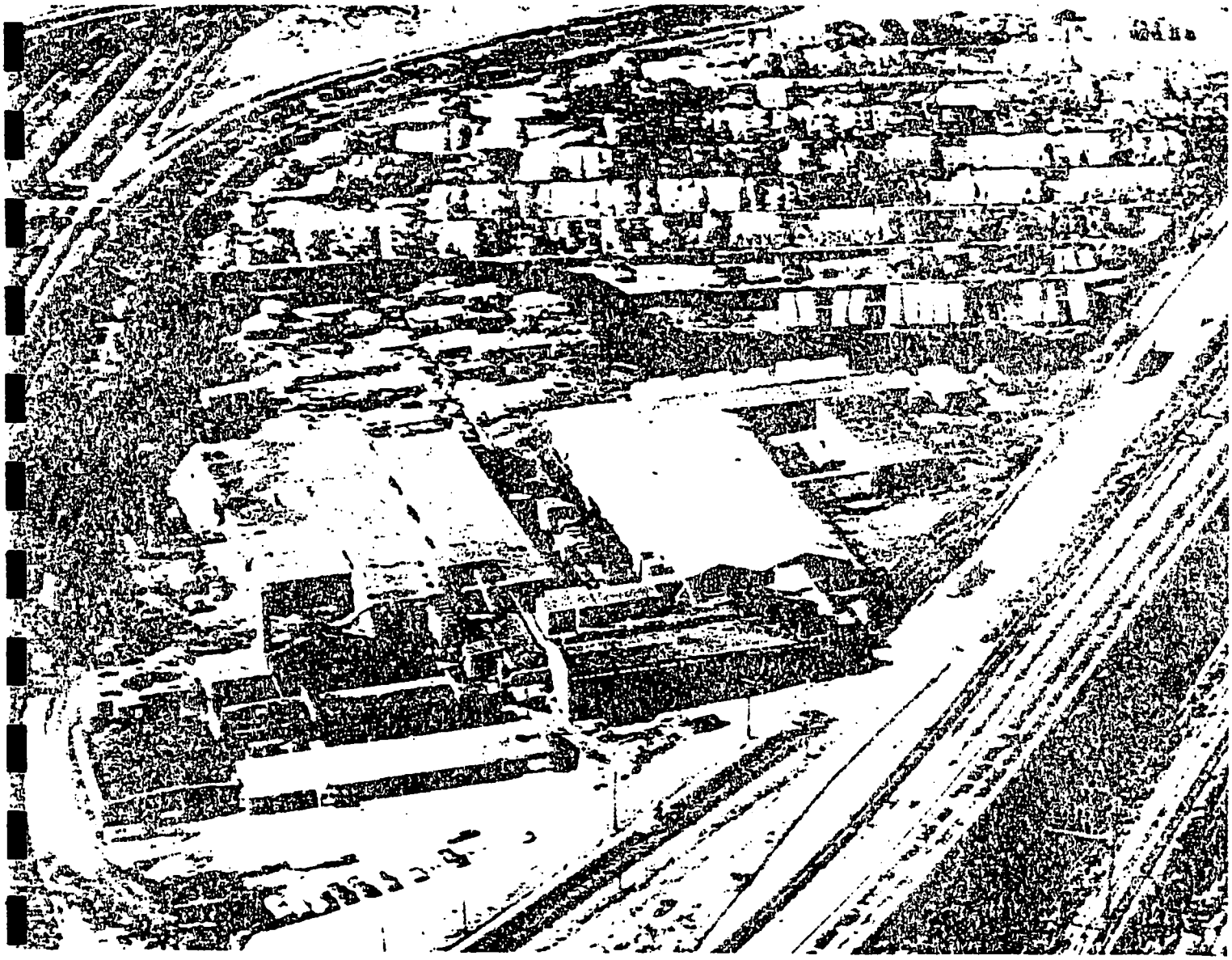
RCRA CLOSURE PLAN

AND

CERCLA REMOVAL ACTION WORK PLAN

VOLUME II



BAYONNE BARREL & DRUM COMPANY
NEWARK, NEW JERSEY

FEBRUARY 1992

EPA ID NO. NJD - 009371401

301011

APPENDIX

A

Diversified
Environmental
Resources, Inc.
1440A Pennington Road Trenton, New Jersey 08618
609-771-3616 FAX # 609-771-4276

APPENDIX A

CONSENT AGREEMENT AND CONSENT ORDER

WITH NOTICE OF ENTRY

A
STOUT
A COMPLETE ENVIRONMENTAL SERVICE COMPANY.
COMPANY

[redacted] wi[redacted]h i[redacted] tr[redacted] co[redacted]
of a duly executed
CONSENT AGREEMENT AND CONSENT ORDER

which is on file in the Regional Office of the U.S. Environmental Protection Agency, Region II.

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION II

In the Matter of

BAYONNE BARREL & DRUM COMPANY, INC.
NJD009874104

Respondent.

Proceeding Under Section 3008 of the Solid Waste Disposal Act, as amended.

CONSENT AGREEMENT AND CONSENT ORDER

WITH NOTICE OF ENTRY

Richard T. Dewling
Acting Regional Administrator

U.S. Environmental Protection Agency
Region II
26 Federal Plaza
New York, New York 10278
(212) 264-2525

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION II

In the Matter of BAYONNE BARREL & DRUM COMPANY NJD009871401, Respondent. Proceeding Under Section 3008 of the Solid Waste Disposal Act, as amended.	CONSENT AGREEMENT AND CONSENT ORDER Docket No. II RCRA-82-0115

Preliminary Statement

This administrative proceeding was instituted pursuant to Section 3008 of the Solid Waste Disposal Act, as amended, 42 U.S.C. §6901 et seq. ("the Act"). [Note: Among the statutes amending the Act is the Resource Conservation and Recovery Act, 90 Stat. 2795, P.L. 94-580 (1976).]

The Director of the Enforcement Division of the U.S. Environmental Protection Agency ("EPA"), Region II, Complainant in this proceeding, issued a Complaint, Compliance Order, and Notice of Opportunity for Hearing to Respondent, Bayonne Barrel & Drum Company, on May 21, 1982. Said document charged Respondent with certain violations of Sections 3004 and 3005 of the Act, 42 U.S.C. §§6924 and 6925, respectively, and the regulations promulgated thereunder.

1. Respondent owns and operates a steel container reconditioning plant located at 150 Raymond Boulevard, Newark, New Jersey 07105 ("the plant").

2. Respondent informed EPA, pursuant to Section 3010 of the Act, that conducts activities at the plant involving "hazardous waste," as that term is defined in Section 1004(5) of the Act, 42 U.S.C. §6904(5) and in 40 CFR §261. Respondent did not submit Part A of a hazardous waste permit application pursuan to 40 CFR §122.22.

3. On January 27, 1982 and March 3, 1982, inspections of the plant were conducted by a duly designated representative of EPA pursuant to Section 3007 of the Act, 42 U.S.C. §6927. Said inspections were conducted for the purpose f enforcing the EPA regulations for hazardous waste management, 40 CFR Parts 260 through 265 (published in 45 Fed. Reg. 33073 et seq., May 19, 1980, and as later amended), promulated pursuant to Subtitle C of the Act, 42 U.S.C. §6921 et sec

4. The Complainant contends and the Respondent denies that the above-referenced inspections revealed that Respondent's facility was being used for th generation, storage, and disposal of hazardous waste.

5. Section 3005(a) of the Act, 42 U.S.C. §6925(a) and 40 CFR §262.34(a) prohibits the storage of hazardous waste without a hazardous waste permit. At the time of the above-referenced January 27, 1982 and March 3, 1982 inspection, Complainant contends and Respondent denies that Respondent was disposing of hazardous sludge and ash on the ground without having received a hazardous waste permit. Respondent was, therefore, in violation of Section 3005(a) of the Act

6. Section 3005(a) of the Act, 42 U.S.C. §6925(a) prohibits the storage of hazardous waste without a hazardous waste permit. At the time of the above-referenced January 27, 1982 and March 3, 1982 inspections, Respondent was stor

ash in a pile without having received a hazardous waste permit even though sis by Respondent's licensed hazardous waste hauler had determined the ash hazardous. (Respondent contends that the storage of ash in a pile was temp and was caused by Respondent's severe financial condition at the time.) Re dent was, therefore, in violation of Section 3005(a) of the Act. At the ti of the March 3, 1982 inspection, Respondent was given two weeks to dispose its hazardous sludge piles at an approved RCRA facility. On March 15, 1982 Respondent asked for an extension until March 29, 1982 to remove its hazard waste sludge piles. As of March 31, 1982 hazardous waste sludge piles cont to be stored at Respondent's facility.

7. 40 CFR 265 sets standards for all hazardous waste treatment, stor and disposal facilities. These standards apply until a final administrativ disposition on a permit application has been made with respect to TSD facil No such final disposition has been made with respect to Respondent's facili Respondent contends that it is a generator and that the standards of Part 2 do not apply to its plant. Respondent does admit that it temporarily store in a pile at its plant for over ninety (90) days and contends that this was to a lack of funds for removal and disposal.

8. 40 CFR §265.31 requires that the owner or operator of a hazardous treatment, storage, or disposal facility must maintain and operate that fac to minimize the possibility of a fire, explosion, or release of hazardous to the air, soil, or surface water. At the time of the above-referenced J. 27, 1982 inspection, the Complainant contends that the duly-designated EPA sentative observed a stream of hazardous waste originating from an overflo

5,000 gallon settling tank. This hazardous waste stream flowed across Respondent's property into a storm sewer which empties directly into the Passaic River. The Complainant contends that Respondent was, therefore, in violation of 40 CFR §265.31.

9. 40 CFR §265.251 requires that the owner or operator of a facility that treats or stores hazardous waste in a pile cover or otherwise manage the pile so that wind dispersal is controlled. During the above-referenced January 27, 1982 and March 3, 1982 inspections, Complainant alleges that Respondent had not protected from wind dispersal, by cover or other means, a pile of ash constituting hazardous waste. Said waste pile was stored at Respondent's facility for more than ninety (90) days. Complainant alleges Respondent was in violation of 40 CFR §265.251. Respondent contends such waste pile was only temporarily stored more than ninety days and that the failure to protect the pile was due to a lack of funds.

10. 40 CFR §261.3(c)(2) provides that any solid waste generated from the treatment, storage or disposal of hazardous waste, including any leachate, is a hazardous waste unless and until proven otherwise. At the time of the above-referenced inspections, leachate was observed originating from Respondent's pile of hazardous waste ash, and was therefore a hazardous waste. 40 CFR §265.253 provides that where the leachate or run-off from a pile constitutes a hazardous waste, the pile must be placed on an impermeable base, compatible with the waste, run-on must be diverted and leachate collected from precipitation and run-on by some other means. At the time of the above-referenced inspections, Respondent's

waste pile was not adequately contained to prevent leachate from escaping. Respondent was, therefore, in violation of 40 CFR §265.253. Respondent contends that this was due to a lack of funds.

11. Respondent has informed the Complainant that on July 13, 1982 Respondent filed a Petition, pursuant to Chapter 11 of the Bankruptcy Act in U.S. Bankruptcy Court.

CONSENT AGREEMENT

Based upon the foregoing, and pursuant to Section 3008 of the Act, and Section 22.18 of the Consolidated Rules of Practices Governing the Administrative Assessment of Civil Penalties and the Revocation or Suspension of Permits, 40 CFR §22.18, it is hereby ORDERED that Respondent shall hereinafter comply with all relevant regulations at 40 CFR Parts 261 through 265. Specifically:

1. Respondent shall cease the disposal, treatment, or storage of hazardous waste at its facility unless and until Respondent complies with all applicable requirements for treatment, storage, or disposal of hazardous waste.

2. Respondent shall, by no later than thirty (30) days after the effective date of this Agreement, cease to store hazardous waste in piles and hazardous waste sludge in tanks at the facility.

3. Respondent shall immediately comply with the provisions of 40 CFR 262.34 governing the temporary accumulation of hazardous waste.

4. Respondent shall immediately cease disposal of hazardous waste from ruptured pipes, settling tanks, or holding tanks in any unauthorized manner.

5. Respondent shall immediately take all necessary steps to minimize the possibility of fire, explosion, or release of hazardous waste or hazardous waste constituents into the environment.

6. Within forty-five (45) days of the effective date of this Consent Agreement, Respondent shall submit to EPA representatives a proposed program to accomplish the following:

(a) soil sampling in incoming drum storage area

(b) soil sampling in the loading dock area

(c) aqueous sampling (and any other sampling if required) from any floor drains or holes in the floor of the drum reconditioning and painting building.

Within thirty (30) days of receiving EPA's approval or modifications of the proposed program, Respondent shall perform the sampling required by EPA and shall submit a report with the sampling results to EPA.

7. Respondent shall, by no later than sixty (60) days after the effective date of this Agreement, have taken the following steps:

(a) <u>Under Ground Settling Tank and Above Ground Storage Tank</u>

(i) Respondent shall remove all liquids and all sludge from the above ground and below-ground settling and storage tanks. Respondent shall demonstrate to an EPA representative that any tank to be used in the future does not leak and is not damaged or corroded. Thereafter, Respondent shall adopt a reliable and ongoing system that will allow EPA representatives to verify that no liquid or sludge will be stored in the future in a storage or settling tank for ninety (90) days or longer.

(ii) Respondent shall install a manhole cover and warning device to insure that no liquid or sludge overflows the underground settling tank. The Respondent shall install a device to insure that the underground tank is properly vented.

(iii) Respondent shall remove contaminated soil surrounding all the storage and settling tanks and dispose of the waste in accordance with all applicable RCRA regulations.

(b) Oil/Water Separator and Pipe System

(i) Respondent shall remove soil and stone contaminated with hazardous waste from the area near the oil/water separator and dispose of that soil and stone in accordance with all applicable regulations. Respondent shall clean out the separator and insure that it does not overflow in the future by operating pumps, capping the trench, or taking other steps.

(ii) Respondent shall cease disposal of hazardous waste from ruptured pipes and insure that the pipe system is leak-proof.

(c) Waste Piles

Respondent shall remove from the facility hazardous waste piles and soil contaminated thereby (including run-off residue) and dispose of both in accordance with all applicable RCRA regulations. (A representative of EPA shall be present when soil is removed or excavated from the location in which the piles are or were located.)

(d) Incinerator Area

(i) Respondent shall immediately cease to dispose of hazardous waste incinerator ash on the ground at the facility.

(ii) Respondent shall remove hazardous waste and soil contaminated thereby from the area surrounding its incinerator (including the alleyway behind the incinerator) and dispose of the waste in accordance with all applicable RCRA regulations. Such removal shall occur prior to the installation of any cement or crushed stone pad or floor near the incinerator. Installation of a new type of floor or pad shall only occur after approval of the removal by an EPA representative.

(iii) Respondent shall remove contaminated soil surrounding the loading area of the conveyor belt entering the incinerator and dispose of the waste in accordance with all applicable RCRA regulations.

(iv) Respondent shall insure that the two underground tanks next to the incinerators do not overflow and shall demonstrate to an EPA representative that any tank to be used in the future does not leak and is not damaged or corroded.

8. Within ninety (90) days of the effective date of this Consent Agreement Respondent shall submit to EPA Region II a detailed report of the activities which took place at the facility to comply with this Order.

9. Within one hundred and twenty (120) days of the effective date of this Consent Agreement, Respondent shall submit the results of post clean-up soil samples taken from each of the four areas designated in number 7(a) through (d)

of this Compliance Order to confirm removal of all contaminated soils at the site. These samples shall be collected in the presence of a representative of the EPA.

10. Within forty (40) days of the effective date of this Consent Agreement, Respondent shall submit to EPA representatives a proposed program for monitoring the groundwater at the facility sufficient to determine whether contamination of the groundwater has occurred and the extent and direction of movement of any contaminated plume. Within ninety (90) days of approval or modification by EPA representatives of the proposed program, Respondent shall implement the program required by EPA.

11. Respondent shall comply with the following requirements if it no longer wishes to own or operate a hazardous waste management facility:

Respondent shall, within ninety (90) days of the effective date of this Consent Order, submit to EPA a closure plan for Respondent's facility. The closure plan shall satisfy the requirements of 40 CFR §265.112(a) and 40 CFR 265.197 ~~2~~ 40 CFR 265.351

Within sixty days of the approval or modification by EPA of the proposed closure plan, Respondent shall comply with the approved or modified closure plan and shall implement that plan according to the schedule in the approved or modified plan. Respondent shall comply with other applicable requirements concerning closure set forth at 40 CFR Part 265, Subpart G or in equivalent New Jersey regulations.

~~B. Respondent shall, within one hundred and eighty (180) days of the effective date of this Consent Order, submit to EPA a post-closure plan for Respondent's facility. The post-closure plan shall satisfy the requirements of 40 CFR 265.117, 265.118 and 265.310. Within sixty (60) days of approval or modification by EPA of the proposed post-closure plan, Respondent shall comply with the approved or modified post-closure plan and shall implement that plan according to the schedule in the approved or modified plan.~~

12. Within forty (40) days of the effective date of this Consent Agreement, Respondent shall obtain or arrange for a bond or other financial assurance mechanism in the amount of at least $150,000.00 guaranteeing Respondent's performance of the steps described in this Consent Agreement. The arrangements and details concerning the selection and implementation of this financial assurance mechanism must be reviewed and approved in advance by EPA.

The provisions of this Consent Agreement shall apply to and be binding upon the parties to this action, affiliated companies, successors, and assigns.

This Consent Agreement is being entered into by the parties in full settlement of all liabilities which might have attached as a result of the proceedings. Respondent admits the jurisdictional allegations of the Complaint. Furthermore, Respondent has read the Agreement and neither admits nor denies specific factual allegations contained in the complaint. Respondent explicitly waives its right to request a hearing on the Complaint, this Agreement, or the attached

Consent Order. Re[illegible]ndent also waives its rights [illegible] contest the issuance or terms of this Order in any action to enforce its provisions.

BAYONNE BARREL & DRUM COMPANY

RESPONDENT:

BY: Frank Fugella

DATE: 8/17/84

This document has been reviewed by the undersigned as counsel only for the Debtor in Possession

SCHWARTZ, TOBIA & STANZIALE

BY: Charles A. Stanziale

CHARLES A. STANZIALE, JR.

COMPLAINANT:

DOUGLAS R. BLAZEY
Regional Counsel
Office of Regional Counsel
EPA-Region II

DATE: August 28, 1984

The Regional Administrator of EPA, Region II concurs in the foregoing Consent Agreement. The Agreement entered into by the parties is hereby approved and issued, as an Order, effective immediately.

RICHARD T. DEWLING
Acting Regional Administrator
U.S. Environmental Protection
Agency - Region II
26 Federal Plaza
New York, New York 10278

DATE: 9/3/84

Diversified
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APPENDIX J

CLOSURE SCHEDULE

A
STOUT
A COMPLETE ENVIRONMENTAL SERVICE COMPANY.
COMPANY

Closure Schedule

This closure schedule has been prepared in accordance with N.J.A.C. 7:26-9.8(e)4.

Wastes were generated and stored at Bayonne Barrel and Drum and were never received at the facility for treatment, storage or disposal.

Phase I

Within 90 days of approval of this Closure Plan, seasonal conditions permitting, Phase I of the site remediation will commence. Phase I remediation includes the sampling, removal and disposal of identified hazardous wastes stored at the site, decontamination of the buildings and furnace structure and demolition and disposal of the furnace structure. Phase I of this plan is anticipated to take 5 months. Therefore, Phase I will be completed within 8 months of approval of this plan.

Phase II

Phase II of this plan includes the sampling and analysis of soil in the areas of the SWMU's to identify and delineate contamination within those areas. Phase II also includes the preparation of excavation plans based upon the extent of identified contamination. Phase II will commence upon completion of Phase I, seasonal conditions permitting, and will be completed within a 5 month period.

Phase III

Phase III of this plan includes the excavation, stockpiling, waste characterization sampling and off-site disposal of contaminated soil in accordance with excavation plans developed during Phase II. Phase III will commence upon completion of Phase II, seasonal conditions permitting, and will be completed within a 6 month period.

Therefore, closure will be completed within 18 months of approval of this plan if seasonal weather conditions permit continues operations.

APPENDIX

B

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APPENDIX B

RESULTS OF PRELIMINARY INVESTIGATIONS AND SAMPLING IN PROPOSED NEW JERSEY TURNPIKE RIGHT-OF-WAY AT THE BAYONNE BARREL AND DRUM PROPERTY NEWARK, NEW JERSEY

SUBMITTED BY:
LOUIS BERGER & ASSOCIATES, INC.
100 HALSTED STREET
EAST ORANGE, NEW JERSEY

A
STOUT
A COMPLETE ENVIRONMENTAL SERVICE COMPANY.
COMPANY

Results of Preliminary Investigations and Sampling in Proposed New Jersey Turnpike Right-of-Way at the Bayonne Barrel and Drum Property

Newark, New Jersey

Submitted to:

New Jersey Turnpike Authority

P.O. Box 1121

New Brunswick, New Jersey

Submitted by:

Louis Berger & Associates, Inc.
100 Halsted Street
East Orange, New Jersey

December 1986

JUN 1 3 1989

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1.0 INTRODUCTION

The New Jersey Turnpike Authority (NJTA) in anticipation of the need to acquire the property of Bayonne Barrel and Drum (BB&D), has initiated through their consultant, Louis Berger & Associates, a preliminary investigation of the site to determine its potential for environmental contamination.

The BB&D property has been identified by USEPA as an unpermitted hazardous waste storage facility (in violation of 40 CFR 264.34(a)). This subjects it to a consent order requiring the owner to establish the extent of contamination and to provide for its cleanup through an approved closure plan (see Appendix A for the consent agreement and the USEPA's investigations). The satisfactory completion of this process may be required to satisfy ECRA.

The scope of the investigation conducted by Louis Berger & Associates, Inc. was limited to a reconnaissance level soil and groundwater sampling program. The samples were taken either on, or in, close proximity to the proposed right-of-way and were tested for 127 priority pollutants plus 40 other possible pollutants. The priority pollutants are a broad cross-section of chemicals designated as toxic pollutants under Section 307(a)(1) of the Clean Water Act.

The results of the site reconnaissance were intended to indicate the areal extent of contamination in the proposed right-of-way and whether the levels of contamination require a site cleanup. It did not cover portions of the property not under consideration by the NJTA for the 1985-90 widening project.

This report provides a description of the site, the methods of investigation, the results of analyses and their interpretation. The report is not intended to serve as a comprehensive working document for purposes of preparing plans and specifications for any required cleanup. For this reason no specific recommendations have been prepared.

2.0 SITE DESCRIPTION

Bayonne Barrel and Drum (BB&D) is located at 150 Raymond Boulevard in Newark, New Jersey. The property is bounded by Routes 1 and 9 on the west and north, the New Jersey Turnpike on the east, and the constuction site, previously the Newark Drive-In Movie Theater, on the south (see General Site Map, Figure 1). The site consists of three tracts designated 1, 2, and 3 which correspond to the land ownership as indicated by the City of Newark. Tract 1 is approximately 11 acres and encompasses the buildings, operations, storage areas, a shredded tire pile and the proposed right-of-way. Tract 2, located in the southeast part of the site, is 5 acres. It contains empty drums, an ash pile and other refuse. Tract 3, owned by the Turnpike Authority and adjacent to the Turnpike right-of-way, is 1.4 acres. It is partly covered by a pile of shredded tires.

2.1 Site Characteristics

The BB&D site is characterized by its location in an old flood-plain of the Passaic River. Topographically, the site is relatively flat with a slight undulating slope towards the east and northeast. Elevations on the property range from approximately 10 to 15 feet above sea level. Drainage follows the topography and empties into drains that traverse the eastern border of the site near the Turnpike's fence. The stormwater sewer system drains into the Passaic River. There is no natural surface water on the site.

The site currently contains a number of buildings which were utilized for drum reconditioning, an incinerator, above ground and underground storage tanks, shredded tire piles and a large empty drum storage area (Figure 1).

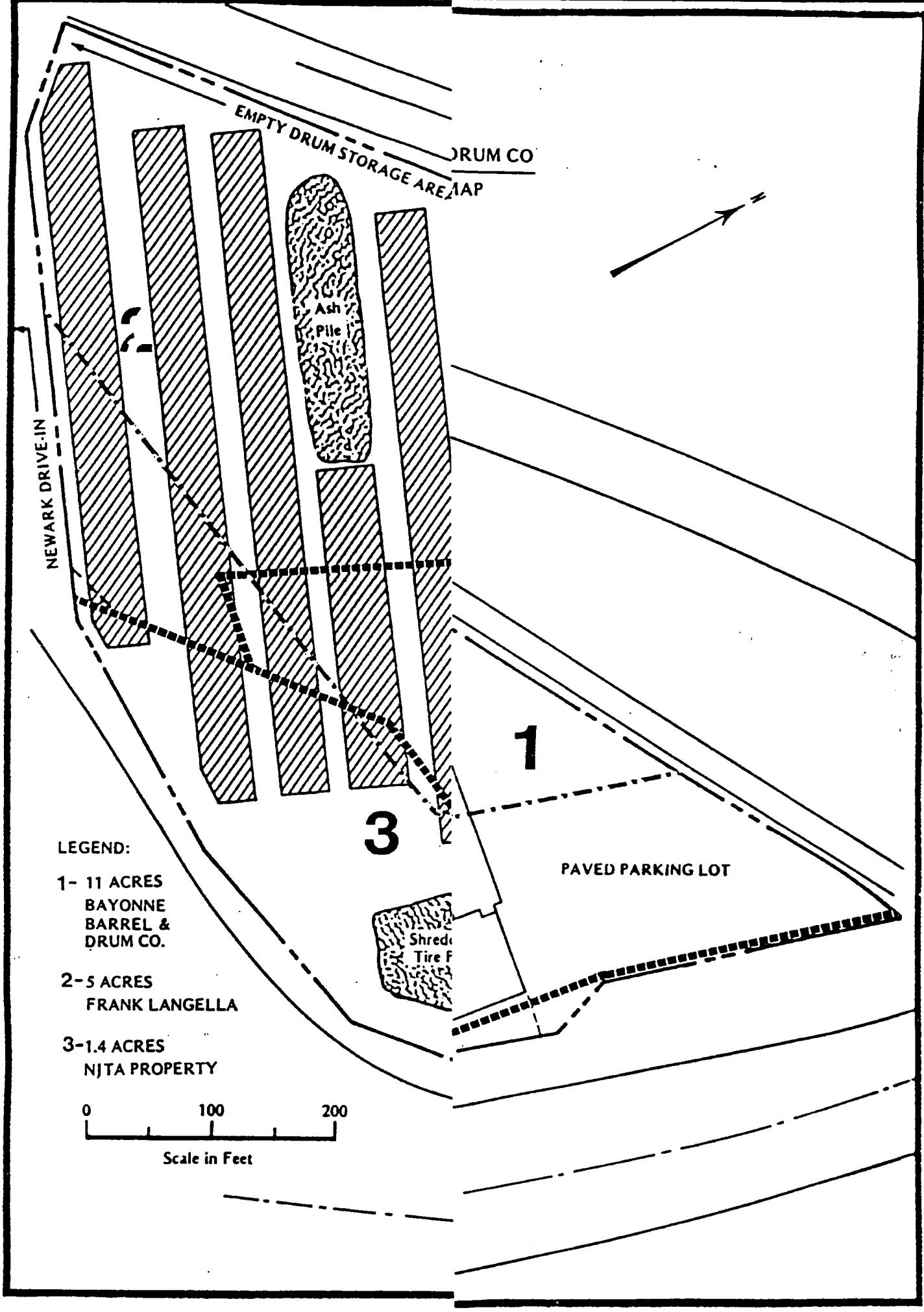
2.2 Current Owner/Operator

Tract 1 is owned and operated by Bayonne Barrel and Drum Company, Inc. The five acre Tract 2 is owned by the BB&D's principal owner Frank Langella, but is utilized as part of the BB&D facility. The Bayonne Barrel and Drum Company, Inc. filed a petition under Chapter 11 of the Bankruptcy Code (11 U.S.C. 101, et seq.) on July 13, 1982. The 1.4 acre Tract 3, is owned by the NJTA.

2.3 Status of the Property

Bayonne Barrel and Drum Company was a reconditioner of storage drums. Since it filed for protection under the bankruptcy acts, a portion of the property has been leased and is used to repair and maintain trailers and cargo containers. Currently, the New Jersey Tire Pyrolysis System Company is seeking financial assistance from the Essex County Improvement Authority for the purpose of financing the acquisition of the land and existing buildings at BB&D. This company plans to operate a tire pyrolysis system to produce saleable products.

The previous site activities included the cleaning and reconditioning of drums using caustic solutions and incineration. These operations produced large amounts of spent solution, incinerator ash and sludge. The storage of these waste products, as well as the storage of the drums awaiting reconditioning, provide the potential for hazardous waste contamination.


EMPTY DRUM STORAGE AREA
DRUM CO
MAP
Ash
Pile
NEWARK DRIVE-IN
1
3
PAVED PARKING LOT
Shred
Tire F
LEGEND:
1- 11 ACRES
BAYONNE
BARREL &
DRUM CO.
2-5 ACRES
FRANK LANGELLA
3-1.4 ACRES
NJTA PROPERTY
0
100
200
Scale in Feet

Newark Directory shows the same company with Frank Langella (the current owner) and David Pacrulli as owners. A 1943 Newark Directory indicates that the establishment's name was changed to its current name of Bayonne Barrel and Drum Company, but the owners are still listed as Mr. Langella and Mr. Pacrulli.

Aerial photographs from 1947 to 1985 document physical changes at the site. Figure 2 graphicly displays these changes. Following is a chronologic narrative of the significant changes that have impacted the site's present environmental setting.

1947 - Aerial photographs taken on April 28, 1947 show that portions of an adjacent landfill covered the southern two thirds of the current site area (B). A short road provided access between the drum storage facility and the landfill. One waste lagoon (C) was observed at the site in a location which straddles the current eastern site boundary. Drainage channels connected the lagoon to drainage channels leading southeast to the Passaic River. A large open storage area (D) was located south of the site buildings. Several thousand drums were stored in this area and ground stains were seen surrounding the drum stacks. A substantial portion of areas C and D are now overlain by the Turnpike.

1959 - The construction of the New Jersey Turnpike (Interstate 95) altered the pattern of drum storage at the site. Photographs taken on April 15, 1959 show that drum storage E had been moved to the site's southwest corner extending slightly beyond the current site boundary. A new building has been constructed and a small concentration of drums (F) was noted east of that building. The lagoon (C) previously seen along the site boundary has apparently been filled in (G). Additionally, a small waste disposal area (H) was located in the northeast corner of the site. Drainage ditches at the eastern edge of the site apparently drained into a liquid-filled trench (I) adjacent to the old lagoon location.

1985 - Recent photographs (July 3, 1985) show that the areal extent of open drums has decreased only slightly from that used in 1959. Six new buildings were noted in the site's northern area, and several storage containers (possibly truck trailers) were observed north of the drum storage area. An area of dark staining, indicating a recent spill, was seen at the eastern edge of the site. Ground stains were also observed in the drum storage area. A large mound of dark material (possibly ash) was seen at the western edge of the site. Waste disposal previously seen in the northeast corner of the site (1959) was no longer evident.

PHOTO SOURCES:

April 28, 1947 - Black and white aerial photographs at an approximate scale of 1"=1000' from Robinson Aerial Surveys, Inc., Newton, NJ.

April 16, 1959 - Black and white aerial photographs at an approximate scale of 1"=1500' from Robinson Aerial Surveys, Inc., Newton, NJ.

July 3, 1985 - Black and white aerial photograph at an approximate scale of 1"=1000' from HNTB engineering plans for 1990 NJ Turnpike widening.

3.0 METHODS OF INVESTIGATION

The methods employed during this reconnaissance level investigation consisted of establishing site safety practices prior to working on the site; developing a sampling plan, and sampling methodology; and establishing a quality assurance program. The methods used were selected based upon their compliance with NJDEP recommended guidelines for hazardous waste site investigations.

3.1 Site Safety Practices

A Site Safety Plan was developed prior to the commencement of any site activity, (refer to Appendix B). The Site Safety Plan establishes the policies and procedures that protect workers from the potential hazards posed by site investigative activities at a hazardous waste site. To minimize accidents and injuries that may occur during site activity, the plan addresses such practices as decontamination procedures, the use of personal protective equipment, and the type of air monitoring techniques employed during site operations.

3.1.1 Air Quality Monitoring

During the initial site investigation it was necessary to determine whether or not the workers were exposed to an imminent hazard. To characterize the atmospheric conditions at the site various parameters were measured with the use of air monitoring equipment.

At the time of the initial reconnaissance, a walk-through inspection of the site was conducted, using direct-reading instruments to identify and quantify airborne contaminants. The investigators monitored for combustible gases, oxygen levels, radiation levels and total organic vapors.

After the initial survey, workers continued to monitor for the presence of organic vapors only, as the other parameters had not been detected or were within safe levels during the walk-through survey.

The total organics were measured with an Hnu Model P1-101 Photoionization Detector (PID). The analyzer is calibrated to benzene and reads out in deflection units or parts per million (ppm) relative to benzene.

The PID was used for measuring the ambient atmosphere as well as for screening all soil and groundwater boreholes. In both cases, it was used as a monitoring device for identifying worker exposure levels, thereby supplying the measurements needed for the determination of personnel protection. Measurements of the ambient atmosphere ranged from 0.10 to 0.20 ppm.

Of the thirteen (13) borehole locations measured, only one location showed a significant reading of 100-125 deflection units on the PID. This was in Sampling Area C on Figure 3.

A Foxboro Century Organic Vapor Analyzer (OVA), with a flame ionization detector, was also used as a screening device for the measurement of organic vapors during well development. During the drilling of monitoring well #2, OVA readings reached 400 deflection units.

3.1.2 Personnel Protection Equipment

The determination of protection levels was made by the Site Safety Officer. The information that aided in making the decision was the air quality measurements, the type of work being performed and the visual evidence of known and suspected hazards.

Based on PID measurements in ambient air, field personnel were suited to Level D protection. During the drilling of monitoring well #2, the field personnel suited up to Level C. This required the use of a half-face respirator with a particulate filter.

3.1.3 Decontamination Procedures

When leaving a site all personnel were required to decontaminate themselves and dispose of all nonreusable equipment. Boots were scrubbed clean on site with soapy water and dried. Tyvek suits and gloves, and air cartridges and filters were disposed of in trash bags. Exposed skin was washed with soap and water. All wash water was disposed of on-site.

3.2 Sampling Plan

For the reconnaissance-level investigation conducted, sampling of soils and of groundwater was planned. The sampling locations for both soils and groundwater are shown on Figure 3. The soil sampling sites are designated by a five character alpha numeric code. The groundwater monitoring wells are identified as MW2 and MW3. Well MW1 occurs on the adjacent drive-in movie property which is not addressed in this report. The rationale for sample locations and the methodology employed for soil sampling and for groundwater sampling are discussed in the following sections as well as the physical description of the material encountered during sampling.

3.2.1 Soils

The determination of the soil sampling points was based on both random and biased sampling. Random sampling methodology was employed for all the discrete samples that were taken and the composite sample locations were chosen by biased sampling. The random sampling methodology was performed by dividing the area at BB&D that is within the Turnpike's proposed right-of-way into a grid of 30 blocks, assigning numbers to each block, and then statistically selecting blocks for sampling point location by using a table of computer generated random numbers. When the number of matching numbers equalled the predetermined number of samples to be taken, the process was stopped. For the purpose of preparing the sampling plan no division was made between property currently owned by NJTA and that owned by Bayonne Barrel & Drum. The area within the fenceline is being operated as a single entity irrespective of property lines and the purpose of the investigation was to determine the level of contamination in the construction area.

The biased sample locations were selected due to site specific criteria: drainage, previous land use, and location of random samples. Nearly all surface and subsurface runoff within the proposed right-of-way flows to the storm sewer that transects the eastern border of the site. Therefore, any leachate emanating from the drums or ash pile as well as contaminants leaking from the surface and subsurface storage tanks in the northeast part of the site were intercepted by the soil borings.

The number of samples to be taken was based on a field investigation of the site, historical land use, and USEPA's investigations. Because the purpose of the site reconnaissance investigation was to determine whether the site is contaminated or not, and if so by what, it was decided to take 5 discrete samples at two different depths, 0-18 and 18-36 inches below land surface, for a total of 10 discrete samples. Two composite samples, comprised of three (3) different sample locations each at two distinct depths, were collected for a total of four composite samples. Due to local conditions, there were six discrete 0-18 inch samples taken and only four 18-36 inch samples. Of the four composite samples, one of the two 18-36 inch samples was comprised of only two samples.

Sediment samples, comprised of sediment collected from the floors, floor drains and scrapings off the walls of the buildings, were taken from locations inside the closed drum reconditioning building and in the boiler room. Each building sample was composed of five separate samples.

Discrete or grab samples are retrieved at a single point. Composite samples are samples comprised of two or more discrete samples taken at several different horizontal or vertical locations. The composites at BB&D were taken at three different horizontal locations and composited in the laboratory where the analyses were performed.

Compositing is performed during site reconnaissance when the nature and the extent of the contamination is unknown. It allows for determining the general areal extent of contamination and the nature of the contamination without requiring extensive sampling. The disadvantages are that the compositing may reduce contaminant levels to safe levels. By diluting a contaminated sample with two relatively clean samples the source of contamination is unknown. Another disadvantage is that volatile chemicals in a sample are lost during the compositing process. Compositing is never used when point specific chemical data is needed. Therefore, by discriminately using both discrete and composite samples, the general areal nature and extent of the contamination was able to be assessed. The vertical sampling at 0-18 and 18-36 inches below ground surface was intended to demonstrate whether only the surface material was contaminated, or if vertical migration of contaminants had occurred.

The actual number of composite samples was greatly reduced with respect to the sampling plan originally proposed. Discussions with NJDEP officials indicated a strong reluctance to accept results from composite samples due to the problems stated above. The sampling method adopted presented the best compromise between obtaining a sufficiently wide coverage of the area while having a reasonable number of discrete samples to support our findings to NJDEP.

Discrete soil samples were also taken during installation of the monitoring wells at depths above and below the water table. It was decided to limit the number of samples analyzed to six from both the Bayonne Barrel & Drum and the Newark Drive-In Movie Site. Therefore, 24 inch samples were taken every five feet and examined. Based on this, the following four samples were analyzed and the remainder discarded. At monitoring well #3 only one sample was analyzed, from 0-18" below land surface (b.l.s.), because of the poor recovery below the water table. For monitoring well #2, three discrete samples were analyzed, one above the water table and two below the water table. The depths were 3-5 feet, 13-15 feet and 17 1/2-19 1/2 feet b.l.s., respectively. The boring logs for the monitoring well are presented in the Groundwater section.

3.2.1.1 Sampling methods

A split spoon was used to retrieve all soil samples, including those in the monitoring well boreholes. It is composed of carbide steel, and is 24 inches long with a 2-inch outer diameter. The method for collecting samples using the split spoon is as follows:

a. Assemble the sampler by aligning both sides of the barrel and then screwing on the bit on the bottom and the heavier head piece on top.

b. Place the sampler in a perpendicular position on the material to be sampled.

c. Drive the sampler utilizing a sledge hammer (140 lb. weight with a 30" drop when using the well rig for sampling in the boreholes).

d. Record the length of the tube that penetrated the material (also the number of blows needed to reach that depth when using the well rig).

e. Withdraw the sampler, and open it by unscrewing the bit and the head piece and then splitting the barrel.

f. Record the physical description of the material and place it into the appropriate sample containers.

g. Decontaminate sampler using procedures outlined in Appendix C. In some locations where the split spoon sampler could not penetrate the material, a motor driven auger was used to break up the material, and the sample was taken using dedicated plastic scoops. This normally occurred at the surface where compaction of the material was most severe.

A description of materials encountered at each sample site are shown in Table 1.

3.2.1.2 Sample containers

Soil samples were taken from the sampler and placed in containers that have been determined by the USEPA to be adequate for the types of analyses the

Table 1

SOIL BORING DESCRIPTIONS

A. Discrete Soil Samples

Boring #	Depth (Inches)	Soil Description
M1188	0-8	Black muck, some gravel; oily odor
M1189	0-18	Brown silt and gravel
M1190	2- 8	Dark brown silty sand; friable
	8-13	Dense silty sand, trace glass
	13-18	Dark black sandy silt, some fill (plastic, china, whitish silica based material)
M1191	18-24	Brownish, black silty sand; some fill (asphalt glass, plastic, waste concretions)
	24-30	Same with trace plastic
	30-36	Fill (slag, glass, iron/sand concretions); distinct petroleum odor.
M1192	0-18	Dense black sand and fill (plastic, brick, slag)
M1193	18-24	Black silt; some fill (brick, glass, cardboard)
	24-36	Same with asphalt and wood; moist
M1194	0-7	Gravelly, f-m sand, trace glass
	7-12	F-m brown sand
	12-17	C gravel and c-m white sand; moist
	17-18	Orange-brown silty clay; trace organic smears
M1195	18-26	F-m brown silty sand
	26-29	Same, trace asphalt-like material
	29-33	Fill (greyish-black asphalt-like material and coarse fragments with trace black smears)
	33-36	Dense sand and gravel; some conglomerate, moist
M1196	0-7	Brownish black silty sand, some gravel, little asphalt
	7-14	Same with some asphalt
	14-18	Reddish brown silt and fill (brick conglomerate, trace asphalt)
M1197	18-25	Black sandy clay and fill (asphalt, brick)
	25-31	Fill (brick, coarse fragments (>1.5"), concretions, trace plastic)
	31-36	Brownish black silt, little black smears and weathered brick. Distinct petroleum odor.

Table 1 (continued)

Boring #	Depth (Inches)	Soil Description
B. Composited Soil Samples		
M1207 (6A)	0-4	Dark brown silty sand, some slatey coarse fragments, trace asphalt-like material
	4-8	Same, but more orange-colored sand with little coarse fragments and trace glass.
	8-14	Same, some whitish sand with little black streaks, trace glass
	14-18	C white sand and m-c brown sand, trace black smears, little cemented, rusted fill; moist
M1208	18-24	Gravelly m-c brown sand
	24-30	C white sand, some orange brands & trace pebbles
	30-36	Same, some coarse fragments, trace black streak
M1207 (6B)	0-4	Greyish brown silty sand, trace orange-green streaks
	4-10	Same, black with some fill (glass and wood)
	10-18	Fill (Asphalt-like matrix, some white specks and orange material, trace wood and glass)
No 18-36 inch sample taken for composite M1208 at 6B.		
M1207 (6C)	0-8	Brownish, black silty sand, some coarse frags.
	8-15	Same, some broken brick and asphalt-like material. Slight petroleum odor.
	15-18	Orange, brown silty sand and gleyed silty sand, trace brick and black streaks.
M1208	18-24	Black sandy loam; distinct oily texture and odor
	24-30	Dense sandy loam, some fill (brick, plastic): distinct petroleum odor.
	30-33	Sandy loam and fill (glass, wood, asphalt-like material, paint streaks); distinct oily odor
	33-36	Same, little plastic, some wood, distinct odor
M1209 (7A)	0-6	Sandy loam; little orange streaks, brick; weak petroleum odor.
	6-12	Dense sandy loam, trace white flakes & black laminates; strong petroleum odor.
	12-18	Fill (asphalt-like material, white flakes, green and red streaks, glass, sand concretions).
M1242	18-22	Black sand, some pebbles and fill (asphalt-like material, plastic, glass)
	22-30	Fill (glass, pebbles, wood fibers, green marl, brick
	30-36	Same, little dense red clay, petroleum-saturated

Table 1 (continued)

Boring #	Depth (Inches)	Soil Description
M1209	0-4	Black sandy loam, trace small pebbles; friable
(7B)	4-8	Same, some fill (Slag, brick and glass)
	8-14	Same, little rainbow colored bands; moist
	14-18	Fill (asphalt-like material); trace oily odor.
M1242	18-24	Fill (same, but little wood); slight oily odor
	24-30	Fill (asphalt-like material, white coatings, spongy material, sand and other)
	30-36	Same, all black trace-white coatings. Weak oily odor.
M1209	0-10	Black sandy silt and m-c gravel
(7C)	10-14	Fill (asphalt-like substrate, trace slag)
	14-18	Same, little orange coated slag; distinct petroleum odor.
M1242	18-24	Fill (wood fibers, asphalt-like material, glass, slag); moist; distinct petroleum odor.
	24-30	Same
	30-36	Same, some brick

sample is to undergo. These containers and the types of analyses they are appropriate for are defined by EPA in 40 CFR part 136 for aqueous samples and EPA's manual of Test Methods for Evaluating Solid Waste (SW 846; July 1982) for soil/sediment samples. The sample containers were prepared by Environmental Testing and Certification (ETC), the analytical laboratory used, and placed in preconfigured insulated and cooled shuttles.

The soil samples at BB&D were analyzed for 127 priority pollutants plus the next 40 highest peaks that were detected on the gas chromatograph. "Peak" is the parameter that defines concentration. By allowing for analysis of forty constituents that might have escaped detection if only target chemicals were specified, greater flexibility was incorporated into the analytical plan.

The term "priority pollutants" describes the pollutants' relative frequency of occurrence at potential hazardous waste sites, and represents a cross-section of inorganic and organic chemical groups. The 127 priority pollutants are the substances designated as toxic pollutants under Section 307(a)(1) of the Federal Clean Water Act (43 CFR 4108, January 1978), and are depicted in Table 2. In this table, NPDES is an abbreviation for National Pollutant Discharge and Elimination System. CAS stands for the Chemical Abstract Service, while MDL is the Minimum Detection Limit for each compound, measured in micrograms (10^{-6} grams) per liter of sample being tests.

3.2.2 Groundwater

Samples of groundwater on the BB&D site were obtained from two wells along the eastern boundary. The objective in locating these two wells was two-fold: first, to ascertain whether groundwater contamination existed, and second, to see if there were noticeable differences in the nature and degree of contamination. If there were marked differences in either of the two factors, one or all of the following conditions may exist: different sources of contamination (i.e. leaking drums or leaching ash piles), unconnected hydrologic systems, or varying proximities to a single contaminant source. Both wells were downgradient of the potential contaminant sources on the site. Background conditions or the exact direction of groundwater flow could therefore not be determined. This data is not needed until contamination has been verified. If contamination is detected, then at a minimum the installation of an upgradient well and one more downgradient well will be needed.

3.2.2.1 Monitoring Well Installation

The installation of both monitoring wells 2 and 3 was performed in accordance with NJDEP's Bureau of Groundwater Management recommended procedures. Though not required for this investigation, adhering to these procedures will insure their acceptance as New Jersey Pollutant Discharge Elimination System (NJPDES) monitoring wells, should the site prove to have contaminated groundwater. A NJPDES permit is required by owners/operators of sites that have the potential to be discharging effluent (i.e., contaminated leachate) to the groundwater.

Table 2

PRIORITY POLLUTANT LIST

I. VOLATILE PARAMETERS

NPDES Number	CAS Number	Compound	MDL (ug/l)
1V	107-02-8	Acrolein	100
2V	107-13-1	Acrylonitrile	100
3V	71-43-2	Benzene	4.4
4V	542-88-1	bis(Chloromethyl)ether	10
5V	75-25-2	Bromoform	4.7
6V	56-23-5	Carbon tetrachloride	2.8
7V	108-90-71	Chlorobenzene	6.0
8V	124-48-1	Chlorodibromomethane	3.1
9V	75-00-3	Chloroethane	10
10V	110-75-8	2-Chloroethylvinyl ether	10
11V	67-66-3	Chloroform	1.6
12V	75-27-4	Dichlorobromomethane	2.2
13V	75-71-8	Dichlorodifluoromethane	10
14V	75-34-3	1,1-Dichloroethane	4.7
15V	107-06-2	1,2-Dichloroethane	2.8
16V	75-35-4	1,1-Dichloroethylene	2.8
17V	78-87-5	1,2-Dichloropropane	6.0
18V	542-75-6	cis-1,3-Dichloropropylene	5.0
19V	100-41-4	Ethylbenzene	7.2
20V	74-83-9	Methyl bromide	10
21V	74-87-3	Methyl chloride	10
22V	75-09-2	Methylene chloride	2.8
23V	79-34-5	1,1,2,2-Tetrachloroethane	6.9
24V	127-18-4	Tetrachloroethylene	4.1
25V	108-88-2	Toluene	6.0
26V	156-60-5	1,2-Trans-dichloroethylene	1.6
27V	71-55-6	1,1,1-Trichloroethane	3.9
28V	79-00-5	1,1,2-Trichloroethane	5.0
29V	79-01-6	Trichloroethylene	1.9
30V	75-69-4	Trichlorofluoromethane	10
31V	75-01-4	Vinyl Chloride	10

II. ACID PARAMETERS

1A	95-57-8	2-Chlorophenol	3.3
2A	120-83-2	2,4-Dichlorophenol	2.7
3A	105-67-9	2,4-Dimethylphenol	2.7
4A	534-52-1	4,6-Dinitro-o-cresol	24
5A	51-28-5	2,4-Dinitrophenol	42
6A	88-75-5	2-Nitrophenol	3.6
7A	100-02-7	4-Nitrophenol	2.4
8A	59-50-7	p-Chloro-m-cresol	3.0
9A	87-86-5	Pentachlorophenol	3.6
10A	108-95-2	Phenol	1.5
11A	88-06-2	2,4,5-Trichlorophenol	2.7

Table 2 (continued)

III. BASE NEUTRAL PARAMETERS

NPDES Number	CAS Number	Compound	MDL (ug/l)
1B	83-32-9	Acenaphthene	1.9
2B	208-96-8	Acenaphthylene	3.5
3B	120-12-7	Anthracene	1.9
4B	92-87-5	Benzidine	44
5B	56-55-3	Benzo(a)anthracene	7.8
6B	50-32-8	Benzo(a)pyrene	2.5
7B	205-99-2	3,4-Benzofluoranthene	4.8
8B	191-24-2	Benzo(ghi)perylene	4.1
9B	207-08-9	Benzo(k)fluoranthene	2.5
10B	111-91-1	bis(2-Chloroethoxy)methane	5.3
11B	111-44-4	bis(2-Chloroethyl)ether	5.7
12B	39638-32-9	bis(2-Chloroisopropyl)ether	5.7
13B	117-81-7	bis(2-Ethylhexyl)phthalate	2.5
14B	101-55-3	4-Bromophenyl phenyl ether	1.9
15B	85-68-7	Butyl benzyl phthalate	2.5
16B	91-58-7	2-Chloronaphthalene	1.9
17B	7005-72-3	4-Chlorophenyl phenyl ether	4.2
18B	218-01-9	Chrysene	2.5
19B	53-70-3	Dibenzo(a,h)anthracene	2.5
20B	95-50-1	1,2-Dichlorobenzene	1.9
21B	541-73-1	1,3-Dichlorobenzene	1.9
22B	106-46-7	1,4-Dichlorobenzene	4.4
23B	91-94-1	3,3'-Dichlorobenzidine	16.5
24B	84-66-2	Diethyl phthalate	1.9
25B	131-11-3	Dimethyl phthalate	1.6
26B	84-74-2	Di-n-butyl phthalate	2.5
27B	121-14-2	2,4-Dinitrotoluene	5.7
28B	606-20-2	2,6-Dinitrotoluene	1.9
29B	117-84-0	Di-n-octyl phthalate	2.5
30B	122-66-7	1,2-Diphenylhydrazine	10
31B	206-44-0	Fluoranthene	2.2
32B	86-73-7	Fluorene	1.9
33B	118-74-1	Hexachlorobenzene	1.9
34B	87-68-3	Hexachlorobutadiene	0.9
35B	77-47-4	Hexachlorocyclopentadiene	10
36B	67-72-1	Hexachloroethane	1.6
37B	193-39-5	Indeno(1,2,3-c,d)pyrene	3.7
38B	78-59-1	Isophorone	2.2
39B	91-20-3	Naphthalene	1.6
40B	98-95-3	Nitrobenzene	1.9
41B	62-75-9	N-Nitrosodimethylamine	10
42B	621-64-7	N-Nitrosodi-n-propylamine	10
43B	86-30-6	N-Nitrosodiphenylamine	1.9
44B	85-01-8	Phenanthrene	5.4
45B	129-00-0	Pyrene	1.9
46B	120-82-1	1,2,4-Trichlorobenzene	1.9

Table 2 (continued)

IV. PESTICIDE PARAMETERS

NPDES Number	CAS Number	Compound	MDL (ug/l)
1P	309-00-2	Aldrin	1.9
2P	319-84-6	Alpha-BHC	10
3P	319-85-7	Beta-BHC	4.2
4P	58-89-9	Gamma-BHC	10
5P	319-86-8	Delta-BHC	3.1
6P	57-74-9	Chlordane	10
7P	50-29-3	4,4'-DDT	4.7
8P	72-55-9	4,4'-DDE	5.6
9P	72-54-8	4,4'-DDD	2.8
10P	60-57-1	Dieldrin	2.5
11P	115-29-7	Endosulfan I	10
12P	115-29-7	Endosulfan II	10
13P	1031-07-8	Endosulfan sulfate	5.6
14P	72-20-8	Endrin	10
15P	7421-93-4	Endrin aldehyde	10
16P	76-44-2	Heptachlor	1.9
17P	1024-57-3	Heptachlor epoxide	2.2
18P	53469-21-9	PCB-1242	36
19P	11097-69-1	PCB-1254	36
20P	11104-28-2	PCB-1221	30
21P	11141-16-5	PCB-1232	36
22P	12672-29-6	PCB-1248	36
23P	11096-82-5	PCB-1260	36
24P	12674-11-2	PCB-1016	36
25P	8001-35-2	Toxaphene	10

V. METAL PARAMETERS

1M	7440-36-0	Antimony, Total	32
2M	7440-38-2	Arsenic, Total	1.0
3M	7440-41-7	Beryllium, Total	0.3
4M	7440-43-9	Cadmium, Total	4.0
5M	7440-47-3	Chromium, Total	7.0
6M	7550-50-8	Copper, Total	6.0
7M	7439-92-1	Lead, Total	42
8M	7439-97-6	Mercury, Total	0.2
9M	7440-02-0	Nickel, Total	15
10M	7782-49-2	Selenium, Total	2.0
11M	7440-22-4	Silver, Total	7.0
12M	7440-28-0	Thallium, Total	1.0
13M	7440-66-6	Zinc, Total	2.0

VI. CONVENTIONALS

14M	57-12-5	Cyanide, Total	20
15M	-------	Phenols, Total	50

Courtesy of USEPA 1985

The borehole for installation of the monitoring wells was made by a hollow stem auger attached to a well rig. The auger was steam cleaned prior to use and between wells. It was scaled with chalk to every 6 inches to determine the sample depth. Samples were taken at the last two feet of every 5 foot segment (i.e. 3-5 feet, 8-10 feet below land surface). The results of the boring logs for the monitoring wells are in Appendix D. Both boreholes had distinct petroleum odors with significant amounts of tarlike material.

Approximate depth of hole and depth to water table were made using a weighted string. Borings were generally made to a depth of 10 to 12 feet below the water table. After the hole was bored to the desired depth, the augers were disconnected from the rig but left in the hole to support the sidewalls. The hole was flushed clean of soil cuttings using a roller bit and pressurized potable water. The flushing operation ceased when the water discharging from the hole was clean. The roller bit was then removed from the hole, and the well screen installed into the borehole with the hollow stem auger still in place. The 4 inch O.D. (outer diameter) PVC well screen had a plastic cap attached to its bottom and was threaded into a 4 inch O.D. well casing at its top before placing it into the borehole. The top of the casing rose to approximately two feet above the ground surface. The area between the borehole walls and the well screen (the annular space) was filled with #2 Morie sand to maintain a good hydraulic connection between the aquifer material and the well screen. The auger was slowly lifted out of the borehole as the annular space was being filled. Eventually the auger was removed and the sand was emplaced until it was 6-12 inches above the well screen. A bentonite/cement grout was then injected into the hole until it was flush with the ground surface, and a 6" O.D. steel casing placed over the inner casing and set into the sealant (bentonite/cement mixture). Next, the steel casing was locked and security posts were placed around the well. All materials and specifications for monitoring wells 2 and 3 are detailed in Appendix D along with their permits from the Bureau of Water Allocation.

3.2.2.2 Well Development

Well development took place soon after installation of the wells, in order to create a good hydraulic connection between the aquifer and the well screen. Development of a monitoring well can be accomplished by a variety of methods and equipment. A well is satisfactorily developed when pumping the well yields a sand-free discharge.

Monitoring well #3 was developed with a hand bailer until the well went dry. Its discharge was extremely turbid but did not contain much sand. Monitoring well #2 was developed by pumping with a suction pump for approximately 30 minutes at a rate exceeding 10 gpm. Its discharge was relatively turbid free.

3.2.2.3 Groundwater Sampling

Seven days after the wells were developed, but prior to their sampling for chemical analyses, samples were collected and tested for total organic carbon (TOC), and if turbid, for grain size distribution of the sediment. (Measuring these constituents is recommended by the USEPA for assessing the integrity of monitoring well installation and development on RCRA sites.)

The water was purged from each well using a bladder pump with a check valve for regulating discharge. The purge water for sediment size distribution was collected in glass containers, while the TOC samples were collected in the appropriate container and preserved. All containers and preservatives used for storing groundwater samples after collection were laboratory cleaned and composed of materials appropriate for the intended analyses in accordance with 40 CFR 136. The appropriate containers for each type of analyses is listed in Appendix C. The analyses for both parameters were performed the next day. The results of the grain size distribution and TOC analyses indicated that the majority of the purge water was silt, clay and organic material with very little sand.

Samples for chemical analyses were collected from the monitoring wells after evacuating a minimum of 3 times the volume of standing water in each well with a bladder pump. This was to insure that only fresh, nonstratified aquifer water was being sampled. The polyethylene tubing placed into each well for evacuation was dedicated to that well only. The depth to water and the depth of well were measured before sampling to determine the volume of water in each well using an oil/water interface meter.

Prior to and after evacuation of each well, field measurements were taken of several parameters that are usually considered controlling variables of the chemical speciation found in water quality analysis. The parameters are also signatures of the water that help determine whether the water recovered in a well is stable after evacuation, compared to the water previous to evacuation. The results of the field measurements are in Table 3. These parameters and the methods for measuring them are as follows:

- pH - A measure of the hydrogen ion concentration in the water. Measured with a Beckman 21 pH meter calibrated in the field with standard pH solutions of 4 and 7. Initial pH's were taken of water pumped from the well during purging (evacuation) and of the water collected from sampling. Water samples used for measuring pH were not kept for further chemical analyses.

- Salinity - Measures the total salt content in the water to determine whether it is fresh, brackish or saline. Measured in each borehole before purging and after sampling with a YSI #33 S-C-T meter. Neither well had saline water.

- Conductivity - An indirect measure of the total dissolved solids in solution. The measurements are in micromhos, a unit indicating the conductivity of the solution and therefore all ionized species. The micromhos units can be converted to mg/l of total dissolved solids by using a conversion factor (0.55 to 0.90) that is based on the source of the water and the types of charged chemical species that dominate the solution. Conductivity was measured the same way as salinity.

- Temperature - Measured in each borehole prior to purging but after sampling using the YSI S-C-T meter.

Table 3

FIELD MEASUREMENTS OF PARAMETERS AT
MONITORING WELLS 2 AND 3

	MW2	MW3
Date	5/27/86	5/27/86
Time	10:00 a.m.	1:27 p.m.
Water Level	3.67'	3.72'
pH (units)	7.24	8.35
Salinity (ppt)	1.0	0.5
Conductivity (micromhos/cm)	1,500	1,300
Temperature (°C)	14	19
Immiscible Layers		
Light Phase	No	No
Dense Phase	No	No
Total Organic Vapors (ppm)	400	350
Total Organic Carbon (mg/l)	61.5	37.5

Source: Louis Berger & Associates, 1986.

Immiscible Layer Measurements - Immiscible layers are concentrations of organic liquids that are insoluble in water and therefore form a distinct layer above the water table and/or at the bottom of a borehole. Where layers of either light or dense phase immiscibles are detected, separate samples of these layers will be taken. These measurements were made prior to purging and just before sampling with an oil/water interface sounding probe (Oil Recovery Systems - Interface Meter, Model 100EN/M) that transmits a steady beep when hitting an immiscible layer and in intermittent beep when in water.

Measurements in both monitoring wells indicated no distinct immiscible layers.

- Depth to water and depth of well measurements were made during development of each well, prior to evacuation, during recovery of the well and before and after sampling using the oil/water interface probe. Measurements were made to the nearest 0.01 foot.

All sampling of groundwater was performed using 36 inch long, teflon coated, single-bottom, check-valve bailers dedicated to each well. They were cleaned by the laboratory doing the chemical analyses and wrapped in autoclaved tinfoil. The wire used to rinse and lower each bailer was also teflon coated. The sampling procedures were as follows:

a) Each well was allowed to recover after purging, and sampling began when the water had risen to within 0.1 feet of water level prior to purging.

b) Each bailer was removed from tinfoil, tied to teflon coated wire which was connected to a circular spindle, and lowered into the corresponding well.

c) Volatile organics (VOA's) were sampled first by lowering the bottom of a bailer until it was entirely submerged below the water surface so as to sample any light phase immiscibles. Extreme care was taken when lowering and raising the bailer so as not to degas the sample. The sample was then transferred into the sample container by pushing the ball check-valve located at the bottom of the bailer upward with a finger and allowing the water to flow into the container. No air bubble or head space was left in the VOA containers.

d) The same method as (c) was used to collect samples for all other analyses but at depths in each well ranging from 18 to 48 inches below the water surface. Samples retrieved for metals analysis were first filtered through disposable 0.45 micrometer pore size cellulose acetate filters, and then stored in the appropriate containers and preserved. This is to minimize the effect that the sediment might have on the concentration of the metals in solution while the sample is awaiting analysis. The result of the analysis is reported as total dissolved metals.

e) After a sample was collected, depth of water, salinity, conductivity and temperature were measured and recorded. After removal of all probes, the plastic cap was fitted to the top of the inner casing and the steel protective casing was locked.

The groundwater samples collected and preserved were analyzed for the 127 priority pollutants plus 40 peaks. A listing of the priority pollutants categories are provided in Table 2 of Section 3.2.1.3.

3.3 Quality Assurance

The chain of custody is a quality assurance/quality control (QA/QC) measure to provide for the integrity of the sampling and analytical process. Chain of custody procedures were carried out in accordance with NJDEP and USEPA guidelines. The chain of custody forms used for each sample are contained in Appendix C.

All data on types of chemicals and their levels reported by ETC Laboratories have been critically evaluated with respect to data acceptance criteria which include accuracy, precision, representativeness, completeness and reliability. The evaluation was done according to NJDEP's guidelines for these criteria.

The data were found to meet these criteria with a few exceptions. The data are presented in the enclosed tables. Those data which did not meet the above mentioned criteria for acceptance are flagged with USEPA's data qualifier code letters. The qualifier codes are annotated and the code letters with annotations written next to the qualified data. Definitions of codes are presented at the bottom of Tables 5, 6 and 7 showing related data. Thus, concentrations of analytes flagged with code "J" are to be considered estimated concentrations.

The samples were analyzed for 127 priority pollutants plus 40 peaks. The tables show only those compounds which were "hits" in any of the samples. Compounds not detected in any sample are not included.

Data related to the volatile organic fraction meets our quality assurance criteria except for methylene chloride. Reported levels of methylene chloride are to be treated as estimated concentrations.

Data related to acids and base/neutral extractable compounds, metals, total phenolics and total cyanides meet acceptance criteria.

All concentrations reported for pesticides and PCB's are to be considered estimated concentrations. These compounds were found in the soil samples, but not in any of the water samples (see Tables 5, 6 and 7). The laboratory had difficulty in analyzing for these parameters due to matrix interference and had to repeat extraction and analyses. However, reextraction was done past the time limit allowed by NJDEP. The laboratory will obtain a decision from USEPA/NJDEP to allow acceptance of these results as valid. In the meantime these data could be used in characterization of the site.

4.0 RESULTS OF ANALYSES AND CONCLUSIONS

The sampling area has been divided into three sections for the purpose of relating chemical results to site characteristics. Area A covers the buildings, above and below ground tanks and the oil/water trench. Monitoring well #3 is in this area. Area B encompasses the dock area, trailer storage and the storm sewer system. No monitoring well is in this area. Area C includes the shredded tire pile, part of the storm sewer system, and is directly down gradient of the drum storage area. Monitoring well #2 is located in Area C.

Results of soil and water analyses from samples taken from the BB&D property are presented in Tables 5, 6 and 7 and correspond to Areas A, B and C, respectively. Table 4 depicts the cleanup level criteria used by the NJDEP's Bureau of Industrial Site Evaluation (BISE) to determine if a cleanup action should be taken. BB&D is currently being regulated by USEPA under RCRA, but the BISE cleanup levels provide a measure against which the results may be judged. Many of the parameters do not have specific criteria to be judged by, but instead are included in the totals for a whole group of contaminants that have a single cleanup level. Other parameters, such as acid extractable organics in soils do not have any clean-up criteria. The location of the results that exceed the BISE clean-up levels are summarized in Figure 4, along with their respective parameters.

Specific levels for many of the parameters in the USEPA Priority Pollutant List (Table 2) for both soil and groundwater are currently being developed, and may be applicable to this site when they are approved in the Federal Register.

As noted in Section 3.3 all concentrations reported for pesticides and PCB's are to be considered estimated or provisional. The analysis procedures did not meet USEPA and NJDEP Quality Assurance requirements. The laboratory will either have to obtain written confirmation from these agencies of their validity or resampling and reanalysis will be undertaken at the laboratory's expense. However, for the purpose of general description of contamination at the site they are considered valid, as the infringement was of a technical nature.

As previously indicated each sample was analyzed for the 127 "priority pollutants," a list of specific chemicals, and the results were fully quantified. In addition a search was made for other chemicals present with the highest concentration. Attempts were made to identify a total of up to 40 other chemicals, including 15 volatile organics, 15 base/neutral extractables, and 10 acid extractables. These concentrations are only reported in a semiquantitative form, and therefore only represent a rough estimate of the concentrations of the chemicals found.

The full laboratory analysis reports (NJDEP Tier II format) have been reviewed by our QA Coordinator and are maintained in our document control system. They are available for review upon request.

Table 4

CLEANUP LEVELS USED BY BISE

A. Soil	Concentration
Arsenic	20 mg/kg
Barium	400
Cadmium	3
Chromium	100
Copper	170
Lead	100
Nickel	100
Mercury	1
Petroleum Hydrocarbons	100
Polychlorinated Biphenyls	1-5**
Silver	5
Selenium	4
Total Cyanides	12
Total Volatile Organics	1
Zinc	350

B. Groundwater	Concentration
Petroleum Hydrocarbons	1 mg/l
Total Volatile Organics	10 ug/l*
Total Base/Neutral Organics	50 ug/l*
Total Acid Extractable Organics	50 ug/l*
Others	See Groundwater Quality Standards

*Lesser concentrations for specific chemicals may be utilized based upon 10^{-6} cancer risk and/or other toxicologic factors.

**USEPA does not regulate PCBs at concentrations of less than 50 mg/kg.

Table 4 (continued)

N.J.A.C. Groundwater Quality Standards

Primary Statewide/Toxic Pollutants

Pollutant, Substance or Chemical	Groundwater Quality Criteria
1. Aldrin/Dieldrin	1. 0.003 ug/l
2. Arsenic and Compounds	2. 0.05 mg/l
3. Barium	3. 1.0 mg/l
4. Benzadine	4. 0.0001 mg/l
5. Cadmium and Compounds	5. 0.01 mg/l
6. Chromium (Hexavalent) and Compounds	6. 0.05 mg/l
7. Cyanide	7. 0.2 mg/l
8. DDT and Metabolites	8. 0.001 ug/l
9. Endrin	9. 0.004 ug/l
10. Lead and Compounds	10. 0.05 mg/l
11. Mercury and Compounds	11. 0.002 mg/l
12. Nitrate-Nitrogen	12. 10 mg/l
13. Phenol	13. 3.5 mg/l
14. Polycholorinated Biphenyls	14. 0.001 ug/l
15. Radionuclides	15. Prevailing regulations adopted by the USEPA pursuant to sections 1412, 1415 and 1450 of the Public Health Services Act as amended by the Safe Drinking Water Act (PL 93-523)
16. Selenium and Compounts	16. 0.01 mg/l
17. Silver and Compounds	17. 0.05 mg/l
18. Toxaphene	18. 0.005 ug/l

Secondary Standards

19. Ammonia	19. 0.5 mg/l
20. Chloride	20. Natural Background
21. Coliform Bacteria	21. a) by membrane filtration, not to exceed four per 100 ml in more than one sample when less than 20 are examined per month, or b) by fermentation tube, with a standard 10 ml portion, not to be present in three or more portions in more than one sample when less than 20 are examined per month, or c) prevailing criteria adopted pursuant to the Federal Safe Drinking Water Act (PL 93-523)

Table 4 (continued)

Primary Statewide/Toxic Pollutants

Pollutant, Substance or Chemical	Groundwater Quality Criteria
22. Color	22. None Noticeable
23. Copper	23. 1.0 mg/l
24. Fluoride	24. 2.0 mg/l
25. Foaming Agents	25. 0.5 mg/l
26. Iron	26. 0.3 mg/l
27. Manganese	27. 0.05 mg/l
28. Odor and Taste	28. None Noticeable
29. Oil and Grease and Petroluem Hydrocarbons	29. None Noticeable
30. pH (Standard Units)	30. 5-9
31. Phenol	31. 0.3 mg/l
32. Sodium	32. Natural Background
33. Sulfate	33. Natural Background
34. Total Dissolved Solids	34. Natural Background
35. Zinc and Compounds	35. 5 mg/l

Source: N.J.A.C. 7:9-6.6

4.1 Soils

Area A

Priority pollutant heavy metals were the most significant contaminants in all three soil samples (M1188, M1189 and M1198) in Area A. Samples M1188 and M1189 had levels of cadmium (Cd), chromium (Cr), copper (Cu), lead (Pb), mercury (Hg) and zinc (zn) all exceeding BISE cleanup levels (Cr in sample M1188 was 99 mg/kg which is 1 mg/kg below the cleanup level). Sample M1198 had only excessive levels of lead with all other priority pollutant metals below cleanup levels.

The source of these metals may be from the impurities in the reconditioned steel drums which are removed during the incineration process. The ash from the incineration concentrates these metals which can then be leached. Other sources can be from the drum reconditioning building and overflows from the oil/water trench which also contains metal from the incinerator leachate. The levels found in LB&A's investigation are lower than those detected by the USEPA analysis of the ash pile and soils near the incinerator but consistent with those findings (see Appendix A). Where metal concentration in ash and incinerator soil was in the hundreds to thousands (mg/Kg) the soil near the settling and holding tanks was in the tens to hundreds (mg/kg) range.

Area A had surficial soils (0-24") with excessive levels of organic contaminants. The organics in high concentration were polycyclic aromatic hydrocarbons (PAHs) and phthalates from the base/neutral extraction group. The total concentration of all priority pollutant base/neutral organics exceeded 110 mg/kg (see Table 5), with the phthalates comprising over 85% of the total. When additional peaks of the non-priority pollutants are figured in the total, the diversity of organic compounds increases to include other aliphatic and monocyclic aromatic hydrocarbons besides phthalates. In sample M1188, alkanes, a group of aliphatic hydrocarbons registered at over 76 mg/kg, while total monocyclic aromatic hydrocarbons which includes the tri and dimethyl benzenes exceeded 58 mg/kg. Both of these classes of chemicals were conspicuously absent in sample M1189 which is only 30 feet south of M1188. Sample M1198, taken from the first two feet of soil of monitoring well #3, also had low levels of nonpriority pollutants, except for alkanes, which were over 2.6 mg/kg. (Note: Results of non-priority pollutants are semiquantitative and useful only in indicating their presence and general level of concentration.)

There are no BISE criteria for cleanup levels of base/neutral extractables in soil, but polycyclic aromatic hydrocarbons are either known or suspected carcinogens and are included in the range of constituents found in sample M1188. There were no other excessive levels of contaminants in any of the soil samples in Area A, except for PCB's in sample M1188, at a concentration of 19.1 mg/kg. The BISE cleanup criteria for PCB's in soils is 1-5 mg/kg while USEPA does not regulate PCBs with a concentration of less than 50 mg/kg.

TABLE 5
SUMMARY OF AREA A CHEMICAL ANALYSIS RESULTS

Sample #	M1188		M1189		M1198		M1213		M1214		M1215	
Units	ug/kg		ug/kg		ug/kg		ug/kg		ug/kg		ug/l	
Date of Submission	25-Apr		25-Apr		05-May		26-Apr		26-Apr		27-May	
Depth	0-18"		0-18"		0-2'							
Composite/Discrete	D		D		D		C		C		D	
Soil (S)/Water (W)/Sediment (X)	S		S		S		X		X		W	
VOLATILE ORGANICS												
PRIORITY POLLUTANTS												
Benzene	ND		ND		ND		NA		NA		ND	
cis-1,3-Dichloropropylene	ND		ND		ND		NA		NA		ND	
Ethylbenzene	28.10	J2	ND	UJ1	ND	UJ1	NA		NA		ND	UJ2
Methylene chloride	158		ND		ND		NA		NA		ND	
Tetrachloroethylene	ND		ND		ND		NA		NA		ND	
Toluene	33		2		ND		NA		NA		ND	
Totals	219.1		2		0		NA		NA		0	
ADDITIONAL PEAKS (SEMI-QUANTITATIVE)												
2-Methyl hexane	ND		ND		ND		NA		NA		ND	
2-Pentanone, 4-Methyl	ND		ND		ND		NA		NA		ND	
2-Propanones	ND		ND		ND		NA		NA		ND	
3-methyl benzene	ND		ND		ND		NA		NA		ND	
3-Methyl pentane	ND		ND		ND		NA		NA		ND	
4-Ethyl 2-Pentanone	ND		ND		ND		NA		NA		ND	
4-Methyl 2-Pentanones	ND		ND		ND		NA		NA		ND	
Acetone	ND		ND		ND		NA		NA		ND	
Alkanes	50		ND		ND		NA		NA		ND	
Alkyl benzene	ND		ND		ND		NA		NA		ND	
Benzene ethenyl-methyl	ND		ND		ND		NA		NA		ND	
Benzene, 1,2,3-trimethyl	ND		50		ND		NA		NA		ND	
Cycloheptane, methyl	89		ND		ND		NA		NA		ND	
Cyclohexanes, 1,1,3-trimethyl	ND		ND		ND		NA		NA		ND	
Cyclohexane, 1,1-dimethyl	76		ND		ND		NA		NA		ND	
Cyclohexane, 1,3-dimethyl	64		ND		ND		NA		NA		ND	
Cyclohexanes, 1,3-dimethyl, cis	ND		ND		ND		NA		NA		ND	
Cyclohexanes, 1,3-dimethyl,trans	ND		ND		ND		NA		NA		ND	
Cyclohexane,1,1,3-trimethyl	ND		ND		ND		NA		NA		ND	
Cyclohexane,1,2-dimethyl,cis	ND		ND		ND		NA		NA		ND	
Cyclohexane,1,2-dimethyl,trans	ND		ND		ND		NA		NA		ND	
Cyclohexane,1,3-dimethyl,trans	ND		ND		ND		NA		NA		ND	
Cyclohexane,1,4-dimethyl,cis	ND		ND		ND		NA		NA		ND	
Cyclohexane,1-ethyl-4-methyl cis	ND		ND		ND		NA		NA		ND	
Cyclohexane,1-ethyl-4-methyl trans	ND		ND		ND		NA		NA		ND	
Cyclohexanone, 3,3,5-trimethyl	ND		ND		ND		NA		NA		ND	
Cyclooctane, butyl	176		ND		ND		NA		NA		ND	
Cyclopentane, methyl	ND		ND		ND		NA		NA		ND	
Cyclopentane,1,3-dimethyl,trans	ND		ND		ND		NA		NA		ND	
Dimethyl benzenes	ND		ND		ND		NA		NA		ND	

J2= Estimated concentration due to %RDS for response factor in initial calibration higher than 30%
ND = Not Detectable
UJ1 = Estimated quantitation limit 13ug/kg
UJ2 = Estimated quantitation limit 16.3ug/l

NA = Not analyzed for this parameter

TABLE 5 (CONTINUED)
SUMMARY OF AREA A CHEMICAL ANALYSIS RESULTS

Sample #	M1188	M1189	M1198	M1213	M1214	M1215
Units	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/l
Date of Submission	25-Apr	25-Apr	05-May	26-Apr	26-Apr	27-May
Depth	0-18"	0-18"	0-2'			
Composite/Discrete	D	D	D	C	C	D
Soil (S)/Water (W)/Sediment (X)	S	S	S	X	X	W
VOLATILE ORGANICS ADDITIONAL PEAKS (SEMI-QUANTITATIVE) CONTINUED						
dimethyl cyclohexane	ND	ND	ND	NA	NA	ND
Dimethyl cyclopentane	ND	ND	ND	NA	NA	ND
Dimethyl-3-hexene	ND	ND	ND	NA	NA	ND
Ethane, 1,1'-oxybis	ND	ND	ND	NA	NA	ND
Ethyl-methyl benzene	ND	ND	ND	NA	NA	ND
Heptane, methyl	ND	ND	ND	NA	NA	ND
Hydrocarbons	ND	ND	ND	NA	NA	ND
Methyl cyclohexane	ND	ND	ND	NA	NA	ND
m-Xylenes	ND	ND	ND	NA	NA	ND
o&p-Xylenes	ND	ND	ND	NA	NA	ND
Pentane, 3-methyl	ND	ND	ND	NA	NA	ND
Pentanes, methyl	ND	ND	ND	NA	NA	ND
Propyl benzene	ND	ND	ND	NA	NA	ND
Xylenes	ND	ND	ND	NA	NA	ND
ACID EXTRACTABLES						
PRIORITY POLLUTANTS						
2-Chlorophenol	ND	ND	ND	ND	ND	ND
2,4-Dichlorophenol	ND	ND	ND	ND	ND	ND
2,4-Dimethylphenol	230	ND	ND	ND	ND	21.9
Pentachlorophenol	ND	ND	ND	ND	ND	ND
Phenol	210	ND	ND	708	360	ND
2,4,6-Trichlorophenol	ND	ND	ND	ND	ND	ND
Totals	440	0	0	708	360	21.9
BASE/NEUTRAL EXTRACTABLES						
PRIORITY POLLUTANTS						
Acenaphthene	ND	ND	ND	ND	ND	2.3
Acenaphthylene	ND	ND	BMDL	ND	ND	ND
Anthracene	510	ND	BMDL	ND	ND	ND
Benzo(a)anthracene	ND	ND	BMDL	ND	ND	ND
Benzo(a)pyrene	1,100	ND	BMDL	ND	ND	ND
Benzo(b)fluoranthene	2,000	ND	733	ND	ND	ND
Benzo(ghi)perylene	ND	ND	ND	ND	ND	ND
bis(2-Ethylhexyl)phthalate	95,100	44,600	12,200	206,000	114,000	ND
Butyl benzyl phthalate	1,200	ND	7,520	47,600	5,400	ND
Chrysene	ND	ND	BMDL	ND	ND	ND

TABLE 5 (CONTINUED)
SUMMARY OF AREA A CHEMICAL ANALYSIS RESULTS

Sample #	M1188	M1189	M1196	M1213	M1214	M1215
Units	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/l
Date of Submission	25-Apr	25-Apr	05-May	26-Apr	26-Apr	27-May
Depth	0-18"	0-18"	0-2'			
Composite/Discrete	D	D	D	C	C	D
Soil (S)/Water (W)/Sediment (X)	S	S	S	X	X	W
BASE/NEUTRAL EXTRACTABLES, PRIORITY POLLUTANTS CONTINUED						
Dibenzo(a,h)anthracene	ND	ND	ND	ND	ND	ND
1,4-Dichlorobenzene	ND	ND	ND	ND	ND	ND
Diethyl phthalate	ND	ND	ND	19,900	ND	ND
Dimethyl phthalate	ND	ND	ND	ND	ND	ND
Di-n-butyl phthalate	ND	ND	420	48,000	4,600	ND
2,6-Dinitrotoluene	ND	ND	ND	ND	ND	ND
Di-n-octyl phthalate	ND	ND	ND	3,700	ND	ND
Fluoranthene	2,800	ND	BMDL	2,090	1,500	ND
Fluorene	ND	ND	ND	ND	ND	ND
Indeno(1,2,3-c,d)pyrene	ND	ND	ND	ND	ND	ND
Isophorone	ND	ND	ND	ND	ND	ND
Naphthalene	2,000	ND	BMDL	860	4,200	ND
N-Nitrosodiphenylamine	ND	ND	3,210	1,570	ND	ND
Phenanthrene	2,200	ND	BMDL	3,500	3,100	ND
Pyrene	4,100	ND	BMDL	2,130	1,200	ND
1,2,4-Trichlorobenzene	ND	ND	ND	ND	ND	8.24
Totals	111,010	44,600	24,083	335,350	134,000	10.54
BASE/NEUTRAL/ACID EXTRACTABLES, ADDITIONAL PEAKS (SEMI-QUANTITATIVE)						
1H-Indene octahydro 2,2,4,4,7,7-hexamethyl	6,560	ND	ND	ND	ND	ND
1H-Benzo(b) fluorene	ND	ND	ND	ND	ND	ND
1H-Indene,2,3-dihydro	ND	ND	ND	ND	ND	ND
1H-Inden-5-ol,2,3-dihydro	ND	ND	ND	ND	ND	ND
1,1'-Biphenyl	ND	ND	ND	ND	ND	ND
1,2,3,4-Tetramethyl benzene	5,410	ND	ND	ND	ND	ND
1,2,3-Trimethyl benzene	ND	ND	ND	ND	ND	ND
1-Methyl anthracene	ND	ND	ND	ND	ND	ND
2,6-Dimethyl nonane	ND	ND	ND	ND	9,080	ND
2-Ethyl hexanoic	ND	ND	ND	1,234	ND	ND
2-Ethyl naphthalene	ND	ND	ND	ND	ND	ND
2-hydroxy benzaldehyde	ND	ND	ND	ND	ND	ND
2-methyl 1,1'-biphenyl	ND	ND	ND	ND	ND	ND
2-Methyl anthracenes	ND	ND	ND	ND	ND	ND
2-Methyl naphthalene	ND	ND	ND	ND	ND	ND
2-Methyl phenanthrene	ND	ND	ND	ND	ND	ND
2-methyl phenol	ND	ND	ND	ND	ND	ND
2-Propenoic acid, 2-Methyl, Dodecyl ester	ND	ND	ND	3,834	ND	ND

TABLE 5 (CONTINUED)
SUMMARY OF AREA A CHEMICAL ANALYSIS RESULTS

Sample #	M1188	M1189	M1198	M1213	M1214	M1215
Units	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/l
Date of Submission	25-Apr	25-Apr	05-May	26-Apr	26-Apr	27-May
Depth	0-18"	0-18"	0-2'			
Composite/Discrete	D	D	D	C	C	D
Soil (S)/Water (W)/Sediment (X)	S	S	S	X	X	W
BASE/NEUTRAL/ACID EXTRACTIBLES, ADDITIONAL PEAKS (SEMI-QUANTITATIVE) CONTINUED						
3-Ethyl-2-Methyl heptane	ND	ND	ND	ND	ND	ND
3-Methyl phenanthrene	ND	ND	ND	ND	ND	ND
3-Methyl phenol	ND	ND	ND	ND	ND	ND
4-Methyl phenanthrene	ND	ND	ND	ND	ND	ND
4-Methyl phenols	ND	ND	ND	ND	ND	ND
Alkanes	76,390	ND	2,668	20,114	54,924	ND
Benzenesulfonamide, 4-methyl	ND	ND	ND	ND	ND	ND
Bicyclo(3,2,1)oct-2-ene,3-methyl-4-methylene	ND	ND	ND	ND	ND	ND
Cyclohexane,pentyl	ND	ND	ND	ND	ND	ND
Diethyl benzene	ND	ND	ND	ND	ND	ND
Dimethyl 2-pentenes	ND	2,120	ND	ND	ND	ND
Dimethyl ethyl phenol	ND	ND	ND	ND	ND	ND
Dimethyl heptane	ND	ND	ND	ND	ND	ND
Dimethyl naphthalenes	ND	ND	ND	ND	ND	ND
Dimethyl pentenes	ND	ND	ND	ND	ND	ND
Dimethyl phenanthrenes	ND	ND	ND	ND	ND	ND
Dimethyl phenols	ND	ND	ND	ND	ND	ND
Dimethyl-ethyl benzenes	ND	ND	396	ND	ND	ND
Dimethyl-ethyl phenol	ND	ND	ND	ND	ND	ND
Ethanone, 1-(4-ethyl phenyl)-ethyl	ND	ND	ND	ND	ND	ND
Ethyl benzenes	ND	ND	ND	ND	ND	ND
Ethyl methyl benzene	ND	ND	ND	ND	ND	ND
Ethyl naphthalene	ND	ND	ND	ND	ND	ND
Ethyl phenols	ND	ND	ND	ND	ND	ND
Ethyl- methyl benzenes	ND	ND	ND	ND	ND	ND
Ethyl-1,2,3-trimethyl benzene	ND	ND	ND	ND	ND	ND
Ethyl-1,2,4-trimethyl benzene	8,920	ND	ND	ND	ND	ND
Ethyl-dimethyl benzenes	9,640	ND	ND	ND	ND	ND
Ethyl-methyl benzenes	4,840	ND	1,096	ND	ND	ND
Ethyl-methyl phenols	ND	ND	ND	ND	ND	ND
Ethyl-propyl benzene	ND	ND	ND	ND	ND	ND
Hexadecanoic acid	ND	ND	ND	ND	16,062	ND
Hexanal	ND	ND	ND	ND	11,010	ND
Hydroxy benzaldehyde	ND	ND	ND	4,628	ND	ND
Methoxy benzaldehyde	ND	ND	ND	ND	ND	ND
Methyl benzenes	ND	ND	721	3,939	9,400	ND
Methyl ethyl benzene	ND	ND	ND	ND	ND	ND
Methyl Fluorenes	ND	ND	ND	ND	ND	ND
Methyl naphthalene	ND	ND	367	ND	ND	ND
Methyl phenanthrene	ND	ND	ND	ND	ND	ND
Methyl phenols	ND	ND	ND	ND	ND	ND
Methyl-ethyl benzene	ND	ND	ND	ND	ND	ND

TABLE 5 (CONTINUED)
SUMMARY OF AREA A CHEMICAL ANALYSIS RESULTS

Sample #	M1186	M1189	M1196	M1213	M1214	M1215
Units	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/l
Date of Submission	25-Apr	25-Apr	05-May	26-Apr	26-Apr	27-May
Depth	0-18"	0-18"	0-2'			
Composite/Discrete	D	D	D	C	C	D
Soil (S)/Water (W)/Sediment (X)	S	S	S	X	X	W
BASE/NEUTRAL/ACID EXTRACTIBLES, ADDITIONAL PEAKS (SEMI-QUANTITATIVE) CONTINUED						
Methyl-ethyl-phenols	ND	ND	ND	ND	ND	ND
Methyl-methyl ethyl phenols	ND	ND	ND	ND	ND	ND
Methyl-methyl-ethyl benzenes	7,290	ND	627	ND	ND	ND
Methyl-naphthalene	ND	ND	ND	ND	ND	ND
Methyl-propyl benzenes	ND	ND	ND	ND	ND	ND
Naphthalene,decahydro,trans	ND	ND	ND	ND	ND	ND
N-propyl benzamide	ND	ND	ND	8,490	ND	ND
Phosphoric acid, triphenyl ester	ND	ND	ND	ND	ND	ND
Propyl benzenes	ND	ND	ND	ND	ND	ND
Tetrachlorobiphenyls	ND	ND	ND	ND	ND	ND
Tetradecanoic acid	ND	ND	ND	1,229	ND	ND
Tetramethyl benzenes	ND	ND	ND	ND	ND	ND
Tetramethyl butyl phenols	5,090	2,480	335	ND	ND	ND
Trichlonethene	ND	ND	ND	ND	ND	ND
Trimethyl benzenes	ND	ND	ND	ND	ND	ND
Trimethyl naphthalenes	4,950	ND	ND	ND	ND	ND
Trimethyl phenols	ND	ND	ND	ND	ND	ND
Xylenes	5,580	ND	386	ND	ND	ND
PCB						
PRIORITY POLLUTANTS						
Aroclor 1242	4,100 J1	ND	ND	ND	ND	ND
Aroclor 1254	15,000 J1	2,200 J1	3,600 J1	ND	ND	ND
Totals	19,100 J1	2,200 J1	3,600 J1	0	0	0
METALS						
UNITS	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	ug/L
PRIORITY POLLUTANTS						
Antimony	13.60	0.90	1.10	3.50	4.10	3.10
Arsenic	6.20	9.20	3.60	5.60	27.00	ND
Beryllium	2.30	0.09	ND	0.48	0.32	ND
Cadmium	11	24	ND	100	16	2.50
Chromium	99	170	ND	210	120	12.00
Copper	550	233	1.10	223	530	7.80
Lead	980	790	330	570	720	ND
Mercury	1.20	2.50	0.44	53	1.00	0.65
Nickel	84	54	ND	69	76	15
Selenium	ND	ND	0.41	ND	ND	ND

J1 = Estimated Concentration. Samples were reextracted past holding time limits as specified in 40CFR Part 136

TABLE 5 (CONTINUED)
SUMMARY OF AREA A CHEMICAL ANALYSIS RESULTS

Sample #	M1188	M1189	M1198	M1213	M1214	M1215
Units	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/l
Date of Submission	25-Apr	25-Apr	05-May	26-Apr	26-Apr	27-May
Depth	0-18"	0-18"	0-2'			
Composite/Discrete	D	D	D	C	C	D
Soil (S)/Water (W)/Sediment (X)	S	S	S	X	X	W
METALS, PRIORITY POLLUTANTS CONTINUED						
UNITS	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	ug/L
Silver	2.80	2.70	ND	2.90	1.50	2.00
Thallium	0.48	0.76	ND	0.39	0.16	ND
Zinc	2,470	718	2.20	1,340	2,970	71.00
Totals	4,221	2,005	339	2,978	4,466	114
PESTICIDES						
UNITS	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/L
PRIORITY POLLUTANTS						
Beta-BHC	ND	ND	ND	24 J1	ND	ND
4,4'-DDE	ND	ND	ND	140 J1	130 J1	ND
4,4'-DDD	ND	ND	ND	ND	160 J1	ND
Endosulfan sulfate	ND	ND	ND	160 J1	34 J1	ND
Endrin aldehyde	ND	ND	ND	65 J1	ND	ND
Totals	0	0	0	389 J1	324 J1	0
PHENOLICS & CYANIDE						
UNITS	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/L
Phenolics, Total	1.00	1.40	0.70			0.06
Cyanide, Total	1.40	1.20	1.00			<.025

J1 = Estimated concentration. Samples were reextracted past holding time limits as specified in 40CRF part 136

Sediment

Two buildings within area A were sampled for total priority pollutants plus 40 by taking sediment samples in 5 different locations of each building. The 5 sediment samples were then composited for analyses.

The composite samples from the drum reconditioning building and the boiler rooms (M1213 and M1214) also reflected high heavy metal concentrations that exceeded BISE cleanup levels for Cd, Cr, Cu, Pb, Hg and Zn. These parameters are the same metals found in the two soil samples near the 5,000 gallons settling tank and oil/water trench. Considering the high levels of heavy metals found in the soils it was not surprising to find equally high metal concentrations in the drum reconditioning building. The use of this building made it susceptible to concentration in the floor drain from the effluent produced in chemical cleaning of the drums. But the degree of contamination found in the boiler room was unexpected and indicated flagrant contamination of structures not used in operations that would be the obvious sources of contamination. One possible explanation may be that given the age of the facility (original buildings dating back to 1931 - See Section 2.4 and Figure 2), the use of buildings has changed to its present use from one that may have caused the contamination.

Regardless of sources, the heavy metals contamination is prevalent in both the soils and buildings at levels that exceed cleanup levels and indicates widespread contamination.

Sample M1213, from the floor drain of the Closed Head Reconditioning Building, had excessive concentrations of the same organic constituents found in soil sample M1188: phthalates, alkanes and lesser amounts of PAH's. Total priority pollutant base/neutral organics exceeded 300 mg/kg. The phthalates were much higher in the floor drain sample than in the soil of Area A, with bis (2-ethylhexyl)phthalate exceeding 200 mg/kg.

The presence of pesticides in both buildings is to be noted.

The Boiler Rooms (Sample M1214) had sediment samples taken off of their floors and walls. Though similar in constituency to the floor drain sample concentrations, total priority pollutant base/neutral organics made-up only 134 mg/kg, with phthalates being the primary constituent. Conversely, alkane concentration exceeded 54 mg/kg, as compared to 20 mg/kg for sample M1213. The pesticide concentrations were similar to those found in the floor drain samples.

See Table 5 and Figure 4 for summary analytical results and location of excessive concentration levels, respectively.

Area B

Soils in Area B had a wide variety of contaminants from heavy metals and all organic groups, some of which exceeded the BISE cleanup levels. Area B covers the largest areal extent of the sampling program and receives runoff from the drum storage area and the tire pile, and overlays the storm sewer system. This makes it susceptible to various sources of contamination.

TABLE 6
SUMMARY OF AREA B CHEMICAL ANALYSIS RESULTS

Sample #	M1190	M1191	M1192	M1193	M1196	M1197	M1209	M1242
Units	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg
Date of Submission	25-Apr	25-Apr	25-Apr	25-Apr	26-Apr	26-Apr	26-Apr	26-Apr
Depth	(-18"	18-36"	(-18"	18-36"	(-18"	18-36"	(-18"	
Composite/Discrete	D	D	D	D	D	D	C	C
Soil (S)/Water (W)/Sediment (X)	S	S	S	S	S	S	S	S
VOLATILE ORGANICS								
PRIORITY POLLUTANTS								
Benzene	22,000	31,100	ND	1.6	BMDL	ND	NA	237
cis-1,3-Dichloropropylene	ND	ND	ND	ND	ND	ND	NA	ND
Ethylbenzene	243,000	408,000	5.83	ND	4.5	23.9	NA	ND
Methylene chloride	48,800 J3	91,600 J3	ND UJ3	ND	UJ4 ND	UJ5 ND	UJ6 NA	85.9
Tetrachloroethylene	ND	ND	ND	ND	ND	ND	NA	ND
Toluene	265,000	321,000	ND	ND	ND	15.4	NA	ND
Totals	576,800	851,700	5.83	1.6	4.5	49.3	NA	322.9
ADDITIONAL PEAKS (SEMI-QUANTITATIVE)								
2-Methyl hexane	ND	ND	ND	ND	ND	ND	ND	ND
2-Pentanone, 4-Methyl	ND	ND	ND	ND	ND	ND	ND	ND
2-Propanones	ND	ND	8	30	6	32	ND	ND
3-methyl benzene	ND	ND	ND	ND	ND	ND	ND	ND
3-Methyl pentane	69,000	ND	ND	ND	ND	ND	ND	ND
4-Ethyl 2-Pentanone	ND	ND	ND	ND	ND	ND	ND	ND
4-Methyl 2-Pentanones	ND	ND	ND	ND	ND	ND	ND	ND
Acetone	ND	ND	ND	ND	ND	ND	ND	ND
Alkenes	ND	ND	ND	ND	ND	ND	ND	ND
Alkyl benzene	ND	ND	ND	ND	ND	ND	ND	ND
Benzene ethenyl-methyl	ND	ND	ND	ND	ND	7	ND	ND
Benzene, 1,2,3-trimethyl	ND	ND	ND	ND	ND	ND	ND	ND
Cycloheptane, methyl	ND	ND	ND	ND	ND	ND	ND	ND
Cyclohexanes, 1,1,3-trimethyl	ND	ND	17	20	ND	ND	ND	ND
Cyclohexane, 1,1-dimethyl	ND	ND	ND	ND	ND	ND	ND	ND
Cyclohexane, 1,3-dimethyl	ND	ND	ND	ND	ND	ND	ND	ND
Cyclohexanes, 1,3-dimethyl, cis	ND	ND	10	ND	ND	ND	ND	ND
Cyclohexanes, 1,3-dimethyl,trans	ND	ND	9	ND	ND	ND	ND	ND
Cyclohexane,1,1,3-trimethyl	ND	ND	ND	ND	ND	ND	ND	48
Cyclohexane,1,2-dimethyl,cis	ND	ND	ND	ND	ND	ND	ND	37
Cyclohexane,1,2-dimethyl,trans	ND	ND	ND	ND	ND	ND	ND	57
Cyclohexane,1,3-dimethyl,trans	ND	ND	ND	ND	ND	ND	ND	26
Cyclohexane,1,4-dimethyl,cis	ND	ND	ND	ND	ND	ND	ND	4[illegible]
Cyclohexane,1-ethyl-4-methyl cis	ND	ND	ND	ND	ND	ND	ND	[illegible]
Cyclohexane,1-ethyl-4-methyl trans	ND	ND	ND	ND	ND	ND	ND	46
Cyclohexanone, 3,3,5-trimethyl	ND	ND	ND	ND	ND	ND	ND	ND
Cyclooctane, butyl	ND	ND	ND	ND	ND	ND	ND	ND
Cyclopentane, methyl	ND	ND	ND	ND	ND	ND	ND	ND
Cyclopentane,1,3-dimethyl,trans	ND	ND	ND	ND	ND	ND	ND	ND
Dimethyl benzenes	ND	ND	ND	ND	ND	ND	ND	ND

J3 = Estimated concentrations due to greater than 25% difference between RF for initial calibration and RF for continuing calibration.
ND = Not Detectable
BMDL = Below Minimum Detection Limits
UJ3 = Estimated quantitation limit 16.4ug/kg
UJ4 = Estimated quantitation limit 27.1ug/kg
UJ5 = Estimated quantitation limit 22.9ug/kg
UJ6 = Estimated quantitation limit 17.8ug/kg

TABLE 6 (CONTINUED)
SUMMARY OF AREA B CHEMICAL ANALYSIS RESULTS

Sample #	M1190	M1191	M1192	M1193	M1196	M1197	M1209	M1242
Units	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg
Date of Submission	25-Apr	25-Apr	25-Apr	25-Apr	26-Apr	26-Apr	26-Apr	26-Apr
Depth	0-18"	18-36"	0-18"	18-36"	0-18"	18-36"	0-18"	
Composite/Discrete	D	D	D	D	D	D	C	C
Soil (S)/Water (W)/Sediment (X)	S	S	S	S	S	S	S	S
VOLATILE ORGANICS ADDITIONAL PEAKS (SEMI-QUANTITATIVE) CONTINUED								
dimethyl cyclohexane	ND	ND	ND	ND	ND	ND	ND	ND
Dimethyl cyclopentane	ND	ND	ND	ND	ND	ND	ND	ND
Dimethyl-3-hexene	ND	ND	ND	ND	ND	ND	ND	ND
Ethane, 1,1'-oxybis	ND	ND	ND	ND	ND	ND	ND	ND
Ethyl-methyl benzene	ND	ND	ND	ND	ND	ND	ND	ND
Heptane, methyl	ND	ND	ND	ND	ND	ND	ND	ND
Hydrocarbons	ND	74,000	ND	ND	ND	ND	ND	ND
Methyl cyclohexane	ND	ND	ND	ND	ND	ND	ND	ND
m-Xylenes	1,810,000	3,200,000	ND	ND	ND	ND	ND	ND
o&p-Xylenes	1,310,000	2,280,000	ND	ND	ND	ND	ND	ND
Pentane, 3-methyl	ND	ND	ND	ND	ND	ND	ND	ND
Pentanes, methyl	ND	ND	ND	ND	ND	ND	ND	15
Propyl benzene	ND	ND	ND	ND	ND	ND	ND	ND
Xylenes	ND	ND	ND	ND	ND	ND	ND	ND
ACID EXTRACTABLES								
PRIORITY POLLUTANTS								
2-Chlorophenol	ND	880	ND	ND	ND	ND	ND	ND
2,4-Dichlorophenol	470	3,700	ND	ND	ND	ND	ND	1780
2,4-Dimethylphenol	2,850	7,410	5,090	ND	ND	ND	890	2470
Pentachlorophenol	ND	ND	ND	ND	ND	ND	ND	ND
Phenol	4,130	1,500	800	ND	BMDL	ND	ND	4000
2,4,6-Trichlorophenol	ND	ND	ND	ND	ND	ND	ND	ND
Totals	7,450	13,490	5,890	0	0	0	890	8,250
BASE/NEUTRAL EXTRACTABLES								
PRIORITY POLLUTANTS								
Acenaphthene	ND	15,500	ND	ND	ND	130	200	390
Acenaphthylene	ND	3,500	ND	ND	ND	ND	120	ND
Anthracene	4,700	14,600	ND	ND	150	240	230	ND
Benzo(a)anthracene	7,300	22,200	1,900	2,600	380	530	350	1,700
Benzo(a)pyrene	4,600	18,000	2,500	3,100	1,040	680	772	2,500
Benzo(b)fluoranthene	8,450	23,000	3,900	5,700	1,180	730	1,360	4,100
Benzo(ghi)perylene	2,100	4,000	2,600	2,700	1,150	ND	814	ND
bis(2-Ethylhexyl)phthalate	290,000	186,000	7,100	7,500	11,200	2,110	58,800	75,900
Butyl benzyl phthalate	30,100	4,100	ND	ND	1,310	310	1,170	9,030
Chrysene	7,910	24,400	2,200	2,700	690	600	ND	2,100

TABLE 6 (CONTINUED)
SUMMARY OF AREA B CHEMICAL ANALYSIS RESULTS

Sample #	M1190	M1191	M1192	M1193	M1196	M1197	M1209	M1242
Units	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg
Date of Submission	25-Apr	25-Apr	25-Apr	25-Apr	28-Apr	28-Apr	28-Apr	28-Apr
Depth	0-18"	18-36"	0-18"	18-36"	0-18"	18-36"	0-18"	
Composite/Discrete	D	D	D	D	D	D	C	C
Soil (S)/Water (W)/Sediment (X)	S	S	S	S	S	S	S	S
BASE/NEUTRAL EXTRACTABLES, PRIORITY POLLUTANTS CONTINUED								
Dibenzo(a,h)anthracene	ND	ND	ND	ND	ND	ND	ND	ND
1,4-Dichlorobenzene	ND	11,800	ND	ND	ND	ND	ND	ND
Diethyl phthalate	7,550	ND	ND	ND	ND	ND	320	ND
Dimethyl phthalate	ND	ND	ND	ND	330	ND	ND	ND
Di-n-butyl phthalate	83,200	113,000 J	1,100 J	1,200 J	700	150	3,870	13,100
2,6-Dinitrotoluene	ND	ND	ND	ND	ND	1,900	ND	ND
Di-n-octyl phthalate	4,400	ND	ND	ND	310	ND	2,060	5,400
Fluoranthene	14,900	35,900	2,100	3,900	670	1,000	490	2,400
Fluorene	7,400	29,300	ND	ND	80	130	220	1,800
Indeno(1,2,3-c,d)pyrene	1,200	3,500	2,100	2,000	877	ND	560	ND
Isophorone	ND	ND	ND	ND	600	ND	ND	ND
Naphthalene	50,800	191,000	1,200	ND	680	390	5,630	31,000
N-Nitrosodiphenylamine	ND	ND	ND	ND	ND	ND	ND	ND
Phenanthrene	26,200	80,800	ND	1,900	670	1,100	966	4,200
Pyrene	19,200	56,200	2,900	4,000	866	950	590	2,700
1,2,4-Trichlorobenzene	5,600	24,700	ND	ND	ND	ND	350	2,100
Totals	575,610	861,500	29,600	37,300	22,883	10,950	78,872	158,420
BASE/NEUTRAL/ACID EXTRACTIBLES, ADDITIONAL PEAKS (SEMI-QUANTITATIVE) CONTINUED								
1H-Indene octahydro 2,2,4,4,7,7-hexamethyl	ND	ND	ND	ND	ND	ND	ND	ND
1H-Benzo(b) fluorene	ND	ND	ND	ND	ND	ND	ND	ND
1H-Indene,2,3-dihydro	ND	ND	ND	ND	ND	ND	ND	ND
1H-Inden-5-ol,2,3-dihydro	ND	ND	ND	ND	ND	ND	ND	ND
1,1'-Biphenyl	ND	ND	ND	ND	ND	ND	ND	ND
1,2,3,4-Tetramethyl benzene	ND	ND	ND	ND	ND	ND	ND	ND
1,2,3-Trimethyl benzene	49,600	ND	ND	ND	ND	ND	ND	ND
1-Methyl anthracene	ND	ND	ND	ND	ND	ND	ND	ND
2,6-Dimethyl nonane	ND	ND	ND	ND	ND	ND	ND	ND
2-Ethyl hexanoic	ND	ND	ND	ND	ND	ND	ND	ND
2-Ethyl naphthalene	ND	ND	ND	ND	ND	ND	ND	26,501
2-hydroxy benzaldehyde	ND	ND	2,650	ND	ND	ND	ND	ND
2-methyl 1,1'-biphenyl	ND	ND	ND	ND	ND	ND	ND	ND
2-Methyl anthracenes	ND	ND	ND	ND	ND	ND	ND	ND
2-Methyl naphthalene	ND	ND	ND	ND	ND	ND	ND	ND
2-Methyl phenanthrene	ND	ND	ND	ND	ND	ND	ND	ND
2-methyl phenol	ND	ND	9,770	ND	ND	ND	ND	ND
2-Propenoic acid, 2-Methyl, Dodecyl ester	ND	ND	ND	ND	ND	ND	ND	ND

J = Estimated concentration. QC Blank contaminated with 126ug/l of di-n-butyl phthalate

TABLE 6 (CONTINUED)
SUMMARY OF AREA B CHEMICAL ANALYSIS RESULTS

Sample #	M1190	M1191	M1192	M1193	M1196	M1197	M1209	M1242
Units	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg
Date of Submission	25-Apr	25-Apr	25-Apr	25-Apr	26-Apr	28-Apr	26-Apr	26-Apr
Depth	0-18"	18-36"	0-18"	18-36"	0-18"	18-36"	0-18"	
Composite/Discrete	D	D	D	D	D	D	C	C
Soil (S)/Water (W)/Sediment (X)	S	S	S	S	S	S	S	S
BASE/NEUTRAL/ACID EXTRACTIBLES, ADDITIONAL PEAKS (SEMI-QUANTITATIVE) CONTINUED								
3-Ethyl-2-Methyl heptane	ND	21,100	ND	ND	ND	ND	ND	ND
3-Methyl phenanthrene	ND	ND	ND	ND	ND	ND	ND	ND
3-Methyl phenol	ND	ND	ND	ND	ND	ND	ND	8,676
4-Methyl phenanthrene	ND	ND	ND	ND	ND	ND	ND	ND
4-Methyl phenols	ND	ND	73,500	ND	ND	ND	ND	10,771
Alkanes	196,600	243,500	17,170	ND	ND	2,241	13,350	123,250
Benzenesulfonamide, 4-methyl	ND	ND	ND	ND	378	ND	ND	ND
Bicyclo(3,2,1)oct-2-ene,3-methyl-4-methylene	ND	ND	ND	ND	ND	ND	ND	ND
Cyclohexane,pentyl	ND	ND	ND	ND	ND	ND	ND	ND
Diethyl benzene	ND	ND	ND	ND	ND	ND	ND	ND
Dimethyl 2-pentenes	ND	ND	7,250	ND	ND	ND	ND	ND
Dimethyl ethyl phenol	ND	ND	ND	ND	ND	ND	ND	ND
Dimethyl heptane	ND	ND	ND	ND	ND	ND	ND	ND
Dimethyl naphthalenes	ND	ND	ND	ND	ND	ND	ND	ND
Dimethyl pentenes	ND	ND	ND	ND	ND	514	ND	ND
Dimethyl phenanthrenes	ND	ND	ND	ND	ND	ND	ND	ND
Dimethyl phenols	ND	ND	ND	ND	ND	ND	ND	ND
Dimethyl-ethyl benzenes	ND	ND	ND	ND	ND	ND	ND	ND
Dimethyl-ethyl phenol	ND	ND	ND	ND	ND	ND	ND	58,969
Ethanone, 1-(4-ethyl phenyl)-ethyl	ND	ND	ND	ND	ND	ND	ND	ND
Ethyl benzenes	91,300	67,700	ND	ND	564	ND	ND	53,189
Ethyl methyl benzene	ND	ND	ND	ND	ND	ND	ND	ND
Ethyl naphthalene	ND	ND	ND	ND	ND	ND	ND	ND
Ethyl phenols	ND	ND	ND	ND	ND	ND	ND	ND
Ethyl- methyl benzenes	ND	ND	ND	ND	ND	ND	ND	ND
Ethyl-1,2,3-trimethyl benzene	ND	ND	ND	ND	ND	ND	ND	ND
Ethyl-1,2,4-trimethyl benzene	ND	ND	ND	ND	ND	ND	ND	ND
Ethyl-dimethyl benzenes	96,300	ND	ND	ND	773	ND	31,040	114,556
Ethyl-methyl benzenes	388,900	129,900	7,870	ND	404	875	ND	275,877
Ethyl-methyl phenols	ND	ND	ND	ND	ND	ND	ND	0
Ethyl-propyl benzene	ND	ND	ND	ND	ND	ND	ND	ND
Hexadecanoic acid	ND	ND	ND	ND	ND	ND	ND	ND
Hexanal	ND	ND	ND	ND	ND	ND	ND	ND
Hydroxy benzaldehyde	ND	ND	ND	ND	ND	ND	ND	ND
Methoxy benzaldehyde	ND	ND	19,600	ND	ND	ND	ND	ND
Methyl benzenes	113,000	47,400	ND	ND	3,227	2,620	ND	63,345
Methyl ethyl benzene	ND	ND	ND	ND	ND	ND	ND	ND
Methyl Fluorenes	ND	ND	ND	ND	ND	ND	ND	ND
Methyl naphthalene	ND	ND	ND	ND	ND	ND	ND	ND
Methyl phenanthrene	ND	ND	ND	ND	ND	ND	ND	ND
Methyl phenols	ND	ND	ND	ND	ND	ND	ND	ND
Methyl-ethyl benzene	ND	45,700	ND	ND	ND	ND	ND	ND

TABLE 6 (CONTINUED)
SUMMARY OF AREA 1 CHEMICAL ANALYSIS RESULTS

Sample #	M1190	M1191	M1192	M1193	M1194	M1195	M1196	M1197
Units	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg
Date of Submission	25-Apr	25-Apr	25-Apr	25-Apr	26-Apr	26-Apr	26-Apr	26-Apr
Depth	0-18"	18-36"	0-18"	18-36"	0-18"	18-36"	0-18"	
Composite/Discrete	D	D	D	D	D	D	C	C
Soil (S)/Water (W)/Sediment (X)	S	S	S	S	S	S	S	S
BASE/NEUTRAL/ACID EXTRACTABLES, ADDITIONAL PEAKS (SEMI-QUANTITATIVE) CONTINUED								
Methyl-ethyl phenols	ND	ND	ND	ND	ND	ND	ND	ND
Methyl-methyl ethyl phenols	ND	ND	ND	ND	ND	ND	ND	ND
Methyl-methyl-ethyl benzenes	ND	48,400	ND	3,180	ND	ND	ND	ND
Methyl-naphthalene	ND	26,300	ND	ND	ND	ND	ND	ND
Methyl-propyl benzenes	81,900	26,300	ND	ND	ND	ND	4,925	ND
Naphthalene,decahydro,trans	ND	ND	ND	ND	ND	ND	ND	ND
N-propyl benzamide	ND	ND	ND	ND	ND	ND	ND	ND
Phosphoric acid, triphenyl ester	ND	ND	ND	ND	ND	ND	ND	ND
Propyl benzenes	27,600	17,700	ND	ND	ND	ND	ND	ND
Tetrachlorobiphenyls	ND	ND	ND	ND	ND	ND	ND	ND
Tetradecanoic acid	ND	ND	ND	ND	ND	ND	ND	ND
Tetramethyl benzenes	112,200	ND	ND	ND	1,187	ND	5,842	25,960
Tetramethyl butyl phenols	ND	ND	ND	ND	ND	ND	ND	ND
Trichlorethene	ND	ND	ND	ND	ND	ND	ND	ND
Trimethyl benzenes	ND	82,100	ND	ND	894	ND	ND	ND
Trimethyl naphthalenes	ND	ND	ND	ND	ND	ND	ND	ND
Trimethyl phenols	ND	ND	ND	ND	ND	ND	ND	ND
Xylenes	475,000	238,700	3,600	ND	1,868	759	ND	232,560
PCB								
PRIORITY POLLUTANTS								
Aroclor 1242	ND	ND	ND	ND	ND	ND	ND	ND
Aroclor 1254	87,000 J1	73,000 J1	37,000 J1	1,400 J1	1,800 J1	140 J1	2,800 J1	1,100 J1
Totals	87,000 J1	73,000 J1	37,000 J1	1,400 J1	1,800 J1	140 J1	2,800 J1	1,100 J1
METALS UNITS	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
PRIORITY POLLUTANTS								
Antimony	12.00	16.00	1.70	3.20	1.00	1.20	6.70	12.00
Arsenic	36.00	73.00	24.00	26.00	5.60	1.50	18.00	62.00
Beryllium	1.20	0.16	0.52	0.59	0.38	0.34	0.25	9.70
Cadmium	62	71	6	10	2.90	0.35	27	29
Chromium	790	590	67	96	130	10.00	305	510
Copper	1,580	870	380	430	140	34	1150	2,050
Lead	8,200	6,520	1,440	ND	1,010	1,060	2,500	5,600
Mercury	9.10	1.90	1.60	1.80	1.90	0.27	1.20	3.60
Nickel	160	110	37	5.40	24.00	6.50	110	218
Selenium	ND	ND	ND	ND	ND	ND	ND	ND

J1 = Estimated Concentration. Samples were reextracted past holding time limits as specified in 40CFR part 136

TABLE 6 (CONTINUED)
SUMMARY OF AREA P CHEMICAL ANALYSIS RESULTS

Sample #	M1190	M1191	M1192	M1193	M1196	M1197	M1209	M1242
Units	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg
Date of Submission	25-Apr	25-Apr	25-Apr	25-Apr	28-Apr	28-Apr	28-Apr	28-Apr
Depth	0-18"	18-36"	0-18"	18-36"	0-18"	18-36"	0-18"	
Composite/Discrete	D	D	D	D	D	D	C	C
Soil (S)/Water (W)/Sediment (X)	S	S	S	S	S	S	S	S
METALS, PRIORITY POLLUTANTS CONTINUED								
UNITS	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
Silver	2.80	2.70	6.40	4.20	0.69	0.22	6.40	4.40
Thallium	ND	ND	0.14	ND	0.29	0.23	0.43	ND
Zinc	6,120	4,970	1,050	1,400	640	130	2,760	12,200
Totals	16,976	15,227	3,014	1,979	1,962	1,247	6,885	20,699
PESTICIDES								
PRIORITY POLLUTANTS								
Beta-BHC	ND	ND	ND	ND	ND	ND	ND	ND
4,4'-DDE	ND	ND	ND	ND	ND	ND	ND	ND
4,4'-DDD	ND	ND	ND	ND	ND	ND	ND	ND
Endosulfan sulfate	ND	ND	ND	ND	ND	ND	ND	ND
Endrin aldehyde	ND	ND	ND	ND	ND	ND	ND	ND
Totals	0	0	0	0	0	0	0	0
PHENOLICS & CYANIDE								
Units	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
Phenolics, Total	13.00	0.24	0.25	0.13	0.38	0.07	1.90	5.90
Cyanide, Total	16.00	13.00	1.70	2.30	2.20	1.00	0.73	16.00

Samples M1190 and M1191 were the only samples in Area B to have excessive levels of contamination from volatile organics (see Table 6 and Figure 4). M1190 (0-18") and M1191 (18-36") both exceeded the clean-up levels of mg/kg total volatile organics (VOA) used by the BISE, with total priority pollutant concentrations of 579 mg/kg and 852 mg/kg, respectively. There are also high concentrations of the non-priority pollutant VOA xylene (in all its isomeric forms) in samples M1190 and M1191. It is not surprising that the deeper sample had higher VOA concentrations as samples closer to the surface volatilize more easily. No other samples in Area B had concentrations of VOAs exceeding 1 mg/kg.

