# FINAL
# SITE INSPECTION PRIORITIZATION REPORT
# KEEGAN LANDFILL
# KEARNY, HUDSON COUNTY, NEW JERSEY

**CERCLIS ID No.: NJD981490428**

**VOLUME 1 OF 3**

**Prepared for:**
**UNITED STATES ENVIRONMENTAL PROTECTION AGENCY**
**REGION II**

**DCN: START-02-F-01093**
**TDD No.: 02-96-11-0044**
**EPA Contract No.: 68-W5-0019**

**JULY 1998**

**Prepared by:**
**Region II Superfund Technical Assessment and Response Team**
**Roy F. Weston, Inc.**
**Federal Programs Division**
**Edison, New Jersey 08837**

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JUNE 1998

SUBMITTED BY:

Kathy A. Campbell
START Project Manager

Date 07/17/98

W. Scott Butterfield, CHMM
Site Assessment Team Leader

Date 7/17/98

KEEGAN.SIP

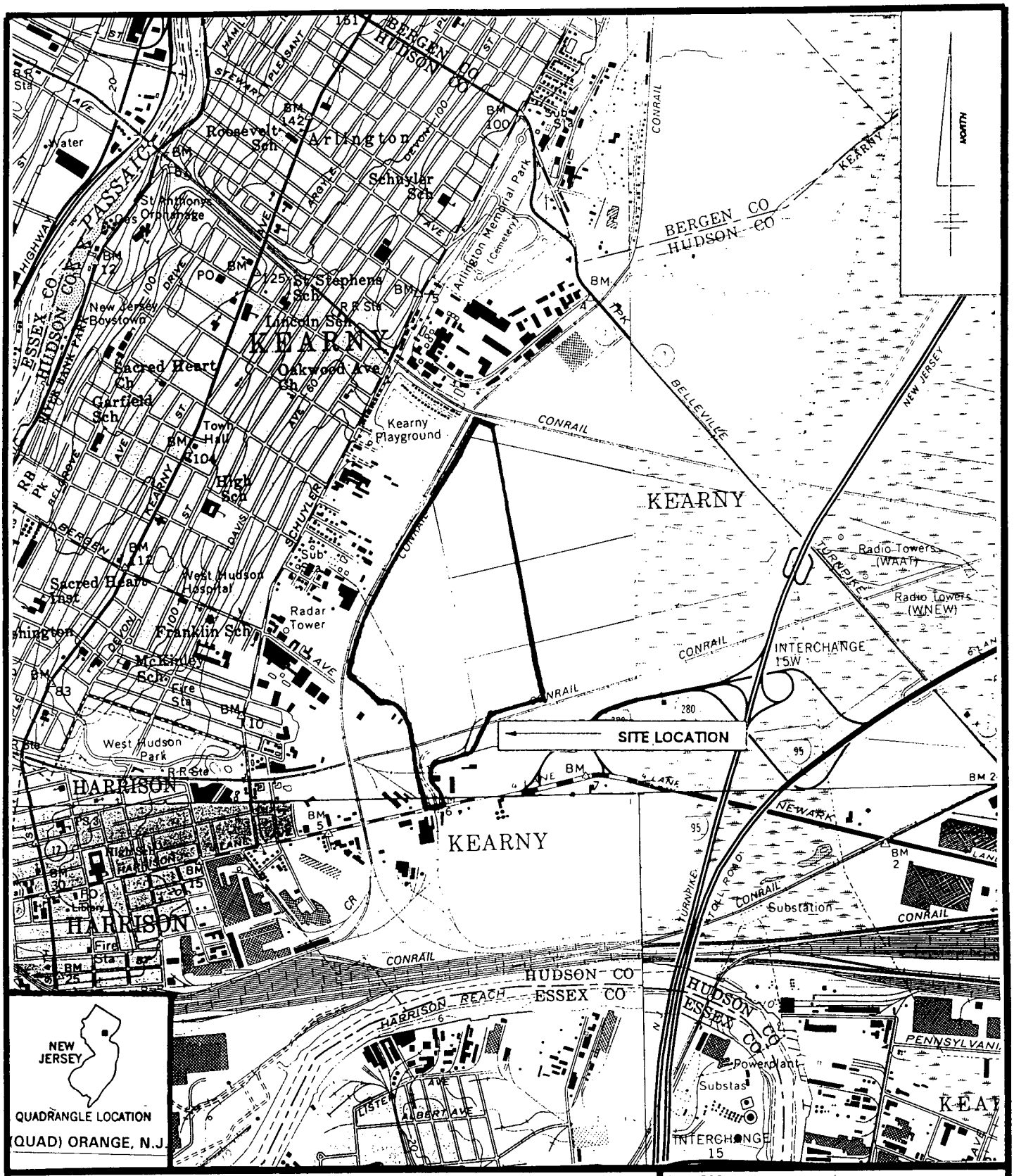
## SITE SUMMARY

The Keegan Landfill (Keegan) site (a.k.a. MSLA Site B) is located at the foot of Bergen Avenue in a predominantly industrial section of Kearny, Hudson County, New Jersey (Ref. Nos. 1; 3, p. 3). Figures 1 and 2 provide a Site Location Map and Site Map, respectively. The Comprehensive Environmental Response, Compensation, and Liability Information System (CERCLIS) list notes that the site is located in Congressional District No. 11; however, the actual district is No. 09 (Ref. Nos. 1, p. 1; 2, p. 3). The unfenced property encompasses approximately 230 acres. The site is bordered on the north and west by Conrail railroad tracks; on the southwest by businesses along Bergen Avenue, including a scrap metal facility; on the south by Harrison Avenue; and on the southeast and east by wetland areas and a tidal open-water wetland (Ref. Nos. 3, pp. 3, 64; 4; 7). Primary site access was formerly gained through two entrances from Bergen Avenue. An additional access road originates at Harrison Avenue, located south of the site (Ref. Nos. 3, pp. 3, 12; 7). The three entrances are currently barricaded with concrete roadway dividers (Ref. No. 7). One makeshift shelter exists on site; it is unknown if the shelter is occupied (Ref. No. 24, p. 3). Another east-west Conrail rail line crosses the southern portion of the site (Ref. No. 4). One creek, Frank Creek, originates on site. The creek flows south and eventually discharges to the Passaic River, which is located ½-mile south of the former Harrison Avenue site entrance. The unnamed creek identified in the September 1989 Site Inspection (SI) Report is actually an open-water wetland area that is contiguous with other site wetlands (Ref. Nos. 3, pp. 3, 8, 12, 64; 4; 24, p. 3).

The Town of Kearny (the "Town") owns the property, which was leased to John P. Keegan/Municipal Sanitary Landfill Authority (Keegan/MSLA). From the mid-1960s to 1974, Keegan/MSLA operated an unlined municipal landfill at the site; operations ceased at the request of the Hackensack Meadowlands Development Commission (HMDC) (Ref. No. 3, p. 41). Keegan/MSLA no longer leases the property (Ref. No. 7). A 1986 Malcolm Pirnie, Inc. Preliminary Assessment (PA) Report noted the on-site presence of approximately 10 drums; the drums' location and contents, if any, are unknown (Ref. No. 3, pp. 3, 36). During the 1989 U.S. Environmental Protection Agency (EPA) Region II Field Investigation Team (FIT) SI, personnel noted the occurrence of ongoing disposal of cardboard waste, construction waste, household refuse, and landscaping debris (e.g., leaves, tree branches). During the inspection, FIT personnel also noted the presence of abandoned tires, appliances, and automobiles (Ref. No. 3, pp. 65, 67, 68). The drums observed during the April 1986 PA off-site reconnaissance were not observed during the SI on-site activities (Ref. No. 3, pp. 65 through 70).

In addition to landfill activities, illegal dumping of various materials and wire burning have occurred on site (Ref. No. 3, pp. 38, 45, 199). A Kearny Police Department officer, who worked as a truck driver for DuPont Chemical of Newark during the 1960s, stated that for approximately 7 years, a daily delivery of approximately forty 30-gallon drums of waste was disposed of on the Keegan property. Drums of waste were reportedly both deposited intact or emptied onto the ground surface. Drum contents included plating wastes, such as chromate and bichromate slurry; pigment wastes; and organic wastes (Ref. No. 3, p. 383).

In December 1981, December 1984, June/July 1987, and most recently in 1992, underground fires occurred at the site (Ref. Nos. 3, pp. 44, 46, 204 through 213; 7). On July 2, 1987, the New Jersey Department of Environmental Protection (NJDEP) cited fires as a recurring problem and recommended that the Town submit a closure plan for the landfill (Ref. No. 3, p. 182). In July 1987, the Town of Kearny contracted Neglia Engineering Associates (Neglia) to provide closure guidance for the extinguished portions of the landfill. In August 1987, Neglia provided the following recommendations: 1) improvement of the access road by eliminating depressions and providing a turnaround area, 2) deposition of two feet of compacted cover and seed layer on the extinguished areas, and 3) securing of the access road from Bergen Avenue, securing of a roadway easement for the access road situated on lots




| | | |
|---|---|---|
| WESTON MANAGERS DESIGNERS/CONSULTANTS **Roy F. Weston, Inc.** **FEDERAL PROGRAMS DIVISION** | EPA PM MOYIK | **FIGURE 1 SITE LOCATION MAP** |
| **IN ASSOCIATION WITH RESOURCE APPLICATION,Inc. C.C. JOHNSON & MALHOTRA, P.C., R.E. SARRIERA ASSOCIATES, PRC ENVIRONMENTAL MANAGEMENT, AND GRB ENVIRONMENTAL SERVICES, INC.** | START PM CAMPBELL | **KEEGAN LANDFILL KEARNY, NJ** |

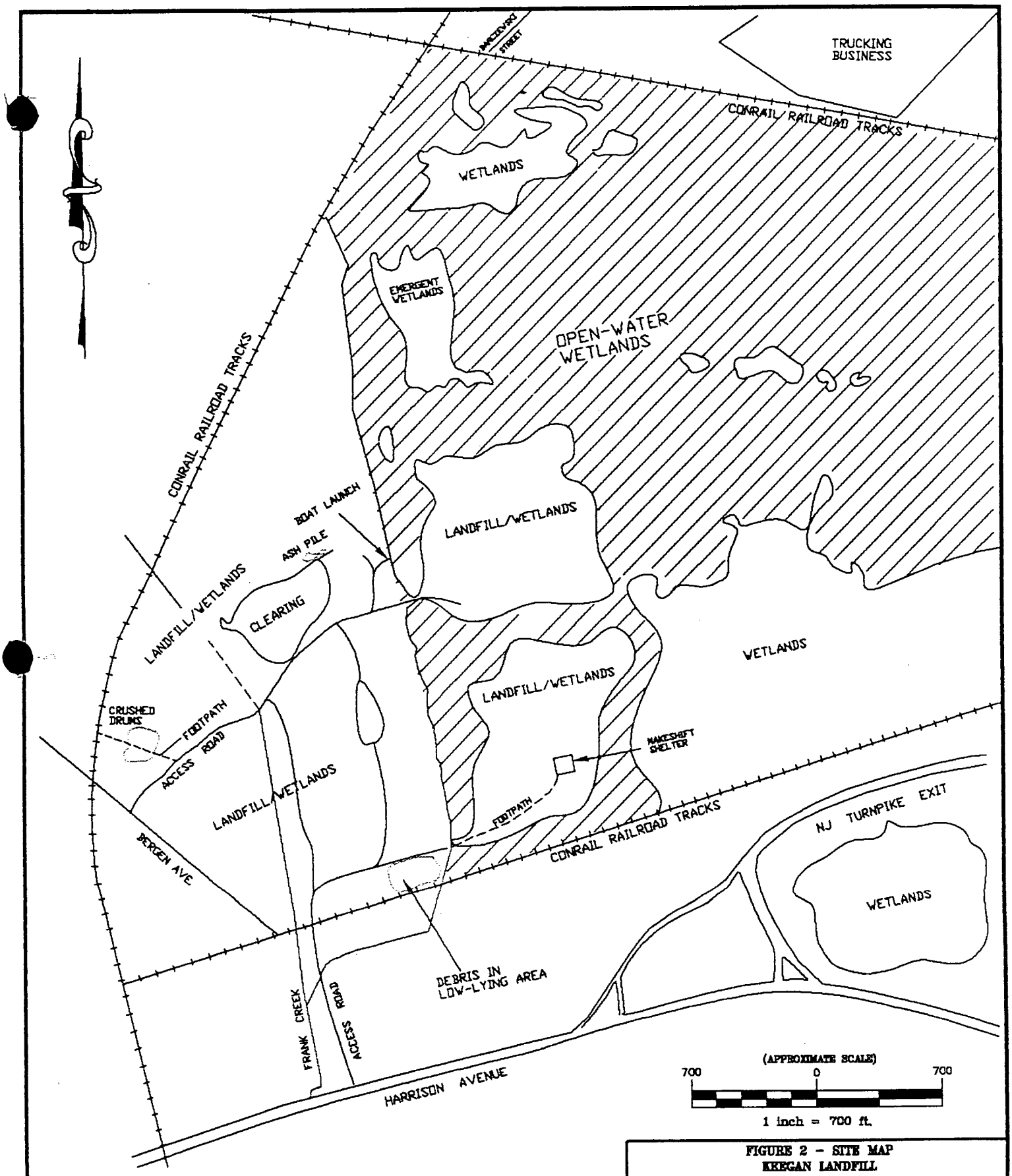



**FIGURE 2 - SITE MAP**
**KEEGAN LANDFILL**
**KEARNY, NEW JERSEY**
**JULY 1997**

**US ENVIRONMENTAL PROTECTION AGENCY**
SUPERFUND TECHNICAL ASSESSMENT AND RESPONSE TEAM
CONTRACT# 68-W5-0018

DRAWN BY: J. HAMPTON JR.
EPA TASK MONITOR: C. MOYIK
START PROJECT MANAGER: K. CAMPBELL

WESTON
Roy F. Weston, Inc.
FEDERAL PROGRAMS DIVISION

IN ASSOCIATION WITH PRC ENVIRONMENTAL MANAGEMENT, INC., C.C. JOHNSON & MALHOTRA, P.C., RESOURCE APPLICATIONS, INC., R.E. SARRIERA ASSOCIATES, AND GRB ENVIRONMENTAL SERVICES, INC.

13FIG2.PLT - C:\BITMAP\13000A.DWG

owned by Hudson Meadows Urban Renewal Corporation, and cessation of illegal dumping on these lots (Ref. No. 3, pp. 188, 189). As of June 1997, the Town has improved the access road and secured the three site entrances from vehicular traffic. The site property is currently involved in litigation between the Town and the HMDC; the HMDC is attempting to procure the property. Dependent upon the outcome of court proceedings, HMDC plans to utilize the property initially as a construction/demolition debris landfill; after proper closure, HMDC plans to develop the property into a recreational park (Ref. No. 7).

On April 25, 1989, as part of SI activities, Region II FIT collected a total of seven surface water samples and six sediment samples from on-site surface water bodies. Samples were obtained from the open-water wetland, the "unnamed creek," and Frank Creek (Ref. No. 3, pp. 4, 13). Analytical results of the sediment samples indicate the presence of elevated concentrations of semivolatile organic compounds, polychlorinated biphenyls (PCBs), and metals (mercury, lead, and chromium). Elevated concentrations of mercury, lead, and chromium were also detected in the Frank Creek surface water samples (Ref. No. 3, pp. 4, 216 through 220). Additional analytical data collected on site by IT Corporation in 1994 indicate the presence of elevated concentrations of volatile organic compounds (VOCs) and metals in groundwater (Ref. Nos. 9, p. 37; 10, p. 3). In addition, analytical data of surface soil samples indicate the presence of VOCs; semivolatile organic compounds, such as phthalates and polynuclear aromatic hydrocarbons (PAHs); pesticides; PCBs; dioxin; petroleum hydrocarbons; and inorganic analytes, such as aluminum, barium, chromium, iron, lead, mercury, and cyanide (Ref. Nos. 9, p. 34; 10, p. 2).

On July 30-31, 1997, the U.S. Environmental Protection Agency (U.S. EPA) Region II Superfund Technical Assessment and Response Team (START) conducted sampling at the site as part of Site Inspection Prioritization (SIP) activities. START collected a total of 13 sediment samples, 3 surface water samples, and 4 soil samples (Ref. No. 24, p. 16). Analytical data of soil and sediment samples indicate the on-site presence of phthalates, pesticides, and metals at concentrations significantly above background (Ref. No. 25, pp. 14 through 16, 18 through 23, 26 through 28, and 337 through 339). During the sampling event, START personnel observed the following conditions/events on and adjacent to the site: leachate at the headwaters of Frank Creek, an ash pile located at the end of the westernmost access road, a variety of debris along all access roads, and recreational use of property/adjacent surface waters (e.g., a motorcyclist, person in a kayak, apparent boat launch area) (Ref. No. 24, pp. 1, 3 through 5, 10).

Although there is a potential for a release of contaminants to groundwater, drinking water supplies within the site vicinity are obtained from sources greater than 4 miles from the site (Ref. Nos. 4; 8, p. 23; 11, 12). The July 1997 START analytical data documents a release of site contaminants to adjacent surface water sediments (Ref. No. 25, pp. 14 through 16, 18 through 23, 26 through 28, and 337 through 339). The eastern adjacent wetland areas are interconnected with the Kearny Marsh, a NJDEP Natural Heritage Program (NHP) Priority Site and state-listed endangered species habitat (Ref. Nos. 14, 22). The remainder of the surface water migration route is composed of highly industrialized coastal tidal water bodies (Ref. No. 3, pp. 146, 147). Although these surface waters sustain fish populations, state-issued prohibitions and health advisories exist regarding the sale and consumption of specific fishes taken from these waters (Ref. Nos. 20; 24, p. 18). There are no residences, schools, or day care facilities within 200 feet of the site boundary (Ref. Nos. 3, pp. 3, 12, 49, 51; 4). As no remedial actions involving removal or containment of on-site wastes have occurred, contaminants associated with the site may continue to migrate to groundwater and adjacent surface water bodies (Ref. Nos. 1, p. 2; 3, p. 29).

# SITE ASSESSMENT REPORT: SITE INSPECTION PRIORITIZATION
## PART I: SITE INFORMATION

1. Site Name/Alias Keegan Landfill (a.k.a. MSLA Site B)

   Street Foot of Bergen Avenue

   City Kearny State NJ Zip Code 07032

2. County Hudson County Code 017 Cong.Dist. 09

3. CERCLIS ID No. NJD981490428

4. Block Nos. 205; 286 Lot Nos. 18, 19, 24 through 33♦; 4

5. Latitude 40° 45' 19" N Longitude 74° 08' 15" W

   USGS Quad(s). Orange, NJ

6. Approximate size of site 230 acres

7. Owner Town of Kearny Telephone No. (201) 955-7979

   Street 402 Kearny Avenue

   City Kearny State New Jersey Zip 07032

8. Operator John P. Keegan/Municipal Sanitary Landfill Authority (MSLA) * Telephone No. (201) 741-1377

   Street 18 Somerset Drive

   City Rumson State New Jersey Zip 07760

9. Type of Ownership

   __Private __Federal __State
   __County X Municipal __Unknown __Other_____

♦ An access road crosses Lot Nos. 18, 31, 32 of Block 205; the owner of these properties is Hudson Meadow Urban Renewal Corporation (Mimi Development) (Ref. No. 3, p. 188).

* The second party identified as former lessee of Keegan Landfill is William A. Keegan, Jr., of 411 Bergen Avenue, Kearny, NJ. (Ref. No. 3, p. 43).

**PART I: SITE INFORMATION (Continued)**

10. Owner/Operator Notification on File

__ RCRA 3001 __Date __CERCLA 103c Date _____

X None __ Unknown

11. Permit Information

| Permit | Permit No. | Date Issued | Expiration Date | Comments |
|---|---|---|---|---|

None known.

12. Site Status

__Active X Inactive __Unknown

13. Years of Operation: mid-1960s to 1974 (as Municipal Landfill)

14. Identify the types of waste sources (e.g., landfill, surface impoundment, piles, stained soil, above- or underground tanks or containers, land treatment, etc.) on site. Initiate as many waste unit numbers as needed to identify all waste sources on site.

(a) Waste Sources

| Waste Unit No. | Waste Source Type | Facility Name for Unit |
|---|---|---|
| 1 | Landfill | Landfill |

Ref. Nos. 1 through 7.

**PART I: SITE INFORMATION (Continued)**

(b) Other Areas of Concern
Identify any miscellaneous spills, dumping, etc. on site; describe the materials and identify their locations on site.

On August 5, 1980, the Kearny Police Department received information regarding illegal dumping of hazardous materials; the event allegedly occurred 1 year prior to the police report. Materials were reportedly dumped in an area southeast of the western Conrail line and northeast of Bergen Avenue. The Kearny Department of Public Works excavated four locations to depths from 18 inches to 4 feet. No evidence of deposited materials was observed. No samples were collected during the investigation of the incident.

In December 1984, while monitoring an underground landfill fire, a member of the Kearny Department of Public Health and Environmental Protection (DPHEP) noted that "a large pile of debris had been set on fire over the weekend by someone burning wire." The location and size of the burn pile are unknown.

Ref. No. 3, pp. 45, 47.

15. Describe the regulatory history of the site, including the scope and objectives of any previous response actions, investigations and litigation by State, Local and Federal agencies (indicate type, affiliation, and date of investigations).

Local - Underground landfill fires are known to have occurred on site in December 1981, December 1984, June/July 1987, and most recently in 1992. Local agencies, including the Kearny DPHEP, and Keegan/MSLA personnel have been on site at these times to conduct and monitor fire-extinguishing efforts (Ref. Nos. 3, pp. 44, 46, 204 through 213; 7). During the 1987 fire, NJDEP personnel also visited the site to monitor fire-extinguishing progress (Ref. No. 3, pp. 206, 207, 209, 213).

State - In May 1986 Malcolm Pirnie, Inc., a contractor to the NJDEP, conducted a Preliminary Assessment (PA) of the site. PA activities included the collection of background information and performance of an off-site reconnaissance. The PA evaluation indicated that the site, although "non-hazardous" overall, was a medium priority candidate for further action due to the observance of drums and exposed waste on the unsecured site (Ref. Nos. 1, p. 2; 3, pp. 34, 35, 40).

As mentioned in the above subsection ("Local"), NJDEP personnel participated in the monitoring of the June/July 1987 fire. On July 2, 1987, the NJDEP recommended that the Town submit a landfill closure plan (Ref. No. 3, p. 182). In August 1987, Neglia, under contract to the Town, provided closure recommendations for the extinguished burn areas (Ref. No. 3, pp. 188, 189).

**PART I: SITE INFORMATION (Continued)**

Federal - In April 1989, Region II FIT conducted surface water/sediment sampling on site as part of a Site Inspection (SI) project. A total of seven surface water samples and six sediment samples were collected from on-site surface water bodies. Analytical data indicate the presence of elevated concentrations of semivolatile organic compounds, PCBs, and metals in sediment samples. Analytical data indicate the presence of elevated concentrations of the same metals in the Frank Creek surface water samples (Ref. No. 3, pp. 4, 13, 28). In July 1997, Region II START conducted environmental sampling at the site. Analytical results of this event are discussed in the Site Inspection Prioritization subsection of Part III of this report.

a) Is the site or any waste source subject to Petroleum Exclusion? Identify petroleum products and by-products that justify this decision.

Petroleum products and by-products are not known to have been disposed of at the site. Therefore, neither the site nor any waste source is subject to petroleum exclusion provisions under CERCLA.

Ref. No. 3, p. 3.

b) Has normal farming application of pesticides registered under the Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA) occurred at the site? Have pesticides been produced or stored on site? Have there been any leaks or spills of pesticides on site?

The site has not been used for agricultural purposes, nor are pesticides known to have been produced, stored, or spilled on site. However, analytical data of on-site soil and sediment samples collected in July 1997 by Region II START indicate the presence of pesticides, including 4,4'-DDD, 4,4'-DDE, 4,4'-DDT, endrin, endrin aldehyde, and chlordane. Similarly, analytical data of sample collected by IT Corporation indicate the presence of pesticides, including aldrin, beta-BHC, 4,4'-DDD, 4,4'-DDE, 4,4'-DDT, dieldrin, endrin, endosulfan I, endosulfan sulfate, heptachlor, heptachlor epoxide, and methoxychlor.

Ref. Nos. 3, p. 3; 9, pp. 34, 35; 10, Attachment C, p. 13, Attachment D, pp. 41 through 48, Attachment E, pp. 22 through 25; 25, pp. 26 through 28.

c) Is the site or any waste source subject to RCRA Subtitle C (briefly explain)?

Neither the site nor any waste source is subject to RCRA Subtitle C. The site has been inactive as a municipal sanitary landfill since 1974.

Ref. No. 3, p. 3.

**PART I: SITE INFORMATION (Continued)**

d) Is the site or any waste source maintained under the authority of the Nuclear Regulatory Commission (NRC)?

Neither the site nor any waste source is maintained under the authority of the NRC.

Ref. No. 3, p. 3.

16. Information available from:

Contact Cathy Moyik Agency U.S. EPA Telephone No.: (212) 637-4339
Preparer Kathy Campbell Agency Region II START Date: June 1998

## PART II: WASTE SOURCE INFORMATION

For each of the waste units identified in Part I, complete the following items.

Waste Unit 1 - Landfill

Source Type

| | | | |
|---|---|---|---|
| X | Landfill | | Contaminated Soil |
| | Surface Impoundment | | Pile |
| | Drums | | Land Treatment |
| | Tanks/Containers | | Other |

**Description:**

1. Describe the types of containers, impoundments or other storage systems (i.e., concrete-lined surface impoundment) and any labels that may be present.

   The Keegan site is an unlined landfill located in a primarily industrial portion of Kearny, New Jersey; the Town of Kearny owns the property. From the mid-1960s to 1974 Keegan/MSLA, the property lessee, operated a municipal sanitary landfill at the site. Historical information indicates that unauthorized dumping has occurred. Wastes deposited on site include construction and landscaping debris; cardboard waste; household refuse; used tires, appliances, and automobiles; and drummed wastes. From 1981 to the present, four underground landfill fires have occurred on site. While monitoring the December 1984 fire, a Kearny DPHEP member observed the remains of a wire burn pile; its location and size are unknown.

   A Kearny Police Department member reported that, while working as a truck driver for DuPont of Newark in the 1960s, drummed wastes were transported to the site for disposal. For approximately 7 years, at least one daily delivery of an estimated forty 30-gallon drums were reportedly deposited both intact and emptied on the site. Drum contents included plating wastes, such as chromate and bichromate slurry; pigment wastes, and organic wastes. A 1986 PA Report noted the presence of 10 drums; however, their location and contents, if any, are unknown. Drums and crushed drums were observed at various locations during 1997 Region II START SIP on-site sampling activities.

**PART II: WASTE SOURCE INFORMATION (Continued)**

2. Describe the physical condition of the containers or storage systems (i.e., rusted and/or bulging metal drums).

   N/A

3. Describe any secondary containment that may be present (e.g., drums on concrete pad in building or above ground tank surrounded by berm).

   The Keegan Landfill site is unlined; no secondary containment is present.

Ref. Nos. 3, pp. 3, 35, 38, 41, 44 through 47, 65 through 70, 199, 204 through 213, 383; 7; 8, pp. 28, 61; 24, p. 1, 5, 12.

**Hazardous Waste Quantity**

The actual quantity of hazardous waste disposed of at the site is unknown. For the purposes of this report, the total site acreage (i.e., 230 acres) will be utilized as an estimated hazardous waste quantity value.

**Hazardous Substances/Physical State**

In July 1997 Region II START collected 13 sediment samples, 4 soil samples, and 3 surface water samples from the site and its vicinity. Analytical data indicate the presence of phthalates, pesticides, and metals at concentrations significantly above background. As part of 1989 SI activities, seven surface water samples and six sediment samples were collected from on-site surface water bodies. Analytical data of the sediment samples collected in 1989 indicate the presence of elevated concentrations of semivolatile organic compounds, such as phenanthrene, fluoranthene, pyrene, benzo(a)anthracene, chrysene, benzo(a)pyrene; PCBs; and metals, such as mercury, lead, and chromium. Analytical data indicate the presence of elevated concentrations of the same metals in the Frank Creek surface water samples.

Plating wastes and organic wastes from DuPont were reportedly disposed on site during the 1960s in slurry and liquid forms. Wastes generated from wire burning are in the solid/ash state. The physical state of other possible deposited wastes is unknown.

Additional analytical data collected on site by IT Corporation in 1994 indicate the presence of VOCs and elevated concentrations of metals in groundwater. In addition, analytical data of surface soil samples indicate the presence of VOCs; semivolatile organic compounds, such as phthalates and PAHs; pesticides; PCBs; dioxin; and inorganic analytes, such as aluminum, barium, chromium, iron, lead, mercury, and cyanide.

Ref. Nos. 3, pp. 4, 27, 28, 45, 216 through 220, 383; 9, pp. 34, 37; 10, pp. 2, 3; 25, pp. 14 through 16, 18 through 23, 26 through 28, 337 through 339.

# PART III. SAMPLING RESULTS

## EXISTING ANALYTICAL DATA

**Site Inspection** - On April 25, 1989, Region II FIT conducted an SI at the Keegan site. Seven surface water samples and six sediment samples were collected from on-site surface water bodies; the total numbers include one environmental duplicate sample per sampling medium (Ref. No. 3, pp. 13, 27). A Sample Location Map is presented in Reference No. 3, page 13. An analytical data summary is presented in Reference No. 3, page 28. All media samples were analyzed for Target Compound List (TCL) and Target Analyte List (TAL) parameters. For Quality Assurance/Quality Control (QA/QC) purposes, two equipment rinsate blank samples and one trip blank sample (VOC analysis only) were also collected. The Contract Laboratory Program (CLP) data package is included in Reference No. 3, pp. 215 through 350.

Analytical data of sediment samples indicate the presence of elevated concentrations of semivolatile organic compounds, such as phenanthrene, fluoranthene, pyrene, benzo(a)anthracene, chrysene, benzo(a)pyrene; PCBs, such as Aroclor 1254 and Aroclor 1260; and metals, such as mercury, lead, and chromium. Analytical data indicate the presence of elevated concentrations of the same metals in the Frank Creek surface water samples.

**Passaic River Flood Protection Project** - In May 1994, the Baltimore District of the U.S. Army Corps of Engineers (USACE) contracted IT Corporation to perform a Hazardous, Toxic, or Radioactive Waste (HTRW) investigation and hydrogeologic investigation along the proposed alignment of the Passaic River Basin floodwater diversion tunnel (Ref. Nos. 8, p. 2; 9, p. 1). As part of the HTRW investigation, IT Corporation collected soil and groundwater samples for chemical analyses. The sampling methodology is outlined in Reference No. 9, pages 17 through 28. Workshaft 2B-K of the project is located near the foot of Bergen Avenue on the Keegan Landfill site. During the project, a pilot borehole into bedrock and overburden boring were drilled at this location. Wells were constructed in both boreholes (Ref. No. 8, pp. 11, 24, 88, 89). At the close of sampling activities, IT Corporation abandoned the wells by drilling out obstructions in the pilot borehole and grouting both boreholes (Ref. No. 8, p. 60).

From May through August 1994, IT Corporation collected numerous surface soil, subsurface soil, and groundwater samples. All media samples were analyzed for the following parameters: VOCs, semivolatile organic compounds, pesticides, PCBs, total petroleum hydrocarbons (TPH), and metals (including cyanide). Most of the media samples were also analyzed for the presence of herbicides and the dioxin compound 2,3,7,8-TCDD (Ref. No. 9, pp. 33, 34). Table 1 of this report provides a summary of selected soil sampling analytical results. Table 2 of this report presents a summary of selected groundwater sampling analytical results.

## Table 1: PASSAIC RIVER FLOOD PROTECTION PROJECT DATA
## SOIL SAMPLING DATES: 05/19/94 THROUGH 08/12/94

| Sample No. | S-PB01-08 | S-PB01-12 | S-PB01-50 | S-PB01-100 | S-0B1-04 | S-HA1* | S-HA2* | S-HA3* | S-HA4* | S-HA6* | S-HA7* | S-HA8* | S-HA9* | S-HA10* | S-HA11* | S-HA12* | S-HA13* |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Contaminant | | | | | | | | | | | | | | | | | |
| **~TAL Metal** | (mg/kg) | | | | | | | | | | | | | | | | |
| Aluminum | 6,100 | 5,300 | 11,000 | 12,000 | 6,560 | 4,940 | 3,570 | 4,640 | 5,180 | 5,280 | 16,000 | 9,220 | 13,900 | 9,600 | 2,620 | 12,800 | 16,800 |
| Barium | 12 B | 8.3 B | 66 | 130 | 252 | 388 | 2,300 | 783 | 1,890 | 1,740 | 2,700 | 2,740 | 23,200 | 3,300 | 1,370 | 242 | 4,070 |
| Chromium | 9.4 | 8.3 | 19 | 211 | 40.9 | 38.9 | 249 | 171 | 386 | 179 | 406 | 437 | 295 | 262 | 101 | 450 | 1,270 |
| Iron | 7,300 | 5,500 | 23,000 | 23,000 | 11,100 | 14,700 | 35,900 | 25,800 | 43,300 | 77,100 | 60,200 | 35,100 | 48,600 | 57,800 | 8,000 | 53,800 | 202,000 |
| Lead | 9.4 | ~ | 13 | 15 | 199 | 452 | 1,460 | 959 | 1,090 | 1,850 | 13,000 | 7,700 | 7,240 | 9,400 | 4,260 | 564 | 6,520 |
| Mercury | ~ | ~ | ~ | ~ | 0.34 | 0.67 | 5.7 | 1.3 | 3.8 | 3.2 | 3.6 | 1 | 3.7 | 1.4 | ~ | 0.31 | 1.3 |
| **~TCL Compound** | (ug/kg) | | | | | | | | | | | | | | | | |
| Bis(2-ethylhexyl)phthalate | 79 BJ | 44 BJ | ~ | 63 J | 300 J | ~ | ~ | ~ | 7,600 | 15,000 | ~ | 810 | 1,500 | ~ | ~ | ~ | ~ |
| Di-n-butyl phthalate | 320 J | 150 J | 110 J | 90 J | ~ | ~ | ~ | ~ | ~ | ~ | 4,700 | ~ | ~ | ~ | ~ | ~ | ~ |
| Di-n-octyl phthalate | 87 BJ | 160 BJ | ~ | ~ | ~ | ~ | ~ | ~ | ~ | ~ | ~ | ~ | ~ | ~ | ~ | ~ | ~ |
| Acenaphthene | ~ | ~ | ~ | ~ | 1,200 J | ~ | ~ | ~ | ~ | ~ | ~ | ~ | 2,000 | ~ | ~ | ~ | ~ |
| Anthracene | ~ | ~ | ~ | ~ | 1,800 | ~ | ~ | 2,200 | ~ | ~ | ~ | ~ | ~ | ~ | ~ | ~ | ~ |
| Benzo(a)anthracene | ~ | ~ | ~ | ~ | 4,000 | 910 | ~ | 4,400 | 2,100 | ~ | ~ | ~ | 4,200 | ~ | ~ | ~ | ~ |
| Benzo(b)fluoranthene | ~ | ~ | ~ | ~ | 4,800 | 1,400 | 4,100 | 7,200 | 5,000 | ~ | 1,500 | 500 | 13,000 | ~ | 430 | ~ | ~ |
| Benzo(k)fluoranthene | ~ | ~ | ~ | ~ | 4,200 | ~ | ~ | ~ | ~ | ~ | ~ | ~ | ~ | ~ | ~ | ~ | ~ |
| Benzo(a)pyrene | ~ | ~ | ~ | ~ | 5,200 | 670 | 1,900 | 4,000 | ~ | ~ | ~ | ~ | 8,100 | ~ | ~ | ~ | ~ |
| Chrysene | ~ | ~ | ~ | ~ | 4,100 | 720 | ~ | 4,100 | ~ | ~ | ~ | ~ | 4,200 | ~ | ~ | ~ | ~ |
| Fluoranthene | ~ | ~ | ~ | ~ | 9,900 | 1,800 | ~ | 8,200 | 3,700 | ~ | ~ | ~ | 3,600 | ~ | ~ | ~ | ~ |
| Hexachlorobenzene | ~ | ~ | ~ | ~ | ~ | ~ | ~ | ~ | ~ | ~ | ~ | 860 | 5,400 | 140,000 | 640 | ~ | ~ |
| Naphthalene | ~ | ~ | ~ | ~ | 300 J | ~ | ~ | ~ | ~ | ~ | ~ | ~ | ~ | ~ | ~ | ~ | ~ |
| Phenathrene | ~ | ~ | ~ | ~ | 6,700 | 1,100 | ~ | 7,500 | 2,500 | ~ | ~ | ~ | 2,000 | ~ | ~ | ~ | ~ |
| Pyrene | ~ | ~ | ~ | ~ | 7,800 | 1,700 | ~ | 8,600 | 4,400 | ~ | ~ | ~ | 4,800 | ~ | ~ | ~ | ~ |
| 1,2,4-Trichlorobenzene | ~ | ~ | ~ | ~ | ~ | ~ | ~ | ~ | ~ | ~ | ~ | ~ | 3,700 | ~ | ~ | ~ | ~ |
| Trichloroethene | ~ | ~ | ~ | ~ | ~ | ~ | ~ | ~ | ~ | ~ | ~ | ~ | ~ | ~ | ~ | ~ | 7.7 |
| PCBs - Total Aroclors | ~ | ~ | ~ | ~ | 2,230 | 430 | 3,800 | 45,000 | 120,000 | ~ | ~ | ~ | ~ | ~ | ~ | ~ | 7,400 |
| Aldrin | ~ | ~ | ~ | ~ | 45 | ~ | ~ | ~ | ~ | ~ | ~ | ~ | ~ | ~ | ~ | ~ | ~ |
| 4',4'-DDD | ~ | ~ | ~ | ~ | 20 | ~ | ~ | ~ | ~ | 790 | ~ | ~ | ~ | ~ | 20 | ~ | ~ |
| 4',4'-DDE | ~ | ~ | ~ | ~ | 12 | ~ | ~ | ~ | ~ | 7,400 | 73,000 | 480 | 6,300 | 27,000 | 210 | ~ | ~ |
| 4',4'-DDT | ~ | ~ | ~ | ~ | 7.1 | 31 | 120 | ~ | ~ | 3,700 | 9,400 | 2,000 | 6,800 | 50,000 | 140 | 230 | 100 |
| Dieldrin | ~ | ~ | ~ | ~ | 24 | ~ | ~ | ~ | ~ | ~ | ~ | ~ | ~ | ~ | ~ | ~ | ~ |
| Endrin | ~ | ~ | ~ | ~ | 3.8 | ~ | ~ | ~ | ~ | ~ | ~ | ~ | ~ | ~ | ~ | ~ | ~ |

All sample numbers are preceded by "2BK-."

J - Estimated value.

B - Detected in blank sample.

~ - Not detected.

Ref. Nos. 8, p. 28; 10, Atts. A through E.

Sample Designations:

* - Sample Nos. S-HA1 through S-HA13 are surficial soil samples (e.g., collected from a depth less than 2 feet.

"PB" - Sample collected from the overburden portion of a pilot borehole in bedrock; the final number indicates sample depth.

"OB" - Sample collected from overburden borehole; the final number indicates sample depth.

## EXISTING ANALYTICAL DATA (Continued)

Table 2: PASSAIC RIVER FLOOD PROTECTION PROJECT DATA
GROUNDWATER SAMPLING DATE: JULY 26, 1994

| | ~TAL Metal | Aluminum | Barium | Chromium | Iron | Lead | Mercury | ~TCL Compound | 1,2-Dichloroethene | Trichloroethene | Tetrachloroethene |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Sample No. | (mg/L) | | | | | | | (ug/L) | | | |
| GW-0B1 | | 8.6 | 0.42 | 0.027 | 33.9 | 0.11 | 0.00023 | | ~ | ~ | ~ |
| GW-PB1 | | 0.12 | 0.028 | ~ | 46.2 | 0.024 | ~ | | 31 | 34 | 5.1 |
| TB-0726 (VOAs ONLY) | | NA | NA | NA | NA | NA | NA | | ~ | ~ | ~ |

All sample numbers are preceded by "2BK-."
~ - Not detected.
NA - Not analyzed for particular contaminant.

Ref. No. 10, Attachment F.

A complete list of groundwater sampling analytical results is located in Reference No. 9, pp. 44 through 59. Groundwater and Soil Sample Location Maps are presented in Reference Number 8, pp. 56 and 57.

*Surface Soil Sampling* - Analytical data of surface soil samples indicate the presence of elevated concentrations of inorganic analytes, such as aluminum [16,800 milligrams per kilogram (mg/kg)], barium (23,200 mg/kg), chromium (1,270 mg/kg), iron (202,000 mg/kg), lead (13,000 mg/kg), and mercury (3.8 mg/kg) (Ref. No. 10, pp. 1, 2, Att. D, pp. 57 through 64, Att. E, pp. 30 through 33). PCBs were also detected in on-site soils at total Aroclor concentrations ranging from non-detected to 120,000 micrograms per kilogram (ug/kg) (Ref. No. 10, Att. D, pp. 41 through 48, Att. E, pp. 22 through 25).

## EXISTING ANALYTICAL DATA (Continued)

Other organic compound groups detected in on-site surface soils include VOCs; semivolatile organic compounds, including phthalates and PAHs; and pesticides, such as 4,4'-DDD, 4,4'-DDE, and 4,4'-DDT (see Table 2). Analytical data of four surface soil samples indicated the presence of the dioxin compound 2,3,7,8-TCDD; contaminant concentration ranged from 0.34 to 5.5 ug/kg (Ref. No. 9, p. 34). TPH surface soil sample concentrations ranged from 42 mg/kg to 24,000 mg/kg (Ref. No. 10, Att. D, pp. 49 through 56, Att. E, pp. 26 through 29). Total cyanide concentrations in surface soil samples ranged from non-detected to 7.8 mg/kg (Ref. No. 10, Att. D, pp. 65 through 74, Att. E, pp. 34 through 37).

*Subsurface Soil Sampling* - Analytical data of subsurface soil samples indicated the presence of elevated concentrations of inorganic analytes such as aluminum (12,000 mg/kg), barium (711 mg/kg), chromium (211 mg/kg), iron (23,000 mg/kg), and mercury (0.65 mg/kg) (Ref. No. 10, Att. B, p. 2, Att. C, p. 8). Analytical data of Sample No. 2BK-OB1-04, collected at a depth of 4 feet, indicated the presence of organic compounds similar to those detected in surface soil samples (i.e., PAHs, PCBs, and pesticides) (Ref. No. 10, Att. C, pp. 9 through 13).

*Groundwater Sampling* - Analytical data of a groundwater sample collected from the 510-foot pilot boring indicated the presence of elevated concentrations of VOCs (1,2-dichloroethene, trichloroethene, and tetrachloroethene) and metals (iron and zinc). Analytical data of the overburden groundwater sample indicated the presence of elevated concentrations of lead (Ref. No. 9, p. 37).

## SITE INSPECTION PRIORITIZATION SAMPLING RESULTS

On July 30-31, 1997, Region II START conducted a sampling event at the site as part of SIP activities. During the SIP, 13 sediment samples, three surface water samples, and four soil samples were collected. In addition, 2 rinsate blanks and 1 trip blank were collected for Quality Assurance/Quality Control (QA/QC) purposes (Ref. No. 25, pp. 1 through 5). Figure 3 provides a Sample Location Map. All samples, except for the trip blank sample, were analyzed under the U.S. EPA Contract Laboratory Program (CLP) for full Target Compound List (TCL) and Target Analyte List (TAL) parameters, excluding cyanide; the trip blank sample was analyzed through the CLP for volatile organic compounds (VOCs) only. Environmental duplicate and matrix spike/matrix spike duplicate (MS/MSD) samples were collected for QA/QC purposes. One environmental duplicate was collected per sampling medium (Sample Nos. SW01/SW05 and SD01/SD05). Additional sample volumes were collected at the Sample No. SW02/SD02 location and submitted to the laboratories for MS/MSD analyses (Ref. No. 25, p. 4).

Tables 3 and 4 present analytical data summaries for the sampling event. Reference No. 25 includes the Sampling Trip Report, as well as the CLP TCL/TAL analytical data packages. Analytical data of soil and sediment samples indicate the presence of elevated concentrations of phthalates, pesticides, and metals.

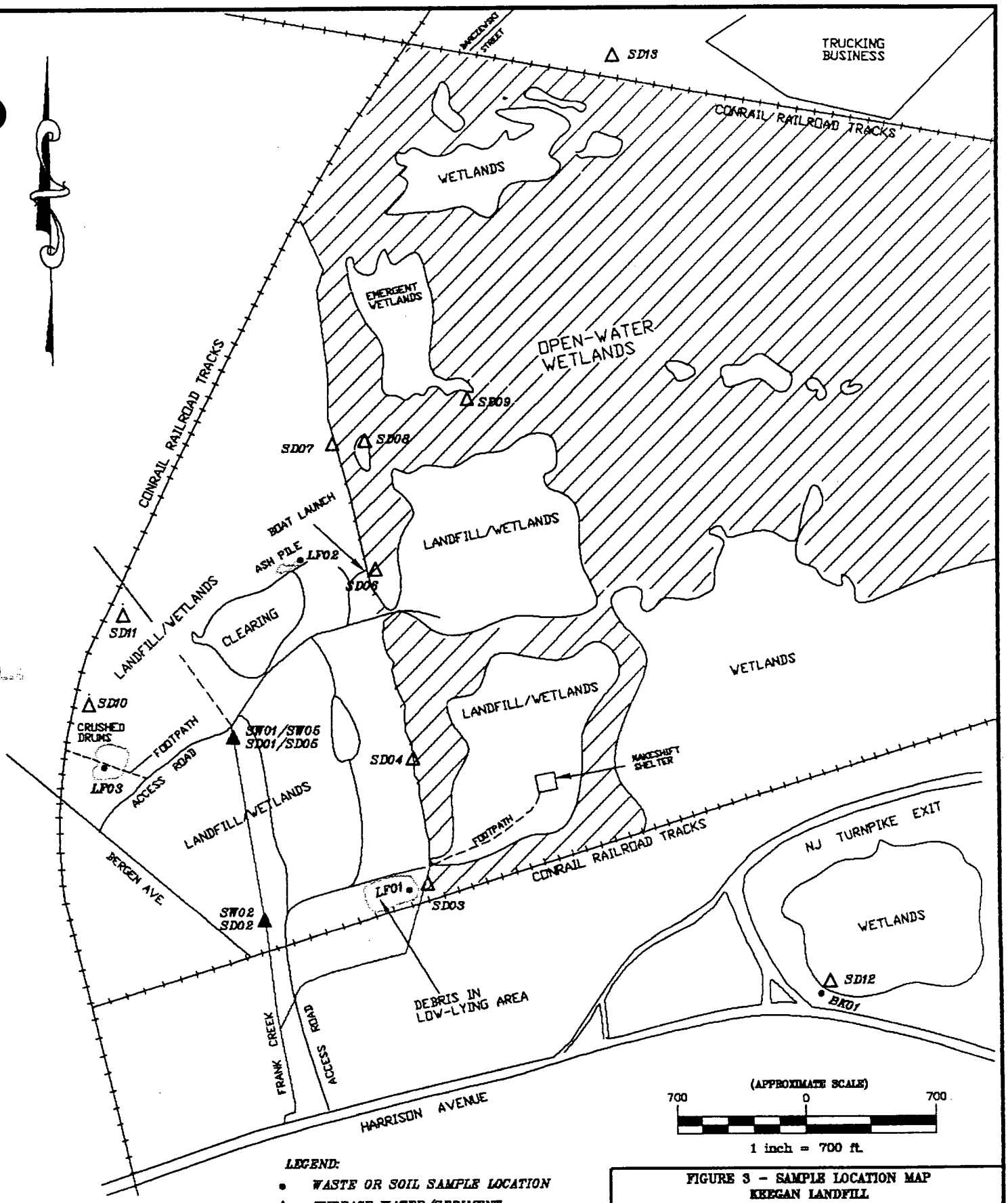



**FIGURE 3 - SAMPLE LOCATION MAP**
**KEEGAN LANDFILL**
**KEARNY, NEW JERSEY**
**JULY 1997**

**US ENVIRONMENTAL PROTECTION AGENCY**
SUPERFUND TECHNICAL ASSESSMENT AND RESPONSE TEAM
CONTRACT# 68-W8-0018

WESTON
Roy F. Weston, Inc.
FEDERAL PROGRAMS DIVISION

IN ASSOCIATION WITH PRC ENVIRONMENTAL MANAGEMENT, INC., C.C. JOHNSON & MALHOTRA, P.C., RESOURCE APPLICATIONS, INC., R.E. SARRIERA ASSOCIATES, AND GRB ENVIRONMENTAL SERVICES, INC.

DRAWN BY: J. HAMPTON JR.
EPA TASK MONITOR: C. MOYIK
START PROJECT MANAGER: K. CAMPBELL

13FIG3.PLT - C:\BITMAP\13000A.DWG

## Table 3: Data Summary for TCL Compounds
## Keegan Landfill SIP
## July 30-31,1997

| Sample No. | Diethyl phthalate | n-Nitrosodi phenylamine | Butylbenzyl phthalate | 4,4'-DDE | Endrin | 4,4'-DDD | 4,4'-DDT | Endrin aldehyde | alpha-Chlordane | gamma-Chlordane | Aroclor-1260 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| SD01 | ND (330) | ND (330) | ND (330) | 16 | ***48*** | ***73*** | 93 | ND (3.3) | ND (1.7) | ND (1.7) | 530 |
| SD02 | ND (330) | ND (330) | 700 | ND (3.3) | ND (3.3) | ***240*** | 130 | ND (3.3) | ***73*** | ***72*** | 450 |
| SD03 | ND (330) | ND (330) | 580 | 29 | ND (3.3) | ***26*** | 73 | 31 | ***28*** | ***24*** | 520 |
| SD04 | ND (330) | ND (330) | ***2,600*** | 54 | ND (3.3) | ***78*** | 100 | R | ***29*** | ***16*** | 600 |
| SD05 | ND (330) | ND (330) | ND (330) | ND (3.3) | ND (3.3) | ***130*** | R | ND (3.3) | ND (1.7) | ND (1.7) | ND (33) |
| SD06 | ND (330) | ND (330) | ND (330) | ND (3.3) | ND (3.3) | ND (3.3) | 9.5 | ND (3.3) | ***22*** | ***20*** | 110 |
| SD07 | ***1,400*** | ND (330) | ***7,800*** | ***730*** | R | ***1,300*** | ***780*** | ***810*** | ***900*** | ***870*** | 8,100 |
| SD08 | ND (330) | ND (330) | ND (330) | ND (3.3) | ND (3.3) | ND (3.3) | ND (3.3) | ND (3.3) | ND (1.7) | ND (1.7) | ND (33) |
| SD09 | ND (330) | ND (330) | 180 | ND (3.3) | ND (3.3) | ***81*** | ND (3.3) | ND (3.3) | ND (1.7) | ND (1.7) | ND (33) |
| SD10 | ND (330) | ND (330) | ***2,800*** | 23 | ND (3.3) | ***39*** | 78 | R | ***25*** | ***26*** | 350 |
| SD11 | ND (330) | ND (330) | ***1,900*** | ***140*** | R | ***1,900*** | ***530*** | ***260*** | ***180*** | ***170*** | 690 |
| SD12* | ND (330) | ND (330) | 230 | ND (3.3) | ND (3.3) | ND (3.3) | 48 | 72 | ND (1.7) | ND (1.7) | 320 |
| SD13* | ND (330) | ND (330) | 120 | 20 | ND (3.3) | ND (3.3) | R | ND (3.3) | R | ND (1.7) | 350 |
| LF01 | ND (330) | ND (330) | 190 | ***56*** | ***120*** | ***42*** | ND (3.3) | ND (3.3) | ***83*** | ***63*** | 650 |
| LF02 | ND (330) | ND (330) | ND (330) | ND (3.3) | ND (3.3) | ND (3.3) | R | ND (3.3) | ND (1.7) | ND (1.7) | ND (33) |
| LF03 | ***1,600*** | ***1,200*** | ***5,300*** | ***180*** | ***300*** | R | ***600*** | ***93*** | ***190*** | R | 1,800 |
| BK01* | ND (330) | ND (330) | ND (330) | ND (3.3) | ND (3.3) | ND (3.3) | 61 | ND (3.3) | ND (1.7) | ND (1.7) | 810 |

Ref. No. 25

All concentrations are reported in micrograms per kilogram (ug/kg).

***Bold italics*** indicates that concentration exceeds three times background.

* Samples SD12, SD13, and BK01 are background samples.

ND = Not detected.

R = Rejected data.

( ) = Method detection limit.

## Table 4: Data Summary for TAL Analytes
## Keegan Landfill SIP
## July 30-31, 1997

| Sample No. | Antimony | Arsenic | Cadmium | Chromium | Copper | Lead | Mercury | Nickel | Vanadium |
|---|---|---|---|---|---|---|---|---|---|
| SD01 | 3.8 | ***27.9*** | 5.3 | 103 | 447 | 1,130 | 10.8 | 50.2 | 74.2 |
| SD02 | 2.5 | 11.8 | 5.8 | 125 | 279 | 879 | 4.2 | 44 | 53.8 |
| SD03 | ND (12) | 2.6 | 1.3 | 19.8 | R | 164 | 1.1 | 16 | 20.6 |
| SD04 | ***71.5*** | ***17.9*** | 13.9 | ***229*** | 588 | 27,700 | 1.7 | 157 | 94.8 |
| SD05 | 2.8 | ***18.9*** | 4.3 | 61.7 | 302 | 844 | 7.5 | 35.3 | 51.3 |
| SD06 | ND (12) | 4.6 | 1.1 | 19.8 | R | 92.2 | 0.3 | 12.9 | 13 |
| SD07 | 23.2 | 93 | ***22.2*** | ***441*** | ***1,560*** | 2,250 | 7.1 | 468 | 145 |
| SD08 | ND (12) | 4.9 | 1.5 | 49.2 | R | 215 | 0.82 | 21.7 | 51.7 |
| SD09 | 15.9 | ***31.4*** | 3.4 | ***143*** | R | 518 | 0.89 | 43.9 | 112 |
| SD10 | 6.6 | 9.2 | 8.4 | 54.9 | 247 | 319 | 1.2 | 56.2 | 49.3 |
| SD11 | 4.7 | 2.7 | 8.2 | ***281*** | 545 | 1,330 | 5 | 71.1 | 72.4 |
| SD12* | ND (12) | 1.8 | 1.7 | 35.1 | R | 282 | 0.75 | 24.6 | 35.7 |
| SD13* | ND (12) | 5.4 | 5.9 | 44.2 | 390 | 754 | 4 | 299 | 59.6 |
| LF01 | 1.7 | 4.5 | 3.3 | 57 | 177 | 463 | 2.1 | 27.3 | 23.1 |
| LF02 | 4 | ***60.5*** | 0.87 | 28.9 | ***4,870*** | 91.4 | 0.15 | 13.8 | 24.3 |
| LF03 | ***215*** | ***39.6*** | ***22.4*** | ***118*** | 443 | 1,200 | ***3.7*** | ***82.3*** | ***106*** |
| BK01* | 3.9 | 12.1 | 5.4 | 34.2 | 154 | 522 | 1.1 | 24 | 30.4 |

Ref. No. 25.
All concentrations are reported in milligrams per kilogram (mg/kg).
***Bold italics*** indicates that concentration exceeds three times background.
* Samples SD12, SD13, and BK01 are background samples.
ND = Not detected.
R = Rejected data.
( ) = Contract Required Detection Limit.

*Soil Sampling* - Three samples (Sample Nos. LF01, LF02, and LF03) were collected from areas of the landfill in order to assist in characterizing the site waste source. One background sample (Sample No. BK01) was collected from an area located southeast of the site in order to assist in determining regional background hazardous substance concentrations. Analytical results of landfill samples indicated the presence of the following substances at concentrations significantly above background: diethyl phthalate, butylbenzyl phthalate, n-nitrosodiphenylamine, 4,4'-DDE, 4,4'-DDD, 4,4'-DDT, endrin, endrin aldehyde, chlordane, antimony, arsenic, cadmium, chromium, copper, mercury, nickel, and vanadium. Aroclor-1260 was detected in soil samples LF01 and LF03 at concentrations of 650 ug/kg and 1,800 ug/kg, respectively. However, Aroclor-1260 was also detected in the background soil sample, Sample BK01, at a concentration of 810 ug/kg (Ref. No. 25, pp. 14 through 16, 18 through 23, 26 through 28, and 337 through 339).

*Sediment Sampling* - START collected a total of 13 sediment samples, including two background samples (Sample Nos. SD12 and SD13), from the site and its vicinity. Two samples were collected from areas located north and southeast of the site in order to assist in determining regional background hazardous substance concentrations. Analytical data of Samples SD01 through SD11 represent TCL/TAL parameter concentrations within site wetlands and adjacent wetlands. Samples SD01/SD05 and SD02 were collected from Frank Creek, a south-flowing water body that originates on site. Samples SD10 and SD11 were collected from associated wetland areas. Analytical data of the Frank Creek sediment samples indicate the presence of the following substances at concentrations significantly above background: butylbenzyl phthalate, 4,4'-DDE, 4,4'-DDD, 4,4'-DDT, endrin, endrin aldehyde, chlordane, arsenic, and chromium. Samples SD03, SD04, and SD06 through SD09 were collected from wetland areas along the eastern portion of the site. Analytical data of these samples indicate the presence of the following substances at concentrations significantly above background: diethyl phthalate, butylbenzyl phthalate, 4,4'-DDE, 4,4'-DDD, 4,4'-DDT, endrin aldehyde, chlordane, antimony, arsenic, cadmium, chromium, and copper. Aroclor-1260 was detected in Samples SD03, SD04, SD06, and SD07; the concentrations ranged from 110 to 8,100 ug/kg. However, Aroclor-1260 was also detected in background sediment samples SD12 and SD13 at concentrations of 320ug/kg and 350 ug/kg, respectively (Ref. No. 25, pp. 14 through 16, 18 through 23, 26 through 28, and 337 through 339).

*Surface Water Sampling* - START collected three surface water samples, including one environmental duplicate sample (Sample No. SW05), from Frank Creek. Organic analytical data of these samples did not indicate the presence of elevated levels of TCL compounds. Inorganic analytical data indicate lead concentrations ranging from 1,020 to 1,590 ug/L (Ref. No. 25, pp. 17, 24, 25, 29, and 336).

# PART IV. HAZARD ASSESSMENT

## GROUNDWATER ROUTE

1. **Describe the likelihood of a release of contaminant(s) to the groundwater as follows: observed release, suspected release, or none. Identify contaminants detected or suspected and provide a rationale for attributing them to the site. For observed release, define the supporting analytical evidence and relationship to background.**

A release of contaminants is suspected due to the presence of on-site soil contamination and the existence of a shallow water table. From the mid-1960s to 1974, the property was utilized as a municipal sanitary landfill. Keegan/MSLA leased the property from the Town of Kearny. Unauthorized dumping is also reported to have occurred at the site. Wastes deposited on site included cardboard, construction, and household waste; landscaping debris; abandoned tires, appliances, automobiles; and drummed/uncontained plating wastes (chromate and bichromate slurry), pigment wastes, and organic wastes. As part of the Passaic River Flood Protection Project, IT Corporation drilled two on-site wells, including one 510-foot pilot boring well (Well No. 2BK-PB01) and one 22-foot overburden monitoring well (Well No. 2BK-OB01). The wells are located at Workshaft 2BK, at the foot of Bergen Avenue. Groundwater was encountered at 14 feet below ground surface. In July 1994, one groundwater sample was collected from each well.

Results of on-site groundwater sampling suggest that a release to groundwater has occurred; however, the data do not meet the observed release criteria because background samples were not collected. Analytical data of overburden groundwater samples indicate the presence of inorganic analytes, including aluminum, barium, chromium, iron, lead, and mercury. The pilot borehole groundwater sample contained the following chlorinated solvents: 1,2-dichloroethene (31 ug/L), trichloroethene (34 ug/L), and tetrachloroethene (5.1 ug/L). The sample also contained aluminum, barium, iron, lead, and zinc. In addition, analytical data of surface soil and subsurface soil samples indicate the presence of similar analytes. Numerous contaminants, such as PCBs, phthalates, PAHs, pesticides, petroleum hydrocarbons, and dioxin, have been detected in surface soil samples. Surface soil sample 2BK-S-HA13 contained trichloroethene (7.7 ug/kg); VOCs were not detected in all other soil samples. Similarly, analytical data of soil and sediment samples collected in July 1997 by Region II START indicate the presence of phthalates, pesticides, and inorganic analytes at concentrations significantly above background.

Ref. Nos. 8, pp. 3, 12, 53, 56, 57; 9, pp. 34, 37, 44 through 58; 10, pp. 2, 3; 25, pp. 14 through 16, 18 through 23, 26 through 28, 337 through 339.

2. **Describe the aquifer of concern; include information such as depth, thickness, geologic composition, areas of karst terrain, permeability, overlying strata, confining layers, interconnections, discontinuities, depth to water table, groundwater flow direction.**

The Keegan site is located within the Hackensack Meadowlands in the Piedmont physiographic province of New Jersey. The meadowlands area was once glacial Lake Hackensack. Groundwater is not known to be used for drinking water purposes in the vicinity of the site. Therefore, there is no true aquifer of concern. For the purposes of this report, the aquifer of concern is considered to be the underlying Passaic Formation of the Brunswick Group (Newark Supergroup). The formation consists of soft, reddish shale; red sandstone and siltstone; mudstone; and conglomerate. The strata are generally tilted northwestward, with the ridges tending northeastward. In the site area, the total thickness of these late Triassic Age rocks is estimated to be 6,000 to 7,000 feet. The primary water-bearing zone occurs from less than 200 feet to 600 feet below ground surface. Groundwater movement and storage occurs primarily due to extensive fracturing of its component rocks. Though cracks intersect so as to allow omni-directional movement, water may be inhibited in traveling along certain paths by fracture size and capacity. Approximately 150 feet of unconsolidated sediment overlie bedrock at the site. The sediments mainly consist of glacial lake sediments and glacial till, which do not yield a significant amount of water; these sediments usually act as a semi-confining aquiclude.

In 1994, IT Corporation conducted a hydrogeologic investigation at the Keegan site as part of USACE Passaic River Flood Protection Project activities. One 510-foot pilot borehole (No. 2BK-PB01) and one 22-foot overburden borehole were drilled. The stratigraphy of the 2BK-PB01 borehole was reported as follows: 0' to 6' - refuse and soil fill material; 6' to 9' - organic soil with fill; 9' to 20.5' - gray, sandy silt and silty sand; 20.5' to 25' - medium to coarse sand and fine gravel; 25' to 50' - brownish-gray silty sand, sandy silt, and clay; 50' to 100' - gray to reddish-brown varved clay, and silt with sand seams; 100' to 140' - silty sand; and 140' to 155' - glacial till. Bedrock was encountered at 155 feet below ground surface. Groundwater flow in the overburden is believed to be south-southwestward toward the Passaic River. Groundwater occurs at water table conditions at 14 feet below grade.

Ref. Nos. 3, pp. 39, 106, 132 through 135, 356 through 358, 361; 8, pp. 19, 28, 53, 58, 61 through 87.

3. **What is the depth from the lowest point of waste disposal/storage to the highest seasonal level of the saturated zone of the aquifer of concern?**

The actual lowest point of waste disposal is unknown. Analytical data of surface soil and sediment samples collected by Region II START indicate the presence of phthalates, pesticides, and inorganic analytes at concentrations significantly above background. The highest possible seasonal level of the saturated zone of the aquifer of concern is the bedrock surface, which is encountered 155 feet below ground surface at the site. Therefore, the depth from the lowest point of waste disposal to the highest seasonal level of the saturated zone of the aquifer of concern is estimated to be 155 feet.

Ref. Nos. 8, pp. 28, 53; 10, Att. C, pp. 8 through 13; 25, pp. 14 through 16, 18 through 23, 26 through 28, 337 through 339.

4. **What is the permeability value of the least permeable continuous intervening stratum between the ground surface and the top of the aquifer of concern?**

The varved clay and silt with sand seams encountered between 50 and 100 feet below grade at the site is the least permeable continuous intervening stratum. The permeability associated with this material (silty clay) is $10^{-6}$ centimeters per second (cm/s).

Ref. Nos. 8, pp. 27, 28, 57, 61 through 67; 13, p. 4.

5. **What is the net precipitation at the site (inches)?**

The net precipitation in the vicinity of the site is between 15 and 30 inches.

Ref. No. 13, pp. 2, 3.

6. **What is the distance to and depth of the nearest well that is currently used for drinking purposes?**

Groundwater is not used for drinking purposes within 4 miles of the site.

Ref. Nos. 4; 8, p. 23; 11; 12.

7. **If a release to groundwater is observed or suspected, determine the number of people that obtain drinking water from wells that are documented or suspected to be actually contaminated by hazardous substance(s) attributed to an observed release from the site.**

Groundwater is not utilized for drinking water purposes within 4 miles of the site. Due to the absence of drinking water wells in the site vicinity, no wells are suspected to be within a contamination boundary of a potential release.

Ref. Nos. 4; 8, pp. 23, 52; 11; 12.

8. **Identify the population served by wells located within 4 miles of the site that draw from the aquifer of concern.**

| Distance | Population |
|---|---|
| 0 - ¼ mile | 0 |
| > ¼ - ½ mile | 0 |
| > ½ - 1 mile | 0 |
| > 1 - 2 miles | 0 |
| > 2 - 3 miles | 0 |
| > 3 - 4 miles | 0 |

Ref. Nos. 4; 8, pp. 23, 52; 11; 12.

**State whether groundwater is blended with surface water, groundwater, or both before distribution.**

Not applicable.

Ref. Nos. 4; 8, pp. 23, 52; 11; 12.

**Is a designated wellhead protection area within 4 miles of the site?**

The site is not located within a designated wellhead protection area, as groundwater is not utilized for drinking water purposes within 4 miles of the site.

Ref. Nos. 4; 8, pp. 23, 52; 11; 12.

**Does a waste source overlie a designated or proposed wellhead protection area? If a release to groundwater is observed or suspected, does a designated or proposed wellhead protection area lie within the contaminant boundary of the release?**

Not applicable.

Ref. Nos. 4; 8, pp. 23, 52; 11; 12.

**9. Identify one of the following resource uses of groundwater within 4 miles of the site (i.e., commercial livestock watering, ingredient in commercial food preparation, supply for commercial aquaculture, supply for major, or designated water recreation area, excluding drinking water use, irrigation (5-acre minimum) of commercial food or commercial forage crops, unusable).**

Groundwater is not known to be utilized for the above-mentioned resources. No drinking water wells are located within 4 miles of the site; however, the potential exists for underlying groundwater to be used for drinking water purposes. Regionally, the chemical quality of bedrock groundwater is considered to be undesirable for potable supply without proper treatment. Groundwater within 4 miles of the site is utilized for industrial, commercial, and small-scale irrigation (lawn-watering) purposes.

Ref. Nos. 4; 8, pp. 22, 23, 46 through 52; 11; 12.

## SURFACE WATER ROUTE

**10. Describe the likelihood of a release of contaminant(s) to surface water as follows: observed release, suspected release, or none. Identify contaminants detected or suspected and provide a rationale for attributing them to the site. For observed release, define the supporting analytical evidence and relationship to background.**

There are observed releases of contaminants associated with the site to both watersheds of the surface water pathway. From the mid-1960s to 1974, the property was utilized as a municipal sanitary landfill. Keegan/MSLA leased the property from the Town of Kearny. Unauthorized dumping is also reported to have occurred at the site. Wastes deposited on site include cardboard, construction, and household waste; landscaping debris; abandoned tires, appliances, automobiles; and drummed/uncontained plating wastes (chromate and bichromate slurry), pigment wastes, and organic wastes. Two probable points of entry to surface water exist on site: a creek that originates on site (Frank Creek), and a tidal open-water wetland. Frank Creek flows south and eventually discharges to the Passaic River, located ½ mile south of the site's Harrison Avenue entrance. The tidal wetland area, located along the eastern border of the site, is part of the Hackensack River drainage basin. Although there are observed releases to both watersheds, the Hackensack River watershed is evaluated fully in this report due to analytical data supporting actual contamination of a sensitive environment.

On July 30-31, 1997, Region II START collected 13 sediment samples, four soil samples, and three surface water samples. The samples were analyzed through the U.S. EPA CLP for TCL/TAL parameters. All of the surface water samples were collected from Frank Creek. The sediment samples were collected from locations along Frank Creek and contiguous wetlands, the eastern open-water wetland area, and two background locations. Analytical data of sediment samples collected from Frank Creek and its associated wetlands

indicate the presence of phthalates, pesticides, arsenic, and chromium at concentrations significantly above background. Analytical data of sediment samples collected from the eastern open-water wetland area indicate the presence of phthalates, pesticides, antimony, arsenic, cadmium, chromium, and copper at concentrations significantly above background. Concentrations of PCBs were detected at various locations throughout the site; however, PCBs were also detected at similar levels in background samples.

On April 25, 1989, Region II FIT conducted a SI at the Keegan site and collected seven surface water samples and six sediment samples from on-site surface water bodies. All media samples were analyzed for TCL/TAL parameters through the U.S. EPA CLP. Analytical data of sediment samples indicate the presence of elevated concentrations of semivolatile PAH compounds, such as phenanthrene, fluoranthene, pyrene, benzo(a)anthracene, chrysene, benzo(a)pyrene; PCBs, such as Aroclor 1254 and Aroclor 1260; and metals, such as mercury, lead, and chromium. Analytical data indicate the presence of elevated concentrations of the same metals in the Frank Creek surface water samples. Analytical data of Sample No. Sed-1, a sediment sample collected from the open-water wetland perimeter, indicated the presence of PCBs, mercury, and lead. An "oily sheen" was observed at surface water/sediment Sample Location No. SW-5. In 1994, similar contaminants were detected during on-site surface soil sampling conducted by IT Corporation.

Ref. Nos. 3, pp. 12, 13, 27, 28, 38, 41, 45, 78, 199, 383; 7; 10, p. 2; 14; 24; 25, pp. 14 through 16, 18 through 23, 26 through 28, 337 through 339.

**11. Identify the nearest downslope surface water. If possible, include a description of possible surface drainage patterns from the site.**

Two downslope surface water bodies are located on site. Frank Creek originates on site and flows south off site before discharging to the Passaic River; the river is located ½-mile south of the former Harrison Avenue entrance. The estuarine open-water wetland is situated along the eastern border of the site. The open-water wetland area drains southeastward to the Hackensack River. The Passaic and Hackensack Rivers both discharge to Newark Bay.

Ref. Nos. 3, pp. 3, 12; 14; 24, p. 3.

**12. What is the distance in feet to the nearest downslope surface water? Measure the distance along a course that runoff can be expected to follow.**

Frank Creek originates on site. The open-water wetland is immediately adjacent to the eastern border of the site.

Ref. Nos. 3, pp. 3, 12; 14.

**13. Identify all surface water body types within 15 downstream miles.**

| Name | Water Body Type | Flow (cfs) | Saline/Fresh/Brackish |
|---|---|---|---|
| Open-water Wetland Hackensack River Watershed * | Tidal River | N/A | Brackish |
| Frank Creek | Tidal River | N/A | Brackish |
| Passaic River | Tidal River | N/A | Brackish |
| Hackensack River* | Tidal River | N/A | Brackish |
| Newark Bay* | Coastal Tidal | N/A | Saline |
| Arthur Kill * | Coastal Tidal | N/A | Saline |
| Kill Van Kull* | Coastal Tidal | N/A | Saline |
| Upper NY Bay* | Coastal Tidal | N/A | Saline |
| Hudson River* | Tidal River | N/A | Brackish |
| The Narrows* | Coastal Tidal | N/A | Saline |
| Lower NY Bay* | Coastal Tidal | N/A | Saline |

* Surface water body evaluated in Hazard Ranking System (HRS) PREscore for the site.

Ref. Nos. 3, p. 90; 13, p. 6; 14 through 17.

**14. Determine the 2-yr., 24-hr. rainfall (inches) for the site.**

The 2-year, 24-hour rainfall in the area of the site is approximately 3.3 inches.

Ref. No. 18.

**15. Determine size of the drainage area (acres) for sources at the site.**

Two drainage areas exist on the 230-acre property. It is estimated that the Frank Creek area, belonging to the Passaic River basin, drains approximately 60 percent, or 138 acres, of the site. Consequently it is estimated that the open-water wetland area, belonging to the Hackensack River basin, drains approximately 40 percent, or 92 acres, of the site.

Ref. Nos. 3, pp. 3, 12, 112; 14.

**16. Describe the predominant soil group in the drainage area.**

Overburden soils in the drainage area are composed primarily of glacial lake sediment deposits, refuse, and fill. Glacial lake sediments typically include sand, gravel, silt, clay, peat, and root mat. Due to the presence of clays, sandy clays, silty clays, and organic soils, it is estimated that fine-textured soils with very low infiltration rates are the predominant soil group in the area of the site.

Ref. Nos. 3, pp. 356, 357; 8, p. 28; 13, p. 5.

**17. Determine the type of floodplain within which the site is located.**

The Keegan site is located within a 100-year flood area.

Ref. No. 19.

**18. Identify drinking water intakes in surface waters within 15 miles downstream of the point of surface water entry. For each intake identify: the name of the surface water body in which the intake is located, the distance in miles from the point of surface water entry, population served, and stream flow at the intake location.**

| Intake | Distance | Population Served | Flow (cfs) |
|---|---|---|---|
| None | N/A | N/A | N/A |

Ref. Nos. 4; 8, p. 52; 11; 12.

**19. Identify fisheries that exist within 15 miles downstream of the point of surface water entry. For each fishery specify the following information:**

| Fishery Name | Water Body Type | Flow (cfs) | Saline/Fresh/Brackish |
|---|---|---|---|
| Open-water Wetland | Tidal River | N/A | Brackish |
| Hackensack River | Tidal River | N/A | Brackish |
| Newark Bay | Coastal Tidal | N/A | Saline |
| Arthur Kill | Coastal Tidal | N/A | Saline |
| Kill Van Kull | Coastal Tidal | N/A | Saline |
| Upper NY Bay | Coastal Tidal | N/A | Saline |
| Hudson River | Tidal River | N/A | Brackish |
| The Narrows | Coastal Tidal | N/A | Saline |
| Lower NY Bay | Coastal Tidal | N/A | Saline |

During July 1997 Region II START sampling activities, no one was observed fishing. However, START personnel noted the presence of a boat launch area, as well as discarded fishing supplies, along the eastern wetland shore.

There is a statewide ban on the sale of all striped bass taken from New Jersey waters. A ban also exists on the sale and consumption of *all* fish and shellfish taken from the lower portion of the Passaic River.

Certain restrictions due to known contamination exist on the above-mentioned fisheries. In the Newark Bay Complex, which includes Newark Bay, the lower Hackensack River, Arthur Kill, Kill Van Kull, and tidal portions of its tributaries, there is a ban on the consumption of striped bass and blue crab, as well as a health advisory regarding the consumption of American eel, bluefish, white perch, and white catfish. In the Hudson River and Upper New York Bay, there is a health advisory regarding the consumption of American eel, striped bass, bluefish, white perch, white catfish, and blue crabs. In the Raritan Bay Complex, which includes The Narrows and Lower New York Bay, there is a health advisory regarding the consumption of striped bass, bluefish, white perch, white catfish, and blue crabs.

Ref. Nos. 13, p. 6; 14 through 17; 20; 24, p. 10.

**20. Identify surface water sensitive environments that exist within 15 miles of the point of surface water entry.**

| Environment | Water Body Type | Flow (cfs) | Wetland Frontage (miles) |
|---|---|---|---|
| Wetlands - Open-water Wetland (Hackensack River watershed) | Tidal River | N/A | 4 |
| Wetlands - Hackensack River | Coastal Tidal | N/A | 10 |
| Wetlands -Newark Bay | Coastal Tidal | N/A | 0.1 |
| Wetlands -Arthur Kill | Coastal Tidal | N/A | 2 |
| Wetlands - Upper NY Bay | Coastal Tidal | N/A | 1 |
| Wetlands - Lower NY Bay | Coastal Tidal | N/A | 0.1 |

| Environment | Water Body Type | Flow (cfs) | Wetland Frontage (miles) |
|---|---|---|---|
| State-listed endangered species (*Podilymbus podiceps*) | Coastal Tidal | N/A | N/A |
| Unique Biotic Community - Coastal Heron Rookery at Kearny Marsh | Coastal Tidal | N/A | N/A |
| Federally-listed endangered species (*Falco peregrinus*) | Coastal Tidal | N/A | N/A |
| State-listed endangered species (*Sterna antillarum*) | Coastal Tidal | N/A | N/A |
| State-listed endangered species (*Lemna perpusilla*) | Coastal Tidal | N/A | N/A |
| Unique Biotic Community - Coastal Heron Rookery at Global Terminal | Coastal Tidal | N/A | N/A |

Ref. Nos. 13, p. 6; 14 through 17; 21; 22.

**21. If a release to surface water is observed or suspected, identify any intakes, fisheries, and sensitive environments from question Nos. 18-20 that are or may be actually contaminated by hazardous substance(s) attributed to an observed release from the site.**

Intake: N/A

Fishery: Open-water wetland

Sensitive Environment: Wetland; state-listed endangered species habitat; unique biotic community.

The 1997 Region II START analytical data support actual contamination of 0.2 mile of wetland frontage based on an observed release of contaminants to the adjacent open-water

wetland, which is interconnected with the Kearny Marsh. The NJDEP Natural Heritage Program (NHP) has indicated that a state-listed endangered species habitat (Pied-billed grebe) and a unique biotic community (coastal heron rookery at Kearny Marsh) may be located within the site boundaries.

Ref. Nos. 4; 9, p. 23; 11; 12; 14 through 17; 21; 22; 25, pp. 14 through 16, 18 through 23, 26 through 28, 337 though 339.

**22. Identify whether the surface water is used for any of the following purposes, such as: irrigation (5 acre minimum) of commercial food or commercial forage crops, watering of commercial livestock, commercial food preparation, recreation, potential drinking water supply.**

The surface waters along the migration route are highly industrialized waterways. However, surface waters provide navigational channels for both commercial and recreational boating vessels. In July 1997, Region II START personnel observed a person in a kayak on the adjacent open-water wetland area.

Ref. No. 3, pp. 146, 147; 24, p. 4.

## SOIL EXPOSURE PATHWAY

**23. Determine the number of people that occupy residences or attend school or day care on or within 200 feet of observed contamination.**

The site is located in a primarily industrial area of the Town of Kearny. No residences are located on or within 200 feet of observed contamination. There are no schools or day care centers within 200 feet of the site.

Ref. Nos. 3, pp. 3, 12, 49, 51; 4.

**24. Determine the number of people that regularly work on or within 200 feet of observed contamination.**

The site is currently inactive; no workers are employed at the site.

Ref. No. 7.

**25. Identify terrestrial sensitive environments on or within 200 feet of observed contamination.**

Numerous contaminants, such as PCBs, phthalates, PAHs, pesticides, petroleum hydrocarbons, and dioxin, have been detected in surface soil samples. The NJDEP Natural Heritage Program (NHP) has indicated that a state-listed endangered species habitat (Pied-billed grebe) and a unique biotic community (coastal heron rookery at Kearny Marsh) may be located within the site boundaries. However, these locations are not considered terrestrial sensitive environments.

Ref. Nos. 10, p. 2; 22; 25, pp. 14 through 16, 18 through 23, 26 through 28, 337 through 339.

**26. Identify whether there are any of the following resource uses, such as commercial agriculture, silviculture, livestock production or grazing within an observed or suspected soil contamination.**

The site is located in a primarily industrial portion of the Town of Kearny. None of the above-mentioned resource uses occur within an area of observed or suspected soil contamination.

Ref. Nos. 3, pp. 3, 49, 51; 4.

## AIR PATHWAY

**27. Describe the likelihood of release of hazardous substances to air as follows: observed release, suspected release, or none. Identify contaminants detected or suspected and provide a rationale for attributing them the site. For an observed release, define the supporting analytical evidence and relationship to background.**

A potential for a release of contaminants associated with the site to air is not currently suspected. From the mid-1960s to 1974, the property was utilized as a municipal sanitary landfill. Unauthorized dumping is also reported to have occurred at the site. Wastes deposited on site include cardboard, construction, and household waste; landscaping debris; abandoned tires, appliances, and automobiles; and drummed/uncontained plating wastes (chromate and bichromate slurry), pigment wastes, and organic wastes. The site is currently inactive.

Underground landfill fires are known to have occurred on site in December 1981, December 1984, June/July 1987, and most recently in 1992. On June 29, 1987, air monitoring results during the underground landfill fire indicated "3 ppm organics at ground level." In December 1994, while monitoring an underground landfill fire, a Kearny DPHEP employee noted the presence of a debris pile from wire-burning activities.

In 1994, IT Corporation conducted on-site field activities as part of the Passaic River Flood Protection Project. Air monitoring was conducted using a photoionization detector (PID) during advancement of a split-spoon sampler at Pilot Borehole 2BK-PB01. Well boring logs indicate that a PID reading of "5 ppm above background" was detected from the 32-foot-depth sample. No readings above background were detected in ambient air during non-intrusive activities. During July 1997 Region II sampling activities, no air monitoring instrument readings were detected in ambient air. During collection of Sample No. SW-02, a PID reading of 0.5 units above background was detected from the sample.

Ref. Nos. 3, p. 3, 38, 44, 45, 46, 47, 65, 67, 68, 199, 204 through 213, 383; 7; 8, p. 62; 24.

**28. Determine populations that reside within 4 miles of the site.**

| Distance | Population |
|---|---|
| On site | 0 |
| > 0 – ¼ mi. | 230 |
| > ¼ - ½ mi. | 1,820 |
| > ½ - 1 mi. | 17,490 |
| > 1 - 2 mi. | 63,220 |
| > 2 - 3 mi. | 128,230 |
| > 3 - 4 mi. | 187,460 |

Ref. Nos. 7; 23.

**29. Identify sensitive environments, including wetlands and associated wetland acreage, within 4 miles of the site.**

| Distance | Wetlands Acreage | Sensitive Environment |
|---|---|---|
| 0 - ¼ mi. | 225 | State-listed endangered species (*Podilymbus podiceps*); unique biotic community (coastal heron rookery). |
| > ¼ - ½ mi. | 185 | None Identified. |
| > ½ - 1 mi. | 320 | None Identified. |
| > 1 - 2 mi. | 335 | State-listed threatened species (*Passerculus sandwichensis*); state-listed endangered species (*Lemna perpusilla*). |
| > 2 - 3 mi. | 625 | Two state-listed endangered species (*Circus cyaneus* and *Cistothorus platensis*). |
| > 3 - 4 mi. | 880 | Federal-listed endangered species (*Falco peregrinus*); three state-listed endangered species (*Phlox pilosa, Prenanthes racemosa,* and *Scirpus maritimus*). |

Ref. Nos. 14; 21; 22.

**30. If a release to air is observed or suspected, determine the number of people that reside or are suspected to reside within the area of air contamination from the release.**

A release to air is not observed or suspected; refer to Question No. 27 for a description of likelihood of a release.

**31. If a release to air is observed or suspected, identify any sensitive environments, listed in question No. 29, that are or may be located within the area of air contamination from the release.**

A release to air is not observed or suspected; refer to Question No. 27 for a description of likelihood of a release.

# ATTACHMENT 1

# EXHIBIT A

## PHOTOGRAPH LOG

## KEEGAN LANDFILL
## KEARNY, HUDSON COUNTY, NEW JERSEY

## SITE SAMPLING: JULY 30-31, 1997

# PHOTOGRAPH INDEX

**KEEGAN LANDFILL**
**KEARNY, NEW JERSEY**
**JULY 30-31, 1997**

**PHOTOGRAPHS TAKEN BY G. GILLILAND and JOANNE D'ONOFRIO**

| PHOTO NUMBER | DESCRIPTION |
|---|---|
| **July 30, 1997** | |
| P-1 | View looking north at leachate at head of Frank Creek. |
| P-2 | View looking south at leachate from head of Frank Creek. |
| P-3 | View of START Filosa collecting Sample No. SW1. |
| P-4 | View looking north at open-water wetland. |
| P-5 | View looking south at START Filosa collecting Sample No. LF01. |
| P-6 | View looking west at START D'Onofrio collecting Sample No. LF02 from ash pile. |
| P-7 | View looking west at ash pile located near the location of Sample No. LF02. |
| P-8 | View looking southeast at START Filosa collecting Sample No. LF03. |
| **July 31, 1997** | |
| P-9 | View looking east at START Foerter collecting Sample No. SD03, located approximately 30 feet east of the location of Sample No. LF01. |
| P-10 | View looking east at the location of Sample No. SD04, collected by START personnel via boat. |
| P-11 | View looking east from Sample No. SD03 location, with wetlands in foreground and railroad tracks to the right. |
| P-12 | View looking east at the location of Sample No. SD08. |
| P-13 | View looking west at the location of Sample No. SD07, with the landfill site in the background. |
| P-14 | View looking northeast at heron in emergent wetlands north of Sample No. SD09 location. |
| P-15 | View looking east from Sample No. SD09 location, with New York City skyline in background. |
| P-16 | View looking west at the landfill site from Sample No. SD09 location. |
| P-17 | View looking northwest at START D'Onofrio collecting Sample No. SD12, a background sample. |
| P-18 | View looking northeast at START Foerter collecting Sample No. BK01, a background sample. |
| P-19, -20 | Panoramic view looking south to southwest at wetlands located south of Sample No. SD13, a background sample. |
| P-21, -22 | Panoramic view looking southeast to south at wetlands located south of Sample No. SD13, a background sample. |
| P-23 | View looking north at START D'Onofrio collecting Sample No. SD-13. |

P-1 July 30, 1997
View looking north at leachate at head of Frank Creek.

P-2 July 30, 1997
View looking south at leachate from head of Frank Creek.

P-3 July 30, 1997
View of START Filosa collecting Sample No. SW1.

P-4 July 30, 1997
View looking north at open-water wetland.

P-5 July 30, 1997
View looking south at START Filosa collecting Sample No. LF01.

P-6 July 30, 1997
View looking west at START D'Onofrio collecting Sample No. LF02 from ash pile.

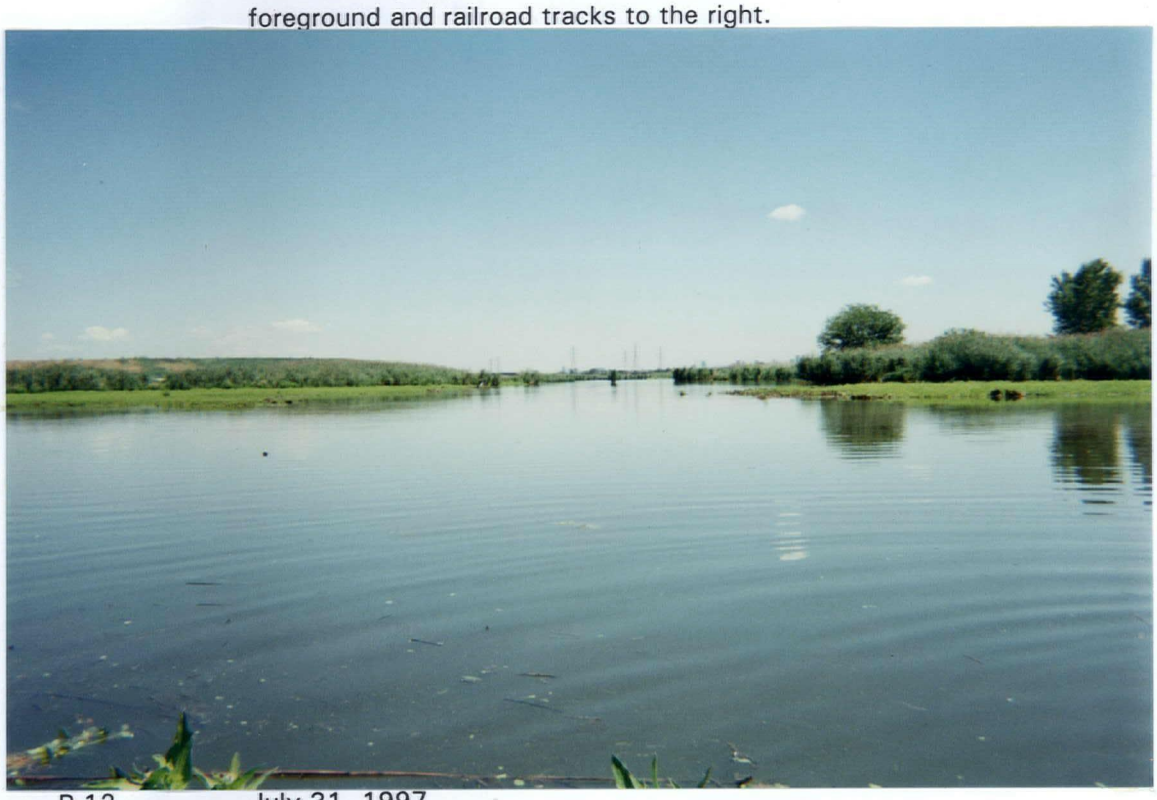
P-7 July 30, 1997
View looking west at ash pile located near the location of Sample No. LF02.

P-8 July 30, 1997
View looking southeast at START Filosa collecting Sample No. LF03.

P-9 July 31, 1997
View looking east at START Foerter collecting Sample No. SD03, located approximately 30 feet east of the location of Sample No. LF01.

P-10 July 31, 1997
View looking east at the location of Sample No. SD04, collected by START personnel via boat.

P-11 July 31, 1997
View looking east from Sample No. SD03 location, with wetlands in foreground and railroad tracks to the right.



P-12 July 31, 1997
View looking east at the location of Sample No. SD08.

P-13 July 31, 1997
View looking west at the location of Sample No. SD07, with the landfill site in the background.

P-14 July 31, 1997
View looking northeast at heron in emergent wetlands north of Sample No. SD09 location.

P-15 July 31, 1997
View looking east from Sample No. SD09 location, with New York City skyline in background.

P-16 July 31, 1997
View looking west at the landfill site from Sample No. SD09 location.

P-17 July 31, 1997
View looking northwest at START D'Onofrio collecting Sample No. SD12, a background sample.

