged to contact such insurers and notify them of the issuance of this Directive and Notice to Insurers.

Date: 8/8/96

Ronald T. Corcory, Assistant Director
Responsible Party Cleanup Element