Samples M1190 and M1191 are also the only samples in Area B to exceed the cleanup level criteria for total cyanides (12 mg/kg) with concentrations of 16 mg/kg and 13 mg/kg, respectively.

There was no consistency in the results with respect to depth, as some organic parameters were higher in the 0-18" interval than in the 18-36" interval, while others were higher in the lower depth interval than in the surface interval. For example, in samples M1190 and M1191, most of the priority pollutant base/neutral organic parameters were higher in M1191 than in M1190, while for alkanes (a nonpriority pollutant), xylenes and other non-priority pollutant base/neutrals, the reverse was true. The same is true for M1192, M1193 and M1196/M1197 (which is upgradient of the M1190/M1191), but with lower concentrations.

The alkane concentrations in the borings of samples M1192/M1193 and M1196/M1197 were likewise inconsistent, but to a greater degree. For M1192 (0-18") the alkane concentration was 17.2 mg/kg while from 18"-36" (M1193) there was no detectable concentration. The opposite is true for samples M1196 and M1197: M1196 had no detectable levels of alkane while M1197 had 2.2 mg/kg. Samples M1190/M1191, the boring for which is only 75 feet south of that for M1196/M1197, had high concentrations in both intervals.

PCB's also greatly exceeded cleanup levels of 1-5 mg/kg in samples M1190, M1191 and M1192 with concentrations of 87 mg/kg, 73 mg/kg and 37 mg/kg, respectively. Samples M1190 and M1191 also exceed USEPA trigger levels of 50 mg/kg.

Heavy metal concentrations that exceeded BISE cleanup levels were detected in all soil samples in Area B. The metals were the same as those found in Area A but with the addition of Arsenic (As), nickel (Ni), and silver (Ag). The highest levels were found in samples M1190/M1191 with Pb (8,200/8,520 mg/kg), Cr (790/590 mg/kg), Cd (63/71 mg/kg), Hg (9.1/1.9 mg/kg), Zn (6,120 /4,970 mg/kg), and Cu (1,580/870 mg/kg) well above other discrete soil samples concentrations. Only composite sample M1242 (18-36") had higher levels of Cu and Zn.

The extensive metal contamination found throughout Area B is most likely from leaching of the ash pile and runoff from the drum storage area. Area B is in closer proximity to both these sources than Area A thereby resulting in higher contaminant levels.

TABLE 7
SUMMARY OF AREA C CHEMICAL ANALYSIS RESULTS

Sample #	M1194	M1195	M1203	M1205	M1206	M1207	M1208	M1217
Units	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/l
Date of Submission	26-Apr	26-Apr	06-May	06-May	06-May	26-Apr	26-Apr	27-May
Depth	0-18"	18-36"	3-5'	13-15'	17.5-19	0-18"	18-36"	
Composite/Discrete	D	D	D	D	D	C	C	D
Soil (S)/Water (W)/Sediment (X)	S	S	S	S	S	S	S	W
VOLATILE ORGANICS								
PRIORITY POLLUTANTS								
Benzene	ND	ND	85.3	5.6	ND	4.53	1,100	5.58
cis-1,3-Dichloropropylene	ND	ND	ND	ND	ND	ND	ND	ND
Ethylbenzene	ND	ND	333	46	111	19.9	44,300	15.9
Methylene chloride	ND UJ7	ND UJ8	34	ND	44	46.9 J2	5,280 J3	ND UJ9
Tetrachloroethylene	ND	ND	6.8	ND	ND	ND	ND	ND
Toluene	2.1	ND	318	58	85	25.2	218,000	76.6
Totals	2.1	0	777.1	109.6	240	96.53	268,680	98.08
VOLATILE ORGANICS, ADDITIONAL PEAKS (SEMI-QUANTITATIVE)								
2-Methyl hexane	ND	ND	295	ND	ND	ND	ND	ND
2-Pentanone, 4-Methyl	ND	ND	ND	ND	ND	ND	ND	323
2-Propanones	ND	ND	ND	71	ND	1,050	ND	64
3-methyl benzene	ND	ND	ND	ND	ND	ND	62,000	ND
3-Methyl pentane	ND	ND	ND	ND	ND	ND	ND	ND
4-Ethyl 2-Pentanone	ND	ND	572	ND	ND	ND	ND	ND
4-Methyl 2-Pentanones	ND	ND	ND	1,023	240	ND	ND	ND
Acetone	ND	ND	ND	ND	ND	ND	ND	ND
Alkanes	ND	ND	409	ND	ND	ND	ND	ND
Alkyl benzene	ND	ND	ND	ND	ND	ND	42,000	ND
Benzene ethenyl-methyl	ND	ND	ND	ND	ND	ND	ND	ND
Benzene, 1,2,3-trimethyl	ND	ND	ND	ND	ND	ND	ND	ND
Cycloheptane, methyl	ND	ND	ND	ND	ND	ND	ND	ND
Cyclohexanes, 1,1,3-trimethyl	ND	ND	ND	ND	ND	160	ND	ND
Cyclohexane, 1,1-dimethyl	ND	ND	ND	ND	ND	ND	ND	ND
Cyclohexane, 1,3-dimethyl	ND	ND	ND	ND	ND	ND	ND	ND
Cyclohexanes, 1,3-dimethyl, cis	ND	ND	ND	ND	ND	94	ND	ND
Cyclohexanes, 1,3-dimethyl,trans	ND	ND	ND	ND	ND	53	ND	ND
Cyclohexane,1,1,3-trimethyl	ND	ND	ND	ND	ND	ND	ND	ND
Cyclohexane,1,2-dimethyl,cis	ND	ND	ND	ND	ND	ND	ND	ND
Cyclohexane,1,2-dimethyl,trans	ND	ND	ND	ND	ND	ND	ND	ND
Cyclohexane,1,3-dimethyl,trans	ND	ND	ND	ND	ND	ND	ND	ND
Cyclohexane,1,4-dimethyl,cis	ND	ND	ND	ND	ND	ND	ND	ND
Cyclohexane,1-ethyl-4-methyl cis	ND	ND	ND	ND	ND	ND	ND	ND
Cyclohexane,1-ethyl-4-methyl trans	ND	ND	ND	ND	ND	ND	ND	ND
Cyclohexanone, 3,3,5-trimethyl	ND	ND	ND	ND	ND	ND	ND	35
Cyclooctane, butyl	ND	ND	ND	ND	ND	ND	ND	ND
Cyclopentane, methyl	ND	ND	ND	ND	ND	994	ND	ND
Cyclopentane,1,3-dimethyl,trans	ND	ND	ND	ND	ND	ND	ND	ND
Dimethyl benzenes	ND	ND	ND	ND	ND	847	ND	ND

J2 = Estimated concentration due to %RSD for response factor in initial calibration higher than 30%
J3 = Estimated concentration due to greater than 25% difference between RF for initial calibration and RF for continuing calibration
ND = Not Detectable
BMDL = Below Minimum Detection Limits
UJ7 = Estimated quantitation limit 18.4ug/kg
UJ8 = Estimated quantitation limit 18.9ug/kg
UJ9 = Estimated quantitation limit 11.0ug/l

TABLE 7 (CONTINUED)
SUMMARY OF AREA C CHEMICAL ANALYSIS RESULTS

Sample #	M1194	M1195	M1203	M1205	M1206	M1207	M1208	M1217
Units	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/l
Date of Submission	26-Apr	26-Apr	06-May	06-May	06-May	26-Apr	26-Apr	27-May
Depth	0-18"	18-36"	3-5'	13-15'	17.5-19	0-18"	18-36"	
Composite/Discrete	D	D	D	D	D	C	C	D
Soil (S)/Water (W)/Sediment (X)	S	S	S	S	S	S	S	W
VOLATILE ORGANICS ADDITIONAL PEAKS (SEMI-QUANTITATIVE) CONTINUED								
dimethyl cyclohexane	ND	ND	179	ND	ND	ND	ND	ND
Dimethyl cyclopentane	ND	ND	218	ND	ND	ND	ND	ND
Dimethyl-3-hexene	ND	ND	412	ND	ND	ND	ND	ND
Ethane, 1,1'-oxybis	ND	ND	ND	ND	ND	ND	ND	13
Ethyl-methyl benzene	ND	ND	ND	ND	ND	ND	ND	21
Heptane, methyl	ND	ND	ND	ND	ND	115	ND	ND
Hydrocarbons	ND	ND	ND	ND	ND	ND	13,000	ND
Methyl cyclohexane	ND	ND	2,078	ND	ND	ND	ND	ND
m-Xylenes	ND	ND	ND	ND	ND	ND	1,010,000	ND
o&p-Xylenes	ND	ND	ND	ND	ND	ND	769,000	ND
Pentane, 3-methyl	ND	ND	ND	ND	ND	ND	ND	ND
Pentanes, methyl	ND	ND	ND	ND	ND	9,550	ND	ND
Propyl benzene	ND	ND	ND	ND	ND	ND	187,000	ND
Xylenes	ND	ND	7,105	91	1,535	ND	ND	326
ACID EXTRACTABLES								
PRIORITY POLLUTANTS								
2-Chlorophenol	ND	ND	ND	ND	ND	ND	ND	ND
2,4-Dichlorophenol	ND	ND	ND	ND	ND	ND	ND	ND
2,4-Dimethylphenol	ND	ND	188,000	79,900	11,500	ND	3,600	860
Pentachlorophenol	ND	ND	ND	ND	ND	ND	1,000	ND
Phenol	ND	ND	27,700	58,900	750	ND	17,600	877
2,4,6-Trichlorophenol	ND	ND	ND	ND	ND	ND	650	ND
Totals	0	0	215,700	138,800	12,250	0	22,850	1,737
BASE/NEUTRAL EXTRACTABLES								
PRIORITY POLLUTANTS								
Acenaphthene	ND	ND	BMDL	19,600	ND	ND	ND	9.2
Acenaphthylene	ND	ND	ND	ND	ND	250	ND	ND
Anthracene	ND	ND	BMDL	15,300	310	140	ND	ND
Benzo(a)anthracene	ND	ND	BMDL	16,800	300	500	ND	ND
Benzo(a)pyrene	ND	ND	10,100	11,000	510	994	ND	ND
Benzo(b)fluoranthene	ND	ND	ND	ND	ND	1,200	ND	ND
Benzo(ghi)perylene	ND	ND	BMDL	BMDL	350	895	ND	ND
bis(2-Ethylhexyl)phthalate	4,100	1,700	61,700	ND	1,500	4,620	411,000	ND
Butyl benzyl phthalate	ND	ND	BMDL	ND	ND	110	26,500	ND
Chrysene	ND	ND	BMDL	ND	330	670	ND	ND

TABLE 7 (CONTINUED)
SUMMARY OF AREA C CHEMICAL ANALYSIS RESULTS

Sample #	M1194	M1195	M1203	M1205	M1206	M1207	M1208	M1217
Units	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/l
Date of Submission	28-Apr	28-Apr	06-May	06-May	06-May	28-Apr	28-Apr	27-May
Depth	0-18"	18-36"	3-5'	13-15'	17.5-19	0-18"	18-36"	
Composite/Discrete	D	D	D	D	D	C	C	D
Soil (S)/Water (W)/Sediment (X)	S	S	S	S	S	S	S	W
BASE/NEUTRAL EXTRACTABLES, PRIORITY POLLUTANTS CONTINUED								
Dibenzo(a,h)anthracene	ND	ND	ND	BMDL	ND	140	ND	ND
1,4-Dichlorobenzene	ND	ND	ND	ND	ND	ND	ND	ND
Diethyl phthalate	ND	ND	ND	ND	ND	ND	11,500	ND
Dimethyl phthalate	ND	ND	ND	ND	ND	ND	22,000	ND
Di-n-butyl phthalate	ND	ND	11,300	45,300	480	96	87,900	ND
2,6-Dinitrotoluene	ND	ND	ND	ND	ND	ND	ND	ND
Di-n-octyl phthalate	ND	ND	ND	ND	ND	ND	15,700	ND
Fluoranthene	ND	ND	12,200	32,000	630	460	3,400	ND
Fluorene	ND	ND	BMDL	19,300	360	ND	2,800	3.15
Indeno(1,2,3-c,d)pyrene	ND	ND	BMDL	BMDL	280	640	ND	ND
Isophorone	ND	ND	ND	ND	ND	260	ND	ND
Naphthalene	ND	ND	44,700	13,700	1,660	240	179,000	16.3
N-Nitrosodiphenylamine	ND	ND	ND	ND	ND	ND	ND	ND
Phenanthrene	ND	ND	18,900	48,400	1,150	430	8,180	4.9
Pyrene	ND	ND	11,700	25,300	530	894	4,700	ND
1,2,4-Trichlorobenzene	ND	ND	ND	ND	ND	ND	6,200	ND
Totals	4,100	1,700	170,600	246,700	8,390	12,539	778,880	34
BASE/NEUTRAL/ACID EXTRACTABLES, ADDITIONAL PEAKS (SEMI-QUANTITATIVE)								
1H-Indene octahydro 2,2,4,4,7,7-hexamethyl	ND	ND	ND	ND	ND	ND	ND	ND
1H-Benzo(b) fluorene	ND	ND	ND	ND	ND	ND	ND	ND
1H-Indene,2,3-dihydro	ND	ND	ND	ND	ND	ND	2,250	ND
1H-Inden-5-ol,2,3-dihydro	ND	ND	19,700	ND	ND	ND	ND	ND
1,1'-Biphenyl	ND	ND	ND	ND	ND	ND	ND	ND
1,2,3,4-Tetramethyl benzene	ND	ND	ND	ND	ND	ND	ND	ND
1,2,3-Trimethyl benzene	ND	ND	ND	ND	ND	ND	ND	ND
1-Methyl anthracene	ND	ND	ND	ND	ND	ND	ND	ND
2,6-Dimethyl nonane	ND	ND	ND	ND	ND	ND	ND	ND
2-Ethyl hexanoic	ND	ND	ND	ND	ND	ND	ND	ND
2-Ethyl naphthalene	ND	ND	ND	ND	ND	ND	ND	ND
2-hydroxy benzaldehyde	ND	ND	ND	ND	ND	ND	ND	ND
2-methyl 1,1'-biphenyl	ND	ND	ND	ND	ND	ND	ND	ND
2-Methyl anthracenes	ND	ND	ND	ND	ND	ND	ND	ND
2-Methyl naphthalene	ND	ND	ND	ND	ND	ND	ND	ND
2-Methyl phenanthrene	ND	ND	ND	ND	ND	ND	ND	ND
2-methyl phenol	ND	ND	ND	ND	ND	ND	ND	ND
2-Propenoic acid, 2-Methyl, Dodecyl ester	ND	ND	ND	ND	ND	ND	ND	ND

TABLE 7 (CONTINUED)
SUMMARY OF AREA C CHEMICAL ANALYSIS RESULTS

Sample #	M1194	M1195	M1203	M1205	M1206	M1207	M1208	M1217
Units	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/l
Date of Submission	28-Apr	28-Apr	06-May	06-May	06-May	28-Apr	28-Apr	27-May
Depth	0-18"	18-36"	3-5'	13-15'	17.5-19	0-18"	18-36"	
Composite/Discrete	D	D	D	D	D	C	C	D
Soil (S)/Water (W)/Sediment (X)	S	S	S	S	S	S	S	W
BASE/NEUTRAL/ACID EXTRACTIBLES, ADDITIONAL PEAKS (SEMI-QUANTITATIVE) CONTINUED								
3-Ethyl-2-Methyl heptane	ND	ND	ND	ND	ND	ND	ND	ND
3-Methyl phenanthrene	ND	ND	ND	ND	ND	ND	ND	ND
3-Methyl phenol	ND	ND	ND	ND	ND	ND	ND	ND
4-Methyl phenanthrene	ND	ND	ND	ND	ND	ND	ND	ND
4-Methyl phenols	ND	ND	ND	ND	ND	ND	ND	ND
Alkanes	2,870	ND	53,000	ND	937	ND	2,790	ND
Benzenesulfonamide, 4-methyl	ND	ND	ND	ND	ND	ND	ND	ND
Bicyclo(3,2,1)oct-2-ene,3-methyl-4-methylene	ND	ND	ND	ND	ND	ND	2,870	ND
Cyclohexane,pentyl	ND	ND	ND	ND	ND	ND	ND	ND
Diethyl benzene	ND	ND	ND	ND	ND	ND	2,560	ND
Dimethyl 2-pentenes	ND	ND	ND	ND	ND	ND	ND	ND
Dimethyl ethyl phenol	ND	ND	ND	1,400	ND	ND	ND	ND
Dimethyl heptane	1,830	ND	ND	ND	ND	ND	ND	ND
Dimethyl naphthalenes	ND	ND	ND	ND	ND	ND	ND	ND
Dimethyl pentenes	ND	165,770	ND	ND	ND	ND	ND	ND
Dimethyl phenanthrenes	ND	ND	ND	ND	ND	ND	ND	ND
Dimethyl phenols	ND	ND	6,860	1,090	6,019	ND	ND	ND
Dimethyl-ethyl benzenes	ND	ND	29,000	ND	ND	ND	ND	ND
Dimethyl-ethyl phenol	ND	ND	ND	ND	ND	ND	ND	ND
Ethanone, 1-(4-ethyl phenyl)-ethyl	ND	ND	ND	21,210	ND	ND	ND	ND
Ethyl benzenes	ND	ND	ND	ND	ND	270	2,450	ND
Ethyl methyl benzene	ND	ND	ND	ND	ND	ND	16,730	ND
Ethyl naphthalene	ND	ND	ND	ND	ND	ND	ND	ND
Ethyl phenols	ND	ND	6,890	11,410	ND	ND	ND	ND
Ethyl- methyl benzenes	ND	ND	ND	ND	ND	ND	10,770	ND
Ethyl-1,2,3-trimethyl benzene	ND	ND	ND	ND	ND	ND	1,980	ND
Ethyl-1,2,4-trimethyl benzene	ND	ND	ND	ND	ND	ND	ND	ND
Ethyl-dimethyl benzenes	ND	ND	ND	ND	ND	ND	16,100	ND
Ethyl-methyl benzenes	ND	ND	299,300	ND	3,290	315	ND	ND
Ethyl-methyl phenols	ND	ND	17,880	16,280	4,210	ND	ND	ND
Ethyl-propyl benzene	ND	ND	35,100	ND	ND	ND	ND	ND
Hexadecanoic acid	ND	ND	ND	ND	ND	ND	ND	ND
Hexanal	ND	ND	ND	ND	ND	ND	ND	ND
Hydroxy benzaldehyde	ND	ND	ND	ND	ND	ND	ND	ND
Methoxy benzaldehyde	ND	ND	ND	ND	ND	ND	ND	ND
Methyl benzenes	13,280	11,920	ND	ND	ND	1,585	7,780	ND
Methyl ethyl benzene	ND	ND	ND	ND	ND	ND	1,375	ND
Methyl Fluorenes	ND	ND	ND	ND	ND	ND	ND	ND
Methyl naphthalene	ND	ND	ND	ND	1,190	ND	ND	ND
Methyl phenanthrene	ND	ND	ND	ND	ND	ND	ND	ND
Methyl phenols	ND	ND	13,100	26,070	9,870	ND	ND	ND
Methyl-ethyl benzene	ND	ND	ND	ND	ND	ND	ND	ND

TABLE 7 (CONTINUED)
SUMMARY OF AREA C CHEMICAL ANALYSIS RESULTS

Sample #	M1194	M1195	M1203	M1205	M1206	M1207	M1208	M1217
Units	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	mg/l
Date of Submission	26-Apr	26-Apr	06-May	06-May	06-May	26-Apr	26-Apr	27-May
Depth	0-18"	18-36"	3-5'	13-15'	17.5-19	0-18"	18-36"	
Composite/Discrete	D	D	D	D	D	C	C	D
Soil (S)/Water (W)/Sediment (X)	S	S	S	S	S	S	S	W
BASE/NEUTRAL/ACID EXTRACTIBLES. ADDITIONAL PEAKS (SEMI-QUANTITATIVE) CONTINUED								
Methyl-ethyl phenols	ND	ND	2,080	ND	918	ND	ND	ND
Methyl-methyl ethyl phenols	ND	ND	ND	3,920	ND	ND	ND	ND
Methyl-methyl-ethyl benzenes	ND	ND	ND	ND	896	ND	1,750	ND
Methyl-naphthalene	ND	ND	ND	ND	ND	ND	ND	ND
Methyl-propyl benzenes	ND	ND	ND	ND	ND	ND	4,805	ND
Naphthalene,decahydro,trans	ND	ND	ND	ND	ND	ND	ND	ND
N-propyl benzamide	ND	ND	ND	ND	ND	ND	ND	ND
Phosphoric acid, triphenyl ester	ND	ND	ND	2,890	ND	ND	ND	ND
Propyl benzenes	ND	ND	ND	ND	ND	ND	4,700	ND
Tetrachlorobiphenyls	ND	ND	ND	ND	ND	927	ND	ND
Tetradecanoic acid	ND	ND	ND	ND	ND	ND	ND	ND
Tetramethyl benzenes	ND	ND	57,700	ND	ND	ND	4,350	ND
Tetramethyl butyl phenols	ND	ND	ND	ND	ND	ND	ND	ND
Trichloethene	ND	1,530	ND	ND	ND	ND	ND	ND
Trimethyl benzenes	ND	ND	ND	ND	ND	491	20,410	ND
Trimethyl naphthalenes	ND	ND	ND	ND	ND	ND	ND	ND
Trimethyl phenols	ND	ND	2,590	2,900	2,490	ND	ND	ND
Xylenes	ND	ND	98,900	9,370	1,050	740	26,000	ND
PCB								
PRIORITY POLLUTANTS								
Aroclor 1242	ND	ND	ND	ND	ND	ND	ND	ND
Aroclor 1254	500 J1	79 J1	ND	ND	1,100 J1	5,300 J1	50,000 J1	ND
Totals	500 J1	79 J1	0	0	1,100 J1	5,300 J1	50,000 J1	0
METALS UNITS	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	ug/L
PRIORITY POLLUTANTS								
Antimony	0.90	0.20	19.00	ND	ND	5.20	6.70	2.60
Arsenic	4.50	3.70	11.00	5.90	1.30	14.00	7.70	2.00
Beryllium	0.16	0.14	ND	ND	ND	0.32	0.49	ND
Cadmium	0.49	ND	0.28	ND	ND	9.90	12	ND
Chromium	19	9.90	3.30	1.10	ND	130	290	2.30
Copper	29	23	4.80	1.60	ND	250	350	8.30
Lead	43	43	2,760	250	90	1,060	1,880	ND
Mercury	0.29	0.10	1.30	1.90	0.05	2.00	1.30	ND
Nickel	7.40	5.20	ND	0.30	ND	35	52	22
Selenium	ND	ND	3.90	0.32	ND	0.60	1.00	ND

J1 = Estimated Concentration. Samples were reextracted past holding time limits as specified in 40CFR part 136

TABLE 7
SUMMARY OF AREA C CHEMICAL ANALYSIS RESULTS

Sample #	M1194	M1195	M1203	M1205	M1206	M1207	M1208	M1217
Units	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/l
Date of Submission	28-Apr	28-Apr	06-May	06-May	06-May	28-Apr	28-Apr	27-May
Depth	0-18"	18-36"	3-5'	13-15'	17.5-19	0-18"	18-36"	
Composite/Discrete	D	D	D	D	D	C	C	I
Soil (S)/Water (W)/Sediment (X)	S	S	S	S	S	S	S	W
METALS, PRIORITY POLLUTANTS CONTINUED								
UNITS	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	ug/L
Silver	0.18	0.11	ND	ND	ND	1.10	0.99	ND
Thallium	0.43	2.30	ND	ND	ND	0.33	0.33	ND
Zinc	67	49	18.00	3.70	ND	705	2,200	69.00
Totals	172	137	2,822	365	91	2,213	4,898	106
PESTICIDES								
PRIORITY POLLUTANTS								
Beta-BHC	ND	ND	ND	ND	ND	ND	ND	ND
4,4'-DDE	ND	ND	ND	ND	ND	ND	ND	ND
4,4'-DDD	ND	ND	ND	ND	ND	ND	ND	ND
Endosulfan sulfate	ND	ND	ND	ND	ND	ND	ND	ND
Endrin aldehyde	ND	ND	ND	ND	ND	ND	ND	ND
Totals	0	0	0	0	0	0	0	0
PHENOLICS & CYANIDE								
Units	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/L
Phenolics, Total	0.11	0.12	0.40	1700	0.30	0.62	0.47	16.30
Cyanide, Total	1.80	0.69	0.90	0.50	<.05	2.60	8.80	0.08

The randomness of these results indicates that the current site operations might not be the major source of contamination. Previous land-use (see Section 2.4) activities may have been caused by subsurface contamination that was then covered with fill of questionable cleanliness. This makes it impossible to discern target-to-source relationships or to infer that contamination is defined by the existing boundaries of Bayonne Barrel and Drum.

Area C

The soil samples in Area C, as in Areas A and B, had concentrations that exceed the BISE cleanup criteria for volatile organic, heavy metals and PCBs, plus high levels of acid extractable organics, phenolics, and a variety of base/neutral organics. See Table 7 and Figure 4 for the results of the analyses.

Composite sample M1208 (18-36") had the highest level of VOAs with a total concentration of 2,351.7 mg/kg, whereas M1207 (0-18") had less than 12 mg/kg. These results include the non-priority pollutant VOAs.

The three soil samples from monitoring well #2 (M1203, M1205 and M1206) also had total VOAs exceeding the 1 mg/kg cleanup level. The 3-5' sample (M1203) had 11 mg/kg, while the samples from 13-15' and 17.5-19' had VOA total concentrations of only 1-2 mg/kg. All three samples from well #2 also had high acid extractable organic concentrations that decreased with depth. The two main parameters were 2, 4-dimethylphenol and phenol, while total phenolics in sample 1205 (13-15') measured at 1,700 mg/kg.

Heavy metal concentrations in the first two soil samples from monitoring well #2 exceeded BISE cleanup levels for lead and mercury. The lead concentration was significantly less for the 13 to 15 foot sample (M1205) than for the 3 to 5 foot layer (M1203) and both lead and mercury totally absent from the 17.5 to 19 foot sample (M1206). The mercury concentrations were not significantly different from sample M1203 (1.3 mg/kg) to sample M1205 (1.9 mg/kg).

The composite soil samples (M1207/M1208) had excessive levels of cadmium, chromium, copper, mercury, lead and zinc. Lead concentrations ranged from 10 to 20 times the cleanup level of 100 mg/kg. In contast to the monitoring well soil samples the composite samples had higher metal concentrations in the lower sample interval (18-36 inches) than for the surface soil sample (0-18 inches). Though both composite samples are above the uppermost monitoring well soil sample. Since compositing does not allow for relating a specific sample to a contaminant source it can be safely proposed that like the rest of the site, metal contamination is from leaching of the ash pile and runoff from the drum storage area.

The metal contamination does not appear to have migrated below the water table to any great extent but not enough evidence is available to discern a concentration decrease with depth relationship. As groundwater on the site

did not possess excessive levels of metals it can be inferred that the metals are tightly bound to the sediment under existing pH and redox (reduction/oxidation) conditions.

Base/neutral organic concentrations were equally as high as elsewhere in the study area, but with some differences. The phthalates especially bis(2-ethyhexyl)phthalate, were greater than 6 mg/kg in sample M1203 (3'-5'), not detectable in sample M1205 (13'-15'), but at 17.5'-19 their concentration rose to 1.5 mg/kg. Also for the composite samples M1207/M1208, the upper composite (0-18") has a bis(2ethylhexyl) phthalate concentration of 4.6 mg/kg and a lower composite (18-36") concentration of 411 mg/kg.

Discrete samples M1194/M1195 were conspicuously void of high concentrations of contaminants found in the other Area C samples. Except possibly for the base/ neutral organic, methyl benzene, there were no other contaminant levels of concern even heavy metals. Samples M1194/M1195 were obtained farther south than any other discrete samples, and are upgradient from both the ash and tire piles and the runoff from the drum storage area.

PCBs exceeded clean-up levels for both the upper and lower depth intervals of composite samples M1207/M1208, with the lower sample being almost ten times higher in concentration than the upper (50 mg/kg vs. 5.3 mg/kg).

4.2 Groundwater

The water samples collected on May 27, 1986 from monitoring well #2 and 3 were analyzed for Full Priority Pollutants Plus Forty. The BISE cleanup levels for groundwater, as presented in Table 4, are much stricter than for soil. This is because mobility for off-site contamination is much greater for groundwater than for soil, and the pathways for the water's uptake by fauna and flora, is more efficient.

Area A

Monitoring well #3 in Area A does not exceed the cleanup levels for any parameter.

Area B

There was no monitoring well located in Area B.

Area C

The results of monitoring well #2 are in sharp contrast to those of monitoring well #3. MW #2 contained excessive levels of volatile organics, acid extractable organics, and total phenolics. The volatile organic fraction was derived mainly from xylene; 4-methyl, 2-pentanone; and toluene, all of which are solvents in industrial applications and components in the

refinery of petroleum products. Taking the additional non-priority pollutant peaks into consideration greatly increases the total concentration of volatiles. The total concentration of both priority and nonpriority pollutants was over 98 ug/l, far in excess of the 10 ug/l cleanup level.

The total acid extractable organics concentration was 1,737 ug/l, with 2,4-dimethylphenol and phenol being the only contributors. Again, this far exceeds the cleanup level of 50 ug/l.

Total phenolics which is measured by a different method than for acid extractable phenols, was 16.3 mg/l. The criteria for this compound and most of the heavy metals and pesticides is established by the Bureau of Groundwater Quality Management in N.J.A.C. 7:9-6(c) and are presented in Table 4.

The groundwater quality criteria are applicable to the groundwater of the study area because the total dissolved solids concentration is between 500 mg/l and 10,000 mg/l, which is the main criteria for classifying groundwater. Conductivity measurements listed in Table 3 indicate total dissolved solid concentrations in this range. The Brunswick Shale is the primary aquifer underlying the site and has been subjected to a wide variety of contamination from industrial sources, infiltration of urban runoff, salt-water intrusion and reductions in recharge. Additionally, the Passaic River has also been subjected to upgradient sources of contamination that infiltrates the Brunswick Shale Aquifer and also receives discharge from the aquifer due to tidal affects. This pervasive pollution may result in the BISE deciding not to subject this portion of the aquifer to the cleanup guidelines listed in Table 4. No formal declaration of such an exclusion has been made public at the time of writing.

The results of the groundwater analyses do not exhibit pervasive on-site contamination. Monitoring well #3 is uncontaminated while monitoring well #2 has fairly high concentrations of phenolic compounds and volatile organics. This indicates that the sources of contamination are upgradient of monitoring well #2, (i.e., the old ash pile, drum storage area, tire pile, and other off-site sources) and that groundwater flows generally eastward instead of northeastward. Monitoring wells #2 and #3 had very similar water levels (3.67 and 3.72 feet, respectively), which made it impossible to delineate a hydraulic gradient, especially since the data has not been corrected for tidal influences. A larger number of measurements needs to be made during low and high tides to correct for tidal affects. If measurements indicate the same hydraulic heads (water levels), then it is likely that groundwater passing through monitoring well #2 does not flow near monitoring well #3.

It is also apparent that many of the pollutants in the soils have not mobilized to the groundwater, especially the base/neutral extractable organics, heavy metals and PCB fractions. Volatile organics, being a mobile group of chemicals, are detected in the groundwater but not nearly at the levels found in the soil. The reason for this may be that the more mobile, water soluble constituents have already been flushed out of the soil, as the contamination has been deposited there over many years. The less water soluble substances, such as the base/neutral extractables and PCBs are not

mobile and have partition coefficients that do not permit phase changes from soil to water at any discernable concentration. The immiscible (insoluble in water) chemicals are more tightly bound to the sediment where they accumulate over time at high concentrations. As previously mentioned in Section 4.1 the metals also appear tightly bound to the sediment and not mobilizing into the water column.

The contamination found in the lower soil layers (below the surface) indicates that historical sources are a major contributor, and that the low levels found in the groundwater are not due to the lack of time needed for the above ground sources of contamination (drums, storage tanks, ash pile) to leach to the water table. This does not necessarily reduce the magnitude of existing on-site sources, but it does express the need for a more regional and historical explanation of the contamination.

5.0 RECOMMENDATIONS

In view of the results of this report some further investigations will be necessary. These investigation should include estimating the extent of contamination and determining the most prudent and feasible solutions for construction on this property.

APPENDIX A

USEPA INVESTIGATIONS AND CONSENT ORDER

APPENDIX 1

SUBSTANCES FOUND BY USEPA DURING PRELIMINARY INVESTIGATION

Table I

Comparison of Sample Analysis to Characteristic of EP Toxicity

Parameter	Maximum Concentration for EP Toxicity mg/l	ash pile 65184 mg/l	ash pile 65185 mg/l	ash pile 65186 mg/l	soil near ash 65187 mg/l	SS tank 65191 mg/l	soil [illegible] 65192 mg/l
Arsenic	5.0	.02K	.02K	.02K	.02K	.02K	.02K
Barium	100.0	4.0	5.3	1.3	1.5	.16	1.7
Cadmium	1.0	.99	[illegible]	.17	.08	.002K	.04
Chromium	5.0	.02J	.01J	.04	.008K	.02J	.08J
Lead	5.0	[illegible]	[illegible]	2.4	.25	.04	.10
Mercury	0.2	.0002K	.0002K	.0002K	.001	.0002K	.000[illegible]
Selenium	1.0	.008K	.02J	.008K	.008K	.009J	.008K
Silver	5.0	.002K	.002J	.002K	.002J	.002K	.002
Endrin	.02	.000008K	.000008K	.000008K	.000008K	.000008k	.00000[illegible]
Lindane	.4	.00003	.00004	.00023	.00066	.00002	.00000[illegible]
Methoxychlor Methoxychlor	10.0	.00038	.00008K	.00328	.01100	.00054	.000[illegible]
2,4,-D	10.0	.0003K	.0003K	.0073	.0080	.0003K	.0003[illegible]
Silvex	1.0	.00007K	.00007K	.00007K	.00007K	.00007K	.0000[illegible]
Toxophene	0.5	.00035K	.00035K	.00035K	.00035K	.00035K	.0003[illegible]

K = Actual valve less than valve given
J = Estimated valve

65184, 65185, 65186 - Ash Pile
65187 - Soil by Ash Pile
65191 - Subsurface Tank Near Incinerator
65192 - Soil by Subburface Tank Near Incinerator

Results of Metals Analysis on Samples

Parameter	65184 mg/kg	65185 mg/kg	65186 mg/kg	65187 mg/kg	65192 mg/kg
Silver	3K	3J	3K	3K	3K
Arsenic	7.5	6.6	3J	23	7.0
Beryllium	1J	1K	1K	1K	1K
[redacted]	160	120	84	59	13
Chromium	2900	1800	3300	650	1200
[redacted]	3300	2400	1100	1000	1100
[redacted]	12	.5J	21	27	7.4
[redacted]	21,000	13,000	17,000	4500	2700
[redacted]	250	250	79	99	850
Antimony	.8K	.8K	.8K	.8K	.8K
Selenium	.9J	5.1	.8K	4.2	2J
Thallium	.8K	.8K	.8K	.8K	.8K
[redacted]	3400	3800	3500	2300	1900

K = Actual valve less than valve given
J = Estimated valve

65184, 65185, 65186 - Ash Pile
65187 - Soil by Ash Pile
65192 - Soil by Subsurface Tank Near Incinerator

Results of Organics Analysis on Samples

Organic Compounds	Oil/with Trench 65188 ug/l	5,000 tank 65189 ug/l	35 tank 65191 ug/l
[redacted]		90J	
[redacted]	1800J		1300
[redacted]	1500J	1400	
Bis(2-ethylhexyl) phthalate	13,000	6900	
Butyl benzly phthalate		1100	
Di-n-butyl phthalate	3800J	1800	
Fluorene		70J	
Phenanthrene	2500J	290	
Pyrene		60J	
[redacted]			110J
[redacted]			4900

J = Estimated valve
K = Actual valve less than valve given

65188 - Oil Separator
65189 - 5,000 Gallon Tank
65191 - Subsurface Tank by Incinerator

Table Va

Results of Organic Analysis on Samples

anic Compounds	ash 65184 ug/kg	ash 65185 ug/kg	ash 65186 ug/kg	soil 65187 ug/kg	soil 65190 ug/kg	soil 65192 ug/kg
[redacted]			4300J	2500J	1400J	
[redacted]			8400	1200J		
[redacted]		730				
[redacted]		240				
[redacted]	3200J		11000	1900J	1500J	2300J
[redacted]	2600J	280	15000	12000	12000	3700J
[redacted]	92000	22000	250000	27000		25000
[redacted]	110000	8300	180000	18000	22000	12000
[redacted]	20000	120	1700J	2000J	4800J	780J
.s(2-ethylhexyl)phthalatel	800000	11000	1200000	990000	1200000	210000
[redacted]yl benzyl phthalate	370000	2100	1200000	210000	400000	200000
n-butyl phthalate	450000	2100	330000	110000	280000	280000
[redacted]-n-octyl phthalate	5700J	1200	7200	3800J		770J
[redacted]ethylphthalate	9700	400				
imethylphthalate	24000					
[redacted]	1200J	160		1800J		3100J
thracene	2300J	100	8000	3000J		1400J
luorene	2400J	57K	7400	3200J	3300J	1600J
[redacted]enanthrene	12000	900	32000	17000	28000	7000
yrene	3600J	260	14000	15000	9000	4700J
[redacted]	80000	170	46000	5800J		4700J

[redacted] = Estimated valve
[redacted] = Actual valve less than valve given

Table Vb

Results of Organic Analysis on Samples

anic Compounds	ash 65184 ug/kg/	ash 65185 ug/kg	ash 65186 ug/kg	soil 65187 ug/kg	soil 65190 ug/kg	soil 6519[illegible] ug/kg
[redacted]	160	130	480		15	
[redacted]	46		88	36		
[redacted]	58	380	7000	350	15	
[redacted]	320	67	500	16		
[redacted]	1300		5000	660		
[redacted]	47	120	160	23		
,1-dichloroethylene	68		400	13		
,2-dichloropropane		18K				
[redacted]	3200	1900	65000	120	580	
[redacted]	10000	4600	8700	1500		
[redacted]	1800	1300	2600	460	100	
Toluene [redacted]	28000	11000	320000	630	1700	
[redacted]	2200	1200	8100	290	19	
[redacted]	1600		150			

J = Estimated valve
K = Actual valve less than valve given

65184, 65185, 65186 - Ash pile
65187 - Soil by Ash Pile
65190 - Soil by 5,000 Gallon Tank
65192 - Soil by Subsurface Tank Near Incinerator

Table VI

Results for PCB Analysis

PCB	Soil #65187	
Aroclor 1248	67.2 mg/kg	1 mg/kg
Aroclor 1254	117.5 mg/kg	1 mg/kg

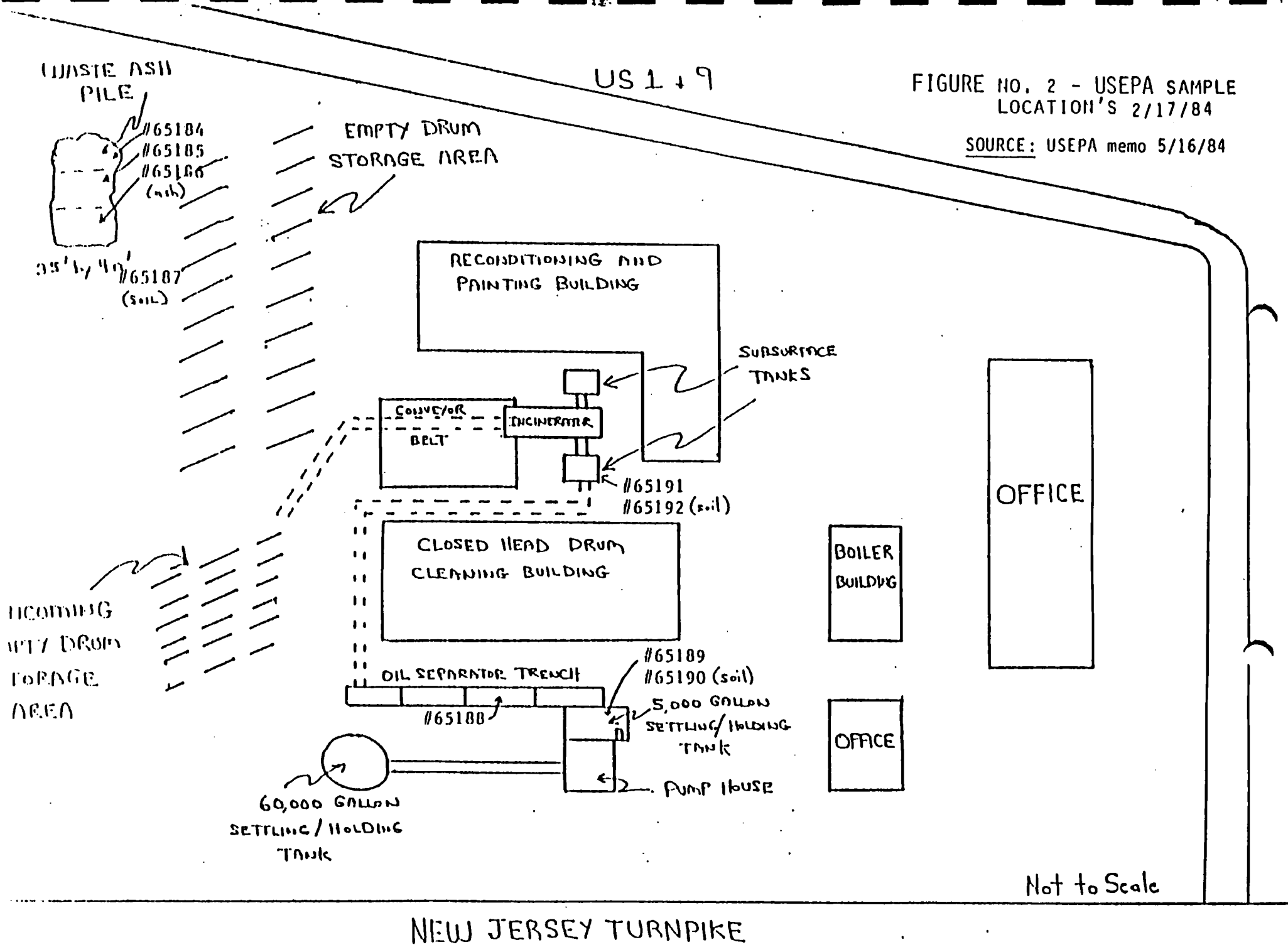
65187 - Composite soil sample by ash pile

APPENDIX 2

SITE MAP OF USEPA SAMPLING LOCATION

FIGURE NO. 2 - USEPA SAMPLE LOCATION'S 2/17/84

SOURCE: USEPA memo 5/16/84



APPENDIX 3

SUMMARY OF EPA'S FINDINGS

APPENDIX 3

SUMMARY OF USEPA,s FINDINGS

TABLE 1

ORGANICS FOUND IN ASH PILE

Concentration Range	Compound	Method Ident.	#
> 1000 ppm	benzyl butyl phthalate	BN	625
	bis (2-ethylhexyl) phthalate	BN	625
100-1000 ppm	di-n-butyl phthalate	BN	625
	naphthalene	BN	625
	toluene	VOA	624
10-100 ppm	Methylene chloride	VOA	624
	fluorantherene	BN	625
	nitrosodiphenylamine	BN	607
	phenanthrene	BN	625
	phenol	A	625
	Pyrene	BN	625

Table 2

ORGANICS FOUND IN SOILS

Concentration Range	Compound	Method Ident.	#
> 1000 ppm	bis (2-ethylhexyl) phthalate	BN	625
100-1000 ppm	benzyl butyl phthalate	BN	625
	di-n-butyl phthalate	BN	625
10-100 ppm	naphthalene	BN	625
	phenanthrene	BN	625
	Pyrene	BN	625

BN - Base Neutral
VOA - Volatile Organic Chemicals
A - Acid

REGULATORY CHEMICALS OF HEALTH AND ENVIRONMENTAL CONCERN

William H. Lederer, Ph.D., J.D.

VNR VAN NOSTRAND REINHOLD COMPANY
New York

BENZYL BUTYL PHTHALATE.
[85-68-7]

TSCA 4(e), ITC
Seventh Report of the TSCA Interagency Testing Committee to the administrator, Environmental Protection Agency, October 1980; 45 FR 78432, November 25, 1980. EPA responded to the committee's recommendations for testing 46FR 53775, October 30, 1981

*TSCA 8(d), Unpublished Health and Safety Studies Reporting, 40 CFR 716, 47 FR 38800, September 2, 1982; 48 FR 13178, March 30, 1983

COAL TAR PITCH VOLATILES (benzene soluble fraction) (Anthracene, BaP, PHENANTHRENE, ACRIDINE, CHRYSENE, PYRENE) [8007-45-2]

*OSHA 29 CFR 1910.1000 Table Z-1
PEL(TWA): 0.2 mg/m^3

Interpretation of term: 29 CFR 1910.1002 (revised 48 FR 2768, January 21, 1983)
Coal tar pitch volatiles include the fused polycyclic hydrocarbons which volatize from the distillation residues of coal, petroleum (excluding asphalt), wood, and other organic matter. Asphalt (CAS 8052-42-4, and CAS 64742-93-4) is not covered under the "coal tar pitch volatiles" standard.

ACGIH-TLV
TWA: 0.2 mg/m^3
Human carcinogen—associated with industrial processes, recognized to have carcinogenic or cocarcinogenic potential

BIS(2-ETHYLHEXYL)PTHALATE.
[117-81-7]

*RCRA 40 CFR 261
EPA hazardous waste no. U028

DIBUTYLPHTHALATE. [84-74-2]

*OSHA 29 CFR 1910.1000 Table Z-1
PEL(TWA): 0.1 ppm, 5 mg/m^3

ACGIH-TLV
TWA: 1 ppm, 5 mg/m^3
STEL: 2 ppm, 10 mg/m^3

NFPA—hazardous chemical (flammable chemical)
health—0, flammability—1, reactivity—0

*RCRA 40 CFR 261
EPA hazardous waste no. U069 (hazardous substance)

CADMIUM [7440-43-9]

OSH Criteria Document (Pub. No. 76-192), TIS Stock No. PB 274237, August 23, 1976 "Cadmium" refers to elemental cadmium l all cadmium compounds. An "action vel" is defined as half the time-weighted average concentration environmental limit cadmium. "Occupational exposure to cadmium" is defined as exposure to cadmium at concentration greater than the action level. posures at lower environmental concentrations will require adherence to Section 6(b) and 7(d). See the Criteria Document for details.

Occupational exposure to cadmium shall be ntrolled so that workers are not exposed o cadmium at a concentration greater than Cd/m³ determined as a time-weighted e (TWA) exposure concentration for p to a 10-hour workday, 40-hour workk, or at a ceiling concentration greater 200 μg Cd/m³ for any 15-minute samng period. The standard is designed to ect the health and safety of workers for o a 10-hour workday, 40-hour workk, over a working lifetime.

CFR 162.11, FIFRA-RPAR issued ent Status: PD 1 published, 42 FR 56574 (10/26/77); comment period closed 2/10/78 Risk/benefit assessment is ongoing.

Criteria Possibly Met or Exceeded: Oncogenicity, Mutagenicity, Teratogenicity, and Fetotoxicity.

CWA 304(a)(1), 45 FR 79318, November 28, 1980, Water Quality Criteria

Freshwater Aquatic Life

For total recoverable cadmium the criterion (in micrograms per liter) to protect freshwater aquatic life as derived using the Guidelines is the numerical value given by e (1.05 [ln (hardness)] − 8.53) as a 24-hour average and the concentration (in micrograms per liter) should not exceed the numerical value given by e (1.05[ln (hardness) − 3.73) at any time. For example, for hardnesses of 50, 100, and 200 mg/liter as $CaCO_3$ the criteria are 0.012, 0.025, and 0.051 μg/liter, respectively, and the concentration of total recoverable cadmium should not exceed 1.5, 3.0, and 6.3 μg/liter respectively, at any time.

Saltwater Aquatic Life

For total recoverable cadmium the criterion to protect saltwater aquatic life as derived using the guidelines is 4.5 μg/liter as a 24-hour average and the concentration should not exceed 59 μg/liter at any time.

Human Health

The ambient water quality criterion for cadmium is recommended to be identical to the existing drinking water standard which is 10 μg/liter. Analysis of the toxic effects data resulted in a calculated level that is protective of human health against the ingestion of contaminated water and contaminated aquatic organisms. The calculated value is comparable to the present standard. For this

reason a selective criterion based on exposure solely from consumption of 6.5 g aquatic organisms was not derived.

CWA 307(a)(1), Priority Pollutant

*National Interim Primary Drinking Wat Regulations, 40 CFR 141; 40 FR 59 December 24, 1975; amended by 41 28402, July 9, 1976; 44 FR 68641, Novembe 29, 1979; corrected by 45 FR 15542, Ma 11, 1980; 45 FR 57342, August 27, 1980 FR 18998, March 3, 1982; corrected by 4 FR 10998, March 12, 1982

Maximum contaminant level—0.010 liter

CAA 112

Chemical proposed to be assessed as Hazardous Air Pollutant by a House Representatives bill to amend the CAA

CADMIUM and compounds. [7440-43-

OSHA Candidate List of Potential Occupational Carcinogens (EPA Carcinogen Assessment Group List), 45 FR 53672, August

LEAD. [7439-92-1]

*OSHA Standard 29 CFR 1910.1025

1. *Permissible exposure limit (PEL).* The employer shall assure that no employee is exposed to lead at concentrations greater than 50 $\mu g/m^3$ of air averaged over an 8-hour period.

2. If an employee is exposed to lead for more than 8 hours in any workday, the permissible exposure limit, as a time-weighted average (TWA) for that day, shall be reduced according to the following formula:

maximum permissible limit ($\mu g/m^3$)

$$= 400 \div \text{hours worked in the day}$$

3. When respirators are used to supplement engineering and work practice controls to comply with the PEL and all the requirements or respiratory protection have been met, employee exposure, for the purpose of determining whether the employer has complied with the PEL, may be considered to be at the level provided by the protection factor of the respirator for those periods the respirator is worn. Those periods may be averaged with exposure levels during periods when respirators are not worn to determine the employee's daily TWA exposure.

4. "Action level" means employee exposure, without regard to the use of respirators, to an airborne concentration of lead of 30 $\mu g/m^3$ of air averaged over an 8-hour period. Shall not apply to the construction industry or to agricultural operations.

CWA 304(a)(1). 45 FR 79318, November 28, 1980, Water Quality Criteria

Freshwater Aquatic Life

For total recoverable lead the criterion (in micrograms per liter) to protect freshwater aquatic life as derived using the guidelines is the numerical value given by $e^{(2.35[\ln(\text{hardness})] - 9.48)}$ as a 24-hour average and the concentration (in micrograms per liter) should not exceed the numerical value given by $e^{(1.22[\ln(\text{hardness})] - 0.47)}$ at any time. For example, at hardnesses of 50, 100, and 200 mg/liter as $CaCO_3$, the criteria are 0.75, 3.8, and 20 μg/liter, respectively, as 24-hour averages, and the concentrations should not exceed 74, 170, and 400 μg/liter, respectively, at any time.

Saltwater Aquatic Life

The available data for total recoverable lead indicate that acute and chronic toxicity to saltwater aquatic life occur at concentrations as low as 668 and 25 μg/liter, respectively, and would occur at lower concentrations among species that are more sensitive than those tested.

Human Health

The ambient water quality criterion for lead is recommended to be identical to the existing drinking water standard which is 50 μg/liter. Analysis of the toxic effects data resulted in a calculated level that is protective to human health against the ingestion of contaminated water and contaminated aquatic organisms. The calculated value is comparable to the present standard. For this reason a selective criterion based on exposure solely from consumption of 6.5 g of aquatic organisms was not derived.

CWA 307(a)(1), Priority Pollutant

*National Interim Primary Drinking Water Regulations, 40 CFR 141; 40 FR 59565, December 24, 1975; amended by 41 FR 28402, July 9, 1976; 44 FR 68641, November 29, 1979; corrected by 45 FR 15542, March 11, 1980; 45 FR 57342, August 27, 1980; 47 FR 18998, March 3, 1982; corrected by 47 FR 10998, March 12, 1982

Maximum contaminant level—0.05 mg/liter

*CAA § 109 1(6); Part C 160-178; 40 CFR 50, National Ambient Air Quality Standard (NAAQS) (not to be exceeded more than once per year)

	$\mu g/m^3$	
	Primary	Secondary
Quarterly	1.5	Same as primary

METHYLENE CHLORIDE. Syn. 1,1-Dichloromethane. [75-09-2]

*OSHA 1910.1000 Table Z-2
500 ppm, 8-hour TWA
1000 ppm, acceptable ceiling concentration
2000 ppm/5 minutes in any 2 hours, acceptable maximum peak

ACGIH-TLV
TWA: 100 ppm, 360 mg/m³
STEL: 500 ppm, 1700 mg/m³

NIOSH Criteria Document (Pub. No. 76-138), NTIS Stock No. PB81 227027, March 4, 1976

Methylene chloride is the common name for dichloromethane.

"Occupational exposure to methylene chloride" is defined as exposure above one-half the daily time-weighted average (TWA) exposure limit, except when there is also exposure to carbon monoxide (CO) at more than 9 ppm.

Because the toxicities of CO and methylene chloride are additive, the appropriate environmental limit and action level of methylene chloride must be reduced in the presence of CO. When CO levels are more than 9 ppm "occupational exposure to methylene chloride" shall be determined from the following formula:

$$\frac{C(CO)}{L(CO)} + \frac{C(CH_2Cl_2)}{L(CH_2Cl_2)} \leq 0.5$$

where:

$C(CO)$ = TWA exposure concentration of CO, ppm
$L(CO)$ = the recommended TWA exposure limit of CO = 35 ppm
$C(CH_2Cl_2)$ = TWA exposure concentration of methylene chloride, ppm
$L(CH_2Cl_2)$ = the recommended TWA exposure limit of methylene chloride = 75 ppm

Exposure to methylene chloride below the appropriate occupational exposure level as defined above will require adherence to Section 4(a)(4), Section 6(d), and Sections 7(a) and (b).

1. In the absence of occupational exposure to CO above a time-weighted average (TWA) of 9 ppm for up to a 10-hour workday, occupational exposure to methylene chloride shall be controlled so that workers are not exposed to methylene chloride in excess of 75 ppm (261 mg/m³) determined as a TWA for up to a 10-hour workday, 40-hour workweek.

2. In the presence of exposure to CO in the work environment at more than 9 ppm determined as a TWA exposure for up to a 10-hour workday, exposure limits of CO, or methylene chloride, or both shall be reduced to satisfy the relationship:

$$\frac{C(CO)}{L(CO)} + \frac{C(CH_2Cl_2)}{L(CH_2Cl_2)} \leq 0.5$$

where:

$C(CO)$ = TWA exposure concentration of CO, ppm
$L(CO)$ = the recommended TWA exposure limit of CO = 35 ppm
$C(CH_2Cl_2)$ = TWA exposure concentration of methylene chloride, ppm
$L(CH_2Cl_2)$ = the recommended TWA exposure limit of methylene chloride = 75 ppm

3. Occupational exposure shall be controlled so that workers are not exposed to methylene chloride above a peak concentration of 500 ppm (1740 mg/m³) as determined by any 15-minute sampling period. The standard is designed to protect the health and safety of workers for up to a 10-hour workday, 40-hour workweek, over a working lifetime.

NFPA—hazardous chemical
health—2, flammability—1, reactivity—0

TSCA 4(e), ITC
Second Report of the TSCA Interagency Testing Committee to the administrator, Environmental Protection Agency, April 1978; 43 FR 16684, April 19, 1978, responded to by the EPA administrator, 46 FR 30300, June 5, 1981, removed from the Priority List in the Ninth Report of the TSCA Interagency Testing Committee to the administrator, Environmental Protection Agency, October 30, 1981, 47 FR 5456, February 5, 1982

*TSCA 8(d), Unpublished Health and Safety Studies Reporting, 40 CFR 716, 47 FR 387, September 2, 1982

TSCA-CHIP available

CWA 307(a)(1), 40 CFR 125, Priority Pollutant

CAA 112
Chemical proposed to be delisted as a Hazardous Air Pollutant by a House of Representatives bill to amend the CAA.

*RCRA 40 CFR 261
[illegible] waste no. [illegible]

NAPHTHALENE. [91-20-3]

*OSHA 29 CFR 1910.1000 Table Z-1
PEL (TWA): 10 ppm, 50 mg/m^3

ACGIH-TLV
TWA: 10 ppm, 50 mg/m^3
STEL: 15 ppm, 75 mg/m^3

FIFRA—Registration Standard—Issued September 1981 (insecticide)

NFPA—hazardous chemical
health—2, flammability—2, reactivity—0

CWA 304(a)(1), 45 FR 79318, November 28, 1980, Water Quality Criteria

Freshwater Aquatic Life

The available data for naphthalene indicate that acute and chronic toxicity to freshwater aquatic life occur at concentrations as low as 2300 and 620 μg/liter, respectively, and would occur at lower concentrations among species that are more sensitive than those tested.

Saltwater Aquatic Life

The available data for naphthalene indicate that acute toxicity to saltwater aquatic life occurs at concentrations as low as 2350 μg/liter and would occur at lower concentrations among species that are more sensitive than those tested. No data are available concerning the chronic toxicity of naphthalene to sensitive saltwater aquatic life.

Human Health

Using the present guidelines, a satisfactory criterion cannot be derived at this time due to the insufficiency in the available data for naphthalene.

CWA 307(a)(1), Priority Pollutant

*CWA 311(b)(2)(A), 40 CFR 116, 117
Discharge RQ = 5000 pounds (2270 kilograms)

*RCRA 40 CFR 261
EPA hazardous waste no. U165 (hazardous substance)

***N*-NITROSODIPHENYLAMINE.**
[86-30-6]

NCI– carcinogenic in animals

CWA 307(a)(1), 40 CFR 125, Priority Pollutant

TSCA-CHIP available

***p*-NITROSODIPHENYLAMINE.**
[156-10-5]

NCI –carcinogenic in animals

PHENANTHRENE. *See* Coal tar pitch volatiles. [85-01-8]

CWA 307(a)(1), 40 CFR 125, Priority Pollutant

PYRENE. *See* Coal tar pitch volatiles. [129-00-0]

CWA 307(a)(1), 40 CFR 125, Priority Pollutant

PHENOL. [108-95-2]

*OSHA 29 CFR 1910.1000 Table Z-1

Skin

PEL(TWA): 5 ppm, 19 mg/m³

ACGIH-TLV

Skin.

TWA: 5 ppm, 19 mg/m³
STEL: 10 ppm, 38 mg/m³

NIOSH Criteria Document (Pub. No. 76-196), NTIS Stock No. PB 266495, July 1, 1976

"Phenol" in this recommended standard includes solids, aerosols, vapor, or solutions containing phenol. "Occupational exposure to phenol" is defined as exposure to phenol at airborne concentrations exceeding one-half the recommended TWA environmental limit. Exposure at lower concentrations shall require adherence to Sections 3, 4(a), 4(b), and 6.

Occupational exposure to phenol shall be controlled so that no employee is exposed to phenol at concentrations greater than 20 mg/m³ in air determined as a time-weighted average (TWA) concentration for up to a 10-hour workday, 40-hour workweek, or to more than 60 mg phenol/m³ of air as a ceiling concentration for any 15-minute period.

The standard is designed to protect the health and provide for the safety of employees for up to a 10-hour workday, 40-hour workweek, over a working lifetime.

NFPA—hazardous chemical
health—3, flammability—2, reactivity—0

CWA 304(a)(1), 45 FR 79318, November 28, 1980, Water Quality Criteria

Freshwater Aquatic Life

The available data for phenol indicate that acute and chronic toxicity to freshwater aquatic life occur at concentrations as low as 10,200 and 2560 μg/liter, respectivity, and would occur at lower concentrations among species that are more sensitive than those tested.

Saltwater Aquatic Life

The available data for phenol indicate that acute toxicity to saltwater aquatic life occurs at concentrations as low as 5800 μg/liter and would occur at lower concentrations among species that are more sensitive than those tested. No data are available concerning the chronic toxicity of phenol to sensitive saltwater aquatic life.

Human Health

For comparison purposes, two approaches were used to derive criterion levels for phenol. Based on available toxicity data, for the protection of public health, the derived level is 3.5 mg/liter. Using available organoleptic data, for controlling undesirable taste and odor quality of ambient water, the estimated level is 0.3 mg/liter. It should be recognized that organoleptic data as a basis for establishing a water quality criterion have limitations and have no demonstrated relationship to potential adverse human health effects.

CWA 307(a)(1), Priority Pollutant

*CWA 311(b)(2)(A), 40 CFR 116, 117
Discharge RQ = 1000 pounds (454 kilograms)

CAA 112
Chemical proposed to be assessed as a Hazardous Air Pollutant by a House of Representatives bill to amend the CAA

*RCRA 40 CFR 261
EPA hazardous waste no. U188 (hazardous substance)

LYCHLORINATED BIPHENYLS
CBs). [1336-36-3]

NIOSH Criteria Document (Pub. No. 77-
), NTIS Stock No. PB 276849, Sep-
ber 27, 1977

"s" are defined for this recommended
ard as commercial preparations of
orinated biphenyl compounds, including
ose preparations that may be described as
ngle isomers or classes of isomers, such as
achlorodiphenyl. Biphenyl and its mo-
chlorinated derivatives occurring in com-
nercial preparations of PCBs shall be
asured along with the polychlorinated
ivatives, and shall be treated in this stan-
ard as the polychlorinated components of
e preparations.

"Occupational exposure to PCBs" is de-
ned as working with PCBs or with equip-
ment containing PCBs that can become air-
rne or that can spill or splash on the skin
into the eyes, or the handling of any solid
roducts that may result in exposure to PCBs by skin contact or by inhalation. The term "PCB work area" is defined as an area where there is occupational exposure to PCBs. In areas where no occupational exposure to PCBs occurs, but where PCBs are present in equipment in the workplace, adherence is required only to Section 8(a).

Occupational exposure to polychlorinated biphenyls (PCBs) shall be controlled so that no worker is exposed to PCBs at a concentration greater than 1.0 $\mu g/m^3$, determined as a time-weighted average (TWA) concentration, for up to a 10-hour workday, 40-hour workweek. The standard is designed to protect the health and provide for the safety of employees for up to a 10-hour workday, 40-hour workweek, over a normal working lifetime.

NIOSH Current Intelligence Bulletin No. 7—cancer-related bulletin

OSHA Candidate List of Potential Occupational Carcinogens (EPA Carcinogen Assessment Group List), 45 FR 53672, August 12, 1980

IARC—carcinogenic in animals

*TSCA 40 CFR 761

I. *Disposal*

—43 FR 7150, February 17, 1978
Polychlorinated Biphenyls (PCBs), Disposal and Marking.

Action: Final Rule.

—48 FR 13181, March 30, 1983
Polychlorinated Biphenyls (PCBs): Procedural Amendment of the Approval Authority for PCB Disposal Facilities and Guidance for Obtaining Approval.

Action: Procedural Rule Amendment and Statement of Policy.

II. *Ban Regulation*

—44 FR 31514, May 31, 1979
Polychlorinated Biphenyls (PCBs): Manufacturing, Processing, Distribution in Commerce, and Use Prohibitions; Criteria Modification; Hearings

III. *Electrical Equipment/Totally Encl*

—46 FR 16090, March 10, 1981
Polychlorinated Biphenyls (PCBs) Manufacturing, Processing, Distribution in Commerce, and Use Prohibitions; Use in Electrical Equipment; Court Order on Inspection and Maintenance.

Action: Rule-Related Court Order and Enforcement Notice.

—47 FR 37342, August 25, 1982
Polychlorinated Biphenyls (PCBs) Manufacturing, Processing, Distribution in Commerce, and Use Prohibitions; Use in Electrical Equipment.

Action: Final Rule.

—47 FR 54436, December 3, 1982
Polychlorinated Biphenyls (PCBs) Manufacturing, Processing, Distribution in Commerce, and Use Prohibitions; Use in Electrical Equipment; Correction.

Action: Rule; Correction.

—48 FR 5729, February 8, 1983
Polychlorinated Biphenyls (PCBs) Manufacturing, Processing, Distribution in Commerce, and Use Prohibitions; Incorporations by Reference; Revisions [incorporates certain revised test methods of the American Society for Testing and Materials (ASTM).]

Action: Final Rule.

—48 FR 15125, April 7, 1983
Polychlorinated Biphenyls (PCBs) Manufacturing, Processing, Distribution in Commerce, and Use Prohibitions; Incorporations by Reference; Revisions; Correction.

Action: Final Rule; Correction.

—48 FR 7172, February 18, 1983
Polychlorinated Biphenyls (PCBs) Manufacturing, Processing, Distribution in Commerce, and Use Prohibitions; Use in Electrical Equipment; Statement of Policy (statement of [illegible] the agency will [illegible]

poses an exposure risk to food or feed).

Action: Rule-Related Notice: Statement of General Policy.

IV. *A. Railroads*

—48 FR 124, January 3, 1983 Polychlorinated Biphenyls (PCBs) Manufacturing, Processing, Distribution in Commerce, and Use Prohibitions; Amendment to Use Authorization for PCB Railroad Transformers.

Action: Final Rule.

V. *Closed and Controlled*

—47 FR 46980, October 21, 1982 Polychlorinated Biphenyls (PCBs): Manufacturing, Processing, Distribution in Commerce, and Use Prohibitions: Use in Closed and Controlled Waste Manufacturing Processes.

Action: Final Rule.

—48 FR 4467, February 1, 1983 Polychlorinated Biphenyls (PCBs) Manufacturing, Processing, Distribution in Commerce, and Use Prohibitions: Use in Closed and Controlled Waste Manufacturing Processes: Correction.

Action: Rule: Correction.

CWA 304(a)(1), 45 FR 79318, November 28, 1980, Water Quality Criteria

Freshwater Aquatic Life

For polychlorinated biphenyls the criterion to protect freshwater aquatic life as derived using the guidelines is 0.014 µg/liter as a 24-hour average. The available data indicate that acute toxicity to freshwater aquatic life probably will occur only at concentrations above 2.0 µg/liter and that the 24-hour average should provide adequate protection against the acute toxicity.

Saltwater Aquatic Life

For polychlorinated biphenyls the criterion to protect saltwater aquatic life as derived using the guidelines is 0.030 µg/liter as a 24-hour average. The available data indicate that acute toxicity to saltwater aquatic life probably will occur only at concentrations above 10 µg/liter and that the 24-hour average should provide adequate protection against acute toxicity.

Human Health

For the maximum protection of human health from the potential carcinogenic effects due to exposure of PCBs through ingestion of contaminated aquatic organisms, the ambient water concentration should be zero based on the nonthreshold assumption for this chemical. However, zero level may not be attainable at the present time. Therefore, the levels that may result in incremental increase of cancer risk over the lifetime are estimated at 10^{-5}, 10^{-6} and 10^{-7}. The corresponding criteria are 0.79 ng/liter, 0.079 ng/liter, and 0.0079 ng/liter, respectively. If the above estimates are made for consumption of aquatic organisms only, excluding consumption of water, the levels are 0.79 ng/liter, 0.079 ng/liter, and 0.0079 ng/liter, respectively. Other concentrations representing different risk levels may be calculated by use of the guidelines. The risk estimate range is presented for information purposes and does not represent an agency judgment on an "acceptable" risk level.

*CWA 311(b)(2)(A), 40 CFR 116, 117
Discharge RQ = 10 pounds (4.54 kilograms)

CAA 112
Chemical proposed to be assessed as a Hazardous Air Pollutant by a House of Representatives bill to amend the CAA

TOLUENE (TOLUOL). [108-88-3]

*OSHA 1910.1000 Table Z-2
200 ppm, 8-hour TWA
300 ppm, acceptable ceiling concentration
500 ppm/10 minutes, acceptable maximum peak

ACGIH-TLV

Skin

TWA: 100 ppm, 375 mg/m^3
STEL: 150 ppm, 560 mg/m^3

NIOSH Criteria Document (Pub. No. 73-10023), NTIS Stock No. PB 222219, January 7, 1974

"Exposure to toluene" means exposure to a concentration of toluene equal to or above one-half the recommended workroom environmental standard. Exposures at lower environmental concentrations will not require adherence to the recommended standard.

Occupational exposure to toluene shall be controlled so that workers shall not be exposed to toluene at a concentration greater than 100 parts per million parts of air (375 mg/m^3 of air) determined as a time-weighted average (TWA) exposure for an 8-hour workday with a ceiling of 200 parts per million parts of air (750 mg/m^3 of air) as determined by a sampling time of 10 minutes.

The standard is designed to protect the health and safety of workers for an 8-hour workday, 40-hour workweek, over a working lifetime.

NFPA—hazardous chemical
health—2, flammability—3, reactivity—0

TSCA 4(e), ITC
Initial Report to the administrator, Environmental Protection Agency, TSCA Interagency Testing Committee, October 1, 1977; 42 FR 55026, October 12, 1977; responded to by the EPA administrator 43 FR 50134, October 26, 1978; 47 FR 56391, December 16, 1982

*TSCA 8(a), 40 CFR 712, 47 FR 26992, June 22, 1982, Chemical Information Rule

*TSCA 8(d) Unpublished Health and Safety Studies Reporting, 40 CFR 716, 47 FR 387, September 2, 1982

TSCA-CHIP available

CWA 304(a)(1), 45 FR 79318, November 28, 1980, Water Quality Criteria

Freshwater Aquatic Life

The available data for toluene indicate that acute toxicity to freshwater aquatic life occurs at concentrations as low as 17,500 μg/liter and would occur at lower concentrations among species that are more sensitive than those tested. No data are available concerning the chronic toxicity of toluene to sensitive freshwater aquatic life.

Saltwater Aquatic Life

The available data for toluene indicate that acute and chronic toxicity to saltwater aquatic life occur at concentrations as low as 6300 and 5000 μg/liter, respectively, and would occur at lower concentrations among species that are more sensitive than those tested.

Human Health

For the protection of human health from the toxic properties of toluene ingested through water and contaminated aquatic organisms, the ambient water criterion is determined to be 14.3 mg/liter.

For the protection of human health from the toxic properties of toluene ingested through contaminated aquatic organisms alone, the ambient water criterion is determined to be 424 mg/liter.

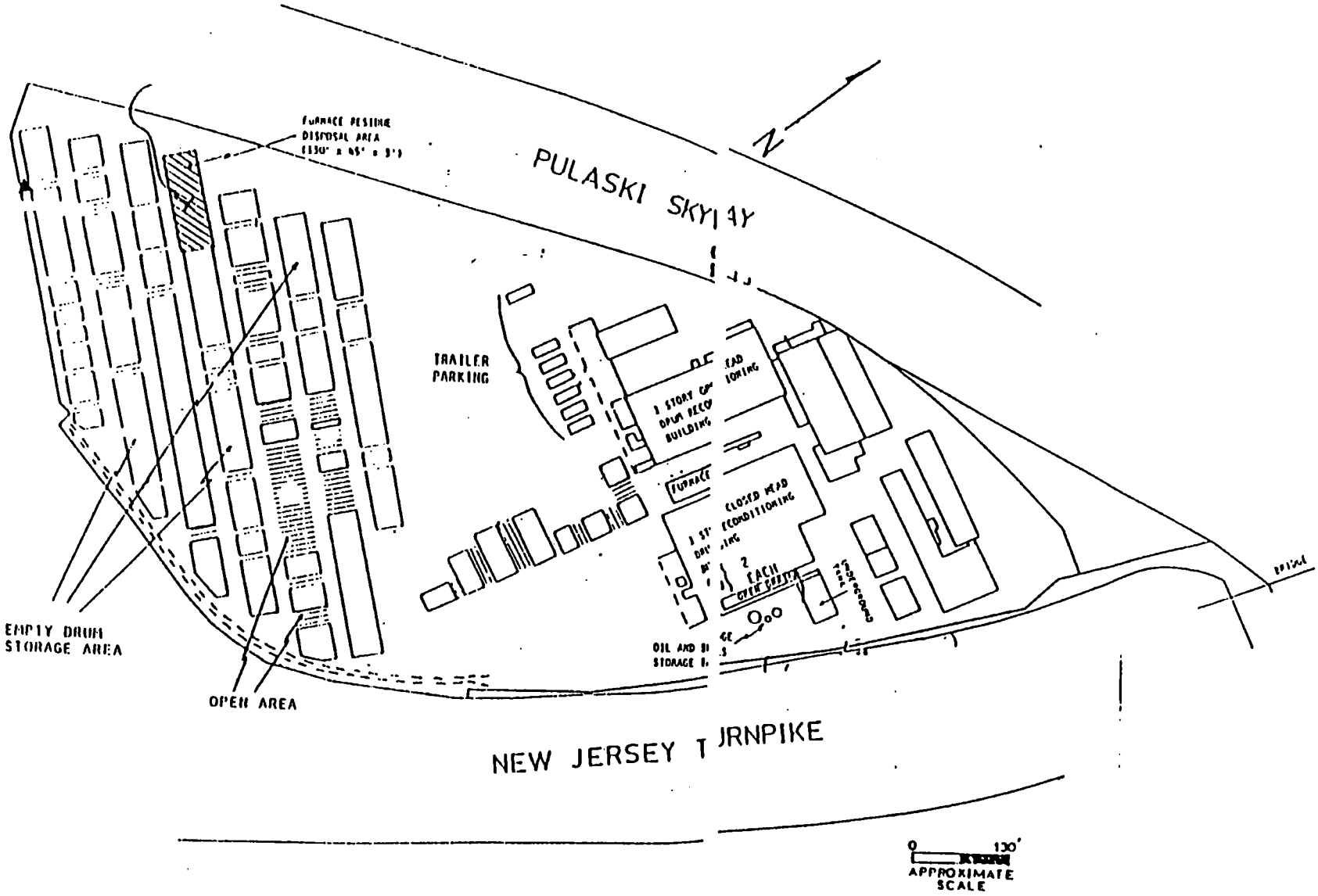
CWA 307(a)(1), Priority Pollutant
*CWA 311(b)(2)(A), 40 CFR 116, 117
Discharge RQ = 1000 pounds (454 kilograms)

CAA 112
Chemical proposed to be assessed as a Hazardous Air Pollutant by a House of Representatives bill to amend the CAA

*RCRA 40 CFR 261
EPA hazardous waste no. U220

APPENDIX 4

SITE MAP



FURNACE RESIDUE DISPOSAL AREA
PULASKI SKYWAY
N
TRAILER PARKING
FURNACE
CLOSED HEAD
EACH
EMPTY DRUM STORAGE AREA
OPEN AREA
NEW JERSEY TURNPIKE
0
130'
APPROXIMATE SCALE

APPENDIX E

CONSENT AGREEMENT

Ted

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION II

In the Matter of BAYONNE BARREL & DRUM COMPANY NJD009871401, Respondent. Proceeding Under Section 3008 of the Solid Waste Disposal Act, as amended.	CONSENT AGREEMENT AND CONSENT ORDER Docket No. II RCRA-82-0115

Preliminary Statement

This administrative proceeding was instituted pursuant to Section 3008 of the Solid Waste Disposal Act, as amended, 42 U.S.C. §6901 et seq. ("the Act"). [Note: Among the statutes amending the Act is the Resource Conservation and Recovery Act, 90 Stat. 2795, P.L. 94-580 (1976).]

The Director of the Enforcement Division of the U.S. Environmental Protection Agency ("EPA"), Region II, Complainant in this proceeding, issued a Complaint, Compliance Order, and Notice of Opportunity for Hearing to Respondent, Bayonne Barrel & Drum Company, on May 21, 1982. Said document charged Respondent with certain violations of Sections 3004 and 3005 of the Act, 42 U.S.C. §§6924 and 6925, respectively, and the regulations promulgated thereunder.

1. Respondent owns and operates a steel container reconditioning plant located at 150 Raymond Boulevard, Newark, New Jersey 07105 ("the plant").

2. Respondent informed EPA, pursuant to Section 3010 of the Act, that it conducts activities at the plant involving "hazardous waste," as that term is defined in Section 1004(5) of the Act, 42 U.S.C. §6904(5) and in 40 CFR §261.3. Respondent did not submit Part A of a hazardous waste permit application pursuant to 40 CFR §122.22.

3. On January 27, 1982 and March 3, 1982, inspections of the plant were conducted by a duly designated representative of EPA pursuant to Section 3007 of the Act, 42 U.S.C. §6927. Said inspections were conducted for the purpose of enforcing the EPA regulations for hazardous waste management, 40 CFR Parts 260 through 265 (published in 45 Fed. Reg. 33073 et seq., May 19, 1980, and as later amended), promulated pursuant to Subtitle C of the Act, 42 U.S.C. §6921 et seq.

4. The Complainant contends and the Respondent denies that the above-referenced inspections revealed that Respondent's facility was being used for the generation, storage, and disposal of hazardous waste.

5. Section 3005(a) of the Act, 42 U.S.C. §6925(a) and 40 CFR §262.34(a), prohibits the storage of hazardous waste without a hazardous waste permit. At the time of the above-referenced January 27, 1982 and March 3, 1982 inspections, Complainant contends and Respondent denies that Respondent was disposing of hazardous sludge and ash on the ground without having received a hazardous waste permit. Respondent was, therefore, in violation of Section 3005(a) of the Act.

6. Section 3005(a) of the Act, 42 U.S.C. §6925(a) prohibits the storage of hazardous waste without a hazardous waste permit. At the time of the above-referenced January 27, 1982 and March 3, 1982 inspections, Respondent was storing

ash in a pile without having received a hazardous waste permit even though analysis by Respondent's licensed hazardous waste hauler had determined the ash to be hazardous. (Respondent contends that the storage of ash in a pile was temporary and was caused by Respondent's severe financial condition at the time.) Respondent was, therefore, in violation of Section 3005(a) of the Act. At the time of the March 3, 1982 inspection, Respondent was given two weeks to dispose of its hazardous sludge piles at an approved RCRA facility. On March 15, 1982 Respondent asked for an extension until March 29, 1982 to remove its hazardous waste sludge piles. As of March 31, 1982 hazardous waste sludge piles continued to be stored at Respondent's facility.

7. 40 CFR 265 sets standards for all hazardous waste treatment, storage, and disposal facilities. These standards apply until a final administrative disposition on a permit application has been made with respect to TSD facilities. No such final disposition has been made with respect to Respondent's facility. Respondent contends that it is a generator and that the standards of Part 265 do not apply to its plant. Respondent does admit that it temporarily stored ash in a pile at its plant for over ninety (90) days and contends that this was due to a lack of funds for removal and disposal.

8. 40 CFR §265.31 requires that the owner or operator of a hazardous waste treatment, storage, or disposal facility must maintain and operate that facility to minimize the possibility of a fire, explosion, or release of hazardous waste to the air, soil, or surface water. At the time of the above-referenced January 27, 1982 inspection, the Complainant contends that the duly-designated EPA representative observed a stream of hazardous waste originating from an overflowing

5,000 gallon settling tank. This hazardous waste stream flowed across Respondent's property into a storm sewer which empties directly into the Passaic River. The Complainant contends that Respondent was, therefore, in violation of 40 CFR §265.31.

9. 40 CFR §265.251 requires that the owner or operator of a facility that treats or stores hazardous waste in a pile cover or otherwise manage the pile so that wind dispersal is controlled. During the above-referenced January 27, 1982 and March 3, 1982 inspections, Complainant alleges that Respondent had not protected from wind dispersal, by cover or other means, a pile of ash constituting hazardous waste. Said waste pile was stored at Respondent's facility for more than ninety (90) days. Complainant alleges Respondent was in violation of 40 CFR §265.251. Respondent contends such waste pile was only temporarily stored more than ninety days and that the failure to protect the pile was due to a lack of funds.

10. 40 CFR §261.3(c)(2) provides that any solid waste generated from the treatment, storage or disposal of hazardous waste, including any leachate, is a hazardous waste unless and until proven otherwise. At the time of the above-referenced inspections, leachate was observed originating from Respondent's pile of hazardous waste ash, and was therefore a hazardous waste. 40 CFR §265.253 provides that where the leachate or run-off from a pile constitutes a hazardous waste, the pile must be placed on an impermeable base, compatible with the waste, run-on must be diverted and leachate collected from precipitation and run-on by some other means. At the time of the above-referenced inspections, Respondent's

waste pile was not adequately contained to prevent leachate from escaping. Respondent was, therefore, in violation of 40 CFR §265.253. Respondent contends that this was due to a lack of funds.

11. Respondent has informed the Complainant that on July 13, 1982 Respondent filed a Petition, pursuant to Chapter 11 of the Bankruptcy Act in U.S. Bankruptcy Court.

CONSENT AGREEMENT

Based upon the foregoing, and pursuant to Section 3008 of the Act, and Section 22.18 of the Consolidated Rules of Practices Governing the Administrative Assessment of Civil Penalties and the Revocation or Suspension of Permits, 40 CFR §22.18, it is hereby ORDERED that Respondent shall hereinafter comply with all relevant regulations at 40 CFR Parts 261 through 265. Specifically:

1. Respondent shall cease the disposal, treatment, or storage of hazardous waste at its facility unless and until Respondent complies with all applicable requirements for treatment, storage, or disposal of hazardous waste.

2. Respondent shall, by no later than thirty (30) days after the effective date of this Agreement, cease to store hazardous waste in piles and hazardous waste sludge in tanks at the facility.

3. Respondent shall immediately comply with the provisions of 40 CFR 262.34 governing the temporary accumulation of hazardous waste.

4. Respondent shall immediately cease disposal of hazardous waste from ruptured pipes, settling tanks, or holding tanks in any unauthorized manner.

(ii) Respondent shall install a manhole cover and warning device to insure that no liquid or sludge overflows the underground settling tank. The Respondent shall install a device to insure that the underground tank is properly vented.

(iii) Respondent shall remove contaminated soil surrounding all the storage and settling tanks and dispose of the waste in accordance with all applicable RCRA regulations.

(b) Oil/Water Separator and Pipe System

(i) Respondent shall remove soil and stone contaminated with hazardous waste from the area near the oil/water separator and dispose of that soil and stone in accordance with all applicable regulations. Respondent shall clean out the separator and insure that it does not overflow in the future by operating pumps, capping the trench, or taking other steps.

(ii) Respondent shall cease disposal of hazardous waste from ruptured pipes and insure that the pipe system is leak-proof.

(c) Waste Piles

Respondent shall remove from the facility hazardous waste piles and soil contaminated thereby (including run-off residue) and dispose of both in accordance with all applicable RCRA regulations. (A representative of EPA shall be present when soil is removed or excavated from the location in which the piles are or were located.)

(d) Incinerator Area

(i) Respondent shall immediately cease to dispose of hazardous waste incinerator ash on the ground at the facility.

(ii) Respondent shall remove hazardous waste and soil contaminated thereby from the area surrounding its incinerator (including the alleyway behind the incinerator) and dispose of the waste in accordance with all applicable RCRA regulations. Such removal shall occur prior to the installation of any cement or crushed stone pad or floor near the incinerator. Installation of a new type of floor or pad shall only occur after approval of the removal by an EPA representative.

(iii) Respondent shall remove contaminated soil surrounding the loading area of the conveyor belt entering the incinerator and dispose of the waste in accordance with all applicable RCRA regulations.

(iv) Respondent shall insure that the two underground tanks next to the incinerators do not overflow and shall demonstrate to an EPA representative that any tank to be used in the future does not leak and is not damaged or corroded.

8. Within ninety (90) days of the effective date of this Consent Agreement, Respondent shall submit to EPA Region II a detailed report of the activities which took place at the facility to comply with this Order.

9. Within one hundred and twenty (120) days of the effective date of this Consent Agreement, Respondent shall submit the results of post clean-up soil samples taken from each of the four areas designated in number 7(a) through (d)

of this Compliance Order to confirm removal of all contaminated soils at the site. These samples shall be collected in the presence of a representative of the EPA.

10. Within forty (40) days of the effective date of this Consent Agreement, Respondent shall submit to EPA representatives a proposed program for monitoring the groundwater at the facility sufficient to determine whether contamination of the groundwater has occurred and the extent and direction of movement of any contaminated plume. Within ninety (90) days of approval or modification by EPA representatives of the proposed program, Respondent shall implement the program required by EPA.

11. Respondent shall comply with the following requirements if it no longer wishes to own or operate a hazardous waste management facility:

Respondent shall, within ninety (90) days of the effective date of this Consent Order, submit to EPA a closure plan for Respondent's facility. The closure plan shall satisfy the requirements of 40 CFR §265.112(a) and 40 CFR 265.197 & 40 CFR 265.351 Within sixty days of the approval or modification by EPA of the proposed closure plan, Respondent shall comply with the approved or modified closure plan and shall implement that plan according to the schedule in the approved or modified plan. Respondent shall comply with other applicable requirements concerning closure set forth at 40 CFR Part 265, Subpart G or in equivalent New Jersey regulations.

~~B. Respondent shall, within one hundred and eighty (180) days of the effective date of this Consent Order, submit to EPA a post-closure plan for Respondent's facility. The post-closure plan shall satisfy the requirements of 40 CFR 265.117, 265.118 and 265.310. Within sixty (60) days of approval or modification by EPA of the proposed post-closure plan, Respondent shall comply with the approved or modified post-closure plan and shall implement that plan according to the schedule in the approved or modified plan.~~

12. Within forty (40) days of the effective date of this Consent Agreement, Respondent shall obtain or arrange for a bond or other financial assurance mechanism in the amount of at least $150,000.00 guaranteeing Respondent's performance of the steps described in this Consent Agreement. The arrangements and details concerning the selection and implementation of this financial assurance mechanism must be reviewed and approved in advance by EPA.

The provisions of this Consent Agreement shall apply to and be binding upon the parties to this action, affiliated companies, successors, and assigns.

This Consent Agreement is being entered into by the parties in full settlement of all liabilities which might have attached as a result of the proceedings. Respondent admits the jurisdictional allegations of the Complaint. Furthermore, Respondent has read the Agreement and neither admits nor denies specific factual allegations contained in the complaint. Respondent explicitly waives its right to request a hearing on the Complaint, this Agreement, or the attached

Consent Order. Respondent also waives its rights to contest the issuance or terms of this Order in any action to enforce its provisions.

BAYONNE BARREL & DRUM COMPANY

RESPONDENT:

BY: [illegible]

DATE: [illegible]

This document has been reviewed by the undersigned as counsel only for the Debtor in Possession.

SCHWARTZ, TOBIA & STANZIALE

BY: [illegible]
CHARLES A. STANZIALE, JR.

COMPLAINANT:

DOUGLAS R. BLAZEY
Regional Counsel
Office of Regional Counsel
EPA-Region II

DATE: August 28, 1984

The Regional Administrator of EPA, Region II concurs in the foregoing Consent Agreement. The Agreement entered into by the parties is hereby approved and issued, as an Order, effective immediately.

RICHARD P. DEWLING
Acting Regional Administrator
U.S. Environmental Protection
Agency - Region II
26 Federal Plaza
New York, New York 10278

DATE: 9/3/84

APPENDIX B

SITE SAFETY PLAN

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LOUIS BERGER & ASSOCIATES

SITE SAFETY PLAN

SITE: Bayonne Barrel & Drum

LOCATION: Raymond Blvd. at the N.J. Turnpike, Newark, N.J.

DESCRIPTION: Closed down drum reconditioner cited by USEPA for RCRA violations.

KNOWN AND SUSPECTED CONTAMINANTS: A variety of organic compounds and heavy metals have been found on the property during a preliminary investigation by USEPA.

SUBCONTRACTORS: O.H. Materials

SITE SAFETY OFFICER: Tim Prothero

APPROVED: Timothy G. Prothero
Corporate Health & Safety Officer

DATE: 11 April 1986

R. Anba Bhillod
Manager, Hazardous Waste Services

DATE: April 11, 1986

1. Site Description

This site is a 15-20 acre property fenced in on all sides. There is a number of buildings at the northern end of the site in which cleaning and reconditioning operations were undertaken. There is the site of an incinerator (it is not known at this time if the incinerator still exists) between the buildings and a settling tank between the buildings and the Turnpike, the areas around both of which are known to be contaminated. Nominally empty drums are stacked on the open area at the south of the property and is suspected that many contain residues of a variety of chemicals. There is also a contaminated ash pile in this area (ash from the incinerator).

The area to be investigated is a stretch about 200 ft. deep and 1500 ft long along the Turnpike fence. It contains parts of two buildings, the settling tanks, some above ground and underground storage tanks, and "empty" drum storage areas. Drum shredding was seen in this area with the discharge of the remnants of the drum contents to the ground. The area to be investigated is not separately fenced off but it is within the facility's overall perimeter fence.

A list of chemicals found by USEPA during their preliminary investigation of the site is attached as Appendix 1. When the USEPA team entered the site they tested air quality with an organic vapor analyzer (OVA) for air characterization and an MSA Combustible Gas Meter for oxygen/explosive vapor monitoring. No oxygen deficiency or potentially combustible atmospheres were observed. The background reading on the OVA was 2 ppm. No further air analysis was performed to identify background airborne constituents.

2. Responsible Personnel

2.1 Responsible LBA Personnel

Project Manager - Andrew Blelloch
Office Phone # (201) 678-1960
Home Phone # (609) 799-1475

Site Safety Officer - Tim Prothero
Office Phone # (201) 678-1960

2.2 Responsible Subcontractor Personnel

The Subcontractor shall provide their own site safety plan which must at a minimum meet the safety conditions in the LBA Site Safety Plan. Additional safety precautions may be taken by the Subcontractor at their own discression. The Subcontractor shall identify the member of their field team who will serve as the Subcontractor's Safety Officer.

The Subcontractor's field team shall include the Subcontractor's Safety Officer. The Subcontractor shall identify the Subcontractor's Safety Officer to LBA prior to commencement of field work.

3. Site Monitoring

The sampling subcontractor will carry out air quality monitoring on entering the site and at any time when a risk of air contamination is suspected or on instruction of the Site Safety Officer using an OVA or MSA Combustible Gas Meter, or similar direct reading air monitoring instrumentation.

4. Level of Protection

Based on the information provided in August 1984 TAT report to USEPA, atmospheric contamination at the site is believed to be minimal. There were special areas where readings on an OVA exceeded background and they include:

"Sump pit" near incinerator's conveyor	-	45 times background
Inside an open drum marked TDI	-	5 times background
Over soil near a leaking drum	-	10 times background
Southeast corner of site	-	5 times background
Over mud by ash pile	-	5 times background

The remainder of the site was reported at or below the background measurement.

Due to the "open-air" nature of the site and the natural ventilation provided by wind, the site is not believed to pose any respiratory hazards during soil and water sampling. Therefore, sampling personnel should be adequately protected in EPA's "Level C" protection using general organic cartridges or cannisters with particulate prefilters in open portions of the site.

A higher degree of respiratory protection is required in areas which are above twice the background readings. These areas will generally be in enclosed spaces or near recent chemical spills. At times the site may exceed background during periods of atmospheric stagnation or inversion conditions. When air monitoring instruments consistently read two or three times background, then an USEPA "Level B" protection should be used. Level B protection shall also be used when handling or sampling actual, concentrated chemicals, as opposed to contaminated soil or water.

5. Site Control

Site security is the responsibility of the property owners and not under any control by LBA or its subcontractors. Sampling personnel should attempt to keep unauthorized persons away from all sampling and field activities.

6. Decontamination Procedures

All contaminated disposable clothing and equipment will be collected in drums for proper disposal. Non-disposable boots and gloves will be washed before leaving the site. Personnel should wash or shower after working at the site.

Emergency decontamination during a medical emergency will consist of removal of the victim outer protective clothing. If chemical contamination is involved in the emergency situation, the victim will be washed with excess

water until an ambulance arrives. If chemical contamination is not involved then the ambulance and/or hospital will be advised to complete any decontamination of the victim as they see fit.

7. Contingency Plan

In the event of any incident involving the imminent or actual release of a significant quantity of hazardous materials to the ground or air the person-in-charge at the site shall take the following actions:

1. Excavate all non-essential personnel from any area within the site where they could become exposed to the hazard.

2. Call the Newark Fire Department who have responsibility for coordinating response to hazardous waste incidents in the City of Newark.

3. Ensure that any personnel injured or exposed to hazardous materials receive appropriate treatment.

8. Emergency Phone Numbers

1.	Newark City Fire Department*	-	(201) 737-7400
2.	Newark City Police Department	-	(201) 911
3.	Ambulance	-	(201) 456-6290
4.	N.J. Department of Environmental Protection	-	(609) 292-7172
5.	U.S. Government	-	(800) 424-8804
6.	Gateway Health Services (Medical advice) Dr. Holstein/Dr. Gronnemeyer	-	(201) 225-5454

* Primary response responsibility

APPENDIX C

QUALITY ASSURANCE PROGRAM AND CHAIN OF CUSTODY DOCUMENTS

REMEDIAL INVESTIGATION OF BAYONNE BARREL AND DRUM
AND NEWARK DRIVE-IN MOVIE THEATER SITES

By

Louis Berger & Associates, Inc.
100 Halsted Street
East Orange, New Jersey 07019

QUALITY ASSURANCE PROJECT PLAN

Approved By

1. Nicholas Masucci — Dated 5/22/86
Nicholas Masucci
Project Manager

2. Manzoor Hussain — Dated 5.1.86
Manzoor Hussain, Ph.D.
Quality Assurance Coordinator

3. Andrew Bielloch — Dated 5/22/86
R. Andrew Bielloch, P.E.
Principal Investigator

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I. PROJECT DESCRIPTION

This project involves remedial investigation as described below:

A. Bayonne Barrel and Drum Company

A section of the property of a former drum recycler is to be taken for widening of the N.J. Turnpike. The facility has been cited by USEPA for RCRA violations in that it stored ash from an incinerator and sludges from a settling pond, both of which are hazardous wastes, for more than 90 days.

A preliminary investigation has been carried out by the USEPA and a variety of hazardous substances were found on site. As a result of consent decrees the owner has commissioned a second investigation. This is an investigation of specific classes of chemicals and not necessarily those found at the site during the USEPA investigation. The results of this investigation have not been made available to Louis Berger & Associates, Inc. (LBA) at this time.

LBA staff observing the site from the Turnpike ROW noted that drums were being shredded on site. Though the drums are nominally empty, stream ran from the shredder and a chemical odor was noted. As a large number of drums are stored at the site, many appearing to be perforated by corrosion, it is suspected that the site may be widely contaminated and that a range of contaminants different from those found by the USEPA may be present.

This investigation is limited to a portion of the property to be taken for the Turnpike widening which includes the settling tank, various above and underground tanks, part of two buildings and part of the drum storage area.

Soil samples taken at various randomly selected sampling locations at two depths (0-18" and 18-36"), soil samples from monitoring wells (0-18", 5' and 10'), water samples from monitoring wells and, if desired, swipe samples from walls and/or floors of the buildings will be taken for analysis. Soil samples will include grab-samples and composits. The samples will be tinted for the full range of 127 priority pollutant chemicals and 40 peaks for additional chemicals. These chemicals will include volatile organic analytes (VOA), base/neutral and acid extractable compounds, pesticides and PCB's and metals.

B. Newark Drive-In Movie Theater

This is a former theater site immediately to the southwest of Bayonne Barrel and Drum Company site. There are no known hazardous substances present at the site. From this site soil samples from 0-18" depth, soil core samples from monitoring well (0-18", 5', 10') and well-water samples will also be taken and analyzed for full range of 127 priority pollutants and 40 additional peaks. Soil samples will include grab-samples and composits.

The investigation will be conducted in two stages, with the results of the first stage guiding the work of the second.

In the first part of the study the sampling will be done during April 1986 and for the second part during June 1986. The data will be analyzed and the report written during July-August 1986.

The data acquired from this study will provide preliminary information regarding the nature and degree of contamination of the two study sites with toxic chemicals. The data will indicate whether or not a more detailed study will be needed to more precisely locate contaminated areas and to identify clean-up procedures.

The scope of this investigtion is limited and the study is intended to provide reasonable assurance that any extensive contamination will be located. It can not guarantee that all contamination will be located or that contamination not located is not of particularly toxic nature.

II. PROJECT ORGANIZATION AND RESPONSIBILITIES

Mr. Andrew Blelloch, Principal Environmental Engineer will be Project Manager and will coordinate the overall project activities; Dr. Manzoor Hussain, Principal Chemist will be Project Quality Assurance Coordinator and Mr. Tim Prothero will be Site Safety Officer. Other LBA personnel will be involved in the project if and when the need develops. Sampling site selection procedures will be followed as described in project study protocol (Chapter A, Sample Site Selection Procedures) shown in Appendix I. Sample collection will be done by O.H. Materials Corporation, Windsor, New Jersey who will follow sample collection and sample handling procedures as shown in Appendix II. All laboratory analysis will be carried out by Environmental Testing and Certification Laboratories, Edison, New Jersey who will follow their sample analysis protocols and quality assurance standards.

Project organization and line authority chart is shown in Figure 1.

The following individuals will be involved in this project and will be responsible for ensuring collection of valid measurement data and the routine assessment of measurement systems for precision and accuracy:

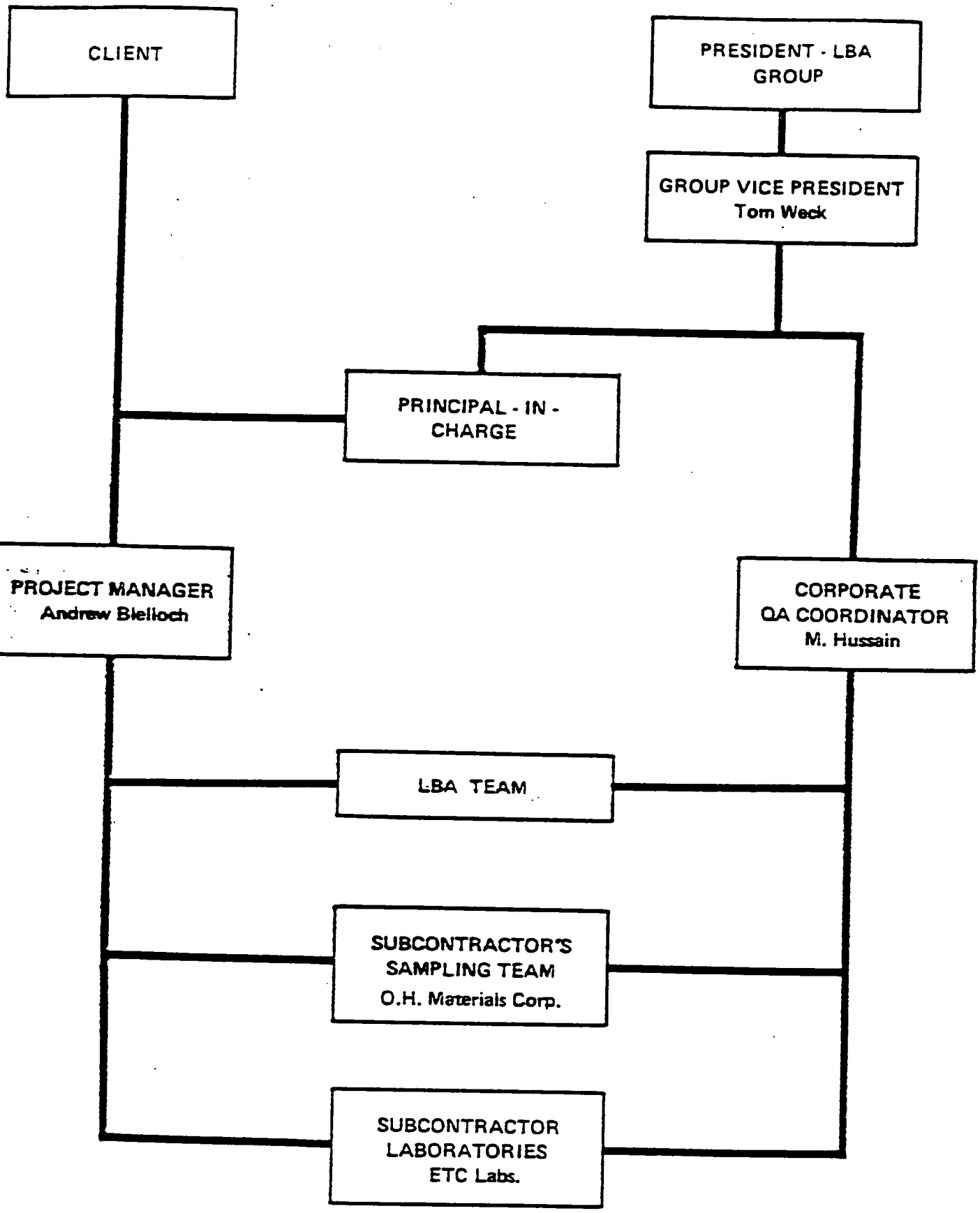
1. Andrew Blelloch, P.E., Principal Environmental Engineer, Project Manager

2. Manzoor Hussain, Ph.D., Principal Chemist, Project Quality Assurance Coordinator

3. Tim Prothero, Site Safety Officer.

Figure 1

PROJECT ORGANIZATION AND LINE AUTHORITY CHART



III. QUALITY ASSURANCE OBJECTIVES

The basic objective of the QA plan is the measurement of data so that it is precise, accurate, complete, representative and comparable.

All measurements will be made so that the results are representative of the media (soil, water, etc.) and conditions being measured. The analysis will be performed by ETC Laboratories which is a EPA-CLP-IFP laboratory and has been approved by the NJDEP Division of Waste Management. The report will be prepared in CLP format.

Data quality objectives for accuracy and precision established for each measurement parameter will be based on prior knowledge of the measurement system employed and method validation studies using replicates, spikes, standards, calibrations, recovery studies of the specific project.

IV. SAMPLING PROCEDURES

A. General

Since the purpose of sampling and analysis is to acquire and measure a small portion of the bulk material and apply the data generated to the entire bulk of material, a certain number of samples will be taken which should statistically represent the bulk materials in the area. Two types of soil samples will be taken, namely grab samples and composite samples.

Grab samples are randomly drawn using a table of random numbers. This method ensures minimization of differences between the samples and bulk material. However, random sampling also has limitations since hazardous waste sites in general do not have wastes randomly distributed throughout and random sampling of non-normal distributions is not valid.

Composite samples are special types of representative samples. In this method samples are taken from various points, pooled and analyzed as one sample. However, composite samples also have limitations and the analyses of such samples do not show any between-sample variability. To overcome this problem, duplicate samples are taken. Moreover, compositing can dilute concentrations of toxic materials unevenly distributed in the area.

NJDEP and USEPA do not encourage sampling by compositing method alone but encourage grab sampling methodology. Therefore, both types of sampling will be included in the plan. In general three matrices will be sampled and analyzed, namely soil and water from the land and scrappings or debris from the floors and walls of the buildings. The number and types of samples from each matrix in each study site will be selected as described in the sample site selection protocol. The grab sample sites will be selected using random sampling procedure and composite samples will be taken at the discretion of the project manager.

The project manager and other personnel involved in the project will document all information and data in field notebooks which will be subject to QA audits. Any loose sheets/maps etc. will be treated as raw data and will be kept with the field notebooks in a separate binder. These documents will also be treated as official documents.

The sampling site selection methods will be adequately described in the notebook and a map of the study site drawn to a known scale and sampling site locations shown on the map with measureable distances to landmarks on the location.

The sampling sites will be code-numbered for record keeping purposes and easy identification. Each site will be described according to visual observation and any special features noted.

Sampling procedures will follow sampling protocol. This will require including the following information:

(i) Inclusion of specific sampling procedures to be used (by reference in the case of standard procedures, and by actual description of the entire procedure in the case of nonstandard procedures).

(ii) Charts, flow diagrams, maps or tables delineating sampling program operations.

(iii) A description of containers, procedures, reagents, etc. used for sample collection, presentation, transport, and storage.

(iv) Special conditions for the preparation of sampling equipment and containers to avoid sample contamination (e.g. containers for organics should be solvent rinsed; containers for trace metals should be acid-rinsed).

(v) Sample preservation methods and holding times.

(vi) Time considerations for shipping samples promptly to the laboratory.

(vii) Forms, notebooks and procedures to be used to record sample history, sampling conditions and analyses to be performed.

B. Sampling Equipment

The LBA Project QA Coordinator will confirm that clean sampling equipment is used in accordance with Appendix III., Equipment Cleaning. All sampling equipment must be either teflon or stainless steel. Samples taken with nickel-chrome steel tools cannot be used for metals analysis, and therefore, are not desirable.

C. Equipment Cleaning

The LBA Project QA Coordinator will confirm the following equipment cleaning protocols:

- Groundwater Bailers - cleaned by laboratory off-site. Each bailer is to be used at one well only between off-site cleaning and packaging.

- Soil or Surface Water Sampling Equipment - cleaned originally off-site and recleaned on-site between samples.

Sampler and sample containers should be cleaned according to the following procedures:

1. Non-phosphate detergent and tap water wash.
2. Tap water rinse.
3. 10% nitric acid rinse.*
   * only if sample is to be analyzed for metals.
4. Distilled/Deionized water rinse.
5. Acetone (Pesticide grade) rinse.
   * Acetone is an acceptable cleaning solvent provided that it is allowed to totally evaporate via air drying or a nitrogen blowout and is followed by a distilled/deionized rinse.
6. Distilled/Deionized water rinse.

Distilled water commonly used for water coolers and available in 5 gallon plastic carboys (i.e. electro-still) is acceptable for use in sampler decontamination but may not be utilized for field and trip blank water.

Field cleaning of well casing, well screening and drilling equipment should consist of a manual scrubbing to remove foreign material and stem cleaning inside and out until traces of oil and grease are removed. These items should then be stored in such a manner as to preserve their pristine condition.

Figure 2

EXAMPLE OF GENERAL SAMPLE LABEL

(NAME OF SAMPLING ORGANIZATION)

SAMPLE DESCRIPTION _____

_____

PLANT: _____ LOCATION: _____

DATE: _____ _____

TIME: _____ _____

MEDIA: _____ STATION: _____

SAMPLE TYPE: _____ PRESERVATIVE: _____

SAMPLED BY: _____

SAMPLE ID NO.: _____ - - - -

LAB NO. _____

REMARKS

Figure 3

SAMPLE OF FIELD TRACKING REPORT FORM

W/O No. _____ Page____

FIELD TRACKING REPORT: _____ - _____
(XXX-SN)

FIELD SAMPLE CODE (FSC)	BRIEF DESCRIPTION	DATE	TIME (s)	SAMPLER

Figure 4

SAMPLE OF LAB-TRACKING REPORT FORM

W/O No. _____ Page ____

LAB TRACKING REPORT: _____ - _____ - _____
(LOC-SN-FSC)

FRACTION CODE	X	PREP/ANAL REQUIRED	RESPONSIBLE INDIVIDUAL	DATE DELIVERED	DATE COMPLETED

Table I

SAMPLE HOLDING TIMES FROM DATE OF COLLECTION

Parameter	Water	Soil/Solid Waste
Metals	5 months	6 months
Mercury	28 days	28 days
Hexavalent Chromium	24 hour	24 hours
Pesticides/PCBs	7 days (1,2)	7 days (1,2)
Herbicides	7 days (1,2)	7 days (1,2)
Purgeable Organics	7 days (1,2)	7 days
2,3,7,8 - TCDD	14 days	90 days (2)
Cyanide	14 days	14 days
Phenols	28 days	28 days

(1) 7 days is time within which sample must be extracted.