P-18 July 31, 1997
View looking northeast at START Foerter collecting Sample No. BK01, a background sample.

Roy F. Weston, Inc.
FEDERAL PROGRAMS DIVISION

IN ASSOCIATION WITH PRC ENV. MGMT., GRB ENV. SVCS., C.C JOHNSON & MALHOTRA, P.C., RESOURCE APPLICATIONS, INC. AND R.E. SARRIERA ASSOCIATES

P-19, -20 Panoramic view looking south to southwest at wetlands located south of Sample No. SD13, a background sample.

Roy F. Weston, Inc.
FEDERAL PROGRAMS DIVISION

IN ASSOCIATION WITH PRC ENV. MGMT., GRB ENV. SVCS., C.C JOHNSON & MALHOTRA, P.C., RESOURCE APPLICATIONS, INC. AND R.E. SARRIERA ASSOCIATES

P-21, -22 Panoramic view looking southeast to south at wetlands located south of Sample No. SD13, a background sample.

P-23 July 31, 1997
View looking north at START D'Onofrio collecting Sample No. SD-13.

ATTACHMENT 2

# REFERENCES


1. U.S. EPA Superfund Program, Comprehensive Environmental Response, Compensation, and Liability Information System (CERCLIS), List-4: Site Alias Location Listing, p. 54, March 26, 1997; and List-8E: Site/Action Listing, p. 100, March 21, 1997.

2. U.S. Bureau of the Census, Congressional District Atlas, 103rd Congress of the United States. U.S. Government Printing Office, Washington, DC, 1993.

3. Final Draft Site Inspection Report, Keegan Landfill, prepared by NUS Corporation, Superfund Division, September 15, 1989, Revised: September 29, 1989.

4. Four-Mile Vicinity Map for the Keegan Landfill site, based on U.S. Department of the Interior, Geological Survey Topographic Maps, 7.5 minute series, Quadrangles for "Orange, NJ," 1955, photorevised 1981; "Weehawken, NJ-NY," 1967, photorevised 1981; "Jersey City, NJ-NY," 1967, photorevised 1981; and "Elizabeth, NJ-NY," 1967, photorevised 1981.

5. Project Note: From K. Campbell, Region II START, to Keegan Landfill File, Subject: Latitude & Longitude Calculations, 28 March 1997.

6. Telecon Note: Conversation between Chris Duor, Hackensack Meadowlands Development Commission, and K. Campbell, Region II START, 9 June 1997; with attachment.

7. Telecon Note: Conversation between Michael Beard, Kearny Department of Public Health and Environmental Protection, and K. Campbell, Region II START, 12 June 1997.

8. Groundwater Investigation Final Report, Passaic River Flood Protection Project, Passaic River Basin, New Jersey. International Technology Corporation, Edison, New Jersey, February 1995.

9. Hazardous, Toxic, or Radioactive Waste Investigation Final Report, Passaic River Flood Protection Project, Passaic River Basin, New Jersey. International Technology Corporation, Edison, New Jersey, January 1995.

10. Project Note: From K. Campbell, Region II START, to Keegan Landfill File, Subject: Passaic River Flood Protection Data, 9 June 1997; with attachments.

11. Project Note: From K. Campbell, Region II START, to Keegan Landfill File, Subject: Groundwater & Surface Water Use, 9 June 1997; with attachments.

## REFERENCES (Continued)


12. Telecon Note: Conversation between Vince Bucci, Engineer, Essex County Parks Department, and K. Campbell, Region II START, 23 June 1997.

13. Federal Register, Environmental Protection Agency, 40 CFR, Part 300, Hazard Ranking System; Final Rule, Volume 55, No. 241, 14 December 1990.

14. Fifteen-Mile Surface Water Pathway Map for the Keegan Landfill site, compiled from the following U.S. Department of the Interior, Fish and Wildlife Services, National Wetland Inventory Maps, 7.5 minute series (based on aerial photography), Quadrangles for "Elizabeth, NJ-NY," 1976; "Jersey City, NJ-NY," 1976; "Orange, NJ," 1976; "Weehawken, NJ-NY," 1976; "The Narrows, NY-NJ," 1976; and "Arthur Kill, NY-NJ," 1976.

15. Surface Water Quality Standards N.J.A.C. 7:9B, New Jersey Department of Environmental Protection (NJDEP), Office of Land and Water Planning, April 1994.

16. Water Quality Regulations, Surface Water and Groundwater Classifications and Standards, New York State Codes, Rules, and Regulations (CRR), Title 6, Chapter X, Parts 700-705, New York State Department of Environmental Conservation, Effective: September 1991.

17. State of New York CRR, Title 6, Subchapter B, Classes and Standards of Quality and Purity Assigned to Fresh Surface and Tidal Salt Waters, New York City Water Series, New York City Waters, Article 13, Part 890, Reissued: July 1995.

18. U.S. Department of Commerce, 2-Year, 24-Hour Rainfall Map, Technical Report No. 40, 1961.

19. Federal Emergency Management Agency, Flood Insurance Rate Map for the Hackensack Meadowlands District, Bergen and Hudson Counties, Community-Panel No. 340570 0009A, December 15, 1982.

20. A Guide To Health Advisories For Eating Fish And Crabs Caught In New Jersey Waters, NJDEP, March 1995.

21. Project Note: From K. Campbell, Region II START, to Keegan Landfill file, Subject: Wetlands in Site Vicinity, 9 June 1997.

22. Project Note: From K. Campbell, Region II START, to Keegan Landfill file, Subject: Sensitive Environments, 12 May 1997.

## REFERENCES (Continued)

23. Letter from Frost Associates, to Subbarao Bhamidipati, Region II START, Subject: Population Within Four Mile Vicinity, 28 March 1997.

24. Field Logbook for the Keegan Landfill site, Logbook Document Control No. START-02-221, TDD No. 02-96-11-0044, SIP Sampling, July 30-31, 1997.

25. Sampling Trip Report, Keegan Landfill site, Case No. 25601, July 30-31, 1997; with attached U.S. EPA CLP Laboratory analyses from Southwest Labs of Oklahoma (Organic analyses) and Sentinel, Inc. (Inorganic analyses).

REFERENCE NO. 1

# AD-HOC
## U.S. EPA Superfund Program
## Region II
## List-4 Site Alias Location Listing

| Site Name<br>EPA Id | Alias name<br>Alias Street<br>Alias City<br>County Name | County Code | Zip Code | Federal Facility Flag | Cong. Dist. |
|---|---|---|---|---|---|
| KEARNY DRUM DUMP #2<br>NJD980770069 | KEARNY DRUM DUMP #2<br>BET RT 508 & ERIE & PENN RR<br>KEARNY<br>HUDSON | 017 | 07032 | N | 09 |
| KEARNY DRUM DUMP #4<br>NJD980770085 | BARONE & PENNER PROD.<br>HUDSON<br>DRUM DUMP #4<br>HUDSON<br>KEARNY DRUM DISPOSAL AREA (NJD98<br>HUDSON | 017 | | N | 09 |
| | KEARNY DRUM DUMP #4<br>100 YDS NE 2ND TPKE OVERPASS<br>KEARNY<br>HUDSON | | 07032 | N | 09 |
| KEARNY DRUM DUMP #5<br>NJD980770093 | DRUM DUMP #5<br>HUDSON<br>KEARNY DRUM DUMP #5<br>0.9 MI SE 2ND TPKE OVERPASS<br>KEARNY<br>HUDSON | 017 | | N | 09 |
| | | | 07032 | N | 09 |
| KEEGAN LANDFILL<br>NJD981490428 | MSLA SITE B<br>HUDSON | 017 | | N | 11 |
| KELBROS INC.<br>NJD980642888 | KELBROS INC.<br>CAMDEN<br>CAMDEN | 007 | | N | 01 |
| KEM MANUFACTURING CO<br>NJD054121223 | KEM MANUFACTURING CORP.<br>MIDDLESEX<br>MIDDLESEX | 023 | | N | 06 |
| KENNY'S CLEANERS<br>NJD035677939 | KENNY CLEANERS<br>1680 PENNINGTON RD<br>TRENTON<br>MERCER | 021 | 08618 | N | 04 |
| | KENNY CLEANERS<br>MERCER | | | | |

Ref. 1

p. 1

AD-HOC
U.S. EPA Superfund Program
Region II
List-8E Site/Action Listing



| EPA ID | Site Name / Address / City / County | Zip Code | Cong Dist | NFRAP Flag | Oprble Unit | Action Type | Action Lead | Action Qualif | Actual Start Date | Actual Compl Date |
|---|---|---|---|---|---|---|---|---|---|---|
| NJD980770085 | KEARNY DRUM DUMP #4 | | 09 | | | | | | | |
| | BELLEVILLE TPKE | | | | | | | | | |
| | KEARNY | 07032 | | | | | | | | |
| | HUDSON | 017 | | | | | | | | |
| | | | | | 00 | PA001 | S | L | | 12/25/85 |
| | | | | | | SI001 | S | N | 03/01/84 | 04/01/84 |
| NJD980770093 | KEARNY DRUM DUMP #5 | | 09 | | | | | | | |
| | BELLEVILLE TPKE | | | | | | | | | |
| | KEARNY | 07032 | | | | | | | | |
| | HUDSON | 017 | | | | | | | | |
| | | | | | 00 | DS001 | S | | | 04/10/84 |
| | | | | | | PA001 | S | L | | 12/20/85 |
| | | | | | | SI001 | S | N | 03/01/84 | 04/01/84 |
| NJD981490428 | KEEGAN LANDFILL | | 11 | | | | | | | |
| | FOOT OF BERGEN AVENUE | | | | | | | | | |
| | KEARNY | 07032 | | | | | | | | |
| | HUDSON | 017 | | | | | | | | |
| | | | | | 00 | DS001 | S | | | 06/27/86 |
| | | | | | | PA001 | S | L | 06/27/86 | 06/30/86 |
| | | | | | | SI001 | F | H | 06/30/89 | 09/27/89 |
| [illegible] | KELBROS INC. | | 01 | | | | | | | |
| | 537 SOUTH 2ND ST., | | | | | | | | | |
| | CAMDEN | 08103 | | | | | | | | |
| | CAMDEN | 007 | | | | | | | | |
| | | | | | 00 | DS001 | F | | | 02/28/89 |
| | | | | | | PA001 | F | L | 02/28/89 | 03/31/89 |
| | | | | | | SI001 | S | D | 06/01/92 | 09/29/92 |
| [illegible] | KEM MANUFACTURING CORP. | | 06 | | | | | | | |
| | 25 COTTERS LANE | | | | | | | | | |
| | EAST BRUNSWICK | 08816 | | | | | | | | |
| | MIDDLESEX | 023 | | | | | | | | |
| | | | | | 00 | DS001 | F | | | 06/06/89 |
| | | | | | | PA001 | F | D | | 07/30/89 |
| NJT[illegible]6309964 | KEMCO CORPORATION | | 07 | | | | | | | |
| | INMAN AVENUE | | | | | | | | | |
| | EDISON | 08818 | | | | | | | | |
| | MIDDLESEX | 023 | | | | | | | | |
| | | | | | 00 | DS001 | F | | | 06/07/91 |
| | | | | | | PA001 | S | H | 04/01/91 | 06/27/91 |

REFERENCE NO. 2

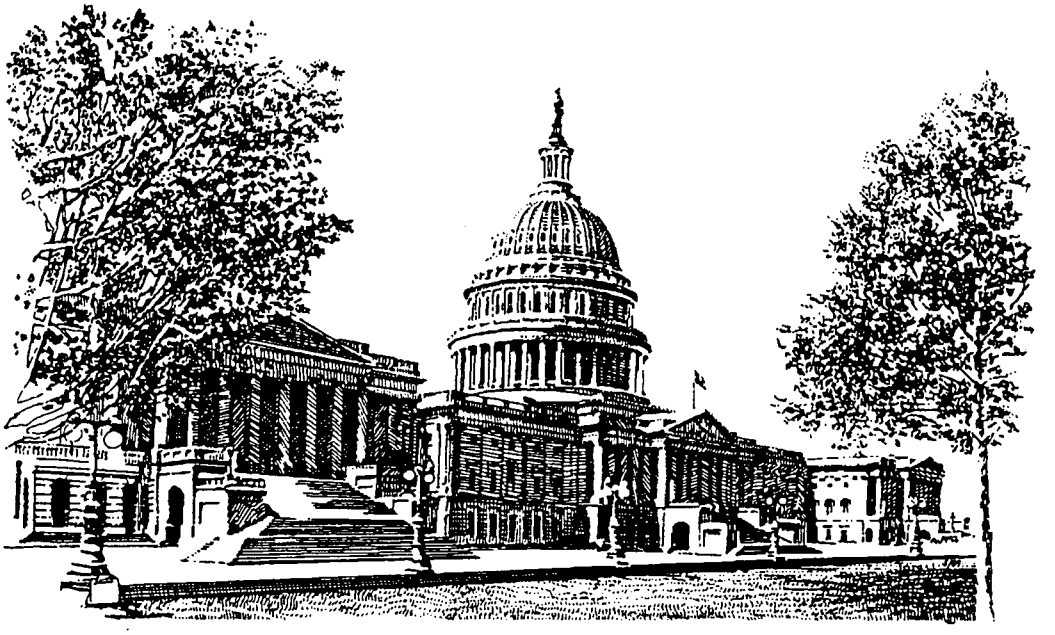
Volume 2

New Jersey - Wyoming,
American Samoa, Guam, Puerto Rico,
and Virgin Islands of the United States

# Congressional District Atlas

## 103rd Congress of the United States

Issued February 1993



**U.S. Department of Commerce**
**Ronald H. Brown,** Secretary
**John Rollwagen,** Deputy Secretary

**Economics and Statistics Administration**
**Jeffrey Mayer,** Acting Under Secretary

**BUREAU OF THE CENSUS**
**Harry A. Scarr,** Acting Director

Ref. 2

p. 1

## Table 1. **Places**

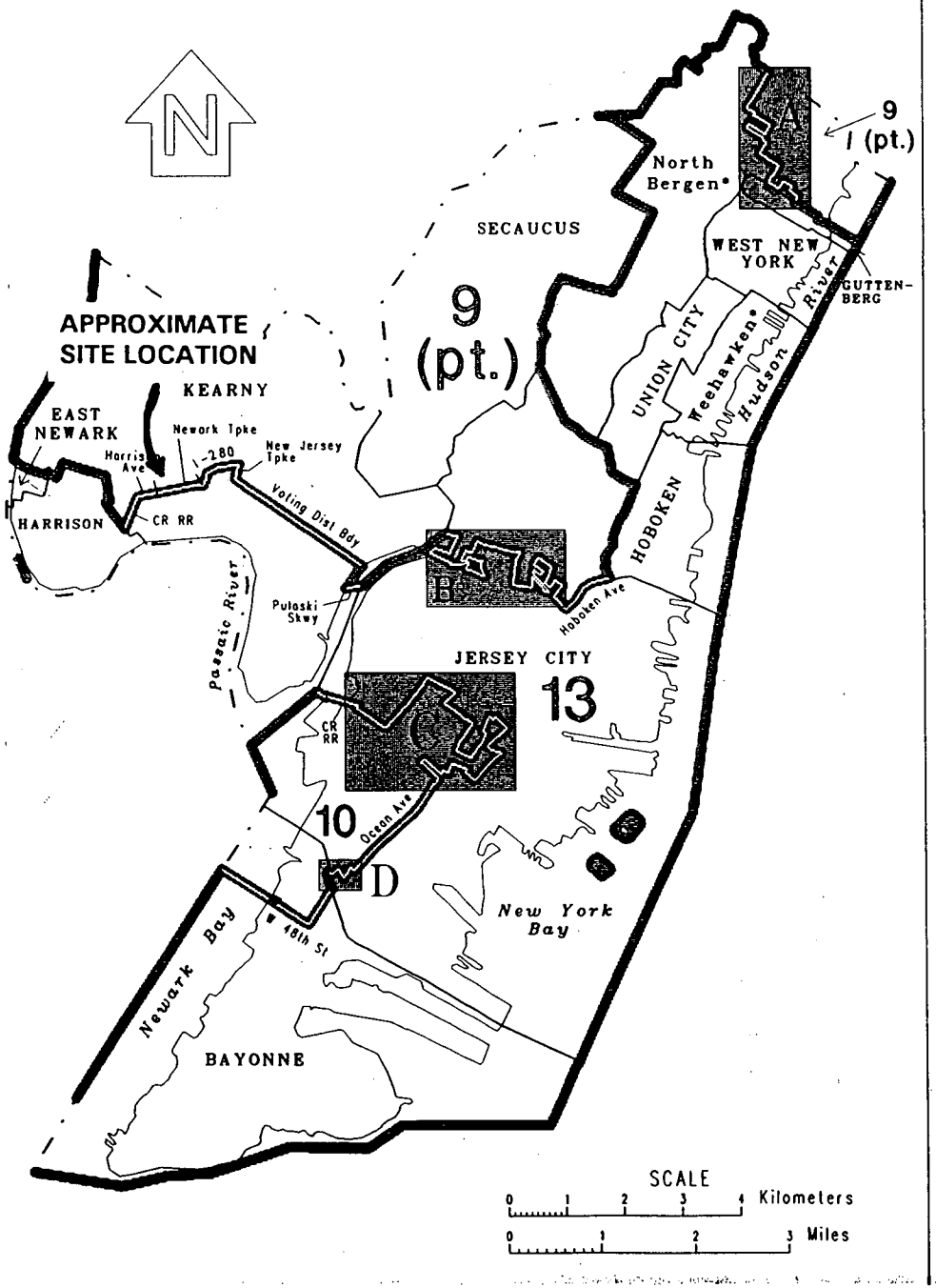
| Place | County | Congressional district |
|---|---|---|
| Absecon city | Atlantic | 2 |
| Allamuchy-Panther Valley CDP | Warren | 5 |
| Allendale borough | Bergen | 5 |
| Allenhurst borough | Monmouth | 6 |
| Allentown borough | Monmouth | 4 |
| Alloway CDP | Salem | 2 |
| Alpha borough | Warren | 5 |
| Alpine borough | Bergen | 5 |
| Andover borough | Sussex | 5 |
| Annandale CDP | Hunterdon | 12 |
| Asbury Park city | Monmouth | 6 |
| Atlantic City city | Atlantic | 2 |
| Atlantic Highlands borough | Monmouth | 6 |
| Audubon borough | Camden | 1 |
| Audubon Park borough | Camden | 1 |
| Avalon borough | Cape May | 2 |
| Avenel CDP | Middlesex | 7 |
| Avon-by-the-Sea borough | Monmouth | 6 |
| Barnegat CDP | Ocean | 3 |
| Barnegat Light borough | Ocean | 3 |
| Barrington borough | Camden | 1 |
| Bay Head borough | Ocean | 4 |
| Bayonne city | Hudson | 10,13 |
| Beach Haven borough | Ocean | 3 |
| Beach Haven West CDP | Ocean | 3 |
| Beachwood borough | Ocean | 3 |
| Beattyestown CDP | Warren | 5 |
| Beckett CDP | Gloucester | 1 |
| Belleville CDP | Essex | 8 |
| Bellmawr borough | Camden | 1 |
| Belmar borough | Monmouth | 6 |
| Belvidere town | Warren | 5 |
| Bergenfield borough | Bergen | 5 |
| Berkeley Heights CDP | Union | 7 |
| Berlin borough | Camden | 1 |
| Bernardsville borough | Somerset | 12 |
| Beverly city | Burlington | 3 |
| Blackwood CDP | Camden | 1 |
| Bloomfield CDP | Essex | 8 |
| Bloomingdale borough | Passaic | 11 |
| Bloomsbury borough | Hunterdon | 12 |
| Bogota borough | Bergen | 9 |
| Boonton town | Morris | 11 |
| Bordentown city | Burlington | 4 |
| Bound Brook borough | Somerset | 7 |
| Bradley Beach borough | Monmouth | 6 |
| Branchville borough | Sussex | 5 |
| Brass Castle CDP | Warren | 5 |
| Brick Township CDP | Ocean | 4 |
| Bridgeton city | Cumberland | 2 |
| Brielle borough | Monmouth | 4 |
| Brigantine city | Atlantic | 2 |
| Brooklawn borough | Camden | 1 |
| Brown Mills CDP | Burlington | 3 |
| Budd Lake CDP | Morris | 11 |
| Buena borough | Atlantic | 2 |
| Burlington city | Burlington | 4 |
| Butler borough | Morris | 11 |
| Caldwell CDP | Essex | 11 |
| Califon borough | Hunterdon | 12 |
| Camden city | Camden | 1 |
| Cape May city | Cape May | 2 |
| Cape May Court House CDP | Cape May | 2 |
| Cape May Point borough | Cape May | 2 |
| Carlstadt borough | Bergen | 9 |
| Carneys Point CDP | Salem | 2 |
| Carteret borough | Middlesex | 13 |
| Cedar Glen Lakes CDP | Ocean | 4 |
| Cedar Glen West CDP | Ocean | 4 |
| Cedar Grove CDP | Essex | 8 |
| Chatham borough | Morris | 11 |
| Cherry Hill CDP | Camden | 3 |
| Chesilhurst borough | Camden | 1 |
| Chester borough | Morris | 11 |
| Cinnaminson CDP | Burlington | 3 |
| Clark CDP | Union | 7 |
| Clayton borough | Gloucester | 2 |
| Clearbrook Park CDP | Middlesex | 12 |
| Clementon borough | Camden | 1 |
| Cliffside Park borough | Bergen | 9 |
| Cliffwood Beach CDP | Monmouth | 6 |
| Clifton city | Passaic | 8 |
| Clinton town | Hunterdon | 12 |
| Closter borough | Bergen | 5 |
| Collings Lakes CDP | Atlantic | 2 |
| Collingswood borough | Camden | 1 |
| Colonia CDP | Middlesex | 7 |
| Concordia CDP | Middlesex | 12 |
| Corbin City city | Atlantic | 2 |
| Country Lake Estates CDP | Burlington | 3 |
| Crandon Lakes CDP | Sussex | 5 |
| Cranford CDP | Union | 7 |
| Cresskill borough | Bergen | 5 |
| Crestwood Village CDP | Ocean | 4 |
| Dayton CDP | Middlesex | 12 |
| Deal borough | Monmouth | 6 |
| Delanco CDP | Burlington | 3 |
| Demarest borough | Bergen | 5 |
| Dover town | Morris | 11 |
| Dumont borough | Bergen | 5 |
| Dunellen borough | Middlesex | 6 |
| East Brunswick CDP | Middlesex | 12 |
| East Freehold CDP | Monmouth | 12 |
| East Hanover CDP | Morris | 11 |
| East Newark borough | Hudson | 13 |
| East Orange city | Essex | 10 |
| East Rutherford borough | Bergen | 9 |
| Eatontown borough | Monmouth | 12 |
| Edgewater borough | Bergen | 9 |
| Edgewater Park CDP | Burlington | 3 |
| Edison CDP | Middlesex | 6,7 |
| Egg Harbor City city | Atlantic | 2 |
| Elizabeth city | Union | 10,13 |
| Elmer borough | Salem | 2 |
| Elmwood Park borough | Bergen | 9 |
| Elwood-Magnolia CDP | Atlantic | 2 |
| Emerson borough | Bergen | 5 |
| Englewood city | Bergen | 9 |
| Englewood Cliffs borough | Bergen | 9 |
| Englishtown borough | Monmouth | 12 |
| Erma CDP | Cape May | 2 |
| Estell Manor city | Atlantic | 2 |
| Ewing CDP | Mercer | 12 |
| Fairfield CDP | Essex | 11 |
| Fair Haven borough | Monmouth | 12 |
| Fair Lawn borough | Bergen | 5,9 |
| Fairton CDP | Cumberland | 2 |
| Fairview borough | Bergen | 9 |
| Fairview CDP | Monmouth | 6,12 |
| Fanwood borough | Union | 7 |
| Far Hills borough | Somerset | 12 |
| Farmingdale borough | Monmouth | 4 |
| Fieldsboro borough | Burlington | 4 |
| Flemington borough | Hunterdon | 12 |
| Florence-Roebling CDP | Burlington | 4 |
| Florham Park borough | Morris | 11 |
| Folsom borough | Atlantic | 2 |
| Fords CDP | Middlesex | 7 |
| Forked River CDP | Ocean | 3 |
| Fort Dix CDP | Burlington | 3,4 |
| Fort Lee borough | Bergen | 9 |
| Franklin borough | Sussex | 5 |
| Franklin Lakes borough | Bergen | 5 |
| Freehold borough | Monmouth | 12 |
| Frenchtown borough | Hunterdon | 12 |
| Garfield city | Bergen | 9 |
| Garwood borough | Union | 7 |
| Gibbsboro borough | Camden | 1 |
| Gibbstown CDP | Gloucester | 1 |
| Gilford Park CDP | Ocean | 3 |
| Glassboro borough | Gloucester | 2 |
| Glendora CDP | Camden | 1 |
| Glen Gardner borough | Hunterdon | 12 |
| Glen Ridge CDP | Essex | 8 |
| Glen Rock borough | Bergen | 5 |
| Gloucester City city | Camden | 1 |
| Great Meadows-Vienna CDP | Warren | 5 |
| Guttenberg town | Hudson | 13 |
| Hackensack city | Bergen | 9 |
| Hackettstown town | Warren | 5 |
| Haddonfield borough | Camden | 3 |
| Haddon Heights borough | Camden | 1 |
| Haledon borough | Passaic | 8 |
| Hamburg borough | Sussex | 5 |
| Hammonton town | Atlantic | 2 |
| Hampton borough | Hunterdon | 12 |
| Hanover Township CDP | Morris | 11 |
| Harrington Park borough | Bergen | 5 |
| Harrison town | Hudson | 13 |
| Harvey Cedars borough | Ocean | 3 |
| Hasbrouck Heights borough | Bergen | 9 |
| Haworth borough | Bergen | 5 |
| Hawthorne borough | Passaic | 5 |
| Heathcote CDP | Middlesex | 12 |
| Helmetta borough | Middlesex | 12 |
| High Bridge borough | Hunterdon | 12 |
| Highland Lake CDP | Sussex | 5 |
| Highland Park borough | Middlesex | 6 |
| Highlands borough | Monmouth | 6 |
| Hightstown borough | Mercer | 4 |
| Hillsdale borough | Bergen | 5 |
| Hillside CDP | Union | 10 |
| Hi-Nella borough | Camden | 1 |
| Hoboken city | Hudson | 13 |
| Ho-Ho-Kus borough | Bergen | 5 |
| Holiday City-Berkeley CDP | Ocean | 3 |
| Holiday City-Dover CDP | Ocean | 3 |
| Holiday City South CDP | Ocean | 3 |
| Holiday Heights CDP | Ocean | 3 |
| Hopatcong borough | Sussex | 11 |
| Hopewell borough | Mercer | 12 |
| Interlaken borough | Monmouth | 12 |
| Irvington CDP | Essex | 8,10 |
| Iselin CDP | Middlesex | 7 |
| Island Heights borough | Ocean | 3 |
| Jamesburg borough | Middlesex | 12 |
| Jersey City city | Hudson | 9,10,13 |
| Keansburg borough | Monmouth | 6 |
| Kearny town | Hudson | 9,13 |
| Kendall Park CDP | Middlesex | 12 |



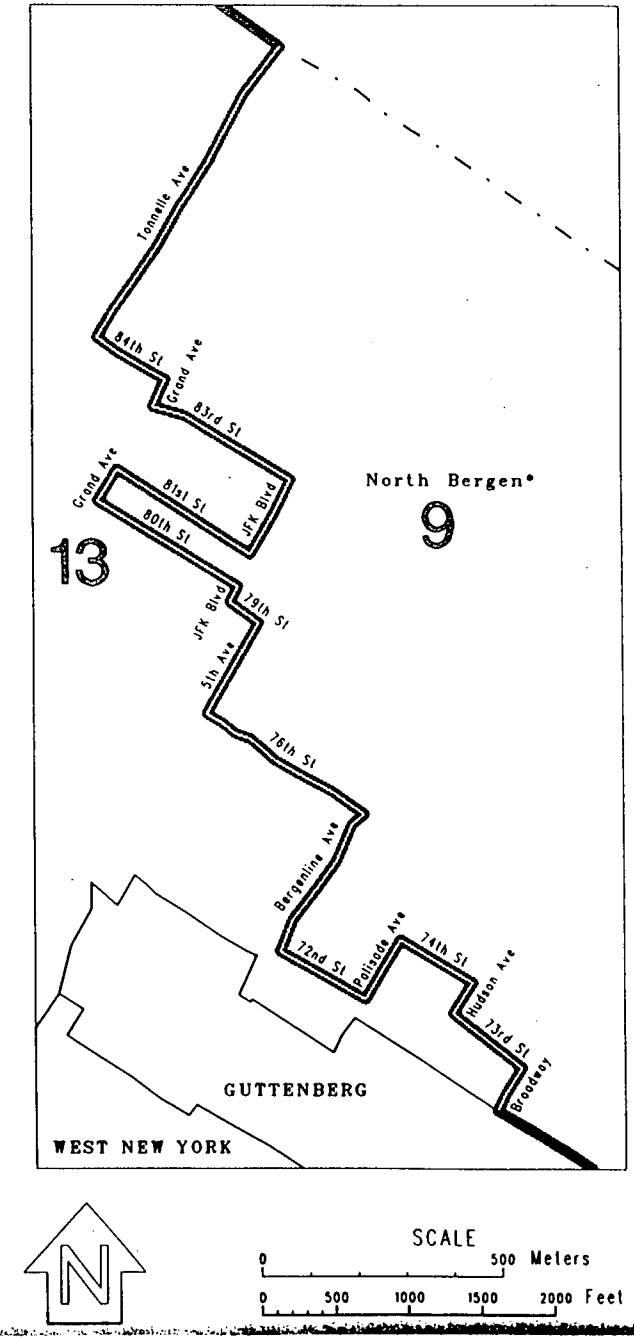
Ref. 2

p. 2

HUDSON COUNTY




INSET A






Ref-2

p.3

REFERENCE NO. 3

NUS CORPORATION

A Halliburton Company

[redacted]

# FIELD INVESTIGATION TEAM ACTIVITIES AT UNCONTROLLED HAZARDOUS SUBSTANCES FACILITIES — ZONE I

NUS CORPORATION
SUPERFUND DIVISION

Ref. 3

02-8810-75-SI
REV. NO. 1

# FINAL DRAFT
# SITE INSPECTION REPORT
# KEEGAN LANDFILL
# KEARNY, NEW JERSEY

PREPARED UNDER
TECHNICAL DIRECTIVE DOCUMENT NO. 02-8810-75
CONTRACT NO. 68-01-7346

FOR THE

ENVIRONMENTAL SERVICES DIVISION
U.S. ENVIRONMENTAL PROTECTION AGENCY

SEPTEMBER 15, 1989
(REVISED SEPTEMBER 29, 1989)

NUS CORPORATION
SUPERFUND DIVISION

SUBMITTED BY:

Donald P. Hessemer
DONALD P. HESSEMER
PROJECT MANAGER

Tamara L. Marquart
TAMARA MARQUART
SITE MANAGER

REVIEWED/APPROVED BY:

Charles LaBrie for RN
RONALD M. NAMAN
FIT OFFICE MANAGER

| | | | |
|---|---|---|---|
| **SITE NAME:** | Keegan Landfill | **EPA ID NO.:** | NJD981490428 |
| **ADDRESS:** | Bergen Avenue<br>Kearny, New Jersey 07032 | **LATITUDE:**<br>**LONGITUDE:** | 40° 45' 27" N<br>74° 08' 07" W |

## 1.0 SITE SUMMARY

The Keegan Landfill Site is an approximately 230-acre tract of land in an industrial section of Kearny, Hudson County, New Jersey. The site is bordered on the south and northwest by Conrail railroad tracks, on the southwest by businesses along Bergen Avenue, and on the northeast by a large wetlands lake. There are residential neighborhoods nearby, as approximately 20,000 people live within 1 mile and 223,000 people live within 3 miles of the site.

The site is the property of the Town of Kearny, but the operator of the landfill was John P. Keegan/Municipal Sanitary Landfill Authority (MSLA). Keegan/MSLA leased the land from the Town of Kearny and operated it as a municipal landfill from the mid 1960s to 1974. Some construction debris, such as concrete and stone, as well as tree branches and limbs, are still being disposed of at the site. There is also unauthorized dumping occurring, as the site is littered with abandoned furniture, appliances, and automobiles. The site is not fenced except for a locked gate at the main Bergen Avenue entrance. Therefore, the potential for direct contact with exposed wastes exists. The Kearny Health Department reported that a member of the Kearny Police Department had worked as a truck driver for Dupont Chemical in Newark in the 1960s. He reported that every morning at least one truck with approximately forty 30-gallon drums went to the Keegan tract. These wastes included chromate and bichromate slurry, pigment wastes, and organic wastes. Disposal of these wastes took place in various areas of the landfill. Approximately 10 drums were observed on site during an off-site reconnaissance conducted by Malcom Pirnie, Inc., on April 28, 1986; however, during the NUS Corporation Region 2 FIT site inspection conducted on April 25, 1989, no evidence of the drums was present.

There is no information available on the quantity of wastes deposited on site or the location of the hazardous waste dumping areas. There have been several underground fires on site, most recently in June and July of 1987. The site is crossed by an unnamed creek and Frank Creek, which originates on site. These two creeks converge south of the site, and flow into the Passaic River.

In a letter dated July 2, 1987, the New Jersey Department of Environmental Protection (NJDEP) recommended that a closure plan be submitted. On July 28, 1987, the NJDEP met with Neglia Engineering Associates to discuss the closure of sections of Keegan Landfill. Neglia Engineering Associates recommended that the access road be improved to provide a turnaround area, that the area of the recently extinguished fires be covered with 2 feet of cover, and that the access road from Bergen Avenue be secured The current status of the closure plan is unknown.

On April 25, 1989, NUS Corporation Region 2 FIT personnel collected seven surface water samples and six sediment samples at the Keegan Landfill Site. These samples were collected to determine the presence or absence of Target Compound List (TCL) substances, and the potential for these substances to migrate off site. Results of this sampling indicate the presence of mercury, lead, chromium, polychlorinated biphenyls (PCBs), and several semivolatile compounds in various sediment samples. Several inorganic compounds, including mercury, lead, and chromium, were detected in surface water samples collected in Frank Creek.

Ref. Nos. 1, 2, 3, 4, 14-22

# 2.0 SITE INSPECTION NARRATIVE

## 2.1 EXISTING ANALYTICAL DATA

It is unknown whether any sampling has been performed at the Keegan Landfill Site prior to the NUS Corporation Region 2 FIT site inspection on April 25, 1989.

Ref. Nos. 1, 2

## 2.2 WASTE SOURCE DESCRIPTION

The Keegan Landfill is approximately 230 acres in size. This site was used as a municipal landfill from the mid 1960s to 1974. Construction debris, such as concrete and stone, as well as tree branches and limbs are still being disposed of at the site. Also scattered throughout the site are abandoned automobiles, appliances, and furniture. The landfill is unlined and there have been reports of chromate and bichromate slurry, organic wastes, and pigment wastes being dumped on site. The quantities and location where these substances were disposed of are unknown. During a 1986 off-site reconnaissance by Malcolm Pirnie, Inc., approximately 10 drums were reported along the eastern access road. The contents and condition of these drums are unknown.

There have been a number of fires beneath the surface of the landfill which recurred periodically, venting smoke from the landfill surface. In July 1987, the NJDEP recommended that a closure plan be submitted for the Keegan Landfill Site. Neglia Engineering Associates met with the NJDEP and recommended that the areas of recently extinguished fires be covered with 2 feet of cover. At the time of the NUS Corporation Region 2 FIT site inspection, there was no evidence of any burning waste or drums on site.

Ref. Nos. 1, 2, 4, 21

## 2.3 GROUNDWATER ROUTE

The Keegan Landfill Site lies within the Hackensack Meadowlands, a large wetlands area formed by the action of glaciers and fluctuations in ocean water levels. The bedrock in the Hackensack River Basin is a part of the Newark Group of Late Triassic Age. Underlying the Keegan Landfill Site is the Brunswick Formation, which forms the bedrock throughout most of the Hackensack River Basin. The Brunswick Formation is composed of mudstone, siltstone, sandstone, and conglomerate. In the southern part of the basin, mudstone is the dominant lithology, and the deposits gradually become coarser grained northward. The Brunswick Formation is the most important bedrock aquifer in the

basin. The water table in this area is assumed to be at or near the ground surface. Groundwater in the Brunswick Formation occurs in a network of interconnected openings formed along joints and fractures. Groundwater flow in the area is likely to be southeast toward the Hackensack River. Unconsolidated deposits overlying the Brunswick Formation consist of till, varved silt and clay, alluvium, sand, and gravel. Small quantities of groundwater are stored in the till which overlies the bedrock.

Deposits of varved silt and clay, such as the lake beds that overlie bedrock and till in most of the meadows, have a poor permeability of approximately $10^{-5}$ to $10^{-7}$ cm/sec and impede the movement, discharge, and recharge of water. Stratified drift deposits of varved silt and clay, as much as 300 feet thick in the meadows, occur in two troughs which parallel the sides of the basin. The Keegan Landfill Site lies within the western trough.

Groundwater from the Brunswick Formation in the lower part of the basin is hard to very hard and highly mineralized. In this area the water quality in both the Brunswick and unconsolidated deposits is influenced by the water quality of the Hackensack River and Newark Bay. Both the surface water and groundwater quality in the lower area is influenced by the disposal of large quantities of sewage and industrial wastes in the Hackensack Meadows. High concentrations of chloride make the water in the lower Hackensack River unsuitable for municipal and industrial processes, although it is usable for cooling purposes.

There is no potable water collected from groundwater in the area. All municipalities within 3 miles of the site draw their drinking water from the Wanaque Reservoir, located in northern Passaic County. There are 10 industrial wells and one recreational well within 3 miles of the site, the nearest being approximately 0.7 mile southwest of the site. This well and nine others withdraw water from the Brunswick Formation. One well located 1.5 miles southeast of the site withdraws water from the stratified glacial drift. The recreational well is operated by the Essex County Parks Department, which is used to replenish water in a pond in Branch Brook Park located approximately 2.7 miles northwest of the site. This well information is summarized in Table 1. There is a potential for groundwater contamination since the landfill is unlined and reports have suggested that chromate and bichromate slurry have been deposited at the site. However, groundwater in the area is not used for potable water, but only for industrial and recreational purposes.

The net annual precipitation in the area is approximately 12 inches.

Ref. Nos. 2, 7, 8, 9, 10, 11, 12, 13, 24, 25

TABLE 1

GROUNDWATER USAGE
WITHIN 3 MILES OF KEEGAN LANDFILL
KEARNY, NEW JERSEY

| Name | Distance From Site (Miles) | Direction From Site | Well Depth (ft) | Aquifer | Use |
|---|---|---|---|---|---|
| American Ref. Company | 1.5 | SE | 35 | Stratified drift | Industrial |
| V. H. Swenson Co., Inc. | 0.75 | N | 400 | Brunswick Formation | Industrial |
| Ronson Metals Corp. | 1.75 | S | 300 | Brunswick Formation | Industrial |
| Ronson Metals Corp. | 2.0 | S | 165 | Brunswick Formation | Industrial |
| Public Service Electric | 2.0 | SW | 216 | Brunswick Formation | Industrial |
| New Jersey Bell Telephone | 2.25 | SW | 215 | Brunswick Formation | Industrial |
| Grand Union Company | 2.7 | N | 300 | Brunswick Formation | Industrial |
| International Minerals and Chemicals | 2.0 | NNW | 400 | Brunswick Formation | Industrial |
| Honeycomb Plastics Corp. | 0.7 | SW | 500 | Brunswick Formation | Industrial |
| Honeycomb Plastics Corp. | 0.7 | SW | 700 | Brunswick Formation | Industrial |
| Essex County Parks | 2.7 | NW | 450 | Brunswick Formation | Recreation |

## 2.4 SURFACE WATER ROUTE

The Keegan Landfill Site is located in the surface waters of the Hackensack Meadowlands. The site is relatively flat with a few small mounds of less than 10 feet in height which were probably caused by the deposition of wastes on site. It is bounded on the northeast by a wetlands lake approximately 15 acres in size. There is an unnamed creek crossing the site, and Frank Creek which originates on site. These two creeks converge south of the site, and flow into the Passaic River approximately 1 stream mile south of the site. The Passaic River drains into the Hackensack River which flows into Newark Bay, and eventually connects with the Atlantic Ocean. Both the Passaic River and Newark Bay are used for navigational purposes. The Hackensack River lies approximately 2.0 miles east of the site and is used for navigational purposes by commerical and recreational vessels. These two rivers are tidal in nature. The 1-year 24-hour rainfall in the area is approximately 2.75 inches. There are no surface water intakes on the Passaic River, the Hackensack River, or Newark Bay within 3 miles downstream of the site. There are no habitats of federally endangered species within 1 mile of the site.

There is a potential for surface water to be contaminated by any hazardous substances present on the site, since the site is located in a wetlands area. The site is also crossed by an unnamed creek and Frank Creek, which drain into the Passaic River and eventually into the Hackensack River and Newark Bay. Therefore, hazardous substances present on site could easily migrate from the site.

On April 25, 1989, NUS Corporation Region 2 FIT personnel collected seven surface water samples and six sediment samples to determine the presence or absence of TCL substances on site, and the possbility for migration of any present TCL substances. Sample locations are shown in Figure 3 of Section 3.0 and analytical data is discussed in Section 4.0 of this report. Results of this sampling indicate the presence of several semivolatile compounds, chromium, lead, mercury, and PCBs in on-site sediments. Several inorganic compounds including chromium, lead, and mercury were detected in on-site surface water samples. These inorganics were detected in higher concentrations in the downstream surface water sample NJG3-SW5 than in the upstream samples NJG3-SW6 and NJG3-SW7. Since chromate and bichromate slurry were reported to have been disposed of on site, chromium contamination of surface waters in Frank Creek may be attributed to the site. During the site inspection, a dead fish was observed in the unnamed creek. Also noted on site was an oily sheen in Frank Creek near sample locations NJG3-SW5 and NJG3-SED5.

Ref. Nos. 1, 2, 4, 5, 6, 7, 8, 9, 13, 22, 24, 27

## 2.5 AIR ROUTE

During the April 25, 1989 site inspection of the Keegan Landfill Site, no air readings above background conditions were detected on the Organic Vapor Analyzer or the HNu photoionization detector. There are no National Historic Sites within view of the Keegan Landfill Site. There have been several underground fires reported at the site; however, there is no indication of a potential for release of hazardous substances to the air.

Ref. Nos. 1, 2

## 2.6 ACTUAL HAZARDOUS CONDITIONS

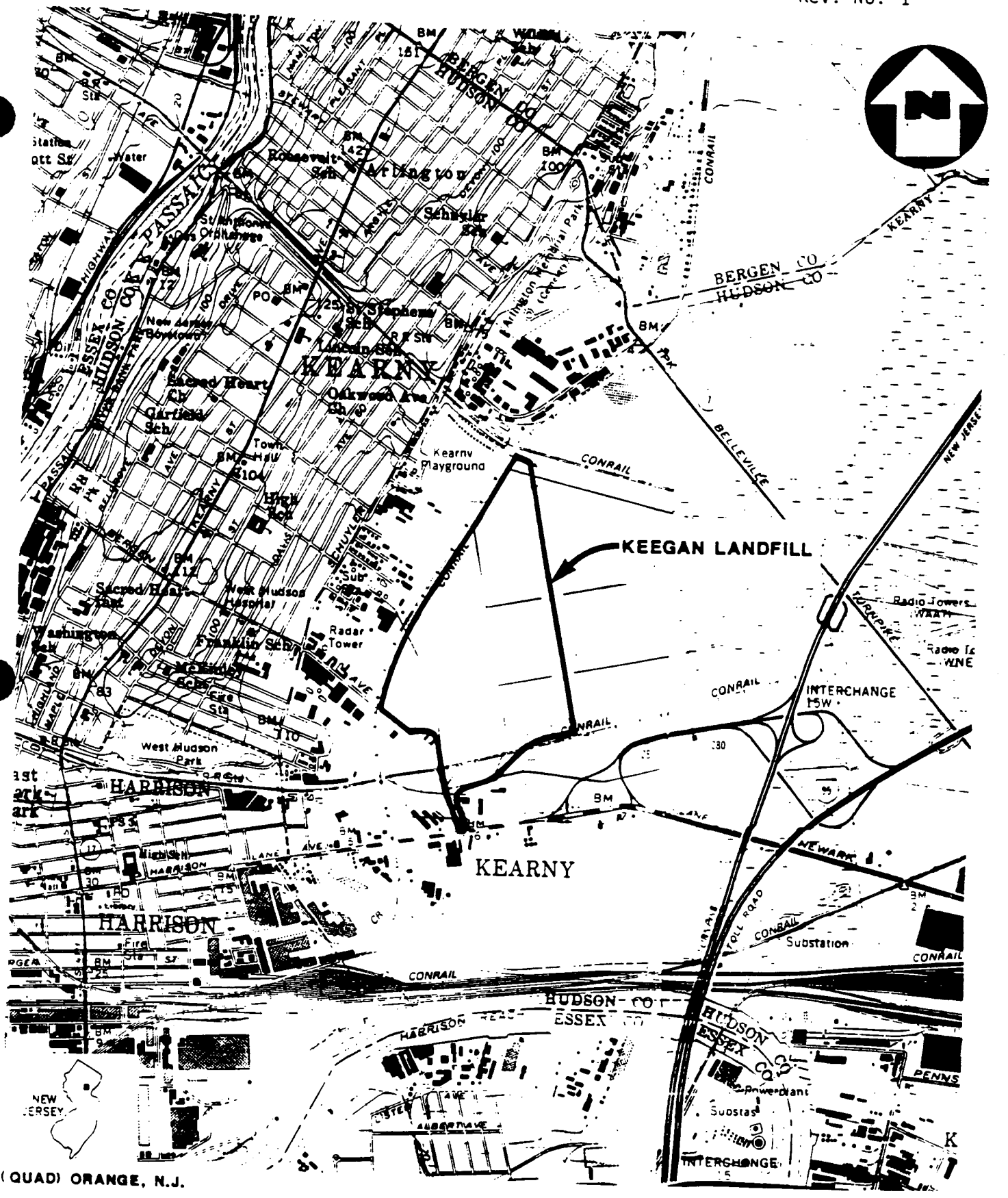
A dead fish was observed in the unnamed creek during the NUS Region 2 FIT site inspection on April 25, 1989. Also noted on site was an oily sheen in Frank Creek near sample locations NJG3-SW5 and NJG3-SED5. Chromium contamination of surface water was found in Frank Creek. PCBs, lead, and mercury were also detected in sediments in Frank Creek, the unnamed creek, and the wetlands lake. There is a potential for direct contact with hazardous substances on site since the site is not fenced. No other actual hazardous conditions pertaining to environmental contamination have been documented. Specifically:

- Contamination has not been documented either in organisms in a food chain leading to humans or in organisms directly consumed by humans.
- There have been no documented observed incidents of direct physical contact with hazardous substances at the landfill involving a human being or a domestic animal.
- There have been no documented instances of damage to flora (e.g., stressed vegetation) that can be attributed to hazardous materials on site.
- There is no documented contamination of a sewer or storm drain.
- There is no direct evidence of a release of a substance of concern from the facility to groundwater.
- There is no threat of explosion on site, although there is a fire hazard. There have been numerous underground fires reported on site, most recently in June and July of 1987.

Ref. Nos. 1, 2

# 3.0 MAPS AND PHOTOS

Figure 1: Site Location Map
Figure 2: Site Map
Figure 3: Sample Location Map
Exhibit A: Photograph Log




(QUAD) ORANGE, N.J.

FIGURE 1

**SITE LOCATION MAP**

**KEEGAN LANDFILL, KEARNY, N.J.**

SCALE: 1" = 2000'

NUS CORPORATION

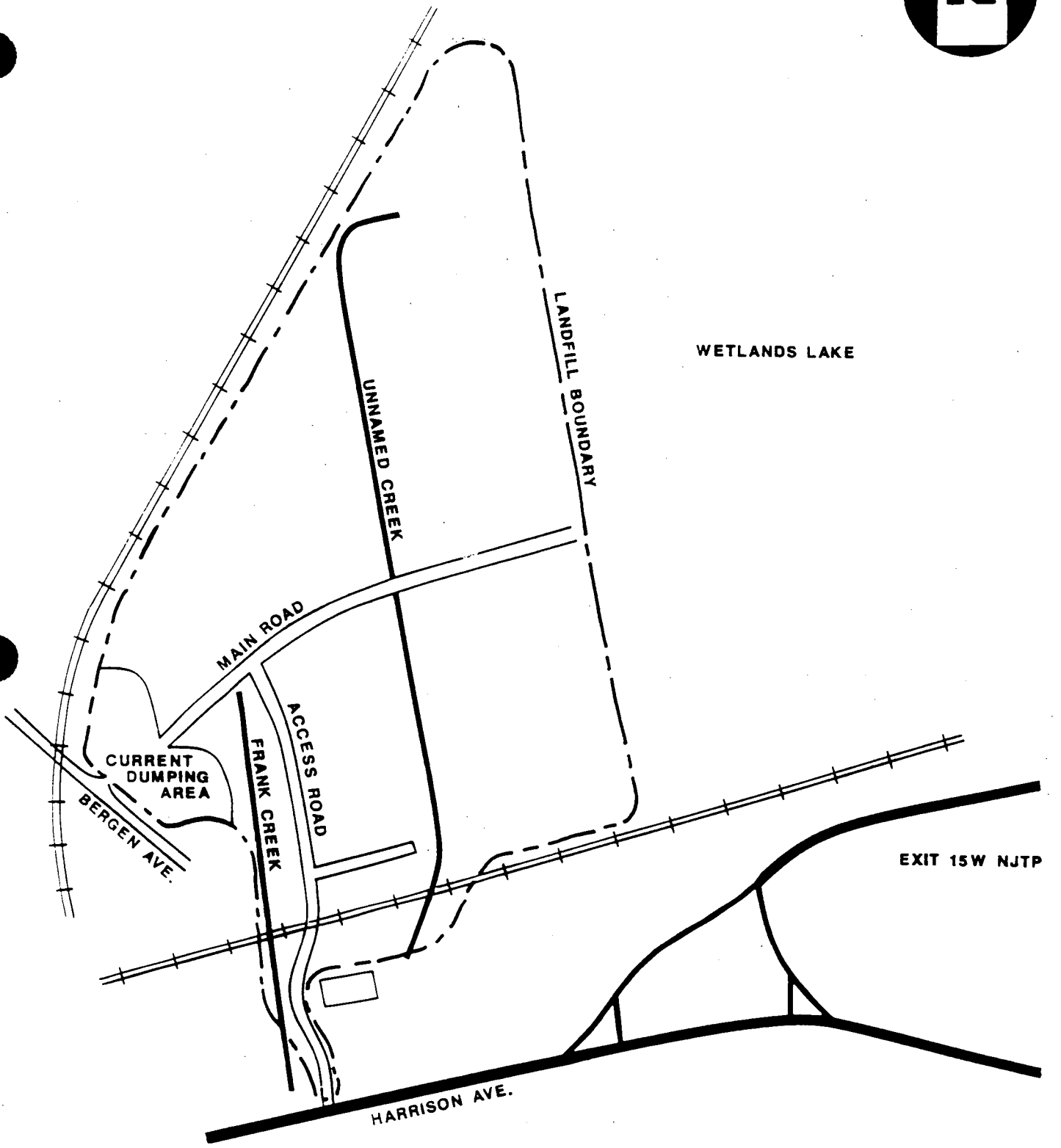



**FIGURE 2**

**SITE MAP**

**KEEGAN LANDFILL, KEARNY, N.J.**

(NOT TO SCALE)

NUS CORPORATION

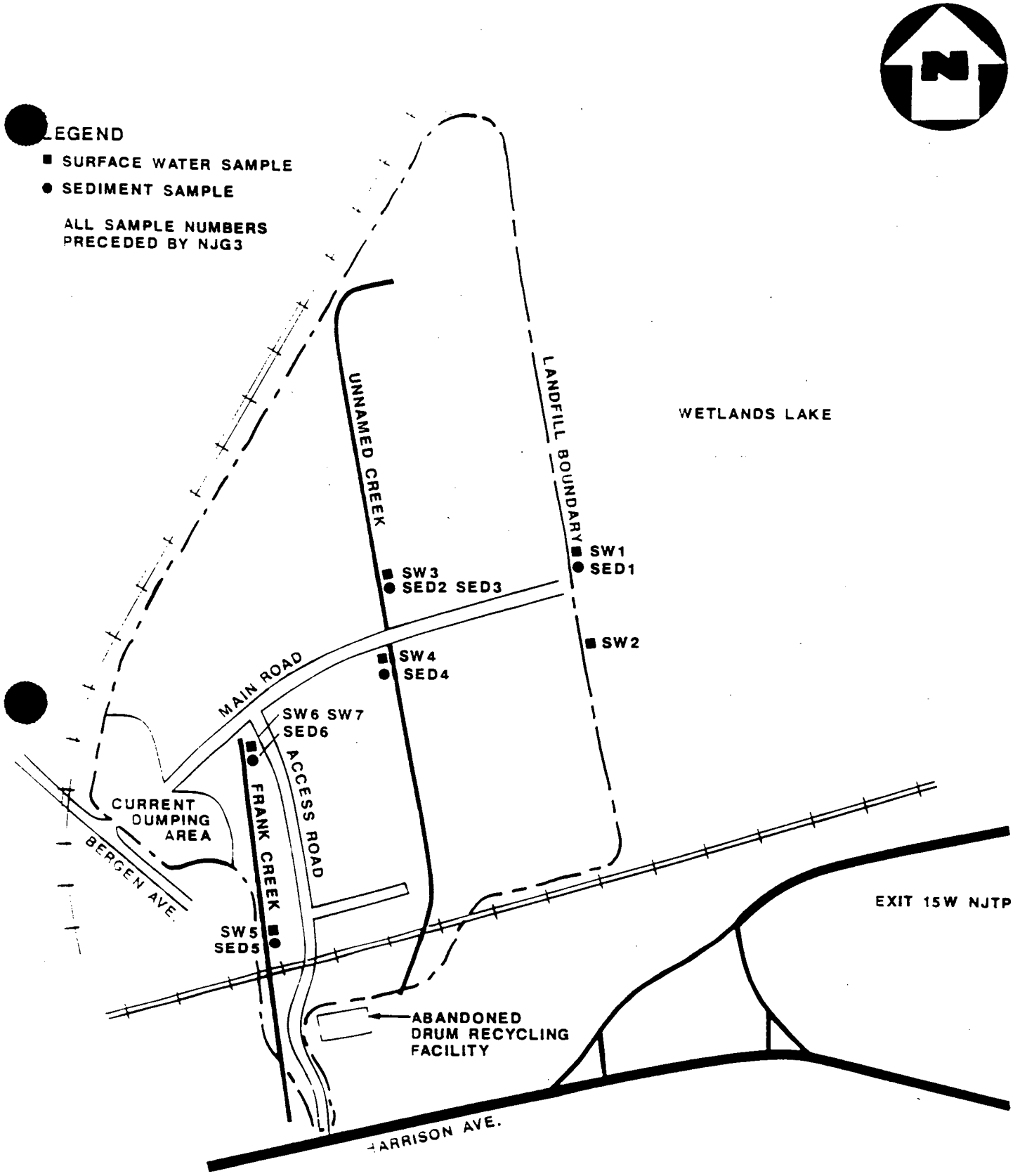



**FIGURE 3**

**SAMPLE LOCATION MAP**

**KEEGAN LANDFILL, KEARNY, N.J.**

(NOT TO SCALE)

NUS CORPORATION

EXHIBIT A

PHOTOGRAPH LOG
KEEGAN LANDFILL
KEARNY, NEW JERSEY

SITE INSPECTION: APRIL 25, 1989

KEEGAN LANDFILL
KEARNY, NEW JERSEY

PHOTOGRAPH INDEX
APRIL 25, 1989

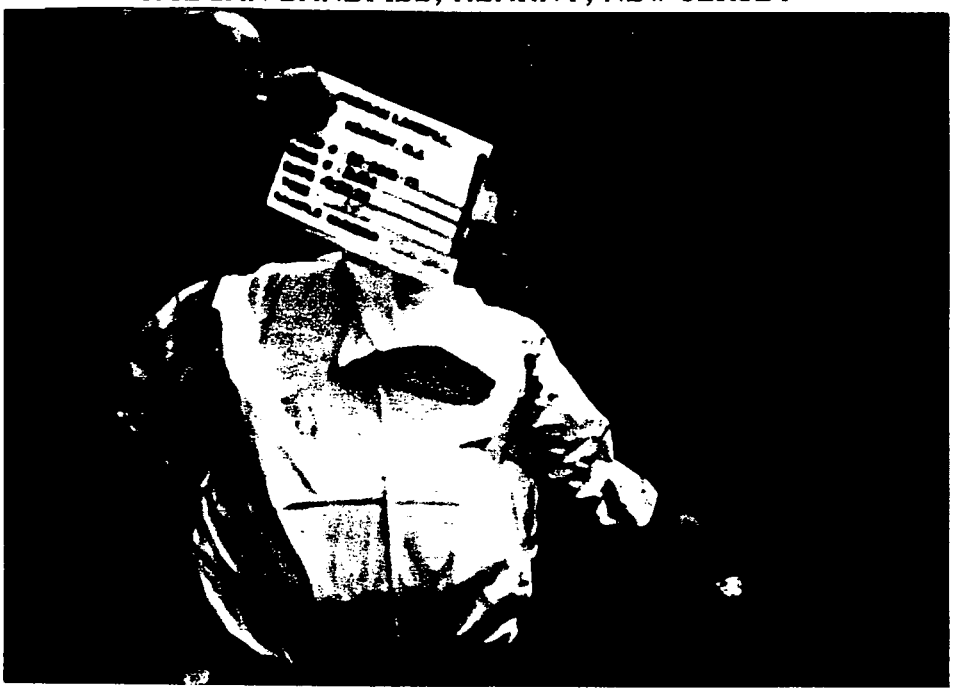
| Photo Number | Description | Time |
|---|---|---|
| 1P-1 | E. Knyfd collecting surface water sample NJG3-SW1. | 1050 |
| 1P-2 | E. Knyfd collecting sediment sample NJG3-SED1. | 1105 |
| 1P-3,4,5 | Panoramic view of wetlands lake from sample NJG3-SW1 location, looking northeast to southeast. | 1125 |
| 1P-6 | T. Marquart collecting surface water sample NJG3-SW2. | 1135 |
| 1P-7 | E. Knyfd collecting surface water sample NJG3-SW3. | 1215 |
| 1P-8 | E. Knyfd collecting sediment samples NJG3-SED2 and NJG3-SED3. | 1220 |
| 1P-9 | Looking north along unnamed creek with sample location NJG3-SW3 on the right side. | 1235 |
| 1P-10 | T. Marquart collecting surface water sample NJG3-SW4. | 1245 |
| 1P-11 | T. Marquart collecting sediment sample NJG3-SED4. | 1250 |
| 1P-12 | E. Knyfd collecting surface water sample NJG3-SW5 and sediment sample NJG3-SED5. | 1325 |
| 1P-13 | Looking north at Frank Creek from railroad tracks. | 1340 |
| 1P-14 | T. Marquart collecting surface water samples NJG3-SW6 and NJG3-SW7. | 1420 |
| 1P-15 | T. Marquart collecting sediment sample NJG3-SED6. | 1430 |
| 1P-16 | Looking south from dirt road at Frank Creek. | 1430 |
| 1P-17,18 | Panoramic view of dumping area near the Bergen Avenue entrance. Looking north to northeast. | 1445 |

(con't)

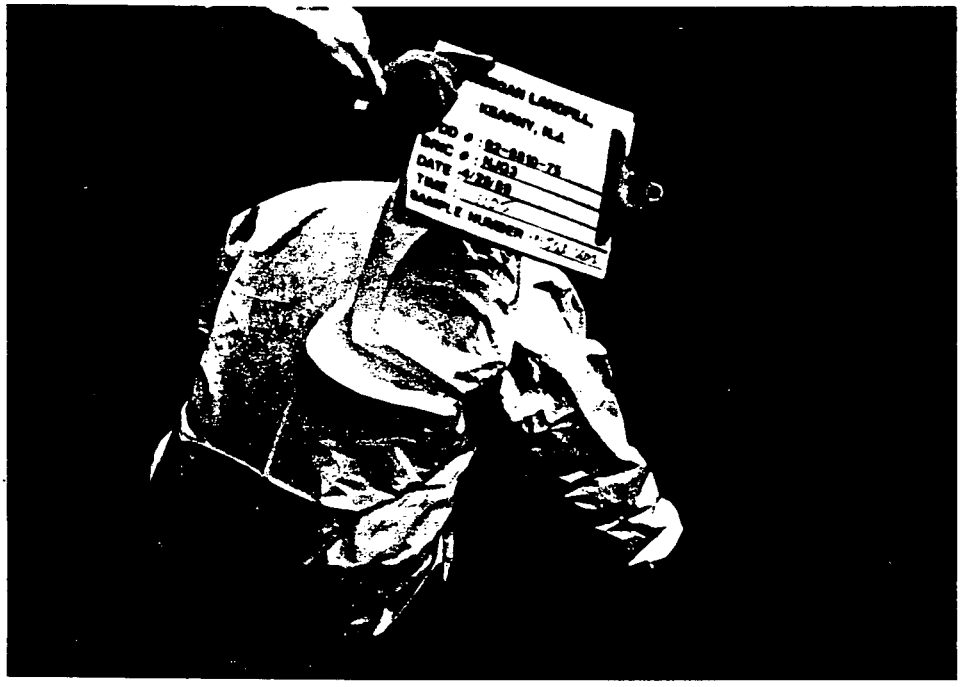
| Photo Number | Description | Time |
|---|---|---|
| 1P-19,20 | Panoramic view of dumping area near the Bergen Avenue entrance. Looking east to southeast. | 1445 |

ALL PHOTOGRAPHS TAKEN BY GERRY GILLILAND.

KEEGAN LANDFILL, KEARNY, NEW JERSEY



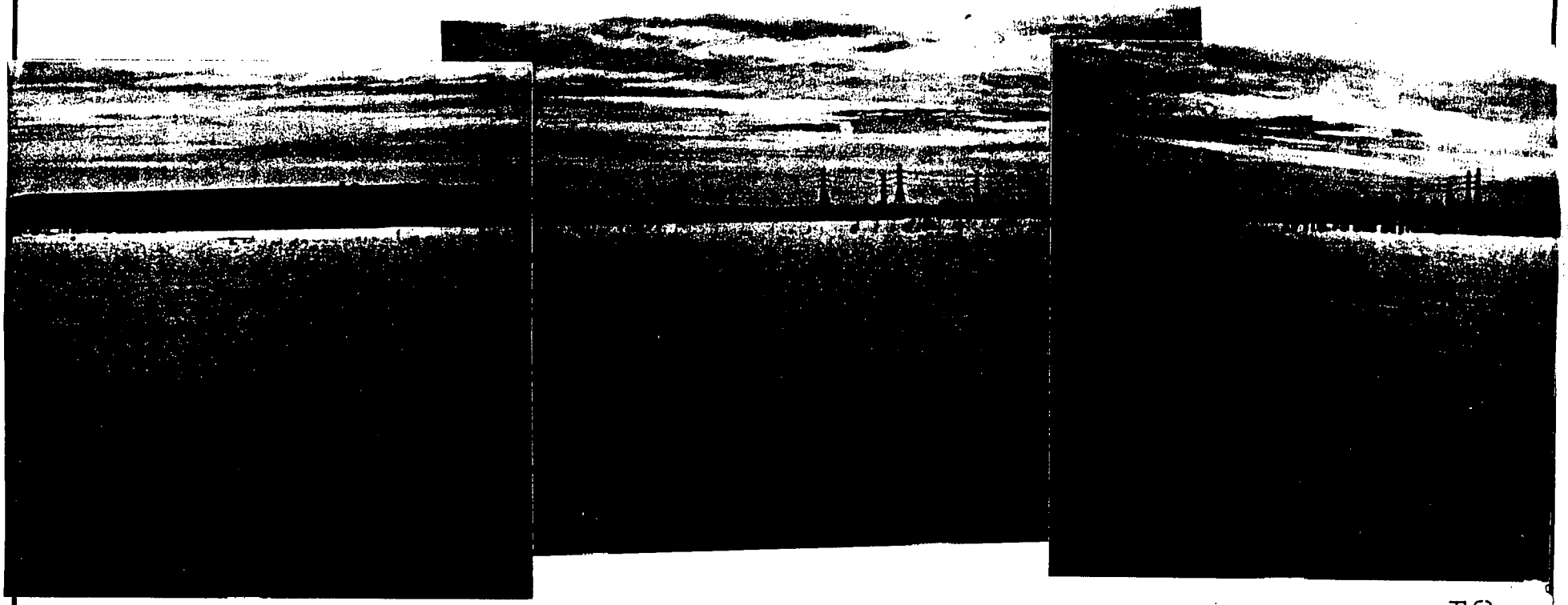
1P-1 April 25, 1989 1050
E. Knyfd collecting surface water sample NJG3-SW1.




1P-2 April 25, 1989 1105
E. Knyfd collecting sediment sample NJG3-SED1.

NUS CORPORATION

KEEGAN LANDFILL
KEARNY, NEW JERSEY



1P-3,4,5 April 25, 1989 1125
Panoramic view of wetlands lake from sample
NJG3-SW1 location, looking northeast to southeast.

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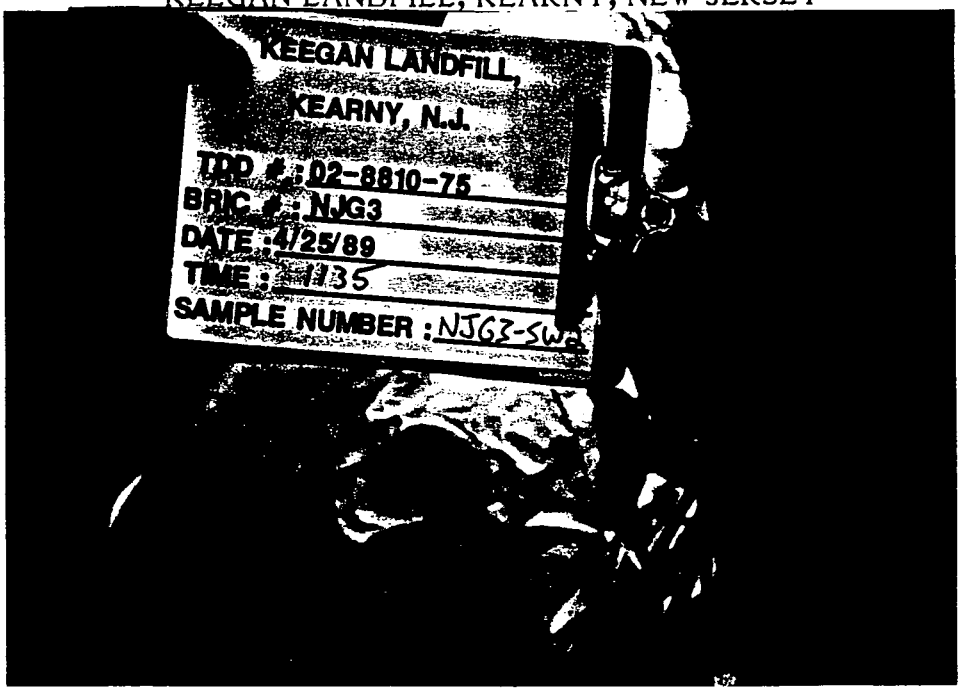
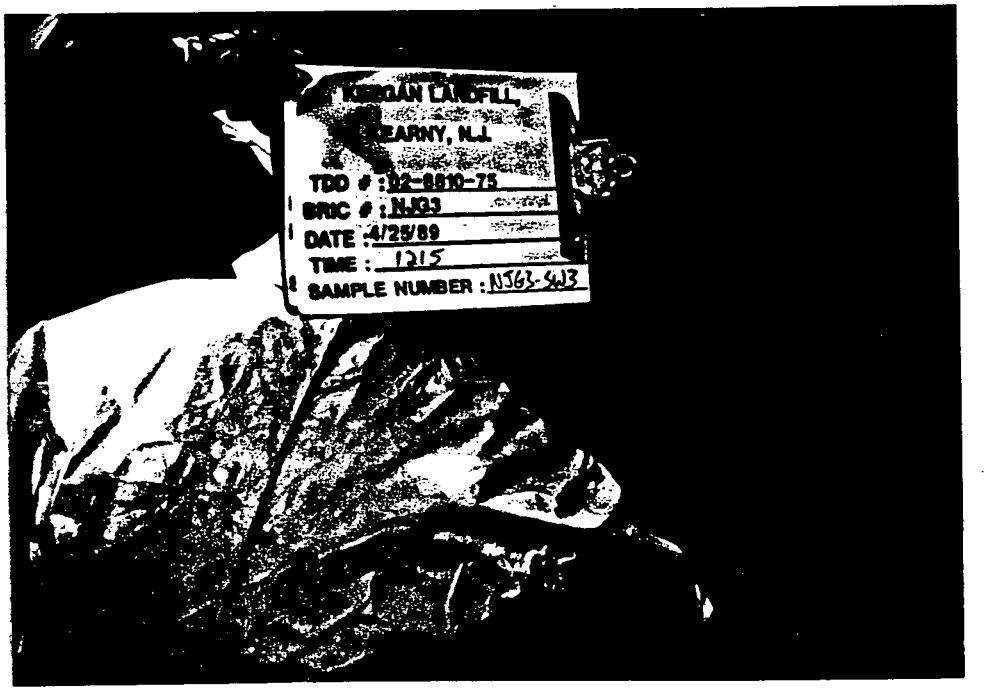
KEEGAN LANDFILL, KEARNY, NEW JERSEY




1P-6 April 25, 1989 1135
T. Marquart collecting surface water sample NJG3-SW2.



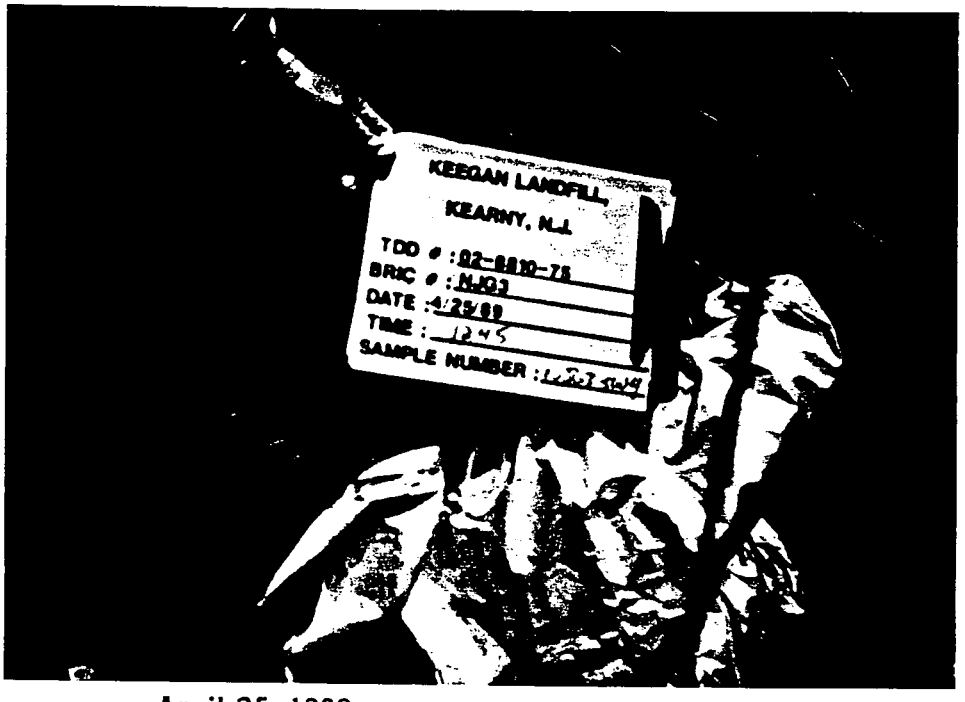

1P-7 April 25, 1989 1215
E. Knyfd collecting surface water sample NJG3-SW3.

KEEGAN LANDFILL, KEARNY, NEW JERSEY

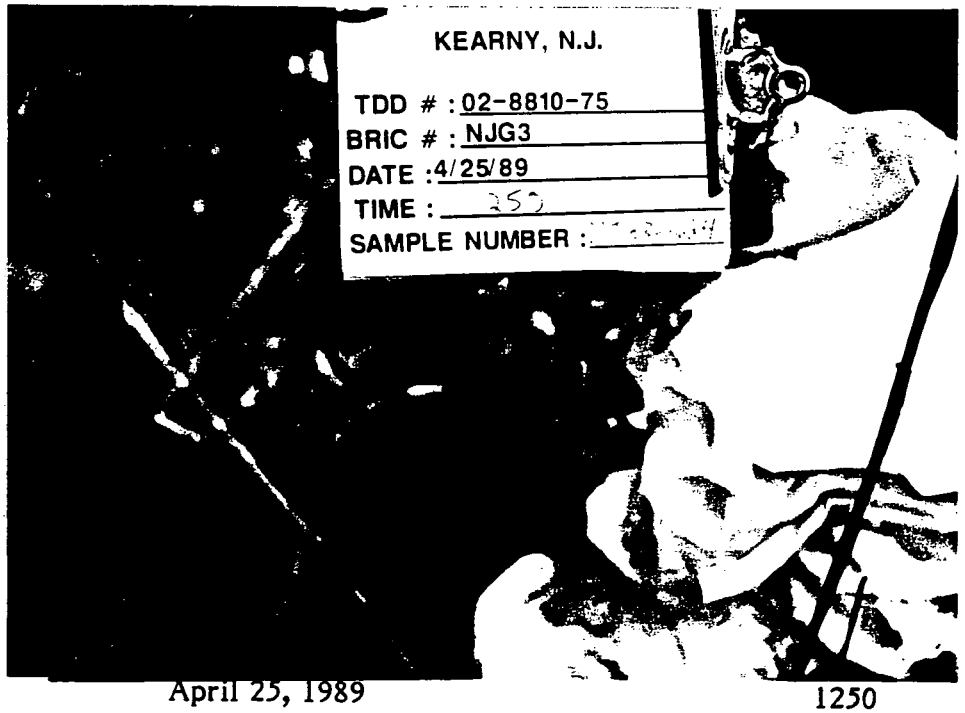
1P-8 April 25, 1989 1220
E. Knyfd collecting sediment samples NJG3-SED2 and NJG3-SED3.

1P-9 April 25, 1989 1235
Looking north along unnamed creek with sample location NJG3-SW3 on the right side.

KEEGAN LANDFILL, KEARNY, NEW JERSEY




1P-10 April 25, 1989 1245
T. Marquart collecting surface water sample NJG3-SW4.



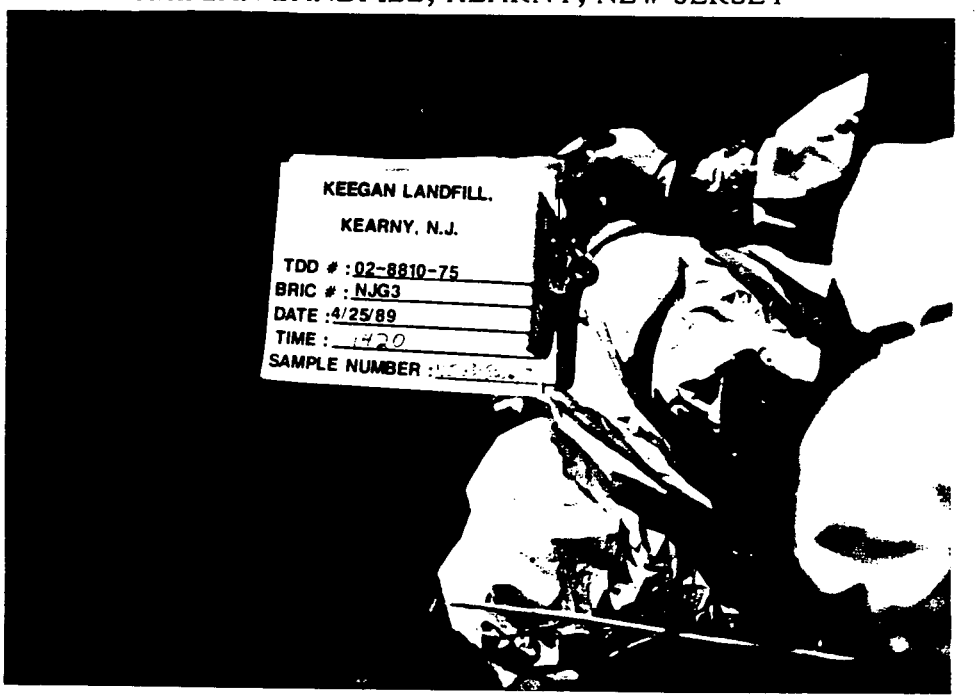

1P-11 April 25, 1989 1250
T. Marquart collecting sediment sample NJG3-SED4.

KEEGAN LANDFILL, KEARNY, NEW JERSEY

1P-12 April 25, 1989 1325
E. Knyfd collecting surface water sample NJG3-SW5 and sediment sample NJG3-SED5.

1P-13 April 25, 1989 1340
Looking north at Frank Creek from railroad tracks.

KEEGAN LANDFILL, KEARNY, NEW JERSEY




1P-14 April 25, 1989 1420
T. Marquart collecting surface water samples NJG3-SW6 and NJG3-SW7.

1P-15 April 25, 1989 1430
T. Marquart collecting sediment sample NJG3-SED6.

KEEGAN LANDFILL
KEARNY, NEW JERSEY

1P-16 April 25, 1989 1430
Looking south from dirt road at Frank Creek.

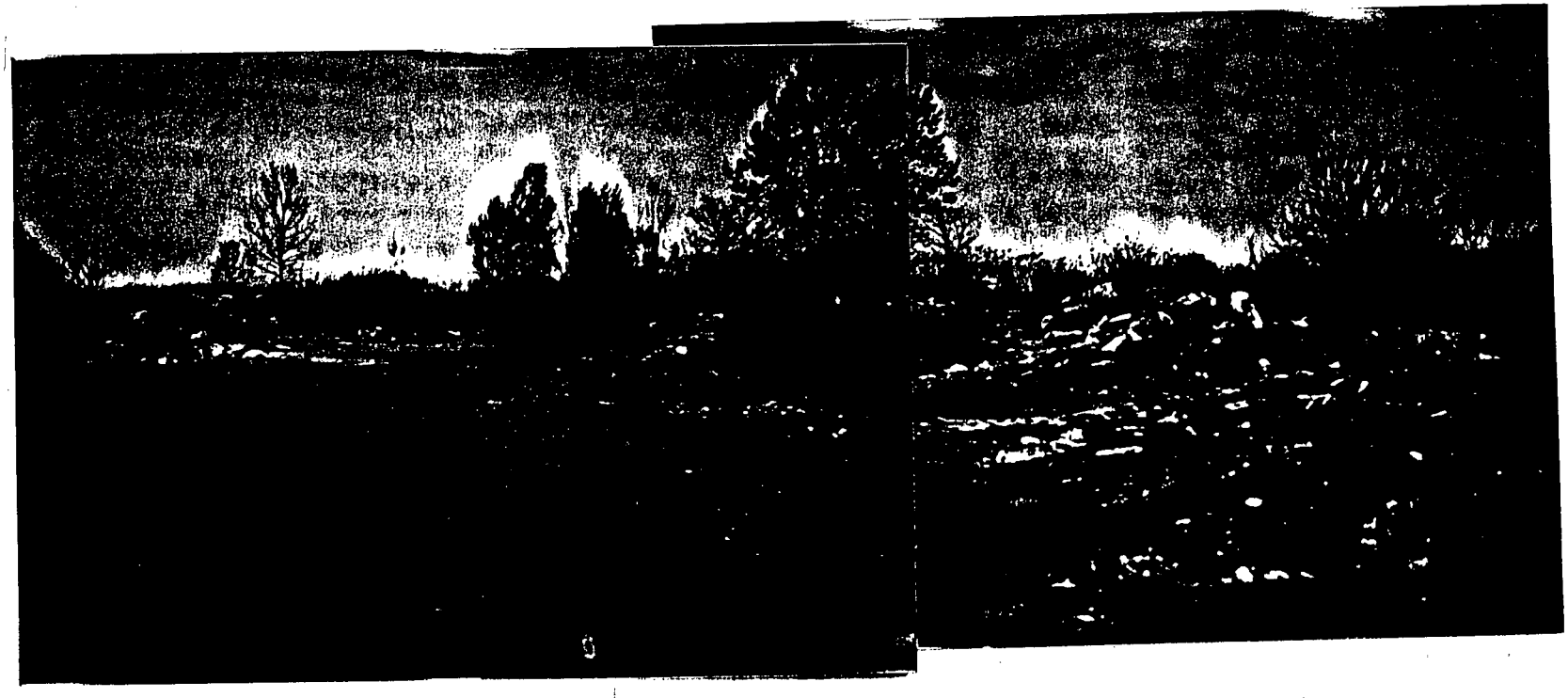
KEEGAN LANDFILL
KEARNY, NEW JERSEY

NUS CORPORATION

1P-17,18

April 25, 1989
Panoramic view of dumping area near the Bergen Avenue entrance. Looking north to northeast.

1445



1P-19, 20

April 25, 1989
Panoramic view of dumping area near the Bergen Avenue entrance. Looking east to southeast.

1445

# 4.0 SITE INSPECTION SAMPLING RESULTS

NUS Corporation conducted a site inspection of Keegan Landfill on April 25, 1989, at which time seven surface water samples and six sediment samples were collected. These samples were collected to determine the presence or absence of TCL substances on site. Sample locations are shown in Figure 3, Section 3.0. The results of the analyses for the sediment and surface water samples are summarized in Tables 2 and 3. A complete list of sample parameters and analytical results is presented in Reference No. 22.

Several additional semivolatile compounds were detected in sediment samples NJG3-SED1, NJG3-SED3, NJG3-SED5, and NJG3-SED6, but were below contract required Quantitation Limits (CRQL). The downstream sample NJG3-SED5 was found to contain greater concentrations of several semivolatile compounds, lead, and mercury than the upstream sample NJG3-SED6. Sediment samples NJ63-SED1, SED5, and SED6 also contained PCBs. Sediment samples NJG3-SED4 and NJG3-SED5 also contained estimated concentrations of tetrachloroethane of 68 ug/kg and 17 ug/kg, respectively. Sediment sample NJG3-SED4 contained an estimated concentration of 100 ug/kg of xylenes. These volatiles were not detected in any of the other sediment samples.

Surface water samples NJG3-SW5 and NJG3-SW6, 7, collected from Frank Creek, contained inorganic concentrations from 2 to 35 times the concentrations found in the other surface water samples collected. The downstream surface water sample NJG3-SW5 contained concentrations of inorganic compounds as much as five times the concentrations found in upstream samples NJG3-SW6, 7.

Ref. Nos. 2, 22

## TABLE 2 - SUMMARY OF ANALYSES FOR SEDIMENT SAMPLES

| | Sediment Sample | | | |
|---|---|---|---|---|
| Parameter/unit | Sed 1 | Sed 4 | Sed 5 | Sed 6 |
| Phenanthrene ug/kg | | | 5300 | 4800 |
| Fluoranthene ug/kg | | | 15,000 | 4700 |
| Pyrene ug/kg | | | 9600 | 3500 |
| Benzo (a) anthracene ug/kg | | | 6900 | 2000 |
| Chrysene ug/kg | | | 7300 | 2400 |
| Benzo(b)fluoranthene ug/kg | | | 5800 | 2300 |
| Benzo(k)fluoranthene ug/kg | | | 3700 | 1100 |
| Indeno (1,2,3-cd) pyrene ug/kg | | | 3200 | 1600 |
| Benzo(a)pyrene ug/kg | | | 4400 | 2000 |
| Benzo(g,h,i)perylene ug/kg | | | 2700 | 2000 |
| Aroclor - 1254 ug/kg | 2600 E | | 1400 E | 4200 E |
| Aroclor - 1260 ug/kg | 2400 E | | 1600 E | |
| Mercurv mg/kg | 0.7 | 2.6 | 8.7 | 2.3 |
| Lead mg/kg | 305 | 1020 | 1180 | 479 |
| Chromium mg/kg | 13.3 | 93.6 | 114 | 116 |

E - estimated value

## TABLE 3 - SUMMARY OF ANALYSES FOR SURFACE WATER SAMPLES

| | Surface Water Sample | |
|---|---|---|
| Parameter/unit | SW-5 | SW-6, SW-7 |
| Aluminum ug/L | 2170 E | 444 E, 467 E |
| Barium ug/L | 445 | 211, 212 |
| Chromium ug/L | 21.6 E | 4.6*, 4.2* |
| Copper ug/L | 95.2 E | |
| Iron ug/L | 11,900 | 2550, 2630 |
| Lead ug/L | 159 | 43.9, 42.8 |
| Manganese ug/L | 484 | 224, 220 |
| Mercury ug/L | 1.2 | |
| Zinc ug/L | 339 | 45.4, 47.7 |

* - estimated value, compound present below CRDL, but above IDL.
E - estimated value
blank space - compound analyzed for but not detected

# 5.0 CONCLUSIONS AND RECOMMENDATIONS

This site poses a potential threat of contamination of surface waters. Hazardous substances reported as being disposed of on site are chromate and bichromate slurry, organic waste, and pigment waste. Analyses of surface water samples collected at the Keegan Landfill Site indicate concentrations of chromium significantly greater in a downstream surface water sample than in an upstream sample. Semivolatile contaminants were detected in higher concentrations in the downstream sediment sample of Frank Creek than in the upstream sediment samples. However, the downstream samples, NJG3-SW5 and NJG3-SED5, were collected next to a railroad trestle; therefore, these contaminants may possibly be attributed to another source.

Groundwater in the area is not used for potable water, but solely for industrial use. The site is located in surface water, but there are no surface water intakes within 3 miles downstream of the site. The Hackensack River, located approximately 2.0 miles east of the site, is used for navigation by commercial and recreational vessels.

There is a potential for direct contact with hazardous substances present on site, since the site is not fenced. Based on the recreational targets from the Hackensack River and the potential for direct contact, this site is recommended for a **MEDIUM PRIORITY** for further action. A fence should be installed around the site to limit access to the landfill. Additional sediment and surface water samples should be collected from Frank Creek to determine if the contaminants present are attributable to the site or another source.

Ref. Nos. 1, 2, 4, 8, 10, 11, 22, 25, 26

# 6.0 REFERENCES

1. Preliminary Assessment, Malcolm Pirnie, Inc. May 5, 1986.

2. Field Notebook No. 0381, Keegan Landfill, TDD No. 02-8810-75, Site Inspection, NUS Corporation Region 2 FIT, Edison, New Jersey. December 19, 1988.

3. General Sciences Corporation, Graphical Exposure Modeling System (GEMS), Landover, Maryland, 1986.

4. Three-Mile Vicinity Map for Keegan Landfill, based on U.S.G.S. Topographic Maps 7.5 Minute Series, "Orange, N.J. Quadrangle," 1955 photorevised 1981, "Weehawken, N.J. Quadrangle," 1967 photorevised 1981, "Elizabeth, N.J. Quadrangle," 1967 photorevised 1981, and "Jersey City, N.J. Quadrangle," 1967 photorevised 1981.

5. U.S. Department of the Interior, Federal Water Pollution Control Administration, Report on the Quality of the Interstate Waters of the Lower Passaic River and Upper and Lower Bays of New York Harbor, November 1969.

6. New Jersey Department of Conservation and Economic Development, Hackensack Meadows Comprehensive Plan Technical Report No. 2A, Definition of the Meadows, March 15, 1965.

7. County of Bergen, New Jersey, Office of the County Engineer Feasibility Study and Report of a Hackensack River Dam. October 1966.

8. Uncontrolled hazardous waste site ranking system, A user's manual, 40 CFR Part 300, Appendix A, 1986.

9. Suszkowski, Dennis J. Sedimentology of Newark Bay, New Jersey: An Urban Estuarine Bay, June 1978.

10. Telecon Note: Conversation between Ms. Carole Schmidt, Kearny Water Department, and David Heim, NUS Corp., July 6, 1989.

11. Telecon Note: Conversation between Mr. Vince Bucci, Essex County Parks Department, and David Heim, NUS Corp., July 7, 1989.

12. New Jersey Geological Survey, Department of Environmental Protection, Bedrock Map of the Hackensack Meadows, 1959, revised 1962.

13. New Jersey Department of Environmental Protection (NJDEP), Bureau of Water Allocation, Water Withdrawal Points and NJGS Case Index Site within 5.0 miles of latitude 40° 44' 53", longitude 74° 06' 48", October 19, 1988.

14. Letter from Edward J. Londres, New Jersey Department of Environmental Protection, to Henry J. Hill, Mayor of Kearny, July 2, 1987.

15. Letter from James A. Rogers, James C. Anderson Associates, Inc., to Henry Hill, Mayor of Kearny, July 7, 1987.

16. Letter from Joseph E. Neglia, Town Engineer, Town of Kearny, to Mayor and Council, Town of Kearny, August 28, 1987.

17. Letter from Robert Ferraiuolo, Hudson Regional Health Commission, to Henry Hill, Mayor of Kearny, July 14, 1987.

## 6.0 REFERENCES (Cont'd)

18. Letter from Edward Grosvenor, Health Officer, Town of Kearny, to Henry Hill, Mayor of Kearny, July 21, 1987.

19. Letter from John P. Sarnas, Assistant Health Officer, Town of Kearny, to Henry Hill, Mayor of Kearny, July 23, 1987.

20. Letter from John A. Castner, NJDEP to John P. Sarnas, Assistant Health Officer, Kearny Department of Health and Environmental Protection, August 25, 1987.

21. Kearny Department of Public Health and Environmental Protection Memos regarding landfill fire dated June 25, 26, 29, 30 and July 1, 2, 6, 7, 8, 9, 10, 1987.

22. U.S. EPA Contract Laboratory Program, PEI Associates, Inc., and York Laboratories, Case No. 11834, Laboratory Analysis from NUS Corporation Region 2 FIT Site Inspection conducted on April 25, 1989.

23. New Jersey and National Registers of Historic Places, June 1, 1980.

24. Carswell, L.D. Appraisal of Water Resources in the Hackensack River Basin, New Jersey. U.S. Geological Survey Water Resources Investigations 76-74. June 1976.

25. Telecon Note: Conversation between Mr. Michael Beard, Kearny Health Department, and Gerald Gilliland, NUS Corp., April 20, 1989.

26. Telecon Note: Conversation between Lt. Ronald Johnstone, Kearny Police Department, and Gerald Gilliland, NUS Corp., April 25, 1989.

27. U.S. Department of the Interior. U.S. Fish and Wildlife Service, Atlantic Coast Ecological Inventory, New York (N.Y.-Conn.-N.J.), 1980.

**REFERENCE NO. 1**

— NJD981490428
— NOT ENTERED IN CERCLIS

# PRELIMINARY ASSESSMENT REVIEW FORM

**SITE NAME:** KEEGAN LANDFILL
**ALIASES:**
**ADDRESS:** FOOT OF BERGEN AVENUE
**CITY:** KEARNY
**COUNTY:** HUDSON
**STATE:** N.J.
**PRIORITY RATING GIVEN:** MEDIUM
**(BY STATE OR CONTRACTOR)**

**AGREE:** ✓
**DISAGREE:**
**(CHECK ONE)**

**IF DISAGREE, WHY?**

**OTHER COMMENTS:**

FACILITY: Active township dump for construction debris and miscellaneous refuse.
CHARACTERISTICS: During the offsite reconnaisance, illegal dumping was evident. Approximately 10 drums were observed along with refuse ranging from appliances to household trash. The site is inadequately secured with an extensive history of dumping activities. Several fires have also been reported.
HAZARDS: Potential exists for adverse impact to wetlands area waters (marshes, streams, ponds) along with soil contamination due to the decomposition of inappropriate materials. Since the landfill is not secured direct contact is available resulting in illegal dumping activities. This continual dumping for lead to further degradation of the area thus a medium priority rating should be assessed even though the wastes are primarily non-hazardous.

**RECOMMENDATION: FINAL (BY EPA)**

MEDIUM PRIORITY

**REVIEWER:** James Ippolito
**DATE:** 7/17/86

MALCOLM PIRNIE

# POTENTIAL HAZARDOUS WASTE SITE PRELIMINARY ASSESSMENT

NJD981490428

Keegan Landfill
**Site Name**

327
**Site ID Number**

Foot of Bergen Avenue
**Address**

Kearny, Hudson Co., NJ
**City, State**

**Date of Off-Site Reconnaissance** April 28, 1986

## SITE DESCRIPTION

The site was used as a municipal landfill from the late 1960's to 1974 when operations ceased at the request of the Hackensack Meadowlands Development Commission(HMDC). The site is owned by the Town of Kearny which leases it to John Keegan/MSLA for a municipal landfill.
The site is presently active as a township dump for construction debris and miscellaneous refuse. During the off-site reconnaissance, illegal dumping was evident. Approximately 10 drums were observed along with refuse ranging from appliances to household trash. The site is inadequately secured.
Located in the Hackensack Meadowlands, the site is potentially impacting on the sensitive environment of the region.
The site is designated as a special use area by the HMDC and is one of the areas being considered as the location of the NJ professional baseball association.

**PRIORITY FOR FURTHER ACTION:** High ____ Medium X Low ____ None ____

## RECOMMENDATIONS

While the overall assessment of the site is non-hazardous, a site inspection is recommended since drums and exposed wastes were observed on-site. A fence should be constructed along Bergen Avenue to restrict access and illegal dumping.

**Prepared by:** Arthur J. Clark **Date:** May 5, 1986

**Of:** Malcolm Pirnie, Inc.

EPA

# POTENTIAL HAZARDOUS WASTE SITE
## PRELIMINARY ASSESSMENT
### PART 1 - SITE INFORMATION AND ASSESSMENT

I. IDENTIFICATION
01 STATE: NJ | 02 SITE NUMBER: 327

## II. SITE NAME AND LOCATION

01 SITE NAME (Legal, common, or descriptive name of site): Keegan Landfill

02 STREET, ROUTE NO., OR SPECIFIC LOCATION IDENTIFIER: Foot of Bergen Avenue

03 CITY: Kearny

04 STATE: NJ | 05 ZIP CODE: 07032 | 06 COUNTY: Hudson | 07 COUNTY CODE | 08 CONG. DIST.

09 COORDINATES LATITUDE: 40-45-15 | LONGITUDE: 74-08-23

BLOCK 242 LOT 25 - 28

10 DIRECTIONS TO SITE (Starting from nearest public road): NJ Turnpike Exit 15W to Rt 280 West. Exit at Harrison Avenue, west to Schuyler Avenue. roceed to Bergen Avenue East. The LF is past the RR tracks on the left.

## III. RESPONSIBLE PARTIES

01 OWNER (If known): Town of Kearny

02 STREET (Business, mailing, residential): 645 Kearny Avenue

03 CITY: Kearny

04 STATE: NJ | 05 ZIP CODE: 07032 | 06 TELEPHONE NUMBER: (201)-9970600

07 OPERATOR (If known and different from owner): John Keegan (former operator)

08 STREET (Business, mailing, residential): 18 Somerset Drive

09 CITY: Rumson

10 STATE: NJ | 11 ZIP CODE: 07760 | 12 TELEPHONE NUMBER: (201)-7411377

13 TYPE OF OWNERSHIP (Check one)

- [ ] A. PRIVATE
- [ ] B. FEDERAL _____ (Agency name)
- [ ] C. STATE
- [ ] D. COUNTY
- [x] E. MUNICIPAL
- [ ] F. OTHER _____ (Specify)
- [ ] G. UNKNOWN

14 OWNER/OPERATOR NOTIFICATION ON FILE (Check all that apply)

- [ ] A. RCRA 3001 DATE RECEIVED: _____ (MONTH DAY YEAR)
- [ ] B. UNCONTROLLED WASTE (CERCLA 103c) DATE RECEIVED: _____ (MONTH DAY YEAR)
- [x] C. NONE

## IV. CHARACTERIZATION OF POTENTIAL HAZARD

01 ON SITE INSPECTION
- [x] YES DATE Numerous (MONTH DAY YEAR)
- [ ] NO

BY (Check all that apply)
- [ ] A. EPA
- [ ] B. EPA CONTRACTOR
- [ ] C. STATE
- [ ] D. OTHER CONTRACTOR
- [x] E. LOCAL HEALTH OFFICIAL
- [x] F. OTHER Police Department (Specify)

CONTRACTOR NAME (S)

02 SITE STATUS (Check one)
- [x] A. ACTIVE
- [ ] B. INACTIVE
- [ ] C. UNKNOWN

03 YEARS OF OPERATION
BEGINNING YEAR | ENDING YEAR
- [x] UNKNOWN

04 DESCRIPTION OF SUBSTANCES POSSIBLY PRESENT, KNOWN, OR ALLEGED

The site has an extensive history of dumping activities. Included is the dumping of construction debris, municipal garbage, and illegal dumping of drums. Several fires have been reported. (Att A,B)

05 DESCRIPTION OF POTENTIAL HAZARD TO ENVIRONMENT AND/OR POPULATION

A potential for damage to the wetlands from disposal of inappropriate materials. The entrance road is blocked by a gate but access to the dump area is still possible. (Off-site Reconnaissance)

## V. PRIORITY ASSESSMENT

01 PRIORITY FOR INSPECTION (Check one. If high or medium is checked, complete Part 2 - Waste Information and Part 3 - Description of Hazardous Conditions and Incidents)

- [ ] A. HIGH (Inspection required promptly)
- [ ] B. MEDIUM (Inspection required)
- [x] C. LOW (Inspection on time available basis)
- [ ] D. NONE (No further action needed, complete current disposition form)

## VI. INFORMATION AVAILABLE FROM

01 CONTACT: Robert Hayton

02 OF (Agency/Organization): NJDEP - HSMA, REERA

03 TELEPHONE NUMBER: (609)-633-7219

04 PERSON RESPONSIBLE FOR ASSESSMENT: Arthur J. Clarke

05 AGENCY

06 ORGANIZATION: M. Pirnie, inc

07 TELEPHONE NUMBER: (201)-450400

08 DATE: 03/05/86 (MONTH DAY YEAR)

EPA FORM 2070-12 (7-81)

EPA

# POTENTIAL HAZARDOUS WASTE SITE
## PRELIMINARY ASSESSMENT
## PART 2 - WASTE INFORMATION

| I. IDENTIFICATION | |
|---|---|
| 01 STATE | 02 SITE NUMBER |
| NJ | 327 |

## II. WASTE STATES, QUANTITIES, AND CHARACTERISTICS

**01 PHYSICAL STATES** *(Check all that apply)*

- [x] A. SOLID
- [ ] B. POWDER, FINES
- [ ] C. SLUDGE
- [ ] D. OTHER _____ *(Specify)*
- [ ] E. SLURRY
- [x] F. LIQUID
- [ ] G. GAS

**02 WASTE QUANTITY AT SITE** *(Measures of waste quantities must be independent)*

TONS unknown
CUBIC YARDS unknown
NO. OF DRUMS 10

**03 WASTE CHARACTERISTICS** *(Check all that apply)*

- [ ] A. TOXIC
- [ ] B. CORROSIVE
- [ ] C. RADIOACTIVE
- [ ] D. PERSISTENT
- [ ] E. SOLUBLE
- [ ] F. INFECTIOUS
- [ ] G. FLAMMABLE
- [ ] H. IGNITABLE
- [ ] I. HIGHLY VOLATILE
- [ ] J. EXPLOSIVE
- [ ] K. REACTIVE
- [ ] L. INCOMPATIBLE
- [x] M. NOT APPLICABLE

## III. WASTE TYPE

| CATEGORY | SUBSTANCE NAME | 01 GROSS AMOUNT | 02 UNIT OF MEASURE | 03 COMMENTS |
|---|---|---|---|---|
| SLU | SLUDGE | | | Unknown |
| OLW | OILY WASTE | | | |
| SOL | SOLVENTS | | | |
| PSD | PESTICIDES | | | |
| OCC | OTHER ORGANIC CHEMICALS | | | |
| IOC | INORGANIC CHEMICALS | | | |
| ACD | ACIDS | | | |
| BAS | BASES | | | |
| MES | HEAVY METALS | | | |

## IV. HAZARDOUS SUBSTANCES *(See Appendix for most frequently cited CAS Numbers)*

| 01 CATEGORY | 02 SUBSTANCE NAME | 03 CAS NUMBER | 04 STORAGE/DISPOSAL METHOD | 05 CONCENTRATION | 06 MEASURE OF CONCENTRATION |
|---|---|---|---|---|---|
| | Unknown | | | | |

## V. FEEDSTOCKS *(See Appendix for CAS Numbers)*

| CATEGORY | 01 FEEDSTOCK NAME | 02 CAS NUMBER | CATEGORY | 01 FEEDSTOCK NAME | 02 CAS NUMBER |
|---|---|---|---|---|---|
| FDS | | | FDS | | |
| FDS | | | FDS | | |
| FDS | | | FDS | | |
| FDS | | | FDS | | |

## VI. SOURCES OF INFORMATION *(Cite specific references, e.g. state files, sample analysis, reports)*

Hackensack Meadowlands Development Commission: Attachment A
Kearny Health Department: See off-site reconnaissance field notes
Tax Assessor: Attachment B

EPA FORM 2070-12 (7-81)

EPA

**POTENTIAL HAZARDOUS WASTE SITE**
**PRELIMINARY ASSESSMENT**
PART 3 - DESCRIPTION OF HAZARDOUS CONDITIONS AND INCIDENTS

I. IDENTIFICATION
01 STATE: NJ | 02 SITE NUMBER: 327

## II. HAZARDOUS CONDITIONS AND INCIDENTS

01 ☐ A. GROUNDWATER CONTAMINATION
02 ☐ OBSERVED (DATE: _____) ☐ POTENTIAL ☐ ALLEGED
03 POPULATION POTENTIALLY AFFECTED: _____
04 NARRATIVE DESCRIPTION

01 ☒ B. SURFACE WATER CONTAMINATION
02 ☐ OBSERVED (DATE: _____) ☒ POTENTIAL ☐ ALLEGED
03 POPULATION POTENTIALLY AFFECTED: _____
04 NARRATIVE DESCRIPTION
A potential exists for adverse impact to the wetlands area waters.

01 ☐ C. CONTAMINATION OF AIR
02 ☐ OBSERVED (DATE: _____) ☐ POTENTIAL ☐ ALLEGED
03 POPULATION POTENTIALLY AFFECTED: _____
04 NARRATIVE DESCRIPTION

01 ☒ D. FIRE/EXPLOSIVE CONDITIONS
02 ☐ OBSERVED (DATE: _____) ☐ POTENTIAL ☒ ALLEGED
03 POPULATION POTENTIALLY AFFECTED: _____
04 NARRATIVE DESCRIPTION
Several fires have been reported at the landfill.
(Attachment C,D)

01 ☒ E. DIRECT CONTACT
02 ☐ OBSERVED (DATE: X) ☐ POTENTIAL ☐ ALLEGED
03 POPULATION POTENTIALLY AFFECTED: _____
04 NARRATIVE DESCRIPTION
As the landfill is not secured and as demonstrated by the illegal dumping activities, a potential exists for direct contact.

01 ☒ F. CONTAMINATION OF SOIL
02 ☐ OBSERVED (DATE: _____) ☒ POTENTIAL ☐ ALLEGED
03 AREA POTENTIALLY AFFECTED: _____ (Acres)
04 NARRATIVE DESCRIPTION
A potential exist from the deposition of inappropriate materials in the landfill.

01 ☐ G. DRINKING WATER CONTAMINATION
02 ☐ OBSERVED (DATE: _____) ☐ POTENTIAL ☐ ALLEGED
03 POPULATION POTENTIALLY AFFECTED: _____
04 NARRATIVE DESCRIPTION

01 ☐ H. WORKER EXPOSURE/INJURY
02 ☐ OBSERVED (DATE: _____) ☐ POTENTIAL ☐ ALLEGED
03 WORKERS POTENTIALLY AFFECTED: _____
04 NARRATIVE DESCRIPTION

01 ☒ I. POPULATION EXPOSURE/INJURY
02 ☐ OBSERVED (DATE: _____) ☐ POTENTIAL ☐ ALLEGED
03 POPULATION POTENTIALLY AFFECTED: _____
04 NARRATIVE DESCRIPTION
As the site is inadequately secured, the potential exists for on-site exposure.

EPA FORM 2070-12 (7-81)

EPA

**POTENTIAL HAZARDOUS WASTE SITE**
**PRELIMINARY ASSESSMENT**
**PART 3 - DESCRIPTION OF HAZARDOUS CONDITIONS AND INCIDENTS**

| I. IDENTIFICATION | |
|---|---|
| 01 STATE | 02 SITE NUMBER |
| NJ | 327 |

**II. HAZARDOUS CONDITIONS AND INCIDENTS** *(Continued)*

01 ☐ J. DAMAGE TO FLORA — 02 ☐ OBSERVED (DATE: _____) ☐ POTENTIAL ☐ ALLEGED
04 NARRATIVE DESCRIPTION

01 ☐ K. DAMAGE TO FAUNA — 02 ☐ OBSERVED (DATE: _____) ☐ POTENTIAL ☐ ALLEGED
04 NARRATIVE DESCRIPTION *(Include name(s) of species)*

01 ☐ L. CONTAMINATION OF FOOD CHAIN — 02 ☐ OBSERVED (DATE: _____) ☐ POTENTIAL ☐ ALLEGED
04 NARRATIVE DESCRIPTION

01 ☒ M. UNSTABLE CONTAINMENT OF WASTES *(Spills/runoff/standing liquids/leaking drums)* — 02 ☒ OBSERVED (DATE: 4/28/86) ☐ POTENTIAL ☐ ALLEGED
03 POPULATION POTENTIALLY AFFECTED: _____
04 NARRATIVE DESCRIPTION
Waste and debris are exposed throughtout the site. The site is inadequately secured.
(Off-Site Recon.)

01 ☒ N. DAMAGE TO OFFSITE PROPERTY — 02 ☒ OBSERVED (DATE: 4/28/86) ☐ POTENTIAL ☐ ALLEGED
04 NARRATIVE DESCRIPTION
Debris extends beyond the limits of the landfill area.
(Off-Site Recon.)

01 ☐ O. CONTAMINATION OF SEWERS, STORM DRAINS, WWTPs — 02 ☐ OBSERVED (DATE: _____) ☐ POTENTIAL ☐ ALLEGED
04 NARRATIVE DESCRIPTION

01 ☒ P. ILLEGAL/UNAUTHORIZED DUMPING — 02 ☒ OBSERVED (DATE: 4/28/86) ☐ POTENTIAL ☐ ALLEGED
04 NARRATIVE DESCRIPTION
The gate across the entrance road inadequately restricts access. Unauthorized dumping is evident throughout the site.
(Off-Site Recon.)

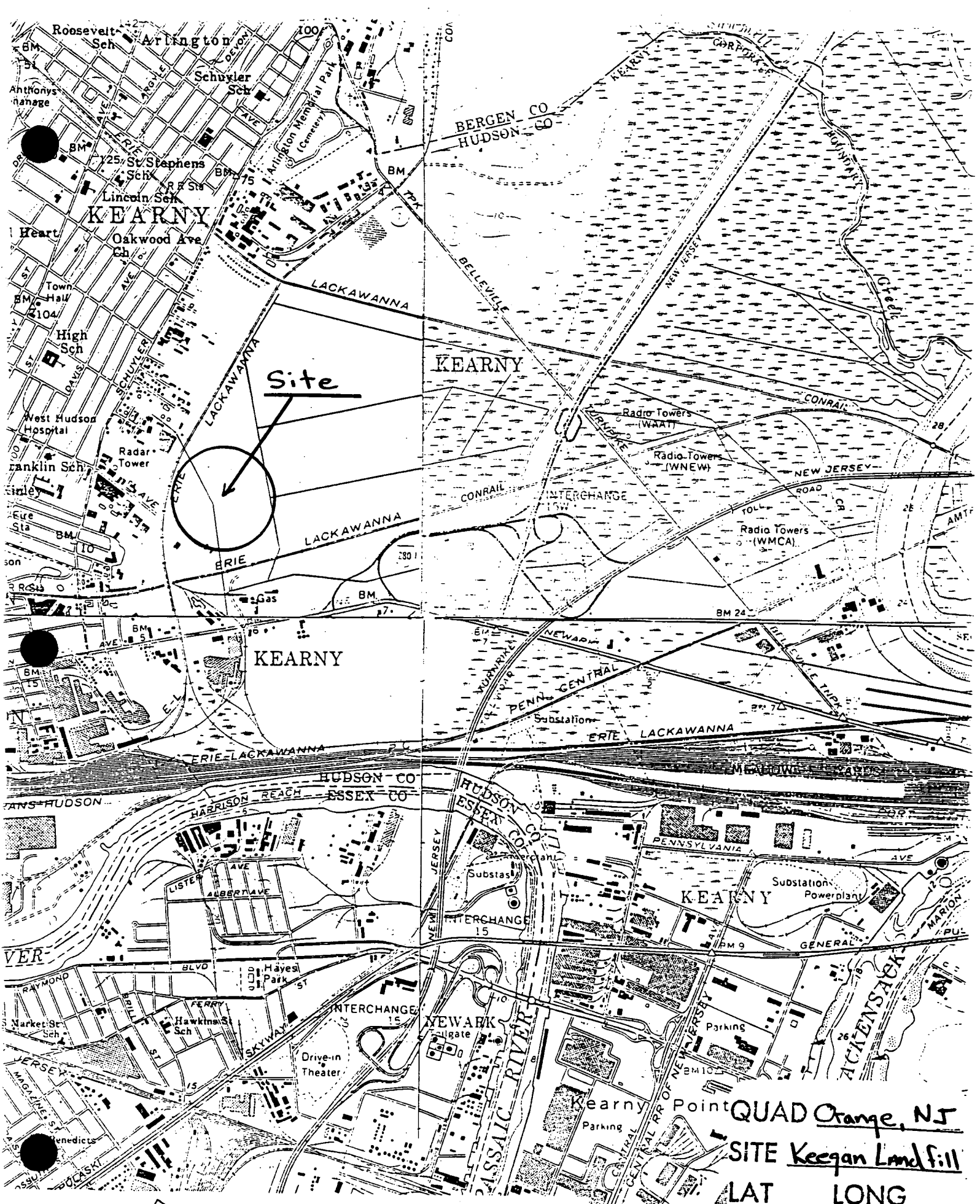
05 DESCRIPTION OF ANY OTHER KNOWN, POTENTIAL, OR ALLEGED HAZARDS
On 8/5/1980, the Kearny Police responded to an alleged sighting of hazardous substances dumping activities. No evidence was collected to substantiate the allegation. (Attachment E)

**III. TOTAL POPULATION POTENTIALLY AFFECTED:** _____

**IV. COMMENTS**
While the overall assessment of the site is non-hazardous, an on-site inspection is warranted. The area in which this lanfill is located historically has been used for midnight dumping of hazardous substances.

**V. SOURCES OF INFORMATION** *(Cite specific references, e.g. state files, sample analysis, reports)*
NMDL : Attachment A
Kearny Health Department: See Off-Site Recon., Attachments B - D
Kearny Police Department: Attachment E

EPA FORM 2070-12 (7-81)




QUAD Orange, NJ

SITE Keegan Landfill

LAT ___ LONG ___

40°45'15" N

74°08'23" W

ORANGE, N. J.

N4045—W7407.5/7.5

p. 39

MALCOLM PIRNIE

SITE NAME: KEEGAN LANDFILL

ID NO: 327

LOCATION: KEARNY

| FILE | SEARCH DATE | REVIEWER | RCRA 3001 FORM | CERCLA 103C FORM | PRELIMINARY INSP. REPORT | FIELD INSPECTION REPORTS | AGENCY INTERNAL MEMOS | RESP. PARTY CORRESPONDENCE | FORMAL REPORTING DOCUMENTS | SITE SKETCHES | ANALYTICAL DATA | SECOND SEARCH DATE | REMARKS | QA CHECK |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| KEARNY HEALTH DEPT. | 3/27/86 | RAM | NF | NF | ✓ | NF | NF | X | NF | ✓ | NF | | doc on file regarding LF FIRES. FIRE DOCUMENTATION includes NEWS ARTICLES, LEGAL BRIEFS, FORMAL COMPLAINTS, STATE INVOLVEMENT. G. GROSVENOR - illegal dumping for many years. | |
| Hudson Health Comm. | 3-27-86 | BLK | NF | — | — | — | — | — | — | — | → | | NO FILE | |

CODES:

✓ REVIEWED AND COPIED
X REVIEWED BUT NOT COPIED
NF NOT FOUND
--- NOT APPROPRIATE

p. 40

A

MALCOLM PIRNIE

NJDEP Preliminary Assessments
Site Number: 327

TELEPHONE CALL CONFIRMATION

Local 201-460-1700 Long Distance

Date 4-29-86

To/From John Balon
HMDC

Time 0930 Hrs

Project Prel. Assess

MPI Name A. CLARKE

Proj. No. 835-08-1100

Subject: Keegan Landfill : Operated from Late 1960's through 1974 when operations were halted at HMDC's request. Recently there are dumping activities at the site by the town of Kearny. Refuse including leaves + misc. debris. Site is owned by the Town of Kearny who leased the property to John - Keegan / MSLA. The lease is still valid.

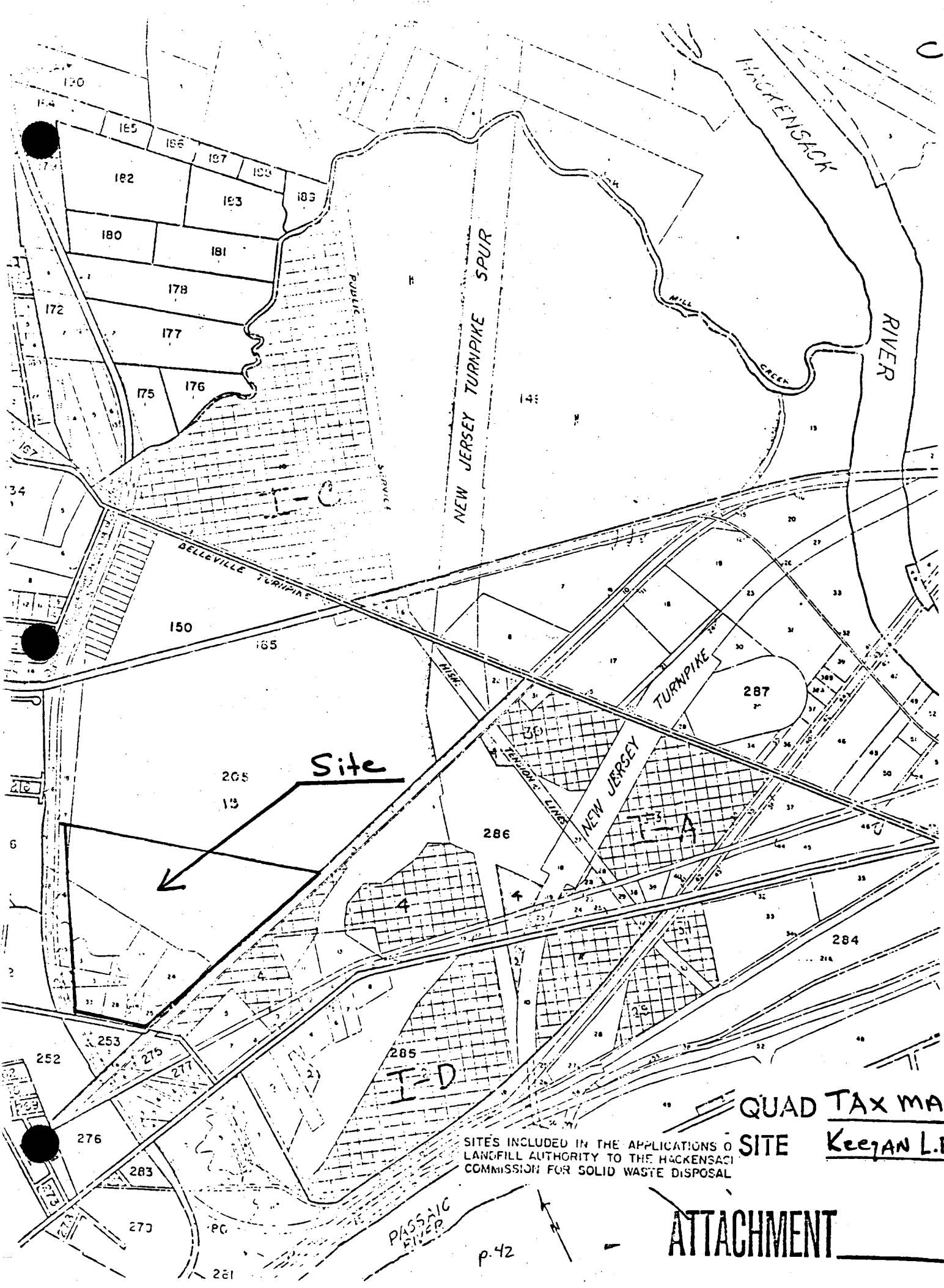
The site is listed as a special use area by HMDC. 50% of this land would be available for development. The site is one of the Meadowlands locations being considered for the Pro. Baseball STADIUM

Mr. Balon has a map of the area but no other files or information

Route to:

File:

ATTACHMENT A


C
HACKENSACK
RIVER
NEW JERSEY TURNPIKE SPUR
MILL CREEK
PUBLIC SERVICE
I-C
BELLEVILLE TURNPIKE
NEW JERSEY TURNPIKE
HIGH TENSION LINES
I-A
Site
I-D
PASSAIC RIVER
QUAD TAX MAP
SITE Keegan L.F.
SITES INCLUDED IN THE APPLICATIONS O
LANDFILL AUTHORITY TO THE HACKENSACI
COMMISSION FOR SOLID WASTE DISPOSAL
ATTACHMENT
p.42

MALCOLM PIRNIE

B

NJDEP Preliminary Assessments
Site Number: 327

TELEPHONE CALL CONFIRMATION

Local _____ Long Distance _____

Date 4-27-8

To/From Kearny TAX ASSESORS

Time 2:00pm

Project Prel. Assess

MPI Name Rich Peters

Proj. No. 835-08-1100

Subject: Lease on Keegan Landfill:

William A. Keegan JR. Address:
Block 242 LOT 26 411 Beigan Ave
(Sheet 46) 27 Kearny NJ 07032
28

John P. Keegan Address:
Block 205 LOT 25 18 Somerset Dr.
(Sheet M-2) 28 Rumson, NJ 0776

Route to:

File:

ATTACHMENT B

C-1

# Kearny
# Department of Public Health and Environmental Protection

BOARD MEETS
THIRD WEDNESDAY OF EACH MONTH
AT HEALTH CENTER
645 KEARNY AVENUE
KEARNY, N.J. 07032

997-0600

COMMISSIONERS, BOARD OF HEALTH:
PETER MALNATI, PRESIDENT
VICTOR RUDOMANSKI, M.D., VICE PRESIDENT
LEONARD VAN ORDEN, SECRETARY
VINCENT MARTONE
RAYMOND MCGAUGHAN
JOHN MCNAMARA
LILLIAN CARDOZA

EDWARD GROSVENOR
HEALTH OFFICER

19

## REPORT ON FIRES - OLD KEAGAN LANDFILL

An underground fire was observed on the above landfill at 12:30PM on Tuesday December 4, 1984. An on-site inspection showed one venting hole approximately 1/2 mile inside landfill north of Bergen Avenue. The Town Engineer's office was called to help identify property ownership. This is very difficult due to no physical or identifiable sites in the surrounding area. The area was eventually identified as belonging to the Town of Kearny. Another visual inspection was made on Wednesday 12/5/84 at 1:00 PM smoke was seen venting from approximately nine different areas. Health officer was informed at 2:00 PM and made observation of problem accompained by Richard Ferraioli of the Kearny Water Department. Councilman McLaughlin, Board of Health liaison and Councilman McIntyre, DPW committeemen were informed of the situation at the same time. Approval was sought to use Town equipment to estinguish these underground fires.

4:00 PM 12/5/84, the site was viewed by John Sarnas, Ed Grosvenor and Councilman McIntyre.Due to the nature of the problem, Town equipment was deemed unsuitable to use on these fires. A tract vehicle was the only suitable piece of equipment which the Town does not have. The Town front end loader has tires which would most likely sink in the soft terraine.

MSLA equipment and expertice were available and the Health Department made contact to have the work done immediately.

10:00 AM Thursday 12/6/84 D-8 dozer arrives on Landfill, water truck not needed. 1:00PM work done on first big vent. Will take two full days to extinguish fifteen sited vents.

Friday call Eugene Siciliano of MSLA. Cold and wind are disipating smoke before it leaves the weeds making siting difficult if not impossible. 1:00PM dozer leaving, told to return for two small vents on North side. Put out at 3:00 PM.

Call to Siciliano, I told him that it was difficult to view vents due to weather and though it appears all is out, I will return on Monday for final inspection.

ATTACHMENT C-1

C-2

Monday 9:30AM 12/10/84 no smoke from vents, however large pile of debris had been set on fire over the weekend by someone burning wire. View site with deputy chief Cody, Kearny Fire Department, he said no truck could reach site, all he has is a two gallon portable pump.

Spoke with Gaglio, DPW who said front end loader has a flat and won't be available till the afternoon. I said that was sufficient.

2:00PM Dennis Burke on front end loader begins to seperate pile of smoldering debris, as he is working open flames are erupting. Fire Department responds to my call and is unable to do anything. Eugene Siciliano stops after siting smoke and said he could handle fire in two hours with his equipment at no charge. Front end loader with rubber tires going thru hot spots, not advisable.

Tuesday, December 11, 1984, 7:30 MSLA equipment begins to put fire out.

Job completed at 10:15AM.



ATTACHMENT C-2

D

# REPORT OF INSPECTION

Date: Dec., 3, 1981
Time: 10:00 PM
Site: Bergen Ave. Landfill

An inspection of the underground fires on the above site was conducted by Health Officer Grosvenor, Deputy Chief Cody, Assistant Superintendant DPW Gaglio and myself on the above date.

Three areas were observed venting smoke, indicating underground fires are present.

Past history has indicated the possibility of hazardous materials being present in the area, increasing the seriousness of this problem.

All present agreed that the only means to illiminate this problem was with a trained buldozer operator opening the areas up and smoking the fires. Galgio stated that the town does not have the proper equipment to handle this problem, Cody stated that water is useless in putting-out underground fires. He went on to say the areas were not presently accessable to fire department equipment. (New roads in the landfill would have to be installed)

It was decided to persue outside help, with the mayors consent to have this problem abated, at not cost to the town if at all possible.

Following this meeting, I met with Mayor Hill on Friday afternoon, December 4, 1981. He gave his approval to looking for voluntary help from outside groups.

Department of Environmental protection hazardous waste management was next contacted. I spoke with George Weiss, who indicated that if it can be documented that chemical waste is located on this site, aid might be forthcoming. Despite two or three follow-ups, DEP has been unable to give any positive statement except to say they may be interested.

Spoke with Turco on December 27, 1981, he said he would be unable to aid us as man and equipment will not be in the area for the next month or two.

Submitted by:

John P. Sarnas

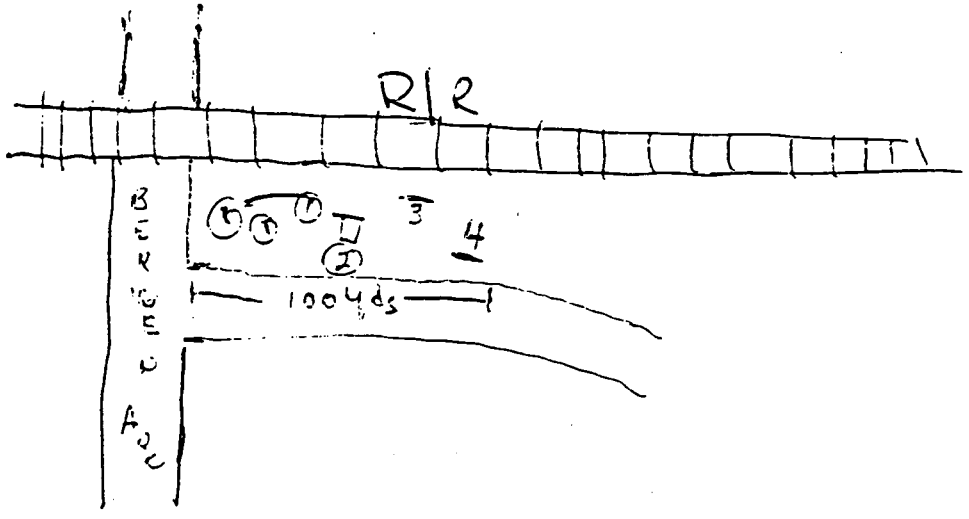
ATTACHMENT D

E

Keegan Dump

August 5, 1980

The K.P.D. received information involving the alleged dumping of hazardous materials at the ~~time~~ closed Keegan Landfill approximately 1 year ago. With the cooperation of the D.P.W from (4) areas of the landfill were "dug up" where the alleged material was dumped and covered. Pits from 18" to 4' were uncovered ~~trying~~ to locate this material. After two (2) hours nothing could be found, this does not mean this material or other hazardous material is not present on this site. Also at sight was the K.F.D.




Edward Pitts



ATTACHMENT E

MALCOLM PIRNIE

# OFF - SITE RECONNAISSANCE

Date: 4-28-86

Time In 1300 hrs Out 1330 hrs

Site ID No. 327

Site Name: Keegan Landfill

Location: Kearny, New Jersey

Address: Foot of Bergen Ave.

City, County: Kearny, Hudson

Zip: 07032

Personnel: A. CLARKE - MPI
R. Peters - MPI
M. Beard - Kearny

Title: Chemist
Engineer
Environmental Specialist

Conditions: SUNNY

Temperature: 80°F

Any evidence of imminent hazard? NO

Illegal Dumping? yes

Uncapped Monitoring Wells? NO

If Yes, Notify NJDEP

Signature: [illegible]

Date: 4-28-86

Witness:

Date:

MALCOLM PIRNIE

FIELD NOTES



Site: Keenan Landfill Site ID No. 327

Date: 4/28/86 Personnel R Peters - MPI

A CLARKE - MPI

M Beard - Kenny D.O.H.

1300HRS ARRIVE AT SITE

Underground fires, drum dumping, Miscellaneous/illegal Refuse dumping, Town dumping and Waste Removal to the Town Dump are all included in the site's history.

1305 HRS - Viewed the active dumping site used by the town of Kenney for miscellaneous debris (eg: soil, tree cuttings, construction refuse)

1310 HRS - Site is bounded by Berann Ave to the southeast, ERIE LACKAWANNA / ConRail TRACKS to the south, west and north, and a marsh / pond area to the east. Beyond this pond lies the western spur of the NJ Turnpike. Total Acreage is unknown.

1320 HRS - Area of property owned by the Keenan's is a great deal less than the entire Landfill area. Two Land parcels of Town land were/are used for illegal dumping of refuse. Site is secured by a chain-gate on Berann Ave, however, it is not known whether it is locked on a daily basis.

ATTACHMENT

Signature: [signature] Date: 4/28/86

Witness: Date:

MALCOLM PIRNIE

PHOTO LOG



Subject: Keegan Landfill Site ID No. 327

Date: 4-28-86 Page No.

ASA: 100

| Frame No: | Object photographed:* | Location of photographer:* | Compass heading: |
|---|---|---|---|
| 7 | Drums at Landfill | Eastern access Road | NW |
| 8 | Eastern Access Road Near Drums. | Eastern access Road | SW |
| 9 | Eastern Access Road Near Drums | Eastern access Road | NE |
| 10 | Stream at Center of Landfill | Central Access Road | SW |
| 11 | Refuse at Center of L.F. | Western Access Road | SE |
| 12 | Central Area of Landfill | Western Access Road | SW |
| 13 | Central Area of Landfill | Western Access Road | S |
| 14 | Entrance to Landfill | Beregan Ave | NE |
| 15 | Beregan Ave West | Beregan Ave | NW |
| 16 | Beregan Ave East | Beregan Ave | SE |

*Indicate on sketch or map if possible

Signature: Date:

Witness: Date:

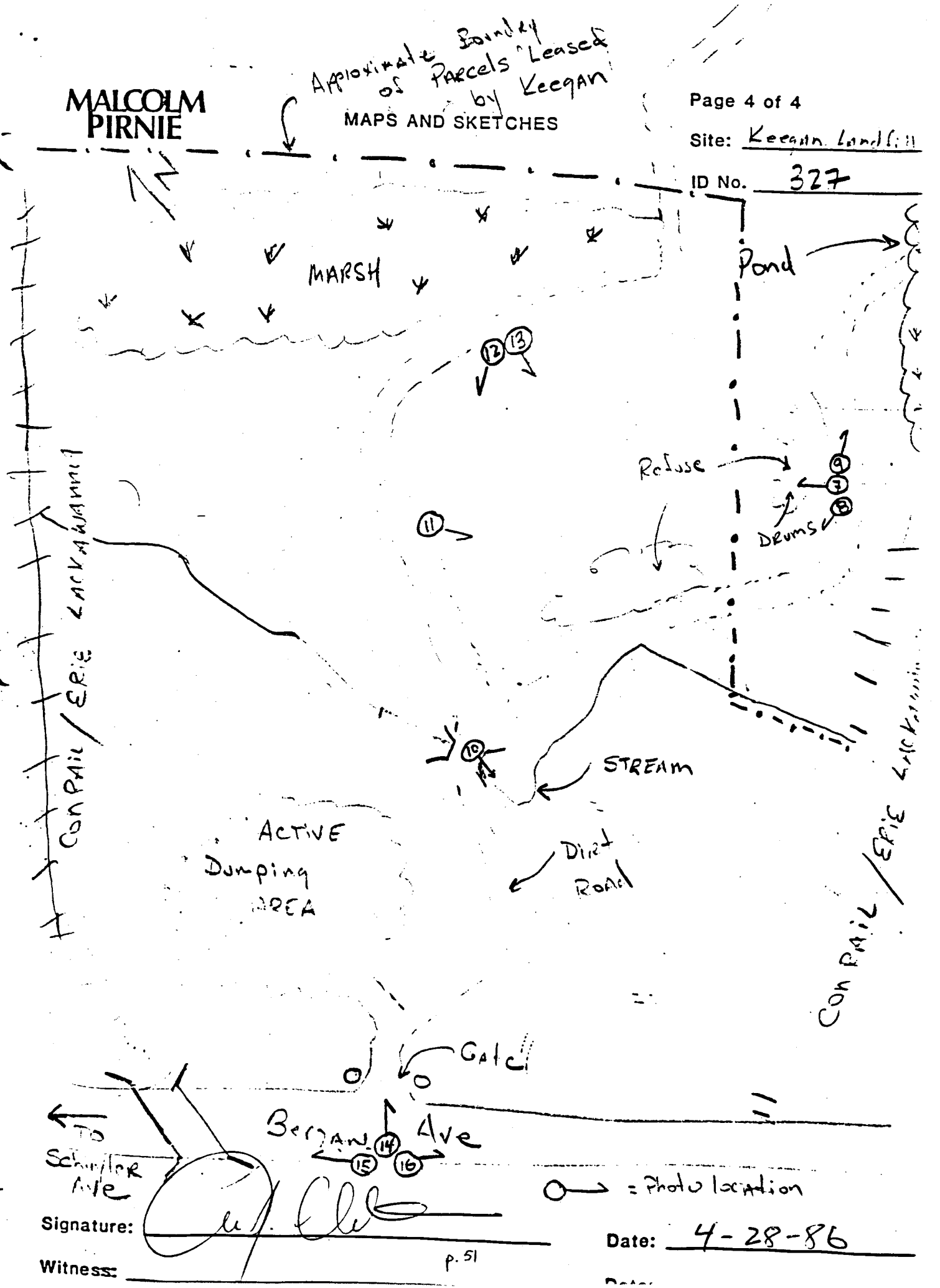
MALCOLM PIRNIE

MAPS AND SKETCHES



Site: Keegan Landfill

ID No. 327




Signature: [illegible]

Date: 4-28-86

Witness:

Date:

NJDEP PRELIMINARY ASSESSMENTS

MARCH TO JUNE, 1986

FILE REVIEW SUMMARY

Site Name: KEEGAN LANDFILL

Site Number: 327

| | SEARCH DATE | REVIEWED BY | STATUS* |
|---|---|---|---|
| **New Jersey Department of Environmental Protection:** | | | |
| Central Files: | | | |
| DWM | 3-21-86 | BLK/JDM | |
| DWR | 3-24-86 | BLK/JDM | |
| HSMA | 3-26-86 | BLK/JDM | |
| Environmental Qual. | 3-26-86 | BLK/JDM | |
| Office of Sci. & Res. | 3-26-86 | BLK/JDM | |
| Field Office: MEMD | | | |
| DWM | 3-20-86 | JDM | |
| DWR | 3-A-86 | BLK | |
| Env. Qual. | | | |
| **U.S. Environmental Protection Agency:** | | | |
| Edison | 4/28/86 | JLC | |
| Federal Plaza | | | |
| **Local Health Offices:** | | | |
| KEARNY HEALTH | 3-27-86 | RHM | X |
| | | | |

Notes:

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* An 'X' indicates information was retrieved from file, a blank line indicates no information was found.

MALCOLM PIRNIE

SITE NAME: KEEGAN LANDFILL

ID NO: 327

LOCATION: KEARNY

| FILE | SEARCH DATE | REVIEWER | RCRA 3001 FORM | CERCLA 103C FORM | PRELIMINARY INSP. REPORT | FIELD INSPECTION REPORTS | AGENCY INTERNAL MEMOS | RESP. PARTY CORRESPONDENCE | FORMAL REPORTING DOCUMENTS | SITE SKETCHES | ANALYTICAL DATA | SECOND SEARCH DATE | REMARKS | QA CHECK |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ~~327~~ KEARNY HEACH | 3-27-86 | [illegible] | NF | NF | NF | NF | ✓ | NF | NF | NF | NF | | | |

CODES:

✓ REVIEWED AND COPIED
X REVIEWED BUT NOT COPIED
NF NOT FOUND
NA NOT APPROPRIATE

p.53

MALCOLM PIRNIE

Preliminary Assessment Photo Log

SITE: Keegan Landfill

I.D. 327

DATE: 4-28-86

FRAME: 7 TIME: 1310hrs DIRECTION: NW

DESCRIPTION: View of Drums taken from eastern access Road

FRAME: 8 TIME: 1310hrs DIRECTION: SW

DESCRIPTION: Eastern access Road near area of drums

MALCOLM PIRNIE

Preliminary Assessment Photo Log

SITE: Keegan Landfill

I.D. 327

DATE: 4-28-86

FRAME: 9 TIME: 1310 hrs DIRECTION: NE

DESCRIPTION: Eastern access Road near drums

FRAME: 10 TIME: 1315 hrs. DIRECTION: SW

DESCRIPTION: Stream that Runs through Center of Landfill

MALCOLM PIRNIE

Preliminary Assessment Photo Log

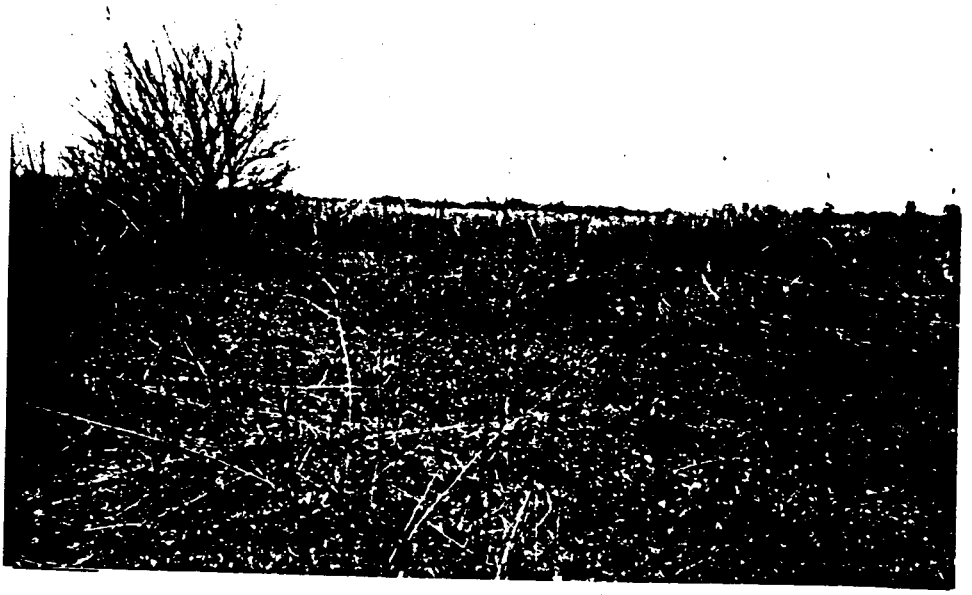
SITE: Keegan Landfill

I.D. 327

DATE: 4-28-86

FRAME: 11 TIME: 1320 hrs DIRECTION: SE

DESCRIPTION: Refuse near center of Landfill



FRAME: 12 TIME: 1320 hrs DIRECTION: SW

DESCRIPTION: Central area of landfill from western Road

MALCOLM PIRNIE

Preliminary Assessment Photo Log

SITE: Keegan Landfill

I.D. 327

DATE: 4-28-86

FRAME: 13 TIME: 1320hrs DIRECTION: S

DESCRIPTION: Central Area of Landfill

FRAME: 14 TIME: 1330hrs DIRECTION: N.E

DESCRIPTION: Entrance to Landfill from Bergan Ave.

MALCOLM PIRNIE

Preliminary Assessment Photo Log

SITE: Keegan Landfill

I.D. 327

DATE: 4-28-86

FRAME: 15 TIME: 1330hrs DIRECTION: NW

DESCRIPTION: Bergan Ave towards Schuyler Ave L.F. to the Rt.

FRAME: 16 TIME: 1330hrs DIRECTION: SE

DESCRIPTION: Bergan Ave away from Schuyler L.F to the Left.

**REFERENCE NO. 2**

# NUS CORPORATION

## II

## 0381

Purpose

- Serves to document onsite activities and be understandable to an outside reader.
- Provides the basis for later written reports.
- Used an an evidentiary document and may be used in legal proceedings.

Distribution

- Controlled by the project manager and distributed as appropriate to personnel designated by the project manager.

General Procedures

- Record information in language which is objective and factual.
- Use ink. Waterproof ink is recommended.
- Leave first two pages blank. They serve as space for the table of contents to be added when the log book is complete.
- The first written page identifies the date, time, TDD number, site name, location, NUS personnel and their responsibilities, other non-NUS personnel and observed weather conditions.
- Start on a new page at the start of each day's field activities. This page should identify date, time, TDD number, site name and location, NUS personnel and their responsibilities, other non-NUS personnel and observed weather conditions.
- List all persons leaving or entering the site.
- Information recorded in the log book should be in chronological order.
- Sign and date each page, log all entries using a 24 hour clock. Entries should be time logged every 15 to 30 minutes.
- Corrections are to be lined through and initialed. No erroneous notes are to be made illegible.
- Include a sketch or map of the site which can be used to locate photo or sample locations. Note landmarks, indicate north, and if possible include an approximate scale. Include as many sketches and maps as necessary.
- A person not present when field activities were being documented should read each completed page, and countersign and date when satisified that the written notes are understandable.

Specific Field Activities To Be Documented

- Record the who, what and where of field activities.
- Indicate sampling and photo locations on a site sketch or map.
- As part of the chain of custody procedure, recorded in-situ sampling information must include sample number, date, time, sampling personnel, sample type, designation of sample as a grab or composite, and any preservative used.
- Information for in-situ measurements must include a sample ID number, the date, time, and personnel taking measurements. Pertinent in-situ measurements include but are not limited to pH, temperature, conductivity, flow measurements, continuous air monitoring measurements, and stack gas analysis. If infield calculations are necessary they must be checked and signed by a second team member.
- Create a photo log to document photos taken in the field. These must include date, time, photographer, sample number, roll number, frame number, photo ID number and description. Indicate if the film is for slides or prints in the column for roll number. Photo ID numbers can be added at the time the photo log is assembled.
- Record onsite health and safety measures used. Describe observed potential hazards to health and safety. Document the level of protection used, decontamination procedure used and specific decontamination solutions.
- When sampling is complete, a summary log is to be completed. It must include date, time, sample number, description, field book reference page, and the number and date of the chain of custody from on which the sample is listed. Indicate whether or not the sample was split.
- Record details regarding relevant information obtained during onsite interviews. Include names of persons interviewed, the interest group represented, their address and phone number.
- Record any other relevant information which would be difficult to generate at a later date.

# TABLE OF CONTENTS

On-site Reconnaissance Notes . . . . . pp 3-8

Sampling Trip Notes - 1/11/89 (aborted) due to frozen water . . . pp 9-11

Sampling Trip - 4/25/89 (completed) . . . . . pp 12-17

Photograph Log . . . . . p. 20

Sample Mgmt. Information . . . . . p. 21

Sample Location Map . . . . . p. 25

Gerald V. Gilbert
5/1/89

Keegan Landfill 02-8810-75
On-site Reconnaissance - 1/3/89

0800 Cory Deas (CD), John Bulich (JB), and Gerry Gilliland (GG) load necessary equipment into the truck.

0845 We hold the kickoff meeting. The ~~below listed~~ GG/JAB personnel listed below are aware of the work plan, QA, and Health & Safety requirements:

| | | | |
|---|---|---|---|
| Gerry Gilliland | SM/Documentation | Gerald V. Gilliland | 1/3/89 |
| Jane Billis (JAB) | SSO | Jane Billis | 1/3/89 |
| John Bulich | Asst. SM | John Bulich | 1/3/89 |
| Cory Deas | Line-of-sight | Cory Deas | 1/3/89 |

0915 Leave the office for the site.

0950 Arrive at site, wait for Mike Beard of Kearny HD to arrive. The chain across access is down.

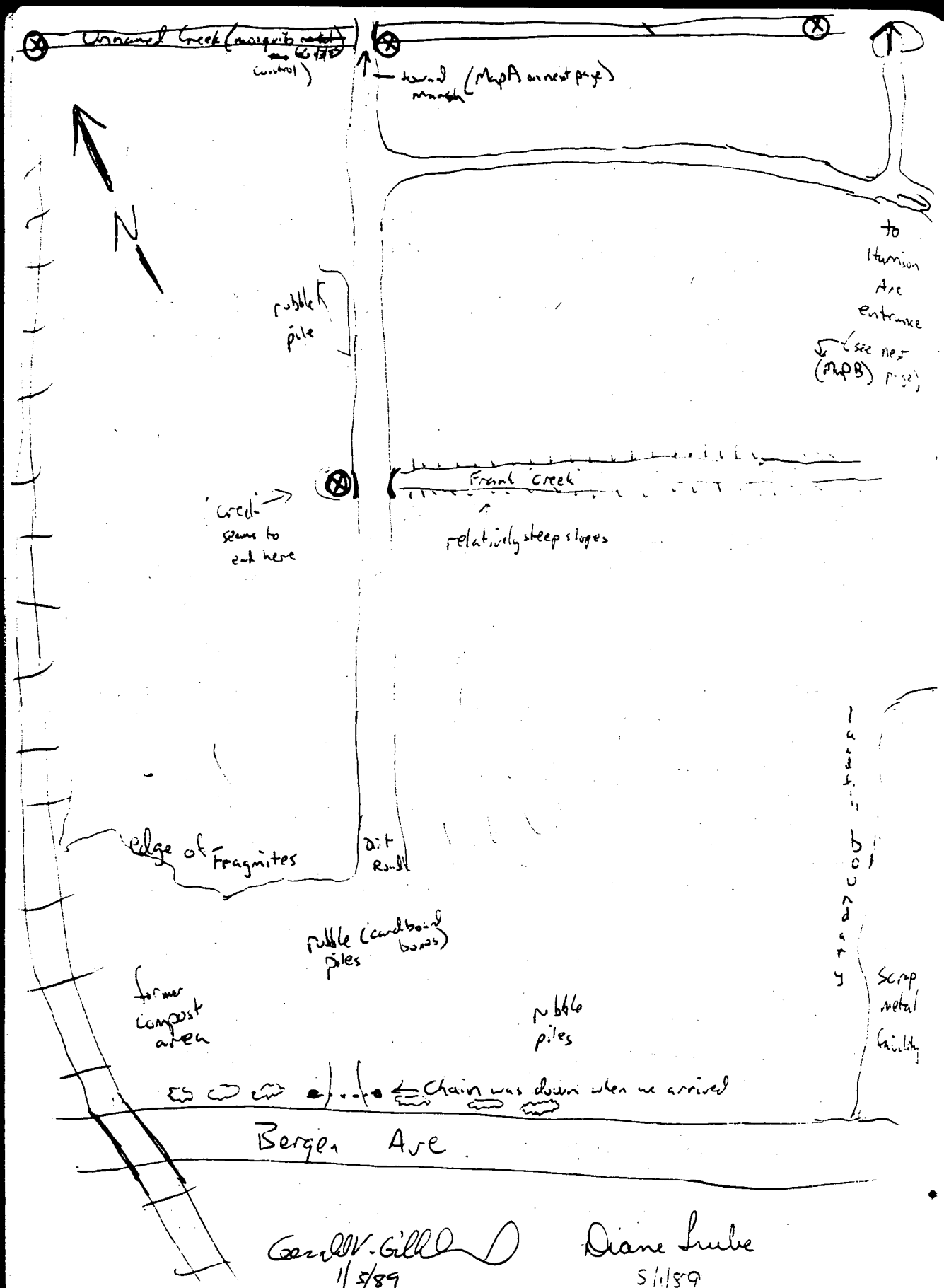
1000 Mike Beard (MB) arrives at site. We park truck just inside entrance and begin to set up decon pad.

1010 Ready for recon. JB and JAB on air. GG on backup. CD at truck for radio contact.

SCBAs - JB : 307172
JAB : 192069
GG : 428552

Gerald V. Gilliland
1/3/89

Diane Grube
5/1/89




Gerald V. Gill
1/5/89

Diane Lube
5/11/89

Keegan Landfill 02-8810-75
On-site Recon - 1/3/89

1010 Monitoring instruments fired + ready:

| | | | background |
|---|---|---|---|
| OVA M | 469784 | | 0 ppm |
| HNu D | 307144 | Probe 307141 | 0 " |
| Mini Rad | 428520 | | 12 cpm |

Screen open area at front of landfill. Old heaps (to ~~right~~ left of entrance) that are left behind from composting operation. Piles of cardboard boxes, construction rubble directly ahead (about 40') of entrance, other piles to right. Cardboard boxes look "unweathered" as if they've been dumped recently. See site sketch opposite page.
No readings above background on OVA, HNu or Mini Rad

Weather: Sunny, ~40°F, light variable wind.

1020 There were no readings above background in front portion of landfill. We begin to walk down dirt road. Small piles of rubble at various places. No drums noticed, just construction debris, household garbage.

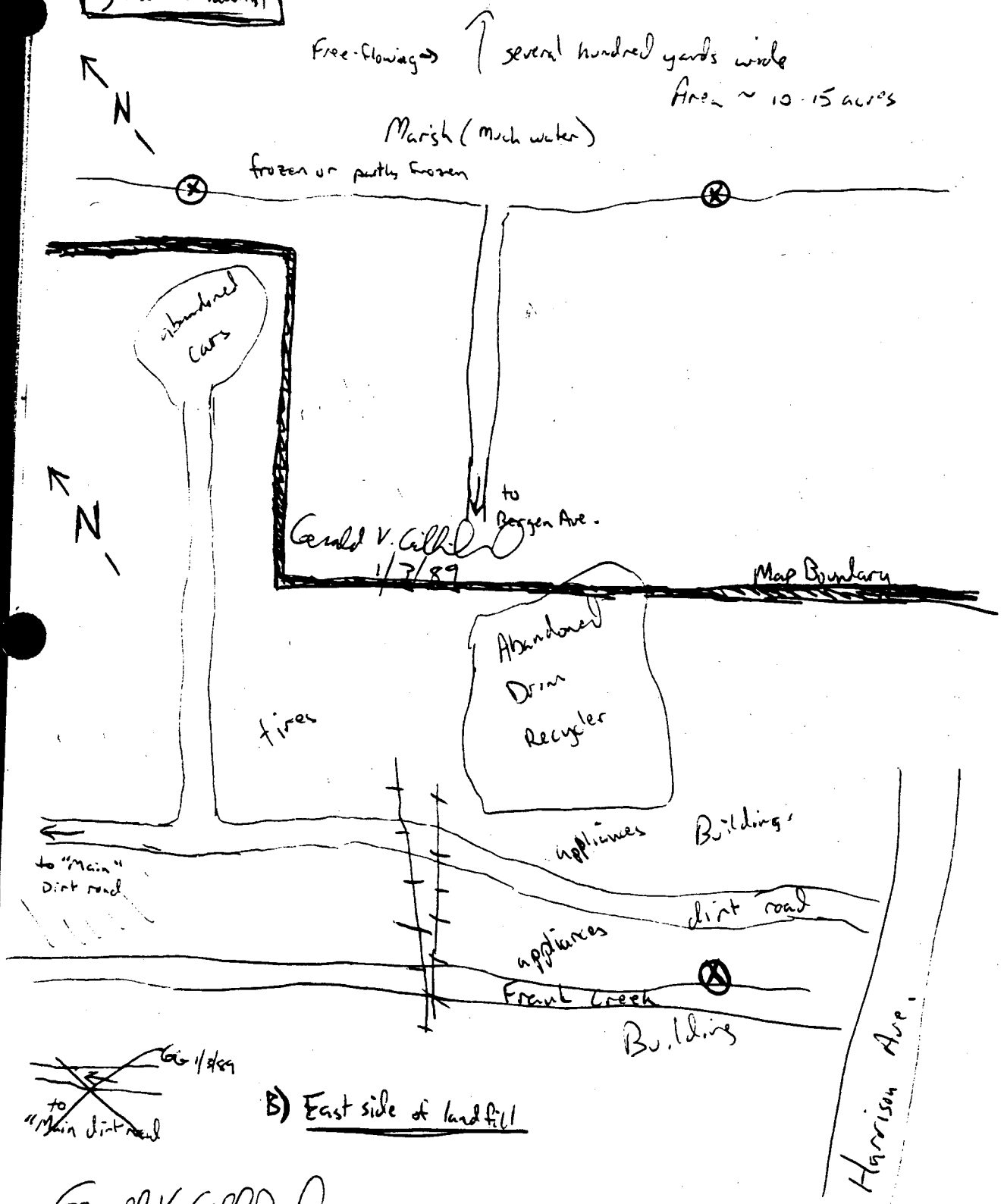
1025 Come to creek. It seems to end just west of the dirt road (runs through conduit under road). Water appears to be frozen. JB + JAB screen along bank, break a little ice, No readings above background on OVA, HNu, or Mini Rad. Potential for couple sw/sed samples.

1035 JB's air tank bell goes off. JB + JAB back up to road and off air. We head back to command post.

Gerald V. Gallo
1/3/89

MSLA I-C Landfill

A) Back of landfill




B) East side of landfill

Gerald V. Gilbert
1/3/89

1045 Back at command post. JB + JAB get fresh tanks for SCBA's. MB says that road goes back very far and it's a long way to walk. There's also another road that shoots off to right, goes out to Harrison Ave. He says we'll be here all day if we walk the whole thing. We decide it would be best to drive along dirt roads and screen potential sampling locations; JB + JAB will go on air for level B screening upon getting out of truck.

1053 Kearny DPW truck (license plate MG-983Y) arrives onto site with truckload of construction debris. MB had told me earlier that the landfill is not used anymore, except by illegal dumpers. He talks to the truck driver, who then leaves the site without dumping his load.

1100 Truck seats are lined with plastic. We follow MB in his truck down dirt road. Beyond creek, there is road going to right. We go that way. Nothing noticeable except owl in tree to left. Large pile of tires to left just over RR tracks. Opening ahead to left with several appliances, creek to right. ~~JB + J~~ GG 1/3/89

1115 JB + JAB out of truck + on air to screen area near appliances, other debris. No readings above background on OVA, $H_2S$, or Mini Rad. They go down to creek. Not all frozen here, no readings above background. They walk toward Harrison Ave.

Gerald V. Gillespie
1/3/89

Diane Grube
5/1/89

Keegan LandFill 02-8810-75 6
On-site Recon - 1/3/89

1125 There is another entrance ahead on Harrison Ave. It appears to be just a dirt road to there, some scattered garbage. Most dumping appeared to be right near the RR tracks. No readings above background along dirt road or near scrap piles.

Note: There are several industrial properties in this area. There is an abandoned Drum recycler adjacent to the landfill and the entrance road. MB said this place was a serious contamination problem

1130 JB + JAB off air. Back into truck and turn around, back toward "Main" dirt road.

1135 There is a small offshoot dirt road to right. Go down it, nothing of real note until the end, where there are several abandoned cars.

1140 JB + JAB on air to screen area near abandoned cars. They screen as much area as possible, but most of surrounding area is covered with tall fragmites (spelling unsure) [phragmites DT 5/1/89] No readings above background.

1145 JB + JAB off air. Turn truck around and back toward "main" dirt road.

1155 Back at main" dirt road. Turn right, toward back of dump away from Bergen Ave.

Gerald V. Gilbert
1/3/89

Diane Lube
5/1/89

Keegan Landfill 02-8810-75 
On-site recon - 1/3/89

1200 Arrive at another "creek" perpendicular to the road.
JB + JAB off air on air to screen potential sampling locations.
Walk west along creek (not frozen). No readings above background.

1205 JB + JAB walk east along creek. No readings above background
They walked approximately 200 yards each way and obtained no readings. Weeds are not as heavy along creek so samples should be obtainable.

1210 JB + JAB off air. Tanks are changed. We go toward back of fill.
1212 Small debris pile along road. No readings above background. Nothing of note.

1215 At back of dirt road. An abandoned car, a raft made of drums and 2x6's at edge of "marsh".
JB + JAB on air. Walk along edge of "marsh", which is frozen, but areas where ice is thin or not there. No readings above background on OVA, HNu, or Mini Rad.

1225 JB + JAB walked both ways from dirt road along edge of water. No readings above background
JB + JAB off air.
The water appears to be flowing east where it is not frozen (50-100 yards out). It is several 100 yards wide.

Gerald V. Gilbert 1/3/89 Diane Lube 5/1/89

Keegan Landfill 02-8810-75
On-site Recon - 1/3/89

1230 Back to command post. Decon, pack-up equipment

The entire landfill, except for the few open areas mentioned, is covered with fragmites up to [phragmites - DT 5/1/89] 12' tall or higher. MB said the area north of the 2nd "creek" and west of the main dirt road burns every year due to methane content. We got no readings, but it is cold today. It appears as though there is not good locations for representative soil samples, but there are several locations where sw/sed samples can be obtained. These spots are marked on the site sketches (opposite pages 4 & 5) with an ⊗.

1245 MB & GG agree to meet Wednesday 1/11/89 at 0900 hours for sampling of sw/sed at the landfill. We leave the site.

Gerald V. Gilbert
1/3/89

Diane Lube
5/1/89

Keegan Landfill 02-8810-75
Sampling Trip - 1/11/89

0745 Kickoff meeting at the office. The personnel listed below are aware of work plan, QA, and Health + Safety requirements:

| | | | |
|---|---|---|---|
| Gerry Gilliland (GG) | SM | Gerald V. Gilliland | 1/11/89 |
| Dave Heim (DH) | SSO | David Heim | 1/11/89 |
| Mark Ellis (ME) | SMO | [illegible] | 1/11/89 |
| Scott Halm (SH) | Sampler | [illegible] | 1/11/89 |
| Jane Bullis (JB) | Sampler | Jane Bullis | 1/11/89 |

0800 Air instruments checked out:

| | | | Background @ 0945 GG 1/11/89 |
|---|---|---|---|
| OVA - A | EPA # 469758 | | 1 ppm |
| HNu - B | EPA # 307138 | probe 307143 | 1 ppm |
| Mini-Rad | EPA # 428604 | | 14 cpm |

0850 Arrive at site. We wait for Mike Beard (MB) to arrive. The chain across the access road is down.
Weather: sunny, 40°F, calm.

Gerald V. Gilliland
1/11/89

Diane Fuhr
5/1/89

Keegan Landfill 02-8810-75
Sampling Trip - 1/11/89

0900 MB is not here yet. We begin to set up command post at front portion of landfill

0905 Kearny police officer comes to landfill. I explain that we're meeting Mike Beard here. He says OK, drives down dirt road into landfill.

0912 Police car drives back out, leaves site.

0915 We begin to decontaminate equipment MB still not here.

0935 ~~Dr~~ ~~Co/Mike~~ GG Drives to public phone, calls MB, who says he'll be here shortly.

0945 MB arrives at landfill. DH starts air instruments.

1000 GG, DH, JB, + SH go toward the back of the landfill to collect Sw/Sed samples 1 + 2 from the wetlands area at the rear. MB follows in his truck

1010 Arrive at end of dirt road. Out of truck.

Gerald V. Gill
1/11/89

Diane Grube
5/1/89

Keegan Landfill
Sampling Trip - 1/11/89

02-8810-75



1020 Upon inspection, the entire wetland's area is frozen solid. We try to use a pick-ax to get through it, but we had no luck. We cannot collect samples from this location today. Leave to check other locations.

1050 All sw/sed locations are frozen solid. We will get no samples today. I told MB we will be back when the weather breaks, possibly at the end of February or in March. Back to command post. MB leaves site.

1100 GG at public phone, calls R. Lorfing at office to inform him of decision to postpone sampling trip. He says to pack it up if sampling isn't possible

1105 GG back at command post, crew begins to reload everything back into the truck.

1140 Trucks loaded. Leave site.

Gerald V. Gilbert
1/11/89

Diane Lube
5/1/89

Keegan Landfill
Sampling Trip - 4/25/89

02-8810-75



0925 Arrive at landfill. Hold kickoff tailgate H&S QA meeting with NJS personnel:

Gerry Gilliland (GG) - SM, Documentation Gerald V. Gilliland 4/25/89
Dave Heim (DH) - SSO David Heim
Sue Lenczyk (SL) - SMO Sue Lenczyk 4/25/89
Tammy Marquart (TM) - Sampler Tammy Marquart 4/25/89
Ed Kryfd (EK) - Sampler Ed Kryfd 4/25/89

Work plan, safety plan, & QA requirements were discussed with the above listed personnel.

0935 Begin to set up decon pad near landfill entrance (Bergen Ave.)

Weather: 50°F, cloudy, slight breeze from SW

There is more refuse in the dumping area near the entrance than there was in January. Appears to be construction debris (broken concrete & bricks), branches & logs.

1000 Equipment is being deconned.

Gerald V. Gilliland
4/25/89

Diane Grube
5/1/89

Keegan Landfill 02-8810-75
Sampling Trip-4/25/89

1030 Drive Suburban down dirt road toward edge at back of landfill.

1045 Arrive at end of road. Walk to water, go left approx. 50', there is an open area with much refuse. Well set SW-1 Sed-1 at this location. EK, TM, DH, GG on level C.

1050 EK begins to collect SW-1
Photo 1P-1, 1S-1 of EK collecting sample.
No readings above background on OVA or HNu or Mini Rad.
SW-1 is MS/MSD aqueous.

1100 EK finishes collecting SW-1.

1105 EK begins collecting Sed-1, same location as SW-1.
Sed-1 is MS/MSD (solid).
No readings above backgrd.
Photo 1P-2, 1S-2

Exact location is 70' North from ~~edge~~ GG where road meets water. There is a car carcass at that location.

Note: See map on p. 25 for all sample locations.

1125 EK finishes collecting Sed-1.
Photos 1P-3,4,5 1S-3,4,5 : Panorama of wetlands lake from SW-1 location, looking NE to SE.

Gerald V. Gallo
4/25/89

Diane Grube
5/1/89

Keegan Land Fill 02-8810-75
Sampling Trip - 4/25/89

1135 Begin collecting SW-2. approx. 50' opposite direction of car carcass vs SW-1 location.
No readings above background. JM collecting sample.
Photo 1P-86 15-36
No sed sample here, because area is overgrown with phragmites. ~~and~~ CC 4/25

1140 Finish collecting SW-2
Exact location was 80' south of car carcass, at edge of water.

Back to command post. Respirators off.

1150 Back at command post. Decon samples.
Take a break.

— D. Neim changes respirator cartridges — DH 4.26

1200 Go toward next location, at the 2nd creek back from the entrance.

1210 Arrive at location for SW-3, about 200' north of dirt road, along water, on east side of creek. Respirators on EK, JM, DH, GG.
No readings above background on OVA Hnu Minirad.

Gerald V. Gallo 4/25/89

Diane Fuhe 5/1/89

Keegan Landfill 02-8810-75
Sampling Trip - 4/25/89

1215 EK begins collecting SW-3.
Photo 1P-7, 1S-7

1220 EK finishes collecting SW-3.
Begins collecting SED2 and SED3 (env. duplicate location)
Photo 1P-8 1S-8
No readings abg.

1230 Finish collecting SED 2 + 3. EK spots dead fish in water about 10' out from sample location.

1235 Back at truck, short break. Respirators off.
Photo 1P-9, 1S-9: looking N up "creek", SW3 location on the right (taken from dirt road bridge)

1245 TM begins collecting SW-4, location about 20' from dirt road (south), on west edge of creek.
No readings abg. Respirators on at this time.
Photo 1P-10, 1S-10
Exact location 26' south of dirt road.

1250 TM finishes collecting SW4, begins collecting SED4. No readings above background.
Photo 1P-10, 1S-10 GG 4/25/89

1255 Bring samples back to command post, TM finished collecting SED4. Respirators off

1300 NH change respirator cartridges -NH 4-26

Gerald Gilliland
4/25/89

Diane Lube
5/1/89

Keegan Landfill 02-8810-75
Sampling Trip - 4/25/89

1305 The road leading south toward Harrison Ave is impassable (blocked with a mound of dirt) We will go to Harrison Ave. entrance.

1320 Harrison Ave. entrance has mound of dirt just before RR tracks, but it is passable with 4-wheel drive.

1325 Sample location SW-5, 30' north of RR tracks on east edge of Frank Creek. Respirators on. Oily sheen on water at this location
EK begins to collect SW5. No readings abg.
Photo 1P-12, 1E-12: photo of SW-5 Sed-5 location + sample collection.

1330 EK finishes collecting SW5, begins collecting Sed 5.
No readings above background on OVA, HNu, or MiniRad

1340 Photo 1P-13, 1E-13: looking N up Frank Creek from RR tracks; sample location SW, Sed-5 at right corner of photo.

1345 Finish collecting Sed 5. Head back to Bergen Ave. entrance. Respirators off.

Gerald V. Gilbert 4/25/89

Duane Lube 5/1/89

Keegan Landfill 02-8810-75
Sampling Trip – 4/25/89

1430 TM begins to collect SW6 + SW7 (env. dup. loc.)
No readings above background. Respirators on.
Photo 1P-14, 1S-14
Exact location on east side of Frank Creek,
75' ~~north~~ south of dirt road.

1430 TM finishes collecting SW6 + 7,
begins collecting Sed 6. No readings above b.grd.
Photo 1P-15, 1S-15 of sample collection.
Photo 1P-16, 1S-16: looking S from dirt road down Frank Creek; SW begins on S side of the road; a dug trench.

1440 TM finishes collecting Sed 6. Back in truck.
Off level C. back to command post.

1445 At command post. Decon equipment + samples.
Photo 1P, 1S-17, 18, 19, 20; panorama of dumping area from Bergen Ave. entrance, looking approx. N to SE
1540 SMO work is done, truck is loaded. Leave site.

1700 Arrive at Fed Ex. Ship samples (Organics - Priority 1 Next Day, Inorganics - Standard Air 2 day)

Gerald V. Gill 4/25/89 Duane Tube 5/1/89

Keegan Landfill 02-8810-75
Photograph Log
Sampling Trip - 4/25/89

All photos taken by G. Gilliland; all numbers preceded by 1P and 1$.

| Number | Description | Time |
|---|---|---|
| 1 | EK collects SW-1. | 1050 |
| 2 | EK collects Sed-1. | 1105 |
| 3,4,5 | Panorama of wetlands lake from SW1 location, looking NE to SE. | 1125 |
| 6 | TM collects SW-2 | 1135 |
| 7 | EK collects SW-3. | 1215 |
| 8 | " " Sed2 and Sed3 (env. dupe). | 1220 |
| 9 | Looking north up unnamed "creek", SW3 sample location on right side. | 1235 |
| 10 | TM collects SW4. | 1245 |
| 11 | " " Sed4. | 1250 |
| 12 | EK collects SW5, Sed5. | 1325 |
| 13 | Looking north up Frank Creek from RR tracks; SW5 location at right corner of photo. | 1340 |
| 14 | TM collects SW6, 7 (env. dupe) | 1420 |
| 15 | " " Sed 6 | 1430 |
| 16 | Looking south from dirt road down Frank Creek; creek begins adjacent to south side of the road [a dug trench]. | 1430 |
| 17, 18, 19, 20 | Panorama of dumping area near the Aergan Ave. entrance to the LF, looking N to SE. | 1445 |

Gerald V. Gilliland 4/28/89

Keegan Landfill 02-8810-75 

Sample Mgmt. Information Sampling Trip 4/25/89

| Sample # | OTR # | ITR # | Time | Location/Description |
|---|---|---|---|---|
| SW1 * | BZ949 | MBX056 | 1050 | 70' north of east end of main dirt road, at edge of wetlands lake. |
| SW2 | BZ950 | MBX057 | 1135 | 150' south of SW-1. |
| SW3 | BZ951 | MBX058 | 1215 | 200' north of dirt road, on east side of unnamed "creek". |
| SW4 | BZ952 | MBX059 | 1245 | 26' south of dirt road, on west side of unnamed "creek". |
| SW5 | BZ953 | MBX060 | 1325 | 30' N of RR, east side of Frank Creek. |
| SW6 | BZ954 | MBX061 | 1420 | 75' S of dirt road, east side of Frank Creek. |
| SW7 ** | BZ9~~63~~ | MBX0~~62~~70 GG 4/25/89 | 1420 | Same as SW6. |
| SED1 * | BZ955 | MBX062 | 1105 | Same as SW1. |
| SED2 | BZ956 | MBX063 | 1220 | Same as SW3. |
| SED3** | BZ957 | MBX064 | 1220 | Same as SW3. |
| SED4 | BZ958 | MBX065 | 1250 | Same as SW4. |
| SED5 | BZ959 | MBX066 | 1330 | Same as SW5. |
| SED6 | BZ960 | MBX067 | 1430 | Same as SW6. |
| RIN1 | BZ961 | MBX068 | 1000 | Trowel rinsate |
| RIN2 | BZ962 | MBX069 | 1020 | Bowl rinsate |
| TBLK1 | BZ963 | N/A | N/A | Trip blank |

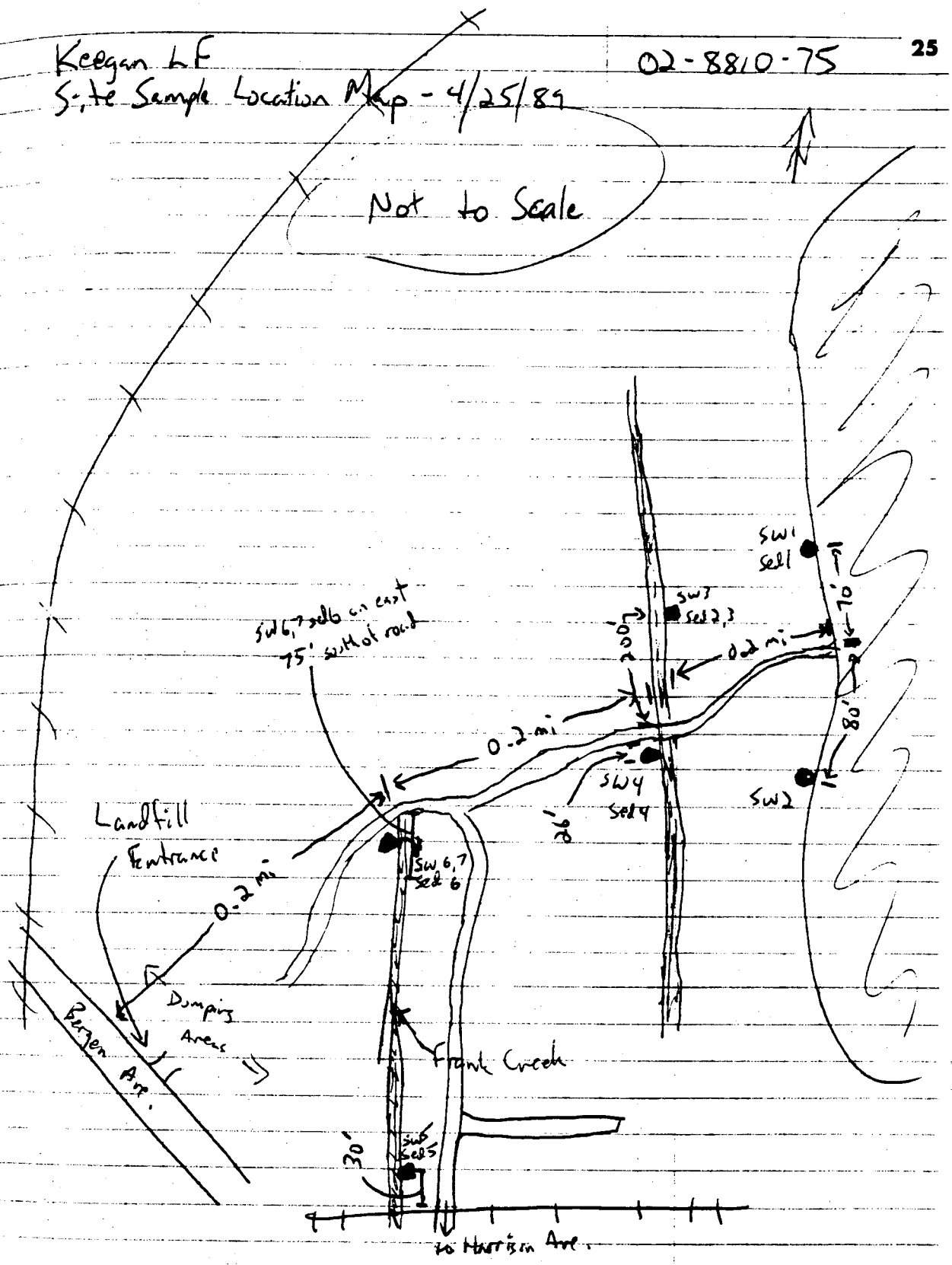
* MS/MSD

** Environmental duplicate

Gerald V. Calk 4/28/89 Diane Lube 5/1/89

Keegan LF 02-8810-75

Site Sample Location Map - 4/25/89




Gerald V. Gill 4/25/89 Diane Snube 5/1/89

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**REFERENCE NO. 3**

LONGITUDE 74: 8: 7 1980 POPULATION

| 10 | .810-1.60 | 1.60-3.20 | 3.20-4.80 | 4.80-6.40 | SECTO TOTAL |
|---|---|---|---|---|---|
| 25 | 16582 | 65371 | 137652 | 203429 | 42645 |
| 25 | 16582 | 65371 | 137652 | 203429 | 42645 |

LONGITUDE 74: 8: 7 1980 HOUSING

| 10 | .810-1.60 | 1.60-3.20 | 3.20-4.80 | 4.80-6.40 | SECTOR TOTALS |
|---|---|---|---|---|---|
| 52 | 5974 | 22685 | 49743 | 71113 | 150777 |
| 52 | 5974 | 22685 | 49743 | 71113 | 150777 |

| Population | Housing |
|---|---|
| 0 | 0 |
| 3425 | 1262 |
| 20,007 | 7236 |
| 85,378 | 29,921 |
| 223,030 | 79,664 |
| 426,459 | 150,777 |

**REFERENCE NO. 4**

**REFERENCE NO. 5**

# REPORT ON THE QUALITY OF THE INTERSTATE WATERS OF THE LOWER PASSAIC RIVER AND UPPER AND LOWER BAYS OF NEW YORK HARBOR

U. S. DEPARTMENT OF THE INTERIOR

FEDERAL WATER POLLUTION CONTROL ADMINISTRATION

NORTHEAST REGION

HUDSON DELAWARE BASINS OFFICE

Edison, New Jersey

November 1969

c) construction started by July 1, 1967; d) construction completed and plants placed into operation by January 1, 1970...". The complete recommendations of the Secretary for the first and second sessions and the recommendations to the Secretary by the conferees for the third session are contained in the Appendix of this report.

3. At the June, 1969 session, preliminary reports were presented by the Federal Water Pollution Control Administration regarding the operation of the Passaic Valley Sewerage Commissioners' waste treatment facility, direct discharges to the Lower Passaic River and the effect of the direct discharges on water quality in the Lower Passaic River. Since that session, additional studies have been conducted by the Federal Water Pollution Control Administration to evaluate the operational efficiency of the Passaic Valley Sewerage Commissioners' waste treatment facility and the effect of its effluent on the water quality of the Upper and Lower Bays of New York Harbor. Studies were also conducted by the Federal Water Pollution Control Administration and the New Jersey State Department of Health to identify waste discharges to and evaluate the water quality of the Lower Passaic River.

## CONCLUSIONS

1. The quality of the interstate waters of the Upper and Lower Bays of New York Harbor and the Passaic River is below that required by the approved Federal-State Water Quality Standards. In the interstate waters of New Jersey, the present standards prescribe the highest use as follows: in the Upper Bay — limited recreation and fish survival and in the Passaic River

upstream to the head of tide-fish survival. In the interstate waters of New York, the present standards prescribe the highest use as follows: in the Lower Bay-bathing and in the Upper Bay-fishing.

2. The quality of water in the Upper and Lower Bays of New York Harbor is affected by the discharge of inadequately treated waste from Passaic Valley Sewerage Commissioners and other discharges originating in the New Jersey-New York City Metropolitan area.

3. As a result of inadequately treated wastes originating in Upper Bay of New York Harbor, a public health hazard exists in the waters of Lower Bay which are classified for recreational purposes. Pathogenic organisms have been isolated in the effluent of the Passaic Valley Sewerage Commissioners, in the waters of Upper Bay of New York Harbor, in the vicinity of Passaic Valley Sewerage Commissioners' dispersal field and in the waters off the bathing beaches of the Lower Bay of New York Harbor.

4. Most of the municipalities and industries in the conference area are moving to meet the conference recommendations.

5. The Passaic Valley Sewerage Commissioners have not initiated adequate action to comply with the conference recommendations for needed treatment facilities.

6. Court action against the Passaic Valley Sewerage Commissioners for not complying with New Jersey treatment requirements was initiated in 1967 by the New Jersey State Department of Health. The Chancery Division of the Superior Court and the Appellate Division of the Superior Court upheld the Department's orders in dealing with the quality of effluent discharges from the Commissioners' facility.

## DESCRIPTION OF THE PASSAIC RIVER BASIN

The Passaic River Basin, situated in northeastern New Jersey and southeastern New York, drains an area of approximately 935 square miles. The Basin is roughly elliptical in shape with a northeasterly length of about 56 miles and a maximum width of 28 miles. It spans across eight counties in New Jersey (Bergen, Essex, Hudson, Morris, Passaic, Somerset, Sussex and Union) and two counties in southeastern New York (Rockland and Orange).

The headwaters of the Passaic River are located north of Millington, New Jersey. From Millington, the River flows northeast for about 32 miles to the Great Piece Meadows above Caldwell, New Jersey, and continues east for 16 miles to Great Falls near Paterson, New Jersey. At Paterson, the river turns due south for 24 miles to its confluence with Newark Bay. The last 17 miles of the Passaic River from Dundee Dam to Newark Bay are tidal.

The Basin can be divided into three distinctly separate physiographical regions: The Highland Area in the northwest part of the Basin, comprising about 55 percent of the total watershed area; the Central Basin located in the southerly portion of the watershed and representing a little over 25 percent of the total area; and the Lower Valley comprising only about 20 percent of the watershed area and located in the eastern fringe of the Basin.

The Highland area is characterized by broad ridges and narrow valleys with terrain that is rugged and wooded. It contains many natural and man-made lakes. The area is sparsely settled and supports minor industrial activity.

The Central Basin consists of small hills, flat meadows and extensive areas of fresh water swamps. The major part of this Basin is rapidly undergoing residential and commercial development.

The Lower Valley is similar in physiographic characteristics to the Central Basin. It is essentially a flat, wide, flood plain with abutting low rolling hillsides. The area is densely populated and contains some of the most highly developed land in New Jersey. Extensive industrial activities are concentrated in the Valley.

The population of the Basin in 1968 totaled about 2,000,000 persons, the majority of which are located in the highly urbanized Lower Valley. Population densities varied from a low of about 130 persons per square mile in Sussex County to a high of 7,140 persons per square mile in Essex County.

At least 155 municipal and 23 industrial facilities discharge treated wastewaters into the Passaic River Basin. The majority of the municipal facilities, all generally located in the Highland and Central Basin areas, provide secondary treatment with chlorination to a total flow of approximately 50 mgd. The Passaic Valley Sewerage Commissioners, the largest wastewater collection and treatment facility in the Basin, handles the domestic and industrial wastes primarily within the Lower Valley. The Commissioners' plant, serving 1,200,000 people, nearly three-fifths of the total sewered population in the Basin, discharges primary treated effluent without disinfection into the interstate waters of Upper Bay of New York Harbor.

The main stem of the Passaic River below the confluence with the Pompton River is considered interstate water under Section 10 of the Federal Water Pollution Control Act, as amended. The classifications established for these interstate waters are given below. Detailed definitions of these classes and their criteria are provided in Appendix B.

| WATER | CLASSIFICATION | HIGHEST USE |
|---|---|---|
| Newark Bay | TW-3 | Navigation not recreation |
| Passaic River (main stem from mouth to head of tide at Dundee Lake Dam) | TW-3 | Navigation not recreation |
| Passaic River (main stem and tributaries between Dundee Lake Dam and Little Falls) | FW-3 | All recreational purposes but not for public potable water supply |
| Passaic River (main stem between Little Falls and its confluence with the Pompton River) | FW-2 | Public potable water supply after treatment and all recreational purposes |

WATER QUALITY CRITERIA

(NOTE: Except where noted by an asterisk (*), these criteria have been approved by the Secretary of the Interior).

STATE OF NEW JERSEY

CLASS TW-3

DEFINITION OR BEST USAGE: Tidal surface waters used primarily for navigation, not recreation. These waters, although not expected to be used for fishing, shall provide for fish survival. These waters shall not be an odor nuisance and shall not cause damage to pleasure craft traversing them.

FLOW CONDITIONS:

| | | |
|---|---|---|
| 1 | Floating Solids | None which are noticeable in the water or contribute to the formation of sludge deposits along the shores. |
| 2 | Settleable Solids | See Number 1. |
| 3 | Sludge Deposits | Harmful sludge deposits are not permitted. |
| 4 | Solid Refuse, Garbage, Cinders, Ashes, Oils, Sludge or Other Refuse | Not Specified. |
| 5 | Sewage or Other Effluent | Effective disinfection if required by the State Department of Health. |
| 6 | Oil, Grease, Oil Slicks, or Scum | Oil, Grease: See Number 1. |
| 7 | Coliform Density | None in such concentration that would impair the waters for assigned uses. |
| 8 | pH | Between 6.5 and 8.5 unless naturally outside thereof. |
| 9 | Dissolved Oxygen | Not less than 30% of saturation, if such value is greater than 2.5 ppm. Otherwise, not less than 2.5 ppm. |
| 10 | Color | Not Specified. |
| 11 | Turbidity | Not Specified. |
| 12 | Taste, Odor | Taste and odor producing substances: None which shall be offensive or that would detrimentally affect finfish, shellfish, or other aquatic life in higher quality waters. |
| 13 | Toxic Wastes, Deleterious Substances: | See over. |
| 14 | Heated Effluents and Temperature Criteria: | See over. |

REMARKS:

13 Toxic Wastes, Deleterious Substances:

None in such concentrations as to cause fish mortality or inhibit their natural migration.

14(a) Heated Effluents:

Not Specified.

*(b) Temperature Criteria - Allowable Temperature Increase:

None that will have a detrimental effect upon the natural aquatic biota or reasonably anticipated reuse of the waters.