(2) Extracts may be held for 40 days.

Reference: Federal Rgister 40 CFR, Part 136, Oct. 26, 1984.
CLP Statement of Work for Inorganic Analyses.
USEPA, May 1984.

Sample Preservation

Sample preservatives will be provided by ETC in the Sample Shuttles. The LBA Project QA officer will confirm their proper use in the field. Table II (below) describes NJDEP's sample preservation requirements.

Table II

SAMPLE PRESERVATION

Metals	Nitric acid to below pH of 2
Mercury	Nitric acid to below pH of 2
Hexavalent Chromium	Cool to 4 degrees Centigrade
Herbicides, Pesticides/PCBs	Cool to 4 degrees C, maintain pH between 5-9
Purgeable Organics	Cool to 4 degrees C
2,3,7,8-TCDD	Cool to 4 degrees C
Cyanide	Cool to 4 degrees C, Sodium Hydroxide to above pH of 12, 0.6 g ascorbic acid/qt.
Phenols	Cool to 4 degrees C, Sulfuric Acid to below pH of 2.

Reference: Federal Register 40 CFR, part 136 October 26, 1984.
CLP Statement of Work for Inorganic Analyses USEPA, May 1984

EXHIBIT I

REQUEST FOR ANALYSIS SHEET

Upon completion of sampling, the person assuming responsibility for the sample must fill out a Request for Analysis sheet (Form K). On this sheet the following should be recorded:

1. Site or case name
2. DWM case number
3. Date and time of collection
4. Exact location of sampling point
5. Name of collector
6. Sample number(s)
7. Sample description
8. Method of collection
9. Method of preservation
10. Name of person assuming responsibility for sample
11. Time and date responsibility for sample assumed
12. Parameters for which the sample is to be analyzed.

EXHIBIT II

CHAIN OF CUSTODY RECORD

Upon completion of sampling, the person assuming responsibility for the sample must fill out a NJDEP Chain of Custody Record (Form L). On this sheet, the following should be recorded:

1. Name and address of the Division performing the sampling
2. Sample number(s)
3. Number of containers per sample
4. Total number of containers
5. Sample description
6. Name of person assuming responsibility for the sample
7. Date and time of assuming responsibility for the sample.

Completion of this form is necessary to establish a legal record of possession of the sample. This record should remain with the sample at all times and the person assuming responsibility for the samples should ensure the samples are in fact in his custody or in a secured place. When this form is completed, it should indicate that there were no lapses in sample accountability.

VI. ANALYTICAL PROCEDURES

All soil, water and complex matrix samples will be analyzed by ETC Laboratories who will supply laboratory clean sample containers with required sample-preserving additives in sealed shuttles.

All soil and water samples will be analyzed for 127 priority pollutants plus 40 additional peaks. These will include volatile organic analytes, acid extractable pesticides, PBB's, metals, cyanides and phenols. The complex matrix samples will be analyzed for all of these chemicals except VOA.

The chain of custody procedures will start with supply of lab-cleaned sample containers.

ETC Laboratories will handle the samples according their quality assurance procedures. They will use the QA/QC procedures for all analytical procedures including sample storage, extraction, equipment calibration test sample analysis and data recording and analyses.

ETC will follow the following QA/QC procedures for equipment calibration and test sample analyses:

A. Calibration

Calibration is defined by ETC QA/QC Procedures as follows:

(i) VOA (USEPA Method 624)

- Each GC/MS is checked and returned, if necessary, every 8 hours to ensure that its performance or bromofluorobenzene (BFB) meets the USEPA criteria.
- A calibration curve for quantitation is prepared using a mixture of Volatile Organic Priority Pollutant "standards" at a minimum of 3 different concentrations and using a mixture of 3 internal standards at a constant concentration.
- The calibration curve is verified with a mixture of priority pollutant standards every 8 hours.
- Results are compared to the acceptance criteria given in Method 624: any that do not meet the criteria are re-analyzed.

(ii) Acid and Base/Neutral Extractions (USEPA Method 625)

- Each GC/MS is checked and returned, if necessary, every eight hours to ensure that its performance on decafluorotriphenylphosphine (DF TPP) meets the EPA criteria.
- A calibration curve for quantitation is prepared using a mixture of standards composed of either the organic Acid or Base/Neutral Extractable Compounds at a minimum of 3 concentrations and using 2.2' - difluorobiphenyl as a internal standard.

- The calibration curve is verified with a mixture of priority pollutant standards every eight hours.

- Results are compared to the acceptance criteria given in Method 625; any that do not meet the criteria are re-analyzed.

(iii) Metals

- New standards are prepared for each batch of samples.

- Normal calibration is performed using a blank sample for four standards that have been through the sample preparation procedure. A regression analysis is used to construct the calibration curve.

- For each sample analysis that requires the use of the "method of additions" technique, a three point calibration is performed using USEPA "Methods for Chemical Analysis of Water Wastes, 1979". Results are obtained using linear regression analysis. Any results with a coefficient or correlation below 0.990 are considered erroneous, necessitating raw data editing or sample re-analysis.

- In constructing the normal calibration curves the lowest concentration levels used are values greater than or equal to five times the Instrumental Detection Limit (IDL).

- All calibration standards are analyzed in duplicate, at a minimum.

- Independent reference standards are used to check the accuracy of calibration standards.

- A check standard is analyzed every ten samples to validate the normal calibration curve.

B. Test Samples

As defined by the ETC QA/QC Procedures the following samples will be introduced:

(i) VOAs (USEPA Method 624)

- Each batch of 13 samples consists of 9 customer samples (at maximum) one blank sample, one spiked blank, one spiked sample and one replicate sample. This amounts to a 30% quality control factor.

- Three surrogate compounds are added to each sample in the batch of 13.

- At least one blind quality control sample is introduced to the laboratory for analysis for each hundred samples analyzed.

Analysis of Mercury

- each of the 20 customer samples in duplicate;
- 3 Replicates;
- 2 Replicate spikes;
- 2 Replicate independent reference standards;
- 10 Calibration standards (processed using the sample preparation method)

VII. DATA REDUCTION, VALIDATION AND REPORTING

For each major measurement parameter the following will be described by ETC Laboratories.

(i) Data reduction scheme planned on collected data, including all equations used to calculate concentrations or value of the measured parameter and reporting units.

(ii) The principal criteria that will be used to validate data integrity during collection and reporting of data.

(iii) The methods used to identify and treat the outliers.

(iv) The data flow or reporting scheme from collection of raw data through storage of validated concentrations. A flow chart will be prepared.

(v) The key individuals who will handle the data in this reporting scheme.

VIII. QUALITY CONTROL CHECKS

A. Internal Quality Control Checks

All special internal quality control methods to be followed have been described by ETC Laboratories. These will include description of the following:

- Replicates
- Spiked samples
- Split samples
- Control charts
- Blanks
- Internal standards
- Zero and span gases
- Quality control samples
- Surrogate samples
- Calibration standards and devices
- Reagents checks

B. Performance and Systems Audits

These audits include descriptions of internal and external performance and systems audits required to monitor the capability and performance of the total measurement systems.

C. Measurement Systems

The systems audit will consist of all components of the measurement systems to determine their proper selection and use. This audit includes an evaluation of both field and laboratory quality control procedures. Systems audit will be performed shortly after systems become operational and will be performed continuously on a regular basis.

After systems are operational and generating data performance, audits will be conducted periodically to determine the accuracy of the total measurements system or its components.

D. Specific Procedures to Assess Data Precision, Accuracy and Completeness

Precision and accuracy of data generated by subcontractors will be assessed on a routine basis as a part of Project QA Plan. These procedures should include the equations to calculate precision, accuracy and completeness and the methods used to gather data for the precision and accuracy calculations.

Statistical procedures that might be used and will be subject to assessment include:

(i) Central tendency and dispersion

- Arithmetic mean
- Range
- Standard deviation

(ii) Measures of variability

- Accuracy
- Bias
- Precision

(iii) Significance test

- U-test
- Z-test
- F-test
- Chi-square test
- Confidence limits
- Testing of outliers

The final report for the project will include a separate QA section which will summarize data quality information.

APPENDIX I

SAMPLE SITE SELECTION PROCEDURES

I. Preparation of Site Map

A map of the two adjacent sites of investigation namely the Bayonne Barrel and Drum Company Site and the Newark Drive-In Movie Theater site was copied from an enlarged aerial photograph of Section No. 6C - Milepost 105 to Milepost 107 prepared by Gannett Fleming Transportation Engineers, Inc. for New Jersey Turnpike Authority dated November 1, 1985. The map was traced onto a graph paper. The map had a scale of 1" = 100 feet. The areas under investigation were divided into a grid of rectangles and squares. There were 30 grid areas in the Bayonne Barrel and Drum site and 14 in the Drive-In Movie Theater site. On each site map the grid areas were sequentially numbered and using a table of random numbers six sampling sites were selected for grab soil samples at the BB&D site and three at the DIMT site. Distances from landmarks on the site map to various sampling sites were measured and written on the map. The map is shown following this Appendix. For composite samples, sites will be selected on the day of sampling. The following sampling site and sample identification code numbers have been assigned to each sampling site and samples to be collected.

SAMPLING SITE CODE NUMBERS AND SAMPLE CODE NUMBERS TO BE USED

Study Site	Sampling Site I.D. Code #	Type of Sample	Sample Depth	Sample I.D. Code #
I. Bayonne Barrel & Drum Company	BBLBSG-1	Soil-Grab	0-18"	BBLBSGU-1
	BBLBSG-1	Soil-Grab	18-36"	BBLBSG1-L
	BBLBSG-2	Soil-Grab	0-18"	BBLBSGU-2
	BBLBSG-2	Soil-Grab	18-36"	BBLBSG2-L
	BBLBSG-3	Soil-Grab	0-18"	BBLBSGU-3
	BBLBSG-3	Soil-Grab	18-36"	BBLBSG3-L
	BBLBSG-4	Soil-Grab	0-18"	BBLBSGU-4
	BBLBSG-4	Soil-Grab	18-36"	BBLBSG4-L
	BBLBSG-5	Soil-Grab	0-18"	BBLBSGU-5
	BBLBSG-5	Soil-Grab	18-36"	BBLBSG5-L
	BBLBSG-6	Soil-Grab	0-18"	BBLBSGU-6
	BBLBSG-6	Soil-Grab	18-36"	BBLBSG6-L
	BBLBCS-6A	Soil-Composite	0-18"	BBLBCSU6-A
	BBLBCS-6B	Soil-Composite	0-18"	BBLBCSU6-B 6U*
	BBLBCS-6C	Soil-Composite	0-18"	BBLBCSU6-C
	BBLBCS-6A	Soil-Composite	18-36"	BBLBCSU6-AL
	BBLBCS-6B	Soil-Composite	18-36"	BBLBCSU6-BL 6L*
	BBLBCS-6C	Soil-Composite	18-36"	BBLBCSU6-CL
	BBLBCS-7A	Soil-Composite	0-18"	BBLBCSU7-A
	BBLBCS-7B	Soil-Composite	0-18"	BBLBCSU7-B 7U*
	BBLBCS-7C	Soil-Composite	0-18"	BBLBCSU7-C

Study Site	Sampling Site I.D. Code #	Type of Sample	Sample Depth	Sample I.D. Code #
I. Bayonne Barrel & Drum Company				
	BBLBCS-7A	Soil-Composite	18-36"	BBLBCS7A-L
	BBLBCS-7B	Soil-Composite	18-36"	BBLBCS7B-L 7L*
	BBLBCS-7C	Soil-Composite	18-36"	BBLBCS7C-L
	BBLBWELL-1	Well Soil Core	0-18"	BBLBWS11
	BBLBWELL-1	Well Soil Core	5'	BBLBWS12
	BBLBWELL-1	Well Soil Core	10'	BBLBWS13
	BBLBWELL-2	Well Soil Core	0-18"	BBLBWS21
	BBLBWELL-2	Well Soil Core	5'	BBLBWS22
	BBLBWELL-2	Well Soil Core	10'	BBLBWS23
	BBLBWELL-1	Water	-	BBLBWW1
	BBLBWELL-1	Water	-	BBLBWW2
	BBLBWELL-1	Water (spiked)	-	BBLBWW3
	BBLBBDGL-(1-8)	Swipe or Bldg Material		BBLBSPC-1
	BBLBBDGL-(1-8)	Control for Swipe		BBLBSPC-2
	BBLBBDGL-(1-8)	Field Blank(Soil Auger Wash)		BBLBFB-1
	BBLBWDGL-(1-8)	Field Blank (Boiler Wash)		BBLBFB-2

*For analysis three composites will be pooled and analysed as one sample from each of upper and lower stratum.

Study Site	Sampling Site I.D. Code #	Type of Sample	Sample Depth	Sample I.D. Code #
I. Bayonne Barrel & Drum Company				
	BBLBWELL-1	Well Soil Core	0-18"	BBLBWS11
	BBLBWELL-1	Well Soil Core	5'	BBLBWS12
	BBLBWELL-1	Well Soil Core	10'	BBLBWS13
	BBLBWELL-2	Well Soil Core	0-18"	BBLBWS21
	BBLBWELL-2	Well Soil Core	5'	BBLBWS22
	BBLBWELL-2	Well Soil Core	10'	BBLBWS23
	BBLBWELL-1	Water	-	BBLBWW1
	BBLBWELL-1	Water	-	BBLBWW2
	BBLBWELL-1	Water (spiked)	-	BBLBWW3
	BBLBBDGL-(1-8)	Swipe or Bldg Material		BBLBSPC-1
	BBLBBDGL-(1-8)	Control for Swipe		BBLBSPC-2
	BBLBBDGL-(1-8)	Field Blank(Soil Auger Wash)		BBLBFB-1
	BBLBWDGL-(1-8)	Field Blank (Boiler Wash)		BBLBFB-2

Study Site	Sampling Site I.D. Code #	Type of Sample	Sample Depth	Sample I.D. Code #
II. Newark Drive-In Movie Theater				
	MTLBSG-8	Soil-Grab	0-18"	MTLBSG-8
	MTLBAG-9	Soil-Grab	0-18"	MTLBSG-9
	MTLBCSA-10	Soil-Composite	0-18"	MTLBCS-10A
	MTLBCSB-10	Soil-Composite	0-18"	MTLBCS-10B
	MTLBCSC-10	Soil-Composite	0-18"	MTLBCS-10C
	MTLBWELL-3	Well Core	0-18"	MTLBWS-31
	MTLBWELL-3	Well Core	5'	MTLBWS-32
	MTLBWELL-3	Well Core	10'	MTLBWS-33
	MTLBWELL-3	Water	-	MTLBWW-34
		Field Blank (wash of auger)		MTLBFB-3

APPENDIX II

SAMPLE COLLECTION PROTOCOL

The entire sample site demarcation and sample collection procedures will be coordinated by the project manager. The project manager will make sure that the appropriate soil sampling equipment and tools to be used by the subcontractor (O.H. Materials Corp.) are available, appropriate and clean. The project manager will also make sure that for sample collection the proper and adequate number of sample collection containers to be supplied by subcontractor (ETC Laboratories) are available on time. In addition, the site safety officer will make sure that all personnel working on the site are properly dressed with respect to safety and protection against any hazardous and toxic chemicals that might be present on site.

Before starting sampling the following data will be recorded:

(i) Date and time of study events.
(ii) Location of the site and project description
(iii) Meteorological conditions, windy, rainy, overcast, sunny, hazy etc., (need air-monitoring equipment).
(iv) Temperature and wind velocity and direction
(v) Results of volatile organic analyzer
(vi) Results of geiger counter readings.
(vii) Any other relevant data related to site survey, photoionization, potentiometry, explosivity detection etc.

The samples will be collected by representatives of subcontractor (O.H. Materials). The project manager and his field staff will make sure the samples are collected consistent with the protocol requirements.

Two matrices will be sampled. These include soil and water. Soil will be collected at different depths and water from the water table in the monitoring well. In addition, two composites of swipe samples will be taken from the walls and floors of the buildings located on the property.

Samples of surface soil (0-18"), subterranean soil (18-36"), well core soil (0-18", 5', 10') and well water will be collected from each site. The subcontractor for sample collection will be O.H. Materials Corporation, Windsor, NJ.

The following types of samples will be collected for analysis:

I. Bayonne Barrel & Drum Site:

a. Grab-soil samples
   (i) One soil sample ($\simeq$ 1 kg) at 0-18" depth from each of six sampling sites 1 to 6.

   (ii) One soil sample ($\simeq$ 1 kg) at 18-36" depth from each of six sampling sites 1 to 6.

b. Composite soil samples
   (i) One soil sample ($\simeq$ 1 kg) from each of three sites-7A/7C selected on the spot at 0-18" depth.

(ii) A soil sample (≃ 1 kg) from each of three sites, 7A to 7C at 18-36" depth. These samples will be taken from the same cores from where 0-18" samples were taken.

c. Monitoring Well Core Soil Samples

(i) One soil sample (≃ 1 kg) at each of two monitoring well sites (#1 and #2).

(ii) One soil sample (≃ 1 kg) at 5' depth at each of two monitoring well sites (#1 and #1).

(iii) One soil sample (≃ 1 kg at 10' depth at each of two monitoring well sites (#1 and #2).

d. Monitoring Well Water Samples

A 1 liter sample will be taken from each of monitoring wells #1 and #2.

e. Spiked Well Water Sample

A 1 liter sample from well # 2 will be spiked with a 1 to 10 ml aqueous solution of three chemicals prepared by a laboratory.

f. Field blank water samples

(i) A field blank sample will be taken by washing the equipment to be used for taking grab and composite soil samples. The equipment (auger or other type of tools) will be washed before taking soil samples and the wash collected into containers. The wash will be made with deionized distilled water to be provided by ETC Laboratories.

(ii) A field blank sample will be taken by washing the equipment to be used for drilling monitoring wells. The equipment will be washed before using it and the wash will be collected into containers.

II. Newark Drive-In Movie Theater Site:

a. Grab soil samples

One soil sample (≃ 1 kg) at 0-18" depth from each of two sampling sites 8 & 9.

b. Composite soil samples

One soil sample (≃ 1 kg) from each of three sites, 10A to 10C selected on the spot at 0-18" depth.

c. Monitoring well #3 core soil samples.

(i) One soil sample (≃1 kg) at 0-18" depth.

(ii) One soil sample (≃1 kg) at 10' depth.

(iii) One soil sample (≃1 kg) at 10' depth.

d. Monitoring well #3 water samples.

A one liter well water sample will be collected.

e. Field Blank Water Sample

A field blank water sample will be taken by washing the soil sampling equipment (auger or other tools) with deionized distilled water provided by ETC Laboratories. The washing will be made before the soil sample is taken and the wash will be collected in a container.

Grab samples from sampling sites #5 and 6 will be taken at the border of the two areas in close proximity to each other to represent a duplicate sample.

The grab samples will be taken from one single location by using a soil auger. The size of the auger will be such that a soil sample taken at 0-18" depth will be accommodated in the sample container provided by ETC Laboratories. If the soil sample taken from one point is not adequate to fill at least 80% capacity of the sample container, another similar sample will be taken at an adjacent point. Sampling through a hard rocky ground will be avoided. Any materials other than soil including rocks and debris will be transfered into properly labled sample containers and no attempt will be made to separate such materials from soil. The composite samples will not be taken from areas sampled by grab sample collection method.

The composite soil samples will be transfered into individual containers and not composited in the field. Compositing will take place in the laboratory. The equipment will be decontaminated between sampling from one site to another for grab samples. No need to decontaminate between taking samples to be composited.

The equipment will be decontaminated between sampling at various depths at the same sampling point to avoid decontamination of lower soil with upper one.

For decontamination, the equipment will be washed with water to remove soil, followed by acetone or methyl alcohol and finally with deionized distilled water.

The project manager or assigned personnel will document all events in the field notebooks. This recording will include all details. The details will include the following:

1. Description of the project with project identification code number.

2. Objectives of the project and each event.

3. Date and time of event.

4. Name, designation and affiliation of personnel involved with each event

5. Description of event.

6. Description, make and model of tools and equipment used.

7. Assurance that equipment was calibrated.

8. Any deviations from prescribed protocol will be thoroughly documented.

9. Date and sign at the end of description of each event.

After taking each sample, a sample analysis request sheet and a chain of custody form will be completed and enclosed with the sample in the shuttle. These sheets will bear proper sample identification number. A list of prepared sample identification numbers is enclosed in Appendix I.

The QA coordinator will be present throughout the entire sample site demarcation and sample collection processes and will make sure standards of quality assurance are strictly adhered to.

LBA personnel present on the study site will work in close cooperation with the personnel of O.H. Materials and make sure the study procedures follow protocol requirements.

Each sample container will be labeled and the method of collection and location recorded in a field log book. The samples will be transferred to ETC supplied containers which have been cleaned by the laboratory with any additives or preparations necessary for the type of sample collected. Each sample will be listed on a chain of custody form for transmittal. Sample handling and transfer from the site to ETC Laboratories will be recorded in accordance with the chain of custody form.

The field blank for the well water will include water rinse of the bailes to be lowered into the well.

The O.H. Material personnel will follow the LBA QA plan as shown in Appendix III.

ETC ENVIRONMENTAL TESTING and CERTIFICATION

CHAIN OF CUSTODY FORM (CC1)

Seal No. [illegible] ETC Job # [illegible]

Date Sealed 5/5/86 By: M. Eckstadt

Company: LOUIS BERGER & ASSOC.

Facility/Site: Bayonne Barrel & Drum

Address: Newark, NJ

Attn.: M. HUSSAIN

Phone: (201) 678-1960

SAMPLE IDENTIFICATION

Facility: BBDLBANJTK (Facility/Site Code) | Near the pile of tires 13-15 deep. (Optional Sample Point Descriptions)

Sample Point: W-LBAWS13FIP (Source Code (from below) / Your Sample Point ID (left justify)) | 860506 (Start Date (YY/MM/DD)) | 1115 (Start Time (2400 hr. clock)) | 1.00 (Elapsed Hours (composite))

Source Codes:
Well ..(W) Outfall.....(O) Bottom Sediment ....(B) Surface Impoundment....(I) Leachate Collection Sys.....(C) Other .....(X)
Soil ...(S) River/Stream..(R) Generation Point ....(G) Treatment Facility .....(T) Lake/Ocean .....(L) Specify

SHUTTLE CONTENTS

BOTTLE No	Type	Size	Preserv.	ANALYSIS	SAMPLER Filt. (Y/N)	SAMPLER Observations	LAB Observations
1	E	1L	BAKED	EXTRACTABLE	N	13' to 15	
2	F	40ml	↓	VOA	N	deep soil	
						sample	

CHAIN OF CUSTODY CHRONICLE

1. Shuttle Opened By: (print) M. HUSSAIN Date: 5.6.86 Time: 1100
Signature: Mangoor Hussain Seal #: 56271 Intact: yes

2. I have received these materials in good condition from the above person.
Name: Signature:
Date: Time: Remarks:

3. I have received these materials in good condition from the above person.
Name: Signature:
Date: Time: Remarks:

4. Shuttle Sealed By: (print) M. HUSSAIN Date: 5.6.86 Time: 1330
Signature: Mangoor Hussain Seal #: 56272 Intact: yes

ETC USE ONLY Opened By: R. [illegible] Date: 5/6/86 Time: 6:15 PM

ETC ENVIRONMENTAL TESTING and CERTIFICATION

FIELD PARAMETER FORM (CC2)

ETC JOB # [illegible]

Sample Point S (Source Code) LBABG2LFIP (Sample Point I.D.)

FIELD PROCEDURES

PURGE DATE (YY MM DD)	START PURGE (2400 Hr Clock)	ELAPSED HRS	WATER VOL IN CASING (Gallons)	VOLUME PURGED (Gallons)
860425	1725			

SAMPLING METHOD:

Sampler Type [X] A-Submersible Pump, B-ISCO, C-Bladder Pump, D-Dipper/Bottle, E-Bailer, F-Scoop/Shovel, X-Other Split Spoon (SPECIFY OTHER)

Sampler Material [B] A-Teflon, B-Metal, C-PVC, D-Plastic, X-Other (SPECIFY OTHER)

Tubing Material [ ] A-Teflon, B-Tygon, C-Polyethylene, D-Silicon, X-Other (SPECIFY OTHER)

Sample Composited [Y/N] N (Procedure/Proportions)

FIELD MEASUREMENTS

Well Elevation (ft/msl)

Depth to Ground water (ft)

Groundwater Elevation (ft msl)

Well Depth (ft)

Sample Depth (non-well) (ft) 30

	ph		spec. cond.		(other parameter)	value	units
1st	(STD)	1st	um/cm at 25° C				
2nd	(STD)	2nd	um/cm at 25°C				
3rd	(STD)	3rd	um/cm at 25°C				
4th	(STD)	4th	um/cm at 25°C				

Sample Temp (°C)

Turbidity NTU

FIELD COMMENTS

Sample Appearance:

Weather Conditions: Cloudy, rainy, windy

Other: Soil taken at 18-36" depth.

FILTERING: Use Chain of Custody (CC1) to indicate which bottles were filtered

Sampler: BLAINE FRESCO (Print) Employer: O.H. MATERIALS

I certify that sampling procedures were in accordance with applicable EPA state and corporate protocols.

4/25/86 (Date) Blaine Fresco (Signature)

ORIGINAL

ETC ENVIRONMENTAL TESTING and CERTIFICATION

CHAIN OF CUSTODY FORM (CC1)

Seal No. 56273 ETC Job # [illegible]

Date Sealed 5/5/86 By: M. Jakstadt

Company: LOUIS BERGER & ASSOC.

Facility/Site: Bayonne Barrel & Drum

Address: Newark, NJ

Attn.: M. HUSSAIN

Phone: (201) 678-1960

SAMPLE IDENTIFICATION

Facility: BBDLBANTTK (Facility/Site Code) Soil sample at 0-2' at Site of Well #2 (Optional Sample Point Descriptions)

Sample Point: S-LBABW21FIP (Source Code (from below) / Your Sample Point ID (left justify)) 860505 (Start Date (YY/MM/DD)) 1100 (Start Time (2400 hr. clock)) Elapsed Hours (composite)

Source Codes:

Well ..(W) Outfall.....(O) Bottom Sediment....(B) Surface Impoundment....(I) Leachate Collection Sys.....(C) Other .....(X)

Soil ...(S) River/Stream..(R) Generation Point ....(G) Treatment Facility .....(T) Lake/Ocean .....(L) Specify

SHUTTLE CONTENTS

BOTTLE No	Type	Size	Preserv.	ANALYSIS	SAMPLER Filt. (Y/N)	SAMPLER Observations	LAB Observations
1	E	1L	BAKED	EXTRACTABLE..	N	0-2' depth	
2	F	40ml	↓	VOA	N	Soil sample.	
3	TB	↓	Gc/ms H2O	TRIP BLANK			

CHAIN OF CUSTODY CHRONICLE

1. Shuttle Opened By: (print) M. HUSSAIN Date: 5.5.86 Time: 1100
   Signature: Manzoor Hussain Seal #: 56273 Intact: yes

2. I have received these materials in good condition from the above person.
   Name: Signature:
   Date: Time: Remarks:

3. I have received these materials in good condition from the above person.
   Name: Signature:
   Date: Time: Remarks:

4. Shuttle Sealed By: (print) M. HUSSAIN Date: 5-5-86 Time: 1515
   Signature: Manzoor Hussain Seal #: 56274 Intact: yes

ETC USE ONLY Opened By: R Pender Date: 5/6/86 Time: 6:15

ETC ENVIRONMENTAL TESTING and CERTIFICATION

FIELD PARAMETER FORM (CC2)

ETC JOB #: M1198

Sample Point: S (Source Code) LBABW21FIP (Sample Point I.D.)

FIELD PROCEDURES

PURGE DATE (YY MM DD)	START PURGE (2400 Hr Clock)	ELAPSED HRS	WATER VOL. IN CASING (Gallons)	VOLUME PURGED (Gallons)
860505	1100	000		

SAMPLING METHOD: Split Spoon

Sampler Type: A-Submersible Pump, B-ISCO, C-Bladder Pump, D-Dipper/Bottle, E-Bailer, F-Scoop/Shovel, X-Other _____ (SPECIFY OTHER)

Sampler Material: B — A-Teflon, B-Metal, C-PVC, D-Plastic, X-Other _____ (SPECIFY OTHER)

Tubing Material: A-Teflon, B-Tygon, C-Polyethylene, D-Silicon, X-Other _____ (SPECIFY OTHER)

Sample Composited: Y/N N

Procedure/Proportions

FIELD MEASUREMENTS

Well Elevation (ft/msl) _____

Depth to Ground water (ft) _____

Groundwater Elevation (ft msl) _____

Well Depth (ft): 20

Sample Depth (non-well) (ft): ~~[illegible]~~ M.H

	ph	(STD)	spec. cond.	um/cm at 25°C	(other parameter)	value	units
1st							
2nd							
3rd							
4th							

Sample Temp _____ (°C)

Turbidity _____ NTU

FIELD COMMENTS

Sample Appearance: Dirty black looking soil

Weather Conditions: Sunny, clear nice

Other:

FILTERING: Use Chain of Custody (CC1) to indicate which bottles were filtered

Sampler: BLAINE FRESCO (Print) Employer: O.H. MATERIALS, Corp.

I certify that sampling procedures were in accordance with applicable EPA state and corporate protocols.

5/5/86 (Date) Blaine Fresco OHM (Signature)

ETC ENVIRONMENTAL TESTING and CERTIFICATION

CHAIN OF CUSTODY FORM (CC1)

Seal No. 2627 ETC Job # [illegible]

Date Sealed 5/5/86 By: M. Eckstadt

Company: LOUIS BERGER & ASSOC.

Facility/Site: Bayonne Barrel & Drum Co

Address: Newark NJ

Attn.: M. HUSSAIN

Phone: (201) 678-1960

SAMPLE IDENTIFICATION

Facility: BBDLBANJTK (Facility/Site Code) Well #1 near pile of Tires (Optional Sample Point Descriptions)

Sample Point: W-LBABW11FIP (Source Code (from below) / Your Sample Point ID (left justify)) 860506 (Start Date (YY/MM/DD)) 1115 (Start Time (2400 hr. clock)) (Elapsed Hours (composite))

Source Codes:
Well ..(W) Outfall.....(O) Bottom Sediment....(B) Surface Impoundment....(I) Leachate Collection Sys.....(C) Other .....(X)
Soil ...(S) River/Stream..(R) Generation Point ....(G) Treatment Facility .....(T) Lake/Ocean .....(L) Specify

SHUTTLE CONTENTS

BOTTLE No	Type	Size	Preserv.	ANALYSIS	SAMPLER Fill (Y/N)	Observations	LAB Observations
1	E	1L	BAKED	EXTRACTABLE	N	Soil sample	
2	F	40ml	↓	VOA	N	taken during	
1	TB	↓	6c/mSH2O	TRIP BLANK	N	well digging.	
						Sample was	
						taken at	
						depth of	
						3'-5	

CHAIN OF CUSTODY CHRONICLE

1. Shuttle Opened By: (print) MANZOOR HUSSAIN Date: 5.6.86 Time: 1100 HRs
Signature: Manzoor Hussain Seal #: 0056271 Intact: yes

2. I have received these materials in good condition from the above person.
Name: Signature:
Date: Time: Remarks:

3. I have received these materials in good condition from the above person.
Name: Signature:
Date: Time: Remarks:

4. Shuttle Sealed By: (print) M. HUSSAIN Date: 5.6.86 Time: 1330
Signature: Manzoor Hussain Seal #: 56272 Intact: yes

ETC USE ONLY Opened By: R. Fender Date: 5/6/86 Time: 6:15PM

ETC ENVIRONMENTAL TESTING and CERTIFICATION

FIELD PARAMETER FORM (CC2)

ETC JOB # M1203

Sample Point W (Source Code) LBABW11FIP (Sample Point I.D)

FIELD PROCEDURES

PURGE DATE (YY MM DD)	START PURGE (2400 Hr Clock)	ELAPSED HRS	WATER VOL. IN CASING (Gallons)	VOLUME PURGED (Gallons)
860506	1115	990		

SAMPLING METHOD: Split Spoon

Sampler Type: A-Submersible Pump, B-ISCO, C-Bladder Pump, D-Dipper/Bottle, E-Bailer, F-Scoop/Shovel, X-Other _____ (SPECIFY OTHER)

Sampler Material: B — A-Teflon, B-Metal, C-PVC, D-Plastic, X-Other _____ (SPECIFY OTHER)

Tubing Material: A-Teflon, B-Tygon, C-Polyethylene, D-Silicon, X-Other _____ (SPECIFY OTHER)

Sample Composited Y/N: N

Procedure/Proportions

FIELD MEASUREMENTS

Well Elevation (ft/msl) _____

Depth to Ground water (ft) _____

Groundwater Elevation (ft msl) _____

Well Depth (ft) _____

Sample Depth (non-well) (ft) 3'-5 soil

	ph	(STD)		spec. cond.	um/cm at 25° C	(other parameter)	value	units
1st			1st					
2nd			2nd					
3rd			3rd					
4th			4th					

Sample Temp (°C) _____ Turbidity NTU _____

FIELD COMMENTS

Sample Appearance: _____

Weather Conditions: Sunny, warm in high 70s.

Other: _____

FILTERING: Use Chain of Custody (CC1) to indicate which bottles were filtered

Sampler: BLAINE FRESCO (Print) Employer: O.H. MATERIALS, Corp.

I certify that sampling procedures were in accordance with applicable EPA state and corporate protocols.

5/6/86 (Date) Blaine Fresco (Signature)

ETC ENVIRONMENTAL TESTING and CERTIFICATION

CHAIN OF CUSTODY FORM (CC1)

Seal No. [illegible] ETC Job # [illegible]

Date Sealed 4/24/86 By: [illegible]

Company: Lowry Berger & Assoc.

Attn.: R. Andrew Bellock

Facility/Site:

Phone: ( )

Address:

SAMPLE IDENTIFICATION

Facility: BBD-LBAMJT (Facility/Site Code) Near Trailer Parking (area 4) Lower Station

Sample Point: S-LBABG4LFIP (Source Code (from below); Your Sample Point ID (left justify)) 860425 (Start Date (YY/MM/DD)) 1555 (Start Time (2400 hr. clock)) (Elapsed Hours (composite))

(Optional Sample Point Descriptions)

Source Codes:

Well ..(W) Outfall.....(O) Bottom Sediment....(B) Surface Impoundment....(I) Leachate Collection Sys.....(C) Other .....(X)

Soil ...(S) River/Stream..(R) Generation Point ....(G) Treatment Facility .....(T) Lake/Ocean .....(L) Specify

SHUTTLE CONTENTS

BOTTLE No.	Type	Size	Preserv.	ANALYSIS	SAMPLER Filt. (Y/N)	SAMPLER Observations	LAB Observations
1	E	1L	BA(G)	EXTR SOIL			✓
2	V	40mL	BA(G)	VOA SOIL			✓

CHAIN OF CUSTODY CHRONICLE

1. Shuttle Opened By: (print) MANZOOR HUSSAIN Date: 4.25.86 Time: 1520
   Signature: Manzoor Hussain Seal #: 56989 Intact: yes

2. I have received these materials in good condition from the above person.
   Name: Signature:
   Date: Time: Remarks:

3. I have received these materials in good condition from the above person.
   Name: Signature:
   Date: Time: Remarks:

4. Shuttle Sealed By: (print) MANZOOR HUSSAIN Date: 4 25 86 Time: 1800 HRS
   Signature: Manzoor Hussain Seal #: 56990 Intact: yes

ETC USE ONLY Opened By: [illegible] Date: 4/26/86 Time: 8:00

ETC ENVIRONMENTAL TESTING and CERTIFICATION

FIELD PARAMETER FORM (CC2)

ETC JOB # M1143

Sample Point S (Source Code) L B A B G 4 L F 1 F (Sample Point I.D.)

FIELD PROCEDURES

PURGE DATE (YY MM DD)	START PURGE (2400 Hr Clock)	ELAPSED HRS	WATER VOL IN CASING (Gallons)	VOLUME PURGED (Gallons)
	1555			

SAMPLING METHOD:

Sampler Type [X] A-Submersible Pump, B-ISCO, C-Bladder Pump, D-Dipper/Bottle, E-Bailer, F-Scoop/Shovel, X-Other Split Spoon (SPECIFY OTHER)

Sampler Material [B] A-Teflon, B-Metal, C-PVC, D-Plastic, X-Other (SPECIFY OTHER)

Tubing Material [ ] A-Teflon, B-Tygon, C-Polyethylene, D-Silicon, X-Other (SPECIFY OTHER)

Sample Composited [Y/N] N (Procedure/Proportions)

FIELD MEASUREMENTS

Well Elevation (ft/msl)

Depth to Ground water (ft)

Groundwater Elevation (ft msl)

Well Depth (ft)

Sample Depth (non-well) (ft) 3.0

	ph		spec. cond.		(other parameter)	value	units
1st	(STD)	1st	um/cm at 25° C				
2nd	(STD)	2nd	um/cm at 25°C				
3rd	(STD)	3rd	um/cm at 25°C				
4th	(STD)	4th	um/cm at 25°C				

Sample Temp (°C) Turbidity NTU

FIELD COMMENTS

Sample Appearance:

Weather Conditions:

Other: This sample was taken at 18-36" depth.

FILTERING: Use Chain of Custody (CC1) to indicate which bottles were filtered

Sampler: BLAINE FRESCO (Print) Employer: O. H. MATERIALS

I certify that sampling procedures were in accordance with applicable EPA state and corporate protocols.

4/25/86 (Date) Blaine Fresco (Signature) OHM

ETC ENVIRONMENTAL TESTING and CERTIFICATION

CHAIN OF CUSTODY FORM (CC1)

Seal No. 3019 ETC JOB # [illegible]

Date Sealed 4/24/86 By: [illegible]

Company: Louis Berger & Assoc.

Attn.: R. Andrew Kielbach

Facility/Site: Bayonne Barrel & Drum

Phone: ( )

Address: Newark, NJ

SAMPLE IDENTIFICATION

Facility: BBD-LBANJT (Facility/Site Code) Near Trailer Parking area (Area 4) (Optional Sample Point Descriptions)

Sample Point: S (Source Code (from below)) - LBABG4UFIP (Your Sample Point ID (left justify)) 860425 (Start Date (YY/MM/DD)) 1525 (Start Time (2400 hr clock)) ___ (Elapsed Hours (composite))

Source Codes:

Well ..(W) Outfall.....(O) Bottom Sediment....(B) Surface Impoundment....(I) Leachate Collection Sys.....(C) Other .....(X)

Soil ...(S) River/Stream..(R) Generation Point ....(G) Treatment Facility .....(T) Lake/Ocean .....(L) Specify _____

SHUTTLE CONTENTS

BOTTLE No	Type	Size	Preserv.	ANALYSIS		SAMPLER Fill (Y/N)	SAMPLER Observations	LAB Observations
1	E	1l	NA(4)	EXTBL	SOIL			✓
2	1l	40ml	NA(4)	VOA	SOIL			✓

CHAIN OF CUSTODY CHRONICLE

1. Shuttle Opened By: (print) MANZOOR HUSSAIN Date: 4.25.86 Time: 1520
   Signature: Manzoor Hussain Seal #: 56989 Intact: yes

2. I have received these materials in good condition from the above person.
   Name: Signature:
   Date: Time: Remarks:

3. I have received these materials in good condition from the above person.
   Name: Signature:
   Date: Time: Remarks:

4. Shuttle Sealed By: (print) MANZOOR HUSSAIN Date: 4.25.86 Time: 1800 HRS
   Signature: Manzoor Hussain Seal #: 56990 Intact: yes

ETC USE ONLY Opened By: [illegible] Date: 4/26/86 Time: [illegible]

ETC ENVIRONMENTAL TESTING and CERTIFICATION

FIELD PARAMETER FORM (CC2)

ETC JOB # W1172

Sample Point S (Source Code) LBABG4UFIP (Sample Point I.D.)

FIELD PROCEDURES

PURGE DATE (YY MM DD)	START PURGE (2400 Hr Clock)	ELAPSED HRS	WATER VOL. IN CASING (Gallons)	VOLUME PURGED (Gallons)
860485	1525			

SAMPLING METHOD:

Sampler Type [X] A-Submersible Pump, B-ISCO, C-Bladder Pump, D-Dipper/Bottle, E-Bailer, F-Scoop/Shovel, X-Other ____ (SPECIFY OTHER)

Sampler Material [B] A-Teflon, B-Metal, C-PVC, D-Plastic, X-Other ____ (SPECIFY OTHER)

Tubing Material [ ] A-Teflon, B-Tygon, C-Polyethylene, D-Silicon, X-Other ____ (SPECIFY OTHER)

Sample Composited [Y/N] N — Procedure/Proportions

FIELD MEASUREMENTS

Well Elevation (ft/msl) ____

Depth to Ground water (ft) ____

Groundwater Elevation (ft msl) ____

Well Depth (ft) ____

Sample Depth (non-well) (ft) 15

	ph	(STD)		spec. cond.	um/cm at 25° C	(other parameter)	value	units
1st			1st					
2nd			2nd					
3rd			3rd					
4th			4th					

Sample Temp ____ (°C)

Turbidity ____ NTU

FIELD COMMENTS

Sample Appearance: ____

Weather Conditions: Clouds, warm, windy.

Other: Ground was too hard for Split Spoon sampler. Therefore motorized auger used to dig hole loose. Then sample taken with Split Spoon.

FILTERING: Use Chain of Custody (CC1) to indicate which bottles were filtered

Sampler: BLAINE FRESCO (Print) Employer: O.H. MATERIALS CORP

I certify that sampling procedures were in accordance with applicable EPA state and corporate protocols.

7/25/86 (Date) Blaine Fresco (Signature)

ETC ENVIRONMENTAL TESTING and CERTIFICATION

FIELD PARAMETER FORM (CC2)

ETC JOB # M1205

Sample Point W (Source Code) LBAWS13FIP (Sample Point I.D.)

FIELD PROCEDURES

PURGE DATE (YY MM DD)	START PURGE (2400 Hr Clock)	ELAPSED HRS	WATER VOL. IN CASING (Gallons)	VOLUME PURGED (Gallons)
860506	1150			

SAMPLING METHOD: Split Spoon

Sampler Type: X — A-Submersible Pump, B-ISCO, C-Bladder Pump, D-Dipper/Bottle, E-Bailer, F-Scoop/Shovel — X-Other: Split Spoon (SPECIFY OTHER)

Sampler Material: B — A-Teflon, B-Metal, C-PVC, D-Plastic — X-Other: (SPECIFY OTHER)

Tubing Material: / — A-Teflon, B-Tygon, C-Polyethylene, D-Silicon — X-Other: (SPECIFY OTHER)

Sample Composited Y/N: N

Procedure/Proportions

FIELD MEASUREMENTS

Well Elevation (ft/msl): .

Depth to Ground water (ft): 6.11

Groundwater Elevation (ft msl): .

Well Depth (ft): 1.5

Sample Depth (non-well) (ft): 1.5

13 to 15 feet.

	ph	(STD)		spec. cond.	um/cm at 25° C	(other parameter)	value	units
1st			1st					
2nd			2nd					
3rd			3rd					
4th			4th					

Sample Temp (°C) Turbidity NTU

FIELD COMMENTS

Sample Appearance: Dirty black soil

Weather Conditions: Sunny, warm 70's

Other:

FILTERING: Use Chain of Custody (CC1) to indicate which bottles were filtered

Sampler: BLAINE FRESCO (Print) Employer: O.H. MATERIALS Corp.

I certify that sampling procedures were in accordance with applicable EPA state and corporate protocols.

5/6/86 (Date) Blaine Fresco (Signature) OHM

ETC ENVIRONMENTAL TESTING and CERTIFICATION

CHAIN OF CUSTODY FORM (CC1)

Seal No. [illegible] ETC JOB # [illegible]

Date Sealed 5/5/86 By: [illegible]

Company: LOUIS BERGER & ASSOC.

Facility/Site: Bayonne Barrel & Drum

Address: Newark, NJ

Attn.: M. Hussain

Phone: (201) 678-1960

SAMPLE IDENTIFICATION

Facility: BBDLBANJTK (Facility/Site Code) | Well #1 near tire pile (Optional Sample Point Descriptions)

Sample Point: W - LBABS14FIP (Source Code (from below): W; Your Sample Point ID (left justify): M.H.) | 86 05 06 (Start Date (YY/MM/DD)) | 13 00 (Start Time (2400 hr. clock)) | Elapsed Hours (composite)

Source Codes:
Well ..(W) Outfall.....(O) Bottom Sediment ....(B) Surface Impoundment....(I) Leachate Collection Sys.....(C) Other .....(X)
Soil ...(S) River/Stream..(R) Generation Point ....(G) Treatment Facility .....(T) Lake/Ocean .....(L) Specify

SHUTTLE CONTENTS

BOTTLE No	Type	Size	Preserv.	ANALYSIS	SAMPLER Filt. (Y/N)	SAMPLER Observations	LAB Observations
1	E	1L	BAKED	EXTRACTABLE	N	Soil sample	
2	F	40ml	↓	VOA	N	taken at	
						11:5-14:5	

CHAIN OF CUSTODY CHRONICLE

1. Shuttle Opened By: (print) M. HUSSAIN Date: 5.6.86 Time: 1100
Signature: Manzoor Hussain Seal #: 56271 Intact: yes

2. I have received these materials in good condition from the above person.
Name: Signature:
Date: Time: Remarks:

3. I have received these materials in good condition from the above person.
Name: Signature:
Date: Time: Remarks:

4. Shuttle Sealed By: (print) M. HUSSAIN Date: 5.6.86 Time: 1330
Signature: Manzoor Hussain Seal #: 56272 Intact: yes

ETC USE ONLY Opened By: [illegible] Date: 5/6/86 Time: 6:15 PM

ETC ENVIRONMENTAL TESTING and CERTIFICATION

FIELD PARAMETER FORM (CC2)

ETC JOB # M1206

Sample Point W (Source Code) LBABW14FIP (Sample Point I.D.)

FIELD PROCEDURES

PURGE DATE (YY MM DD)	START PURGE (2400 Hr Clock)	ELAPSED HRS	WATER VOL. IN CASING (Gallons)	VOLUME PURGED (Gallons)
860506	1305			

SAMPLING METHOD: Split spoon

Sampler Type [X] A-Submersible Pump B-ISCO C-Bladder Pump D-Dipper/Bottle E-Bailer F-Scoop/Shovel X-Other Split spoon (SPECIFY OTHER)

Sampler Material [B] A-Teflon B-Metal C-PVC D-Plastic X-Other (SPECIFY OTHER)

Tubing Material [ ] A-Teflon B-Tygon C-Polyethylene D-Silicon X-Other (SPECIFY OTHER)

Sample Composited [Y/N] N (Procedure/Proportions)

FIELD MEASUREMENTS

Well Elevation (ft/msl) ___ Well Depth (ft) ___

Depth to Ground water (ft) 6.11 Sample Depth (non-well) (ft) ___

Groundwater Elevation (ft msl) ___ → 17.5' to 19.5' Soil

	ph		spec. cond.		(other parameter)	value	units
1st		(STD)		um/cm at 25° C			
2nd		(STD)		um/cm at 25°C			
3rd		(STD)		um/cm at 25°C			
4th		(STD)		um/cm at 25°C			

Sample Temp (°C) Turbidity NTU

FIELD COMMENTS

Sample Appearance: sandy granules

Weather Conditions: Sunny Clear in upper 70's

Other:

FILTERING: Use Chain of Custody (CC1) to indicate which bottles were filtered

Sampler: BLAINE FRESCO (Print) Employer: O.H. MATERIALS Corp.

I certify that sampling procedures were in accordance with applicable EPA state and corporate protocols.

Skdk (Date) Blaine Fresco (Signature) OHM

ETC ENVIRONMENTAL TESTING and CERTIFICATION

CHAIN OF CUSTODY FORM (CC1)

Seal No. [illegible] ETC Job # [illegible]

Date Sealed 4/2 [illegible] By: [illegible]

Company: Louis Berger & Assoc.

Facility/Site: Bayonne Barrel & Drum

Address: Newark, NJ

Attn.: R. Andrew Blellock

Phone: (201) 678-1960

SAMPLE IDENTIFICATION

Facility: Facility/Site Code (Optional Sample Point Descriptions)

Sample Point: 480 S-LBABC6UFIP 860428 1400

Source Code (from below) | Your Sample Point ID (left justify) | Start Date (YY/MM/DD) | Start Time (2400 hr. clock) | Elapsed Hours (composite)

Source Codes: 5.3

Well ...(W) Outfall .....(O) Bottom Sediment ....(B) Surface Impoundment ....(I) Leachate Collection Sys. ....(C) Other .....(X)

Soil ...(S) River/Stream ..(R) Generation Point ....(G) Treatment Facility .....(T) Lake/Ocean .....(L) Specify

SHUTTLE CONTENTS

BOTTLE No	Type	Size	Preserv.	ANALYSIS	SAMPLER Filt. (Y/N)	SAMPLER Observations	LAB Observations
3	E	500mL	BAKED	EXTBL SOIL	N		—
1	V	40mL	BAKED	VOA SOIL			— [illegible]
1	TB	40mL	[illegible]	TRIP BLANK			—

CHAIN OF CUSTODY CHRONICLE

1. Shuttle Opened By: (print) MANZOOR HUSSAIN Date: 4.28.86 Time: 1400 HRS
   Signature: Manzoor Hussain Seal #: 56985 Intact: yes

2. I have received these materials in good condition from the above person.
   Name: Signature:
   Date: Time: Remarks:

3. I have received these materials in good condition from the above person.
   Name: Signature:
   Date: Time: Remarks:

4. Shuttle Sealed By: (print) MANZOOR HUSSAIN Date: 4.28.86 Time: 1730 HRS
   Signature: Manzoor Hussain Seal #: 56986 Intact: yes

ETC USE ONLY Opened By: [illegible] Date: 4/29/86 Time: 1255

ETC ENVIRONMENTAL TESTING and CERTIFICATION

FIELD PARAMETER FORM (CC2)

ETC JOB # M1207

Sample Point S (Source Code) L B A B C 6 U F I P (Sample Point I.D.)

FIELD PROCEDURES

PURGE DATE (YY MM DD)	START PURGE (2400 Hr Clock)	ELAPSED HRS	WATER VOL. IN CASING (Gallons)	VOLUME PURGED (Gallons)
860428	1409			

SAMPLING METHOD: Split Spoon Soil Sampling

Sampler Type: X — A-Submersible Pump, B-ISCO, C-Bladder Pump, D-Dipper/Bottle, E-Bailer, F-Scoop/Shovel — X-Other: Split Spoon (SPECIFY OTHER)

Sampler Material: B — A-Teflon, B-Metal, C-PVC, D-Plastic — X-Other: (SPECIFY OTHER)

Tubing Material: A-Teflon, B-Tygon, C-Polyethylene, D-Silicon — X-Other: (SPECIFY OTHER)

Sample Composited: Y/N — Three discreet samples M 1207 E, M1207E2 + M1207E to be composited in the laboratory at ETC (Procedure/Proportions)

FIELD MEASUREMENTS

Well Elevation (ft/msl):

Depth to Ground water (ft):

Groundwater Elevation (ft msl):

Well Depth (ft):

Sample Depth (non-well) (ft): [illegible] 50

	ph		spec. cond.		(other parameter)	value	units
1st		(STD)		um/cm at 25° C			
2nd		(STD)		um/cm at 25°C			
3rd		(STD)		um/cm at 25°C			
4th		(STD)		um/cm at 25°C			

Sample Temp: (°C)

Turbidity: NTU

FIELD COMMENTS

Sample Appearance: Soil

Weather Conditions: Sunny, breezy, 70° F

Other:

Three soil samples were taken from three different sampling points 6A, 6B + 6C. These are in three amber bottles, 6A in M1207E, 6B in M1207E and 6C in bottle labeled M1207E3. These samples are to be composited in the laboratory at ETC & analyzed

FILTERING: Use Chain of Custody (CC1) to indicate which bottles were filtered

Sampler: ~~O.H. M~~ BLAINE FRESCO (Print) Employer: O.H. MATERIALS Corp

I certify that sampling procedures were in accordance with applicable EPA state and corporate protocols.

4/24/16 (Date) Blaine Fresco (Signature)

ETC TESTING and CERTIFICATION

CHAIN OF CUSTODY FORM (CC1)

Seal No. _____ ETC Job # _____

Date Sealed [illegible] By: [illegible]

Company: Louis Berger & Assoc.

Facility/Site: Bayonne Barrel & Drum

Address: Newark, NJ

Attn.: R. Andrew Blellock

Phone: (201) 678-1960

SAMPLE IDENTIFICATION

Facility: BBDLBANJTK (Facility/Site Code) | Bayonne Barrel & Drum 18-36 Composite (Optional Sample Point Descriptions)

Sample Point: S-LBABCGLFIP (Source Code (from below) 480; Your Sample Point ID (left justify) 5-3) | 860428 (Start Date (YY/MM/DD)) | 1630 (Start Time (2400 hr. clock)) | Elapsed Hours (composite)

Source Codes:

Well ..(W) Outfall.....(O) Bottom Sediment....(B) Surface Impoundment....(I) Leachate Collection Sys.....(C) Other .....(X)

Soil ...(S) River/Stream..(R) Generation Point ....(G) Treatment Facility .....(T) Lake/Ocean .....(L) Specify _____

SHUTTLE CONTENTS

BOTTLE No	Type	Size	Preserv.	ANALYSIS	SAMPLER Fill (Y/N)	SAMPLER Observations	LAB Observations
3	E	500mL	BAKED	EXTBL SOIL	N		- EL Empty
1	V	40mL	BAKED	VOA SOIL		Two samples in Bottles labeled M1208 to be composited in the lab & analyzed.	- read empty

CHAIN OF CUSTODY CHRONICLE

1. Shuttle Opened By: (print) MANZOOR HUSSAIN Date: 4.28.86 Time: 1400 HRS
   Signature: Manzoor Hussain Seal #: 56985 Intact: yes

2. I have received these materials in good condition from the above person.
   Name: _____ Signature: _____
   Date: _____ Time: _____ Remarks: _____

3. I have received these materials in good condition from the above person.
   Name: _____ Signature: _____
   Date: _____ Time: _____ Remarks: _____

4. Shuttle Sealed By: (print) MANZOOR HUSSAIN Date: 4.28.86 Time: 1730 HRS
   Signature: Manzoor Hussain Seal #: 56986 Intact: yes

ETC USE ONLY Opened By: [illegible] Date: 4/29/86 Time: 1255

ETC ENVIRONMENTAL TESTING and CERTIFICATION

FIELD PARAMETER FORM (CC2)

ETC JOB # M1208

Sample Point S (Source Code) L B A B C 6 L F I P (Sample Point I.D)

FIELD PROCEDURES

PURGE DATE (YY MM DD)	START PURGE (2400 Hr Clock)	ELAPSED HRS	WATER VOL. IN CASING (Gallons)	VOLUME PURGED (Gallons)
860428	1427			

SAMPLING METHOD: Split spoon soil sampling

Sampler Type: X — A-Submersible Pump, B-ISCO, C-Bladder Pump, D-Dipper/Bottle, E-Bailer, F-Scoop/Shovel — X-Other: Split spoon (SPECIFY OTHER)

Sampler Material: B — A-Teflon, B-Metal, C-PVC, D-Plastic — X-Other: (SPECIFY OTHER)

Tubing Material: A-Teflon, B-Tygon, C-Polyethylene, D-Silicon — X-Other: (SPECIFY OTHER)

Sample Composited Y/N: To be composited in the lab. (Procedure/Proportions)

FIELD MEASUREMENTS

Well Elevation (ft/msl):

Depth to Ground water (ft):

Groundwater Elevation (ft msl):

Well Depth (ft):

Sample Depth (non-well) (ft): 3.0

	ph		spec. cond.		(other parameter)	value	units
1st	(STD)	1st	um/cm at 25° C				
2nd	(STD)	2nd	um/cm at 25°C				
3rd	(STD)	3rd	um/cm at 25°C				
4th	(STD)	4th	um/cm at 25°C				

Sample Temp (°C) — Turbidity NTU

FIELD COMMENTS

Sample Appearance: sandy soil

Weather Conditions: sunny, windy, clear

Other:

Two samples M1208E + M1208E2 to be composited in the laboratory & analyzed.

FILTERING: Use Chain of Custody (CC1) to indicate which bottles were filtered

Sampler: BLAINE FRESCO (Print) Employer: O.H. MATERIALS.

I certify that sampling procedures were in accordance with applicable EPA state and corporate protocols.

4/28/88 (Date) Blaine Fresco (Signature)

ETC TESTING and CERTIFICATION

CHAIN OF CUSTODY FORM (CC1)

Seal No. _____ ETC Job # _____

Date Sealed 4/24/86 By: [signature]

Company: Louis Berger & Assoc

Facility/Site: Bayonne Barrel & Drum

Address: Newark, NJ

Attn.: R. Andrew Blellock

Phone: (201) 678-1960

SAMPLE IDENTIFICATION

Facility: BBDLBANJTK (Facility/Site Code) | Bayonne Barrel & Drum Site 7-0-18 (Optional Sample Point Descriptions)

Sample Point: S-LBABC7UFIP (Source Code (from below) / Your Sample Point ID (left justify)) | 860428 (Start Date (YY/MM/DD)) | 1800 (Start Time (2400 hr clock)) | Elapsed Hours (composite)

Source Codes:

Well (W) Outfall (O) Bottom Sediment (B) Surface Impoundment (I) Leachate Collection Sys. (C) Other (X)

Soil (S) River/Stream (R) Generation Point (G) Treatment Facility (T) Lake/Ocean (L) Specify _____

SHUTTLE CONTENTS

BOTTLE No	Type	Size	Preserv.	ANALYSIS	SAMPLER Filt. (Y/N)	SAMPLER Observations	LAB Observations
3	E	500mL	BAKED	EXTBL SOIL	N	Three	✓
1	V	40mL	BAKED	VOA SOIL		samples	✓
1	TB	40mL	GCMS PRO	TRIP BLANK		in bottles	✓
						M1209 E1,	
						M1209 E2,	
						and M1209 E3	
						have to be	
						composited	
						in the Pal	
						& analyzed as	
						a single	
						composited	
						sample.	

CHAIN OF CUSTODY CHRONICLE

1. Shuttle Opened By: (print) Manzoor Hussain Date: 4.28.86 Time: 1800 HRS
   Signature: Manzoor Hussain Seal #: 56983 Intact: yes

2. I have received these materials in good condition from the above person.
   Name: _____ Signature: _____
   Date: _____ Time: _____ Remarks: _____

3. I have received these materials in good condition from the above person.
   Name: _____ Signature: _____
   Date: _____ Time: _____ Remarks: _____

4. Shuttle Sealed By: (print) MANZOOR HUSSAIN Date: 4.28.86 Time: 1245
   Signature: Manzoor Hussain Seal #: 56984 Intact: yes

ETC USE ONLY Opened By: Mark Ickstadt Date: 4-29-86 Time: 6:45 PM

LAB FILE Seal #: 56984 Condition: INTACT

ETC ENVIRONMENTAL TESTING and CERTIFICATION

FIELD PARAMETER FORM (CC2)

ETC JOB # [illegible]

Sample Point S (Source Code) 4BABC7UFIP (Sample Point I.D.)

FIELD PROCEDURES

PURGE DATE (YY MM DD)	START PURGE (2400 Hr Clock)	ELAPSED HRS	WATER VOL. IN CASING (Gallons)	VOLUME PURGED (Gallons)
860428	1800			

SAMPLING METHOD: Split Spoon - hammered in the ground

Sampler Type: Y — A-Submersible Pump, B-ISCO, C-Bladder Pump, D-Dipper/Bottle, E-Bailer, F-Scoop/Shovel — X-Other: Split Spoon (SPECIFY OTHER)

Sampler Material: M — A-Teflon, B-Metal, C-PVC, D-Plastic — X-Other: (SPECIFY OTHER)

Tubing Material: - — A-Teflon, B-Tygon, C-Polyethylene, D-Silicon — X-Other: (SPECIFY OTHER)

Sample Composited: Y/N — To be composited in the lab. (Procedure/Proportions)

FIELD MEASUREMENTS

Well Elevation (ft/msl):

Depth to Ground water (ft):

Groundwater Elevation (ft msl):

Well Depth (ft):

Sample Depth (non-well) (ft): 1.50

	ph	(STD)	spec. cond.	um/cm at 25° C	(other parameter)	value	units
1st							
2nd							
3rd							
4th							

Sample Temp (°C) — Turbidity NTU

FIELD-COMMENTS

Sample Appearance:

Weather Conditions: Sunny, clear, windy, 65°F

Other:

Sample in bottle M1209 E (from point 7A) had heavy odor of organic chemicals (petroleum products etc) The sample from 7B in bottle M1209 E2 does not have any distinct odor but looks dark black.

FILTERING: Use Chain of Custody (CC1) to indicate which bottles were filtered

Sampler: BLAINE FRESCO (Print) Employer: O.H. MATERIALS.

I certify that sampling procedures were in accordance with applicable EPA state and corporate protocols.

4/28/86 (Date) Blaine Fresco (Signature)

LAB FILE

ETC TESTING and CERTIFICATION

CHAIN OF CUSTODY FORM (CC1)

Seal No. _____ ETC USE # _____

Date Sealed _____ By: _____

Company: [illegible]

Facility/Site: Bayonne Barrel & Drum

Address: [illegible] New York

Attn.: R Andrew Kellish

Phone: (201) 678 1960

SAMPLE IDENTIFICATION

Facility: LBABBDMTTK (Facility/Site Code) Bayonne Barrel & Drum Bldg #1 Int (Optional Sample Point Descriptions)

Sample Point: 617 — Source Code (from below): X — Your Sample Point ID (left justify): LBABBD1F1P — Start Date (YY/MM/DD): 860428 — Start Time (2400 hr clock): 1700 — Elapsed Hours (composite): ___

Source Codes: 45

Well ..(W) Outfall.....(O) Bottom Sediment ....(B) Surface Impoundment....(I) Leachate Collection Sys.....(C) Other floor dirt (X)

Soil ...(S) River/Stream..(R) Generation Point ....(G) Treatment Facility .....(T) Lake/Ocean .....(L) Specify _____

SHUTTLE CONTENTS

BOTTLE No	Type	Size	Preserv.	ANALYSIS	SAMPLER Filt. (Y/N)	SAMPLER Observations	LAB Observations
1	E	1L	BAKED	EXTBL SOIL	N	Dirt from	
2	V	40mL	BAKED	VOA SOIL		floors +	
1	VB	40mL	6CMSHCL	TKIP SWNIL		walls of	
						Bldg #1	

CHAIN OF CUSTODY CHRONICLE

1. Shuttle Opened By: (print) MANZOOR HUSSAIN Date: 4.28.86 Time: 1700 HR
   Signature: Manzoor Hussain Seal #: 56979 Intact: yes

2. I have received these materials in good condition from the above person.
   Name: _____ Signature: _____
   Date: _____ Time: _____ Remarks: _____

3. I have received these materials in good condition from the above person.
   Name: _____ Signature: _____
   Date: _____ Time: _____ Remarks: _____

4. Shuttle Sealed By: (print) MANZOOR HUSSAIN Date: 4.28.86 Time: 1730 HRS
   Signature: Manzoor Hussain Seal #: 56980 Intact: yes

ETC USE ONLY Opened By: [illegible] Date: 4/29/86 Time: 1247

LAB FILE Seal #: 5698 Condition: [illegible]

ETC ENVIRONMENTAL TESTING and CERTIFICATION

FIELD PARAMETER FORM (CC2)

ETC JOB # _____

Sample Point [X] Source Code [LBABD1FIP] Sample Point I.D.

FIELD PROCEDURES

PURGE DATE (YY MM DD)	START PURGE (2400 Hr Clock)	ELAPSED HRS	WATER VOL. IN CASING (Gallons)	VOLUME PURGED (Gallons)
860428	1700			

SAMPLING METHOD: _____

Sampler Type [ ] A-Submersible Pump, B-ISCO, C-Bladder Pump, D-Dipper/Bottle, E-Bailer, F-Scoop/Shovel, X-Other Plastic Scoop (SPECIFY OTHER)

Sampler Material [D] A-Teflon, B-Metal, C-PVC, D-Plastic, X-Other _____ (SPECIFY OTHER)

Tubing Material [ ] A-Teflon, B-Tygon, C-Polyethylene, D-Silicon, X-Other _____ (SPECIFY OTHER)

Sample Composited [Y/N] Yes Composited (Procedure/Proportions)

FIELD MEASUREMENTS

Well Elevation (ft/msl) _____

Depth to Ground water (ft) _____

Groundwater Elevation (ft msl) _____

Well Depth (ft) _____

Sample Depth (non-well) (ft) _____

	ph	(STD)		spec. cond.	um/cm at 25°C	(other parameter)	value	units
1st			1st					
2nd			2nd					
3rd			3rd					
4th			4th					

Sample Temp _____ (°C)

Turbidity _____ NTU

FIELD COMMENTS

Sample Appearance: mixture of complex materials

Weather Conditions: sunny, clear, 70°F.

Other: This is a sample of complex matrices collected from floor + walls of building #1 at the site of investigation

FILTERING: Use Chain of Custody (CC1) to indicate which bottles were filtered

Sampler: ~~BLAINE FRESE~~ MANZOOR HUSSAIN (Print) Employer: ~~D.H. MATERIALS~~ Louis Berger & Associates

I certify that sampling procedures were in accordance with applicable EPA state and corporate protocols.

Manzoor Hussain 4/28/86 (Date) (Signature)

LAB FILE

ETC TESTING and CERTIFICATION

CHAIN OF CUSTODY FORM (CC1)

Seal No. ____ ETC Job # ____

Date Sealed 4/28/86 By: ____

Company: Louis Berger & Assoc.

Facility/Site: Bayonne Barrel & Drum

Address: Newark, NJ

Attn.: K. Andrew Blellak

Phone: (201) 678-1960.

SAMPLE IDENTIFICATION

Facility: BBDCBAMJTK (Facility/Site Code) Bayonne Barrel & Drum, Bldg #2. (Optional Sample Point Descriptions)

Sample Point: 617 — X (Source Code (from below)) - LBABBD2FIP (Your Sample Point ID (left justify)) 860428 (Start Date (YY/MM/DD)) 1700 (Start Time (2400 hr clock)) ___ (Elapsed Hours (composite))

Source Codes: 615

Well ..(W) Outfall.....(O) Bottom Sediment ....(B) Surface Impoundment....(I) Leachate Collection Sys.....(C) Other Floor Dirt (X)

Soil ...(S) River/Stream..(R) Generation Point ....(G) Treatment Facility .....(T) Lake/Ocean .....(L) Specify ____

SHUTTLE CONTENTS

BOTTLE No	Type	Size	Preserv.	ANALYSIS	SAMPLER Filt. (Y/N)	SAMPLER Observations	LAB Observations
1	E	1L	BAKED	EXTBL SOIL	N		
2	V.	40mL	BAKED	VOA SOIL			not empty

CHAIN OF CUSTODY CHRONICLE

1. Shuttle Opened By: (print) MANZOOR HUSSAIN Date: 4.28.86 Time: 1700 HRS
   Signature: Manzoor Hussain Seal #: 56979 Intact: yes

2. I have received these materials in good condition from the above person.
   Name: ____ Signature: ____
   Date: ____ Time: ____ Remarks: ____

3. I have received these materials in good condition from the above person.
   Name: ____ Signature: ____
   Date: ____ Time: ____ Remarks: ____

4. Shuttle Sealed By: (print) MANZOOR HUSSAIN Date: 4.28.86 Time: 1730 HRS
   Signature: Manzoor Hussain Seal #: 56980 Intact: yes

ETC USE ONLY Opened By: ____ Date: 4/29/86 Time: 1247

LAB FILE Seal #: 56980 Condition: Intact

ETC ENVIRONMENTAL TESTING and CERTIFICATION

FIELD PARAMETER FORM (CC2)

ETC JOB # [illegible]

Sample Point [X] (Source Code) LBABBD2FIP (Sample Point I.D)

FIELD PROCEDURES

PURGE DATE (YY MM DD)	START PURGE (2400 Hr Clock)	ELAPSED HRS	WATER VOL. IN CASING (Gallons)	VOLUME PURGED (Gallons)
860428	1700			

SAMPLING METHOD:

Sampler Type [F] A-Submersible Pump B-ISCO C-Bladder Pump D-Dipper/Bottle E-Bailer F-Scoop/Shovel X-Other Plastic Scoop (SPECIFY OTHER)

Sampler Material [D] A-Teflon B-Metal C-PVC D-Plastic X-Other (SPECIFY OTHER)

Tubing Material [ ] A-Teflon B-Tygon C-Polyethylene D-Silicon X-Other (SPECIFY OTHER)

Sample Composited [Y/N] Yes composited (Procedure/Proportions)

FIELD MEASUREMENTS

Well Elevation (ft/msl)

Depth to Ground water (ft)

Groundwater Elevation (ft msl)

Well Depth (ft)

Sample Depth (non-well) (ft)

	ph		spec. cond.		(other parameter)	value	units
1st		(STD)		um/cm at 25° C			
2nd		(STD)		um/cm at 25°C			
3rd		(STD)		um/cm at 25°C			
4th		(STD)		um/cm at 25°C			

Sample Temp (°C) Turbidity NTU

FIELD COMMENTS

Sample Appearance: Complex matrix.

Weather Conditions: clear, sunny, windy, 70 F.

Other: This is a complex matrix mixture collected from floors & walls of Bldg # 2.

FILTERING: Use Chain of Custody (CC1) to indicate which bottles were filtered

Sampler: MANZOOR HUSSAIN (Print) Employer: Louis BERGER & Assoc.

I certify that sampling procedures were in accordance with applicable EPA state and corporate protocols.

4/28/86 (Date) Manzoor Hussain (Signature)

LAB FILE

ETC ENVIRONMENTAL TESTING and CERTIFICATION

CHAIN OF CUSTODY

Company: Louis Berger & Assoc Job No. 1215, 1216, 1217, 1218 3983.

Address 100 Halstead, E. Orange

Attention: S. Timmerman

Sample Description: 6 sealed Shutter.

A.B. 5/28/84

Sample(s) Relinquished by: Manzoor Hossain

Time: 8:42 Date: 5/28/84

Sample(s) Received by: A. Brown

Time: 8:42 Date: 5/28/84

ETC ENVIRONMENTAL TESTING and CERTIFICATION

CHAIN OF CUSTODY FORM (CC1)

Seal No. 69915 ETC Job # M1215

Date Sealed 5/27/86 By: AL

Company: Louis Berger & Assoc

Facility/Site: 100 Halsted St

Address: E. Orange N.J

Attn.: R Andrew Blellock

Phone: ( )

SAMPLE IDENTIFICATION

Facility: LBABDNFIP (Facility/Site Code) — Near Entrance Gate. (Optional Sample Point Description)

Sample Point: W - LBABWIWFIP (Source Code (from below); Your Sample Point ID (left justify)) — 860527 (Start Date (YY/MM/DD)) — 1420 (Start Time (2400 hr. clock)) — Elapsed Hours (Composite)

Source Codes:

Well ..(W) Outfall.....(O) Bottom Sediment ....(B) Surface Impoundment....(I) Leachate Collection Sys.....(C) Other .....(X)

Soil ...(S) River/Stream..(R) Generation Point ....(G) Treatment Facility .....(T) Lake/Ocean .....(L) Specify

SHUTTLE CONTENTS

BOTTLE No	Type	Size	Preserv.	ANALYSIS	SAMPLER Fill (Y/N)	SAMPLER Observations	LAB Observations
1	E	1L	BAKED	EXTBL	N		
1	M	1L	HNO_3	METALS	Y		
1	PN	125 mL	H_2SO_4	Phenols	N		
1	CN	125 mL	NaOH	Cyanide	N		
2	F	40 mL	BAKED	VOA	N		
	TB	40 mL	GC/MS	Trip Blank	N		

Sample water for metal analysis

CHAIN OF CUSTODY CHRONICLE

1. Shuttle Opened By: (print) M. HUSSAIN Date: 5.27.86 Time: 1420
   Signature: Manzoor Hussain Seal #: 69915 Intact: yes

2. I have received these materials in good condition from the above person.
   Name: Signature:
   Date: Time: Remarks:

3. I have received these materials in good condition from the above person.
   Name: Signature:
   Date: Time: Remarks:

4. Shuttle Sealed By: (print) M. HUSSAIN Date: 5.27.86 Time: 1700 hrs
   Signature: Manzoor Hussain Seal #: 69916 Intact: yes

LAB USE ONLY Opened By: Date: Time:

ETC ENVIRONMENTAL TESTING and CERTIFICATION

FIELD PARAMETER FORM (CC2)

ETC JOB # M1215

Sample Point W (Source Code) LBABW1WFIP (Sample Point I.D)

FIELD PROCEDURES

PURGE DATE (YY MM DD)	START PURGE (2400 Hr Clock)	ELAPSED HRS	WATER VOL IN CASING (Gallons)	VOLUME PURGED (Gallons)
860527	1420			

SAMPLING METHOD: Bottom bailer

Sampler Type: E — A-Submersible Pump, B-ISCO, C-Bladder Pump, D-Dipper/Bottle, E-Bailer, F-Scoop/Shovel, X-Other _____ (SPECIFY OTHER)

Sampler Material: A — A-Teflon, B-Metal, C-PVC, D-Plastic, X-Other _____ (SPECIFY OTHER)

Tubing Material: C — A-Teflon, B-Tygon, C-Polyethylene, D-Silicon, X-Other _____ (SPECIFY OTHER)

Sample Composited Y/N: N

Procedure/Proportions

FIELD MEASUREMENTS

Well Elevation (ft/msl) _____

Depth to Ground water (ft) _____

Groundwater Elevation (ft msl) _____

Well Depth (ft) _____

Sample Depth (non-well) (ft) _____

	ph	(STD)		spec. cond.	um/cm at 25°C	(other parameter)	value	units
1st			1st					
2nd			2nd					
3rd			3rd					
4th			4th					

Sample Temp (°C) _____ Turbidity NTU _____

FIELD COMMENTS

Sample Appearance: _____

Weather Conditions: Sunny, clear, warm.

Other: water for metal analysis filtered through a fiberglass filter & a 0.45 μ filter

FILTERING: Use Chain of Custody (CC1) to indicate which bottles were filtered

Sampler: Blaine Fresco (Print) Employer: O.H. Materials Corp

I certify that sampling procedures were in accordance with applicable EPA state and corporate protocols.

5/27/86 (Date) Blaine Fresco (Signature)

ETC ENVIRONMENTAL TESTING and CERTIFICATION

CHAIN OF CUSTODY FORM (CC1)

Seal No. 69919 ETC Job # M1217

Date Sealed 5/27/02 By: [illegible]

Company: Louis Berger & Assoc

Facility/Site: Bayonne Barrel & Drum

Address: 100 Halsted St.
E. Orange, NJ

Attn.: R. Andrew Blellock

Phone: ( )

SAMPLE IDENTIFICATION

Facility: LBABBDNF1P (Facility/Site Code) — Near Pile of Tires (Optional Sample Point Descriptions)

Sample Point: W-LBABW2WFIP (Source Code (from below) / Your Sample Point ID (left justify)) — 860527 (Start Date (YY/MM/DD)) — 1235 (Start Time (2400 hr. clock)) — Elapsed Hours (composite)

Source Codes:
Well ..(W) Outfall.....(O) Bottom Sediment ..(B) Surface Impoundment....(I) Leachate Collection Sys.....(C) Other .....(X)
Soil ...(S) River/Stream..(R) Generation Point ....(G) Treatment Facility .....(T) Lake/Ocean .....(L) Specify

SHUTTLE CONTENTS

BOTTLE No	Type	Size	Preserv.	ANALYSIS	SAMPLER Fill (Y/N)	SAMPLER Observations	LAB Observations
4	E	1L	BAKED	EXTBL	N		
1	M	1L	HNO_3	METALS	Y		
1	PN	125 mL	H_2SO_4	Phenols	N		
1	CN	125 mL	NaOH	Cyanide	N		
2	F	40mL	BAKED	VOA	N		
1	TB	40mL	GC/MS	Trip Blank	—		

only sample water for metal analysis filtered through a fiberglass + 0.45μm filter in a plastic filtering apparatus.

CHAIN OF CUSTODY CHRONICLE

1. Shuttle Opened By: (print) M. HUSSAIN Date: 5.27.86 Time: 12 40
Signature: Manzoor Hussain Seal #: 69919 Intact: yes

2. I have received these materials in good condition from the above person.
Name: Signature:
Date: Time: Remarks:

3. I have received these materials in good condition from the above person.
Name: Signature:
Date: Time: Remarks:

4. Shuttle Sealed By: (print) M. HUSSAIN Date: 5.27.86 Time: 1400 hrs
Signature: Manzoor Hussain Seal #: 69920 Intact: yes

ETC USE ONLY Opened By: Date: Time:

ETC ENVIRONMENTAL TESTING and CERTIFICATION

FIELD PARAMETER FORM (CC2)

ETC JOB # M1217

Sample Point W LB ABW2W FIP (Source Code / Sample Point I.D.)

FIELD PROCEDURES

PURGE DATE (YY MM DD)	START PURGE (2400 Hr Clock)	ELAPSED HRS	WATER VOL IN CASING (Gallons)	VOLUME PURGED (Gallons)
86 05 27	1100			

SAMPLING METHOD:

Sampler Type [E] A-Submersible Pump, B-ISCO, C-Bladder Pump, D-Dipper/Bottle, E-Bailer, F-Scoop/Shovel, X-Other ____ (SPECIFY OTHER)

Sampler Material [A] A-Teflon, B-Metal, C-PVC, D-Plastic, X-Other ____ (SPECIFY OTHER)

Tubing Material [C] A-Teflon, B-Tygon, C-Polyethylene, D-Silicon, X-Other ____ (SPECIFY OTHER)

Sample Composited [Y/N] N — Procedure/Proportions

FIELD MEASUREMENTS

Well Elevation (ft/msl) ____

Depth to Ground water (ft) 8.62

Groundwater Elevation (ft msl) ____

Well Depth (ft) ____

Sample Depth (non-well) (ft) ____

	ph	(STD)		spec. cond.	um/cm at 25° C	(other parameter)	value	units
1st			1st					
2nd			2nd					
3rd			3rd					
4th			4th					

Sample Temp ____ (°C)

Turbidity ____ NTU

FIELD COMMENTS

Sample Appearance: Dirty water - Colored even after filteration

Weather Conditions: Sunny, warm, clear

Other: Water sample for metal analysis was filtered through a fiber glass + a 0.45 μ filters in a disposable Nalgene filteration apparatus.

FILTERING: Use Chain of Custody (CC1) to indicate which bottles were filtered

Sampler: Blaine Fresco (Print) Employer: C. H. MATERIALS, Corp

I certify that sampling procedures were in accordance with applicable EPA state and corporate protocols.

5/27/86 (Date) Blaine Fresco (Signature)

ETC ENVIRONMENTAL TESTING and CERTIFICATION

CHAIN OF CUSTODY FORM (CC1)

Seal No. [illegible] ETC Job # [illegible]

Date Sealed 4/24/86 By: [illegible]

Company: [illegible] Bergen & Assoc

Attn.: R. Andrew Blellock

Facility/Site: Bayonne Barrel & Drum Co.

Phone: ( )

Address: Newark, NJ

SAMPLE IDENTIFICATION

Facility: BB&DLBANJT (Facility/Site Code) | Bayonne Barrel & Drum site (near Tanks) (Optional Sample Point Descriptions)

Sample Point: X - LBABFB1FIT (Source Code (from below) / Your Sample Point ID (left justify)) | 860425 (Start Date (YY/MM/DD)) | 1315 (Start Time (2400 hr. clock)) | (Elapsed Hours (composite))

Source Codes:
Well ..(W) Outfall.....(O) Bottom Sediment ....(B) Surface Impoundment....(I) Leachate Collection Sys.....(C) Other Field Blank ...(X)
Soil ...(S) River/Stream..(R) Generation Point ....(G) Treatment Facility .....(T) Lake/Ocean .....(L) Specify

SHUTTLE CONTENTS

BOTTLE No	Type	Size	Preserv.	ANALYSIS	SAMPLER Filt. (Y/N)	SAMPLER Observations	LAB Observations
4	E	1L	BAKED	EXTBL FIELD BLANK	N		✓
1	M	1L	HNCB	METAL			✓
1	CN	125mL	NAOH	CYCT			✓
1	PN	125mL	H2SO4	PHENOLS			✓
2	V	40mL	BAKED	VOA			✓

CHAIN OF CUSTODY CHRONICLE

1. Shuttle Opened By: (print) MANZOOR HUSSAIN Date: 4.25.86 Time: 1315 HRS.
Signature: Manzoor Hussain Seal #: 56997 Intact: yes

2. I have received these materials in good condition from the above person.
Name: Signature:
Date: Time: Remarks:

3. I have received these materials in good condition from the above person.
Name: Signature:
Date: Time: Remarks:

4. Shuttle Sealed By: (print) MANZOOR HUSSAIN Date: 4.25.86 Time: 1355
Signature: Manzoor Hussain Seal #: 56998 Intact: yes

ETC USE ONLY Opened By: [illegible] Date: 4/26/86 Time: 9:00

ORIGINAL Seal #: 56998 Condition: Intact

ETC ENVIRONMENTAL TESTING and CERTIFICATION

FIELD PARAMETER FORM (CC2)

ETC JOB # M1220

Sample Point [X] [L B A B F B 1 F I P]
Source Code — Sample Point I.D

FIELD PROCEDURES

PURGE DATE (YY MM DD)	START PURGE (2400 Hr Clock)	ELAPSED HRS	WATER VOL. IN CASING (Gallons)	VOLUME PURGED (Gallons)
8 6 0 4 2 5	1 3 1 5			

SAMPLING METHOD: Field Blank - Split-spoon washed in supplied water

Sampler Type [X] A-Submersible Pump, B-ISCO, C-Bladder Pump, D-Dipper/Bottle, E-Bailer, F-Scoop/Shovel, X-Other Split Spoon (SPECIFY OTHER)

Sampler Material [B] A-Teflon, B-Metal, C-PVC, D-Plastic, X-Other ____ (SPECIFY OTHER)

Tubing Material [ ] A-Teflon, B-Tygon, C-Polyethylene, D-Silicon, X-Other ____ (SPECIFY OTHER)

Sample Composited [Y/N] Y Field Blank.
Procedure/Proportions

FIELD MEASUREMENTS

Well Elevation (ft/msl) ____ Well Depth (ft) ____

Depth to Ground water (ft) ____ Sample Depth (non-well) (ft) ____

Groundwater Elevation (ft msl) ____

	ph		spec. cond.		(other parameter)	value	units
1st	(STD)	1st	um/cm at 25° C				
2nd	(STD)	2nd	um/cm at 25°C				
3rd	(STD)	3rd	um/cm at 25°C				
4th	(STD)	4th	um/cm at 25°C				

Sample Temp (°C) ____ Turbidity ____ NTU

FIELD COMMENTS

Sample Appearance: ____

Weather Conditions: Sunny, clear, warm, windy.

Other: This sample is a wash from sampling tool (Split Spoon).

FILTERING: Use Chain of Custody (CC1) to indicate which bottles were filtered

Sampler: Blaine Fresco (Print) Employer: O.H. Materials.

I certify that sampling procedures were in accordance with applicable EPA state and corporate protocols.

4/25/86 (Date) Blaine Fresco OHM (Signature)

CHAIN OF CUSTODY

Company: Louis Berger + Assoc. Job No. _____

Address _____

_____

Attention: _____

Sample Description: Rec'd (2) Shuttles (M1221)

5/5/86

Sample(s) Relinquished by: Manzoor Hussain

Time: 5 25 pm Date: 5.5.86

Sample(s) Received by: [illegible]

Time: 5:25 pm Date: 5/5/86

ETC ENVIRONMENTAL TESTING and CERTIFICATION

CHAIN OF CUSTODY FORM (CC1)

Seal No. [illegible] ETC JOB # [illegible]

Date Sealed 5/5/86 By: M. [illegible]

Company: LOUIS BERGER & ASSOC.

Facility/Site: Bayonne Barrel + Drum

Address: Newark, NJ

Attn.: M. HUSSAIN

Phone: (201) 678-1960

SAMPLE IDENTIFICATION

Facility: LBABFBFIP (Facility/Site Code)

Sample Point: X - LBABFB4FIP (Source Code (from below); Your Sample Point ID (left justify))

(Optional Sample Point Descriptions): 860505 (Start Date (YY/MM/DD)); 1000 (Start Time (2400 hr. clock)); (Elapsed Hours (composite))

Source Codes:

Well ..(W) Outfall.....(O) Bottom Sediment ....(B) Surface Impoundment....(I) Leachate Collection Sys.....(C) Other .....(X)

Soil ...(S) River/Stream..(R) Generation Point ....(G) Treatment Facility .....(T) Lake/Ocean .....(L) Specify _____

SHUTTLE CONTENTS

BOTTLE No	Type	Size	Preserv.	ANALYSIS	SAMPLER Filt. (Y/N)	SAMPLER Observations	LAB Observations
5	FB	1L	Millip H_2O	FIELD BLANK H_2O	N	Millipore	
4	↓	↓	↓	↓		distilled	
4	↓	40ml	Eclmst H_2O	↓		water used	
						for wash	
						of split	
						spoon as	
						field blank	
						two 2-ft	
						split spoons	

CHAIN OF CUSTODY CHRONICLE

1. Shuttle Opened By: (print) MANZOOR HUSSAIN Date: 5-5-86 Time: 1000 HRS
   Signature: Manzoor Hussain Seal #: 56263 Intact: yes

2. I have received these materials in good condition from the above person.
   Name: _____ Signature: _____
   Date: _____ Time: _____ Remarks: _____

3. I have received these materials in good condition from the above person.
   Name: _____ Signature: _____
   Date: _____ Time: _____ Remarks: _____

4. Shuttle Sealed By: (print) M. HUSSAIN Date: 5-5-86 Time: 1515
   Signature: Manzoor Hussain Seal #: 56264 Intact: yes

ETC USE ONLY Opened By: _____ Date: _____ Time: _____

ORIGINAL Seal #: _____ Condition: _____

ETC ENVIRONMENTAL TESTING and CERTIFICATION

FIELD PARAMETER FORM (CC2)

ETC JOB # M1221

Sample Point [X] Source Code | L5ABFB4FIP Sample Point I.D

FIELD PROCEDURES

PURGE DATE (YY MM DD)	START PURGE (2400 Hr Clock)	ELAPSED HRS	WATER VOL. IN CASING (Gallons)	VOLUME PURGED (Gallons)
860505	1000			

SAMPLING METHOD: split spoon & soil sampler

Sampler Type [ ] A-Submersible Pump, B-ISCO, C-Bladder Pump, D-Dipper/Bottle, E-Bailer, F-Scoop/Shovel, X-Other _____ (SPECIFY OTHER)

Sampler Material [B] A-Teflon, B-Metal, C-PVC, D-Plastic, X-Other _____ (SPECIFY OTHER)

Tubing Material [ ] A-Teflon, B-Tygon, C-Polyethylene, D-Silicon, X-Other _____ (SPECIFY OTHER)

Sample Composited [Y/N] N _____ Procedure/Proportions

FIELD MEASUREMENTS

Well Elevation (ft/msl) _____ Well Depth (ft) _____

Depth to Ground water (ft) _____ Sample Depth (non-well) (ft) _____

Groundwater Elevation (ft msl) _____

	ph		spec. cond.		(other parameter)	value	units
1st		(STD)		um/cm at 25° C			
2nd		(STD)		um/cm at 25°C			
3rd		(STD)		um/cm at 25°C			
4th		(STD)		um/cm at 25°C			

Sample Temp _____ (°C) Turbidity _____ NTU

FIELD COMMENTS

Sample Appearance: Clear water

Weather Conditions: Sunny, Clear -

Other: This liquid is aqueous wash of sampling equipment (split spoon) used for drilling well/ taking soil sample at well #2

FILTERING: Use Chain of Custody (CC1) to indicate which bottles were filtered

Sampler: (Print) BLAINE FRESCO Employer: O.H. MATERIALS.

I certify that sampling procedures were in accordance with applicable EPA state and corporate protocols.

5/5/86 (Date) Blaine Fresco . OHM (Signature)

ORIGINAL

ETC ENVIRONMENTAL TESTING and CERTIFICATION

CHAIN OF CUSTODY FORM (CC1)

Seal No. [illegible] ETC Job # [illegible]

Date Sealed 5/5/86 By: M. Ickstadt

Company: LOUIS BERGER & ASSOC.

Facility/Site: Bayonne Barrel & Drum

Address:

Attn.: M. HUSSAIN

Phone: (201) 678-1960

SAMPLE IDENTIFICATION

Facility: BBDLBANJTK (Facility/Site Code) — Field Blank rinse of sampling equip. (Optional Sample Point Descriptions)

Sample Point: X (Source Code (from below)) - LBABFB4FIP (Your Sample Point ID (left justify)) | 860505 (Start Date (YY/MM/DD)) | 1000 (Start Time (2400 hr clock)) | ___ (Elapsed Hours (composite))

Source Codes:

Well ..(W) Outfall.....(O) Bottom Sediment ....(B) Surface Impoundment....(I) Leachate Collection Sys.....(C) Other .....(X)

Soil ...(S) River/Stream..(R) Generation Point ....(G) Treatment Facility .....(T) Lake/Ocean .....(L) Specify _____

SHUTTLE CONTENTS

BOTTLE No	Type	Size	Preserv.	ANALYSIS	SAMPLER Fill (Y/N)	SAMPLER Observations	LAB Observations
4	FB	1L	BAKED	EXTRACTABLE / FIELD BLANK	N		
1	|	↓	HNO3	METALS / FIELD BLANK	N		
1	|	125ml	NaOH	CY/T / FIELD BLANK	N		
1	|	↓	H2SO4	PHENOLS / FIELD BLANK	N		
2	↓	40ml	BAKED	VOA / FIELD BLANK			

CHAIN OF CUSTODY CHRONICLE

1. Shuttle Opened By: (print) M. HUSSAIN Date: 5.5.86 Time: 1000 HRS
   Signature: Manzoor Hussain Seal #: 56265 Intact: yes

2. I have received these materials in good condition from the above person.
   Name: Signature:
   Date: Time: Remarks:

3. I have received these materials in good condition from the above person.
   Name: Signature:
   Date: Time: Remarks:

4. Shuttle Sealed By: (print) M. HUSSAIN Date: 5.5.86 Time: 1515
   Signature: Manzoor Hussain Seal #: 56266 Intact: yes

ETC USE ONLY Opened By: Date: Time:

ORIGINAL Seal #: Condition:

ETC ENVIRONMENTAL TESTING and CERTIFICATION

FIELD PARAMETER FORM (CC2)

ETC JOB # M1221

Sample Point [X] (Source Code) L B A B F B 4 F I P (Sample Point I.D.)

FIELD PROCEDURES

PURGE DATE (YY MM DD)	START PURGE (2400 Hr Clock)	ELAPSED HRS	WATER VOL IN CASING (Gallons)	VOLUME PURGED (Gallons)
8 6 0 5 0 5	1 6 0 0			

SAMPLING METHOD:

Sampler Type [ ] A-Submersible Pump, B-ISCO, C-Bladder Pump, D-Dipper/Bottle, E-Bailer, F-Scoop/Shovel, X-Other ____ (SPECIFY OTHER)

Sampler Material [B] A-Teflon, B-Metal, C-PVC, D-Plastic, X-Other ____ (SPECIFY OTHER)

Tubing Material [ ] A-Teflon, B-Tygon, C-Polyethylene, D-Silicon, X-Other ____ (SPECIFY OTHER)

Sample Composited [Y/N] N ____ Procedure/Proportions

FIELD MEASUREMENTS

Well Elevation (ft/msl) ____ Well Depth (ft) ____

Depth to Ground water (ft) ____ Sample Depth (non-well) (ft) ____

Groundwater Elevation (ft msl) ____

	ph		spec. cond.		other parameter	value	units
1st		(STD)	1st	um/cm at 25° C			
2nd		(STD)	2nd	um/cm at 25°C			
3rd		(STD)	3rd	um/cm at 25°C			
4th		(STD)	4th	um/cm at 25°C			

Sample Temp ____ (°C) Turbidity ____ NTU

FIELD COMMENTS

Sample Appearance: ____

Weather Conditions: Sunny, clear

Other: Millipore filtered water was used for wash of sampling equipment — Field Blank.

FILTERING: Use Chain of Custody (CC1) to indicate which bottles were filtered

Sampler: BLAINE FRESCO (Print) Employer: O.H. MATERIALS Corp.

I certify that sampling procedures were in accordance with applicable EPA state and corporate protocols.

5/5/86 (Date) Blaine Fresco (Signature) OHM

TESTING and CERTIFICATION

CHAIN OF CUSTODY FORM (CC1)

Seal No. _____ ETC Job # _____

Date Sealed 4/24/86 By: [illegible]

Company: Louis Berger & Assoc.

Facility/Site: Bayonne Barrel & Drum

Attn.: R. Andrew Blellock

Address: Newark, NJ

Phone: (201) 678 7960

SAMPLE IDENTIFICATION

Facility: BBDLBANJTK (Facility/Site Code) Bayonne Barrel & Drum #7 18-36 (Optional Sample Point Descriptions)

Sample Point: S-LBABC7LFIP (Source Code (from below) / Your Sample Point ID (left justify)) 860428 (Start Date (YY/MM/DD)) 1830 (Start Time (2400 hr. clock)) ___ (Elapsed Hours (composite))

Source Codes:

Well ..(W) Outfall.....(O) Bottom Sediment ....(B) Surface Impoundment....(I) Leachate Collection Sys.....(C) Other .....(X)

Soil ...(S) River/Stream..(R) Generation Point ....(G) Treatment Facility .....(T) Lake/Ocean .....(L) Specify _____

SHUTTLE CONTENTS

BOTTLE No	Type	Size	Preserv.	ANALYSIS	SAMPLER Fill (Y/N)	SAMPLER Observations	LAB Observations
3	E	500mL	BAKED	EXTBL SOIL	N	Three samples from bottles M1242E, M1242E2, and M1242E3 have to be composited in the lab at ETC & analyzed as a single composited sample	✓
1	V	40mL	BAKED	VOA SOIL			✓

CHAIN OF CUSTODY CHRONICLE

1. Shuttle Opened By: (print) MANZOOR HUSSAIN Date: 4.28.86 Time: 1800 HRS
   Signature: Manzoor Hussain Seal #: 56983 Intact: yes

2. I have received these materials in good condition from the above person.
   Name: _____ Signature: _____
   Date: _____ Time: _____ Remarks: _____

3. I have received these materials in good condition from the above person.
   Name: _____ Signature: _____
   Date: _____ Time: _____ Remarks: _____

Shuttle Sealed By: (print) MANZOOR HUSSAIN Date: 4.29.86 Time: 1845 HRS
Signature: Manzoor Hussain Seal #: 56984 Intact: yes

USE ONLY Opened By: [illegible] Date: 4-29-86 Time: 6:45 PM

LAB FILE Seal #: 56984 Condition: INTACT

ETC ENVIRONMENTAL TESTING and CERTIFICATION

FIELD PARAMETER FORM (CC2)

ETC JOB # [illegible]

Sample Point S (Source Code) L6A5G7LFIF (Sample Point I.D)

FIELD PROCEDURES

PURGE DATE (YY MM DD)	START PURGE (2400 Hr Clock)	ELAPSED HRS	WATER VOL IN CASING (Gallons)	VOLUME PURGED (Gallons)
860428	1830			

SAMPLING METHOD:

Sampler Type: A-Submersible Pump, B-ISCO, C-Bladder Pump, D-Dipper/Bottle, E-Bailer, F-Scoop/Shovel, X-Other _____ (SPECIFY OTHER)

Sampler Material: A-Teflon, B-Metal, C-PVC, D-Plastic, X-Other _____ (SPECIFY OTHER)

Tubing Material: A-Teflon, B-Tygon, C-Polyethylene, D-Silicon, X-Other _____ (SPECIFY OTHER)

Sample Composited Y/N: N — To be composited in the lab at ETC (Procedure/Proportions)

FIELD MEASUREMENTS

Well Elevation (ft/msl) _____

Depth to Ground water (ft) _____

Groundwater Elevation (ft msl) _____

Well Depth (ft) _____

Sample Depth (non-well) (ft) 3.0

	ph		spec. cond.		(other parameter)	value	units
1st		(STD)		um/cm at 25° C			
2nd		(STD)		um/cm at 25°C			
3rd		(STD)		um/cm at 25°C			
4th		(STD)		um/cm at 25°C			

Sample Temp _____ (°C)

Turbidity _____ NTU

FIELD COMMENTS

Sample Appearance:

Weather Conditions: Clear, Sunny, 65°F. Wind southern direction

Other:

FILTERING: Use Chain of Custody (CC1) to indicate which bottles were filtered

Sampler: BLAINE FRESCO (Print) Employer: C.H. MATERIALS

I certify that sampling procedures were in accordance with applicable EPA state and corporate protocols.

4/28/86 (Date) Blaine Fresco (Signature)

TESTING and CERTIFICATION

CHAIN OF CUSTODY FORM (CC1)

Date Sealed 4/24/00 By: [signature]

Company: Lawn Berger & Assoc.

Facility/Site:

Address:

Attn.: R Andrew Blellock

Phone: ( )

SAMPLE IDENTIFICATION

Facility: Facility/Site Code

Sample Point: Source Code (from below) 617 — Your Sample Point ID (left justify) 6.5 — (Optional Sample Point Descriptions) — Start Date (YY/MM/DD) — Start Time (2400 hr. clock) — Elapsed Hours (composite)

Source Codes:
Well ..(W) Outfall.....(O) Bottom Sediment....(B) Surface Impoundment...(I) Leachate Collection Sys.....(C) Other.....(X)
Soil ...(S) River/Stream..(R) Generation Point....(G) Treatment Facility.....(T) Lake/Ocean.....(L) Specify

SHUTTLE CONTENTS

BOTTLE No	Type	Size	Preserv.	ANALYSIS	SAMPLER Filt. (Y/N)	SAMPLER Observations	LAB Observations
1	TB	40mL	GCMSHCL	TRIP BLANK			✓

CHAIN OF CUSTODY CHRONICLE

1. Shuttle Opened By: (print) Date: Time:
Signature: Seal #: Intact:

2. I have received these materials in good condition from the above person.
Name: Signature:
Date: Time: Remarks:

3. I have received these materials in good condition from the above person.
Name: Signature:
Date: Time: Remarks:

4. Shuttle Sealed By: (print) Date: Time:
Signature: Seal #: Intact:

USE ONLY Opened By: [signature] Date: 4/29/00 Time: 1247

ORIGINAL Seal #: 5698 Condition: intact

APPENDIX D

BORING LOGS AND WELL PERMITS

OHM

ART 1

JOB NO. 3736	BORE HOLE NO. MW-2
PROJECT Louis Berger & Assoc.	LOCATION Newark, New Jersey
DRILLING CONTRACTOR J.E. Fritts & Assoc.	DRILLING EQUIPMENT Hollow Stem Auger
HYDROGEOLOGIST Blaine Fresco	DRILLER Bruce Higbee
DATE START/TIME 5/6/86 1100	DATE FINISH/TIME 5/6/86 1445
SURFACE ELEVATION 12.32'(TOC)	TOTAL DEPTH 17.1"
WELL CASING PVC	SCREEN TYPE PVC
LENGTH 15'	SLOT .020

GROUND WATER					CASING	CORE	SAMPLER	TUBE
DATE	TIME	DEPTH	WEATHER	TYPE	PVC		SS	
/6/86	1250	5.5'	clear	DIAMETER	4"ID		2"OD	
5/7/86	0830	8.13'(TOC)		HAMMER WEIGHT			140 lbs	
/15/86	1405	8.46'(TOC)	overcast	FALL			30"	
5/27/86	1000	8.65'(TOC)	clear					

DEPTH	SAMPLE NO.	BLOW COUNT PER 6"	RECOVERY	BORE HOLE LOG: LITHOLOGIC DESCRIPTION	REMARKS	GRAPHIC LOG
1					Bentonite/cement grout; Bentonite pellets	PVC casing
	S-5	3-2 2-1	10"	S-5: 5" Brwn silt w/ some f. sand; 5" Brwn/Blck sandy clay w/ tr. silt	moist	
3						
	S-6	2-1 3-2		S-6: Brwn/Blck silty clay	very dense, heavy pet. odor & visible sheen	#2 Morie Sand to 2'; .020 PVC screen 17.1'-2.1'
11						

PART 2

OHM

JOB NO 3736

BORE HOLE NO. MW-2

PROJECT Louis Berger & Assoc.

LOCATION Newark, New Jersey

DEPTH	SAMPLE NO.	BLOW COUNT PER 6"	RECOVERY	LITHOLOGIC DESCRIPTION	REMARKS	GRAPHIC LOG
13						
14	S-7	3-3-3-8		S-7: "DO" S-6 but w/ 1.5" m-crs sand at end		#2 Morie Sand / .020 PVC screen
15						
16						
17						
18	S-8	1-2 7-9		S-8: Brwn f. sand w/ tr. gravel	Pet. odor	
19						
20				EOB		

#MW-2

0' - 5'	Brown Silt w/Fine Sand, Clay at Bottom
5' - 14'	Dark Brown Black, Very Dense Silty Clay
14' - 17'6"	Brown Sand w/Some Gravel

/80

DEPARTMENT OF ENVIRONMENTAL PROTECTION
DIVISION OF WATER RESOURCES

PERMIT NO. 269073

APPLICATION NO. _____

COUNTY Essex

WELL RECORD

1. OWNER N.J. TURNPIKE AUTHORITY ADDRESS _____
   Owner's Well No. MW-2 SURFACE ELEVATION _____ Feet (Above mean sea level)
2. LOCATION ~~Lot: Block: 5002 Municipality: Newark~~
3. DATE COMPLETED 5/6/86 DRILLER ~~J. E. Fritts~~
4. DIAMETER: Top 4 inches Bottom 4 inches TOTAL DEPTH 17'6" Feet
5. CASING: Type PVC Diameter 4 Inches Length 2'6" Feet
6. SCREEN: Type PVC Size of Opening .020 Diameter 4 Inches Length 15 Feet
   Range in Depth { Top 2'6" Feet / Bottom 17'6" Feet } Geologic Formation _____
   Tail Piece: Diameter - Inches Length _____ Feet
7. WELL FLOWS NATURALLY _____ Gallons per minute at _____ Feet above surface
   Water rises to _____ Feet above surface
8. RECORD OF TEST: Date _____ Yield _____ Gallons per minute
   Static water level before pumping _____ Feet below surface
   Pumping level _____ feet below surface after _____ hours pumping
   Drawdown _____ Feet Specific Capacity _____ Gals. per min. per ft. of drawdown
   How pumped _____ How measured _____
   Observed effect on nearby wells _____
9. PERMANENT PUMPING EQUIPMENT:
   Type None Mfrs. Name _____
   Capacity _____ G.P.M. How Driven _____ H.P. _____ R.P.M. _____
   Depth of Pump in well _____ Feet Depth of Footpiece in well _____ Feet
   Depth of Air Line in well _____ Feet Type of Meter on Pump _____ Size _____ Inches
10. USED FOR Monitoring AMOUNT { Average _____ Gallons Daily / Maximum _____ Gallons Daily }
11. QUALITY OF WATER _____ Sample: Yes ____ No ____
    Taste _____ Odor _____ Color _____ Temp. _____ °F.
12. LOG _____ Are samples available? _____
    (Give details on back of sheet or on separate sheet. If electric log was made, please furnish copy.)
13. SOURCE OF DATA Drillers Log
14. DATA OBTAINED BY J. E. Fritts & Assoc., Inc. Date 5/12/86

(NOTE: Use other side of this sheet for additional information such as log of materials penetrated, analysis of the water, sketch map, sketch of special casing arrangements, etc.)

OHM

PAGE 1 OF 1

BORE HOLE NO. MW-3

ART 1

OB NO. 3736	
OJECT Louis Berger & Assoc.	LOCATION Newark, New JErsey
RILLING CONTRACTOR J.E. Fritts & Assoc.	DRILLING EQUIPMENT Hollow Stem Auger
HYDROGEOLOGIST Blaine Fresco	DRILLER Bruce Higbee
ATE START/TIME 5/5/86 1100 / DATE FINISH/TIME 5/6/86 0945	SURFACE ELEVATION 7.32'(TOC) / TOTAL DEPTH 10.72'
ELL CASING PVC / SCREEN TYPE PVC	LENGTH 10' / SLOT .020

GROUND WATER					CASING	CORE	SAMPLER	TUBE
DATE	TIME	DEPTH	WEATHER	TYPE	PVC		SS	
5/5/86	1100	3'	sunny	DIAMETER	4"ID		2"OD	
5/7/86	0820	3.28"(TOC)		HAMMER WEIGHT			140 lbs	
5/15/86	1210	3.57'(TOC)	overcast	FALL			30"	
5/27/86	1327	3.60'(TOC)	clear					

DEPTH	SAMPLE NO.	BLOW COUNT PER 6"	RECOVERY	BORE HOLE LOG: LITHOLOGIC DESCRIPTION	REMARKS	GRAPHIC LOG
1	S-1	21-22 19-13	8"	S-1: Brwn sandy silt w/ f-m gravel	Bentonite/cement grout; 2" Bentonite Pellets	PVC casing
	S-2	6-5-1-1	4"	S-2: Blck cinders w/ f. gravel	saturated	#2 Morie sand to 9"
	S-3	1-1/12"1	8"	S-3: 3" Brwn/Blck cinders w/ gravel; 5" Brwn peat	Pet. odor	.020 PVC screen 10.72'-.72'
3	S-4	2-2-4-6	5"	S-4: Brwn/Blck cinders w/ some Brwn peat	Pet. odor	
11						sand

EOB

#MW-3

0' - 3'	Brown Sandy Silt w/Fine to Medium Gravel
3' - 6'	Black Cinders w/Fine to Medium Gravel
6' - 8'	Brown Organic Peat
8' - 11'	Black Cinder and Fine to Medium Gravel w/ little Peat and Fine Sand

DwR-136

STATE OF NEW JERSEY
DEPARTMENT OF ENVIRONMENTAL PROTECTION
DIVISION OF WATER RESOURCES

PERMIT NO. 269074

APPLICATION NO. _____

COUNTY Essex

WELL RECORD

OWNER N.J. TURNPIKE AUTHORITY ADDRESS _____

Owner's Well No. MW-3 SURFACE ELEVATION _____ Feet (Above mean sea level)

LOCATION Lot: Block: 5002 Municipality: Newark

3. DATE COMPLETED 5/6/86 DRILLER J. E. Fritts

DIAMETER: Top 4 inches Bottom 4 inches TOTAL DEPTH 11' Feet

5. CASING: Type PVC Diameter 4 Inches Length 1' Feet

SCREEN: Type PVC Size of Opening .020 Diameter 4 Inches Length 10' Feet

Range in Depth { Top 1 Feet / Bottom 11 Feet } Geologic Formation _____

Tail Piece: Diameter - Inches Length _____ Feet

WELL FLOWS NATURALLY _____ Gallons per minute at _____ Feet above surface

Water rises to _____ Feet above surface

RECORD OF TEST: Date _____ Yield _____ Gallons per minute

Static water level before pumping _____ Feet below surface

Pumping level _____ feet below surface after _____ hours pumping

Drawdown _____ Feet Specific Capacity _____ Gals. per min. per ft. of drawdown

How pumped _____ How measured _____

Observed effect on nearby wells _____

PERMANENT PUMPING EQUIPMENT:

Type None Mfrs. Name _____

Capacity _____ G.P.M. How Driven _____ H.P. _____ R.P.M. _____

Depth of Pump in well _____ Feet Depth of Footpiece in well _____ Feet

Depth of Air Line in well _____ Feet Type of Meter on Pump _____ Size _____ Inches

10. USED FOR Monitoring AMOUNT { Average _____ Gallons Daily / Maximum _____ Gallons Daily }

QUALITY OF WATER _____ Sample: Yes ____ No ____

Taste _____ Odor _____ Color _____ Temp. _____ °F.

LOG _____ Are samples available? _____
(Give details on back of sheet or on separate sheet. If electric log was made, please furnish copy.)

SOURCE OF DATA Drillers Log

DATA OBTAINED BY J. E. Fritts & Assoc., Inc. Date 5/12/86

(NOTE: Use other side of this sheet for additional information such as log of materials penetrated, analysis of the water, sketch map, sketch of special casing arrangements, etc.)

FIELD COPY

O.H. MATERIALS CO.

OHM

THE ENVIRONMENTAL SERVICES COMPANY

PAGE NO._____

STATIC WATER WELL ELEVATIONS

DATE: 5/15/86 PROJECT NO.: 3736 SITE LOCATION Newark NJ

TEST WELL#	TOP OF CASING ELEV.	WATER LEVEL IND. READING	STATIC H_2O ELEVATION	TIME TAKEN	COMMENTS
mw-1	17.25'	12.49'	4.76'	1010	overcast
mw-2	12.32'	8.46	3.86'	1405	
mw-3	7.32'	3.57'	3.75'	1210	

* All wells will be measured prior to purging.
All readings will be taken with the use of a surveyors tape.

BY: Blaine Fraro

WITNESS:

FIELD COPY

O.H. MATERIALS CO.

OHM

THE ENVIRONMENTAL SERVICES COMPANY

PAGE NO._____

STATIC WATER WELL ELEVATIONS

DATE: 5/27/86 PROJECT NO.: 3236 SITE LOCATION Newark NJ

TEST WELL#	TOP OF CASING ELEV.	WATER LEVEL IND. READING	STATIC H_2O ELEVATION	TIME TAKEN	COMMENTS
mw-1	12.25'	12.65	4.60'	1550	clear
mw-2	12.32'	8.65'	3.67'	1000	
mw-3	7.32'	3.60	3.72	1327	

* All wells will be measured prior to purging.
All readings will be taken with the use of a surveyors tape.

BY: [illegible]

Thomas Tyler Moore
Associates, Inc.

67 SCOTCH RD., W. TRENTON, N.J. 08628
(609) 883-2313

THOMAS TYLER MOORE, Pres., P.E., P.L.S., P.P.
JOSEPH M. MAHAN, JR., Vice Pres., P.E.
DOROTHEA L. LANTZ, Secy., Treas., N.P.
PATRICIA C. DERR
DONALD H. KAMP, P.L.S.
MALCOLM D. LOWENHAUPT, P.L.S.
DAVID G. McALEESE, P.P.
CARL A. RETTENBERGER, P.E., P.L.S.

May 28, 1986

O. H. Materials
P.O. Box 41
Windsor, NJ 08561

Attention: Blaine Fresco

Re: Bayonne Barrel & Drum Co.
6-268-00-202

Gentlemen:

In accordance with your request, Thomas Tyler Moore Associates, Inc. has obtained New Jersey State Plane Coordinates and elevations for three monitoring wells at the above referenced site. This information has been tabulated as follows:

Well No.	Coordinates North	Coordinates East	Top of Casing Elev.	Ground Elev.
1.	690,767.49	2,148,604.61	17.25	15.2
2.	691,739.83	2,149,419.59	12.32	9.0
3.	692,240.88	2,149,808.03	7.32	5.2

Elevations shown are based on the National Geodetic Vertical Datum.