**REFERENCE NO. 6**

HACKENSACK MEADOWS COMPREHENSIVE PLAN

TECHNICAL REPORT NO. 2A

DEFINITION OF THE MEADOWS

NJ Con-28

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METUCHEN, N. J. 08840

p. 96

Hackensack Meadows Comprehensive Plan
Prepared by State of New Jersey Department of
Conservation and Economic Development,
Division of State and Regional Planning.

March 15, 1965

- for the -
Meadowland Regional Development
Agency and The State of New Jersey

# TECHNICAL REPORT NO. 2A
# DEFINITION OF THE MEADOWS

The preparation of this report was financially aided through a Federal Grant from the Urban Renewal Administration of The Housing and Home Finance Agency, under the Urban Planning Assistance Program authorized by Section 701 of The Housing Act of 1954 as amended.

The remainder has been financed by funds contributed by the Municipalities which constitute The Meadowlands Regional Development Agency and by an appropriation of The State of New Jersey as part of the Cooperative Governmental Planning Program

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METUCHEN, N. J. 08840

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The selection of an area for planning studies of the Hackensack Meadows, involves a consideration of other interrelated areas of a political, administrative and technical nature, of which the Meadows is a part. In all, there are six major areas which have to be considered in planning studies of the Hackensack Meadows. These are:

1. Physical Meadows Area (Analysis Area)
2. Study and Planning Area (Div. of State and Regional Planning)
3. Jurisdictional Area
4. Protection Area (U.S. Army Corps of Engineers)
5. Impact Area (Economic Area)
6. Hackensack River Drainage Basin (Public Health and Allied Federal Agencies)

THE PHYSICAL MEADOWS AREA

The Hackensack Meadows lies close to the geographic center of the New York-New Jersey Metropolitan Area. Located entirely in New Jersey, they parallel the Hudson River about 2 miles from its western bank and stretch in a northeast-southwest direction, approximately from the northern tip of Manhattan Island to its southern end. In terms of size it includes about 15,000 acres or about 23.5 square miles, split longitudinally by the Hackensack River.

It is not difficult to define the geographic boundaries of the Meadows because of its uniquely low-lying elevation in the midst of considerable higher land elevations surrounding it. Visually, this presents a striking panorama as one travels by train or auto approaching New York City or views it from one of a number of cliffs at its western edge.

It has been determined that the ten foot contour is a reasonable line of demarcation between the Hackensack Meadows and the heavily urbanized area which surrounds it. An examination of aerial photos, maps and technical reports revealed that the first indication of any significant change in topography in the Hackensack Meadows occurs at an elevation of ten feet. Below this elevation, the land is fairly flat and marshy, including flooded areas, wetlands and higher ground elevations which are dry. Above this elevation, there is a marked change in the municipalities within the Meadowlands area. These are commonly referred to as the uplands portion of the Meadowlands municipalities, that is, areas where the bulk of residence, commerce and other elements of urban life are located. It is laced with miles of major highways and roads and most important passenger and freight railroads, operated by the Pennsylvania, Erie-Lackawanna, New York Central and New York Susquehanna and Western Railroads, which terminate in or near the Meadows.

In spite of these major site features, the Meadows has remained largely undeveloped. Urbanization has, for the most part, leapfrogged over the area and expanded in it's environs. This has occurred to such an extent, that the Northeastern part of New Jersey, surrounding this area, has developed into one of the most heavily urbanized areas in the United States. When viewed as a part of the Megalopolis, which is rapidly forming along the Northeastern Seaboard of the United States, it's position becomes even more conspicuous and strategic.

Therefore, for purposes of this report, the physical meadows will technically be considered to be all areas, both wet and dry, below an elevation of ten feet. This has generally been ascribed to in various technical reports published by NEDCO[1] and the U.S. Army Corps of Engineers. A 1960 report

published by the MRPA[2] delineated an analysis area which closely coincided with the physical Meadows area described herein. This analysis area will be used to study existing real estate values which exist today in the Meadows. These will be compared to real estate values, as given in the 1960 report, so that a comparison can be made.

The present study area is related to the analysis area, in that it is an extension of it. Since 1960, development has continued to occur along the fringes of the Meadows, as well as within it. The analysis area, or the Meadows, has therefore, been expanded to include a larger and more comprehensive study and planning area. Any plans ultimately made will focus on developable land within this area.

However, development since 1960 has continued to expand on the fringes of the Meadows as well as within it. This necessitates expanding the original 1960 analysis area to a larger and more comprehensive study and planning area.

THE MEADOWS STUDY AREA: BASIS FOR DELINEATION

Using the ten foot contour as a study area boundary poses a number of problems. First of all, contours are subject to change. Grading the land in the course of development or erosion can alter the surface of the land.

Furthermore, the ten foot contour extends to a considerable distance, to the north as far as the Oradell Reservoir and south past Jersey City. This would necessitate considering tributary areas along the Upper Hackensack River and Overpeck Creek. These tributary areas have for the most part, been developed in the past years. Although these are technically a part of the Hackensack Meadows, they do not offer any great development potential, as compared to the bulk of the vacant Meadows located between Kearny and Route 46.

They will, however, be considered later when the U. S. Army Corps of Engineers Protection Area is discussed.

Next to topography, the vast urbanized area surrounding the Meadowlands creates an apparent contrast. When looking at aerial photos or maps, the first impression one receives is a void situated within the middle of an intensely built-up area. This area, known as the Northeastern New Jersey Metropolitan Area, contains many urban functions which are exerting pressure on Meadows development. Therefore, the apparent difference between the slightly built-up Meadowlands and the intensely built-up surrounding Northeastern New Jersey Metropolitan Area, was another delineating factor.

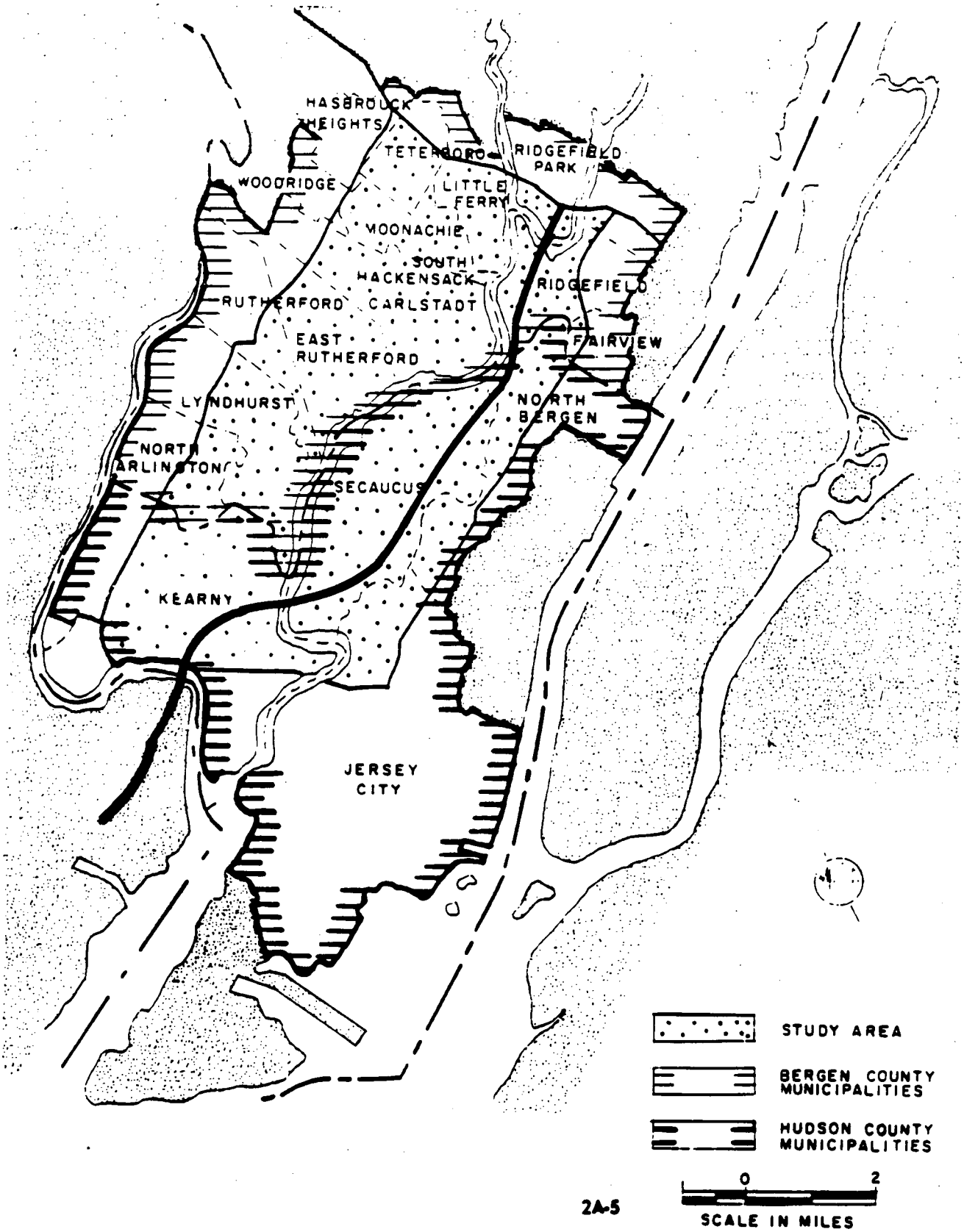
The boundaries of the study area were selected on the basis of physical related to man-made elements. In delineating a study area, the ten foot contour was considered.

It was also noticeable that various man-made elements, such as major roads and highways peripheral to the Hackensack Meadows, align closely with the ten foot contour. The bulk of urban development, such as homes, industries, and commercial establishments abuts the edges of these roads and in some places spills into the Meadows. Therefore, these major roads and highways, because of their relation to topography and urban development, become a final choice in the actual delineation of the Meadows study area. These routes and the boundaries they form are shown in Figure 2a-1 and are as follows:

NORTH: The northerly limit of the study area is U. S. Route 46, that part of which, extends from State Route 17 at Teterboro Airport, to the junction of U. S. Route 46 with State Route 93 (Grand Avenue) at the Ridgefield-Palisades Park Municipal Boundary.

Figure 2a-1

THE MEADOWS STUDY AREA



EAST: The easterly boundary of the study area extends from this junction of State Route 19 and U. S. Route 1 and 9, to it's intersection with the Pulaski Skyway in Jersey City.

SOUTH: The southerly boundary of the study area is formed by the Pulaski Skyway to a point where the Port Authority Trans-Hudson tracks pass under the Pulaski Skyway. From this point the boundary continues along the PATH tracks to their intersection with Harrison's municipal boundary. This provides a distinct separation between Kearny's portion of the Hackensack Meadows and Industrial Kearny south of the PATH tracks.

WEST: The westerly boundary of the study area is actually a series of north-south routes. The first of these proceeds for a short distance along Ogden Avenue, then north along the easterly municipal boundary of Harrison Avenue. From Harrison Avenue, the westerly boundary continues north along Schuyler Avenue and Orient Way, until State Route 3 is reached. The remaining part of the westerly boundary of the study area includes all of State Route 17 between State Route 3 and it's junction with U. S. Route 46.

Since the Study Area does not conform in all respects to the ten foot contour line, it contains some residential and industrial sections not normally part of the Meadows. These built-up portions are, however, intimately related to all aspects of Meadows growth and development. For this reason, analysis and data collection in this report are based on the somewhat larger Study Area boundaries.

The Meadows Study Area is unique in many respects. Within its boundaries is a land mass roughly four miles wide and eight to nine miles long, encompassing

about 21,400 acres or 33 square miles of land. As such, it is larger than the Meadows, yet is only one-sixth of a larger area known as the Hackensack River Basin, which will be discussed later. The immensity of this Study Area is more readily understood, when it is realized that it can almost contain the Island of Manhattan twice over.

As delineated, it actually incorporates an area larger than the tidal marsh, representing the bulk of the Hackensack Meadows. It also includes urban development, represented primarily by the communities of Secaucus and Little Ferry. On the fringe of this area is an almost continuous band of industrially developed land. However, viewed in it's entirety, the proportion of developed land to undeveloped land is extremely small. In fact, the one feature which makes this area stand out is its vast emptiness.

The importance of this area as a transportation hub, is clear cut. Its networks focus and coordinate the movement of people and goods between the New York Metropolitan Region and the United States.

However, the study area had other unique aspects, particularly with regards to the political jurisdiction of municipalities within it. Therefore, an examination of political subdivision in the Study and Planning Area seems appropriate.

## POLITICAL JURISDICTION IN THE HACKENSACK MEADOWS STUDY AREA

The Hackensack Meadows Study Area is more than just a physical entity. Upon closer examination, the natural and man-made elements which are situated in and around the Study Area, such as roads, highways, and watercourses, assume other identities. Some of these are also the political boundaries between the various municipalities and counties comprising the Hackensack Meadows Study Area.

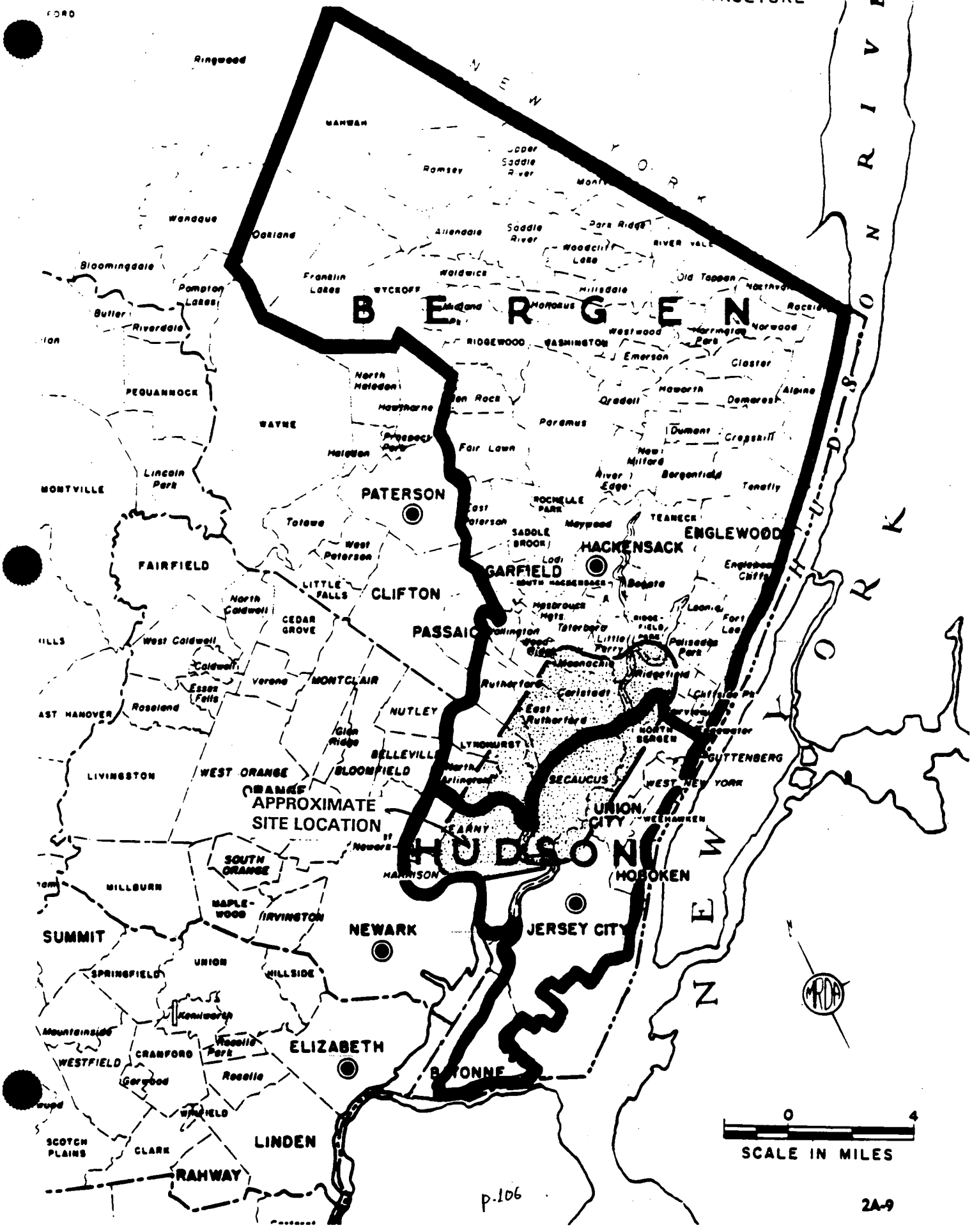
For example, the Hackensack River and the Erie Railroad (Main Line on the westerly side of the Hackensack River form such political boundaries. It is the nature of political subdivision and the role that natural and man-made features play in the subdivision of the Meadows Study Area which will now be explored.

As is frequently the case, political boundaries do correspond with natural and man-made features. This is particularly true where the land contours and transportation lines almost uniformly impart a north-south rectangular shape to the Study Area, but governmental boundaries cross them at right angles as shown in Figures 2a-2 and 2a-3.

Thus, the entire land area of the Meadows Study Area is split between two counties, Bergen and Hudson and the Hackensack River forms the boundary between them. As shown in Figure 2a-4, 14 Bergen municipalities and only 4 Hudson municipalities fall wholly or partially with the boundaries of the Meadows Study Area. However, they are much more equal in terms of land area since the Bergen County municipalities occupy 11,300 acres compared with 10,062 for the Hudson communities.

Only two communities, Moonachie in Bergen and Secaucus in Hudson County, fall entirely within the Meadows Study Area, but all other communities have varying proportions of their land areas in the Study Area. For example, a number of Bergen municipalities are almost wholly in the Study Area. These include Carlstadt with a total land area of 2,688 acres, 85 percent of which is the Meadows. East Rutherford and Little Ferry both have more than three-fourths of their total land area in the Study Area and Lyndhurst, Ridgefield and Teterboro also fall mainly within the Study Area boundaries. The same is essentially true for Kearny and North Bergen in Hudson County.

Figure 2a-2 HACKENSACK MEADOWS STUDY AREA AND COUNTY STRUCTURE




p.106

Figure 2a-3

POLITICAL SUBDIVISION IN THE MEADOWS STUDY AREA

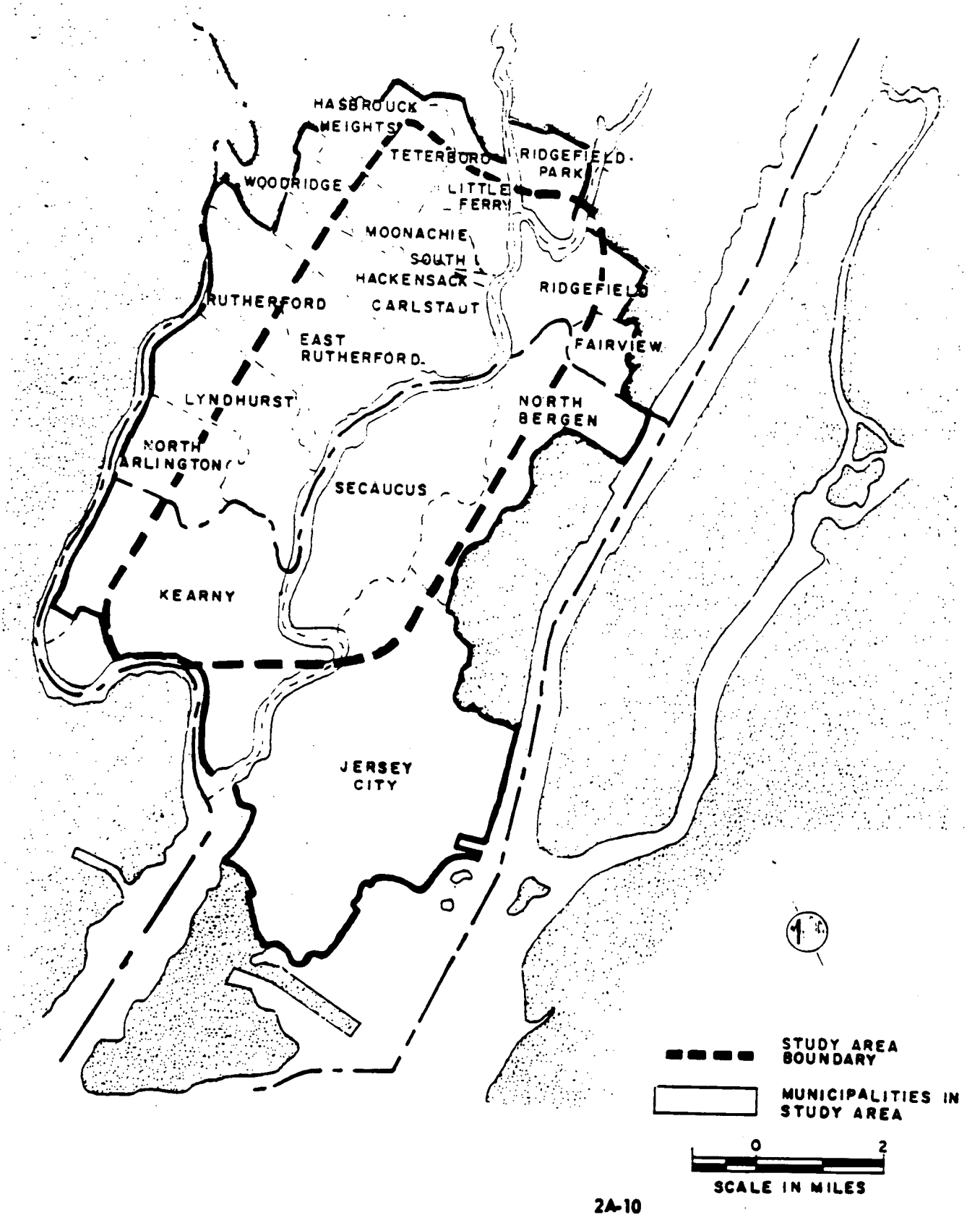


TABLE 13-[illegible]

MUNICIPALITIES IN THE STUDY AREA

| COUNTY | MUNICIPALITY | TOTAL LAND AREA (Acres) | LAND AREA IN STUDY AREA (Acres) | PERCENT OF LAND IN STUDY AREA |
|---|---|---|---|---|
| Bergen | Carlstadt | 2,688 | 2,276 | 84.67 |
| | East Rutherford | 2,368 | 1,861 | 78.59 |
| | Fairview | 576 | 80 | 13.88 |
| | Hasbrouck Heights | 960 | 87 | 9.06 |
| | Little Ferry | 960 | 854 | 88.96 |
| | Lyndhurst | 3,008 | 1,977 | 65.72 |
| | Moonachie | 1,024 | 1,024 | 100.00 |
| | North Arlington | 1,600 | 654 | 40.88 |
| | Ridgefield | 1,664 | 1,091 | 65.56 |
| | Ridgefield Park | 1,280 | 229 | 17.89 |
| | Rutherford | 1,664 | 545 | 32.75 |
| | South Hackensack | 320 | 76 | 23.75 |
| | Teterboro | 768 | 473 | 61.59 |
| | Wood-Ridge | 704 | 73 | 10.37 |
| Sub-Total | | 19,584 | 11,300 | 57.71 |
| Hudson | Jersey City | 8,640 | 923 | 10.68 |
| | Kearny | 5,952 | 3,570 | 59.98 |
| | North Bergen | 3,264 | 1,665 | 51.01 |
| | Secaucus | 3,904 | 3,904 | 100.00 |
| Sub-Total | | 21,760 | 10,062 | 46.24 |
| Grand Total | | 41,344 | 21,362 | 51.67 |

Source: New Jersey Division of State and Regional Planning
Note: Figures For Land Area In Meadows Exclude Water Areas

In examining the size and spatial distribution of municipalities in the Hackensack Meadows Study Area, the following patterns emerge. The present configuration of political subdivision reflects past surveying practices used during the 1600 and 1700's when the Proprietor's of East Jersey controlled the land. The subdivision of land at that time was largely done by rough surveying practices in which private large tract subdivision occurred using natural and man-made features. Gradually these subdivisions were incorporated together into large townships, most of which were further subdivided (around 1800-1900) into municipalities generally forming the political pattern as it exists today. The boundaries of municipalities in the Hackensack Meadows Study Area are projected in all directions. They follow an irregular pattern, which varies from a straight line course to a curving, twisting effect. Orderly boundaries are formed where streets, railroads and other man-made features are followed. Curving, twisting patterns have been created where they follow creeks and the Hackensack River. In some instances, the boundaries of some municipalities extend from the Passaic River to the Hackensack River, which roughly parallel each other at a distance of 2 miles. To the east of the Hackensack River, a similar condition exists, where boundaries extend from the Hudson River to the Hackensack River. This is also a distance of about 2 miles. This results in some municipalities having river frontage on two sides, while others, such as Teterboro and Moonachie, have no river frontage.

Therefore, boundary delineation has created Meadowlands municipalities with a variety of shapes. Some are large sprawling areas, whereas others are large wedge-like forms. Few, if any indicate any similarity in their physical delineation. In fact, individuality is fully expressed in the political subdivision of the Hackensack Meadows.

This individuality has greater meaning; however. While planning for the Hackensack Meadows must be done on a comprehensive scale, any plan conceived must satisfy all political interests. Municipalities in the Hackensack Meadows have formed together into the Meadowlands Regional Development Agency. This agency has the legal responsibility to develop the Meadows once a plan is adopted.

After political jurisdiction, the next most powerful force having an influence on the Hackensack Meadows is the effect of flooding in the Meadows and it's tributaries upstream. For this reason, an even larger area will now be considered, which has been chosen to account for the amount of land which will be protected.

THE PROTECTION AREA

Another area having an important relationship to the development of the Hackensack Meadows has been established by the U.S. Army Corps of Engineers. This area includes land below an elevation of fifteen feet and is referred to as the protection area, that is, all that area which must be considered in planning for various types of controls needed to combat problems created by the Hackensack River in times of flood. In addition, the future construction of reclamation projects will be based upon the needs of this area, that is, what will be needed to protect all property in the Meadows. A most important purpose of this area, however, will be to determine a cost-benefit ratio. Such a ratio will be derived after present real estate values, in addition to the enhanced real estate values of land within the protection area based on future land use development, are compared to the cost of reclaiming the area.

In terms of size, it is larger than the Study and Planning Area, either including parts or all of twenty-three municipalities totaling about 24,000 to 25,000 acres or 38 square miles. This is about 3,000 acres larger than the Study and Planning Area. This greater coverage, not only takes into account

the Hackensack Meadows proper, but also includes Industrial Kearny, where the Hackensack and Passaic Rivers converge at Newark Bay, lands of Jersey City, south of the Pulaski Skyway, in the area of N.J. Routes 1 and 9, are also included , as are tributary areas along the Upper Hackensack and Overpeck Creek. Here heavy flooding has occurred in the past.

The delineation of this area is highly irregular, largely due to the meandering nature of the fifteen foot contour and the inclusion of additional parts of municipalities. In general, this area is roughly six to seven miles long, extending from the Kearny-Jersey City area to Hackensack on the Hackensack River and Englewood on Overpeck Creek. As Fig.___ in Technical Report 2c indicates, the area is roughly rectangular along a northeast-southwest axis, with the exception of its northerly and southerly boundaries, where its delineation along the Susquehanna Railroad and local streets make it irregular.

The protection area was selected because of the effect of flooding on municipalities bordering the Hackensack River. This flooding occurs when the Hackensack River overflows it's banks during heavy rain periods. The flooding is caused not only by the tidal surges of the ocean, but is added to by surface runoff. This runoff is collected by a vast drainage system associated with the Hackensack River, which together form the Hackensack River Drainage Basin.

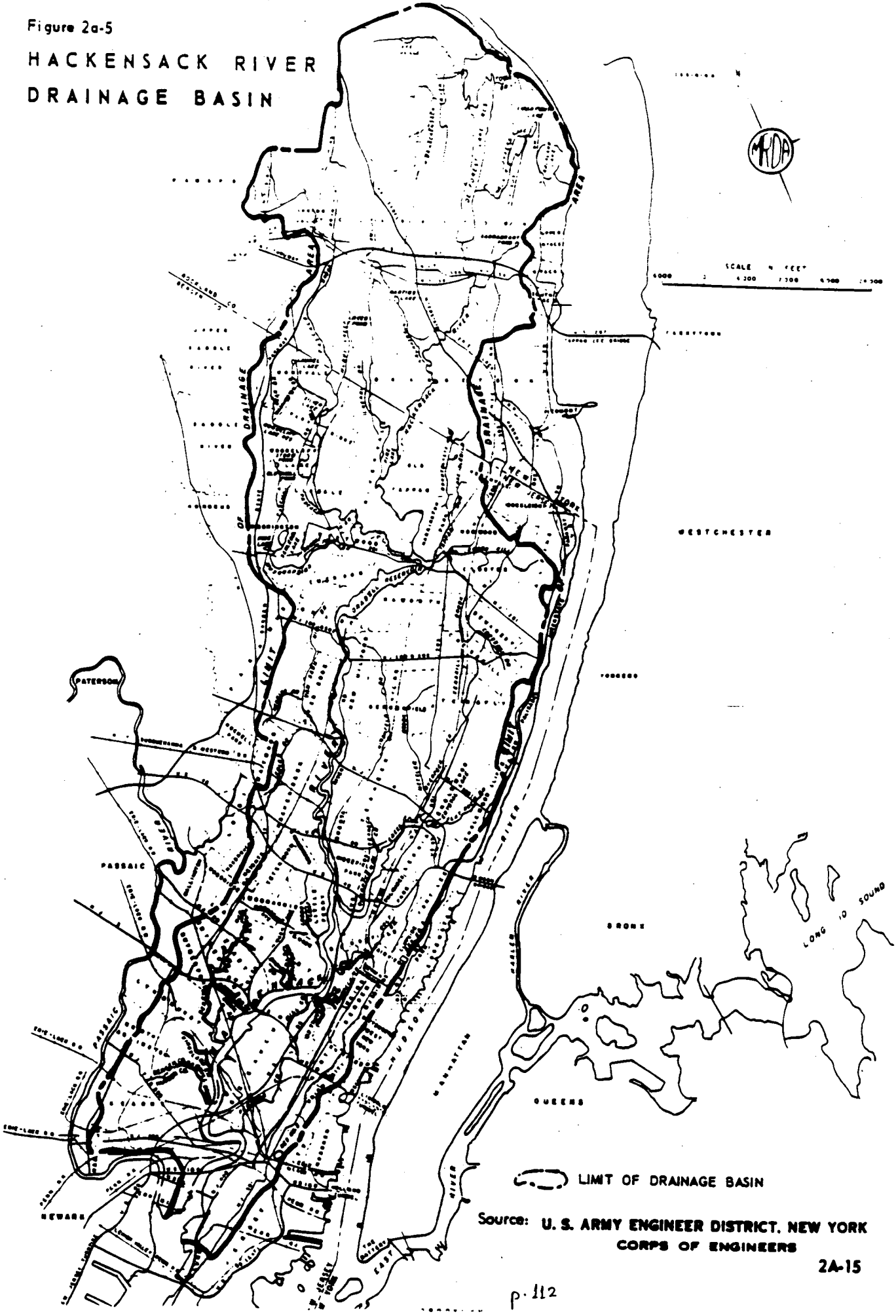
## THE HACKENSACK RIVER BASIN

The largest area of concern having an important relationship to the Hackensack Meadows is the Hackensack River Drainage Basin. This immense area,as shown in Fig. 2a-5, including 202 square miles, extends from Haverstraw, New York, south to the Kearny-Jersey City area.

Bounded to the west of the Passaic Ridge and to the east by the Palisades Ridge, this area generally resembles an elongated oval,which varies

Figure 2a-5

# HACKENSACK RIVER DRAINAGE BASIN




Source: U. S. ARMY ENGINEER DISTRICT, NEW YORK
CORPS OF ENGINEERS

from about 5 to 6 miles in width and in about 20 to 30 miles measured longitudinally through it's center.

In general, the hydrological system which spreads throughout the basin contains a large number of canals, streams, brooks, creeks which focus on the Hackensack River. The overall system largely resembles a tree with many branches shooting off from it's trunk.

The Hackensack River more or less splits this large basin in a meandering fashion and is fed by waters collected from tributaries of the Hackensack River. Pascack Brook, Overpeck Creek, Berry Creek Canal, Saw Mill and Penhorn Creeks are among the larger tributaries in the vast drainage network which spreads throughout this basin, feeding the Hackensack River.

The physical nature and general makeup of the Hackensack River is best indicated in the following excerpts:

> "Hackensack River, a winding stream 45 miles long, rises in the vicinity of Harverstraw, Rockland County, N.Y., flows south and empties into Newark Bay at its junction with Passaic River. It has a drainage area of 202 square miles and the average fresh-water discharge at its mouth is 292 cubic feet per second. The river is tidal and navigable up to New Milford, 21 miles above the mouth, where navigation is terminated by a low dam of the Hackensack Water Co. The principal navigable tributaries of Hackensack River are Berry Creek, with its entrance through Berry Creek Canal, and Overpeck Creek, 8.5 and 14 miles respectively, above the mouth of the river. These tributaries are each navigable for a distance of about 3 miles."[3]

The next area of concern, although slightly smaller in physical stature, is very important. Up to this point, the main area of concern has been with areas related to the Hackensack Meadows. However, what of the relationship of the Hackensack Meadows to other areas? This will be considered next.

## IMPACT AREA

Usually, economic impact is studied only from one point of view, that is, the external effect that proposed development will have on a surrounding area. However, the Hackensack Meadows is for the most part a void. As such, there is immediate impact being placed on it by the heavily urbanized area surrounding it.

Therefore, impact, in the case of the Hackensack Meadows, must be viewed in two ways. Immediate impact upon the Meadows by the surrounding urbanized area, as compared to the eventual impact that proposed development in the Meadows will have on the surrounding communities. This is the basis for selecting the impact area.

Since the extent of impact is an intangible thing, it was decided that some criteria must be used in order to describe any impact area which might be selected, prior to measuring the extent in quantity and direction of this impact.

The Setting for Regional Planning[4] offered such an approach. This report delineated the State of New Jersey into regions based on various criteria. Newspaper coverage, retail sales, labor market area, telephone coverage and other social and economic indicators were used. Based on these, four regional levels were developed, namely Class I, II, III and IV regions.

For impact study, at the Meadows level, the Class I and II regions are too broad, since these are oriented to the major cities of Newark, New York and Philadelphia, and are metropolitan in nature.

According to the Setting for Regional Planning, regions at the Class III level are self-sustaining socio-economic units. As such, they are large areas, either a county, groups of counties or a combination of a county and municipalities comprising a part of a contiguous county. Therefore, for purposes of impact

study, such a level would still be inappropriate due to the size and character of these regions.

A combination of Class IV regions appear to be the best choice to study impact. These regional levels focus on the Hackensack Meadows and have a strong relation to this area. In fact, six of the seven Class IV regions selected contain municipalities which are situated within the Hackensack Meadows Study and Planning Area.

These selected include the Newark, Fort Lee, Hackensack, Jersey City, Passaic, Rutherford, and Union City Class IV Regions. Together, they contain 46 municipalities, which encompasses an area of 154.8 square miles. This is 4 to 5 times larger than the Meadows Study Area and about 40 to 50 square miles smaller than the Hackensack River Drainage Basin. This area is highly urbanized, attested to by the 1,658,034 people living within it.

In terms of extent, the impact area terminates to the east at the New Jersey-New York State boundary which splits the Hudson River. To the south, it extends as far as Bayonne and the Essex-Union County boundary. Westerly it extends out as far as Maplewood, the Oranges, Montclair and West Paterson. The northerly boundary is highly irregular, but generally, it extends out to the Englewood-Bergenfield-Paterson Area.

The impact area is our last area of concern, with regards to planning for the Hackensack Meadows. When land use proposals are made for the Hackensack Meadows, they will be examined in terms of effect or impact on this area.

Before any proposals can be made, however, existing land use trends must be known. This very important part of overall planning studies will now be presented, considering development that has occurred in the Meadows Study and Planning Area.

Figure 2a-6

THE IMPACT AREA

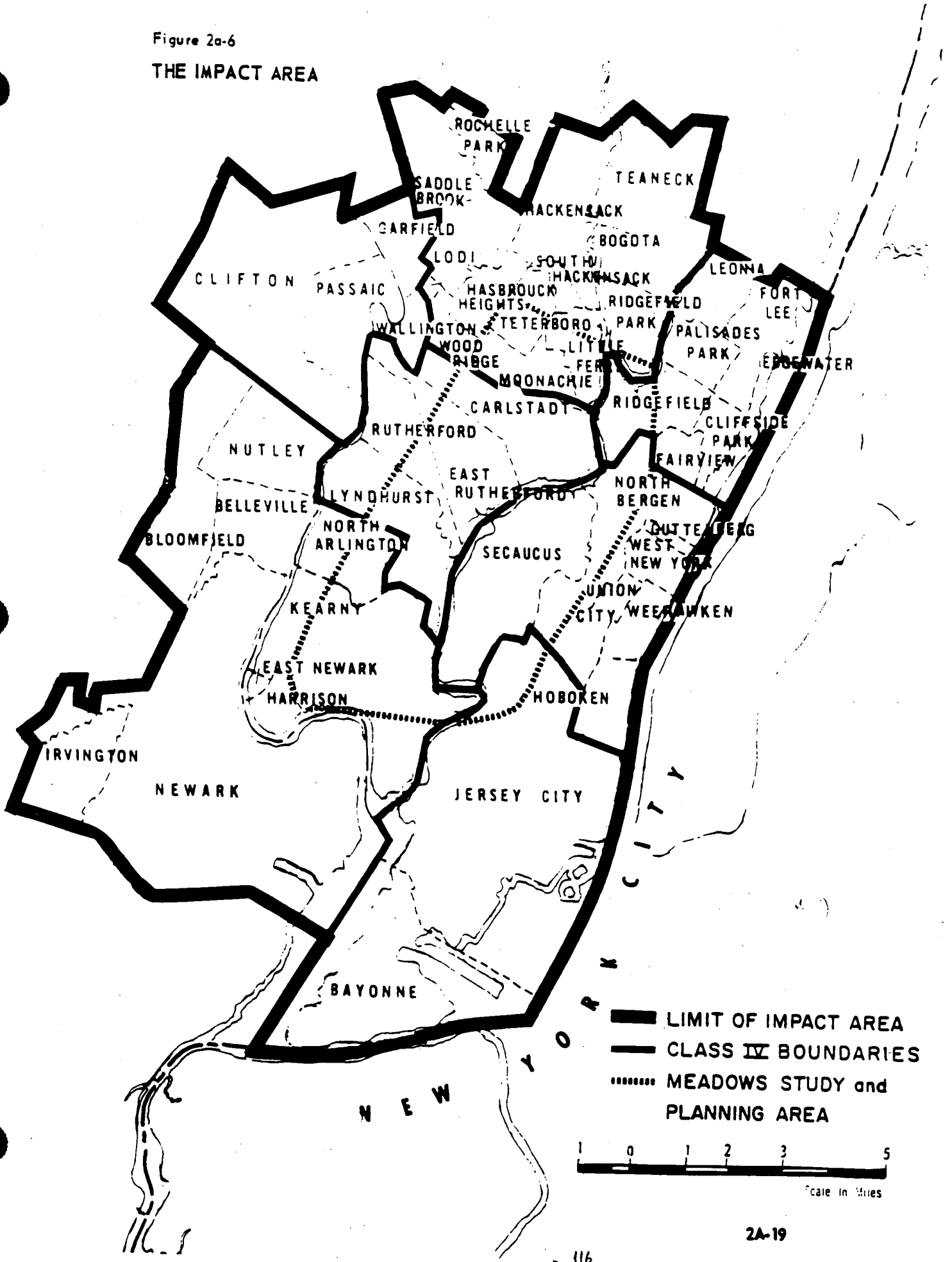


Figure 2A-7

## Regional and Municipal Composition in the Impact Area

### Newark Class IV

Belleville
Bloomfield
East Newark
Harrison
Irvington
Kearny
Newark
North Arlington
Nutley

### Fort Lee Class IV

Cliffside Park
Edgewater
Fairview
Fort Lee
Leonia
Palisades Park
Ridgefield

### Hackensack Class IV

Bogota
Hackensack
Hasbrouck Heights
Little Ferry
Lodi
Moonachie
Ridgefield Park
Rochelle Park
Saddle Brook
South Hackensack
Teaneck
Teterboro
Wood - Ridge

### Jersey City Class IV

Bayonne
Hoboken
Jersey City

### Passaic Class IV

Clifton
Garfield
Passaic
Wallington

### Rutherford Class IV

Carlstadt
East Rutherford
Lyndhurst
Rutherford

### Union City Class IV

Guttenburg
North Bergen
Secaucus
Union City
Weehawken
West New York

### SUMMARY

| | Municipalities | Area | Pop. |
|---|---|---|---|
| Newark Class IV | 9 | 52.1 | 649,548 |
| Fort Lee Class IV | 7 | 10.5 | 49,300 |
| Hackensack Class IV | 13 | 26.0 | 168,827 |
| Jersey City Class IV | 3 | 19.1 | 398,757 |
| Passaic Class IV | 4 | 17.5 | 174,561 |
| Rutherford Class IV | 4 | 15.2 | 56,151 |
| Union City Class IV | 6 | 14.4 | 160,890 |
| | 46 | 154.8 | 1,658,034 |

## Geological Structure of the Hackensack Meadows

The geological structure of the Hackensack Meadows today, is the result of extensive geological change, which began to occur over a million years ago. At that time, it was part of an upland basin, several hundred feet above sea level. The Meadows grass, as seen today, was not present. Only a rock floor, rising in elevation to the Palisades existed and the Hackensack River was then located on the westerly side of the basin.

A major change occurred in it's physical appearance, when the Wisconsin Ice sheet scoured and gouged the upland basin, reducing it's level. New stream beds were created, and when it finally receded, large deposits of rock and soil remained at the lower end of the Hackensack Valley. This formed a natural dam, beyond which the waters of the melting glacier were stored. Thus, Lake Hackensack was formed.

For thousands of years, the lake remained intact, collecting large deposits of organic materials, sand and clay. Eventually the ocean level rose, and the natural dam retaining Lake Hackensack was breached. A continuing rise in the ocean level eventually inundated Hackensack Valley.

The final phase of the development of the Hackensack Meadows occurred as the ocean receded. The soils were washed of their heavy salt content, and plant and animal life appeared. Thus, the basic geological structure of the Meadows was established.

The geological composition of the Hackensack Meadows is varied. Many terms are used to describe the various types of soils, rock and organic materials that comprise the Hackensack Meadows. Generally, these include, in various combinations, meadow mat, peat, wood, cinders, mud, clay, sand, quicksand, gravel,

silt, topsoil, shale, sandstone, traprock, limestone, bedrock, boulders and even garbage fill.

It is difficult to visualize this structure when traveling over the Meadows, either by motor vehicle or train, for all that can be seen is a vast expanse of marsh grass.

Nevertheless, this surface picture is deceptive. Below this mantle, the true geologic makeup of the Hackensack Meadows becomes clearer. Actually, the surface as well as the sub-surface stratum of the Meadows must be examined before a full understanding of this area is gained.

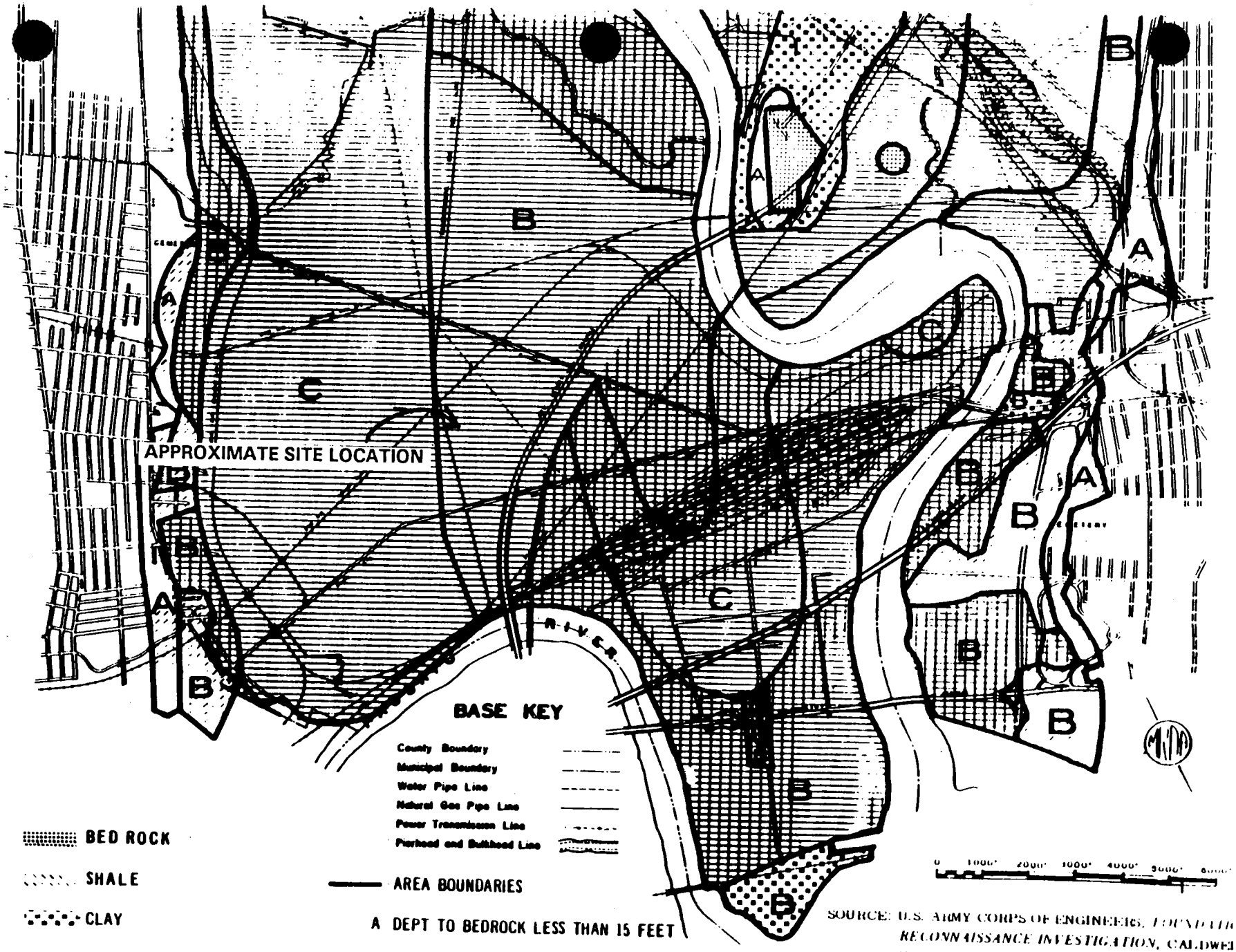
According to the Engineering Soil Survey of New Jersey, much of the Hackensack Meadows is Tidal Marsh of Marine Origin.[5] As Figure 2a-8 indicates, this comprises a large part of the Hackensack Meadows. The organic materials, fine sands, silts and clays, which comprise this area have considerable variation in depth.

In fact, a sectional view of the Hackensack Meadows would present the following. As Figure 2a-9 indicates, a multi-level structure of different soil and rock types exist, creating a configuration, similar to a mountainous profile. In some areas, these layers are relatively parallel to the Meadows surface, while in other areas, they rise and fall steeply. Generally, this relationship of soil and rock layers is similar throughout the entire Meadows sub-structure.

Near the surface of the Meadows is an agglomeration of organic materials, including meadow mat, peat, decayed vegetation and organic silt. Generally, organic silt is found immediately under the meadow mat, peat and other materials covering Meadow's surface. This combination of materials results in an extremely unstable surface requiring foundation treatment before structures can be erected.

Figure 2a-8 GEOLOGIC STRUCTURE OF THE HACKENSACK MEADOWS

A
B
C
CEMETERY




SOURCE: U.S. ARMY CORPS OF ENGINEERS, *FOUNDATION RECONNAISSANCE INVESTIGATION*, CALDWELL N.J. JOSEPH S. WARD, INC., 1962.

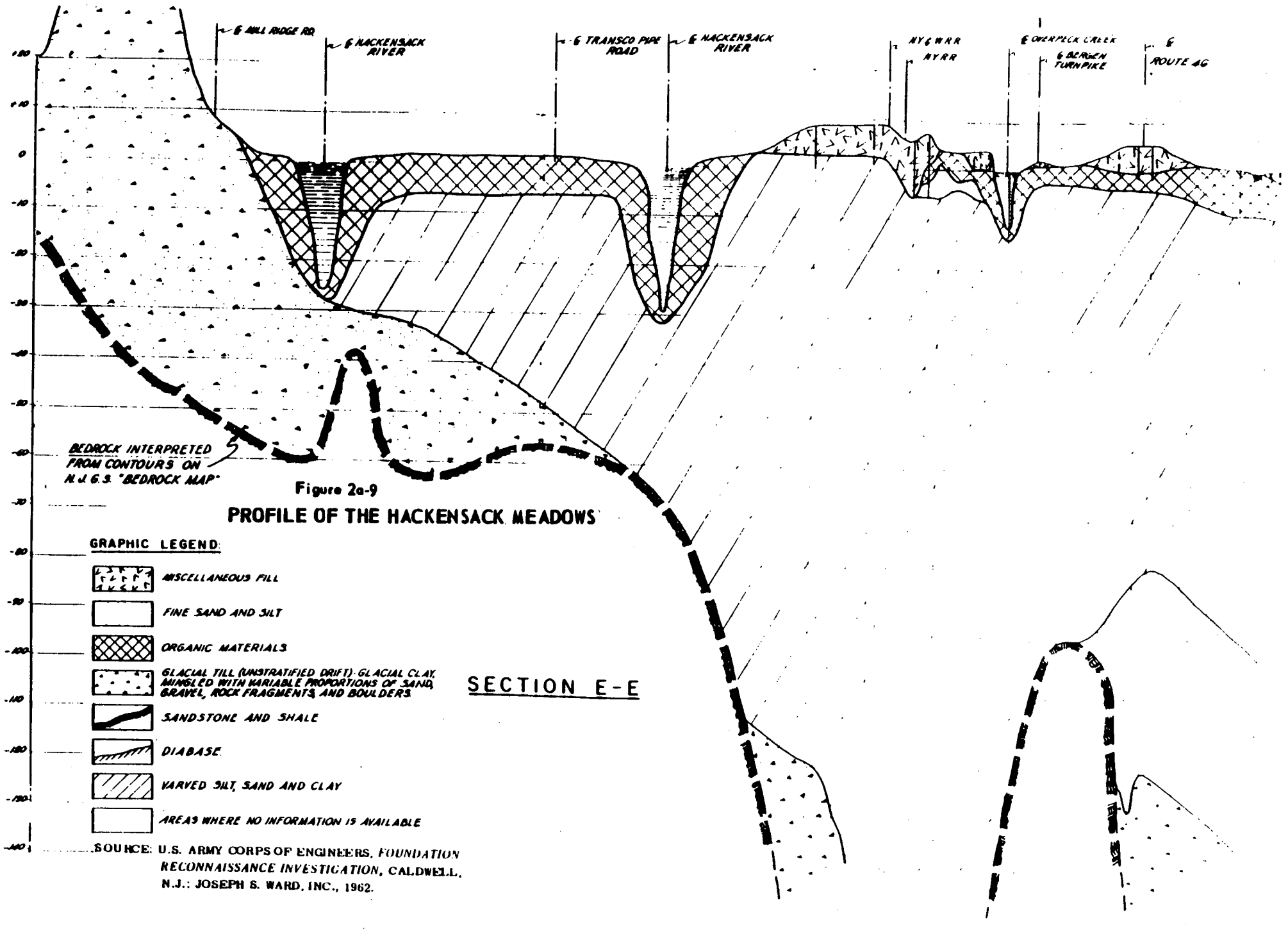



Figure 2a-9

PROFILE OF THE HACKENSACK MEADOWS

SOURCE: U.S. ARMY CORPS OF ENGINEERS, FOUNDATION RECONNAISSANCE INVESTIGATION, CALDWELL, N.J.: JOSEPH S. WARD, INC., 1962.

Directly beneath this surface layer are a wide variety of soil types, including silts, sands, clays, gravel and boulders. These are not quite as unstable as the surface materials, still they add to the structural instability of the Meadows. Over-all, much of the soils materials in the Meadows are plastic and are found at varying depths, in some places greater than 100 feet.

There is considerable variation in the depth of the fine sands, silts and clays which predominate in this area. They attain their greatest depth near the center of the Meadows and in areas immediately adjacent to the right and left of the Hackensack River. In some areas, these soft layers have been found to attain depths of 100 to 200 feet.

Beneath this soft, highly unstable surface and immediate sub-surface layers, are quantities of glacial till. Glacial till is composed of a wide assortment of rock and soils particles, which range from sand particles to boulders. This conglomeration of soil and rock types are residual materials deposited by the Wisconsin Glacier, whose role in the development of the Hackensack Meadows was discussed previously.

The geological structure of the Hackensack Meadows adds greater stability in the presence of shale, sandstone and bedrock. Depths attained by these rock formations likewise vary considerably. Shale, for example, has been found close to the surface of the Meadows, as well as to a depth of 416 feet.[6] Diabase bedrock also assumes a similar position in the Meadows. Snake Hill, composed of diabase rises above the Meadows to an elevation of 100 to 200 feet. At other locations it attains depths in excess of 250 feet. Diabase, the hardest of the groups, is a dense, coarse-grained rock formed during the Triassic Age, when volcanic activity was occurring. In general, rock occupies an extreme position in the Hackensack Meadows.

The distribution of these soil and rock types assumes a definite pattern in the Hackensack Meadows. Generally, the softer organic materials, sands and clays are located in greater amounts towards the center of the Meadows and become shallow towards the periphery of the Meadows. Rock is closer to the surface, at the periphery of the Meadows. In some areas outcrops occur. Secaucus, for example, is such an area where this condition exists. As Figure 2a-9 indicates, firmer solid and underlying shale deposits have been responsible for greater urban development of the Meadows in this area. For the most part, the unstable organic soils in the Meadows has deterred such development.

Drainage patterns in the Hackensack Meadows largely reflect the soil structure of this area. In areas composed of organic and other highly compressible materials, such as silt and clay, extremely poor drainage results. Some areas in the Meadows are almost constantly saturated with water as a result, and others are subject to intermittent flooding, due to poor runoff and tidal surge. Higher ground, however, composed of more porous types, such as glacial till and glacial moraine, has better surface and internal runoff.

In summary, the type and distribution of soils in the Hackensack Meadows is varied and unique. Since it creates an obvious contrast in the midst of the highly developed urban complex of Northeastern New Jersey, this area represents a throwback to primeval times. Geologically, it is much the same as it was a million years ago. The organic materials present today are remnants of the flora and fauna which then existed. Since the bulk of the Hackensack Meadows is composed of these organic soils, and other highly compressible materials, poor drainage results. The land therefore, is not suitable for development in it's natural state and prior foundation treatment is necessary to render it so. This has been a major factor in deterring land use development in the Meadows.

Topography in the Hackensack Meadows

The Hackensack River splits this area longitudinally, shifting from the westerly side of the Meadows, to a more central position. A number of creeks created by glacial activity flow into the Hackensack River. The largest of these is Overpeck Creek, which diverges from the Hackensack River at Little Ferry. Berry Creek and Berry Creek Canal are the next largest water courses. The remaining creeks are small, traversing the Hackensack Meadows in all directions. These are particularly numerous on the westerly side of the Hackensack River. Irregardless of size and placement, these water channels are at sea level occupying a low position in the topographic setting of the Meadows.

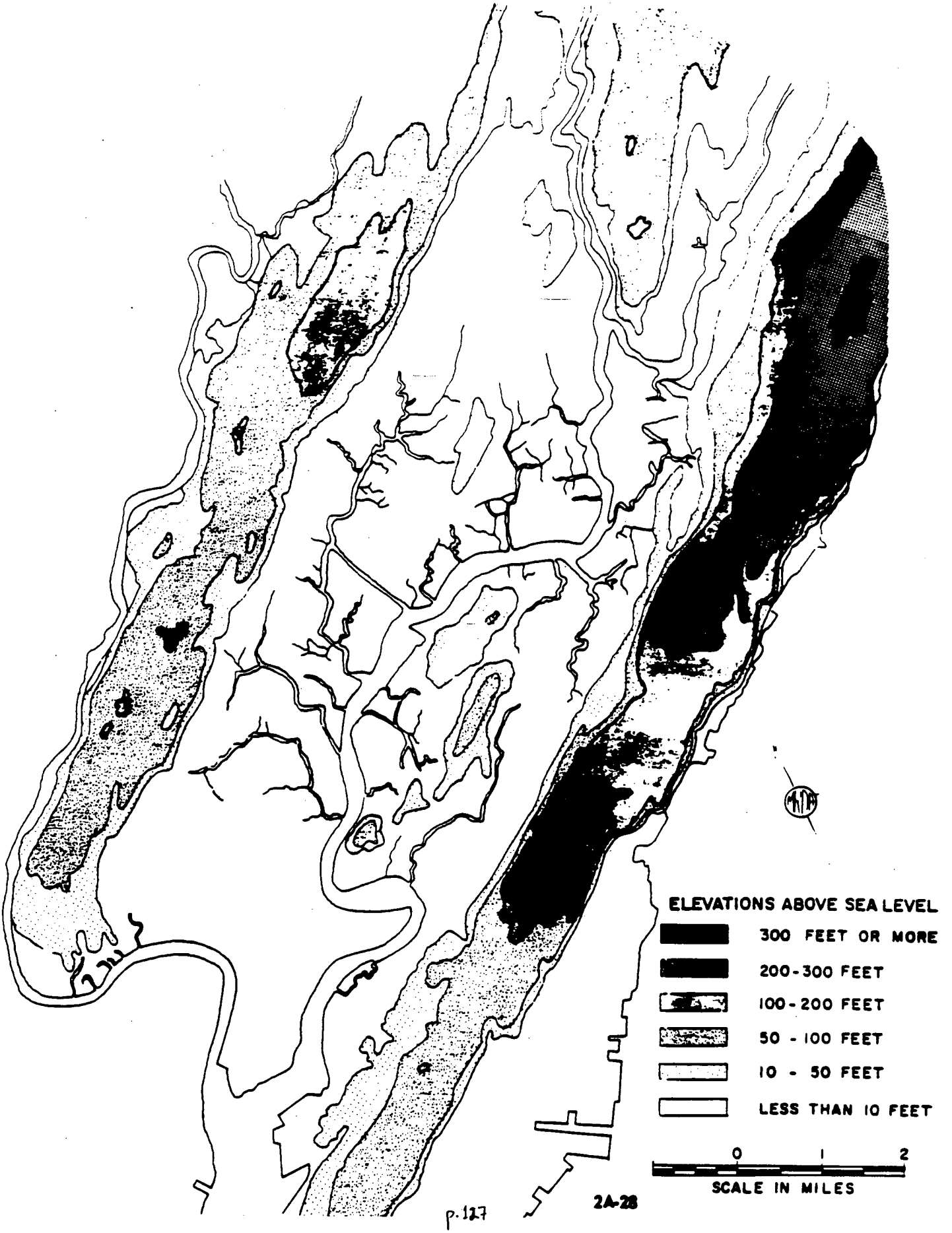
There are areas, however, which have elevations lower than the surface of the Hackensack River and it's tributary creek. One such area is situated in the North Arlington-Lyndhurst-Kearny sector which has below sea level elevations, as low as minus 1.2 feet. This area is roughly situated within the industrial line of the Erie-Lackawanna Railroad, the Erie-Lackawanna main line, New Jersey Route 7 and the Greenwood Lake Branch of the Erie Railroad.

As a result of these below sea level elevations, this area is intermittenly inundated with water, which surges over the banks of the Hackensack River, in periods of high tide and floods. This area represents an extreme in the topographic profile of the Hackensack Meadows. As Figure 2a-10 indicates, while low elevation generally characterize the Meadows, for the most part not exceeding ten feet, there are exceptions.

In the built-up portion of Secaucus, elevations greater than 50 feet exist either of natural or man-made origin. Big Snake Hill, also located in Secaucus, has an elevation in excess of 150 feet. There is also a built-up area in Carlstadt, located along Washington Road, which has an elevation of greater than 40 feet. Therefore, the Hackensack Meadows is not without some topographic variation.

Figure 2a-10

ELEVATIONS IN THE HACKENSACK MEADOWS AREA



In addition to natural elevations greater than ten feet, there are also man-made elevations of equivalent height. During the past years, the extensive dumping of garbage and other fill materials has occurred. This has elevated certain sections of the Hackensack Meadows to heights of 20 to 30 feet. Such operations have occurred mainly along major transportation routes, particularly Route S-3, and along the fringe of the Meadows in it's southwest quadrant.

An elevation of ten feet is particularly significant to the topographic setting of the Meadows. The ten foot contour is referred to as a line of division between the built-up or upland portion of the Meadowland municipalities and their meadows. This elevation generally follows existing transportation routes surrounding the Meadows. On the westerly side of the Meadows, it roughly follows Schuyler Avenue, and Route 17. On the easterly side, it closely borders U. S. Route 1 and 9.

The upland portion of the Hackensack Valley, containing an intense amount of urban development originates at the ten foot contour. An elevation of about 10' is attained, West of the Hackensack River, at the Harrison end of the Passaic Ridge. This increases to 200', when proceeding north along the Passaic Ridge to the Carlstadt area. East of the Hackensack River, an elevation of 20 to 30' is attained at the Jersey City end of the Palisades Ridge, increasing to an elevation in excess of 300' in the Palisades Park area.

In conclusion, elevations increase east and west of the Hackensack River, becoming higher to the north along the Passaic and Palisades Ridges. The general configuration of topography in the Hackensack Meadows is a low lying basin with little topographic change, bordered by two parallel ridges on the east and west sides, with the Palisades Ridge to the east being higher.

## FOOTNOTES

1. Netherlands Engineering Consultants, Report on the Feasibility of Reclaiming the Hackensack Meadows By means of Closing the Hackensack River, 1958.

2. Meadowlands Regional Development Agency and New Jersey Department of Conservation and Economic Development, MRDA Comprehensive Report, Trenton, 1960.

3. Department of the Army. Hackensack River, New Jersey Report of the Chief of Engineers, United States Army, House Document No. 252 (Washington, U.S. Government Printing Office, 1951), p. 6.

4. State of New Jersey Department of Conservation and Economic Development. The Setting for Regional Planning. (Trenton: Division of State and Regional Planning, 1961.

5. Rutgers University. Engineering Soil Survey of New Jersey. Engineering Research Bulletin No. 18 (New Brunswick: College of Engineering, 1952), p. 33.

6. Ward, Joseph S. Foundation Reconnaissance Investigation, Hackensack Meadows, New Jersey, (Caldwell: Joseph S. Ward, Inc. 1962), p. 7.

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* This report was prepared, written and illustrated by William Strachan under the direction of Richard A. Ginman.

**REFERENCE NO. 7**

PLANNING BOARD

# FEASIBILITY STUDY & REPORT

# OF A

# HACKENSACK RIVER DAM

A Preliminary Engineering Study to Determine the Feasibility of the Construction of a New Dam on the Hackensack River, Bergen County, New Jersey.

Prepared By

The Office of the County Engineer
County of Bergen, New Jersey

Roy J. Elam, P.E., L.S.
County Engineer

October, 1966

NJ Be-1

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# PART III

## A - GEOLOGY AND TOPOGRAPHY

### Geology - General

In New Jersey there are three (3) convenient reference points for keeping geologic time in proper perspective. These are the Precambrian, Triassic, and the Pleistocene or Ice Age. The first time period, the Precambrian, is distinguished by the fact that all rocks are more than six hundred million years old. Practically all of the rocks of this age are found in the New Jersey Highlands, are located in the north west section of the state, and do not reach into the Hackensack River Valley in Bergen County.

The second reference point, the Triassic, began about 225 million years ago and covers the central portion of the state. This portion of New Jersey is also the most heavily populated and includes the area occupied by the Hackensack River Basin in Bergen County.

The third reference point is the Pleistocene, or Ice Ages, an epoch of the Quaternary period of the Cenozoic era, and bagan about one million years ago.

There are four natural geologic areas or regions in New Jersey. Each of these areas is a part of a much larger region of similar topography, that extends into adjacent states in which there are similar sequences of rock types, of geologic structure, and a common geologic history. Each such area, in its entirety, is known as a "physiographic province" and can

A - GEOLOGY AND TOPOGRAPHY

Geology - General (Continued)

be listed as follows:

a. Ridge and Valley - Northern Sussex and Warren Counties.

b. The Highlands - Southern Sussex and Warren Counties.

c. Piedmont - South of the Highlands and north of a line from New Brunswick to Trenton.

d. Coastal Plain - South of the line from New Brunswick to Trenton and south or southeast of the Delaware River betwen Trenton and Wilmington.

The Hackensack River Basin is a part of the Piedmont Phisographic Province. This Province, as it pertains to New Jersey, starts at the Hudson River and extends southwesterly across the state. The entire Hackensack River basin, as well as the surrounding area, has a surface cover of glacial till overlying Triassic sandstones, shales and igneous rocks of the Newark Series and the Mesozoic Era. The glacial till cover was formed by the final ice advance known as the Wisconsin Age and was a part of the Ice Age (Pleistocene) period of geologic time. It has been well established that the terminal moraine of the Wisconsin Age lies at the mouth of the Hackensack River and the Hackensack River Meadow was once Glacial Lake Hackensack.

Glacial Lake Hackensack, that covered the area in which the proposed dam would be located, was formed during the waning

Geology - General (Continued)

of the Wisconsin ice in the area north of Staten Island, west of the Palisades, and east of the Watchungs. The shore lines of this lake are not as obvious as other geologic features and the exact location of the overflow points in the moraine are eroded away. The Hackensack River Valley, as it now exists, was also a part of Glacial Lake Hackensack. This is indicated by the presence of sediments such as fine sands, silts and varved clays in depths ranging from twenty (20') to one hundred ten (110') feet. Information collected, test borings made for this project, and logs of borings made for other projects, agree with the general geologic theory that there were two periods of deposition of lake clays separated by an interval of erosion which deposited sand on the first clay layer. All of this is further complicated by the fact that the area under study, the bottom of a former glacial lake, is constantly flooded because it is below sea level.

Soils - Sub-surface

The geologic history of the site under study for the feasibility of the installation of a new dam, when correlated with recent test borings taken for this study, indicated bed rock composed of Triassic sandstones or shales as shallow as sixty-three (63') feet below sea level and as deep as seventy-seven (77') feet, overlain with glacial lake sediment.

The soils resulting from the lake deposits, and overlying the bedrock are silts, varved clays, silty clays and fine sands. The test borings taken for this study also indicate that the soils, resulting from the lake deposits, that

**REFERENCE NO. 8**

# Uncontrolled Hazardous Waste Site Ranking System

## A Users Manual

(HW-10)

Originally Published in
the July 16, 1982, *Federal Register*

United States
Environmental Protection
Agency

1984

p. 137

TABLE 2

PERMEABILITY OF GEOLOGIC MATERIALS*

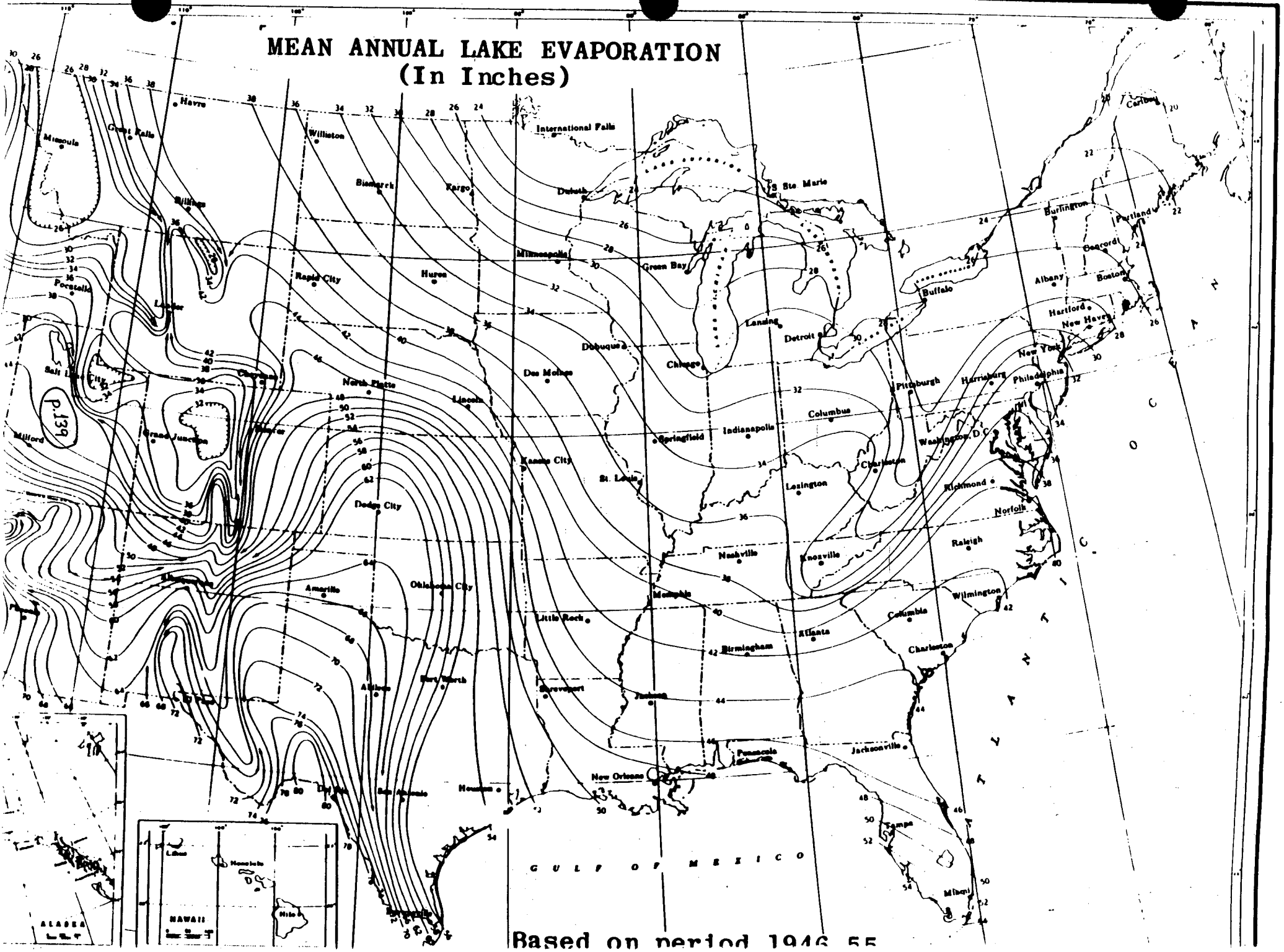
| Type of Material | Approximate Range of Hydraulic Conductivity | Assigned Value |
|---|---|---|
| Clay, compact till, shale; unfractured metamorphic and igneous rocks | $<10^{-7}$ cm/sec | 0 |
| Silt, loess, silty clays, silty loams, clay loams; less permeable limestone, dolomites, and sandstone; moderately permeable till | $10^{-5}$ - $10^{-7}$ cm/sec | 1 |
| Fine sand and silty sand; sandy loams; loamy sands; moderately permeable limestone, dolomites, and sandstone (no karst); moderately fractured igneous and metamorphic rocks, some coarse till | $10^{-3}$ - $10^{-5}$ cm/sec | 2 |
| Gravel, sand; highly fractured igneous and metamorphic rocks; permeable basalt and lavas; karst limestone and dolomite | $>10^{-3}$ cm/sec | 3 |

*Derived from:

Davis, S. N., Porosity and Permeability of Natural Materials in Flow-Through Porous Media, R.J.M. DeWest ed., Academic Press, New York, 1969

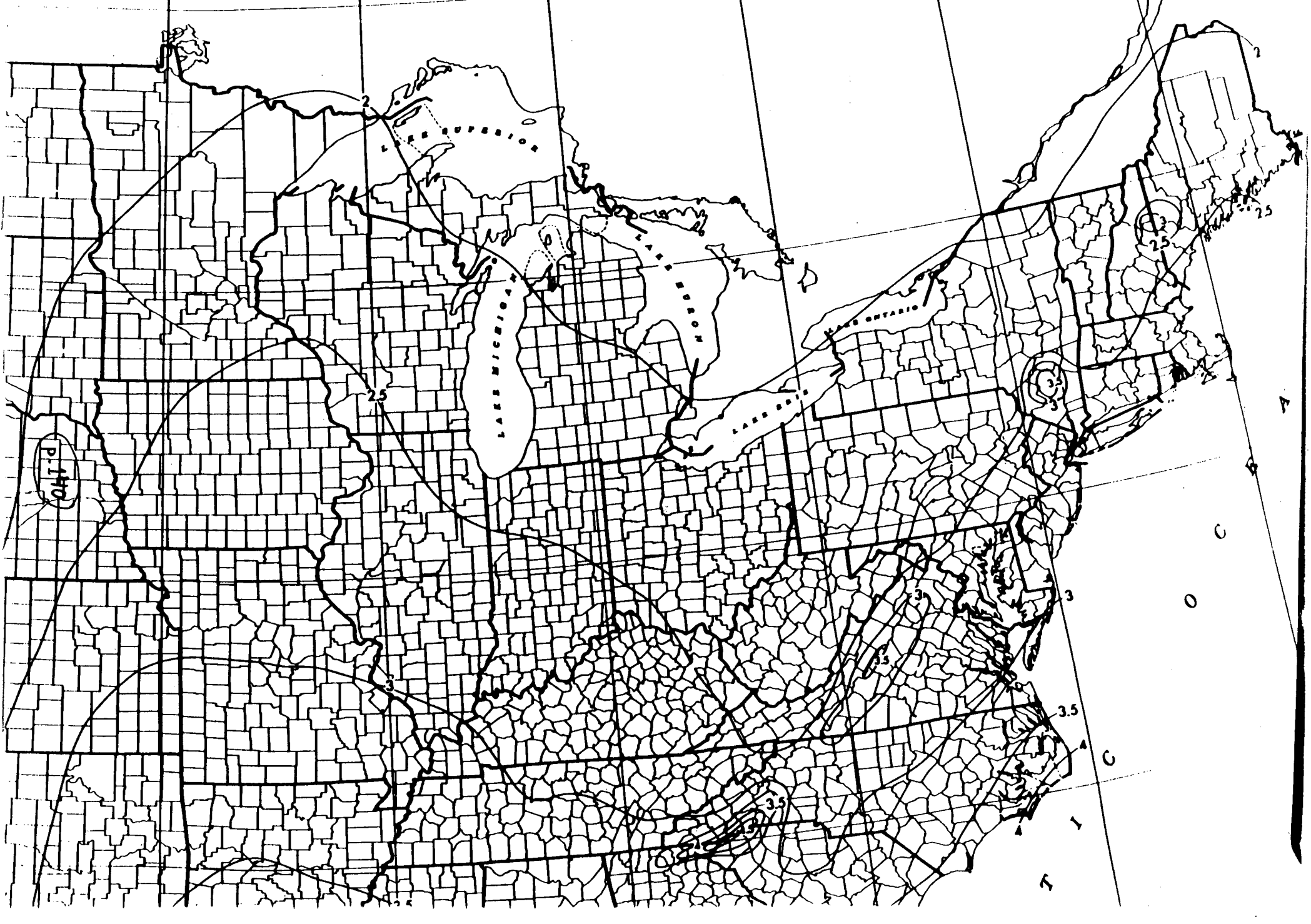
Freeze, R.A. and J.A. Cherry, Groundwater, Prentice-Hall, Inc., New York, 1979

# MEAN ANNUAL LAKE EVAPORATION
## (In Inches)

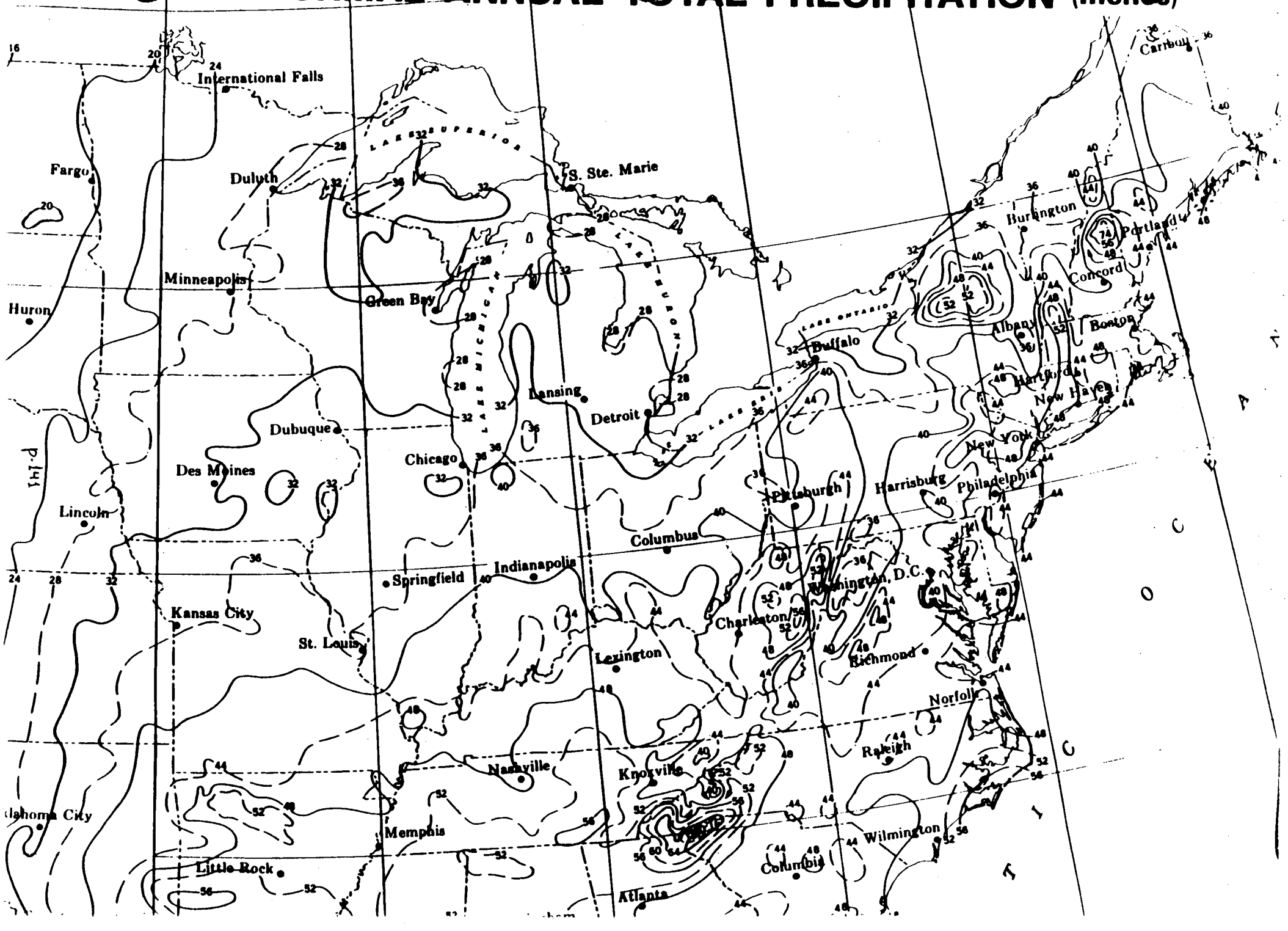



Based on period 1946-55

# 1 YEAR 24-HOUR RAINFALL (inches)



# NORMAL ANNUAL TOTAL PRECIPITATION (Inches)



**REFERENCE NO. 9**

# SEDIMENTOLOGY OF NEWARK BAY, NEW JERSEY:

# AN URBAN ESTUARINE BAY

BY

Dennis John Suszkowski

A dissertation submitted to the Faculty of the University of Delaware in partial fulfillment of the requirements for the degree of Doctor of Philosophy in Marine Studies.

June, 1978

p. 143

B. Regional Geology

Newark Bay is within the Triassic Lowlands subdivision of the Piedmont Plain which is the easternmost division of the Applachian Province. The Hackensack River watershed is confined entirely to the Piedmont Plain (U.S. Army Engineer District, New York, 1974). The Passaic River Basin is situated within two subdivisions of the Appalachian Province, the Highlands and the Piedmont Plain (U.S. Army Engineer District, New York, 1969).

In New Jersey, the Triassic Lowlands of the Piedmont Plain extend in a broad, downfaulted basin southwestward across the state from the Palisades of the Hudson River towards Pennsylvania. The Lowlands are underlain by Triassic (Newark Group) strata composed of sedimentary sandstone and shale dipping to the northwest. The Palisades forming the divide on the northeast and east comprise a great mass of diabase rock which breaks obliquely across the sedimentary strata (U.S. Army Engineer District, New York, 1974). Sedimentation in the Newark Basin during Triassic times was accompanied by volcanic activity resulting in basaltic lava flows. Through differential erosion between the less resistant sedimentary and more resistant igneous rocks, the Watchung Mountains are present today within the Triassic Lowlands (Schuberth, 1968).

The Highlands Province is a physiographic unit extending northward from Pennsylvania, across northern New Jersey into New York State and beyond. In northern New Jersey it constitues a dissected mountainous region which is considerably higher in altitude than the adjacent Triassic area. The province covers close to one-half of the Passaic watershed and includes almost all of the tributary drainage areas of the Ramapo, Wanaque, Pequannock, Rockaway, and Whippany Rivers. The Highlands region is principally composed of almost parallel crystalline Pre-Cambrian gneiss ridges which are aligned in a northeast-southwest direction. In addition, Devonian and Silurian sandstones and conglomerates commonly occur in the northern and western portions of the province (U.S. Army Engineer District, New York, 1974).

During the Pleistocene Epoch, the Wisconsin ice sheet intruded into what is now the Hackensack and Passaic River Basins, including Newark Bay. As the glacier began to melt, the terminal morraines formed dams which impeded the flow of melt waters. Subsequently large lakes formed in the northern New Jersey - New York region. Lake Hackensack covered what is now Newark Bay and the Hackensack River Basin while Lake Passaic covered most of the present Passaic River Basin. The lakes endured for thousands of years and accumulated several tens of feet of varved sediments

composed of fine sand, silt and clay (Schuberth, 1968). The sea level eventually rose high enough from the melting ice to breach the terminal morraine and flood Lake Hackensack. As the glaciers finally wasted away, the lands beneath it were uplifted, the streams were rejuvenated and deposited gravel, sand, and coarse silt over the varved clay beds (Schuberth, 1968). Recent sediments in Newark Bay overlie the post glacial outwash deposits.

C. Waterway Usage

Newark Bay is situated in one of the most industrialized and populated areas in the eastern United States. The New York Metropolitan region has a population of over 14 million people. Principal manufactured products in the Newark Bay area are textiles, chemicals rubber products, electrical machinery and supplies. Petroleum products and building materials, brought to the waterfront terminals by vessel, are distributed throughout the area. Newark Bay and the Hackensack and Passaic Rivers are used by a variety of commercial and recreational vessels. The commercial deep-draft vessels include oil tankers and general cargo vessels, many of which are containerized cargo vessels having drafts in excess of 10 meters, lengths of over 250 meters, and beam widths greater than 30 meters. At Port Newark and Port Elizabeth, the Port of New York Authority maintains two of the largest marine transfer facilities in the world. Shallow draft vessels utilizing Newark Bay include all types of recreational vessels, barges and

tugs. In the Kill Van Kull, Newark Bay, and the Hackensack and Passaic Rivers, the U.S. Army Corps of Engineers maintains approximately 35 kilometers of navigation channels

Since the Newark Bay region is extremely populated and heavily industrialized, it has only been natural that the waters of this region be used for industrial and municip waste disposal. Leighton (1902) stated that the natural resources of the Passaic River were severely damaged due to water pollution 75 years ago. Suszkowski (1973) showed that dissolved oxygen levels in all sections of New York Harbor declined dramatically at the turn of the century due to the increased organic loadings of a growing populous. Mueller et al.(1976) indicate that at present, Newark Bay and the Hackensack and Passaic Rivers receive discharges of domestic and industrial wastewater amounting to 6.6 $m^3$/sec. This is approximately 13% of the total fresh water input into Newark Bay.

## IV. HISTORICAL CHANGES IN GEOLOGICAL PROCESSES

### A. Holocene Geology

As previously mentioned, the retreat of the Wisconsin Ice Sheet created large lakes in what is currently the Passaic and Hackensack River basins. Schuberth (1968) reports that thick layers of varved clays accumulated in the lakes and the U.S. Geological Survey (1908) observes that stones and cobbles can be found in some of the clay sediments and are derived from the melt waters of large blocks of ice which floated south from the southern portion of the retreating glacier. The Survey also points out that no marine fossils have been found in the clay deposits suggesting that the lakes were composed of fresh water and did not have a free connection with the open sea.

During the melting of the glaciers, sea level rose rapidly. Kraft (1971) and Emery and Garrison (1967) respectively report that at the end of the Wisconsin glacial period, sea level along the Atlantic Coast was approximately 100 m and 120 m below present levels. Using data from Emery et al.(1967), Stuiver and Daddario (1963), Newman et al.(1969), Redfield (1967), Kraft (1971), and Kraft and Thomas (1976), Kardas and Larabee (1976) have indicated three distinct periods of differing sea level rise. (1) The most rapid rise, as mentioned above, occurring about 19,000 years B.P. (before present). (2) An intermediate rise of about 0.3 m per

century occurring between 8-12,000 years B.P. to 4-2,600 years B.P. and (3) finally the most recent slowest rise which is estimated by the above authors to be between 7.6 and 15.2 cm per century.

After enduring for thousands of years, glacial Lake Hackensack, which covered the present area of Newark Bay, was drained due to the breaching of the terminal moraine by the rise in sea level. The land areas were subsequently uplifted, the streams were rejuvenated, and coarse material deposited over the thick beds of clay (Schuberth, 1968). With maturity of the streams and relative sea level rise, Newark Bay developed into its present condition.

Kardas and Larabee (1976) have estimated that in the year 3000 B.C., when sea level was approximately 6 m lower than at present, Newark Bay would have been greatly reduced in area and would have existed as a river or tidal stream. The bay at present is a relatively low energy environment where the principal mode of sediment transport is by suspension. Consequently fine grained sediments are currently accumulating.

The late Pleistocene and entire Holocene sedimentary record is evident from borings reported by the U.S. Army Engineer District, New York (1963 and 1969b). A few borings drilled to be-

tween 27 and 30 m below mean low water in the mid and upper sections of Newark Bay penetrated the shale and/or sandstone deposits of the Triassic Newark Group strata.

A 27 m boring drilled in 1963 adjacent to Port Elizabeth revealed that a few meters of gravel and boulders overlie the Triassic beds. This is probably outwash deposits associated with the retreating Wisconsin ice sheet. Boring logs from Newark Bay which have been reviewed (U.S. Army Engineer District, New York, 1963, 1969b and 1976 and Port Authority of New York and New Jersey, 1976), indicate a thick bed of varved glacial lake sediments containing sand, silt, and clay layers overlying the glacial outwash deposits and having thicknesses ranging from 9 to 15 m.

Figure 4 shows distributions of mean grain size of samples extracted from borings taken by the U.S. Army Corps of Engineers (1975). Locations of the borings are shown in Figure 5. Along with mean grain size, visual discriptions taken from the boring logs are also included in Figure 4.

The lake deposits are overlain with sands containing traces of gravel to thicknesses of up to several meters. These deposits are thought to be associated with the draining of Lake Hackensack with uplift of the land. As indicated in Figure 4, these sand deposits which tend to be approximately 6-8 m below the water

## V. CHARACTERIZATION OF SALINITY AND SUSPENDED AND BOTTOM SEDIMENTS

### A. Salinity

As previously mentioned, conductivity measurements were routinely taken "in situ" where water samples were collected for suspended sediment analyses. Conductivity has been converted to salinity (ppt) for all of the cruises and the individual cruise distributions of salinity are shown in Figures 14 - 24.

The influence of fresh water input from the Passaic River (Station #10) is evident in all of the distributions. A very distinct "salt wedge" in the upper portion of the bay exists throughout the year. Station #9 in the lower Passaic River exhibits the most extreme salinity gradient between surface and bottom waters. This gradient has a range of between 3 and 9 ppt.

The lower Hackensack River (Stations #11 and #12) shows less stratification than the Passaic River. This is due to the relatively low volume of fresh water associated with the river. The tidal flow in the Hackensack River is much greater than in the Passaic River and consequently there is additionally greater turbulence and vertical mixing.

Waters with the highest salinities associated with Upper New York Bay are found at Station #1 in the Kill Van Kull. Relatively high current velocities are found throughout the Kill Van

**REFERENCE NO. 10**

**NUS CORPORATION AND SUBSIDIARIES** — **TELECON NOTE**

| CONTROL NO: | DATE: 6 July 1989 | TIME: 3:45 pm |
|---|---|---|

DISTRIBUTION:

Keegan Landfill

| BETWEEN: Carole Schmidt | OF: Kearny Water Department | PHONE: (201) 991-2700 |
|---|---|---|

AND: David Heim - NUS

DISCUSSION:

I asked where Kearny Water Department drew its water for distribution. She said that Kearny is part of the North Jersey Water Association, and owns 12% of the Wanaque Reservoir. Other partners include Newark, Hackensack, Secaucus, Paterson, Harrison, Belleville, Montclair, North Arlington, and East Orange. The Kearny Water Department has 8000 customers

David Heim 7-6-89

ACTION ITEMS:

NUS 067 REVISED 0685

**REFERENCE NO. 11**

**NUS CORPORATION AND SUBSIDIARIES** — **TELECON NOTE**

| CONTROL NO: | DATE: 7 July 1987 | TIME: 11:00 am |
|---|---|---|

**DISTRIBUTION:**

File: Keegan Landfill

| BETWEEN: | OF: | PHONE: |
|---|---|---|
| Vince Bucci | ~~Yonkers~~ Essex County Parks Dept. | ext 35 (201) 482-0400 |

**AND:** David Heim (NUS)

**DISCUSSION:**

Mr. Bucci said that the Essex County Parks Dept. pumps a well in Branch Brook Park from which it puts water into the pond in the park. This is done to keep the water level up and reduce oxygenation.

David Heim 7-7-87

**ACTION ITEMS:**

NUS 067 REVISED 0685

**REFERENCE NO. 12**

# BEDROCK MAP OF THE HACKENSACK MEADOWS

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NEW JERSEY GEOLOGICAL SURVEY

DEPARTMENT OF ENVIRONMENTAL PROTECTION

NJ Con-65

p.157

Department of Environmental Protection
David J. Bardin, Commissioner
Glenn L. Paulson, Assistant Commissioner

Bureau of Geology and Topography
Kemble Widmer, State Geologist

# BEDROCK MAP

# HACKENSACK MEADOWS

1959

by
Daniel G. Parillo

revised by
Haig F. Kasabach
1962

Bureau of Geology and Topography
P.O. Box 2809
Trenton, New Jersey 08625

Reprinted 1983

PROTECTION AGENCY
p.158

HACKENSACK MEADOWS

This summary of the bedrock conditions underlying the Hackensack Meadows was undertaken because of the current interests in reclamation in the area. A statement was made at a Hackensack Meadows reclamation meeting that very little was known about the depth to bedrock. Since this was somewhat contrary to the opinions of the staff of the Bureau of Geology, who had in the past been called upon to solve problems with regard to wells drilled in the Meadows area, it was decided to see how much information was actually available in the files of the Bureau. This report is the first compilation of that work. The area of investigation has been extended both north and south of the area shown on the map. New information is continuing to come in and an interpretation of the geology and geologic history of the area is not being made at present because certain key areas, with respect to the geologic history, are still under investigation. Since information is of very little use as long as it remains buried and unused in the files, this report has been prepared.

The map and sections are as accurate as the available information will permit. The exact position of the inferred contour lines on bedrock will change as new information is received. Only the logs of wells and borings used in constructing the cross-sections are given in this report. Information about other borings shown on the map, but not occurring on the section line are, therefore, not listed. This data, when available, may be secured from this Bureau. Since the information about these borings was secured from a wide variety of sources, there is both an overlapping of terminology and of degrees of information. In some cases, only the depth of the hole and whether or not rock was penetrated is available. In other cases the records are complete.

As stated above, this does not represent the final views of the Bureau and the map should be used with care in the area between Bayonne and Newark. Information at hand indicates that some of the contours may have to be changed radically in this area. If the hypothesis under investigation proves correct, it may be that the two deep channels between Bayonne and Newark have a cross-connection in this general area.

The excellent cooperation of all the individuals and companies who have been approached in the search for data is greatly appreciated by the Bureau. So many sources were involved in gathering this information that it is believed it is better to thank all and sundry as a group, rather than try to list the individuals who contributed and thereby commit a sin of omission.

Kemble Widmer
State Geologist

May 12, 1959

# BEDROCK MAP, HACKENSACK MEADOWS AR

## NEW JERSEY

## CROSS-SECTIONS

### GEOLOGIC REPORT SERIES #1

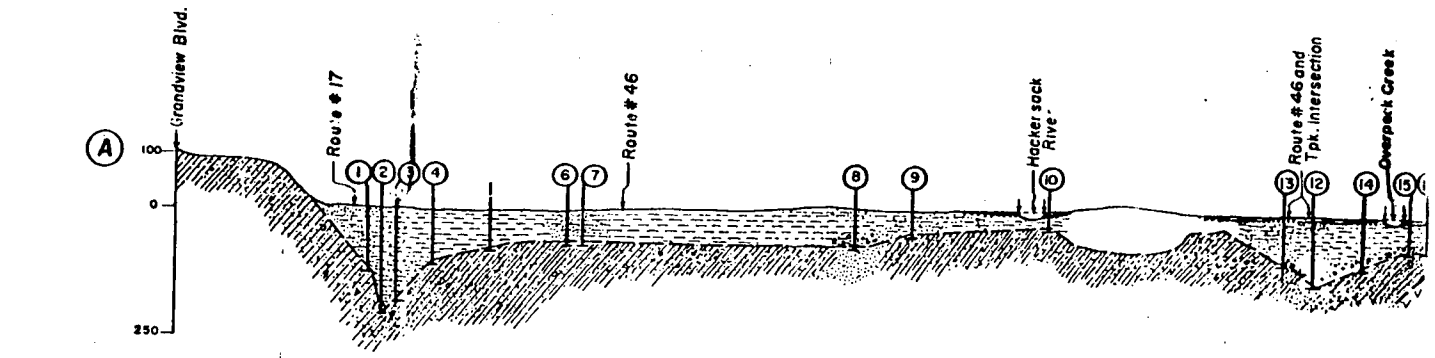
Scale:
Horizontal - 1" = 2000 Feet
Vertical - 1" = 250 Feet

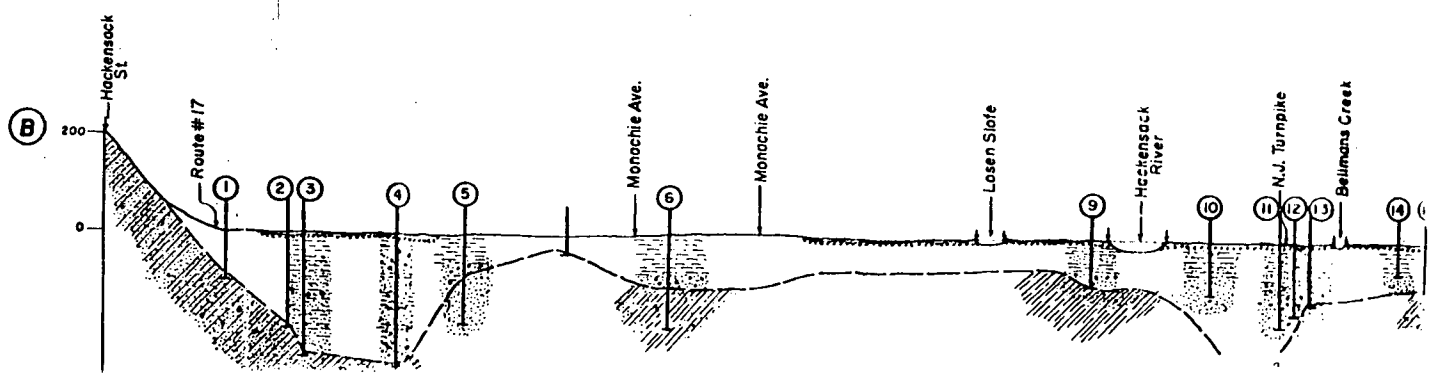
**LEGEND**

CROSS-SECTION

- Marsh
- Sand & Gravel
- Clay & Silt
- Sandstone
- Shale
- Diabase
- Limestone

Numbered wells refer to ap
detailed logs of each sectio

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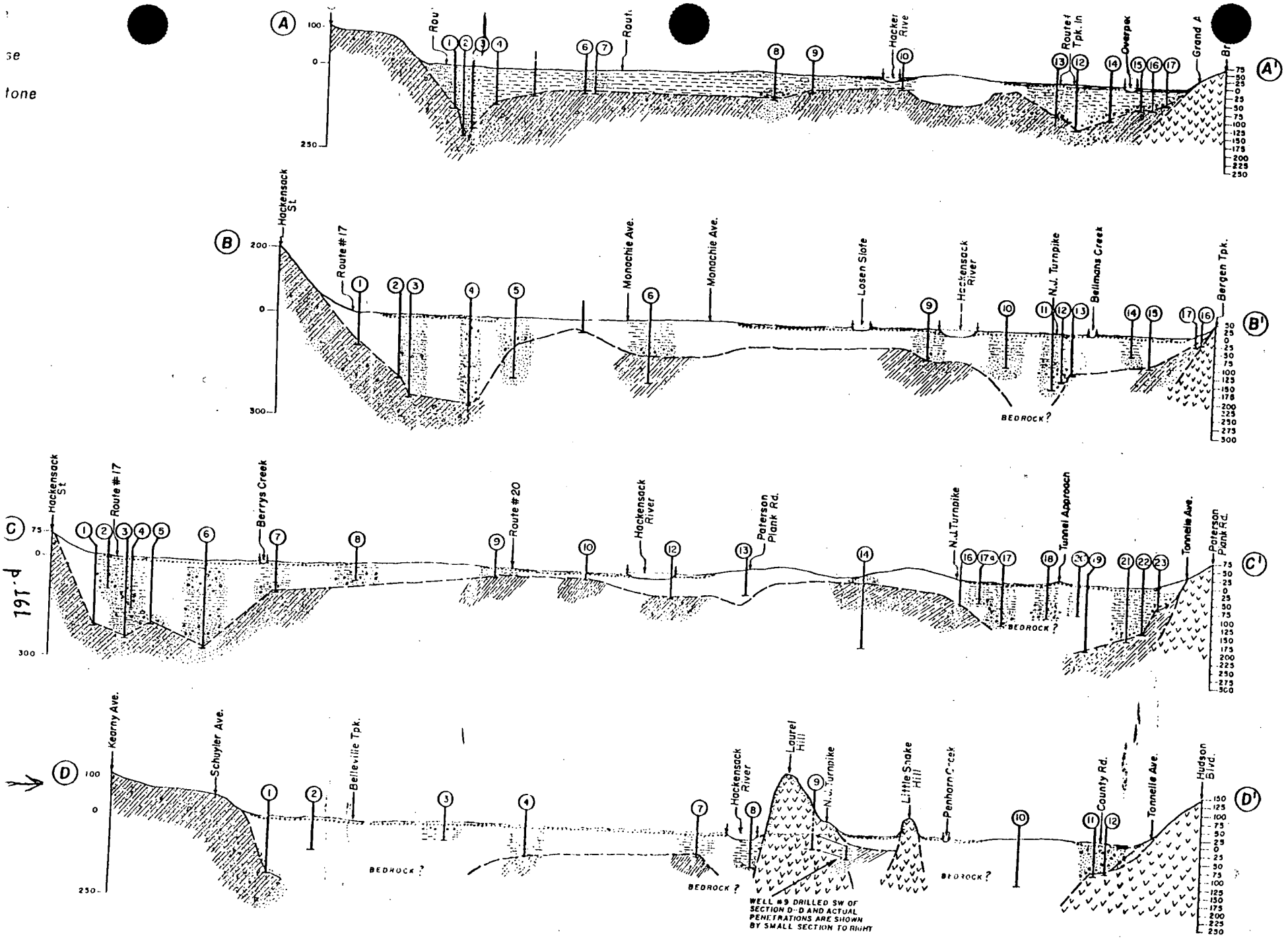
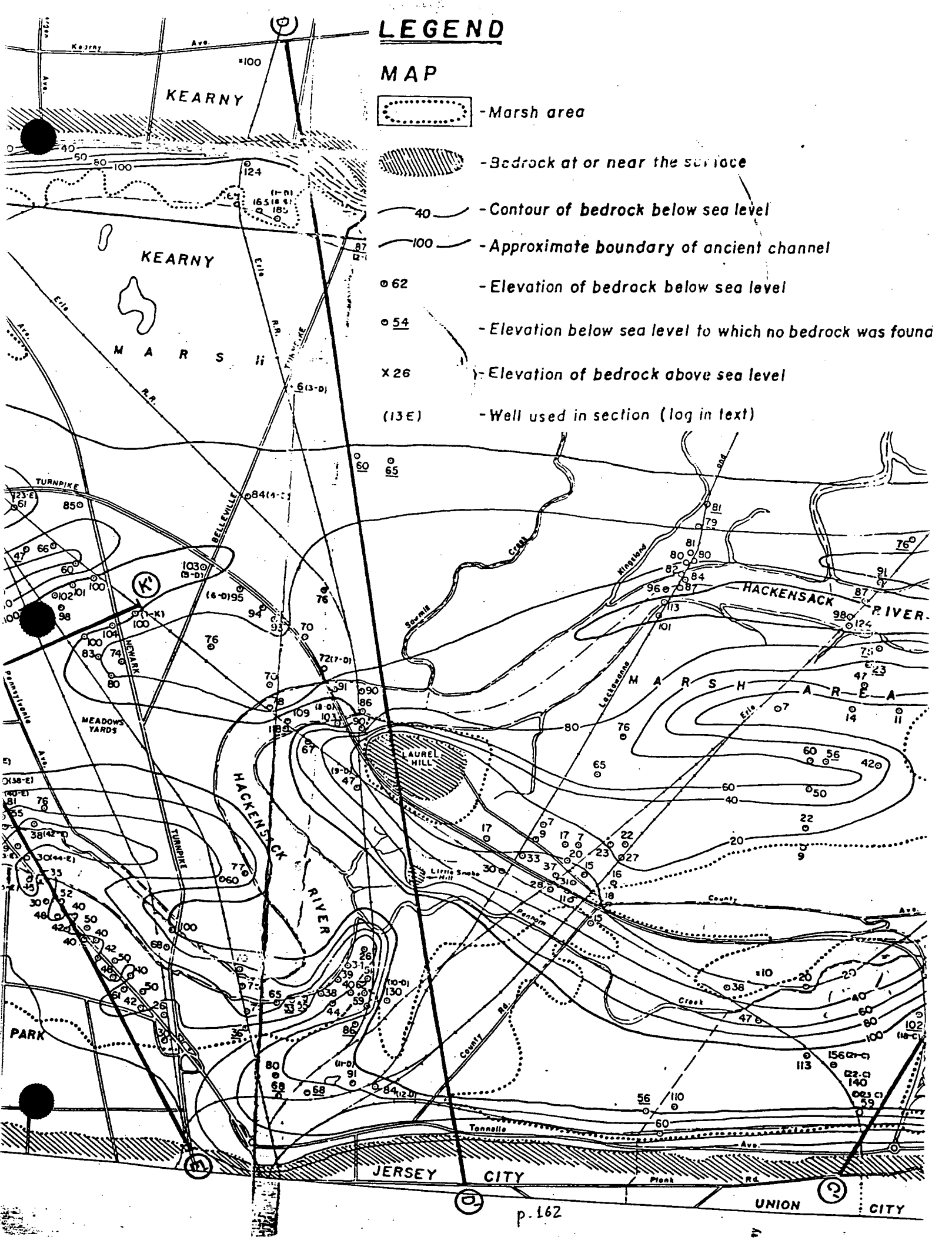

A
A'
Hacker River
Overpak
Grand A
B
B'
Hackensack St
Route #17
Monachie Ave.
Losen Slote
Hackensack River
N.J. Turnpike
Bellmans Creek
Bergen Tpk.
BEDROCK?
C
C'
Hackensack St
Route #17
Berrys Creek
Route #20
Hackensack River
Paterson Plank Rd.
N.J. Turnpike
Tunnel Approach
Tonnelle Ave.
BEDROCK?
D
D'
Kearny Ave.
Schuyler Ave.
Belleville Tpk.
Hackensack River
Laurel Hill
N.J. Turnpike
Little Snake Hill
Penhorn Creek
County Rd.
Tonnelle Ave.
Hudson Blvd.
BEDROCK?
WELL #9 DRILLED SW OF SECTION D-D AND ACTUAL PENETRATIONS ARE SHOWN BY SMALL SECTION TO RIGHT

d 191


LEGEND
MAP
-Marsh area
-Bedrock at or near the surface
-Contour of bedrock below sea level
-Approximate boundary of ancient channel
-Elevation of bedrock below sea level
-Elevation below sea level to which no bedrock was found
-Elevation of bedrock above sea level
-Well used in section (log in text)
KEARNY
MARSH
HACKENSACK RIVER
MARSH AREA
LAUREL HILL
MEADOWS YARDS
PARK
JERSEY CITY
UNION CITY
BELLEVILLE TURNPIKE
NEWARK
Erie R.R.
Pennsylvania Ave.
Kearny Ave.
Kingsland
Lackawanna
Sawmill Creek
Penhorn Creek
Little Snake Hill
County Rd.
Tonnelle Ave.
Plank Rd.

Section D - D

1. E. I. duPont wells

   165', 185', 185' to bedrock

2. D.L.&W. Railroad borings

   87' no rock

3. Erie Railroad boring

| | |
|---|---|
| 0 - 7 | marsh |
| 7 - 18 | sand and gravel |
| 18 - 46 | blue clay |

4. Erie Railroad boring

| | |
|---|---|
| 0 - 4 | marsh |
| 4 - 16 | gray sand |
| 16 - 41 | clay and sand |
| 41 - 81 | clay |
| 81 - 84 | light brown sand |
| 84 - | rock |

5. New Jersey Turnpike boring

| | |
|---|---|
| 0 - 7 | marsh |
| 7 - 8 | clay |
| 8 - 12 | sand |
| 12 - 94 | blue clay |
| 94 - 103 | clay, sand and gravel |
| 103 - | rock |

Not used in Section

6. New Jersey Turnpike boring

| | |
|---|---|
| 0 - 6 | marsh |
| 6 - 13 | gray silty sand |
| 13 - 90 | clay |
| 90 - 95 | sand and gravel and clay |

Not used in Section

7. New Jersey Turnpike boring

| | |
|---|---|
| 0 - 9 | marsh |
| 9 - 12 | sand |
| 12 - 72 | clay |
| 72 - | red shale |

8. New Jersey Turnpike boring

| | |
|---|---|
| 0 - 10 | mud |
| 10 - 98 | clay |
| 98 - 103 | stone and clay |
| 103 - 106 | brown clay |

9. Erie Railroad boring

| | |
|---|---|
| 0 - 6 | marsh |
| 6 - 41 | clay |
| 41 - 47 | sand, gravel and clay |
| 47 - | shale |

10. D.L.&W. Railroad boring

130' no rock

11. Erie Railroad boring

| | |
|---|---|
| 0 - 12 | marsh |
| 12 - 24 | fine red sand |
| 24 - 39 | red sand and gravel |
| 39 - 49 | medium sand |
| 49 - 64 | fine red sand |
| 64 - 69 | medium to coarse sand |
| 69 - 82 | fine red sand |
| 82 - 91 | fine red sand, clay and gravel |
| 91 - | decomposed diabase |

12. Erie Railroad boring

| | |
|---|---|
| 0 - 16 | sand, gravel and peat |
| 16 - 22 | brown sand and gravel |
| 22 - 29 | fine red sand |
| 29 - 58 | medium to coarse sand and gravel |
| 58 - 69 | fine brown sand |
| 69 - 78 | medium and coarse brown sand and gravel |
| 78 - 82 | fine brown sand |
| 82 - 84 | broken rock |
| 84 - 89 | diabase |

**REFERENCE NO. 13**

SUBJECT TO REVISION

**WATER WITHDRAWAL POINTS AND NJGS CASE INDEX SITES WITHIN 5.0 MILES OF:**

**LATITUDE 404453**
**LONGITUDE 740648**

# DRAFT

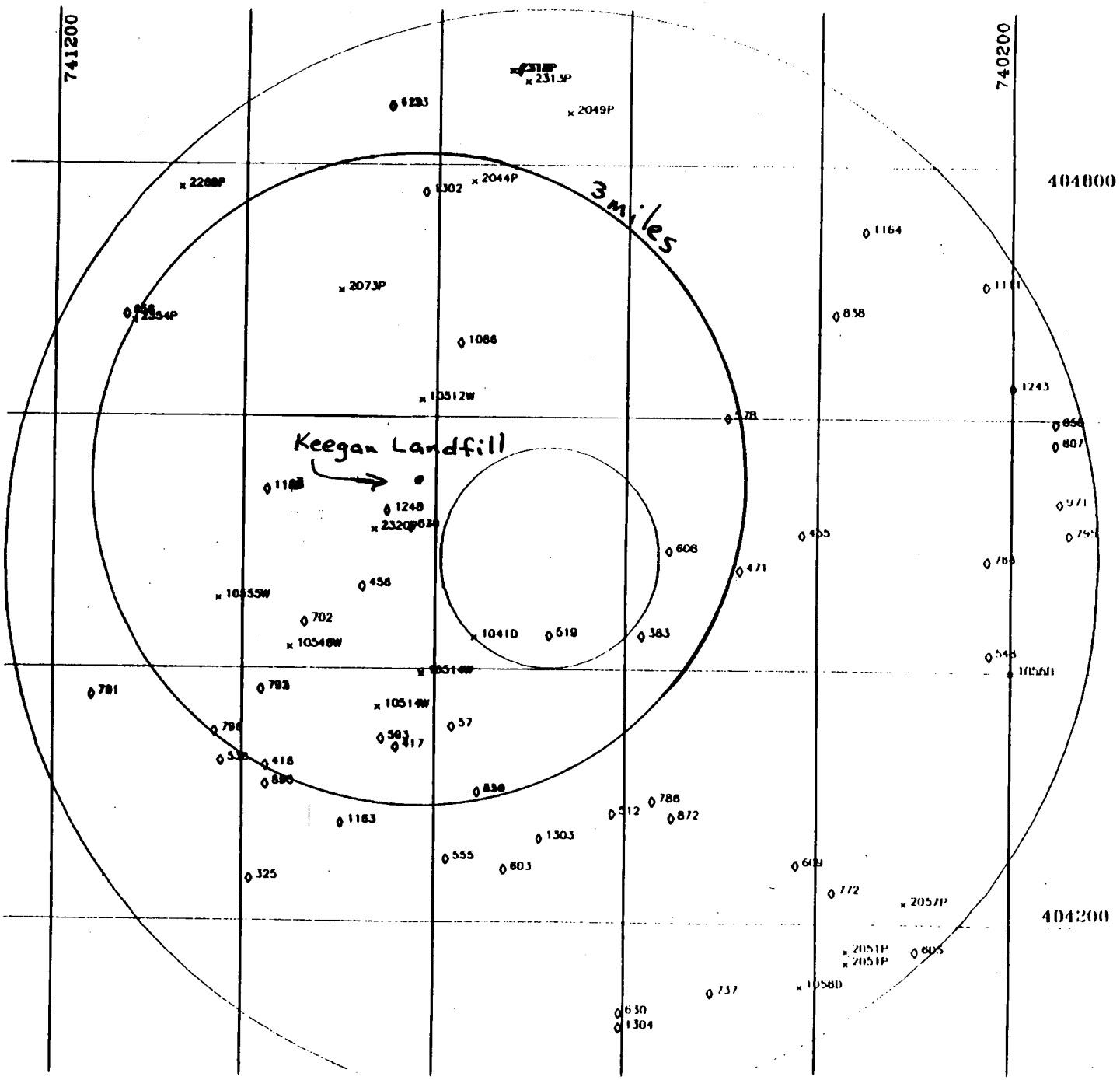
SCALE: 1:63,360
(1 Inch = 1 Mile)

× WATER WITHDRAWAL POINTS
◊ NJGS CASE INDEX SITES
1 MILE AND 5 MILE RADII INDICATED

NJGS CASE INDEX DATA RETRIEVED FROM:
NEW JERSEY GEOLOGICAL SURVEY
ON 12/22/87

PLOT PRODUCED BY:
NJDEP
DIVISION OF WATER RESOURCES
BUREAU OF WATER ALLOCATION
CN--029
TRENTON, NJ 08625

DATE: 10/19/88

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Page 1 of PRELIMINARY SURVEY OF WATER WITHDRAWAL POINTS WITHIN 5.0 MILES OF 404845 LAT. 740240 LON. CITY OGDEN IS FIRST POINT [illegible]

| NUMBER | NAME | SOURCE ID | LOCID | LAT | LON | FLAG | DISTANCE | COUNTY | MUN | [illegible] | [illegible] | [illegible] | [illegible] |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1.5 — 1041D | AMERICAN REFRIGERATION COMPANY | 175 WELL | POINTS | 404115 | 740735 | I | 1.0 | 13 | 14 | [illegible] | [illegible] | | [illegible] |
| .35 — 1051W | V.H. SWENSON CO., INC. | 2602717 | 1 | 404503 | 740607 | F | 1.5 | 17 | [illegible] | [illegible] | [illegible] | | [illegible] |
| .35 — 1061W | RONSON METALS CORP. | 2603400 | 1 | 404323 | 740003 | I | 1.5 | 17 | 14 | [illegible] | [illegible] | | [illegible] |
| | RONSON METALS CORP. | 2604933 | 2 | 404342 | 740035 | I | 2.1 | 13 | 14 | [illegible] | | | [illegible] |
| 2.0 — 1066W | PUBLIC SERVICE ELECTRIC & GAS | 4600103 | 1 | 404410 | 740730 | I | 2.5 | 17 | 04 | [illegible] | [illegible] | | [illegible] |
| 1.7 — 1065W | NEW JERSEY BELL TELEPHONE | 2603173 | 1 | 404433 | 741015 | | [illegible] | 13 | 14 | [illegible] | [illegible] | | [illegible] |
| 1060D | NEWPORT CITY DEV. CO. | | | 404400 | 740300 | I | 4.3 | 17 | [illegible] | | | | [illegible] |
| 1060D | FORT LIBERTE PARTNERS | | | 404130 | 740410 | I | 4.5 | 17 | 05 | | | | [illegible] |
| 2.2 — 2044P | GRAND UNION CO. | 4600002 | | 404552 | 740731 | S | 3.5 | 03 | [illegible] | [illegible] | [illegible] | | [illegible] |
| 2044P | SIFA CORPORATION | 2604036 | 1 | 404832 | 740531 | | 4.1 | 03 | [illegible] | [illegible] | [illegible] | | [illegible] |
| 2061P | LIBERTY HILLSIDE ASSOC. | 4600077 | STANDBY | 404147 | 740341 | | 1.5 | 27 | [illegible] | [illegible] | [illegible] | | |
| | LIBERTY HILLSIDE ASSOC. | 4600078 | STANDBY A | 404141 | 740341 | | 4.6 | 27 | 07 | [illegible] | [illegible] | | [illegible] |
| | LIBERTY HILLSIDE ASSOC. | 4600079 | MAIN B | 404141 | 740341 | | 4.6 | 27 | [illegible] | [illegible] | [illegible] | | [illegible] |
| | LIBERTY HILLSIDE ASSOC. | 2600418 | MAIN D | 404141 | 740341 | | 4.6 | 27 | 07 | [illegible] | [illegible] | | [illegible] |
| 2064P | SPINNERIN YARN CO., INC. | 4600174 | 1 | 404210 | 740725 | F | 1.5 | 03 | [illegible] | [illegible] | [illegible] | | [illegible] |
| 2.0 — 2072P | INTERNATIONAL MINERALS & CHEM. | 4600072 | 1 | 404700 | 740000 | I | 5.1 | 13 | 04 | [illegible] | [illegible] | | [illegible] |
| | INTERNATIONAL MINERALS & CHEM. | 4600073 | 2 | 404700 | 740000 | I | 5.1 | 13 | 04 | [illegible] | [illegible] | | [illegible] |
| | INTERNATIONAL MINERALS & CHEM. | 2600113 | 3 | 404700 | 740000 | I | 5.1 | 13 | 04 | [illegible] | [illegible] | | [illegible] |
| 2084P | FOREST HILL FIELD CLUB | 2604550 | 1 | 404749 | 741041 | S | 4.3 | 17 | [illegible] | [illegible] | [illegible] | | [illegible] |
| 2093P | FENCO OF LYNDHURST INC. | 4600172 | 1 | 404845 | 740711 | | 4.5 | 03 | [illegible] | [illegible] | [illegible] | | [illegible] |
| | FENCO OF LYNDHURST INC. | 4600173 | 2 | 404845 | 740715 | | 4.5 | 03 | [illegible] | [illegible] | [illegible] | | [illegible] |
| | FENCO OF LYNDHURST INC. | 2601699 | 3 | 404845 | 740715 | I | 4.5 | 03 | [illegible] | [illegible] | [illegible] | | [illegible] |
| | FENCO OF LYNDHURST INC. | 2603034 | 4 | 404840 | 740705 | I | 1.5 | 03 | [illegible] | [illegible] | [illegible] | | [illegible] |
| 2.3 — 2104P | HONEYCOMB PLASTICS CORP. | 4600182 | 1 | 404505 | 740638 | S | 1.5 | 17 | [illegible] | [illegible] | [illegible] | | [illegible] |
| | HONEYCOMB PLASTICS CORP. | 2602304 | 2 | 404505 | 740638 | S | 1.5 | 17 | [illegible] | [illegible] | [illegible] | | [illegible] |
| 2.0 — 2154P | ESSEX COUNTY DEPT. OF PARKS | 2604874 | 2 | 404645 | 741110 | I | 4.4 | 13 | 14 | [illegible] | [illegible] | | [illegible] |

Number of Observations: 26

Page 1 of PRELIMINARY SURVEY OF WATER WITHDRAWAL POINTS WITHIN [illegible] MILES OF [illegible] [illegible]

| NUMBER | NAME | SOURCE ID | LOCID | LAT | LON | [illegible] | DISTANCE | COUNTY | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1.5 — 1[illegible]HID | AMERICAN REFFUEL COMPANY | 175 WELL | PUMPS | 404415 | 740[illegible] | 1 | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] |
| .75 — 1[illegible]W | V.H. SWENSON CO., INC. | 2600717 | 1 | 404[illegible] | 740[illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] |
| 1.75 — 1[illegible]HN | NUNSON METALS CORP. | 2603403 | 1 | 404[illegible] | 740[illegible] | 1 | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] |
| | NUNSON METALS CORP. | 2604[illegible] | 2 | 404[illegible] | 740[illegible] | 1 | [illegible] | [illegible] | [illegible] | [illegible] | | | [illegible] |
| 2.0 — 1[illegible] | PUBLIC SERVICE ELECTRIC & GAS | 4600103 | 1 | 404[illegible] | 740[illegible] | 1 | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] |
| 2.5 — 1[illegible] | NEW JERSEY BELL TELEPHONE | 2603173 | 1 | 404433 | 741015 | | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] |
| 1[illegible] | TEMPLE CITY DEV. CO. | | | 404[illegible] | 740[illegible] | 1 | [illegible] | [illegible] | [illegible] | | | | [illegible] |
| 1[illegible]D | PORT LIBERTE PARTNERS | | | 404130 | 740110 | 1 | [illegible] | [illegible] | [illegible] | | | | [illegible] |
| 2.5 — 2[illegible]HP | GRAND UNION CO. | 4600002 | | 404[illegible] | 740[illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] |
| 2[illegible]HP | SIFA CORPORATION | 2604036 | 1 | 404[illegible] | 740[illegible] | | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] |
| 2[illegible]P | LIBERTY HILLSIDE ASSOC. | 4600077 | STANDBY | 404147 | 740541 | | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | |
| | LIBERTY HILLSIDE ASSOC. | 4600078 | STANDBY A | 404141 | 740541 | | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] |
| | LIBERTY HILLSIDE ASSOC. | 4600079 | MAIN B | 404141 | 740541 | | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] |
| | LIBERTY HILLSIDE ASSOC. | 2600418 | MAIN D | 404141 | 740541 | | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] |
| 2[illegible]P | SPINNERIN YARN CO., INC. | 4600174 | 1 | 404210 | 740[illegible] | F | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] |
| 3.0 — 2[illegible]P | INTERNATIONAL MINERALS & CHEM. | 4600072 | 1 | 404700 | 740[illegible] | 1 | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] |
| | INTERNATIONAL MINERALS & CHEM. | 4600073 | 2 | 404700 | 740[illegible] | 1 | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] |
| | INTERNATIONAL MINERALS & CHEM. | 2600113 | 3 | 404700 | 740[illegible] | 1 | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] |
| 2[illegible] | FOREST HILL FIELD CLUB | [illegible]583 | 1 | 404749 | 741041 | S | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] |
| 2[illegible]P | FENCO OF LYNDHURST INC. | 4600172 | 1 | 404845 | 740711 | | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] |
| | FENCO OF LYNDHURST INC. | 4600173 | 2 | 404845 | 740[illegible] | | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] |
| | FENCO OF LYNDHURST INC. | 2601699 | 3 | 404845 | 740[illegible] | 1 | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] |
| | FENCO OF LYNDHURST INC. | 2603304 | 4 | 404840 | 740[illegible] | 1 | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] |
| 3 — 2[illegible]P | HONEYCOMB PLASTICS CORP. | 4600182 | 1 | 404505 | 740[illegible] | S | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] |
| | HONEYCOMB PLASTICS CORP. | 2602384 | 2 | 404[illegible] | 740[illegible] | S | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] |
| 0 — 2[illegible]P | ESSEX COUNTY DEPT. OF PARKS | 2608874 | 2 | 404645 | 741110 | 1 | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] |

Number of Observations: 26

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## DESCRIPTION OF WATER WITHDRAWAL POINTS

The Water Withdrawal Points listing contains the following fields:

**CAPACITY:** the pump capacity in gallons per minute
**COUNTY:** county the withdrawal point is in
**DEPTH:** depth of the well or pond
**DISTANCE:** distance in miles from center of circle
**GEO1:** the ground or surface water source
**GEO2:** a secondary source of the water
**LAT:** latitude of the withdrawal point
**LLACC:** accuracy of the latitude and longitude estimates
**LOCID:** the local identification of the withdrawal point, or a continuation of the SOURCEID field for surface water
**LON:** longitude of the withdrawal point
**MUN:** the municipality the withdrawal point is in
**NAME:** name of the permit, certificate, or registration holder
**NUMBER:** Water Allocation permit, Agricultural Certification, or Registration number
**SOURCEID:** the well permit number or other identifier for the water withdrawal

The listing that you have requested includes most wells and surface intakes that are in the Water Allocation Permits, and representative sources from most of the Agricultural Certificates. Recognizing the fact that the list will contain errors and omissions, it is advisable to use this resource as a guide and to verify all data. We try to maintain an accurate database; however, we can not yet guarantee reliability. If you spot any errors we would be very grateful to hear about them. Please call or write to us in reference to the "Radius Program" at:

NJDEP
Division of Water Resources
Bureau of Water Allocation
CN-029
Trenton, NJ 08625

(609) 292-2957

Thank you.

Please see the attached sheets for definitions of the codes used in the Water Withdrawal Points listing.

# CODES USED IN THE WATER WITHDRAWAL POINTS LISTING

This packet contains information on the database codes that the Bureau of Water Allocation uses in the Water Withdrawal Points Listing.

**COUNTY:**

| | | |
|---|---|---|
| 01 - Atlantic | 15 - Gloucester | 29 - Ocean |
| 03 - Bergen | 17 - Hudson | 31 - Passaic |
| 05 - Burlington | 19 - Hunterdon | 33 - Salem |
| 07 - Camden | 21 - Mercer | 35 - Somerset |
| 09 - Cape May | 23 - Middlesex | 37 - Sussex |
| 11 - Cumberland | 25 - Monmouth | 39 - Union |
| 13 - Essex | 27 - Morris | 41 - Warren |

**GEO:**

| | |
|---|---|
| RECENT | |
| Surficial Deposits | GRS |
| PLEISTOCENE | |
| Glacial Undifferentiated | GQGU |
| Stratified Drift | GQSD |
| Terminal Moraine | GQTM |
| Bridgeton | GQBS |
| Cape May | GQCM |
| Holly Beach Mbr. | GQCHB |
| Estuarine Sand | GQES |
| Pennsauken | GQPS |
| TERTIARY | |
| Beacon Hill | GTBH |
| Cohansey | GTCH |
| Cohansey & Kirkwood | GTCK |
| Kirkwood | GTKW |
| Upper | GTKWU |
| Rio Grande | GTKRG |
| Lower | GTKWL |
| Piney Point Mbr. | GTKPP |
| Shark River Marl | GTSR |
| Manasquan Marl | GTMQ |
| Vincentown Sand | GTVT |
| Hornerstown Marl | GTHT |
| CRETACEOUS | |
| Red Bank | GKRB |
| Navesink | GKNS |
| Mount Laurel | GKML |
| Wenonah | GKWE |
| Mount Laurel & Wenonah | GKMW |
| Marshalltown | GKMT |
| Englishtown | GKET |
| Woodbury | GKWB |
| Merchantville | GKMV |
| Magothy | GKM |

| | |
|---|---|
| Old Bridge | GKROB |
| Raritan | GKR |
| Sayreville Sand | GKRSS |
| Farrington | GKRF |
| Raritan/Magothy | GKMR |
| Potomac | GKP |
| **TRIASSIC** | |
| Brunswick Formation | GTRB |
| Lockatong Formation | GTRL |
| Stockton Formation | GTRS |
| Basalt | GTRBS |
| Diabase | GTRDB |
| Conglomerate | GTRCG |
| **DEVONIAN** | |
| Undifferentiated | GD |
| **SILURIAN** | |
| Bossardville Limestone | GSBD |
| Decker Formation | GSDK |
| Longwood Shale | GSLS |
| Poxono Island Fm | GSPI |
| Greenpond Conglomerate | GSGP |
| High Falls | GSHF |
| Shawangunk Fm | GSSG |
| **ORDOVICIAN** | |
| Martinsburg Fm | GOMB |
| Jacksonburg Fm | GOJB |
| Kittatinny Group | GOK |
| Outleaunee Fm | GOKO |
| Harmonyvale Mbr | GOKOH |
| Beaver Run Mbr | GOKOB |
| Epler | GOKE |
| Rickenbach | GOKR |
| **CAMBRO ORDOVICIAN** | |
| Kittatinny Fm | GCOK |
| **CAMBRIAN** | |
| Hardyston Quartzite | GCH |
| Allentown Fm | GCKA |
| Upper Mbr | GCKU |
| Limeport Mbr | GCKLP |
| Leithsville Fm | GCKL |
| Walkill Mbr | GCKLW |
| Hamburg Mbr | GCKLH |
| Califon Mbr | GCKLC |
| **PRECAMBRIAN** | |
| Granite | GPCGR |
| Gneiss | GPCGN |
| Undifferentiated | GPC |

| | |
|---|---|
| Franklin Lms | GPCFL |
| DELAWARE RIVER BASIN | |
| Unknown or Non-Specific | SD |
| Alloways Creek | SDALL |
| Alexsocken Creek | SDALE |
| Assiscunk Creek | SDASC |
| Assunpink Creek | SDASP |
| Big Timber Creek | SDBIG |
| Blacks Creek | SDBLA |
| Cooper's Creek | SDCOO |
| Crafts Creek | SDCRA |
| Crosswicks Creek | SDCRO |
| Delaware River | SDDEL |
| Flat Brook | SDFLA |
| Hakihokake Creek | SDHAK |
| Harihokake Creek | SDHAR |
| Jacob's Creek | SDJAC |
| Lockatong Creek | SDLOC |
| Lopatcong Creek | SDLOP |
| Mantua Creek | SDMNT |
| Musconetcong River | SDMUS |
| Nichisakawick Creek | SDNIC |
| Old Man's Creek | SDOLD |
| Paulins Kill | SDPAU |
| Pennsauken Creek | SDPEN |
| Pequest River | SDPST |
| Pohatcong Creek | SDPOH |
| Raccoon Creek | SDRAC |
| Rancocas Creek | SDRAN |
| Salem River | SDSAL |
| Wickecheoke Creek | SDWIC |
| RARITAN RIVER BASIN | |
| Unknown or Non-Specific | SR |
| Lawrence Brook | SRLAW |
| Lower Raritan | SRLOW |
| Millstone River | SRMIL |
| North Branch Raritan | SRNBR |
| South Branch Raritan | SRSBR |
| South River | SRSRV |
| PASSAIC RIVER BASIN | |
| Unknown or Non-Specific | SP |
| Canoe Brook | SPCAN |
| Lower Mid-Passaic River | SPLMP |
| Lower Passaic | SPLOW |
| Passaic River | SPPAS |
| Peckman River | SPPEC |
| Pequannock River | SPPNK |
| Pompton River | SPPOM |
| Ramapo River | SPRAM |
| Rockaway River | SPROC |
| Saddle River | SPSAD |

| | |
|---|---|
| Upper Mid-Passaic River | SPUMP |
| Upper Passaic River | SPUPP |
| Wanaque River | SPWAN |
| Whippany River | SPWHI |
| **ATLANTIC COASTAL BASIN** | |
| Unknown or Non-Specific | SC |
| Atlantic County Coastal | SCATL |
| Cape May County Coastal | SCCAP |
| Cedar Creek | SCCED |
| Great Egg Harbor River | SCGRE |
| Manasquan River | SCMSQ |
| Metedeconk River | SCMET |
| Monmouth County Coastal | SCMON |
| Mullica River | SCMUL |
| Navesink River | SCNAV |
| Ocean County Coastal | SCOCE |
| Raritan Bay | SCRAR |
| Shark River | SCSHA |
| Shrewsbury River | SCSHR |
| Toms River | SCTOM |
| Tuckahoe River | SCTUC |
| **HUDSON RIVER BASIN** | |
| Unknown or Non-Specific | SH |
| Hudson River | SHHUD |
| Papakating Creek | SHPAP |
| Pochuck Creek | SHPOC |
| Wallkill River | SHWAL |
| **HACKENSACK RIVER BASIN** | |
| Unknown or Non-Specific | SK |
| Hackensack River | SKHAC |
| **RAHWAY RIVER BASIN** | |
| Unknown or Non-Specific | SY |
| Rahway River | SYRAH |
| **ELIZABETH RIVER BASIN** | |
| Unknown or Non-Specific | SE |
| Elizabeth River | SEELI |
| **DELAWARE BAY BASIN** | |
| Unknown or Non-Specific | SB |
| Cohansey River | SBCOH |
| Maurice River | SBMAU |
| Stow Creek | SBSTO |

**LLACC:**

S - accurate to +- 1 second
F - accurate to +- 5 seconds
T - accurate to +- 10 seconds
M - accurate to +- 1 minute
U - accuracy unknown

MUN:

ATLANTIC COUNTY (01)

01 - Absecon City
02 - Atlantic City
03 - Brigantine City
04 - Buena Boro
05 - Buena Vista Twp
06 - Corbin City
07 - Egg Harbor City
08 - Egg Harbor Twp
09 - Estell Manor City
10 - Folsom Boro
11 - Galloway Twp
12 - Hamilton Twp
13 - Hammonton Town
14 - Linwood City
15 - Longport Boro
16 - Margate City
17 - Mullica Twp
18 - Northfield City
19 - Pleasantville City
20 - Port Republic City
21 - Somers Point City
22 - Ventnor City
23 - Weymouth Twp

BERGEN COUNTY (03)

01 - Allendale Boro
02 - Alpine Boro
03 - Bergenfield Boro
04 - Bogota Boro
05 - Carlstadt Boro
06 - Cliffside Park Boro
07 - Closter Boro
08 - Cresskill Boro
09 - Demarest Boro
10 - Dumont Boro
12 - East Rutherford Boro
13 - Edgewater Boro
11 - Elmwood Park Boro
14 - Emerson Boro
15 - Englewood City
16 - Englewood Cliffs Boro
17 - Fair Lawn Boro
18 - Fairview Boro
19 - Fort Lee Boro
20 - Franklin Lakes Boro
21 - Garfield Boro
22 - Glen Rock Boro
23 - Hackensack City
24 - Harrington Park Boro
25 - Hasbrouck Heights Boro
26 - Haworth Boro
27 - Hillsdale Boro
28 - Hohokus Boro
29 - Leonia Boro
30 - Little Ferry Boro
31 - Lodi Boro
32 - Lyndhurst Twp
33 - Mahwah Twp
34 - Maywood Boro
35 - Midland Park Boro
36 - Montvale Boro
37 - Moonachie Boro
38 - New Milford Boro
39 - North Arlington Boro
40 - Northvale Boro
41 - Norwood Boro
42 - Oakland Boro
43 - Old Tappan Boro
44 - Oradell Boro
45 - Palisades Park Boro
46 - Paramus Boro
47 - Park Ridge Boro
48 - Ramsey Boro
49 - Ridgefield Boro
50 - Ridgefield Park Village
51 - Ridgewood Village
52 - River Edge Boro
53 - River Vale Twp
54 - Rochelle Park Twp
55 - Rockleigh Boro
56 - Rutherford Boro
57 - Saddle Brook Twp
58 - Saddle River Boro
59 - South Hackensack Twp
60 - Teaneck Twp
61 - Tenafly Boro
62 - Teterboro Boro
63 - Upper Saddle River Boro
64 - Waldwick Boro
65 - Wallington Boro
66 - Washington Twp
67 - Westwood Boro
68 - Wood-Ridge Boro
69 - Woodcliff Lake Boro
70 - Wyckoff Twp

BURLINGTON COUNTY (05)

01 - Bass River Twp
02 - Beverly City
03 - Bordentown City
04 - Bordentown Twp

05 - Burlington City
06 - Burlington Twp
07 - Chesterfield Twp
08 - Cinnaminson Twp
09 - Delanco Twp
10 - Delran Twp
11 - Eastampton Twp
12 - Edgewater Park Twp
13 - Evesham Twp
14 - Fieldsboro Boro
15 - Florence Twp
16 - Hainesport Twp
17 - Lumberton Twp
18 - Mansfield Twp
19 - Maple Shade Twp
20 - Medford Lakes Boro
21 - Medford Twp
22 - Moorestown Twp
23 - Mount Holly Twp
24 - Mount Laurel Twp
25 - New Hanover Twp
26 - North Hanover Twp
27 - Palmyra Boro
28 - Pemberton Boro
29 - Pemberton Twp
30 - Riverside Twp
31 - Riverton Boro
32 - Shamong Twp
33 - Southampton Twp
34 - Springfield Twp
35 - Tabernacle Twp
36 - Washington Twp
37 - Westampton Twp
38 - Willingboro Twp
39 - Woodland Twp
40 - Wrightstown

CAMDEN COUNTY (07)

01 - Audubon Boro
02 - Audubon Park Boro
03 - Barrington Boro
04 - Bellmawr Boro
05 - Berlin Boro
06 - Berlin Twp
07 - Brooklawn Boro
08 - Camden City
09 - Cherry Hill Twp
10 - Chesilhurst Boro
11 - Clementon Boro
12 - Collingswood Boro
13 - Gibbsboro Boro
14 - Gloucester City
15 - Gloucester Twp
18 - Haddon Heights Boro
16 - Haddon Twp
17 - Haddonfield Boro
19 - Hi-Nella Boro
20 - Laurel Springs Boro
21 - Lawnside Boro
22 - Lindenwold Boro
23 - Magnolia Boro
24 - Merchantville Boro
25 - Mount Ephraim Boro
26 - Oaklyn Boro
27 - Pennsauken Twp
28 - Pine Hill Boro
29 - Pine Valley Boro
30 - Runnemede Boro
31 - Somerdale Boro
32 - Stratford Boro
33 - Tavistock Boro
34 - Voorhees Twp
35 - Waterford Twp
36 - Winslow Twp
37 - Woodlynne Boro

CAPE MAY COUNTY (09)

01 - Avalon Boro
02 - Cape May City
03 - Cape May Point Boro
04 - Dennis Twp
05 - Lower Twp
06 - Middle Twp
07 - North Wildwood City
08 - Ocean City
09 - Sea Isle City
10 - Stone Harbor Boro
11 - Upper Twp
12 - West Cape May Boro
13 - West Wildwood Boro
14 - Wildwood City
15 - Wildwood Crest Boro
16 - Woodbine Boro

CUMBERLAND COUNTY (11)

01 - Bridgeton City
02 - Commercial Twp
03 - Deerfield Twp
04 - Downe Twp
05 - Fairfield Twp
06 - Greenwich Twp

07 - Hopewell Twp
09 - Maurice River Twp
11 - Shiloh Boro
13 - Upper Deerfield Twp
08 - Lawrence Twp
10 - Millville City
12 - Stow Creek Twp
14 - Vineland City

ESSEX COUNTY (13)

01 - Belleville Town
03 - Caldwell Boro
05 - East Orange City
07 - Fairfield Boro
09 - Irvington Town
11 - Maplewood Twp
13 - Montclair Town
15 - North Caldwell Boro
17 - Orange City
19 - South Orange Village
21 - West Caldwell Boro
02 - Bloomfield Town
04 - Cedar Grove Twp
06 - Essex Fells Boro
08 - Glen Ridge Boro
10 - Livingston Twp
12 - Millburn Twp
14 - Newark City
16 - Nutley Town
18 - Roseland Boro
20 - Verona Boro
22 - West Orange Town

GLOUCESTER COUNTY (15)

01 - Clayton Boro
03 - East Greenwich Twp
05 - Franklin Twp
07 - Greenwich Twp
09 - Logan Twp
11 - Monroe Twp
13 - Newfield Boro
15 - Pitman Boro
17 - Swedesboro Boro
19 - Wenonah Boro
21 - Westville Boro
23 - Woodbury Heights Boro
02 - Deptford Twp
04 - Elk Twp
06 - Glassboro Boro
08 - Harrison Twp
10 - Mantua Twp
12 - National Park Boro
14 - Paulsboro Boro
16 - South Harrison Twp
18 - Washington Twp
20 - West Deptford Twp
22 - Woodbury City
24 - Woolwich Twp

HUDSON COUNTY (17)

01 - Bayonne City
03 - Guttenberg Town
05 - Hoboken City
07 - Kearny Town
09 - Secaucus Twp
11 - Weehawken Twp
02 - East Newark Boro
04 - Harrison Town
06 - Jersey City
08 - North Bergen Twp
10 - Union City
12 - West New York Town

HUNTERDON COUNTY (19)

01 - Alexandria Twp
03 - Bloomsbury Boro
05 - Clinton Town
07 - Delaware Twp
09 - Flemington Boro
11 - Frenchtown Boro
13 - Hampton Boro
15 - Holland Twp
17 - Lambertville City
19 - Lebanon Twp
21 - Raritan Twp
23 - Stockton Boro
25 - Union Twp
02 - Bethlehem Twp
04 - Califon Boro
06 - Clinton Twp
08 - East Amwell Twp
10 - Franklin Twp
12 - Glen Gardner Boro
14 - High Bridge Boro
16 - Kingwood Twp
18 - Lebanon Boro
20 - Milford Boro
22 - Readington Twp
24 - Tewksbury Twp
26 - West Amwell Twp

MERCER COUNTY (21)

01 - East Windsor Twp
02 - Ewing Twp
03 - Hamilton Twp
04 - Hightstown Boro
05 - Hopewell Boro
06 - Hopewell Twp
07 - Lawrence Twp
08 - Pennington Boro
09 - Princeton Boro
10 - Princeton Twp
11 - Trenton City
12 - Washington Twp
13 - West Windsor Twp

MIDDLESEX COUNTY (23)

01 - Carteret Boro
02 - Cranbury Twp
03 - Dunellen Boro
04 - East Brunswick Twp
05 - Edison Twp
06 - Helmetta Boro
07 - Highland Park Boro
08 - Jamesburg Boro
10 - Metuchen Boro
11 - Middlesex Boro
12 - Milltown Boro
13 - Monroe Twp
14 - New Brunswick City
15 - North Brunswick Twp
09 - Old Bridge Twp
16 - Perth Amboy City
17 - Piscataway Twp
18 - Plainsboro Twp
19 - Sayreville Boro
20 - South Amboy City
21 - South Brunswick Twp
22 - South Plainfield Boro
23 - South River Boro
24 - Spotswood Boro
25 - Woodbridge Twp

MONMOUTH COUNTY (25)

30 - Aberdeen Twp
01 - Allenhurst Boro
02 - Allentown Boro
03 - Asbury Park City
04 - Atlantic Highlands Boro
05 - Avon-By-The-Sea Boro
06 - Belmar Boro
07 - Bradley Beach Boro
08 - Brielle Boro
09 - Colts Neck Twp
10 - Deal Boro
11 - Eatontown Boro
12 - Englishtown Boro
13 - Fair Haven Boro
14 - Farmingdale Boro
15 - Freehold Boro
16 - Freehold Twp
39 - Hazlet Twp
17 - Highland Boro
18 - Holmdel Boro
19 - Howell Twp
20 - Interlaken Boro
21 - Keansburg Boro
22 - Keyport Boro
23 - Little Silver Boro
24 - Loch Arbour Village
25 - Long Branch City
26 - Manalapan Twp
27 - Manasquan Boro
28 - Marlboro Twp
29 - Matawan Boro
31 - Middletown Twp
32 - Millstone Twp
33 - Monmouth Beach Boro
35 - Neptune City Boro
34 - Neptune Twp
37 - Ocean Twp
38 - Oceanport Boro
40 - Red Bank Boro
41 - Roosevelt Boro
42 - Rumson Boro
43 - Sea Bright Boro
44 - Sea Girt Boro
45 - Shrewsbury Boro
46 - Shrewsbury Twp
47 - South Belmar Boro
48 - Spring Lake Boro
49 - Spring Lake Heights Boro
36 - Tinton Falls Boro
50 - Union Beach Boro
51 - Upper Freehold Twp
52 - Wall Twp
53 - West Long Branch Twp

MORRIS COUNTY (27)

01 - Boonton Town
02 - Boonton Twp
03 - Butler Boro
04 - Chatham Boro
05 - Chatham Twp
06 - Chester Boro
07 - Chester Twp
08 - Denville Twp
09 - Dover Town
10 - East Hanover Twp
11 - Florham Park Boro
12 - Hanover Twp
13 - Harding Twp
14 - Jefferson Twp
15 - Kinnelon Boro
16 - Lincoln Park Boro
17 - Madison Boro
18 - Mendham Boro
19 - Mendham Twp
20 - Mine Hill Twp
21 - Montville Twp
23 - Morris Plains Boro
22 - Morris Twp
24 - Morristown Town
26 - Mount Arlington Boro
27 - Mount Olive Twp
25 - Mountain Lakes Boro
28 - Netcong Boro
29 - Parsippany Troy-Hills Twp
30 - Passaic Twp
31 - Pequannock Twp
32 - Randolph Twp
33 - Riverdale Boro
34 - Rockaway Boro
35 - Rockaway Twp
36 - Roxbury Twp
37 - Victory Gardens Boro
38 - Washington Twp
39 - Wharton Boro

OCEAN COUNTY (29)

01 - Barnegat Light Boro
33 - Barnegat Twp
02 - Bay Head Boro
03 - Beach Haven Boro
04 - Beachwood Boro
05 - Berkeley Twp
06 - Brick Twp
07 - Dover Twp
08 - Eagleswood Twp
09 - Harvey Cedars Boro
10 - Island Heights Boro
11 - Jackson Twp
12 - Lacey Twp
13 - Lakehurst Boro
14 - Lakewood Twp
15 - Lavalette Boro
16 - Little Egg Harbor Twp
17 - Long Beach Twp
18 - Manchester Twp
19 - Mantaloking Boro
21 - Ocean Gate Boro
20 - Ocean Twp
22 - Pine Beach Boro
23 - Plumsted Twp
25 - Point Pleasant Beach Boro
24 - Point Pleasant Boro
26 - Seaside Heights Boro
27 - Seaside Park Boro
28 - Ship Bottom Boro
29 - South Toms River Boro
30 - Stafford Twp
31 - Surf City Boro
32 - Tuckerton Boro

PASSAIC COUNTY (31)

01 - Bloomingdale Boro
02 - Clifton City
03 - Haledon Boro
04 - Hawthorne Boro
05 - Little Falls Twp
06 - North Haledon Boro
07 - Passaic City
08 - Paterson City
09 - Pompton Lakes Boro
10 - Prospect Park Boro
11 - Ringwood Boro
12 - Totowa Boro
13 - Wanaque Boro
14 - Wayne Twp
15 - West Milford Twp
16 - West Paterson Boro

SALEM COUNTY (33)

01 - Alloway Twp
13 - Carney's Point Twp
02 - Elmer Boro
03 - Elsinboro Twp

04 - Lower Alloways Creek Twp
06 - Oldmans Twp
08 - Pennsville Twp
10 - Pittsgrove Twp
12 - Salem City
15 - Woodstown Boro
05 - Mannington Twp
07 - Penns Grove Boro
09 - Pilesgrove Twp
11 - Quinton Twp
14 - Upper Pittsgrove Twp

SOMERSET COUNTY (35)

01 - Bedminster Twp
03 - Bernardsville Boro
05 - Branchburg Twp
07 - Far Hills Boro
09 - Green Brook Twp
11 - Manville Boro
13 - Montgomery Twp
15 - Peapack-Gladstone Boro
17 - Rocky Hill Boro
19 - South Bound Brook Boro
21 - Watchung Boro
02 - Bernards Twp
04 - Bound Brook Boro
06 - Bridgewater Twp
08 - Franklin Twp
10 - Hillsborough Twp
12 - Millstone Boro
14 - North Plainfield Boro
16 - Raritan Boro
18 - Somerville Boro
20 - Warren Twp

SUSSEX COUNTY (37)

01 - Andover Boro
03 - Branchville Boro
05 - Frankford Twp
07 - Fredon Twp
09 - Hamburg Boro
11 - Hardyston Twp
13 - Lafayette Twp
15 - Newton Town
17 - Sandyston Twp
19 - Stanhope Boro
21 - Sussex Boro
23 - Walpack Twp
02 - Andover Twp
04 - Byram Twp
06 - Franklin Boro
08 - Green Twp
10 - Hampton Twp
12 - Hopatcong Boro
14 - Montague Twp
16 - Ogdensburg Boro
18 - Sparta Twp
20 - Stillwater Twp
22 - Vernon Twp
24 - Wantage Twp

UNION COUNTY (39)

01 - Berkeley Heights Twp
03 - Cranford Twp
05 - Fanwood Boro
07 - Hillside Twp
09 - Linden City
11 - New Providence Boro
13 - Rahway City
15 - Roselle Park Boro
17 - Springfield Twp
19 - Union Twp
21 - Winfield Twp
02 - Clark Twp
04 - Elizabeth City
06 - Garwood Boro
08 - Kenilworth Boro
10 - Mountainside Boro
12 - Plainfield City
14 - Roselle Boro
16 - Scotch Plains Twp
18 - Summit City
20 - Westfield Town

WARREN COUNTY (41)

01 - Allamuchy Twp
03 - Belvidere Town
05 - Franklin Twp
07 - Greenwich Twp
09 - Hardwick Twp
11 - Hope Twp
02 - Alpha Boro
04 - Blairstown Twp
06 - Frelinghuysen Twp
08 - Hackettstown Town
10 - Harmony Twp
12 - Independence Twp



4/87

13 - Knowlton Twp
14 - Liberty Twp
15 - Lopatcong Twp
16 - Mansfield Twp.
17 - Oxford Twp
18 - Pahaquarry Twp
19 - Phillipsburg Town
20 - Pohatcong Twp
21 - Washington Boro
22 - Washington Twp
23 - White Twp

**REFERENCE NO. 14**

State of New Jersey
DEPARTMENT OF ENVIRONMENTAL PROTECTION
DIVISION OF SOLID WASTE MANAGEMENT
CN 414, Trenton, N.J. 08625

Michael F. DeBonis
Acting Director

RECEIVED
JUL 6 1987

July 2, 1987

Honorable Henry J. Hill
Mayor
Kearny Town Hall
402 Kearny Avenue
Kearny, New Jersey 07032

Dear Mayor Hill:

It is our understanding that there was recently a fire at the Keegan Landfill. I am pleased to learn that steps were taken to correct this serious situation.

According to our records, this is a problem which has occurred several times in the past. Such events are usually the result of improper closure of a site. Our Department's closure rules and operating requirements provide specific parameters necessary for the prevention of such occurrences. It is our recommendation, therefore, that the following actions be taken:

As an immediate, short term remedial measure, a conceptual proposal for correction of the existing situation should be prepared. Next, a closure plan for this site must be submitted, to preclude similar events from occurring in the future. Among the requirements for proper closure are; the application of a minimum of 24 inches of final cover, proper grading, slope stabilization and seeding, and development of provisions for groundwater monitoring. In addition, based on past experiences at this site, adequate access roads must be constructed to facilitate fire vehicle entry. Subsequent to the completion of these roads, measures to prevent public access to this site, such as fences and/or periodic patrols, should be put into place. It is recommended that proper disruption approval be obtained from our Department prior to the commencement of any of these activities.

For your information, the following is a list of persons in the Division of Solid Waste Management whom you may wish to consult:

Alfred B. Cherry, P.E.
Assistant Director for Engineering
(609) 292-7019

Edward J. Londres, P.E.
Assistant Director for Enforcement
(609) 292-6724

John Castner, Chief, Bureau of Sanitary
Landfill Closure
(609) 292-7875

Alan Kaczoroski, Chief, Bureau of Inspections
and Investigations
Enforcement Element
(609) 426-0791

Environmental Hotline (For Emergencies)
(609) 292-7172

Any plans or designs should be submitted to Mr. Cherry. Should you need assistance in any area, please feel free to involve us in your endeavor. You may call me at any time with your questions or concerns.

Sincerely,

Edward J. Londres

Edward J. Londres, P.E.
Assistant Director
Enforcement

d
c: A. Cherry
J. Castner
A. Kaczoroski

**REFERENCE NO. 15**

JCA

JAMES C. ANDERSON ASSOCIATES, INC.
CONSULTING ENGINEERS, SCIENTISTS, PLANNERS AND SURVEYORS

385 PROSPECT AVENUE • HACKENSACK, NEW JERSEY 07602 • (201) 343- 2266

July 7, 1987

Mayor Henry Hill & Town Council
c/o Town Hall
425 Kearny Avenue
Kearny, New Jersey 07032

Ref: Health & Safety at
Fire Dousing of Landfill

Dear Mayor & Council:

Thank you for the confidence in our capabilities as expressed by your vote of approval two weeks ago. We greatly appreciated your resolution for our providing health and safety services at the above referenced location. I and the firm are always honored to work for the Town of Kearny.

In order to complete our health and safety monitoring task, we need to complete a number of items. First among them is the use of a temperature probe to detect any remaining "hot spots" within the landfill which may require further extinguishment. We will work closely with the contractor on this item.

Next, we must submit to you and the Town at large our report on the remedial actions taken by the contractor, as seen from our role as 1) serving as the Town's representative and 2) protecting the health and safety of Kearny residents during the dousing of the fire.

Third, we must meet with the Mayor and Council to discuss the range of options open to the Town for prevention of the recurrence of the fire. The long-term resolution of the landfill combustion problem must be addressed from an environmental engineering perspective and an assessment of the existing conditions promoting combustion. Suggested actions include a complete mixing of the waste volume, isolation, insulation and toe-in to ground water. Monitoring stations must also be set up to assure warning of abrupt changes in temperature by location. This perspective is one with which JCAA is completely familiar, having served a consultant to many landfill owner/operators.

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MKC

Please contact me at the above should you have any questions or wish to review our observations and monitoring at the Keegan site. I look forward to your reply and to meeting with you all in the near future. Thank you for this opportunity to serve the Town of Kearny.

Sincerely,
James C. Anderson Associates

James A. Rogers

James A. Rogers, Principal
Member, Governor's Hazardous
Waste Advisory Council

JAR/cea

7-10-87 - COPIES TO - MAYOR HICC
T IEMER - J. MECIR
HEALTH OFFICER -
E. GROSVENOR

**REFERENCE NO. 16**

NEGLIA ENGINEERING
ASSOCIATES
— Consulting Engineers —
CIVIL • MUNICIPAL • LAND SURVEYS
205 CHUBB AVENUE · P.O. BOX 426 · LYNDHURST, NEW JERSEY 07071 · PHONES (201) 939-8805 & 8809
JOSEPH E. NEGLIA, P.E., L.S., P.P.

August 28, 1987

Mayor and Council
Town of Kearny
402 Kearny Avenue
Kearny, New Jersey 07032

Re: Keegan Landfill
Bergen Avenue
Our file: - K-Pending

Honorable Mayor and Council:

On July 28, 1987 a meeting was held at the Town's Health Department with the New Jersey Department of Environmental Protection (NJDEP) to discuss the Department's requirements for the "closure" of the recently extinguished sections of the Keegan Landfill. A subsequent meeting was held between my office and the N.J.D.E.P. on August 11, 1987 to discuss the technical requirements for this section of the landfill. Based on these meetings we would recommend that the following remedial actions be taken:

1) The access road should be improved to eliminate the depressions and to provide for a turn around area. This can be accomplished by the use of construction/demolition rubble.

2) Cover the areas of the recently extinguished fires with two (2) feet of cover, compact and seed the area. This is normally done by using clean fill. However, we have had discussions with the Jersey City Water Department to use their water treatment sludge for this purpose. The NJDEP has approved this sludge to be used for landfill cover and Jersey City will make this sludge available to the Town at no cost. Provided that Town and/or its contractor load and transport the sludge.

3) The access road from Bergen Avenue must be secured and the illegal dumping on lots 18, 31 and 32 in Block 205 should be halted. It should be noted that these lots are owned by the Hudson Meadow Urban Renewal Corp. (Mimi Development) and the access road to the Towns property is located on these lots. The Town may wish to secure a roadway easement

from the property owner for this access road if one does not exist. The Town should also determine the southerly property boundry of lot 19 in block 205 in which the landfill is located.

It is estimated that cost of improving access road and covering the landfill with clean fill will be two hundred thousand dollars ($200,000.00). The utilization of the Jersey City sludge may reduce this to one hundred fifty thousand dollars ($150,000.00). We would recommend that plans and specifications be prepared for this work and bids be accepted for the two (2) alternate cover materials.

The Town should also research whether an easement exists for the access road, establish the Town's property boundary and require the owner of lots 18,31 and 32 to secure their property and remove the illegally dumped material. An appropriation should be made of two hundred fifty thousand dollars ($250,000.00) to cover all anticipated costs.

I trust you will find this in order.

Very truly yours,

Joseph E. Neglia, P.E.,L.S.,P.P.
Town Engineer
Town of Kearny

JEN/bjs/js

cc: Kearny Health Dept.
Kearny Fire Dept.
NJDEP-John Castner

Revised 7/86

July 1987

## ENGINEERING PLAN REQUIREMENTS FOR DISRUPTION OF LANDFILLS

The following items shall be addressed in the landfill disruption application narrative. Please note that review time can be minimized by numbering the responses and listing them in the same order as shown below.

1. Application Form - Application form CP#1 and Solid Waste supplement must be completed.

2. Engineering Design Review Fee - An application fee of $500.00, made payable to "Treasurer, State of New Jersey", must be submitted.

3. Topographic Map - A topographic map is required which clearly shows the area to be excavated, as well as any areas where waste will be redeposited. Existing and final contour lines shall be shown at two-foot intervals. Boundary lines and numbers of property lots and blocks shall be shown.

4. Extent of Operations - The applicant shall include a statement of the size of the area involved, the depth of excavation, volume of fill to be removed, and lot and block numbers of property on which disruption is to occur.

5. Elevation Drawings - Cross-sections showing depths of excavation or redeposition, required final cover and final grades shall be submitted.

6. Property Deed - A copy of the deed of record is required.

7. Timetable - The Applicant shall submit a timetable or schedule of operations.

8. Cover - The application shall include a description of the means by which all opened surfaces will be covered when excavation procedures are halted. (Daily cover of six (6) inches of clean soil is required when work is interrupted for up to 24 hours; intermediate cover of twelve (12) inches of clean soil is required when work is halted for up to six (6) months.)

9. Removal of waste - A statement is required confirming that no waste material will be stored on-site. In most cases, it shall be removed immediately; however, if only a small area is disrupted and the material can be immediately redeposited, permission may be granted for on-site disposal. The application shall address the off-site disposal destination or the methods used for on site disposal.

10. Purpose of Disruption - The applicant shall provide the reasons for the excavation and a brief statement describing the facility to be constructed (if any).

11. Water Control - The application shall include a description of measures to provide drainage of surface water and subsurface water to minimize contact with fill.

12. Leachate Control - A description and design shall be submitted showing how leachate in the excavated area will be collected and treated.

13. Odor Control - A description of procedures to be used shall be submitted.

14. Gas Control - The application shall include details of the methane gas intercept system used to protect workers during excavation and construction and to protect any building facility when completed.

15. Rodent, Insect, Fire, Dust, and Litter Controls - A description of measures to be taken shall be submitted.

16. Excavation of Hazardous Waste - In the event that hazardous materials will be disrupted, specific procedures for the disruption, handling, and disposal along with a detailed Health and Safety Plan shall be submitted to the Department for review andshall be implemented upon approval.

17. Utility Lines - A design drawing shall be submitted indicating paved areas, areas for underground utility lines such as water, sanitary sewer, storm drainages, gas, electric and telephone.

18. Soil Borings - Soil borings of the property shall be provided in accordance with the following table:

| ACREAGE OF DISRUPTED AREA | MINIMUM NUMBER OF BORINGS |
|---|---|
| 1-10 | 3 |
| 10-50 | 6 |
| 50-100 | 12 |
| 100-200 | 18 |
| over 200 | minimum 24 |

a. The borings should employ a grid pattern, wherever possible, such that there is, at a minimum, one boring in each major geomorphic feature. The boring pattern shall enable the development of detailed cross sections through the sanitary landfill in order to sufficiently define the geology, hydrology and nature of the fill.

b. Subsurface data obtained by borings shall be collected by standard undisturbed soil sampling techniques for engineering indexes and classification. Diamond bit coring shall be used for rock boring. Samples shall not be composited. The sampling interval for the borings shall be determined by a geologist or geotechnical engineer and be representative of the stratigraphy of the site. It is recommended

that sampling be performed on a continuous basis for the first 20 feet below the lowest elevation of the sanitary landfill.

c. All borings shall be a minimum depth of 20 feet below the lowest elevation of the sanitary landfill. The Department reserves the right to require a deeper minimum depth in areas in which 20 feet is not sufficient to describe the geological formation and the groundwater flow patterns below the proposed sanitary landfill disruption in regard to potential contaminant migration paths;

d. Excavations, test pits and geophysical methods may be employed to supplement to soil boring investigation;

e. Field and final borings shall be submitted for each boring; recording soils or rock conditions encountered. Each log shall include a soil or rock description in accordance with the Unified Soil Classification sampling, the depth of soil or rock, the water levels encountered, the blow counts, the soil tests and date. All depths of soil and rock as described with the boring log shall be corrected to National Geodetic Vertical Datum.

f. All borings, not to be utilized as permanent monitoring wells, and wells within the active disposal area shall be sealed in accordance with NJAC 7:9-9, "Sealing of Abandoned Wells", and excavations and test pits shall be backfilled and properly compacted to prevent possible paths of leachate migration.

19. Departmental Permits - Copies of all departmental permits as may be required or written proof of application for such permits due to flood plain involvement, stream encroachment, discharge to groundwater or discharge to surface water, and copies of all titles for lands involved in riparian lands or wetlands (together with land use permits) shall be submitted. For more information, please contact the Bureau of Flood Plain Management, (609) 292-2372, the Bureau of Stream Encroachment, (609) 292-2402, the Bureau of Ground Water Discharge Permits, (609) 292-0424 or the Bureau of Industrial Waste, (609) 292-0407.

20. Erosion and Sediment Control - The disruption application must include a soil erosion and sediment control plan approved by the regional soil conservation district.

All drawings and other documents prepared by the applicant must be signed and sealed by a New Jersey licensed Professional Engineer.

REFERENCE NO. 17

14

# HUDSON REGIONAL HEALTH COMMISSION

215 ~~313~~ HARRISON AVENUE
HARRISON, NEW JERSEY 07029

(201) 485-7001

(201) 485-700:

July 14, 1987

Honorable Mayor Henry Hill
Town Hall
Kearny Avenue
Kearny, N.J. 07032

Re: Keegan Landfill

Dear Mayor Hill:

I wish to compliment you, the Council and particularly your Department of Health for a job well done in taking prompt and decisive action to remediate the underground fire at the above referenced site. I was personally pleasantly surprised to observe that visible smoke conditions were substantially ameliorated in short order by Mr. Cali and that efforts were underway to minimize the potential for recurrence.

As a result of an inspection conducted on July 13, 1987 it is our determination that visible emissions have been completely eliminated based upon which compliance with our Order of May 18, 1987 has been achieved.

It is the recommendation of the Commission that additional measures be taken by the town to further militate against the potential for recurrence and to facilitate site control. These include:

* A final cover of 24 inches at least over that area recently disrupted.

* Construction of access roads for emergency and patrol vehicles.

* Site security to prevent public access.

Your continuing cooperation is appreciated.

Sincerely,

Robert Ferraiuolo,
Director

"SERVING BAYONNE, EAST NEWARK, GUTTENBERG, HARRISON, HOBOKEN, JERSEY CITY, KEARNY, NORTH BERGEN, SECAUCUS, UNION CITY, WEEHAWKEN, WEST NEW YORK."

**REFERENCE NO. 18**

# Kearny
# Department of Public Health and Environmental Protection

BOARD MEETS
THIRD WEDNESDAY OF EACH MONTH
AT HEALTH CENTER
646 KEARNY AVENUE
KEARNY, N.J. 07032

997-0600

COMMISSIONERS
KEARNY BOARD OF HEALTH

JO-ANN CARRATURA, President
VICTOR RUDOMANSKI, M.D., Vice President
PETER CICCHINO
CHESTER KOZLIK
GORDON FOWLIE
ROBERT KERWIN
JAMES CONNORS

EDWARD GROSVENC
HEALTH OFFICER

July 21, 1987

Honorable Henry J. Hill &
Members of the Town Council
Kearny, New Jersey 07032

Dear Mayor & Council Members:

As of the afternoon of July 9, 1987 there were no visual signs of underground smoldering at the Keegan Site as observed by Mayor Hill and this writer.

In a communication from the Department of Environmental Protection to Mayor Hill, dated July 2, 1987, they were pleased that Kearny took immediate steps to put out the fires. They also recommended that the town take steps to properly close the dump. One recommendicn is to cover the entire site with twenty-four (24") inches of clean fill which would cost the town millions of dollars.

We can possibly avoid the spending of millions by taking short term remedial action which includes the following:

1.) Cover with clean fill the area that was on fire.

2.) Build roads to make all areas of the dump more accessible to fire fighting equipment.

3.) Secure the main entrance area and have area patrolled regularly.

A letter from the Town Engineer with our plan for remedial action would be submitted to John Castner, Chief, Bureau of Sanitary Landfill Closure, Division of Solid Waste Management, CN-414, Trenton, New Jersey 08625.

The town should also have the dirt portion of Bergen Avenue's perimeter free of all debris indiscriminately dumped, and signs posted to halt dumping and trespassing on the old dump (see enclosed report).

The Health Department also respectfully recommends that the town sell or lease the property for development. If there are no possibilities, we ought to apply for funding for recreational purposes to the H.M.D.C., Hudson County, State of New Jersey and the Federal Government, who have all had input into the following:

1.) Over fifty (50) years of garbage dumping in Kearny.

2.) Issuing permits to conduct hazardous waste facilities in the Town of Kearny.

3.) Storing 10,000 to 12,000 drums of radioactive solid and debris in Kearny.

4.) In the near future, construction of a 1,000 inmate jail in Kearny.

5.) Contruction of at least a 1,500 ton a day resource recovery unit in Kearny.

6.) And finally, we will probably be host community for the toxic ash from one or more resource recovery plants.

If we do nothing at all, we will probably continue to have underground fires errupt annually creating a public health nuisance for our residents, and, more seriously, we will have the hazardous conditions that could permit serious injury to anyone falling into a burning cavity. Years ago we had one boy lose his legs and another crippled from falling into a burning cavity.

The Kearny Department of Public Health strongly recommends that the Mayor and Council consider our recommendations or develop a plan to remove the potential nuisance and hazard at the Keegan Dump Site.

Sincerely,

Edward Grosvenor

Edward Grosvenor,
Health Officer

EG:el
CC: A. Cavalier
R. Robertson
R. MacMillan

**REFERENCE NO. 19**

Kearny
Department of Public Health
and Environmental Protection

BOARD MEETS
THIRD WEDNESDAY OF EACH MONTH
AT HEALTH CENTER
645 KEARNY AVENUE
KEARNY, N.J. 07032

997-0600

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ROBERT KERWIN
JAMES CONNORS

EDWARD GROSVENOR
HEALTH OFFICER

July 23, 1987

Honorable Henry J. Hill &
Members of the Town Council
Town Hall
Kearny, New Jersey 07032

Honorable Mayor & Council:

It has been brought to our attention that the foot of Bergen Avenue, south of the railroad trestle, has become an illegal dumping area for a few irresponsible violators. Most of this dumping involves washers, dryers, furniture and other various debris.

To improve access of emergency equipment and abate a nuisance along the roadway, this area should be cleaned and debris removed as it presently poses a fire hazard and an unslightly nuisance.

By way of a letter to Town Engineer Neglia, we have requested that town property be delineated before removal begins so town properties can be cleaned.

Once town property on Bergen Avenue is properly cleared, we can begin to have private property in the area properly cleaned and fenced as required by law.

Very truly yours,

John P. Sarnas,
Assistant Health Officer

JPS:el

**REFERENCE NO. 20**

let's protect our earth

State of New Jersey
DEPARTMENT OF ENVIRONMENTAL PROTECTION
DIVISION OF SOLID WASTE MANAGEMENT
CN 414, Trenton, N.J. 08625

Michael F. DeBonis
Acting Director

August 25, 1987

Mr. John P. Sarnas
Assistant Health Officer
Kearny Department of Health and
Environmental Protection
645 Kearny Avenue
Kearny, New Jersey 07032

Re: Keagan Landfill, Kearny, Hudson County

Dear Mr. Sarnas:

This correspondence serves as a follow-up to your letter of July 30, 1987 and Christina Gerke's letter of August 10, 1987. On August 11, 1987, I met with Mr. Barry Sutherland and Mr. John Edwards, of my staff, to discuss plans for the Keagan Landfill.

It is our understanding that Neglia Engineering Associates will submit a plan to regrade and cover the recently disrupted area of the landfill with twenty four (24) inches of final cover. Among its other attributes, the cover will eliminate ignition sources and should prevent future fires. Although no formal disruption permit or review fee will be necessary, this Division will issue an "authorization to proceed" once a plan has been received and reviewed. Additionally, we will want a copy of a soil erosion and sediment control plan that has been sent to the appropriate district for proper certification.

All landfills, regardless of age, are subject to a determination as to whether the site should be monitored under the New Jersey Pollutant Discharge Elimination System (NJPDES) permitting program. As such, we will be referring this site to them for such a determination.

There has also been mention that it may be prudent for the town to prearrange agreements with contractors to have contingency plans established for the purpose

of fighting fires at the landfill. Having authorization in advance, to hire a contractor, would greatly expedite the process of putting out a fire.

I trust this will satisfy your present concerns. However, should you have further questions, kindly contact Mr. Edwards at (609) 984-5851.

Sincerely,

John A. Castner

John A. Castner, Chief
Sanitary Landfill Closure

JTE/smw

c: E. Londres

**REFERENCE NO. 21**

# Kearny
# Department of Public Health and Environmental Protection

BOARD MEETS
THIRD WEDNESDAY OF EACH MONTH
AT HEALTH CENTER
645 KEARNY AVENUE
KEARNY, N.J. 07032

997-0600

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EDWARD GROSVENOR
HEALTH OFFICER

MEMO

UP-DATE ON LANDFILL FIRE

6/25/87

Cali Inc.
Arrived at site at approximately 2:30PM Thursday.

Basic mode to attack fire is to create a path and brake around area on fire.

Then attend to each seperate area by turning over garbage and wetting it down.

6/26/87

Two large dozers at site. Path has been cut around area on fire. Pumps being set up in three seperate locations.

James Anderson Inc., representive safety officer on site.

Briefing took place.

Air samples taken every 15 minutes. Readings of less than 3 parts per million detected of C.O. No safety threat at this time.

# Kearny
# Department of Public Health and Environmental Protection

BOARD MEETS
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997-0600

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EDWARD GROSVENOR
HEALTH OFFICER

TO: Henry Hill

FROM: John Sarnas, Assistant Health Officer

SUBJECT: Keegan Fire

DATE: June 29, 1987

10:00AM on site observed no smoke - one dozer turning over soaked area. One punp working, another being repaired. Area was smothered to prevent smoke from creating nuisance. However, fire is not out. John Craig on sceene from Rogers Consultants found only 3ppm of organics at ground level which is within guidelines.

2:00PM - on site observed two dozers running 3 pumps operating. Smoke venting in two areas. R. Ferraiolo of Hudson Regional on sceene and recommends temperature probe of site to find hot spots which is more reliable than waiting for smoke to vent.

# Kearny
# Department of Public Health and Environmental Protection

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EDWARD GROSVENOR
HEALTH OFFICER


## UP-DATE LANDFILL FIRE

June 30, 1987

No smoke observed at site. All equipment at site being used. Safety Engineer indicating area is satisfactory.

DEP Metro Department- Anthony Cavalier and members of hazardous waste team came to site. Visual observation was taken - No furter action taken.

Cali stated that with additional pump being put into place today, 30,000 gallons per hour capability; the intent is to turn area over again and flood, grade area and possibly cover.

# Kearny
# Department of Public Health and Environmental Protection

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EDWARD GROSVENOR
HEALTH OFFICER

July 2, 1987

LANDFILL UPDATE

July 1, 1987:

Director of Metro D.E.P. office Tony Cavalier at site; area being turned over for second time while large amounts of water being pumped; no smoke observed.

CC: Mayor Hill
Councilman MacMillan
Councilperson Robertson

# Kearny
# Department of Public Health and Environmental Protection

BOARD MEETS
THIRD WEDNESDAY OF EACH MONTH
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997-0600

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EDWARD GROSVENOR
HEALTH OFFICER


LANDFILL FIRE UPDATE:

July 2, 1987:

Meet with Cali; spotted one site still smoking; Cali will leave equipment and pump and personnel at site to make sure no additional fire starts or comes up.

Has stopped pumping water onto site to allow area to drain; to assure flooding conditions don't happen thereby causing problem for dozer to operate properly.

Kearny
Department of Public Health
and Environmental Protection

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EDWARD GROSVENOR
HEALTH OFFICER

LANDFILL FIRE UPDATE:

July 6, 1987:

D.E.P. Cavalier at site; Cali and J. Anderson at site; road and area being dressed in order to have easier access to site.

Area, where smoke was coming from on Thursday, has been put out, however, garbage uncovered; needs to be leveled again.

Kearny
Department of Public Health
and Environmental Protection

BOARD MEETS
THIRD WEDNESDAY OF EACH MONTH
AT HEALTH CENTER
645 KEARNY AVENUE
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JAMES CONNORS

EDWARD GROSVENOR
HEALTH OFFICER

LANDFILL FIRE UPDATE:

July 7, 1987:

Site shows no smoke; most of the area level; road made easier to travel in and out; J. Anderson, Consultant, has not gotten any reading for the past couple of days; possible ground temperature reading has been discussed; Cali indicated he would make contact with the Mayor's office to ask for town's inspection of site in order to determine at what stage Cali has reached in meeting his agreement; spoke with J. Anderson Inc. who stated there has been some suggestion that they take heat probe readings of area, but has not taken reading to this time.

# Kearny
# Department of Public Health and Environmental Protection

BOARD MEETS
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997-0600

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ROLEFT KERWIN
JAMES CONNORS

EDWARD GROSVENOR
HEALTH OFFICER


## LANDFILL FIRE UP-DATE

July 7, 1987, Tuesday

No sign of fire at site. Area wed from pumping water and heavy rain.

Most of the area has been leveled.
Cali Inc. - present
Anderson Inc. - present

July 8, 1987, Wednesday

Road has been worked in order that access to site is made easier.

# Kearny
# Department of Public Health and Environmental Protection

BOARD MEETS
THIRD WEDNESDAY OF EACH MONTH
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KEARNY, N.J. 07032

997-0600

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JAMES CONNORS

EDWARD GROSVENOR
HEALTH OFFICER


## LANDFILL UP-DATE

July 9, 1987

AM - site visited - heavy rain made leveling difficult.

PM - talked with Cali, who said he spoke with Mayor and followed it up with letter to Mayor and Council. Cali said he told Mayor Hill he felt the fire was out, but that Cali wanted a Town representative either Neglia or the Fire Departemnt to declare the fire out and agree that Cali had completed his charge to the Town.

Later that afternoon the Mayor and Ed Grosvenor went to site to discuss an order from DEP for a Mr. M. DeBonis to develop a closure plan for the future.

# Kearny
# Department of Public Health and Environmental Protection

BOARD MEETS
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997-0600

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JAMES CONNORS

EDWARD GROSVENOR
HEALTH OFFICER

LANDFILL UP-DATE

July 10, 1987

Meet with DEP, Tony Cavalier at fire site. Cable accross road. No activity at site.

9:00 AM

J. Anderson Inc. - called to find out status of site. Unable to get on site. The last week no readings were gotten.

This Department has not received any communication from any source as to status of site. Nor has this department been asked to present more then the general observation it has ben supplying to the Mayor and Council Members.