We trust this information will meet your requirements. If you have any questions or we can be of further assistance, kindly so advise.

Very truly yours,

THOMAS TYLER MOORE ASSOCIATES, INC.

Donald H. Kamp, P.L.S.
Division Director

DHK:lmt

WR-133 (5/85)

Mail to
Water Allocation
CN 029
Trenton, N.J. 08625

STATE OF NEW JERSEY
DEPARTMENT OF ENVIRONMENTAL PROTECTION
DIVISION OF WATER RESOURCES
TRENTON, N.J.

Permit No. 26-9074-1

PERMIT TO DRILL WELL

VALID ONLY AFTER APPROVAL BY THE D.E.P.

Owner: N.J. Turnpike Authority
Address: New Brunswick, NJ 08907

Name of Facility: Bayonne Barrel & Drum Co.
Address: US-1 & 9
Newark, New Jersey

Driller: J. E. Fritts & Assoc., Inc.
Address: P. O. Box 333
Voorhees, NJ 08043

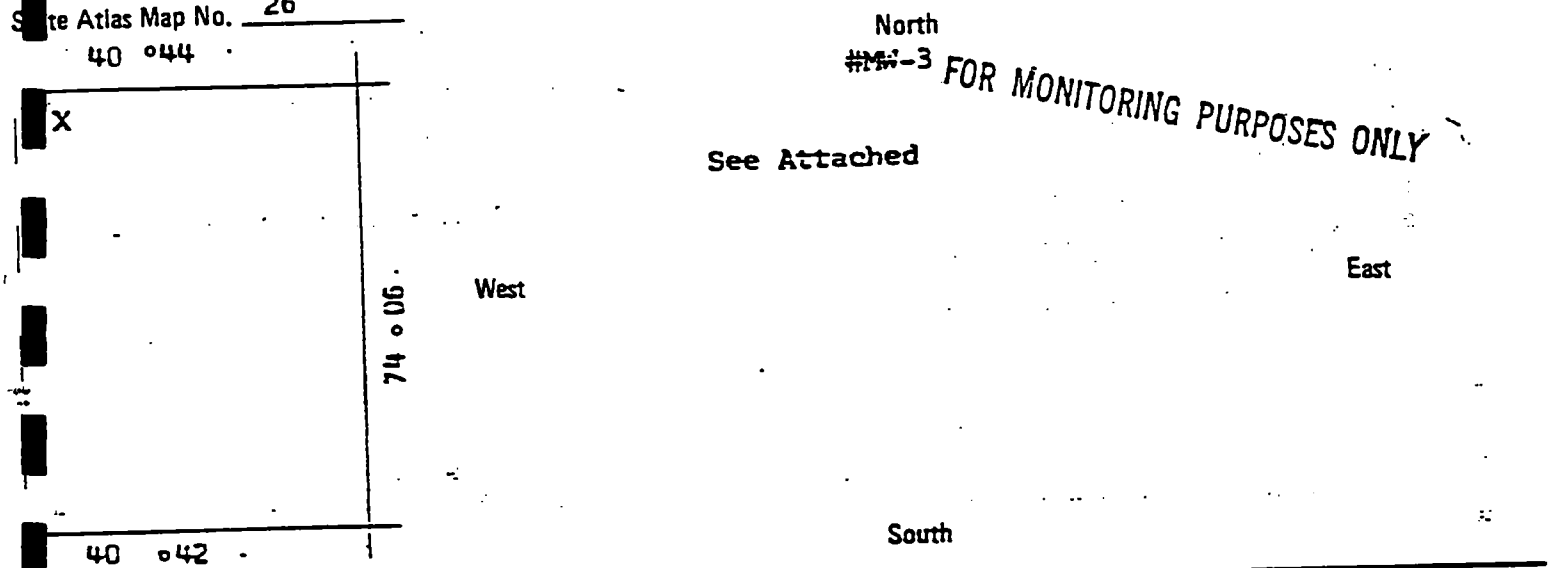
Diameter of Well	4 Inches	Proposed Depth of Well	20 Feet
Proposed Capacity of Pump	None GPM	Method of Drilling (cable-tool, rotary, etc.)	HSA
Use of Well (See Reverse)	Monitoring		

LOCATION OF WELL

Lot #	Block #	Municipality	County
	5002	Newark	Essex

Draw sketch showing distance and relations of well site to nearest public roads, streets, septic systems, etc.

State Atlas Map No. 26



SEE REVERSE SIDE for IMPORTANT PROVISIONS AND REGULATIONS pertaining to this permit. APPROVAL of this permit is made SUBJECT TO acceptance of and compliance with the following ADDITIONAL CONDITIONS.

- [ ] Pinelands - Well must be drilled over 100' deep or a clay layer at least 4' in thickness must be encountered.
- [ ] It is necessary that Geophysical Logs of this well be made. Permanent pumping equipment SHALL NOT be installed until such logs are made.
- [ ] Authorization by rule under N.J.A.C. 7:14A-1 et sec.
- [ ] Samples of cuttings required every _____ feet or change in material.
- [x] The results of a volatile organic scan must be obtained prior to using the water and submitted to _____.
- [ ] Domestic Potable Water Supply - The service line for water from the public community water supply system shall be turned off at the curb cock, and the meter shall be removed by the water purveyor.
- [ ] Domestic Irrigation Supply - No piping from the well for which the permit applies shall enter any building.
- [ ] Industrial/Commercial Supply - A physical connection permit shall be obtained pursuant to the provisions of N.J.A.C. 7:10-10-1 et seq., and a vigorous cross connections control program shall be instituted and maintained within the premises.
- [ ] Heat Pump Wells - Wells must be 50 feet apart and the water must be returned to the same aquifer as the production well.
- [ ] _____

This Space for Approval Stamp

WELL PERMIT
APPROVED
MAY 6 1986
DEPT. ENV. PROTECTION
DIV. OF WATER RESOURCES
WATER ALLOCATION

In compliance with R.S. 58:4A-14, application is made for a permit to drill a well as described above.

Date _____ Signature of Owner _____

COPIES Water Allocation – White Health Dept. – Yellow Owner – Blue Driller – White

VR-133 (5/85)

Mail to

Water Allocation
CN 029
Trenton, N.J. 08625

STATE OF NEW JERSEY
DEPARTMENT OF ENVIRONMENTAL PROTECTION
DIVISION OF WATER RESOURCES
TRENTON, N.J.

Permit No. 26-9273-2

PERMIT TO DRILL WELL

14

VALID ONLY AFTER APPROVAL BY THE D.E.P.

21 22 / 12

Owner N.J. Turnpike Authority
Address New Brunswick, NJ 08907

Driller J. E. Fritts & Assoc., Inc.
Address P. O. Box 333
Voorhees, NJ 08043

Name of Facility Bayonne Barrel & Drum Co.
Address US-1 & 9
Newark, New Jersey

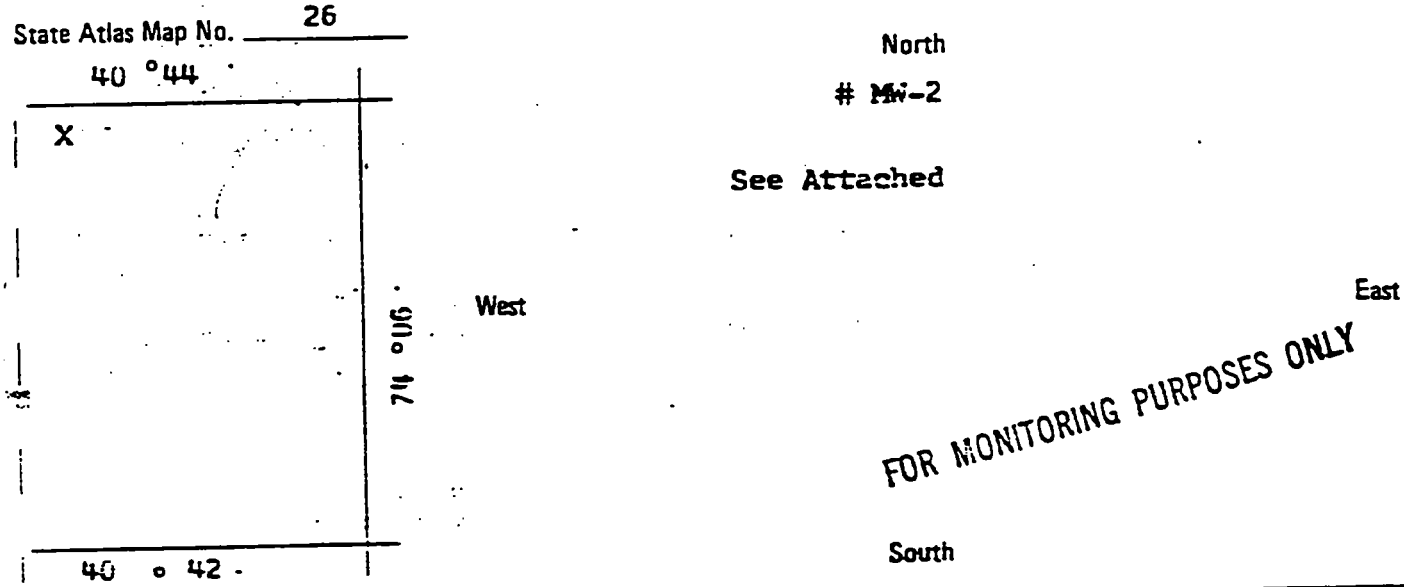
Diameter of Well	4 *Inches*	Proposed Depth of Well	20 *Feet*
Proposed Capacity of Pump	None *GPM*	Method of Drilling *(cable-tool, rotary, etc.)*	HSA
Use of Well *(See Reverse)*	Monitoring		

LOCATION OF WELL

Lot #	Block #	Municipality	County
	5002	Newark	Essex

Draw sketch showing distance and relations of well site to nearest public roads, streets, septic systems, etc.

State Atlas Map No. 26



FOR MONITORING PURPOSES ONLY

E REVERSE SIDE for IMPORTANT PROVISIONS AND REGULATIONS pertaining to this permit. APPROVAL this permit is made SUBJECT TO acceptance of and compliance with the following ADDITIONAL CONDITIONS.

- [ ] Pinelands - Well must be drilled over 100' deep or a clay layer at least 4' in thickness must be encountered.
- [ ] It is necessary that Geophysical Logs of this well be made. Permanent pumping equipment SHALL NOT be installed until such logs are made.
- [ ] Authorization by rule under N.J.A.C. 7:14A-1 et seq.
- [ ] Samples of cuttings required every _____ feet or change in material.
- [ ] The results of a volatile organic scan must be obtained prior to using the water and submitted to _____.
- [ ] Domestic Potable Water Supply - The service line for water from the public community water supply system shall be turned off at the curb cock, and the meter shall be removed by the water purveyor.
- [ ] Domestic Irrigation Supply - No piping from the well for which the permit applies shall enter any building.
- [ ] Industrial/Commercial Supply - A physical connection permit shall be obtained pursuant to the provisions of N.J.A.C. 7:10-10-1 et seq., and a vigorous cross connections control program shall be instituted and maintained within the premises.
- [ ] Heat Pump Wells - Wells must be 50 feet apart and the water must be returned to the same aquifer as the production well.

This Space for Approval Stamp

WELL PERMIT
APPROVED
MAY 6 1986
DEPT. ENV. PROTECTION
DIV. OF WATER RESOURCES
WATER ALLOCATION

In compliance with R.S. 58:4A-14, application is made for a permit to drill a well as described above.

Date [illegible]

Signature of Owner [signature]

COPIES Water Allocation - White Health Dept. - Yellow Owner - Blue [illegible]

APPENDIX

C

Diversified
Environmental
Resources, Inc.
1440A Pennington Road Trenton, New Jersey 08618
609-771-3616 FAX # 609-771-4276

APPENDIX C

SOILS AND GROUND WATER CHARACTERIZATION
BAYONNE BARREL AND DRUM COMPANY
NEWARK, NEW JERSEY
JOB NO. 84C182

SUBMITTED BY:

DAN RAVIV ASSOCIATES, INC.
5 CENTRAL AVENUE
WEST ORANGE, NEW JERSEY

A
STOUT
A COMPLETE ENVIRONMENTAL SERVICE COMPANY.
COMPANY

Soils and Ground Water Characterization
Bayonne Barrel and Drum Company
Newark, New Jersey
Job No. 84C182

PREPARED FOR

Scheider & Wiener, P.A.
Attorneys at Law
1180 Raymond Boulevard
Newark, New Jersey

ON BEHALF OF

First Fidelity Bank, N.A., New Jersey
550 Broad Street
Newark, New Jersey

PREPARED BY

Dan Raviv Associates, Inc.
5 Central Avenue
West Orange, New Jersey

April 18, 1986
Updated: July 1986

Dan Raviv Associates, Inc.

Dan Raviv Associates, Inc.
Consultants in ground water hydrology, water quality and landfill hydrology

July 17, 1986

Scheider & Wiener, P.A.
Attorneys at Law
1180 Raymond Boulevard
Suite 400
Newark, New Jersey 07102

Attention: Avram Eule, Esq.

Re: Transmittal of Soils and Ground Water
Characterization Report
Bayonne Barrel and Drum Co. - Newark, New Jersey
DRAI Job No. 84C182

Gentlemen:

Dan Raviv Associates, Inc. (DRAI) has completed a site investigation at Bayonne Barrel and Drum Company (BB&D). Enclosed you will find our Report entitled "Soils and Ground Water Characterization, Bayonne Barrel and Drum Company".

This investigation has been performed as outlined in the DRAI Work Plan for the Investigation of Soils, Residues, and Water Quality, in compliance with the Consent Agreement Between Bayonne Barrel and Drum Company and the United States Environmental Protection Agency (USEPA) (Docket No. II RCRA-82-0015), dated October 1, 1984.

Our report includes a summary of: (1) activities performed during field investigations; (2) site description and geologic conditions; (3) results of analyses performed on samples collected; and (4) areas of environmental concern (as they have been defined, based on the results of our investigations).

5 Central Avenue. West Orange. New Jersey 07052 (201) 325-0806

In accordance with our agreement, copies of this report should be forwarded to Mr. Frank Langella and his attorneys, as well as Mr. Stanley Siegel, Acting Chief, Solid Waste Branch, USEPA, Region II.

If you have any questions or need additional information, please call.

Very truly yours,

DAN RAVIV ASSOCIATES, INC.

Dan D. Raviv, Ph.D.
President

DDR/sm
Enc. (4 copies sent)

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1.0 Summary of Field Investigations

Four field investigations have been performed by DRAI at Bayonne Barrel and Drum Co., located at 150 Raymond Boulevard in Newark, New Jersey. During these investigations, undisturbed split spoon soil samples, surface sediment samples, and a surface water sample were collected from various locations around the site. Ground water monitoring wells were installed, developed and sampled, and several additional split spoon soil samples were collected from the well borings before the wells were installed. This work was done to establish the quality of soils and ground water at the site. All sample locations are displayed on Figure 2.

The field investigations, discussed below as Field Investigation I, II, III and IV, were performed on: January 18, 1985; October 25-31, 1985; November 27 - December 17, 1985; and January 7, 1986, respectively. All boring and drilling work done at the site was performed by Jersey Boring and Drilling Co., Inc. of Newark, New Jersey. All samples were collected using methods outlined in DRAI Field Procedure Protocols which were submitted with the DRAI Work Plan. Finally, samples were transported for analysis, via a chain of custody, to Gollob Analytical Service Laboratory in Berkeley Heights, New Jersey.

1.1 Field Investigation I - January 18, 1985

On January 18, 1985, DRAI personnel were at Bayonne Barrel and Drum Co. to sample the furnace residue pile. A total of nine split spoon soil samples, BBD1-BBD9, were collected from nine borings (Figure 2). Borings were located at the nodes of an imaginary grid laid out across the residue pile. In addition, four surface soil samples, one from the residue pile (BBD14) and three from the furnace area (BBD11-13), were collected. All samples, except for BBD 10, were analyzed for Polychlorinated Biphenyls (PCB) (Table I.1).

For the purpose of waste classification, a composite sample, BBD10, was created by mixing an equal volume of soil from each of three samples, BBD 2,5 and 8. BBD10 was then analyzed for EP-Toxicity parameters:

(1) Metals:
- (a) Arsenic (As)
- (b) Barium (Ba)
- (c) Cadmium (Cd)
- (d) Chromium (Cr)
- (e) Lead (Pb)
- (f) Mercury (Hg)
- (g) Silver (Ag)
- (h) Selenium (Se)

(2) Herbicides and Pesticides:
- (a) Endrine
- (b) Lindane
- (c) Methoxychlor
- (d) Toxaphene
- (e) 2,4-D (2,4-Dichlorophenoxyacetic acid)
- (d) 2,4,5-TP Silvex (2,4,5-Trichlorophenoxypropionic acid)

(These were the required parameters at the time this analysis was requested).

1.2 Field Investigation II - October 25-31, 1985

Just prior to Field Investigation II, the utility locator service associated with Public Service Electric & Gas Company, was contacted for the purpose of marking out the location of any utility lines that may run underneath the property. They, in turn, contacted several other major utilities. DRAI was informed that two lines exist (Figure 1).

During the second field investigation, soil borings were completed by the auger method, in various areas around the site (Figure 2). Boring locations were chosen to provide general information on conditions around the site, as well as specific target areas, such as the furnace residue pile, the furnace area, and the oil storage tanks area.

In order to examine general site conditions, seventy-six samples, composed of seventy-one split spoon soil samples, four surface sediment samples, and one surface water sample, were collected. Nineteen borings were advanced to various depths between one and fifteen feet, and undisturbed split spoon samples were collected at one foot intervals down to a depth of three feet, and at two feet intervals at depths of five, nine and thirteen feet. Analysis was requested on fifty-two of the seventy-one soil samples and all five of the surface samples (Table I.2).

One of the four surface sediment samples (BBDS1) was collected from sediment accumulation adjacent to the oil separator trench. The remaining three sediment samples (BBDS2-BBDS4) were collected, one from each of the three buildings surrounding the furnace area. All three buildings had contained drum reconditioning equipment. The floor in Building 1 contains 12 drainage canals, with an east-west orientation, along the east wall of the building. All canals were filled with cinder blocks and dry sediment, which appeared to have been swept into the canals. Sample BBDS2 was collected from the west end of the eighth canal (counting north to south). Sample BBDS3 was collected in Building 2 from within a small area enclosed by concrete curbing. Finally, sample BBDS4 was a composite collected from three small floor pits located in Building 3. Again, it appears that sediment accumulation in the building had been swept into these pits. It is from these sediments that the sample was collected.

The surface water sample (BBDW1) was collected at several locations, directly from the oil separator trench.

The list of parameters for which these samples were analyzed includes:

(1) Polychlorinated Biphenyls (PCB)
(2) Total Petroleum hydrocarbons (TPHC)
(3) Volatile Organic Compounds (VOC) plus 15 unidentified peaks
(4) Metals: As, Ba, Cd, Cr, Pb, Hg, Ag, Se
(5) 129 Priority Pollutants plus 40 unidentified peaks including:
    (a) VOC
    (b) Base Neutral and Acid Extractable Compounds (BN/AE)
    (c) Metals:
        (1) Antimony (Sb)
        (2) Arsenic (As)
        (3) Beryllium (Be)
        (4) Cadmium (Cd)
        (5) Chromium (Cr)
        (6) Copper (Cu)
        (7) Lead (Pb)
        (8) Mercury (Hg)
        (9) Nickel (Ni)
        (10) Silver (Ag)
        (11) Selenium (Se)
        (12) Thallium (Tl)
        (13) Zinc (Zn)
    (d) Phenol
    (e) Cyanide
(6) Dioxin

To verify that Dioxin is not present in soils, one sample, BBD17/0-1', collected in the furnace area, has been analyzed. This sample was chosen for Dioxin analysis because materials still remaining in the drums when received for processing, were removed in this area during the reconditioning process.

1.3 Field Investigation III - November 27 - December 17, 1985
During the third field investigation, four monitoring wells (BBDC1-4) and one monitoring well point (BBDC5) were installed at various locations on site (Figure 2). Wells BBDC1 and BBDC2 were installed as background locations. Well BBDC4 was so located to determine water quality conditions near the furnace residue pile, and well BBDC5 was so located to determine water quality conditions near the oil storage storage tanks. In addition, a deep well, BBDC3, was completed near the oil storage tanks area for the purpose of examining the quality of ground water at depth.

Additional split spoon soil samples were collected from well borings BBDC1-4, during the augering phase of well installation. A total of

twenty-one soil samples were collected, and analyses were requested on fourteen of the samples (Table I.3). Finally, after installation, the wells were developed using compressed air. Generally speaking, construction of the four monitoring wells is similar. After the initial boring was completed, four inch diameter PVC screen and casing was installed. The anulus was backfilled by pouring sandpack until it filled to a level approximately two feet above the screen. The anulus was then sealed with bentonite. A protective, locking, steel casing was set with cement in the portion of anulus still open. Construction of the deep well (BBDC3) required installation of an eight inch diameter steel casing down to a depth of thirteen feet. This was done to seal off an upper zone of contamination (discussed in more detail later). The well point (Well BBDC5) was constructed using 2½ inch diameter steel screen and casing. Well construction diagrams are presented in Appendix A.

1.4 Field Investigation IV - January 7, 1986

The last field investigation was completed on January 7, 1986. At that time, the four monitoring wells and one well point were redeveloped using a suction pump. A minimum of three well volumes was removed from each well, which was then sampled with a pre-cleaned teflon bailer. All samples were analyzed for VOC's, except for BBDC4, which was analyzed for priority pollutants (Table I.4).

2.0 Site Description and Geologic Conditions

As stated in the DRAI Work Plan, the site covers approximately 20 acres of land located in an industrial area of Newark. The area is characterized by storage tank facilities, rail yards, trucking facilities and used car yards.

Ground surface of the site is approximately ten feet above sea level and slopes downward slightly to the northeast. It is underlain by Pleistocene drift, which fills a buried valley cut into the Brunswick Formation. The Passaic River runs a loop, north of the site, and eventually joins the Hackensack River where it opens into Newark Bay. The River is within a one mile radius of the site.

The property has an elongate shape that trends northeast-southwest (Figure 1). The northern edge of the property is bounded by the Pulaski Skyway, and the southern edge is bounded by the New Jersey Turnpike. The property consists of three main buildings, formerly used in the the drum reconditioning process, and several smaller buildings, used for offices. These facilities are located at the northeast end of the property. The central and southwest portions of the property are characterized, in general, by a black coal-cinder type fill. Approximately one-third of the southwest corner of the property is used for empty drum storage.

Boring log data, accumulated during DRAI field investigations, indicate a slight difference in the type and thickness of the lithologic sequence than was originally stated in the DRAI Work Plan. Lithologic data from borings around the site indicate that there is a black coal-cinder type fill found from surface down to an average depth of ten feet. The location of hydrogeologic cross-sections are displayed on Figure 3. The fill is underlain by a medium to a coarse grained, well sorted sand that ranges in color from brown to red-brown to dark maroon-brown. Observations of the lithology at depth were made while drilling well boring BBDC3 (Figures 4 and 5). As stated above, the fill is underlain by a medium to coarse sand that lies within a depth interval of ten to forty feet. The material observed from forty to fifty feet below surface consists of a dark red-brown, uniform, coarse silt. Below fifty feet, observations of cuttings indicated a gradational zone downward into more consolidated material. Once drilling proceeded beyond fifty feet, small fragments of dark red shale were observed. Drilling continued to a depth of fifty-three feet to confirm these observations. These findings are interpreted as a vertical gradation into the upper zone of weathered Brunswick Shale Formation. Boring logs are presented in Appendix B.

3.0 Results of Analyses

Due to the volume of data, samples are not always discussed individually. Instead, the data is presented in tables using two formats. The data presented in the first format (Table II) has been categorized numerically by areas, as they are defined in Figure 6.

The concentration listed for a particular parameter (e.g., metals) represents a total of the individual constituents (e.g., Antimony, Arsenic, Barium, etc.) of that parameter. The data presented in Tables III through IX follow the second format. These data are listed chronologically and numerically. In addition, for those parameters having more than one constituent, each constituent and its concentration are listed. Chain of Custody Forms and laboratory data sheets are presented in Appendices C and D, respectively.
In summary, the list of parameters for which soil, surface sediment, surface water, and ground water samples were analyzed includes PCB's, TPHC's, VOC's, Priority Pollutants, Metals, EP-Toxicity, and Dioxin. These parameters were chosen to characterize the site and to establish base line conditions. The results of these analyses were also used to more thoroughly delineate suspected areas of environmental concern. Results, for analyses performed on samples, are discussed below.

3.1 Furnace Residue Pile Area

Forty-two soil samples were collected from the Furnace Residue Pile Area (Figure 2). Thirty-one of these forty-two samples were collected in the immediate vicinity of the furnace residue pile itself. The other eleven samples were collected from other locations within the area. One or more types of analyses, including PCB's, TPHC's, VOC's, a single priority pollutant scan and a single EP-Toxicity, were performed on thirty-four of the forty-two samples collected, and results were reported on all samples (Table II - Furnace Residue Pile Area). Eleven samples, consisting of nine split spoon soil samples (BBD1-9), one surface soil sample (BBD14) and one composite sample (BBD10), were collected during field investigation I. The nine soil samples and Sample BBD14 were analyzed for PCB's. Sample BBD10 is a composite sample which was produced on-site. An equal volume of material was taken from samples BBD2, 5 and 8, mixed on plastic, then containerized. This sample was analyzed for EP-Toxicity.

During Field Investigation II, an additional twenty-one split spoon soil samples were collected from five borings (BBD2, 4, 5, 6 and 7). Sixteen of these twenty-one samples were analyzed for parameters, including PCB's TPHC's, VOC's, and a single sample for priority pollutants. (Note: Some samples collected during Field Investigations I & II possess the same sample number; they are differentiated in the tables, by sampling date.)

The final ten of the forty-two samples are split spoon soil samples collected during field investigation III from well borings BBDC1 and 4, before installation of the wells. Seven of these samples were analyzed for PCB's, TPHC's and VOC's.

Of the eighteen samples analyzed for PCB's, laboratory results indicate that PCB's are present in six of them (Figure 7). Of the twenty-three soil samples analyzed for total petroleum hydrocarbons (TPHC's), TPHC's are present in twenty-two (Figure 8). A volatile organic compound analysis was run on six samples. Results show that four of the samples are contaminated (Figure 9). A priority pollutant scan performed on one sample (BBD4/0-1') revealed the presence of a variety of pollutants, including VOC's, metals, Phenol and Cyanide (Table 10).

3.2 Incoming Drum Storage Area

Eighteen split spoon soil samples were collected from four borings (BBD 9, 12, 13 & 15) during Field Investigation II. These borings are located in an area defined as the Incoming Drum Storage Area (Figure 6). Analyses were requested on fourteen of the eighteen samples. Analyses for PCB's, TPHC's, VOC's, and Metals were performed on thirteen samples. Results indicate that several of these contaminants are present in soils. A PCB analysis was performed on six samples. Four samples, one from each boring location, were found to be contaminated (Table II - Incoming Drum Storage Area). Three samples were analyzed for VOC's, and results show that all are contaminated. Finally, one sample (BBD15/0-1') was analyzed for metals and several constituents were detected.

3.3 Furnace Area

Fourteen samples, consisting of three surface soil, and eleven split spoon soil samples, were collected from the Furnace Area (Figure 2). One or more analyses were requested on thirteen of the fourteen samples collected, and results were reported for ten. Three surface soil samples (BBD 11, 12 and 15) collected during Field Investigation I were analyzed for PCB's. Eleven split spoon samples were collected from three borings (BBD 17, 18 and 19) during Field Investigation II. Results for seven of the eleven soil samples were reported for one or more contaminants including PCB's, TPHC's and VOC's. One sample (BBD17/0-1') was also analyzed for priority pollutants and Dioxin. Laboratory results indicate that PCB's were not present in the three surface soil samples (Table II - Furnace Area). PCB results were reported on the eight samples for which that analysis was requested and was detected in four of the samples. TPHC analysis, performed on seven soil samples, indicated that petroleum hydrocarbons are present in soils. Finally, a priority pollutant scan and an analysis for Dioxin were performed on one sample (BBD17/0-1'). Results indicate that VOC's, base neutral extractables (including Pesticide extractables) compounds, metals, Phenol and Cyanide compounds are also present in soils. Dioxin was not detected.

3.4 Oil Storage Tank Area

Thirteen samples, consisting of one surface water sample, one surface sediment sample and eleven split spoon soil samples, were collected from the oil storage tank area (Figure 2). Analyses were requested and reported for nine of the samples. Two surface samples (BBDS1 and BBDW1) and two soil samples from Boring BBD16 were collected during Field Investigation II. The remaining seven soil samples, all taken during the augering of well boring BBDC3, were collected during Field Investigation III. Analyses requested for these samples include: PCB's, TPHC's, VOC's, and a Priority Pollutant scan.

Results for these samples indicate that many of the contaminants are present in soils (Table II - Oil Storage Tanks Area). Eight samples were analyzed for PCB's and nine were analyzed for TPHC's. Four samples contain PCB's, while all nine samples contain petroleum hydrocarbons. A volatile organic analysis was performed on five of the nine samples, three of which contained VOC's. Finally, a priority pollutant scan was requested on sample BBD16/5-8' and 8-10'. PCB's and VOC's, reported as part of the priority pollutant scan, have been discussed above. The remaining types of analyses, which complete the priority pollutant analysis, are metals, Phenol and Cyanide. Several metals and Phenol were detected in relatively minor concentrations. Cyanide was not detected.

3.5 Drum Storage and Background Areas

The Drum Storage and Background Areas consist of those sections, between the process buildings and the southern plant boundary, which have not yet been discussed. A total of twenty-one samples, all split spoon soil samples, were collected from seven borings. Nineteen of the twenty-one samples were collected from six borings (BBD1, 3, 8, 10, 11, and 14) during Field Investigation II. The remaining two samples were collected from well boring BBDC2 during Field Investigation III.

Analyses were requested on eighteen samples and reported for seventeen of them. Samples were analyzed for one or more parameters, including PCB's, TPHC's and VOC's (Table II - Drum Storage and Background Areas). A priority pollutant analysis was performed on one sample (BBD14/0-1'). Results indicate that VOC's are not present. However, a total concentration of 250 ppm was reported for metals and a total concentration of 830 ppm was reported for base neutral compounds. Acid extractable compounds, Phenols and Cyanide were not detected. Five samples were analyzed for PCB's. Four of the five samples contain PCB's at a detectable concentration. All twenty-one samples were analyzed for TPHC's. Results indicate that all samples contained a detectable concentration of petroleum hydrocarbons.

3.6 Buildings

Three sediment samples (BBDS2-4) were collected, one each, from the three reconditioning buildings. Sample BBDS2 was analyzed for PCB's and VOC's, sample BBDS3 was analyzed for TPHC's and sample BBDS4 was analyzed for PCB's, TPHC's and VOC's. PCB's were detected in samples BBDS2 and BBDS4 at 80 and 11.1 ppm, respectively. Petroleum hydrocarbons were detected in samples BBDS3 and BBDS4 at 850 and 39,400 ppm, respectively, and concentrations of 84 parts per billion (ppb) was reported for sample BBDS4. Finally, volatile organics were detected in sample BBDS4 at 84 ppb.

3.7 Ground Water

A total of six samples, five ground water samples and one field blank, were analyzed (Table VIII). The field blank was made up of store-bought spring water. The types of analyses performed on the samples, with the exception of BBDC4, included PCB's, TPHC's and VOC's. Sample BBDC4 was analyzed for priority pollutants.

PCB's were detected, in a concentration of 53 ppb, in sample BBDC5. In addition, the laboratory filtered the sediment out of the sample and analyzed the sediment. A concentration of 80 ppm was reported. PCB's were not detected in any other samples. All of the ground water samples, except BBDC4, were analyzed for TPHC's. Concentrations found in samples BBDC1, 2, 3 and 6 are 2.8, 3.7, 4.8 and 1.8 ppm, respectively. The concentration in sample BBDC5, taken in the old storage tank area, was reported at 2,000 ppm. The remaining analyses were performed on sample BBDC4 as part of the priority pollutant scan. No metals were found in any significant concentrations. Although several metals were detected, all were, at, or just above, the threshold detection limit. A total concentration of 42 ppb was reported for base neutral compounds, and acid extractable compounds, Phenol and Cyanide, were not detected.

4.0 Areas of Environmental Concern

For the purpose of defining areas of environmental concern, the property has been geographically subdivided into six major areas, based on usage, land ownership, and future potential land utilization (Figure 6). These areas are:

I. Furnace Residue Pile Area
II. Incoming Drum Storage Area
III. Furnace Area
IV. Oil Storage Tank Area
V. Drum Storage and Background Area
VI. Drum Storage and Background Area (BBD3 & 8)
VII. Buildings

Activities performed in each area are discussed below in detail.

4.1 Furnace Residue Pile Area - Area I

The furnace residue pile area has been defined by two features. First, the waste residues generated during the drum cleaning process were disposed of on the furnace residue pile, which is located in this area (Figure 6); and, second, this portion of the property is owned by the principal of Bayonne Barrel & Drum Company. In addition, the remaining portion of this area is used for empty drum storage. Results of laboratory analyses indicate that a wide variety of contaminants, including PCB's, TPHC's, VOC's and metals, are present in significant concentrations in the furnace residue pile area.

4.2 Incoming Drum Storage Area - Area II

The incoming drum storage area is defined as the area which extends from the plant buildings to immediately south of the furnace area (Figure 6). This area was utilized as the first stage in reconditioning for the drums about to enter the furnace. Significant concentrations of each of four types of contaminants, PCB's, TPHC's, VOC's and metals, were found within this area.

4.3 Furnace Area - Area III

The furnace area is an enclosure created by the three main plant buildings (Figure 6). The furnace, itself, is situated here with a conveyor that passed from the incoming drum storage area, through the furnace, into a drum reconditioning building (Bldg. 2), where the process was completed. A recovery pit, rectangular in shape and perpendicular to the conveyor, was situated beneath the exit port of the furnace. Furnace residue type materials were observed on the ground, adjacent to the northwest side of the furnace. Analytical results revealed the presence of many contaminants. Constituents found included PCB's, TPHC's, VOC's, metals, base neutral compounds and Phenols.

4.4 Oil Storage Tank Area Area IV

The oil storage tank area is located east of the main plant buildings,

on the side closest to the New Jersey Turnpike (Figure 6). One tank (Figure 2) was used for storage of oil which had been liberated during the firing of incoming drums in the furnace area. Only one was observed by DRAI to be directly associated with the oil recovery system. Prior use of the remaining two tanks is unknown. There is also a trench which carried fluids, generated in the furnace area, to the oil separator area and a single underground tank located at the northern terminus of the trench. The exact volume of the tank is unknown. (Several inquiries, combined with information on file, have yielded several different answers.) However, using surface measurements, DRAI has estimated the volume to be 1,000 gallons.

Observations of the subsurface conditions, during the augering phase of borings BBD16, BBD3 & BBD5, revealed a zone of material, between three and nine feet, which appeared to be saturated with oil. Soils in this zone were very soft and fluid-like and offered little resistance when split spoons were actually driven.

The analytical results for samples collected in this area indicated that many contaminants are present in soils. PCB's and TPHC's were found at relatively high concentrations (Table II - Oil Storage Tanks Area). VOC's were detected, as were minor concentrations of metals and Phenol.

4.5 Drum Storage and Background Areas - Areas V & VI

The drum storage area encompasses those areas, between the furnace residue pile area and the main plant buildings, which have not been previously categorized (Figure 6). This area is actually divided into a northern and southern half. The division has been based on a knowledge of the prospects for land use in the future. Specifically, the Department of Transportation wishes to acquire the southern half of the property (Area V - south) to be used for transportation purposes.

These areas are characterized by a black, coal-cinder type of surface fill to a depth of approximately ten feet below surface (Figures 4 and 5). The areas are used primarily for storage of empty drums, and as lanes for vehicular traffic. Three types of pollutants, petroleum hydrocarbons, VOC's, and metals, were detected in soils within Area V. Petroleum hydrocarbons were found in all of the samples. Metals were detected in three samples, BBD8, 11 and 14. Volatile organics were detected in two of five samples analyzed for VOC's (both from well boring BBDC2).

4.6 Buildings

Three surface sediment samples (BBDS2, 3 and 4) were collected, one each, from the three main buildings surrounding the furnace area (Figure 6). Three types of analyses, PCB's, TPHC's and VOC's, were performed for the purpose of detecting contaminants in the interiors of the buildings. Results indicate that all three parameters are present in significant concentrations.

5.0 Summary of Findings

5.1 Soil and Sediment Quality

Soil samples, sediment samples, one surface water sample and five ground water samples were analyzed for a variety of parameters including PCB's, TPHC's, and VOC's. Four samples, each from a different area, were submitted for analysis of 129 Priority Pollutants plus 40 largest peaks (PP+40). A PP+40 scan includes VOC's, PCB's, Metals, Acid Extractables and Base/Neutrals Extractable Compounds, and four pesticides and two herbicides. One soil sample was submitted for analysis of Dioxin.

Analytical results for all parameters, except metals, are presented chronologically by area in Table II. This table was included to facilitate the review of results by area. Results of analyses for PCB's and total petroleum hydrocarbons (TPHC) are listed in Table III. Virtually all soil samples collected were analyzed for TPHC's. Only one sample was analyzed for Dioxin (Table III). Volatile organic compound (VOC) analyses results for both "priority" and non-priority" compounds are found on Table IV. Concentrations for inorganic parameters (metals, phenol, cyanide and pesticides) are presented in Table V. Concentrations for Base/Neutral - Pesticide extractable and acid extractable compounds are included on Table VI. Finally, results of analyses for PCB, TPHC, and VOC concentrations in surface sediment and water samples are presented on Table VII.

An unusual occurance appears to be present in the Oil Storage Tank area, which is unique to this location of the facility. During drilling operations an anomalously high water table was encountered. In addition, at the time of drilling, soils in this area possessed more fluid-like characteristics due to an abnormally high liquid content. This was observed in soils down to a depth of approximately 5 to 8 feet below surface. Concentrations for a variety of parameters reported for one ground water sample (BBDC5) and several soil samples collected in this area were consistantly higher than concentrations found in other areas. The furnace area is the only area which exhibits higher concentrations for several contaminants; specifically, concentrations of PCB's and VOC's are slightly higher. This is most likely a result of the fact that the furnace area is, in essence, the source area since the furnace area is the first location in which materials brought on site are liberated from drums. The liquid materials are then transferred to the Oil Storage Tank area for storage in above and below ground tanks, via a channel which connects both areas. The concentration for TPHC's is highest in the Oil Storage area. Although the initial source of these liquids may be the furnace area, the oils captured during drum firing are stored, in volume, in the Oil Storage Tank area thus creating a new primary source.

Polychlorinated Biphenyls. In general, results for PCB analyses indicate that this contaminant is distributed throughout the site. Concentrations reported, range from "not detected" at 1 part per million (ppm), to 320 ppm. The highest concentrations are found in the furnance and oil storage tank areas. Fluids, generated as a result of drum firing operations in the furnace area were pumped via a drainage channel into the storage tanks. Therefore, the relatively high concentration found in the storage tank area is substantiated by the fact that these materials have been readily transferred into the tanks area. PCB's were also detected in soils located in the incoming drum storage area, the furnace residue pile, and the drum storage and background areas.

A comparison of results obtained from duplicate analyses of samples performed by the laboratory, indicates a high degree of correlation in both compound identification and concentrations. The correlation between one sample (BBD17/1') a field duplicate of it (BBD17/S), collected in the furnace area, does indicate some disparity. However, in our opinion, this is a result of the method used to collect the duplicate. The two samples, the original and the duplicate, were collected by driving two separate split spoon samplers into the ground. The spoon sample locations were within a one to two foot distance of each other, but the soil samples can not be considered as typical duplicates since they were not from the same sample. Instead, each sample was collected separately, one from each spoon sample recovered.

Total Petroleum Hydrocarbons. With respect to total petroleum hydrocarbons, all soil samples collected during the field investigations of October and November 1985, and submitted to the laboratory, were analyzed for TPHC's. Concentrations found in samples collected from the surface to a depth of ten feet, all exceed the maximum permissible concentration allowed in soils. With the exception of one sample, BBDC1/10-12' (410 ppm), the concentration of TPHC's in all samples collected below a depth of ten feet were below the maximum permissible concentration for TPHC's in soil.

When reviewing these results, it should be noted that this property was used as a disposal area for coal and ash. These materials were an end product of a coal-burning, electric power generating station operating in the area. A review of Figures 4 and 5 reveals that the depth of this coal-ash fill is approximately ten feet and exists as the uppermost layer, from the surface down to a depth of ten feet.

For reasons as explained in the discussion of PCB's, TPHC results for sample BBD17/1' and its duplicate BBD17/S display some disparity; however, results for duplicate analyses performed by the laboratory exhibit a high degree of correlation.

Volatile Organic Compounds. In general, volatile organic compounds in soils for priority and non-priority constituents were limited to specific areas only. VOC concentrations are significant in soils found in the incoming drum storage, furnace, oil storage tank and furnace residue pile areas, whereas results for soils analyzed outside the specified boundaries of these areas indicate that VOC's were not even present in detectable concentrations. Priority VOC's were detected in a range from "not detected" at 20 ppb to 22,553 ppb, and non-priority VOC's were detected in a range from "not detected" at 20 ppb to 66,035 ppb. The appearance of VOC's in soils is, in general, restricted to those areas in which materials handled and liberated in the process of reconditioning drums are most likely to be found. Thus, a noticeable distinction is present between contaminated and uncontaminated soils. Only one sample, (BBDC1/5-7'), collected outside any of the above named areas, contain significant concentrations of VOC's with reported values of 27.0 ppb and 2,160 ppb for priority and non-priority VOC's, respectively. VOC concentrations were found mostly within two depth intervals, 0-1' and 5-7', and where present in depths below seven feet, did not exceed the maximum permissible concentration allowed in soils.

One surface water and two surface sediment samples were analyzed for VOC's. VOC's were detected in one of the samples; however, concentrations do not exceed the maximum permissible concentration allowed in soils.

Inorganic Parameters. With respect to inorganic parameters, including metals, phenol and cyanide, some contaminants are present. Results for these parameters were generated as part of a PP+40 scan requested on four soil samples (BBD4/1', BBD14/1', BBD16/5-8 & 8-10' and BBD17/1'), one each from four different areas of the facility. Metals were found in a range of concentrations from "Not detected" for Thallium, to 15,500 ppm for Copper. The highest concentrations were found in the furnace and furnace residue pile areas. Metals showing the highest concentrations include Cadmium, Chromium, Copper, Lead and Zinc. Concentrations for these metals in the remaining two areas, in which the analyses were requested (Oil Storage Tank and Background), are substantially less. The remaining metals for which soils were analyzed were either not present, or present in relatively lower concentrations.

Phenol was detected in three of the four areas. Concentrations range between ND0.5 to 20 ppm. Phenol was detected in the furnace, furnace residue pile and oil storage tank areas. Phenol was not detected in a Background area.

Finally, Cyanide was reported in a range of concentrations from ND0.1 to 2 ppm in the furnace and furnace residue pile areas.

Base/Neutral and Acid Extractable Compounds. B/N, AE analysis was requested on four samples (as listed "Inorganic parameters). The soils are generally clean with respect to these compounds. Concentrations for base neutrals were reported in a range from ND9.5 to 850 ppm. Acid Extractable compounds were not detected.

5.2 Ground Water

Polychlorinated Biphenyls. A PCB analysis was requested for four of the five ground water samples including BBDC1, 2, 3 and 5. Contamination was detected in Well BBDC5 only, in the oil storage tank area, at a concentration of 53 ppb. Results of an analysis performed on sediments which were separated, from the water sample, by the laboratory, indicate that they also contain PCB's at a concentration of 80 ppm.

Total Petroleum Hydrocarbons. A TPHC analysis was requested on four (same as listed above) of the five ground water samples. The range of concentrations reported extends from 2.8 to 2,000 ppm. Concentrations for samples BBDC1, BBDC2, BBDC3 and BBDC5 were 2.8, 3.7, 4.8 and 2,000, respectively. A detectable concentration for TPHC's was reported (1.8) ppm) in the trip blank. As a result, the values reported for BBDC1-3, (2.8, 3.7 and 4.8 ppm) that are of the same magnitude, are questionable. However, since the results reported for sample BBDC5 are three times greater in magnitude, this is a positive indication that contamination is present in the sample.

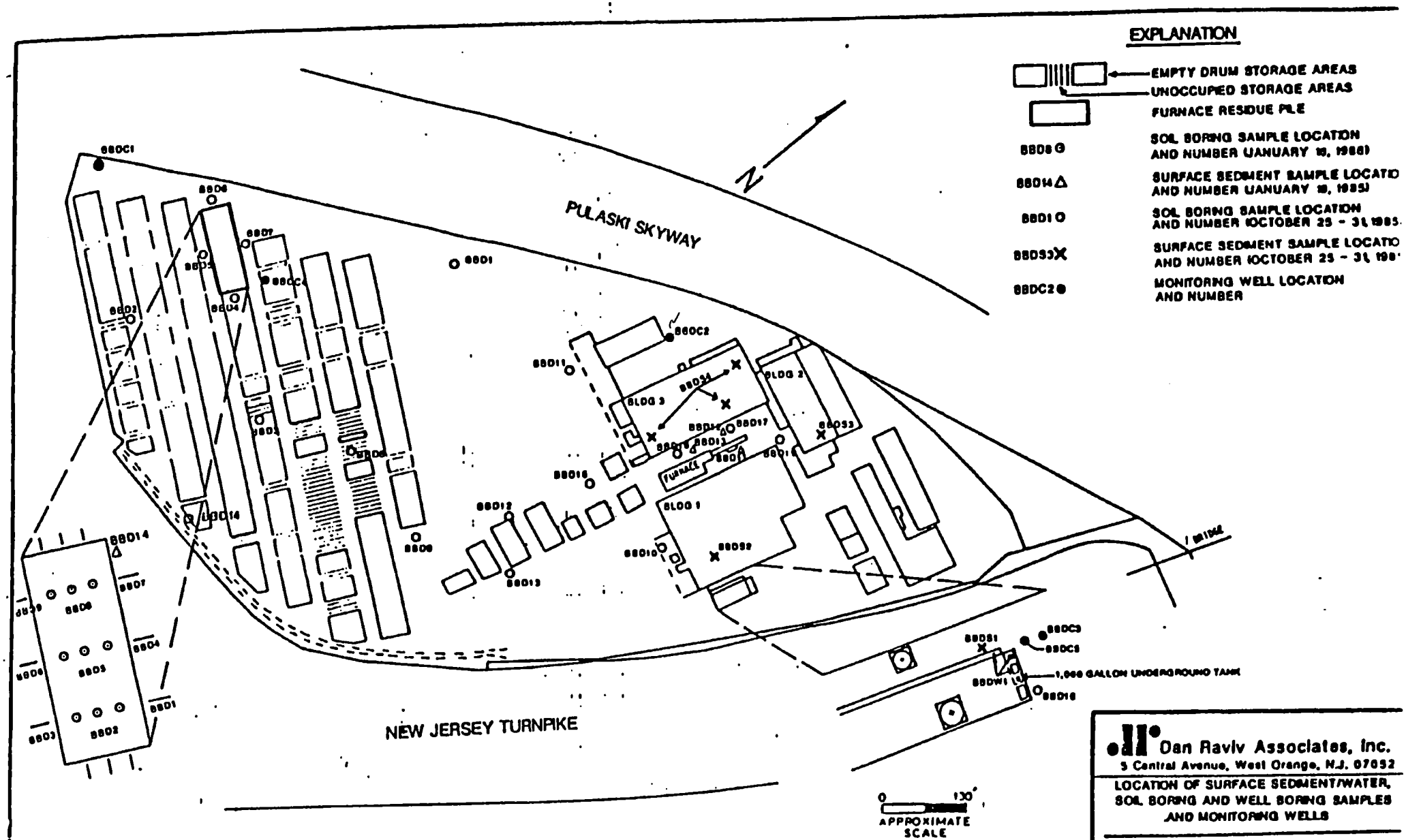
Volatile Organic Compounds. VOC's were detected in all five ground water samples. However, there is a distinct difference between the total priority and non-priority concentrations reported for water sample BBDC5 when compared to the values reported for the remaining four ground water samples. For the priority VOC's, values were reported between "not detected" and 1,353 ppb. The range of values reported for non-priority VOC's falls between "none-detected" and 4,620 ppb. The total concentration reported in well BBDC5 for each set of parameters, priority and non-priority VOC's, exceeds the maximum allowable concentration for VOC's in ground water. For concentrations reported in the remaining four wells, BBDC1, 2, 3 and 4, the combined sum of priority and non-priority VOC's concentrations found in each does not exceed the maximum allowable concentration for VOC's in ground water.

Inorganic Parameters. The inorganic parameters including metals, phenol and cyanide were requested as part of a PP+40 analysis requested on ground water sample BBDC4. With respect to these parameters, ground water was clean. Concentrations reported for all metals were reported as "not detected" or at or very close to the method detection limit, for each metal, in ground water. Both phenol and cyanide were "not detected".

Base/Neutral and Acid Extractable Compounds. B/N and AE compound analyses were also reported as part of the PP+40 scan requested on water sample BBDC4. The sum total concentration of B/N compounds reported is 42 ppb while AE compounds were "not detected".

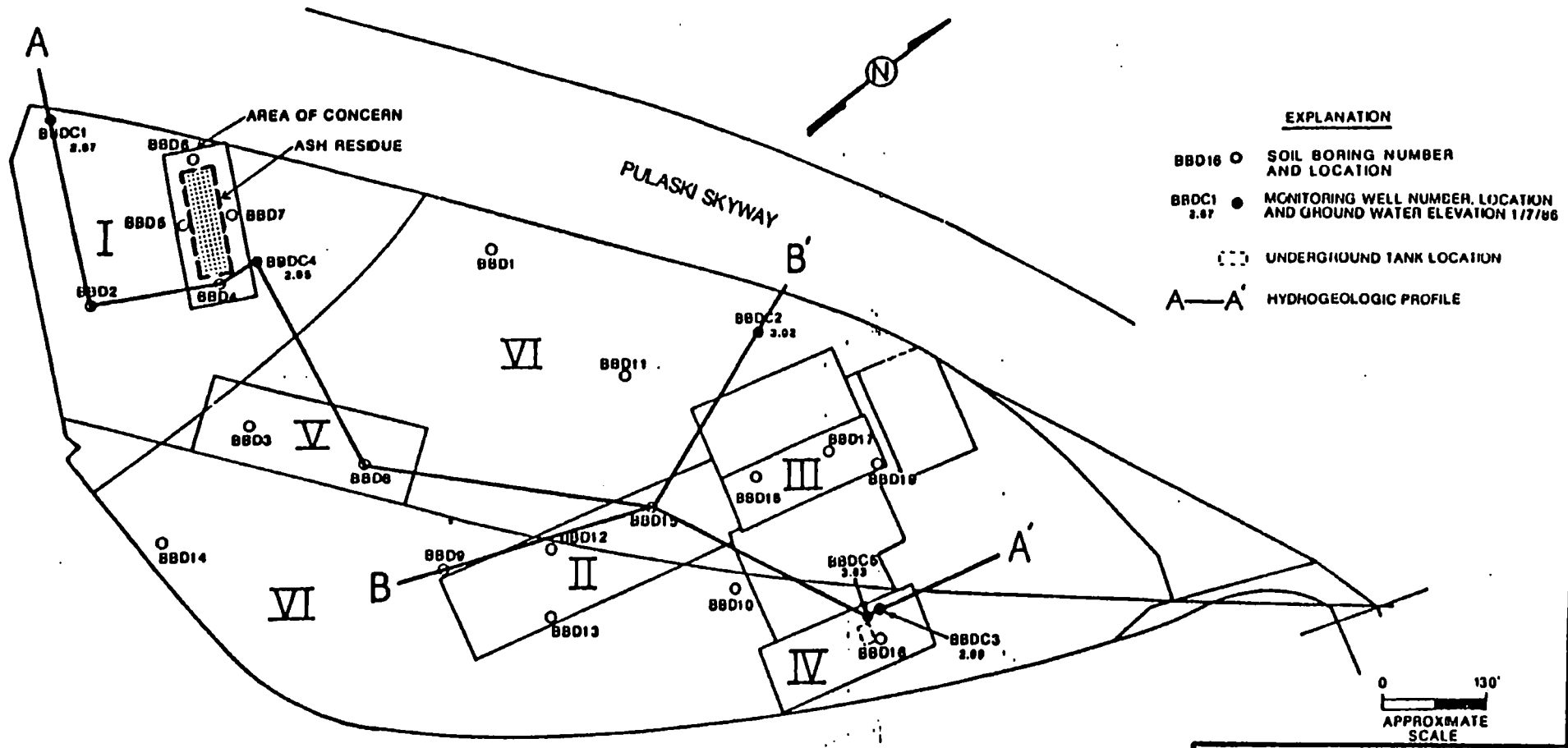
Dioxin. One sample BBD17/1', taken from the furnace area, was submitted for analysis of Dioxin. A concentration of "not-detected" at a method detection limit of 0.320 ppb was reported.

Figures


EXPLANATION
EMPTY DRUM STORAGE AREAS
UNOCCUPIED STORAGE AREAS
FURNACE RESIDUE PILE
SOIL BORING SAMPLE LOCATION AND NUMBER (JANUARY 18, 1988)
SURFACE SEDIMENT SAMPLE LOCATION AND NUMBER (JANUARY 18, 1985)
SOIL BORING SAMPLE LOCATION AND NUMBER (OCTOBER 25 - 31, 1985)
SURFACE SEDIMENT SAMPLE LOCATION AND NUMBER (OCTOBER 25 - 31, 198
MONITORING WELL LOCATION AND NUMBER
PULASKI SKYWAY
NEW JERSEY TURNPIKE
N
BLDG 1
BLDG 2
BLDG 3
FURNACE
1,000 GALLON UNDERGROUND TANK
0 100'
APPROXIMATE SCALE
Dan Raviv Associates, Inc.
5 Central Avenue, West Orange, N.J. 07052
LOCATION OF SURFACE SEDIMENT/WATER, SOIL BORING AND WELL BORING SAMPLES AND MONITORING WELLS
BAYONNE BARREL &
CO - NEWARK, NJ

APPENDIX A

RESULTS OF GROUND WATER ANALYSES
JUNE 1984



Dan Raviv Associates, Inc
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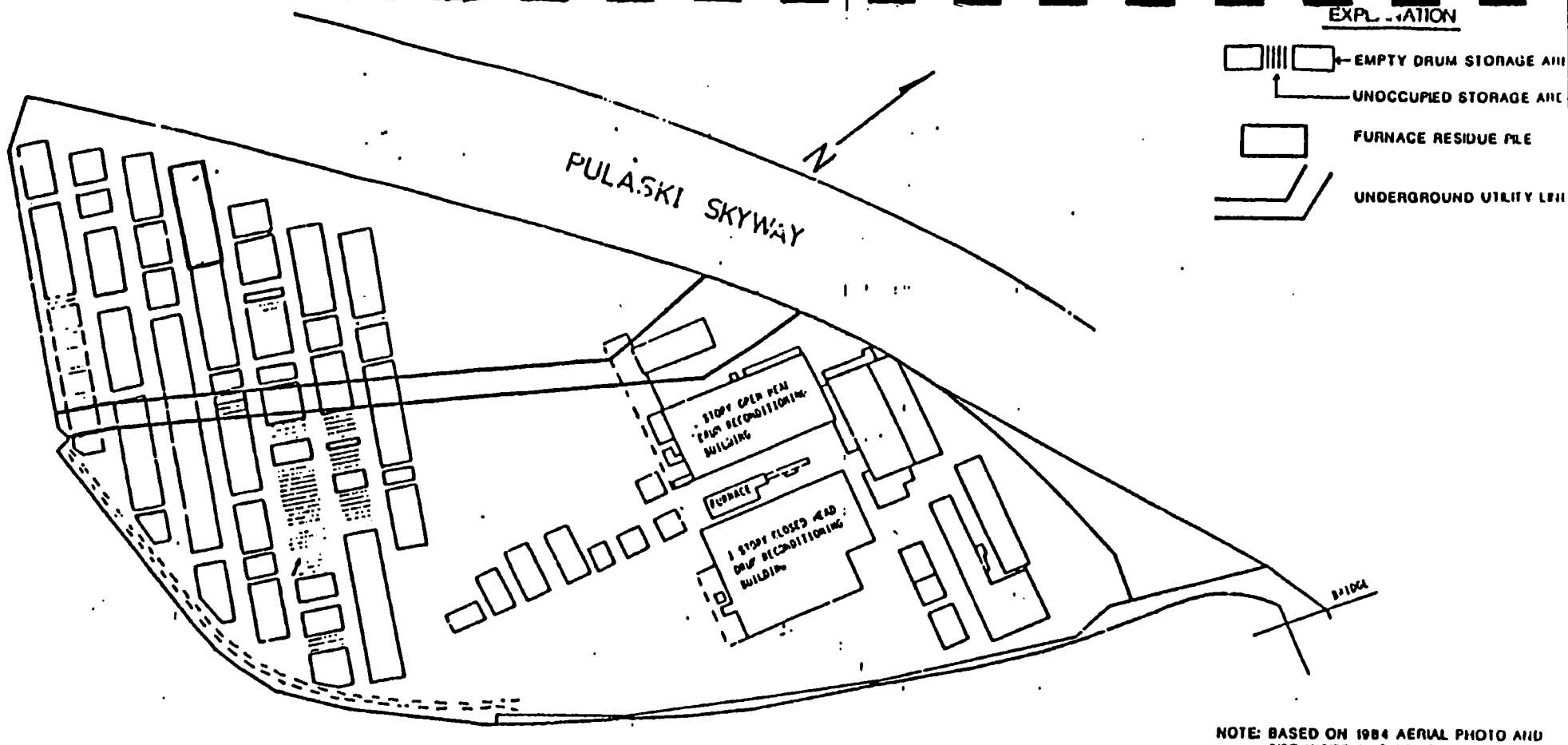
LOCATION OF HYDROGEOLOGIC PROFILES

BAYONNE BARREL & DRUM CO - NEWARK, NJ.

Prepared By MZ/JAL	Date MARCH 1986
Job No 84C182	Figure 3



NOTE: BASED ON 1984 AERIAL PHOTO AND SITE VISITS (8 & 9/84)

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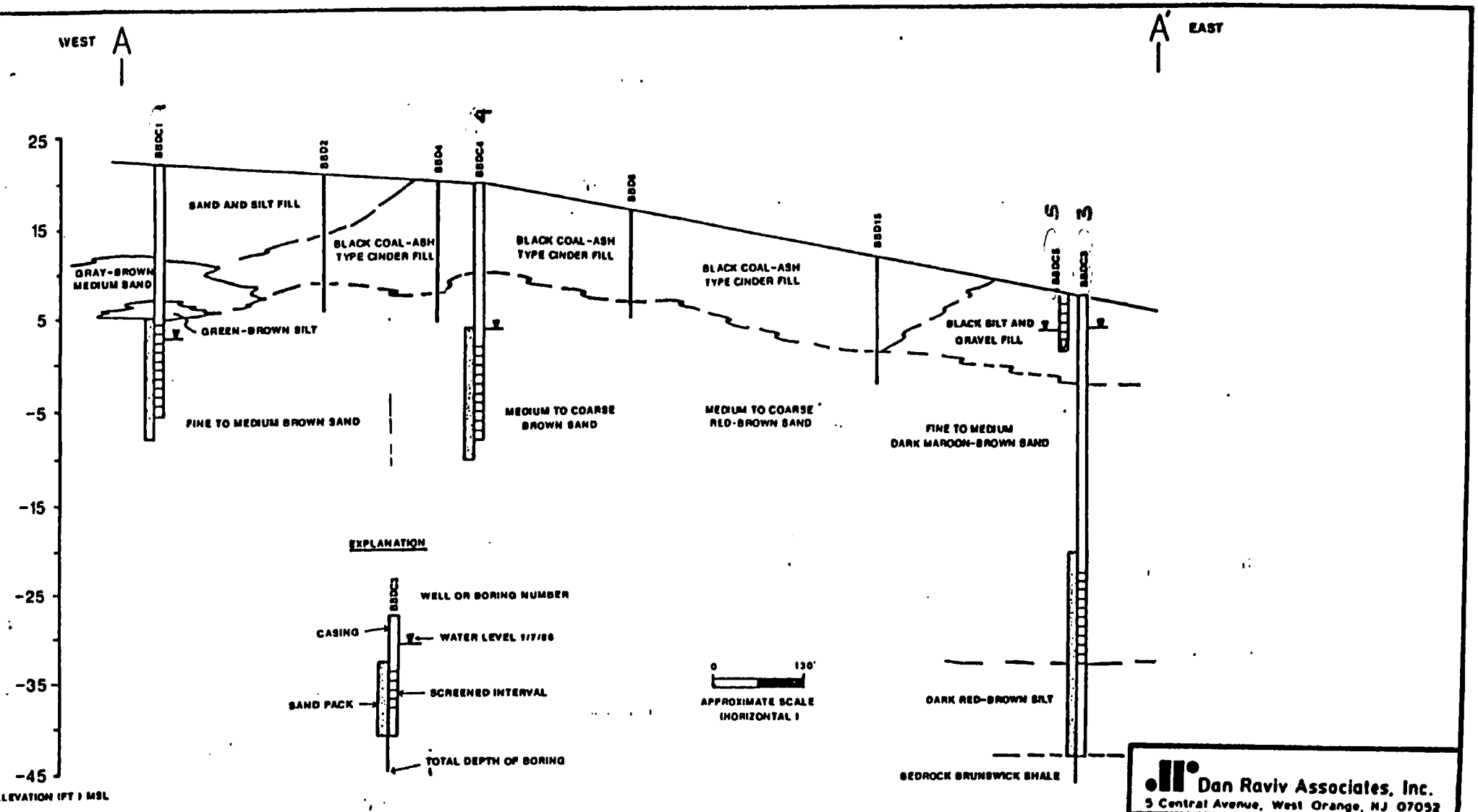
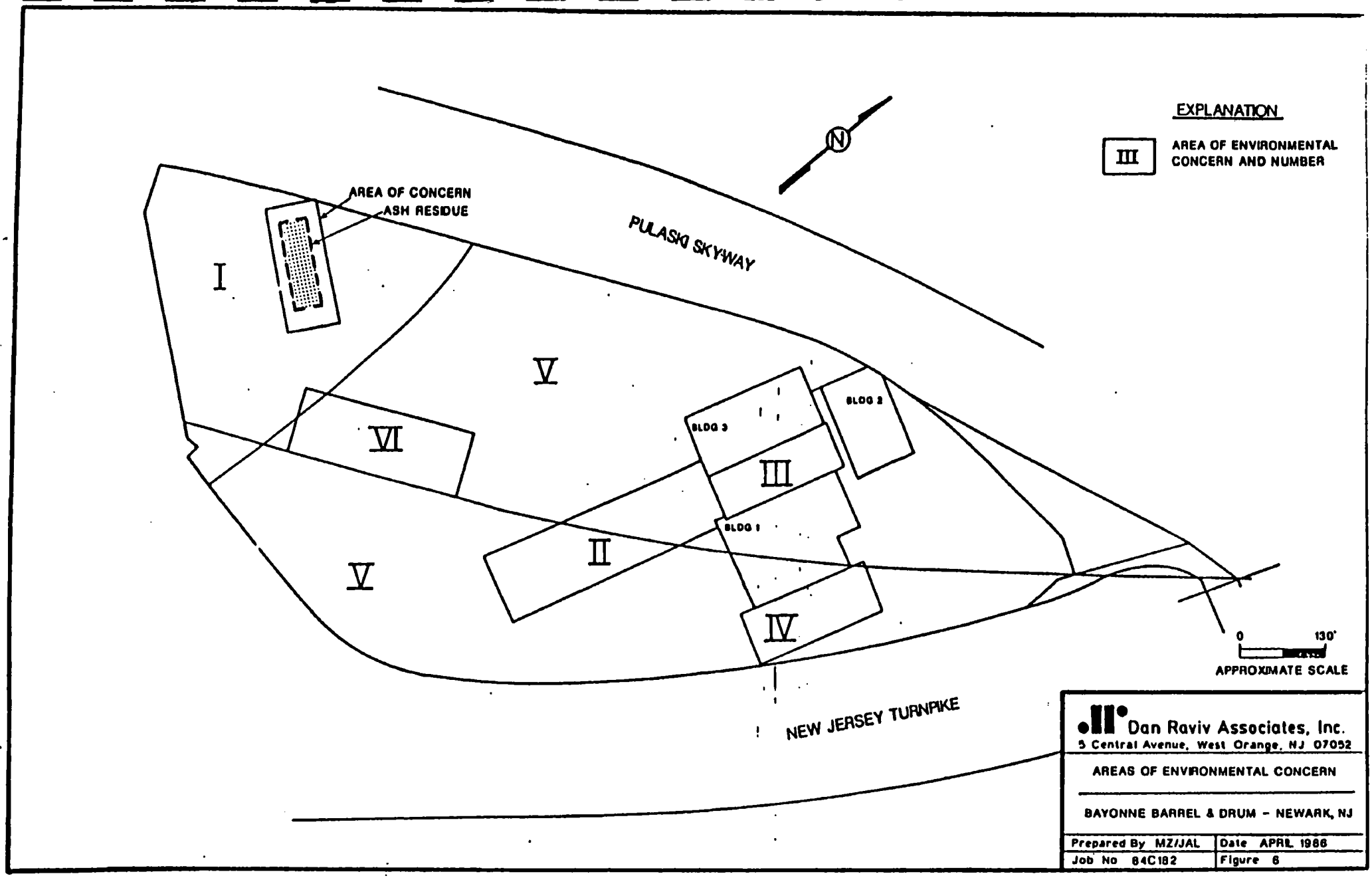
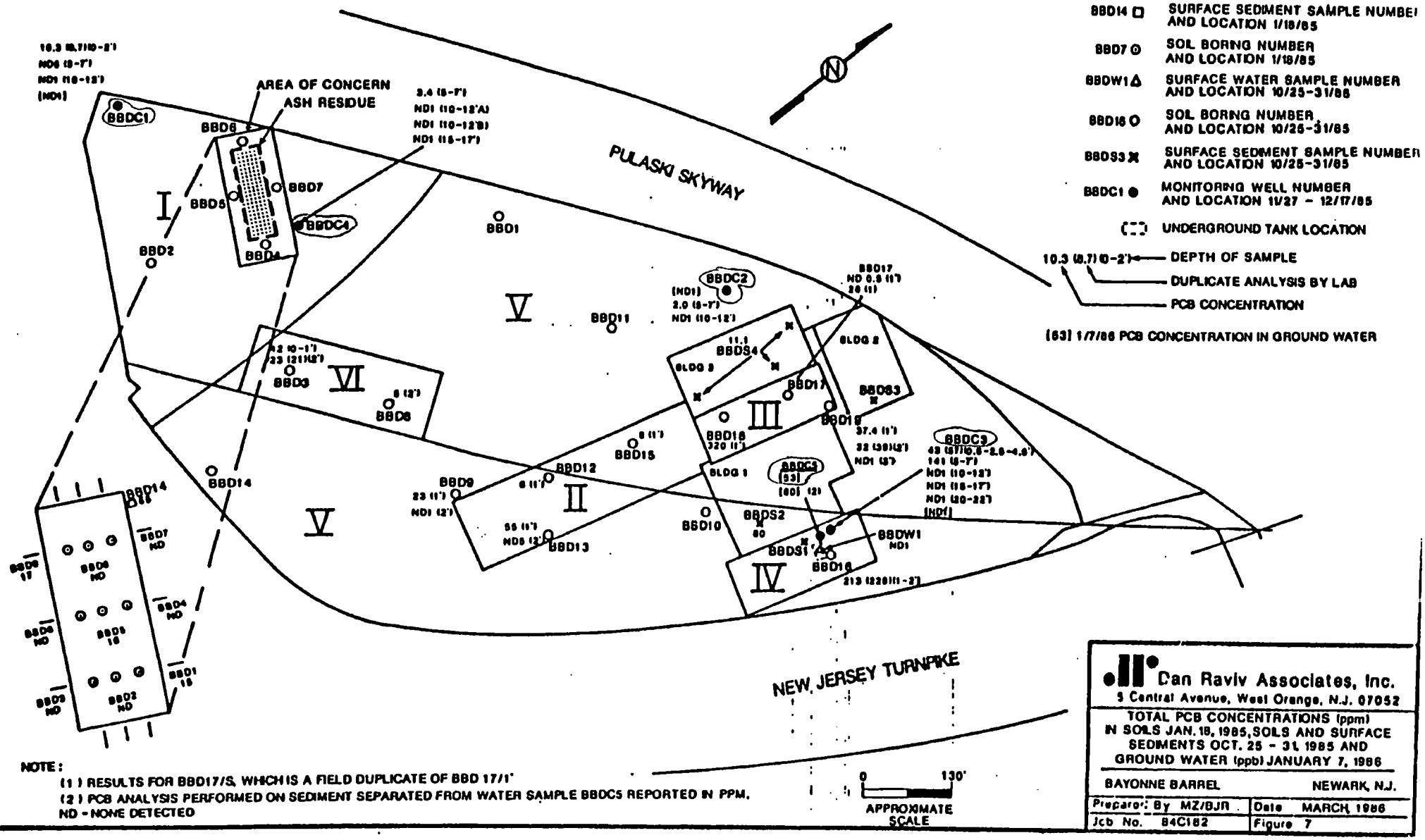
SITE MAP
LOCATION OF UNDERGROUND UTILITY LINES

BAYONNE BARREL & DRUM CO-NEWARK, NJ

Prepared By MZ/BJR	Date APRIL, 1986
Job No. 84C182	Figure 1


WEST
A
A'
EAST
25
15
5
-5
-15
-25
-35
-45
ELEVATION (FT) MSL
SBDC1
SBD2
SBD4
SBDC4
SBD6
SBD15
SBDC5
SBDC3
SAND AND SILT FILL
BLACK COAL-ASH TYPE CINDER FILL
BLACK COAL-ASH TYPE CINDER FILL
BLACK COAL-ASH TYPE CINDER FILL
GRAY-BROWN MEDIUM SAND
GREEN-BROWN SILT
BLACK SILT AND GRAVEL FILL
FINE TO MEDIUM BROWN SAND
MEDIUM TO COARSE BROWN SAND
MEDIUM TO COARSE RED-BROWN SAND
FINE TO MEDIUM DARK MAROON-BROWN SAND
EXPLANATION
WELL OR BORING NUMBER
CASING
WATER LEVEL 1/17/86
SCREENED INTERVAL
SAND PACK
TOTAL DEPTH OF BORING
0
130'
APPROXIMATE SCALE (HORIZONTAL)
DARK RED-BROWN SILT
BEDROCK BRUNSWICK SHALE
Dan Raviv Associates, Inc.
5 Central Avenue, West Orange, NJ 07052
HYDROGEOLOGIC PROFILE
A - A'
BAYONNE BARREL AND DRUM CO.
NEWARK, N.J.


EXPLANATION
III
AREA OF ENVIRONMENTAL CONCERN AND NUMBER
N
AREA OF CONCERN
ASH RESIDUE
PULASKI SKYWAY
I
V
VI
V
II
III
IV
BLDG 1
BLDG 2
BLDG 3
NEW JERSEY TURNPIKE
0
130'
APPROXIMATE SCALE
Dan Raviv Associates, Inc.
5 Central Avenue, West Orange, NJ 07052
AREAS OF ENVIRONMENTAL CONCERN
BAYONNE BARREL & DRUM - NEWARK, NJ
Prepared By MZ/JAL
Date APRIL 1986
Job No 84C182
Figure 6



NOTE:

(1) RESULTS FOR BBD17/S, WHICH IS A FIELD DUPLICATE OF BBD 17/1'

(2) PCB ANALYSIS PERFORMED ON SEDIMENT SEPARATED FROM WATER SAMPLE BBDC5 REPORTED IN PPM.

ND - NONE DETECTED

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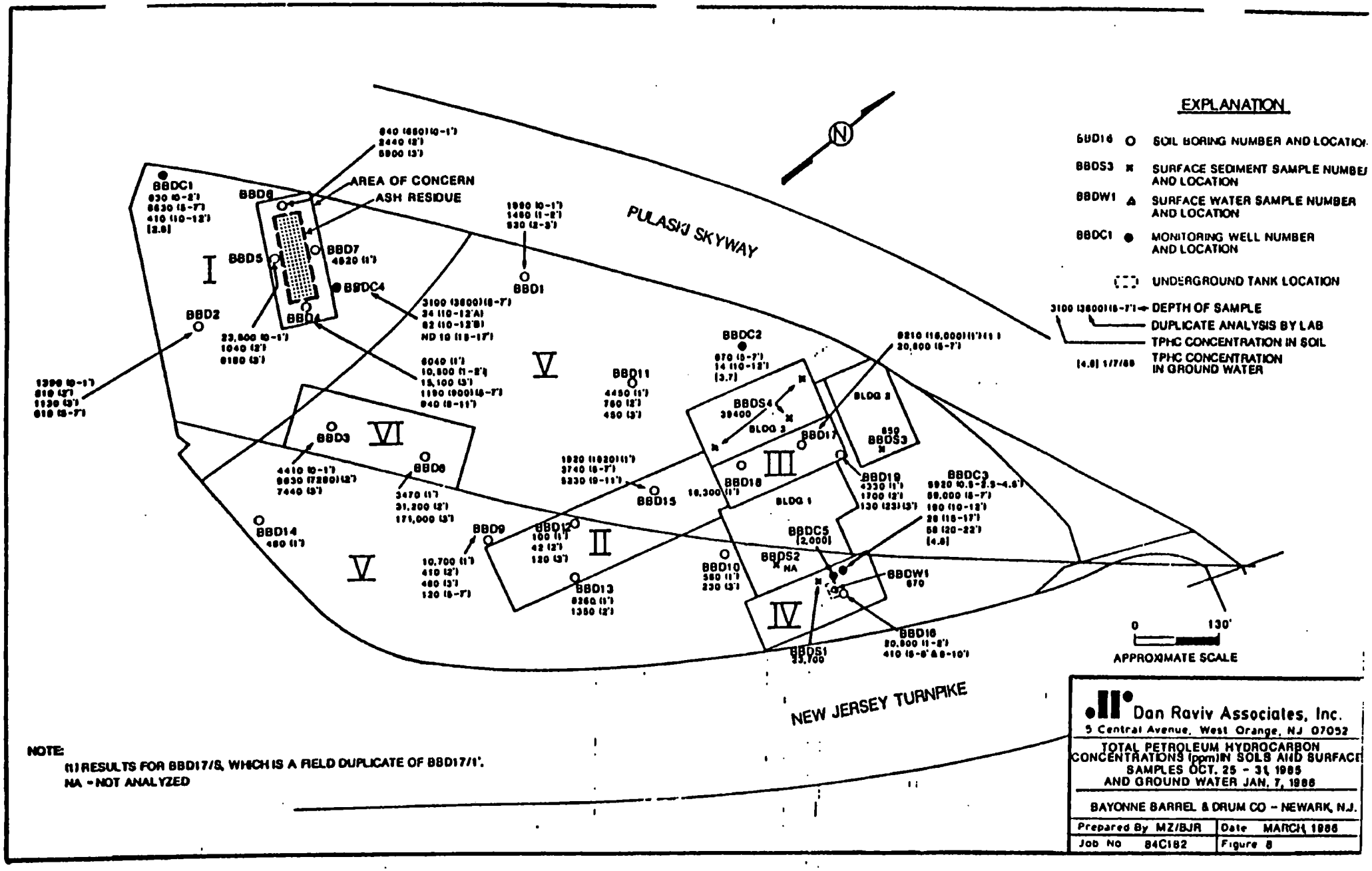
TOTAL PCB CONCENTRATIONS (ppm) IN SOILS JAN. 18, 1985, SOILS AND SURFACE SEDIMENTS OCT. 25 - 31, 1985 AND GROUND WATER (ppb) JANUARY 7, 1986

BAYONNE BARREL NEWARK, N.J.

Preparer: By MZ/BJR	Date MARCH, 1986
Job No. 84C182	Figure 7



NOTE:
(1) RESULTS FOR BBD17/S, WHICH IS A FIELD DUPLICATE OF BBD17/1'.
NA = NOT ANALYZED

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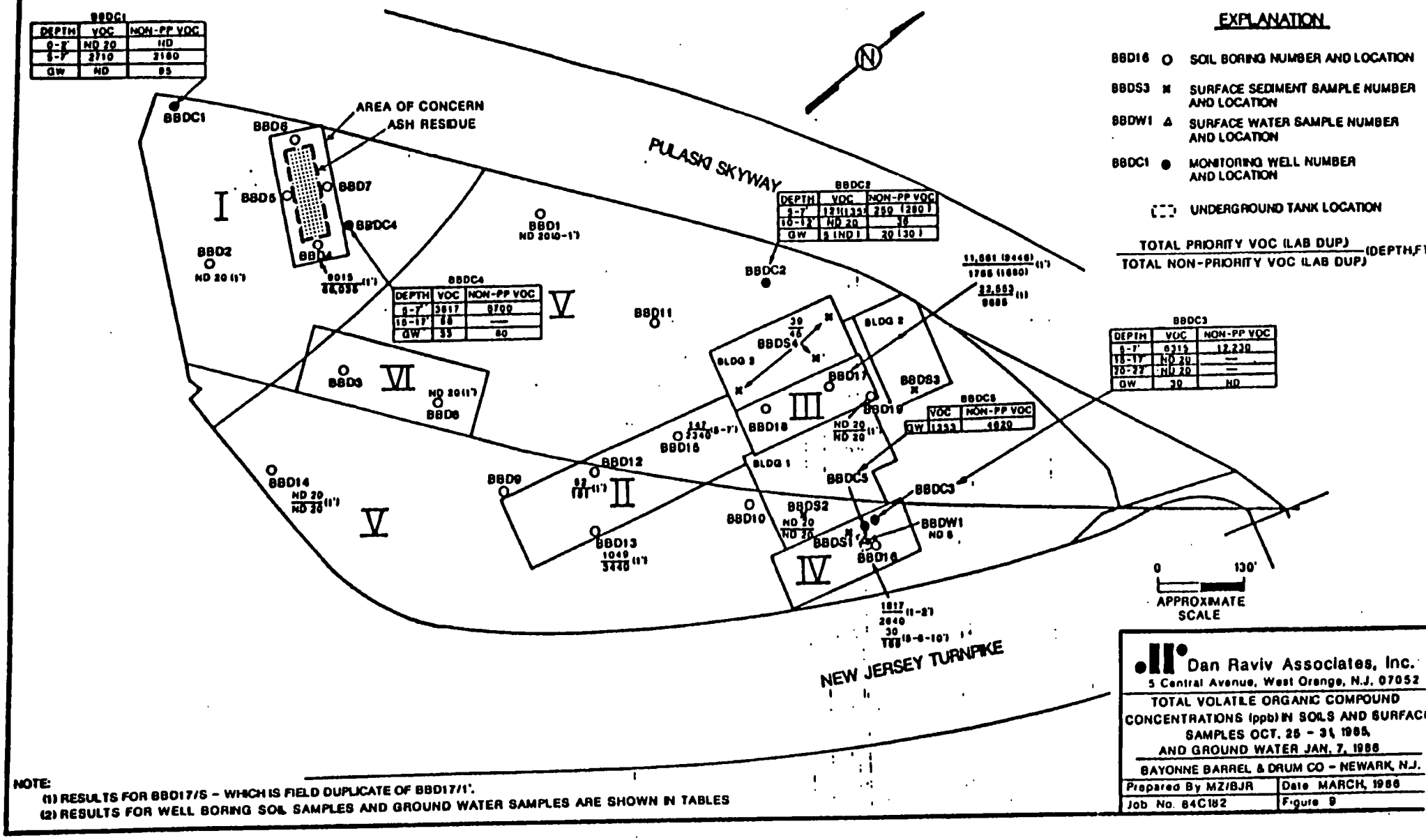
5 Central Avenue, West Orange, NJ 07052

TOTAL PETROLEUM HYDROCARBON CONCENTRATIONS (ppm) IN SOILS AND SURFACE SAMPLES OCT. 25 - 31, 1985 AND GROUND WATER JAN. 7, 1986

BAYONNE BARREL & DRUM CO - NEWARK, N.J.

Prepared By MZ/BJR	Date MARCH, 1986
Job No 84C182	Figure 8



BBDC1

DEPTH	VOC	NON-PP VOC
0-3'	ND 20	ND
3-7'	2710	2160
GW	ND	95

BBDC2

DEPTH	VOC	NON-PP VOC
3-7'	121 (135)	250 (280)
10-12'	ND 20	30
GW	5 (ND)	20 (30)

BBDC3

DEPTH	VOC	NON-PP VOC
3-7'	6315	12,230
18-19'	ND 20	—
20-22'	ND 20	—
GW	30	ND

BBDC4

DEPTH	VOC	NON-PP VOC
3-7'	3817	8700
10-12'	88	—
GW	35	80

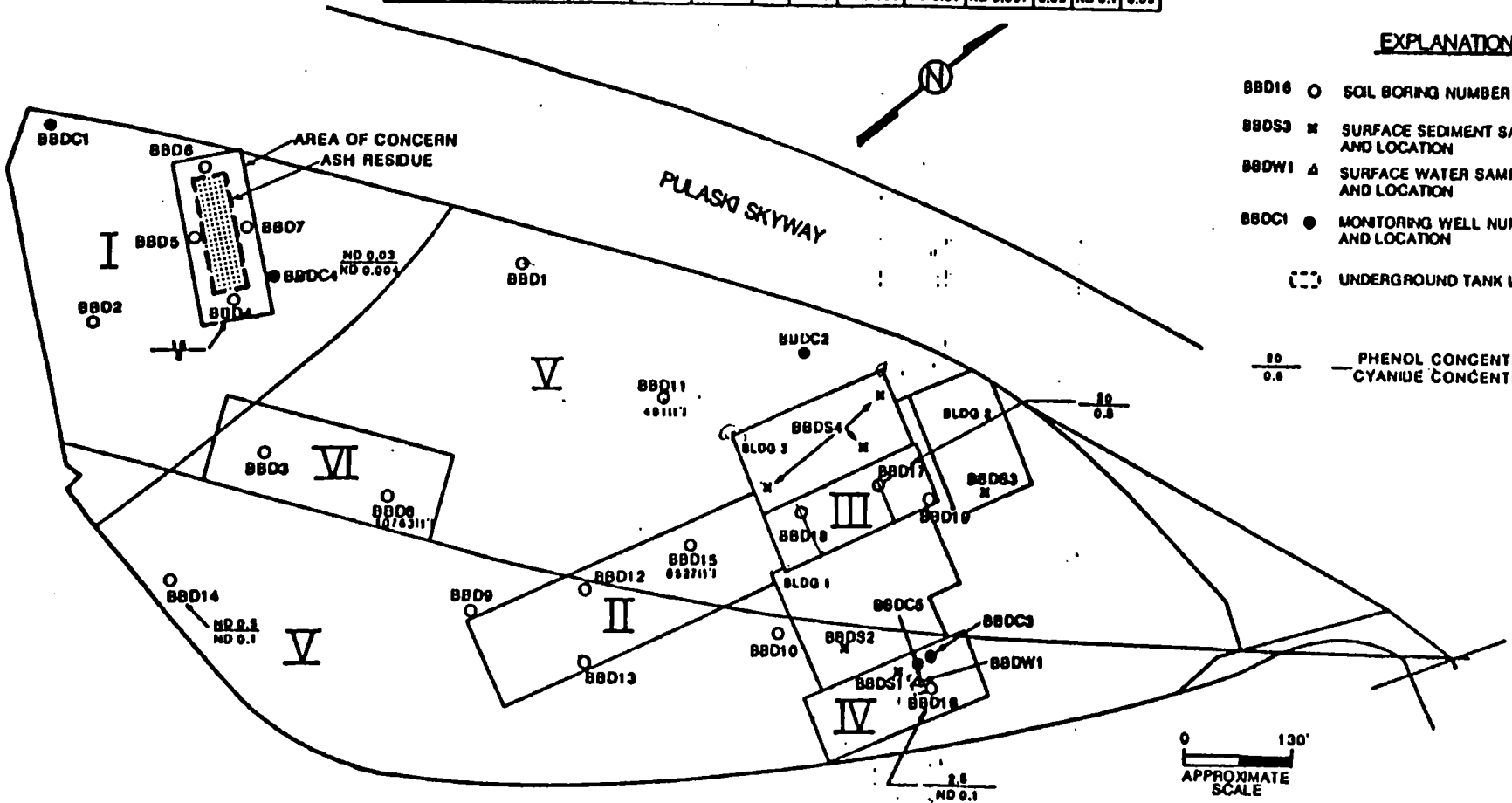
BBDC5

	VOC	NON-PP VOC
GW	1333	4820

NOTE:
(1) RESULTS FOR BBD17/5 - WHICH IS FIELD DUPLICATE OF BBD17/1'.
(2) RESULTS FOR WELL BORING SOIL SAMPLES AND GROUND WATER SAMPLES ARE SHOWN IN TABLES

GROUND WATER

METALS (PPM)	Sb	As	Be	Cd	Cr	Cu	Pb	Hg	Ni	Se	Ag	Tl	Zn
BBDC4	ND 0.5	0.01	ND 0.01	ND 0.01	ND 0.01	0.04	ND 0.1	ND 0.002	ND 0.01	ND 0.007	0.03	ND 0.1	0.03



SOILS

METAL (PPM)	Sb	As	Be	Se	Cd	Cr	Cu	Pb	Hg	Ni	Ag	Se	Tl	Zn
BBD 4/1'	13	17	NR	0.64	1300	3400	18500	8400	2.2	62.4	0.92	0.030	ND 0.4	4520
BBD 14/1'	6.4	6.4	NR	0.28	0.52	27	16.6	92	1.6	25	0.3	0.019	ND 0.4	71.2
BBD 16/6-10'	4.0	2.9	NR	0.32	0.2	7.00	4.64	16	0.62	6.26	0.2	ND 0.004	ND 0.4	16.4
BBD 17/1'	6.0	56	NR	0.50	6.56	2300	126	370	1.6 (2.3)	56.6	1.7	0.023	ND 0.4	5040

NOTES:

FOR SAMPLES BBD 6, 11 & 15, METALS ANALYSIS INCLUDES: As,Ba,Cd,Cr,Pb,Hg,Ag and Se.
FOR SAMPLES BBD4, 14, 16 & 17, METALS ANALYSIS INCLUDES: Sb,As,Be,Cd,Cr,Cu,Pb,Hg,Ni,Se,Ag,Tl AND Zn.
(GW)-RESULTS SHOWN FOR SAMPLE BBDC4 ARE CONCENTRATIONS IN GROUND WATER.

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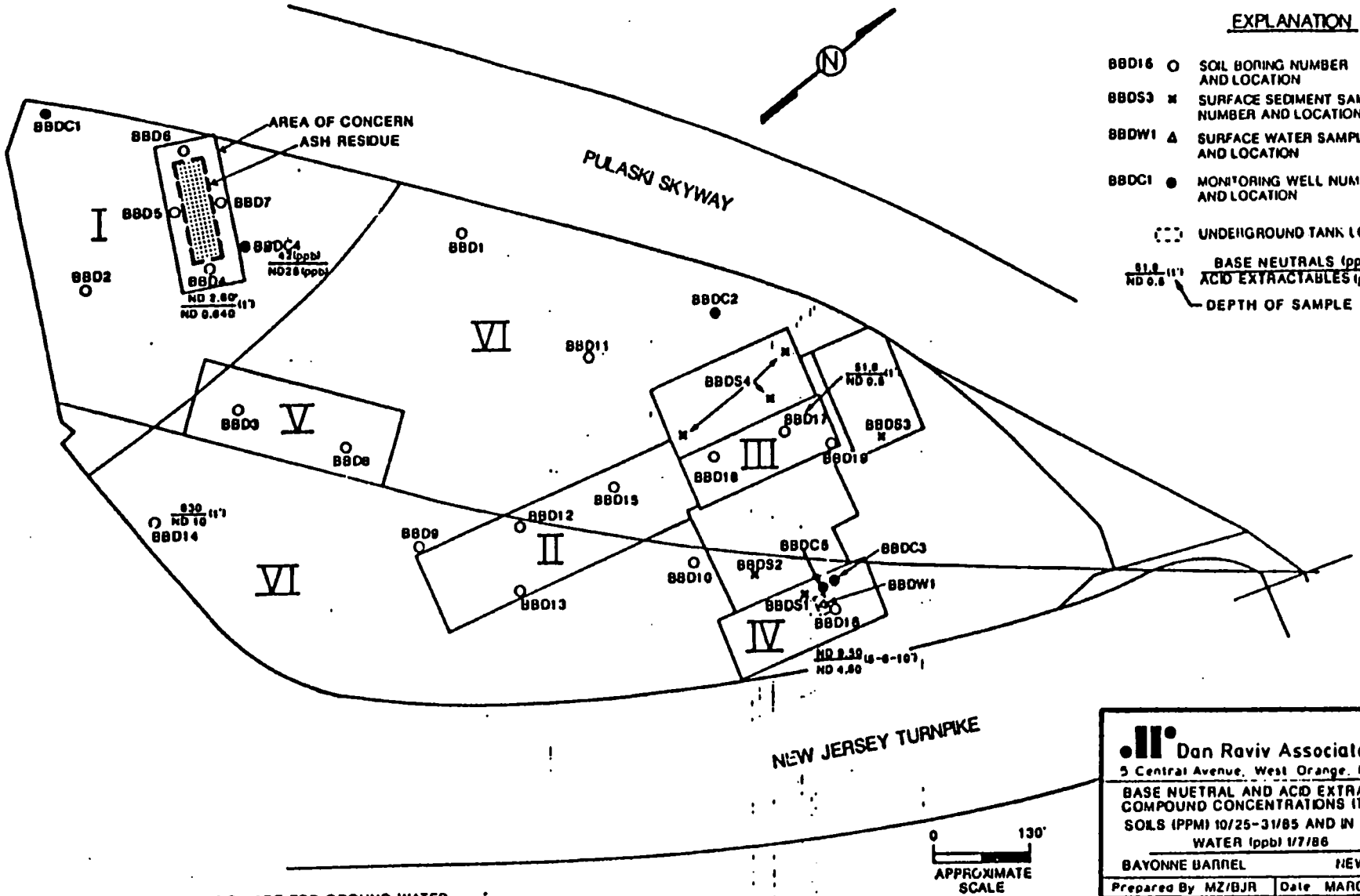
METALS, PHENOL, AND CYANIDE CONCENTRATIONS (ppm) IN SOILS OCTOBER 25 - 31, 1985 AND GROUND WATER JANUARY 7, 1986

BAYONNE BARREL & DRUM CO - NEWARK, NJ

Prepared By MZ/JAL	Date APRIL, 1986
Job No. 84C182	Figure 10



NOTE: CONCENTRATIONS REPORTED FOR BBDC4 ARE FOR GROUND WATER.

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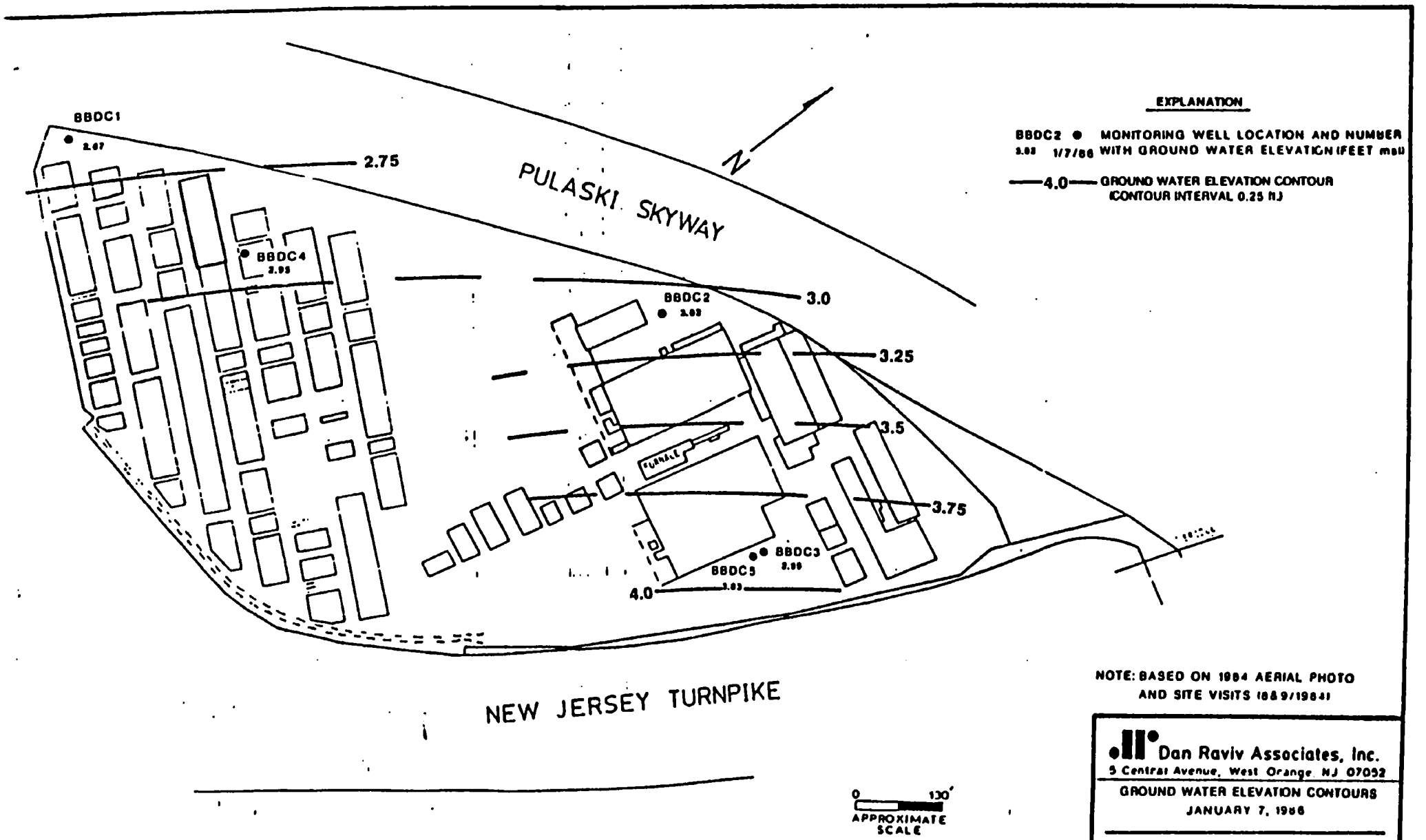
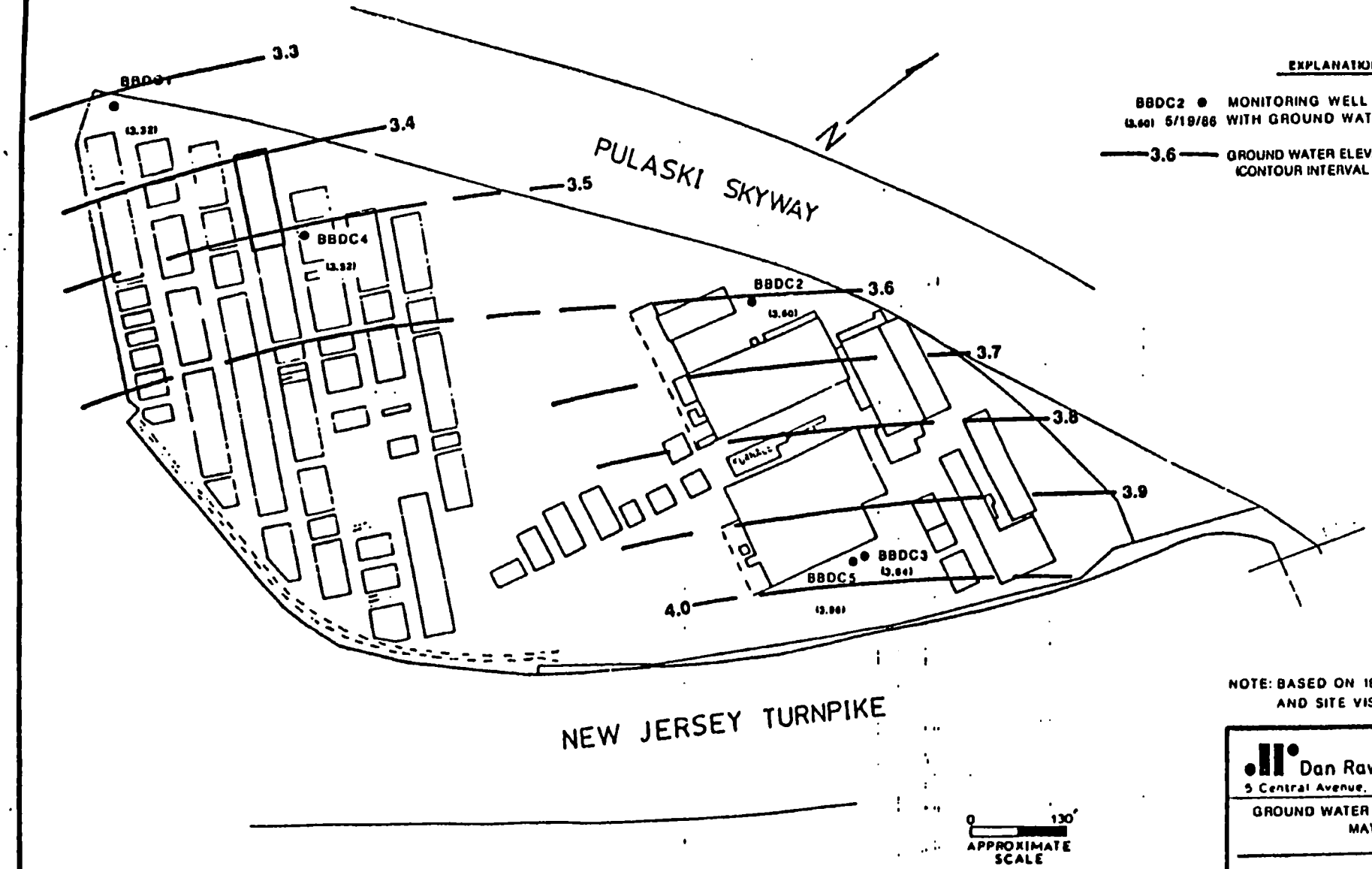
BASE NUETRAL AND ACID EXTRACTABLE COMPOUND CONCENTRATIONS (TOTAL) IN SOILS (PPM) 10/25-31/85 AND IN GROUND WATER (ppb) 1/7/86

BAYONNE BARREL — NEWARK, N.J.

Prepared By MZ/BJR	Date MARCH, 1986
Job No 84C182	Figure 11


EXPLANATION
BBDC2 ● MONITORING WELL LOCATION AND NUMBER
1/7/86 WITH GROUND WATER ELEVATION (FEET msl)
4.0 GROUND WATER ELEVATION CONTOUR
(CONTOUR INTERVAL 0.25 ft.)
BBDC1
2.75
PULASKI SKYWAY
N
BBDC4
BBDC2
3.0
3.25
3.5
3.75
FURNACE
BBDC3
BBDC5
4.0
NEW JERSEY TURNPIKE
NOTE: BASED ON 1984 AERIAL PHOTO
AND SITE VISITS (8&9/1984)
0
130'
APPROXIMATE
SCALE
Dan Raviv Associates, Inc.
5 Central Avenue, West Orange NJ 07052
GROUND WATER ELEVATION CONTOURS
JANUARY 7, 1986
BAYONNE BARREL AND DRUM NEWARK, NJ
Prepared By MZ/BJR
Date MAY, 1986



EXPLANATION

BBDC2 ● MONITORING WELL LOCATION AND NUMBER
(3.60) 5/19/86 WITH GROUND WATER ELEVATION (FEET msl)

—3.6— GROUND WATER ELEVATION CONTOUR (CONTOUR INTERVAL 0.1 ft.)

NOTE: BASED ON 1984 AERIAL PHOTO AND SITE VISITS (8&9/1984)

Dan Raviv Associates, Inc
5 Central Avenue, West Orange NJ 07052

GROUND WATER ELEVATION CONTOURS
MAY 19, 1986

BAYONNE BARREL AND DRUM NEWARK, NJ

Prepared By MZ/BJR	Date MAY, 1986
Job No 84C182	Figure 12D

Tables

Table I.1

Summary of Soil Boring and Surface Samples and Analyses
Field Investigation I
January 18, 1985

Boring/Soil Sample No.	Sample Interval Deep (feet)	Analyses Requested
BBD1	0-2	PCB
BBD2	0-2	PCB
BBD3	0-3	PCB
BBD4	0-3	PCB
BBD5	0-3	PCB
BBD6	0-3	PCB
BBD7	0-3	PCB
BBD8	0-3	PCB
BBD9	0-3	PCB
BBD10	Composite (1)	EP-Toxicity
BBD11	Surface	PCB
BBD12	Surface	PCB
BBD13	Surface	PCB
BBD14	Surface	PCB

(1) Sample BBD10 is a composite of samples BBD 2,5 and 8. Analysis includes metals (As,Ba,Cd,Cr,Pb,Hg,Ag and Se), Herbicides (Endrine, Lindane, Methoxychlor, and Toxaphene) and Pesticides (2,4-D and 2,4,5-TP Silvex).

Table 1.2

Summary of Soil Boring and Surface Samples and Analyses
Field Investigation II
October 25-31, 1985

Boring/Soil Sample No.	Sample Interval Depth (feet)	Analyses Requested
BBD1	0-1	TPHC, VOA
	1-2	[TPHC] (2)
	2-3	[TPHC]
	5-7	[TPHC]
BBD2	0-1	TPHC, VOA
	1-2	[TPHC]
	2-3	[TPHC]
	5-7	TPHC
	9-11	NR
	13-15	NR
BBD3	0-1	PCB, TPHC
	1-2	[PCB,TPHC]
	2-3	[TPHC]
BBD4	0-1	PP, TPHC
	1-2	TPHC
	2-3	[TPHC]
	5-7	[TPHC]
	9-11	[TPHC]
	13-15	NR
BBD5	0-1	TPHC
	1-2	[TPHC]
	2-3	[TPHC]
BBD6	0-1	TPHC
	1-2	[TPHC]
	2-3	[TPHC]
BBD7	0-1	TPHC
	1-2	NR
	2-3	NR
BBD8	0-1	TPHC, VOA, Metals
	1-2	[PCB, TPHC]
	2-3	[TPHC]
	5-7	TPHC
	7-9	NR
	9-11	NR

(1) NR = Analysis Not Requested.
(2) Request for analyses listed in brackets was made on 2/5/86.

Dan Raviv Associates, Inc.
Job No. 84C182

Table 1.2 (cont'd)

Summary of Soil Boring and Surface Samples and Analyses
Field Investigation II
October 25-31, 1985

Boring/Soil Sample No.	Sample Interval Depth (feet)	Analyses Requested
BBD9	0-1	PCB, TPHC
	1-2	[PCB, TPHC] (1)
	2-3	TPHC
	5-7	[TPHC]
	7-9	NR (2)
	9-11	NR
BBD10	0-1	TPHC
	1-2	(PCB,TPHC) (3)
	2-3	[TPHC]
BBD11	0-1	TPHC, Metals
	1-2	TPHC
	2-3	[TPHC]
BBD12	0-1	PCB,TPHC, VOA
	1-2	[TPHC]
	2-3	[TPHC]
BBD13	0-1	PCB, TPHC, VOA
	1-2	[PCB, TPHC]
	2-3	(TPHC)
	4(Field Blank)	VOA
BBD14	0-1	PP, TPHC
BBD15	0-1	PCB, TPHC, Metals
	1-2	NR
	2-3	(TPHC)
	5-7	TPHC, VOA
	9-11	[TPHC]
	12-14	NR
	15(Field Blank)	VOA
BBD16	1-2	VOA, [PCB, TPHC]
	5-8 & 8-10	PP, TPHC

(1) For parameters listed in brackets, request for analyses was made on 2/5/86.
(2) NR = Analysis not requested.
(3) For parameters listed in parenthesis, request for analyses was made 2/5/86; however, the sample was either lost or not analyzed due to insufficient volume.

Table I.2 (cont'd)

Summary of Soil Boring and Surface Samples and Analyses
Field Investigation II
October 25-31, 1985

Boring/Soil Sample No.	Sample Interval Depth (feet)	Analyses Requested
BBD9	0-1	PCB, TPHC
	1-2	[PCB, TPHC] (1)
	2-3	TPHC
	5-7	[TPHC]
	7-9	NR (2)
	9-11	NR
BBD17	0-1	PP,TPHC, Dioxin
	S (1)	PCB, TPHC, VOA
	2-3	(PCB, TPHC) (2)
	5-7	[TPHC] (3)
	9-11	NR
BBD18	0-1	PCB,TPHC
	1-2	(PCB, TPHC)
	2-3	(PCB, TPHC)
BBD19	0-1	PCB,TPHC, VOA
	1-2	[PCB, TPHC]
	2-3	[PCB, TPHC]
BBD20	(Field Blank)	VOA
BBDW1	Surface Water	PCB, TPHC
BBDS1	Surface Sediment	PCB, TPHC
BBDS2	Surface Sediment	PCB, VOA
BBDS3	Surface Sediment	TPHC
BBDS4	Surface Sediment	PCB,TPHC, VOA

(1) BBD17/S is a field duplicate of BBD17/0-1'.
(2) For parameters listed in parentheses, request for analyses was made 2/5/86; however, the sample was either lost or not analyzed due to insufficient volume.
(3) For parameters listed in brackets, request for analysis was made 2/5/86.

Table I.3

Summary of Well Boring Samples and Analyses
Field Investigation III
November 27 - December 17, 1985

Boring/Soil Sample No.	Sample Interval Depth (feet)	Analyses Requested
BBDC1	0-2	PCB, TPHC, VOA
	5-7	VOA, [PCB,TPHC]
	10-12	PCB, TPHC
	15-17	NR
	20-22	NR
BBDC2	5-7	PCB, TPHC, VOA
	10-12	PCB, TPHC
BBDC3	0.5-2.5 & 2.5-4.5	[PCB,TPHC] (2)
	5-7	PCB, TPHC, VOA
	10-12	(PCB, TPHC)
	30-32	NR
	35-37	NR
	40-42	NR
BBDC4	0-2	NR
	5-7	PCB, TPHC, VOA
	10-12A	PCB, TPHC
	10-12B	PCB, TPHC
	15-17	PCB, TPHC, VOA
BBDC5	No Sample	PCB

(1) NR = Analysis Not Requested.
(2) For parameters listed in brackets, request for analyses was made on 2/5/86.
(3) For parameters listed in parentheses, request for analyses was made on 2/5/86; however, the sample was either lost or not analyzed due to insufficient volume.

Table I.4

Summary of Ground Water Analyses
Field Investigation IV
January 7, 1986

Well Sample No.	Analysis Requested
BBDC1	PCB, TPHC, VOA
BBDC2	PCB, TPHC, VOA
BBDC3	PCB, TPHC, VOA
BBDC4	129 Priority Pollutants +40
BBDC5	PCB, TPHC, VOA
BBDC6 (1)	PCB, TPHC, VOA

(1) Sample BBDC6 is a field blank.

Table II
Summary of Sample Results by Area:
Concentrations of PCB's, TPHC's, VOC's, Base/Neutrals,
Acid Extractables, Phenol, Cyanide & Dioxin
Bayonne Barrel & Drum Company

PARAMETER: (units)			PCB's (ppm)	TPHC's (ppm)	VOC 's PRIORITY (Total) (ppb)	VOC's NON PRIORITY (ppb)	B/N (Total) (ppm)	AE (Total) (ppm)	PHENOL (ppm)	CYANIDE (ppm)
Sample Date	Sample No.	Sample Depth (ft)								
FURNACE RESIDUE PILE AREA										
January 18, 1985										
	BBD 1	0-2	15							
	BBD 2	0-2	ND 10							
	BBD 3	0-3	ND 10							
	BBD 4	0-2	ND 10							
	BBD 5	0-2	16							
	BBD 6	0-3	ND 10							
	BBD 7	0-2	ND 10							
	BBD 8	0-3	ND 15							
	BBD 9	0-3	17							
	BBD 10	C								
	BBD 14	surface	65							
October 25-31, 1985										
	BBD 2	0-1		1,390	ND 20	ND 20				
	BBD 2	1-2		810						
	BBD 2	2-3		1,130						
	BBD 2	5-7		610						
	BBD 4	0-1		6,040	9,015	66,035	ND 0.640	ND 2.60	15	2
	BBD 4	1-2		10,500						
	BBD 4	2-3		15,100						
	BBD 4	5-7		1,190 (900)						
	BBD 4	9-11		940						
	BBD 5	0-1		23,600						
	BBD 5	1-2		1,040						
	BBD 5	2-3		9,180						
	BBD 6	0-1		640 (650)						
	BBD 6	1-2		2,440						
	BBD 6	2-3		5,900						
	BBD 7	0-1		4,520						

Notes: ND = Not detected at or above minimum detection limit indicated.
C = Composite of samples BBD 2, BBD 3 & BBD 8.
Laboratory duplicates in parentheses.
If no entry, analysis was not requested.

Table II (cont.)
Summary of Sample Results by Area:
Concentrations for PCB's, TPHC's, VOC's, Base/Neutrals,
Acid Extractables, Phenol, Cyanide & Dioxin
Sayonne Barrel & Drum Company

Sample Date	Sample No.	Sample Depth (ft)	PCB's (ppm)	TPHC's (ppm)	VOC's PRIORITY (Total) (ppb)	VOC's NON PRIORITY (ppb)	B/N (Total) (ppm)	AE (Total) (ppm)	PHENOL (ppm)	CYANIDE (ppm)	DIOXIN (ppb)
FURNACE RESIDUE PILE AREA (cont.)											
November 27 - December 17, 1985											
	BBDC 1	0-2	10.3 (8.7)	830	ND 20	ND 20					
	BBDC 1	5-7	ND 5	8,630	2,710	2,160					
	BBDC 1	10-12	ND 1	410							
	BBDC 4	5-7	3.4	3,100 (3,600)	3,817	5,700					
	BBDC 4	10-12A	ND 1	34							
	BBDC 4	10-12B	ND 1	82							
	BBDC 4	15-17	ND 1	ND 10	56	ND 20					
January 7, 1986											
	BBDC 4	Ground Water	ND 10 (1)		33	80	42 ppb	ND 25 ppb	ND 0.03	ND 0.004	
FURNACE AREA											
January 18, 1985											
	BBD 11	surface	ND 10								
	BBD 12	surface	ND 20								
	BBD 13	surface	ND 10								
October 23-31, 1985											
	BBD 17	0-1	ND 0.5 (1)	9,210	11,561 (9,446)	1,765 (1,680)	51.8	ND 0.5	20	0.5	ND 0.32
	BBD 17	8	28	16,000	22,553						
	BBD 17	5-7		20,800							
	BBD 18	0-1	320	16,300							
	BBD 19	0-1	37.4	4,330	ND 20	ND 20					
	BBD 19	1-2	32 (39)	1,700							
	BBD 19	2-3	ND 1.0	130 (23)							
INCOMING DRUM STORAGE AREA											
October 23-31, 1985											
	BBD 9	0-1	23	10,700							
	BBD 9	1-2	ND 1	410							
	BBD 9	2-3		480							
	BBD 9	5-7		120							
	BBD 12	0-1	6	100	92	191	9.13	ND 0.5			
	BBD 12	1-2		42							
	BBD 12	2-3		120							
	BBD 13	0-1	55	8,260	1,049	3,440	27.01	ND 0.5			
	BBD 13	1-2	ND 5	1,350							
	BBD 15	0-1	8	1,820 (1,820)			31.24	ND 0.5			
	BBD 15	5-7		3,740	147	2,340					
	BBD 15	9-11		5,230							

Notes: (1) PCB results are part of the priority pollutent-base neutral scan for the sample listed.
Sample BBD17/8 is a field duplicate of sample BBD17/0-1.
ND = Not detected at or above minimum detection limit indicated.
Laboratory duplicates in parentheses.
If no entry, analysis was not requested.