**REFERENCE NO. 22**

- Copy of CLP Data
(Redlined & mark

- Computer QA'd printo

Site Name: Keegan LF
Case : 11834
Bries#: NJG3
TDD#: 02-8810-75

SITE NAME: KEEGAN LANDFILL
TDD#: 02-8810-75
SAMPLING DATE: 5/25/89
EPA CASE NO.: 11834
LAB NAME: YORK LABORATORIES

INORGANICS

| Sample ID No. | NJG3-SW1(MS/MSD) | NJG3-SW2 | NJG3-SW3 | NJG3-SW4 | NJG3-SW5 | NJG3-SW6 | NJG3-SW7(DUP) | NJG3-SED1(MS/MSD) | NJG3-SED2 | NJG3-SED3(DUP) | NJG3-SED4 | NJG3-SED5 | NJG3-SED6 | NJG3-RIN1 | NJG3-RIN2 | NJG3-TBLK1 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Traffic Report No. | MBX056 | MBX057 | MBX058 | MBX059 | MBX060 | MBX061 | MBX070 | MBX062 | MBX063 | MBX064 | MBX065 | MBX066 | MBX067 | MBX068 | MBX069 | N/A |
| Matrix | WATER | WATER | WATER | WATER | WATER | WATER | WATER | SEDIMENT | SEDIMENT | SEDIMENT | SEDIMENT | SEDIMENT | SEDIMENT | WATER | WATER | N/A |
| Units | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L | mg/kg | mg/kg | mg/kg | mg/kg | mg/kg | mg/kg | ug/L | ug/L | ug/L |
| Aluminum | R | R | R | R | 2170 E | 444 E | 467 E | 3750 | 5340 | 4830 | 6000 | 10700 | 6410 | J | J | NR |
| Antimony | | | | | J | J | J | | | | | | | | | NR |
| Arsenic | J | J | J | J | J | J | J | J | J | J | 23.1 | 33 | 10 | | | NR |
| Barium | J | J | 204 | J | 445 | 211 | 212 | 102 | J | J | 645 | 420 | 207 | | | NR |
| Beryllium | | | | | J | | | J | J | J | | J | | | | NR |
| Cadmium | | | | | | | | 3.7 | | | 4.6 | 5 | 2.3 | | | NR |
| Calcium | 77400 | 70900 | 83800 | 74400 | 177000 | 172000 | 169000 | 4480 | 2360 | 2540 | 13300 | 7900 | 10800 | J | J | NR |
| Chromium | | J | J | J | 21.6 E | J | J | 26.3 | 13.1 | 13.3 | 93.6 | 114 | 116 | | | NR |
| Cobalt | J | J | J | J | J | | | J | J | J | J | J | J | | J | NR |
| Copper | | | | | 95.2 E | | | 293 | 8.9 E | 9.6 E | 327 | 562 | 575 | | | NR |
| Iron | 347 | 666 | 2870 | 1800 | 11900 | 2550 | 2630 | 20700 | 12100 | 12500 | 42400 | 35500 | 29300 | | | NR |
| Lead | 14.7 | 8.9 | 20.1 | 7.7 | 159 | 43.9 | 42.8 | 305 | 11.1 | 10.9 | 1020 | 1180 | 479 | | | NR |
| Magnesium | 25000 | 24100 | 29900 | 29600 | 50100 | 49900 | 48900 | J | 2470 | 2490 | J | 3710 | J | | J | NR |
| Manganese | 49.8 | 59.2 | 114 | 92.5 | 484 | 224 | 220 | 97 | 180 | 203 | 341 | 191 | 286 | J | | NR |
| Mercury | | | | | 1.2 | | 0.23 | 0.7 | | | 2.6 | 8.7 | 2.3 | | | NR |
| Nickel | | J | J | J | J | J | J | 26.1 | J | J | 78.9 | 48.1 | 78.3 | | J | NR |
| Potassium | 11300 | 11200 | 15700 | 15800 | 27800 | 27000 | 26400 | J | J | J | J | J | J | | | NR |
| Selenium | J | J | | | J | J | J | J | J | J | J | 6.1 E | J | | J | NR |
| Silver | | | | | J | | | J | | | | J | J | | | NR |
| Sodium | 152000 | 149000 | 165000 | 173000 | 87600 | 92500 | 91400 | J | J | J | J | J | J | J | J | NR |
| Thallium | | J | J | J | J | J | J | J | J | J | J | J | J | J | | NR |
| Vanadium | | | | | J | J | J | 35.6 E | 17.6 E | 17.4 E | 63.9 E | 98.8 E | 27.2 E | | | NR |
| Zinc | J | J | 43 | J | 339 | 45.4 | 47.7 | 483 | 32.1 | 36.1 | 1000 | 753 | 754 | J | J | NR |

NOTES:
Blank space - compound analyzed for but not detected
E - estimated value
J - estimated value, compound present below CRDL but above IDL
R - analysis did not pass EPA QA/QC
NR - analysis not required

SITE NAME: KEEGAN LANDFILL
TDD#: 02-8810-75
SAMPLING DATE: 05/25/89
EPA CASE NO.: 11834 LAB: PEI ASSOCIATES, INC.

| VOLATILES | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Sample ID No. | NJG3-SW1(MS/MSD) | NJG3-SW2 | NJG3-SW3 | NJG3-SW4 | NJG3-SW5 | NJG3-SW6 | NJG3-SW7(DUP) | NJG3-SED1(MS/MSD) | NJG3-SED2 | NJG3-SED3(DUP) | NJG3-SED4 | NJG3-SED5 | NJG3-SED6 | NJG3-RIN1 | NJG3-RIN2 | NJG3-TBLK |
| Traffic Report No. | BZ949 | BZ950 | BZ951 | BZ952 | BZ953 | BZ954 | BZ964 | BZ955 | BZ956 | BZ957 | BZ958 | BZ959 | BZ960 | BZ961 | BZ962 | BZ973 |
| Matrix | WATER | WATER | WATER | WATER | WATER | WATER | WATER | SEDIMENT | SEDIMENT | SEDIMENT | SEDIMENT | SEDIMENT | SEDIMENT | WATER | WATER | WATER |
| Units | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/L | ug/L | ug/L |
| Dilution Factor | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| Percent Moisture | -- | -- | -- | -- | -- | -- | -- | 50 | 22 | 22 | 54 | 59 | 41 | -- | -- | -- |
| Chloromethane | | | | | | | | | | | | | | | | |
| Bromomethane | | | | | | | | | | | | | | | | |
| Vinyl Chloride | | | | | | | | | | | | | | | | |
| Chloroethane | | | | | | | | | | | | | | B | B | B |
| Methylene Chloride | | | | | | | | | | | | | | B | B | B |
| Acetone | | | | | | | | J | | | | | | | | |
| Carbon Disulfide | | | | | | | | | | | | | | | | |
| 1,1-Dichloroethene | | | | | | | | | | | | | | | | |
| 1,1-Dichloroethane | | | | | | | | | | | | | | | | |
| Trans-1,2-Dichloroethene (total) | | | | | | | | | | | | | | | | |
| Chloroform | | | | | | | | | | | | | | | | |
| 1,2-Dichloroethane | | | | | | | | | | J | 79 E | | | B | B | B |
| 2-Butanone | | | | | | | | | | | | | | | | |
| 1,1,1-Trichloroethane | | | | | | | | | | | | | | | | |
| Carbon Tetrachloride | | | | | | | | | | | | | | | | |
| Vinyl Acetate | | | | | | | | | | | | | | | | |
| Bromodichloromethane | | | | | | | | | | | | | | | | |
| 1,2-Dichloropropane | | | | | | | | | | | | | | | | |
| cis-1,3-Dichloropropene | | | | | | | | | | | | | | | | |
| Trichloroethene | | | | | | | | | | | | | | | | |
| Dibromochloromethane | | | | | | | | | | | | | | | | |
| 1,1,2-Trichloroethane | | | | | | | | | | | | | | | | |
| Benzene | | | | | | | | | | | | | | | | |
| trans-1,3-Dichloropropene | | | | | | | | | | | | | | | | |
| Bromoform | | | | | | | | | | | | | | | | |
| 4-Methyl-2-Pentanone | | | | | | | | | | | | | | | | |
| 2-Hexanone | | | | | | | | | | | 68 E | 17 E | | | | |
| Tetrachloroethene | | | | | | | | | | | | | | | | |
| Toluene | | | | | | | | | | | | | | | | |
| 1,1,2,2-Tetrachloroethane | | | | | | | | | | | | | | | | |
| Chlorobenzene | | | | | | | | J | J | | | | | | | |
| Ethylbenzene | | | | | | | | | | | | | | | | |
| Styrene | | | | | | | | | | | | | | | | |
| Xylenes (Total) | | | | | | | | | | | 100 E | | | | | |

NOTES:
Blank space - compound analyzed for but not detected
B - compound found in lab blank as well as sample, indicates possible/probable blank contamination
E - estimated value
J - estimated value, compound present below CRQL but above IDL
R - analysis did not pass EPA QA/QC
N - Presumptive evidence of the presence of the material
NR - analysis not required
Detection limits elevated if Dilution Factor >1 and/or percent moisture >10%

SITE NAME: KEEGAN LANDFILL
TDD#: 02-8810-75
SAMPLING DATE: 05/25/89
EPA CASE NO.: 11834 LAB: PEI ASSOCIATES, INC.

| SEMI-VOLATILES | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Sample ID No. | NJG3-SW1(MS/MSD) | NJG3-SW2 | NJG3-SW3 | NJG3-SW4 | NJG3-SW5 | NJG3-SW6 | NJG3-SW7(DUP) | NJG3-SED1(MS/MSD) | NJG3-SED2 | NJG3-SED3(DUP) | NJG3-SED4 | NJG3-SED5 | NJG3-SED6 | NJG3-RIN1 | NJG3-RIN2 | NJG3-TBLK |
| Traffic Report No. | BZ949 | BZ950 | BZ951 | BZ952 | BZ953 | BZ954 | BZ964 | BZ955 | BZ956 | BZ957 | BZ958 | BZ959 | BZ960 | BZ961 | BZ962 | BZ973 |
| Matrix | WATER | WATER | WATER | WATER | WATER | WATER | WATER | SEDIMENT | SEDIMENT | SEDIMENT | SEDIMENT | SEDIMENT | SEDIMENT | WATER | WATER | WATER |
| Units | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/L | ug/L | ug/L |
| Dilution Factor/GPC Cleanup (Y) | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1/Y | 1/Y | 1/Y | 1/Y | 1/Y | 1/Y | 1 | 1 | N/A |
| Percent Moisture | -- | -- | -- | -- | -- | -- | -- | 50 | 22 | 22 | 54 | 59 | 41 | -- | -- | N/A |
| Pentachlorophenol | | | | | | | | | | | | | | | | NR |
| Phenanthrene | | | | | | | | | | | | 5300 | 4800 | | | NR |
| Anthracene | | | | | | | | | | | | J | J | | | NR |
| Di-n-butylphthalate | | | | | | | J | J | | | | J | | | | NR |
| Fluoranthene | | | | | | | | J | | | | 15000 | 4700 | | | NR |
| Pyrene | | | | | | | | J | | | | 9600 | 3500 | | | NR |
| Butylbenzylphthalate | | | | | | | | J | | | | | | | | NR |
| 3,3'-Dichlorobenzidine | | | | | | | | | | | | | | | | NR |
| Benzo(a)anthracene | | | | | | | | | | | | 6300 | 2000 | | | NR |
| Chrysene | | | | | | | | J | | | | 7300 | 2400 | | | NR |
| bis(2-Ethylhexyl)phthalate | | | | | | | | J | | | | J | J | | | NR |
| Di-n-octylphthalate | | | | | | | | | | | | | | | | NR |
| Benzo(b)fluoranthene | | | | | | | | J | | | | 5800 | 2300 | | | NR |
| Benzo(k)fluoranthene | | | | | | | | | | | | 3700 | 1100 | | | NR |
| Benzo(a)pyrene | | | | | | | | | | | | 4400 | 2000 | | | NR |
| Indeno(1,2,3-cd)pyrene | | | | | | | | | | | | 3200 | 1600 | | | NR |
| Dibenz(a,h)anthracene | | | | | | | | | | | | | J | | | NR |
| Benzo(g,h,i)perylene | | | | | | | | | | | | 2700 | 2000 | | | NR |

NOTES:
Blank space - compound analyzed for but not detected
B - compound found in lab blank as well as sample, indicates possible/probable blank contamination
E - estimated value
J - estimated value, compound present below CRQL but above IDL
R - analysis did not pass EPA QA/QC
N - Presumptive evidence of the presence of the material
NR - analysis not required
Detection limits elevated if Dilution Factor >1 and/or percent moisture >10%

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SITE NAME: KEEGAN LANDFILL
TDD#: 02-8810-75
SAMPLING DATE: 05/25/89
EPA CASE NO.: 11834 LAB: PEI ASSOCIATES, INC.

| PESTICIDES | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Sample ID No. | NJG3-SW1(MS/MSD) | NJG3-SW2 | NJG3-SW3 | NJG3-SW4 | NJG3-SW5 | NJG3-SW6 | NJG3-SW7(DUP) | NJG3-SED1(MS/MSD) | NJG3-SED2 | NJG3-SED3(DUP) | NJG3-SED4 | NJG3-SED5 | NJG3-SED6 | NJG3-RIN1 | NJG3-RIN2 | NJG3-TBLK |
| Traffic Report No. | BZ949 | BZ950 | BZ951 | BZ952 | BZ953 | BZ954 | BZ964 | BZ955 | BZ956 | BZ957 | BZ958 | BZ959 | BZ960 | BZ961 | BZ962 | BZ973 |
| Matrix | WATER | WATER | WATER | WATER | WATER | WATER | WATER | SEDIMENT | SEDIMENT | SEDIMENT | SEDIMENT | SEDIMENT | SEDIMENT | WATER | WATER | WATER |
| Units | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/L | ug/L | ug/L |
| Dilution Factor/GPC Cleanup (Y) | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1/Y | 1/Y | 1/Y | 1 | 1/Y | 1/Y | 1 | 1 | N/A |
| Percent Moisture | — | — | — | — | — | — | — | 50 | 22 | 22 | 54 | 59 | 41 | -- | -- | N/A |
| alpha-BHC | | | | | | | | | | | | | | | | NR |
| beta-BHC | | | | | | | | | | | | | | | | NR |
| delta-BHC | | | | | | | | | | | | | | | | NR |
| gamma-BHC (Lindane) | | | | | | | | | | | | | | | | NR |
| Heptachlor | | | | | | | | | | | | | | | | NR |
| Aldrin | | | | | | | | | | | | | | | | NR |
| Heptachlor epoxide | | | | | | | | | | | | | | | | NR |
| Endosulfan I | | | | | | | | | | | | | | | | NR |
| Dieldrin | | | | | | | | | | | | | | | | NR |
| 4,4'-DDE | | | | | | | | | | | | | | | | NR |
| Endrin | | | | | | | | | | | | | | | | NR |
| Endosulfan II | | | | | | | | | | | | | | | | NR |
| 4,4'-DDD | | | | | | | | | | | | | | | | NR |
| Endosulfan sulfate | | | | | | | | | | | | | | | | NR |
| 4,4'-DDT | | | | | | | | | | | | | | | | NR |
| Methoxychlor | | | | | | | | | | | | | | | | NR |
| Endrin ketone | | | | | | | | | | | | | | | | NR |
| alpha-Chlordane | | | | | | | | | | | | | | | | NR |
| gamma-Chlordane | | | | | | | | | | | | | | | | NR |
| Toxaphene | | | | | | | | | | | | | | | | NR |
| Aroclor-1016 | | | | | | | | | | | | | | | | NR |
| Aroclor-1221 | | | | | | | | | | | | | | | | NR |
| Aroclor-1232 | | | | | | | | | | | | | | | | NR |
| Aroclor-1242 | | | | | | | | | | | | | | | | NR |
| Aroclor-1248 | | | | | | | | | | | | | | | | NR |
| Aroclor-1254 | | | | | | | | 2600 E | | | | 1400 E | 4200 E | | | NR |
| Aroclor-1260 | | | | | | | | 2400 E | | | | 1600 E | | | | NR |

NOTES:
Blank space - compound analyzed for but not detected
B - compound found in lab blank as well as sample, indicates possible/probable blank contamination
E - estimated value
J - estimated value, compound present below CRQL but above IDL
R - analysis did not pass EPA QA/QC
N - Presumptive evidence of the presence of the material
NR - analysis not required
Detection limits elevated if Dilution Factor >1 and/or percent moisture >0%

SITE NAME: KEEGAN LANDFILL
TDD#: 02-8810-75
SAMPLING DATE: 05/25/89
EPA CASE NO.: 11834 LAB: PEI ASSOCIATES, INC.

| SEMI-VOLATILES | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Sample ID No. | NJG3-SW1(MS/MSD) | NJG3-SW2 | NJG3-SW3 | NJG3-SW4 | NJG3-SW5 | NJG3-SW6 | NJG3-SW7(DUP) | NJG3-SED1(MS/MSD) | NJG3-SED2 | NJG3-SED3(DUP) | NJG3-SED4 | NJG3-SED5 | NJG3-SED6 | NJG3-RIN1 | NJG3-RIN2 | NJG3-TBLK |
| Traffic Report No. | BZ949 | BZ950 | BZ951 | BZ952 | BZ953 | BZ954 | BZ964 | BZ955 | BZ956 | BZ957 | BZ958 | BZ959 | BZ960 | BZ961 | BZ962 | BZ973 |
| Matrix | WATER | WATER | WATER | WATER | WATER | WATER | WATER | SEDIMENT | SEDIMENT | SEDIMENT | SEDIMENT | SEDIMENT | SEDIMENT | WATER | WATER | WATER |
| Units | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/kg | ug/L | ug/L | ug/L |
| Dilution Factor/GPC Cleanup (Y) | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1/Y | 1/Y | 1/Y | 1/Y | 1/Y | 1/Y | 1 | 1 | N/A |
| Percent Moisture | -- | -- | -- | -- | -- | -- | -- | 50 | 22 | 22 | 54 | 59 | 41 | -- | -- | N/A |
| Phenol | | | | | | | | | | | | | | | | NR |
| bis(2-Chloroethyl)ether | | | | | | | | | | | | | | | | NR |
| 2-Chlorophenol | | | | | | | | | | | | | | | | NR |
| 1,3-Dichlorobenzene | | | | | | | | | | | | | | | | NR |
| 1,4-Dichlorobenzene | | | | | | | | | | | | | | | | NR |
| Benzyl alcohol | | | | | | | | | | | | | | | | NR |
| 1,2-Dichlorobenzene | | | | | | | | | | | | | | | | NR |
| 2-Methylphenol | | | | | | | | | | | | | | | | NR |
| bis(2-Chloroisopropyl)ether | | | | | | | | | | | | | | | | NR |
| 4-Methylphenol | | | | | | | | | | | | | | | | NR |
| N-Nitroso-di-n-dipropylamine | | | | | | | | | | | | | | | | NR |
| Hexachloroethane | | | | | | | | | | | | | | | | NR |
| Nitrobenzene | | | | | | | | | | | | | | | | NR |
| Isophorone | | | | | | | | | | | | | | | | NR |
| 2-Nitrophenol | | | | | | | | | | | | | | | | NR |
| 2,4-Dimethylphenol | | | | | | | | | | | | | | | | NR |
| Benzoic acid | | | | | | | | | | | | | | | | NR |
| bis(2-Chloroethoxy)methane | | | | | | | | | | | | | | | | NR |
| 2,4-Dichlorophenol | | | | | | | | | | | | | | | | NR |
| 1,2,4-Trichlorobenzene | | | | | | | | | | | | | | | | NR |
| Naphthalene | | | | | | | | J | | | | J | J | | | NR |
| 4-Chloroaniline | | | | | | | | | | | | | | | | NR |
| Hexachlorobutadiene | | | | | | | | | | | | | | | | NR |
| 4-Chloro-3-Methylphenol | | | | | | | | | | | | | | | | NR |
| 2-Methylnaphthalene | | | | | | | | | | | | | J | | | NR |
| Hexachlorocyclopentadiene | | | | | | | | | | | | | | | | NR |
| 2,4,6-Trichlorophenol | | | | | | | | | | | | | | | | NR |
| 2,4,5-Trichlorophenol | | | | | | | | | | | | | | | | NR |
| 2-Chloronaphthalene | | | | | | | | | | | | | | | | NR |
| 2-Nitroaniline | | | | | | | | | | | | | | | | NR |
| Dimethylphthalate | | | | | | | | | | | | | | | | NR |
| Acenaphthylene | | | | | | | | | | | | | J | | | NR |
| 2,6-Dinitrotoluene | | | | | | | | | | | | | | | | NR |
| 3-Nitroaniline | | | | | | | | | | | | | | | | NR |
| Acenaphthene | | | | | | | | | | | | J | J | | | NR |
| 2,4-Dinitrophenol | | | | | | | | | | | | | | | | NR |
| 4-Nitrophenol | | | | | | | | | | | | | | | | NR |
| Dibenzofuran | | | | | | | | | | | | | J | | | NR |
| 2,4-Dinitrotoluene | | | | | | | | | | | | | | | | NR |
| Diethylphthalate | | | | | | | | | | | | | | | J | NR |
| 4-Chlorophenyl-phenyl ether | | | | | | | | | | | | | | | | NR |
| Fluorene | | | | | | | | | | | | J | J | | | NR |
| 4-Nitroaniline | | | | | | | | | | | | | | | | NR |
| 4,6-Dinitro-2-methylphenol | | | | | | | | | | | | | | | | NR |
| N-nitrosodiphenylamine | | | | | | | | | | | | | | | | NR |
| 4-Bromophenyl-phenyl ether | | | | | | | | | | | | | | | | NR |
| Hexachlorobenzene | | | | | | | | | | | | | | | | NR |

# SAMPLING TRIP REPORT

| | |
|---|---|
| SITE NAME: | Keegan Landfill |
| TDD NO.: | 02-8810-75 |
| SAMPLING DATE: | April 25, 1989 |
| EPA CASE NO.: | 11834 |

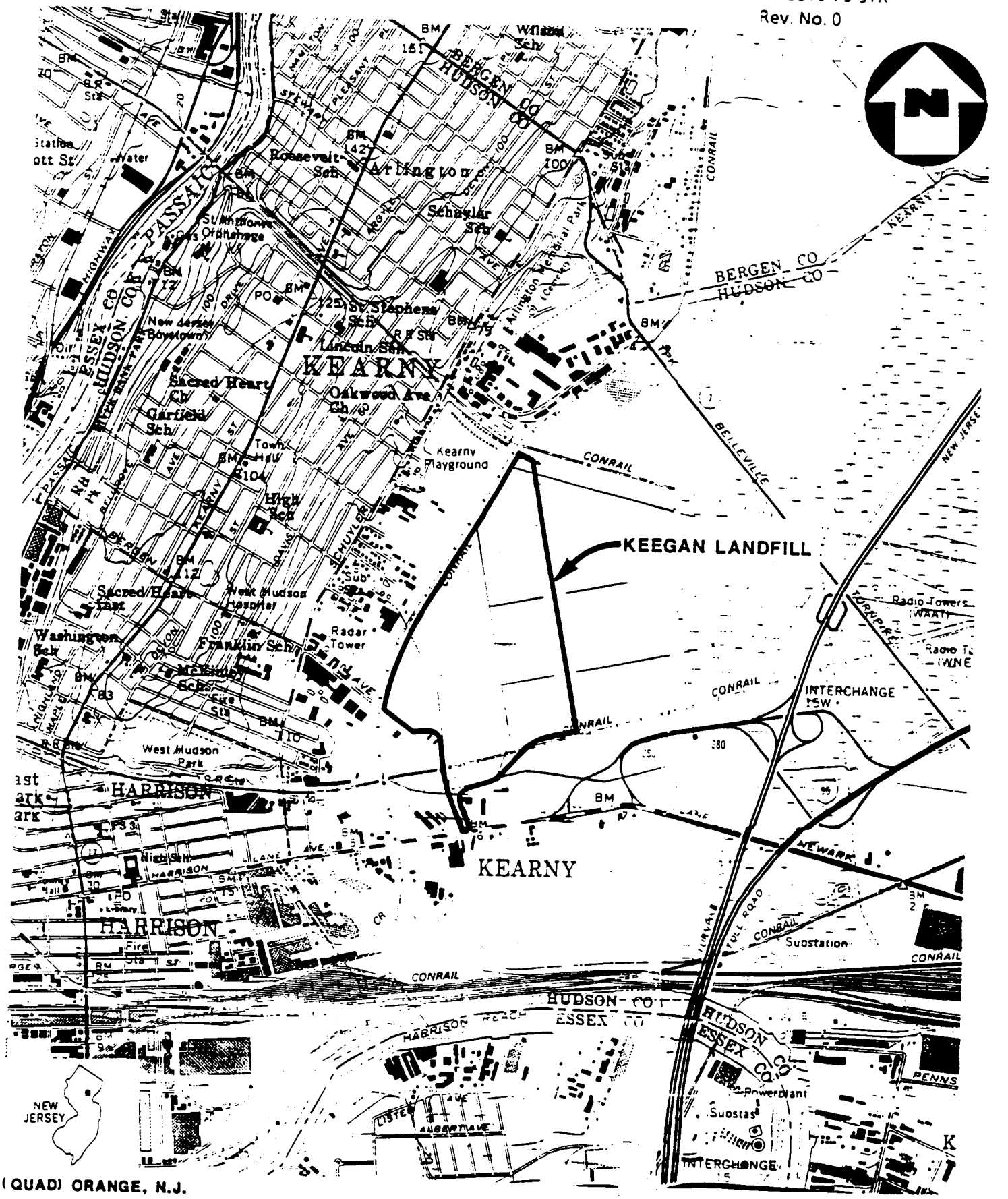
1. Site Location: See Figure 1
2. Sample Locations: See Figure 2
3. Sample Descriptions: See Table 1
4. Laboratories Receiving Samples:

| Sample Type | Name and Address of Laboratory |
|---|---|
| Organics | PEI Associates, Inc. (PEI)<br>11499 Chester Road<br>Cincinnati, OH 45246 |
| Inorganics | York Laboratories (YORK)<br>200 Monroe Turnpike<br>Monroe, CT 06468 |

6. Sample Dispatch Data:

A total of ten aqueous and six sediment samples for organic analysis were shipped by FIT 2 personnel via Federal Express under Airbill No. 2738328714 to PEI Associates, Inc. on April 25, 1989 at 1700 hours.

A total of nine aqueous and six sediment samples for inorganic analysis were shipped by FIT 2 personnel via Federal Express under Airbill No. 2738328725 to York Laboratories, on April 25, 1989 at 1700 hours.




(QUAD) ORANGE, N.J.

FIGURE 1

**SITE LOCATION MAP**

**KEEGAN LANDFILL, KEARNY, N.J.**

SCALE: 1" = 2000'

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NUS CORPORATION

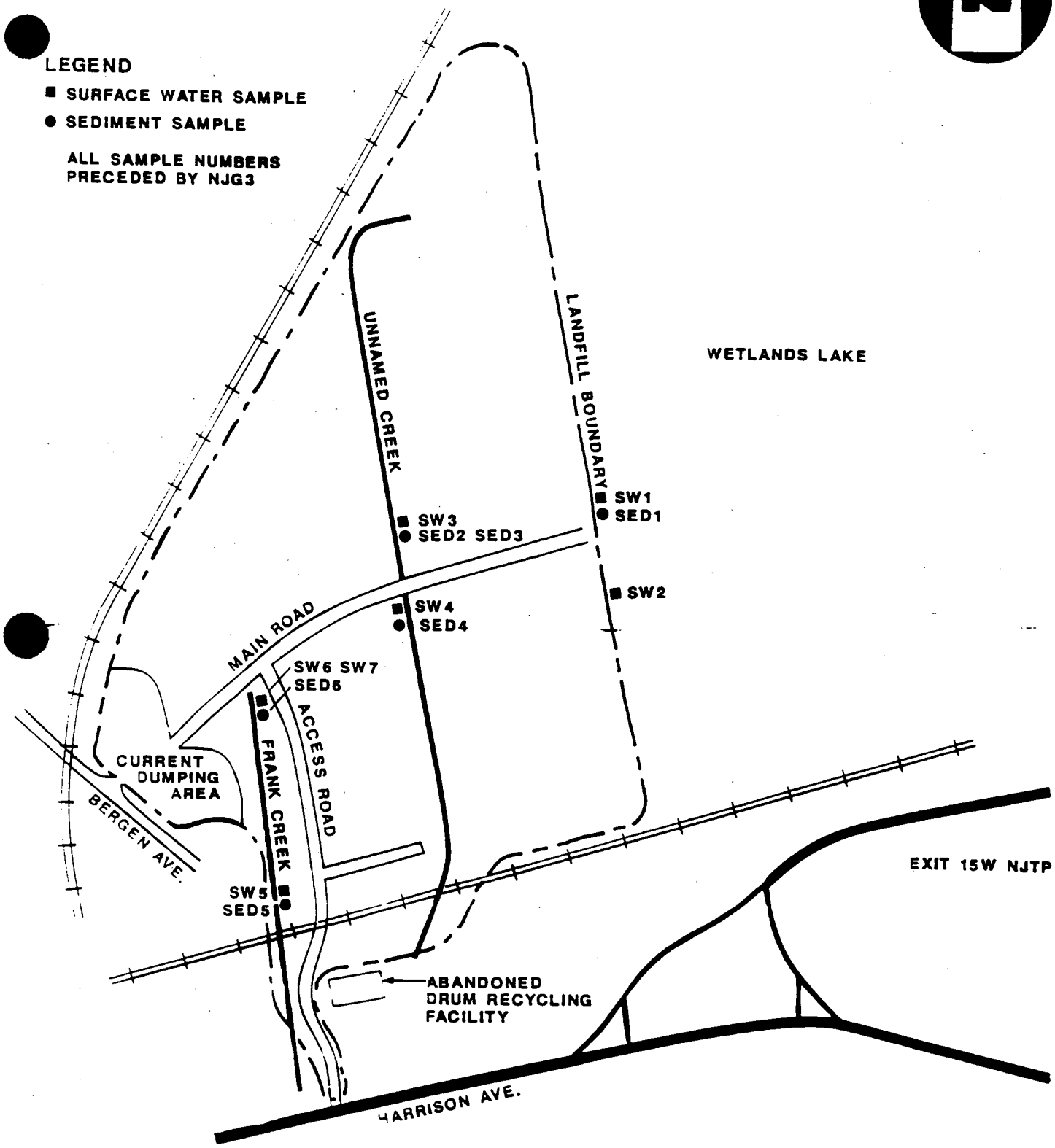


FIGURE 2

**SAMPLE LOCATION MAP**

**KEEGAN LANDFILL, KEARNY, N.J.**

(NOT TO SCALE)

NUS CORPORATION

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TABLE I
SAMPLE DESCRIPTIONS
KEEGAN LANDFILL
KEARNY, HUDSON COUNTY, NEW JERSEY
CASE NO. 11834

| NUS Sample ID Number | CLP Organic Sample Number | CLP Inorganic Sample Number | Collection Time | Sample Type | Sample Location |
|---|---|---|---|---|---|
| NJG3-SW1* | BZ949 | MBX056 | 1050 | Aqueous | Collected 70 feet north of the east end of the main dirt road, at the edge of the tidal lake adjacent to the landfill. |
| NJG3-SW2 | BZ950 | MBX057 | 1135 | Aqueous | Collected 150 feet south of sample location NJG3-SW1. |
| NJG3-SW3 | BZ951 | MBX058 | 1215 | Aqueous | Collected 200 feet north of the main dirt road, on the east side of the unnamed creek. |
| NJG3-SW4 | BZ952 | MBX059 | 1245 | Aqueous | Collected 26 feet south of the main dirt road, on the west side of the unnamed creek. |
| NJG3-SW5 | BZ953 | MBX060 | 1325 | Aqueous | Collected 30 feet north of the railroad track, on the east side of Frank Creek. |
| NJG3-SW6 | BZ954 | MBX061 | 1420 | Aqueous | Collected 75 feet south of the main dirt road, on the east side of Frank Creek. |
| NJG3-SW7** | BZ964 | MBX070 | 1420 | Aqueous | Same location as NJG3-SW6. |
| NJG3-SED1* | BZ955 | MBX062 | 1105 | Sediment | Same location as NJG3-SW1. |
| NJG3-SED2 | BZ956 | MBX063 | 1220 | Sediment | Same location as NJG3-SW3. |
| NJG3-SED3** | BZ957 | MBX064 | 1220 | Sediment | Same location as NJG3-SW3. |

* Indicates that additional volume was collected and shipped to the laboratory for matrix spike and matrix spike duplicate (MS/MSD) analysis

** Indicates that a sample was collected for duplicate analysis.

TABLE I
SAMPLE DESCRIPTIONS
KEEGAN LANDFILL
KEARNY, HUDSON COUNTY, NEW JERSEY
CASE NO. 11834

| NUS Sample ID Number | CLP Organic Sample Number | CLP Inorganic Sample Number | Collection Time | Sample Type | Sample Location |
|---|---|---|---|---|---|
| NJG3-SED4 | BZ958 | MBX065 | 1250 | Sediment | Same location as NJG3-SW4. |
| NJG3-SED5 | BZ959 | MBX066 | 1330 | Sediment | Same location as NJG3-SW5. |
| NJG3-SED6 | BZ960 | MBX067 | 1430 | Sediment | Same location as NJG3-SW6. |
| NJG3-RIN1 | BZ961 | MBX068 | 1000 | Aqueous | Trowel rinsate collected in the field. |
| NJG3-RIN2 | BZ962 | MBX069 | 1020 | Aqueous | Bowl rinsate collected in the field. |
| NJG3-TBLK1 | BZ963 | N/A | N/A | Aqueous | Trip blank, demonstrated analyte-free water obtained from NUS FIT 2 |

N/A Not Applicable

7. Sampling Personnel:

| Name | Organization | Duties on Site |
|---|---|---|
| Gerald Gilliland | NUS Corporation, FIT 2 | Site Manager, Written and Photographic Documentation |
| Dave Heim | NUS Corporation, FIT 2 | Site Safety Officer |
| Susan Lenczyk | NUS Corporation, FIT 2 | Sample Management Officer |
| Tamara Marquart | NUS Corporation, FIT 2 | Sampler |
| Ed Knyfd | NUS Corporation, FIT 2 | Sampler |

8. Weather Conditions:

50 F, overcast, slight breeze from southwest.

9. Additional Comments:

All samples except for the trip blank will be analyzed for Target Compound List (TCL) organic and inorganic compounds, excluding cynaide. The trip blank will be analyzed for volatile organic compounds only

Six surface water/sediment locations were sampled rather than the proposed seven because the southernmost location at the middle mosquito ditch was inaccessible due to *Phragmites* overgrowth. A sediment sample was not collected at the NJG3-SW2 location because there was too much organic matter at that location.

10. Report Prepared By: Gerald V. Gilliland Date: 04/28/89

11. Approved By: [signature] Date: 5/2/89

U.S. EPA - CLP

000081

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COVER PAGE - INORGANIC ANALYSES DATA PACKAGE

Lab Name: YORKLABS/CT Contract: 68-W8-0017

Lab Code: YORK Case No.: 11834 SAS No.: SDG No.: MBX056

SOW No.: 7/87

| EPA Sample No. | Lab Sample ID. |
|---|---|
| MBX056 | 0822001 |
| MBX056D | 0822001D |
| MBX056S | 0822001S |
| MBX057 | 0822002 |
| MBX058 | 0822003 |
| MBX059 | 0822004 |
| MBX060 | 0822005 |
| MBX061 | 0822006 |
| MBX062 | 0822007 |
| MBX062D | 0822007D |
| MBX062S | 0822007S |
| MBX063 | 0822008 |
| MBX064 | 0822009 |
| MBX065 | 0822010 |
| MBX066 | 0822011 |
| MBX067 | 0822012 |
| MBX068 | 0822013 |
| MBX069 | 0822014 |
| MBX070 | 0822015 |

Were ICP interelement corrections applied? Yes/No YES

Were ICP background corrections applied? Yes/No YES
If yes-were raw data generated before application of background corrections? Yes/No NO

Comments:

Release of the data contained in this hardcopy data package and in the computer-readable data submitted on floppy diskette has been authorized by the Laboratory Manager or the Manager's designee, as verified by the following signature.

Lab Manager: Mary A. McCann

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Date: June 1, 1989

YORK LABORATORIES

Laboratory: York Labs/CT
Contract #: 68-W8-0017
Case #: 11834
SDG #: MBX056

CASE NARRATIVE

Nine (9) water samples and six (6) soil samples were received at York Laboratories Division of YWC, Inc. on April 26, 1989. The samples were labeled as follows:

Federal Express Airbill #2738328725

| EPA Sample ID | Matrix | Lab Sample ID |
|---|---|---|
| MBX056 | Water | 0822001 |
| MBX057 | Water | 0822002 |
| MBX058 | Water | 0822003 |
| MBX059 | Water | 0822004 |
| MBX060 | Water | 0822005 |
| MBX061 | Water | 0822006 |
| MBX062 | Soil | 0822007 |
| MBX063 | Soil | 0822008 |
| MBX064 | Soil | 0822009 |
| MBX065 | Soil | 0822010 |
| MBX066 | Soil | 0822011 |
| MBX067 | Soil | 0822012 |
| MBX068 | Water | 0822013 |
| MBX069 | Water | 0822014 |
| MBX070 | Water | 0822015 |

All the samples were analyzed for TAL Metals Analysis using USEPA Contract Laboratory Program Protocols, IFB WA-87K025/26/27. The following items were noted during the course of analysis:

Metals

IEC's have currently been updated for the JA61 and are applied by the computer. However, the ICSA is utilized as a daily monitoring mechanism to adjust for any slight fluctuations in the instrument. Any necessary adjustments are calculated manually and are noted on the raw data.

An "E" flag resulted for the water serial dilution indicating that the aluminum result was out of the control limits. Since the diluted result is at a lower end of the working curve, the discrepancy is most likely due to a slight instrument drift.

Two "N" flags resulted in the spike analysis of the soil sample. The elements that fell outside the control limits were antimony and copper. Antimony has consistently recovered at or below the control limits in soil samples. This appears to be a method defect and is currently under investigation. It is difficult to identify a particular reason for the copper being out of the limits.

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Metals (continued)

This could be attributed to a problem of sample homogeneity, but since the other analytes recovered within the limits, one cannot be certain.

A spike and duplicate are supplied for Lead for both furnace and ICP for the soil samples. The Lead quantifications of this case were achieved using both techniques.

All other data appears consistent.

Mary A. McCann — June 1, 1989

Mary A. McCann
Project Manager

Date

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[illegible] • WHIPPANY NEW JERSEY 07981 • (201) 428 9181
[illegible] • SCHAUMBURG ILLINOIS 60195 • (312) 705 0740

STANDARD OPERATING PROCEDURE

Date: Dec. 1988
Number: HW-2 6/2/88
Revision: 8

Evaluation of Metals Data for the Contract Laboratory Program
Appendix A.2: Data Assessment Narrative

Case # 11834 Site Keegan LF Matrix: Soil ✓
Reviewer G mehta. Lab York-CT. Water ✓
Contractor ESAT Other ____

A.2.1 All data are of acceptable quality? Yes ____ No ✓

If no, exceptions are noted below with reason(s) for rejection or qualification as estimated value (J).

(1) Al data rejected on MBX 56 → MBX 59 due to field blank contamination. Concentration of Al is less than 5x F.B. value on these samples.

(2) Sb data qualify as estimated J on soil samples MBX 62 → MBX 67 due to poor spike recovery. 90 R per spike recovery is 64% which falls between 10-74%.

(3) The following data qualify as estimated J due to ICP ser. dil. % diff > 10% and concentration of the elements > 10 x IDL.

Al → MBX 60, 61, 70
Cr → MBX 60
Cu → MBX 60
V → MBX 62 → MBX 67

(4) The following data qualify as estimated J due to CRDL % R out of 90-110%.

Cu → MBX 63, 64.
As → MBX 63, 64
Se → MBX 60 - 67, 69-70, 56-57.

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1

INORGANIC ANALYSIS DATA SHEET

MBX056

Lab Name: YORKLABS/CT Contract: 68-W8-0017

Lab Code: YORK Case No.: 11834 SAS No.: SDG No.: MBX056

Matrix (soil/water): WATER Lab Sample ID: 0822001

Level (low/med): LOW Date Received: 04/26/89

% Solids: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

| CAS No. | Analyte | Concentration | C | Q | M |
|---|---|---|---|---|---|
| 7429-90-5 | Aluminum | ~~104~~ | B | E | P |
| 7440-36-0 | Antimony | 16.9 | U | | P |
| 7440-38-2 | Arsenic | 1.7 | B | | F |
| 7440-39-3 | Barium | 168 | B | | P |
| 7440-41-7 | Beryllium | 0.20 | U | | P |
| 7440-43-9 | Cadmium | 1.7 | U | | P |
| 7440-70-2 | Calcium | 77400 | | | P |
| 7440-47-3 | Chromium | 2.1 | U | | P |
| 7440-48-4 | Cobalt | 9.1 | B | | P |
| 7440-50-8 | Copper | 4.9 | U | | P |
| 7439-89-6 | Iron | 347 | | | P |
| 7439-92-1 | Lead | 14.7 | | S | F |
| 7439-95-4 | Magnesium | 25000 | | | P |
| 7439-96-5 | Manganese | 49.8 | | | P |
| 7439-97-6 | Mercury | 0.20 | U | | CV |
| 7440-02-0 | Nickel | 6.0 | U | | P |
| 7440-09-7 | Potassium | 11300 | | | P |
| 7782-49-2 | Selenium | 1.1 | B | | F |
| 7440-22-4 | Silver | 2.1 | U | | P |
| 7440-23-5 | Sodium | 152000 | | | P |
| 7440-28-0 | Thallium | 0.30 | U | | F |
| 7440-62-2 | Vanadium | 5.9 | U | | P |
| 7440-66-6 | Zinc | 19.2 | B | | P |
| | Cyanide | | | | NR |
| | | | | | |

Color Before: YELLOW Clarity Before: CLEAR Texture:

Color After: COLORLESS Clarity After: CLEAR Artifacts:

Comments:

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000008

EPA SAMPLE NO.

1

INORGANIC ANALYSIS DATA SHEET

MBX057

Lab Name: YORKLABS/CT Contract: 68-W8-0017

Lab Code: YORK Case No.: 11834 SAS No.: SDG No.: MBX056

Matrix (soil/water): WATER Lab Sample ID: 0822002

Level (low/med): LOW Date Received: 04/26/89

% Solids: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

| CAS No. | Analyte | Concentration | C | Q | M |
|---|---|---|---|---|---|
| 7429-90-5 | Aluminum | 148 | B | E | P |
| 7440-36-0 | Antimony | 16.9 | U | | P |
| 7440-38-2 | Arsenic | 2.2 | B | | F |
| 7440-39-3 | Barium | 162 | B | | P |
| 7440-41-7 | Beryllium | 0.20 | U | | P |
| 7440-43-9 | Cadmium | 1.7 | U | | P |
| 7440-70-2 | Calcium | 70900 | | | P |
| 7440-47-3 | Chromium | 2.3 | B | | P |
| 7440-48-4 | Cobalt | 9.1 | B | | P |
| 7440-50-8 | Copper | 4.9 | U | | P |
| 7439-89-6 | Iron | 666 | | | P |
| 7439-92-1 | Lead | 8.9 | | | F |
| 7439-95-4 | Magnesium | 24100 | | | P |
| 7439-96-5 | Manganese | 59.2 | | | P |
| 7439-97-6 | Mercury | 0.20 | U | | CV |
| 7440-02-0 | Nickel | 9.1 | B | | P |
| 7440-09-7 | Potassium | 11200 | | | P |
| 7782-49-2 | Selenium | 0.60 | B | | F |
| 7440-22-4 | Silver | 2.1 | U | | P |
| 7440-23-5 | Sodium | 149000 | | | P |
| 7440-28-0 | Thallium | 0.30 | B | W | F |
| 7440-62-2 | Vanadium | 5.9 | U | | P |
| 7440-66-6 | Zinc | 18.6 | B | | P |
| | Cyanide | | | | NR |
| | | | | | |

Color Before: YELLOW Clarity Before: CLEAR Texture:

Color After: COLORLESS Clarity After: CLEAR Artifacts:

Comments:

# INORGANIC ANALYSIS DATA SHEET

MBX058

Lab Name: YORKLABS/CT Contract: 68-W8-0017

Lab Code: YORK Case No.: 11834 SAS No.: SDG No.: MBX056

Matrix (soil/water): WATER Lab Sample ID: 0822003

Level (low/med): LOW Date Received: 04/26/89

% Solids: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

| CAS No. | Analyte | Concentration | C | Q | M |
|---|---|---|---|---|---|
| 7429-90-5 | Aluminum | ~~218~~ | | E | P |
| 7440-36-0 | Antimony | 16.9 | U | | P |
| 7440-38-2 | Arsenic | 2.5 | B | | F |
| 7440-39-3 | Barium | 204 | | | P |
| 7440-41-7 | Beryllium | 0.20 | U | | P |
| 7440-43-9 | Cadmium | 1.7 | U | | P |
| 7440-70-2 | Calcium | 83800 | | | P |
| 7440-47-3 | Chromium | 2.8 | B | | P |
| 7440-48-4 | Cobalt | 9.0 | B | | P |
| 7440-50-8 | Copper | 4.9 | U | | P |
| 7439-89-6 | Iron | 2870 | | | P |
| 7439-92-1 | Lead | 20.1 | | | F |
| 7439-95-4 | Magnesium | 29900 | | | P |
| 7439-96-5 | Manganese | 114 | | | P |
| 7439-97-6 | Mercury | 0.20 | U | | CV |
| 7440-02-0 | Nickel | 9.0 | B | | P |
| 7440-09-7 | Potassium | 15700 | | | P |
| 7782-49-2 | Selenium | 0.40 | U | | F |
| 7440-22-4 | Silver | 2.1 | U | | P |
| 7440-23-5 | Sodium | 165000 | | | P |
| 7440-28-0 | Thallium | 0.30 | B | W | F |
| 7440-62-2 | Vanadium | 5.9 | U | | P |
| 7440-66-6 | Zinc | 43.0 | | | P |
| | Cyanide | | | | NR |
| | | | | | |

Color Before: YELLOW Clarity Before: CLEAR Texture:

Color After: COLORLESS Clarity After: CLEAR Artifacts:

Comments:

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EPA SAMPLE NO.

1

INORGANIC ANALYSIS DATA SHEET

MBX059

Lab Name: YORKLABS/CT Contract: 68-W8-0017

Lab Code: YORK Case No.: 11834 SAS No.: SDG No.: MBX056

Matrix (soil/water): WATER Lab Sample ID: 0822004

Level (low/med): LOW Date Received: 04/26/89

% Solids: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

| CAS No. | Analyte | Concentration | C | Q | M |
|---|---|---|---|---|---|
| 7429-90-5 | Aluminum | ~~103~~ | B | E | P |
| 7440-36-0 | Antimony | 16.9 | U | | P |
| 7440-38-2 | Arsenic | 2.3 | B | | F |
| 7440-39-3 | Barium | 191 | B | | P |
| 7440-41-7 | Beryllium | 0.20 | U | | P |
| 7440-43-9 | Cadmium | 1.7 | U | | P |
| 7440-70-2 | Calcium | 74400 | | | P |
| 7440-47-3 | Chromium | 2.8 | B | | P |
| 7440-48-4 | Cobalt | 13.6 | B | | P |
| 7440-50-8 | Copper | 4.9 | U | | P |
| 7439-89-6 | Iron | 1800 | | | P |
| 7439-92-1 | Lead | 7.7 | | | F |
| 7439-95-4 | Magnesium | 29600 | | | P |
| 7439-96-5 | Manganese | 92.5 | | | P |
| 7439-97-6 | Mercury | 0.20 | U | | CV |
| 7440-02-0 | Nickel | 6.1 | B | | P |
| 7440-09-7 | Potassium | 15800 | | | P |
| 7782-49-2 | Selenium | 0.40 | U | | F |
| 7440-22-4 | Silver | 2.1 | U | | P |
| 7440-23-5 | Sodium | 173000 | | | P |
| 7440-28-0 | Thallium | 0.40 | B | W | F |
| 7440-62-2 | Vanadium | 5.9 | U | | P |
| 7440-66-6 | Zinc | 17.0 | B | | P |
| | Cyanide | | | | NR |
| | | | | | |

Color Before: YELLOW Clarity Before: CLEAR Texture:

Color After: COLORLESS Clarity After: CLEAR Artifacts:

Comments:

U.S. EPA - CLP

EPA SAMPLE NO.

1

INORGANIC ANALYSIS DATA SHEET

MBX060

Lab Name: YORKLABS/CT Contract: 68-W8-0017

Lab Code: YORK Case No.: 11834 SAS No.: SDG No.: MBX056

Matrix (soil/water): WATER Lab Sample ID: 0822005

Level (low/med): LOW Date Received: 04/26/89

% Solids: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

| CAS No. | Analyte | Concentration | C | Q | M |
|---|---|---|---|---|---|
| 7429-90-5 | Aluminum | 2170 | | E | P |
| 7440-36-0 | Antimony | 32.9 | B | | P |
| 7440-38-2 | Arsenic | 6.6 | B | W | F |
| 7440-39-3 | Barium | 445 | | | P |
| 7440-41-7 | Beryllium | 0.34 | B | | P |
| 7440-43-9 | Cadmium | 1.7 | U | | P |
| 7440-70-2 | Calcium | 177000 | | | P |
| 7440-47-3 | Chromium | 21.6 | | | P |
| 7440-48-4 | Cobalt | 12.9 | B | | P |
| 7440-50-8 | Copper | 95.2 | | | P |
| 7439-89-6 | Iron | 11900 | | | P |
| 7439-92-1 | Lead | 159 | | | P |
| 7439-95-4 | Magnesium | 50100 | | | P |
| 7439-96-5 | Manganese | 484 | | | P |
| 7439-97-6 | Mercury | 1.2 | | | CV |
| 7440-02-0 | Nickel | 34.1 | B | | P |
| 7440-09-7 | Potassium | 27800 | | | P |
| 7782-49-2 | Selenium | 0.70 | B | | F |
| 7440-22-4 | Silver | 3.6 | B | | P |
| 7440-23-5 | Sodium | 87600 | | | P |
| 7440-28-0 | Thallium | 0.30 | B | | F |
| 7440-62-2 | Vanadium | 12.3 | B | | P |
| 7440-66-6 | Zinc | 339 | | | P |
| | Cyanide | | | | NR |
| | | | | | |

Color Before: GRAY Clarity Before: CLEAR Texture:

Color After: COLORLESS Clarity After: CLEAR Artifacts:

Comments:

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EPA SAMPLE NO.

1

INORGANIC ANALYSIS DATA SHEET

MBX061

Lab Name: YORKLABS/CT Contract: 68-W8-0017

Lab Code: YORK Case No.: 11834 SAS No.: SDG No.: MBX056

Matrix (soil/water): WATER Lab Sample ID: 0822006

Level (low/med): LOW Date Received: 04/26/89

% Solids: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

| CAS No. | Analyte | Concentration | C | Q | M |
|---|---|---|---|---|---|
| 7429-90-5 | Aluminum | 444 | | E | P |
| 7440-36-0 | Antimony | 28.8 | B | | P |
| 7440-38-2 | Arsenic | 4.4 | B | | F |
| 7440-39-3 | Barium | 211 | | | P |
| 7440-41-7 | Beryllium | 0.20 | U | | P |
| 7440-43-9 | Cadmium | 1.7 | U | | P |
| 7440-70-2 | Calcium | 172000 | | | P |
| 7440-47-3 | Chromium | 4.6 | B | | P |
| 7440-48-4 | Cobalt | 8.4 | U | | P |
| 7440-50-8 | Copper | 4.9 | U | | P |
| 7439-89-6 | Iron | 2550 | | | P |
| 7439-92-1 | Lead | 43.9 | | | F |
| 7439-95-4 | Magnesium | 49900 | | | P |
| 7439-96-5 | Manganese | 224 | | | P |
| 7439-97-6 | Mercury | 0.20 | U | | CV |
| 7440-02-0 | Nickel | 32.7 | B | | P |
| 7440-09-7 | Potassium | 27000 | | | P |
| 7782-49-2 | Selenium | 1.3 | B | | F |
| 7440-22-4 | Silver | 2.1 | U | | P |
| 7440-23-5 | Sodium | 92500 | | | P |
| 7440-28-0 | Thallium | 0.50 | B | W | F |
| 7440-62-2 | Vanadium | 10.8 | B | | P |
| 7440-66-6 | Zinc | 45.4 | | | P |
| | Cyanide | | | | NR |
| | | | | | |

Color Before: YELLOW Clarity Before: CLEAR Texture:

Color After: COLORLESS Clarity After: CLEAR Artifacts:

Comments:

U.S. EPA - CLP

000021

EPA SAMPLE NO.

1

INORGANIC ANALYSIS DATA SHEET

MBX070

Lab Name: YORKLABS/CT Contract: 68-W8-0017

Lab Code: YORK Case No.: 11834 SAS No.: SDG No.: MBX056

Matrix (soil/water): WATER Lab Sample ID: 0822015

Level (low/med): LOW Date Received: 04/26/89

% Solids: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

| CAS No. | Analyte | Concentration | C | Q | M |
|---|---|---|---|---|---|
| 7429-90-5 | Aluminum | 467 | | E J | P |
| 7440-36-0 | Antimony | 32.3 | B | | P |
| 7440-38-2 | Arsenic | 1.9 | B | W | F |
| 7440-39-3 | Barium | 212 | | | P |
| 7440-41-7 | Beryllium | 0.20 | U | | P |
| 7440-43-9 | Cadmium | 1.7 | U | | P |
| 7440-70-2 | Calcium | 169000 | | | P |
| 7440-47-3 | Chromium | 4.2 | B | | P |
| 7440-48-4 | Cobalt | 8.4 | U | | P |
| 7440-50-8 | Copper | 4.9 | U | | P |
| 7439-89-6 | Iron | 2630 | | | P |
| 7439-92-1 | Lead | 42.8 | | | F |
| 7439-95-4 | Magnesium | 48900 | | | P |
| 7439-96-5 | Manganese | 220 | | | P |
| 7439-97-6 | Mercury | 0.23 | | | CV |
| 7440-02-0 | Nickel | 29.6 | B | | P |
| 7440-09-7 | Potassium | 26400 | | | P |
| 7782-49-2 | Selenium | 2.0 | B | | F |
| 7440-22-4 | Silver | 2.1 | U | | P |
| 7440-23-5 | Sodium | 91400 | | | P |
| 7440-28-0 | Thallium | 0.30 | B | | F |
| 7440-62-2 | Vanadium | 9.7 | B | | P |
| 7440-66-6 | Zinc | 47.7 | | | P |
| | Cyanide | | | | NR |
| | | | | | |

Color Before: YELLOW Clarity Before: CLEAR Texture:

Color After: COLORLESS Clarity After: CLEAR Artifacts:

Comments:

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EPA SAMPLE NO.

1

INORGANIC ANALYSIS DATA SHEET

MBX062

Lab Name: YORKLABS/CT

Contract: 68-W8-0017

Lab Code: YORK

Case No.: 11834

SAS No.:

SDG No.: MBX056

Matrix (soil/water): SOIL

Lab Sample ID: 0822007

Level (low/med): LOW

Date Received: 04/26/89

% Solids: 48.1

Concentration Units (ug/L or mg/kg dry weight): MG/KG

| CAS No. | Analyte | Concentration | C | Q | M |
|---|---|---|---|---|---|
| 7429-90-5 | Aluminum | 3750 | | | P |
| 7440-36-0 | Antimony | 6.5 | U | N | P |
| 7440-38-2 | Arsenic | 5.5 | B | S | F |
| 7440-39-3 | Barium | 102 | | | P |
| 7440-41-7 | Beryllium | 0.12 | B | | P |
| 7440-43-9 | Cadmium | 3.7 | | | P |
| 7440-70-2 | Calcium | 4480 | | | P |
| 7440-47-3 | Chromium | 26.3 | | | P |
| 7440-48-4 | Cobalt | 6.0 | B | | P |
| 7440-50-8 | Copper | 293 | | N | P |
| 7439-89-6 | Iron | 20700 | | | P |
| 7439-92-1 | Lead | 305 | | | F |
| 7439-95-4 | Magnesium | 911 | B | | P |
| 7439-96-5 | Manganese | 97.0 | | | P |
| 7439-97-6 | Mercury | 0.70 | | | CV |
| 7440-02-0 | Nickel | 26.1 | | | P |
| 7440-09-7 | Potassium | 288 | B | | P |
| 7782-49-2 | Selenium | 0.85 | B | W | F |
| 7440-22-4 | Silver | 0.92 | B | | P |
| 7440-23-5 | Sodium | 402 | B | | P |
| 7440-28-0 | Thallium | 0.19 | B | | F |
| 7440-62-2 | Vanadium | 35.6 | | | P |
| 7440-66-6 | Zinc | 483 | | | P |
| | Cyanide | | | | NR |
| | | | | | |

Color Before: BROWN

Clarity Before:

Texture: FINE

Color After: YELLOW

Clarity After: CLEAR

Artifacts: YES

Comments:
ROCKS AND TWIGS

U.S. EPA - CLP

1

INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

MBX063

Lab Name: YORKLABS/CT

Contract: 68-W8-0017

Lab Code: YORK

Case No.: 11834

SAS No.:

SDG No.: MBX056

Matrix (soil/water): SOIL

Lab Sample ID: 0822008

Level (low/med): LOW

Date Received: 04/26/89

% Solids: 58.0

Concentration Units (ug/L or mg/kg dry weight): MG/KG

| CAS No. | Analyte | Concentration | C | Q | M |
|---|---|---|---|---|---|
| 7429-90-5 | Aluminum | 5340 | | | P |
| 7440-36-0 | Antimony | 5.7 | U | N | P |
| 7440-38-2 | Arsenic | 1.9 | B | | F |
| 7440-39-3 | Barium | 35.5 | B | | P |
| 7440-41-7 | Beryllium | 0.09 | B | | P |
| 7440-43-9 | Cadmium | 0.57 | U | | P |
| 7440-70-2 | Calcium | 2360 | | | P |
| 7440-47-3 | Chromium | 13.1 | | | P |
| 7440-48-4 | Cobalt | 5.3 | B | | P |
| 7440-50-8 | Copper | 8.9 | | N | P |
| 7439-89-6 | Iron | 12100 | | | P |
| 7439-92-1 | Lead | 11.1 | | | F |
| 7439-95-4 | Magnesium | 2470 | | | P |
| 7439-96-5 | Manganese | 180 | | | P |
| 7439-97-6 | Mercury | 0.08 | U | | CV |
| 7440-02-0 | Nickel | 9.6 | B | | P |
| 7440-09-7 | Potassium | 688 | B | | P |
| 7782-49-2 | Selenium | 0.19 | B | | F |
| 7440-22-4 | Silver | 0.71 | U | | P |
| 7440-23-5 | Sodium | 252 | B | | P |
| 7440-28-0 | Thallium | 0.16 | B | | F |
| 7440-62-2 | Vanadium | 17.6 | | | P |
| 7440-66-6 | Zinc | 32.1 | | | P |
| | Cyanide | | | | NR |
| | | | | | |

Color Before: BROWN

Clarity Before:

Texture: FINE

Color After: YELLOW

Clarity After: CLEAR

Artifacts: YES

Comments:
ROCKS AND ROOTS

U.S. EPA - CLP

EPA SAMPLE NO.

1

INORGANIC ANALYSIS DATA SHEET

MBX064

Lab Name: YORKLABS/CT Contract: 68-W8-0017

Lab Code: YORK Case No.: 11834 SAS No.: SDG No.: MBX056

Matrix (soil/water): SOIL Lab Sample ID: 0822009

Level (low/med): LOW Date Received: 04/26/89

% Solids: 57.3

Concentration Units (ug/L or mg/kg dry weight): MG/KG

| CAS No. | Analyte | Concentration | C | Q | M |
|---|---|---|---|---|---|
| 7429-90-5 | Aluminum | 4830 | | | P |
| 7440-36-0 | Antimony | 5.5 | U | N | P |
| 7440-38-2 | Arsenic | 1.8 | B | | F |
| 7440-39-3 | Barium | 31.7 | B | | P |
| 7440-41-7 | Beryllium | 0.16 | B | | P |
| 7440-43-9 | Cadmium | 0.55 | U | | P |
| 7440-70-2 | Calcium | 2540 | | | P |
| 7440-47-3 | Chromium | 13.3 | | | P |
| 7440-48-4 | Cobalt | 8.0 | B | | P |
| 7440-50-8 | Copper | 9.6 | | N | P |
| 7439-89-6 | Iron | 12500 | | | P |
| 7439-92-1 | Lead | 10.9 | | | F |
| 7439-95-4 | Magnesium | 2490 | | | P |
| 7439-96-5 | Manganese | 203 | | | P |
| 7439-97-6 | Mercury | 0.08 | U | | CV |
| 7440-02-0 | Nickel | 9.9 | B | | P |
| 7440-09-7 | Potassium | 663 | B | | P |
| 7782-49-2 | Selenium | 0.36 | B | | F |
| 7440-22-4 | Silver | 0.68 | U | | P |
| 7440-23-5 | Sodium | 251 | B | | P |
| 7440-28-0 | Thallium | 0.10 | B | | F |
| 7440-62-2 | Vanadium | 17.4 | | | P |
| 7440-66-6 | Zinc | 36.1 | | | P |
| | Cyanide | | | | NR |
| | | | | | |

Color Before: BROWN Clarity Before: Texture: FINE

Color After: YELLOW Clarity After: CLEAR Artifacts: YES

Comments:
ROOTS AND TWIGS

U.S. EPA - CLP

000016
EPA SAMPLE NO.

1
INORGANIC ANALYSIS DATA SHEET

MBX065

Lab Name: YORKLABS/CT Contract: 68-W8-0017

Lab Code: YORK Case No.: 11834 SAS No.: SDG No.: MBX056

Matrix (soil/water): SOIL Lab Sample ID: 0822010

Level (low/med): LOW Date Received: 04/26/89

% Solids: 31.0

Concentration Units (ug/L or mg/kg dry weight): MG/KG

| CAS No. | Analyte | Concentration | C | Q | M |
|---|---|---|---|---|---|
| 7429-90-5 | Aluminum | 6000 | | | P |
| 7440-36-0 | Antimony | 10.0 | U | N | P |
| 7440-38-2 | Arsenic | 23.1 | | S | F |
| 7440-39-3 | Barium | 645 | | | P |
| 7440-41-7 | Beryllium | 0.12 | U | | P |
| 7440-43-9 | Cadmium | 4.6 | | | P |
| 7440-70-2 | Calcium | 13300 | | | P |
| 7440-47-3 | Chromium | 93.6 | | | P |
| 7440-48-4 | Cobalt | 8.2 | B | | P |
| 7440-50-8 | Copper | 327 | | N | P |
| 7439-89-6 | Iron | 42400 | | | P |
| 7439-92-1 | Lead | 1020 | | | P |
| 7439-95-4 | Magnesium | 2650 | B | | P |
| 7439-96-5 | Manganese | 341 | | | P |
| 7439-97-6 | Mercury | 2.6 | | | CV |
| 7440-02-0 | Nickel | 78.9 | | | P |
| 7440-09-7 | Potassium | 977 | B | | P |
| 7782-49-2 | Selenium | 2.4 | B | | F |
| 7440-22-4 | Silver | 1.2 | U | | P |
| 7440-23-5 | Sodium | 1040 | B | | P |
| 7440-28-0 | Thallium | 0.54 | B | | F |
| 7440-62-2 | Vanadium | 63.9 | | | P |
| 7440-66-6 | Zinc | 1000 | | | P |
| | Cyanide | | | | NR |
| | | | | | |

Color Before: BLACK Clarity Before: Texture: FINE

Color After: BROWN Clarity After: CLOUDY Artifacts: YES

Comments:
ROCKS, ROOTS, AND TWIGS

U.S. EPA - CLP

1

INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

MBX066

b Name: YORKLABS/CT

Contract: 68-W8-0017

Lab Code: YORK

Case No.: 11834

SAS No.:

SDG No.: MBX056

Matrix (soil/water): SOIL

Lab Sample ID: 0822011

Level (low/med): LOW

Date Received: 04/26/89

% Solids: 31.4

Concentration Units (ug/L or mg/kg dry weight): MG/KG

| CAS No. | Analyte | Concentration | C | Q | M |
|---|---|---|---|---|---|
| 7429-90-5 | Aluminum | 10700 | | | P |
| 7440-36-0 | Antimony | 9.9 | U | N | P |
| 7440-38-2 | Arsenic | 33.0 | | | F |
| 7440-39-3 | Barium | 420 | | | P |
| 7440-41-7 | Beryllium | 0.34 | B | | P |
| 7440-43-9 | Cadmium | 5.0 | | | P |
| 7440-70-2 | Calcium | 7900 | | | P |
| 7440-47-3 | Chromium | 114 | | | P |
| 7440-48-4 | Cobalt | 8.3 | B | | P |
| 7440-50-8 | Copper | 562 | | N | P |
| 7439-89-6 | Iron | 35500 | | | P |
| 7439-92-1 | Lead | 1180 | | | P |
| 7439-95-4 | Magnesium | 3710 | | | P |
| 7439-96-5 | Manganese | 191 | | | P |
| 7439-97-6 | Mercury | 8.7 | | | CV |
| 7440-02-0 | Nickel | 48.1 | | | P |
| 7440-09-7 | Potassium | 1090 | B | | P |
| 7782-49-2 | Selenium | 6.1 | | | F |
| 7440-22-4 | Silver | 5.2 | B | | P |
| 7440-23-5 | Sodium | 604 | B | | P |
| 7440-28-0 | Thallium | 0.49 | B | | F |
| 7440-62-2 | Vanadium | 98.8 | | | P |
| 7440-66-6 | Zinc | 753 | | | P |
| | Cyanide | | | | NR |
| | | | | | |

olor Before: BLACK

Clarity Before:

Texture: FINE

olor After: YELLOW

Clarity After: CLEAR

Artifacts: YES

omments:
ROOTS AND TWIGS

U.S. EPA - CLP

000018

1

INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

MBX067

Lab Name: YORKLABS/CT

Contract: 68-W8-0017

Lab Code: YORK

Case No.: 11834

SAS No.:

SDG No.: MBX056

Matrix (soil/water): SOIL

Lab Sample ID: 0822012

Level (low/med): LOW

Date Received: 04/26/89

% Solids: 46.5

Concentration Units (ug/L or mg/kg dry weight): MG/KG

| CAS No. | Analyte | Concentration | C | Q | M |
|---|---|---|---|---|---|
| 7429-90-5 | Aluminum | 6410 | | | P |
| 7440-36-0 | Antimony | 6.7 | U | N | P |
| 7440-38-2 | Arsenic | 10.0 | | | F |
| 7440-39-3 | Barium | 207 | | | P |
| 7440-41-7 | Beryllium | 0.08 | U | | P |
| 7440-43-9 | Cadmium | 2.3 | | | P |
| 7440-70-2 | Calcium | 10800 | | | P |
| 7440-47-3 | Chromium | 116 | | | P |
| 7440-48-4 | Cobalt | 9.3 | B | | P |
| 7440-50-8 | Copper | 575 | | N | P |
| 7439-89-6 | Iron | 29300 | | | P |
| 7439-92-1 | Lead | 479 | | | P |
| 7439-95-4 | Magnesium | 1800 | B | | P |
| 7439-96-5 | Manganese | 286 | | | P |
| 7439-97-6 | Mercury | 2.3 | | | CV |
| 7440-02-0 | Nickel | 78.3 | | | P |
| 7440-09-7 | Potassium | 642 | B | | P |
| 7782-49-2 | Selenium | 1.3 | B | | F |
| 7440-22-4 | Silver | 1.3 | B | | P |
| 7440-23-5 | Sodium | 340 | B | | P |
| 7440-28-0 | Thallium | 0.28 | B | | F |
| 7440-62-2 | Vanadium | 27.2 | | | P |
| 7440-66-6 | Zinc | 754 | | | P |
| | Cyanide | | | | NR |
| | | | | | |

Color Before: BROWN

Clarity Before:

Texture: FINE

Color After: YELLOW

Clarity After: CLEAR

Artifacts: YES

Comments:
ROCKS, ROOTS, AND TWIGS

EPA SAMPLE NO.

1

INORGANIC ANALYSIS DATA SHEET

MBX068

Lab Name: YORKLABS/CT Contract: 68-W8-0017

Lab Code: YORK Case No.: 11834 SAS No.: SDG No.: MBX056

Matrix (soil/water): WATER Lab Sample ID: 0822013

Level (low/med): LOW Date Received: 04/26/89

% Solids: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

| CAS No. | Analyte | Concentration | C | Q | M |
|---|---|---|---|---|---|
| 7429-90-5 | Aluminum | 69.6 | B | E | P |
| 7440-36-0 | Antimony | 16.9 | U | | P |
| 7440-38-2 | Arsenic | 0.30 | U | | F |
| 7440-39-3 | Barium | 1.7 | U | | P |
| 7440-41-7 | Beryllium | 0.20 | U | | P |
| 7440-43-9 | Cadmium | 1.7 | U | | P |
| 7440-70-2 | Calcium | 75.2 | B | | P |
| 7440-47-3 | Chromium | 2.1 | U | | P |
| 7440-48-4 | Cobalt | 8.4 | U | | P |
| 7440-50-8 | Copper | 4.9 | U | | P |
| 7439-89-6 | Iron | 64.9 | U | | P |
| 7439-92-1 | Lead | 0.50 | U | | F |
| 7439-95-4 | Magnesium | 19.6 | U | | P |
| 7439-96-5 | Manganese | 3.4 | B | | P |
| 7439-97-6 | Mercury | 0.20 | U | | CV |
| 7440-02-0 | Nickel | 6.0 | U | | P |
| 7440-09-7 | Potassium | 509 | U | | P |
| 7782-49-2 | Selenium | 0.40 | U | | F |
| 7440-22-4 | Silver | 2.1 | U | | P |
| 7440-23-5 | Sodium | 555 | B | | P |
| 7440-28-0 | Thallium | 0.30 | B | | F |
| 7440-62-2 | Vanadium | 5.9 | U | | P |
| 7440-66-6 | Zinc | 6.9 | B | | P |
| | Cyanide | | | | NR |
| | | | | | |

Color Before: COLORLESS Clarity Before: CLEAR Texture:

Color After: COLORLESS Clarity After: CLEAR Artifacts:

Comments:

U.S. EPA - CLP

000020

EPA SAMPLE NO.

1

INORGANIC ANALYSIS DATA SHEET

MBX069

Lab Name: YORKLABS/CT Contract: 68-W8-0017

Lab Code: YORK Case No.: 11834 SAS No.: SDG No.: MBX056

Matrix (soil/water): WATER Lab Sample ID: 0822014

Level (low/med): LOW Date Received: 04/26/89

% Solids: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

| CAS No. | Analyte | Concentration | C | Q | M |
|---|---|---|---|---|---|
| 7429-90-5 | Aluminum | 72.0 | B | E | P |
| 7440-36-0 | Antimony | 16.9 | U | | P |
| 7440-38-2 | Arsenic | 0.30 | U | | F |
| 7440-39-3 | Barium | 1.7 | U | | P |
| 7440-41-7 | Beryllium | 0.20 | U | | P |
| 7440-43-9 | Cadmium | 1.7 | U | | P |
| 7440-70-2 | Calcium | 75.2 | B | | P |
| 7440-47-3 | Chromium | 2.1 | U | | P |
| 7440-48-4 | Cobalt | 9.3 | B | | P |
| 7440-50-8 | Copper | 4.9 | U | | P |
| 7439-89-6 | Iron | 64.9 | U | | P |
| 7439-92-1 | Lead | 0.50 | U | W | F |
| 7439-95-4 | Magnesium | 42.5 | B | | P |
| 7439-96-5 | Manganese | 0.80 | U | | P |
| 7439-97-6 | Mercury | 0.20 | U | | CV |
| 7440-02-0 | Nickel | 9.0 | B | | P |
| 7440-09-7 | Potassium | 509 | U | | P |
| 7782-49-2 | Selenium | 0.60 | B | | F |
| 7440-22-4 | Silver | 2.1 | U | | P |
| 7440-23-5 | Sodium | 338 | B | | P |
| 7440-28-0 | Thallium | 0.30 | U | | F |
| 7440-62-2 | Vanadium | 5.9 | U | | P |
| 7440-66-6 | Zinc | 8.1 | B | | P |
| | Cyanide | | | | NR |
| | | | | | |

Color Before: COLORLESS Clarity Before: CLEAR Texture:

Color After: COLORLESS Clarity After: CLEAR Artifacts:

Comments:

ATTACHMENT 1
SOP NO. HW-6



TOTAL REVIEW

CLP DATA ASSESSMENT

Functional Guidelines for Evaluating Organics Analysis

Case No. 11834 SDG No. BZ949 LABORATORY PEI SITE Keegan LF

DATA ASSESSMENT:

The current functional guidelines (1988) for evaluating organic data have been applied.

All data are valid and acceptable except those analytes which have been qualified with a "J" (estimated), "U" (non-detects), "R" (unusable),or "JN" (presumptive evidence for the presence of the material at an estimated value). All action is detailed on the attached sheets.

Two facts should be noted by all data users. First, the "R" flag means that the associated value is unusable. In other words, due to significant QC problems the analysis is invalid and provides no information as to whether the compound is present or not. "R" values should not appear on data tables because they cannot be relied upon, even as a last resort. The second fact to keep in mind is that no compound concentration, even if it has passed all QC tests, is guaranteed to be accurate. Strict QC serves to increase confidence in data but any value potentially contains error.

Reviewer's Signature: Valerie A. Lindh Date: 7/19/1989

Verified By: Pamela Franklin Date: 7/22/1989

ATTACHMENT 1
SOP NO. HW-6

DATA ASSESSMENT:

2. BLANK CONTAMINATION:

Quality assurance (QA) blanks, i.e., method, trip field, rinse and water blanks are prepared to identify any contamination which may have been introduced into the samples during sample preparation or field activity. Method blanks measure laboratory contamination. Trip blanks measure cross-contamination of samples during shipment. Field blanks measure cross- contamination of samples during field operations. If the concentration of the analyte is less than 5 times the blank contaminant level (10 times for the common contaminants), the analytes are qualified as non- detects, "U". The following analytes in the samples shown were qualified with "U" for these reasons:

A) Method blank contamination

VOA - methylene chloride was flagged non-detect in samples BZ949, 950, 952, 953, 955, 956, 959RE, 951, 957, 958RE, 954, & 960RE.
- Acetone was flagged non-detect in samples BZ949, 950, 952, 954, 956, 959RE & 958RE.
- 2-Butanone was flagged non-detect in samples BZ949, 950, 952, 953, 955, 956, 954, 959RE & 951.
- Chloroform was flagged non-detect in sample BZ957

B) Field or rinse blank contamination ("water blanks" or "distilled water blanks" are validated like any other sample)

BN - Diethylphthalate was flagged non-detect in samples BZ 951 + 964.

C) Trip blank contamination

DATA ASSESSMENT:

6. SURROGATES:

All samples are spiked with surrogate compounds prior to sample preparation to evaluate overall laboratory performance and efficiency of the analytical technique. If the measured surrogate concentrations were outside contract specifications, qualifications were applied to the samples and analytes as shown below.

VOA - All analytes in samples B2958RE, 959RE & 960 RE were flagged estimated (J) due to recoveries > 10%.

PEST - High recoveries for sample B2957; no action taken.

DATA ASSESSMENT:

7. INTERNAL STANDARDS PERFORMANCE:

Internal standard (IS) performance criteria ensure that the GC/MS sensitivity and response are stable during every experimental run. The internal standard area count must not vary by more than a factor of 2 (-50% to +100%) from the associated continuing calibration standard. The retention time of the internal standard must not vary more than ±30 seconds from the associated continuing calibration standard. If the area count is outside the (-50% to +100%) range of the associated standard, all of the positive results for compounds quantitated using that IS are qualified as estimated, "J", and all non-detects as "UJ", or "R" if there is a severe loss of sensitivity.

If an internal standard retention time varies by more than 30 seconds, the reviewer will use professional judgment to determine either partial or total rejection of the data for that sample fraction.

VOA - some IS were out of criteria in samples BZ958RE, 959RE & 960RE. No action was taken. Data was previously (J'd) estimated due to surrogate recoveries

DATA ASSESSMENT:

10. OTHER QC DATA OUT OF SPECIFICATION:

Aroclor 1254 & 1260 in samples BZ955 + BZ959 were flagged estimated (J) due to interference, Also Aroclor 1254 in sample BZ960 was flagged estimated (J) for the same reason.

11. SYSTEM PERFORMANCE AND OVERALL ASSESSMENT (continued on next page if necessary):

Missing VOA BZ958 scan # 729 for (total) xylenes.

12. CONTRACT PROBLEMS____NON-COMPLIANCE:

13. **This package contains re-extraction, re-analysis or dilution. Upon reviewing the QA results, the following form I(s) are identified to be used.**

VOA BZ958, 959 + 960 were reanalyzed; the reanalyzed data will be used.

no page 2

May 18, 1989

10(W)
6(S)

**PEI ASSOCIATES, INC.**
11499 CHESTER ROAD
CINCINNATI, OHIO 45246
(513) 782-4700
TELECOPIER (513) 782-4807

Ms. Anne Babyak
U.S. EPA Contract Lab Program
Sample Management Office (SMO)
300 North Lee St., Suite 200
Alexandria, VA 22314

Re: Contract No. 68-D9-0037
PN 3791
Case Narrative for Case 11834, SDG BZ949
SOW: 2/88

Dear Anne:

Enclosed is the data package for the above SDG, whose ten soil and eight water samples were received April 26, 1989. The SMO sample numbers are BZ949-964. Sample BZ963 was analyzed for the volatile fraction only. All other samples were analyzed for the full TCL.

The volatile fraction of samples BZ958, BZ959, and BZ960 had low internal standard area counts and surrogate recoveries outside of acceptable limits. These samples were reanalyzed with the same results. The matrix effect is proven and two analyses are payable for each of these samples.

The enclosed sheet, "Limitations in EPA-Supplied Format B Software" is an integral part of this case narrative.

Please call me if you have any questions.

I certify that this data package is in compliance with the terms and conditions of the contract, both technically and for completeness, for other that the conditions detailed above. Release of the data contained in this hardcopy data package and in the computer-readable data submitted on floppy diskette has been authorized by the Laboratory Manager or his designee, as verified by the following signature.

5/19/89

Sincerely,

PEI/IT

H.William Jess
Organic Laboratory Supervisor

## LIMITATIONS IN EPA-SUPPLIED FORMAT B SOFTWARE

The EPA-supplied Format B software has several limitations which make full compliance with some contract requirements impossible. These limitations are described below.

The software does not allow the entry of Lab Sample ID's for standards for the various forms. CCS has flagged us for failure to enter them. However, page B-22 of the SOW says that the lab sample ID is an "optional. . . internal identifier [which] may be reported". CCS should not penalize us for not making an optional entry that we couldn't make if we wanted to.

The EPA Sample No.'s for standards as printed on the forms do not match those on the diskette, as the software appends an eighth (non-printing) character.

## LIMITATIONS IN EXTREL MASS LISTING PROGRAM

The Extrel Mass Spectral Data System software contains a "bug" which leads to potential discrepancies between the mass listing it produces and the Form V generated by the EPA-supplied Format B software.

When scan averaging is used to produce the mass spectrum for BFB or DFTPP, an apparent rounding error occurs which leads to differences between the two outputs mentioned above.

The Extrel mass listing also does not display any mass with a relative intensity of less than 0.5% Relative Abundance with respect to the largest peak in the spectrum. Peaks less than 0.5% Relative Abundance are, however, printed on the Form V by the Format B software. This is most often seen with low intensity ions such as m/z 68 and m/z 173.

The EPA-supplied Format B public domain software uses the raw data as acquired by the data system without performing averaging or rounding during calculations. The only rounding it performs is done on the final values to be entered on the Form V. Because of this, the values printed on the Form V should be regarded as the "true" abundance for all ions in the spectrum.

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

BZ949

Lab Name: PEI Contract: 68-D9-0037

Lab Code: PEI Case No.: 11934 SAS No. SDG No.: BZ949

Matrix: (soil/water) WATER Lab Sample ID: T9-04-195-01

Sample wt/vol: 5.0 (g/mL) ML Lab File ID: BZ949

Level: (low/med) LOW Date Received: 4/26/89

% Moisture: not dec. 100 Date Analyzed: 5/ 3/89

Column: (pack/cap) CAP Dilution Factor: 1.00

| CAS NO. | COMPOUND | CONCENTRATION UNITS (ug/L or ug/Kg) UG/L | Q |
|---|---|---|---|
| 74-87-3 | Chloromethane | 10. | U |
| 74-83-9 | Bromomethane | 10. | U |
| 75-01-4 | Vinyl Chloride | 10. | U |
| 75-00-3 | Chloroethane | 10. | U |
| 75-09-2 | Methylene Chloride | 5 ~~2.~~ | ~~BU~~ U |
| 67-64-1 | Acetone | 10 ~~6.~~ | ~~BU~~ U |
| 75-15-0 | Carbon Disulfide | 5. | U |
| 75-35-4 | 1,1-Dichloroethene | 5. | U |
| 75-34-3 | 1,1-Dichloroethane | 5. | U |
| 540-59-0 | 1,2-Dichloroethene (total) | 5 | U |
| 67-66-3 | Chloroform | 5. | U |
| 107-06-2 | 1,2-Dichloroethane | 5. | U |
| 78-93-3 | 2-Butanone | 10 ~~7.~~ | ~~BU~~ U |
| 71-55-6 | 1,1,1-Trichloroethane | 5. | U |
| 56-23-5 | Carbon Tetrachloride | 5. | U |
| 108-05-4 | Vinyl Acetate | 10. | U |
| 75-27-4 | Bromodichloromethane | 5. | U |
| 78-87-5 | 1,2-Dichloropropane | 5. | U |
| 10061-01-5 | cis-1,3-Dichloropropene | 5. | U |
| 79-01-6 | Trichloroethene | 5. | U |
| 124-48-1 | Dibromochloromethane | 5. | U |
| 79-00-5 | 1,1,2-Trichloroethane | 5. | U |
| 71-43-2 | Benzene | 5. | U |
| 10061-02-6 | trans-1,3-Dichloropropene | 5. | U |
| 75-25-2 | Bromoform | 5. | U |
| 108-10-1 | 4-Methyl-2-Pentanone | 10. | U |
| 591-78-6 | 2-Hexanone | 10. | U |
| 127-18-4 | Tetrachloroethene | 5. | U |
| 79-34-5 | 1,1,2,2-Tetrachloroethane | 5. | U |
| 108-88-3 | Toluene | 5. | U |
| 108-90-7 | Chlorobenzene | 5. | U |
| 100-41-4 | Ethylbenzene | 5. | U |
| 100-42-5 | Styrene | 5. | U |
| 1330-20-7 | Xylene (total) | 5. | U |

1E

EPA SAMPLE NO 000032

VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

BZ949

Lab Name: PEI Contract 68-D9-0037

Lab Code: PEI Case No. 11834 SAS No. SDG No.: BZ949

Matrix: (soil/water) WATER Lab Sample ID: T9-04-199-01B

Sample wt/vol. 5.0 (g/mL) ML Lab File ID: BZ949

Level: (low/med) LOW Date Received 4/26/89

% Moisture not dec. 100 Date Analyzed 5/ 3/89

Column (pack/cap) CAP Dilution Factor: 1.00

Number TICs found 0 CONCENTRATION UNITS (ug/L or ug/Kg) UG/L

| | CAS NUMBER | COMPOUND NAME | RT | EST. CONC. | Q |
|---|---|---|---|---|---|
| 1. | | | | | |
| 2. | | | | | |
| 3. | | | | | |
| 4. | | | | | |
| 5. | | | | | |
| 6. | | | | | |
| 7. | | | | | |
| 8. | | | | | |
| 9. | | | | | |
| 10. | | | | | |
| 11. | | | | | |
| 12. | | | | | |
| 13. | | | | | |
| 14. | | | | | |
| 15. | | | | | |
| 16. | | | | | |
| 17. | | | | | |
| 18. | | | | | |
| 19. | | | | | |
| 20. | | | | | |
| 21. | | | | | |
| 22. | | | | | |
| 23. | | | | | |
| 24. | | | | | |
| 25. | | | | | |
| 26. | | | | | |
| 27. | | | | | |
| 28. | | | | | |
| 29. | | | | | |
| 30. | | | | | |

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

BZ950

Lab Name: PEI Contract: 68-D9-0037

Lab Code: PEI Case No. 11834 SAS No. SDG No.: BZ949

Matrix: (soil/water) WATER Lab Sample ID: T9-04-199-02D

Sample wt/vol: 5.0 (g/mL) ML Lab File ID: BZ950

Level: (low/med) LOW Date Received: 4/26/89

% Moisture: not dec. 100 Date Analyzed: 5/ 3/89

Column: (pack/cap) CAP Dilution Factor: 1.00

| CAS NO | COMPOUND | CONCENTRATION UNITS (ug/L or ug/Kg) UG/L | Q |
|---|---|---|---|
| 74-87-3 | Chloromethane | 10. | U |
| 74-83-9 | Bromomethane | 10. | U |
| 75-01-4 | Vinyl Chloride | 10. | U |
| 75-00-3 | Chloroethane | 10. | U |
| 75-09-2 | Methylene Chloride | 5 ~~2~~ | ~~BJ~~ |
| 67-64-1 | Acetone | 10 ~~7~~ | ~~BJ~~ |
| 75-15-0 | Carbon Disulfide | 5. | U |
| 75-35-4 | 1,1-Dichloroethene | 5. | U |
| 75-34-3 | 1,1-Dichloroethane | 5 | U |
| 540-59-0 | 1,2-Dichloroethene (total) | 5. | U |
| 67-66-3 | Chloroform | 5. | U |
| 107-06-2 | 1,2-Dichloroethane | 5. | U |
| 78-93-3 | 2-Butanone | 10 ~~7~~ | ~~BJ~~ |
| 71-55-6 | 1,1,1-Trichloroethane | 5. | U |
| 56-23-5 | Carbon Tetrachloride | 5. | U |
| 108-05-4 | Vinyl Acetate | 10. | U |
| 75-27-4 | Bromodichloromethane | 5. | U |
| 78-87-5 | 1,2-Dichloropropane | 5. | U |
| 10061-01-5 | cis-1,3-Dichloropropene | 5. | U |
| 79-01-6 | Trichloroethene | 5. | U |
| 124-48-1 | Dibromochloromethane | 5. | U |
| 79-00-5 | 1,1,2-Trichloroethane | 5. | U |
| 71-43-2 | Benzene | 5. | U |
| 10061-02-6 | trans-1,3-Dichloropropene | 5. | U |
| 75-25-2 | Bromoform | 5. | U |
| 108-10-1 | 4-Methyl-2-Pentanone | 10. | U |
| 591-78-6 | 2-Hexanone | 10. | U |
| 127-18-4 | Tetrachloroethene | 5. | U |
| 79-34-5 | 1,1,2,2-Tetrachloroethane | 5. | U |
| 108-88-3 | Toluene | 5. | U |
| 108-90-7 | Chlorobenzene | 5. | U |
| 100-41-4 | Ethylbenzene | 5. | U |
| 100-42-5 | Styrene | 5. | U |
| 1330-20-7 | Xylene (total) | 5. | U |

1E

EPA SAMPLE NO 000342

VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

BZ950

Lab Name: PEI Contract: 68-D9-0037

Lab Code: PEI Case No. 11834 SAS No SDG No.: BZ949

Matrix: (soil/water) WATER Lab Sample ID: T9-04-199-02B

Sample wt/vol 5.0 (g/mL) ML Lab File ID: BZ950

Level: (low/med) LOW Date Received 4/26/89

% Moisture: not dec. 100 Date Analyzed 5/ 3/89

Column: (pack/cap) CAP Dilution Factor 1.00

Number TICs found 0 CONCENTRATION UNITS (ug/L or ug/Kg) UG/L

| | CAS NUMBER | COMPOUND NAME | RT | EST. CONC. | Q |
|---|---|---|---|---|---|
| 1. | | | | | |
| 2. | | | | | |
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1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO
BZ951

Lab Name: PEI Contract: 68-D9-0037

Lab Code: PEI Case No.: 11834 SAS No.: SDG No.: BZ949

Matrix: (soil/water) WATER Lab Sample ID: T9-04-199-03F

Sample wt/vol: 5.0 (g/mL) ML Lab File ID: BZ951

Level: (low/med) LOW Date Received: 4/26/89

% Moisture: not dec. 100 Date Analyzed: 5/ 3/89

Column: (pack/cap) CAP Dilution Factor: 1.00

| CAS NO | COMPOUND | CONCENTRATION UNITS (ug/L or ug/Kg) UG/L | Q |
|---|---|---|---|
| 74-87-3 | Chloromethane | 10. | U |
| 74-83-9 | Bromomethane | 10. | U |
| 75-01-4 | Vinyl Chloride | 10. | U |
| 75-00-3 | Chloroethane | 10. | U |
| 75-09-2 | Methylene Chloride | 5 ~~1.~~ | ~~BU~~ |
| 67-64-1 | Acetone | 10. | U |
| 75-15-0 | Carbon Disulfide | 5. | U |
| 75-35-4 | 1,1-Dichloroethene | 5. | U |
| 75-34-3 | 1,1-Dichloroethane | 5. | U |
| 540-59-0 | 1,2-Dichloroethene (total) | 5. | U |
| 67-66-3 | Chloroform | 5. | U |
| 107-06-2 | 1,2-Dichloroethane | 5. | U |
| 78-93-3 | 2-Butanone | 10 ~~6.~~ | ~~BU~~ |
| 71-55-6 | 1,1,1-Trichloroethane | 5. | U |
| 56-23-5 | Carbon Tetrachloride | 5. | U |
| 108-05-4 | Vinyl Acetate | 10. | U |
| 75-27-4 | Bromodichloromethane | 5. | U |
| 78-87-5 | 1,2-Dichloropropane | 5. | U |
| 10061-01-5 | cis-1,3-Dichloropropene | 5. | U |
| 79-01-6 | Trichloroethene | 5. | U |
| 124-48-1 | Dibromochloromethane | 5. | U |
| 79-00-5 | 1,1,2-Trichloroethane | 5. | U |
| 71-43-2 | Benzene | 5. | U |
| 10061-02-6 | trans-1,3-Dichloropropene | 5. | U |
| 75-25-2 | Bromoform | 5. | U |
| 108-10-1 | 4-Methyl-2-Pentanone | 10. | U |
| 591-78-6 | 2-Hexanone | 10. | U |
| 127-18-4 | Tetrachloroethene | 5. | U |
| 79-34-5 | 1,1,2,2-Tetrachloroethane | 5. | U |
| 108-88-3 | Toluene | 5. | U |
| 108-90-7 | Chlorobenzene | 5. | U |
| 100-41-4 | Ethylbenzene | 5. | U |
| 100-42-5 | Styrene | 5. | U |
| 1330-20-7 | Xylene (total) | 5. | U |

1E

EPA SAMPLE NO.

BZ951

VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

Lab Name: PEI Contract: 68-D9-0037

Lab Code: PEI Case No.: 11834 SAS No. SDG No.: BZ949

Matrix: (soil/water) WATER Lab Sample ID: T9-04-199-03B

Sample wt/vol 5.0 (g/ml) ML Lab File ID: BZ951

Level: (low/med) LOW Date Received: 4/26/89

% Moisture: not dec. 100. Date Analyzed: 5/ 3/89

Sclutr (pack/cap) CAP Dilution Factor: 1.00

Number TICs found 0 CONCENTRATION UNITS (ug/L or ug/Kg) UG/L

| | CAS NUMBER | COMPOUND NAME | RT | EST. CONC. | Q |
|---|---|---|---|---|---|
| 1 | | | | | |
| 2 | | | | | |
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1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

BZ952

Lab Name: PEI Contract: 68-D9-0037

Lab Code: PEI Case No.: 11834 SAS No. SDG No.: BZ949

Matrix: (soil/water) WATER Lab Sample ID: T9-04-199-04B

Sample wt/vol: 5.0 (g/mL) ML Lab File ID: BZ952

Level: (low/med) LOW Date Received: 4/26/89

% Moisture: not dec. 100 Date Analyzed: 5/ 3/89

Column: (pack/cap) CAP Dilution Factor: 1.00

| CAS NO. | COMPOUND | CONCENTRATION UNITS (ug/L or ug/Kg) UG/L | Q |
|---|---|---|---|
| 74-87-3 | Chloromethane | 10. | U |
| 74-83-9 | Bromomethane | 10. | U |
| 75-01-4 | Vinyl Chloride | 10. | U |
| 75-00-3 | Chloroethane | 10. | U |
| 75-09-2 | Methylene Chloride | 5. | ~~B~~ U |
| 67-64-1 | Acetone | 10 ~~8~~ | ~~B~~ U |
| 75-15-0 | Carbon Disulfide | 5. | U |
| 75-35-4 | 1,1-Dichloroethene | 5. | U |
| 75-34-3 | 1,1-Dichloroethane | 5. | U |
| 540-59-0 | 1,2-Dichloroethene (total) | 5. | U |
| 67-66-3 | Chloroform | 5. | U |
| 107-06-2 | 1,2-Dichloroethane | 5. | U |
| 78-93-3 | 2-Butanone | 10 ~~6~~ | ~~B~~ U |
| 71-55-6 | 1,1,1-Trichloroethane | 5. | U |
| 56-23-5 | Carbon Tetrachloride | 5. | U |
| 108-05-4 | Vinyl Acetate | 10. | U |
| 75-27-4 | Bromodichloromethane | 5. | U |
| 78-87-5 | 1,2-Dichloropropane | 5. | U |
| 10061-01-5 | cis-1,3-Dichloropropene | 5. | U |
| 79-01-6 | Trichloroethene | 5. | U |
| 124-48-1 | Dibromochloromethane | 5. | U |
| 79-00-5 | 1,1,2-Trichloroethane | 5. | U |
| 71-43-2 | Benzene | 5. | U |
| 10061-02-6 | trans-1,3-Dichloropropene | 5. | U |
| 75-25-2 | Bromoform | 5. | U |
| 108-10-1 | 4-Methyl-2-Pentanone | 10. | U |
| 591-78-6 | 2-Hexanone | 10. | U |
| 127-18-4 | Tetrachloroethene | 5. | U |
| 79-34-5 | 1,1,2,2-Tetrachloroethane | 5. | U |
| 108-88-3 | Toluene | 5. | U |
| 108-90-7 | Chlorobenzene | 5. | U |
| 100-41-4 | Ethylbenzene | 5. | U |
| 100-42-5 | Styrene | 5. | U |
| 1330-20-7 | Xylene (total) | 5. | U |

1E

EPA SAMPLE NO.
000561

VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

BZ952

Lab Name: PEI Contract: 68-D9-0037

Lab Code: PEI Case No. 11834 SAS No. SDG No.: BZ949

Matrix: (soil/water) WATER Lab Sample ID: T9-04-199-04D

Sample wt/vol. 5.0 (g/mL) ML Lab File ID: BZ952

Level: (low/med) LOW Date Received: 4/26/89

% Moisture not dec. 100. Date Analyzed 5/ 3/89

Column: (pack/cap) CAP Dilution Factor 1.00

Number TICs found: 0 CONCENTRATION UNITS (ug/L or ug/Kg) UG/L

| | CAS NUMBER | COMPOUND NAME | RT | EST. CONC. | Q |
|---|---|---|---|---|---|
| 1. | | | | | |
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1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

BZ953

Lab Name: PEI Contract: 68-D9-0037

Lab Code: PEI Case No. 11834 SAS No.: SDG No.: BZ949

Matrix: (soil/water) WATER Lab Sample ID: T9-04-199-05B

Sample wt/vol: 5.0 (g/mL) ML Lab File ID: BZ953

Level: (low/med) LOW Date Received: 4/26/89

% Moisture: not dec. 100. Date Analyzed: 5/ 3/89

Column: (pack/cap) CAP Dilution Factor 1.00

| CAS NO. | COMPOUND | CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L | Q |
|---|---|---|---|
| 74-87-3 | Chloromethane | 10. | U |
| 74-83-9 | Bromomethane | 10 | U |
| 75-01-4 | Vinyl Chloride | 10. | U |
| 75-00-3 | Chloroethane | 10. | U |
| 75-09-2 | Methylene Chloride | 5. | ~~B~~ U |
| 67-64-1 | Acetone | 10. | U |
| 75-15-0 | Carbon Disulfide | 5 | U |
| 75-35-4 | 1,1-Dichloroethene | 5. | U |
| 75-34-3 | 1,1-Dichloroethane | 5. | U |
| 540-59-0 | 1,2-Dichloroethene (total) | 5. | U |
| 67-66-3 | Chloroform | 5. | U |
| 107-06-2 | 1,2-Dichloroethane | 5 | U |
| 78-93-3 | 2-Butanone | 10 ~~5~~ | ~~B~~ U |
| 71-55-6 | 1,1,1-Trichloroethane | 5. | U |
| 56-23-5 | Carbon Tetrachloride | 5 | U |
| 108-05-4 | Vinyl Acetate | 10. | U |
| 75-27-4 | Bromodichloromethane | 5. | U |
| 78-87-5 | 1,2-Dichloropropane | 5. | U |
| 10061-01-5 | cis-1,3-Dichloropropene | 5. | U |
| 79-01-6 | Trichloroethene | 5. | U |
| 124-48-1 | Dibromochloromethane | 5. | U |
| 79-00-5 | 1,1,2-Trichloroethane | 5. | U |
| 71-43-2 | Benzene | 5. | U |
| 10061-02-6 | trans-1,3-Dichloropropene | 5. | U |
| 75-25-2 | Bromoform | 5. | U |
| 108-10-1 | 4-Methyl-2-Pentanone | 10. | U |
| 591-78-6 | 2-Hexanone | 10. | U |
| 127-18-4 | Tetrachloroethene | 5. | U |
| 79-34-5 | 1,1,2,2-Tetrachloroethane | 5. | U |
| 108-88-3 | Toluene | 5. | U |
| 108-90-7 | Chlorobenzene | 5. | U |
| 100-41-4 | Ethylbenzene | 5. | U |
| 100-42-5 | Styrene | 5. | U |
| 1330-20-7 | Xylene (total) | 5. | U |

1E

# VOLATILE ORGANICS ANALYSIS DATA SHEET
## TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO

BZ953

Lab Name: PEI

Contract: 68-D9-0037

Lab Code: PEI

Case No.: 11834

SAS No.:

SDG No.: BZ949

Matrix: (soil/water) WATER

Lab Sample ID: T9-04-199-05D

Sample wt/vol: 5.0 (g/mL) ML

Lab File ID: BZ953

Level: (low/med) LOW

Date Received: 4/26/89

% Moisture: not dec 100

Date Analyzed: 5/ 3/89

Column: (pack/cap) CAP

Dilution Factor: 1.00

Number TICs found: 1

CONCENTRATION UNITS (ug/L or ug/Kg) UG/L

| | CAS NUMBER | COMPOUND NAME | RT | EST. CONC. | Q |
|---|---|---|---|---|---|
| 1. | - - | UNKNOWN | 4.63 | 10. | JN |
| 2. | | | | | |
| 3. | | | | | |
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VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

BZ954

Lab Name: PEI  Contract: 68-D9-0037

Lab Code: PEI  Case No.: 11834  SAS No.:  SDG No.: BZ949

Matrix: (soil/water) WATER  Lab Sample ID: T9-04-199-06B

Sample wt/vol: 5.0 (g/mL) ML  Lab File ID: BZ954

Level (low/med) LOW  Date Received: 4/26/89

% Moisture: not dec. 100.  Date Analyzed: 5/ 3/89

Column: (pack/cap) CAP  Dilution Factor: 1.00

| CAS NO. | COMPOUND | CONCENTRATION UNITS (ug/L or ug/Kg) UG/L | Q |
|---|---|---|---|
| 74-87-3 | Chloromethane | 10. | U |
| 74-83-9 | Bromomethane | 10. | U |
| 75-01-4 | Vinyl Chloride | 10. | U |
| 75-00-3 | Chloroethane | 10. | U |
| 75-09-2 | Methylene Chloride | 10. | U |
| 67-64-1 | Acetone | 6. | ~~B~~ UL |
| 75-15-0 | Carbon Disulfide | 13. | ~~B~~ UL |
| 75-35-4 | 1,1-Dichloroethene | 5. | U |
| 75-34-3 | 1,1-Dichloroethane | 5. | U |
| 540-59-0 | 1,2-Dichloroethene (total) | 5. | U |
| 67-66-3 | Chloroform | 5. | U |
| 107-06-2 | 1,2-Dichloroethane | 5. | U |
| 78-93-3 | 2-Butanone | 10. | ~~B~~ UL |
| 71-55-6 | 1,1,1-Trichloroethane | 5. | U |
| 56-23-5 | Carbon Tetrachloride | 5. | U |
| 108-05-4 | Vinyl Acetate | 10. | U |
| 75-27-4 | Bromodichloromethane | 5. | U |
| 78-87-5 | 1,2-Dichloropropane | 5. | U |
| 10061-01-5 | cis-1,3-Dichloropropene | 5. | U |
| 79-01-6 | Trichloroethene | 5. | U |
| 124-48-1 | Dibromochloromethane | 5. | U |
| 79-00-5 | 1,1,2-Trichloroethane | 5. | U |
| 71-43-2 | Benzene | 5. | U |
| 10061-02-6 | trans-1,3-Dichloropropene | 5. | U |
| 75-25-2 | Bromoform | 5. | U |
| 108-10-1 | 4-Methyl-2-Pentanone | 10. | U |
| 591-78-6 | 2-Hexanone | 10. | U |
| 127-18-4 | Tetrachloroethene | 5. | U |
| 79-34-5 | 1,1,2,2-Tetrachloroethane | 5. | U |
| 108-88-3 | Toluene | 5. | U |
| 108-90-7 | Chlorobenzene | 5. | U |
| 100-41-4 | Ethylbenzene | 5. | U |
| 100-42-5 | Styrene | 5. | U |
| 1330-20-7 | Xylene (total) | 5. | U |

1E

EPA SAMPLE NO.