Table II (cont.)
Summary of Sample Results by Area:
Concentrations for PCB's, TPHC's, VOC's, Base Neutrals,
Acid Extractables, Phenol, Cyanide & Dioxin
Bayonne Barrel & Drum Company

Sample Date	Sample No.	Sample Depth (ft)	PCB's (ppm)	TPHC's (ppm)	VOC's PRIORITY (Total) (ppb)	VOC's NON PRIORITY (ppb)	B/N (Total) (ppm)	AE (Total) (ppm)	PHENOL (ppm)	CYANIDE (ppm)
OIL STORAGE TANKS AREA										
October 23-31, 1985										
	BBD 16	1-2	- 213 (229)	20800	1817	2640				
	BBD 16	5-8 & 8-10		410	30	166	ND 9.50	ND 4.80	2.8	ND 0.1
	BBDS 1	surface	- 130	23700						
	BBDV 1	surface	ND 1	670						
November 27 - December 17, 1985										
	BBDC 3	0.5-2.5 & 2.5-4.5	- 43 (57)	5920						
	BBDC 3	5-7	- 141	59000	6315	12230				
	BBDC 3	10-12	ND 1	190						
	BBDC 3	15-17	ND 1	28	ND 20	ND 20				
	BBDC 3	20-22	ND 1	58	ND 20	ND 20				
January 7, 1986										
	BBDC 3	Ground Water	ND 1 (ppb)	4.8						
	BBDC 5	Ground Water	- 53 (ppb)	2000						
			- 80 (1)							
DRUM STORAGE AND BACKGROUND AREAS										
October 23-31, 1985										
	BBD 1	0-1		1990	ND 20	ND 20				
	BBD 1	1-2		1480						
	BBD 1	2-3		530						
	BBD 3	0-1	- 42	4410						
	BBD 3	1-2	- 23 (21)	9630 (7290)						
	BBD 3	2-3		7440						
	BBD 8	0-1		3470	ND 20	ND 20				
	BBD 8	1-2	5	31200						
	BBD 8	2-3		173000						
	BBD 10	0-1		580						
	BBD 10	2-3		230						
	BBD 11	0-1		4450						
	BBD 11	1-2		760						
	BBD 11	2-3		450						
	BBD 14	0-1		460	ND 20	ND 20	830	ND 10	ND 0.5	ND 0.1
November 27 - December 17, 1985										
	BBDC 2	5-7	2	670	121 (135)	250 (280)				
	BBDC 2	10-12	ND 1	14	ND 20	36				
BUILDINGS										
October 23-31, 1985										
	BBDS 2	surface	80		ND 20	ND 20				
	BBDS 3	surface		850						
	BBDS 4	surface	11.1	89400	ND	4[illegible]				

Notes: (1) Concentration (ppm) in sediments filtered out of sample.
ND - [illegible] date [illegible] t or [illegible] mini [illegible] test [illegible] nit [illegible] ted.

Summary of Polychlorinated Biphenyls, Total Petroleum Hydrocarbon & Dioxin
Concentrations in Soils January 18, October 25-31, 1985 and November 27 - December 17, 1985
Bayonne Barrel & Drum Company

PARAMETER (units):	PCB's (ppm)	PCB's (ppm)	Total Petroleum Hydrocarbons (ppm)	Dioxin (ppb)
Sample date:	1/18/86	10/25-31/85 11/27 - 12/17/85	10/25-31/86	10/25-31/85
ample Designation/ Sample Depth (ft.)				
BD 11/0-1	- ND 10 (1)		- 4450	
BD 11/1-2			- 760	
BD 11/2-3			- 450	
BD 12/0-1	- ND 20 (1)	- 6	- 100	
BD 12/1-2			42	
BD 12/2-3			- 120	
BD 13/0-1	- ND 10 (1)	- 55	- 8260	
BD 13/1-2		ND 5	- 1350	
BD 14/0-1	- 65 (1)		- 460	
BD 15/0-1		- 8	- 1820 (1820)	
BD 15/5-7			- 3710	
BD 15/9-11			- 5230	
BD 16/1-2		- 213 (229)	- 20800	
BD 16/5-8,8-10			- 410	
BD 17/0-1		ND 0.5	- 9210	ND 0.320
BD 17/8		- 28	- 16000	
BD 17/5-7		--	- 20800	
BD 18/0-1		- 320	- 16300	
BD 19/0-1		- 37.4	- 4330	
BD 19/1-2		- 32(39)	- 1700	
BD 19/2-3		ND 1	- 130 (23)	
BD C1/0-2		- 10.3(8.7)	- 830	
BD C1/5-7		ND 5	- 8630	
BD C1/10-12		ND 1	410	
BD C2/5-7		2	670	
BD C2/10-12		ND 1	14	
BD C3/0.5-2.5, 2.5-4.6		- 43(57)	- 5920	
BD C3/5-7		- 141	- 59000	
BD C3/10-12		ND 1	190	
BD C3/15-17		ND 1	28	
BD C3/20-22		ND 1	58	
BD C4/5-7		3.4	- 3100 (3600)	
BD C4/10-12A		ND 1	34	
BD C4/10-12B		ND 1	82	
BD C4/15-17		ND 1	ND 10	

Notes: (1) Samples BBD 11 - BBD 14, collected January 18, 1986, are surface soil samples.
Results for samples designated "BBD C" are for samples collected on 11/27 - 12/17/85.
ND = Not detected at or above minimum detection limit indicated
[redacted]f n[redacted] y[redacted]lys[redacted]s n[redacted]equ[redacted]d. [redacted]

Table III
Summary of Polychlorinated Biphenyls, Total Petroleum Hydrocarbon & Dioxin
Concentrations in Soils January 18, October 25-31, 1985 and November 27 - December 17, 1985
Bayonne Barrel & Drum Company

PARAMETER (units): Sample date:	PCB's (ppm) 1/18/85	PCB's (ppm) 10/25-31/85	Total Petroleum Hydrocarbons (ppm) 10/25-31/85
mple No./ mple Depth (ft)			
D 1/0-1	15		1990
D 1/1-2			1480
D 1/2-3			530
BD 2/0-1	ND 10		1390
BD 2/1-2			810
BD 2/2-3			1130
BD 2/5-7			610
BD 3/0-1	ND 10	42	4410
BD 3/1-2		23 (21)	9630 (7290)
BD 3/2-3			7440
BD 4/0-1	ND 10		6040
BD 4/1-2			10500
BD 4/2-3			15100
BD 4/5-7			1190 (900)
BD 4/9-11			940
BD 5/0-1	16		23800
BD 5/1-2			1040
BD 5/2-3			9180
BD 6/0-1	ND 10		640 (650)
BD 6/1-2			2440
BD 6/2-3			5900
BD 7/0-1	ND 10		4520
BD 8/0-1	ND 15		3470
BD 8/1-2		5	31200
BD 8/2-3			173000
BD 9/0-1	17	23	10700
BD 9/1-2		ND 1	410
BD 9/2-3			480
BD 9/5-7			120
BD 10/0-1			580
BD 10/2-3			230

No S es [illegible] 1 - [illegible] 9, [illegible] noted [illegible] 19, 1985 are split spoon samples taken from a depth of 0-2 feet.

Table IV
Summary of Volatile Organic Compound
Concentrations in Soils
October 25-31, 1985
Bayonne Barrel & Drum Company

Sample No.	BBD 1	BBD 2	BBD 4	BBD 8	BBD 12	BBD 13	BBD 13	BBD 14
Sample Depth (ft):	0-1	0-1	0-1	0-1	0-1	0-1	4 (field blank)	0-1
PRIORITY POLLUTANTS (ppb)								
Acrolein (ppm)			ND 1					ND 1
Acrylonitrile (ppm)			ND 1					ND 1
Vinyl Chloride	ND 20	ND 20	ND 20	ND 20	ND 20	ND 20	ND 5	ND 20
Chloroethane								
Methylene Chloride								
1,1-Dichloroethylene								
1,1-Dichloroethane								
1,2-Dichloroethylene								
Chloroform								
1,2-Dichloroethane								
1,1,1-Trichloroethane								
1,2-Dichloropropane								
Trichloroethylene			ND 20			ND 20		
Benzene			55			29		
1,1,2-Trichloroethane			ND 20			ND 20		
1,1,2,2-Tetrachloroethylene			ND 20			ND 20		
Toluene			360			210		
Chlorobenzene			ND 20		ND 20	ND 20		
Ethylbenzene			8600		52	810		
1,2 & 1,4-Dichlorobenzene	ND 20	ND 20	ND 20	ND 20	ND 20	ND 20	ND 5	ND 20
Total Priority Pollutants	ND 20	ND 20	9015	ND 20	52	1049	ND 5	ND 20

Notes: ND = Not detected at or above minimum detection limit indicated.
If no entry, analysis was not requested.

Table IV (cont.)
Summary of Volatile Organic Compound
Concentrations in Soils
October 25-31, 1985
Bayonne Barrel & Drum Company

Sample No.	BDD 1	BDD 2	BDD 4	BDD 8	BDD 12	BDD 13	BDD 13	BDD 14
Sample Depth (ft):	0-1	0-1	0-1	0-1	0-1	0-1	4 (field blank)	0-1
ON PRIORITY POLLUTANTS (ppb)								
-Butanol	ND 20	ND 20	50	ND 20	ND 20	ND 20	ND 5	ND 20
sopropylcyclopropane			ND 20		ND 20	ND 20		
ylenes			28000		ND 20	ND 20		
-Xylene			28000		38	1500		
p-Xylene			ND 20		47	1200		
yclopropane					ND 20	ND 20		
etone								
imethyl Sulfide								
sopropanol								
arbon Disulfide								
ethyl Ethyl Ketone								
reon 113								
yclohexane								
exane								
ethyl Isobutyl Ketone								
-Methyl-2-Pentanol								
6H12 Aliphatic Hydrocarbons			ND 20			ND 20		
7H11 Aliphatic Hydrocarbons			190			70		
7H16 Aliphatic Hydrocarbons			35			ND 20		
8H16 Aliphatic Hydrocarbons			30		ND 20	ND 20		
9H10 Aromatic Hydrocarbons			2600		75	150		
9H12 Aromatic Hydrocarbons			430		31	130		
9H12 Aromatic Hydrocarbons			3400		ND 20	330		
9H12 Aromatic Hydrocarbons			ND 20			60		
9H12 Aromatic Hydrocarbons			3300			ND 20		
10H14			ND 20					
10H20			ND 20					
tyrene	ND 20	ND 20	ND 20	ND 20	ND 20	ND 20	ND 5	ND 20
otal Non Priority Pollutants	ND 20	ND 20	66035	ND 20	191	3440	ND 5	ND 20

otes: ND = Not detected at or above minimum detection limit indicated.
If no entry, analysis was not requested.

Table IV (cont.)
Summary of Volatile Organic Compound
Concentrations in Soils
October 28-31, 1985
Bayonne Barrel & Drum Company

Sample No.	BBD 15	BBD 15	BBD 16	BBD 16	BBD 17	BBD 17	BBD 17	BBD 19	BBD 20
Sample Depth (ft):	5-7	15 (Field Blank)	1-2	5-8 8-10	0-1	0-1 (Lab Dup)	S	0-1	Water (Field Blank)
PRIORITY POLLUTANTS (ppb)									
Acrolein (ppm)				ND 1	ND 1				
Acrylonitrile (ppm)				ND 1	ND 1				
Vinyl Chloride	ND 20	ND 5	ND 20	ND 20	89	170	170	ND 20	ND 5
Chloroethane					ND 20	ND 20	33		
Methylene Chloride					130	91	740		
1,1-Dichloroethylene					ND 20	ND 20	28		
1,1-Dichloroethane					250	210	1000		
1,2-Dichloroethylene					150	120	1100		
Chloroform					41	21	100		
1,2-Dichloroethane					36	32	78		
1,1,1-Trichloroethane					510	211	850		
1,2-Dichloropropane					ND 20	ND 20	52		
Trichloroethylene	ND 20		ND 20	ND 20	240	210	830		
Benzene	60		57	30	130	87	220		
1,1,2-Trichloroethane	ND 20		ND 20	ND 20	100	92	220		
1,1,2,2-Tetrachloroethylene			ND 20		94	71	290		
Toluene			930		7500	6400	14000		
Chlorobenzene	ND 20		ND 20		30	22	49		
Ethylbenzene	87		830		2200	1600	2700		
1,2 & 1,4-Dichlorobenzene	ND 20	ND 5	ND 20	ND 20	61	79	93	ND 20	ND 5
Total Priority Pollutants	147	ND 5	1817	30	11561	9446	22553	ND 20	ND 5

Notes: ND = Not detected at or above minimum detection limit indicated.
If no entry, analysis was not requested.

Table IV (cont.)
Summary of Volatile Organic Compound
Concentrations in Soils
October 25-31, 1985
Bayonne Barrel & Drum Company

Sample No.	BBD 15	BBD 15	BBD 16	BBD 16	BBD 17	BBD 17	BBD 17	BBD 19	BBD 20
Sample Depth (ft):	5-7	15 (Field Blank)	1-2	5-8 8-10	0-1	0-1 (Lab Dup)	S	0-1	Water (Field Blank)
8010 PRIORITY POLLUTANTS (ppb)									
1-Butanol	ND 20	ND 5	ND 20	ND 20	ND 20	ND 20	ND 20	ND 20	ND 5
Isopropylcyclopropane			ND 20	ND 20			ND 20		
Xylenes			ND 20	ND 20			ND 20		
m-Xylene			1400	43			3900		
o,p-Xylene			1200	23			3400		
Cyclopropane			ND 20	ND 20	ND 20	ND 20	30		
Acetone					130	130	70		
Dimethyl Sulfide					ND 20	ND 20	30		
Isopropanol					ND 20	ND 20	50		
Carbon Disulfide					30	15	50		
Methyl Ethyl Ketone					170	140	110		
Freon 113					ND 20	ND 20	20		
Cyclohexane					40	20	50		
Hexane					25	15	25		
Methyl Isobutyl Ketone					730	500	550		
4-Methyl-2-Pentanol					160	85	140		
C6H12 Aliphatic Hydrocarbons				ND 20	30	35	100		
C7H14 Aliphatic Hydrocarbons				70	40	80	120		
C7H16 Aliphatic Hydrocarbons				ND 20	ND 20	ND 20	ND 20		
C8H16 Aliphatic Hydrocarbons	ND 20			30	ND 20	ND 20	ND 20		
C9H10 Aromatic Hydrocarbons	300		ND 20	ND 20	ND 20	ND 20	ND 20		
C9H12 Aromatic Hydrocarbons	910		40		40	35	60		
C9H12 Aromatic Hydrocarbons	580		ND 20		60	55	80		
C9H12 Aromatic Hydrocarbons	550				190	200	300		
C9H12 Aromatic Hydrocarbons	ND 20				120	90	150		
C10H14					ND 20	ND 20	ND 20		
C10H20					ND 20	ND 20	ND 20		
Styrene	ND 20	ND 5	ND 20	ND 20	ND 20	280	450	ND 20	ND 5
Total Non Priority Pollutants	2340	ND 5	2640	166	1765	1680	9685	ND 20	ND 5

Notes: ND = Not detected at or above minimum detection limit indicated.
If no entry, analysis was not requested.

Table IV (cont.)
Summary of Volatile Organic Compound
Concentrations in Soils
November 27 - December 17, 1985
Bayonne Barrel & Drum Company

Sample No.	BBD C1	BBD C1	BBD C2	BBD C2	BBD C2	BBD C3	BBD C3	BBD C3	BBD C4	BBD C4
Sample Depth (ft):	0-2	5-7	5-7	5-7 (Lab Dup)	10-12	5-7	15-17	20-22	5-7	15-17
PRIORITY POLLUTANTS (ppb)										
Acrolein (ppm)										
Acrylonitrile (ppm)										
Vinyl Chloride	ND 20	ND 20	ND 20	ND 20	ND 20	ND 20	ND 20	ND 20	ND 20	ND 20
Chloroethane										
Methylene Chloride										
1,1-Dichloroethylene										
1,1-Dichloroethane										
1,2-Dichloroethylene										
Chloroform										
1,2-Dichloroethane										
1,1,1-Trichloroethane										
1,2-Dichloropropane										
Trichloroethylene		ND 20	ND 20	ND 20		ND 20			ND 20	ND 20
Benzene		410	50	51		265			90	26
1,1,2-Trichloroethane		ND 20	ND 20	ND 20		ND 20			ND 20	ND 20
1,1,2,2-Tetrachloroethylene			ND 20	ND 20		ND 20			ND 20	ND 20
Toluene			71	84		1700			2200	20
Chlorobenzene		ND 20	ND 20	ND 20		330			650	ND 20
Ethylbenzene		2300	ND 20	ND 20		3700			790	10
1,2 & 1,4-Dichlorobenzene	ND 20	ND 20	ND 20	ND 20	ND 20	320	ND 20	ND 20	87	ND 20
Total Priority Pollutants	ND 20	2710	121	135	ND 20	6315	ND 20	ND 20	3817	56

Notes: ND = Not detected at or above minimum detection limit indicated.
If no entry, analysis was not requested.

Table IV (cont.)
Summary of Volatile Organic Compound
Concentrations (ppb) in Soils
November 27 - December 17, 1985
Bayonne Barrel & Drum Company

Sample No.	BBD C1	BBD C1	BBD C2	BBD C2	BBD C2	BBD C3	BBD C3	BBD C3	BBD C1	BBD C1
Sample Depth (ft):	0-2	5-7	5-7	5-7 (Lab Dup)	10-12	5-7	15-17	20-22	5-7	15-17
N PRIORITY POLLUTANTS (ppb)										
Butanol	ND 20	ND 20	ND 20	ND 20	ND 20	ND 20	ND 20	ND 20	ND 20	ND 20
opropylcyclopropane		ND 20	ND 20	ND 20		ND 20			70	
lenes		800	130	140		9600			4300	
Xylene		ND 20	ND 20	ND 20		ND 20			ND 20	
p-Xylene										
clopropane										
etone										
methyl Sulfide										
opropanol				ND 20	ND 20				ND 20	
rbon Disulfide				20	36				40	
thyl Ethyl Ketone				ND 20	ND 20				ND 20	
con 113									ND 20	
clohexane									50	
ane			ND 20	ND 20					ND 20	
thyl Isobutyl Ketone			120	120						
-Methyl-2-Pentanol			ND 20	ND 20						
6H12 Aliphatic Hydrocarbons						ND 20			ND 20	
7H14 Aliphatic Hydrocarbons						200			150	
7H16 Aliphatic Hydrocarbons						ND 20			30	
8H16 Aliphatic Hydrocarbons		ND 20				ND 20			ND 20	
9H10 Aromatic Hydrocarbons		1100				330			80	
9H12 Aromatic Hydrocarbons		ND 20				2000			800	
9H12 Aromatic Hydrocarbons		ND 20				ND 20			ND 20	
9H12 Aromatic Hydrocarbons		ND 20				ND 20				
9H12 Aromatic Hydrocarbons		260				ND 20				
10H14		ND 20				100				
10H19						100			ND 20	
10H20						ND 20			180	
Styrene	ND 20	ND 20	ND 20	ND 20	ND 20	ND 20	ND 20	ND 20	ND 20	ND 20
Total Non Priority Pollutants	ND 20	2160	250	280	36	12230	ND 20	ND 20	5700	ND 20

Notes: ND = Not detected at or above minimum detection limit indicated.
If no entry, analysis was not requested.

Table V
Summary of Metals, Phenol, Cyanide & Pesticides Concentrations
in Soils January 18, 1985 and October 25-31, 1985
Bayonne Barrel & Drum Company

Sample No.	BBD10	BBD 4	BBD 8	BBD 11	BBD 14	BBD 15	BBD 16	BBD 17
Sample Depth (ft):	(notes)	0-1	0-1	0-1	0-1	0-1	5-8 8-10	0-1
METALS (ppm)								
Antimony		13			8.4		4.0	6.0
Arsenic	0.002	17	390	51	8.4	55	2.9	56
Barium	ND 1.0		22	10		10		
Beryllium		0.64			0.28		0.32	0.5
Cadmium	0.21	1300	34	4.72	0.52	5.08	0.2	6.56
Chromium	ND 0.02	3400	1900	43.2	27	52.0	7.0	2300
Copper		15500			15.6		4.64	128
Lead	2.6	8400	8400	380	92	6400	15	370
Mercury	0.0004	2.2	13.6	1.3	1.6	4.1	0.62	1.6 (2.3)
Nickel		62.4			25		5.28	56.8
Silver	ND 0.02	0.92	3.1	0.48	0.3	0.84	0.2	1.7
Selenium	0.001	0.03	0.046	0.004	0.019	0.042	ND 0.004	0.023
Thallium		ND 0.4			ND 0.4		ND 0.4	ND 0.4
Zinc		4520			71.2		15.4	5040
Phenol (ppm)		15			ND 0.5		2.8	20
Cyanide (ppm)		2			ND 0.1		ND 0.1	0.5
PESTICIDES (ppb)								
Endrine	ND 1.0							
Lindane	ND 1.0							
Methoxychlor	ND 1.0							
Toxaphene	ND 1.0							
2,4-D	ND 1.0							
2,4,5-TP Silvex	ND 1.0							

Notes: Sample BBD 10, collected January 18, 1985, from furnace residue pile, is a composite sample analyzed for EP Toxicity.
ND = Not detected at or above minimum detection limit indicated.
If no entry, analysis was not requested.

Table VI
Summary of Base/Neutral - Pesticide Extractable
& Acid Extractable Compounds Concentrations in Soils
October 25-31, 1985

Sample No.	BBD 4	BBD 14	BBD 16	BBD 17	BBD 12	BBD 13	BBD 15
Sample Depth (ft):	0-1	0-1	5-8 8-10	0-1	0-1	0-1	0-1
BASE/NEUTRAL - PESTICIDES (ppm)							
Benzyl Butyl Phthalate	ND 2.60		ND 4.80	19.3	ND 0.5	ND 0.5	ND 0.5
Di-n-Butylphthalate				17.0	ND 0.5	ND 0.5	ND 0.5
2-Methyl Naphthalene				15.5	0.68	1.5	ND 0.5
Anthracene				ND 0.5	ND 0.5	0.65	1.0
Benzo(b)fluoranthene					ND 0.5	0.91	1.9
Benzo(a)pyrene					ND 0.5	1.3	2.3
Bis(2-Ethylhexyl)phthalate		410			7.26	6.3	2.8
Chrysene					ND 0.5	2.3	2.9
2,6-Dinitrotoluene						1.9	ND 0.5
Fluoranthene						2.5	5.2
Fluorene					ND 0.5	0.63	ND 0.5
Naphthalene		420			1.2	1.7	ND 0.5
Phenanthrene					ND 0.5	2.8	4.7
Pyrene						4.0	5.8
1,2-Diphenylhydrazene						0.52	ND 0.5
Benzo(a)anthracene						ND 0.5	2.9
Benzo(ghi)perylene						ND 0.5	0.87
Indeno(1,2,3-cd)pyrene				ND 0.5	ND 0.5	ND 0.5	0.87
Total Base/Neutral & Pesticides	ND 2.60	830	ND 4.80	51.8	9.13	27.01	31.24
Total ACID EXTRACTABLES (ppm)	ND 0.640(1)		ND 9.50(1)	ND 0.5	ND 0.5	ND 0.5	ND 0.5

Notes: ND = not detected at or above minimum detection limit indicated.
If no entry, analysis was not requested.

Table VII
Summary of Polychlorinated Diphenyls, Total Petroleum Hydrocarbons
& Volatile Organic Compound Concentrations
in Surface Sediment & Surface Water Samples
October 25-31, 1985
Bayonne Barrel & Drum Company

	Sediments				Water
Sample No.:	BBD S1	BBD S2	BBD S3	BBD S4	BBD W1
PARAMETER	Concentrations (ppm)				
PCB's	130	80		11.1	ND 1
Total Petroleum Hydrocarbons	23700		850	39400	670
PARAMETER	Concentrations (ppb)				
Volatile Organic Compounds					
Priority Pollutants		ND 20			ND 5
Toluene		ND 20		39	
Non Priority Pollutants		ND 20			
Acetone				25	
4-Methyl-2-Pentanol				20	

Notes: ND = Not detected at or above minimum detection limit indicated.
If no entry, analysis was not requested.

Table VIII
Summary of Polychlorinated Biphenyls , Total Petroleum Hydrocarbons, Metals,
Acid Extractables, Base Neutrals, Phenol & Cyanide
Concentrations in Ground Water
January 7,1986
Bayonne Barrel & Drum Company

ample No.:	BBD C1	BBD C2	BBD C3	BBD C4	BBD C5	BBD C6
ARAMETER (units)						
B's (ppb)	ND 1	ND 1	ND 1	ND 10 (1)	53 80 (2)	ND 1
tal Petroleum drocarbons (ppm)	2.8	3.7	4.8		2000	1.8
METAL CONSTITUENTS	Concentrations (ppm)					
timony				ND 0.5		
senic				0.01		
ryllium				ND 0.01		
dmium				ND 0.01		
romium				ND 0.01		
pper				0.04		
ad				ND 0.1		
rcury				ND 0.002		
ckel				ND 0.01		
lenium				ND 0.007		
lver				0.03		
allium				ND 0.1		
nc				0.03		
RAMETER (units)						
se/Neutrals (ppb)						
-N-Butylphthalate				28		
phthalene				14		
id Extractables (ppb)				ND 25		
enol (ppm)				ND 0.03		
anide (ppm)				ND 0.004		

tes: (1) PCB results are part of the priority pollutant - Base Neutral scan for the sample listed.
(2) Concentration (ppm) in sediments filtered out of water sample.
ND = Not detected at or above minimum detection limit indica
If ntry, analysis was not requested.

Table IX
Summary of Volatile Organic Compound Concentrations in Ground Water
January 7, 1986
Bayonne Barrel & Drum Company

ample No.:	BBD C1	BBD C2	BBD C3	BBD C4	BBD C5	BBD C6
ONSTITUENTS	Concentrations (ppb)					
RIORITY POLLUTANTS (ppb)						
hloroform	ND 5	ND 5	25	ND 5	ND 5	ND 5
,1,1-Trichloroethane		5 (ND 5)	ND 5	ND 5		
romodichloromethane		ND 5	5	ND 5		
enzene			ND 5	28	ND 5	
oluene				5	150	
hlorobenzene				ND 5	67	
thylbenzene				ND 5	1060	
,2 & 1,4-Dichlorobenzene	ND 5	ND 5	ND 5	ND 5	76	ND 5
otal Priority Pollutants	ND 5	5	30	33	1353	ND 5
ON PRIORITY POLLUTANTS (ppb)						
hlorofluoromethane	10	ND 5	ND 5	ND 5	ND 5	ND 5
ichlorofluoromethane	70	ND 5		ND 5		
-Isopropylether	15	ND 5		ND 5		
ethylether	ND 5	10 (20)		30		
,1,1-Trimethylpentene		10 (10)		ND 5	ND 5	
lene Isomers		ND 5		15	2000	
clohexane				ND 5	60	
thylcyclopentane					30	
clohepta ne					100	
sopropylbenzene					90	
-Propylbenzene				ND 5	150	
hyl Toluene Isomers				35	550	
imethylbenzene Isomers				ND 5	1400	
DHIO Isomers	ND 5	ND 5	ND 5	ND 5	240	ND 5
otal Non Priority Pollutants	95	20 (30)	ND 5	80	4620	ND 5

otes: ND = Not detected at or above minimum detection limit indicated.
Laboratory duplicates in parentheses.
If no entry, analysis was not requested.

Appendices

Appendix A

Well Construction Diagrams

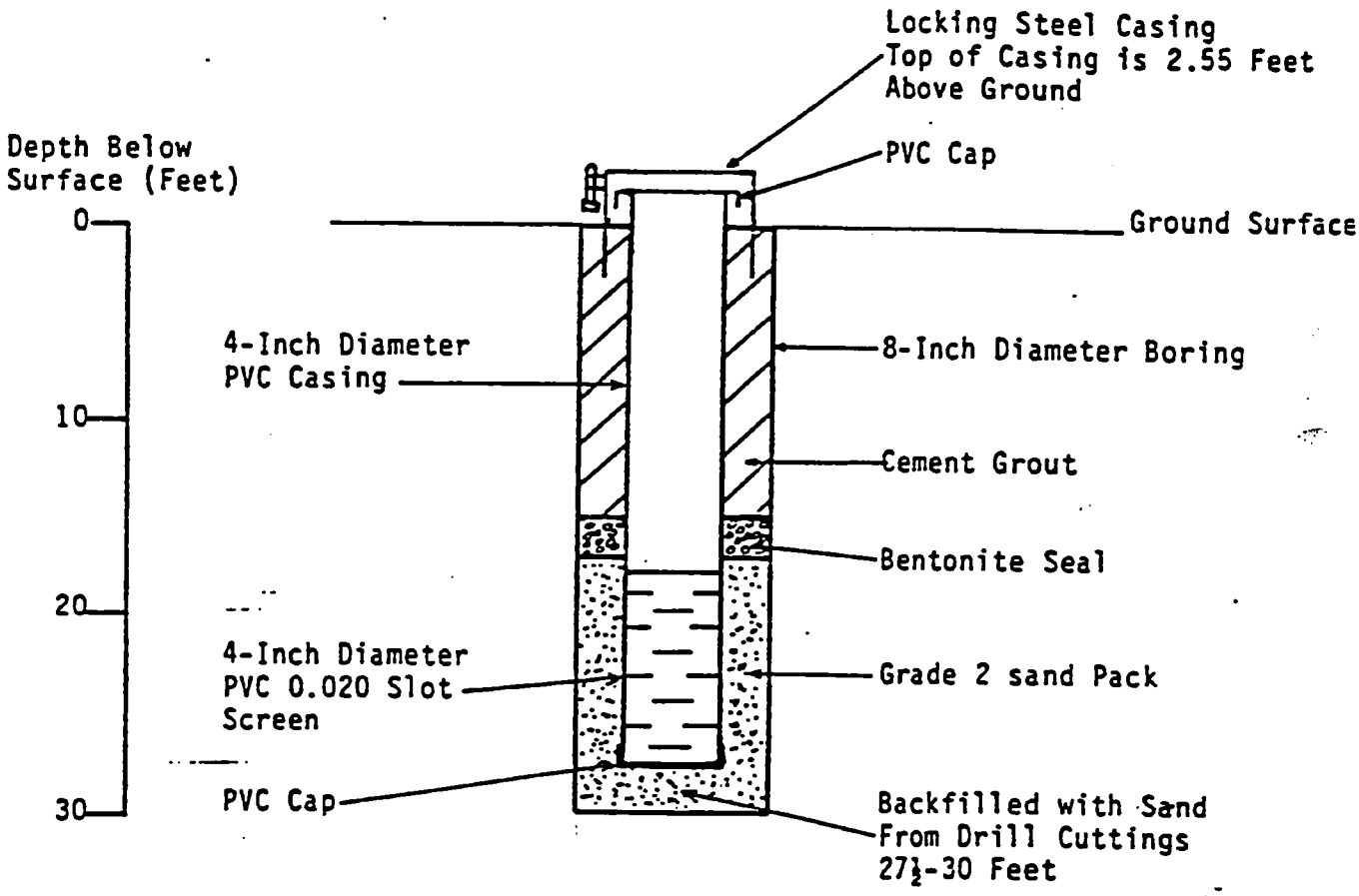
Dan Raviv Associates, Inc.

Job No. 84C182

PROJECT Bayonne Barrel and Drum Company SUBJECT Monitoring Wells

COMPUTATION Construction Details-BBDC1

COMPUTED BY _____ DATE 12/26/85 CHECKED BY _____ DATE _____



Total Depth Drilled 30 Feet
Total Depth Cased 27½ Feet

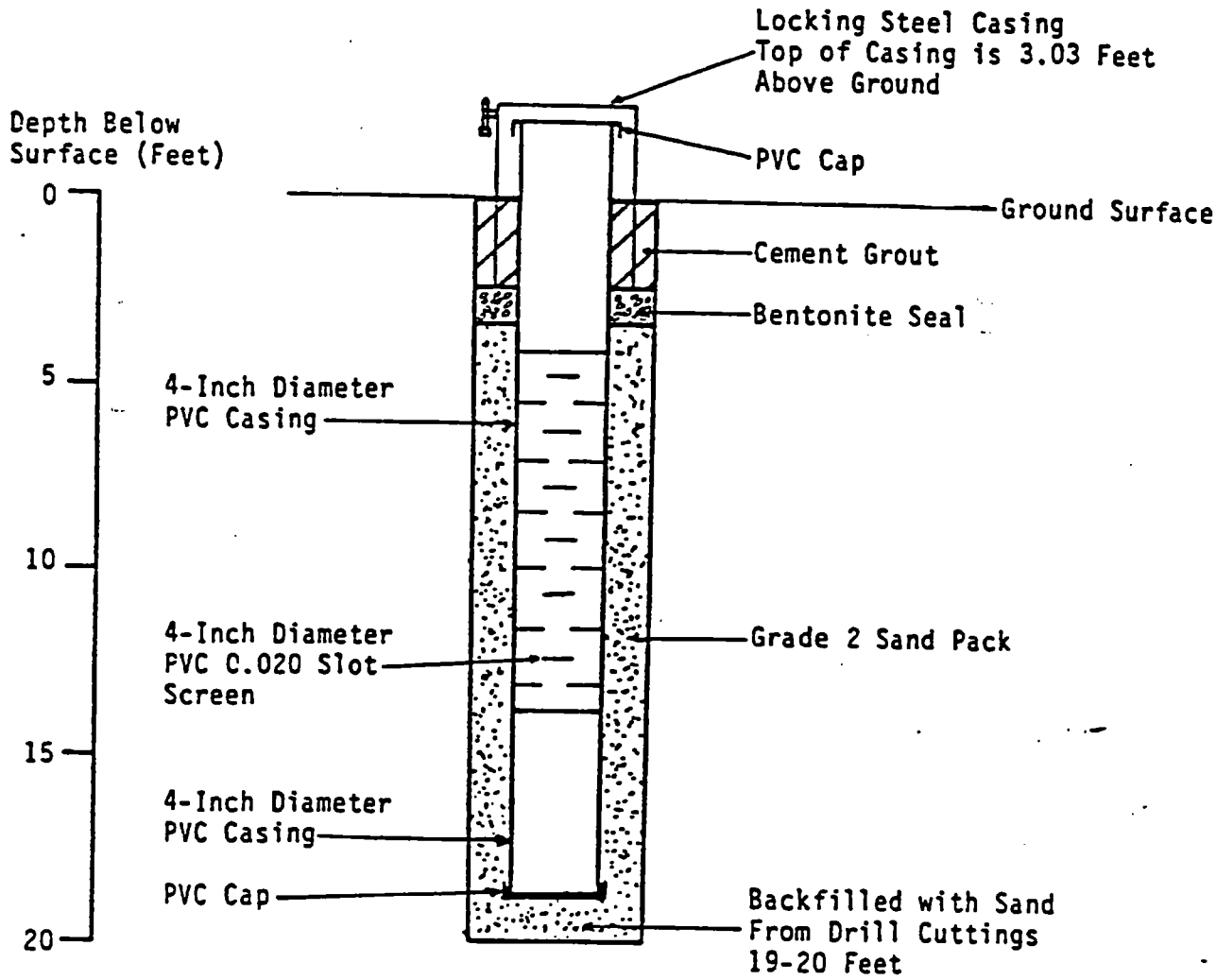
Dan Raviv Associates, Inc.

Job No. 84C182

PROJECT Bayonne Barrel and Drum Company SUBJECT Monitoring Wells

COMPUTATION Construction Details-BBDC2

COMPUTED BY _____ DATE 12/26/85 CHECKED BY _____ DATE _____



Total Depth Drilled 20 Feet
Total Depth Cased 19 Feet

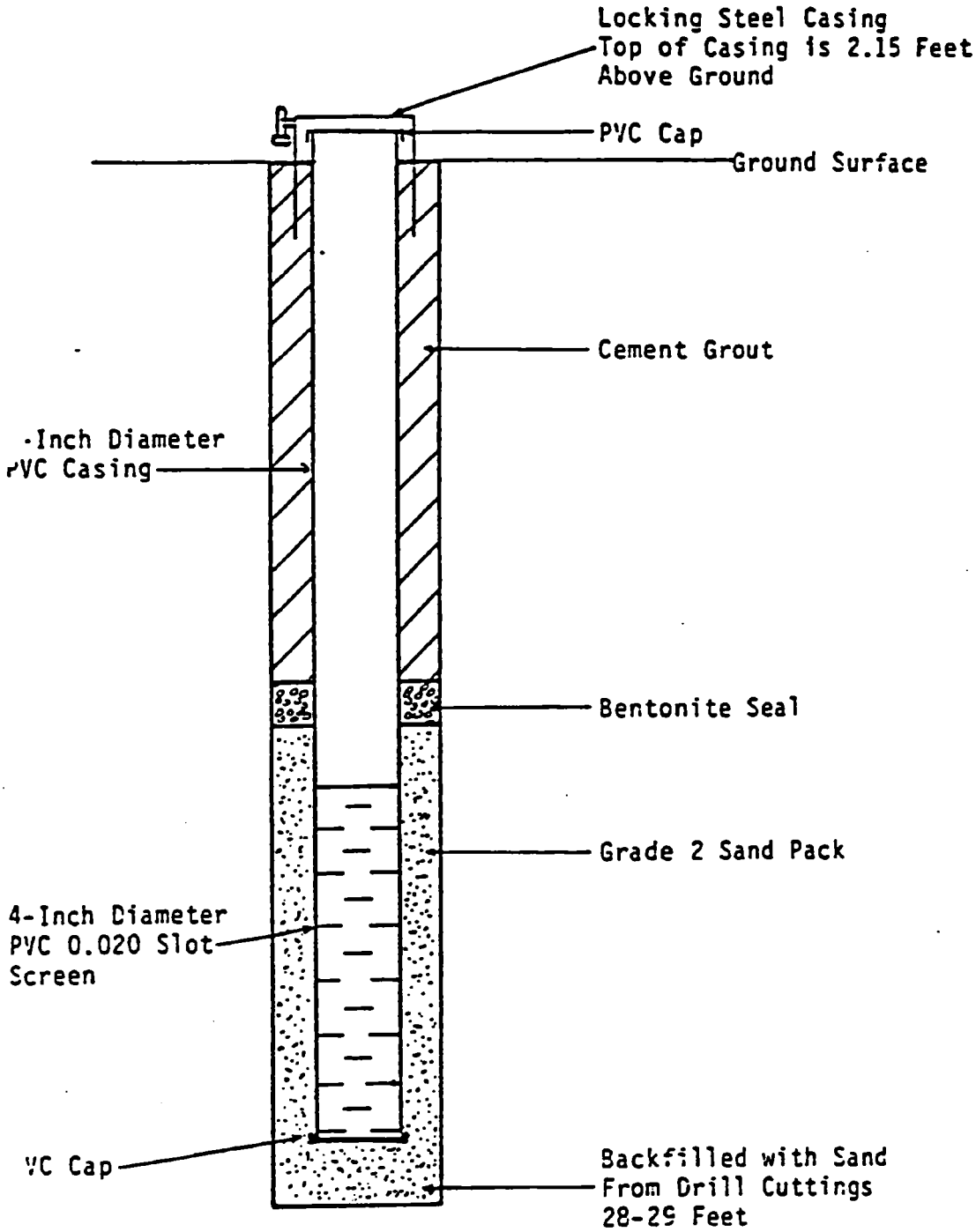
ıviv Associates, Inc.

Job No. 84C182

ne Barrel and Drum Company SUBJECT Monitoring Wells

Construction Details-38DC4

DATE 12/26/85 CHECKED BY _____ DATE _____



Total Depth Drilled 30 Feet
Total Depth Cased 28 Feet

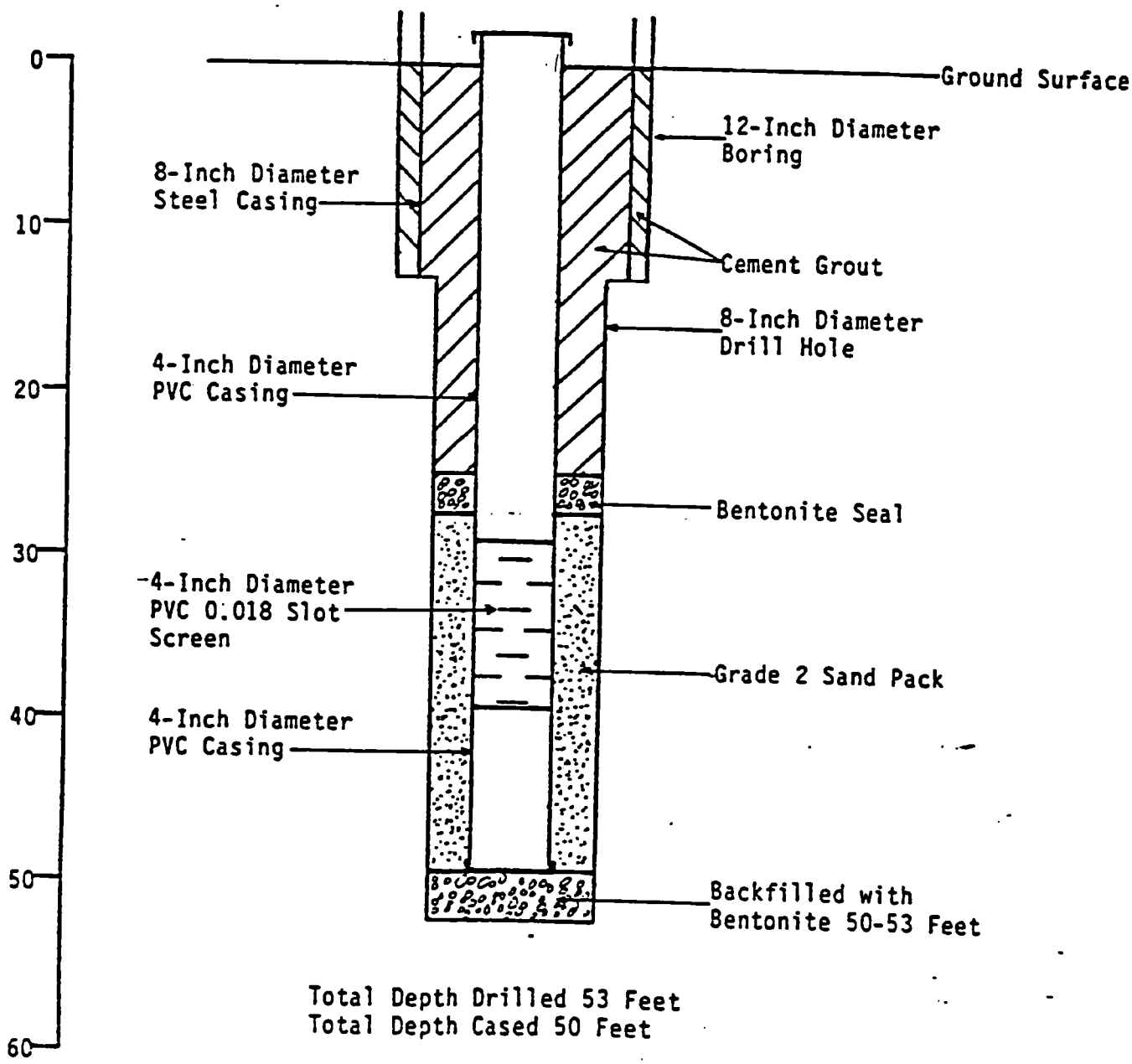
Dan Raviv Associates, Inc.

Job No. 84C182

PROJECT Bayonne Barrel and Drum Company SUBJECT Monitoring Wells

COMPUTATION Well Construction Details-RRDC3

COMPUTED BY _____ DATE 12/26/85 CHECKED BY _____ DATE _____



Total Depth Drilled 53 Feet
Total Depth Cased 50 Feet

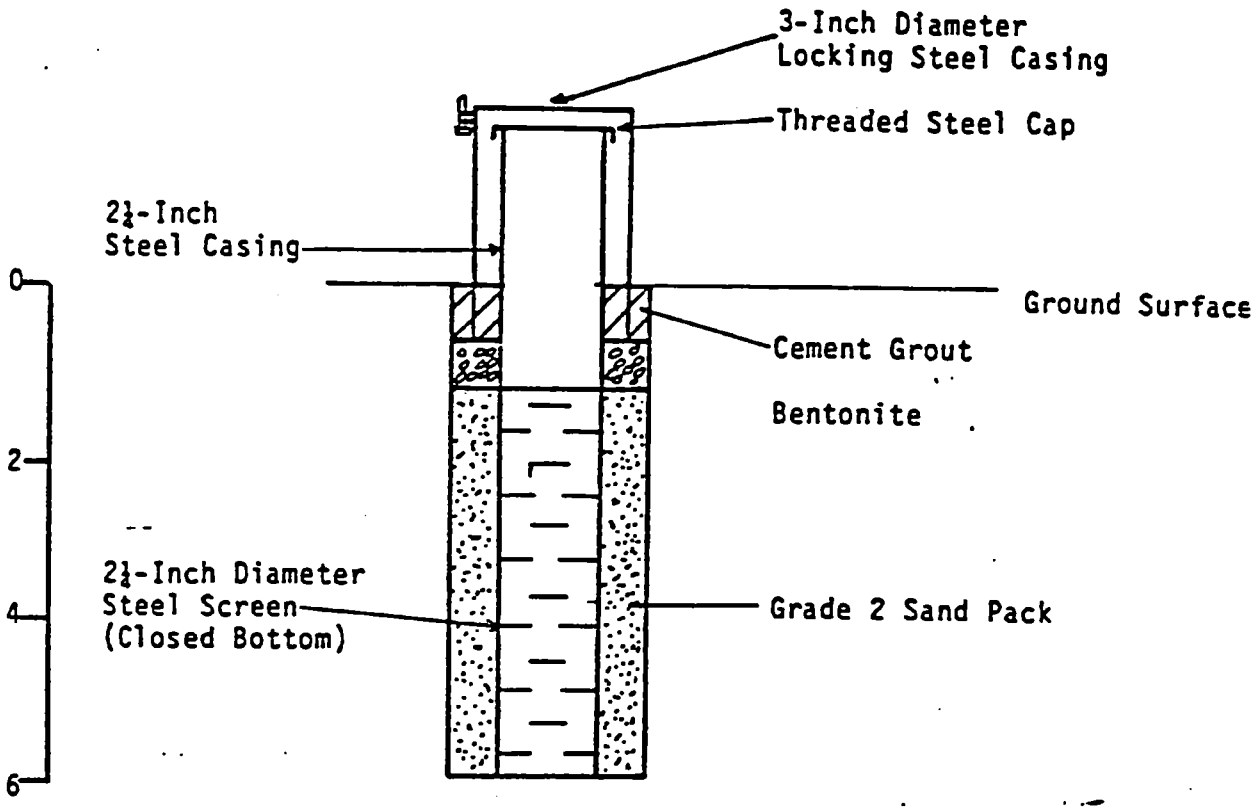
Dan Raviv Associates, Inc.

Job No. 84C182

PROJECT Bayonne Barrel and Drum Company SUBJECT Monitoring Wells

COMPUTATION Well Construction Details-BBDC5

COMPUTED BY _____ DATE 12/26/85 CHECKED BY _____ DATE _____



Total Depth Drilled 6 Feet
Total Depth Cased 6 Feet

Appendix B

Well Logs

Appendix B

Well Logs

Dan Raviv Associates, Inc. West Orange, N.J. DETAILED DRILL LOG	PROJECT NAME Bayonne Bond & Plan	TEST HOLE NUMBER BGDC 2
	PROJECT/JOB NUMBER 84-C-82-	SHEET 2 of 4
DRILLING COMPANY Texas Boring & Drilling Co	SITE	LOCATION Kearny, NJ
NAME of DRILLER George [illegible]	LOGGED BY: [illegible] / CHECKED BY:	ELEVATION
DRILL MANUFACTURER AND MODEL NUMBER	DEPTH TO GROUNDWATER/DATE Ground Surface 6.35' 1/2/86	ORIENTATION Vertical
SIZE AND TYPE OF BIT (S) 10" O.D. Hollow Stem Auger	TOTAL DEPTH OF HOLE 20' / TOTAL CORE RECOVERY	DATE STARTED 12/3/85 / DATE COMPLETED 12/4/85

Depth Elev.	Drilling & Sampling	Recovery (Ft)	Recov. / RQD	Longest (Ft) Shown in	Water Tests		REMARKS (Drill Time, Water Loss, Weathering etc.)	Depth Elev.	Graphic Log	CLASSIFICATION OF MATERIALS (DESCRIPTION)
	SS	C	0%							0-5' Auger cuttings disp[illegible]
5	SS	1/3	15%							
							Water encountered at [illegible]			5-7' Moist, dark brown granulated fill
10	SS	1	50%							
15										10-12' Brick red-brown, fine to medium grain sand with some gravels
20										
							Flushed boring from 20' flush water brought up dark red-brown, fine-medium grain sand			12-20' Brick red-brown, fine to medium grain sand
							14 [illegible]			
							4-14' Screened TD = 20' TD cased = 20'			

(TITLE PAGE)

Analytical Data Report Package

for

New Jersey Department of Environmental Protection

Hazardous Site Mitigation Administration

CN-029

Trenton, N. J. 08625

Case Name	Field Sample #	Laboratory Sample #	Sample Location	Date and Time of Sample Collection
SOLLOB Analytical Service	59411 BBD 17/1'	23217		

Lab Name CALIFORNIA ANALYTICAL LAB, INC.

Certification #

Supervisor/Manager Signature Michael J. Miille

Name Michael J. Miille, Ph.D

QUALITY CONTROL SUMMARY

Case No. 23217

Mean Accuracy, Surrogate Measurements: 98% # of Data Points 2

Accuracy, Fortified/Spike Field Blank: – Sample # –

Rel. Diff. (%), Duplicate Analysis: – Sample # –

Prepared by: [signature]

Approved by: [signature] Date 12/20/85

FORM B-3A

Base Neutral & Pesticide Extractables

Soil Samples

Milligrams/kilogram

Sample Identity:	BBD 13/1	BBD 15/1	BBD 12/1
Acenaphthene	ND 0.5	ND 0.5	ND 0.5
Acenaphthylene	ND 0.5	ND 0.5	ND 0.5
Anthracene	0.65	1.0	ND 0.5
Aldrin	ND 0.5	ND 0.5	ND 0.5
Benzo(a)anthracene	ND 0.5	2.9	ND 0.5
Benzo(b)fluoranthene	ND 0.91	1.9	ND 0.5
Benzo(k)fluoranthene	ND 0.5	ND 0.5	ND 0.5
Benzo(a)pyrene	1.3	2.3	ND 0.5
Benzo(ghi)perylene	ND 0.5	0.87	ND 0.5
Benzyl butyl phthalate	ND 0.5	ND 0.5	ND 0.5
β-BHC	ND 0.5	ND 0.5	ND 0.5
δ-BHC	ND 0.5	ND 0.5	ND 0.5
Bis(2-chloroethyl)ether	ND 0.5	ND 0.5	ND 0.5
Bis(2-chloroethoxy)methane	ND 0.5	ND 0.5	ND 0.5
Bis(2-ethylhexyl)phthalate	6.3	2.8	7.25
Bis(2-chloroisopropyl)ether	ND 0.5	ND 0.5	ND 0.5
4-Bromophenyl phenyl ether	ND 0.5	ND 0.5	ND 0.5
Chlordane	ND 0.5	ND 0.5	ND 0.5
2-Chloronaphthalene	ND 0.5	ND 0.5	ND 0.5
4-Chlorophenyl phenyl ether	ND 0.5	ND 0.5	ND 0.5
Chrysene	2.3	2.9	ND 0.5
4,4'-DDD	ND 0.5	ND 0.5	ND 0.5
4,4'-DDE	ND 0.5	ND 0.5	ND 0.5
4,4'-DDT	ND 0.5	ND 0.5	ND 0.5
Dibenzo(a,h)anthracene	ND 0.5	ND 0.5	ND 0.5
Di-n-butylphthalate	ND 0.5	ND 0.5	ND 0.5
1,3-Dichlorobenzene	ND 0.5	ND 0.5	ND 0.5
1,2-Dichlorobenzene	ND 0.5	ND 0.5	ND 0.5
1,4-Dichlorobenzene	ND 0.5	ND 0.5	ND 0.5
3,3'-Dichlorobenzidine	ND 0.5	ND 0.5	ND 0.5
Dieldrin	ND 0.5	ND 0.5	ND 0.5
Diethyl phthalate	ND 0.5	ND 0.5	ND 0.5
Dimethyl phthalate	ND 0.5	ND 0.5	ND 0.5
2,4-Dinitrotoluene	ND 0.5	ND 0.5	ND 0.5
2,6-Dinitrotoluene	1.9	ND 0.5	ND 0.5
Di-n-octylphthalate	ND 0.5	ND 0.5	ND 0.5
Endosulfan sulfate	ND 0.5	ND 0.5	ND 0.5
Endrin aldehyde	ND 0.5	ND 0.5	ND 0.5

Date Extracted:

Date Analyzed:

ND=None detected, less than

Sample Identity:	BBD 13/1	BBD 15/1	BBD 12/1
	Milligrams/kilogram		
Fluoranthene	2.5	5.2	ND 0.5
Fluorene	0.63	ND 0.5	ND 0.5
Heptachlor	ND 0.5	ND 0.5	ND 0.5
Heptachlor epoxide	ND 0.5	ND 0.5	ND 0.5
Hexachlorobenzene	ND 0.5	ND 0.5	ND 0.5
Hexachlorobutadiene	ND 0.5	ND 0.5	ND 0.5
Hexachloroethane	ND 0.5	ND 0.5	ND 0.5
Indeno(1,2,3-cd)pyrene	ND 0.5	0.87	ND 0.5
Isophorone	ND 0.5	ND 0.5	ND 0.5
Naphthalene	1.7	ND 0.5	1.2
Nitrobenzene	ND 0.5	ND 0.5	ND 0.5
N-Nitrosodi-n-propylamine	ND 0.5	ND 0.5	ND 0.5
PCB-1016	ND 0.5	ND 0.5	ND 0.5
PCB-1221	ND 0.5	ND 0.5	ND 0.5
PCB-1232	ND 0.5	ND 0.5	ND 0.5
PCB-1242	ND 0.5	ND 0.5	ND 0.5
PCB-1248	ND 0.5	ND 0.5	ND 0.5
PCB-1254	ND 0.5	ND 0.5	ND 0.5
PCB-1260	ND 0.5	ND 0.5	ND 0.5
Phenanthrene	2.8	4.7	ND 0.5
Pyrene	4.0	5.8	ND 0.5
Toxaphene	ND 0.5	ND 0.5	ND 0.5
1,2,4-Trichlorobenzene	ND 0.5	ND 0.5	ND 0.5
Benzidine	ND 0.5	ND 0.5	ND 0.5
α-BHC	ND 0.5	ND 0.5	ND 0.5
γ-BHC	ND 0.5	ND 0.5	ND 0.5
Endosulfan I	ND 0.5	ND 0.5	ND 0.5
Endosulfan II	ND 0.5	ND 0.5	ND 0.5
Endrin	ND 0.5	ND 0.5	ND 0.5
Hexachlorocyclopentadiene	ND 0.5	ND 0.5	ND 0.5
N-Nitrosodimethylamine	ND 0.5	ND 0.5	ND 0.5
N-Nitrosodiphenylamine	ND 0.5	ND 0.5	ND 0.5
1,2 Diphenyl Hydrazine	0.52		
2 Methyl Naphthalene	1.5		0.68

ND=None detected, less than

Gollob Analytical Service

MOLININI/GOLLOB A DIVISION OF ENSECO INCORPORATED
47 INDUSTRIAL ROAD, BERKELEY HEIGHTS, NEW JERSEY 07922 • TEL. (201) 464 3331

Don Raviv Associates, Inc.
84C182
APR 17 1986
RECEIVED

TO Dr. D. Raviv
Raviv Associates
5 Central Avenue
West Orange, NJ 07052

G.A.S. REPORT No. 60700 (Formerly 59797)
Date Requested: 11/1/85
Date Reported: 4/15/86
P.O. No. 84C182

MATERIAL SUBMITTED. 30 (Thirty) Samples - Bayonne Barrel & Drum

INFORMATION REQUESTED: Gas Chromatography Analysis

NOTEBOOK REFERENCE: LM 1183 page 13

RESULT OF INVESTIGATION

Subject samples, hand delivered to G.A.S. on 11/1/85, have been analyzed for the remaining constituents requested completing the analytical requirements.

All data are presented in the attached tables.

t 41686

By _____
GOLLOB ANALYTICAL SERVICE

Sample Identity: BBD 4/1'

micrograms/kilograms

ACID COMPOUNDS

21A	2,4,6-Trichlorophenol	ND
22A	p-Chloro-m-cresol	ND
24A	2-Chlorophenol	ND
31A	2,4-Dichlorophenol	ND
34A	2,4-Dimethylphenol	ND
57A	2-Nitrophenol	ND
58A	4-Nitrophenol	ND
59A	2,4-Dinitrophenol	ND
60A	4,6-Dinitro-o-cresol	ND
64A	Pentachlorophenol	ND
65A	Phenol	ND

BASE/NEUTRAL COMPOUNDS

1B	Acenaphthene	ND
5B	Benzidine	ND
8B	1,2,4-Trichlorobenzene	ND
9B	Hexachlorobenzene	ND
12B	Hexachloroethane	ND
18B	Bis(2-chloroethyl)ether	ND
20B	2-Chloronaphthalene	ND
25B	1,2-Dichlorobenzene	ND
26B	1,3-Dichlorobenzene	ND
27B	1,4-Dichlorobenzene	ND
28B	3,3-Dichlorobenzidine	ND
35B	2,4-Dinitrotoluene	ND
36B	2,6-Dinitrotoluene	ND
37B	1,2-Diphenylhydrazine	ND
39B	Fluoranthene ----------	*
40B	4-Chlorophenyl phenyl ether	ND

BASE/NEUTRAL COMPOUNDS

41B	4-Bromophenyl phenyl ether	ND
42B	Bis(2-chloroisopropyl)ether	ND
43B	Bis(2-chloroethoxy)methane	ND
52B	Hexachlorobutadiene	ND
53B	Hexachlorocyclopentadiene	ND
54B	Isophorone	ND
55B	Naphthalene	ND
56B	Nitrobenzene	ND
61B	n-Nitrosodimethylamine	NA
62B	n-Nitrosodiphenylamine[a]	ND
63B	n-Nitrosodi-n-propylamine	ND
66B	Bis(2-ethylhexyl)phthalate	ND
67B	Butyl benzyl phthalate	ND
68B	Di-n-butyl phthalate	ND
69B	Di-n-octyl phthalate	ND
70B	Diethyl phthalate	ND
71B	Dimethyl phthalate	ND
72B	Benzo(a)anthracene ----------	*
73B	Benzo(a)pyrene)† --------	*
74B	Benzo(b)fluoranthene)	
75B	Benzo(k)fluoranthene ----------	*
76B	Chrysene ----------	*
77B	Acenaphthylene	ND
78B	Anthracene	ND
79B	Benzo(ghi)perylene ----------	*
80B	Fluorene	ND
81B	Phenanthrene ----------	*
82B	Dibenzo(a,h)anthracene	ND
83B	Indeno(1,2,3-cd)pyrene --------	*
84B	Pyrene ----------	*

ND = None detected above the average reporting limit of 640 ppb for acids and 2,600 ppb for B/N.

NA = Not analyzed due to method limitations.

[a]Analyzed as diphenylamine.

*Trace concentrations detected below the average reporting limit.

†Coelute.

Reported by: JB
Checked by: [illegible]

December 23, 1985

Gollob Analytical Service
47 Industrial Road
Berkeley Heights, New Jersey 07922

Attention: Lou Molinini

Re: Transfer of Soil Samples and Request for Analysis
Bayonne Barrel and Drum Company
Job No. 84C182

Gentlemen:

Please find attached a copy of the Chain of Custody form for the samples from the subject site. These samples were transferred to your laboratory by John A. Larkins, of Dan Raviv Associates, Inc. on December 3, 1985. The purpose of this letter is to confirm our instructions regarding the type of analysis to be performed. The analyses requested are indicated in the "Remarks" column opposite each of the samples listed on the attached form.

If you have any questions, please call.

Very truly yours,

DAN RAVIV ASSOCIATES, INC.

Michael M. Zucker
Geologist

MMZ/sm
Enc.

Sample Identity: BBD 14/1'

micrograms/kilograms

ACID COMPOUNDS

21A	2,4,6-Trichlorophenol	ND
22A	p-Chloro-m-cresol	ND
24A	2-Chlorophenol	ND
31A	2,4-Dichlorophenol	ND
34A	2,4-Dimethylphenol	ND
57A	2-Nitrophenol	ND
58A	4-Nitrophenol	ND
59A	2,4-Dinitrophenol	ND
60A	4,6-Dinitro-o-cresol	ND
64A	Pentachlorophenol	ND
65A	Phenol	ND

BASE/NEUTRAL COMPOUNDS

1B	Acenaphthene	ND
5B	Benzidine	ND
8B	1,2,4-Trichlorobenzene	ND
9B	Hexachlorobenzene	ND
12B	Hexachloroethane	ND
18B	Bis(2-chloroethyl)ether	ND
20B	2-Chloronaphthalene	ND
25B	1,2-Dichlorobenzene	ND
26B	1,3-Dichlorobenzene	ND
27B	1,4-Dichlorobenzene	ND
28B	3,3-Dichlorobenzidine	ND
35B	2,4-Dinitrotoluene	ND
36B	2,6-Dinitrotoluene	ND
37B	1,2-Diphenylhydrazine	ND
39B	Fluoranthene	ND
40B	4-Chlorophenyl phenyl ether	ND

BASE/NEUTRAL COMPOUNDS

41B	4-Bromophenyl phenyl ether	ND
42B	Bis(2-chloroisopropyl)ether	ND
43B	Bis(2-chloroethoxy)methane	ND
52B	Hexachlorobutadiene	ND
53B	Hexachlorocyclopentadiene	ND
54B	Isophorone	ND
55B	Naphthalene ----------	420,000 ✓
56B	Nitrobenzene	ND
61B	n-Nitrosodimethylamine	NA
62B	n-Nitrosodiphenylamine[a]	ND
63B	n-Nitrosodi-n-propylamine	ND
66B	Bis(2-ethylhexyl)phthalate	410,000 ✓
67B	Butyl benzyl phthalate	ND
68B	Di-n-butyl phthalate	ND
69B	Di-n-octyl phthalate	ND
70B	Diethyl phthalate	ND
71B	Dimethyl phthalate	ND
72B	Benzo(a)anthracene	ND
73B	Benzo(a)pyrene	ND
74B	Benzo(b)fluoranthene	ND
75B	Benzo(k)fluoranthene	ND
76B	Chrysene	ND
77B	Acenaphthylene	ND
78B	Anthracene	ND
79B	Benzo(ghi)perylene	ND
80B	Fluorene	ND
81B	Phenanthrene	ND
82B	Dibenzo(a,h)anthracene	ND
83B	Indeno(1,2,3-cd)pyrene	ND
84B	Pyrene	ND

ND = None detected above the average reporting limit of 10,000 ppb for acids and 200,000 ppb for B/N.

NA = Not analyzed due to method limitations.

[a]Analyzed as diphenylamine.

ppb Reported by: JB
Checked by: AT

Sample Identity: BBD 16/5-8'

micrograms/kilogram

ACID COMPOUNDS

21A	2,4,6-Trichlorophenol	ND
22A	p-Chloro-m-cresol	ND
24A	2-Chlorophenol	ND
31A	2,4-Dichlorophenol	ND
34A	2,4-Dimethylphenol	ND
57A	2-Nitrophenol	ND
58A	4-Nitrophenol	ND
59A	2,4-Dinitrophenol	ND
60A	4,6-Dinitro-o-cresol	ND
64A	Pentachlorophenol	ND
65A	Phenol	ND

BASE/NEUTRAL COMPOUNDS

1B	Acenaphthene	ND
5B	Benzidine	ND
8B	1,2,4-Trichlorobenzene	ND
9B	Hexachlorobenzene	ND
12B	Hexachloroethane	ND
18B	Bis(2-chloroethyl)ether	ND
20B	2-Chloronaphthalene	ND
25B	1,2-Dichlorobenzene	ND
26B	1,3-Dichlorobenzene	ND
27B	1,4-Dichlorobenzene	ND
28B	3,3-Dichlorobenzidine	ND
35B	2,4-Dinitrotoluene	ND
36B	2,6-Dinitrotoluene	ND
37B	1,2-Diphenylhydrazine	ND
39B	Fluoranthene ----------	*
40B	4-Chlorophenyl phenyl ether	ND

BASE/NEUTRAL COMPOUNDS

41B	4-Bromophenyl phenyl ether	ND
42B	Bis(2-chloroisopropyl)ether	ND
43B	Bis(2-chloroethoxy)methane	ND
52B	Hexachlorobutadiene	ND
53B	Hexachlorocyclopentadiene	ND
54B	Isophorone	ND
55B	Naphthalene	ND
56B	Nitrobenzene	ND
61B	n-Nitrosodimethylamine	NA
62B	n-Nitrosodiphenylamine[a]	ND
63B	n-Nitrosodi-n-propylamine	ND
66B	Bis(2-ethylhexyl)phthalate	ND
67B	Butyl benzyl phthalate	ND
68B	Di-n-butyl phthalate	ND
69B	Di-n-octyl phthalate	ND
70B	Diethyl phthalate	ND
71B	Dimethyl phthalate	ND
72B	Benzo(a)anthracene	ND
73B	Benzo(a)pyrene	ND
74B	Benzo(b)fluoranthene	ND
75B	Benzo(k)fluoranthene	ND
76B	Chrysene	ND
77B	Acenaphthylene	ND
78B	Anthracene	ND
79B	Benzo(ghi)perylene	ND
80B	Fluorene	ND
81B	Phenanthrene ----------	*
82B	Dibenzo(a,h)anthracene	ND
83B	Indeno(1,2,3-cd)pyrene	ND
84B	Pyrene ----------	*

ND = None detected above the average reporting limit of 4,800 ppb for acids and 9,500 ppb for B/N.

Reported by: HS
Checked by: FI

NA = Not analyzed due to method limitations.

[a]Analyzed as diphenylamine.

*Trace concentrations detected below the average reporting limit.

d Extractibles

mple Type: Water

Micrograms/liter

Sample Identity:	BBDC 4											
stituents												
4-Chloro-3-Methylphenol	ND-25											
hlorophenol												
2,4-Dichlorophenol												
-Dimethylphenol												
2,4-Dinitrophenol												
ethyl 4,6-Dinitrophenol												
Nitrophenol												
-Nitrophenol												
tachlorophenol												
enol												
-Trichlorophenol												

Date Extracted: 1/13/86

e Analyzed: 1/24/86

ND=None Detected, less than

Base Neutral & Pesticide Extractables

Sample Type: Water (BBD)

Sample Identity:	Micrograms/liter BBDC4
Acenaphthene	ND 10
Acenaphthylene	ND 10
Anthracene	ND 10
Aldrin	ND 10
Benzo(a)anthracene	ND 10
Benzo(b)fluoranthene	ND 10
Benzo(k)fluoranthene	ND 10
Benzo(a)pyrene	ND 10
Benzo(ghi)perylene	ND 40
Benzyl butyl phthalate	ND 10
β-BHC	ND 10
δ-BHC	ND-10
Bis(2-chloroethyl)ether	ND-10
Bis(2-chloroethoxy)methane	ND-10
Bis(2-ethylhexyl)phthalate	ND-10
Bis(2-chloroisopropyl)ether	ND-10
4-Bromophenyl phenyl ether	ND-10
Chlordane	ND-10
2-Chloronaphthalene	ND-10
4-Chlorophenyl phenyl ether	ND-10
Chrysene	ND-10
4,4'-DDD	ND-10
4,4'-DDE	ND-10
4,4'-DDT	ND-10
Dibenzo(a,h)anthracene	ND-40
Di-n-butylphthalate	28
1,3-Dichlorobenzene	ND-10
1,2-Dichlorobenzene	ND-10
1,4-Dichlorobenzene	ND-10
3,3'-Dichlorobenzidine	ND-25
Dieldrin	ND-10
Diethyl phthalate	ND-10
Dimethyl phthalate	ND-10
2,4-Dinitrotoluene	ND-10
2,6-Dinitrotoluene	ND-10
Di-n-octylphthalate	ND-10
Endosulfan sulfate	ND-10
Endrin aldehyde	ND-10

Date Extracted: 1/13/86

Date Analyzed: 1/24/86

Dan Raviv Associates, Inc. West Orange, N.J. DETAILED DRILL LOG	PROJECT NAME: Bayonne Gravel & Dam	TEST HOLE NUMBER: GBPC 2
	PROJECT/JOB NUMBER: 84C182-	SHEET 2 of 4
DRILLING COMPANY: Texas Boring & Drilling Co	SITE	LOCATION: Kearny, NJ
NAME of DRILLER: George [illegible]	LOGGED BY: [illegible] / CHECKED BY:	ELEVATION
DRILL MANUFACTURER AND MODEL NUMBER	DEPTH TO GROUNDWATER/DATE: Ground Surface 6.35' - 1/2/86	ORIENTATION: Vertical
SIZE AND TYPE OF BIT (S): 10" O.D. Hollow Stem Auger	TOTAL DEPTH OF HOLE: 20' / TOTAL CORE RECOVERY	DATE STARTED: 12/3/85 / DATE COMPLETE: 12/4/85

Depth Elev	Drilling & Sampling	Recovery (Ft)	Recovery % RQD	Length (Ft) Shortest	Water Tests		REMARKS (Drill Time, Water Loss, Weathering etc.)	Depth Elev.	Graphic Log	CLASSIFICATION OF MATERIALS (DESCRIPTION)
	SS	C	0%							0-5' Auger cuttings display
5	SS	1/3	15%				Water encountered at 5'			5-7' Moist, dark brown granulated fill
10	SS	1	50%							10-12' Brick red-brown, fine to medium grain sand with some gravels
15										
20							Flushed boring from 20' flush water brought up dark red-brown, fine-medium grain sand			12-20' Brick red-brown, fine to medium grain sand
						Marble →				
							4-14' Screened TD = 20' TD cased = 20'			

Dan Raviv Associates, Inc. West Orange, N.J. DETAILED DRILL LOG	PROJECT NAME: Bayonne Barrel + Drum	TEST HOLE NUMBER: B3DC3
	PROJECT/JOB NUMBER: 84C152	SHEET 3 of —
DRILLING COMPANY: Terry Boring + Drilling	SITE	LOCATION
NAME of DRILLER: George Thornhill	LOGGED BY: MJ / CHECKED BY:	ELEVATION
DRILL MANUFACTURER AND MODEL NUMBER	DEPTH TO GROUNDWATER/DATE	ORIENTATION: Vertical
SIZE AND TYPE OF BIT (S): 8" Rotary	TOTAL DEPTH OF HOLE: 53' / TOTAL CORE RECOVERY	DATE STARTED: 12/12/85 / DATE COMPLETED: 12/17/85

Depth Elev.	Drilling & Sampling	Recovery (Ft)	Blows/RQD	Longest (Ft) Shortest (Ft)	Water Tests		REMARKS (Drill Time, Water Loss, Weathering etc.)	Depth Elev.	Graphic Log	CLASSIFICATION OF MATERIALS (DESCRIPTION)
	SS									0-2.5' Rand stone gravel fill
	SS									2.5-5' Black silvery-gray gritty silt fill
5	SS						Water level @ about 3'3" below surface (in boring) at this level material - probably due to wetness - is very loose and appeared to drop from walls of boring			5-7' Angular sandy type road gravel fill
10	SS									10-12' Maroon red-brown medium grained, well sorted sand
15										
20										
25										
30										
35							This boring was ~~[illegible]~~ Sealed			
40										
45										
50										

SENT 1/10/86

January 7, 1986

Gollob Analytical Service
47 Industrial Road
Berkeley Heights, New Jersey 07922

Attention: Lou Molinini

Re: Request for Analysis of Samples
Bayonne Barrel & Drum
Job No. 84C182

Gentlemen:

Please find attached a copy of the Chain of Custody form for the samples from the subject site. These samples were transferred to your laboratory by Thomas Voss, geologist, of Dan Raviv Associates, Inc. (DRAI) on January 7, 1986. The purpose of this letter is to confirm our instructions regarding the type of analysis to be performed. The analyses requested are indicated in the "Remarks" column opposite each of the samples listed on the attached form.

If you have any questions, please call.

Very truly yours,

DAN RAVIV ASSOCIATES, INC.

Roberta N. Hoy
Geohydrologist

RNH/sl
Enc.

DAN RAVIV ASSOCIATES, INC.
WEST ORANGE, NEW JERSEY 07052
CHAIN OF CUSTODY RECORD

PROJECT NO. 86C182 PROJECT NAME Bayonne Barrel & Drum

LOCATION Bayonne, NJ LABORATORY Gollob

SAMPLE NO.	TYPE (WATER/SOIL)	DATE	TIME	TOTAL # OF CONTAINERS	SAMPLERS SIGNATURE	REMARKS
BBDC 1	water	1/7/86	1255	4	[illegible]	VOA's, TPHC & PCB
BBDC 2	water	1/7/86	1350	4	[illegible]	VOA's, TPHC & PCB
BBDC 3	water	1/7/86	1410	4	[illegible]	VOA's, TPHC & PCB
* BBDC 4	water	1/7/86	1320	8	[illegible]	129 Priority Pollutants
BBDC 5	water	1/7/86	1440	4	[illegible]	VOA's, TPHC & PCB
BBDC 6	water	1/7/86	1250	4	[illegible]	VOA's, TPHC & PCB

Relinquished By:	Date/Time:	Received By:	Comments/Condition:
[illegible]	1/7/86-1628	[illegible] 1633	
[illegible]	1-07-86	[illegible]	
Method of Shipment:	Shipped By:	Received By:	Comments/Condition:

Received for Laboratory: [illegible] Authorization for Disposal:

Laboratory Job No: Type of Disposal:

Date/Time: 1-07-86 1720 Date of Disposal:

* Filter sample in plastic containers for metal analysis prior to adding

DAN RAVIV ASSOCIATES, INC.
WEST ORANGE, NEW JERSEY 07052
CHAIN OF CUSTODY RECORD

PROJECT NO. 84C132 PROJECT NAME Bayonne Bowl + Dunn C

LOCATION Newark, NJ LABORATORY Gollob Analytical Barrington, Hwy

SAMPLE NO.	TYPE (WATER/SOIL)	DATE	TIME	TOTAL # OF CONTAINERS	SAMPLERS SIGNATURE	REMARKS
BBDC1/0-2'	Soil	11/27/85	1346	2	[illegible]	TPHC, VOA, PCB
BBDC1/5-7'	Soil	11/27/85	1402	2	[illegible]	VOA.
BBDC1/10-12'	Soil	11/27/85	1421	1	[illegible]	TPHC, PCB
BBDC 1/15-17'	Soil	11/27/85	1459	2	[illegible]	HOLD
BBDC 1/20-22'	Soil	12/2/85	0814	1	[illegible]	HOLD
BBDC2/5-7'	Soil	12/3/85	1250	2	[illegible]	TPHC, VOA, PCB
BBDC2/10-12'	Soil	12/3/85	1322	2	[illegible]	TPHC, VOA, PCB

Relinquished By:	Date/Time:	Received By:	Comments/Condition:
[illegible]	12/3/85 1700	John A Lankin	Cold + good, on ice
Relinquished By: John A. Lankin	Date/Time: 12/3/85 12:45	Received By: T. [illegible]	Comments/Condition:
Method of Shipment:	Shipped By:	Received By:	Comments/Condition:

Received for Laboratory: _____ Authorization for Disposal: _____

Laboratory Job No: _____ Type of Disposal: _____

Date/Time: _____ Date of Disposal: _____

DAN RAVIV ASSOCIATES, INC.
WEST ORANGE, NEW JERSEY 07052
CHAIN OF CUSTODY RECORD

1/3

PROJECT NO. 84CB2 PROJECT NAME Bayonne Brook

LOCATION Newark, NJ LABORATORY Gulf Analytical

SAMPLE NO.	TYPE (WATER/SOIL)	DATE	TIME	TOTAL # OF CONTAINERS	SAMPLERS SIGNATURE	REMARKS
GBDC3/0.5-2.5 2.5-4.5	soil	12/4/85	1513 1524	1	[illegible]	HOLD
GBDC3/5-7	soil	12/5/85	[illegible]	2	[illegible]	TPHC, PCB, VOA
GBDC3/10-12	soil	12/5/85	0925	2	[illegible]	HOLD
GBDC4/0-2	soil	12/5/85	1524	5	[illegible]	HOLD

Relinquished By:	Date/Time:	Received By:	Comments/Condition:
[illegible]	12/14/85 [illegible]	Roberta Hay	good, on ice
Relinquished By: Roberta Hay	Date/Time: 12/16/85 1130	Received By: A. L. Russo	Comments/Condition: good, on ice
~~Method of Shipment:~~ A. L. Russo	~~Shipped By:~~ Date/Time 12/16/85 1735	Received By: H. D'Allacco	Comments/Condition: good on ice

Received for Laboratory: H. D'Allacco

Authorization for Disposal:

Laboratory Job No:

Type of Disposal:

Date/Time: 12/16/85 1735

Date of Disposal:

DRAI 12/83

2/3

DAN RAVIV ASSOCIATES, INC.
WEST ORANGE, NEW JERSEY 07052
CHAIN OF CUSTODY RECORD

PROJECT NO. 84C182 PROJECT NAME [illegible]

LOCATION Newark, NJ LABORATORY [illegible]

SAMPLE NO.	TYPE (WATER/SOIL)	DATE	TIME	TOTAL # OF CONTAINERS	SAMPLERS SIGNATURE	REMARKS
BBDC4/5-7'	soil	12/9/85	0758	3	[illegible]	TPHC, PCB, VOA
BBDC4/10-12'	soil	12/9/85	0907	2	[illegible]	(1) TPHC, PCB
BBDC4/15-17'	soil	12/9/85	0928	2	[illegible]	TPHC, PCB, VOA

Relinquished By:	Date/Time:	Received By:	Comments/Condition:
[illegible]	12/14/85 [illegible]	[illegible]	good, on ice
Relinquished By: Roberta Hay	Date/Time: 12/16/85 1130	Received By: A.L. Russo	Comments/Condition: good, on ice
~~Method of Shipment:~~ Relinquished by A.L. Russo	~~Shipped By:~~ Date/Time 12/16/85 1735	Received By: H DeAllaero	Comments/Condition: good on ice

Received for Laboratory: H DeAllaero Authorization for Disposal: _____

Laboratory Job No: _____ Type of Disposal: _____

Date/Time: 12/16/85 1735 Date of Disposal: _____

Sample BBDC4/10-12' two 1pt [illegible], Run TPHC and PCB for each jar, do not mix the jars.

DRAI 12/83

DAN RAVIV ASSOCIATES, INC.
WEST ORANGE, NEW JERSEY 07052
CHAIN OF CUSTODY RECORD

3/3

PROJECT NO. 84C182 PROJECT NAME [illegible]

LOCATION [illegible] LABORATORY [illegible]

SAMPLE NO.	TYPE (WATER/SOIL)	DATE	TIME	TOTAL # OF CONTAINERS	SAMPLERS SIGNATURE	REMARKS
BBDC3/15-17'	Soil	12/13/85	0920	2	[illegible]	TPHC, PCB, VOC
BBDC3/20-22'	Soil	12/13/85	1134	2	[illegible]	TPHC, PCB, VOC
BBDC3/25-27'	Soil	12/13/85	1316	2	[illegible]	HOLD
BBDC3/30-32'	Soil	12/13/85	1356	2	[illegible]	HOLD
BBDC3/35-37'	Soil	12/13/85	1421	2	[illegible]	HOLD
BBDC3/40-42'	Soil	12/13/85	1503	2	[illegible]	HOLD

Relinquished By:	Date/Time:	Received By:	Comments/Condition:
[illegible]	12/16/85 [illegible]	[illegible]	good, on ice
Robert Hay	12/16/85 1130	O.L. Russo	good, on ice
~~Method of Shipment:~~ O.L. Russo	~~Shipped By:~~ 12/16/85 1735	Received By: [illegible]	Comments/Condition: good on ice

Received for Laboratory: [illegible] Authorization for Disposal:

Laboratory Job No: Type of Disposal:

Date/Time: 12/16/85 1735 Date of Disposal:

-13

SAMPLE ANALYSIS REQUEST FORM

Job Number: 84C182 Job Location: Newark, New Jersey

Samples Collected by : M Zach Sampling Date: 10/25/85 - 10/31/85

Time Sampling began : : : finished : : :

Collection Method : Boring

Sampling Equipment Used: Split Spoon

Sample Matrix : Soil

Was Chain of Custody Implemented : YES ✓ NO _

Were Samples Delivered to Lab on Ice: YES _ NO _

ANALYSIS REQUESTED

Parameter	Container ID	Detection Limit	Preservative Used	Requested Turnaround Time (days)
TPHC	BBD1/1-2'			
TPHC	BBD1/2-3'			
TPHC	BBD2/2'			
TPHC	BBD2/3'			
TPHC	BBD2/5-7'			
TPHC, PCB	BBD3/2'			
TPHC	BBD3/3'			
TPHC	BBD4/3'			
TPHC	BBD4/5-7'			
TPHC	BBD4/9-11'			
TPHC	BBD5/2'			
TPHC	BBD5/3'			
TPHC	BBD6/2'			
TPHC	BBD6/3'			

COMMENTS: Please note on Report that holding time has been exceeded, analyses being performed for the purpose of delineation only

ANALYSIS REQUESTED BY : HZ

PERSON ACCEPTING SAMPLE: H. A. D'Allasso Date: 2/5/86 Time: 09:19:1

LAB NAME: Gallo Analytical Ser. LAB I.D. : 20003

2/3

E ANALYSIS REQUEST FORM

? Job Location: Newark, New Jersey

by : M. Zoch Sampling Date: 10/25/85 - 10/31/85

an : : : finished : : :

: Boring

Used: Split Spoon

: Soil

dy Implemented : YES X NO _

vered to Lab on Ice: YES _ NO _

NALYSIS REQUESTED

Container ID	Detection Limit	Preservative Used	Requested Turnaround Time(days)
BBD 8/2'			
BBD 8/3'			
BBD 9/2'			
BBD 9/5-7'			
BBD 10/2'			
BBD 10/3'			
BBD 11/3'			
BBD 12/2'			
BBD 12/3'			
BBD 13/2'			
BBD 13/3'			
BBD 13/4'			

BY : MZ

AMPLE: [illegible] Date: 2/5/86 Time: 09:19:12

[illegible] LAB I.D. : 20003

Constituent:	PCB	
Sample Identity	Amount	Arochlor Type
	Concentration, ppm by Weight	
BBD1	15	1254
BBD2	ND 10	
BBD3	ND 10	
BBD4	ND 10	
BBD5	16	1260
BBD6	ND 10	
BBD7	ND 10	
BBD8	ND 15	
BBD9	17	1260
BBD11	ND 10	
BBD12	ND 20	
BBD13	ND 10	
BBD14	65	1260

ND=none detected, less than

Gollob Analytical Service

MOLININI-GOLLOB, INC.

47 INDUSTRIAL ROAD, BERKELEY HEIGHTS, NEW JERSEY 07922 • TEL. (201) 464-3331

TO: Dr. D. Raviv
Dan Raviv Associates
588 Eagle Rock Avenue
West Orange, NJ 07052

G.A.S. REPORT No. 57163B

Date Requested: 1/18/85
Date Reported: 2/13/85
P. O. No. 84C182

Dan Raviv Associates, Inc.
FEB 16 1985
RECEIVED

MATERIAL SUBMITTED: 1 (One) Soil Sample - BBD 10

INFORMATION REQUESTED: Gas Chromatography Analysis

NOTEBOOK REFERENCE: CM 1063 page 1, CM 1023 page 59

RESULT OF INVESTIGATION

Subject sample, hand delivered to G.A.S. on 1/18/85, has been analyzed for the constituents requested.

All data are presented in the attached tables.

t 21485

By Victor H. [illegible]
GOLLOB ANALYTICAL SERVICE

Gas Chromatography Analysis

Constituent: Sample Identity	PCB (mg/kg) (1248)	PCB (mg/kg) (1254)	Date Analyzed
BBDC3/10-12'	ND 1	ND 1	2/7, 2/22
BBDC3/(0.5-2.5) (2.5-4.5')	14	29	2/10,2/22
BBDC3/(0.5-2.5) (2.5-4.5)Dup.	19	38	
BBD 19/3	ND 1	ND 1	2/7
BBDC1/5-7	ND 5*	ND 5*	2/10,2/22
BBD19/2'	8	24	2/7, 2/22
BBD19/2'(Dup.)	10	29	2/7, 2/22
BBD16/1-2'	90	123	2/12
BBD16/1-2'(Dup.)	85	144	2/12
BBD3/2'	23	ND 1	2/7,2/24
BBD3/2' Dup.	21	ND 1	
BBD13/2	ND 5*	ND 5*	2/7
BBD8/2'	ND 1	5	2/10
BBD9/2'	ND 1	ND 1	2/10

All Extracted 2/7/86.

	% Recovery	
BBD8/2' (Spike)	133	107

Date Extracted: 2/13/86
Date Analyzed: 2/14/86

ND=none detected, less than

*Higher threshold due to interferences, no Arochlor chromatographic fingerprint present.

mg/kg=milligrams/kilogram

Concentration, milligrams/kilogram

Sample Identity:	BBD1 1-2'	BBD1 2-3'	BBDC1 5-7'	BBD2 2'	BBD2 3'
Petroleum Hydrocarbons	1480	530	8630	810	1130

Sample Identity:	BBD2 5-7'	BBDC3 0.5-2.5' 2.5-4.5'	BBD3 2'	BBD3 3'	BBDC3 10-12'
Petroleum Hydrocarbons	610	5920	9630 7290 Dup.	7440	190

Sample Identity:	BBD4 3'	BBD4 5-7'	BBD4 9-11'	BBD5 2'	BBD5 3'
Petroleum Hydrocarbons	15,100	1190 900 Dup.	940	1040	9180

All Extracted: 2/12/86

All Analyzed: 2/14/86

Sample Identity:	BBD6 2'	BBD6 3'	BBD8 2'	BBD8 3'	BBD9 2'
Petroleum Hydrocarbons	2440	5900	31,200	173,000	410

Sample Identity:	BBD9 5-7'	BBD10 3'	BBD11 3'	BBD12 2'	BBD12 3'
Petroleum Hydrocarbons	120	230	450	42	120

Sample Identity:	BBD13 2'	BBD15 9-11'	BBD16 1-2'	BBD17 5-7'	BBD19 2'
Petroleum Hydrocarbons	1350	5230	20,800	20,800	1700

Sample Identity:	BBD19 3'
Petroleum Hydrocarbons	130 23 Dup.

All Extracted 2/13/86

All Analyzed 2/14/86

Dan Raviv Associates Inc.

Dan Raviv Associates, Inc. West Orange, N.J. DETAILED DRILL LOG	PROJECT NAME: Bayonne Bowel + Dam	TEST HOLE NUMBER: B3DC3
	PROJECT/JOB NUMBER: 84C152	SHEET 3 of —
DRILLING COMPANY: Terry Bering + Drilling	SITE	LOCATION
NAME of DRILLER: George Thornhill	LOGGED BY: MJ / CHECKED BY:	ELEVATION
DRILL MANUFACTURER AND MODEL NUMBER	DEPTH TO GROUNDWATER/DATE	ORIENTATION: Vertical
SIZE AND TYPE OF BIT (S): 8" Rotary	TOTAL DEPTH OF HOLE: 53' / TOTAL CORE RECOVERY	DATE STARTED: 12/12/85 / DATE COMPLETE: 12/17/85

Depth Elev.	Drilling & Sampling	Recovery (ft)	Water % / RQD	Length (ft) Shelby (ft)	Water Tests		REMARKS (Drill Time, Water Loss, Weathering etc.)	Depth Elev.	Graphic Log	CLASSIFICATION OF MATERIALS (DESCRIPTION)
	SS									0-2.5' Rare stone gravel fill
	SS									2.5-5' Black silvery-gray gritty silt fill
5	SS						Water level @ about 3'3" below surface (in boring) at this level material - probably due to wetness - is very loose and appears to cave from walls of boring			5-7' Angular sandy type Bad gravel fill
10	SS									10-12' Maroon red-brown medium grained, well sorted sand
15										
20										
25										
30										
35							This boring was ~~closed~~ Sealed			
40										
45										
50										

Dan Raviv Associates, Inc. West Orange, N.J. DETAILED DRILL LOG	PROJECT NAME Bayonne Barrel	TEST HOLE NUMBER BBDC5
	PROJECT/JOB NUMBER 846132	SHEET 1 of 1
DRILLING COMPANY Jersey Boring and Drilling	SITE	LOCATION
NAME of DRILLER George Thornhill	LOGGED BY: M Zucker CHECKED BY:	ELEVATION
DRILL MANUFACTURER AND MODEL NUMBER	DEPTH TO GROUNDWATER/DATE 5.70 ft 1/7/86	ORIENTATION Vertical
SIZE AND TYPE OF BIT (S)	TOTAL DEPTH OF HOLE 7' TOTAL CORE RECOVERY	DATE STARTED 12/17/85 DATE COMPLETED 12/17/85

Depth (ft)	Drilling & Sampling	Recovery (ft)	Blows/6"	Lowest (ft) Shown	Water Level		Remarks (Drill Rate, Water Loss, Weathering etc.)	Depth (ft)	Graphic Log	Classification of Materials (Description)
										0-3" Road gravel and black silt
2										0-7' Black silty fill moist to wet,
4							strong odor			
6							Drilled to Seven ft 0-1 ft 2¼ casing 1-6 ft 2¼" ϕ steel screen			
8										

Appendix C

Chain of Custody Forms

January 18, 1985

Gollob Analytical Service
47 Industrial Road
Berkeley Heights, New Jersey 07922

Attention: Lou Molinini

Re: Transfer of Soil Samples and Request for Analysis
Bayonne Barrel and Drum Company
Job No. 84C182

Gentlemen:

Please find attached a copy of the Chain of Custody form for the samples from the subject site. These samples were transferred to your laboratory by David Morrow, Geologist, of Dan Raviv Associates, Inc. on January 18, 1985. The purpose of this letter is to confirm our instructions regarding the type of analysis to be performed. The analyses requested are indicated in the "Remarks" column opposite each of the samples listed on the attached form.

We request 13 analyses to determine the presence and concentrations of PCB's (samples #1 through #9 and #11 through #14) and 1 analysis to determine EP-Toxicity characteristics (Sample #10). Sample #10 is a composite of samples #2, #5 and #8. Please analyze and report as soon as possible.

If you have any questions, please call.

Very truly yours,

DAN RAVIV ASSOCIATES, INC.

Dan D. Raviv, Ph.D.
President

DDR/sm
Enc.
cc: William K. Sawyer, Esq.
Waste and Toxic Substances Branch
USEPA - Region II

Friday 1/2

DAN RAVIV ASSOCIATES, INC.
WEST ORANGE, NEW JERSEY 07052
CHAIN OF CUSTODY RECORD

PROJECT NO. 84C182 PROJECT NAME Bayonne Barrel & Drum

LOCATION Bayonne, NJ LABORATORY

SAMPLE NO.	TYPE (WATER/SOIL)	DATE	TIME	TOTAL # OF CONTAINERS	SAMPLERS SIGNATURE	REMARKS
BBD1/0-1	Soil	10/25/85	0934	2 PT	M. Zuch	VOA,(1) TPHC(2)
BBD1/1-2	Soil	10/25/85	0940	2 PT	M. Zuch	(4)
BBD1/2-3'	Soil	10/25/85	0950	2 PT	M. Zuch	
BBD2/1'	Soil	10/25/85	1057	1 pt	M. Zuch	VOA, TPHC
BBD2/2'	Soil	10/25/85	1102	1 pt	M. Zuch	
BBD2/3'	Soil	10/25/85	1104	1 pt	M. Zuch	
BBD3/1'	Soil	10/25/85	1200	1 pt	M. Zuch	TPHC, PCB(3)
BBD3/2'	Soil	10/25/85	1213	1 pt	M. Zuch	
BBD3/3'	Soil	10/25/85	1224	1 pt	M. Zuch	
BBD4/1'	Soil	10/25/85	1402	1 pt	M. Zuch	
BBD4/2'	Soil	10/25/85	1404	1 pt	M. Zuch	TPHC
BBD4/3'	Soil	10/25/85	1407	1 pt	M. Zuch	

Relinquished By:	Date/Time:	Received By:	Comments/Condition:
M Zuch	11/26/85 1814	J. Dallaeco	good/cool
Relinquished By:	Date/Time:	Received By:	Comments/Condition:-
Method of Shipment:	Shipped By:	Received By:	Comments/Condition:

Received for Laboratory: J. Dallaeco Authorization for Disposal:

Laboratory Job No: Type of Disposal:

Date/Time: Date of Disposal:

(1) VOA = Volatile Organic Compound's Analysis.

(2) TPHC = Total Petroleum Hydrocarbons Analysis.

(3)

(4) Please HOLD all Samples not currently listed for Analysis.

Friday
2/2

DAN RAVIV ASSOCIATES, INC.
WEST ORANGE, NEW JERSEY 07052
CHAIN OF CUSTODY RECORD

PROJECT NO. 84C182 PROJECT NAME Bayonne Barrel & Drum

LOCATION Bayonne, NJ LABORATORY

SAMPLE NO.	TYPE (WATER/SOIL)	DATE	TIME	TOTAL # OF CONTAINERS	SAMPLERS SIGNATURE	REMARKS
BBD 5/1'	Soil	10/25/85	1422	1 Qt	M. Zuck	TPHC
BBD 5/2'	Soil	10/25/85	1444	1 Qt	M Zuck	
BBD 5/3'	Soil	10/25/85	1449	1 Qt	M. Zuck	
BBD 6/1'	Soil	10/25/85	1505	1 Qt	M Zuck	TPHC
BBD 6/2'	Soil	10/25/85	1507	1 Qt.	M Zuck	
BBD 6/3'	Soil	10/25/85	1511	1 Qt	M Zuck	

Relinquished By:	Date/Time:	Received By:	Comments/Condition:
M Zuck	10/28/85 1814	H Dallacco	Good/iced
Relinquished By:	Date/Time:	Received By:	Comments/Condition:
Method of Shipment:	Shipped By:	Received By:	Comments/Condition:

Received for Laboratory: H. Dallacco Authorization for Disposal:

Laboratory Job No: Type of Disposal:

Date/Time: Date of Disposal:

latile Organic Analysis (GC-MS)

l data are presented in the attached table listing the priority pollutant nstituents detected in excess of 20 ppb by weight. The non-priority pollutant constituents detected in excess of 20 ppb are listed in the following tabl

Sample Identity: Constituents Detected	BBDC 3/5-7'	BBDC 4/5-7'
	Concentration, ppb by Weight	
Carbon Disulfide	- - -	40
Cyclohexane	- - -	50
Isopropyl Cyclopropane	- - -	70
$C_7 H_{14}$ Hydrocarbons	200	150
Xylene Isomers	9600	4300
$C_9 H_{12}$ Hydrocarbons	2000	800
$C_9 H_{10}$ Hydrocarbons	330	80
$C_7 H_{10}$ Hydrocarbons	- - -	30
$C_{10}H_{20}$ Hydrocarbons	- - -	180
$C_{10}H_{19}$ Hydrocarbons	100	- - -

Samples Extracted 12/30/85
Samples Analyzed 12/31/85

Samples: are:
BBDC3/15-17' ND 20
C3/20-22' ND 20
C4/15-17' ND 20

for Non Priority Constituents
as per phone Conversation w/
Lou Melinini, 4/1/86 MJ

Dr. Dan Raviv
Dan Raviv Associates

G.A.S.# 39[illegible]

Concentration, ppb by Weight

Volatile Organic Analysis by EPA Method 624

Sample Identification:	BBD	BBD	BBD	BBD	BBD								
Pollutants	C1 5-7'	C1 15-17'	C1 20-22'	C4 5-7'	C4 15-17'								
Chloromethane		ND-30	ND-20										
Bromomethane													
Vinyl Chloride													
Chloroethane													
Methylene Chloride													
Trichlorofluoromethane													
1,1,-Dichloroethylene													
1,1-Dichloroethane													
1,2-Dichloroethylene													
Chloroform													
1,2-Dichloroethane													
1,1,1-Trichloroethane													
Carbon Tetrachloride													
Bromodichloromethane													
1,2-Dichloropropane													
trans-1,3-Dichloropropene													
Trichloroethylene													
Benzene	265			90	26								
Dibromochloromethane													
cis-1,3-Dichloropropene													
1,1,2-Trichloroethane													
2-Chloroethylvinyl Ether													
Bromoform													
1,1,2,2-Tetrachloroethene													
1,1,2,2-Tetrachloroethane													
Toluene	1700			2200	20								
Chlorobenzene	330			650									
Ethylbenzene	3700			790	10								
1,3-Dichlorobenzene													
1,2 & 1,4-Dichlorobenzene	320			87									

Samples Prepared 12/30/85
Samples Analyzed 12/31/85
Limit of Detection 20 ppb

Detection threshold 20 ppb by Weight

Gollob Analytical Service

MOLININI-GOLLOB, INC.

47 INDUSTRIAL ROAD, BERKELEY HEIGHTS, NEW JERSEY 07922 • TEL. (201) 464 3331

Dan Raviv Associates, Inc.

MAR 24 1986

RECEIVED

TO Dr. Dan Raviv
Dan Raviv Associates
5 Central Avenue
West Orange, NJ 07052

G.A.S. REPORT No. 59883

Date Requested: 1/7/86
Date Reported: 2/28/86
P.O. No. 84C182

MATERIAL SUBMITTED: 6 (Six) Water Samples (BBD)

INFORMATION REQUESTED: Gas Chromatography Analysis

NOTEBOOK REFERENCE: GC/MS 1148, Page 17 and LP 1154, Page 14

RESULT OF INVESTIGATION

Subject samples, hand delivered to G.A.S. on 1/7/86, have been analyzed for the constituents requested and reported in the following tables.

By _____
GOLLOB ANALYTICAL SERVICE

PCB Analysis by Gas Chromatography

Sample Identity (Water Samples)	PCB Concentration, micrograms/liter
BBDC1	ND 1
BBDC2	ND 1
BBDC3	ND 1
BBDC5	53*
BBDC6	ND 1

Sediment Separated From Sample Identity	Milligrams/Kilogram
BBDC5	80*

*Characteristic of Arochlor 1254

ND=None detected, less than

Volatile Organics (EPA Method 624)

All data are presented in the attached table listing the volatile priority pollutants and non-priority constituents detected.

Dan Kaviv Associates

Concentration, ppb by Weight

Volatile Organic Analysis by EPA Method 624

Sample Identification: Pollutants	C1	C2	C2 Dupl.	C3	C4 (BED)	C5	C6	C6 Dupl.					
Chloromethane	ND-5		ND-5				ND-5	ND-5					
Bromomethane													
Vinyl Chloride													
Chloroethane													
Methylene Chloride													
Trichlorofluoromethane													
1,1,-Dichloroethylene													
1,1-Dichloroethane													
1,2-Dichloroethylene													
Chloroform				25									
1,2-Dichloroethane													
1,1,1-Trichloroethane		5											
Carbon Tetrachloride													
Bromodichloromethane				5									
1,2-Dichloropropane													
trans-1,3-Dichloropropene													
Trichloroethylene													
Benzene					28								
Dibromochloromethane													
cis-1,3-Dichloropropene													
1,1,2-Trichloroethane													
2-Chloroethylvinyl Ether													
Bromoform													
1,1,2,2-Tetrachloroethene													
1,1,2,2-Tetrachloroethane													
Toluene						5	150						
Chlorobenzene							67						
Ethylbenzene							1060						
1,3-Dichlorobenzene													
1,2 & 1,4-Dichlorobenzene							76						
Non-Priority Pollutants (Method 624)													
Chlorofluoromethane		10						ND					
Dichlorofluoromethane		70											
Di-isopropylether		15											
Diethylether			10	20		30							
2,4,4-Trimethylpentene			10	10									
Xylene Isomers						15	2000						
Cyclohexane							60						
Methylcyclopentane							30						
Cycloheptane							100						
Isopropylbenzene							90						
n-propylbenzene							150						
Ethyl Toluene Isomers						35	550						
Trimethylbenzene Isomers							1400						
C_9 Compound							240						

Detection threshold - ppb by Weight

'etals - Atomic Absorption Analysis

Sample Identity:	BBDC-4	Date Extracted	Date Analyzed
Constituents	Milligrams/liter		
Antimony	ND 0.5	1/9/86	1/24/86
Arsenic	0.01	1/22/86	1/22/86
Beryllium	ND 0.01	1/9/86	1/14/86
Cadmium	ND 0.01	1/9/86	1/10/86
Chromium	ND 0.01	1/9/86	1/10/86
Copper	0.04	1/9/86	1/10/86
Lead	ND 0.1	1/9/86	1/10/86
Mercury	ND 0.002	1/9/86	1/15/86
Nickel	ND 0.01	1/9/86	1/10/86
Selenium	ND 0.007	1/15/86	1/10/86
Silver	0.03	1/9/86	1/10/86
Thallium	ND 0.1	1/9/86	1/24/86
Zinc	0.03	1/9/86	1/10/86
Cyanide	ND 0.004	1/14/86	1/15/86
Phenol	ND 0.03	1/24/86	1/27/86

ND=None detected, less than

Sample filtered through a 0.45 micron filter prior to analysis.

Petroleum Hydrocarbons

Sample Identity:	BBDC1	BBDC2	BBDC3	BBDC5	BBDC6
		Milligrams/liter			
Petroleum Hydrocarbons	2.8	3.7	4.8	2000	1.8

Date Extracted: 1/9/86

Date Analyzed: 1/10/86

Micrograms/liter

	BBDC4
Fluoranthene	ND-10
Fluorene	ND-10
Heptachlor	ND-10
Heptachlor epoxide	ND-10
Hexachlorobenzene	ND-10
Hexachlorobutadiene	ND-10
Hexachloroethane	ND-10
Indeno(1,2,3-cd)pyrene	ND-40
Isophorone	ND-10
Naphthalene	14
Nitrobenzene	ND-10
N-Nitrosodi-n-propylamine	ND-10
PCB-1016	ND-10
PCB-1221	ND-10
PCB-1232	ND-10
PCB-1242	ND-10
PCB-1248	ND-10
PCB-1254	ND-10
PCB-1260	ND-10
Phenanthrene	ND-10
Pyrene	ND-10
Toxaphene	ND-10
1,2,4-Trichlorobenzene	ND-10
Benzidine	ND-50
α-BHC	ND-10
γ-BHC	ND-10
Endosulfan I	ND-10
Endosulfan II	ND-10
Endrin	ND-10
Hexachlorocyclopentadiene	ND-50
N-Nitrosodimethylamine	ND-10
N-Nitrosodiphenylamine	ND-10

ND=None detected, less than

Gollob Analytical Service

MOLININI-GOLLOB, INC.
47 INDUSTRIAL ROAD, BERKELEY HEIGHTS, NEW JERSEY 07922 • TEL. (201) 464

Dan Raviv Associates, Inc

MAR 6 1986

RECEIVED

TO: Dr. D. Raviv
Raviv Associates
5 Central Avenue
West Orange, NJ 07052

G.A.S. REPORT No. 60122

Date Requested: 2/5/86
Date Reported: 3/5/86
P.O. No. 84C182

MATERIAL SUBMITTED. 31 (Thirty One) Soil Samples - BBD

INFORMATION REQUESTED: Gas Chromatography, Petroleum Hydrocarbon Analyses

NOTEBOOK REFERENCE:

RESULT OF INVESTIGATION

Samples previously submitted under the following G.A.S. numbers: 59359, 59360, 59652, 59411, 59397, 59764 have been analyzed for the constituents requested. The following samples were not available for re-analysis: BBD10/2', BBD17/2-3', BBD18/2', BBD18/3'.

Holding times on all samples have been exceeded. However, the analyses are being performed for the purpose of delineation only.

Results are presented in the attached tables.

t 3586

By _____
GOLLOB ANALYTICAL SERVICE

Gollob Analytical Service

MOLININI-GOLLOB, INC.

47 INDUSTRIAL ROAD, BERKELEY HEIGHTS, NEW JERSEY 07922 • TEL. (201) 464-3331

Dan Raviv Associates, Inc.
84C182
RECEIVED

TO: Dr. Dan Raviv
Dan Raviv Associates
5 Central Avenue
West Orange, N.J. 07052

G.A.S. REPORT No. 60535 Formerly(59397

Date Requested: 11/1/85
Date Reported: 12/23/85
P.O. No. 84C182

MATERIAL SUBMITTED: 30 (Thirty) Samples BBD1 (3 Analyzed)

INFORMATION REQUESTED: Gas Chromatography/Mass Spectrometry Analysis

NOTEBOOK REFERENCE: LM 1183, Page 1

RESULT OF INVESTIGATION

This completes the analysis of subject samples for the presence of Base Neutral and Acid Extractible constituents.

All data are presented in the attached tables.

n 32786

By _____
GOLLOB ANALYTICAL SERVICE

Acid Extractable Constituents

Sample Identity:	Milligrams/kilogram BBD 13/1	BBD 15/1	BBD 12/1
4-Chloro-3-methylphenol	ND 0.5	ND 0.5	ND 0.5
2-Chlorophenol	ND 0.5	ND 0.5	ND 0.5
2,4-Dichlorophenol	ND 0.5	ND 0.5	ND 0.5
2,4-Dimethylphenol	ND 0.5	ND 0.5	ND 0.5
2,4-Dinitrophenol	ND 0.5	ND 0.5	ND 0.5
2-Methyl-4,6-dinitrophenol	ND 0.5	ND 0.5	ND 0.5
2-Nitrophenol	ND 0.5	ND 0.5	ND 0.5
4-Nitrophenol	ND 0.5	ND 0.5	ND 0.5
Pentachlorophenol	ND 0.5	ND 0.5	ND 0.5
Phenol	ND 0.5	ND 0.5	ND 0.5
2,4,6-Trichlorophenol	ND 0.5	ND 0.5	ND 0.5
Date Extracted:	11/13/86	11/13/86	11/13/86
Date Analyzed:	12/5/86	12/6/86	12/6/86

ND=None detected, less than

Petroleum Hydrocarbons (Infrared Analysis - EPA 418.1)

Sample Identity	Petroleum Hydrocarbons milligrams/kilograms	Extracted	Analyzed
BBD 17/S	16000	11/12/85	11/14/85
BBD 17/1'	9210	11/12/85	11/14/85
BBD 18/1'	16300	11/12/85	11/14/85
BBD 19/1'	4330	11/12/85	11/14/85
BBD S1	23700	11/12/85	11/14/85
BBD W1	670	11/13/85	11/14/85
BBD S3	850	11/13/85	11/14/85
BBD S4	39400	11/13/85	11/14/85

Note: Dioxin & B/N Extractibles will be reported at a later date.

Metals-Atomic Absorption Analysis

Sample Identity: Constituents	BBD 17/1' milligrams/kilograms
Antimony	6.0
Arsenic	56
Beryllium	0.50
Cadmium	6.56
Chromium	2300
Copper	128
Lead	370
Mercury	1.6, 2.3*
Nickel	56.8
Selenium	0.023
Silver	1.7
Thallium	ND 0.4
Zinc	5040

ND=none detected, less than *Duplicate Analysis

Date Extracted: 11/11/85 Date Analyzed: 11/14/85

Chemical Analysis

Sample Identity:	BBD 17/1'
Constituents	milligrams/kilogram
Cyanide	0.5
Phenol	20

Date Extracted: 11/13/85
Date Analyzed: 11/14/85

Polychlorinated Biphenyls-(Electron Capture Detector & Hall Electrolytic Conductivity Detection)

Constituent:	Arochlor 1248	Arochlor 1254
Sample Identity	Concentration, ppm by Weight	
BBD 17/S	14	14
BBD 18/1'	125	195
BBD 19/1'	3.4	34
BBD S1	33	97
BBD S2	45	35
BBD S4	3.1	8.0
	Concentration, ppb by Weight	
BBD W1	ND 1	ND 1

Date Extracted: 11/7/85
Date Analyzed: 11/15/85

ND=none detected, less than

Gollob Analytical Service

MOLININI-GOLLOB, INC.

47 INDUSTRIAL ROAD, BERKELEY HEIGHTS, NEW JERSEY 07922 • TEL. (201) 464 3331

Dan Raviv Associates, I.
84C182
JAN 1 , 86
RECEIVED

TO: Dr. Dan Raviv
Dan Raviv Associates
5 Central Avenue
West Orange, NJ 07052

G.A.S. REPORT No. 59764

Date Requested: 12/17/85
Date Reported: 1/14/86
P.O. No. 84C182

MATERIAL SUBMITTED: 14 (Fourteen) Soil Samples (BBD)

INFORMATION REQUESTED: Gas Chromatography & Infrared Analyses

NOTEBOOK REFERENCE: GC/MS 1157, Pg. 3; SW 1116, Pg. 50

RESULT OF INVESTIGATION

Subject samples, hand delivered to G.A.S. on 12/17/85, have been analyzed for the constituents requested and listed in the tables attached.

n 11586

By _____
GOLLOB ANALYTICAL SERVICE

Petroleum Hydrocarbon Analysis (Infrared)

Sample Identity	Petroleum Hydrocarbons Milligrams/kilogram
BBDC3/5-7'	59,000
BBDC4/5-7'	3,100, 3,600
BBDC4/10-12'A	34
BBDC4/10-12'B	82
BBDC4/15-17'	ND 10
BBDC3/15-17'	28
BBDC3/20-22'	58

Samples Extracted 1/2/86
Samples Analyzed 1/3/86

Polychlorinated Byphenyls Analysis (ECGC)

Sample Identity	Arochlor 1248	Arochlor 1254
	Concentration, Milligrams/Kilogram	
BBDC3/20-22'	ND 1	ND 1
BBDC4/15-17'	ND 1	ND 1
BBDC4/10-12'A	ND 1*	ND 1
BBDC4/10-12'B	ND 1	ND 1
BBDC3/15-17'	ND 1*	ND 1
BBDC4/5-7'	1.4	2.0
BBDC3/5-7'	67	74

*Trace detected below the threshold reported.
Samples Extracted 12/10/85
Samples Analyzed 12/19/& 12/23/85

ND=none detected, less than

Dr. Dan Raviv
Dan Raviv Associates

Concentration, ppb by Weight

Volatile Organic Analysis by EPA Method 624 (Duplicates) Soil Samples

Sample Identification: Pollutants	BBDC1 0-2'	BBDC1 5-7'	BBDC2 2-7'	BBDC2 5-7'	BBDC2 10-12'		
Chloromethane	ND 20				ND 20		
Bromomethane							
Vinyl Chloride							
Chloroethane							
Methylene Chloride							
Trichlorofluoromethane							
1,1,-Dichloroethylene							
1,1-Dichloroethane							
1,2-Dichloroethylene							
Chloroform							
1,2-Dichloroethane							
1,1,1-Trichloroethane							
Carbon Tetrachloride							
Bromodichloromethane							
1,2-Dichloropropane							
trans-1,3-Dichloropropene							
Trichloroethylene							
Benzene		410	50	51			
Dibromochloromethane							
cis-1,3-Dichloropropene							
1,1,2-Trichloroethane							
2-Chloroethylvinyl Ether							
Bromoform							
1,1,2,2-Tetrachloroethene							
1,1,2,2-Tetrachloroethane							
Toluene			71	84			
Chlorobenzene							
Ethylbenzene		2300					
1,3-Dichlorobenzene							
1,2 & 1,4-Dichlorobenzene							
Non Priority Pollutants							
Carbon Disulfide (Estimated)	ND			20	36		
Methyl Isobutyl Ketone (Est.)			120	120			
Xylenes (Actual)		800	130	140			
C_9H_{10} Isometric (Estimated)		1100					
C_9H_{12} Isometric (Estimated)		260					

ND=None detected, less than

Detection threshold 20 ppb by Weight

Gollob Analytical Service

47 INDUSTRIAL ROAD
BERKELEY HEIGHTS, NEW JERSEY 07922
TEL. (201) 464-3331

MOLININI-GOLLOB, INC.