BZ954

VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

Lab Name: PEI Contract: 68-D9-0037

Lab Code: PEI Case No.: 11834 SAS No.: SDG No.: BZ949

Matrix: (soil/water) WATER Lab Sample ID: T9-04-199-06D

Sample wt/vol: 5.0 (g/mL) ML Lab File ID: BZ954

Level: (low/med) LOW Date Received: 4/26/89

% Moisture: not dec. 100 Date Analyzed: 5/ 3/89

Column: (pack/cap) CAP Dilution Factor: 1.00

Number TICs found: 1 CONCENTRATION UNITS: (ug/L or ug/kg) UG/L

| | CAS NUMBER | COMPOUND NAME | RT | EST. CONC. | Q |
|---|---|---|---|---|---|
| 1. | - - | UNKNOWN | 6.45 | 6. | J |
| 2. | | | | | |
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# VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO

BZ964

Lab Name: PEI  Contract: 68-D9-0037

Lab Code: PEI  Case No.: 11834  SAS No.  SDG No.: BZ949

Matrix: (soil/water) WATER  Lab Sample ID: T9-04-196-16B

Sample wt/vol: 5.0 (g/mL) ML  Lab File ID: BZ964RE

Level: (low/med) LOW  Date Received: 4/26/89

% Moisture: not dec. 100.  Date Analyzed: 5/10/89

Column: (pack/cap) CAP  Dilution Factor: 1.00

| CAS NO | COMPOUND | CONCENTRATION UNITS (ug/L or ug/Kg) UG/L | Q |
|---|---|---|---|
| 74-87-3 | Chloromethane | 10. | U |
| 74-83-9 | Bromomethane | 10. | U |
| 75-01-4 | Vinyl Chloride | 10. | U |
| 75-00-3 | Chloroethane | 10. | U |
| 75-09-2 | Methylene Chloride | 5. | U |
| 67-64-1 | Acetone | 10 | U |
| 75-15-0 | Carbon Disulfide | 5 | U |
| 75-35-4 | 1,1-Dichloroethene | 5. | U |
| 75-34-3 | 1,1-Dichloroethane | 5. | U |
| 540-59-0 | 1,2-Dichloroethene (total) | 5. | U |
| 67-66-3 | Chloroform | 5. | U |
| 107-06-2 | 1,2-Dichloroethane | 5. | U |
| 78-93-3 | 2-Butanone | 10. | U |
| 71-55-6 | 1,1,1-Trichloroethane | 5. | U |
| 56-23-5 | Carbon Tetrachloride | 5. | U |
| 108-05-4 | Vinyl Acetate | 10. | U |
| 75-27-4 | Bromodichloromethane | 5. | U |
| 78-87-5 | 1,2-Dichloropropane | 5. | U |
| 10061-01-5 | cis-1,3-Dichloropropene | 5. | U |
| 79-01-6 | Trichloroethene | 5. | U |
| 124-48-1 | Dibromochloromethane | 5. | U |
| 79-00-5 | 1,1,2-Trichloroethane | 5. | U |
| 71-43-2 | Benzene | 5. | U |
| 10061-02-6 | trans-1,3-Dichloropropene | 5. | U |
| 75-25-2 | Bromoform | 5. | U |
| 108-10-1 | 4-Methyl-2-Pentanone | 10. | U |
| 591-78-6 | 2-Hexanone | 10. | U |
| 127-18-4 | Tetrachloroethene | 5. | U |
| 79-34-5 | 1,1,2,2-Tetrachloroethane | 5. | U |
| 108-88-3 | Toluene | 5. | U |
| 108-90-7 | Chlorobenzene | 5. | U |
| 100-41-4 | Ethylbenzene | 5. | U |
| 100-42-5 | Styrene | 5. | U |
| 1330-20-7 | Xylene (total) | 5. | U |

1E

EPA SAMPLE NO.
000222

VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

BZ964

Lab Name: PEI Contract: 68-D9-0037

Lab Code: PEI Case No 11834 SAS No : SDG No.: BZ949

Matrix: (soil/water) WATER Lab Sample ID: T9-04-196-163

Sample wt/vol. 5.0 (g/mL) ML Lab File ID: BZ964RE

Level: (low/med) LOW Date Received: 4/26/89

% Moisture: not dec. 100. Date Analyzed: 5/10/89

Column (pack/cap) CAP Dilution Factor: 1.00

Number TICs found: 0 CONCENTRATION UNITS (ug/L or ug/Kg) UG/L

| | CAS NUMBER | COMPOUND NAME | RT | EST. CONC. | Q |
|---|---|---|---|---|---|
| 1. | | | | | |
| 2. | | | | | |
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1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

BZ955

Lab Name: FEI Contract: 68-D9-0037

Lab Code: FEI Case No.: 11884 SAS No.: SDG No.: BZ949

Matrix: (soil/water) SOIL Lab Sample ID: T9-04-199-07B

Sample wt/vol: 5.0 (g/mL) G Lab File ID: BZ955RE2

Level: (low/med) LOW Date Received: 4/26/89

% Moisture: not dec. 50. Date Analyzed: 5/ 9/89

Column: (pack/cap) CAP Dilution Factor: 1.00

| CAS NO. | COMPOUND | CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG | Q |
|---|---|---|---|
| 74-87-3 | Chloromethane | 20. | U |
| 74-83-9 | Bromomethane | 20. | U |
| 75-01-4 | Vinyl Chloride | 20. | U |
| 75-00-3 | Chloroethane | 20. | U |
| 75-09-2 | Methylene Chloride | 20. | U |
| 67-64-1 | Acetone | 19. | ~~B~~ U |
| 75-15-0 | Carbon Disulfide | 90. | ~~B~~ U |
| 75-35-4 | 1,1-Dichloroethene | 9. | J |
| 75-34-3 | 1,1-Dichloroethane | 10. | U |
| 540-59-0 | 1,2-Dichloroethene (total) | 10. | U |
| 67-66-3 | Chloroform | 10. | U |
| 107-06-2 | 1,2-Dichloroethane | 10. | U |
| 78-93-3 | 2-Butanone | 10. | U |
| 71-55-6 | 1,1,1-Trichloroethane | 20 ~~17~~ | ~~BJ~~ U |
| 56-23-5 | Carbon Tetrachloride | 10. | U |
| 108-05-4 | Vinyl Acetate | 10. | U |
| 75-27-4 | Bromodichloromethane | 20. | U |
| 78-87-5 | 1,2-Dichloropropane | 10. | U |
| 10061-01-5 | cis-1,3-Dichloropropene | 10. | U |
| 79-01-6 | Trichloroethene | 10. | U |
| 124-48-1 | Dibromochloromethane | 10. | U |
| 79-00-5 | 1,1,2-Trichloroethane | 10. | U |
| 71-43-2 | Benzene | 10. | U |
| 10061-02-6 | trans-1,3-Dichloropropene | 10. | U |
| 75-25-2 | Bromoform | 10. | U |
| 108-10-1 | 4-Methyl-2-Pentanone | 10. | U |
| 591-78-6 | 2-Hexanone | 20. | U |
| 127-18-4 | Tetrachloroethene | 20. | U |
| 79-34-5 | 1,1,2,2-Tetrachloroethane | 10. | U |
| 108-88-3 | Toluene | 10. | U |
| 108-90-7 | Chlorobenzene | 10. | U |
| 100-41-4 | Ethylbenzene | 4. | J |
| 100-42-5 | Styrene | 10. | U |
| 1330-20-7 | Xylene (total) | 10. | U |

1E

EPA SAMPLE NO.
000331

VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

BZ955

Lab Name: PEI Contract: 68-D9-0037

Lab Code: PEI Case No.: 11834 SAS No.: SDG No.: BZ949

Matrix: (soil/water) SOIL Lab Sample ID: T9-04-199-C7D

Sample wt/vol 5.0 (g/mL) G Lab File ID: BZ955RE2

Level: (low/med) LOW Date Received 4/26/89

% Moisture: not dec 50 Date Analyzed: 5/ 9/89

Column: (pack/cap) CAP Dilution Factor: 1.00

Number TICs found: 0 CONCENTRATION UNITS (ug/L or ug/Kg) UG/KG

| | CAS NUMBER | COMPOUND NAME | RT | EST. CONC. | Q |
|---|---|---|---|---|---|
| 1. | | | | | |
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1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

BZ956

Lab Name: PEI Contract: 68-D9-0037

Lab Code: PEI Case No.: 11834 SAS No. SDG No.: BZ949

Matrix: (soil/water) SOIL Lab Sample ID: T9-04-199-08L

Sample wt/vol: 5.0 (g/mL) G Lab File ID: BZ956RE2

Level (low/med) LOW Date Received: 4/26/89

% Moisture: not dec. 22 Date Analyzed: 5/ 9/89

Column (pack/cap) CAP Dilution Factor: 1.00

| CAS NO. | COMPOUND | CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG | Q |
|---|---|---|---|
| 74-87-3 | Chloromethane | 13. | U |
| 74-83-9 | Bromomethane | 13. | U |
| 75-01-4 | Vinyl Chloride | 13. | U |
| 75-00-3 | Chloroethane | 13. | U |
| 75-09-2 | Methylene Chloride | 12. | ~~U~~ |
| 67-64-1 | Acetone | 46. | ~~U~~ |
| 75-15-0 | Carbon Disulfide | 6. | U |
| 75-35-4 | 1,1-Dichloroethene | 6 | U |
| 75-34-3 | 1,1-Dichloroethane | 6. | U |
| 540-59-0 | 1,2-Dichloroethene (total) | 6. | U |
| 67-66-3 | Chloroform | 6. | U |
| 107-06-2 | 1,2-Dichloroethane | 6. | U |
| 78-93-3 | 2-Butanone | 13 ~~5.~~ | ~~U~~ |
| 71-55-6 | 1,1,1-Trichloroethane | 6. | U |
| 56-23-5 | Carbon Tetrachloride | 6. | U |
| 108-05-4 | Vinyl Acetate | 13. | U |
| 75-27-4 | Bromodichloromethane | 6. | U |
| 78-87-5 | 1,2-Dichloropropane | 6. | U |
| 10061-01-5 | cis-1,3-Dichloropropene | 6. | U |
| 79-01-6 | Trichloroethene | 6. | U |
| 124-48-1 | Dibromochloromethane | 6. | U |
| 79-00-5 | 1,1,2-Trichloroethane | 6. | U |
| 71-43-2 | Benzene | 6. | U |
| 10061-02-6 | trans-1,3-Dichloropropene | 6. | U |
| 75-25-2 | Bromoform | 6. | U |
| 108-10-1 | 4-Methyl-2-Pentanone | 13. | U |
| 591-78-6 | 2-Hexanone | 13. | U |
| 127-18-4 | Tetrachloroethene | 6. | U |
| 79-34-5 | 1,1,2,2-Tetrachloroethane | 6. | U |
| 108-88-3 | Toluene | 6. | U |
| 108-90-7 | Chlorobenzene | 2. | J |
| 100-41-4 | Ethylbenzene | 6. | U |
| 100-42-5 | Styrene | 6. | U |
| 1330-20-7 | Xylene (total) | 6. | U |

1E

EPA SAMPLE NO.

BZ956

VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

Lab Name: PEI Contract: 68-D9-0037

Lab Code: PEI Case No.: 11834 SAS No.: SDG No.: BZ949

Matrix (soil/water) SOIL Lab Sample ID: T9-04-199-08D

Sample wt/vol: 5.0 (g/mL) G Lab File ID: BZ956RE2

Level: (low/med) LOW Date Received: 4/26/89

% Moisture: not dec. 22. Date Analyzed: 5/ 9/89

Column (pack/cap) CAP Dilution Factor: 1.00

Number TICs found: 0 CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG

| | CAS NUMBER | COMPOUND NAME | RT | EST. CONC. | Q |
|---|---|---|---|---|---|
| 1. | | | | | |
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1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO

BZ957

Lab Name: PEI

Contract: 68-D9-0037

Lab Code: PEI

Case No.: 11834

SAS No.:

SDG No.: BZ949

Matrix: (soil/water) SOIL

Lab Sample ID: T9-04-199--09B

Sample wt/vol: 5.0 (g/mL) G

Lab File ID: BZ957

Level: (low/med) LOW

Date Received: 4/26/89

% Moisture: not dec. 22.

Date Analyzed: 5/ 8/89

Column: (pack/cap) CAP

Dilution Factor: 1.00

| CAS NO. | COMPOUND | CONCENTRATION UNITS (ug/L or ug/Kg) UG/KG | Q |
|---|---|---|---|
| 74-87-3 | Chloromethane | 13. | U |
| 74-83-9 | Bromomethane | 13. | U |
| 75-01-4 | Vinyl Chloride | 13. | U |
| 75-00-3 | Chloroethane | 13. | U |
| 75-09-2 | Methylene Chloride | 11. | ~~B~~ U |
| 67-64-1 | Acetone | 13 | U |
| 75-15-0 | Carbon Disulfide | 6. | U |
| 75-35-4 | 1,1-Dichloroethene | 6. | U |
| 75-34-3 | 1,1-Dichloroethane | 6. | U |
| 540-59-0 | 1,2-Dichloroethene (total) | 6. | U |
| 67-66-3 | Chloroform | 6. | U |
| 107-06-2 | 1,2-Dichloroethane | 6 ~~2~~ | ~~J~~ U |
| 78-93-3 | 2-Butanone | 6. | U |
| 71-55-6 | 1,1,1-Trichloroethane | 3. | ~~B~~ U |
| 56-23-5 | Carbon Tetrachloride | 6. | U |
| 108-05-4 | Vinyl Acetate | 6. | U |
| 75-27-4 | Bromodichloromethane | 13. | U |
| 78-87-5 | 1,2-Dichloropropane | 6. | U |
| 10061-01-5 | cis-1,3-Dichloropropene | 6. | U |
| 79-01-6 | Trichloroethene | 6. | U |
| 124-48-1 | Dibromochloromethane | 6. | U |
| 79-00-5 | 1,1,2-Trichloroethane | 6. | U |
| 71-43-2 | Benzene | 6. | U |
| 10061-02-6 | trans-1,3-Dichloropropene | 6. | U |
| 75-25-2 | Bromoform | 6. | U |
| 108-10-1 | 4-Methyl-2-Pentanone | 6. | U |
| 591-78-6 | 2-Hexanone | 13. | U |
| 127-18-4 | Tetrachloroethene | 13. | U |
| 79-34-5 | 1,1,2,2-Tetrachloroethane | 6. | U |
| 108-88-3 | Toluene | 6. | U |
| 108-90-7 | Chlorobenzene | 6. | U |
| 100-41-4 | Ethylbenzene | 6. | U |
| 100-42-5 | Styrene | 6. | U |
| 1330-20-7 | Xylene (total) | 6. | U |

1E

EPA SAMPLE NO.

VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

000114

BZ957

Lab Name: PEI Contract: 68-D9-0037

Lab Code: PEI Case No.: 11834 SAS No.: SDG No.: BZ949

Matrix: (soil/water) SOIL Lab Sample ID: T9-04-199--09F

Sample wt/vol 5.0 (g/mL) G Lab File ID: BZ957

Level: (low/med) LOW Date Received: 4/26/89

% Moisture: not dec. 22. Date Analyzed: 5/ 8/89

Column: (pack/cap) CAP Dilution Factor: 1.00

Number TICs found: 0

CONCENTRATION UNITS:
(ug/L or ug/Kg) UG/KG

| | CAS NUMBER | COMPOUND NAME | RT | EST. CONC. | Q |
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| 1. | | | | | |
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FORM I VOA-TIC 1/87 Rev.

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

CC0136

BZ958 RE

Lab Name: PEI

Contract: 68-D9-0037

Lab Code: PEI Case No. 11834 SAS No.

SDG No.: BZ949

Matrix: (soil/water) SOIL

Lab Sample ID: T9-04-199-10E

Sample wt/vol: 5.0 (g/mL) G

Lab File ID: BZ958RE

Level: (low/med) LOW

Date Received: 4/26/89

% Moisture: not dec. 54

Date Analyzed: 5/ 8/89

Column: (pack/cap) CAP

Dilution Factor: 1.00

| CAS NO | COMPOUND | CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG | Q |
|---|---|---|---|
| 74-87-3 | Chloromethane | 22. | U J |
| 74-83-9 | Bromomethane | 22. | U |
| 75-01-4 | Vinyl Chloride | 22. | U |
| 75-00-3 | Chloroethane | 22. | U |
| 75-09-2 | Methylene Chloride | 22. | U |
| 67-64-1 | Acetone | 32. | BU |
| 75-15-0 | Carbon Disulfide | 55. | BU |
| 75-35-4 | 1,1-Dichloroethene | 11. | U |
| 75-34-3 | 1,1-Dichloroethane | 11. | U |
| 540-59-0 | 1,2-Dichloroethene (total) | 11. | U |
| 67-66-3 | Chloroform | 11. | U |
| 107-06-2 | 1,2-Dichloroethane | 11. | U |
| 78-93-3 | 2-Butanone | 11. | U |
| 71-55-6 | 1,1,1-Trichloroethane | 79. | [illegible] |
| 56-23-5 | Carbon Tetrachloride | 11. | U |
| 108-05-4 | Vinyl Acetate | 11. | U |
| 75-27-4 | Bromodichloromethane | 22. | U |
| 78-87-5 | 1,2-Dichloropropane | 11. | U |
| 10061-01-5 | cis-1,3-Dichloropropene | 11. | U |
| 79-01-6 | Trichloroethene | 11. | U |
| 124-48-1 | Dibromochloromethane | 11. | U |
| 79-00-5 | 1,1,2-Trichloroethane | 11. | U |
| 71-43-2 | Benzene | 11. | U |
| 10061-02-6 | trans-1,3-Dichloropropene | 11. | U |
| 75-25-2 | Bromoform | 11. | U |
| 108-10-1 | 4-Methyl-2-Pentanone | 11. | U |
| 591-78-6 | 2-Hexanone | 22. | U |
| 127-18-4 | Tetrachloroethene | 22. | U |
| 79-34-5 | 1,1,2,2-Tetrachloroethane | 68. | J |
| 108-88-3 | Toluene | 11. | U |
| 108-90-7 | Chlorobenzene | 11. | U |
| 100-41-4 | Ethylbenzene | 11. | U |
| 100-42-5 | Styrene | 11. | U |
| 1330-20-7 | Xylene (total) | 11. | U |
| | | 100. | J |

1E

EPA SAMPLE NO. 000137

VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

BZ958 RE

Lab Name: PEI Contract: 68-D9-0037

Lab Code: PEI Case No.: 11834 SAS No.: SDG No.: BZ949

Matrix: (soil/water) SOIL Lab Sample ID: T9-04-199-102

Sample wt/vol: 5.0 (g/mL) G Lab File ID: BZ958RE

Level (low/med) LOW Date Received: 4/26/89

% Moisture: not dec. 54 Date Analyzed: 5/ 8/89

Column (pack/cap) CAP Dilution Factor: 1.00

Number TICs found 2 CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG

| | CAS NUMBER | COMPOUND NAME | RT | EST. CONC | Q |
|---|---|---|---|---|---|
| 1. | 624-92-0 | Disulfide, dimethyl | 9.20 | 100. | J |
| 2. | - - | UNKNOWN | 13.67 | 30. | J |
| 3. | | | | | |
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1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO

BZ95C

Lab Name: PEI Contract: 68-D9-0037

Lab Code: PEI Case No: 11894 SAS No: SDG No: BZ947

Matrix: (soil/water) SOIL Lab Sample ID: T9-04-199-10b

Sample wt/vol: 5.0 (g/mL) g Lab File ID: BZ958

Level: (low/med) LOW Date Received: 4/26/89

% Moisture: not dec. 54 Date Analyzed: 5/ 4/89

Column: (pack/cap) CAP Dilution Factor: 1.00

DO NOT USE

| CAS NO. | COMPOUND | CONCENTRATION UNITS (ug/L or ug/Kg) UG/KG | Q |
|---|---|---|---|
| 74-87-3 | Chloromethane | 22. | U |
| 74-83-9 | Bromomethane | 22. | U |
| 75-01-4 | Vinyl Chloride | 22. | U |
| 75-00-3 | Chloroethane | 22. | U |
| 75-09-2 | Methylene Chloride | 110. | ~~B~~ |
| 67-64-1 | Acetone | 210. | ~~B~~ J |
| 75-15-0 | Carbon Disulfide | 11. | U |
| 75-35-4 | 1,1-Dichloroethene | 11. | U |
| 75-34-3 | 1,1-Dichloroethane | 11. | U |
| 540-59-0 | 1,2-Dichloroethene (total) | 11. | U |
| 67-66-3 | Chloroform | 11. | U |
| 107-06-2 | 1,2-Dichloroethane | 11. | U |
| 78-93-3 | 2-Butanone | 11. | U |
| 71-55-6 | 1,1,1-Trichloroethane | 37 | ~~B~~ UJ |
| 56-23-5 | Carbon Tetrachloride | 11. | U |
| 108-05-4 | Vinyl Acetate | 11. | U |
| 75-27-4 | Bromodichloromethane | 22. | U |
| 78-87-5 | 1,2-Dichloropropane | 11. | U |
| 10061-01-5 | cis-1,3-Dichloropropene | 11. | U |
| 79-01-6 | Trichloroethene | 11. | U |
| 124-48-1 | Dibromochloromethane | 11. | U |
| 79-00-5 | 1,1,2-Trichloroethane | 11. | U |
| 71-43-2 | Benzene | 11. | U |
| 10061-02-6 | trans-1,3-Dichloropropene | 11. | U |
| 75-25-2 | Bromoform | 11. | U |
| 108-10-1 | 4-Methyl-2-Pentanone | 22. | U |
| 591-78-6 | 2-Hexanone | 22. | U |
| 127-18-4 | Tetrachloroethene | 140. | J |
| 79-34-5 | 1,1,2,2-Tetrachloroethane | 11. | U |
| 108-88-3 | Toluene | 11. | U |
| 108-90-7 | Chlorobenzene | 11. | U |
| 100-41-4 | Ethylbenzene | 11. | U |
| 100-42-5 | Styrene | 11. | U |
| 1330-20-7 | Xylene (total) | 81. | J |

1E

EPA SAMPLE NO.

BZ958

# VOLATILE ORGANICS ANALYSIS DATA SHEET
## TENTATIVELY IDENTIFIED COMPOUNDS

Lab Name: FEI Contract: 68-D9-0037

Lab Code: FEI Case No.: 11834 SAS No.: SDG No.: BZ949

Matrix: (soil/water) SOIL Lab Sample ID: T9-04-199-10B

Sample wt/vol: 5.0 (g/mL) G Lab File ID: BZ958

Level: (low/med) LOW Date Received: 4/26/89

% Moisture: not dec. 54 Date Analyzed: 5/ 4/89

Column: (pack/cap) CAP Dilution Factor: 1.00

Number TICs found: 2

CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG

| | CAS NUMBER | COMPOUND NAME | RT | EST. CONC. | Q |
|---|---|---|---|---|---|
| 1 | - - | UNKNOWN | 8.25 | 20. | J |
| 2 | 624-92-0 | Disulfide, dimethyl | 9.28 | 20. | J |
| 3. | | | | | |
| 4. | | | | | |
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1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

BZ959 RE

Lab Name: PEI Contract: 68-D9-0037

Lab Code: PEI Case No. 11834 SAS No. SDG No.: BZ949

Matrix: (soil/water) SOIL Lab Sample ID: T9-04-199-11D

Sample wt/vol: 5.0 (g/mL) G Lab File ID: BZ959RE2

Level: (low/med) LOW Date Received: 4/26/89

% Moisture: not dec. 59 Date Analyzed: 5/ 9/89

Column: (pack/cap) CAP Dilution Factor: 1.00

| CAS NO | COMPOUND | CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG | Q |
|---|---|---|---|
| 74-87-3 | Chloromethane | 24 | U J |
| 74-83-9 | Bromomethane | 24. | U |
| 75-01-4 | Vinyl Chloride | 24. | U |
| 75-00-3 | Chloroethane | 24. | U |
| 75-09-2 | Methylene Chloride | 24. | U |
| 67-64-1 | Acetone | 24. | ~~15~~ U |
| 75-15-0 | Carbon Disulfide | 120. | ~~51~~ U |
| 75-35-4 | 1,1-Dichloroethene | 12. | U |
| 75-34-3 | 1,1-Dichloroethane | 12. | U |
| 540-59-0 | 1,2-Dichloroethene (total) | 12. | U |
| 67-66-3 | Chloroform | 12. | U |
| 107-06-2 | 1,2-Dichloroethane | 12. | U |
| 78-93-3 | 2-Butanone | 12. | U |
| 71-55-6 | 1,1,1-Trichloroethane | 31. | ~~12~~ |
| 56-23-5 | Carbon Tetrachloride | 12. | U |
| 108-05-4 | Vinyl Acetate | 12. | U |
| 75-27-4 | Bromodichloromethane | 24. | U |
| 78-87-5 | 1,2-Dichloropropane | 12. | U |
| 10061-01-5 | cis-1,3-Dichloropropene | 12. | U |
| 79-01-6 | Trichloroethene | 12. | U |
| 124-48-1 | Dibromochloromethane | 12. | U |
| 79-00-5 | 1,1,2-Trichloroethane | 12. | U |
| 71-43-2 | Benzene | 12. | U |
| 10061-02-6 | trans-1,3-Dichloropropene | 12. | U |
| 75-25-2 | Bromoform | 12. | U |
| 108-10-1 | 4-Methyl-2-Pentanone | 12. | U |
| 591-78-6 | 2-Hexanone | 24. | U J |
| 127-18-4 | Tetrachloroethene | 24. | U J |
| 79-34-5 | 1,1,2,2-Tetrachloroethane | 17. | J |
| 108-88-3 | Toluene | 12. | U J |
| 108-90-7 | Chlorobenzene | 12. | U |
| 100-41-4 | Ethylbenzene | 12. | U |
| 100-42-5 | Styrene | 12. | U |
| 1330-20-7 | Xylene (total) | 12. | U |
| | | 12. | U J |

1E

EPA SAMPLE NO

BZ959 RE

VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

Lab Name: PEI Contract: 68-D9-0037

Lab Code: PEI Case No.: 11034 SAS No.: SDG No.: BZ949

Matrix: (soil/water) SOIL Lab Sample ID: T9-04-199-11B

Sample wt/vol: 5.0 (g/mL) G Lab File ID: BZ959RE2

Level: (low/med) LOW Date Received: 4/26/89

% Moisture: not dec. 59 Date Analyzed: 5/ 9/89

Column: (pack/cap) CAP Dilution Factor: 1.00

Number TICs found: 1 CONCENTRATION UNITS (ug/L or ug/Kg) UG/KG

| | CAS NUMBER | COMPOUND NAME | RT | EST. CONC | Q |
|---|---|---|---|---|---|
| 1. | 624-92-0 | Disulfide, dimethyl | 9.22 | 40. | JN |
| 2. | | | | | |
| 3. | | | | | |
| 4. | | | | | |
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1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

BZ959

Lab Name: PEI  Contract: 68-D9-0037

Lab Code: PEI  Case No.: 11834  SAS No.:  SDG No.: BZ949

Matrix: (soil/water) SOIL  Lab Sample ID: T9-04-199-11B

Sample wt/vol 5.0 (g/mL) G  Lab File ID: BZ959RE

Level (low/med) LOW  Date Received: 4/26/89

% Moisture: not dec. 59.  Date Analyzed: 5/ 8/89

Column: (pack/cap) CAP  Dilution Factor: 1.00

do not use data

CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG

| CAS NO. | COMPOUND | | C |
|---|---|---|---|
| 74-87-3 | Chloromethane | 24. | U |
| 74-83-9 | Bromomethane | 24. | U |
| 75-01-4 | Vinyl Chloride | 24. | U |
| 75-00-3 | Chloroethane | 24. | U |
| 75-09-2 | Methylene Chloride | 27. | ~~B~~ U |
| 67-64-1 | Acetone | 24. | U |
| 75-15-0 | Carbon Disulfide | 12. | U |
| 75-35-4 | 1,1-Dichloroethene | 12. | U |
| 75-34-3 | 1,1-Dichloroethane | 12. | U |
| 540-59-0 | 1,2-Dichloroethene (total) | 12. | U |
| 67-66-3 | Chloroform | 12. | U |
| 107-06-2 | 1,2-Dichloroethane | 12. | U |
| 78-93-3 | 2-Butanone | 12. | U J |
| 71-55-6 | 1,1,1-Trichloroethane | 112 ~~4~~ | ~~B~~ U |
| 56-23-5 | Carbon Tetrachloride | 12. | U J |
| 108-05-4 | Vinyl Acetate | 12. | U |
| 75-27-4 | Bromodichloromethane | 24. | U |
| 78-87-5 | 1,2-Dichloropropane | 12. | U |
| 10061-01-5 | cis-1,3-Dichloropropene | 12. | U |
| 79-01-6 | Trichloroethene | 12. | U |
| 124-48-1 | Dibromochloromethane | 12. | U |
| 79-00-5 | 1,1,2-Trichloroethane | 12. | U |
| 71-43-2 | Benzene | 12. | U |
| 10061-02-6 | trans-1,3-Dichloropropene | 12. | U |
| 75-25-2 | Bromoform | 12. | U |
| 108-10-1 | 4-Methyl-2-Pentanone | 12. | U |
| 591-78-6 | 2-Hexanone | 24. | U |
| 127-18-4 | Tetrachloroethene | 24. | U J |
| 79-34-5 | 1,1,2,2-Tetrachloroethane | 20. | J |
| 108-88-3 | Toluene | 12. | U J |
| 108-90-7 | Chlorobenzene | 12. | U |
| 100-41-4 | Ethylbenzene | 12. | U |
| 100-42-5 | Styrene | 12. | U |
| 1330-20-7 | Xylene (total) | 12. | U J |
| | | 12. | U |

1E

000151

EPA SAMPLE NO.

VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

BZ959

Name: FEI

Contract: 68-D9-0037

Lab Code: FEI Case No 11834 SAS No SDG No.: BZ949

Matrix: (soil/water) SOIL Lab Sample ID: T9-04-199-11

Sample wt/vol 5.0 (g/mL) G Lab File ID: BZ959RE

Level (low/med) LOW Date Received: 4/26/89

% Moisture not dec 59 Date Analyzed 5/ 8/89

Column (pack/cap) CAP Dilution Factor: 1.00

Number TICs found 1 CONCENTRATION UNITS (ug/L or ug/Kg) UG/KG

| | CAS NUMBER | COMPOUND NAME | RT | EST. CONC. | Q |
|---|---|---|---|---|---|
| 1 | 624-92-0 | Disulfide, dimethyl | 9.25 | 10 | JN |
| 2. | | | | | |
| 3. | | | | | |
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FORM I VOA-TIC

1/87 Rev.

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO

BZ960 RE

Lab Name: PEI Contract: 68-D9-0037

Lab Code: PEI Case No.: 11834 SAS No.: SDG No.: BZ949

Matrix: (soil/water) SOIL Lab Sample ID: T9-04-199-12E

Sample wt/vol: 5.0 (g/mL) G Lab File ID: BZ960RE

Level: (low/med) LOW Date Received: 4/26/89

% Moisture: not dec. 41 Date Analyzed: 5/ 8/89

Column: (pack/cap) CAP Dilution Factor: 1.00

| CAS NO | COMPOUND | CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG | Q |
|---|---|---|---|
| 74-87-3 | Chloromethane | 17. | U |
| 74-83-9 | Bromomethane | 17. | U |
| 75-01-4 | Vinyl Chloride | 17. | U |
| 75-00-3 | Chloroethane | 17. | U |
| 75-09-2 | Methylene Chloride | 20. | ~~B~~ U |
| 67-64-1 | Acetone | 17. | U |
| 75-15-0 | Carbon Disulfide | 9. | U |
| 75-35-4 | 1,1-Dichloroethene | 9. | U |
| 75-34-3 | 1,1-Dichloroethane | 9. | U |
| 540-59-0 | 1,2-Dichloroethene (total) | 9. | U |
| 67-66-3 | Chloroform | 9. | U |
| 107-06-2 | 1,2-Dichloroethane | 9. | U |
| 78-93-3 | 2-Butanone | 17. | U |
| 71-55-6 | 1,1,1-Trichloroethane | 9. | U |
| 56-23-5 | Carbon Tetrachloride | 9. | U |
| 108-05-4 | Vinyl Acetate | 17. | U |
| 75-27-4 | Bromodichloromethane | 9. | U |
| 78-87-5 | 1,2-Dichloropropane | 9. | U |
| 10061-01-5 | cis-1,3-Dichloropropene | 9. | U |
| 79-01-6 | Trichloroethene | 9. | U |
| 124-48-1 | Dibromochloromethane | 9. | U |
| 79-00-5 | 1,1,2-Trichloroethane | 9. | U |
| 71-43-2 | Benzene | 9. | U |
| 10061-02-6 | trans-1,3-Dichloropropene | 9. | U |
| 75-25-2 | Bromoform | 9. | U |
| 108-10-1 | 4-Methyl-2-Pentanone | 9. | U |
| 591-78-6 | 2-Hexanone | 17. | U |
| 127-18-4 | Tetrachloroethene | 17. | U |
| 79-34-5 | 1,1,2,2-Tetrachloroethane | 9. | U |
| 108-88-3 | Toluene | 9. | U |
| 108-90-7 | Chlorobenzene | 9. | U |
| 100-41-4 | Ethylbenzene | 9. | U |
| 100-42-5 | Styrene | 9. | U |
| 1330-20-7 | Xylene (total) | 9. | U |



FORM I VOA

1E

EPA SAMPLE NO.

BZ960 RE

# VOLATILE ORGANICS ANALYSIS DATA SHEET
## TENTATIVELY IDENTIFIED COMPOUNDS

Lab Name: PEI Contract: 68-D9-0037

Lab Code: PEI Case No.: 11834 SAS No.: SDG No.: BZ949

Matrix: (soil/water) SOIL Lab Sample ID: T9-04-199-12B

Sample wt/vol: 5.0 (g/mL) G Lab File ID: BZ960RE

Level: (low/med) LOW Date Received: 4/26/89

% Moisture: not dec. 41 Date Analyzed: 5/ 8/89

Column: (pack/cap) CAP Dilution Factor: 1.00

Number TICs found: 0 CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG

| | CAS NUMBER | COMPOUND NAME | RT | EST. CONC. | G |
|---|---|---|---|---|---|
| 1. | | | | | |
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1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

BZ960

Lab Name: PEI Contract: 68-D9-0037

Lab Code: PEI Case No.: 11834 SAS No. SDG No.: BZ949

Matrix: (soil/water) SOIL Lab Sample ID: T9-04-199-12P

Sample wt/vol: 5.0 (g/mL) G Lab File ID: BZ960

Level: (low/med) LOW Date Received: 4/26/89

% Moisture not dec. 41 do not use this data Date Analyzed: 5/ 4/89

Column (pack/cap) CAP Dilution Factor: 1.00

| CAS NO. | COMPOUND | CONCENTRATION UNITS: (ug/L or ug/kg) UG/KG | |
|---|---|---|---|
| 74-87-3 | Chloromethane | 17 | U J |
| 74-83-9 | Bromomethane | 17. | U |
| 75-01-4 | Vinyl Chloride | 17. | U |
| 75-00-3 | Chloroethane | 17. | U |
| 75-09-2 | Methylene Chloride | 24. | ~~BUL~~ |
| 67-64-1 | Acetone | 120 | ~~BUL~~ |
| 75-15-0 | Carbon Disulfide | 9. | U |
| 75-35-4 | 1,1-Dichloroethene | 9. | U |
| 75-34-3 | 1,1-Dichloroethane | 9. | U |
| 540-59-0 | 1,2-Dichloroethene (total) | 9. | U |
| 67-66-3 | Chloroform | 9. | U |
| 107-06-2 | 1,2-Dichloroethane | 9. | U J |
| 78-93-3 | 2-Butanone | 17 ~~18~~ | ~~B~~ U |
| 71-55-6 | 1,1,1-Trichloroethane | 9. | U J |
| 56-23-5 | Carbon Tetrachloride | 9. | U |
| 108-05-4 | Vinyl Acetate | 17. | U |
| 75-27-4 | Bromodichloromethane | 9. | U |
| 78-87-5 | 1,2-Dichloropropane | 9. | U |
| 10061-01-5 | cis-1,3-Dichloropropene | 9. | U |
| 79-01-6 | Trichloroethene | 9. | U |
| 124-48-1 | Dibromochloromethane | 9. | U |
| 79-00-5 | 1,1,2-Trichloroethane | 9. | U |
| 71-43-2 | Benzene | 9. | U |
| 10061-02-6 | trans-1,3-Dichloropropene | 9. | U |
| 75-25-2 | Bromoform | 9. | U |
| 108-10-1 | 4-Methyl-2-Pentanone | 17. | U |
| 591-78-6 | 2-Hexanone | 17. | U |
| 127-18-4 | Tetrachloroethene | 9. | U |
| 79-34-5 | 1,1,2,2-Tetrachloroethane | 9. | U |
| 108-88-3 | Toluene | 9. | U |
| 108-90-7 | Chlorobenzene | 9. | U |
| 100-41-4 | Ethylbenzene | 9. | U |
| 100-42-5 | Styrene | 9. | U |
| 1330-20-7 | Xylene (total) | 9. | U J |

1E

EPA SAMPLE NO

VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

BZ960

Name PEI Contract 68-D9-0037

Lab Code PEI Case No. 11834 SAS No. SDG No. BZ949

Matrix (soil/water) SOIL Lab Sample ID T9-04-199-12I

Sample wt/vol 5.0 (g/mL) G Lab File ID BZ960

Level (low/med) LOW Date Received 4/26/89

% Moisture not dec. 41 Date Analyzed 5/ 4/89

Column (pack/cap) CAP Dilution Factor 1.00

Number TICs found 0 CONCENTRATION UNITS (ug/L or ug/Kg) UG/KG

| | CAS NUMBER | COMPOUND NAME | RT | EST. CONC. | Q |
|---|---|---|---|---|---|
| 1 | | | | | |
| 2 | | | | | |
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1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

BZ961

Lab Name: PEI Contract: 68-D9-0037

Lab Code: PEI Case No.: 11834 SAS No.: SDG No.: BZ949

Matrix: (soil/water) WATER Lab Sample ID: T9-04-199-13B

Sample wt/vol: 5.0 (g/mL) ML Lab File ID: BZ961

Level: (low/med) LOW Date Received: 4/26/89

% Moisture: not dec. 100 Date Analyzed: 5/ 3/89

Column: (pack/cap) CAP Dilution Factor: 1.00

| CAS NO. | COMPOUND | CONCENTRATION UNITS (ug/L or ug/kg) UG/L | Q |
|---|---|---|---|
| 74-87-3 | Chloromethane | 10. | U |
| 74-83-9 | Bromomethane | 10. | U |
| 75-01-4 | Vinyl Chloride | 10. | U |
| 75-00-3 | Chloroethane | 10. | U |
| 75-09-2 | Methylene Chloride | 5. | BJ |
| 67-64-1 | Acetone | 6. | BJ |
| 75-15-0 | Carbon Disulfide | 5. | U |
| 75-35-4 | 1,1-Dichloroethene | 5. | U |
| 75-34-3 | 1,1-Dichloroethane | 5 | U |
| 540-59-0 | 1,2-Dichloroethene (total) | 5 | U |
| 67-66-3 | Chloroform | 5 | U |
| 107-06-2 | 1,2-Dichloroethane | 5. | U |
| 78-93-3 | 2-Butanone | 6. | BJ |
| 71-55-6 | 1,1,1-Trichloroethane | 5. | U |
| 56-23-5 | Carbon Tetrachloride | 5. | U |
| 108-05-4 | Vinyl Acetate | 10. | U |
| 75-27-4 | Bromodichloromethane | 5. | U |
| 78-87-5 | 1,2-Dichloropropane | 5. | U |
| 10061-01-5 | cis-1,3-Dichloropropene | 5. | U |
| 79-01-6 | Trichloroethene | 5. | U |
| 124-48-1 | Dibromochloromethane | 5. | U |
| 79-00-5 | 1,1,2-Trichloroethane | 5. | U |
| 71-43-2 | Benzene | 5. | U |
| 10061-02-6 | trans-1,3-Dichloropropene | 5. | U |
| 75-25-2 | Bromoform | 5. | U |
| 108-10-1 | 4-Methyl-2-Pentanone | 10. | U |
| 591-78-6 | 2-Hexanone | 10. | U |
| 127-18-4 | Tetrachloroethene | 5. | U |
| 79-34-5 | 1,1,2,2-Tetrachloroethane | 5. | U |
| 108-88-3 | Toluene | 5. | U |
| 108-90-7 | Chlorobenzene | 5. | U |
| 100-41-4 | Ethylbenzene | 5. | U |
| 100-42-5 | Styrene | 5. | U |
| 1330-20-7 | Xylene (total) | 5. | U |

1E

C0013

EPA SAMPLE NO

VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

BZ961

Lab Name: PEI

Contract: 68-D9-0037

Lab Code: PEI Case No. 11834 SAS No.:

SDG No.: BZ949

Matrix (soil/water) WATER

Lab Sample ID: T9-04-199-13B

Sample wt/vol 5.0 (g/mL) ML

Lab File ID: BZ961

Level (low/med) LOW

Date Received 4/26/89

% Moisture: not dec. 100.

Date Analyzed: 5/ 3/89

Column (pack/cap) CAP

Dilution Factor 1.00

Number TICs found 0

CONCENTRATION UNITS
(ug/L or ug/kg) UG/L

| | CAS NUMBER | COMPOUND NAME | RT | EST. CONC | Q |
|---|---|---|---|---|---|
| 1 | | | | | |
| 2. | | | | | |
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FORM I VOA-TIC

1/87 Rev.

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO

BZ962

Lab Name: PEI Contract: 68-D9-0037

Lab Code: PEI Case No.: 11834 SAS No.: SDG No.: BZ949

Matrix: (soil/water) WATER Lab Sample ID: T9-04-199-14B

Sample wt/vol: 5.0 (g/mL) ML Lab File ID: BZ962

Level: (low/med) LOW Date Received: 4/26/89

% Moisture: not dec. 100 Date Analyzed: 5/ 3/89

Column: (pack/cap) CAP Dilution Factor 1.00

| CAS NO | COMPOUND | CONCENTRATION UNITS (ug/L or ug/Kg) UG/L | C |
|---|---|---|---|
| 74-87-3 | Chloromethane | 10. | U |
| 74-83-9 | Bromomethane | 10. | U |
| 75-01-4 | Vinyl Chloride | 10. | U |
| 75-00-3 | Chloroethane | 10. | U |
| 75-09-2 | Methylene Chloride | 4. | BJ |
| 67-64-1 | Acetone | 6. | BJ |
| 75-15-0 | Carbon Disulfide | 5. | U |
| 75-35-4 | 1,1-Dichloroethene | 5 | U |
| 75-34-3 | 1,1-Dichloroethane | 5. | U |
| 540-59-0 | 1,2-Dichloroethene (total) | 5. | U |
| 67-66-3 | Chloroform | 5. | U |
| 107-06-2 | 1,2-Dichloroethane | 5. | U |
| 78-93-3 | 2-Butanone | 5. | BJ |
| 71-55-6 | 1,1,1-Trichloroethane | 5 | U |
| 56-23-5 | Carbon Tetrachloride | 5. | U |
| 108-05-4 | Vinyl Acetate | 10. | U |
| 75-27-4 | Bromodichloromethane | 5. | U |
| 78-87-5 | 1,2-Dichloropropane | 5. | U |
| 10061-01-5 | cis-1,3-Dichloropropene | 5. | U |
| 79-01-6 | Trichloroethene | 5. | U |
| 124-48-1 | Dibromochloromethane | 5. | U |
| 79-00-5 | 1,1,2-Trichloroethane | 5. | U |
| 71-43-2 | Benzene | 5. | U |
| 10061-02-6 | trans-1,3-Dichloropropene | 5. | U |
| 75-25-2 | Bromoform | 5. | U |
| 108-10-1 | 4-Methyl-2-Pentanone | 10. | U |
| 591-78-6 | 2-Hexanone | 10. | U |
| 127-18-4 | Tetrachloroethene | 5. | U |
| 79-34-5 | 1,1,2,2-Tetrachloroethane | 5. | U |
| 108-88-3 | Toluene | 5. | U |
| 108-90-7 | Chlorobenzene | 5. | U |
| 100-41-4 | Ethylbenzene | 5. | U |
| 100-42-5 | Styrene | 5. | U |
| 1330-20-7 | Xylene (total) | 5. | U |

1E

EPA SAMPLE NO

VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

BZ962

Name: PEI Contract: 68-D9-0037

Lab Code: PEI Case No.: 11834 SAS No.: SDG No.: BZ949

Matrix: (soil/water) WATER Lab Sample ID: T9-04-199-147

Sample wt/vol 5.0 (g/mL) ML Lab File ID: BZ962

Level: (low/med) LOW Date Received: 4/26/89

% Moisture not dec. 100 Date Analyzed: 5/ 3/89

Column (pack/cap) CAP Dilution Factor: 1.00

Number TICs found: 0 CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L

| | CAS NUMBER | COMPOUND NAME | RT | EST. CONC. | Q |
|---|---|---|---|---|---|
| 1. | | | | | |
| 2. | | | | | |
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FORM I VOA-TIC 1/87 Rev.

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO

BZ963

Lab Name: PEI Contract: 68-D9-0037

Lab Code PEI Case No.: 11834 SAS No.: SDG No.: BZ949

Matrix: (soil/water) WATER Lab Sample ID: T9-04-199-15L

Sample wt/vol: 5.0 (g/mL) ML Lab File ID: BZ963

Level (low/med) LOW Date Received: 4/26/89

% Moisture: not dec. 100 Date Analyzed: 5/ 3/89

Column: (pack/cap) CAP Dilution Factor: 1.00

| CAS NO | COMPOUND | CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L | Q |
|---|---|---|---|
| 74-87-3 | Chloromethane | 10 | U |
| 74-83-9 | Bromomethane | 10 | U |
| 75-01-4 | Vinyl Chloride | 10 | U |
| 75-00-3 | Chloroethane | 10 | U |
| 75-09-2 | Methylene Chloride | 3 | BJ |
| 67-64-1 | Acetone | 7 | BJ |
| 75-15-0 | Carbon Disulfide | 5 | U |
| 75-35-4 | 1,1-Dichloroethene | 5 | U |
| 75-34-3 | 1,1-Dichloroethane | 5 | U |
| 540-59-0 | 1,2-Dichloroethene (total) | 5 | U |
| 67-66-3 | Chloroform | 5 | U |
| 107-06-2 | 1,2-Dichloroethane | 5 | U |
| 78-93-3 | 2-Butanone | 7 | BJ |
| 71-55-6 | 1,1,1-Trichloroethane | 5 | U |
| 56-23-5 | Carbon Tetrachloride | 5 | U |
| 108-05-4 | Vinyl Acetate | 10 | U |
| 75-27-4 | Bromodichloromethane | 5 | U |
| 78-87-5 | 1,2-Dichloropropane | 5 | U |
| 10061-01-5 | cis-1,3-Dichloropropene | 5 | U |
| 79-01-6 | Trichloroethene | 5 | U |
| 124-48-1 | Dibromochloromethane | 5 | U |
| 79-00-5 | 1,1,2-Trichloroethane | 5 | U |
| 71-43-2 | Benzene | 5 | U |
| 10061-02-6 | trans-1,3-Dichloropropene | 5 | U |
| 75-25-2 | Bromoform | 5 | U |
| 108-10-1 | 4-Methyl-2-Pentanone | 10 | U |
| 591-78-6 | 2-Hexanone | 10 | U |
| 127-18-4 | Tetrachloroethene | 5 | U |
| 79-34-5 | 1,1,2,2-Tetrachloroethane | 5 | U |
| 108-88-3 | Toluene | 5 | U |
| 108-90-7 | Chlorobenzene | 5 | U |
| 100-41-4 | Ethylbenzene | 5 | U |
| 100-42-5 | Styrene | 5 | U |
| 1330-20-7 | Xylene (total) | 5 | U |

1E

EPA SAMPLE NO. GE0512

VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

BZ963

Lab Name: PEI Contract: 68-D9-0037

Lab Code: PEI Case No.: 11834 SAS No. SDG No.: BZ949

Matrix: (soil/water) WATER Lab Sample ID: T9-04-199-15B

Sample wt/vol: 5.0 (g/mL) ML Lab File ID: BZ963

Level: (low/med) LOW Date Received: 4/26/89

% Moisture: not dec. 100 Date Analyzed: 5/ 3/89

Column: (pack/cap) CAP Dilution Factor: 1.00

Number TICs found: 0 CONCENTRATION UNITS: (ug/L or ug/kg) UG/L

| | CAS NUMBER | COMPOUND NAME | RT | EST. CONC. | Q |
|---|---|---|---|---|---|
| 1. | | | | | |
| 2. | | | | | |
| 3. | | | | | |
| 4. | | | | | |
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1B
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

BZ949

Name: PEI  Contract: 68-D9-0037

Lab Code: PEI  Case No.: 11834  SAS No.:  SDG No.: BZ949

Matrix: (soil/water) WATER  Lab Sample ID: T9-04-199-01A

Sample wt/vol  1000.0 (g/mL) ML  Lab File ID: BZ949

Level: (low/med) LOW  Date Received: 4/26/89

% Moisture: not dec 100  dec 0  Date Extracted: 4/26/89

Extraction (SepF/Cont/Sonc) CONT  Date Analyzed: 5/ 5/89

GPC Cleanup (Y/N) N  pH: 7.0  Dilution Factor: 1.00

| CAS NO | COMPOUND | CONCENTRATION UNITS (ug/L or ug/Kg) UG/L | G |
|---|---|---|---|
| 108-95-2 | Phenol | 10 | U |
| 111-44-4 | bis(2-Chloroethyl)ether | 10 | U |
| 95-57-8 | 2-Chlorophenol | 10 | U |
| 541-73-1 | 1,3-Dichlorobenzene | 10 | U |
| 106-46-7 | 1,4-Dichlorobenzene | 10 | U |
| 100-51-6 | Benzyl alcohol | 10 | U |
| 95-50-1 | 1,2-Dichlorobenzene | 10 | U |
| 95-48-7 | 2-Methylphenol | 10 | U |
| 108-60-1 | bis(2-Chloroisopropyl)ether | 10 | U |
| 106-44-5 | 4-Methylphenol | 10 | U |
| 621-64-7 | N-Nitroso-di-n-propylamine | 10 | U |
| 67-72-1 | Hexachloroethane | 10 | U |
| 98-95-3 | Nitrobenzene | 10 | U |
| 78-59-1 | Isophorone | 10 | U |
| 88-75-5 | 2-Nitrophenol | 10 | U |
| 105-67-9 | 2,4-Dimethylphenol | 10 | U |
| 65-85-0 | Benzoic acid | 50 | U |
| 111-91-1 | bis(2-Chloroethoxy)methane | 10 | U |
| 120-83-2 | 2,4-Dichlorophenol | 10 | U |
| 120-82-1 | 1,2,4-Trichlorobenzene | 10 | U |
| 91-20-3 | Naphthalene | 10 | U |
| 106-47-8 | 4-Chloroaniline | 10 | U |
| 87-68-3 | Hexachlorobutadiene | 10 | U |
| 59-50-7 | 4-Chloro-3-methylphenol | 10 | U |
| 91-57-6 | 2-Methylnaphthalene | 10 | U |
| 77-47-4 | Hexachlorocyclopentadiene | 10 | U |
| 88-06-2 | 2,4,6-Trichlorophenol | 10 | U |
| 95-95-4 | 2,4,5-Trichlorophenol | 50 | U |
| 91-58-7 | 2-Chloronaphthalene | 10 | U |
| 88-74-4 | 2-Nitroaniline | 50 | U |
| 131-11-3 | Dimethylphthalate | 10 | U |
| 208-96-8 | Acenaphthylene | 10 | U |
| 606-20-2 | 2,6-Dinitrotoluene | 10 | U |

1C

EPA SAMPLE NO. 6UU122

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

BZ949

Lab Name: PEI Contract: 68-D9-0037

Lab Code: PEI Case No.: 11834 SAS No.: SDG No.: BZ949

Matrix: (soil/water) WATER Lab Sample ID: T9-04-199-01A

Sample wt/vol: 1000.0 (g/mL) ML Lab File ID: BZ949

Level: (low/med) LOW Date Received: 4/26/89

% Moisture: not dec. 100 dec. 0 Date Extracted: 4/26/89

Extraction: (SepF/Cont/Sonc) CONT Date Analyzed: 5/ 5/89

GPC Cleanup: (Y/N) N pH: 7.0 Dilution Factor: 1.00

| CAS NO. | COMPOUND | CONCENTRATION UNITS (ug/L or ug/kg) UG/L | Q |
|---|---|---|---|
| 99-09-2 | 3-Nitroaniline | 50. | U |
| 83-32-9 | Acenaphthene | 10. | U |
| 51-28-5 | 2,4-Dinitrophenol | 50. | U |
| 100-02-7 | 4-Nitrophenol | 50. | U |
| 132-64-9 | Dibenzofuran | 10. | U |
| 121-14-2 | 2,4-Dinitrotoluene | 10. | U |
| 84-66-2 | Diethylphthalate | 10. | U |
| 7005-72-3 | 4-Chlorophenyl-phenylether | 10. | U |
| 86-73-7 | Fluorene | 10. | U |
| 100-01-6 | 4-Nitroaniline | 50. | U |
| 534-52-1 | 4,6-Dinitro-2-methylphenol | 50. | U |
| 86-30-6 | N-Nitrosodiphenylamine (1) | 10. | U |
| 101-55-3 | 4-Bromophenyl-phenylether | 10. | U |
| 118-74-1 | Hexachlorobenzene | 10. | U |
| 87-86-5 | Pentachlorophenol | 50. | U |
| 85-01-8 | Phenanthrene | 10. | U |
| 120-12-7 | Anthracene | 10. | U |
| 84-74-2 | Di-n-butylphthalate | 10. | U |
| 206-44-0 | Fluoranthene | 10. | U |
| 129-00-0 | Pyrene | 10. | U |
| 85-68-7 | Butylbenzylphthalate | 10. | U |
| 91-94-1 | 3,3'-Dichlorobenzidine | 20. | U |
| 56-55-3 | Benzo(a)anthracene | 10. | U |
| 218-01-9 | Chrysene | 10. | U |
| 117-81-7 | bis(2-Ethylhexyl)phthalate | 10. | U |
| 117-84-0 | Di-n-octylphthalate | 10. | U |
| 205-99-2 | Benzo(b)fluoranthene | 10. | U |
| 207-08-9 | Benzo(k)fluoranthene | 10. | U |
| 50-32-8 | Benzo(a)pyrene | 10. | U |
| 193-39-5 | Indeno(1,2,3-cd)pyrene | 10. | U |
| 53-70-3 | Dibenz(a,h)anthracene | 10. | U |
| 191-24-2 | Benzo(g,h,i)perylene | 10. | U |

(1) - Cannot be separated from diphenylamine

1F

EPA SAMPLE NO. 00123

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

BZ949

Lab Name: PEI Contract: 68-D9-0037

Lab Code: PEI Case No.: 11834 SAS No.: SDG No.: BZ949

Matrix: (soil/water) WATER Lab Sample ID: T9-04-199-01A

Sample wt/vol 1000.0 (g/mL) ML Lab File ID: BZ949

Level: (low/med) LOW Date Received: 4/26/89

% Moisture: not dec. 100. dec 0 Date Extracted: 4/26/89

Extraction: (SepF/Cont/Sonc) CONT Date Analyzed: 5/ 5/89

GPC Cleanup: (Y/N) N pH: 7.0 Dilution Factor 1.00

Number TICs found 6 CONCENTRATION UNITS (ug/L or ug/Kg) UG/L

| | CAS NUMBER | COMPOUND NAME | RT | EST. CONC | Q | |
|---|---|---|---|---|---|---|
| 1. | - - | UNKNOWN | 6.60 | 80. | BJ | A |
| 2. | - - | UNKNOWN | 7.40 | 50. | BJ | A |
| 3. | - - | UNKNOWN | 7.87 | 20. | BJ | A |
| 4. | - - | UNKNOWN | 7.93 | 80. | J | A |
| 5. | - - | UNKNOWN | 8.28 | 10. | BJ | A |
| 6. | - - | UNKNOWN | 10.50 | 90. | J | A |
| 7. | | | | | | |
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1B
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

BZ950

Lab Name: PEI Contract: 68-D9-0037

Lab Code: PEI Case No.: 11834 SAS No.: SDG No.: BZ949

Matrix: (soil/water) WATER Lab Sample ID: T9-04-199-02A

Sample wt/vol: 1000.0 (g/mL) ML Lab File ID: BZ950

Level: (low/med) LOW Date Received: 4/26/89

% Moisture: not dec. 100. dec. 0. Date Extracted: 4/26/89

Extraction: (SepF/Cont/Sonc) CONT Date Analyzed: 5/ 5/89

GPC Cleanup: (Y/N) N pH: 7.0 Dilution Factor: 1.00

| CAS NO. | COMPOUND | CONCENTRATION UNITS (ug/L or ug/Kg) UG/L | Q |
|---|---|---|---|
| 108-95-2 | Phenol | 10. | U |
| 111-44-4 | bis(2-Chloroethyl)ether | 10. | U |
| 95-57-8 | 2-Chlorophenol | 10. | U |
| 541-73-1 | 1,3-Dichlorobenzene | 10. | U |
| 106-46-7 | 1,4-Dichlorobenzene | 10. | U |
| 100-51-6 | Benzyl alcohol | 10. | U |
| 95-50-1 | 1,2-Dichlorobenzene | 10. | U |
| 95-48-7 | 2-Methylphenol | 10. | U |
| 108-60-1 | bis(2-Chloroisopropyl)ether | 10. | U |
| 106-44-5 | 4-Methylphenol | 10. | U |
| 621-64-7 | N-Nitroso-di-n-propylamine | 10. | U |
| 67-72-1 | Hexachloroethane | 10. | U |
| 98-95-3 | Nitrobenzene | 10. | U |
| 78-59-1 | Isophorone | 10. | U |
| 88-75-5 | 2-Nitrophenol | 10. | U |
| 105-67-9 | 2,4-Dimethylphenol | 10. | U |
| 65-85-0 | Benzoic acid | 10. | U |
| 111-91-1 | bis(2-Chloroethoxy)methane | 50. | U |
| 120-83-2 | 2,4-Dichlorophenol | 10. | U |
| 120-82-1 | 1,2,4-Trichlorobenzene | 10. | U |
| 91-20-3 | Naphthalene | 10. | U |
| 106-47-8 | 4-Chloroaniline | 10. | U |
| 87-68-3 | Hexachlorobutadiene | 10. | U |
| 59-50-7 | 4-Chloro-3-methylphenol | 10. | U |
| 91-57-6 | 2-Methylnaphthalene | 10. | U |
| 77-47-4 | Hexachlorocyclopentadiene | 10. | U |
| 88-06-2 | 2,4,6-Trichlorophenol | 10. | U |
| 95-95-4 | 2,4,5-Trichlorophenol | 50. | U |
| 91-58-7 | 2-Chloronaphthalene | 10. | U |
| 88-74-4 | 2-Nitroaniline | 50. | U |
| 131-11-3 | Dimethylphthalate | 10. | U |
| 208-96-8 | Acenaphthylene | 10. | U |
| 606-20-2 | 2,6-Dinitrotoluene | 10. | U |

1C

EPA SAMPLE NO. GV0139

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

BZ950

Name: PEI Contract: 68-D9-0037

Lab Code: PEI Case No.: 11834 SAS No.: SDG No.: BZ949

Matrix: (soil/water) WATER Lab Sample ID: T9-04-199-02A

Sample wt/vol 1000.0 (g/mL) ML Lab File ID: BZ950

Level: (low/med) LOW Date Received: 4/26/89

% Moisture: not dec. 100. dec. 0 Date Extracted: 4/26/89

Extraction: (SepF/Cont/Sonc) CONT Date Analyzed: 5/ 5/89

GPC Cleanup: (Y/N) N pH: 7.0 Dilution Factor: 1.00

| CAS NO | COMPOUND | CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L | Q |
|---|---|---|---|
| 99-09-2 | 3-Nitroaniline | 50. | U |
| 83-32-9 | Acenaphthene | 10. | U |
| 51-28-5 | 2,4-Dinitrophenol | 50. | U |
| 100-02-7 | 4-Nitrophenol | 50. | U |
| 132-64-9 | Dibenzofuran | 10. | U |
| 121-14-2 | 2,4-Dinitrotoluene | 10. | U |
| 84-66-2 | Diethylphthalate | 10 | U |
| 7005-72-3 | 4-Chlorophenyl-phenylether | 10. | U |
| 86-73-7 | Fluorene | 10. | U |
| 100-01-6 | 4-Nitroaniline | 50. | U |
| 534-52-1 | 4,6-Dinitro-2-methylphenol | 50. | U |
| 86-30-6 | N-Nitrosodiphenylamine (1) | 10. | U |
| 101-55-3 | 4-Bromophenyl-phenylether | 10. | U |
| 118-74-1 | Hexachlorobenzene | 10. | U |
| 87-86-5 | Pentachlorophenol | 50. | U |
| 85-01-8 | Phenanthrene | 10. | U |
| 120-12-7 | Anthracene | 10. | U |
| 84-74-2 | Di-n-butylphthalate | 10. | U |
| 206-44-0 | Fluoranthene | 10. | U |
| 129-00-0 | Pyrene | 10. | U |
| 85-68-7 | Butylbenzylphthalate | 10. | U |
| 91-94-1 | 3,3'-Dichlorobenzidine | 20. | U |
| 56-55-3 | Benzo(a)anthracene | 10. | U |
| 218-01-9 | Chrysene | 10. | U |
| 117-81-7 | bis(2-Ethylhexyl)phthalate | 10. | U |
| 117-84-0 | Di-n-octylphthalate | 10. | U |
| 205-99-2 | Benzo(b)fluoranthene | 10. | U |
| 207-08-9 | Benzo(k)fluoranthene | 10. | U |
| 50-32-8 | Benzo(a)pyrene | 10. | U |
| 193-39-5 | Indeno(1,2,3-cd)pyrene | 10. | U |
| 53-70-3 | Dibenz(a,h)anthracene | 10. | U |
| 191-24-2 | Benzo(g,h,i)perylene | 10. | U |

(1) - Cannot be separated from diphenylamine

1F

EPA SAMPLE NO. C-0130

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

BZ950

Name: PEI  Contract: 68-D9-0037

Lab Code: PEI  Case No.: 11834  SAS No.  SDG No.: BZ949

Matrix (soil/water) WATER  Lab Sample ID: T9-04-199-02A

Sample wt/vol 1000.0 (g/mL) ML  Lab File ID: BZ950

Level (low/med) LOW  Date Received: 4/26/89

% Moisture: not dec. 100 dec. 0.  Date Extracted: 4/26/89

Extraction (SepF/Cont/Sonc) CONT  Date Analyzed: 5/ 5/89

Concentrated (Y/N) N  pH: 7.0  Dilution Factor: 1.00

Number TICs found: 6  CONCENTRATION UNITS (ug/L or ug/kg) UG/L

| | CAS NUMBER | COMPOUND NAME | RT | EST. CONC. | Q |
|---|---|---|---|---|---|
| 1. | - - | UNKNOWN | 6.00 | 30. | BJ |
| 2. | - - | UNKNOWN | 6.57 | 70. | BJ |
| 3. | - - | UNKNOWN | 7.32 | 50. | BJ |
| 4. | - - | UNKNOWN | 7.88 | 90. | BJ |
| 5. | - - | UNKNOWN | 8.15 | 20. | BJ |
| 6. | - - | UNKNOWN | 8.28 | 30. | BJ |
| 7. | | | | | |
| 8. | | | | | |
| 9. | | | | | |
| 10. | | | | | |
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1B
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

BZ951

Lab Name: PEI Contract: 68-D9-0037

Lab Code: PEI Case No.: 11834 SAS No.: SDG No.: BZ949

Matrix: (soil/water) WATER Lab Sample ID: T9-04-199-03A

Sample wt/vol: 1000.0 (g/mL) ML Lab File ID: BZ951

Level: (low/med) LOW Date Received: 4/26/89

% Moisture: not dec. 100. dec. 0. Date Extracted: 4/26/89

Extraction: (SepF/Cont/Sonc) CONT Date Analyzed: 5/ 9/89

GPC Cleanup: (Y/N) N pH: 7.0 Dilution Factor: 1.00

| CAS NO. | COMPOUND | CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L | Q |
|---|---|---|---|
| 108-95-2 | Phenol | 10. | U |
| 111-44-4 | bis(2-Chloroethyl)ether | 10. | U |
| 95-57-8 | 2-Chlorophenol | 10. | U |
| 541-73-1 | 1,3-Dichlorobenzene | 10. | U |
| 106-46-7 | 1,4-Dichlorobenzene | 10. | U |
| 100-51-6 | Benzyl alcohol | 10. | U |
| 95-50-1 | 1,2-Dichlorobenzene | 10. | U |
| 95-48-7 | 2-Methylphenol | 10. | U |
| 108-60-1 | bis(2-Chloroisopropyl)ether | 10. | U |
| 106-44-5 | 4-Methylphenol | 10. | U |
| 621-64-7 | N-Nitroso-di-n-propylamine | 10. | U |
| 67-72-1 | Hexachloroethane | 10. | U |
| 98-95-3 | Nitrobenzene | 10. | U |
| 78-59-1 | Isophorone | 10. | U |
| 88-75-5 | 2-Nitrophenol | 10. | U |
| 105-67-9 | 2,4-Dimethylphenol | 10. | U |
| 65-85-0 | Benzoic acid | 50. | U |
| 111-91-1 | bis(2-Chloroethoxy)methane | 10. | U |
| 120-83-2 | 2,4-Dichlorophenol | 10. | U |
| 120-82-1 | 1,2,4-Trichlorobenzene | 10. | U |
| 91-20-3 | Naphthalene | 10. | U |
| 106-47-8 | 4-Chloroaniline | 10. | U |
| 87-68-3 | Hexachlorobutadiene | 10. | U |
| 59-50-7 | 4-Chloro-3-methylphenol | 10. | U |
| 91-57-6 | 2-Methylnaphthalene | 10. | U |
| 77-47-4 | Hexachlorocyclopentadiene | 10. | U |
| 88-06-2 | 2,4,6-Trichlorophenol | 10. | U |
| 95-95-4 | 2,4,5-Trichlorophenol | 50. | U |
| 91-58-7 | 2-Chloronaphthalene | 10. | U |
| 88-74-4 | 2-Nitroaniline | 50. | U |
| 131-11-3 | Dimethylphthalate | 10. | U |
| 208-96-8 | Acenaphthylene | 10. | U |
| 606-20-2 | 2,6-Dinitrotoluene | 10. | U |

1C

EPA SAMPLE NO. 000456

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

BZ951

Name: PEI Contract: 68-D9-0037

Lab Code: PEI Case No.: 11834 SAS No.: SDG No.: BZ949

Matrix: (soil/water) WATER Lab Sample ID: T9-04-199-03A

Sample wt/vol: 1000.0 (g/mL) ML Lab File ID: BZ951

Level: (low/med) LOW Date Received: 4/26/89

% Moisture: not dec. 100. dec. 0. Date Extracted: 4/26/89

Extraction: (SepF/Cont/Sonc) CONT Date Analyzed: 5/ 9/89

GPC Cleanup: (Y/N) N pH: 7.0 Dilution Factor: 1.00

| CAS NO. | COMPOUND | CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L | Q |
|---|---|---|---|
| 99-09-2 | 3-Nitroaniline | 50. | U |
| 83-32-9 | Acenaphthene | 10. | U |
| 51-28-5 | 2,4-Dinitrophenol | 50. | U |
| 100-02-7 | 4-Nitrophenol | 50. | U |
| 132-64-9 | Dibenzofuran | 10. | U |
| 121-14-2 | 2,4-Dinitrotoluene | 10. | U |
| 84-66-2 | Diethylphthalate | 10. | U |
| 7005-72-3 | 4-Chlorophenyl-phenylether | 10 ~~3~~ | ~~J~~ U |
| 86-73-7 | Fluorene | 10 | U |
| 100-01-6 | 4-Nitroaniline | 10. | U |
| 534-52-1 | 4,6-Dinitro-2-methylphenol | 50. | U |
| 86-30-6 | N-Nitrosodiphenylamine (1) | 50. | U |
| 101-55-3 | 4-Bromophenyl-phenylether | 10. | U |
| 118-74-1 | Hexachlorobenzene | 10. | U |
| 87-86-5 | Pentachlorophenol | 10. | U |
| 85-01-8 | Phenanthrene | 50. | U |
| 120-12-7 | Anthracene | 10. | U |
| 84-74-2 | Di-n-butylphthalate | 10. | U |
| 206-44-0 | Fluoranthene | 10. | U |
| 129-00-0 | Pyrene | 10. | U |
| 85-68-7 | Butylbenzylphthalate | 10. | U |
| 91-94-1 | 3,3'-Dichlorobenzidine | 10. | U |
| 56-55-3 | Benzo(a)anthracene | 20. | U |
| 218-01-9 | Chrysene | 10. | U |
| 117-81-7 | bis(2-Ethylhexyl)phthalate | 10. | U |
| 117-84-0 | Di-n-octylphthalate | 10. | U |
| 205-99-2 | Benzo(b)fluoranthene | 10. | U |
| 207-08-9 | Benzo(k)fluoranthene | 10. | U |
| 50-32-8 | Benzo(a)pyrene | 10. | U |
| 193-39-5 | Indeno(1,2,3-cd)pyrene | 10. | U |
| 53-70-3 | Dibenz(a,h)anthracene | 10. | U |
| 191-24-2 | Benzo(g,h,i)perylene | 10. | U |

(1) - Cannot be separated from diphenylamine

1F

EPA SAMPLE NO. 6/N 57

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

BZ951

Lab Name: PEI Contract: 68-D9-0037

Lab Code: PEI Case No.: 11834 SAS No.: SDG No.: BZ949

Matrix: (soil/water) WATER Lab Sample ID: T9-04-199-03A

Sample wt/vol: 1000.0 (g/mL) ML Lab File ID: BZ951

Level: (low/med) LOW Date Received: 4/26/89

% Moisture: not dec. 100. dec. 0. Date Extracted: 4/26/89

Extraction: (SepF/Cont/Sonc) CONT Date Analyzed: 5/ 9/89

GPC Cleanup: (Y/N) N pH: 7.0 Dilution Factor: 1.00

Number TICs found: 7

CONCENTRATION UNITS
(ug/L or ug/Kg) UG/L

| CAS NUMBER | COMPOUND NAME | RT | EST. CONC | G |
|---|---|---|---|---|
| 1. - - | UNKNOWN | 5.35 | 10. | J N |
| 2. - - | UNKNOWN | 5.75 | 50. | ~~J~~ A |
| 3. - - | UNKNOWN | 6.37 | 60. | BJ A |
| 4. - - | UNKNOWN | 7.18 | 30. | BJ A |
| 5. - - | UNKNOWN | 7.67 | 90. | BJ A |
| 6. - - | UNKNOWN | 7.93 | 10. | BJ A |
| 7. - - | UNKNOWN | 27.35 | 80. | J N |
| 8. | | | | |
| 9. | | | | |
| 10. | | | | |
| 11. | | | | |
| 12. | | | | |
| 13. | | | | |
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1B

# SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

BZ952

Name: PEI

Contract: 68-D9-0037

Code: PEI Case No. 11834 SAS No.: SDG No.: BZ949

Matrix (soil/water) WATER

Lab Sample ID: T9-04-199-04A

Sample wt/vol. 1000.0 (g/mL) ML

Lab File ID: BZ952

Level (low/med) LOW

Date Received: 4/26/89

% Moisture: not dec. 100 dec. 0.

Date Extracted: 4/26/89

Extraction (SepF/Cont/Sonc) CONT

Date Analyzed: 5/ 9/89

GPC Cleanup (Y/N) N pH: 7.0

Dilution Factor: 1.00

| CAS NO. | COMPOUND | CONCENTRATION UNITS (ug/L or ug/Kg) UG/L | Q |
|---|---|---|---|
| 108-95-2 | Phenol | 10. | U |
| 111-44-4 | bis(2-Chloroethyl)ether | 10. | U |
| 95-57-8 | 2-Chlorophenol | 10. | U |
| 541-73-1 | 1,3-Dichlorobenzene | 10. | U |
| 106-46-7 | 1,4-Dichlorobenzene | 10. | U |
| 100-51-6 | Benzyl alcohol | 10. | U |
| 95-50-1 | 1,2-Dichlorobenzene | 10. | U |
| 95-48-7 | 2-Methylphenol | 10. | U |
| 108-60-1 | bis(2-Chloroisopropyl)ether | 10 | U |
| 106-44-5 | 4-Methylphenol | 10. | U |
| 621-64-7 | N-Nitroso-di-n-propylamine | 10. | U |
| 67-72-1 | Hexachloroethane | 10. | U |
| 98-95-3 | Nitrobenzene | 10. | U |
| 78-59-1 | Isophorone | 10. | U |
| 88-75-5 | 2-Nitrophenol | 10. | U |
| 105-67-9 | 2,4-Dimethylphenol | 10. | U |
| 65-85-0 | Benzoic acid | 50. | U |
| 111-91-1 | bis(2-Chloroethoxy)methane | 10. | U |
| 120-83-2 | 2,4-Dichlorophenol | 10. | U |
| 120-82-1 | 1,2,4-Trichlorobenzene | 10. | U |
| 91-20-3 | Naphthalene | 10. | U |
| 106-47-8 | 4-Chloroaniline | 10. | U |
| 87-68-3 | Hexachlorobutadiene | 10. | U |
| 59-50-7 | 4-Chloro-3-methylphenol | 10. | U |
| 91-57-6 | 2-Methylnaphthalene | 10. | U |
| 77-47-4 | Hexachlorocyclopentadiene | 10. | U |
| 88-06-2 | 2,4,6-Trichlorophenol | 10. | U |
| 95-95-4 | 2,4,5-Trichlorophenol | 50. | U |
| 91-58-7 | 2-Chloronaphthalene | 10. | U |
| 88-74-4 | 2-Nitroaniline | 50. | U |
| 131-11-3 | Dimethylphthalate | 10. | U |
| 208-96-8 | Acenaphthylene | 10. | U |
| 606-20-2 | 2,6-Dinitrotoluene | 10. | U |

1C

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO

06/0475

BZ952

Lab Name: PEI Contract: 68-D9-0037

Lab Code: PEI Case No.: 11834 SAS No.: SDG No.: BZ949

Matrix: (soil/water) WATER Lab Sample ID: T9-04-199-044

Sample wt/vol: 1000.0 (g/mL) ML Lab File ID: BZ952

Level: (low/med) LOW Date Received: 4/26/89

% Moisture: not dec. 100. dec. 0. Date Extracted: 4/26/89

Extraction: (SepF/Cont/Sonc) CONT Date Analyzed: 5/ 9/89

GPC Cleanup: (Y/N) N pH: 7.0 Dilution Factor: 1.00

| CAS NO | COMPOUND | CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L | Q |
|---|---|---|---|
| 99-09-2 | 3-Nitroaniline | 50. | U |
| 83-32-9 | Acenaphthene | 10. | U |
| 51-28-5 | 2,4-Dinitrophenol | 50. | U |
| 100-02-7 | 4-Nitrophenol | 50. | U |
| 132-64-9 | Dibenzofuran | 10. | U |
| 121-14-2 | 2,4-Dinitrotoluene | 10. | U |
| 84-66-2 | Diethylphthalate | 10. | U |
| 7005-72-3 | 4-Chlorophenyl-phenylether | 10. | U |
| 86-73-7 | Fluorene | 10. | U |
| 100-01-6 | 4-Nitroaniline | 50. | U |
| 534-52-1 | 4,6-Dinitro-2-methylphenol | 50. | U |
| 86-30-6 | N-Nitrosodiphenylamine (1) | 10. | U |
| 101-55-3 | 4-Bromophenyl-phenylether | 10. | U |
| 118-74-1 | Hexachlorobenzene | 10. | U |
| 87-86-5 | Pentachlorophenol | 50. | U |
| 85-01-8 | Phenanthrene | 10. | U |
| 120-12-7 | Anthracene | 10. | U |
| 84-74-2 | Di-n-butylphthalate | 10. | U |
| 206-44-0 | Fluoranthene | 10. | U |
| 129-00-0 | Pyrene | 10. | U |
| 85-68-7 | Butylbenzylphthalate | 10. | U |
| 91-94-1 | 3,3'-Dichlorobenzidine | 20. | U |
| 56-55-3 | Benzo(a)anthracene | 10. | U |
| 218-01-9 | Chrysene | 10. | U |
| 117-81-7 | bis(2-Ethylhexyl)phthalate | 10. | U |
| 117-84-0 | Di-n-octylphthalate | 10. | U |
| 205-99-2 | Benzo(b)fluoranthene | 10. | U |
| 207-08-9 | Benzo(k)fluoranthene | 10. | U |
| 50-32-8 | Benzo(a)pyrene | 10. | U |
| 193-39-5 | Indeno(1,2,3-cd)pyrene | 10. | U |
| 53-70-3 | Dibenz(a,h)anthracene | 10. | U |
| 191-24-2 | Benzo(g,h,i)perylene | 10. | U |

(1) - Cannot be separated from diphenylamine

1F

EPA SAMPLE NO.

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

BZ952

Lab Name: PEI

Lab Code: PEI Case No.: 11834 SAS No.: Contract: 68-D9-0037 SDG No.: BZ949

Matrix: (soil/water) WATER

Lab Sample ID: T9-04-199-04A

Sample wt/vol: 1000.0 (g/mL) ML

Lab File ID: BZ952

Level: (low/med) LOW

Date Received: 4/26/89

% Moisture: not dec. 100. dec. 0.

Date Extracted: 4/26/89

Extraction: (SepF/Cont/Sonc) CONT

Date Analyzed: 5/ 9/89

GPC Cleanup: (Y/N) N pH: 7.0

Dilution Factor: 1.00

Number TICs found: 13

CONCENTRATION UNITS.
(ug/L or ug/Kg) UG/L

| | CAS NUMBER | COMPOUND NAME | RT | EST. CONC. | Q |
|---|---|---|---|---|---|
| 1. | - - | UNKNOWN | 5.70 | 40. | ~~J~~ ~~A~~ |
| 2. | - - | UNKNOWN | 5.80 | 60. | ~~J~~ ~~A~~ |
| 3. | - - | UNKNOWN | 6.20 | 8. | ~~J~~ ~~A~~ |
| 4. | - - | UNKNOWN | 6.42 | 80. | ~~BJ~~ ~~A~~ |
| 5. | - - | UNKNOWN | 7.20 | 20. | ~~BJ~~ ~~A~~ |
| 6. | - - | UNKNOWN | 7.70 | 80. | ~~BJ~~ ~~A~~ |
| 7. | - - | UNKNOWN | 9.63 | 30. | J |
| 8. | - - | UNKNOWN | 10.35 | 20. | J |
| 9. | - - | UNKNOWN | 22.95 | 10. | J |
| 10. | 57-10-3 | Hexadecanoic acid | 23.15 | 30. | J |
| 11. | - - | UNKNOWN | 25.00 | 30. | J |
| 12. | - - | UNKNOWN | 26.88 | 20. | J |
| 13. | - - | UNKNOWN | 27.35 | 20. | J |
| 14. | | | | | |
| 15. | | | | | |
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1B
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

BZ953

ab Name: PEI Contract: 68-D9-0037

ab Code: PEI Case No.: 11834 SAS No.: SDG No.: BZ949

atrix: (soil/water) WATER Lab Sample ID: T9-04-199-05A

ample wt/vol: 1000.0 (g/mL) ML Lab File ID: BZ953

evel: (low/med) LOW Date Received: 4/26/89

Moisture: not dec. 100. dec. 0. Date Extracted: 4/26/89

xtraction: (SepF/Cont/Sonc) CONT Date Analyzed: 5/10/89

PC Cleanup: (Y/N) N pH: 7.0 Dilution Factor: 1.00

| CAS NO. | COMPOUND | CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L | Q |
|---|---|---|---|
| 108-95-2 | Phenol | 10. | U |
| 111-44-4 | bis(2-Chloroethyl)ether | 10. | U |
| 95-57-8 | 2-Chlorophenol | 10. | U |
| 541-73-1 | 1,3-Dichlorobenzene | 10. | U |
| 106-46-7 | 1,4-Dichlorobenzene | 10. | U |
| 100-51-6 | Benzyl alcohol | 10. | U |
| 95-50-1 | 1,2-Dichlorobenzene | 10. | U |
| 95-48-7 | 2-Methylphenol | 10. | U |
| 108-60-1 | bis(2-Chloroisopropyl)ether | 10. | U |
| 106-44-5 | 4-Methylphenol | 10. | U |
| 621-64-7 | N-Nitroso-di-n-propylamine | 10. | U |
| 67-72-1 | Hexachloroethane | 10. | U |
| 98-95-3 | Nitrobenzene | 10. | U |
| 78-59-1 | Isophorone | 10. | U |
| 88-75-5 | 2-Nitrophenol | 10. | U |
| 105-67-9 | 2,4-Dimethylphenol | 10. | U |
| 65-85-0 | Benzoic acid | 50. | U |
| 111-91-1 | bis(2-Chloroethoxy)methane | 10. | U |
| 120-83-2 | 2,4-Dichlorophenol | 10. | U |
| 120-82-1 | 1,2,4-Trichlorobenzene | 10. | U |
| 91-20-3 | Naphthalene | 10. | U |
| 106-47-8 | 4-Chloroaniline | 10. | U |
| 87-68-3 | Hexachlorobutadiene | 10. | U |
| 59-50-7 | 4-Chloro-3-methylphenol | 10. | U |
| 91-57-6 | 2-Methylnaphthalene | 10. | U |
| 77-47-4 | Hexachlorocyclopentadiene | 10. | U |
| 88-06-2 | 2,4,6-Trichlorophenol | 10. | U |
| 95-95-4 | 2,4,5-Trichlorophenol | 50. | U |
| 91-58-7 | 2-Chloronaphthalene | 10. | U |
| 88-74-4 | 2-Nitroaniline | 50. | U |
| 131-11-3 | Dimethylphthalate | 10. | U |
| 208-96-8 | Acenaphthylene | 10. | U |
| 606-20-2 | 2,6-Dinitrotoluene | 10. | U |

1C

EPA SAMPLE NO. 048133

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

BZ953

Lab Name: PEI Contract: 68-D9-0037

Lab Code: PEI Case No.: 11834 SAS No.: SDG No.: BZ949

Matrix: (soil/water) WATER Lab Sample ID: T9-04-199-05A

Sample wt/vol: 1000.0 (g/mL) ML Lab File ID: BZ953

Level: (low/med) LOW Date Received: 4/26/89

% Moisture: not dec. 100. dec. 0. Date Extracted: 4/26/89

Extraction: (SepF/Cont/Sonc) CONT Date Analyzed: 5/10/89

GPC Cleanup: (Y/N) N pH: 7.0 Dilution Factor: 1.00

| CAS NO. | COMPOUND | CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L | Q |
|---|---|---|---|
| 99-09-2 | 3-Nitroaniline | 50. | U |
| 83-32-9 | Acenaphthene | 10. | U |
| 51-28-5 | 2,4-Dinitrophenol | 50. | U |
| 100-02-7 | 4-Nitrophenol | 50. | U |
| 132-64-9 | Dibenzofuran | 10. | U |
| 121-14-2 | 2,4-Dinitrotoluene | 10. | U |
| 84-66-2 | Diethylphthalate | 10. | U |
| 7005-72-3 | 4-Chlorophenyl-phenylether | 10. | U |
| 86-73-7 | Fluorene | 10. | U |
| 100-01-6 | 4-Nitroaniline | 50. | U |
| 534-52-1 | 4,6-Dinitro-2-methylphenol | 50. | U |
| 86-30-6 | N-Nitrosodiphenylamine (1) | 10. | U |
| 101-55-3 | 4-Bromophenyl-phenylether | 10. | U |
| 118-74-1 | Hexachlorobenzene | 10. | U |
| 87-86-5 | Pentachlorophenol | 50. | U |
| 85-01-8 | Phenanthrene | 10. | U |
| 120-12-7 | Anthracene | 10. | U |
| 84-74-2 | Di-n-butylphthalate | 10. | U |
| 206-44-0 | Fluoranthene | 10. | U |
| 129-00-0 | Pyrene | 10. | U |
| 85-68-7 | Butylbenzylphthalate | 10. | U |
| 91-94-1 | 3,3'-Dichlorobenzidine | 20. | U |
| 56-55-3 | Benzo(a)anthracene | 10. | U |
| 218-01-9 | Chrysene | 10. | U |
| 117-81-7 | bis(2-Ethylhexyl)phthalate | 10. | U |
| 117-84-0 | Di-n-octylphthalate | 10. | U |
| 205-99-2 | Benzo(b)fluoranthene | 10. | U |
| 207-08-9 | Benzo(k)fluoranthene | 10. | U |
| 50-32-8 | Benzo(a)pyrene | 10. | U |
| 193-39-5 | Indeno(1,2,3-cd)pyrene | 10. | U |
| 53-70-3 | Dibenz(a,h)anthracene | 10. | U |
| 191-24-2 | Benzo(g,h,i)perylene | 10. | U |

(1) - Cannot be separated from diphenylamine

1F

000500
EPA SAMPLE NO.

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

BZ953

Lab Name: PEI Contract: 68-D9-0037

Lab Code: PEI Case No.: 11834 SAS No.: SDG No.: BZ949

Matrix: (soil/water) WATER Lab Sample ID: T9-04-199-05A

Sample wt/vol: 1000.0 (g/mL) ML Lab File ID: BZ953

Level: (low/med) LOW Date Received: 4/26/89

% Moisture: not dec. 100. dec. 0. Date Extracted: 4/26/89

Extraction: (SepF/Cont/Sonc) CONT Date Analyzed: 5/10/89

GPC Cleanup: (Y/N) N pH: 7.0 Dilution Factor: 1.00

Number TICs found: 16 CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L

| | CAS NUMBER | COMPOUND NAME | RT | EST. CONC. | Q |
|---|---|---|---|---|---|
| 1. | - - | UNKNOWN | 5.15 | 200. | J A |
| 2. | - - | UNKNOWN | 5.60 | 50. | J A |
| 3. | - - | UNKNOWN | 5.68 | 50. | J A |
| 4. | - - | UNKNOWN | 6.33 | 100. | J A |
| 5. | - - | UNKNOWN | 7.13 | 20. | J A |
| 6. | - - | UNKNOWN | 7.62 | 20. | J A |
| 7. | - - | UNKNOWN | 9.60 | 60. | J A |
| 8. | 108-67-8 | Benzene, 1,3,5-trimethyl- | 9.77 | 60. | J A |
| 9. | - - | UNKNOWN | 15.28 | 50. | J |
| 10. | - - | UNKNOWN | 15.50 | 9. | J |
| 11. | - - | UNKNOWN AROMATIC | 15.85 | 100. | J |
| 12. | - - | UNKNOWN | 17.88 | 10. | J |
| 13. | - - | UNKNOWN | 18.18 | 9. | J |
| 14. | - - | UNKNOWN | 18.90 | 20. | J |
| 15. | - - | UNKNOWN | 22.95 | 20. | J |
| 16. | 57-10-3 | Hexadecanoic acid | 23.13 | 20. | J |
| 17. | | | | | |
| 18. | | | | | |
| 19. | | | | | |
| 20. | | | | | |
| 21. | | | | | |
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# SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

BZ954

Lab Name: PEI  Contract: 68-D9-0037

Lab Code: PEI  Case No.: 11834  SAS No.:  SDG No.: BZ949

Matrix: (soil/water) WATER  Lab Sample ID: T9-04-199-06A

Sample wt/vol: 1000.0 (g/mL) ML  Lab File ID: BZ954

Level: (low/med) LOW  Date Received: 4/26/89

% Moisture: not dec. 100. dec. 0.  Date Extracted: 4/26/89

Extraction: (SepF/Cont/Sonc) CONT  Date Analyzed: 5/11/89

GPC Cleanup: (Y/N) N  pH: 7.0  Dilution Factor: 1.00

| CAS NO. | COMPOUND | CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L | Q |
|---|---|---|---|
| 108-95-2 | Phenol | 10. | U |
| 111-44-4 | bis(2-Chloroethyl)ether | 10. | U |
| 95-57-8 | 2-Chlorophenol | 10. | U |
| 541-73-1 | 1,3-Dichlorobenzene | 10. | U |
| 106-46-7 | 1,4-Dichlorobenzene | 10. | U |
| 100-51-6 | Benzyl alcohol | 10. | U |
| 95-50-1 | 1,2-Dichlorobenzene | 10. | U |
| 95-48-7 | 2-Methylphenol | 10. | U |
| 108-60-1 | bis(2-Chloroisopropyl)ether | 10. | U |
| 106-44-5 | 4-Methylphenol | 10. | U |
| 621-64-7 | N-Nitroso-di-n-propylamine | 10. | U |
| 67-72-1 | Hexachloroethane | 10. | U |
| 98-95-3 | Nitrobenzene | 10. | U |
| 78-59-1 | Isophorone | 10. | U |
| 88-75-5 | 2-Nitrophenol | 10. | U |
| 105-67-9 | 2,4-Dimethylphenol | 10. | U |
| 65-85-0 | Benzoic acid | 10. | U |
| 111-91-1 | bis(2-Chloroethoxy)methane | 50. | U |
| 120-83-2 | 2,4-Dichlorophenol | 10. | U |
| 120-82-1 | 1,2,4-Trichlorobenzene | 10. | U |
| 91-20-3 | Naphthalene | 10. | U |
| 106-47-8 | 4-Chloroaniline | 10. | U |
| 87-68-3 | Hexachlorobutadiene | 10. | U |
| 59-50-7 | 4-Chloro-3-methylphenol | 10. | U |
| 91-57-6 | 2-Methylnaphthalene | 10. | U |
| 77-47-4 | Hexachlorocyclopentadiene | 10. | U |
| 88-06-2 | 2,4,6-Trichlorophenol | 10. | U |
| 95-95-4 | 2,4,5-Trichlorophenol | 10. | U |
| 91-58-7 | 2-Chloronaphthalene | 50. | U |
| 88-74-4 | 2-Nitroaniline | 10. | U |
| 131-11-3 | Dimethylphthalate | 50. | U |
| 208-96-8 | Acenaphthylene | 10. | U |
| 606-20-2 | 2,6-Dinitrotoluene | 10. | U |

EPA SAMPLE NO.