March 19, 1986

Dan Ravin Associates
84C182
MAR 2 . 1986
RECEIVED

Dear Mike:

As per our recent phone conversation, please destroy the 1st page of G.A.S. 59883 and replace with the enclosed copies.

Thank you.

Lou Molinini

t

Gollob Analytical Service
MOLININI-GOLLOB, INC.
47 INDUSTRIAL ROAD, BERKELEY HEIGHTS, NEW JERSEY 07922 • TEL. (201) 464-3331

Dan Raviv Associates, Inc.
DEC 23 1985

TO. Dr. Dan Raviv
Dan Raviv Associates
5 Central Avenue
West Orange, N.J. 07052

G.A.S. REPORT No. 59652

Date Requested: 12/4/85
Date Reported: 12/13/85
P.O. No. 84C182

MATERIAL SUBMITTED: 7 (Seven) Soil Samples (Bayonne Barrel)

INFORMATION REQUESTED: Gas Chromatography Analysis

NOTEBOOK REFERENCE: GC/MS 1148, Page 1 and CM 1084, Page 144

RESULT OF INVESTIGATION

Subject samples, hand delivered to G.A.S. on 12/4/85, have been analyzed for the constituents requested, and are listed in the attached table.

n 122085

By Victor H. [illegible]
GOLLOB ANALYTICAL SERVICE

Petroleum Hydrocarbon Analysis by Infrared Spectroscopy

Sample Identity	Quantity Milligrams/kilograms
BBDC1/0-2'	830
BBDC1/10-12'	410
BBDC2/5-7'	670
BBDC2/10-12'	14

Samples Extracted 12/9/85
Samples Analyzed 12/9/85

Polychlorinated Biphenyls - ECD & HECD

Sample Identity	Concentration, ppm by Weight*
BBDC1/0-2'	10.3
BBDC1/0-2' Duplicate	8.7
BBDC1/10-12'**	ND 1
BBDC2/5-7'	2.0
BBDC2/10-12'**	ND 1

Samples Extracted 12/5/85
Samples Analyzed 12/11/85

*Based on Arochlor 1260
**Determined by Electron Capture Detection, all others by Hall Electrolytic Conductivity Detection.

ND=None detected, less than

Volatile Organics - EPA Method 624

All data are presented in the attached table.

Davis Associates

Volatile Organic Analysis by EPA Method 624 — Soil — Water

Sample Identification: Pollutants BBD-	17/S	17/1'	17/1' Dup.	19/1'	S2	S4	20	W1					
Chloromethane				ND 20	ND 20		ND 5	ND 5					
Bromomethane													
Vinyl Chloride	170	89	170										
Chloroethane	33												
Methylene Chloride	740	130	91										
Trichlorofluoromethane													
1,1,-Dichloroethylene	28												
1,1-Dichloroethane	1000	250	240										
1,2-Dichloroethylene	1100	150	120										
Chloroform	100	41	21										
1,2-Dichloroethane	78	36	32										
1,1,1-Trichloroethane	850	510	211										
Carbon Tetrachloride													
Bromodichloromethane													
1,2-Dichloropropane	52												
trans-1,3-Dichloropropene													
Trichloroethylene	830	240	210										
Benzene	220	130	87										
Dibromochloromethane													
cis-1,3-Dichloropropene													
1,1,2-Trichloroethane	220	100	92										
2-Chloroethylvinyl Ether													
Bromoform													
1,1,2,2-Tetrachloroethene	290	94	71										
1,1,2,2-Tetrachloroethane													
Toluene	14000	7500	6400			39							
Chlorobenzene	49	30	22										
Ethylbenzene	2700	2200	1600										
1,3-Dichlorobenzene													
1,2 & 1,4-Dichlorobenzene	93	61	79										

Detection threshold 20 ppb by weight for soils & 5 ppb by weight for water

*Chemne detected, less than

Non Priority Pollutants

Sample Identity: BBD-	Soils 17/S	17/1'	17/1'*	19/1'	S2	S4	Water 20
Constituents	Concentration, ppb by Weight						
m-Xylene	3900			ND 20	ND 20		ND 5
o/p Xylene	3400						
Cyclopropane	30						
Acetone	70	130	130			25	
Dimethyl Sulfide	30						
Isopropanol	50						
Carbon Disulfide	50	30	15				
Methyl Ethyl Ketone	110	170	140				
Freon 113	20						
Cyclohexane	50	40	20				
Hexane	25	25	15				
Methyl Isobutyl Ketone	550	730	500				
4-Methyl-2-Pentanol	140	160	85			20	
C_6H_{12} Aliphatic Hydrocarbons	100	30	35				
C_7H_{14} Aliphatic Hydrocarbons	120	40	80				
C_9H_{12} Aromatic Hydrocarbons	60	40	35				
C_9H_{12} Aromatic Hydrocarbons	80	60	55				
C_9H_{12} Aromatic Hydrocarbons	300	190	200				
C_9H_{12} Aromatic Hydrocarbons	150	120	90				
Styrene	450	---	280				

Note: These are estimated values.

*Duplicate

ND=none detected, less than 20 ppb by weight for soil & 5 ppb by weight for water.

Thursday 1/2

DAN RAVIV ASSOCIATES, INC.
WEST ORANGE, NEW JERSEY 07052
CHAIN OF CUSTODY RECORD

PROJECT NO. 84C132 PROJECT NAME Bayonne Barrel & Drum

LOCATION Newark, NJ LABORATORY Gollob

SAMPLE NO.	TYPE (WATER/SOIL)	DATE	TIME	TOTAL # OF CONTAINERS	SAMPLERS SIGNATURE	REMARKS
BBD 17/5	Soil	10/31/85	0845	1 qt	M Zuel	VOA, TPHC, PCB
BBD 17/1'	Soil	10/31/85	0850	4/ qt, 2x pt, ½ pt	M Zuel	(1) PP, TPHC DIOXIN (2
BBD 17/2-3'	Soil	10/31/85	0856	1 qt	M Zuel	
BBD 17/5-7'	Soil	10/31/85	0941	1 qt	M Zuel	
BBD 17/9-11'	Soil	10/31/85	1058	1 qt	M Zuel	
BBD 18/1'	Soil	10/31/85	1232	2/ 1 qt, ½ pt	M Zuel	TPHC, PCB
BBD 18/2'	Soil	10/31/85	1244	1 qt	M Zuel	
BBD 18/3'	Soil	10/31/85	1256	1 qt	M Zuel	
BBD 20	Water	10/31/85	1325	2x 40 ml	M Zuel	VOA
BBD 19/1'	Soil	10/31/85	1348	2/ 1 qt, ½ pt	M Zuel	VOA, TPHC, PCB
BBD 19/2'	Soil	10/31/85	1352	1 qt	M Zuel	
BBD 19/3'	Soil	10/31/85	1358	1 qt	M Zuel	

Relinquished By:	Date/Time:	Received By:	Comments/Condition:
M. Zuel	10/31/85	[illegible]	
Relinquished By:	Date/Time:	Received By:	Comments/Condition:
[illegible]	11/1/85 - 1800	[illegible]	Good
Method of Shipment:	Shipped By:	Received By:	Comments/Condition:

Received for Laboratory: [illegible] Authorization for Disposal:

Laboratory Job No: Type of Disposal:

Date/Time: 11-1-85 1800 Date of Disposal:

(1) Thoroughly mix contents of quart jar and the one-pint jars together to homogenize sample. one-half-pint jar is for VOA.

Thursday 2/2

DAN RAVIV ASSOCIATES, INC.
WEST ORANGE, NEW JERSEY 07052
CHAIN OF CUSTODY RECORD

PROJECT NO. 84E182 PROJECT NAME Bayonne Barrel & Drum

LOCATION Newark, NJ LABORATORY Gallob

SAMPLE NO.	TYPE (WATER/SOIL)	DATE	TIME	TOTAL # OF CONTAINERS	SAMPLERS SIGNATURE	REMARKS
BBDS1	Sediment	10/31/85	1430	1 ft	[signature]	TPHC, PCB
BBDW1	Water	10/31/85	1436	1 ft	[signature]	TPHC, PCB
BBDS2	sediment	10/31/85	1448	2 x 1 ft	[signature]	VOA, PCB
BBDS3	sediment	10/31/85	1527	2 x 1 ft	[signature]	TPHC
BBDS4	sediment	10/31/85	1541	2 x 1 ft	[signature]	VOA, TPHC, PCB

Relinquished By:	Date/Time:	Received By:	Comments/Condition:
[signature]	10/31/85	[signature]	
Relinquished By:	Date/Time:	Received By:	Comments/Condition:
[signature]	11/1/85 - 1800	[signature]	Good
Method of Shipment:	Shipped By:	Received By:	Comments/Condition:

Received for Laboratory: [signature] Authorization for Disposal:

Laboratory Job No: Type of Disposal:

Date/Time: 11-1-85 1800 Date of Disposal:

Tuesday
2/2

DAN RAVIV ASSOCIATES, INC.
WEST ORANGE, NEW JERSEY 07052
CHAIN OF CUSTODY RECORD

PROJECT NO. 84C182 PROJECT NAME Bayonne

LOCATION Newark, NJ LABORATORY Gollob

SAMPLE NO.	TYPE (WATER/SOIL)	DATE	TIME	TOTAL # OF CONTAINERS	SAMPLERS SIGNATURE	REMARKS
BBD12/2'	Soil	10/29/85	1323	1 gt	[illegible]	
BBD12/3'	Soil	10/29/85	1331	1 gt	[illegible]	
BBD13/1'	Soil	10/29/85	1423	2; 1 gt, ½ gt	[illegible]	VOA, TPHC, PCB
BBD13/2'	Soil	10/29/85	1430	1 gt	[illegible]	
BBD13/3'	Soil	10/29/85	1440	1 gt	[illegible]	
BBD13/4'	Water	10/29/85	1530	2x40 ml	[illegible]	VOA

Relinquished By:	Date/Time:	Received By:	Comments/Condition:
M. [illegible]	10/31/85 1715	[illegible]	on ice
Relinquished By: [illegible]	Date/Time: 10/31/85 1809	Received By: [illegible]	Comments/Condition: on ice
Method of Shipment:	Shipped By:	Received By:	Comments/Condition:

Received for Laboratory: [illegible] Authorization for Disposal:

Laboratory Job No: Type of Disposal:

Date/Time: 10/31/85 1810 Date of Disposal:

DAN RAVIV ASSOCIATES, INC.
WEST ORANGE, NEW JERSEY 07052
CHAIN OF CUSTODY RECORD

Wednesday
1/1

PROJECT NO. 84C182 PROJECT NAME Bayonne Barrel & Drum

LOCATION Newark, NJ LABORATORY Gollob

SAMPLE NO.	TYPE (WATER/SOIL)	DATE	TIME	TOTAL # OF CONTAINERS	SAMPLERS SIGNATURE	REMARKS
BBD4/1' (PP)	Soil	10/30/85	0752	4; ft, ½ pt 2x pt	[signature]	PP,(1) TPHC
BBD14/1' (PP)	Soil	10/30/85	0824	4; ft, ½ pt 2x pt	[signature]	PP, TPHC
BBD15/1'	Soil	10/30/85	0904	2; ft, ½ pt	[signature]	TPHC, PCB, METALS
BBD15/2'	Soil	10/30/85	0931	1 ft	[signature]	
BBD15/3'	Soil	10/30/85	0937	1 ft	[signature]	
BBD15/5-7'	Soil	10/30/85	0954	1 ft	[signature]	VOA, TPHC
BBD15/9-11'	Soil	10/30/85	1026	1 ft	[signature]	
BBD15/12-14'	Soil	10/30/85	1058	1 ft	[signature]	
BBD15/15'	water	10/30/85	1228	2x 40 ml	[signature]	VOA
BBD16/1-2'	Soil	10/30/85	1330	2; ft, ½ pt	[signature]	VOA
BBD16/5-8'	Soil	10/30/85	1415	1x½ pt	[signature]	PP, TPHC(2)
BBD16/5-8' 8-10'	Soil	10/30/85	1415/1425	1 ft	[signature]	PP, TPHC(2)

Relinquished By:	Date/Time:	Received By:	Comments/Condition:
[signature]	10/31/85 1715	[signature]	on ice
Relinquished By: [signature]	Date/Time: 10/31/85 1809	Received By: [signature]	Comments/Condition: on ice
Method of Shipment:	Shipped By:	Received By:	Comments/Condition:

Received for Laboratory: [signature] Authorization for Disposal:

Laboratory Job No: Type of Disposal:

Date/Time: 10/31/85 1810 Date of Disposal:

(1) PP = Priority Pollutants Analyses.

(2) Samples BBD16/5-8' and BBD16/5-8' 8-10', should be combined before PP, TPHC analyses.

Tuesday 1/2

DAN RAVIV ASSOCIATES, INC.
WEST ORANGE, NEW JERSEY 07052
CHAIN OF CUSTODY RECORD

PROJECT NO. 84C182 PROJECT NAME Bayonne Barrel + Drum

LOCATION Newark, NJ LABORATORY Gouco

SAMPLE NO.	TYPE (WATER/SOIL)	DATE	TIME	TOTAL # OF CONTAINERS	SAMPLERS SIGNATURE	REMARKS
BBD2/5-7'	Soil	10/29/85	0749	1 pt	M Zuck	
BBD2/9-11'	Soil	10/29/85	0809	1 pt	M Zuck	
BBD2/13-15'	Soil	10/29/85	0834	1 pt	M Zuck	
BBD1/5-7'	Soil	10/29/85	1034	2; 1 pt, 1 pt	M Zuck	
BBD10/1'	Soil	10/29/85	1113	1 pt	M Zuck	TPHC
BBD10/2'	Soil	10/29/85	1117	1 pt	M Zuck	
BBD10/3'	Soil	10/29/85	1119	1 pt	M Zuck	
BBD11/1'	Soil	10/29/85	1234	1 pt	M Zuck	TPHC, METALS (1)
BBD11/2'	Soil	10/29/85	1241	1 pt	M Zuck	TPHC
BBD11/3'	Soil	10/29/85	1246	1 pt	M Zuck	
BBD12/1'	Soil	10/29/85	1315	1 pt	M Zuck	TPHC, PCB
BBD12/1'	Soil	10/29/85	1518	1 1/2 pt	M Zuck	VOA

Relinquished By:	Date/Time:	Received By:	Comments/Condition:
M. Zuck	10/31/85 1715	[signature]	on ice
Relinquished By:	Date/Time:	Received By:	Comments/Condition:
[signature]	10/31/85 1809	[signature]	on ice
Method of Shipment:	Shipped By:	Received By:	Comments/Condition:

Received for Laboratory: [signature] Authorization for Disposal:

Laboratory Job No: Type of Disposal:

Date/Time: 10/31/85 1810 Date of Disposal:

(1) METALS ANALYSES: As, Ba, Cd, Cr, Pb, Hg, Ag, Se.

SAMPLE ANALYSIS REQUEST FORM

Job Number: 84C132 Job Location: Newark, New Jersey

Samples Collected by : _____ Sampling Date: / /
12/23/85 - 12/31/85 &
4/27/85 - 12/13/

Time Sampling began : : : finished : : :

Collection Method : Boring

Sampling Equipment Used: Split Spoon

Sample Matrix : Soil

Was Chain of Custody Implemented : YES ✓ NO _
Were Samples Delivered to Lab on Ice: YES _ NO _

ANALYSIS REQUESTED

Parameter	Container ID	Detection Limit	Preservative Used	Requested Turnaround Time (days)
TPHC	BBD15/3'			
TPHC	BBD15/9-11'			
TPHC, PCB	BBD16/1-2'			
TPHC, PCB	BBD17/2-3'			
TPHC	BBD17/5-7'			
TPHC, PCB	BBD18/2'			
TPHC, PCB	BBD18/3'			
TPHC, PCB	BBD19/2'			
TPHC, PCB	BBD19/3'			
TPHC, PCB	BBDC1/5-7'			
TPHC, PCB	BBDC3/0.5-2.5' 2.5-4.5'			
TPHC, PCB	BBDC3/10-12'			

COMMENTS: _____

ANALYSIS REQUESTED BY : HZ

PERSON ACCEPTING SAMPLE: [illegible] Date: 2/5/86 Time: 09:19:12

LAB NAME: [illegible]

Monday 9/2

DAN RAVIV ASSOCIATES, INC.
WEST ORANGE, NEW JERSEY 07052
CHAIN OF CUSTODY RECORD

PROJECT NO. 84C182 PROJECT NAME Bayonne Barrel & Drum

LOCATION Newark LABORATORY G0110B

SAMPLE NO.	TYPE (~~WATER~~/SOIL)	DATE	TIME	TOTAL # OF CONTAINERS	SAMPLERS SIGNATURE	REMARKS
BBD 7/1'	Soil	10/28/85	0805	1 ft	M Zuck	TPHC
BBD 7/2'	Soil	10/28/85	0808	1 ft	M Zuck	
BBD 7/3'	Soil	10/28/85	0814	1 ft	M Zuck	
BBD 8/1'	Soil	10/28/85	0909	1 ft	M Zuck	VOA, TPHC, METALS(1)
BBD 8/2'	Soil	10/28/85	0914	1 ft	M Zuck	
BBD 8/3'	Soil	10/28/85	0919	1 ft	M Zuck	
BBD 9/1'	Soil	10/28/85	0949	1 ft	M Zuck	TPHC, PCB
BBD 9/2'	Soil	10/28/85	0954	1 ft	M Zuck	
BBD 9/3'	Soil	10/28/85	0957	1 ft	M Zuck	TPHC
BBD 9/5-7'	Soil	10/28/85	1053	1 ft	M Zuck	
BBD 9/7-9'	Soil	10/28/85	1059	1 ft	M Zuck	
BBD 9/9-11'	Soil	10/28/85	1109	1 ft	M. Zuck	

Relinquished By:	Date/Time:	Received By:	Comments/Condition:
M Zuck	10/28/85 1814	H D'Allaco	Good/iced
Relinquished By:	Date/Time:	Received By:	Comments/Condition:
Method of Shipment:	Shipped By:	Received By:	Comments/Condition:

Received for Laboratory: H D'Allaco Authorization for Disposal: _____

Laboratory Job No: _____ Type of Disposal: _____

Date/Time: _____ Date of Disposal: _____

(1) METALS ANALYSES: As, Ba, Cd, Cr, Pb, Hg, Ag, Se.

Monday 2/2

DAN RAVIV ASSOCIATES, INC.
WEST ORANGE, NEW JERSEY 07052
CHAIN OF CUSTODY RECORD

PROJECT NO. 84C182 PROJECT NAME Bayonne Barrel & Drum

LOCATION Newark LABORATORY Gollob

SAMPLE NO.	TYPE (WATER/SOIL)	DATE	TIME	TOTAL # OF CONTAINERS	SAMPLERS SIGNATURE	REMARKS
BBD8/5-7'	Soil	10/28/85	1202	1 ft	M Zeck	
BBD8/9-11'	Soil	10/28/85	1305	1 ft	M Zeck	
BBD4/5-7'	Soil	10/28/85	1358	1 ft	M Zeck	
BBD4/9-11'	Soil	10/28/85	1421	1 ft	M Zeck	
BBD4/13-15'	Soil	10/28/85	1451	1 ft	M Zeck	

Relinquished By:	Date/Time:	Received By:	Comments/Condition:
M. Zeck	10/28/85 1814	H D'Allaeco	Good/iced
Relinquished By:	Date/Time:	Received By:	Comments/Condition:
Method of Shipment:	Shipped By:	Received By:	Comments/Condition:

Received for Laboratory: H D'Allaeco

Authorization for Disposal:

Laboratory Job No:

Type of Disposal:

Date/Time:

Date of Disposal:

DAN RAVIV ASSOCIATES, INC.
WEST ORANGE, NEW JERSEY 07052
CHAIN OF CUSTODY RECORD

PROJECT NO. 84C182 PROJECT NAME Bayonne Barrel and Drum Co.

LOCATION Newark LABORATORY Gollob

SAMPLE NO.	TYPE (WATER/SOIL)	DATE	TIME	TOTAL # OF CONTAINERS	SAMPLERS SIGNATURE	REMARKS
BBD 1	Soil	1/18/85	9:40	1 QT	D J Monow	PCB'S
BBD 2	Soil	1/18/85	10:00	1 QT	D J Monow	PCB'S
BBD 3	Soil	1/18/85	10:20	1 QT	M. Zucker	PCB'S
BBD 4	Soil	1/18/85	11.15	1 QT	M Zucker	PCB'S
BBD 5	Soil	1/18/85	11:00	1 QT	M Zucker	PCB'S
BBD 6	Soil	1/18/85	10:45	1 QT	M Zucker	PCB'S
BBD 7	Soil	1/18/85	12:35	1 QT	M Zucker	PCB'S
BBD 8	Soil	1/18/85	13:00	1 QT	M Zucker	PCB'S
BBD 9	Soil	1/18/85	13:40	1 QT	M Zucker	PCB'S
BBD 10	Soil	1/18/85	13:10	1 QT	D J Monow	EP-TOXICITY
BBD 11	Soil	1/18/85	12:10	1 QT	D J Monow	PCB'S
BBD 12	Soil	1/18/85	12:20	1 QT	M Zucker	PCB'S

Relinquished By:	Date/Time:	Received By:	Comments/Condition:
M Zucker	1/18/85 4:00 P	D J Monow	Good.
Relinquished By:	**Date/Time:**	**Received By:**	**Comments/Condition:**
David J Monow	1/18/85 17:12	[illegible]	Good
Method of Shipment:	**Shipped By:**	**Received By:**	**Comments/Condition:**

Received for Laboratory: [illegible] Authorization for Disposal:

Laboratory Job No: Type of Disposal:

Date/Time: 1/18/85 1711 hrs Date of Disposal:

DAN RAVIV ASSOCIATES, INC.
WEST ORANGE, NEW JERSEY 07052
CHAIN OF CUSTODY RECORD

PROJECT NO. 84C182 PROJECT NAME Bayonne Barrel and Drum Co

LOCATION Newark LABORATORY Gollob

SAMPLE NO.	TYPE (WATER/SOIL)	DATE	TIME	TOTAL # OF CONTAINERS	SAMPLERS SIGNATURE	REMARKS
BBD 13	Soil	1/18/85	12:30	1 QT	DJ Monow	PCB'S
BBD 14	Soil	1/18/85	14:10	1 QT	DJ Monow	PCB'S

Relinquished By:	Date/Time:	Received By:	Comments/Condition:
M Zucker	1/18/85 4:00p	DJ Monow	Good.
Relinquished By:	Date/Time:	Received By:	Comments/Condition:
David J Monow	1/18/85 17:12	[illegible]	Good
Method of Shipment:	Shipped By:	Received By:	Comments/Condition:

Received for Laboratory: [illegible] Authorization for Disposal:

Laboratory Job No: Type of Disposal:

Date/Time: 1/18/85 1712 hrs Date of Disposal:

Petroleum Hydrocarbon Analysis

Sample Identification	TPHC (Milligrams/kilogram)	Date Extracted	Date Analyzed
BBD 1(0-1')	1990	11/5/85	11/14/85
BBD 2(0-1')	1390	11/5/85	11/14/85
BBD 3(0-1')	4410	11/5/85	11/14/85
BBD 4(1'-2')	10,500	11/5/85	11/14/85
BBD 5(0-1')	23,800	11/5/85	11/14/85
BBD 6(0-1')	640 (650)*	11/5/85	11/14/85

*Duplicate Determination

PCB Analysis

Sample Identification	PCB (Milligrams/kilogram)		
BBD 3 (0-1')	42*	11/7/85	11/12/85

The chromatographic fingerprint is characteristic of Arochlor 1248.

Volatile Analysis

Subject samples have been analyzed for volatile organics according to EPA Method 624. No volatile constituents were detected in either sample.

Sample Identification	Volatiles (PPB by Wgt.)		
BBD 1 (0-1')	ND 20	10/31/85	11/5/85
BBD 2 (0-1')	ND 20	10/31/85	11/5/85

Gollob Analytical Service

MOLININI-GOLLOB, INC.
47 INDUSTRIAL ROAD, BERKELEY HEIGHTS, NEW JERSEY 07922 • TEL. (201) 464 3331

TO: Dr. Dan Raviv
Dan Raviv Associates
5 Central Avenue
West Orange, NJ 07052

G.A.S. REPORT No. 59360

Date Requested: 10/29/85
Date Reported: 11/22/85
P.O. No. 84C182

MATERIAL SUBMITTED: 17 (Seventeen) Soil Samples (Seventeen Soil Samples Extracted - 4 Analyzed)

INFORMATION REQUESTED: Gas Chromatography Analysis

NOTEBOOK REFERENCE: SW 1137, Page 1 GC/MS 1057, Pg. 78

RESULT OF INVESTIGATION

Subject samples, hand delivered to G.A.S. on 10/29/85, have been analyzed for the constituents requested, and listed in the attached tables.

Dan Raviv Associates, Inc.
RECEIVED
1985

n 112785

By F. Gollob
GOLLOB ANALYTICAL SERVICE

EP Toxicity Test

Metals

Sample Identity:	BBD-10
Constituents	Concentration, milligrams/liter
Arsenic	0.002
Barium	ND 1
Cadmium	0.21
Chromium, total	ND 0.02
Lead	2.6
Mercury	0.0004
Selenium	0.001
Silver	ND 0.02

Pesticides

	micrograms/liter
Endrin	ND 1
Lindane	ND 1
Methoxychlor	ND 1
Toxaphene	ND 1
Herbicides 2,4-D	ND 1
2,4,5-TP	ND 1

ND=none detected, less than

Gollob Analytical Service

MOLININI-GOLLOB, INC.

47 INDUSTRIAL ROAD, BERKELEY HEIGHTS, NEW JERSEY 07922 • TEL. (201) 464-3331

Dan Raviv Associates, Inc.

NOV 20 1985

RECEIVED

TO: Dr. D. Raviv
Raviv Associates
5 Central Avenue
West Orange, NJ 07052

G.A.S. REPORT No. 59

Date Requested: 10/29/85
Date Reported: 11/5/85
P.O. No. 84C182

MATERIAL SUBMITTED: 18 (Eighteen) Soil Samples - Bayonne Barrel & Drum

INFORMATION REQUESTED: Gas Chromatography/Mass Spectrometry, Infrared and Gas Chromatography Analyses

NOTEBOOK REFERENCE: GC/MS 1057, Page 78 and SW 1137, Page 1

RESULT OF INVESTIGATION

Subject samples, hand delivered on 10/28/85, have been analyzed for the constituents requested.

All data are presented in the attached tables.

n111985

By _____
GOLLOB ANALYTICAL SERVICE

Gollob Analytical Service

MOLININI-GOLLOB, INC.
47 INDUSTRIAL ROAD, BERKELEY HEIGHTS, NEW JERSEY 07922 • TEL. (201) 464-3337

Dan Raviv Associates, Inc.
84C182
JAN 7 1986

RECEIVED

TO: Dr. D. Raviv
Raviv Associates
5 Central Avenue
West Orange, NJ 07052

G.A.S. REPORT No. 59397

Date Requested: 11/1/85
Date Reported: 12/26/85
P.O. No. 84C182

MATERIAL SUBMITTED: 30 (Thirty) Samples- (BBD)

INFORMATION REQUESTED: Gas Chromatography, Gas Chromatography/Mass Spectrometry Analyses

NOTEBOOK REFERENCE: GC/MS 1057 page 78, AP 1089 page 67, SW 1138 page 1

RESULT OF INVESTIGATION

Subject samples, hand delivered to G.A.S. on 11/1/85, have been analyzed for the constituents requested and listed in the attached tables.

t 123085

By _____
GOLLOB ANALYTICAL SERVICE

Polychlorinated Biphenyls Analysis (PCB'S) (ECGC*)

Constituent:	PCB	
Sample Identity	Concentration, ppm by Weight	Arochlor Type
BBD 12/1'	2	1248
	4	1254
BBD 13/1'	30	1248
	25	1254
BBD 15/1'	8	1254

Samples Extracted 11/5/85
Samples Analyzed 11/14/85

*Electron Capture Gas Chromatography

Petroleum Hydrocarbons (Infrared Analysis)

Constituent:	Petroleum Hydrocarbons
Sample Identity	milligrams/kilograms
BBD4/1'	6040
BBD 14/1'	460
BBD 15/1'	1820, 1820
BBD 15/5-7'	3740
BBD 16/5-8'-8-10'*	410
BBD 10/1'	580
BBD 11/1'	4450
BBD 11/2'	760
BBD 12/1'	100
BBD 13/1'	8260

*Composited

Samples Extracted 11/11/85
Samples Analyzed 11/14/85

(Continued) Sample BBD 17/1'

	milligrams/kilogram
Fluoranthene	ND
Fluorene	ND
Heptachlor	ND
Heptachlor epoxide	ND
Hexachlorobenzene	ND
Hexachlorobutadiene	ND
Hexachloroethane	ND
Indeno(1,2,3-cd)pyrene	ND
Isophorone	ND
Naphthalene	ND
Nitrobenzene	ND
N-Nitrosodi-n-propylamine	ND
PCB-1016	ND
PCB-1221	ND
PCB-1232	ND
PCB-1242	ND
PCB-1248	ND
PCB-1254	ND
PCB-1260	ND
Phenanthrene	ND
Pyrene	ND
Toxaphene	ND
1,2,4-Trichlorobenzene	ND
Benzidine	ND
α-BHC	ND
γ-BHC	ND
Endosulfan I	ND
Endosulfan II	ND
Endrin	ND
Hexachlorocyclopentadiene	ND
N-Nitrosodimethylamine	ND
N-Nitrosodiphenylamine	ND
2-Methyl Naphthalene	15.5

ND=none detected, less than 0.5

Date Extracted: 11/13/85

Date Analyzed: 12/5/85

TCDD DATA REPORT
California Analytical Laboratories
2544 Industrial Blvd.
W. Sacramento, CA 95691

Lab: California Analytical Laboratories
Case No. 23217
Batch/Shipment No.

Report Date: 12-17-85
Column: SP-2331

Cal Labs ID	Sample Number	C U	Aliquot Wet Wt. (grams)	PPB TCDD Meas	PPB TCDD Det. Lmt	Inst ID	Date	Time	320/322	332/334	PPB Surrg Meas	Surrg % Acc'c	320	322	257	328*	332	334	Co.
23217MB	METHOD BLANK	Y	10.00	ND	0.021	8	12/17/85	20:22:00	-	0.81	1.02	102	-	-	-	650301	688667	850474	
23217-1	59411 BBD 17/1'	Y	10.11	ND	0.320	8	12/17/85	19:27:00	-	0.71	0.92	93	-	-	-	31101	33520	47024	

MB = Method Blank
P = Partial Scan/Confirmatory Analysis
MS = Native TCDD Spike
D = Duplicate/Fortified Field Blank
RI = Re-injection

FB = Field Blank
ND = Not Detected
DL = Detection Limit
RX = Re-extraction
MPC = Maximum Possible Concentration

*Corrected for contribution by native TCDD; 0.9% of m/z 322 subtracted

FORM B-1

Gollob Analytical Service

MOLININI-GOLLOB, INC.

47 INDUSTRIAL ROAD, BERKELEY HEIGHTS, NEW JERSEY 07922 • TEL. (201) 464-3331

Dan F... Inc.
85C182

To: Dr. D. Raviv
Raviv Associates
5 Central Avenue
West Orange, NJ 07052

G.A.S. REPORT No. 60209
(Originally 59411)
Date Requested: 11/5/85
Date Reported: 2/13/86
P.O. No. 84C182

MATERIAL SUBMITTED: 1 (One) Soil Sample - BBD-17/1'

INFORMATION REQUESTED: Gas Chromatography/Mass Spectrometry Analysis

NOTEBOOK REFERENCE: LM 1134 page 74

RESULT OF INVESTIGATION

Subject sample, hand delivered to G.A.S., has been analyzed for the constituents requested and listed in the attached tables.

This completes G.A.S. 59411.

t 21986

By _____
GOLLOB ANALYTICAL SERVICE

Base Neutral & Pesticide Extractables

milligrams/kilogram

Sample Identity:	BBD 17/1'
Acenaphthene	ND
Acenaphthylene	ND
Anthracene	ND
Aldrin	ND
Benzo(a)anthracene	ND
Benzo(b)fluoranthene	ND
Benzo(k)fluoranthene	ND
Benzo(a)pyrene	ND
Benzo(ghi)perylene	ND
Benzyl butyl phthalate	19.3
β-BHC	ND
δ-BHC	ND
Bis(2-chloroethyl)ether	ND
Bis(2-chloroethoxy)methane	ND
Bis(2-ethylhexyl)phthalate	ND
Bis(2-chloroisopropyl)ether	ND
4-Bromophenyl phenyl ether	ND
Chlordane	ND
2-Chloronaphthalene	ND
4-Chlorophenyl phenyl ether	ND
Chrysene	ND
4,4'-DDD	ND
4,4'-DDE	ND
4,4'-DDT	ND
Dibenzo(a,h)anthracene	ND
Di-n-butylphthalate	17.0
1,3-Dichlorobenzene	ND
1,2-Dichlorobenzene	ND
1,4-Dichlorobenzene	ND
3,3'-Dichlorobenzidine	ND
Dieldrin	ND
Diethyl phthalate	ND
Dimethyl phthalate	ND
2,4-Dinitrotoluene	ND
2,6-Dinitrotoluene	ND
Di-n-octylphthalate	ND
Endosulfan sulfate	ND
Endrin aldehyde	ND

ND=none detected, less than 0.5

Date Extracted: 11/13/85

Date Analyzed: 12/5/85

Raviv Associates

Volatile Organic Analysis by EPA Method 624

Sample Identification: Pollutants BBD-	Soil 4/1'	Soil 12/1'	Soil 13/1'	Water 13/4'	Soil 15/5-7'	Water 15/15'	Soil 14/1'	Soil 16/1-2'	Soil 16 * Composite	Water Blank		
Chloromethane				ND 5		ND 5	ND 20			ND		
Bromomethane												
Vinyl Chloride												
Chloroethane												
Methylene Chloride												
Trichlorofluoromethane												
1,1,-Dichloroethylene												
1,1-Dichloroethane												
1,2-Dichloroethylene												
Chloroform												
1,2-Dichloroethane												
1,1,1-Trichloroethane												
Carbon Tetrachloride												
Bromodichloromethane												
1,2-Dichloropropane												
trans-1,3-Dichloropropene												
Trichloroethylene												
Benzene	55		29		60			57	30			
Dibromochloromethane												
cis-1,3-Dichloropropene												
1,1,2-Trichloroethane												
2-Chloroethylvinyl Ether												
Bromoform												
1,1,2,2-Tetrachloroethene												
1,1,2,2-Tetrachloroethane												
Toluene	360		210					930				
Chlorobenzene												
Ethylbenzene	8600	52	810		87			830				
1,3-Dichlorobenzene												
1,2 & 1,4-Dichlorobenzene												
*5-8' + 5-8'/8-10'												
Non Priority Pollutants Detected												
1-Butanol	50			ND 5		ND 5	ND 20					
C_7H_{16} Aliphatic Hydrocarbon	35											
C_7H_{14} Aliphatic Hydrocarbon	190		70						70			
C_8H_{16} Aliphatic Hydrocarbon	30								30			
m-Xylene	28000	38	1500					1400	43			
o/p Xylene	28000	47	1200					1200	23			
C_9H_{12} Aromatic Hydrocarbon	430		130		910			40				
C_9H_{12} Aromatic Hydrocarbon	3400		330		580							
C_9H_{10} Aromatic Hydrocarbon	2600	75	150		300							
C_9H_{12} Aromatic Hydrocarbon	3300	31	60		550							

Note: Numerous aromatic constituents eluted after the GC/MS data file was full and are not reported.
The values for the above compounds are estimated except for xylene.

Detection threshold 20 ppb by Weight for soil and 5 ppb by weight for water

Date Extracted: 11/5/85 Date Analyzed: 11/6/85

Gollob Analytical Service

MOLININI-GOLLOB, INC.

47 INDUSTRIAL ROAD, BERKELEY HEIGHTS, NEW JERSEY 07922 • TEL. (201) 464 3331

Con. Raviv Associates Inc.
84C182

TO: Dr. D. Raviv
Raviv Associates
5 Cenral Avenue
West Orange, NJ 07052

G.A.S. REPORT No. 59411

Date Requested: 11/5/85
Date Reported: 12/20/85
P.O. No. 84C182

MATERIAL SUBMITTED: 15 (Fifteen) Soil Samples - (8 Analyzed)
2 (Two) Water Samples

INFORMATION REQUESTED: Infrared, Atomic Absorption, Chemical, Gas Chromatography & Gas Chromatography/Mass Spectrometry Analyses

NOTEBOOK REFERENCE: AP 1089 page 67, GC/MS 1054 page 98, SW 1137 page 7

RESULT OF INVESTIGATION

Subject samples, hand delivered to G.A.S. on 11/5/85, have been analyzed for the constituents requested and listed in the attached tables.

t 122685

By Victor H. [illegible]
GOLLOB ANALYTICAL SERVICE

Chemical Analysis

Constituents:	Cyanide	Phenol
Sample Identity	milligrams/kilogram	
BBD 4/1'	2	15
BBD 14/1'	ND 0.1	ND 0.5
BBD 16/5-8' & 8-10'*	ND 0.1	2.8

*Composited

Samples extracted 11/13/85

Samples analyzed 11/18/85

Atomic Absorption Analysis

Sample Identity:	BBD-4/1'	BBD-14/1'	BBD-15/1'	BBD-16/5-8' 8-10'*	BBD-11/1'
	milligrams/kilogram				
Antimony	13	8.4	--	4.0	--
Arsenic	17	8.4	55	2.9	51
Beryllium	0.64	0.28	--	0.32	--
Cadmium	1300	0.52	5.08	0.2	4.72
Chromium	3400	27	52.0	7.00	43.2
Copper	15 500	15.6	-- --	4.64	--
Lead	8400	92	6400	15	380
Mercury	2.2	1.6	4.1	0.62	1.3
Nickel	62.4	25	--	5.28	--
Selenium	0.030	0.019	0.042	ND 0.004	0.004
Silver	0.92	0.3	0.84	0.2	0.48
Thallium	ND 0.4	ND 0.4	--	ND 0.4	--
Zinc	4520	71.2	--	15.4	--
Barium	--	--	10	--	10

ND=none detected, less than

*Composite

Volatile Organic Analysis (EPA 624)

All data are presented in the table listing the priority and non-priority constituents detected.

Flame Ionization Gas Chromatography Analysis

Sample Identity:	BBD4/1'	BBD14/1'	BBD16/5-8&8-10
Constituents	Concentration, ppm by Weight		
Acrolein	ND 1	ND 1	ND 1
Acrylonitrile	ND 1	ND 1	ND 1

Samples Extracted 11/5/85
Samples Analyzed 11/12/85

Note: Base Neutral & Acid Extractibles will be reported at a later date.

ND=none detected, less than

Appendix D

Laboratory Data Sheets

Gollob Analytical Service

MOLININI-GOLLOB, INC.

47 INDUSTRIAL ROAD, BERKELEY HEIGHTS, NEW JERSEY 07922 • TEL. (201) 464 3331

TO: Dr. D. Raviv
Dan Raviv Associates
588 Eagle Rock Avenue
West Orange, NJ 07052

G.A.S. REPORT No. 57163A

Date Requested: 1/18/85
Date Reported: 2/1/85
P. O. No. 84C182

MATERIAL SUBMITTED: 14 (Fourteen) Soil Samples - (13 Analyzed)

INFORMATION REQUESTED: Gas Chromatography Analysis

NOTEBOOK REFERENCE: CM 1063 page 1, CM 1023 page 59

RESULT OF INVESTIGATION

Subject samples have been analyzed by gas chromatography (Hall Electrolytic Conductivity Detection) for the presence of polychlorinated biphenyls (PCB'S) as requested.

EP Toxicity results on Sample BBD-10 will be reported at a later date.

Alldata are presented in the attached table.

t 2185

By _____
GOLLOB ANALYTICAL SERVICE

Sample Identification:	Concentration, Milligrams/kilogram					
		BED				
	7	8	9	9	Date Extracted	Date Analyzed
	1'	1'	1'	3'		
Constituents						
Petroleum Hydrocarbons	4520	3470	10,700	480	11/11/85	11/12/8
Arsenic	- - -	390	- -	--	11/12/85	11/13/8
Barium	- - -	22	- -	--	1/11/85	11/15/8
Cadmium	- - -	34	- -	--	11/11/85	11/12/8
Chromium	- - -	1900	- -	--	11/11/85	11/12/8
Lead	- - -	8400	- -	--	11/11/85	11/12/8
Mercury	- - -	13.6	- -	--	- - -	11/13/8
Silver	- - -	3.1	- -	--	11/11/85	11/12/8
Selenium	- - -	0.046	- -	--	11/13/85	11/14/8
PCB	- - -	- - -	23	--	11/7/85	11/12/8

Dr. Dan Raviv
Dan Raviv Associates

Concentration, p

59360

Volatile Organic Analysis by EPA Method 624

Sample Identification: Pollutants	BRD 8-1'												
Chloromethane	ND 20												
Bromomethane													
Vinyl Chloride													
Chloroethane													
Methylene Chloride													
Trichlorofluoromethane													
1,1,-Dichloroethylene													
1,1-Dichloroethane													
1,2-Dichloroethylene													
Chloroform													
1,2-Dichloroethane													
1,1,1-Trichloroethane													
Carbon Tetrachloride													
Bromodichloromethane													
1,2-Dichloropropane													
trans-1,3-Dichloropropene													
Trichloroethylene													
Benzene													
Dibromochloromethane													
cis-1,3-Dichloropropene													
1,1,2-Trichloroethane													
2-Chloroethylvinyl Ether													
Bromoform													
1,1,2,2-Tetrachloroethene													
1,1,2,2-Tetrachloroethane													
Toluene													
Chlorobenzene													
Ethylbenzene													
1,3-Dichlorobenzene													
1,2 & 1,4-Dichlorobenzene													

Date Extracted 10/30/85
Date Analyzed 11/8/85

Detection threshold 20 ppb by Weight

APPENDIX
D

Diversified
Environmental
Resources, Inc.
1440A Pennington Road Trenton, New Jersey 08618
609-771-3616 FAX # 609-771-4276

APPENDIX D

PRELIMINARY SITE INVESTIGATIONS:
NEW JERSEY TURNPIKE
1985-90 WIDENING
FROM PASSAIC RIVER TO MILEPOST 105

SUBMITTED BY:

LOUIS BERGER & ASSOCIATES, INC.
EAST ORANGE, NEW JERSEY

A
STOUT
A COMPLETE ENVIRONMENTAL SERVICE COMPANY.
COMPANY

Preliminary Site Investigations: New Jersey Turnpike 1985 - 90 Widening from Passaic River to Milepost 105

Historical Survey of Possible Sources of Contamination within and adjacent to the Proposed Turnpike Right-Of-Way

Submitted to:

New Jersey Turnpike Authority

New Brunswick, New Jersey

Submitted by:

Louis Berger & Associates, Inc.
East Orange, New Jersey

December 1986

I. INTRODUCTION

A. Purpose

The purpose of this historical survey is to identify and locate the possible sources of pollution which may have contaminated properties within and adjacent to the proposed Right-of-Way for the New Jersey Turnpike Widening Project. The specific spatial limits of this survey extend from the Passaic River on the north to a point just north of Milepost 105 on the south. Subsequent historical surveys of individual properties outside of this area will be completed in the near future. However these properties, because of their relative separation from one another do not lend themselves to the regional type of evaluation used in this report.

This exercise is historical in nature, in that data from the years 1934 through 1985 were analyzed and presented as indications of historical contamination. Within the context of this study, sources of contamination have been identified via remote sensing techniques (that is, not field-checked) and therefore can be considered qualitative in nature. In addition, since the position of a possible source of contamination is derived from the analysis of aerial photographs, its precise location is limited by the scale distortions inherent in aerial photography.

This work was performed since a particular property cannot be evaluated for contamination based only on factors which exist at the present time. Rather it must be appraised in light of previous activities on the site, since those activities may have had a profound effect on present levels of contamination. This is especially true of the geographic areas within this report which have undergone extensive changes over the last fifty years. The present status of properties of concern has been described previously by Louis Berger and Associates. This report concentrates more on identifying, locating and chronicling the possible origins of contamination.

B. Organization

Section II depicts the methodology used in the analysis of sources of contamination. Section II-A relates the stereoscopic photointerpretation procedure along with the remote sensing characteristics of each possible cause of contamination. Section II-B describes the tabular and graphical forms of data presentation. Section III provides an overall historical summary of land use within and adjacent to the proposed Turnpike widening area.

Section IV describes the possible sources of contamination on each property in detail and is subdivided on a geographic basis into: IV-A. North Map - West Side of Turnpike, IV-B. North Map - East Side of Turnpike, IV-C. South Map - West Side of Turnpike and IV-D. South Map - East Side of Turnpike.

C. Use of the Data

The information in this historical survey has been used to delineate the presence, type, location and duration of possible sources of contamination on the properties involved in the widening of the New Jersey Turnpike from the Passaic River to Milepost 105. With this in mind, the locations of certain subsequent field detection measurements (e.g., Soil Borings and Groundwater Monitoring Wells) have been concentrated in areas where possible sources of contamination are concentrated.

It should be emphasized that because of the nature of data acquisition (remote sensing and literature search), neither the existence nor absence of contamination on a property can be proved conclusively. Confirming evidence must be obtained where possible through subsequent field investigations. In addition, no allegations of legal violations are intended.

II. METHODOLOGY

A. Aerial Photography

Aerial photographs covering the Turnpike area from the Passaic River to Milepost 105 were obtained from various sources for the years 1934, 1940, 1947, 1951, 1959, 1970 and 1985. This frequency of exposure provided sufficient coverage to chronicle the recent industrial and environmental history of the area. The scales of the photographs in this initial phase of investigation ranged from 1"=1000' to 1"=2000'.

Stereoscopic photointerpretation with a mirror stereoscope was done for each set of photographs to delineate cultural and environmental features. The stereoscope enables one to see a "stereo pair" of photographs in three dimensions, thus facilitating identification procedures. Features can be recognized as having positive relief (above ground level), negative relief (below ground level) or zero relief (at ground level). The following are some of the characteristics of the possible sources of contamination identified by stereoscopic photointerpretation in the Turnpike area and in heavily industrialized and urbanized areas in general:

* Industrial Activity - buildings and other industrial structures were identified and exhibited positive relief. Ground outlines of former building sites (zero relief) and excavations (negative relief) were distinguished. Other signs of industrial activity are parking lots, smokestacks, incinerators, site roads, trucks and other vehicles.

* Drum Storage - Drums and barrels were identified based on positive relief, shape and grouping. Ground stains are usually present when drum storage is identified.

* Tank Storage - Usually associated with a larger industrial operation (refinery, utility, chemical company). Positive relief.

* Liquid Storage - Usually associated with a larger industrial operation (refinery, etc.). Much greater potential source of contamination than tank storage. Distinguished by the presence of liquid (flat, usually black), negative relief and by surrounding dikes (positive relief).

* Standing Liquid - Usually associated with industrial or landfill operations, however it is more likely to be an unplanned accumulation. Where it does appear to be planned, it is usually confined to a ditch and a surrounding dike is not usually present. Distinguished by presence of a liquid and negative relief.

* Lagoon - Characterized by the same features as that for liquid storage, except that the purpose is for liquid disposal or runoff rather than for industrial use.

* Sludge - Usually associated with larger industrial operations. Characterized by lighter color than a liquid, negative relief, presence of surrounding dikes (positive relief).

* Fill - Usually associated with grading operations. Distinguished from undisturbed ground by its lighter color at inception (lack of vegetation) and by having positive relief. Distinguished from landfill operations by its uniformity of color (generally light), smooth texture, flat surface and lack of obvious waste.

* Landfill - Usually a sanitary landfill where municipal solid wastes and construction debris are permanently deposited. Characteristic features are positive relief, variable light and dark coloration, irregular texture, presence of waste piles, road networks, trucks, incinerators, leachate (lighter color) at extremities of landfill. There may also be liquid storage, lagoons and drum storage.

* Waste Disposal - Usually associated with an industrial facility. Recognized by variable light and dark coloration, irregular texture and positive relief. It may be permanent disposal or temporary storage of waste material.

When the identification of possible sources of contamination on the 9" x 9" stereo pairs was completed, each photo was enlarged to a scale of 1"=200' to facilitate positive identification of minute features and to allow the smallest possible margin of error in the digitizing process. The cultural, industrial and environmental features on each enlarged photograph were then digitized with an IBM PC-AT equipped with a CAD software package and the data was stored. This process permitted the readjustment of the scales of the aerial photos and the capability to display the data in a variety of useful formats.

B. Forms of Data Presentation

A summary of the aerial photographic analysis is presented in Tables 1,2,3 and 4. Tables 1 and 2 contain information derived from the north half of the study area (that is, from the Passaic River on the north to the Central Railroad Line on the south; see Figure 1) and Tables 3 and 4 contain information on the south half of the study area (that is, from the Central Railroad Line on the north to the Oak Island Rail Yards on the south; see Figure 2). The set of maps in the Appendix show the possible sources of contamination for each year analyzed. Each year was assigned a different color and each feature was labelled as to the type of contamination. For an exact location of a potential source of contamination on a property, one may refer to these maps.

Figures 1 and 2 show the Proposed Turnpike Right-of-Way (in black), the Properties within or touched by the Right-of-Way (in black and indexed by numbers 1/10" in height) and the Roads and Railroads (black). The site numbers of the properties on the map correspond to the site numbers in Tables 1,2,3 and 4.

Figures 3 and 4 show the Proposed Right-of-Way (black), the Properties within or touched by the ROW (black), the Roads and Railroads (black) and the maximum areal extent of the present day as well as historic landfills (aqua). Four previously undocumented landfills included in the Proposed Right-of-Way were identified (Landfills *A*,*B*,*C* and *G*) and two previously known landfills in the ROW (Avenue P Landfill{*I*&*J*} and the Delancey Street Landfill{*H*}) were found to be much greater in areal extent than was originally thought. The existence of the undocumented landfills will be confirmed through cross references to geotechnical boring logs and site investigations.

Figures 5 and 6 show the Proposed ROW (black), Properties, Roads and Railroads (black) and the Historic Industrial Facilities (various colors). The facilities are shown by an open polygon and coded by color, that is, the year in which a particular industrial facility was added is referenced to a color in the Explanation. Also the year a particular facility was removed is shown by a cross-hatching in the open polygon with a color corresponding to that year.

Supplemental historical identification of the Industrial Facilities in the study area was made possible through the use of Graphic Map Volumes for Newark by the Sanborn Map Company and is shown in Tables 1,2,3 and 4. Other historical sources are currently being investigated to cross check the industrial facility identification from Sanborn.

III. SUMMARY REPORT OF LAND USE

In 1934, the Turnpike area between the Passaic River and the Oak Island Rail Yards was characterized by heavy industrialization and urbanization. An infrastructure of highways, city streets and railroads was in place. The industrial elements which dominated the landscape of that time were the Public Service Electric and Gas coal burning power plant adjacent to the Passaic River, the Conoco Refinery on Doremus Avenue, Metz Laboratories on Foundry Street, along with numerous small industrial facilities (Hart Dying Company, Capstone Manufacturing Company, Lacquer Specialties, Bayonne Barrel and Drum and the Mertz Rendering Plant). Other indications of an increasingly expansive urbanization are the Sewage Treatment Plant and the already growing landfill activity. Landfills *F* (Milepost 106 Landfill) and *H* (nucleus of Delancey Street Landfill) on Wilson Street and Landfill *A* on Foundry Street were well established at this time.

The Jersey Feed Farms on Foundry Street and the cultivated areas south of Wilson Avenue are remnants of this area's agricultural past that were present in 1934. In addition, two tracts of undeveloped marshland west of Doremus Avenue were also preserved in 1934.

By 1940, the facilities at the Public Service Electric and Gas Plant had expanded and agricultural activities had been drastically curtailed. Also the Landfills *H* (nucleus of Delancey Street Landfill) and *A* (off Foundry Street) expanded dramatically. Other industrial activity declined as several industrial facilities present in 1934 were demolished by 1940.

By 1947, the Landfills *A* and *H* (nucleus of Delancey Street Landfill) had reached their maximum areal extent and Landfills *K* (south of Wilson Avenue), *I&J* (nucleus of the Avenue P Landfill, west of Doremus Avenue) and *F* (nucleus of the Milepost 106 Landfill) were expanding rapidly. Industrial development was fairly stagnant with the exception of expansions of the Lacquer Specialties Plant on Avenue P and Foundry Street and the Beckwith Chandler Plant on Rutherford Street.

Turnpike development was evident by 1951 and the only major changes were a reclamation of parts of Landfills *A* and *H* (nucleus of Delancey Street Landfill) and continued expansion of Landfills *I&J* (nucleus of Avenue P Landfill), *K* and *F* (nucleus of Milepost 106 Landfill).

The Turnpike was in full operation by 1959. A Drive-In Movie had been built atop part of Landfill *A* and Landfills *K*, *I&J* (nucleus of Avenue P Landfill) and *F* (nucleus of Milepost 106 Landfill) showed renewed expansion. Changes in industrial activity consisted of the establishment of auto salvage yards along the Turnpike near Wilson Avenue and the reduction of operations at the Conoco Refinery.

The Turnpike had been widened by 1970 and the expansion of the auto salvage yards throughout the area was the only notable commercial change. Landfills *I&J* (Avenue P Landfill) were merged and Landfill *F* (Milepost 106 Landfill) and *K* had reached their maximum areal extent.

Changes by 1985 included the closing of the Drive-In Movie and the Conoco Refinery and the expansion of the waste water treatment plant atop former Landfill *K*.

As can be ascertained from the above text, Tables 1-4, Figures 1-6 and the maps in the Appendix, the vast majority of the properties within the Proposed Turnpike Right-of-Way from the Passaic River to Milepost 105 have been exposed to possible sources of contamination at some time from 1934 to 1985 either from activities directly on the properties or immediately adjacent to them. The primary sources of contamination during that period have been from landfill activity and industrial operations.

IV. PROPERTY REPORTS

The property reports are presented in the following manner. The property or site is indexed by a number. This number is the same as that shown in Tables 1,2,3 and 4. Ownership/Occupant data can therefore be found by referring to those tables. The second item of information for each property identifies the type of possible contamination on a property along with the year or years that it was observed. The third item of information is the similar to the second except that only those possible sources of contamination that are wholly or partially within the proposed Right-of-Way on the property are indicated. Industrial Activity where identified indicates a possible source of contamination except where it is described as (low risk).

A. North Map - West Side of Turnpike

* SITE 11
  Property: Fill-(1947,1985). Waste Disposal-(1970).
  ROW: Fill-(1947,1985). Waste Disposal-(1970).

* SITE 20
  Property: Fill-(1947,1985). Waste Disposal-(1970).
  ROW: Fill-(1947,1985). Waste Disposal-(1970).

* SITES 21-22
  Property: Fill-(1947,1985). Waste Disposal-(1970).
  ROW: Fill-(1947,1985). Waste Disposal-(1970).

* SITE 24
  Property: Waste Disposal-(1940,1951,1970). Fill-(1947,1985). Landfill-(1985).
  ROW: Waste Disposal-(1951,1970). Fill-(1985).

* SITE 25
  Property: Industrial Activity-(1934: Hart Dyeing Company, 1985: Deleet Merchandising Company(low risk)). Waste Disposal-(1940,1951). Fill-(1959). Landfill-(1970,1985).

* SITES 30-33
  Property: Industrial Activity-(1934,1940,1947,1951,1959,1970,1985: Bayonne Barrel & Drum). Drum Storage-(1934,1940,1947,1951,1959,1970,1985). Landfill-(1934,1940,1947). Lagoon-(1947,1951). Fill-(1959). Tank Storage-(1985). Waste Disposal-(1959,1985).
  ROW: Industrial Activity-(1934,1940,1947,1951,1959,1970,1985: Bayonne Barrel & Drum). Drum Storage-(1934,1940,1947,1951,1959,1970,1985). Landfill-(1934,1940,1947). Lagoon-(1947,1951). Fill-(1959). Tank Storage-(1985). Waste Disposal-(1959).

* SITES 34-35
Property: Industrial Activity-(1934: Jersey Feed Farms). Landfill-(1934,1940,1947). Lagoon-(1951). Waste Disposal-(1985).
ROW: Industrial Activity-(1934: Jersey Feed Farms). Landfill-(1934,1940,1947). Lagoon-(1951). Waste Disposal-(1985).

* SITES 42-44
Property: Industrial Activity-(1934-1950: Capstone Manufacturing Company, Metz Laboratories, 1950-1970: Ohmlac Paint Company, 1950-?: Chemical Industries/Arkansas Chemical). Tank Storage-(1934,1940,1947,1951,1959,1970,1985). Fill-(1940).
ROW: Industrial Activity-(1934-1950: Capstone Manufacturing Company, Metz Laboratories, 1950-1970: Ohmlac Paint Company, 1950-?: Chemical Industries/Arkansas Chemical). Tank Storage-(1934,1940,1947,1951,1959,1970,1985). Fill-(1940).

B. North Map - East Side of Turnpike

* SITE 10
Property: Fill-(1947).
ROW: Fill-(1947).

* SITE 1
Property: Industrial Activity-(1934,1940,1947,1951,1959,1970,1985: PSE&G). Coal Storage-(1934,1940,1947,1951,1959). Tank Storage-(1940,1947,1951,1959,1970,1985). Waste Disposal-(1940,1959). Lagoon-(1947,1951,1959,1970). Fill-(1970).
ROW: Industrial Activity-(1934,1940,1947,1951,1959,1970,1985: PSE&G).

* SITE 49
Property: Industrial Activity-(1934,1940,1947,1951; 1985: B&S Partners/SCA Chem Services{low risk}. Drum Storage-(1940). Landfill-(1947).
ROW: Indutrial Activity-(1934,1940,1947,1951). Landfill-(1947).

* SITE 50
Property: Industrial Activity-(1985: Vineland Construction{low risk}). Landfill-(1934,1940,1947). Waste Disposal-(1970).
ROW: Landfill-(1934,1940,1947). Waste Disposal-(1970).

* SITE 51
Property: Industrial Activity-(1934,1940,1947,1951,1959,1970,1985: Getty Oil). Waste Disposal-(1934,1959,1970). Tank Storage-(1940,1947,1951,1959,1970,1985). Open Storage-(1959). Standing Liquid-(1959). Landfill-(1970).
ROW: Industrial Activity-(1934,1940,1947,1951,1959,1970,1985: Getty Oil). Waste Disposal-(1934). Tank Storage-(1940,1947,1951,1959,1970,1985). Landfill-(1970).

* SITE 54
Property: Industrial Activity-(1985: Jan Realty Urban Renewal Association/Rollins Truck Leasing(low risk)). Lagoon-(1947,1951,1959). Landfill-(1951,1959,1970). Standing Liquid-(1959).
ROW: Industrial Activity-(1985: Jan Realty Urban Renewal Association/Rollins Truck Leasing(low risk). Lagoon-(1947,1951,1959). Landfill-(1951,1959,1970). Standing Liquid-(1959).

* SITE 55
Property: Industrial Activity-(1934,1940,1947,1951,1959,1970: Pitt-Consol Chemical). Tank Storage-(1934,1940,1947,1951,1959,1970,1985). Waste Disposal-(1934). Liquid Storage-(1934). Lagoon-(1940,1947,1951,1959). Standing Liquid-(1947,1951,1959,1985). Drum Storage-(1947). Fill-(1959).
ROW: Waste Disposal-(1934). Lagoon-(1940,1947,1951,1959). Standing Liquid-(1959).

* SITE 56
Property: Industrial Activity-(1959,1970,1985: Jumon Realty Company/Friedman's Express(low risk)). Landfill-(1940,1947).
ROW: Landfill-(1940,1947).

* SITE 57
Property: Industrial Activity-(1934-1950: Lacquer Specialties; 1950-1985?: Chemical Solvents & Lacquer Specialties/Ashland Oil & Refining). Tank Storage-(1934,1940,1947,1951,1959,1970,1985).
ROW: Industrial Activity-(1934-1950: Lacquer Specialties; 1950-1985?: Chemical Solvents & Lacquer Specialties/Ashland Oil & Refining).

C. South Map - West Side of Turnpike

* SITE 89
Property: Industrial Activity-(1959,1970,1985: Junkyard). Landfill-(1934,1940,1947,1951,1959,1970). Waste Disposal-(1934). Fill-(1951). Liquid Storage-(1985).
ROW: Waste Disposal-(1934). Landfill-(1951,1959,1970). Fill-(1951).

* SITE 90
Property: Industrial Activity-(1934-1950: Rockwell Machinist; 1951,1959,1970,1985: Junkyard). Waste Disposal-(1947,1985). Open Storage-(1959,1985). Drum Storage-(1985).
ROW: Industrial Activity-(1934-1950: Rockwell Machinist; 1951,1959,1970,1985: Junkyard). Waste Disposal-(1947,1985). Open Storage-(1959,1985). Drum Storage-(1985).

* SITE 94
Property: Industrial Activity-(1947; 1951,1959,1970,1985: M&M Transport Motor Freight/Courtesy Container Service(low risk)). Drum Storage-(1947).
ROW: Industrial Activity-(1947; 1951,1959,1970,1985: M&M Transport Motor Freight/Courtesy Container Service(low risk)). Drum Storage-(1947).

* SITE 95
Property: Industrial Activity-(1959,1970,1985: Roy Stone Transfer Corp./Junkyard). Landfill-(1934,1940,1947,1951,1959). Standing Liquid-(1951).
ROW: Industrial Activity-(1959,1970,1985: Roy Stone Transfer Corp./Junkyard). Landfill-(1934,1940,1947,1951,1959). Standing Liquid-(1951).

* SITE 96
Property: Industrial Activity-(1970,1985: Imperial Urban Renewal/Ironbound Transport Park/Junkyard). Landfill-(1934,1940,1947,1951,1959). Waste Disposal-(1970).
ROW: Industrial Activity-(1970,1985: Imperial Urban Renewal/Ironbound Transport Park/Junkyard). Landfill-(1934,1940,1947,1951,1959).

* SITE 97
Property: Industrial Activity-(1970,1985: Imperial Urban Renewal/Ironbound Transport Park/Junkyard). Landfill-(1934,1940,1947,1951,1959).
ROW: Industrial Activity-(1970,1985: Imperial Urban Renewal/Ironbound Transport Park/Junkyard). Landfill-(1934,1940,1947,1951,1959).

* SITE 103
Property: Landfill-(1940,1947,1951,1959,1970,1985).
ROW: Landfill-(1940,1947,1951,1959,1970,1985).

D. South Map - East Side of Turnpike

* SITE 72
Property: Waste Disposal-(1970,1985).

* SITES 73 & 77
Property: Industrial Activity-(1934: Mertz Rendering Plant; 1940,1947,1951,1959,1970; 1985: Pfister Chemical/Alliance Color & Chemical). Lagoon-(1951,1970). Landfill-(1959). Tank Storage-(1985). Drum Storage-(1985).
ROW: Industrial Activity-(1934: Mertz Rendering Plant; 1940,1947,1951,1959). Lagoon-(1951,1970). Landfill-(1959).

* SITES 78-79
Property: Industrial Activity-(1934,1940,1947,1951,1959,1970,1985). Landfill-(1934,1940,1947,1951,1959,1970,1985). Sludge-(1940). Lagoon-(1947,1970).
ROW: Landfill-(1940,1947,1951,1959,1970,1985). Lagoon-(1947,1970).

* SITE 80
Property: Industrial Activity-(1934,1940; 1970: Junkyards; 1985: White Rose Meats(low risk)). Waste Disposal-(1934,1947,1951). Landfill-(1959,1970). Lagoon-(1985).
ROW: Industrial Activity-(1970: Junkyards). Waste Disposal-(1947,1951). Landfill-(1959,1970). Lagoon-(1985).

* SITE 81
Property: Landfill-(1959,1970). Waste Disposal-(1970). Tank Storage-(1985).
ROW: Landfill-(1959,1970). Waste Disposal-(1970). Tank Storage-(1985).

* SITES 82 & 83-85
Property: Industrial Activity-(1934,1940,1947,1951; 1970,1985: Junkyards). Waste Disposal-(1940,1947,1951,1970,1985). Landfill-(1947,1959,1970). Drum Storage-(1947). Open Storage-(1947). Fill-(1947).
ROW: Industrial Activity-(1934,1940,1947,1951; 1970,1985: Junkyards). Waste Disposal-(1940,1947,1951,1970,1985). Landfill-(1947,1959,1970). Drum Storage-(1947). Fill-(1947).

* SITE 86
Property: Industrial Activity-(1934,1940,1947,1951,1959; 1970,1985: Junkyards). Open Storage-(1959).
ROW: Industrial Activity-(1934,1940,1947,1951,1959; 1970,1985: Junkyards). Open Storage-(1959).

* SITE 113
Property: Industrial Activity-(1959,1970: Junkyards; 1985).
ROW: Industrial Activity-(1959,1970: Junkyards; 1985).

* SITE 112
Property: Industrial Activity-(1959:Junkyards; 1985: Jet Urban Renewal Corp./Circle Air Freight (low risk)).
ROW: Industrial Activity-(1959:Junkyards; 1985: Jet Urban Renewal Corp./Circle Air Freight (low risk)).

* SITES 111 & 109
Property: Industrial Activity-(1934-1950: Beckwith Chandler Paints; 1950-?: Devoe & Reynolds; 1951,1959,1970; 1985: ADCO Chemical). Tank Storage-(1959,1985). Waste Disposal-(1985).

* SITE 104
  Property: Industrial Activity-(1959,1970,1985: Monoplast Chemical Company).
  ROW: Industrial Activity-(1959,1970,1985: Monoplast Chemical Company).

* SITE 105
  Property: Landfill-(1970,1985). Drum Storage-(1985).
  ROW: Landfill-(1985).

* SITE 106
  Property: Landfill-(1934,1940,1947,1970,1985).
  ROW: Landfill-(1934,1940,1947).

* SITE 107
  Property: Landfill-(1947).
  ROW: Landfill-(1947).

TABLE 1

HISTORICAL SURVEY - POSSIBLE SOURCES OF CONTAMINATION (NORTH MAP/WESTSIDE OF TURNPIKE)

Site #	Present Owner/Occupant	1934	1940	1947	1951	1959	1970	1985	Previous Owner/Occupant
11	Newark Housing Authority	-	-	FL	-	-	WD	FL	
20	Conrail	-	-	FL	-	-	WD	FL	
21-22	Conrail	-	-	FL	-	-	WD	FL	
24	City of Newark	-	WD	FL	WD	-	WD	LF,FL	
5&26	Conrail	-	-	-	-	-	-	-	
6	PSE&G	-	-	-	-	-	-	-	
7	Dept. of Higher Education	-	-	-	-	-	-	-	
25	Deleet Merchandising Corp.	IA	WD	-	WD	FL	LF	LF,IA	Hart Dyeing Co. 1934-40
30-33	Bayonne Barrel & Drum Frank Langella	IA,DR,LF	IA,DR,LF	IA,DR,LG LF	IA,DR,LG	IA,DR,FL WD	IA,DR	TS,IA,DR,WD	
34-35	Edle Realty	LF,IA	LF	LF	LG	-	-	WD	Jersey Feed Farms (pig-pens) 1934-40/Drive-In 1959
42-44	41-Foundry St. Corp./ Sun Chemical 42-City of Newark/Ark. Chem 43-Ashland Oil 44-Ashland Oil	IA,TS	IA,FL,TS	IA,TS	IA,TS	IA,TS	IA,TS	IA,TS	Capstone Mfg. Co. (oil, Grease,Soaps) 1934-50 Ohmlac Paint & Ref. Co. 1950-70 Metz Laboratories (Mfg. Drugs) 1934-50 Chem Industries/Arkansas Chem. 1950-

LEGEND

C - Coal Storage
DR - Drum Storage
FL - Fill
IA - Industrial Activity
LF - Landfill
LG - Lagoon
LS - Liquid Storage
OS - Open Storage
SD - Sludge
SL - Standing Liquid
TS - Tank Storage
WD - Waste Disposal

TABLE 2

HISTORICAL SURVEY - POSSIBLE SOURCES OF CONTAMINATION (NORTH MAP/EASTSIDE OF TURNPIKE)

Site #	Present Owner/Occupant	1934	1940	1947	1951	1959	1970	1985	Previous Owner/Occupant
9	NJ Turnpike Authority	-	-	-	-	-	-	-	
10	NJ Turnpike Authority	-	-	FL	-	-	-	-	
8	Conrail	-	-	-	-	-	-	-	
1	PSE&G	IA,C	IA,TS,WD, C	IA,TS,LG, C	IA,TS,LG, C	IA,TS,LG, C,WD	IA,TS,LG FL	IA,TS	
3	PSE&G	-	-	-	-	-	-	-	
49	B&S Partners/SCA Chem SVCES (Trailer Parts)	IA	IA,DR	IA,LF	IA	-	-	IA	
50	Vineland Construction	LF	LF	LF	-	-	WD	IA	
51	Power Test Realty/Getty	IA,WD	IA,TS	IA,TS	IA,TS	IA,TS,WD, OS,SL	IA,TS,LF WD	IA,TS	Getty Oil
54	Jan Realty Urban Renewal Assn/Rollins Truck Leas.	-	-	LG	LF,LG	LF,SL,LG	LF	IA	
55	Pitt-Consol Chemical	IA,TS,WD LS	IA,TS,LG	IA,TS, LG,SL,DR	IA,TS, LG,SL	IA,TS,LG SL,FL	IA,TS,	SL,TS	
56	Jumon Realty Co./ Friedman's Express	-	LF	LF	-	IA	IA	IA	
57	Ashland Oil & Refining	IA,TS	IA,TS	IA,TS	IA,TS	IA,TS	IA,TS	IA,TS	Lacquer Specialties (Lacquer Mfg. 1934-50) Chemical Solvents & Lacquer Spec. 1950

LEGEND

C - Coal Storage
DR - Drum Storage
FL - Fill
IA - Industrial Activity
LF - Landfill
LG - Lagoon
LS - Liquid Storage
SD - Sludge
OS - Open Storage
SL - Standing Liquid
TS - Tank Storage
WD - Waste Disposal

TABLE 3

HISTORICAL SURVEY - POSSIBLE SOURCES OF CONTAMINATION (SOUTH MAP/WESTSIDE OF TURNPIKE)

Site #	Present Owner/Occupant	1934	1940	1947	1951	1959	1970	1985	Previous Owner/Occupant
87	Conrail	-	-	-	-	-	-	-	
88	Conrail	-	-	-	-	-	-	-	
89	Newark Housing Authority	LF,WD	LF	LF	LF,FL	IA,LF	IA,LF	IA,LS	
90	Newark Housing Authority/ Junkyard	IA	IA	IA,WD	IA	IA,OS	IA	IA,DR,OS,WD	W.S. Rockwell (Machinist) 1934-50
94	Courtesy Container Service	-	-	IA,DR	IA	IA	IA	IA	M&M Transport(Motor Freight) 1951
95	Roy Stone Transfer Corp.	LF	LF	LF	LF,SL	LF,IA	IA	IA	Junkyard
96	Imperial Urban Renewal Assn/IronBound Transport Park	LF	LF	LF	LF	LF	IA,WD	IA	
97	Imperial Urban Renewal Assn/IronBound Transport Park	LF	LF	LF	LF	LF	IA	IA	
103	Newark Housing Authority	-	LF	LF	LF	LF	LF	LF	

LEGEND

C - Coal Storage
DR - Drum Storage
FL - Fill
IA - Industrial Activity
LF - Landfill
LG - Lagoon
LS - Liquid Storage
SD - Sludge
OS - Open Storage
SL - Standing Liquid
TS - Tank Storage
WD - Waste Disposal

TABLE 4

HISTORICAL SURVEY - POSSIBLE SOURCES OF CONTAMINATION (SOUTH MAP/EASTSIDE OF TURNPIKE)

Site #	Present Owner/Occupant	1934	1940	1947	1951	1959	1970	1985	Previous Owner/Occupant
72	Conrail	-	-	-	-	-	WD	WD	
73	Pfister Chemical/Alliance	IA	IA	IA	IA,LG	IA,LF	IA,LG	IA,TS,DR	Mertz Rendering Plant 1934
77	Alliance Color & Chemical								
78-79	Newark Housing Authority	IA,LF	IA,LF,SD	IA,LF,LG	IA,LF	IA,LF	IA,LF,LG	IA,LF	
80	Newark Economic Development White Rose Meats	IA,WD	IA	WD	WD	LF	IA,LF	IA,LG	
81	Synfax Urban Renewal Corp.	-	-	-	-	LF	LF,WD	TS	
82	Newark Housing Author./ Junkyard	IA	IA,WD	IA,LF,DR, OS,FL,WD	IA,WD	LF	IA,WD,LF	IA,WD	
83-85	Federal Storage Warehouse/ Junkyards								Junkyards
86	Stephanie Klena/Diner	IA	IA	IA	IA	IA,OS	IA	IA	
113	Passaic Valley Sewerage Comm.	-	-	-	-	IA	IA	IA	
112	Jet Urban Renewal Corp./ Circle Air Freight	-	-	-	-	IA	-	IA	
111	Ridge Equities/ADCO Chem.	IA	IA	IA	IA	IA,TS	IA	IA,TS,WD	Beckwith Chandler (Mfg. Paints) 1934-50 Devoe & Reynolds 1950-
109	" " "								
104	Newark Housing Authority/ Monoplast Chemical Corp.	-	-	-	-	IA	IA	IA	
105	Passaic Valley Sewerage Comm.	-	-	-	-	-	LF	LF,DR	
106	City of Newark	LF	LF	LF	-	-	LF	LF	
107	Passaic Valley Sewerage Comm.	-	-	LF	-	-	-	-	

LEGEND

C - Coal Storage
DR - Drum Storage
FL - Fill
LA - Industrial Activity
LF - Landfill
LG - Lagoon
LS - Liquid Storage
OS - Open Storage
SD - Sludge
SL - Standing Liquid
TS - Tank Storage
WD - Waste Disposal

EXPLANATION

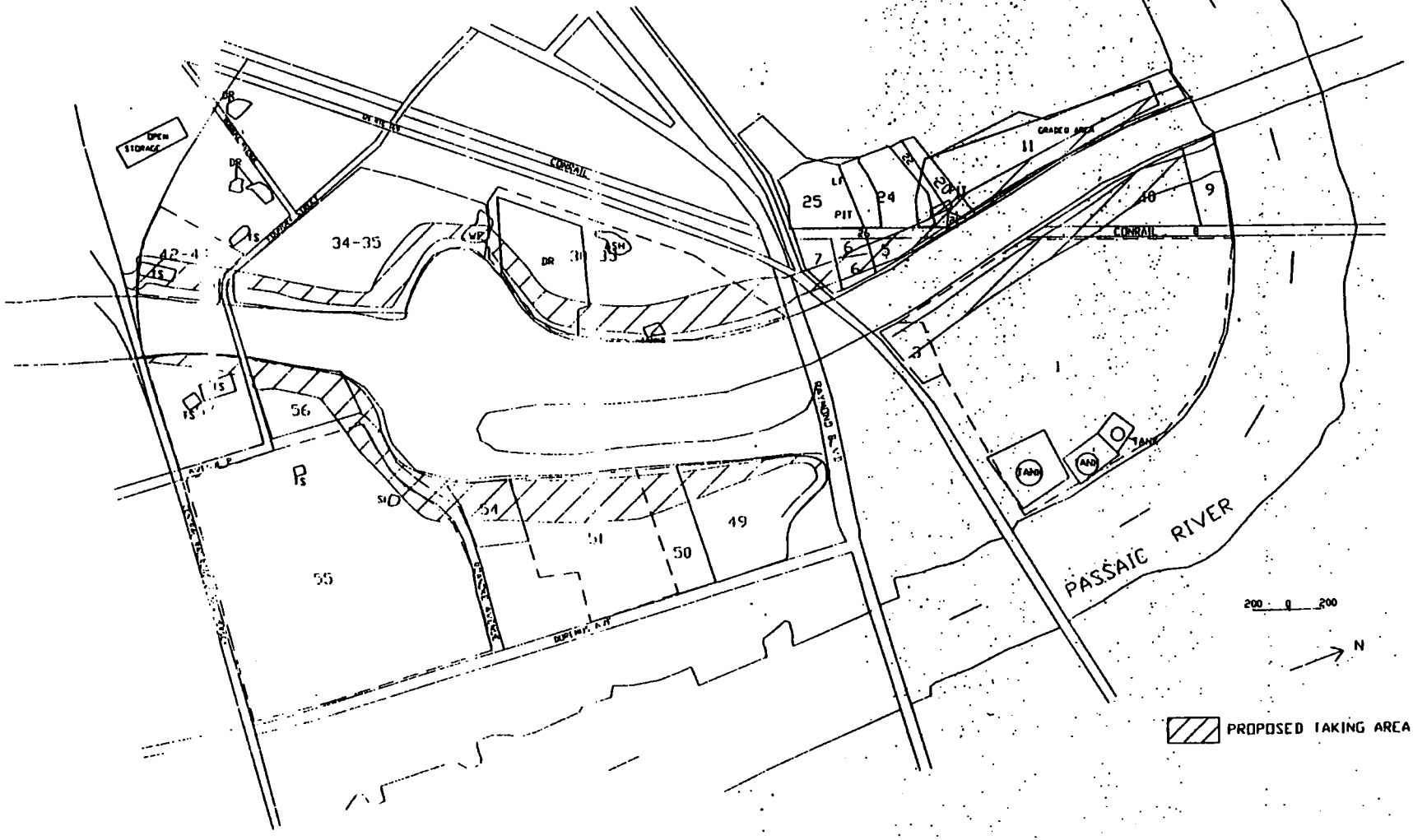
DR	Drum Storage	SD	Sludge
FL	Fill	SL	Standing Liquid
LF	Landfill	TS	Tank Storage
LG	Lagoon	WD	Waste Disposal
LS	Liquid Storage	WP	Waste Pile
OS	Open Storage		

1934 INFORMATION
1940 INFORMATION
1947 INFORMATION
1951 INFORMATION
1959 INFORMATION
1970 INFORMATION
1985 INFORMATION

Proposed Turnpike ROW

Demolished Buildings

1985 - POSSIBLE SOURCES OF CONTAMINATION



December 23, 1985

Gollob Analytical Service
47 Industrial Road
Berkeley Heights, New Jersey 07922

Attention: Lou Molinini

Re: Transfer of Soil Samples and Request for Analysis
Bayonne Barrel and Drum Company
Job No. 84C182

Gentlemen:

Please find attached a copy of the Chain of Custody form for the samples from the subject site. These samples were transferred to your laboratory by John A. Larkins, of Dan Raviv Associates, Inc. on December 3, 1985. The purpose of this letter is to confirm our instructions regarding the type of analysis to be performed. The analyses requested are indicated in the "Remarks" column opposite each of the samples listed on the attached form.

If you have any questions, please call.

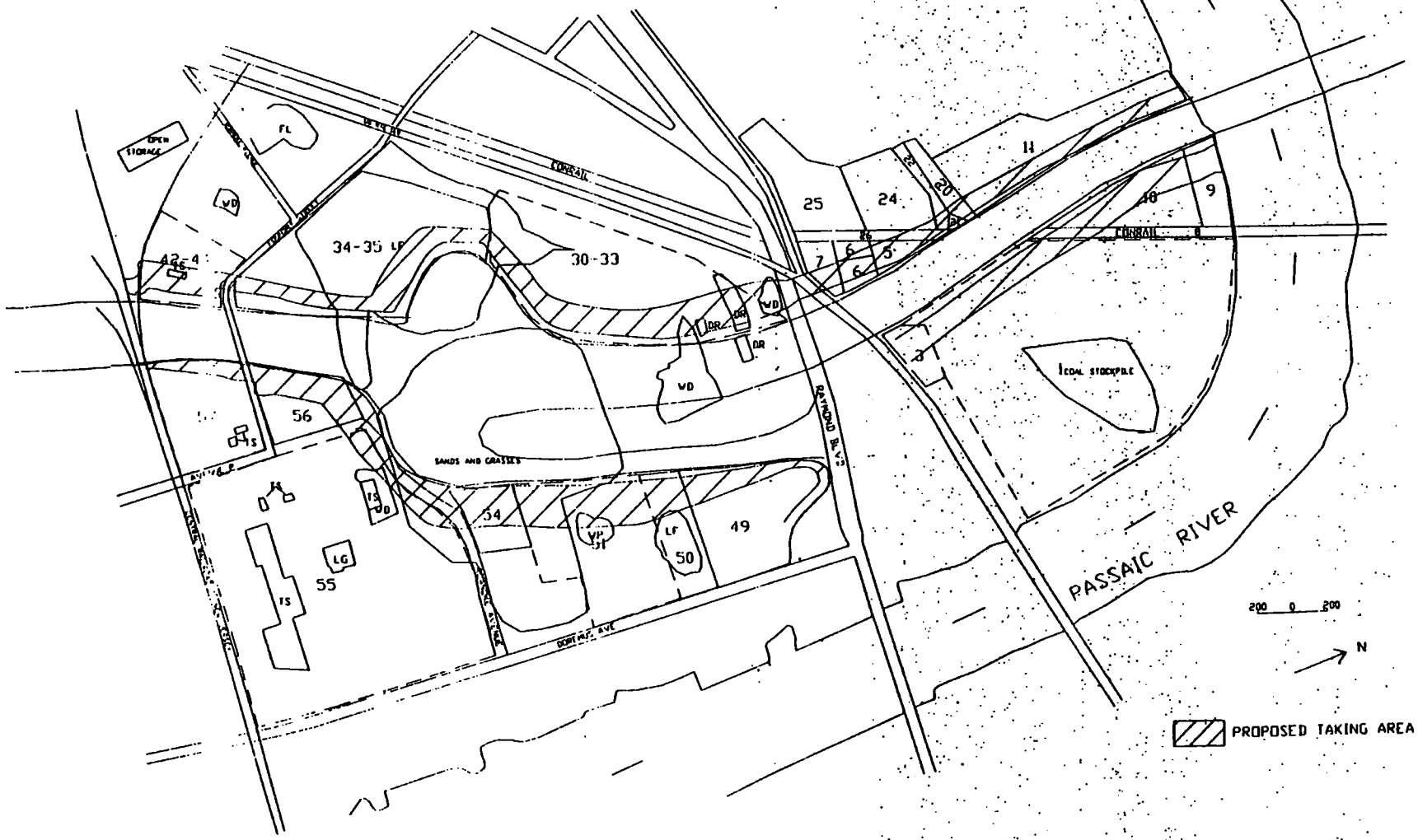
Very truly yours,

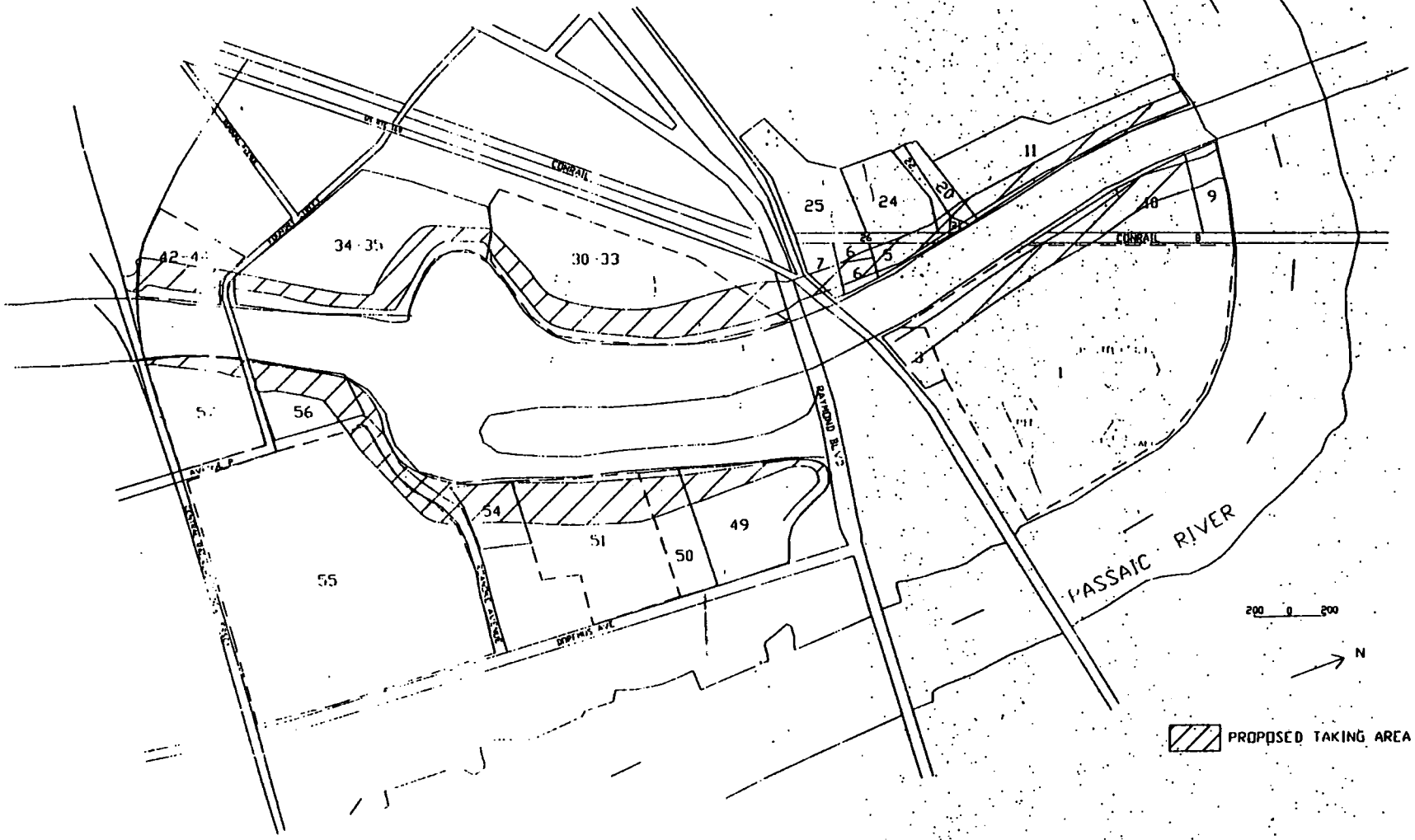
DAN RAVIV ASSOCIATES, INC.

Michael M. Zucker
Geologist

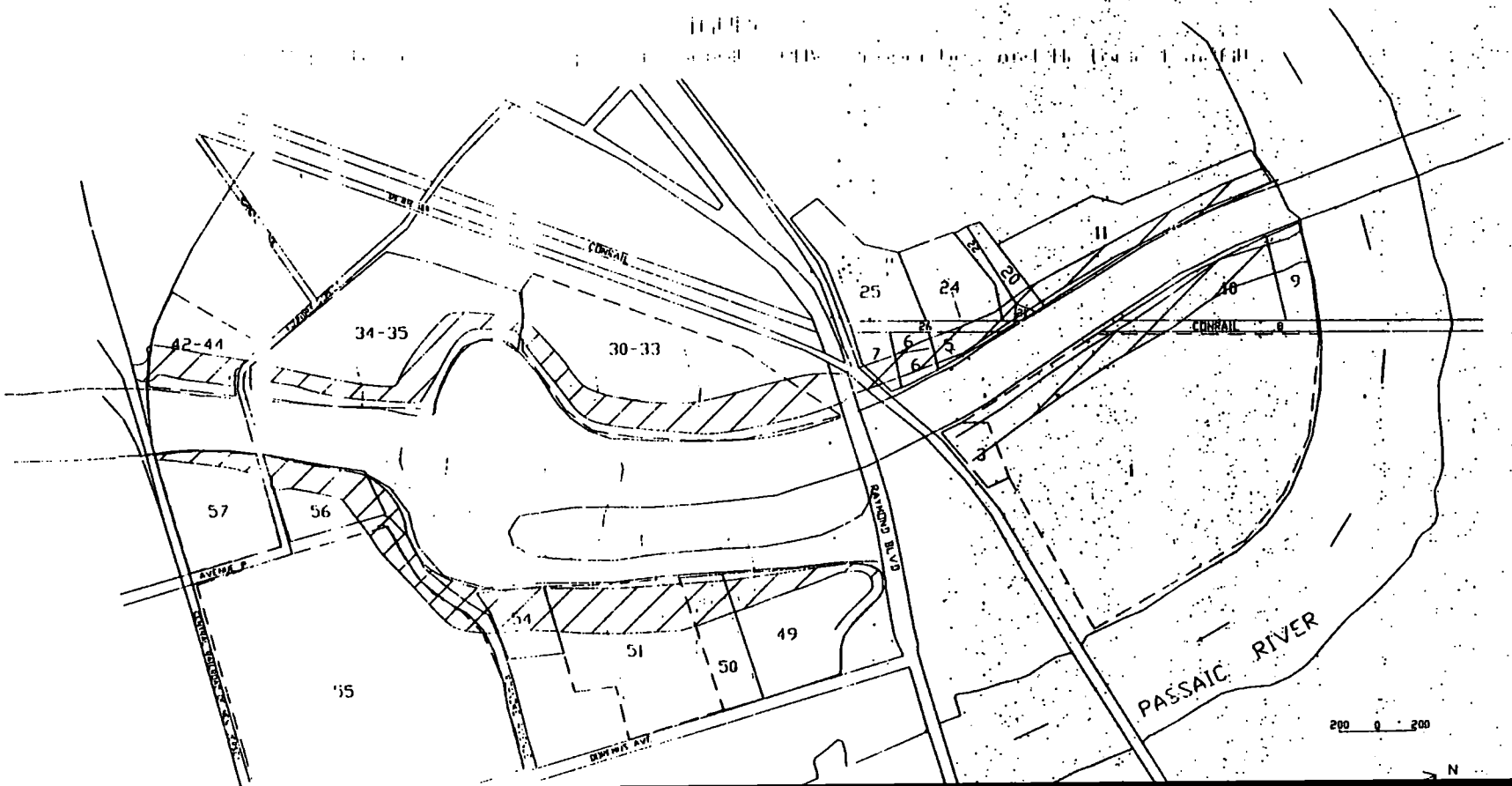
MMZ/sm
Enc.

1934 - POSSIBLE SOURCES OF CONTAMINATION





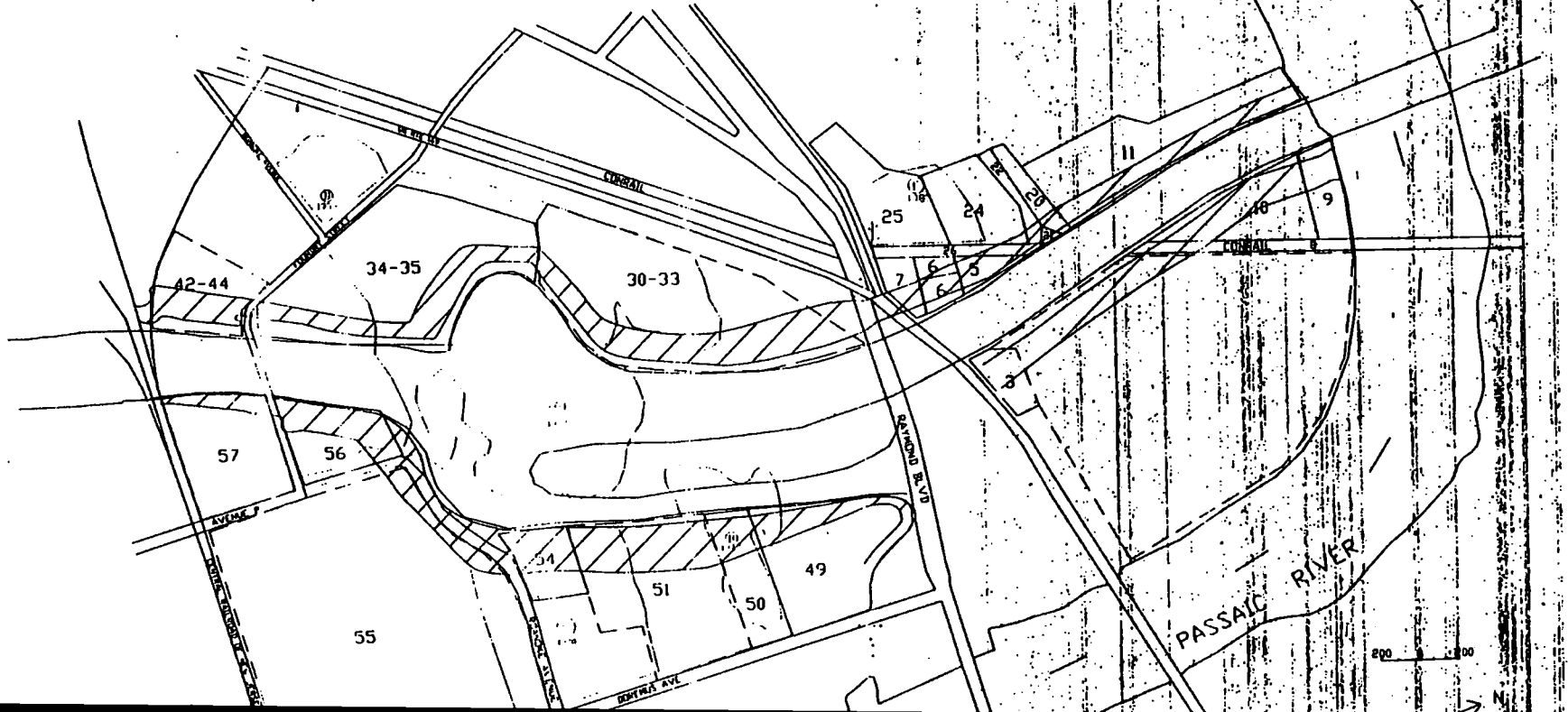
CONRAIL
CONRAIL
RAYMOND BLVD
DOREMUS AVE
PASSAIC RIVER
34-35
30-33
42-44
25
24
20
11
10
9
7
6
6
5
3
1
56
54
51
50
49
55
200 0 200
N
PROPOSED TAKING AREA



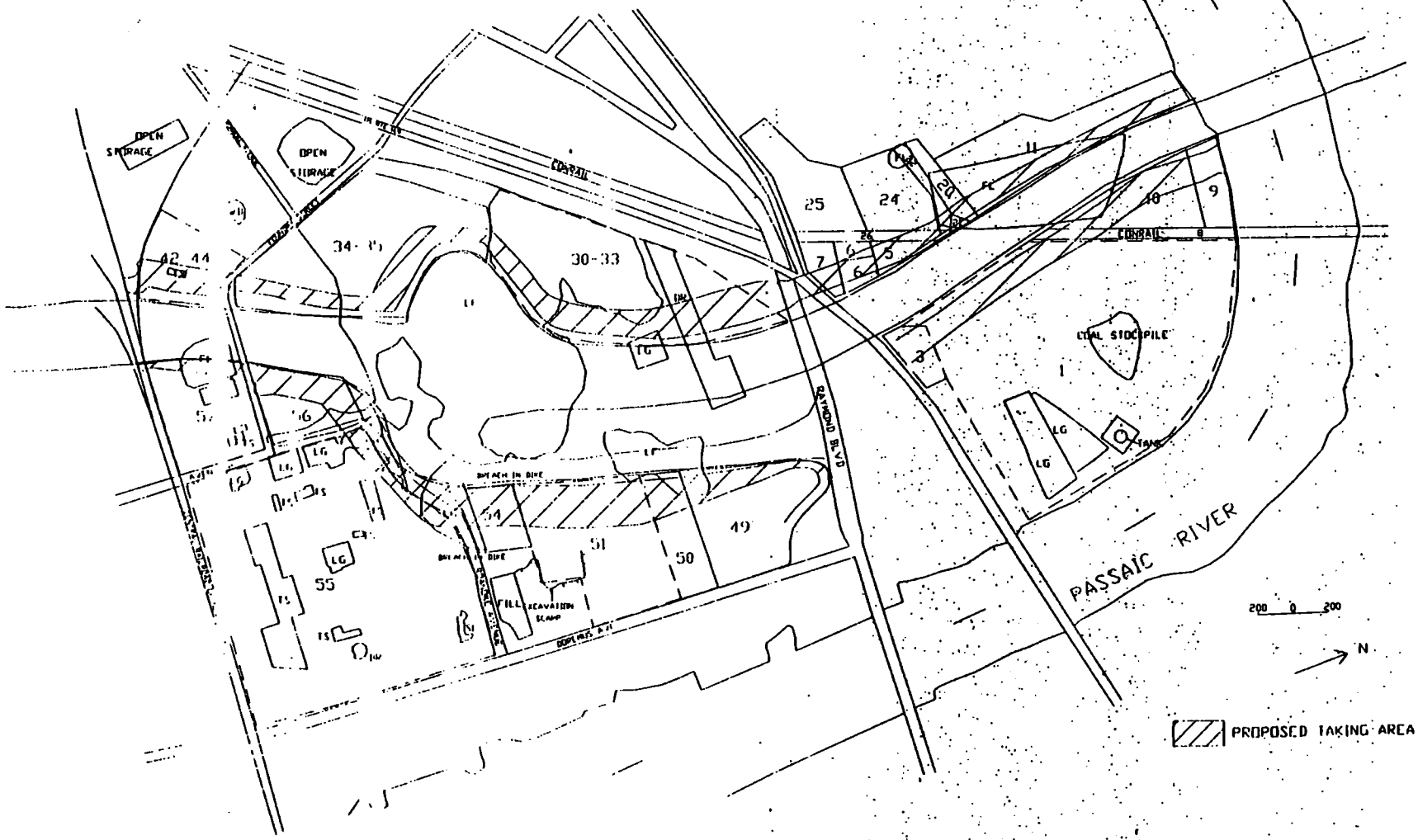
42-44
34-35
30-33
25
24
20
11
10
9
7
6
6
5
3
1
57
56
55
54
51
50
49
CONRAIL
CONRAIL
RAYMOND BLVD
AVENUE P
PASSAIC RIVER
200 0 200
N

FIGURE 3

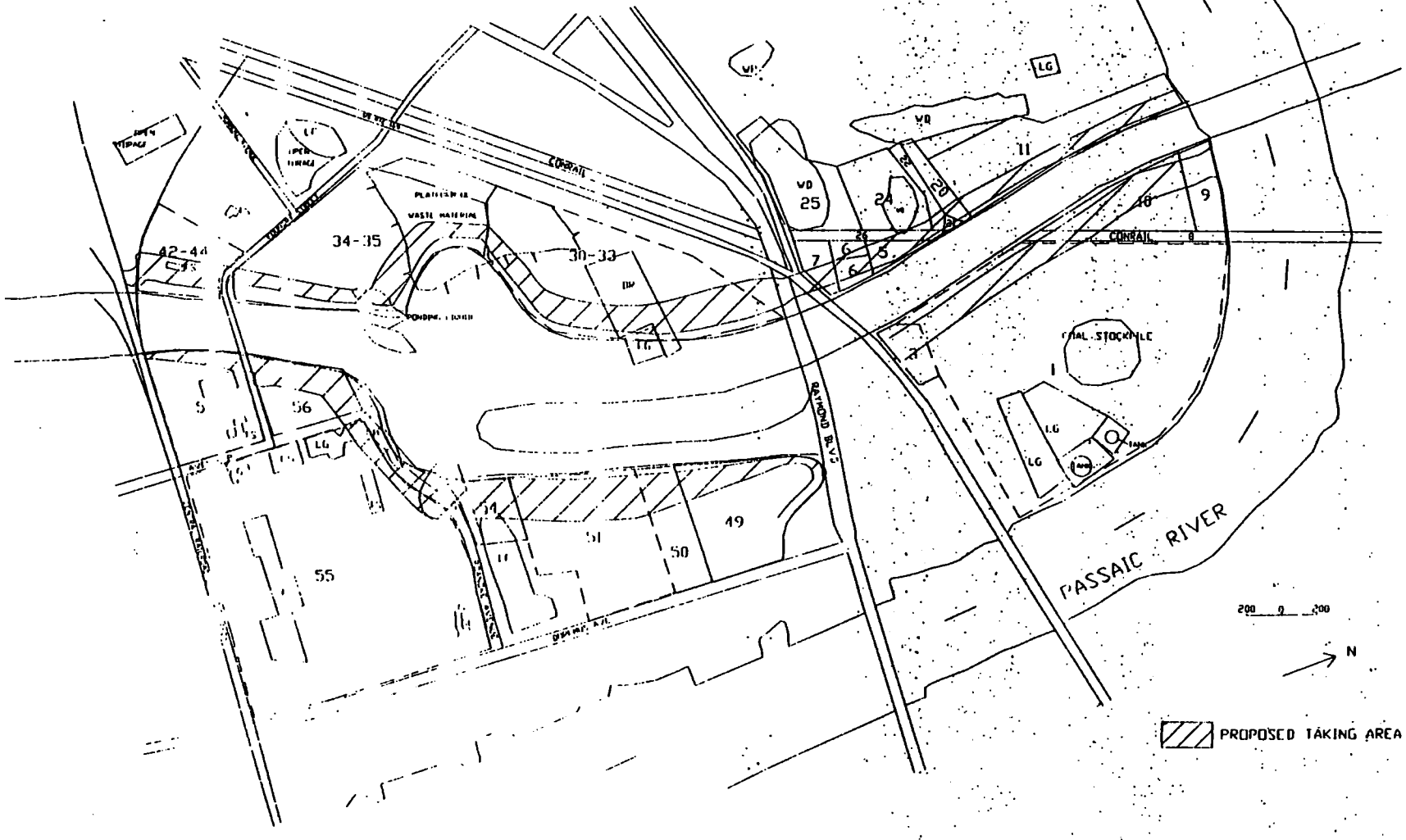
Note: Map Showing Road, Proposed Turnpike PUW, Properties and Historic Landfills



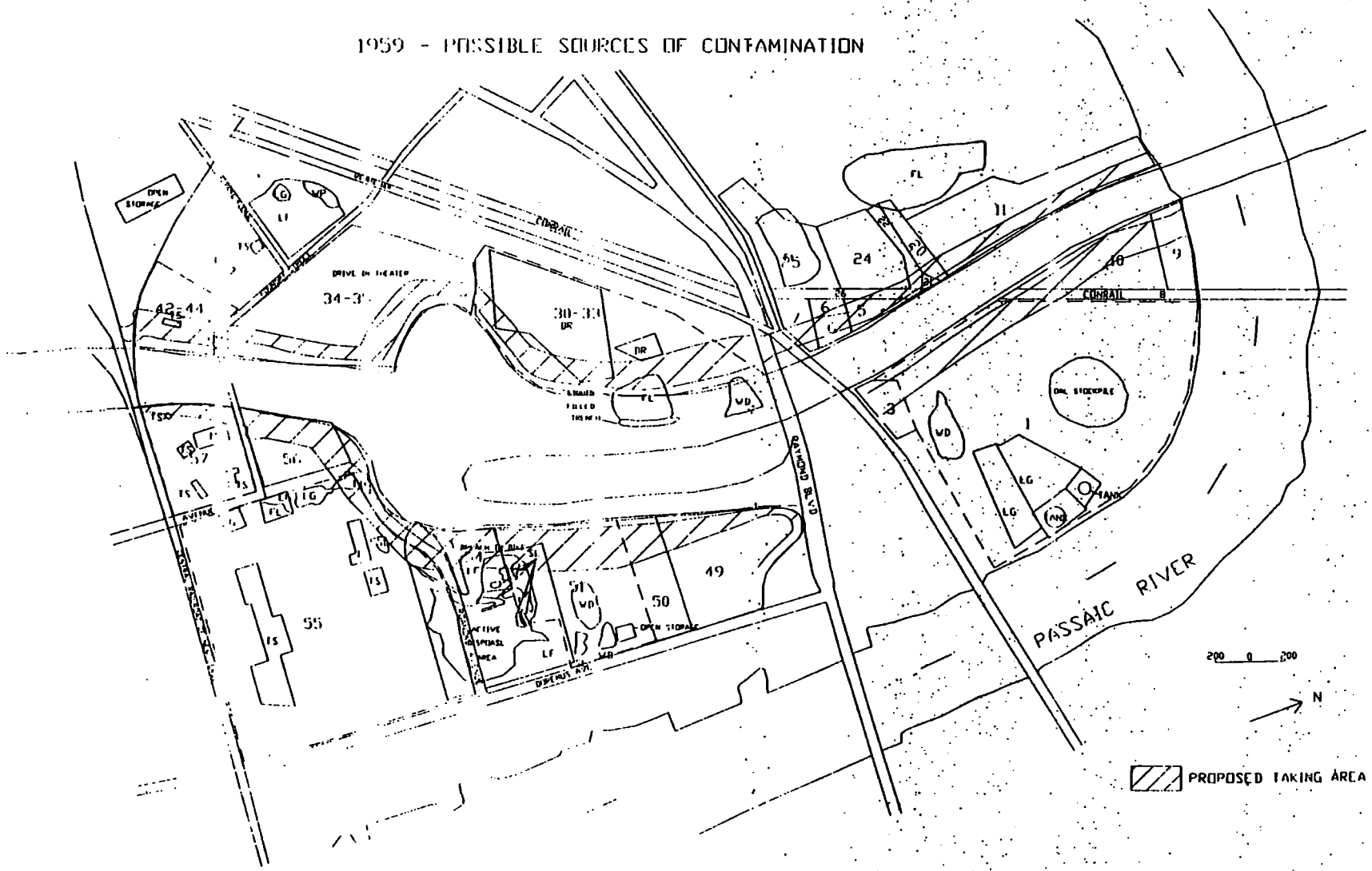
P47 - POSSIBLE SOURCES OF CONTAMINATION



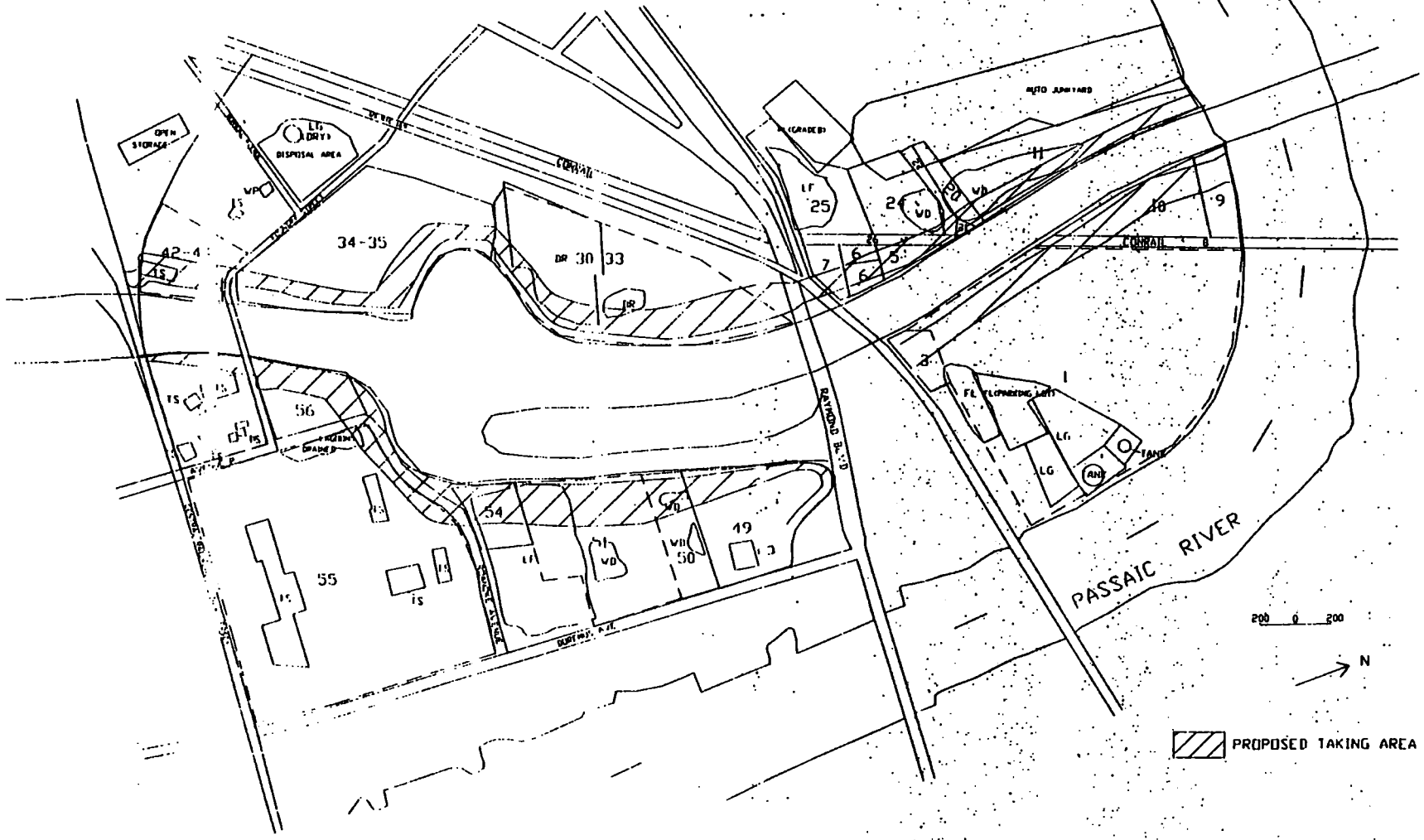
POSI - POSSIBLE SOURCES OF CONTAMINATION



1959 - POSSIBLE SOURCES OF CONTAMINATION



1970 - POSSIBLE SOURCES OF CONTAMINATION



APPENDIX
E

Diversified
Environmental
Resources, Inc.
1440A Pennington Road Trenton, New Jersey 08618
609-771-3616 FAX # 609-771-4276

APPENDIX E

RESULTS OF PRELIMINARY INVESTIGATIONS AND SAMPLING IN PROPOSED NEW JERSEY TURNPIKE RIGHT-OF-WAY AT THE FORMER NEWARK DRIVE-IN PROPERTY NEWARK, NEW JERSEY

SUBMITTED BY:
LOUIS BERGER & ASSOCIATES, INC.
100 HALSTED STREET
EAST ORANGE, NEW JERSEY

A
STOUT
A COMPLETE ENVIRONMENTAL SERVICE COMPANY.
COMPANY

Results of Preliminary Investigations and Sampling in Proposed New Jersey Turnpike Right-of-Way at the Former Newark Drive-In Property

Newark, New Jersey

Submitted to:

New Jersey Turnpike Authority

P.O. Box 1121

New Brunswick, New Jersey

Submitted by:

Louis Berger & Associates, Inc.

100 Halsted Street

East Orange, New Jersey

September, 1986

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Appendices

Appendix A Site Safety Plan

Appendix B Quality Assurance Program and Chain of Custody Documents

Appendix C Boring Logs and Well Permits

1.0 INTRODUCTION

The Newark Drive-In Movie Theater Site is located between two identified hazardous waste sites. To the north there is the Bayonne Barrel and Drum Company facility, a former drum reconditioner subject to a consent order after having been identified by USEPA as an unlicensed hazardous waste storage facility. To the south lies the Ashland Chemical and Arkansas Chemical site identified by NJDEP as containing or suspected of containing, hazardous wastes. The general area surrounding the Drive-In Movie Site is an industrial area with many other identified hazardous waste sites in close proximity. Therefore though the site's use as a movie theater did not make it subject to any hazardous waste regulations, it was determined prudent to undertake a minimal investigation to discover if any contamination is present at the site.

After this determination had been made but prior to commencing any investigation, excavation for a new theater building was witnessed and the existence of an underlying former landfill was noted.

The investigation undertaken was very limited with the sole intention of determining the existence or absence of contamination in the proposed Turnpike right-of-way. It was not intended at this stage to delineate the extent of contamination if it was found. In this regard there are no specific recommendations for further action appropriate at this time.

2.0 SITE DESCRIPTION

The Newark Drive-In Movie Site is located on Foundry Street, in Newark, N.J. (see Figure 1). It is bound by Foundry Street to the south, the Turnpike on the east and northeast, by Bayonne Barrel and Drum Company to the north, and on the west by US 1 and 9. Across Foundry Street there are a number of industrial properties including the aforementioned Ashland Chemical and Arkansas Chemical facilities. The property is in two lots, Block 5002, lots 11 and 12. The total site area is 19.2 acres.

Until it was disturbed by excavation, the site had been flat and covered in cinders with an asphalted perimeter road on the eastern and northeastern boundary. As a result of foundation work there are piles of material on the southwestern area of the site and an open pit, partly inundated on the northeastern area.

2.1 Site Characteristics

Current surface conditions at the former Newark Drive-In reflects a series of large crater-like depressions and mounds composed of demolition debris. These mounds and depressions are the result of the disruption of the Newark Drive-In for a planned multi-theater complex.

Most of the major disruptions took place in the northern half of the site with the southern half being more level. The deep depressions in the northern half allow for moderately rapid drainage of the southern portion into the depressions. Ponded water was evident most of the time in the depressions even during summer months with the water table being very close to the surface. There is no discernable drainage pattern to the site since the disruption occurred. Much of the mounded material consisted of large slabs of asphalt. Besides the asphalt the balance of the debris is mainly demolition material (brick, glass, cinders, sand, etc.). See Section 3.1 for a description of soil borings conducted in May 1985.

The Transco pipeline traverses the site along the extreme eastern boundary of the site. No structures, except for a chain-link fence and some wooden fences are present on the site.

2.2 Current Owner

The current owner of record of the site is Edle Realty Inc., c/o National Amusements, Inc., 200 Elm Street, Dearborn, Massachusetts.

2.3 Current Status of the Property

The property is a closed down drive-in movie site from which all buildings and equipment have been removed. Work was commenced to excavate the northwestern portion of the site in the spring of 1986, ostensibly for a movie theater site. This work has since stopped and no work was being undertaken at the site during the time of sampling.

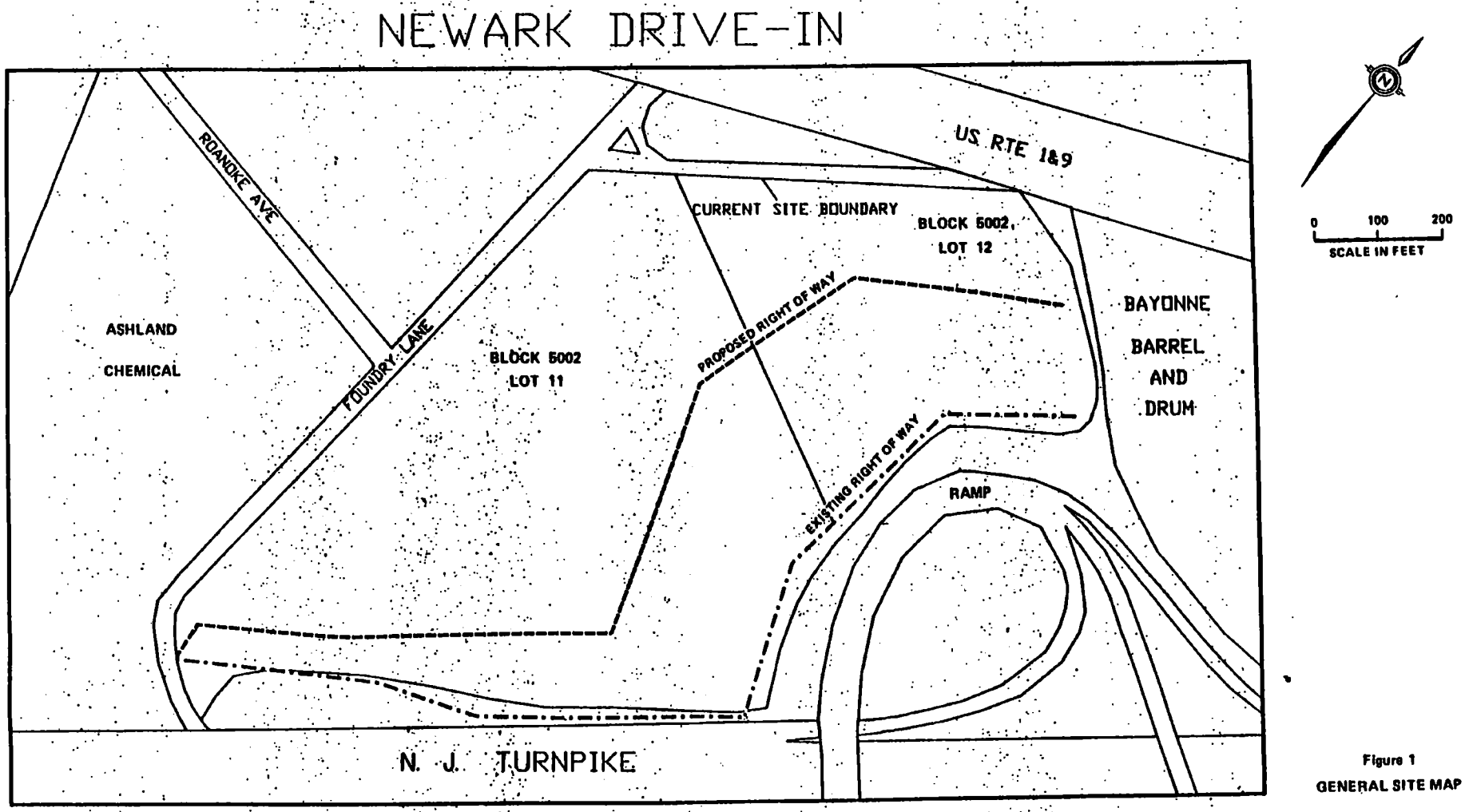


Figure 1
GENERAL SITE MAP

2.4 Historical Use

Historical maps and photos indicate that the Newark Drive-In Theater began operation between 1951 and 1959. Prior to that time much of the site was used as a landfill.

The site is situated in an area which is believed to have been part of the tidal marshes associated with the lower reaches of the Passaic River. At some time, the area appears to have been covered with fill possibly for use as a construction base for nearby roads and industries.

Aerial photographs from 1934 to 1985 document the physical changes at the site. Figure 2 graphically displays changes which may have impacted the site's present environmental setting. The following is a chronologic narrative outlining these changes.

1934 - Aerial photographs taken in 1934 (exact date is unknown) showed that the site was largely covered by fill. The fill had apparently been in place for sometime as revegetation had already occurred. A subsequent landfill operation was observed dumping solid waste material over a substantial portion of the northern half of the site (A). According to a 1931 Sanborn map of this area, the southern half portion of the site was occupied by the Jersey Feed Farms' pig pens. Four buildings (B) associated with that facility were noted.

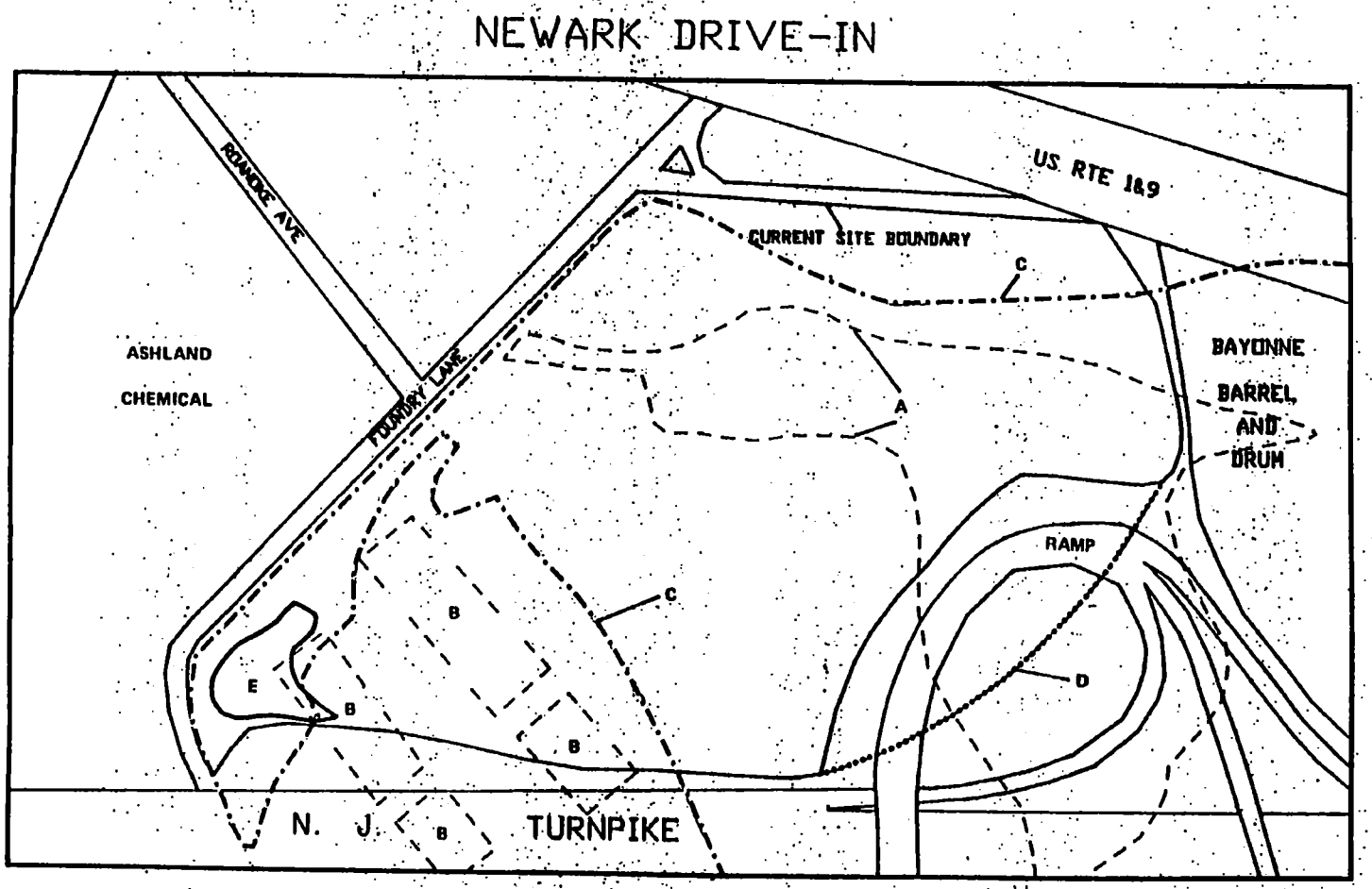
1940 - Aerial photographs taken on April 6, 1940 showed the Jersey feed farms area to be abandoned with only the building foundations and outside pens visible. The landfill operation in the northern portion of the site was still active and expanding.

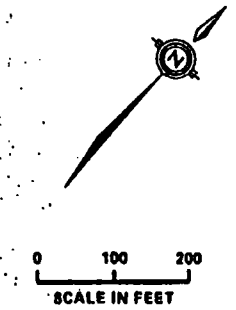
1947 - Aerial photographs taken on April 28, 1947 showed the landfill at its greatest areal extent (C).

1951 - By April 7, 1951, the landfill was inactive and construction of the adjacent Turnpike was underway.

1959 - Aerial photographs taken April 16, 1959 showed that a drive-in theater had been constructed at the site. Portions of the old landfill were visible outside the eastern edge of the drive-in, although substantial revegetation had occurred.

1985 - Aerial photographs taken on April 25, 1985 show that a ramp from the Turnpike had been constructed in an area which, in 1959, had been part of the drive-in's parking area (D). At the southern end of the site, a small area of ground appears to have been recently disturbed (E). This disturbance may be due to recent dumping.





LEGEND:

A - APPROXIMATE LOCATION OF WASTE PILE - 1934
B - 1934 PIGPENS (JERSEY FEED FARMS)
C - EXTENT OF LANDFILL (1947)
D - 1959 EXTENT OF DRIVE-IN AREA
E - DISTURBED AREA (1985)

1934 INFORMATION
1947 INFORMATION
1959 INFORMATION
1985 INFORMATION

Figure 2

SITE HISTORY MAP

SOURCE: LOUIS BERGER & ASSOCIATES, INC., 1986.

3.0 METHODS OF INVESTIGATION

The methods employed during this reconnaissance level investigation consisted of establishing site safety practices prior to working on the site; developing a sampling plan, and sampling methodology; and establishing a quality assurance program. The methods used were selected based upon their compliance with NJDEP recommended guidelines for hazardous waste site investigations.

3.1 Site Safety Practices

A Site Safety Plan was developed prior to the commencement of any site activity, (refer to Appendix A). The Site Safety Plan establishes the policies and procedures that protect workers from the potential hazards posed by site investigative activities at a hazardous waste site. To minimize accidents and injuries that may occur during site activity, the plan addresses such practices as decontamination procedures, the use of personal protective equipment, and the type of air monitoring techniques employed during site operations.

3.1.1 Air Quality Monitoring

During the initial site investigation it was necessary to determine whether or not the workers were exposed to an imminent hazard. To characterize the atmospheric conditions at the site various parameters were measured with the use of air monitoring equipment.

At the time of the initial reconnaissance, a walk-through inspection of the site was conducted, using direct-reading instruments to identify and quantify airborne contaminants. The investigators monitored for combustible gases, oxygen levels, radiation levels and total organic vapors at four locations around the site.

Radiation and oxygen levels were well within normal ranges. The combustible gas indicator did not detect the presence of any combustible vapors.

Total organic vapors were measured with an HNU model P-101 Photoionization Detector (PID). The analyzer is calibrated to benzene and reads out in deflection units or parts per million (ppm) relative to benzene. There were no organic vapors detected at this time.

During the installation of monitoring well #1, which occurred on 5/27/86, a Foxboro 128 Organic Vapor Analyzer (FID) was used to monitor the presence of organic vapors. Although organic vapor concentrations within the workers' breathing zone were nondetectable, there was a FID reading greater than 1,000 ppm detected at a depth of 18 inches during the boring of the well.

3.1.2 Personnel Protection Equipment

The determination of protection levels was made by the Site Safety Officer. The information that aided him in making the decision was the air quality measurements, the type of work being performed and the visual evidence of known and suspected hazards.

Historically, there has been no evidence indicating the presence of hazardous materials at the site, nor were any detectable levels of organic vapors measured on the PID, therefore personnel were suited for Level D protection.

Personnel were dressed in Level D protection during all site activities except for the installation of monitoring well #1 when high levels of organic vapors were found in the borehole, at which time, they were in Level C protection.

3.1.3 Decontamination Procedures

When leaving a site all personnel were required to decontaminate themselves and dispose of all nonreusable equipment. Boots were scrubbed clean on site with soapy water and dried. Tyvek suits and gloves, and air cartridges and filters were disposed of in trash bags. Exposed skin was washed with soap and water. All wash water was disposed of on-site.

3.2 Sampling Plan

Sampling of soils and of groundwater was planned for the reconnaissance-level investigation conducted. The sampling locations for both soils and groundwater are shown on Figure 3. The soil sampling sites are designated by a five character alphanumeric code. The groundwater monitoring well is identified as MW1. Monitoring wells MW2 and MW3 are located on an area of the Bayonne Barrel and Drum property that is not addressed in this report. The rationale for sample locations and the methodology employed for soil sampling and for groundwater sampling are discussed in the following sections as well as the physical description of the material encountered during sampling.

3.2.1 Soils

The determination of the soil sampling points was based on both random and biased sampling. Random sampling methodology was employed for the discrete samples that were taken and the composite sample locations were chosen by biased sampling. The random sampling methodology was performed by dividing the area at Newark Drive-In that is within the Turnpike's proposed right-of-way into a grid of 30 blocks, assigning numbers to each block, and then statistically selecting blocks for sampling point location by using a table of computer generated random numbers. When the number of matching numbers equalled the predetermined number of samples to be taken, the process was stopped.

The biased sample locations for the composite samples were selected due to site specific criteria: drainage, previous land use, and location of random samples. Nearly all surface and subsurface runoff within the proposed right-of-way flows to the depressions that dominate the eastern and northern portions of the site. Therefore, the biased samples were located so as to have this runoff intercepted by the soil borings.

The number of samples to be taken was the minimum considered necessary to determine the existence of contamination. It was decided to take 2

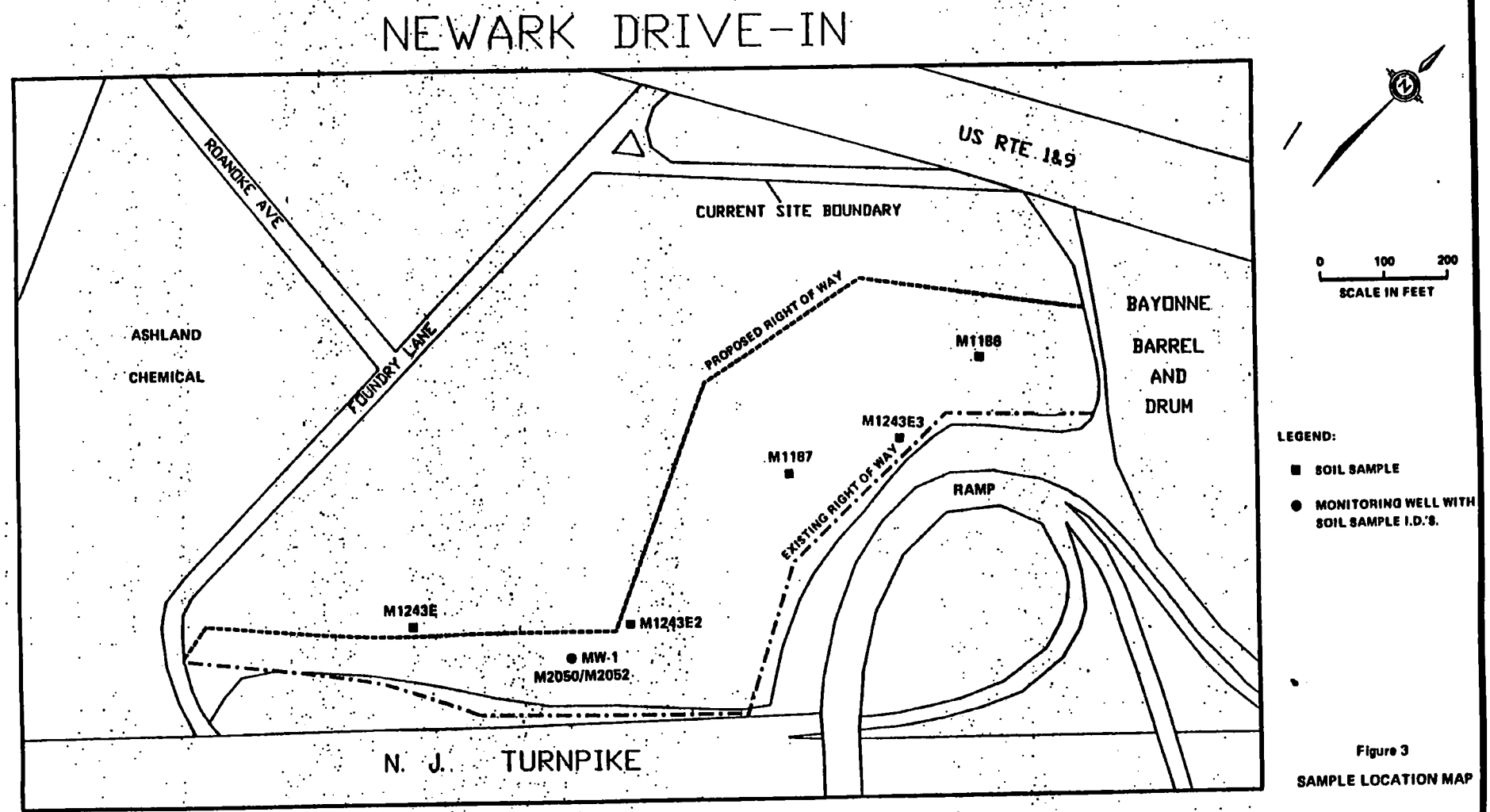


Figure 3

SAMPLE LOCATION MAP

discrete samples at one depth interval: 0-18 inches below land surface (b.l.s.). One composite sample, comprised of three (3) different sample locations at the same depth interval was also collected.

Discrete or grab samples are retrieved at a single point. Composite samples are samples comprised of two or more discrete samples taken at several different horizontal or vertical locations. The composite at the Newark Drive-In were taken at three different horizontal locations and composited in the laboratory where the analyses were performed.

Compositing is performed during site reconnaissance when the nature and the extent of the contamination is unknown. It allows for determining the general areal extent of contamination and the nature of the contamination without requiring extensive sampling. The disadvantages are that the compositing may reduce contaminant levels to safe levels. By diluting a contaminated sample with two relatively clean samples the source of contamination is unknown. Another disadvantage is that volatile chemicals in a sample are lost during the compositing process. Compositing is never used when point specific chemical data is needed. Therefore, by discriminately using both discrete and composite samples, the general areal nature and extent of the contamination was able to be assessed.

Discrete soil samples were also taken during installation of the monitoring wells at depths above the water table. It was decided to limit the number of samples analyzed to six from both the Bayonne Barrel & Drum and the Newark Drive-In Movie Site. Therefore, 18 and 24 inch samples were taken every five feet and examined. Based on this, the following two samples were analyzed and the remainder discarded. For monitoring well #1, two discrete samples were analyzed, both above the water table. The depths were 0-1.5 feet and 8-10 feet b.l.s., respectively. The boring logs for the monitoring well are presented in Appendix C.

3.2.1.1 Sampling Methods

A split spoon was used to retrieve all soil samples, including those in the monitoring well boreholes. It is composed of carbide steel, and is 24 inches long with a 2-inch outer diameter. The method for collecting samples using the split spoon is as follows:

a. Assemble the sampler by aligning both sides of the barrel and then screwing on the bit on the bottom and the heavier head piece on top.

b. Place the sampler in a perpendicular position on the material to be sampled.

c. Drive the sampler utilizing a sledge hammer (or a 140 lb. weight with a 30" drop when using the well rig for sampling in the boreholes).

d. Record the length of the tube that penetrated the material (or the number of blows needed to reach that depth when using the well rig).

e. Withdraw the sampler, and open it by unscrewing the bit and the head piece and then splitting the barrel.

f. Record the physical description of the material and place it into the appropriate sample containers.

g. Decontaminate the sampler using procedures outlined in Appendix B.

A description of materials encountered at each sample site are shown in Table 1.

3.2.1.2 Sample Containers

Soil samples were taken from the sampler and placed in containers that have been determined by the U.S. Environmental Protection Agency (EPA) to be adequate for the types of analyses the sample is to undergo. These containers and the types of analyses they are appropriate for are defined by 40CFR136 for aqueous samples and USEPA's Manual of Test Methods for Evaluating Solid Waste (SW846, July 1982) for soil/sediment samples. The sample containers were prepared by Environmental Testing and Certification (ETC), the analytical laboratory used, and placed in preconfigured insulated and cooled shuttles.

3.2.1.3 Contaminants to be Analyzed

The soil samples at Newark Drive-In were analyzed for 127 priority pollutants plus the next 40 highest peaks that were detected on the gas chromatograph. "Peak" is the parameter that defines concentration. By allowing for analysis of forty constituents that might have escaped detection if only target chemicals were specified, greater flexibility was incorporated into the analytical plan.

The term "priority pollutants" describes the pollutants' relative frequency of occurrence at potential hazardous waste sites, and represents a cross-section of inorganic and organic chemical groups. The 127 priority pollutants are the substances designated as toxic pollutants under Section 307(a)(1) of the Federal Clean Water Act (43 CFR 4108, January 1978), and are depicted in Table 2. In this table, NPDES is an abbreviation for National Pollutant Discharge and Elimination System. CAS stands for the Chemical Abstract Service, while MDL is the Minimum Detection Limit for each compound, measured in micrograms (10^{-6} grams) per liter.

3.2.2 Groundwater

Samples of groundwater at the drive-in site were obtained from the one well, MW1, along the eastern boundary. The objective in locating this well was to ascertain whether groundwater contamination existed. Background conditions or the exact direction of groundwater flow could not be determined from the location of only one well. This information is not needed until contamination has been verified. If contamination is detected, then at a minimum, the installation of a upgradient well and one more downgradient well will be needed to determine its source.

Table 1

SOIL BORING DESCRIPTIONS

Boring No.	Depth (inches)	Soil Description
M1186	0-6	Brown silt, friable, dry; trace fill (glass, white accretions)
	6-12	Brown sandy silt; dry, friable; some fill (black slag, grayish accretions)
	12-18	Fill (blackish brown woody fibers, decomposed brick, greenish smears and trace white accretions)
M1187	0-7	Poor recovery
	7-12	Grey and brown sand; some pebbles, dry, friable little sand accretions
	12-18	Moist black sand with black smears and fill (asphalt-like slag, blueglass, wood fibers, trace brick); distinct petroleum odor
M1243E	0-5	Fill (slag, trace silty)
	5-9	Fill (asphalt, slag, some silt)
	1-14	Same, little glass and silt
	14-18	Fill (cemented accretions, blue, white and gray)
M1234E2	0-5	Reddish brown silty sand with few pebbles, little greyish brown accretions
	5-15	black silt and fill (glass, slag) distinct petroleum odor
	15-18	Same, but some dense whitish crystalline deposits
M1243E3	0-4	No recovery
	4-10	Fill (yellowish accretions, slag, glass in brownish sandy silt matrix)
	10-15	Fill (bluish-black slag, silt, trace glass, brick and yellow accretions)
	15-18	Brown sandy silt and fill (slag, glass, yellow flakes, pebbles)

Table 2

PRIORITY POLLUTANT LIST

I. VOLATILE PARAMETERS

NPDES Number	CAS Number	Compound	MDL (ug/l)
1V	107-02-8	Acrolein	100
2V	107-13-1	Acrylonitrile	100
3V	71-43-2	Benzene	4.4
4V	542-88-1	bis(Chloromethyl)ether	10
5V	75-25-2	Bromoform	4.7
6V	56-23-5	Carbon tet[illegible]hloride	2.8
7V	108-90-7	Chlorobenzene	6.0
8V	124-48-1	Chlorodibromomethane	3.1
9V	75-00-3	Chloroethane	10
10V	110-75-8	2-Chloroethylvinyl ether	10
11V	67-66-3	Chloroform	1.6
12V	75-27-4	Dichlorobromomethane	2.2
13V	75-71-8	Dichlorodifluoromethane	10
14V	75-34-3	1,1-Dichloroethane	4.7
15V	107-06-2	1,2-Dichloroethane	2.8
16V	75-35-4	1,1-Dichloroethylene	2.8
17V	78-87-5	1,2-Dichloropropane	6.0
18V	542-75-6	cis-1,3-Dichloropropylene	5.0
19V	100-41-4	Ethylbenzene	7.2
20V	74-83-9	Methyl bromide	10
21V	74-87-3	Methyl chloride	10
22V	75-09-2	Methylene chloride	2.8
23V	79-34-5	1,1,2,2-Tetrachloroethane	6.9
24V	127-18-4	Tetrachloroethylene	4.1
25V	108-88-2	Toluene	6.0
26V	156-60-5	1,2-Trans-dichloroethylene	1.6
27V	71-55-6	1,1,1-Trichloroethane	3.8
28V	79-00-5	1,1,2-Trichloroethane	5.0
29V	79-01-6	Trichloroethylene	1.9
30V	75-69-4	Trichlorofluoromethane	10
31V	75-01-4	Vinyl Chloride	10

II. ACID PARAMETERS

1A	95-57-8	2-Chlorophenol	3.3
2A	120-83-2	2,4-Dichlorophenol	2.7
3A	105-67-9	2,4-Dimethylphenol	2.7
4A	534-52-1	4,6-Dinitro-o-cresol	24
5A	51-28-5	2,4-Dinitrophenol	42
6A	88-75-5	2-Nitrophenol	3.6
7A	100-02-7	4-Nitrophenol	2.4
8A	59-50-7	p-Chloro-m-cresol	3.0
9A	87-86-5	Pentachlorophenol	3.6
10A	108-95-2	Phenol	1.5
11A	88-06-2	2,4,5-Trichlorophenol	2.7

Table 2 (continued)

III. BASE NEUTRAL PARAMETERS

NPDES Number	CAS Number	Compound	MDL (ug/l)
1B	83-32-9	Acenaphthene	1.9
2B	208-96-8	Acenaphthylene	3.5
3B	120-12-7	Anthracene	1.9
4B	92-87-5	Benzidine	44
5B	56-55-3	Benzo(a)anthracene	7.8
6B	50-32-8	Benzo(a)pyrene	2.5
7B	205-99-2	3,4-Benzofluoranthene	4.8
8B	191-24-2	Benzo(ghi)perylene	4.1
9B	207-08-9	Benzo(k)fluoranthene	2.5
10B	111-91-1	bis(2-Chl ethoxy)methane	5.3
11B	111-44-4	bis(2-Chlo oethyl)ether	5.7
12B	39638-32-9	bis(2-Chloroisopropyl)ether	5.7
13B	117-81-7	bis(2-Ethylhexyl)phthalate	2.5
14B	101-55-3	4-Bromophenyl phenyl ether	1.9
15B	85-68-7	Butyl benzyl phthalate	2.5
16B	91-58-7	2-Chloronaphthalene	1.9
17B	7005-72-3	4-Chlorophenyl phenyl ether	4.2
18B	218-01-9	Chrysene	2.5
19B	53-70-3	Dibenzo(a,h)anthracene	2.5
20B	95-50-1	1,2-Dichlorobenzene	1.9
21B	541-73-1	1,3-Dichlorobenzene	1.9
22B	106-46-7	1,4-Dichlorobenzene	4.4
23B	91-94-1	3,3'-Dichlorobenzidine	16.5
24B	84-66-2	Diethyl phthalate	1.9
25B	131-11-3	Dimethyl phthalate	1.6
26B	84-74-2	Di-n-butyl phthalate	2.5
27B	121-14-2	2,4-Dinitrotoluene	5.7
28B	606-20-2	2,6-Dinitrotoluene	1.9
29B	117-84-0	Di-n-octyl phthalate	2.5
30B	122-66-7	1,2-Diphenylhydrazine	10
31B	206-44-0	Fluoranthene	2.2
32B	86-73-7	Fluorene	1.9
33B	118-71-1	Hexachlorobenzene	1.9
34B	87-68-3	Hexachlorobutadiene	0.9
35B	77-47-4	Hexachlorocyclopentadiene	10
36B	67-72-1	Hexachloroethane	1.6
37B	193-39-5	Indeno(1,2,3-c,d)pyrene	3.7
38B	78-59-1	Isophorone	2.2
39B	91-20-3	Naphthalene	1.6
40B	98-95-3	Nitrobenzene	1.9
41B	62-75-9	N-Nitrosodimethylamine	10
42B	621-64-7	N-Nitrosodi-n-propylamine	10
43B	86-30-6	N-Nitrosodiphenylamine	1.9
44B	85-01-8	Phenanthrene	5.4
45B	129-00-0	Pyrene	1.9
46B	120-82-1	1,2,4-Trichlorobenzene	1.9

Table 2 (continued)

IV. PESTICIDE PARAMETERS

NPDES Number	CAS Number	Compound	MDL (ug/l)
1P	309-00-2	Aldrin	1.9
2P	319-84-6	Alpha-BHC	10
3P	319-85-7	Beta-BHC	4.2
4P	58-89-9	Gamma-BHC	10
5P	319-86-8	Delta-BHC	3.1
6P	57-74-9	Chlordane	10
7P	50-29-3	4,4'-DDT	4.7
8P	72-55-9	4,4'-DDE	5.6
9P	72-54-8	4,4'-DDD	2.8
10P	60-57-1	Dieldrin	2.5
11P	115-29-7	Endosulfan I	10
12P	115-29-7	Endosulfan II	10
13P	1031-07-8	Endosulfan sulfate	5.6
14P	72-20-8	Endrin	10
15P	7421-93-4	Endrin aldehyde	10
16P	76-44-2	Heptachlor	1.9
17P	1024-57-3	Heptachlor epoxide	2.2
18P	53469-21-9	PCB-1242	36
19P	11097-69-1	PCB-1254	36
20P	11104-28-2	PCB-1221	30
21P	11141-16-5	PCB-1232	36
22P	12672-29-6	PCB-1248	36
23P	11096-82-5	PCB-1260	36
24P	12674-11-2	PCB-1016	36
25P	8001-35-2	Toxaphene	10

V. METAL PARAMETERS

1M	7440-36-0	Antimony, Total	32
2M	7440-38-2	Arsenic, Total	1.0
3M	7440-41-7	Beryllium, Total	0.3
4M	7440-43-9	Cadmium, Total	4.0
5M	7440-47-3	Chromium, Total	7.0
6M	7550-50-8	Copper, Total	6.0
7M	7439-92-1	Lead, Total	42
8M	7439-97-6	Mercury, Total	0.2
9M	7440-02-0	Nickel, Total	15
10M	7782-49-2	Selenium, Total	2.0
11M	7440-22-4	Silver, Total	7.0
12M	7440-28-0	Thallium, Total	1.0
13M	7440-66-6	Zinc, Total	2.0

VI. CONVENTIONALS

14M	57-12-5	Cyanide, Total	20
15M	-------	Phenols, Total	50

Courtesy of USEPA 1985

3.2.2.1 Monitoring Well Installation

The installation of monitoring well #1 was performed in accordance with NJDEP's Bureau of Groundwater Management recommended procedures. Though not required for this investigation, adhering to these procedures will help to insure the well's acceptance as a New Jersey Pollutant Discharge Elimination System (NJPDES) monitoring well, should the site prove to have contaminated groundwater. A NJPDES permit is required by owners/operators of sites that have the potential to be discharging effluent (i.e., contaminated leachate) to the groundwater.

The borehole for installation of the monitoring well was made by a hollow stem auger attached to a well rig. The auger was steam cleaned prior to use. It was scaled with chalk to every 6 inches to determine the sample depth. Samples were taken at the last two feet of every 5 foot interval but only two samples (0-1.5 feet and 8-10 feet) were analyzed for full priority pollutants. The results of the boring logs for the monitoring well are in Table 4 and Appendix C. The borehole had distinct petroleum odors with significant amounts of petroleum coated fill.

Approximate depth of hole and depth to water table were measured using a weighted string. The boring was made to approximately 10 feet below the water table. After the hole was bored to the desired depth, the augers were disconnected from the rig but left in the hole to support the sidewalls. The hole was flushed clean of soil cuttings using a roller bit and pressurized potable water. The flushing operation ceased when the water discharging from the hole was clean. The roller bit was then removed from the hole, and the well screen installed into the borehole with the hollow stem auger still in place. The 4 inch O.D. (outer diameter) PVC well screen had a plastic cap attached to its bottom and was threaded into a 4 inch O.D. well casing at its top before placing it into the borehole. The top of the casing rose to approximately two feet above the ground surface. The area between the borehole walls and the well screen (the annular space) was filled with #2 Morie sand to maintain a good hydraulic connection between the aquifer material and the well screen. The auger was slowly lifted out of the borehole as the annular space was being filled. Eventually the auger was removed and the sand was emplaced until it was 6-12 inches above the well screen. A bentonite/cement grout was then injected into the hole until it was flush with the ground surface, and a 6" O.D. steel casing placed over the inner casing and set into the sealant (bentonite/cement mixture). Next, the steel casing was locked and security posts were placed around the well. All materials and specifications for monitoring well #1 are detailed in Appendix C along with the permit from the Bureau of Water Allocation. A detailed soil boring description is presented in Table 3.

3.2.2.2 Well Development

Well development took place soon after installation of the well, in order to create a good hydraulic connection between the aquifer and the well screen. Development of a monitoring well can be accomplished by a variety of methods and equipment. A well is satisfactorily developed when pumping the well yields a sand-free discharge at a consistent pump rate.

Table 3

BORING LOG OF MONITORING WELL 1

Boring No.	Depth (feet)	Soil Description
M2050	0-0.5	Brown silt, moist, dense with 20% pebbles; and fill (miscellaneous); trace clay
	0.5-1.0	Same with more fill (asphalt-like material, glass, brick); distinct petroleum odor
	1.0-1.5	Dry brown silt and fill (dense black asphalt-like material; slag, brick, yellow white particles on asphalt surface)
	3.0-4.0	moist black silt, friable with trace fill (tarry material); distinct petroleum odor
	4.0-4.5	Same but some dense oil covered silt and little construction debris (decomposed brick, slag and glass)
M2052	8-8.5	Dense, friable black silt, moist; some fill (glass); distinct petroleum odor
	8.5-9.0	Fill (coarse gravel, pebbles, multicolored undifferentiated waste), moist
	9.0-10.0	Fill (glass, pebbles, tar, paint chips, concretions of slag and brick); distinct petroleum odor
	13-14	Gray-brown silt clay coated with oily leachate, red streaks, very sticky, very plastic
	14-14.5	Same with oily smears but no red streaks
	14.5-15.0	Brown clay with some silt and sand grading to a sandy clay, rust streaks; weak petroleum odor

Table 4

FIELD MEASUREMENTS OF GROUNDWATER MONITORING WELL #1

Date	5/27/86
Time	3:50 P.M.
Water Level (above msl)	4.60 ft.
pH	7.56
Salinity	1,000 mg/l
Conductivity	1,600 micromhos/cm
<u>Immiscible Layers</u>	
Light Phase	none detectable
Dense Phase	none detectable
Total Organic Vapors	700 ppm
Total Organic Carbon	47.8 mg/l

Monitoring well #1 was developed with a hand bailer until the well went dry which occurred quite rapidly. Its discharge was extremely turbid but did not contain much sand, mainly salt.

3.2.2.3 Groundwater Sampling

Seven days after the well was developed, but prior to sampling for chemical analyses, samples were collected and tested for total organic carbon (TOC), and if turbid, for grain size distribution of the sediment. (Measuring these constituents is recommended by the USEPA for assessing the integrity of monitoring well installation and development on RCRA sites.)

The water was purged from the well using a bladder pump with a check valve for regulating discharge. The purge water for sediment size distribution was collected in glass containers, while the TOC samples were collected in the appropriate container and preserved. All containers and preservatives used for storing groundwater samples after collection were laboratory cleaned and composed of materials appropriate for the intended analyses in accordance with 40 CFR 136. The analyses for both parameters were performed the next day. The results of the grain size distribution and TOC analyses, 47.8 mg/l, indicated that the majority of the purge water was silt, clay and organic material with very little sand.

Samples for chemical analyses were collected from the monitoring well after evacuating a minimum of 3 times the volume of standing water in the well with a bladder pump. This was to insure that only fresh, nonstratified aquifer water was being sampled. The polyethylene tubing placed into the well for evacuation was dedicated to that well only. The depth to water and the depth of the well were measured before sampling to determine the volume of water in the well using an oil/water interface meter.

Prior to and after evacuation of the well, field measurements were taken of several parameters that are usually considered controlling variables of the chemical speciation found in water quality analysis. The parameters are also signatures of the water that help determine whether the water recovered in the well is stable after evacuation, compared to the water previous to evacuation. The results of the field measurements are presented in Table 4. These parameters and the methods for measuring them are as follows:

- pH - A measure of the hydrogen ion concentration in the water. Measured with a Beckman 21 pH meter calibrated in the field with standard pH solutions of 4 and 7. Initial pH's were taken of water pumped from the well during purging (evacuation) and of the water collected from sampling. Water samples used for measuring pH were not kept for further chemical analyses.

- Salinity - Measures the total salt content in the water to determine whether it is fresh, brackish or saline. Measured in each borehole before purging and after sampling with a YSI #33 S-C-T meter. The well water was not saline.

- Conductivity - An indirect measure of the total dissolved solids in solution. The measurements are in micromhos/cm, a unit indicating the conductivity of the solution and therefore a measure of all ionized species. The micromhos units can be converted to mg/l of total dissolved solids by using a conversion factor (0.55 to 0.90) that is based on the source of the water and the types of charged chemical species that dominate the solution. Conductivity was measured the same way as salinity.

- Temperature - Measured in each borehole prior to purging but after sampling using the YSI S-C-T meter.

- Immiscible Layer Measurements - Immiscible layers are concentrations of organic liquids that are insoluble in water and therefore form a distinct layer above the water table and/or at the bottom of a borehole. Where layers of either light or dense phase immiscibles are detected, separate samples of these layers will be taken. These measurements were made prior to purging and just before sampling with an oil/water interface sounding probe (Oil Recovery Systems - Interface Meter, Model 100EN/M) that transmits a steady beep when hitting an immiscible layer and in intermittent beep when in water.

  Measurements in monitoring well #1 indicated no distinct immiscible layers.

- Depth to water and depth of well measurements were made during development of the well, prior to evacuation, during recovery of the well and before and after sampling using the oil/water interface probe. Measurements were made to the nearest 0.01 foot.

All sampling of groundwater was performed using a 36 inch long, teflon coated, single-bottom, check-valve bailer dedicated to the well. It was cleaned by the laboratory doing the chemical analyses and wrapped in autoclaved tinfoil. The wire used to rinse and lower the bailer was also teflon coated. The sampling procedures were as follows:

a) The well was allowed to recover after purging, and sampling began when the water had risen to within 0.1 feet of water level prior to purging.

b) The bailer was removed from tinfoil, tied to teflon coated wire which was connected to a circular spindle, and lowered into the well.

c) Volatile organics (VOA's) were sampled first by lowering the bottom of the bailer until it was entirely submerged below the water surface so as to sample any light phase immiscibles. Extreme care was taken when lowering and raising the bailer so as not to degas the sample. The sample was then transferred into the sample container by pushing the ball check-valve located at the bottom of the bailer upward with a finger and allowing the water to flow into the container. No air bubble or head space was left in the VOA containers.

d) The same method as (c) was used to collect samples for all other analyses but at depths in the well ranging from 18 to 48 inches below the water surface. Samples retrieved for metals analysis were first filtered through disposable 0.45 micrometer pore size cellulose acetate filters, and then stored in the appropriate containers and preserved. This is to minimize the effect that the sediment might have on the concentration of the metals in solution while the sample is awaiting analysis. The result of the analysis is reported as total dissolved metals.

e) After a sample was collected, depth of water, salinity, conductivity and temperature were measured and recorded. After removal of all probes, the plastic cap was fitted to the top of the inner casing and the steel protective casing was locked.

The groundwater samples collected and preserved were analyzed for the 127 priority pollutants plus 40 peaks. A listing of the priority pollutants categories is provided in Table 2.

3.3 Quality Assurance

The chain of custody is a quality assurance/quality control (QA/QC) measure to provide for the integrity of the sampling and analytical process. Chain of custody procedures were carried out in accordance with NJDEP and USEPA guidelines. The chain of custody forms used for each sample are contained in Appendix B.

All data on types of chemicals and their levels reported by ETC Laboratories have been critically evaluated with respect to data acceptance criteria which include accuracy, precision, representativeness, completeness and reliability. The evaluation was done according to NJDEP's guidelines for these criteria.

The data were found to meet these criteria with a few exceptions and are presented in the enclosed tables. Those data which do not meet the above mentioned criteria for acceptance are flagged with USEPA's data qualifier code letters (see Table 6). The qualifier codes are annotated and the code letters with annotations written next to the qualified data. Definitions of codes are presented at the bottom of Table - showing related data. Thus, concentrations of analytes flagged with code "J" are to be considered estimated concentrations.

The samples were analyzed for 127 priority pollutants plus 40 peaks. Table 6 includes only those compounds which were "hits" in any of the samples. Compounds not detected in any sample are not included.

Data related to the volatile organic fraction meets our quality assurance criteria except for methylene chloride. Reported levels of methylene chloride are to be treated as estimated concentrations.

Data related to acids and base/neutral extractable compounds, metals, total phenolics and total cyanides meet acceptance criteria.

All concentrations reported for pesticides and PCB's are to be considered estimated concentrations. These compounds were found in the soil samples, but not in any of the water samples (see Table 6). The laboratory had difficulty in analyzing for these parameters due to matrix interference and had to repeat extraction and analyses. However, reextraction was done past the time limit allowed by NJDEP. The laboratory will obtain a decision from USEPA/NJDEP to allow acceptance of these results as valid. In the meantime these data could be used in characterization of the site.

4.0 RESULTS OF ANALYSES AND CONCLUSIONS

Results of soil and water analyses of samples taken from the Newark Drive-In property are presented in Table 6. Table 5 depicts the cleanup level criteria used by the NJDEP's Bureau of Industrial Site Evaluation (BISE) to determine if a cleanup action should be taken. Newark Drive-In is currently not being investigated under any federal or state statute to to our knowledge, but the BISE cleanup levels provide a measure against which the results may be judged. Many of the parameters do not have specific criteria to be judged by, but instead are included in the totals for a whole group of contaminants that have a single cleanup level. Other parameters, such as acid extractable organics in soils do not have any clean-up criteria. The location of the results that exceed the BISE cleanup levels are summarized in Figure 4, along with their respective parameters.

Specific levels for many of the parameters in the USEPA Priority Pollutant List (Table 2) for both soil and groundwater are currently being developed, and may be applicable to this site when they are approved in the Federal Register.

As noted in Section 3.3 all concentrations reported for pesticides and PCB's are to be considered estimated or provisional. The analysis procedures did not meet USEPA and NJDEP Quality Assurance requirements. However, for the purpose of general description of contamination at the site they are considered valid, as the infringement was of a technical nature.

4.1 Soils

The soil samples included two discrete samples (M1186, M1187), one from each of two sites; a composite (M1243) of three samples taken from three sites and two soil samples from different depths from the monitoring well. The samples from the well were taken at 0-18" (M2050) and 8'-10' (M2052) depths.

All soil samples are characterized contaminated to levels above NJDEP-BISE's cleanup levels. This characterization is based primarily upon metal contaminants, particularly arsenic, cadmium, lead, mercury and zinc, all of which were present in all five soil samples in concentrations above BISE's cleanup levels. In addition to these metals chromium and copper were also found at high levels in samples M1243, M2050 and M2052. High levels of copper were also found in sample M1187. In the soil samples from the well, most of the metals were found in higher concentrations in the upper stratum (sample M2050) than lower stratum (M2052) indicating surficial nature of contamination with leaching down phenomenon. However, presence of only trace amounts in water indicate tight binding of metals to the soil particles, most likely in complex form.

Levels of volatile organic compounds were relatively low in all soil samples and, except for sample M1187, none contained total volatile organics above BISE's cleanup level. Even in the case of sample M1187, the

Table 5

CLEANUP LEVELS USED BY BISE

A. Soil	Concentration
Arsenic	20 mg/kg
Barium	400
Cadmium	3
Chromium	100
Copper	170
Lead	100
Nickel	100
Mercury	1
Petroleum Hydrocarbons	100
Polychlorinated Biphenyls	1-5**
Silver	5
Selenium	4
Total Cyanides	12
Total Volatile Organics	1
Zinc	350

B. Groundwater	Concentration
Petroleum Hydrocarbons	1 mg/l
Total Volatile Organics	10 ug/l*
Total Base/Neutral Organics	50 ug/l*
Total Acid Extractable Organics	50 ug/l*
Others	See Groundwater Quality Standards

*Lesser concentrations for specific chemicals may be utilized based upon 10^{-6} cancer risk and/or other toxicologic factors.

**USEPA does not regulate PCBs at concentrations of less than 50 mg/kg.

Table 5 (continued)

N.J.A.C. Groundwater Quality Standards

Primary Statewide/Toxic Pollutants

Pollutant, Substance or Chemical	Groundwater Quality Criteria
1. Aldrin/Dieldrin	1. 0.003 ug/l
2. Arsenic and Compounds	2. 0.05 mg/l
3. Barium	3. 1.0 mg/l
4. Benzadine	4. 0.0001 mg/l
5. Cadmium and Compounds	5. 0.01 mg/l
6. Chromium (Hexavalent) and Compounds	6. 0.05 mg/l
7. Cyanide	7. 0.2 mg/l
8. DDT and Metabolites	8. 0.001 ug/l
9. Endrin	9. 0.004 ug/l
10. Lead and Compounds	10. 0.05 mg/l
11. Mercury and Compounds	11. 0.002 mg/l
12. Nitrate-Nitrogen	12. 10 mg/l
13. Phenol	13. 3.5 mg/l
14. Polycholorinated Biphenyls	14. 0.001 ug/l
15. Radionuclides	15. Prevailing regulations adopted by the USEPA pursuant to sections 1412, 1415 and 1450 of the Public Health Services Act as amended by the Safe Drinking Water Act (PL 93-523)
16. Selenium and Compounts	16. 0.01 mg/l
17. Silver and Compounds	17. 0.05 mg/l
18. Toxaphene	18. 0.005 ug/l

Secondary Standards

19. Ammonia	19. 0.5 mg/l
20. Chloride	20. Natural Background
21. Coliform Bacteria	21. a) by membrane filtration, not to exceed four per 100 ml in more than one sample when less than 20 are examined per month, or b) by fermentation tube, with a standard 10 ml portion, not to be present in three or more portions in more than one sample when less than 20 are examined per month, or c) prevailing criteria adopted pursuant to the Federal Safe Drinking Water Act (PL 93-523)

Table 5 (continued)

Primary Statewide/Toxic Pollutants

Pollutant, Substance or Chemical	Groundwater Quality Criteria
22. Color	22. None Noticeable
23. Copper	23. 1.0 mg/l
24. Fluoride	24. 2.0 mg/l
25. Foaming Agents	25. 0.5 mg/l
26. Iron	26. 0.3 mg/l
27. Manganese	27. 0.05 mg/l
28. Odor and Taste	28. None Noticeable
29. Oil and Grease and Petroluem Hydrocarbons	29. None Noticeable
30. pH (Standard Units)	30. 5-9
31. Phenol	31. 0.3 mg/l
32. Sodium	32. Natural Background
33. Sulfate	33. Natural Background
34. Total Dissolved Solids	34. Natural Background
35. Zinc and Compounds	35. 5 mg/l

Source: N.J.A.C. 7:9-6.6

Table 6

Results of Analyses

Sample #	M 1186	M 1187	M 1243	M2050	M 2052	M 1218
Units	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/L
Date of Submission	25-Apr	25-Apr	25-Apr	07-May	07-May	27-May
Location	G-1	G-2	COMP	WELL #3	WELL #3	WELL #3
Depth	0-18"	0-18"	0-18"	0-18"	8-10'	
Composite/Discrete	D	D	C	D	D	D
Soil/Water	S	S	S	S	S	W
VOLATILE ORGANICS						
Priority Pollutants						
Benzene	ND	220	ND	1.6	ND	ND
Ethylbenzene	ND	131	ND	1.8	ND	ND
Methylene chloride	84	40	184	ND UJ2	ND UJ3	ND UJ1
Toluene	ND	245	8	ND	ND	ND
Totals	84	636	192	3.4	0	0
Volatile Organics, Additional Peaks (Semi-Quantitative)						
2-Propanone	29	ND	ND	ND	ND	
2-Propanone	ND	ND	ND	ND	ND	
Dimethyl Benzene	ND	981	ND	ND	ND	
ACID EXTRACTABLES						
2,4-Dimethylphenol	ND	ND	ND	3,200	ND	ND
Phenol	ND	ND	ND	430	ND	ND
BASE/NEUTRAL EXTRACTABLES						
Acenaphthene	ND	74,400	11,000 J	2,710	3,660	ND
Acenaphthylene	2,100	30,800	3,000 J	BMDL	1,430	ND
Anthracene	8,240	18,600	14,000 J	4,820	8,350	ND
Benzidine	ND	ND	ND	ND	ND	ND
Benzo(a)anthracene	14,200	23,180	30,200 J	12,100	9,250	ND
Benzo(a)pyrene	11,500	150,000	49,000 J	13,400	12,900	ND
Benzo(b)fluoranthene	7,300	214,100	60,100 J	20,500	14,300	ND
Benzo(ghi)perylene	7,200	101,800	33,500 J	6,670	7,560	ND
bis(2-Ethylhexyl)phthalate	940	ND	ND	2,540	13,500	ND
2-Chloronaphthalene	ND	ND	4,300 J	ND	ND	ND
Chrysene	17,000	21,060	31,100 J	11,900	9,760	ND
Dibenzo(a,h)anthracene	1,500	79,650	9,700 J	2,360	1,910	ND
Di-n-butyl phthalate	ND	ND	2,900 J	BMDL	1,040	ND
Fluoranthene	24,700	348,000	47,400 J	20,600	11,600	ND
Fluorene	13,900	292,000	16,000 J	BMDL	12,900	ND
Indeno(1,2,3-c,d)pyrene	5,100	62,830	23,700 J	5,370	4,930	ND
Naphthalene	36,500	790,000	28,200 J	3,520	28,600	ND
Phenanthrene	54,000	822,000	52,400 J	15,600	35,200	ND
Pyrene	38,700	472,000	61,600 J	26,000	15,200	ND
Totals	242,880	3,500,420	478,100	148,090	192,090	0

J-Estimated concentrations; two surrogates out of control limits.

UJ1-Estimated quantitation limit 11.7 ug/l

UJ2-Estimated quantitation limit 4.2 ug/kg

Table 6 (continued)

Sample #	M 1186	M 1187	M 1243	M2050	M 2052	M 1218
Units	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/L
Date of Submission	25-Apr	25-Apr	25-Apr	07-May	07-May	27-May
Location	G-1	G-2	COMP	WELL #3	WELL #3	WELL #3
Depth	0-18"	0-18"	0-18"	0-18"	8-10'	
Composite/Discrete	D	D	C	D	D	D
Soil/Water	S	S	S	S	S	W

Base/Neutral/Acid Extractables, Additional Peaks (Semi-Quantitative)

Parameter	M1186	M1187	M1243	M2050	M2052	M1218
14-Benzo(B)Fluorene	ND	81,700	ND	ND	ND	ND
1-Methyl Anthracene	ND	128,000	ND	ND	ND	ND
1.1'-Biphenyl	ND	ND	ND	ND	241	ND
1.1-Biphenyl	ND	93,100	ND	ND	ND	ND
2-Ethyl Naphthalene	ND	ND	8,190	ND	ND	ND
2-Methyl 1.1-Biphenyl	ND	94,300	ND	ND	ND	ND
2-Methyl Anthracene	ND	51,500	ND	ND	ND	ND
2-Methyl Anthracene	9,580	ND	ND	ND	ND	ND
2-Methyl Naphthalene	12,100	ND	ND	ND	ND	ND
2-Methyl Naphthalene	ND	ND	15,400	ND	ND	ND
2-Methyl Phenanthrene	9,330	ND	ND	ND	ND	ND
3-Methyl Phenanthrene	ND	194,000	ND	ND	ND	ND
4-Methyl Phenanthrene	ND	106,000	ND	ND	ND	ND
4-Methyl Phenanthrene	ND	ND	7,550	ND	ND	ND
Alkane	ND	ND	9,360	ND	ND	ND
Alkane	ND	ND	ND	ND	412	ND
Alkane	7,890	ND	ND	ND	ND	ND
Cyclohexene,Pentyl	7,610	ND	ND	ND	ND	ND
Dibenzothiophene	ND	ND	ND	ND	305	ND
Diethyl Benzene	ND	ND	ND	ND	276	ND
Dimethyl 2-Pentene	ND	ND	ND	2,830	ND	ND
Dimethyl Naphthalene	ND	ND	ND	3,700	ND	ND
Dimethyl Naphthalene	26,000	ND	ND	ND	ND	ND
Dimethyl Naphthalene	ND	ND	ND	ND	3,037	ND
Dimethyl Naphthalene	ND	854,000	ND	ND	ND	ND
Dimethyl Naphthalene	ND	ND	24,500	ND	ND	ND
Dimethyl Phenanthrene	ND	109,000	ND	ND	ND	ND
Dimethyl Phenanthrene	7,720	ND	ND	ND	ND	ND
Dimethyl Phenol	ND	ND	ND	1,570	ND	ND
Ethyl Naphthalene	ND	58,100	ND	ND	ND	ND
Ethyl-Dimethyl Benzene	ND	ND	ND	ND	364	ND
Ethyl-Methyl Benzene	ND	ND	6,470	ND	ND	ND
Ethyl-Methyl Benzene	ND	ND	ND	1,770	ND	ND
Ethyl-Methyl Benzene	ND	49,600	ND	ND	ND	ND
Ethyl-Methyl Benzene	ND	ND	ND	ND	940	ND
Methyl 9H-Fluorene	ND	ND	ND	ND	373	ND
Methyl Anthracene	ND	ND	ND	ND	927	ND
Methyl Benzene	ND	ND	ND	1,670	ND	7
Methyl Fluorene	ND	184,900	ND	ND	ND	ND
Methyl Naphthalene	ND	1,170,000	ND	ND	ND	ND
Methyl Naphthalene	ND	ND	ND	6,780	ND	ND
Methyl Naphthalene	20,000	ND	ND	ND	ND	ND

Table 6 (continued)

Sample #	M 1186	M 1187	M 1243	M 2050	M 2052	M 1218
Units	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/L
Date of Submission	25-Apr	25-Apr	25-Apr	07-May	07-May	27-May
Location	G-1	G-2	COMP	WELL #3	WELL #3	WELL #3
Depth	0-18"	0-18"	0-18"	0-18"	8-10'	
Composite/Discrete	D	D	C	D	D	D
Soil/Water	S	S	S	S	S	W
Methyl Naphthalene	ND	ND	ND	ND	4,150	ND
Methyl Naphthalene	ND	ND	27,900	ND	ND	ND
Methyl Phenanthrene	10,500	ND	ND	ND	ND	ND
Methyl Phenanthrene	ND	ND	ND	ND	569	ND
Methyl Phenol	ND	ND	ND	6,190	ND	ND
Methyl-Methyl Ethyl Benzene	ND	ND	ND	ND	440	ND
Naphthalene,Decahydro,Trans	10,000	ND	ND	ND	ND	ND
Naphthalene,Decahydro,Trans	ND	ND	7,290	ND	ND	ND
Propyl Benzene	ND	ND	ND	0	353	ND
Tetramethyl Benzene	ND	ND	6,990	ND	ND	ND
Tetramethyl Benzene	ND	ND	ND	2,040	ND	ND
Trimethyl Benzene	ND	ND	6,120	ND	ND	ND
Trimethyl Naphthalene	ND	210,000	ND	ND	ND	ND
Trimethyl Naphthalene	ND	ND	ND	ND	627	ND
Xylene	ND	ND	6,810	ND	ND	ND
Xylene	ND	ND	ND	ND	236	ND
TOTAL PHENOLICS AND CYANIDES						
UNITS	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/L
Phenolics, Total	0.32	0.63	0.08	2.80	1.5	<.05
Cyanide, Total	0.75	4.4	15	1.1	1.2	<.025
PCB						
UNITS	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/L
Aroclor 1254	18,000 J1	ND	ND	ND	ND	ND
Aroclor 1260	ND	ND	ND	23000 J1	ND	ND
METALS						
UNITS	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	ug/L
Antimony	1.7	1.4	5.6	15	6.7	3.1
Arsenic	26	1,200	25	760	46	2
Beryllium	0.11	0.46	0.46	0.6	0.44	ND
Cadmium	4	3.2	33	18	12	0.83
Chromium	43	60	860	240	240	1.4
Copper	91	250	2,560	690	530	7.8
Lead	1,390	740	4,100	3,000	1,840	ND
Mercury	2.4	1.3	3.7	3.9	11.1	ND
Nickel	38	120	340	120	73	ND
Selenium	ND	ND	ND	1.8	ND	ND
Silver	1.2	1.2	2.9	3.3	1.4	ND
Thallium	ND	0.14	0.63	0.26	0.29	ND
Zinc	500	2,120	2,830	2,190	1,900	29

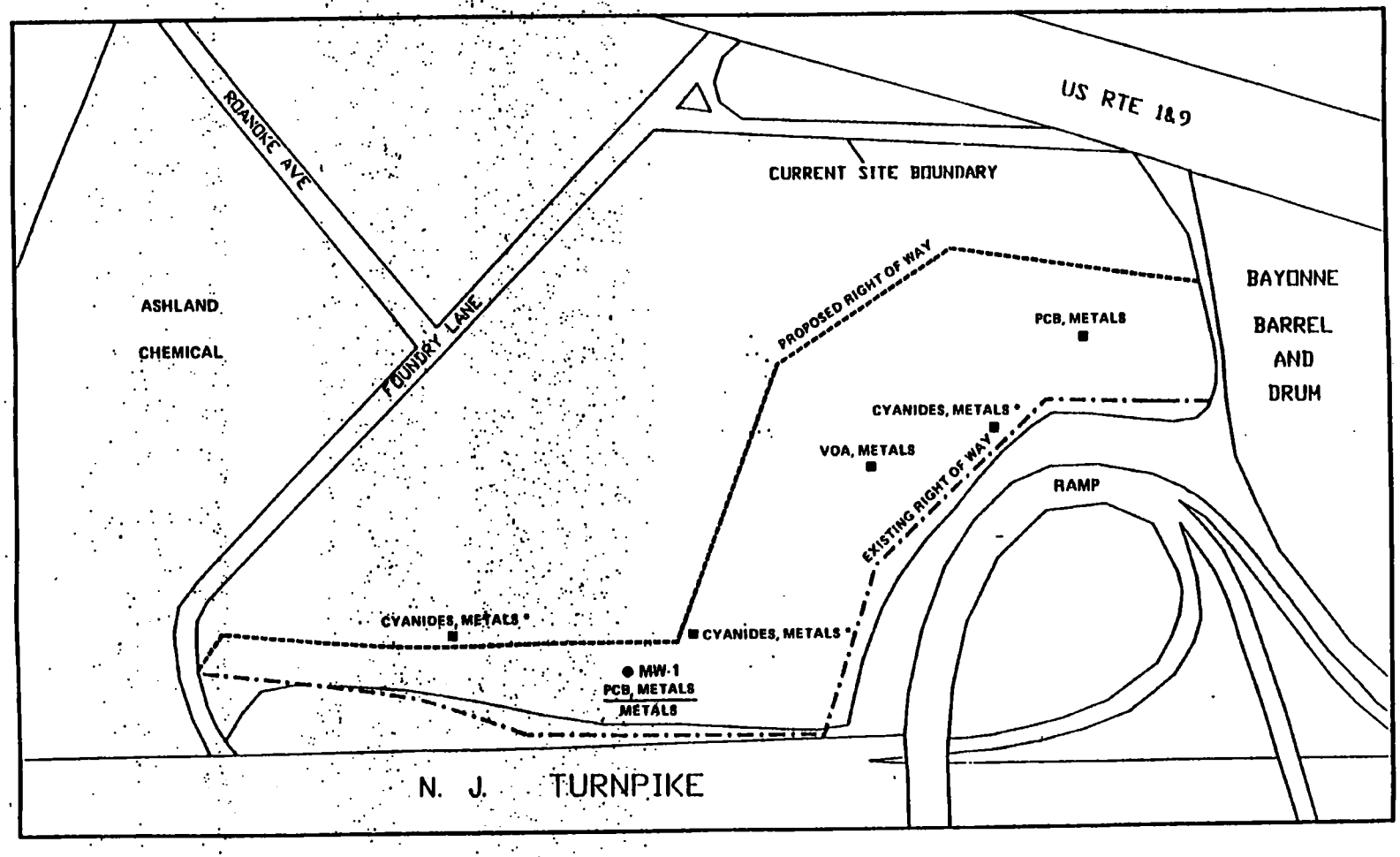
J1- Estimated concentration; sample reextracted past holding time allowed under 40 CFR part 136

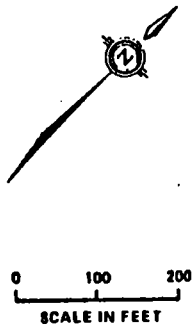
Table 6 (continued)

Sample #	M 1186	M 1187	M 1243	M 2050	M 2052	M 1218
Units	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/L
Date of Submission	25-Apr	25-Apr	25-Apr	07-May	07-May	27-May
Location	G-1	G-2	COMP	WELL #3	WELL #3	WELL #3
Depth	0-18"	0-18"	0-18"	0-18"	8-10'	
Composite/Discrete	D	D	C	D	D	D
Soil/Water	S	S	S	S	S	W
PESTICIDES						
4,4'-DDT	ND	ND	ND	ND	3000 J1	ND
4,4'-DDE	ND	ND	2,900 J1	ND	610 J1	ND
4,4'-DDD	ND	ND	ND	ND	1500 J1	ND
Endrin aldehyde	ND	530 J1	ND	ND	ND	ND
Heptachlor epoxide	ND	2,800 J1	840 J1	ND	ND	ND

J1-Estimated concentration; sample reextracted past holding time allowed under 40 CFR part 136

NEWARK DRIVE-IN





LEGEND:

- ■ SOIL SAMPLE
- ● MONITORING WELL WITH SOIL SAMPLE I.D.'S.

Figure 4

POINTS ABOVE ECRA CLEANUP LEVEL

* Composite Sample

** METALS - Indicates excessive of 3 or more metals, otherwise specific metals are shown.

level of total priority pollutant volatile organics remained at 0.6 mg/kg which is below BISE's cleanup level of 1.0 mg/kg for total volatile organics. However, when concentrations of additional peaks (volatile organic compounds other than those on the list for 127 priority pollutants) are added, sample M1187 contained 1.617 mg/kg of total volatile organics, which is above the BISE's cleanup level. The data is only semiquantitative with respect to additional peaks.

Only one soil sample (M2050) contained detectable levels of acid extractable compounds (phenols); the others did not.

All five soil samples contained relatively high levels of base/neutral extractable organic compounds. The concentration of priority pollutant compounds ranged between 148 mg/kg (M2050) to 478 mg/kg (M1243). The discrete and composited soil samples had higher concentrations than those taken from the monitoring well. These compounds are comprised mostly of polynuclear aromatic hydrocarbons, especially naphthalene, phanenthrene, anthracene, pyrene, chrysene and their substituted analogs. These compounds are constituents of coal tar. Only low levels of phthalates and other organic compounds were found in these samples.

Soil samples M1186 and M1187 also contained excessive levels of additional base/neutral extractable organic compounds. These are the compounds which were analyzed for in addition to base/neutral extractable compounds on the list of 127 priority pollutants. Both samples contained high levels of additional analogs of polynuclear aromatic hydrocarbons, especially derivatives of naphthalene. The other soil samples (M1243, M2050 and M2052) also contained some of these additional compounds but at comparatively lower levels. NJDEP's BISE has no established criteria for cleanup with respect to levels of these contaminants. However, some of these compounds are considered potentially carcinogenic.

Cyanides and total phenolics were detected at low levels in all soil samples but their concentrations did not exceed BISE's cleanup levels except for 15 ppm of cyanide in composite sample #1243.

Discrete soil sample M1186 and soil sample M2050 taken at 0-18" from the monitoring well site contained 18,000 and 23,000 ug/kg, respectively of PCBs. These levels are above the NJDEP-BISE's cleanup levels of 1-5 mg/kg for these parameters. PCBs included Aroclor 1254 in Sample M1186 and Aroclor 1260 in M2050. The other soil samples did not contain detectable levels of PCBs.

High levels of some of the pesticides were also found in soil samples M1187, M1243 and M2052. It was surprising to see higher levels of pesticides in soil sample M2052 which was taken at 8' to 10' depth from the monitoring well than in soil sample M2050 which was taken at 0-18" depth from the well site. Given the fact that DDT has very low water solubility and high affinity for absorption to soil, the possibility of surfacial contamination leading to leaching down to 8'-10' depth can be safely precluded. The data, however, indicates historical nature of contamination of the lower stratum at this site. As indicated earlier the data on levels of PCBs and

pesticides has been flagged as estimated concentrations, using EPA's system of codes for such flagging. This was done because the samples were analyzed by the laboratory past the time limit allowed under Federal Regulations 40 CFR part 136. Since this infringement is of a technical nature, the obtained data could be used to characterize the samples.

4.2 Groundwater

Results of soil and water analyses of samples taken from the Newark Drive-In Theater property are presented in Table 6. The water sample (M1218) shows 7 ug/l (part per billion) of methyl benzene in the base/neutral/acid extractable fraction. This is much below the 50 ug/l concentration level established as cleanup level by NJDEP's Bureau of Industrial Site Evaluation (BISE). The well water sample also contained 3.1, 2.0, 0.83, 1.4, 7.8 and 29.0 ug/l of antimony, arsenic, cadmium, chromium, copper and zinc, respectively. These data indicate that levels of arsenic, cadmium, chromium, copper and zinc are below the levels establish by N.J.A.C. groundwater quality standards. There are no criteria to judge the levels of antimony by.

4.3 Summary

The overall data indicate that this site is contaminated with metals, base/neutral and acid extractable organic compounds, PCBs and pesticides and will require remedial action. The contamination seems to be both surficial resulting from dumping of priority pollutants as well as of historical nature. That the well water sample does not contain appreciable levels of these contaminants is related to the fact that most of these compounds would tend to remain in soil at a soil-water interface due to their high soil adsorption characteristics and low water solubility. Again, due to their high soil adsorption coefficients these compounds do not migrate much with the water in the soil.

The full laboratory analysis reports (NJDEP Tier II format) have been reviewed by our QA Coordinator and are maintained in our document control system. They are available for review upon request.

5.0 RECOMMENDATIONS

In view of the results of this report, further investigations will be necessary. These investigations should include estimating the extent of contamination and determining the most prudent and feasible solutions for construction on this property.

Mail to
Water Allocation
CN 029
Trenton, N.J. 08625

DEPARTMENT OF ENVIRONMENTAL PROTECTION
DIVISION OF WATER RESOURCES
TRENTON, N.J.

Permit No. 26-9072-

PERMIT TO DRILL WELL

14

VALID ONLY AFTER APPROVAL BY THE D.E.P.

26-23 / 17

Owner: Eddie Reality, Inc.
Address: c/o National Amusement, Inc.
200 Elm
Nedlor, Mass.

Name of Facility: Newark Drive in Theatre
Address: Foundry Street under 15E NJTP
Newark, New Jersey

Driller: J. E. Fritts & Assoc., Inc.
Address: P. O. Box 333
Voorhees, N.J. 08043

Diameter of Well	4 Inches	Proposed Depth of Well	20 Feet
Proposed Capacity of Pump	None GPM	Method of Drilling (cable-tool, rotary, etc.)	HSA
Use of Well (See Reverse)	Monitoring		

LOCATION OF WELL

Lot #	Block #	Municipality	County
12	5002	Newark	Essex

State Atlas Map No. 26

Draw sketch showing distance and relations of well site to nearest public roads, streets, septic systems, etc.

40 °44

North

X MW-1

See Attched

West

East

FOR MONITORING PURPOSES ONLY

40 °42

South

SEE REVERSE SIDE for IMPORTANT PROVISIONS AND REGULATIONS pertaining to this permit. APPROVAL of this permit is made SUBJECT TO acceptance of and compliance with the following ADDITIONAL CONDITIONS.

- [ ] Pinelands - Well must be drilled over 100' deep or a clay layer at least 4' in thickness must be encountered.
- [ ] It is necessary that Geophysical Logs of this well be made. Permanent pumping equipment SHALL NOT be installed until such logs are made.
- [ ] Authorization by rule under N.J.A.C. 7:14A-1 et seq.
- [ ] Samples of cuttings required every _____ feet or change in material.
- [ ] The results of a volatile organic scan mut be obtained prior to using the water and submitted to _____
- [ ] Domestic Potable Water Supply - The service line for water from the public community water supply system shall be turned off at the curb cock, and the meter shall be removed by the water purveyor.
- [ ] Domestic Irrigation Supply - No piping from the well for which the permit applies shall enter any building.
- [ ] Industrial/Commercial Supply - A physical connection permit shall be obtained pursuant to the provisions of N.J.A.C. 7:10-10-1 et seq., and a vigorous cross connections control program shall be instituted and maintained within the premises.
- [ ] Heat Pump Wells - Wells must be 50 feet apart and the water must be returned to the same aquifer as the production well.

This Space for Approval Stamp

WELL PERMIT
APPROVED
MAY 6 1986
DEPT. ENV. PROTECTION
DIV. OF WATER RESOURCES
WATER ALLOCATION

pliance with R.S. 58:4A-14, application is made for a permit to drill a well as described above.

Date: May 1, 1986

Signature of Owner: [signature]

COPIES: Water Allocation

#MW-1

0'	-	1'	Brown Loose Silt and Cinder, Wood, Glass-FILL
1'	-	9'	Black Silt w/Trace Clay, Misc.-FILL
9'	-	10'	Yellow Brown Misc.-FILL
10'	-	20'	Brown Silty Clay

DEPARTMENT OF ENVIRONMENTAL PROTECTION
DIVISION OF WATER RESOURCES

PERMIT NO. 269072

APPLICATION NO. _____

COUNTY Essex

WELL RECORD

OWNER N.J. TURNPIKE AUTHORITY ADDRESS _____

Owner's Well No. mw-1 SURFACE ELEVATION _____ Feet (Above mean sea level)

2. LOCATION Lot: 12 Block: 5002 Municipality: Newark

3. DATE COMPLETED 5/7/86 DRILLER J. E. Fritts

4. DIAMETER: Top 4 inches Bottom 4 inches TOTAL DEPTH 20 Feet

5. CASING: Type PVC Diameter 4 Inches Length 5 Feet

6. SCREEN: Type PVC Size of Opening .020 Diameter 4 Inches Length 15 Feet

Range in Depth { Top 15 Feet; Bottom 20 Feet } Geologic Formation _____

Tail Piece: Diameter - Inches Length _____ Feet

7. WELL FLOWS NATURALLY _____ Gallons per minute at _____ Feet above surface.

Water rises to _____ Feet above surface

8. RECORD OF TEST: Date _____ Yield _____ Gallons per minute

Static water level before pumping _____ Feet below surface

Pumping level _____ feet below surface after _____ hours pumping

Drawdown _____ Feet Specific Capacity _____ Gals. per min. per ft. of drawdown

How pumped _____ How measured _____

Observed effect on nearby wells _____

9. PERMANENT PUMPING EQUIPMENT:

Type None Mfrs. Name _____

Capacity _____ G.P.M. How Driven _____ H.P. _____ R.P.M. _____

Depth of Pump in well _____ Feet Depth of Footpiece in well _____ Feet

Depth of Air Line in well _____ Feet Type of Meter on Pump _____ Size _____ Inches

10. USED FOR Monitoring AMOUNT { Average _____ Gallons Daily; Maximum _____ Gallons Daily }

11. QUALITY OF WATER _____ Sample: Yes ____ No ____

Taste _____ Odor _____ Color _____ Temp. _____ °F.

12. LOG _____ Are samples available? _____

(Give details on back of sheet or on separate sheet. If electric log was made, please furnish copy.)

13. SOURCE OF DATA Drillers Log

14. DATA OBTAINED BY J. E. Fritts & Assoc., Inc. Date 5/12/86

(NOTE: Use other side of this sheet for additional information such as log of materials penetrated, analysis of the water, sketch map, sketch of special casing arrangements, etc.)

Thomas Tyler Moore Associates, Inc.
67 SCOTCH RD., W. TRENTON, N.J. 08628
(609) 883-2313

THOMAS TYLER MOORE, Pres., P.E., P.L.S., P.P.
JOSEPH M. MAHAN, JR., Vice Pres., P.E.
DOROTHEA L. LANTZ, Secy., Treas., N.P.
PATRICIA C. DERR
DONALD H. KAMP, P.L.S.
MALCOLM D. LOWENHAUPT, P.L.S.
DAVID G. McALEESE, P.P.
CARL A. RETTENBERGER, P.E., P.L.S.

May 28, 1986

O. H. Materials
P.O. Box 41
Windsor, NJ 08561

Attention: Blaine Presco

Re: Bayonne Barrel & Drum Co.
6-268-00-202

Gentlemen:

In accordance with your request, Thomas Tyler Moore Associates, Inc. has obtained New Jersey State Plane Coordinates and elevations for three monitoring wells at the above referenced site. This information has been tabulated as follows:

Well No.	Coordinates North	Coordinates East	Top of Casing Elev.	Ground Elev.
1.	690,767.49	2,148,604.61	17.25	15.2
2.	691,739.83	2,149,419.59	12.32	9.0
3.	692,240.88	2,149,808.03	7.32	5.2

Elevations shown are based on the National Geodetic Vertical Datum.

We trust this information will meet your requirements. If you have any questions or we can be of further assistance, kindly so advise.

Very truly yours,

THOMAS TYLER MOORE ASSOCIATES, INC.

Donald H. Kamp, P.L.S.
Division Director

DHK:lmt

FIELD COPY

O.H. MATERIALS CO.

OHM

THE ENVIRONMENTAL SERVICES COMPANY

PAGE NO._____

STATIC WATER WELL ELEVATIONS

DATE: 5/15/86 PROJECT NO.: 3736 SITE LOCATION Newark NJ

TEST WELL#	TOP OF CASING ELEV.	WATER LEVEL IND. READING	STATIC H_2O ELEVATION	TIME TAKEN	COMMENTS
mw-1	17.25'	12.49'	4.76'	1010	overcast
mw-2	12.32'	8.46	3.86'	1405	
mw-3	7.32'	3.57'	3.75'	1210	

* All wells will be measured prior to purging.
All readings will be taken with the use of a surveyors tape.

BY: PL

FIELD COPY

O.H. MATERIALS CO.

OHM

THE ENVIRONMENTAL SERVICES COMPANY

PAGE NO.

STATIC WATER WELL ELEVATIONS

DATE: 5/22/86 PROJECT NO.: 3236 SITE LOCATION Newark NJ

TEST WELL#	TOP OF CASING ELEV.	WATER LEVEL IND. READING	STATIC H_2O ELEVATION	TIME TAKEN	COMMENTS
mw-1	12.25'	12.65	4.60'	1550	clear
mw-2	12.32'	8.65'	3.67'	1000	
mw-3	7.32'	3.60	3.72	1327	

* All wells will be measured prior to purging.
All readings will be taken with the use of a surveyors tape.

BY: [illegible]

PART 2

JOB NO 3736

OHM

BORE HOLE NO. MW-1

PROJECT Louis Berger & Assoc.

LOCATION Newark, New Jersey

MARKS

DEPTH	SAMPLE NO.	BLOW COUNT PER 6"	RECOV-ERY	LITHOLOGIC DESCRIPTION	REMARKS	GRAPHIC LOG
13						
14	S-12	1-1-2-9		S-12: Brwn clay w/ f. sand & tr. silt		#2 Morie Sand .020 PVC screen
15						
16						
17						
18						
20				EOB		

OHM

PART 1

JOB NO. 3736	BORE HOLE NO. MW-1
PROJECT Louis Berger & Associates	LOCATION Newark, New Jersey
DRILLING CONTRACTOR J.E. Fritts & Assoc.	DRILLING EQUIPMENT Hollow Stem Auger
HYDROGEOLOGIST Blaine Fresco	DRILLER Bruce Higbee
DATE START/TIME 5/7/86 0845	DATE FINISH/TIME 5/7/86 1145
SURFACE ELEVATION 17.25' (TOC)	TOTAL DEPTH 19.84'
WELL CASING PVC	SCREEN TYPE PVC
LENGTH 15'	SLOT .020

GROUND WATER

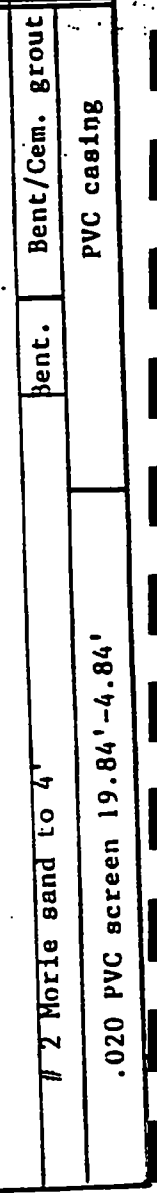
DATE	TIME	DEPTH	WEATHER
5/7/86	0930	10'	
5/15/86	1010	12.49' (TOC)	overcast
5/27/86	1550	12.65' (TOC)	clear

	CASING	CORE	SAMPLER	TUBE
TYPE	PVC		SS	
DIAMETER	4"ID		2"OD	
HAMMER WEIGHT			140 lbs.	
FALL			30"	

REMARKS

DEPTH	SAMPLE NO.	BLOW COUNT PER 6"	RECOVERY	BORE HOLE LOG: LITHOLOGIC DESCRIPTION	REMARKS
1	S-9	3-5-8	18"	S-9: 12" Brwn silt w/ misc. fill 6" Drk Brwn/Blck silt w/ tr. clay & misc. fill	loose damp
3					
4	S-10	12-9-40/6"	18"	S-10: Drk Brwn/Blck silt w/ tr. clay & misc. fill	
5					
6					
7					
8					
9	S-11	4-3-2-2	24"	S-11: 4" Brwn silt 20" Lt. Brwn silt w/ yellow misc. fill material	
10					
11					
12					

GRAPHIC LOG



APPENDIX
F

Diversified
Environmental
Resources, Inc.
1440A Pennington Road Trenton, New Jersey 08618
609-771-3616 FAX # 609-771-4276

APPENDIX F

SUMMARY REPORT OF THE TEST PIT AND MONITORING WELL INVESTIGATION AT THE NEWARK DRIVE-IN SITE PROJECT NO. 07445

SUBMITTED BY:

WEHRAN ENGINEERING CORPORATION

A
STOUT
A COMPLETE ENVIRONMENTAL SERVICE COMPANY.
COMPANY

WEHRAN ENGINEERS & SCIENTISTS

October 26, 1988

RECEIVED
NOV 03 4 1988
DEPT. ENVIRON. PROTECTION
Division Water Resources
Bureau of Permits Admin.

Mr. John Castner
New Jersey Department of
Environmental Protection
428 East State Street
Carroll Building
Trenton, New Jersey 08625

Re: Summary Report of the Test Pit and Monitoring Well Investigation
at the Newark Drive-In Site
(WE Project No. 07445 ES)

Dear Mr. Castner:

On behalf of National Amusements, Inc., we are pleased to submit to you three copies of the above-referenced report. This report was prepared in accordance with the requirements of the December 1987 Proposed Work Plan for the Newark Drive-In Site Landfill Disruption Permit Investigation and NJPDES Well Installation. To date, this project has been reviewed by Donald Carey, formerly of your office, and Erik Kinsel, of the New Jersey Department of Environmental Protection, Division of Water Resources, Bureau of Ground Water Quality Management.

The overall goal of this project is to obtain a Landfill Disruption Permit for the construction of a multi-plex movie theater at the project site. The attached report concludes that, with certain mitigative measures employed, this construction can proceed.

Please review the report as soon as possible. Subsequent to your review, we would like to meet with you to discuss the results of the investigation and the issuance of a Landfill Disruption Permit.

Thank you for your attention to this matter. If you have any questions, please do not hesitate to call.

Very truly yours,

WEHRAN ENGINEERING CORPORATION

Charles T. Bazydlo
Project Manager

CTB/mah
Enclosures
cc: Erick Kinsel, NJDEP, w/enclosure
S. Feldman, National Amusements, w/enclosure
T. Jankowski, National Amusements, w/enclosure
L. Goldshore, Goldshore and Wolf, w/enclosure
M. Schnitzer, Connell Foley & Geiser, w/enclosure

666 EAST MAIN STREET, P.O. BOX 2006, MIDDLETOWN, NY 10940 • (914) 343-0660

SUMMARY REPORT
OF THE
TEST PIT AND MONITORING WELL INVESTIGATION
AT THE
NEWARK DRIVE-IN SITE

Prepared for

NATIONAL AMUSEMENTS, INC.
200 Elm Street
Dedham, Massachussetts 02116

Prepared by

WEHRAN ENGINEERING CORPORATION
666 East Main Street
Middletown, New York 10940

WE Project No. 07445 ES

October 1988

TABLE 5.0 Aqueous

30880-1119

WEHRAN ENGINEERING

EPA PRIORITY POLLUTANT PESTICIDES/PCB's + METHOXYCHLOR

All results reported as ug/L.

Sample Identification

Compound	Method Blank	NDI-MW-02	NDI-MW-01	NDI-MW-04	Lower Limits of Detection with no Dilution
Dilution Factor	1.0	1.0	1.0	1.0	
Method Blank I.D.	6/23/88	6/23/88	6/23/88	6/23/88	
alpha BHC	U	U	U	U	0.002
beta BHC	U	U	U	U	0.002
gamma BHC	U	U	U	U	0.002
delta BHC	U	U	U	U	0.002
Heptachlor	U	U	U	U	0.002
Aldrin	U	U	U	U	0.002
4,4' DDE	U	U	U	U	0.002
Dieldrin	U	U	U	U	0.002
4,4' DDD	U	U	U	U	0.01
Endrin Aldehyde	U	U	U	U	0.01
4,4' DDT	U	U	U	U	0.01
Chlordane	U	U	U	U	0.02
Endosulfan I	U	U	U	U	0.002
Endosulfan II	U	U	U	U	0.01
Endosulfan Sulfate	U	U	U	U	0.01
Endrin	U	U	U	U	0.01
Heptachlor Epoxide	U	U	U	U	0.002
Toxaphene	U	U	U	U	0.20
PCB - 1016	U	U	U	U	0.05
PCB - 1221	U	U	U	U	0.05
PCB - 1232	U	U	U	U	0.05
PCB - 1242	U	U	U	U	0.05
PCB - 1248	U	U	U	U	0.05
PCB - 1254	U	U	U	U	0.05
PCB - 1260	U	U	U	U	0.05
Methoxychlor	U	U	U	U	0.50

U - See Appendix for definition.

TABLE 4.1 Aqueous
30880-1119
WEHRAN ENGINEERING
EPA PRIORITY POLLUTANT BASE/NEUTRAL COMPOUNDS + 1,2-DIPHENYLHYDRAZINE
All results reported in ug/L.

Dilution Factor / Method Blank I.D. / Compound	Sample Identification 1.0 ›C0847 Method Blank 6/27/88	1.0 ›C0847 NDI -MW-05	1.0 ›C0847 NDI-MW -FB-01	1.0 ›C0847 NDI -MW-03	Lower Limits of Detection with no Dilution
N-nitrosodimethyl amine	U	U	U	U	10
bis (2-chloroethyl) ether	U	U	U	U	10
1,3-dichlorobenzene	U	U	U	U	10
1,4-dichlorobenzene	U	U	U	U	10
1,2-dichlorobenzene	U	U	U	U	10
bis (2-chloroisopropyl) ether	U	U	U	U	10
hexachloroethane	U	U	U	U	10
N-nitroso-di-n propylamine	U	U	U	U	10
nitrobenzene	U	U	U	U	10
isophorone	U	U	U	U	10
bis (2-chloroethoxy) methane	U	U	U	U	10
1,2,4-trichlorobenzene	U	U	U	U	10
naphthalene	U	U	U	U	10
hexachlorobutadiene	U	U	U	U	10
hexachlorocyclopentadiene	U	U	U	U	10
2-chloronaphthalene	U	U	U	U	10
dimethyl phthalate	U	U	U	U	10
acenaphthylene	U	U	U	U	10
2,6-dinitrotoluene	U	0.6J	U	U	10
acenaphthene	U	U	U	U	10
2,4-dinitrotoluene	U	U	U	U	10
diethyl phthalate	U	U	U	U	10
fluorene	U	U	U	U	10
4-chlorophenyl-phenyl ether	U	U	U	U	10
4-bromophenyl phenyl ether	U	U	U	U	10
N-nitrosodiphenylamine	U	U	U	U	10
hexachlorobenzene	U	U	U	U	10
phenanthrene	U	U	U	U	10
anthracene	U	1J	U	U	10
di-n-butyl phthalate	U	U	U	U	10
fluoranthene	U	U	U	U	80
benzidine	U	U	U	U	10
pyrene	U	0.7J	U	U	10
butyl benzyl phthalate	U	U	U	U	20
3,3'dichlorobenzidine	U	U	U	U	10
chrysene	U	U	U	U	10
benzo (a) anthracene	3J	3JB	0.9JB	1JB	10
bis (2-ethyl hexyl) phthalate	U	U	U	1J	10
di-n-octyl phthalate	U	U	U	U	10
benzo (b) fluoranthene	U	U	U	U	10
benzo (k) fluoranthene	U	U	U	U	10
benzo (a) pyrene	U	U	U	U	10
benzo (g,h,i) perylene	U	U	U	U	10
dibenzo (a,h) anthracene	U	U	U	U	10
Indeno (1,2,3,c,d) pyrene	U	U	U	U	10
1,2-diphenylhydrazine	U	U	U	U	10

200 MONROE TURNPIKE • MONROE, CONNECTICUT 06468 • (203) 261 4458

U, J, B - See Appendix for definition.

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1.0 INTRODUCTION

1.1 SITE DESCRIPTION

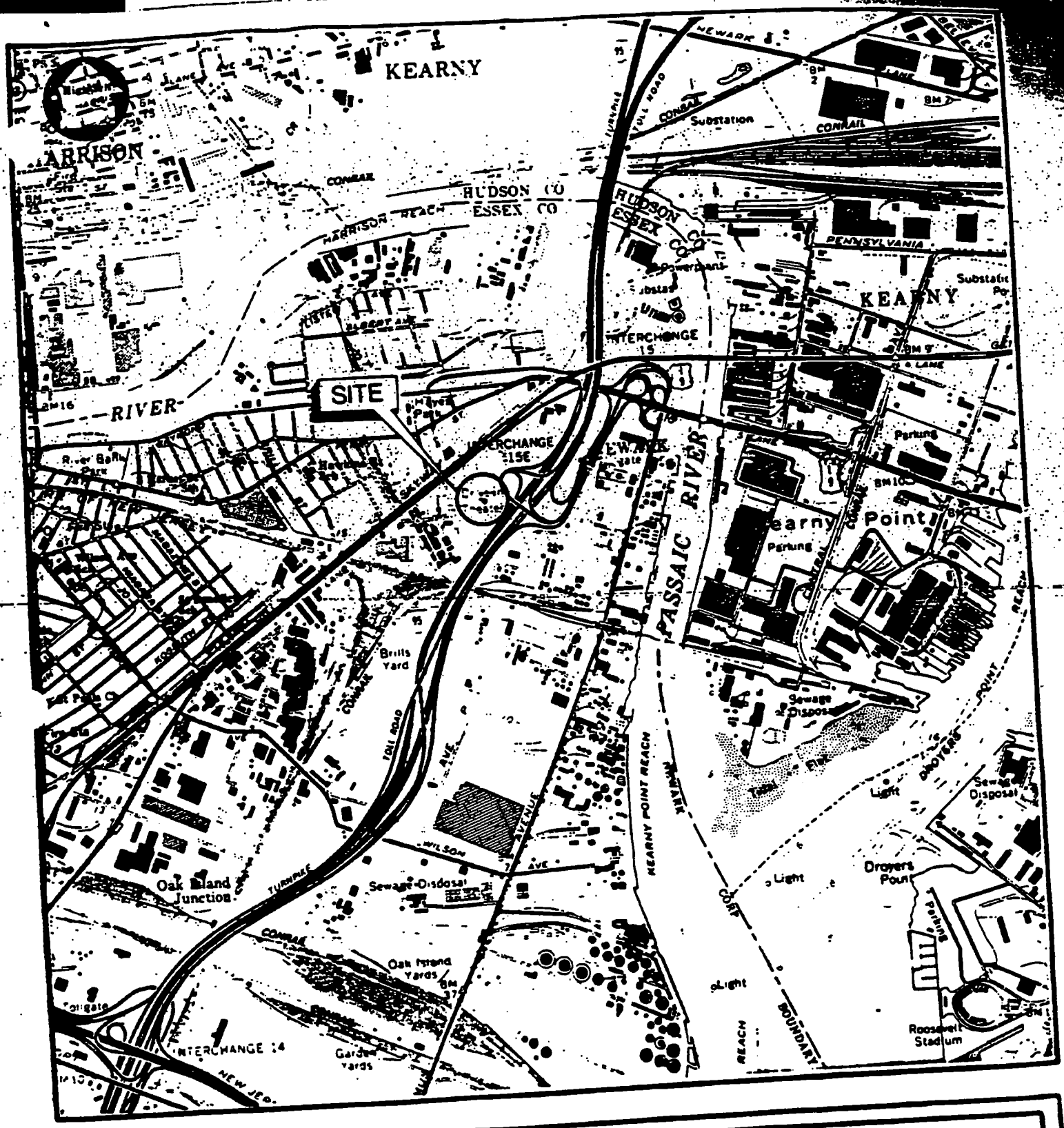
The Newark Drive-In site is located at the intersection of Foundry Street and U. S. Routes 1 and 9 in the City of Newark, New Jersey (Figure 1). Owned by National Amusements, Inc., it is an approximately nine-acre site proposed for a multi-plex theater development. The site was formerly used as a drive-in theater, from the early 1950s through the early 1980s. Prior explorations by the owner and Louis Berger Associates established that construction debris has been present at the site for many decades (i.e., prior to construction of the drive-in theater). This evaluation caused the New Jersey Department of Environmental Protection (NJDEP) to name the site the 15E Sanitary Landfill, due to its proximity to Exit 15E of the New Jersey Turnpike. The total acreage of the 15E Sanitary Landfill is approximately 45 acres; this investigation was performed only on the nine acres owned by National Amusements, Inc. (successor to the interests of Edle Realty, Inc.).

1.2 PROJECT DESCRIPTION

The NJDEP has requested that the site owner complete an investigatory program to ascertain the environmental conditions of the site as a condition to approval of the final permits for theater construction. To meet this end, the following tasks were performed at the Newark Drive-In site:

- Installation of five groundwater monitoring wells, and sampling and chemical analysis of the groundwater.
- A test pit investigation program to further characterize the nature of the existing subsurface material at the theater site and its immediate vicinity within the owner's property. The test pit investigation included chemical analysis of composite and discrete samples from the test pits.

The proposed multi-plex theater development will take place on an approximately ±9-acre portion of the former drive-in site. The actual



SCALE: 1" = 2000'

TOPOGRAPHY TAKEN FROM
1967 ELIZABETH, N.J.-N.Y.
JERSEY CITY, N.J.-N.Y.
U.S.G.S. QUADRANGLE
PHOTOREVISED 1981

NEWARK DRIVE-IN SITE
RT. 1 AND FOUNDRY STREET
NEWARK, ESSEX COUNTY, N.J.

FIGURE 1

SITE LOCATION MAP

NATIONAL AMUSEMENTS

building construction will encompass an area of 280 x 280 feet (1.8 acres). The remaining area of approximately ±7.2 acres will be utilized as a paved parking area. Current construction plans call for raising the area of the proposed building from an existing elevation of 7 to 8 feet MSL to a first floor elevation of 22 feet MSL. Additional fill will be placed in the parking areas to promote positive drainage to the southwest corner of the property, where stormwater runoff will flow into an established public drainage system.

Foundation placement for the theater building itself may require excavation or piling to form a stable construction base. The surrounding parking area will only require minor excavation (two to three feet) for the placement of utility trenches, drainage piping, and concrete divider islands.

Initially, considering the construction scheme, the proposed site investigation was to concentrate on characterizing existing conditions at the proposed building location due to the possibility of deep excavation or piling placement encountering previously buried fill material. However, once the program began and various fill materials were encountered in the soil, it was deemed prudent to locate more of the test pits outside of the proposed building area than was originally planned. In addition, all of the test pits were excavated 9 to 12 feet deep.

The subsurface investigation program conducted by Wehran consisted of the placement of five test pits within the boundaries of the proposed theater building, and ten test pits elsewhere on the site. The test pits were excavated to 9 to 12 feet in depth. The length of each of the pits was a 12-foot nominal length. Additionally, five monitoring wells were installed, ranging from a depth of 21.2 to 31.5 feet. No exploration or investigation occured outside of the proposed Multi-plex Cinema property boundary.

Prior to commencement of the investigation, a Landfill Disruption Permit was applied for by the owner, without prejudice, for the purpose of installing the monitoring wells and excavating the test pits. With respect to the Landfill Disruption Permit, the owner maintains that no landfill operation was ever conducted at the site, or if one was, the owner is not responsible for such activities. The Landfill Disruption Permit (No. 0714C6SD01) was approved by the NJDEP on April 15, 1988. A copy of this permit is presented in Appendix A.

Unless noted otherwise, the investigation was performed in accordance with the procedures outlined in the Proposed Work Plan for Newark Drive-In Site (Wehran Engineering, December 1987), the Landfill Disruption Permit Application (Wehran Engineering, March 1988), the Landfill Disruption Permit (NJDEP, No. 0714C6SD01, April 15, 1988), and the NJPDES Permit for Discharge to Groundwater (NJPDES Permit No. NJ0064068, March 1, 1987).

2.0 MONITORING WELLS INSTALLATION

Five monitoring wells were installed at the site in accordance with the draft New Jersey Pollutant Discharge Elimination System (NJPDES) permit specifications, at the locations shown in Figure 2. The wells were installed between May 26, 1988 and June 3, 1988 by Kendrick Drilling of Chester, New York, under the constant observation of a Wehran geologist. All wells were constructed of four-inch I.D. Schedule 40 PVC in accordance with NJDEP Unconsolidated Monitor Well Specifications (included in NJPDES Permit No. NJ0064008, March 1, 1988). A field survey of the completed monitoring wells was performed by Keelan and Pica surveyors of Bellville, New Jersey. The well logs, certifications, and survey map are presented in Appendix B.

The elevations of the wells are presented in Table 1, along with the water level measurements made by Wehran on June 6, 1988. Based on this data, the generalized groundwater flow direction is toward the north (as shown in Figure 2).

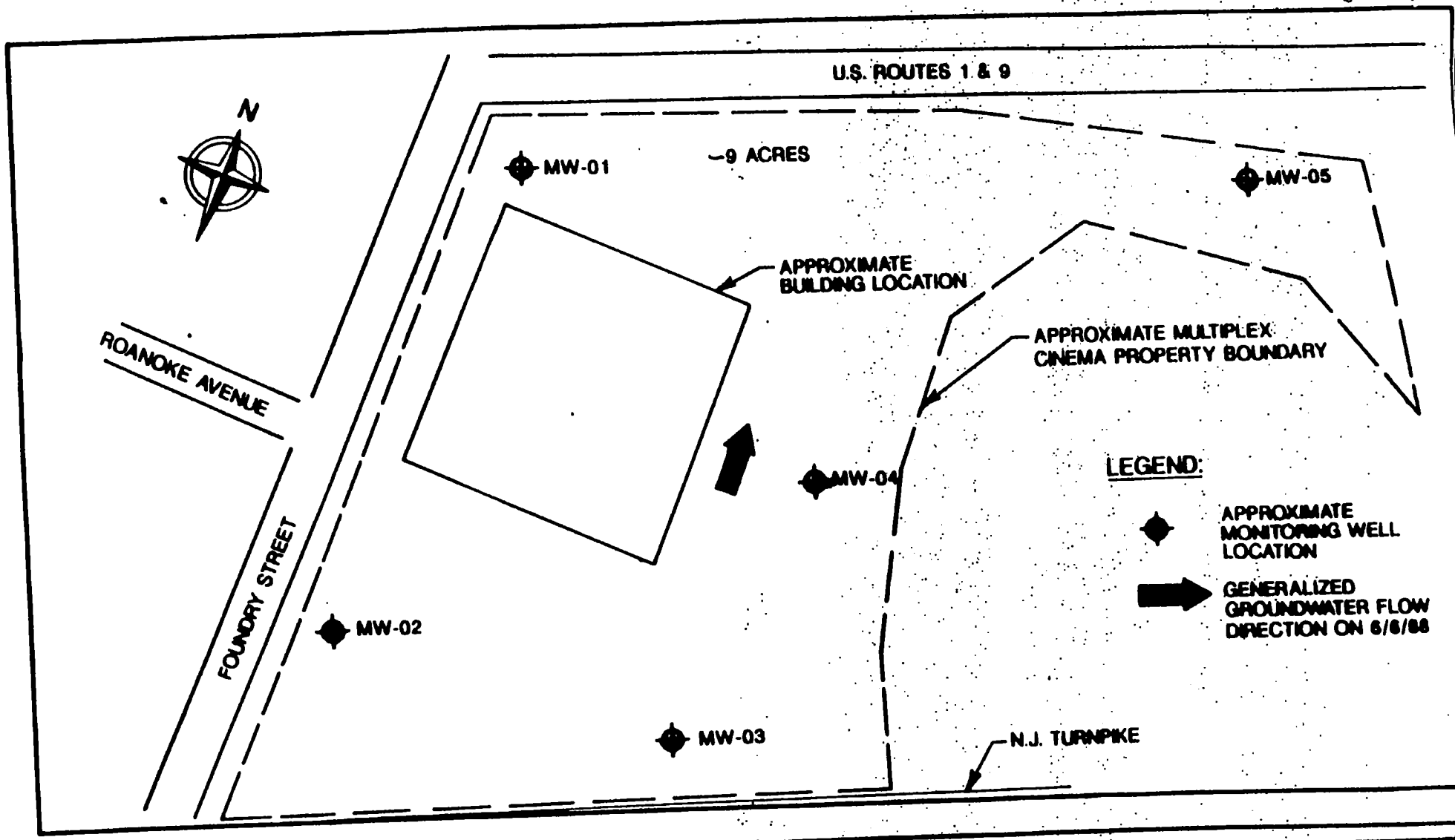


FIGURE 2

APPROXIMATE MONITORING WELL LOCATIONS

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NOT TO SCALE

TABLE 1

NATIONAL AMUSEMENTS, INC.
MONITORING WELL ELEVATIONS AND DEPTH TO GROUNDWATER

Monitoring Well ID	NJDEP Well Permit Numbers	Elevation of Top of Well Casing (feet MSL)	Elevation at Ground Surface (feet MSL)	Depth to top of screen below ground surface	Depth to Water (feet) from Ground Surface on 6/6/88	
MW-01	26-12947-7	12.46	9.98	9.43	4.67	5.31
MW-02	26-12951-5	13.75	11.61	9.05	5.74	5.87
MW-03	26-12950-7	15.63	13.10	12.60	7.03	6.07
MW-04	26-12949-3	12.68	10.30	10.84	4.63	5.67
MW-05	26-12948-5	20.61	18.58	19.40	13.56	5.02

Wells were all installed thru fill & screened below fill.

3.0 GROUNDWATER QUALITY ANALYSIS RESULTS

All five monitoring wells were sampled on June 21, 1988 in accordance with the procedures outlined in the NJPDES Permit. The samples were analyzed for the complete list of parameters presented in the NJPDES Permit for the month of July (comprehensive annual analysis). The samples were analyzed by York Laboratories of Monroe, Connecticut, a New Jersey-certified laboratory.

The results of the groundwater analyses are summarized in Table 2. Table 2 presents the data for metals, and various inorganic and indicator parameters. The laboratory analytical result data sheets are presented in Appendix C, including the organic chemical analysis results and the quality control data.

Several parameters were found to be in exceedance of the NJPDES Permit maximum contaminant limits. All five monitoring wells exhibited concentrations above the permit limits for ammonia-nitrogen, conductivity, dissolved solids, petroleum hydrocarbons, iron, and manganese. However, the analytical results for petroleum hydrocarbons are suspect because the field blank from the sampling program contained a concentration similar to that detected in the five wells. At least one well was above the limitation for the following parameters: sodium, sulfate, coliform bacteria, arsenic, and 1,2-dichloroethene. Table 3 summarizes the groundwater quality data points that exceed the NJPDES Permit contaminant limitation levels.

No pesticides, herbicides, or polychlorinated biphenyls (PCBs) were detected in any of the five groundwater samples (results presented in Appendix C). No acid extractable or base/neutral compounds were found in the groundwater samples at concentrations above the analytical detection limit. The only volatile organic compound detected in the groundwater above the analytical detection limits was 1,2-dichloroethene (total). Monitoring well MW-02 had a concentration of 27,000 ug/l 1,2-dichloroethene, and wells MW-03 and MW-04 contained 6 and 9 ug/l, respectively. Approximately 26,800 ug/l of the 27,000 ug/l of 1,2-dichloroethene detected in MW-02 is in the form of the cis isomer. The trans isomer is included on the USEPA Priority Pollutant list, while the cis isomer is not a USEPA Priority Pollutant.

Table 2
NATIONAL AMUSEMENTS, INC.
ANALYTICAL RESULTS OF GROUNDWATER TESTING

Inorganics and Miscellaneous

Parameter (mg/ℓ unless noted)	NJPDES Permit Maximum Contaminant Limitation	Monitoring Wells				
		MW-01	MW-02	MW-03	MW-04	MW-05
Ammonia-Nitrogen	0.5	*2.29*	*2.89*	*34.9*	*21.8*	*41.9*
Biochemical Oxygen Demand (5 day)	--	3	11	2	<1	<1
Chemical Oxygen Demand	--	65.4	50.8	84.8	28.9	117
Chloride	250	8.8	137	31.6	11.6	130
Coliforms, Total, cfu/100 mls	4*	1	*16*	4	0	0
Conductivity, µmhos/cm	--	1,430	1,100	2,100	1,475	2,400
Cyanide	0.2	0.079	0.053	0.091	0.069	0.149
Fluoride	2.0	0.53	0.54	0.70	0.61	0.61
Hardness, as $CaCO_3$	--	941	374	960	729	511
Petroleum Hydrocarbons** (ECRA guideline limit = 1 mg/ℓ)	None Noticeable	*19.1*	*17.3*	*10.0*	*17.8*	*17.4*
MBAS	0.5	0.04	0.22	0.09	0.09	<0.04
Nitrate-Nitrogen	10.0	<0.10	<0.10	0.13	<0.10	<0.10
Odor, Threshold #	--	1	1	1	1	1
Oil & Grease	10.0	2.2	4.0	<1.0	1.3	6.9
Phenols	0.3	0.008	0.022	<0.005	0.009	0.009
Sulfate	250	*650*	13.3	*367*	*653*	*655*

Table 2
NATIONAL AMUSEMENTS, INC.
ANALYTICAL RESULTS OF GROUNDWATER TESTING

Inorganics and Miscellaneous (continued)

Parameter (mg/ℓ unless noted)	NJPDES Permit Maximum Contaminant Limitation	Monitoring Wells				
		MW-01	MW-02	MW-03	MW-04	MW-05
Total Dissolved Solids	500	*1,370*	*693*	*1,462*	*1,230*	*1,889*
Total Organic Carbon	--	16	27	28	11	25
TOX-1, µg/ℓ as Cl–	--	21.6	14,860	47.0	19.4	27.6
TOX-2, µg/ℓ as Cl–	--	26.60	13,240	39.8	15.6	33.8
Turbidity, NTU	--	145	28.0	150	120	95
pH, S.U.	5 – 9	6.39	6.68	6.92	6.68	6.84

Table 2
NATIONAL AMUSEMENTS, INC.
ANALYTICAL RESULTS OF GROUNDWATER TESTING

Metals

Parameter (µg/ℓ unless noted)	NJPDES Permit Maximum Contaminant Limitation	Monitoring Wells				
		MW-01	MW-02	MW-03	MW-04	MW-05
Arsenic	50	***3,220***	<10	<10	<10	<10
Barium	1,000	<200	237	404	<200	294
Cadmium	10	<10	<10	<10	<10	<10
Chromium-Hexavalent	50	<10	<10	<10	<10	<10
Copper	1000	<25	<25	<25	<25	<25
Iron	300	***44,700***	***1,480***	***30,200***	***20,900***	***19,400***
Lead	50	<5.0	<5.0	<5.0	<5.0	<5.0
Manganese	50	***3,920***	***278***	***2,430***	***5,050***	***1,360***
Mercury	2	<0.2	<0.2	0.2	<.02	0.2
Selenium	10	<5.0	<5.0	<5.0	<5.0	<5.0
Silver	50	<10	<10	<10	<10	<10
Sodium	50,000	33,400	***68,700***	***118,000***	32,300	***182,000***
Zinc	5,000	115	83	<20	32	34

Notes:

-- = Not applicable

* = By membrane filtration, not to exceed four per 100 mℓ in more than one sample when less than 20 are examined per month.

** = The field blank had a concentration of 10.4 mg/ℓ.

BOLD = Concentration exceeds the NJPDES Permit Maximum Contaminant Limitation.

Table 3
NATIONAL AMUSEMENTS, INC.
GROUNDWATER PARAMETER NJPDES PERMIT EXCEEDANCES

Parameter (mg/ℓ unless noted)	NJPDES Permit Maximum Contaminant Limitation	Monitoring Wells				
		MW-01	MW-02	MW-03	MW-04	MW-05
Arsenic	0.05	3.22				
Iron	0.3	44.7	1.48	30.2	20.9	19.4
Manganese	0.05	3.92	0.278	2.43	5.05	1.36
Sodium	50		68.7	118		182
Ammonia-Nitrogen	0.5	2.29	2.89	34.9	21.8	41.9
Coliform (Total), cfu/100 mls	4*		16			
Petroleum Hydrocarbons† (ECRA limit = 1 mg/ℓ)	None noticeable	19.1	17.3	10.0	17.8	17.4
Sulfate	250	650		367	653	655
Total Dissolved Solids	500	1,370	693	1,462	1,230	1,889
1,2-dichloroethene (Total), µg/ℓ	50‡		27,000			

Notes:

blank = concentration below NJPDES permit contaminant limitation

* = By membrane filtration, not to exceed four per 100 mℓ in more than one sample when less than 20 are examined per month.

† = The field blank had a concentration of 10.4 mg/ℓ.

‡ = Limitation for total of volatile, acid extractable, and base/neutral organic compounds = 50 µg/ℓ.

4.0 TEST PIT INVESTIGATION

The test pit investigation was performed at the site during the week of May 23, 1988. B.E.S. Environmental Specialists, Inc. of Kingston, Pennsylvania, excavated 15 test pits (9 to 12-foot deep) under the supervision of Wehran. The approximate locations of the test pits are shown in Figure 3.

Test Pit Nos. 1 through 5 were performed at the proposed monitoring well locations in order to observe the subsurface stratigraphy and determine the approximate depth to groundwater. Test Pit Nos. 8 through 12 were performed on the mounded area of the proposed building. Based on visual observations, the subsurface in each test pit on the mound appeared nearly identical and, therefore, it was determined to obtain a sample from only TP-08, TP-09, and TP-12. The remaining test pits were performed in areas outside of the proposed building location.

The test pit logs are presented in Appendix D. These logs provide descriptions of the soils and materials encountered in each of the test pits. In general, the test pits indicate that the site had been filled with the ash material (plus bottles and metal) from municipal and/or private incineration of household waste. Other common fill included a black tar-like residue, bricks, glass, metal, asphalt, wire and cable, and other construction and demolition debris. The fill ranged in depth from five feet below ground surface to the bottom of the test pits (9 to 11 feet).

An HNU photoionizer (Model PI-101) and/or flame ionization detector (Foxboro Model OVA-128) were utilized to screen the soils for organic vapors. Table 4 lists the organic vapor readings in parts per million (ppm) detected above background levels by the particular instrument utilized.

A total of eight composite and four discrete samples were obtained from 11 of the 15 test pits. Some of the test pits were not sampled due to the similarity of the material encountered with that in other test pits. Discrete samples were taken from specific strata within some of the test pits, whereas composite samples were obtained from bucket scrapings of the side walls and/or bottom. A descriptive list of the samples obtained is included in Table 4.

Test pit samples were analyzed by York Laboratories for full RCRA characterization (EP toxicity metals, pesticides, and herbicides; ignitability, corrosivity, reactivity), the full EPA target compound list (TCL), and petroleum hydrocarbons. Duplicates of samples TP-02-DIS, TP-07, and TP-08 were analyzed for the TCL volatile organic compounds. The analytical results are presented in Section 5.0.

Two field blanks were performed utilizing York Laboratories blank water, which was poured into the excavator bucket, collected in the sampling trowel, and poured into volatile organic vials. Field blanks were analyzed for TCL volatile organic compounds.

Trip blanks, numbered chronologically for each day of sampling, were included with each sample shipment. Each trip blank was analyzed for TCL volatile organics. Samples were packed on ice in sealed coolers with chain-of-custody forms included, and shipped Federal Express to York Laboratories following each day of sampling.

Table 4
NATIONAL AMUSEMENTS, INC.
LIST OF TEST PIT SAMPLES

Test Pit No.	Sample I.D.	HNU Highest reading above background (ppm)	OVA Highest reading above background (ppm)	Sample Description
TP-01	TP-01-DIS	0	–	Discrete sample of white ashes
TP-02	TP-02-DIS TP-02	0	100	Fine black moist sand Composite of side wall
TP-03	TP-03	0	–	Composite of side wall
TP-04	TP-04	–	25	Composite of side wall and bottom
TP-05	TP-05-DIS	600	>1,000	Discrete sample of tar-like residue
TP-06	No Sample	–	>1,000	Similar to TP-05
TP-07	TP-07	–	9	Composite of side walls
TP-08	TP-08	–	>1,000	Composite of side walls black soot, sands
TP-09	TP-09	110	>1,000	Composite of side walls and bottom
TP-10	No Sample	7	–	Same material as TP-08 and TP-09
TP-11	No Sample	30	–	Same material as TP-08 and TP-09
TP-12	TP-12	4	–	Composite of side walls and bottom
TP-13	TP-13	0	–	Composite of side walls
TP-14	TP-14-DIS	15	–	Discrete sample of tar-like residue
TP-15	No Sample	–	–	No Sample
–	FB-01	–	–	Field blank performed 5/24/88
–	FB-02	–	–	Field blank performed 5/26/88
–	TB-01	–	–	Trip blank for 5/23/88
–	TB-02	–	–	Trip blank for 5/24/88
–	TB-03	–	–	Trip blank for 5/25/88
–	TB-04	–	–	Trip blank for 5/26/88
TP-02	TP-02-DIS-RE	0	100	Duplicate of TP-02-DIS, analyzed for VOCs
TP-07	TP-07-RE	–	9	Duplicate of TP-07, analyzed for VOCs
TP-08	TP-08-RE	–	>1,000	Duplicate of TP-08, analyzed for VOCs

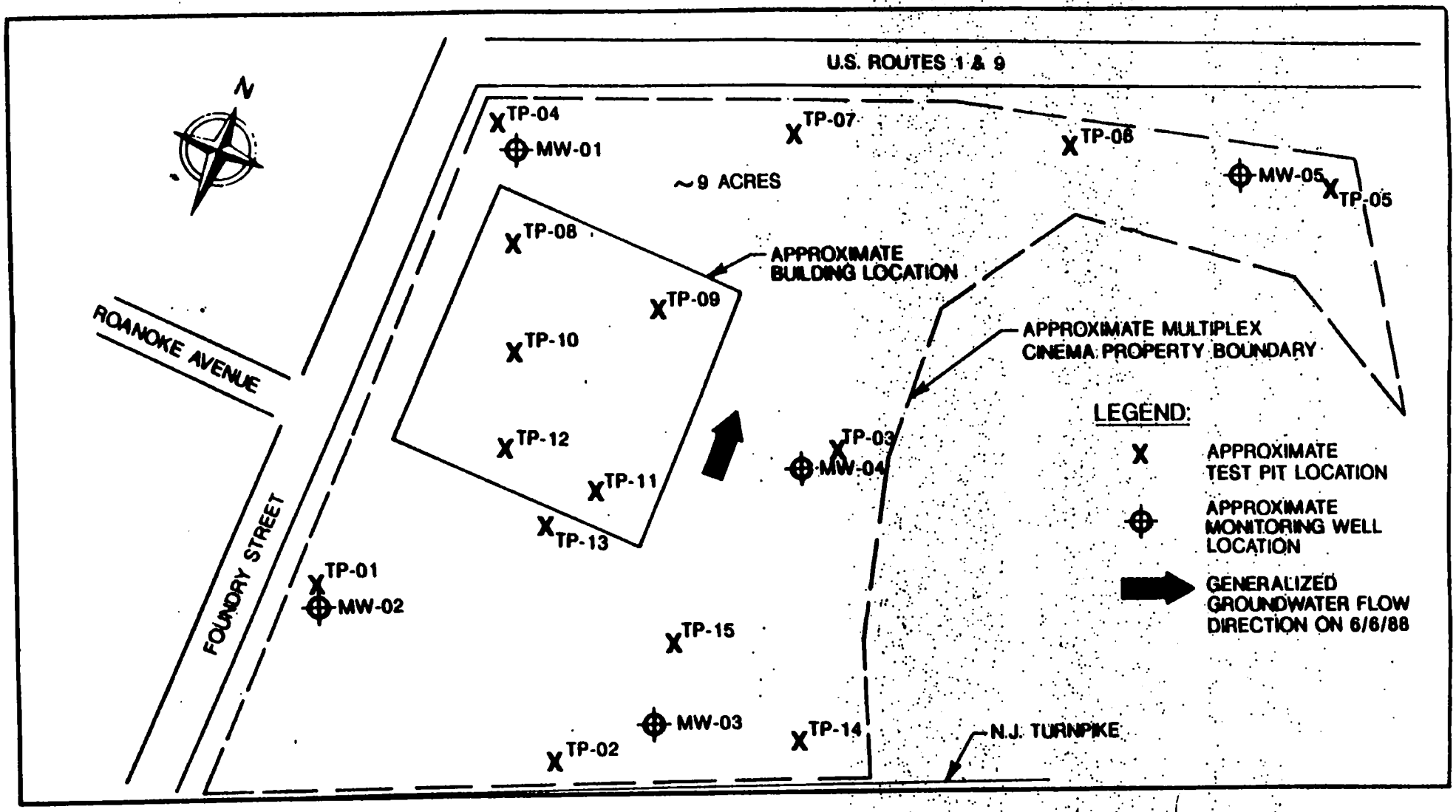

FIGURE 3

APPROXIMATE TEST PIT LOCATIONS

NATIONAL AMUSEMENTS, INC.

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5.0 TEST PIT ANALYSIS RESULTS

5.1 INTRODUCTION

A summary of the analytical results of the test pit samples is presented in Tables 5, 6, 7, and 8. The data included in Tables 5, 6, and 7 consists only of those parameters analyzed which were detected in at least one sample. Table 8 contains the results of all metals, cyanide, and petroleum hydrocarbon analyses. The laboratory analytical data sheets for all analyses, including quality control samples, are presented in Appendix E. All results are presented in terms of dry weight.

All of the test pit samples, both composite and discrete, were found to be non-corrosive, non-ignitable, and non-reactive (Appendix E) according to the criteria of the Resource Conservation and Recovery Act (RCRA). All RCRA Extractable Procedure (EP) Toxicity metals were either not detected or were detected at concentrations well below those used as criteria to characterize a sample as EP toxic (Appendix E). In addition, no EP Toxicity pesticides (lindane, endrin, methoxychlor, and toxaphene) or herbicides (2,4-D and Silvex) were detected (Appendix E). Sample TP-14-DIS was not analyzed for RCRA parameters; this sample was similar to TP-05-DIS. The analytical results indicate that all test pit samples analyzed for RCRA parameters can be characterized as non-hazardous according to RCRA criteria.

5.2 COMPOSITE SAMPLES

Volatile Organic Compounds

The analytical results of the composite test pit samples indicate that four principal volatile organic compounds were detected in low to moderate concentration in some of the composite samples (Table 5). These compounds include:

- Benzene (3 test pits, 3 to 89 ug/Kg)
- Toluene (5 test pits, 7 to 160 ug/Kg)
- Xylene (5 test pits, 27 to 1,000 ug/Kg)
- Ethylbenzene (4 test pits, 14 to 520 ug/Kg)

Of the composite samples, TP-08 contained the highest concentration of total volatile organics (1,292 to 1,769 ug/Kg of total volatiles). Test Pit No. 8 is located in the approximate area of the northwest corner of the proposed building (Figure 3). TP-12 had the second highest total volatile organic compound concentration of the composite samples (approximately 400 ug/Kg). This test pit is also within the area of the proposed building.

No halogenated volatile organics were detected in significant concentrations. TP-01 had a trace of 1,2-dichloroethene (5 ug/Kg); this was the only test pit sample in which this compound was detected. Test Pit No. 1 is located near monitoring well MW-02, along the western border of the site (Figure 3). MW-02 had a groundwater concentration of 27,000 ug/L total 1,2-dichloroethene. The 1,2-dichloroethene in MW-02 was the only volatile organic compound detected above the detection limits in any of the five monitoring wells sampled.

Base/Neutral and Acid Extractable Compounds

The primary base/neutral and/or acid extractable compounds detected in the analyses of composite test pit samples were polycyclic aromatic hydrocarbons (PAHs). PAHs were detected in all of the composite test pit samples (Table 6). Samples TP-08 and TP-12 had the highest concentrations of PAHs, ranging up to a high of 77,000 ug/Kg of pyrene in TP-12. Both of these test pits were within the area of the proposed theater building.

Total Metals

The analytical results for metals are presented in Table 8. The reported values for metals in the composite test pit samples ranged from 274 to 2,260 mg/Kg for lead, 410 to 2,180 mg/Kg for zinc, 91.7 to 658 mg/Kg for copper, 2.0 to 10.7 mg/Kg for cadmium, 7.8 to 198 mg/Kg for arsenic, and 17.8 to 131 mg/Kg for chromium. The highest lead, zinc, copper, cadmium, and chromium concentrations detected in the composite samples were in samples taken from within the area of the proposed building.

EP Toxicity Metals

All metals analyzed in the Extractable Procedure (EP) toxicity test (Appendix E) were either not detected or were detected at concentrations well below those used as criteria to characterize a sample as EP toxic.

Petroleum Hydrocarbons

Analysis for total petroleum hydrocarbons has indicated that concentrations range from a low of 190 mg/Kg in TP-03, to a high of 2,970 mg/Kg in TP-12 (Table 8).

Pesticides, Herbicides, and PCBs

Four pesticides were detected in the composite samples (Table 7):

- 4,4' DDD (7 of 8 samples)
- 4,4' DDD (6 of 8 samples)
- 4,4' DDT (5 of 8 samples)
- Endosulfan I (2 of 8 samples)

The highest concentration of pesticides (by an order of magnitude higher than any other sample) were found in Test Pit No. 4. TP-04 had 68,000 ug/Kg 4,4' DDD, 9,200 ug/Kg of 4,4' DDT, and 3,500 ug/Kg of 4,4' DDE. Test Pit No. 4 is located at the northwest corner of the site, near the intersection of Foundry Street and U. S. Routes 1 and 9. The other test pits where these pesticides were found were located throughout the site.

No herbicides or other pesticides were detected in any of the composite samples. None of the pesticides (lindane, endrin, methoxychlor, and toxaphene), or herbicides (2,4-D and Silvex) analyzed in the EP Toxicity test were detected. No PCBs were detected in any of the composite samples. All of the samples were determined to be non-corrosive, non-ignitable, and non-reactive according to RCRA criteria (Appendix E).

5.3 DISCRETE SAMPLES

The four discrete samples (TP-01-DIS, TP-02-DIS, TP-05-DIS, and TP-14-DIS) were of specific materials encountered during the excavations. Two of the samples were of a black tar-like residue, one was ash, and the other was a fine, black, moist sand.

Discrete sample TP-01-DIS is from a layer of ash at a depth of three to four feet in Test Pit No. 1 (southwest section of the site, near MW-02). While numerous polycyclic aromatic hydrocarbons (PAHs) were detected (a total of approximately 36,000 ug/Kg, Table 6), no volatile organic compounds were found in this sample (Table 5). Low levels of the insecticides 4,4' DDD (48 ug/Kg) and delta BHC (29 ug/Kg) were also detected (Table 7). No herbicides or PCBs were detected (Appendix E). No metals were detected in the EP toxicity test except barium (Appendix E), and the barium concentration was well below the concentration used to characterize a sample as EP toxic.

Discrete sample TP-02-DIS consisted of a fine, black, moist sand taken from a depth of three to four feet in Test Pit No. 2 (southern section of site). The only base/neutral or acid extractable compounds detected were isophorone and benzoic acid (2,700 ug/Kg each, Table 6). Low levels (approximately 8 ug/Kg each) of benzene and toluene (volatile organics) were also found (Table 5). This is the only one of the 12 test pit samples, discrete or composite, where no PAHs were detected (Table 6). The only pesticide concentration reported above the detection limit (16 ug/Kg) was 25 ug/Kg of 4, 4' DDT (Table 7). No herbicides or PCBs were detected. No metals were detected in the EP toxicity test except barium (Appendix E), and the barium concentration was well below the concentration used to characterize a sample as EP toxic.

Discrete sample TP-05-DIS consisted of a black tar-like residue found in Test Pit No. 5, near the northeast corner of the property. Concentrations of several PAHs were detected as follows:

- Naphthalene 5,800,000 ug/Kg
- 2-Methylnaphthalene 5,000,000 ug/Kg

• Phenanthrene	3,400,000 ug/Kg
• Fluorene	2,100,000 ug/Kg
• Pyrene	2,100,000 ug/Kg
• Acenaphthylene	1,300,000 ug/Kg
• Fluoranthene	1,200,000 ug/Kg
• Chrysene	940,000 ug/Kg
• Anthracene	780,000 ug/Kg
• Benzo(a) Anthracene	730,000 ug/Kg

In total, over 3.0 percent (30,000,000 ug/Kg, dry weight) of this sample consisted of PAHs (Table 6).

Discrete sample TP-05-DIS contained 91 ug/Kg 4,4' DDE, and 550 ug/Kg 4,4' DDD (Table 7). No herbicides were detected. Traces of benzene (27 ug/Kg), toluene (24 ug/Kg), ethylbenzene (17 ug/Kg), and xylenes (50 ug/Kg) were the principal volatile organics detected (Table 5). As with all other test pit samples analyzed, the metal concentrations detected in the EP toxicity test were well below the concentrations used to characterize a sample as EP toxic (Appendix E). TP-05-DIS is the only one of the 12 test pit samples to have PCBs present (1,600 ug/Kg PCB-1260, Table 7). Another similar discrete sample of the black tar-like residue (TP-14-DIS) contained no PCBs.

Discrete sample TP-14-DIS consisted of a black tar-like residue, similar to sample TP-05-DIS. This sample was taken approximately five feet deep in Test Pit No. 14, near the southeast corner of the site. The types and concentrations of base/neutral and acid extractable compounds detected were very similar to those found in TP-05-DIS (Table 6). In total, over 2.4 percent of TP-14-DIS is PAHs (24,000,000 ug/Kg, dry weight). In addition, as with TP-05-DIS, benzene (16,000 ug/Kg), toluene (67,000 ug/Kg), ethylbenzene (110,000 ug/Kg), and xylene (220,000 ug/Kg) were the principal volatile organic compounds detected (Table 5). However, these concentrations are higher than those found in TP-05-DIS. No pesticides, herbicides, or PCBs were found in TP-14-DIS. In general, TP-14-DIS had the lowest metal concentrations of any of the test pit samples, discrete or composite (Table 8).

Table 8
NATIONAL AMUSEMENTS, INC.
METALS, CYANIDES, AND PETROLEUM HYDROCARBONS IN TEST PIT SAMPLES

Parameter (mg/kg)	Test Pit Samples					
	TP-07	TP-08	TP-09	TP-12	TP-13	TP-14-DIS
Aluminum	5,710	4,980	5,940	4,980	7,790	2,000
Antimony	<12	53.3	15.6	20.6	13.5	<12
Arsenic	14.0	61.5	55.0	125	11.0	6.8
Barium	1,150	1,020	1,160	801	359	136
Beryllium	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Cadmium	3.84	8.65	7.96	10.7	2.49	<2.0
Calcium	9,910	9,030	9,150	7,610	4,400	5,230
Chromium	63.5	131	84.1	53.8	50.8	14.5
Cobalt	<10	<10	11.9	<10	<10	<10
Copper	304	396	658	373	261	51.2
Iron	14,700	28,900	48,600	89,600	20,100	1,030
Lead	1,650	1,550	2,260	1,340	694	277
Magnesium	1,960	1,180	1,720	1,840	1,970	1,050
Manganese	195	246	380	532	231	82.1
Mercury	28.3	2.11	4.02	3.10	7.10	0.52
Nickel	37.7	62.9	67.1	70.2	35.8	62.0
Potassium	650	443	591	515	668	429
Selenium	1.6	4.1	<1.0	3.9	6.7	<1.0
Silver	23.3	3.4	<2.0	<2.0	<2.0	<2.0
Sodium	377	383	381	362	376	771
Thallium	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Vanadium	29.2	34.3	21.1	29.0	27.5	29.6
Zinc	733	1,730	2,040	2,180	579	114
Total Cyanides	5.72	9.45	7.84	9.20	17.9	11.4
Petroleum Hydrocarbons	1,010	1,380	1,030	2,970	339	not analyzed

Table 8
NATIONAL AMUSEMENTS, INC.
METALS, CYANIDES, AND PETROLEUM HYDROCARBONS IN TEST PIT SAMPLES

Parameter (mg/kg)	Test Pit Samples					
	TP-01-DIS	TP-02-DIS	TP-02	TP-03	TP-04	TP-05-DIS
Aluminum	5,610	7,870	9,020	5,430	5,840	6,190
Antimony	<12	13.8	<12	<12	<12	46.7
Arsenic	14.2	9.1	7.8	10.4	198	19.3
Barium	237	381	245	196	326	1,450
Beryllium	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Cadmium	<2.0	2.74	2.35	<2.0	4.2	26.6
Calcium	5,400	5,210	5,760	3,720	6,000	13,200
Chromium	19.5	53.3	30.0	20.5	17.8	1,420
Cobalt	<10	<10	<10	<10	<10	<10
Copper	106	127	99	207	91.7	788
Iron	14,200	15,600	16,600	25,600	18,400	38,600
Lead	438	556	274	875	745	15,400
Magnesium	1,920	1,570	2,370	1,360	2,100	2,270
Manganese	371	230	273	300	332	322
Mercury	0.95	2.40	1.67	2.59	0.83	2.28
Nickel	14.0	27.7	25.4	24.3	16.4	97.9
Potassium	709	718	739	572	622	706
Selenium	<1.0	1.0	1.2	<1.0	<1.0	8.7
Silver	<2.0	<2.0	<2.0	<2.0	<2.0	2.6
Sodium	233	516	391	434	317	467
Thallium	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Vanadium	22.1	17.3	18.7	18.0	21.5	31.9
Zinc	395	462	410	564	467	1,940
Total Cyanides	0.69	14.2	11.1	1.78	0.89	22.6
Petroleum Hydrocarbons	480	33.4	204	190	608	673

Table 7
NATIONAL AMUSEMENTS, INC.
PESTICIDES AND PCBs DETECTED IN TEST PIT SAMPLES

Parameter (µg/kg)	Test Pit Samples											
	TP-01-DIS	TP-02-DIS	TP-02	TP-03	TP-04	TP-05-DIS	TP-07	TP-08	TP-09	TP-12	TP-13	TP-14-DIS
4,4' DDE			200		3,500	91		320	200	380	140 J	
4,4' DDD	48	11 J	380	240	68,000	550		2,500	600	1,200	570	
4,4' DDT		25	210		9,200			920	220 J	590	410	
delta BHC	28											
Endosulfan I				65			250					
PCB-1260						1,600						

Notes:

Blank = Compound not detected

J = Estimated value, result below detection limit

Table 6
NATIONAL AMUSEMENTS, INC.
BASE/NEUTRAL AND ACID EXTRACTABLE COMPOUNDS DETECTED IN TEST PIT SAMPLES

Parameter (µg/kg)	Test Pit Samples					
	TP-07	TP-08	TP-09	TP-12	TP-13	TP-14-DIS
Naphthalene	310 J	29,000	2,500		330 J	5,600,000
2-Methylnaphthalene	210 J	17,000 J	2,100		210 J	3,900,000
Acenaphthylene	1,800	7,300 J	1,300	17,000 J	720	1,300,000
Acenaphthene	650	4,700 J	960	5,000 J	640	880,000
Dibenzofuran	500		360 J		430	130,000 J
Fluorene	970	15,000 J	2,200	22,000 J	1,200	1,500,000
Phenanthrene	6,200	42,000	5,600	66,000	5,200	3,100,000
Anthracene	2,600	9,400 J	2,000	19,000 J	1,900	720,000
Fluoranthene	6,700	21,000 J	3,900	45,000	4,900	1,400,000
Pyrene	9,800	30,000	7,400	77,000	6,800	1,900,000
Benzo (b) fluoranthene	5,800	6,900 J	2,900	9,700 J	2,700	210,000 J
Benzo (k) fluoranthene	8,000	7,600 J	3,900	17,000 J	94 J	490,000
Benzo (a) pyrene	6,500	10,000 J	4,400	25,000 J	3,900	510,000
Benzo (a) anthracene	7,900	13,000 J	4,800	29,000 J	4,300	580,000
Chrysene	7,200	16,000 J	5,500	36,000	4,700	760,000
Indeno (1,2,3-cd) pyrene	2,800		1,900	14,000 J	1,100	470,000
Dibenzo (a,h) anthracene						
Benzo (g, h, i,) perylene	790		320 J		360 J	130,000 J
Di-n-Butylphthalate		2,300 J	110 J			
bis (2-Ethylhexyl) phthalate		4,200 J	700	1,600 J	550	
2-Chloronaphthalene			210 J			
Benzoic Acid						
Isophorone						

Notes:

Blank = Compound not detected

J = Estimated value, result below detection limit

Table 6
NATIONAL AMUSEMENTS, INC.
BASE/NEUTRAL AND ACID EXTRACTABLE COMPOUNDS DETECTED IN TEST PIT SAMPLES

Parameter (µg/kg)	Test Pit Samples					
	TP-01-DIS	TP-02-DIS	TP-02	TP-03	TP-04	TP-05-DIS
Naphthalene	68 J		490	56 J		5,800,000
2-Methylnaphthalene			210 J	63 J		5,000,000
Acenaphthylene	110 J		190 J	65 J		1,300,000
Acenaphthene	220 J		210 J			380,000 J
Dibenzofuran	98 J		79 J			160,000 J
Fluorene	250 J		450	64 J		2,100,000
Phenanthrene	3,200		1,400	560	2,300 J	3,400,000
Anthracene	950		340 J	130 J		780,000
Fluoranthene	5,800		1,200	850	2,600 J	1,200,000
Pyrene	5,700		1,400	700	2,600 J	2,100,000
Benzo (b) fluoranthene	1,500		490	1,200		210,000 J
Benzo (k) fluoranthene	3,700		540	1,300		490,000
Benzo (a) pyrene	2,500		690	1,300		530,000
Benzo (a) anthracene	4,200		750	580		730,000
Chrysene	4,400		940	660		940,000
Indeno (1,2,3-cd) pyrene	2,700		450	1,700		480,000
Dibenzo (a,h) anthracene						130,000 J
Benzo (g, h, i,) perylene	840		510	2,000		130,000 J
Di-n-Butylphthalate						
bis (2-Ethylhexyl) phthalate	38 J		110 J			
2-Chloronaphthalene						
Benzoic Acid	250 J	2,700				
Isophorone		2,700				

Notes:

Blank = Compound not detected

J = Estimated value, result below detection limit

Table 5
NATIONAL AMUSEMENTS, INC.
VOLATILE ORGANIC COMPOUNDS DETECTED IN TEST PIT SAMPLES

Parameter (µg/kg)	Test Pit Samples						
	TP-07-RE	TP-08	TP-08-RE	TP-09	TP-12	TP-13	TP-14-DIS
Carbon Disulfide				7			
Ethyl Benzene		520	370	14	130		110,000
Xylene (Total)		1,000	760	27	210		220,000 B
Benzene	8J	89	52	3 J	28 J		16,000
Toluene	7 J	160 B	110	5 JB	35 B		67,000 B
Chlorobenzene	5 J						

Notes:

Blank = Compound not detected

J = Estimated value, result below detection limit

B = Compound also found in blank

Table 5
NATIONAL AMUSEMENTS, INC.
VOLATILE ORGANIC COMPOUNDS DETECTED IN TEST PIT SAMPLES

Parameter (µg/kg)	Test Pit Samples							
	TP-01-DIS	TP-02-DIS	TP-02-DIS-RE	TP-02	TP-03	TP-04	TP-05-DIS	TP-07
Carbon Disulfide								
Ethyl Benzene				12			17 J	
Xylene (Total)				3 J			50	6 J
Benzene		8	27	2 J			26 J	11
Toluene	2 JB	8 B		3 JB			24 J	6 JB
Chlorobenzene								8

Notes:

Blank = Compound not detected

J = Estimated value, result below detection limit

B = Compound also found in blank

6.0 CONCLUSIONS AND DISCUSSION

The test pit samples are characterized as non-hazardous, according to RCRA criteria. Varying concentrations of both organic and inorganic chemicals were detected throughout the site. The principal organic compounds found in a majority of the test pit samples include polycyclic aromatic hydrocarbons (PAHs), petroleum hydrocarbons, and pesticides (4,4' DDD, 4,4' DDE, and 4,4' DDT). The concentrations of PAHs in the two discrete samples of tar-like residue were significantly higher than those detected in any of the composite samples. Significant concentrations of certain metals were also found in various test pit samples, including lead, zinc, copper, cadmium, arsenic, chromium, and iron.

The groundwater in each monitoring well at the site was found to be above the NJPDES Permit limitations for iron, manganese, ammonia-nitrogen, and total dissolved solids. In addition, several of the wells were found to be above the limits for sulfate (four wells) and sodium (three wells). Monitoring Well MW-01 was above the limit for arsenic. MW-02 appears to be contaminated with 1,2-dichloroethene. Each well sample was above the limit for total petroleum hydrocarbons; however, the corresponding field blank contained a petroleum hydrocarbon concentration similar to that detected in the well samples.

Polycyclic aromatic hydrocarbons (PAHs) are widely distributed in the environment from both natural and anthropogenic sources. Anthropogenic sources are the major contributor to PAH levels in the environment, and they include incomplete combustion processes (e.g., incineration, fossil fuels, wood fires, automobile exhaust), coke production, asphalt, and coal tar, among others (Sims, et al., 1983). Non-anthropogenic sources include coal, sedimentary rocks, minerals, and biochemical synthesis (Sims, et al., 1983).

PAHs have relatively low solubility in water and tend to strongly adsorb onto particulates, soil, and organic material. The strong adsorptive properties of PAHs are the likely reason they were barely detected in the groundwater at the site. Biodegradation is probably the ultimate fate process for PAHs in the environment (Callahan, et al., 1979).

A potential major source of PAHs at the site is the black tar-like residue encountered during the test pit investigation. Discrete samples of the tar-like residue (TP-05-DIS and TP-14-DIS) contained 2.4 to 3.0 percent PAHs. The incinerator ash found on site could also be a source of PAHs, but not as significant a source as the tar-like residue. A discrete sample of the ash (TP-01-DIS) contained approximately 36,000 ug/Kg total PAHs (0.0036 percent). Another potential source of PAHs is the asphalt material found in some of the test pits.

Monitoring well MW-02 appears to be contaminated with cis-1,2-dichloroethene. MW-02 is located near the southwestern border of the site, along Foundry Street. Former and/or existing chemical manufacturing operations are located across Foundry Street from this location. The generalized groundwater flow direction at the site is toward the north.

Based upon our investigation, the concentration of 1,2-dichloroethene (27,000 ug/Kg) detected in monitoring well MW-02 is anomalous for the site. Sample TP-01-DIS contained a concentration of only 5 ug/Kg. This was the only test pit sample in which this compound was detected. Test Pit No. 1 is located adjacent to monitoring well MW-02. From these results and the calculated groundwater flow direction (Figure 2), it can be concluded that the source of the 1,2-dichloroethene is from off-site.

Common uses of 1,2-dichloroethene include a solvent for various organics, an additive to dye and lacquer solutions, a constitutent of perfumes and thermoplastics, rubber manufacturing, and uses in organic synthesis and medicine, among others (Verschueren, 1983).

The principal pesticides detected in the test pit samples were 4,4' DDD, 4,4' DDT, and 4,4' DDE. DDD and DDT are nonsystemic contact and stomach insecticides; DDE is a degradation product of DDT (Verschueren, 1983). DDT and DDD are widely dispersed in the environment by erosion, runoff, and volatilization. These chemicals are very persistent in the environment, and they have high capacities for sorption and bioaccumulation (Callahan, et al., 1979). Despite their presence in the test pit samples, no traces of any pesticides were detected in the groundwater (this is likely due to their strong adsorption characteristics). A potential source of these pesticides at the site

is from past insect-control applications along the adjacent highways by County and State government. The use of DDT was banned by the USEPA in December 1972.

The relatively high total dissolved solids, sodium, conductivity, and hardness concentrations could be due to groundwater flow interaction with tidal influences of nearby Newark Bay.

The metal concentrations found in the groundwater and test pit samples (e.g., lead, zinc, manganese, iron, arsenic) are likely attributable to the incinerator ash and scrap metal encountered during the investigation. While cadmium, copper, and chromium were all detected in the test pit samples, none of these three metals were detected in any of the groundwater samples.

Monitoring well MW-01 was the only well in which arsenic was detected. The concentration (3,220 ug/l) was relatively high compared to the NJPDES Permit limit (50 ug/l). Correspondingly, the nearest test pit (TP-04) to MW-01 had the highest level of arsenic of any of the test pit samples analyzed. MW-01 and Test Pit No. 4 are located at the northwest corner of the property, near the intersection of Foundry Street and U. S. Routes 1 and 9. Three other test pits (TP-08, TP-09, and TP-12) also contained significant concentrations of arsenic (greater than 50 mg/Kg each). These test pits were located in the area of the proposed building. All other test pits had significantly lower concentrations of arsenic.

Arsenic is considered a ubiquitous element in the earth's crust, present at an average of 5 mg/Kg (Weast, 1977). The four discrete test pit samples and four of the eight composite samples had arsenic concentrations between 6.8 mg/Kg and 19.3 mg/Kg.

A preliminary investigation was performed in 1986 on the portion of the 15E Sanitary Landfill proposed by the New Jersey Turnpike Authority as an addition to the current Turnpike right-of-way (Louis Berger & Associates, Inc., September 1986). The area investigated in 1986 is adjacent to, and to the south and east of the area examined in this report.

The 1986 preliminary investigation indicated the soil contained elevated levels of metals, base/neutral (PAHs) and acid extractable compounds, PCBs,

WEHRAN ENGINEERING
CONSULTING ENGINEERS

TEST BORING LOG

BORING NO. MW#1

SHEET NO. 1 OF 1

JOB NO. 07445 ES

ELEVATION

DATE STARTED 5-31-88

DATE FINISHED 6-2-88

DRILLER T. Kendrick

INSPECTOR SPG, DBM

PROJECT: NATIONAL Amusements

CLIENT:

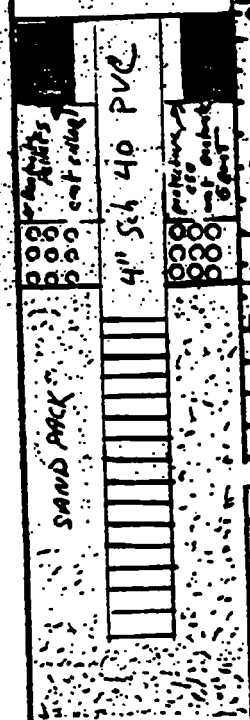
BORING CONTRACTOR: Kendrick Drilling

GROUND WATER

DATE	TIME	WATER EL.	SCREEN
			9.43-19.43

	CAS.	SAMP.	CORE	TUBE
TYPE		SS		
DIA.		2"		
WT.		140#		
FALL		30"		

WELL CONSTRUCTION



DEPTH FEET	SAMPLE NO.	TYPE	BLOWS PER 6 INCHES	CLASSIFICATION	REMARKS
0				FILL black cinder, ash	oily odor
5	1	S.S.	3, 1, 2, 3	6.9	nose of S.S #1 wet
				Lit Brown m SAND, little silt 8.5	
10	2	S.S.	14, 13, 11, 12	Red, br FMC SAND	
15	3	S.S.	5, 7, 8, 8		
20	4	S.S.	3, 3, 3, 5	22.0	
				End of boring @ 22.0	
25					
30					
35					
40					
45					

WEHRAN ENGINEERING
CONSULTING ENGINEERS

TEST BORING LOG

BORING NO. MW-2
SHEET NO. 1 OF 1
JOB NO. 07445 ES
ELEVATION
DATE STARTED 5-27-88
DATE FINISHED 6-1-88
DRILLER T. Kendrick
INSPECTOR DBM

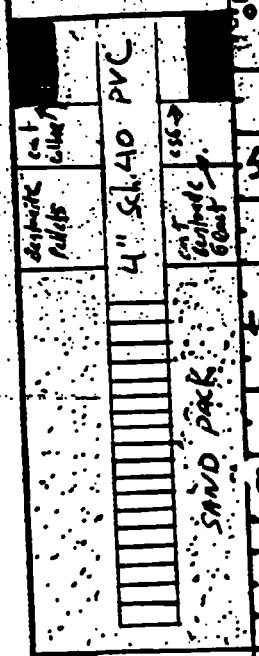
PROJECT: National Amusements
CLIENT:
BORING CONTRACTOR: Kendrick Drilling

GROUND WATER

DATE	TIME	WATER EL.	SCREEN
			9.05 - 19.05

	CAS.	SAMP.	CORE	TUBE
TYPE		SS		
DIA.		2"		
WT.		140 #		
FALL		30"		

WELL CONSTRUCTION



DEPTH FEET	SAMPLE NO.	TYPE	BLOWS PER 6 INCHES	CLASSIFICATION	REMARKS
	1	SS	10, 8, 6, 4	FILL Brown, red sand clean 3.5'	Dry
	2	SS	4, 4, 3, 3	FILL Black slag, ash debris 6.5'	
5	3	SS	3, 6, 3, 2		wet
	4	SS	1, 2, 1, 0	light brown sandy clay loam 9.5'	
10	5	SS	1, 1, 4, 13	brown, orange FML loamy sand 11.5	
	6	SS	13, 13, 12, 14	RED MF SAND 14.0	
	7	SS	10, 11, 12, 12	light brown loamy sand alternate layered with Red FM sand 14.0'	
15	8	SS	15, 12, 12, 14	Red FM Sandy loam 18.0'	
20	9	SS	10, 10, 6, 9	RED Silt loam	
25	10	SS	8, 4, 10, 21	27.0	
				END OF BORING 27.0	
30					
35					
40					
45					

NATIVE SAND

WEHRAN ENGINEERING
CONSULTING ENGINEERS

TEST BORING LOG

BORING NO. MW #3

PROJECT: National Amusements
CLIENT:
BORING CONTRACTOR: Kendrick Drilling

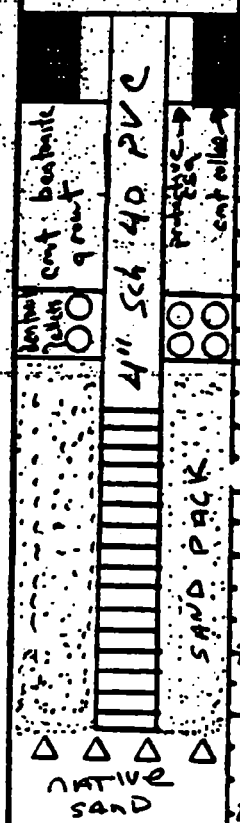
SHEET NO. 1 OF 1
JOB NO. 07445 ES
ELEVATION
DATE STARTED 5-27-88
DATE FINISHED 6-3-88
DRILLER T. Kendrick
INSPECTOR DBM

GROUND WATER

DATE	TIME	WATER EL.	SCREEN
			12.60 - 22.60

	CAS.	SAMP.	CORE	TUBE
TYPE		SS		
DIA.		2"		
WT.		140#		
FALL		40"		

WELL CONSTRUCTION



DEPTH FEET	SAMPLE NO.	TYPE	BLOWS PER 6 INCHES	CLASSIFICATION	REMARKS
				Fill Black slag, debris	
5	1	SS	3, 2, 2, 1		SS#3 wet
	2	SS	3, 3, 1, 3		9.0'
10	3	SS	3, 3, 3, 4	10.0' light brown clay loam	▲ in SS #3 from Fill to native material
	4	SS	12, 13, 14, 14	12.0' Red loamy sand	
15				15.0'	
	5	SS	13, 12, 13, 14	Red Sandy loam	
20	6	SS	7, 6, 8, 7		
				End of Boring 22.0'	when installed bottom of screen at 22.6'
25					
30					
35					
40					
45					

WEHRAN ENGINEERING
CONSULTING ENGINEERS

TEST BORING LOG

BORING NO. MW-4

PROJECT: NATIONAL AMUSEMENTS

CLIENT:

BORING CONTRACTOR: Kendrick Drilling

SHEET NO. 1 OF 1

JOB NO. 07445-ES

ELEVATION

DATE STARTED 5-26-88

DATE FINISHED 6-1-88

DRILLER T. Kendrick

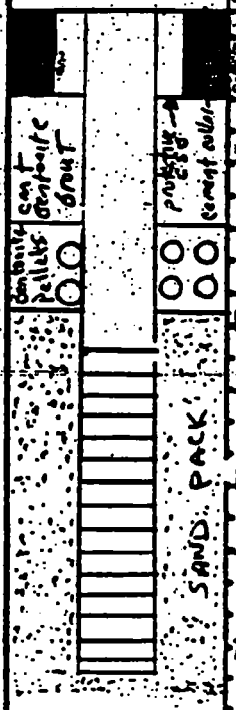
INSPECTOR DCM

GROUND WATER

DATE	TIME	WATER EL.	SCREEN
			10.84 – 20.84

	CAS.	SAMP.	CORE	TUBE
TYPE		SS		
DIA.		2"		
WT.		140#		
FALL		30"		

WELL CONSTRUCTION



DEPTH (FEET)	SAMPLE NO.	TYPE	BLOWS PER 6 INCHES	CLASSIFICATION	REMARKS
0				FILL	
				Brown SAND, some silt reworked clean	moist
5	1	SS	2, 2, 4, 2, 4		
	2	SS	2, 2, 2, 2	black slag Debris 9.5'	wet
10	3	SS	10, 13, 15, 18	RED MF SAND	
15	4	SS	7, 9, 21, 20		
20				END OF BORING 20.95'	
25					
30					
35					
40					
45					

and pesticides. Most of these contaminants were also detected in the test pit samples from the area of the proposed movie theater investigated for this report. In both investigations, most of these contaminants were not detected in significant concentrations in the groundwater. The 1986 preliminary investigation also attributed this to the high soil adsorption characteristics and low water solubility of most of these contaminants.

7.0 RECOMMENDATIONS

- Based on the type and quantity of materials encountered in the investigation, and since the soil and fill material can be classified as non-hazardous according to RCRA criteria, the proposed construction of the movie theater should be permitted to go forward. As part of the construction, the entire site will be paved over to provide two major benefits:

  - Eliminate all contact with the fill material by users of the theater.
  - Minimize infiltration of precipitation through the soil, thus further reducing the potential for leaching of chemical constitutents present in the fill material into the groundwater. The paving will supplement the existing adsorptive capacity of the fill materials in minimizing leaching of chemicals into the groundwater.

- The groundwater monitoring program will be continued, as required in the NJPDES permit, to confirm the results obtained to date. In addition to the requirements of the NJPDES permit, the owner will monitor each well for volatile organic compounds during the next quarterly sampling event (October 1988). This will allow for collection of additional data concerning the possible presence of 1,2-dichloroethene in Monitoring Well MW-02, and further define the extent of its existence at the site. In addition, arsenic, manganese, and total petroleum hydrocarbons will be added to the list of parameters for the October 1988 groundwater sampling event.
- A methane gas control system will be included in the building design, and appropriate precautions regarding methane abatement will be taken during construction of the theater.

REFERENCES

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Weast, R. C. (ed.), 1977. Handbook of Chemistry and Physics, 58th edition. CRC Press, Cleveland, Ohio. 2,398 pg.

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Wehran Engineering, March 1988. Solid Waste Disruption Permit for the Newark Drive-In Site.

MONITORING WELL CERTIFICATION - FORM A - AS-BUILT CERTIFICATION
(One form must be completed for each well)

Name of Permittee: See Reverse Side
Name of Facility: 15E Sanitary Landfill
Location: Rt. 1 and Foundry St., Newark, Essex County
NJPDES Permit No: 0064068

CERTIFICATION

Well Permit Number (As assigned by NJDEP's Well Drilling Permits Section (609-984-6831)):	2 6 - 1 2 9 4 7 - 7
Owner's Well Number (As shown on the application or plans):	MW-01
Well Completion Date:	June 2, 1988
Distance from Top of Casing (cap off) to ground surface (one-hundredth of a foot):	2.60
Total Depth of Well (one-hundredth of a foot):	19.43
Depth to Top of Screen From Top of Casing (one-hundredth of a foot):	12.03
Screen Length (feet):	10.00
Screen or Slot Size:	20
Screen or Slot Material:	PVC
Casing Material: (PVC, Steel or Other-Specify):	PVC
Casing Diameter (inches):	4
Static Water Level From Top of Casing at the Time of Installation (one-hundredth of a foot):	7.15
Yield (gallons per minute):	20
Length of Time Well Pumped or Bailed:	1 Hours 0 Minutes
Lithologic Log:	Attach

Authentication

I certify under penalty of law that, where applicable, I meet the requirements as specified on the reverse of this page, that I have personally examined and am familiar with the information submitted in this document and all attachments, and that, based on my inquiry of those individuals immediately responsible for obtaining the information, I believe the submitted information is true, accurate and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment.

BARRY J. CHENEY
Name (Type or Print)

Signature

GE 26085
Certification or License No.

Seal

Certification by Executive Officer or Duly Authorized Representative

Name (Type or Print)

Signature

Title

Date

MONITORING WELL CERTIFICATION - FORM A - AS-BUILT CERTIFICATION
(One form must be completed for each well)

Name of Permittee: See Reverse Side
Name of Facility: 15E Sanitary Landfill
Location: Rt. 1 and Foundry St., Newark, Essex County
NJPDES Permit No: 0064068

CERTIFICATION

Well Permit Number (As assigned by NJDEP's Well Drilling Permits Section (609-984-6831)):	2 6 - 1 2 9 5 1 - 5
Owner's Well Number (As shown on the application or plans):	MW-02
Well Completion Date:	June 1, 1988
Distance from Top of Casing (cap off) to ground surface (one-hundredth of a foot):	2.16
Total Depth of Well (one-hundredth of a foot):	19.05
Depth to Top of Screen From Top of Casing (one-hundredth of a foot):	11.21
Screen Length (feet):	10.00
Screen or Slot Size:	20
Screen or Slot Material:	PVC
Casing Material: (PVC, Steel or Other-Specify):	PVC
Casing Diameter (inches):	4
Static Water Level From Top of Casing at the Time of Installation (one-hundredth of a foot):	7.88
Yield (gallons per minute):	5
Length of Time Well Pumped or Bailed:	1 Hours 0 Minutes
Lithologic Log:	Attach

Authentication

I certify under penalty of law that, where applicable, I meet the requirements as specified on the reverse of this page, that I have personally examined and am familiar with the information submitted in this document and all attachments, and that, based on my inquiry of those individuals immediately responsible for obtaining the information, I believe the submitted information is true, accurate and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment.

BARRY J. CHENEY
Name (Type or Print)

Barry J Cheney
Signature

GE 26085
Certification or License No.

Seal

Certification by Executive Officer or Duly Authorized Representativ

Name (Type or Print)

Signature

Title

Date

MONITORING WELL CERTIFICATION - FORM A - AS-BUILT CERTIFICATION
(One form must be completed for each well)

Name of Permittee: See Reverse Side
Name of Facility: 15E Sanitary Landfill
Location: Rt. I and Foundry St., Newark, Essex County
NJPDES Permit No: 0064068

CERTIFICATION

Well Permit Number (As assigned by NJDEP's Well Drilling Permits Section (609-984-6831)):	2 6 - 1 2 9 5 0 - 7
Owner's Well Number (As shown on the application or plans):	MW-03
Well Completion Date:	June 3, 1988
Distance from Top of Casing (cap off) to ground surface (one-hundredth of a foot):	2.54
Total Depth of Well (one-hundredth of a foot):	22.60
Depth to Top of Screen From Top of Casing (one-hundredth of a foot):	15.14
Screen Length (feet):	10.00
Screen or Slot Size:	20
Screen or Slot Material:	PVC
Casing Material: (PVC, Steel or Other-Specify):	PVC
Casing Diameter (inches):	4
Static Water Level From Top of Casing at the Time of Installation (one-hundredth of a foot):	9.56
Yield (gallons per minute):	20
Length of Time Well Pumped or Bailed:	1 Hours 0 Minutes
Lithologic Log:	Attach

Authentication

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Seal

Certification by Executive Officer or Duly Authorized Representative

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Signature

Title

Date

THIS FORM MUST BE COMPLETED BY THE PERMITTEE OR HIS/HER AGENT

GROUND WATER MONITORING WELL CERTIFICATION-FORM B-LOCATION CERTIFICATION

NameofPermittee: See Reverse Side
Name of Facility: 15E Sanitary Landfill
Location: Route 1 and Foundry St., Newark, Essex County
NJPDES Number: 0064068

LAND SURVEYOR'S CERTIFICATION

Well Permit Number (As assigned by NJDEP's Water Allocation Section, 609-984-6831): This number must be permanently affixed to the well casing. 2 6 - 1 2 9 5 1 - 5

Longitude (one-tenth of a second): *East 2,148,074.026
Latitude (one-tenth of a second): North 690631.390
Elevation of Top of Casing (cap off) (one-hundredth of a foot): Inner Casing El. 13.75
Owners Well Number (As shown on application or plans): MW-2

AUTHENTICATION

I certify under penalty of law that I have personally examined and am familiar with the information submitted in this document and all attachments and that, based on my inquiry of those individuals immediately responsible for obtaining the information, I believe the submitted information is true, accurate and complete. I am aware that there are significant penalties for submitting false information including the possibility of fine and imprisonment.

John J. Keelen
PROFESSIONAL LAND SURVEYOR'S SIGNATURE

John J. Keelen
PROFESSIONAL LAND SURVEYOR'S NAME
(Please print or type)

SEAL

New Jersey License No. 19950
PROFESSIONAL LAND SURVEYOR'S LICENSE #

The Department reserves the right in cases of violation of permit specified ground water limits or Ground Water Quality Standards (N.J.A.C. 7:9-6.1 et seq.) to require that wells be resurveyed to an accuracy of one-hundredth of a second latitude and longitude. This shall not be considered to be a major modification of the NJPDES permit.

THIS FORM MUST BE COMPLETED BY THE PERMITTEE OR HIS/HER AGENT

GROUND WATER MONITORING WELL CERTIFICATION-FORM B-LOCATION CERTIFICATIO

NameofPermittee: See Reverse Side
Name of Facility: 15E Sanitary Landfill
Location: Route 1 and Foundry St., Newark, Essex County
NJPDES Number: 0064068

LAND SURVEYOR'S CERTIFICATION

Well Permit Number (As assigned by NJDEP's Water Allocation Section, 609-984-6831): This number must be permanently affixed to the well casing. 2 6 - 1 2 9 4 7 - 7

Longitude (one-tenth of a second): East 2,148,075.278
Latitude (one-tenth of a second): North 691875.459
Elevation of Top of Casing (cap off) (one-hundredth of a foot): Inner Casing El. 12.46
Owners Well Number (As shown on application or plans): MW-1

AUTHENTICATION

I certify under penalty of law that I have personally examined and am familiar with the information submitted in this document and all attachments and that, based on my inquiry of those individuals immediately responsible for obtaining the information, I believe the submitted information is true, accurate and complete. I am aware that there are significant penalties for submitting false information including the possibility of fine and imprisonment.

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WEHRAN ENGINEERING
CONSULTING ENGINEERS

TEST BORING LOG

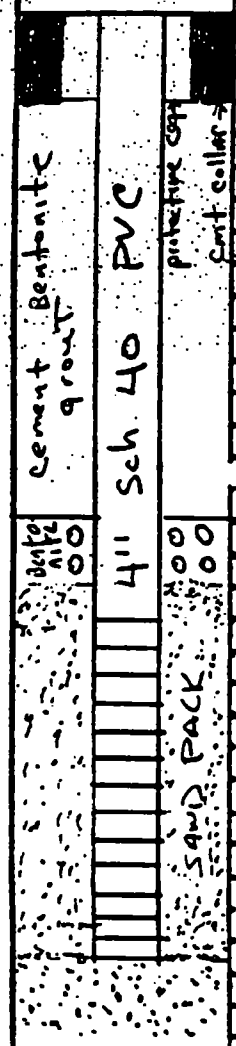
BORING NO. MW #5

PROJECT: NATIONAL Amusements
CLIENT:
BORING CONTRACTOR: Kendrick Drilling

SHEET NO. 1 OF 1
JOB NO. 07445 ES
ELEVATION
DATE STARTED 5/31/88
DATE FINISHED 6/2/88
DRILLER T. Kendrick
INSPECTOR SPG DCM

GROUND WATER					CAS.	SAMP.	CORE	TUBE
DATE	TIME	WATER EL.	SCREEN	TYPE		SS		
			19.4-29.4	DIA.		2"		
				WT.		140#		
				FALL		30"		

WELL CONSTRUCTION



DEPTH FEET	SAMPLE NO.	TYPE	BLOWS PER 6 INCHES	CLASSIFICATION	REMARKS
0				Fill Cinder, Ash, Slag	
5					
10	1	SS	6,37, 17,9		
				14.5'	
15	2	SS	4,2, 3,3	Brown loamy sand	- no recovery
	3	SS	3,4 1,2	19.5'	
20	4	SS	14,14, 14,16	Red, brown FM SAND	
25	5	SS	12,14 13,9		
30	6	SS	7,9, 6,11	32.0'	
				END OF BORING 32.0'	
35					
40					
45					

MONITORING WELL CERTIFICATION - FORM A - AS-BUILT CERTIFICATION
(One form must be completed for each well)

Name of Permittee: See Reverse Side
Name of Facility: 15E Sanitary Landfill
Location: Rt. 1 and Foundry St., Newark, Essex County
NJPDES Permit No: 0064068

CERTIFICATION

Well Permit Number (As assigned by NJDEP's Well Drilling Permits Section (609-984-6831)):	2 6 - 1 2 9 4 9 - 3
Owner's Well Number (As shown on the application or plans):	MW-04
Well Completion Date:	June 1, 1988
Distance from Top of Casing (cap off) to ground surface (one-hundredth of a foot):	2.59
Total Depth of Well (one-hundredth of a foot):	20.84
Depth to Top of Screen From Top of Casing (one-hundredth of a foot):	13.43
Screen Length (feet):	10.00
Screen or Slot Size:	20
Screen or Slot Material:	PVC
Casing Material: (PVC, Steel or Other-Specify):	PVC
Casing Diameter (inches):	4
Static Water Level From Top of Casing at the Time of Installation (one-hundredth of a foot):	7.01
Yield (gallons per minute):	20
Length of Time Well Pumped or Bailed:	1 Hours 0 Minutes
Lithologic Log:	Attach

Authentication

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Name (Type or Print)

Signature

GE 26085
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Seal

Certification by Executive Officer or Duly Authorized Representative

Name (Type or Print)

Signature

Title

Date

TABLE 1.0
30880-1119
WEHRAN ENGINEERING
ANALYTICAL REQUESTS

Sample Identification	Requested Parameters
NDI-MW-02, NDI-MW-01, NDI-MW-04, NDI-MW-05, NDI-MW-FB-01, NDI-MW-03	Ammonia-nitrogen, biochemical oxygen demand (5 day), chloride, chemical oxygen demand, coliform (total), conductivity, cyanide, fluoride, hardness, petroleum hydrocarbons, MBAS, nitrate-nitrogen, odor, oil & grease, pH, phenols, sulfate, total dissolved solids, total organic carbon, total organic halide, turbidity, 2,4-D, silvex, priority pollutant volatile organics, priority pollutant base-neutral/acid extractable organics, priority pollutant pesticides/PCB's, methoxychlor, arsenic, barium, cadmium, copper, iron, lead, manganese, mercury, selenium, silver, sodium, zinc, hexavalent chromium
Trip Blank	Priority pollutant volatile organics

TABLE 2.0
30880-1119
WEHRAN ENGINEERING

All values are mg/L unless noted.

Parameter	NDI-MW-02	NDI-MW-01	NDI-MW-04
Ammonia-Nitrogen	2.89	2.29	21.8
Biochemical Oxygen Demand (5 day)	11	3	<1
Chloride	137	8.8	11.6
Chemical Oxygen Demand	50.8	65.4	28.9
Coliforms, Total ofu/100 mls	16	1	0
Conductivity, umhos/cm	1,100	1,430	1,475
Chromium, Hexavalent	0.01	<0.01	<0.01
Cyanide	0.053	0.079	0.069
Fluoride	0.54	0.53	0.61
Hardness, as $CaCO_3$	374	941	729
Petroleum Hydrocarbons	17.3	19.1	17.8
MBAS	0.22	0.04	0.09
Nitrate-Nitrogen	<0.10	<0.10	<0.10
Odor, Threshold #	1	1	1
Oil & Grease	4.0	2.2	1.3
Phenols	0.022	0.008	0.009
Sulfate	13.3	650	653
Total Dissolved Solids	693	1,370	1,230
Total Organic Carbon	27	16	11
TOX-1, ug/L as Cl^-	14,860	21.6	19.4
TOX-2, ug/L as Cl^-	13,240	26.60	15.6
Turbidity, NTU	28.0	145	120
pH, S.U.	6.68	6.39	6.68

RECEIVED
SEP 13 1988

TABLE 2.1
30880-1119
WEHRAN ENGINEERING

All values are mg/L unless noted.

Parameter	NDI-MW-05	NDI -MW-FB-01	NDI-MW-03
Ammonia-Nitrogen	41.9	0.21	34.9
Biochemical Oxygen Demand (5 day)	<1	<1	2
Chloride	130	9.8	31.6
Chemical Oxygen Demand	117	<10	84.8
Coliforms, Total cfu/100 mls	0	0	4
Conductivity, umhos/cm	2,400	3.0	2,100
Chromium, Hexavalent	<0.01	<0.01	<0.01
Cyanide	0.149	0.074	0.091
Fluoride	0.61	0.58	0.70
Hardness, as $CaCO_3$	511	15.2	960
Petroleum Hydrocarbons	17.4	10.4	10.0
MBAS	<0.04	<0.04	0.09
Nitrate-Nitrogen	<0.10	<0.10	0.13
Odor, Threshold #	1	1	1
Oil & Grease	6.9	2.3	<1.0
Phenols	0.009	<0.005	<0.005
Sulfate	655	<10	367
Total Dissolved Solids	1,889	117	1,462
Total Organic Carbon	25	<1	28
TOX-1, ug/L as Cl^-	27.6	125	47.0
TOX-2, ug/L as Cl^-	33.8	116	39.8
Turbidity, NTU	95	1.5	150
pH, S.U.	6.84	7.34	6.92

Aqueous

TABLE 3.0
30880-1119
WEHRAN ENGINEERING
EPA PRIORITY POLLUTANT VOLATILE COMPOUNDS

All results reported as ug/L.

	Sample Identification				
Dilution Factor	1.0	1.0	1.0	1.0	
Method Blank I.D.	>B2193	>B2193	>B2193	>B2193	
Compound	Method Blank	NDI -MW-04	NDI -MW-03	Trip Blank	Lower Limits of Detection with no Dilution
chloromethane	U	U	U	U	5
bromomethane	U	U	U	U	5
vinyl chloride	U	U	U	U	5
chloroethane	U	U	U	U	5
methylene chloride	6	U	U	3JB	5
trichlorofluoromethane	U	U	U	U	5
acrolein (Note 1)	U	U	U	U	10
acrylonitrile (Note 1)	U	U	U	U	5
1,1-dichloroethene	U	U	U	U	5
1,1-dichloroethane	U	U	U	U	5
1,2-dichloroethene (total)	U	9	6	3J	5
chloroform	U	U	U	U	5
1,2-dichloroethane	U	U	U	U	5
1,1,1-trichloroethane	U	U	U	U	5
carbon tetrachloride	U	U	U	U	5
bromodichloromethane	U	U	U	U	5
2-chloroethylvinyl ether	U	U	U	U	5
1,2-dichloropropane	U	U	U	U	5
cis-1,3-dichloropropene	U	U	U	U	5
trichloroethylene	U	U	U	U	5
benzene	U	U	U	U	5
trans-1,3-dichloropropene	U	U	U	U	5
dibromochloromethane	U	U	U	U	5
1,1,2-trichloroethane	U	U	U	U	5
bromoform	U	U	U	U	5
tetrachloroethylene	U	U	U	U	5
1,1,2-2-tetrachloroethane	U	U	U	U	5
toluene	0.7J	U	U	U	5
chlorobenzene	U	U	U	U	5
ethyl benzene	U	U	U	U	5

U, J, B - See Appendix for definition.

Note 1: Acrolein and acrylonitrile were determined using a separate aliquot of sample. Associated method blank for all samples for these two compounds only is >B2278.

Aqueous

TABLE 4.00
30880-1119
WEHRAN ENGINEERING
EPA PRIORITY POLLUTANT ACID EXTRACTABLE COMPOUNDS

All results reported in ug/L.

	Sample Identification				
Dilution Factor	1.0	1.0	1.0	1.0	
Method Blank I.D.	›C0847	›C0847	›C0847	›C0847	
Compound	Method Blank	NDI -MW-02	NDI -MW-01	NDI -MW-04	Lower Limits of Detection with no Dilution
phenol	U	U	U	U	10
2-chlorophenol	U	U	U	U	10
2-nitrophenol	U	U	U	U	10
2,4-dimethylphenol	U	U	U	U	10
2,4-dichlorophenol	U	U	U	U	10
4-chloro-3-methyl phenol	U	U	U	U	10
2,4,6-trichlorophenol	U	U	U	U	10
2,4-dinitrophenol	U	U	U	U	50
4-nitrophenol	U	U	U	U	50
2-methyl-4,6-dinitrophenol	U	U	U	U	50
pentachlorophenol	U	U	U	U	50

U - See Appendix for definition.

MONITORING WELL CERTIFICATION - FORM A - AS-BUILT CERTIFICATION
(One form must be completed for each well)

Name of Permittee: See Reverse Side
Name of Facility: 15E Sanitary Landfill
Location: Rt. 1 and Foundry St., Newark, Essex County
NJPDES Permit No: 0064068

CERTIFICATION

Well Permit Number (As assigned by NJDEP's Well Drilling Permits Section (609-984-6831)):	2 6 - 1 2 9 4 8 - 5
Owner's Well Number (As shown on the application or plans):	MW-05
Well Completion Date:	June 2, 1988
Distance from Top of Casing (cap off) to ground surface (one-hundredth of a foot):	2.20
Total Depth of Well (one-hundredth of a foot):	29.40
Depth to Top of Screen From Top of Casing (one-hundredth of a foot):	21.60
Screen Length (feet):	10.00
Screen or Slot Size:	20
Screen or Slot Material:	PVC
Casing Material: (PVC, Steel or Other-Specify):	PVC
Casing Diameter (inches):	4
Static Water Level From Top of Casing at the Time of Installation (one-hundredth of a foot):	15.59
Yield (gallons per minute):	5
Length of Time Well Pumped or Bailed:	1 Hours 0 Minutes
Lithologic Log:	Attach

Authentication

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Barry J. Cheney
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Signature

Title

Date

Aqueous

TABLE 4.01
30880-1119
WEHRAN ENGINEERING
EPA PRIORITY POLLUTANT ACID EXTRACTABLE COMPOUNDS

All results reported in ug/L.

	Sample Identification				
Dilution Factor	1.0	1.0	1.0	1.0	
Method Blank I.D.	>C0847	>C0847	>C0847	>C0847	
Compound	Method Blank	NDI -MW-05	NDI-MW -FB-01	NDI -MW-03	Lower Limits of Detection with no Dilution
phenol	U	U	U	U	10
2-chlorophenol	U	U	U	U	10
2-nitrophenol	U	U	U	U	10
2,4-dimethylphenol	U	U	U	U	10
2,4-dichlorophenol	U	U	U	U	10
4-chloro-3-methyl phenol	U	U	U	U	10
2,4,6-trichlorophenol	U	U	U	U	10
2,4-dinitrophenol	U	U	U	U	50
4-nitrophenol	U	U	U	U	50
2-methyl-4,6-dinitrophenol	U	U	U	U	50
pentachlorophenol	U	U	U	U	50

U - See Appendix for definition.

Aqueous

TABLE 5.1
30880-1119
WEHRAN ENGINEERING
EPA PRIORITY POLLUTANT PESTICIDES/PCB's + METHOXYCHLOR

All results reported as ug/L.

	Sample Identification			
Dilution Factor	1.0	1.0	1.0	
Method Blank I.D.	6/23/88	6/23/88	6/23/88	
Compound	Method Blank	NDI-MW-FB-01	NDI-MW-03	Lower Limits of Detection with no Dilution
alpha BHC	U	U	U	0.002
beta BHC	U	U	U	0.002
gamma BHC	U	U	U	0.002
delta BHC	U	U	U	0.002
Heptachlor	U	U	U	0.002
Aldrin	U	U	U	0.002
4,4' DDE	U	U	U	0.002
Dieldrin	U	U	U	0.002
4,4' DDD	U	U	U	0.01
Endrin Aldehyde	U	U	U	0.01
4,4' DDT	U	U	U	0.01
Chlordane	U	U	U	0.02
Endosulfan I	U	U	U	0.002
Endosulfan II	U	U	U	0.01
Endosulfan Sulfate	U	U	U	0.01
Endrin	U	U	U	0.01
Heptachlor Epoxide	U	U	U	0.002
Toxaphene	U	U	U	0.20
PCB - 1016	U	U	U	0.05
PCB - 1221	U	U	U	0.05
PCB - 1232	U	U	U	0.05
PCB - 1242	U	U	U	0.05
PCB - 1248	U	U	U	0.05
PCB - 1254	U	U	U	0.05
PCB - 1260	U	U	U	0.05
Methoxychlor	U	U	U	0.50

U - See Appendix for definition.

TABLE 7.0
30880-1119
WEHRAN ENGINEERING
METALS RESULTS

All values are ug/L.

Parameter	NDI-MW-02	NDI-MW-01	NDI-MW-04
Arsenic	<10	3,220	<10
Barium	237	<200	<200
Cadmium	<10	<10	<10
Copper	<25	<25	<25
Iron	1,480	44,700	20,900
Lead	<5.0	<5.0	<5.0
Manganese	278	3,920	5,050
Mercury	<0.2	<0.2	<0.2
Selenium	<5.0	<5.0	<5.0
Silver	<10	<10	<10
Sodium	68,700	33,400	32,300
Zinc	83	115	32

TABLE 7.1
30880-1119
WEHRAN ENGINEERING
METALS RESULTS

All values are ug/L.

Parameter	NDI-MW-05	NDI -MW-FB-01	NDI-MW-03
Arsenic	<10	<10	<10
Barium	294	<200	404
Cadmium	<10	<10	<10
Copper	<25	<25	<25
Iron	19,400	<100	30,200
Lead	<5.0	<5.0	<5.0
Manganese	1,360	<15	2,430
Mercury	0.2	0.2	0.2
Selenium	<5.0	<5.0	<5.0
Silver	<10	<10	<10
Sodium	182,000	3,410	118,000
Zinc	34	<20	<20

THIS FORM MUST BE COMPLETED BY THE PERMITTEE OR HIS/HER AGENT

GROUND WATER MONITORING WELL CERTIFICATION-FORM B-LOCATION CERTIFICATIC

NameofPermittee: See Reverse Side
Name of Facility: 15E Sanitary Landfill
Location: Route 1 and Foundry St., Newark, Essex County
NJPDES Number: 0064068

LAND SURVEYOR'S CERTIFICATION

Well Permit Number (As assigned by NJDEP's Water Allocation Section, 609-984-6831): This number must be permanently affixed to the well casing. 2 6-1 2 9 5 0-7

Longitude (one-tenth of a second): East 2,148,374.664
Latitude (one-tenth of a second): North 690719.542
Elevation of Top of Casing (cap off) (one-hundredth of a foot): Inner Casing El. 15.63
Owners Well Number (As shown on application or plans): MW-3

AUTHENTICATION

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John J. Keelen
PROFESSIONAL LAND SURVEYOR'S SIGNATURE

SEAL

John J. Keelen
PROFESSIONAL LAND SURVEYOR'S NAME
(Please print or type)

New Jersey License No. 19950
PROFESSIONAL LAND SURVEYOR'S LICENSE #

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THIS FORM MUST BE COMPLETED BY THE PERMITTEE OR HIS/HER AGENT

GROUND WATER MONITORING WELL CERTIFICATION-FORM B-LOCATION CERTIFICATIO

NameofPermittee: See Reverse Side
Name of Facility: 15E Sanitary Landfill
Location: Route 1 and Foundry St., Newark, Essex County
NJPDES Number: 0064068

LAND SURVEYOR'S CERTIFICATION

Well Permit Number (As assigned by NJDEP's Water Allocation Section, 609-984-6831): This number must be permanently affixed to the well casing. 2 6 -1 2 9 4 9-3

Longitude (one-tenth of a second): East 2,148,374.188
Latitude (one-tenth of a second): North 691045.041
Elevation of Top of Casing (cap off) (one-hundredth of a foot): Inner Casing El. 12.68
Owners Well Number (As shown on application or plans): MW-4

AUTHENTICATION

I certify under penalty of law that I have personally examined and am familiar with the information submitted in this document and all attachments and that, based on my inquiry of those individuals immediately responsible for obtaining the information, I believe the submitted information is true, accurate and complete. I am aware that there are significant penalties for submitting false information including the possibility of fine and imprisonment.

John J. Keelen

PROFESSIONAL LAND SURVEYOR'S SIGNATURE

SEAL

John J. Keelen

PROFESSIONAL LAND SURVEYOR'S NAME
(Please print or type)

New Jersey License No. 19950

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THIS FORM MUST BE COMPLETED BY THE PERMITTEE OR HIS/HER AGENT

GROUND WATER MONITORING WELL CERTIFICATION-FORM B-LOCATION CERTIFICATION

NameofPermittee: See Reverse Side
Name of Facility: 15E Sanitary Landfill
Location: Route 1 and Foundry St., Newark, Essex County
NJPDES Number: 0064068

LAND SURVEYOR'S CERTIFICATION

Well Permit Number (As assigned by NJDEP's Water Allocation Section, 609-984-6831): This number must be permanently affixed to the well casing. 2 6-1 2 9 4 8-5

Longitude (one-tenth of a second): East 2,148,510.067
Latitude (one-tenth of a second): North 691,656.086
Elevation of Top of Casing (cap off) (one-hundredth of a foot): Inner Casing El. 20.61
Owners Well Number (As shown on application or plans): MW-5

AUTHENTICATION

I certify under penalty of law that I have personally examined and am familiar with the information submitted in this document and all attachments and that, based on my inquiry of those individuals immediately responsible for obtaining the information, I believe the submitted information is true, accurate and complete. I am aware that there are significant penalties for submitting false information including the possibility of fine and imprisonment.

John J. Keelen
PROFESSIONAL LAND SURVEYOR'S SIGNATURE

John J. Keelen
PROFESSIONAL LAND SURVEYOR'S NAME
(Please print or type)

SEAL

New Jersey License No. 19950
PROFESSIONAL LAND SURVEYOR'S LICENSE #

The Department reserves the right in cases of violation of permit specified ground water limits or Ground Water Quality Standards (N.J.A.C. 7:9-6.1 et seq.) to require that wells be resurveyed to an accuracy of one-hundredth of a second latitude and longitude. This shall not be considered to be a major modification of the NJPDES permit.

TABLE 6.0
30880-1119
WEHRAN ENGINEERING
HERBICIDE RESULTS

All values are ug/L.

Sample Identification	2,4-D	Silvex
NDI-MW-02	<0.1	<0.01
NDI-MW-01	<0.1	<0.01
NDI-MW-04	<0.1	<0.01
NDI-MW-05	<0.1	<0.01
NDI-MW-FB-01	<0.1	<0.01
NDI-MW-03	<0.1	<0.01
Blank	<0.1	<0.01

APPENDIX

U - Indicates that the compound was analyzed for but not detected.

J - Indicates that the compound was analyzed for and determined to be present in the sample. The mass spectrum of the compound meets the identification criteria of the method. The concentration listed is an estimated value, which is less than the specified minimum detection limit but is greater than zero.

B - This flag is used when the analyte is found in the blanks as well as the sample. It indicates possible sample contamination and warns the data user to use caution when applying the results of this analyte.

N - Indicates that the compound was analyzed for but not requested as an analyte. Value will not be listed on tabular result sheet.

X - Matrix spike compound.

APPENDIX
G

Diversified
Environmental
Resources, Inc.
1440A Pennington Road Trenton, New Jersey 08618
609-771-3616 FAX # 609-771-4276

APPENDIX G

THE NEW JERSEY POLLUTANT DISCHARGE ELIMINATION SYSTEM PERMIT NJ006408/ 15E SANITARY LANDFILL NEWARK, ESSEX COUNTRY, NEW JERSEY

A
STOUT
A COMPLETE ENVIRONMENTAL SERVICE COMPANY.
COMPANY

Let's protect our earth

State of New Jersey

DEPARTMENT OF ENVIRONMENTAL PROTECTION
DIVISION OF WATER RESOURCES
METRO BUREAU OF REGIONAL ENFORCEMENT
2 BABCOCK PLACE
WEST ORANGE, NEW JERSEY 07052

GEORGE G. McCANN, P.E.
DIRECTOR

DIRK C. HOFMAN, P.E.
DEPUTY DIRECTOR

April 15, 1988

Bayonne Barrel & Drum Company
154 Raymond Blvd.
Newark, New Jersey 07105

Re: The New Jersey Pollutant Discharge Elimination System
NJ006408/ 15E Sanitary Landfill
Newark/Essex County

Dear Sirs:

On February 24, 1988, a representative of the Division of Water Resources (DWR) conducted a Compliance Evaluation Inspection at the 15E Sanitary Landfill facility in Newark, New Jersey. A copy of the inspection report is enclosed for your information.

If you have any questions, please contact this office at (201) 669-3900.

Very truly yours,

Richard White
Environmental Compliance
Investigator
Metro Bureau of
Regional Enforcement

Ell::G26

c: Dr. Richard A. Baker, USEPA
Mr. Paul Molinari, USEPA
Mr. Robert Grimm, H.O.

NEW JERSEY DEPARTMENT OF ENVIRONMENTAL PROTECTION
DIVISION OF WATER RESOURCES
CN 029, Trenton, N.J. 08625

DISCHARGE SURVEILLANCE REPORT

PERMIT # NJ0006408 NO. OF DISCHARGES — CLASS MAJ IND

DISCHARGER 15 E SANITARY LANDFILL (FORMERLY MULTIPLEX CINEMA)

OWNER See Attached

MUNICIPALITY NEWARK COUNTY ESSEX WATERSHED CODE GW

LOCATION ROUTE 1 & 9 AND FOUNDRY STREET

RECEIVING WATERS DISCHARGE TO GROUNDWATER STREAM CLASS —

~~LICENSED OPERATOR & PLANT CLASS~~

~~TRAINEE, ASSISTANT~~ ~~OTHER INFO.~~

DEFICIENCIES OR COMMENTS NOT RATED

EFFECTIVE DATE OF PERMIT - MARCH 15, 1988

MONITORING WELLS ARE REQUIRED TO BE INSTALLED THIRTY (30) DAYS FROM EDP.

PLEASE NOTIFY THIS OFFICE TWO (2) WEEKS PRIOR TO INSTALLING MONITORING WELLS AT (201) 669-3900.

OVERALL RATING ☐ Acceptable ☐ Conditionally Acceptable ☐ Unacceptable
☒ NOT RATED

EVALUATOR MATTHEW D. WATSON TITLE ENVIRONMENTAL SPECIALIST

~~INFORMATION FURNISHED BY (Name)~~

~~(Title)~~ ~~(Organization)~~

DATE OF INSPECTION February 24, 1988

DIVISION OF WATER RESOURCES
CN 029, Trenton, N.J. 08625

Permit # NJ0064068

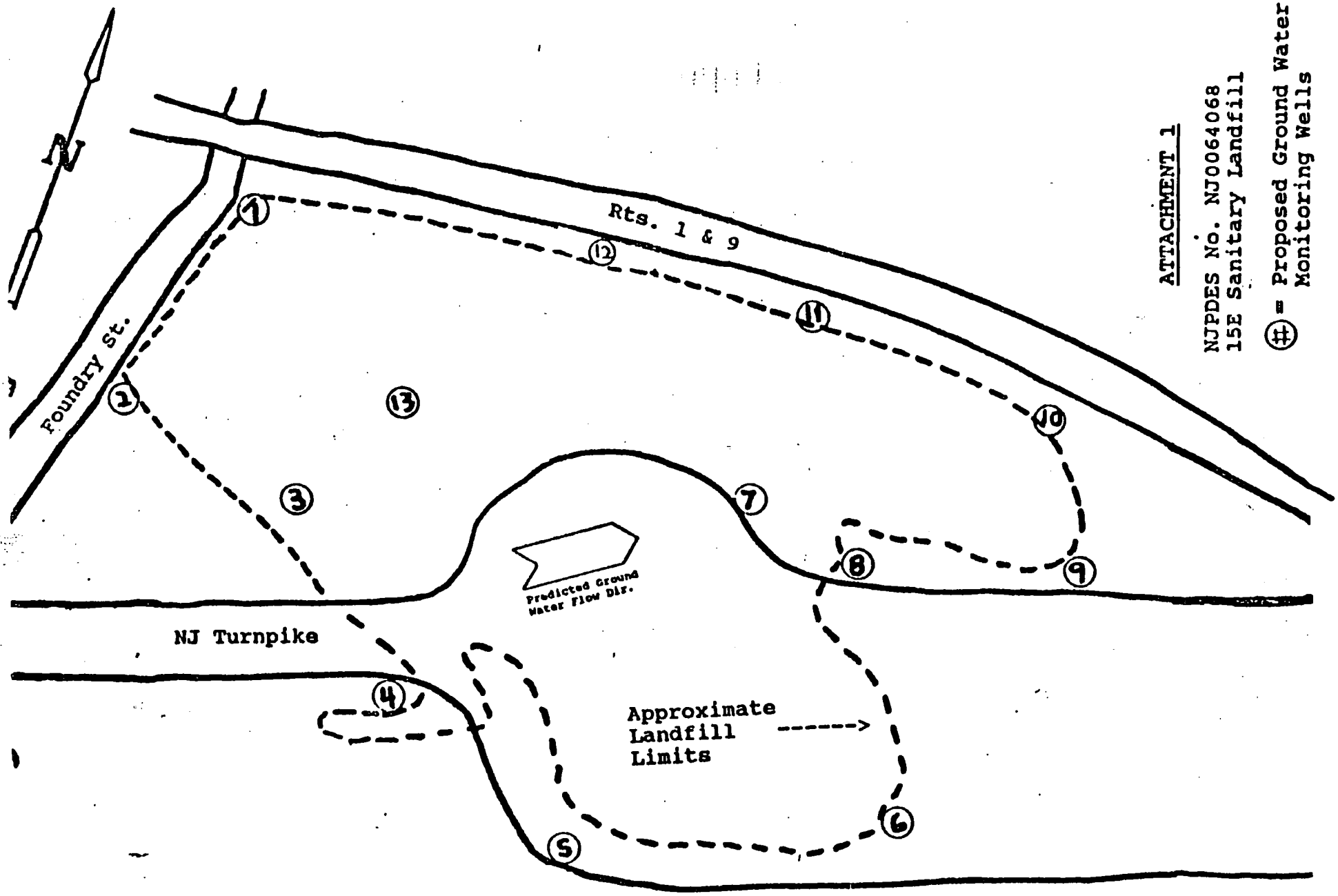
DISCHARGE SURVEILLANCE REPORT

Date FEB 24, 1988

GROUND WATER DISCHARGE EVALUATION

RATING CODES: S = Satisfactory M = Marginal U = Unsatisfactory NA = Not Applicable

		RATING	COMMENTS
GENERAL	TYPE DGW	—	LANDFILL
	RCRA FACILITY	NA	
	DISCHARGE NUMBER	NA	
	WASTEWATER SOURCE/FREQ.	NA	
	PUMPS AND PIPING	NA	
	ALTERNATE POWER/ALARM	NA	
	BYPASS	NA	
MONITORING SYSTEM	WATER SUPPLY/MONITORING	—	
	AQUIFERS MONITORED	—	BRUNSWICK FORMATION
	UPGRADIENT WELLS	—	NOT YET INSTALLED
	DOWNGRADIENT WELLS	—	NOT YET INSTALLED
	SAMPLING PLAN	—	
	SAMPLING PROCEDURES	—	
	LAB CERTIFICATION	—	
	RECORDS	—	
	REPORTING	—	
		—	
LYSIMETER/ MONITORED WELLS	DRILLING PERMIT NUMBERS	NA	
	WELLS NUMBERED/IDENTIFIED	NA	
	LOCKS/INTEGRITY	NA	
	ABANDONMENT PLAN	NA	
	ELEVATION INFORMATION	NA	
	WATER LEVEL MEASUREMENT	NA	
	TURBIDITY FREE	NA	
	SUFFICIENT YIELD	NA	
UIC	CLASSIFICATION		
	PERC./LEACHING PROBLEMS		
	SOLVENTS/REPAIRS MADE		
	MAX. PRESSURE & VOLUME		
	CLOSEST USDW/SUPPLY WELLS		
	MOUND INTEGRITY/COVER		
IMPOUNDMENT	LINING INTEGRITY		
	EMBANKMENT INTEGRITY		
	LEACHATE COLLECTION SYS.		
	SOLIDS BUILDUP/REMOVAL		
	HEIGHT TO FREEBOARD		
	APPEARANCE		
LAND APPLICATION/ SPRAY SYSTEM	EVEN DISTRIBUTION		
	PONDING/RUNOFF/EROSION		
	SPRAY HEADS		
	DISCING		
	COVER CROP		
	APPEARANCE		
	BUFFER ZONE		
	SLUDGE STOCKPILED		
OTHER	SEEPAGE/LEACHING		
	ODOR/AEROSOLS		
	FLOW MONITORING/RECORDING		



--NOT TO SCALE--

ATTACHMENT 1

NJPDES No. NJ0064068
15E Sanitary Landfill

(#) = Proposed Ground Water Monitoring Wells

APPENDIX
H

Diversified
Environmental
Resources, Inc.
1440A Pennington Road Trenton, New Jersey 08618
609-771-3616 FAX # 609-771-4276

APPENDIX H

PUBLIC HEALTH SERVICE
AGENCY FOR TOXIC SUBTANCES
AND DISEASE REGISTRY
MEMORANDUM

FEBRUARY 6, 1987

A
STOUT
A COMPLETE ENVIRONMENTAL SERVICE COMPANY.
COMPANY

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION II
26 FEDERAL PLAZA
NEW YORK, NEW YORK 10278

DEC 12 1989

Edward Sailer
Environmental Risk Limited
120 Mountain Avenue
Bloomfield, Conn. 06002

Dear Mr. Sailer:

Pursuant to your request, I enclose the February 6, 1987 Memorandum from the Office of Health Assessment, Department of Health and Disease Registry regarding the Bayonne Drum Reclamation Site.

Sincerely yours,

Amy R. Chester

Amy R. Chester
Assistant Regional Counsel
Waste and Toxic Substances Section
Air, Waste and Toxic Substances Branch
Office of Regional Counsel

Enclosure

DEPARTMENT OF HEALTH & HUMAN SERVICES

Public Health Service
Agency for Toxic Substances
and Disease Registry

Memorandum

Date FEB 6 1987

From Environmental Engineer
Office of Health Assessment

Subject Bayonne Drum Reclamation Site (RC-87-003B)
Bayonne, New Jersey

To William Q. Nelson
Public Health Advisor
EPA Region II
Through: Director, OHA, ATSDR
Health Assessment Coordination Activities, OHA, ATSDR
Acting Chief, HAB, OHA, ATSDR

EXECUTIVE SUMMARY

The Bayonne Site was formerly operated under the Resource Conservation and Recovery Act (RCRA). The owner of the site filed for bankruptcy and the RCRA activities ceased. The site is used for the repair and storage of shipping containers and for truck repairs. Remains of the RCRA activities include in excess of 30,000 barrels stored in rows, an ash or residue pile, an aboveground storage tank, and a belowground storage tank. Several of the buildings used during the RCRA operation are also present. Site investigations have shown the presence of heavy metals, primarily cadmium, chromium, lead, and polynuclear aromatic hydrocarbons, and petroleum hydrocarbons in the soil. Analysis of the groundwater on the site showed the presence of small quantities of total petroleum hydrocarbons, polychlorinated biphenyls, and base/neutrals in both background samples and site samples. The levels of contaminants found indicate that the groundwater is not usable for drinking purposes regardless of whether remedial actions are taken on the site.

DOCUMENTS REVIEWED

Soils and Ground Water Characterization, Bayonne Barrel and Drum Company, Newark, New Jersey, Job No. 84C182; Dan Raviv Associates, Inc., July 1986.

Results of Preliminary Investigation and Sampling in Proposed New Jersey Turnpike Right-of-Way at the Bayonne Barrel and Drum Site, Newark, New Jersey; Louis Berger & Associates, Inc.; December 1986.

STATEMENT OF THE PROBLEM

This is a former RCRA site. The owner has declared bankruptcy and ceased drum reclamation activities. Surface and subsurface soil and groundwater contamination have been discovered and the Environmental Protection Agency (EPA) is concerned about whether the levels found pose a threat to human health. The Agency for Toxic Substances and Disease Registry (ATSDR) was asked to comment on the data in the reports named above, comment on whether any of the area should be restricted, and review a sampling plan for sampling around the office area.

DISCUSSION

The possible environmental pathways for human exposure to the contaminants at this site are inhalation, ingestion, or skin contact. The groundwater in the area is not used for drinking, cooking, bathing, or any other known method of human contact.

The two reports reviewed showed levels of various contaminants in the soil, surface water, and groundwater. The media of most concern is surface soil.

Groundwater: The Dan Raviv report evaluated the groundwater quality in two background monitoring wells, one well point, and two shallow monitoring wells. The levels of total petrochemical hydrocarbons (TPHC) in both the background wells indicate that the off-site groundwater is already contaminated with these materials. The well point, BBDC-5, indicated that the TPHC is elevated in the upper zone of the groundwater; however, the TPHC was not speciated. Therefore, it is not possible to determine the toxicity of this material since the species is unknown.

Polychlorinated biphenyls were found in well point number BBDC-5 near the oil storage tanks (53 ppb). Di-N-Butylphthalate (28ppb) and napthalene (14 ppb) were found in well BBDC-4 near the furnace residue pile. Neither of these chemicals has an EPA maximum contaminant level under the Safe Drinking Water Act. Neither is listed as a carcinogen. Sittig lists the allowable level for Di-N-Butyl Phthalate in water for protection of human health as 34,000 ug/l. Metals were analyzed in well BBDC-4; however, none of the levels were of public health concern. The Louis Berger report showed elevated levels of volatile organics, acid extractable organics, and total phenolics in monitoring well MW #2, near the northeast edge of the tire pile. It showed no contaminants of public health concern in MW #3 in the tank storage area.

Surface Soil: Both reports named above evaluated the level of contamination of surface soil. The report by Louis Berger & Associates only covered the proposed New Jersey Turnpike right-of-way. The Raviv report covered the entire site.

Several areas warranted an evaluation because of the levels of contaminants found. The residue pile, resulting from incineration of the contents of reconditioned barrels, and the area immediately adjacent to the residue pile, were such areas. These areas showed elevated levels of cadmium, chromium, and lead. The cadmium at 1300 ppm may be high enough to be of concern, depending on the exposure of the workers around the site. The levels normally used to decide whether a soil concentration of a contaminant is sufficient to be of concern are normally determined based on assumptions of quantities of soil ingested. The amount of soil ingested by workers at a site such as this one has not been well documented; therefore, an estimate of the levels of concern for soil contaminants at this site is difficult. Inhalation may be of a higher concern. A determination of the dust levels in the air found on the site would be necessary to estimate the intake of cadmium, or any other material in the

soil, for the workers. However, in view of the levels of cadmium found, versus the levels which are used for removal in residential areas, the 1300 ppm appears to be a potential threat to human health. Since this high level only occurs in the area around the residue pile, it appears that the area of concern can be isolated.

The concentration of chromium around the residue pile is also elevated; however, the valence state of the chromium was not given. This is very critical since the +6 state is much more toxic that the +3 state. The maximum value (3400 ppm) is slightly in excess of the maximum level found in supposedly uncontaminated soil (3000 ppm) (Parr). Since it is unlikely that a large part of the chromium is in the +6 state, due to its reacting with other chemicals on the site, the level of chromium is not considered to be a concern. Chromium was also found at elevated levels in the incinerator area. The levels found were less than those which have been found at some uncontaminated sites; therefore, the chromium in the soil in the incinerator area was not considered to be of concern.

The maximum lead concentration in soil at the residue pile is 8400 ppm. The Centers for Disease Control (CDC) has made a statement that soil lead concentrations of 500 to 1000 ppm in a residential area can result in an increase in the blood lead levels of children above background. Children normally have a higher ingestion rate for soil than adults and have a lower body weight, so exposure to lead in soil is a higher concern than for adults. The levels of lead found at this site are not likely to be a health concern due to its industrial nature. It is highly unlikely that children will enter the site, and it is also unlikely that the site will ever be anything other than an industrial site.

Total petroleum hydrocarbons (TPHC) were found in high concentrations (maximum 39,400 ppm) in the surface sediments on the site. However, the species of the TPHC were not stated. This is important because, as in the

case of chromium, the species present will determine the toxicity of the material. The more volatile compounds will have evaporated, leaving the less mobile, heavier compounds. The most likely route of entry for these heavier compounds is through inhalation during combustion, which is not likely at this site. Even higher concentrations of TPHC were found in the subsurface soils (59,000 ppm at 6-7 feet at site BBDC-3 or 171,000 ppm at BBD-8 at 3 feet).

Polychlorinated biphenyls were found near the residue pile at 65 ppm at BBD-14. High levels (213 ppm) were also found near the storage tanks at location BBD16. Elevated levels of PCBs were found in two of the buildings (80 ppm at BBDS-2 and 11.1 ppm at BBDS-4). Routes of exposure for PCBs are usually through inhalation or skin contact. Skin contact can be avoided through proper hygienic practices. Air sampling for PCBs should be carried in the areas of high soil concentration to determine whether inhalation is a problem.

Significant volatile organic contaminants were found only in the deeper levels of soil and were not considered to be accessible to humans.

Naphthalene (420 ppm) and bis(2-Ethylhexyl)phthalate (410 ppm) were found in soil near the tire pile. Naphthalene is not a known carcinogen. Allowable soil concentration for Bis(2-Ethylhexyl)phthalate, based on an Acceptable Daily Intake of 0.6 ug/kg/day (Sittig), is likely to be in excess of 420 ppm for an industrial site. Although this value does not consider the carcinogenicity of the compound, it provides an idea of possible levels of concern. Other base/neutrals and acid extractable compounds are found in the area on the northeast edge of the tire pile. Due to the fact that these elevated levels are found near the northeast edge of the tire pile and not at the southeast corner of the pile, there appears to have been a localized event in this area.

Phenol was present on the site at a maximum concentration of 20 ppm. This is not a significant level in soil.

The contents of the stored drums and the storage tanks are a concern. These contents were not given in either of the reports and should be characterized and disposed of, if they are defined as hazardous wastes; otherwise, they present the possibility for release, either gradual or catastrophic.

A sampling plan was proposed in a memo dated November 26, 1986, from Mr. Stanley Siegel to Mr. Richard Spear. This plan appears to be adequate, with the exception of its need for air monitoring for particulates near the office building. It should also include the provision for monitoring the soil near the tire pile and for monitoring two additional wells as mentioned below in the recommendations.

RECOMMENDATIONS

1. Isolate the residue pile from mechanical disturbance and from wind and precipitation.

2. Characterize the areas around the residue pile and around the tire pile to determine the amount of soil which contains levels of cadmium similar to those levels already found.

3. Restrict foot traffic around the residue pile and the tire pile to avoid moving the contaminants and to avoid human contact with these areas.

4. Perform air monitoring to determine the amount of particulates and vapors to which workers may be exposed. Include the area near the office building.

5. Prevent off-site migration of soil from the residue pile or from the area around the tire pile.

6. Characterize the contents of the belowground and aboveground tanks.

7. Characterize the contents of the stored drums.

8. Assure that appropriate worker hygienic practices are followed for those with activities in the outside areas, including the provision of clean work clothing daily. All work clothing and shoes should be left on-site and not taken home. Smoking, drinking, and eating should not be allowed in the contaminated area.

9. Fugitive dust during present operations or during cleanup operations should be prevented.

10. The sampling plan proposed in the memo from Mr. Stanley Siegel to Mr. Richard Spear should include sampling the soil in the area around the tire pile for base/neutral compounds to delineate the area of concern.

11. Include Raviv wells BBDC4 and BBDC5 in the sampling plan.

12. Sample the soil near the office building for metals, base/neutrals, and polychlorinated biphenyls.

REFERENCES

Sittig, Marshall, "Handbook of Toxic and Hazardous Chemicals and Carcinogens," 2nd Edition, Noyes Publications, 1985

Bowen, H.J.M., "Environmental Chemistry of the Elements," Academic Press, New York, 1979.

"Draft Health Advisories," U. S. Environmental Protection Agency, Office of Drinking Water, Washington, D.C., 1985.

"Health Assessment Document for Epichlorohydrin," U. S. Environmental Protection Agency, Office of Research and Development, Research Triangle Park, December 1984.

"Draft Superfund Public Health Evaluation Manual," ICF Incorporated, Washington, D.C., December 1985.

Parr, James F., Marsh, Paul,B., Lka, Joanne M., "Land Treatment of Hazardous Wastes," Agricultural Environmental Quality Institute, Agricultural Research Service, USDA, Beltsville, Maryland, Noyes Data Corporation, Park Ridge, New Jersey, 1983.

C. Harold Emmett

C. Harold Emmett, P.E.

cc:
Ralph Touch

APPENDIX

I

Diversified
Environmental
Resources, Inc.
1440A Pennington Road Trenton, New Jersey 08618
609-771-3616 FAX # 609-771-4276

APPENDIX I

RCRA CLOSURE
COST ESTIMATE

A
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A COMPLETE ENVIRONMENTAL SERVICE COMPANY.
COMPANY

Bayonne Barrel and Drum
RCRA Closure Cost Summary

1989 Costs

PHASE I			
Remedial Services and Disposal	$647,261.00	to	$728,151.00
Consulting	$20,000.00	to	$40,000.00
Contingency (15%)	$97,089.15	to	$109,222.65
Phase I Subtotal	$764,350.15		$877,373.65
PHASE II			
Site Sampling and Consulting			$31,700.00
Sample Analysis			$77,670.00
Contingency (15%)			$4,755.00
Phase II Subtotal			$114,125.00
PHASE III			
Remedial Services and Disposal			$1,577,950.00
Consulting	$20,000.00	to	$40,000.00
Contingency (15%)			$236,692.50
Phase III Subtotal			$1,854,642.50
Certification			$6,000.00
Grand Total	$2,719,117.65	to	$2,852,141.15

Description ash/soil	Labor	Non Haz. Tran/Disp $110/ton	RCRA Haz Tran/Disp $305/ton	TSCA Haz Tran/Disp $455/ton
Ash Pile				
Analysis	$8,650.00			
Load 890 cy	$9,345.00			
Trans/Disposal of 890 cy @1cy/ton			$271,145.00	
Post-Ash Removal Sample Analysis	$3,000.00			
Building No.2 and Furnace		**Non-Haz**	**RCRA Haz**	**TSCA Haz**
Ash staged in Building No.2				
Analysis	$950.00			
Loading 65 cy	$1,536.00			
Trans/Disposal of 65 cy@1cy/ton			$19,825.00	
350 drums staged in Building No.2				
Analysis	$4,525.00			
Sample and Re-stage	$6,120.00			
4 Roll-Offs Spot @ $600/each	$2,400.00			
4 Roll-Offs Staging @ $400/mo/RO	$1,600.00			
Trans and Disposal of 95 cy @ 1cy/ton			$28,975.00	
Decontamination of Building No.2				
Decontamination of 5,400 sq.ft.	$4,810.00			
Disposal 3,000 gal of Rinsate @ $0.33/gal		$990.00		
Furnace Decontamination and Removal				
Decontamination of 2,600 sq.ft.	$2,310.00			
Disposal 1,500 gal of Rinsate @ $0.33/gal		$495.00		
Debris Sampling	$1,400.00			
Furnace Demolition and removal	$8,175.00			
Demolition Disposal 94cy @1.5 ton/cy = 141 tons		$15,510.00		

Building No.1 Solid Waste Removal and Decontamination

		Non-Haz	RCRA Haz	TSCA Haz
Remove Solid Waste from 600 linear ft. of trench and Decontaminate	$7,200.00			
Disposal of 3,200 gal of Rinsate @ $0.33/gal		$1,056.00		
Load 22cy Solid Waste @ $10.50/cy	$231.00			
Trans and Disposal of 22 cy @1cy/ton		$2,420.00	$6,710.00	

Waste Water Treatment Area		Non-Haz	RCRA Haz	TSCA Haz
Remove and Trans 10,000 gal water	$1,500.00			
Dispose of 10,000 gal water @ $0.33/gal		$3,300.00		
Remove Sludge from 5,000 gal tank and Trench	$4,400.00			
Trans and Disposal of Sludge from trench, 5,000 & 60,000 tanks est. 40 drums		$6,400.00	$8,000.00	
Clean 60K Gal Tank	$7,750.00			

Furnace Area		Non-Haz	RCRA Haz	TSCA Haz
Clean Trench and collection tanks	$6,300.00			
Remove ash from surface soil 450 cy @ $11/cy	$4,950.00			
Remove underground piping, estimated to be 440 L.F.	$4,500.00			
Disposal of est. 500cy of ash/soil			$150,500.00	$227,500.00
Phase I Project Management and Health & Safety Officer	$25,000.00			
Phase I Mob/de-mob	$3,000.00			

Phase I Equip. Decon	$1,875.00
Construct Decon Pad	$6,900.00

PHASE I Total Costs SUMMARY

Services and Project Management			$128,430.00
Disposal of Wash Waters (Non-TSCA, Non-Haz.)			$5,346.00
Transportation of Wash Waters			$2,000.00
	Subtotal		$135,776.00
	NON-HAZ.	RCRA HAZ.	TSCA HAZ.
Disposal of Non-Land Ban		$487,155.00	$227,500.00
Ash and Sludge			
Demolition Debris	$15,510.00		
Drummed Sludge, WWT Area	$6,400.00	$8,000.00	
Waste From Bldg. No.1	$2,420.00	$6,710.00	
	$24,330.00	$501,865.00	$227,500.00

PHASE I Remedial Subtotal	$647,261.00	to	$728,151.00
PHASE I Consulting	$20,000.00	to	$40,000.00
Contingencies (15%)	$97,089.15	to	$109,222.65
Estimated PHASE I Total	$764,350.15	to	$877,373.65

PHASE II - Site Sampling and Analysis

Description	Labor	Analysis
Furnace Area		
22 soil samples for analysis of PP + 40		$32,560.00
6 Soil Sample for analysis of EP Toxic Metals		$1,500.00
Test Pit Excavation	$2,100.00	
Sample Collection	$2,200.00	
Waste Water Treatment Area		
22 soil samples for analysis of PP + 40		$32,560.00
Test Pit Excavation	$1,400.00	
Sample Collection	$2,200.00	
Building Interiors		
9 wipe samples for analysis of EP Toxic Metals		$2,250.00
Sample Collection	$800.00	
Quality Assurance Samples		$8,800.00
Equip. Decon	$1,000.00	
Phase II Mob/De-Mob.	$1,000.00	
Phase II Health and Safety	$6,000.00	
Phase II Consulting	$15,000.00	
	Labor	Analysis
Estimated Totals	$31,700.00	$77,670.00
Contingency (15%)	$4,755.00	

PHASE II Total $114,125.00

PHASE III Description	Labor		
Waste Water Treatment Area			
Excavation and Stockpiling of an estimated 3,000 cy of soil, $6.7/cy X 3000	$20,100.00		
Removal of one 5,000 gal. Underground Tank	$4,500.00		
Furnace Area			
Excavation and Stockpiling of an estimated 2,600 cy of soil, $11/cy X 2,600	$28,600.00		
Sampling and Analysis of Stockpiled Soil	$8,200.00		
Loading of Stockpiled Soil @ $10.50/cy X 5,600cy	$58,800.00		
Equip. Decon.	$2,800.00		
Mob/De-Mob.	$3,250.00		
Construction Management and Health & Safety	$23,000.00		
Services Subtotal	$149,250.00		
Transportation and Disposal of 5,600 cy of soil @ 1.3 ton/cy = 7,280 tons Non-Land Ban		Trans/Disp Non-Haz.	Trans/Disp TSCA Haz.
One forth of soil estimated to be TSCA Haz.		$600,600.00	$828,100.00
Phase III Total Costs			
Services and Project Management			$149,250.00
Disposal of Non-Land Ban Soil			$1,428,700.00
PHASE III Remedial Subtotal			$1,577,950.00
Phase III Consulting	$20,000.00		$40,000.00

Contingency (15%)			$236.692.50
Est. PHASE III Total	$1.834.642.50	to	$1.854.642.50

APPENDIX
J

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Environmental
Resources, Inc.
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APPENDIX J

CLOSURE SCHEDULE

A
STOUT
A COMPLETE ENVIRONMENTAL SERVICE COMPANY.
COMPANY

Closure Schedule

This closure schedule has been prepared in accordance with N.J.A.C. 7:26-9.8(e)4.

Wastes were generated and stored at Bayonne Barrel and Drum and were never received at the facility for treatment, storage or disposal.

Phase I

Within 90 days of approval of this Closure Plan, seasonal conditions permitting, Phase I of the site remediation will commence. Phase I remediation includes the sampling, removal and disposal of identified hazardous wastes stored at the site, decontamination of the buildings and furnace structure and demolition and disposal of the furnace structure. Phase I of this plan is anticipated to take 5 months. Therefore, Phase I will be completed within 8 months of approval of this plan.

Phase II

Phase II of this plan includes the sampling and analysis of soil in the areas of the SWMU's to identify and delineate contamination within those areas. Phase II also includes the preparation of excavation plans based upon the extent of identified contamination. Phase II will commence upon completion of Phase I, seasonal conditions permitting, and will be completed within a 5 month period.

Phase III

Phase III of this plan includes the excavation, stockpiling, waste characterization sampling and off-site disposal of contaminated soil in accordance with excavation plans developed during Phase II. Phase III will commence upon completion of Phase II, seasonal conditions permitting, and will be completed within a 6 month period.

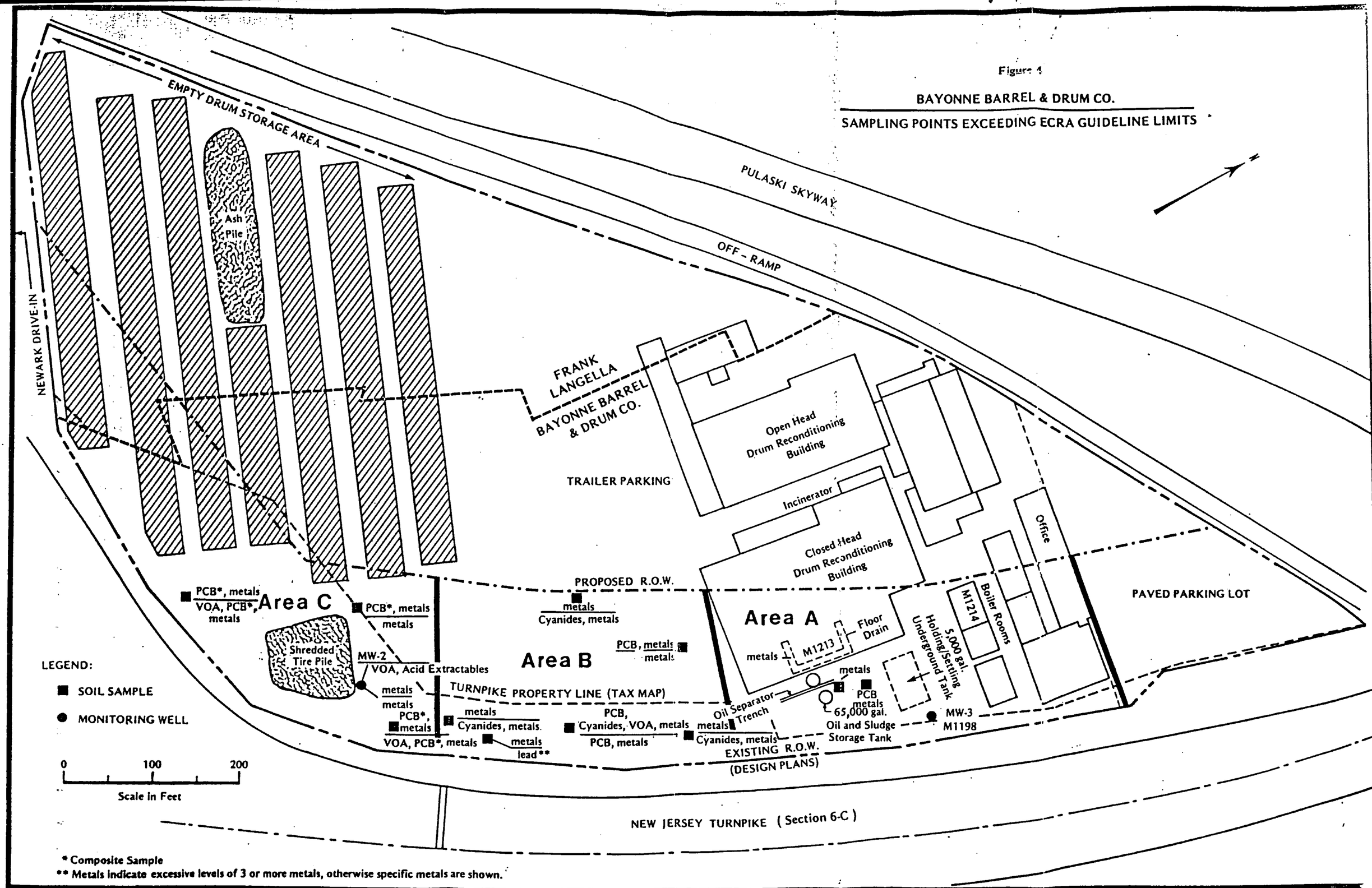
Therefore, closure will be completed within 18 months of approval of this plan if seasonal weather conditions permit continues operations.

Diversified Environmental Resources, Inc

Figure 4

BAYONNE BARREL & DRUM CO.

SAMPLING POINTS EXCEEDING ECRA GUIDELINE LIMITS



* Composite Sample

** Metals indicate excessive levels of 3 or more metals, otherwise specific metals are shown.

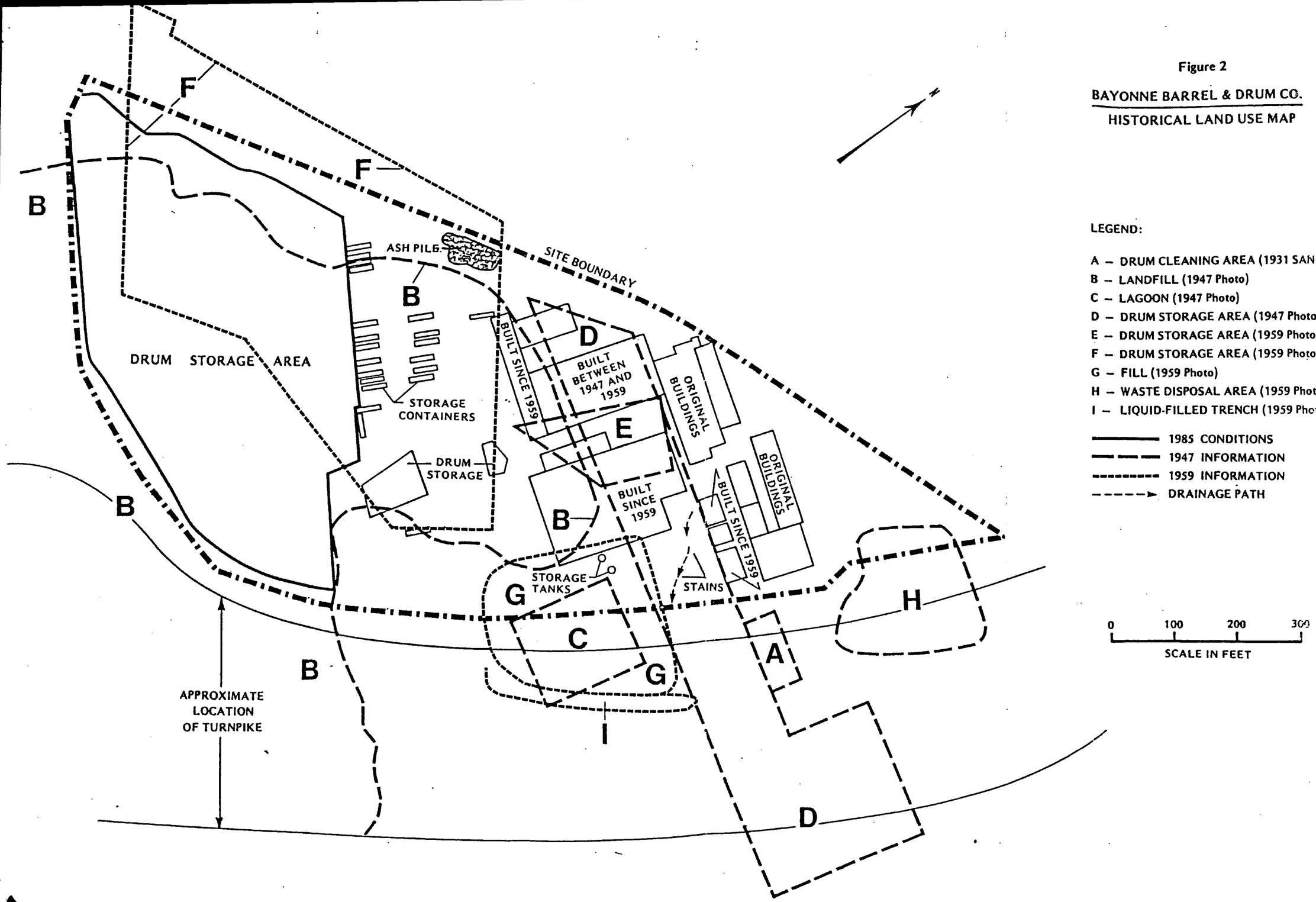


Figure 2

BAYONNE BARREL & DRUM CO.

HISTORICAL LAND USE MAP

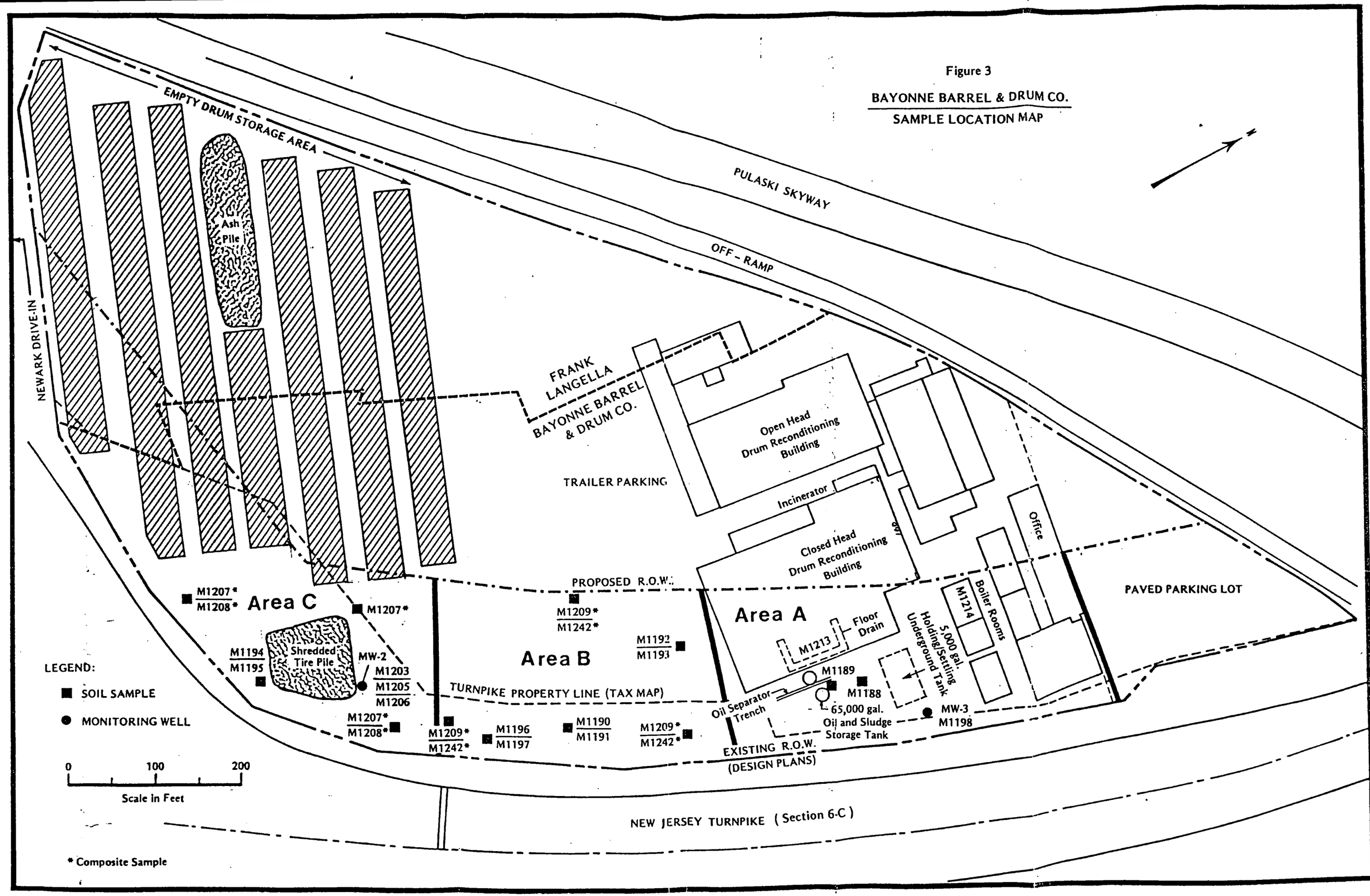


Figure 3

BAYONNE BARREL & DRUM CO.

SAMPLE LOCATION MAP