BZ954

# SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

Lab Name: PEI Contract: 68-D9-0037

Lab Code: PEI Case No. 11834 SAS No.: SDG No.: BZ949

Matrix: (soil/water) WATER Lab Sample ID: T9-04-199-06A

Sample wt/vol. 1000.0 (g/mL) ML Lab File ID: BZ954

Level: (low/med) LOW Date Received: 4/26/89

% Moisture: not dec. 100. dec. 0. Date Extracted: 4/26/89

Extraction: (SepF/Cont/Sonc) CONT Date Analyzed: 5/11/89

GPC Cleanup: (Y/N) N pH: 7.0 Dilution Factor: 1.00

| CAS NO. | COMPOUND | CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L | Q |
|---|---|---|---|
| 99-09-2 | 3-Nitroaniline | 50. | U |
| 83-32-9 | Acenaphthene | 10. | U |
| 51-28-5 | 2,4-Dinitrophenol | 50. | U |
| 100-02-7 | 4-Nitrophenol | 50. | U |
| 132-64-9 | Dibenzofuran | 10. | U |
| 121-14-2 | 2,4-Dinitrotoluene | 10. | U |
| 84-66-2 | Diethylphthalate | 10. | U |
| 7005-72-3 | 4-Chlorophenyl-phenylether | 10. | U |
| 86-73-7 | Fluorene | 10. | U |
| 100-01-6 | 4-Nitroaniline | 50. | U |
| 534-52-1 | 4,6-Dinitro-2-methylphenol | 50. | U |
| 86-30-6 | N-Nitrosodiphenylamine (1) | 10. | U |
| 101-55-3 | 4-Bromophenyl-phenylether | 10. | U |
| 118-74-1 | Hexachlorobenzene | 10. | U |
| 87-86-5 | Pentachlorophenol | 50. | U |
| 85-01-8 | Phenanthrene | 10. | U |
| 120-12-7 | Anthracene | 10. | U |
| 84-74-2 | Di-n-butylphthalate | 10. | U |
| 206-44-0 | Fluoranthene | 10. | U |
| 129-00-0 | Pyrene | 10. | U |
| 85-68-7 | Butylbenzylphthalate | 10. | U |
| 91-94-1 | 3,3'-Dichlorobenzidine | 20. | U |
| 56-55-3 | Benzo(a)anthracene | 10. | U |
| 218-01-9 | Chrysene | 10. | U |
| 117-81-7 | bis(2-Ethylhexyl)phthalate | 10. | U |
| 117-84-0 | Di-n-octylphthalate | 10. | U |
| 205-99-2 | Benzo(b)fluoranthene | 10. | U |
| 207-08-9 | Benzo(k)fluoranthene | 10. | U |
| 50-32-8 | Benzo(a)pyrene | 10. | U |
| 193-39-5 | Indeno(1,2,3-cd)pyrene | 10. | U |
| 53-70-3 | Dibenz(a,h)anthracene | 10. | U |
| 191-24-2 | Benzo(g,h,i)perylene | 10. | U |

(1) - Cannot be separated from diphenylamine

1F

EPA SAMPLE NO

BZ954

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

Lab Name: PEI Contract: 68-D9-0037

Lab Code: PEI Case No.: 11834 SAS No.: SDG No.: BZ949

Matrix: (soil/water) WATER Lab Sample ID: T9-04-199-06A

Sample wt/vol: 1000.0 (g/mL) ML Lab File ID: BZ954

Level: (low/med) LOW Date Received: 4/26/89

% Moisture: not dec. 100. dec. 0. Date Extracted: 4/26/89

Extraction: (SepF/Cont/Sonc) CONT Date Analyzed: 5/11/89

GPC Cleanup (Y/N) N pH: 7.0 Dilution Factor: 1.00

Number TICs found 15

CONCENTRATION UNITS:
(ug/L or ug/Kg) UG/L

| | CAS NUMBER | COMPOUND NAME | RT | EST. CONC. | Q |
|---|---|---|---|---|---|
| 1. | - - | UNKNOWN | 5.23 | 400. | ~~J~~ A |
| 2. | - - | UNKNOWN | 5.57 | 30. | J A |
| 3. | - - | UNKNOWN | 5.63 | 40. | BJ A |
| 4. | - - | UNKNOWN | 5.73 | 40. | J A |
| 5. | - - | UNKNOWN | 6.37 | 200. | BJ A |
| 6. | - - | UNKNOWN | 7.63 | 40. | BJ A |
| 7. | - - | UNKNOWN | 9.60 | 400. | ~~J~~ A |
| 8. | 108-67-8 | Benzene, 1,3,5-trimethyl- | 9.75 | 40. | J |
| 9. | - - | UNKNOWN | 15.27 | 30 | J |
| 10. | - - | UNKNOWN | 15.82 | 90. | J |
| 11. | 544-63-8 | Tetradecanoic acid | 20.92 | 30. | J |
| 12. | - - | UNKNOWN | 22.83 | 30. | J |
| 13. | - - | UNKNOWN HYDROCARBON | 22.95 | 50. | J |
| 14. | 57-10-3 | Hexadecanoic acid | 23.12 | 50. | J |
| 15. | - - | UNKNOWN HYDROCARBON | 24.95 | 30. | J |
| 16. | | | | | |
| 17. | | | | | |
| 18. | | | | | |
| 19. | | | | | |
| 20. | | | | | |
| 21. | | | | | |
| 22. | | | | | |
| 23. | | | | | |
| 24. | | | | | |
| 25. | | | | | |
| 26. | | | | | |
| 27. | | | | | |
| 28. | | | | | |
| 29. | | | | | |
| 30. | | | | | |

1B
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

BZ964

Lab Name: PEI Contract: 68-D9-0037

Lab Code: PEI Case No.: 11834 SAS No.: SDG No.: BZ949

Matrix: (soil/water) WATER Lab Sample ID: T9-04-199-16A

Sample wt/vol: 1000.0 (g/mL) ML Lab File ID: BZ964

Level: (low/med) LOW Date Received: 4/26/89

% Moisture: not dec. 100 dec. 0. Date Extracted: 4/26/89

Extraction: (SepF/Cont/Sonc) CONT Date Analyzed: 5/11/89

GPC Cleanup (Y/N) N pH 7.0 Dilution Factor: 1.00

| CAS NO. | COMPOUND | CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L | Q |
|---|---|---|---|
| 108-95-2 | Phenol | 10. | U |
| 111-44-4 | bis(2-Chloroethyl)ether | 10. | U |
| 95-57-8 | 2-Chlorophenol | 10. | U |
| 541-73-1 | 1,3-Dichlorobenzene | 10. | U |
| 106-46-7 | 1,4-Dichlorobenzene | 10. | U |
| 100-51-6 | Benzyl alcohol | 10. | U |
| 95-50-1 | 1,2-Dichlorobenzene | 10. | U |
| 95-48-7 | 2-Methylphenol | 10. | U |
| 108-60-1 | bis(2-Chloroisopropyl)ether | 10. | U |
| 106-44-5 | 4-Methylphenol | 10. | U |
| 621-64-7 | N-Nitroso-di-n-propylamine | 10. | U |
| 67-72-1 | Hexachloroethane | 10. | U |
| 98-95-3 | Nitrobenzene | 10. | U |
| 78-59-1 | Isophorone | 10. | U |
| 88-75-5 | 2-Nitrophenol | 10. | U |
| 105-67-9 | 2,4-Dimethylphenol | 10. | U |
| 65-85-0 | Benzoic acid | 10. | U |
| 111-91-1 | bis(2-Chloroethoxy)methane | 50. | U |
| 120-83-2 | 2,4-Dichlorophenol | 10. | U |
| 120-82-1 | 1,2,4-Trichlorobenzene | 10. | U |
| 91-20-3 | Naphthalene | 10. | U |
| 106-47-8 | 4-Chloroaniline | 10. | U |
| 87-68-3 | Hexachlorobutadiene | 10. | U |
| 59-50-7 | 4-Chloro-3-methylphenol | 10. | U |
| 91-57-6 | 2-Methylnaphthalene | 10. | U |
| 77-47-4 | Hexachlorocyclopentadiene | 10. | U |
| 88-06-2 | 2,4,6-Trichlorophenol | 10. | U |
| 95-95-4 | 2,4,5-Trichlorophenol | 10. | U |
| 91-58-7 | 2-Chloronaphthalene | 50. | U |
| 88-74-4 | 2-Nitroaniline | 10. | U |
| 131-11-3 | Dimethylphthalate | 50. | U |
| 208-96-8 | Acenaphthylene | 10. | U |
| 606-20-2 | 2,6-Dinitrotoluene | 10. | U |

1C

EPA SAMPLE NO

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

BZ964

Lab Name: PEI Contract: 68-D9-0037

Lab Code: PEI Case No.: 11834 SAS No.: SDG No.: BZ949

Matrix: (soil/water) WATER Lab Sample ID: T9-04-199-16A

Sample wt/vol: 1000.0 (g/mL) ML Lab File ID: BZ964

Level: (low/med) LOW Date Received: 4/26/89

% Moisture: not dec. 100. dec. 0. Date Extracted: 4/26/89

Extraction: (SepF/Cont/Sonc) CONT Date Analyzed: 5/11/89

GPC Cleanup: (Y/N) N pH: 7.0 Dilution Factor: 1.00

| CAS NO. | COMPOUND | CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L | G |
|---|---|---|---|
| 99-09-2 | 3-Nitroaniline | 50. | U |
| 83-32-9 | Acenaphthene | 10. | U |
| 51-28-5 | 2,4-Dinitrophenol | 50. | U |
| 100-02-7 | 4-Nitrophenol | 50. | U |
| 132-64-9 | Dibenzofuran | 10. | U |
| 121-14-2 | 2,4-Dinitrotoluene | 10. | U |
| 84-66-2 | Diethylphthalate | 10 ~~2~~ | ~~J~~ U |
| 7005-72-3 | 4-Chlorophenyl-phenylether | 10. | U |
| 86-73-7 | Fluorene | 10. | U |
| 100-01-6 | 4-Nitroaniline | 50. | U |
| 534-52-1 | 4,6-Dinitro-2-methylphenol | 50. | U |
| 86-30-6 | N-Nitrosodiphenylamine (1) | 10. | U |
| 101-55-3 | 4-Bromophenyl-phenylether | 10. | U |
| 118-74-1 | Hexachlorobenzene | 10. | U |
| 87-86-5 | Pentachlorophenol | 50. | U |
| 85-01-8 | Phenanthrene | 10. | U |
| 120-12-7 | Anthracene | 10. | U |
| 84-74-2 | Di-n-butylphthalate | 1. | J |
| 206-44-0 | Fluoranthene | 10. | U |
| 129-00-0 | Pyrene | 10. | U |
| 85-68-7 | Butylbenzylphthalate | 10. | U |
| 91-94-1 | 3,3'-Dichlorobenzidine | 20. | U |
| 56-55-3 | Benzo(a)anthracene | 10. | U |
| 218-01-9 | Chrysene | 10. | U |
| 117-81-7 | bis(2-Ethylhexyl)phthalate | 10. | U |
| 117-84-0 | Di-n-octylphthalate | 10. | U |
| 205-99-2 | Benzo(b)fluoranthene | 10. | U |
| 207-08-9 | Benzo(k)fluoranthene | 10. | U |
| 50-32-8 | Benzo(a)pyrene | 10. | U |
| 193-39-5 | Indeno(1,2,3-cd)pyrene | 10. | U |
| 53-70-3 | Dibenz(a,h)anthracene | 10. | U |
| 191-24-2 | Benzo(g,h,i)perylene | 10. | U |

(1) - Cannot be separated from diphenylamine

1F

EPA SAMPLE NO. 000776

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

BZ964

Lab Name: PEI Contract: 68-D9-0037

Lab Code: PEI Case No.: 11834 SAS No.: SDG No.: BZ949

Matrix: (soil/water) WATER Lab Sample ID: T9-04-199-16A

Sample wt/vol: 1000.0 (g/mL) ML Lab File ID: BZ964

Level: (low/med) LOW Date Received: 4/26/89

% Moisture: not dec. 100. dec. 0. Date Extracted: 4/26/89

Extraction: (SepF/Cont/Sonc) CONT Date Analyzed: 5/11/89

GPC Cleanup: (Y/N) N pH: 7.0 Dilution Factor: 1.00

Number TICs found 13

CONCENTRATION UNITS:
(ug/L or ug/Kg) UG/L

| | CAS NUMBER | COMPOUND NAME | RT | EST. CONC. | Q |
|---|---|---|---|---|---|
| 1 | - - | UNKNOWN HYDROCARBON | 5.42 | 100. | J N |
| 2. | - - | UNKNOWN | 5.78 | 50. | J A R |
| 3. | - - | UNKNOWN | 6.17 | 70. | J A R |
| [illegible] | - - | UNKNOWN | 6.38 | 80. | BJ A R |
| [illegible] | - - | UNKNOWN | 7.18 | 30. | BJ A R |
| 6. | - - | UNKNOWN | 7.67 | 80. | BJ A R |
| 7. | - - | UNKNOWN | 7.88 | 20. | J N |
| 8. | - - | UNKNOWN | 10.32 | 50. | BJ A R |
| 9. | 544-63-8 | Tetradecanoic acid | 20.92 | 20. | J N |
| 10. | - - | UNKNOWN | 22.83 | 20. | J |
| 11. | - - | UNKNOWN HYDROCARBON | 22.95 | 30. | J |
| 12. | 57-10-3 | Hexadecanoic acid | 23.12 | 30. | J |
| 13 | - - | UNKNOWN HYDROCARBON | 24.95 | 30. | J N |
| 14. | | | | | |
| 15. | | | | | |
| 16. | | | | | |
| 17. | | | | | |
| 18. | | | | | |
| 19. | | | | | |
| 20. | | | | | |
| 21. | | | | | |
| 22. | | | | | |
| 23. | | | | | |
| 24. | | | | | |
| 25. | | | | | |
| 26. | | | | | |
| 27. | | | | | |
| 28. | | | | | |
| [illegible] | | | | | |

1B

# SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO

BZ955

Lab Name: PEI

Contract: 68-D9-0037

Lab Code: PEI Case No. 11834 SAS No.: SDG No.: BZ949

Matrix: (soil/water) SOIL

Lab Sample ID: T9-04-199-07A

Sample wt/vol: 30.1 (g/mL) G

Lab File ID: BZ955

Level: (low/med) LOW

Date Received: 4/26/89

% Moisture: not dec. 50. dec. 0.

Date Extracted: 4/28/89

Extraction: (SepF/Cont/Sonc) SONC

Date Analyzed: 5/11/89

GPC Cleanup: (Y/N) Y pH: 7.0

Dilution Factor: 1.00

| CAS NO. | COMPOUND | CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG | G |
|---|---|---|---|
| 108-95-2 | Phenol | 1300. | U |
| 111-44-4 | bis(2-Chloroethyl)ether | 1300. | U |
| 95-57-8 | 2-Chlorophenol | 1300. | U |
| 541-73-1 | 1,3-Dichlorobenzene | 1300. | U |
| 106-46-7 | 1,4-Dichlorobenzene | 1300. | U |
| 100-51-6 | Benzyl alcohol | 1300. | U |
| 95-50-1 | 1,2-Dichlorobenzene | 1300. | U |
| 95-48-7 | 2-Methylphenol | 1300. | U |
| 108-60-1 | bis(2-Chloroisopropyl)ether | 1300. | U |
| 106-44-5 | 4-Methylphenol | 1300. | U |
| 621-64-7 | N-Nitroso-di-n-propylamine | 1300. | U |
| 67-72-1 | Hexachloroethane | 1300. | U |
| 98-95-3 | Nitrobenzene | 1300. | U |
| 78-59-1 | Isophorone | 1300. | U |
| 88-75-5 | 2-Nitrophenol | 1300. | U |
| 105-67-9 | 2,4-Dimethylphenol | 1300. | U |
| 65-85-0 | Benzoic acid | 1300. | U |
| 111-91-1 | bis(2-Chloroethoxy)methane | 6300. | U |
| 120-83-2 | 2,4-Dichlorophenol | 1300. | U |
| 120-82-1 | 1,2,4-Trichlorobenzene | 1300. | U |
| 91-20-3 | Naphthalene | 1300. | U |
| 106-47-8 | 4-Chloroaniline | 130. | J |
| 87-68-3 | Hexachlorobutadiene | 1300. | U |
| 59-50-7 | 4-Chloro-3-methylphenol | 1300. | U |
| 91-57-6 | 2-Methylnaphthalene | 1300. | U |
| 77-47-4 | Hexachlorocyclopentadiene | 1300. | U |
| 88-06-2 | 2,4,6-Trichlorophenol | 1300. | U |
| 95-95-4 | 2,4,5-Trichlorophenol | 1300. | U |
| 91-58-7 | 2-Chloronaphthalene | 6300. | U |
| 88-74-4 | 2-Nitroaniline | 1300. | U |
| 131-11-3 | Dimethylphthalate | 6300. | U |
| 208-96-8 | Acenaphthylene | 1300. | U |
| 606-20-2 | 2,6-Dinitrotoluene | 1300. | U |

1C

EPA SAMPLE NO. 000553

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

BZ955

Lab Name: PEI Contract: 68-D9-0037

Lab Code: PEI Case No.: 11834 SAS No.: SDG No.: BZ949

Matrix (soil/water) SOIL Lab Sample ID: T9-04-199-07

Sample wt/vol: 30.1 (g/mL) G Lab File ID: BZ955

Level: (low/med) LOW Date Received: 4/26/89

% Moisture: not dec. 50. dec. 0 Date Extracted: 4/28/89

Extraction: (SepF/Cont/Sonc) SONC Date Analyzed: 5/11/89

GPC Cleanup: (Y/N) Y pH: 7.0 Dilution Factor: 1.0

| CAS NO | COMPOUND | CONCENTRATION UNITS (ug/L or ug/Kg) UG/KG | G |
|---|---|---|---|
| 99-09-2 | 3-Nitroaniline | 6300. | U |
| 83-32-9 | Acenaphthene | 1300. | U |
| 51-28-5 | 2,4-Dinitrophenol | 6300. | U |
| 100-02-7 | 4-Nitrophenol | 6300. | U |
| 132-64-9 | Dibenzofuran | 1300. | U |
| 121-14-2 | 2,4-Dinitrotoluene | 1300. | U |
| 84-66-2 | Diethylphthalate | 1300. | U |
| 7005-72-3 | 4-Chlorophenyl-phenylether | 1300. | U |
| 86-73-7 | Fluorene | 1300. | U |
| 100-01-6 | 4-Nitroaniline | 6300. | U |
| 534-52-1 | 4,6-Dinitro-2-methylphenol | 6300. | U |
| 86-30-6 | N-Nitrosodiphenylamine (1) | 1300. | U |
| 101-55-3 | 4-Bromophenyl-phenylether | 1300. | U |
| 118-74-1 | Hexachlorobenzene | 1300. | U |
| 87-86-5 | Pentachlorophenol | 6300. | U |
| 85-01-8 | Phenanthrene | 1300. | U |
| 120-12-7 | Anthracene | 1300. | U |
| 84-74-2 | Di-n-butylphthalate | 210. | J |
| 206-44-0 | Fluoranthene | 130. | J |
| 129-00-0 | Pyrene | 110. | J |
| 85-68-7 | Butylbenzylphthalate | 300. | J |
| 91-94-1 | 3,3'-Dichlorobenzidine | 2600. | U |
| 56-55-3 | Benzo(a)anthracene | 1300. | U |
| 218-01-9 | Chrysene | 140. | J |
| 117-81-7 | bis(2-Ethylhexyl)phthalate | 1000. | J |
| 117-84-0 | Di-n-octylphthalate | 1300. | U |
| 205-99-2 | Benzo(b)fluoranthene | 230. | J |
| 207-08-9 | Benzo(k)fluoranthene | 1300. | U |
| 50-32-8 | Benzo(a)pyrene | 1300. | U |
| 193-39-5 | Indeno(1,2,3-cd)pyrene | 1300. | U |
| 53-70-3 | Dibenz(a,h)anthracene | 1300. | U |
| 191-24-2 | Benzo(g,h,i)perylene | 1300. | U |

(1) - Cannot be separated from diphenylamine

1F

EPA SAMPLE NO.

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

BZ955

Lab Name: PEI Contract: 68-D9-0037

Lab Code: PEI Case No.: 11824 SAS No.: SDG No.: BZ949

Matrix: (soil/water) SOIL Lab Sample ID: T9-04-199-07A

Sample wt/vol: 30.1 (g/mL) G Lab File ID: BZ955

Level: (low/med) LOW Date Received: 4/26/89

% Moisture: not dec. 50. dec. 0. Date Extracted: 4/28/89

Extraction: (SepF/Cont/Sonc) SONC Date Analyzed: 5/11/89

GPC Cleanup: (Y/N) Y pH: 7.0 Dilution Factor: 1.00

Number TICs found: 15 CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG

| | CAS NUMBER | COMPOUND NAME | RT | EST. CONC. | Q |
|---|---|---|---|---|---|
| 1 | - - | UNKNOWN | 5.70 | 5000. | ~~J~~ A |
| 2 | 108-38-3 | Benzene, 1,3-dimethyl- | 7.02 | 2000. | ~~JB~~ T |
| 3 | - - | UNKNOWN | 18.03 | 2000. | J N |
| 4 | - - | UNKNOWN PHTHALATE | 22.22 | 2000. | ~~JB~~ A |
| 5 | 57-10-3 | Hexadecanoic acid | 23.12 | 3000. | J N |
| 6 | - - | UNKNOWN | 24.47 | 5000. | J |
| 7 | - - | UNKNOWN HYDROCARBON | 26.42 | 2000. | J |
| 8 | - - | UNKNOWN HYDROCARBON | 27.32 | 4000. | J |
| 9 | - - | UNKNOWN HYDROCARBON | 28.33 | 3000 | J |
| 10 | - - | UNKNOWN HYDROCARBON | 29.52 | 3000. | J |
| 11 | - - | UNKNOWN | 29.67 | 1000. | J |
| 12 | - - | UNKNOWN HYDROCARBON | 30.96 | 2000. | J |
| 13 | - - | UNKNOWN HYDROCARBON | 32.77 | 3000. | J |
| 14 | - - | UNKNOWN HYDROCARBON | 35.00 | 3000 | J |
| 15 | - - | UNKNOWN | 41.12 | 4000. | J N |
| 16 | | | | | |
| 17 | | | | | |
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1B

# SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO. GLU587

BZ956

Lab Name: PEI  Contract: 68-D9-0037

Lab Code: PEI  Case No. 11834  SAS No.  SDG No.: BZ949

Matrix: (soil/water) SOIL  Lab Sample ID: T9-04-199-08A

Sample wt/vol: 30.0 (g/mL) G  Lab File ID: BZ956

Level: (low/med) LOW  Date Received: 4/26/89

% Moisture: not dec. 22. dec. 0  Date Extracted: 4/28/89

Extraction: (SepF/Cont/Sonc) SONC  Date Analyzed: 5/11/89

GPC Cleanup: (Y/N) Y  pH: 7.0  Dilution Factor: 1.00

| CAS NO. | COMPOUND | CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG | Q |
|---|---|---|---|
| 108-95-2 | Phenol | 850. | U |
| 111-44-4 | bis(2-Chloroethyl)ether | 850. | U |
| 95-57-8 | 2-Chlorophenol | 850. | U |
| 541-73-1 | 1,3-Dichlorobenzene | 850. | U |
| 106-46-7 | 1,4-Dichlorobenzene | 850. | U |
| 100-51-6 | Benzyl alcohol | 850. | U |
| 95-50-1 | 1,2-Dichlorobenzene | 850. | U |
| 95-48-7 | 2-Methylphenol | 850. | U |
| 108-60-1 | bis(2-Chloroisopropyl)ether | 850. | U |
| 106-44-5 | 4-Methylphenol | 850. | U |
| 621-64-7 | N-Nitroso-di-n-propylamine | 850. | U |
| 67-72-1 | Hexachloroethane | 850. | U |
| 98-95-3 | Nitrobenzene | 850. | U |
| 78-59-1 | Isophorone | 850. | U |
| 88-75-5 | 2-Nitrophenol | 850. | U |
| 105-67-9 | 2,4-Dimethylphenol | 850. | U |
| 65-85-0 | Benzoic acid | 4100. | U |
| 111-91-1 | bis(2-Chloroethoxy)methane | 850. | U |
| 120-83-2 | 2,4-Dichlorophenol | 850. | U |
| 120-82-1 | 1,2,4-Trichlorobenzene | 850. | U |
| 91-20-3 | Naphthalene | 850. | U |
| 106-47-8 | 4-Chloroaniline | 850. | U |
| 87-68-3 | Hexachlorobutadiene | 850. | U |
| 59-50-7 | 4-Chloro-3-methylphenol | 850. | U |
| 91-57-6 | 2-Methylnaphthalene | 850. | U |
| 77-47-4 | Hexachlorocyclopentadiene | 850. | U |
| 88-06-2 | 2,4,6-Trichlorophenol | 850. | U |
| 95-95-4 | 2,4,5-Trichlorophenol | 850. | U |
| 91-58-7 | 2-Chloronaphthalene | 4100. | U |
| 88-74-4 | 2-Nitroaniline | 850. | U |
| 131-11-3 | Dimethylphthalate | 4100. | U |
| 208-96-8 | Acenaphthylene | 850. | U |
| 606-20-2 | 2,6-Dinitrotoluene | 850. | U |

1C

EPA SAMPLE NO. 61-0538

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

BZ956

Lab Name: PEI Contract: 68-D9-0037

Lab Code: PEI Case No.: 11834 SAS No. SDG No.: BZ949

Matrix: (soil/water) SOIL Lab Sample ID: T9-04-199-08A

Sample wt/vol. 30.0 (g/mL) G Lab File ID: BZ956

Level: (low/med) LOW Date Received: 4/26/89

% Moisture: not dec. 22. dec. 0. Date Extracted: 4/28/89

Extraction. (SepF/Cont/Sonc) SONC Date Analyzed: 5/11/89

GPC Cleanup (Y/N) Y pH: 7.0 Dilution Factor: 1.00

| CAS NO. | COMPOUND | CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG | Q |
|---|---|---|---|
| 99-09-2 | 3-Nitroaniline | 4100. | U |
| 83-32-9 | Acenaphthene | 850. | U |
| 51-28-5 | 2,4-Dinitrophenol | 4100. | U |
| 100-02-7 | 4-Nitrophenol | 4100. | U |
| 132-64-9 | Dibenzofuran | 850. | U |
| 121-14-2 | 2,4-Dinitrotoluene | 850. | U |
| 84-66-2 | Diethylphthalate | 850. | U |
| 7005-72-3 | 4-Chlorophenyl-phenylether | 850. | U |
| 86-73-7 | Fluorene | 850. | U |
| 100-01-6 | 4-Nitroaniline | 4100. | U |
| 534-52-1 | 4,6-Dinitro-2-methylphenol | 4100. | U |
| 86-30-6 | N-Nitrosodiphenylamine (1) | 850. | U |
| 101-55-3 | 4-Bromophenyl-phenylether | 850. | U |
| 118-74-1 | Hexachlorobenzene | 850. | U |
| 87-86-5 | Pentachlorophenol | 4100. | U |
| 85-01-8 | Phenanthrene | 850. | U |
| 120-12-7 | Anthracene | 850. | U |
| 84-74-2 | Di-n-butylphthalate | 850. | U |
| 206-44-0 | Fluoranthene | 850. | U |
| 129-00-0 | Pyrene | 850. | U |
| 85-68-7 | Butylbenzylphthalate | 850. | U |
| 91-94-1 | 3,3'-Dichlorobenzidine | 1700. | U |
| 56-55-3 | Benzo(a)anthracene | 850. | U |
| 218-01-9 | Chrysene | 850. | U |
| 117-81-7 | bis(2-Ethylhexyl)phthalate | 850. | U |
| 117-84-0 | Di-n-octylphthalate | 850. | U |
| 205-99-2 | Benzo(b)fluoranthene | 850. | U |
| 207-08-9 | Benzo(k)fluoranthene | 850. | U |
| 50-32-8 | Benzo(a)pyrene | 850. | U |
| 193-39-5 | Indeno(1,2,3-cd)pyrene | 850. | U |
| 53-70-3 | Dibenz(a,h)anthracene | 850. | U |
| 191-24-2 | Benzo(g,h,i)perylene | 850. | U |

(1) - Cannot be separated from diphenylamine

EPA SAMPLE NO.

BZ956

# SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET
## TENTATIVELY IDENTIFIED COMPOUNDS

Lab Name: PEI

Contract: 68-D9-0037

Lab Code: PEI Case No. 11834 SAS No.:

SDG No.: BZ949

Matrix: (soil/water) SOIL

Lab Sample ID: T9-04-199-08A

Sample wt/vol 30.0 (g/mL) G

Lab File ID: BZ956

Level: (low/med) LOW

Date Received: 4/26/89

% Moisture: not dec. 22. dec. 0.

Date Extracted: 4/28/89

Extraction: (SepF/Cont/Sonc) SONC

Date Analyzed: 5/11/89

GPC Cleanup: (Y/N) Y pH 7.0

Dilution Factor: 1.00

Number TICs found: 11

CONCENTRATION UNITS (ug/L or ug/Kg) UG/KG

| | CAS NUMBER | COMPOUND NAME | RT | EST. CONC. | Q |
|---|---|---|---|---|---|
| 1. | - - | UNKNOWN HYDROCARBON | 5.25 | 2000. | J N |
| 2. | - - | UNKNOWN HYDROCARBON | 5.33 | 2000. | J N |
| 3. | - - | UNKNOWN | 5.72 | 4000. | ~~J~~ ~~A~~ R |
| 4. | - - | UNKNOWN HYDROCARBON | 6.73 | 400. | J N |
| 5. | - - | UNKNOWN AROMATIC | 6.82 | 1000. | J N |
| 6. | 108-38-3 | Benzene, 1,3-dimethyl- | 7.02 | 1000. | ~~TBJ~~ ~~A~~ R |
| 7. | - - | UNKNOWN | 8.07 | 600. | ~~TBJ~~ ~~A~~ R |
| 8. | 100-52-7 | Benzaldehyde (ACN)(DOT) | 9.03 | 400. | J N |
| 9. | - - | UNKNOWN | 9.68 | 1000. | ~~TBJ~~ ~~A~~ R |
| 10. | - - | UNKNOWN PHTHALATE | 22.20 | 1000. | ~~TBJ~~ ~~A~~ R |
| 11. | - - | UNKNOWN | 24.42 | 600. | J N |
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1B
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

BZ957

Lab Name: PEI Contract: 68-D9-0037

Lab Code: PEI Case No.: 11834 SAS No.: SDG No.: BZ949

Matrix: (soil/water) SOIL Lab Sample ID: T9-04-199-09A

Sample wt/vol: 30.0 (g/mL) G Lab File ID: BZ957

Level: (low/med) LOW Date Received: 4/26/89

% Moisture: not dec. 22. dec. 0. Date Extracted: 4/28/89

Extraction: (SepF/Cont/Sonc) SONC Date Analyzed: 5/10/89

GPC Cleanup: (Y/N) Y pH: 7.0 Dilution Factor: 1.00

| CAS NO. | COMPOUND | CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG | Q |
|---|---|---|---|
| 108-95-2 | Phenol | 840. | U |
| 111-44-4 | bis(2-Chloroethyl)ether | 840. | U |
| 95-57-8 | 2-Chlorophenol | 840. | U |
| 541-73-1 | 1,3-Dichlorobenzene | 840. | U |
| 106-46-7 | 1,4-Dichlorobenzene | 840. | U |
| 100-51-6 | Benzyl alcohol | 840. | U |
| 95-50-1 | 1,2-Dichlorobenzene | 840. | U |
| 95-48-7 | 2-Methylphenol | 840. | U |
| 108-60-1 | bis(2-Chloroisopropyl)ether | 840. | U |
| 106-44-5 | 4-Methylphenol | 840. | U |
| 621-64-7 | N-Nitroso-di-n-propylamine | 840. | U |
| 67-72-1 | Hexachloroethane | 840. | U |
| 98-95-3 | Nitrobenzene | 840. | U |
| 78-59-1 | Isophorone | 840. | U |
| 88-75-5 | 2-Nitrophenol | 840. | U |
| 105-67-9 | 2,4-Dimethylphenol | 840. | U |
| 65-85-0 | Benzoic acid | 4100. | U |
| 111-91-1 | bis(2-Chloroethoxy)methane | 840. | U |
| 120-83-2 | 2,4-Dichlorophenol | 840. | U |
| 120-82-1 | 1,2,4-Trichlorobenzene | 840. | U |
| 91-20-3 | Naphthalene | 840. | U |
| 106-47-8 | 4-Chloroaniline | 840. | U |
| 87-68-3 | Hexachlorobutadiene | 840. | U |
| 59-50-7 | 4-Chloro-3-methylphenol | 840. | U |
| 91-57-6 | 2-Methylnaphthalene | 840. | U |
| 77-47-4 | Hexachlorocyclopentadiene | 840. | U |
| 88-06-2 | 2,4,6-Trichlorophenol | 840. | U |
| 95-95-4 | 2,4,5-Trichlorophenol | 840. | U |
| 91-58-7 | 2-Chloronaphthalene | 4100. | U |
| 88-74-4 | 2-Nitroaniline | 840. | U |
| 131-11-3 | Dimethylphthalate | 4100. | U |
| 208-96-8 | Acenaphthylene | 840. | U |
| 606-20-2 | 2,6-Dinitrotoluene | 840. | U |

1C

EPA SAMPLE NO.

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

BZ957

Name: PEI Contract: 68-D9-0037

Lab Code: PEI Case No.: 11834 SAS No.: SDG No.: BZ949

Matrix: (soil/water) SOIL Lab Sample ID: T9-04-199-09A

Sample wt/vol: 30.0 (g/mL) G Lab File ID: BZ957

Level: (low/med) LOW Date Received: 4/26/89

% Moisture: not dec. 22. dec. 0. Date Extracted: 4/28/89

Extraction: (SepF/Cont/Sonc) SONC Date Analyzed: 5/10/89

GPC Cleanup: (Y/N) Y pH: 7.0 Dilution Factor: 1.00

| CAS NO. | COMPOUND | CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG | Q |
|---|---|---|---|
| 99-09-2 | 3-Nitroaniline | 4100. | U |
| 83-32-9 | Acenaphthene | 840. | U |
| 51-28-5 | 2,4-Dinitrophenol | 4100. | U |
| 100-02-7 | 4-Nitrophenol | 4100. | U |
| 132-64-9 | Dibenzofuran | 840. | U |
| 121-14-2 | 2,4-Dinitrotoluene | 840. | U |
| 84-66-2 | Diethylphthalate | 840. | U |
| 7005-72-3 | 4-Chlorophenyl-phenylether | 840. | U |
| 86-73-7 | Fluorene | 840. | U |
| 100-01-6 | 4-Nitroaniline | 4100. | U |
| 534-52-1 | 4,6-Dinitro-2-methylphenol | 4100. | U |
| 86-30-6 | N-Nitrosodiphenylamine (1) | 840. | U |
| 101-55-3 | 4-Bromophenyl-phenylether | 840. | U |
| 118-74-1 | Hexachlorobenzene | 840. | U |
| 87-86-5 | Pentachlorophenol | 4100. | U |
| 85-01-8 | Phenanthrene | 840. | U |
| 120-12-7 | Anthracene | 840. | U |
| 84-74-2 | Di-n-butylphthalate | 840. | U |
| 206-44-0 | Fluoranthene | 840. | U |
| 129-00-0 | Pyrene | 840. | U |
| 85-68-7 | Butylbenzylphthalate | 840. | U |
| 91-94-1 | 3,3'-Dichlorobenzidine | 1700. | U |
| 56-55-3 | Benzo(a)anthracene | 840. | U |
| 218-01-9 | Chrysene | 840. | U |
| 117-81-7 | bis(2-Ethylhexyl)phthalate | 840. | U |
| 117-84-0 | Di-n-octylphthalate | 840. | U |
| 205-99-2 | Benzo(b)fluoranthene | 840. | U |
| 207-08-9 | Benzo(k)fluoranthene | 840. | U |
| 50-32-8 | Benzo(a)pyrene | 840. | U |
| 193-39-5 | Indeno(1,2,3-cd)pyrene | 840. | U |
| 53-70-3 | Dibenz(a,h)anthracene | 840. | U |
| 191-24-2 | Benzo(g,h,i)perylene | 840. | U |

(1) - Cannot be separated from diphenylamine

1F

EPA SAMPLE NO.

BZ957

# SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET
## TENTATIVELY IDENTIFIED COMPOUNDS

Lab Name: PEI Contract: 68-D9-0037

Lab Code: PEI Case No.: 11834 SAS No.: SDG No.: BZ949

Matrix: (soil/water) SOIL Lab Sample ID: T9-04-199-09A

Sample wt/vol: 30.0 (g/mL) G Lab File ID: BZ957

Level: (low/med) LOW Date Received: 4/26/89

% Moisture: not dec. 22. dec. 0. Date Extracted: 4/28/89

Extraction: (SepF/Cont/Sonc) SONC Date Analyzed: 5/10/89

GPC Cleanup: (Y/N) Y pH: 7.0 Dilution Factor: 1.00

Number TICs found: 8

CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG

| | CAS NUMBER | COMPOUND NAME | RT | EST. CONC. | Q |
|---|---|---|---|---|---|
| 1. | 106-42-3 | Benzene, 1,4-dimethyl- | 7.02 | 1000. | ~~BJ~~ |
| 2. | - - | UNKNOWN | 8.05 | 600. | ~~BJ~~ ~~A~~ |
| 3. | - - | UNKNOWN | 8.13 | 300. | ~~J~~ ~~A~~ |
| 4. | 100-52-7 | Benzaldehyde (ACN)(DOT) | 9.02 | 600. | J |
| 5. | - - | UNKNOWN | 9.68 | 800. | ~~BJ~~ ~~A~~ |
| 6. | - - | UNKNOWN PHTHALATE | 22.20 | 900. | ~~BJ~~ |
| 7. | - - | UNKNOWN | 24.42 | 500. | J |
| 8. | - - | UNKNOWN | 27.32 | 500. | ~~BJ~~ |
| 9. | | | | | |
| 10. | | | | | |
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1B
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

BZ958

Lab Name: PEI Contract: 68-D9-0037

Lab Code: PEI Case No.: 11834 SAS No.: SDG No.: BZ949

Matrix: (soil/water) SOIL Lab Sample ID: T9-04-199-10A

Sample wt/vol: 1.0 (g/mL) G Lab File ID: BZ958

Level: (low/med) MED Date Received: 4/26/89

% Moisture: not dec. 54. dec. 0. Date Extracted: 5/ 2/89

Extraction: (SepF/Cont/Sonc) SONC Date Analyzed: 5/11/89

GPC Cleanup: (Y/N) Y pH: 7.0 Dilution Factor: 1.00

| CAS NO. | COMPOUND | CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG | Q |
|---|---|---|---|
| 108-95-2 | Phenol | 84000. | U |
| 111-44-4 | bis(2-Chloroethyl)ether | 84000. | U |
| 95-57-8 | 2-Chlorophenol | 84000. | U |
| 541-73-1 | 1,3-Dichlorobenzene | 84000. | U |
| 106-46-7 | 1,4-Dichlorobenzene | 84000. | U |
| 100-51-6 | Benzyl alcohol | 84000. | U |
| 95-50-1 | 1,2-Dichlorobenzene | 84000. | U |
| 95-48-7 | 2-Methylphenol | 84000. | U |
| 108-60-1 | bis(2-Chloroisopropyl)ether | 84000. | U |
| 106-44-5 | 4-Methylphenol | 84000. | U |
| 621-64-7 | N-Nitroso-di-n-propylamine | 84000. | U |
| 67-72-1 | Hexachloroethane | 84000. | U |
| 98-95-3 | Nitrobenzene | 84000. | U |
| 78-59-1 | Isophorone | 84000. | U |
| 88-75-5 | 2-Nitrophenol | 84000. | U |
| 105-67-9 | 2,4-Dimethylphenol | 84000. | U |
| 65-85-0 | Benzoic acid | 410000. | U |
| 111-91-1 | bis(2-Chloroethoxy)methane | 84000. | U |
| 120-83-2 | 2,4-Dichlorophenol | 84000. | U |
| 120-82-1 | 1,2,4-Trichlorobenzene | 84000. | U |
| 91-20-3 | Naphthalene | 84000. | U |
| 106-47-8 | 4-Chloroaniline | 84000. | U |
| 87-68-3 | Hexachlorobutadiene | 84000. | U |
| 59-50-7 | 4-Chloro-3-methylphenol | 84000. | U |
| 91-57-6 | 2-Methylnaphthalene | 84000. | U |
| 77-47-4 | Hexachlorocyclopentadiene | 84000. | U |
| 88-06-2 | 2,4,6-Trichlorophenol | 84000. | U |
| 95-95-4 | 2,4,5-Trichlorophenol | 410000. | U |
| 91-58-7 | 2-Chloronaphthalene | 84000. | U |
| 88-74-4 | 2-Nitroaniline | 410000. | U |
| 131-11-3 | Dimethylphthalate | 84000. | U |
| 208-96-8 | Acenaphthylene | 84000. | U |
| 606-20-2 | 2,6-Dinitrotoluene | 84000. | U |

1C

EPA SAMPLE NO. 000523

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

BZ958

Lab Name: PEI Contract: 68-D9-0037

Lab Code: PEI Case No.: 11834 SAS No.: SDG No.: BZ949

Matrix: (soil/water) SOIL Lab Sample ID: T9-04-199-10A

Sample wt/vol: 1.0 (g/mL) G Lab File ID: BZ958

Level: (low/med) MED Date Received: 4/26/89

% Moisture: not dec. 54. dec. 0. Date Extracted: 5/ 2/89

Extraction: (SepF/Cont/Sonc) SONC Date Analyzed: 5/11/89

GPC Cleanup: (Y/N) Y pH: 7.0 Dilution Factor: 1.00

| CAS NO. | COMPOUND | CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG | Q |
|---|---|---|---|
| 99-09-2 | 3-Nitroaniline | 410000. | U |
| 83-32-9 | Acenaphthene | 84000. | U |
| 51-28-5 | 2,4-Dinitrophenol | 410000. | U |
| 100-02-7 | 4-Nitrophenol | 410000. | U |
| 132-64-9 | Dibenzofuran | 84000. | U |
| 121-14-2 | 2,4-Dinitrotoluene | 84000. | U |
| 84-66-2 | Diethylphthalate | 84000. | U |
| 7005-72-3 | 4-Chlorophenyl-phenylether | 84000. | U |
| 86-73-7 | Fluorene | 84000. | U |
| 100-01-6 | 4-Nitroaniline | 410000. | U |
| 534-52-1 | 4,6-Dinitro-2-methylphenol | 410000. | U |
| 86-30-6 | N-Nitrosodiphenylamine (1) | 84000. | U |
| 101-55-3 | 4-Bromophenyl-phenylether | 84000. | U |
| 118-74-1 | Hexachlorobenzene | 84000. | U |
| 87-86-5 | Pentachlorophenol | 410000. | U |
| 85-01-8 | Phenanthrene | 84000. | U |
| 120-12-7 | Anthracene | 84000. | U |
| 84-74-2 | Di-n-butylphthalate | 84000. | U |
| 206-44-0 | Fluoranthene | 84000. | U |
| 129-00-0 | Pyrene | 84000. | U |
| 85-68-7 | Butylbenzylphthalate | 84000. | U |
| 91-94-1 | 3,3'-Dichlorobenzidine | 170000. | U |
| 56-55-3 | Benzo(a)anthracene | 84000. | U |
| 218-01-9 | Chrysene | 84000. | U |
| 117-81-7 | bis(2-Ethylhexyl)phthalate | 84000. | U |
| 117-84-0 | Di-n-octylphthalate | 84000. | U |
| 205-99-2 | Benzo(b)fluoranthene | 84000. | U |
| 207-08-9 | Benzo(k)fluoranthene | 84000. | U |
| 50-32-8 | Benzo(a)pyrene | 84000. | U |
| 193-39-5 | Indeno(1,2,3-cd)pyrene | 84000. | U |
| 53-70-3 | Dibenz(a,h)anthracene | 84000. | U |
| 191-24-2 | Benzo(g,h,i)perylene | 84000. | U |

(1) - Cannot be separated from diphenylamine

000630

1F

EPA SAMPLE NO.

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

BZ958

Lab Name: PEI Contract: 68-D9-0037

Lab Code: PEI Case No.: 11834 SAS No.: SDG No.: BZ949

Matrix: (soil/water) SOIL Lab Sample ID: T9-04-199-10A

Sample wt/vol: 1.0 (g/mL) G Lab File ID: BZ958

Level: (low/med) MED Date Received: 4/26/89

% Moisture: not dec. 54. dec. 0. Date Extracted: 5/ 2/89

Extraction: (SepF/Cont/Sonc) SONC Date Analyzed: 5/11/89

GPC Cleanup: (Y/N) Y pH: 7.0 Dilution Factor: 1.00

Number TICs found: 1 CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG

| | CAS NUMBER | COMPOUND NAME | RT | EST. CONC. | Q |
|---|---|---|---|---|---|
| 1. | - - | UNKNOWN | 6.27 | 40000. | ~~BJ~~ A |
| 2. | | | | | |
| 3. | | | | | |
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| 30. | | | | | |

1B
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

BZ959

Lab Name: PEI Contract: 68-D9-0037

Lab Code: PEI Case No.: 11834 SAS No.: SDG No.: BZ949

Matrix: (soil/water) SOIL Lab Sample ID: T9-04-199-11A

Sample wt/vol: 30.0 (g/mL) G Lab File ID: BZ959

Level: (low/med) LOW Date Received: 4/26/89

% Moisture: not dec. 59. dec. 0. Date Extracted: 4/28/89

Extraction: (SepF/Cont/Sonc) SONC Date Analyzed: 5/11/89

GPC Cleanup: (Y/N) Y pH: 7.0 Dilution Factor: 1.00

| CAS NO. | COMPOUND | CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG | Q |
|---|---|---|---|
| 108-95-2 | Phenol | 1600. | U |
| 111-44-4 | bis(2-Chloroethyl)ether | 1600. | U |
| 95-57-8 | 2-Chlorophenol | 1600. | U |
| 541-73-1 | 1,3-Dichlorobenzene | 1600. | U |
| 106-46-7 | 1,4-Dichlorobenzene | 1600. | U |
| 100-51-6 | Benzyl alcohol | 1600. | U |
| 95-50-1 | 1,2-Dichlorobenzene | 1600. | U |
| 95-48-7 | 2-Methylphenol | 1600. | U |
| 108-60-1 | bis(2-Chloroisopropyl)ether | 1600. | U |
| 106-44-5 | 4-Methylphenol | 1600. | U |
| 621-64-7 | N-Nitroso-di-n-propylamine | 1600. | U |
| 67-72-1 | Hexachloroethane | 1600. | U |
| 98-95-3 | Nitrobenzene | 1600. | U |
| 78-59-1 | Isophorone | 1600. | U |
| 88-75-5 | 2-Nitrophenol | 1600. | U |
| 105-67-9 | 2,4-Dimethylphenol | 1600. | U |
| 65-85-0 | Benzoic acid | 7800. | U |
| 111-91-1 | bis(2-Chloroethoxy)methane | 1600. | U |
| 120-83-2 | 2,4-Dichlorophenol | 1600. | U |
| 120-82-1 | 1,2,4-Trichlorobenzene | 1600. | U |
| 91-20-3 | Naphthalene | 300. | J |
| 106-47-8 | 4-Chloroaniline | 1600. | U |
| 87-68-3 | Hexachlorobutadiene | 1600. | U |
| 59-50-7 | 4-Chloro-3-methylphenol | 1600. | U |
| 91-57-6 | 2-Methylnaphthalene | 1600. | U |
| 77-47-4 | Hexachlorocyclopentadiene | 1600. | U |
| 88-06-2 | 2,4,6-Trichlorophenol | 1600. | U |
| 95-95-4 | 2,4,5-Trichlorophenol | 7800. | U |
| 91-58-7 | 2-Chloronaphthalene | 1600. | U |
| 88-74-4 | 2-Nitroaniline | 7800. | U |
| 131-11-3 | Dimethylphthalate | 1600. | U |
| 208-96-8 | Acenaphthylene | 1600. | U |
| 606-20-2 | 2,6-Dinitrotoluene | 1600. | U |

000540

1C

EPA SAMPLE NO.

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

BZ959

Name: PEI

Contract: 68-D9-0037

Lab Code: PEI Case No.: 11834 SAS No.: SDG No.: BZ949

Matrix: (soil/water) SOIL

Lab Sample ID: T9-04-199-11A

Sample wt/vol: 30.0 (g/mL) G

Lab File ID: BZ959

Level: (low/med) LOW

Date Received: 4/26/89

% Moisture: not dec. 59. dec. 0.

Date Extracted: 4/28/89

Extraction: (SepF/Cont/Sonc) SONC

Date Analyzed: 5/11/89

GPC Cleanup: (Y/N) Y pH: 7.0

Dilution Factor: 1.00

| CAS NO. | COMPOUND | CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG | Q |
|---|---|---|---|
| 99-09-2 | 3-Nitroaniline | 7800. | U |
| 83-32-9 | Acenaphthene | 270. | J |
| 51-28-5 | 2,4-Dinitrophenol | 7800. | U |
| 100-02-7 | 4-Nitrophenol | 7800. | U |
| 132-64-9 | Dibenzofuran | 1600. | U |
| 121-14-2 | 2,4-Dinitrotoluene | 1600. | U |
| 84-66-2 | Diethylphthalate | 1600. | U |
| 7005-72-3 | 4-Chlorophenyl-phenylether | 1600. | U |
| 86-73-7 | Fluorene | 210. | J |
| 100-01-6 | 4-Nitroaniline | 7800. | U |
| 534-52-1 | 4,6-Dinitro-2-methylphenol | 7800. | U |
| 86-30-6 | N-Nitrosodiphenylamine (1) | 1600. | U |
| 101-55-3 | 4-Bromophenyl-phenylether | 1600. | U |
| 118-74-1 | Hexachlorobenzene | 1600. | U |
| 87-86-5 | Pentachlorophenol | 7800. | U |
| 85-01-8 | Phenanthrene | 5300. | |
| 120-12-7 | Anthracene | 920. | J |
| 84-74-2 | Di-n-butylphthalate | 900. | J |
| 206-44-0 | Fluoranthene | 15000. | |
| 129-00-0 | Pyrene | 9600. | |
| 85-68-7 | Butylbenzylphthalate | 1600. | U |
| 91-94-1 | 3,3'-Dichlorobenzidine | 3200. | U |
| 56-55-3 | Benzo(a)anthracene | 6900. | |
| 218-01-9 | Chrysene | 7300. | |
| 117-81-7 | bis(2-Ethylhexyl)phthalate | 820. | J |
| 117-84-0 | Di-n-octylphthalate | 1600. | U |
| 205-99-2 | Benzo(b)fluoranthene | 5800. | |
| 207-08-9 | Benzo(k)fluoranthene | 3700. | |
| 50-32-8 | Benzo(a)pyrene | 4400. | |
| 193-39-5 | Indeno(1,2,3-cd)pyrene | 3200. | |
| 53-70-3 | Dibenz(a,h)anthracene | 1600. | U |
| 191-24-2 | Benzo(g,h,i)perylene | 2700. | |

(1) - Cannot be separated from diphenylamine

1F

EPA SAMPLE NO.

BZ959

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

Lab Name: PEI Contract: 68-D9-0037

Lab Code: PEI Case No.: 11834 SAS No.: SDG No.: BZ949

Matrix: (soil/water) SOIL Lab Sample ID: T9-04-199-11A

Sample wt/vol: 30.0 (g/mL) G Lab File ID: BZ959

Level: (low/med) LOW Date Received: 4/26/89

% Moisture: not dec. 59. dec. 0. Date Extracted: 4/28/89

Extraction: (SepF/Cont/Sonc) SONC Date Analyzed: 5/11/89

GPC Cleanup: (Y/N) Y pH: 7.0 Dilution Factor: 1.00

Number TICs found: 18

CONCENTRATION UNITS:
(ug/L or ug/Kg) UG/KG

| | CAS NUMBER | COMPOUND NAME | RT | EST. CONC. | Q |
|---|---|---|---|---|---|
| 1. | - - | UNKNOWN | 5.22 | 20000. | ~~J~~ A |
| 2. | - - | UNKNOWN | 5.65 | 4000. | ~~J~~ A |
| 3. | - - | UNKNOWN | 6.43 | 100000. | ~~J~~ A |
| 4. | 21368-68-3 | Bicyclo[2.2.1]heptan-2-one, | 12.60 | 8000. | J N |
| 5. | - - | UNKNOWN AROMATIC | 22.85 | 2000. | J |
| 6. | 57-10-3 | Hexadecanoic acid | 23.20 | 20000. | J |
| 7. | - - | UNKNOWN AROMATIC | 24.25 | 9000. | J |
| 8. | - - | UNKNOWN | 24.45 | 3000. | J |
| 9. | - - | UNKNOWN | 24.97 | 2000. | J |
| 10. | - - | UNKNOWN AROMATIC | 25.80 | 4000. | J |
| 11. | - - | UNKNOWN AROMATIC | 26.07 | 3000. | J |
| 12. | - - | UNKNOWN AROMATIC | 26.38 | 6000. | J |
| 13. | - - | UNKNOWN AROMATIC | 27.38 | 3000. | J |
| 14. | - - | UNKNOWN AROMATIC | 27.80 | 6000. | J |
| 15. | - - | UNKNOWN HYDROCARBON | 28.35 | 3000. | J |
| 16. | - - | UNKNOWN HYDROCARBON | 31.02 | 8000. | J |
| 17. | - - | UNKNOWN AROMATIC | 34.70 | 7000. | J |
| 18. | - - | UNKNOWN HYDROCARBON | 39.07 | 10000. | J N |
| 19. | | | | | |
| 20. | | | | | |
| 21. | | | | | |
| 22. | | | | | |
| 23. | | | | | |
| 24. | | | | | |
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| 27. | | | | | |
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| 30. | | | | | |

1B
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO

BZ960

Lab Name: PEI Contract: 68-D9-0037

Lab Code: PEI Case No.: 11834 SAS No.: SDG No.: BZ949

Matrix: (soil/water) SOIL Lab Sample ID: T9-04-199-12A

Sample wt/vol: 30.0 (g/mL) G Lab File ID: BZ960

Level: (low/med) LOW Date Received: 4/26/89

% Moisture: not dec. 41. dec. 0. Date Extracted: 4/28/89

Extraction: (SepF/Cont/Sonc) SONC Date Analyzed: 5/11/89

GPC Cleanup: (Y/N) Y pH: 7.0 Dilution Factor: 1.00

| CAS NO. | COMPOUND | CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG | G |
|---|---|---|---|
| 108-95-2 | Phenol | 1100. | U |
| 111-44-4 | bis(2-Chloroethyl)ether | 1100. | U |
| 95-57-8 | 2-Chlorophenol | 1100. | U |
| 541-73-1 | 1,3-Dichlorobenzene | 1100. | U |
| 106-46-7 | 1,4-Dichlorobenzene | 1100. | U |
| 100-51-6 | Benzyl alcohol | 1100. | U |
| 95-50-1 | 1,2-Dichlorobenzene | 1100. | U |
| 95-48-7 | 2-Methylphenol | 1100. | U |
| 108-60-1 | bis(2-Chloroisopropyl)ether | 1100. | U |
| 106-44-5 | 4-Methylphenol | 1100. | U |
| 621-64-7 | N-Nitroso-di-n-propylamine | 1100. | U |
| 67-72-1 | Hexachloroethane | 1100. | U |
| 98-95-3 | Nitrobenzene | 1100. | U |
| 78-59-1 | Isophorone | 1100. | U |
| 88-75-5 | 2-Nitrophenol | 1100. | U |
| 105-67-9 | 2,4-Dimethylphenol | 1100. | U |
| 65-85-0 | Benzoic acid | 5400. | U |
| 111-91-1 | bis(2-Chloroethoxy)methane | 1100. | U |
| 120-83-2 | 2,4-Dichlorophenol | 1100. | U |
| 120-82-1 | 1,2,4-Trichlorobenzene | 1100. | U |
| 91-20-3 | Naphthalene | 410. | J |
| 106-47-8 | 4-Chloroaniline | 1100. | U |
| 87-68-3 | Hexachlorobutadiene | 1100. | U |
| 59-50-7 | 4-Chloro-3-methylphenol | 1100. | U |
| 91-57-6 | 2-Methylnaphthalene | 270. | J |
| 77-47-4 | Hexachlorocyclopentadiene | 1100. | U |
| 88-06-2 | 2,4,6-Trichlorophenol | 1100. | U |
| 95-95-4 | 2,4,5-Trichlorophenol | 5400. | U |
| 91-58-7 | 2-Chloronaphthalene | 1100. | U |
| 88-74-4 | 2-Nitroaniline | 5400. | U |
| 131-11-3 | Dimethylphthalate | 1100. | U |
| 208-96-8 | Acenaphthylene | 340. | J |
| 606-20-2 | 2,6-Dinitrotoluene | 1100. | U |

1C

EPA SAMPLE NO

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

BZ960

Lab Name: PEI Contract: 68-D9-0037

Lab Code: PEI Case No.: 11834 SAS No.: SDG No.: BZ949

Matrix: (soil/water) SOIL Lab Sample ID: T9-04-~~199~~-12A

Sample wt/vol: 30.0 (g/mL) G Lab File ID: BZ960

Level: (low/med) LOW Date Received: 4/26/89

% Moisture: not dec. 41. dec. 0 Date Extracted: 4/28/89

Extraction: (SepF/Cont/Sonc) SONC Date Analyzed: 5/11/89

GPC Cleanup: (Y/N) Y pH: 7.0 Dilution Factor: 1.00

| CAS NO. | COMPOUND | CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG | G |
|---|---|---|---|
| 99-09-2 | 3-Nitroaniline | 5400. | U |
| 83-32-9 | Acenaphthene | 340. | J |
| 51-28-5 | 2,4-Dinitrophenol | 5400. | U |
| 100-02-7 | 4-Nitrophenol | 5400. | U |
| 132-64-9 | Dibenzofuran | 230. | J |
| 121-14-2 | 2,4-Dinitrotoluene | 1100. | U |
| 84-66-2 | Diethylphthalate | 1100. | U |
| 7005-72-3 | 4-Chlorophenyl-phenylether | 1100. | U |
| 86-73-7 | Fluorene | 390. | J |
| 100-01-6 | 4-Nitroaniline | 5400. | U |
| 534-52-1 | 4,6-Dinitro-2-methylphenol | 5400. | U |
| 86-30-6 | N-Nitrosodiphenylamine (1) | 1100. | U |
| 101-55-3 | 4-Bromophenyl-phenylether | 1100. | U |
| 118-74-1 | Hexachlorobenzene | 1100. | U |
| 87-86-5 | Pentachlorophenol | 5400. | U |
| 85-01-8 | Phenanthrene | 4800. | |
| 120-12-7 | Anthracene | 840. | J |
| 84-74-2 | Di-n-butylphthalate | 1100. | U |
| 206-44-0 | Fluoranthene | 4700. | |
| 129-00-0 | Pyrene | 3500. | |
| 85-68-7 | Butylbenzylphthalate | 1100. | U |
| 91-94-1 | 3,3'-Dichlorobenzidine | 2200. | U |
| 56-55-3 | Benzo(a)anthracene | 2000. | |
| 218-01-9 | Chrysene | 2400. | |
| 117-81-7 | bis(2-Ethylhexyl)phthalate | 400. | J |
| 117-84-0 | Di-n-octylphthalate | 1100. | U |
| 205-99-2 | Benzo(b)fluoranthene | 2300. | |
| 207-08-9 | Benzo(k)fluoranthene | 1100. | |
| 50-32-8 | Benzo(a)pyrene | 2000. | |
| 193-39-5 | Indeno(1,2,3-cd)pyrene | 1600. | |
| 53-70-3 | Dibenz(a,h)anthracene | 570. | J |
| 191-24-2 | Benzo(g,h,i)perylene | 2000. | |

(1) - Cannot be separated from diphenylamine

1F

EPA SAMPLE NO.
000587

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

BZ960

Contract: 68-D9-0037

Lab Name: PEI

Lab Code: PEI Case No.: 11834 SAS No. SDG No.: BZ949

Matrix (soil/water) SOIL Lab Sample ID: T9-04-199-12A

Sample wt/vol: 30.0 (g/mL) G Lab File ID: BZ960

Level: (low/med) LOW Date Received: 4/26/89

% Moisture: not dec. 41. dec. 0. Date Extracted: 4/28/89

Extraction: (SepF/Cont/Sonc) SONC Date Analyzed: 5/11/89

GPC Cleanup: (Y/N) Y pH: 7.0 Dilution Factor: 1.00

Number TICs found: 19

CONCENTRATION UNITS:
(ug/L or ug/Kg) UG/KG

| | CAS NUMBER | COMPOUND NAME | RT | EST. CONC. | Q |
|---|---|---|---|---|---|
| 1. | - - | UNKNOWN HYDROCARBON | 5.23 | 5000. | J N |
| 2. | - - | UNKNOWN | 5.67 | 2000 | ~~J A~~ |
| 3. | - - | UNKNOWN | 6.43 | 60000. | ~~J A~~ |
| 4. | - - | UNKNOWN | 6.60 | 2000. | J N |
| 5. | 108-38-3 | Benzene, 1,3-dimethyl- | 7.02 | 2000. | ~~EJ~~ |
| 6. | - - | UNKNOWN HYDROCARBON | 10.58 | 2000. | J N |
| 7. | 21368-68-3 | Bicyclo[2.2.1]heptan-2-one, | 12.58 | 1000. | J |
| 8. | - - | UNKNOWN | 23.05 | 3000. | J |
| 9. | 57-10-3 | Hexadecanoic acid | 23.12 | 2000 | J |
| 10. | - - | UNKNOWN AROMATIC | 23.55 | 1000. | J |
| 11. | - - | UNKNOWN AROMATIC | 24.05 | 2000. | J |
| 12. | - - | UNKNOWN AROMATIC | 24.25 | 1000. | J |
| 13. | 38380-02-8 | 1,1'-Biphenyl, 2,2',3,4,5'-p | 25.05 | 1000. | J |
| 14. | - - | UNKNOWN | 25.50 | 3000. | J |
| 15. | - - | UNKNOWN AROMATIC | 26.05 | 800. | J |
| 16. | - - | UNKNOWN AROMATIC | 27.63 | 1000. | J |
| 17. | - - | UNKNOWN AROMATIC | 34.72 | 4000. | J |
| 18. | - - | UNKNOWN HYDROCARBON | 39.02 | 3000. | J |
| 19. | - - | UNKNOWN | 39.70 | 2000. | J |
| 20. | | | | | |
| 21. | | | | | |
| 22. | | | | | |
| 23. | | | | | |
| 24. | | | | | |
| 25. | | | | | |
| 26. | | | | | |
| 27. | | | | | |
| 28. | | | | | |
| 29. | | | | | |
| 30. | | | | | |

1B

# EMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

BZ961

e: PEI

Contract: 68-D9-0037

e: PEI  Case No.: 11834  SAS No.:  SDG No.: BZ949

(soil/water) WATER  Lab Sample ID: T9-04-199-13A

ut/vol  1000.0 (g/mL) ML  Lab File ID: BZ961

(low/med) LOW  Date Received: 4/26/89

ure: not dec. 100.  dec. 0.  Date Extracted: 4/26/89

on (Sep/F/Cont/Sonc) CONT  Date Analyzed: 5/ 8/89

roup. (Y/N) N  pH 7.0  Dilution Factor: 1.00

| CAS NO. | COMPOUND | CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L | Q |
|---|---|---|---|
| 108-95-2 | Phenol | 10. | U |
| 111-44-4 | bis(2-Chloroethyl)ether | 10. | U |
| [illegible]57-8 | 2-Chlorophenol | 10. | U |
| 541-73-1 | 1,3-Dichlorobenzene | 10. | U |
| 106-46-7 | 1,4-Dichlorobenzene | 10. | U |
| 100-51-6 | Benzyl alcohol | 10. | U |
| 95-50-1 | 1,2-Dichlorobenzene | 10. | U |
| 95-48-7 | 2-Methylphenol | 10. | U |
| 108-60-1 | bis(2-Chloroisopropyl)ether | 10. | U |
| 106-44-5 | 4-Methylphenol | 10. | U |
| 621-64-7 | N-Nitroso-di-n-propylamine | 10. | U |
| 67-72-1 | Hexachloroethane | 10. | U |
| 98-95-3 | Nitrobenzene | 10. | U |
| 78-59-1 | Isophorone | 10. | U |
| 88-75-5 | 2-Nitrophenol | 10. | U |
| 105-67-9 | 2,4-Dimethylphenol | 10. | U |
| 65-85-0 | Benzoic acid | 10. | U |
| 111-91-1 | bis(2-Chloroethoxy)methane | 50. | U |
| 120-83-2 | 2,4-Dichlorophenol | 10. | U |
| 120-82-1 | 1,2,4-Trichlorobenzene | 10. | U |
| 91-20-3 | Naphthalene | 10. | U |
| 106-47-8 | 4-Chloroaniline | 10. | U |
| 87-68-3 | Hexachlorobutadiene | 10. | U |
| 59-50-7 | 4-Chloro-3-methylphenol | 10. | U |
| 91-57-6 | 2-Methylnaphthalene | 10. | U |
| 77-47-4 | Hexachlorocyclopentadiene | 10. | U |
| 88-06-2 | 2,4,6-Trichlorophenol | 10. | U |
| 95[illegible]5-4 | 2,4,5-Trichlorophenol | 10. | U |
| 91[illegible]8-7 | 2-Chloronaphthalene | 50. | U |
| 88-74-4 | 2-Nitroaniline | 10. | U |
| 131-11-3 | Dimethylphthalate | 50. | U |
| 208-96-8 | Acenaphthylene | 10. | U |
| 606-20-2 | 2,6-Dinitrotoluene | 10. | U |
| | | 10. | U |

C00736

1C

EPA SAMPLE NO.

BZ961

# SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

Contract: 68-D9-0037

Lab Name: PEI

Lab Code: PEI  Case No.: 11834  SAS No.:  SDG No.: BZ949

Matrix: (soil/water) WATER  Lab Sample ID: T9-04-199-13A

Sample wt/vol: 1000.0 (g/mL) ML  Lab File ID: BZ961

Level: (low/med) LOW  Date Received: 4/26/89

% Moisture: not dec. 100.  dec. 0.  Date Extracted: 4/26/89

Extraction: (SepF/Cont/Sonc) CONT  Date Analyzed: 5/ 8/89

GPC Cleanup: (Y/N) N  pH 7.0  Dilution Factor: 1.00

| CAS NO. | COMPOUND | CONCENTRATION UNITS (ug/L or ug/kg) UG/L | Q |
|---|---|---|---|
| 99-09-2 | 3-Nitroaniline | 50. | U |
| 83-32-9 | Acenaphthene | 10. | U |
| 51-28-5 | 2,4-Dinitrophenol | 50. | U |
| 100-02-7 | 4-Nitrophenol | 50. | U |
| 132-64-9 | Dibenzofuran | 10. | U |
| 121-14-2 | 2,4-Dinitrotoluene | 10 | U |
| 84-66-2 | Diethylphthalate | 10. | U |
| 7005-72-3 | 4-Chlorophenyl-phenylether | 10. | U |
| 86-73-7 | Fluorene | 10. | U |
| 100-01-6 | 4-Nitroaniline | 50. | U |
| 534-52-1 | 4,6-Dinitro-2-methylphenol | 50. | U |
| 86-30-6 | N-Nitrosodiphenylamine (1) | 10. | U |
| 101-55-3 | 4-Bromophenyl-phenylether | 10. | U |
| 118-74-1 | Hexachlorobenzene | 10. | U |
| 87-86-5 | Pentachlorophenol | 10. | U |
| 85-01-8 | Phenanthrene | 50. | U |
| 120-12-7 | Anthracene | 10. | U |
| 84-74-2 | Di-n-butylphthalate | 10. | U |
| 206-44-0 | Fluoranthene | 10. | U |
| 129-00-0 | Pyrene | 10. | U |
| 85-68-7 | Butylbenzylphthalate | 10. | U |
| 91-94-1 | 3,3'-Dichlorobenzidine | 20. | U |
| 56-55-3 | Benzo(a)anthracene | 10. | U |
| 218-01-9 | Chrysene | 10. | U |
| 117-81-7 | bis(2-Ethylhexyl)phthalate | 10. | U |
| 117-84-0 | Di-n-octylphthalate | 10. | U |
| 205-99-2 | Benzo(b)fluoranthene | 10. | U |
| 207-08-9 | Benzo(k)fluoranthene | 10. | U |
| 50-32-8 | Benzo(a)pyrene | 10. | U |
| 193-39-5 | Indeno(1,2,3-cd)pyrene | 10. | U |
| 53-70-3 | Dibenz(a,h)anthracene | 10. | U |
| 191-24-2 | Benzo(g,h,i)perylene | 10. | U |

(1) - Cannot be separated from diphenylamine

1/87 Rev.

FORM I SV-2

000737

1F

EPA SAMPLE NO.

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

BZ961

Lab Name: PEI Contract: 68-D9-0037

Lab Code: PEI Case No.: 11834 SAS No.: SDG No.: BZ949

Matrix: (soil/water) WATER Lab Sample ID: T9-04-199-13A

Sample wt/vol: 1000.0 (g/mL) ML Lab File ID: BZ961

Level: (low/med) LOW Date Received: 4/26/89

% Moisture: not dec. 100. dec. 0. Date Extracted: 4/26/89

Extraction: (SepF/Cont/Sonc) CONT Date Analyzed: 5/ 8/89

GPC Cleanup: (Y/N) N pH 7.0 Dilution Factor: 1.0

Number TICs found 7

CONCENTRATION UNITS:
(ug/L or ug/Kg) UG/L

| | CAS NUMBER | COMPOUND NAME | RT | EST. CONC. | Q |
|---|---|---|---|---|---|
| 1 | - - | UNKNOWN | 5.88 | 70. | J A |
| 2 | - - | UNKNOWN | 6.45 | 80. | BJ A |
| 3 | - - | UNKNOWN | 7.25 | 90. | BJ A |
| 4 | - - | UNKNOWN | 7.82 | 300. | J A |
| 5 | - - | UNKNOWN | 9.20 | 8. | J |
| 6 | - - | UNKNOWN | 12.27 | 20. | J |
| 7 | - - | UNKNOWN AROMATIC | 28.52 | 200. | J |
| 8 | | | | | |
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1B
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

BZ962

Lab Name: PEI Contract: 68-D9-0037

Lab Code: PEI Case No.: 11834 SAS No.: SDG No.: BZ949

Matrix: (soil/water) WATER Lab Sample ID: T9-04-199-14A

Sample wt/vol 1000.0 (g/mL) ML Lab File ID: BZ962

Level: (low/med) LOW Date Received: 4/26/89

% Moisture: not dec. 100. dec 0 Date Extracted: 4/26/89

Extraction: (SepF/Cont/Sonc) CONT Date Analyzed: 5/ 9/89

GPC Cleanup: (Y/N) N pH: 7.0 Dilution Factor: 1.00

| CAS NO. | COMPOUND | CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L | Q |
|---|---|---|---|
| 108-95-2 | Phenol | 10. | U |
| 111-44-4 | bis(2-Chloroethyl)ether | 10. | U |
| 95-57-8 | 2-Chlorophenol | 10. | U |
| 541-73-1 | 1,3-Dichlorobenzene | 10. | U |
| 106-46-7 | 1,4-Dichlorobenzene | 10. | U |
| 100-51-6 | Benzyl alcohol | 10. | U |
| 95-50-1 | 1,2-Dichlorobenzene | 10. | U |
| 95-48-7 | 2-Methylphenol | 10. | U |
| 108-60-1 | bis(2-Chloroisopropyl)ether | 10. | U |
| 106-44-5 | 4-Methylphenol | 10. | U |
| 621-64-7 | N-Nitroso-di-n-propylamine | 10. | U |
| 67-72-1 | Hexachloroethane | 10. | U |
| 98-95-3 | Nitrobenzene | 10. | U |
| 78-59-1 | Isophorone | 10. | U |
| 88-75-5 | 2-Nitrophenol | 10. | U |
| 105-67-9 | 2,4-Dimethylphenol | 10. | U |
| 65-85-0 | Benzoic acid | 50. | U |
| 111-91-1 | bis(2-Chloroethoxy)methane | 10. | U |
| 120-83-2 | 2,4-Dichlorophenol | 10. | U |
| 120-82-1 | 1,2,4-Trichlorobenzene | 10. | U |
| 91-20-3 | Naphthalene | 10. | U |
| 106-47-8 | 4-Chloroaniline | 10. | U |
| 87-68-3 | Hexachlorobutadiene | 10. | U |
| 59-50-7 | 4-Chloro-3-methylphenol | 10. | U |
| 91-57-6 | 2-Methylnaphthalene | 10. | U |
| 77-47-4 | Hexachlorocyclopentadiene | 10. | U |
| 88-06-2 | 2,4,6-Trichlorophenol | 10. | U |
| 95-95-4 | 2,4,5-Trichlorophenol | 50. | U |
| 91-58-7 | 2-Chloronaphthalene | 10. | U |
| 88-74-4 | 2-Nitroaniline | 50. | U |
| 131-11-3 | Dimethylphthalate | 10. | U |
| 208-96-8 | Acenaphthylene | 10. | U |
| 606-20-2 | 2,6-Dinitrotoluene | 10. | U |

EPA SAMPLE NO

BZ962

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

Lab Name: PEI Contract: 68-D9-0037

Lab Code: PEI Case No.: 11834 SAS No.: SDG No.: BZ949

Matrix: (soil/water) WATER Lab Sample ID: T9-04-199-14A

Sample wt/vol: 1000.0 (g/mL) ML Lab File ID: BZ962

Level: (low/med) LOW Date Received: 4/26/89

% Moisture: not dec. 100. dec. 0 Date Extracted: 4/26/89

Extraction: (SepF/Cont/Sonc) CONT Date Analyzed: 5/ 9/89

GPC Cleanup: (Y/N) N pH: 7.0 Dilution Factor: 1.00

| CAS NO. | COMPOUND | CONCENTRATION UNITS (ug/L or ug/Kg) UG/L | Q |
|---|---|---|---|
| 99-09-2 | 3-Nitroaniline | 50. | U |
| 83-32-9 | Acenaphthene | 10. | U |
| 51-28-5 | 2,4-Dinitrophenol | 50. | U |
| 100-02-7 | 4-Nitrophenol | 50. | U |
| 132-64-9 | Dibenzofuran | 10. | U |
| 121-14-2 | 2,4-Dinitrotoluene | 10. | U |
| 84-66-2 | Diethylphthalate | 2. | J |
| 7005-72-3 | 4-Chlorophenyl-phenylether | 10. | U |
| 86-73-7 | Fluorene | 10. | U |
| 100-01-6 | 4-Nitroaniline | 50. | U |
| 534-52-1 | 4,6-Dinitro-2-methylphenol | 50 | U |
| 86-30-6 | N-Nitrosodiphenylamine (1) | 10. | U |
| 101-55-3 | 4-Bromophenyl-phenylether | 10. | U |
| 118-74-1 | Hexachlorobenzene | 10. | U |
| 87-86-5 | Pentachlorophenol | 50. | U |
| 85-01-8 | Phenanthrene | 10. | U |
| 120-12-7 | Anthracene | 10. | U |
| 84-74-2 | Di-n-butylphthalate | 10. | U |
| 206-44-0 | Fluoranthene | 10. | U |
| 129-00-0 | Pyrene | 10. | U |
| 85-68-7 | Butylbenzylphthalate | 10. | U |
| 91-94-1 | 3,3'-Dichlorobenzidine | 20. | U |
| 56-55-3 | Benzo(a)anthracene | 10. | U |
| 218-01-9 | Chrysene | 10. | U |
| 117-81-7 | bis(2-Ethylhexyl)phthalate | 10. | U |
| 117-84-0 | Di-n-octylphthalate | 10. | U |
| 205-99-2 | Benzo(b)fluoranthene | 10. | U |
| 207-08-9 | Benzo(k)fluoranthene | 10. | U |
| 50-32-8 | Benzo(a)pyrene | 10. | U |
| 193-39-5 | Indeno(1,2,3-cd)pyrene | 10. | U |
| 53-70-3 | Dibenz(a,h)anthracene | 10. | U |
| 191-24-2 | Benzo(g,h,i)perylene | 10. | U |

(1) - Cannot be separated from diphenylamine

1F

EPA SAMPLE NO. 004755

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

BZ962

Lab Name: PEI Contract: 68-D9-0037

Lab Code: PEI Case No.: 11834 SAS No.: SDG No.: BZ949

Matrix: (soil/water) WATER Lab Sample ID: T9-04-199-14A

Sample wt/vol 1000.0 (g/mL) ML Lab File ID: BZ962

Level: (low/med) LOW Date Received: 4/26/89

% Moisture: not dec. 100. dec. 0 Date Extracted: 4/26/89

Extraction: (SepF/Cont/Sonc) CONT Date Analyzed: 5/ 9/89

GPC Cleanup: (Y/N) N pH 7.0 Dilution Factor: 1.00

Number TICs found 9 CONCENTRATION UNITS (ug/L or ug/Kg) UG/L

| | CAS NUMBER | COMPOUND NAME | RT | EST. CONC. | Q |
|---|---|---|---|---|---|
| 1. | - - | UNKNOWN | 5.80 | 60. | J A |
| 2. | - - | UNKNOWN | 6.38 | 70. | BJ A |
| 3. | - - | UNKNOWN | 7.20 | 50. | BJ A |
| 4. | - - | UNKNOWN | 7.73 | 300. | BJ A |
| 5. | - - | UNKNOWN | 27.33 | 100. | J |
| 6. | - - | UNKNOWN | 35.85 | 70. | J |
| 7. | - - | UNKNOWN | 37.23 | 200. | J |
| 8. | - - | UNKNOWN | 38.40 | 60. | J |
| 9. | - - | UNKNOWN | 39.45 | 100. | J |
| 10. | | | | | |
| 11. | | | | | |
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1D
PESTICIDE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

BZ949

Lab Name: PEI Contract: 68-D9-0037

Lab Code: PEI Case No.: 11834 SAS No.: SDG No.: BZ949

Matrix: (soil/water) WATER Lab Sample ID: T9-04-199-01A

Sample wt/vol: 1000. (g/mL)ML Lab File ID: BZP949

Level: (low/med) LOW Date Received: 4/26/89

% Moisture: not dec.100. dec. 0. Date Extracted: 4/26/89

Extraction: (SepF/Cont/Sonc) CONT Date Analyzed: 5/ 6/89

GPC Cleanup: (Y/N) N pH: 7.0 Dilution Factor: 1.00

| CAS NO. | COMPOUND | CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L | Q |
|---|---|---|---|
| 319-84-6 | alpha-BHC | .050 | U |
| 319-85-7 | beta-BHC | .050 | U |
| 319-86-8 | delta-BHC | .050 | U |
| 58-89-9 | gamma-BHC | .050 | U |
| 76-44-8 | Heptachlor | .050 | U |
| 309-00-2 | Aldrin | .050 | U |
| 1024-57-3 | Heptachlor epoxide | .050 | U |
| 959-98-8 | Endosulfan I | .050 | U |
| 60-57-1 | Dieldrin | .10 | U |
| 72-55-9 | 4,4'-DDE | .10 | U |
| 72-20-8 | Endrin | .10 | U |
| 33213-65-9 | Endosulfan II | .10 | U |
| 72-54-8 | 4,4'-DDD | .10 | U |
| 1031-07-8 | Endosulfan sulfate | .10 | U |
| 50-29-3 | 4,4'-DDT | .10 | U |
| 72-43-5 | Methoxychlor | .50 | U |
| 53494-70-5 | Endrin ketone | .10 | U |
| 5103-71-9 | alpha-Chlordane | .50 | U |
| 5103-74-2 | gamma-Chlordane | .50 | U |
| 8001-35-2 | Toxaphene | 1.0 | U |
| 12674-11-2 | Aroclor-1016 | .50 | U |
| 11104-28-2 | Aroclor-1221 | .50 | U |
| 11141-16-5 | Aroclor-1232 | .50 | U |
| 53469-21-9 | Aroclor-1242 | .50 | U |
| 12672-29-6 | Aroclor-1248 | .50 | U |
| 11097-69-1 | Aroclor-1254 | 1.0 | U |
| 11096-82-5 | Aroclor-1260 | 1.0 | U |

1D
PESTICIDE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

BZ950

Lab Name: PEI  Contract: 68-D9-0037

Lab Code: PEI  Case No.: 11834  SAS No.:  SDG No.: BZ949

Matrix: (soil/water) WATER  Lab Sample ID: T9-04-199-02A

Sample wt/vol: 1000. (g/mL)ML  Lab File ID: BZP950

Level: (low/med) LOW  Date Received: 4/26/89

% Moisture: not dec.100. dec. 0.  Date Extracted: 4/26/89

Extraction: (SepF/Cont/Sonc) CONT  Date Analyzed: 5/ 6/89

GPC Cleanup: (Y/N) N  pH: 7.0  Dilution Factor: 1.00

| CAS NO. | COMPOUND | CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L | Q |
|---|---|---|---|
| 319-84-6 | alpha-BHC | .050 | U |
| 319-85-7 | beta-BHC | .050 | U |
| 319-86-8 | delta-BHC | .050 | U |
| 58-89-9 | gamma-BHC | .050 | U |
| 76-44-8 | Heptachlor | .050 | U |
| 309-00-2 | Aldrin | .050 | U |
| 1024-57-3 | Heptachlor epoxide | .050 | U |
| 959-98-8 | Endosulfan I | .050 | U |
| 60-57-1 | Dieldrin | .10 | U |
| 72-55-9 | 4,4'-DDE | .10 | U |
| 72-20-8 | Endrin | .10 | U |
| 33213-65-9 | Endosulfan II | .10 | U |
| 72-54-8 | 4,4'-DDD | .10 | U |
| 1031-07-8 | Endosulfan sulfate | .10 | U |
| 50-29-3 | 4,4'-DDT | .10 | U |
| 72-43-5 | Methoxychlor | .50 | U |
| 53494-70-5 | Endrin ketone | .10 | U |
| 5103-71-9 | alpha-Chlordane | .50 | U |
| 5103-74-2 | gamma-Chlordane | .50 | U |
| 8001-35-2 | Toxaphene | 1.0 | U |
| 12674-11-2 | Aroclor-1016 | .50 | U |
| 11104-28-2 | Aroclor-1221 | .50 | U |
| 11141-16-5 | Aroclor-1232 | .50 | U |
| 53469-21-9 | Aroclor-1242 | .50 | U |
| 12672-29-6 | Aroclor-1248 | .50 | U |
| 11097-69-1 | Aroclor-1254 | 1.0 | U |
| 11096-82-5 | Aroclor-1260 | 1.0 | U |

1D
PESTICIDE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

BZ951

Lab Name: PEI Contract: 68-D9-0037

Lab Code: PEI Case No.: 11834 SAS No.: SDG No.: BZ949

Matrix: (soil/water) WATER Lab Sample ID: T9-04-199-03A

Sample wt/vol: 1000. (g/mL)ML Lab File ID: BZP951

Level: (low/med) LOW Date Received: 4/26/89

% Moisture: not dec.100. dec. 0. Date Extracted: 4/26/89

Extraction: (SepF/Cont/Sonc) CONT Date Analyzed: 5/ 6/89

GPC Cleanup: (Y/N) N pH: 7.0 Dilution Factor: 1.00

| CAS NO. | COMPOUND | CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L | Q |
|---|---|---|---|
| 319-84-6 | alpha-BHC | .050 | U |
| 319-85-7 | beta-BHC | .050 | U |
| 319-86-8 | delta-BHC | .050 | U |
| 58-89-9 | gamma-BHC | .050 | U |
| 76-44-8 | Heptachlor | .050 | U |
| 309-00-2 | Aldrin | .050 | U |
| 1024-57-3 | Heptachlor epoxide | .050 | U |
| 959-98-8 | Endosulfan I | .050 | U |
| 60-57-1 | Dieldrin | .10 | U |
| 72-55-9 | 4,4'-DDE | .10 | U |
| 72-20-8 | Endrin | .10 | U |
| 33213-65-9 | Endosulfan II | .10 | U |
| 72-54-8 | 4,4'-DDD | .10 | U |
| 1031-07-8 | Endosulfan sulfate | .10 | U |
| 50-29-3 | 4,4'-DDT | .10 | U |
| 72-43-5 | Methoxychlor | .50 | U |
| 53494-70-5 | Endrin ketone | .10 | U |
| 5103-71-9 | alpha-Chlordane | .50 | U |
| 5103-74-2 | gamma-Chlordane | .50 | U |
| 8001-35-2 | Toxaphene | 1.0 | U |
| 12674-11-2 | Aroclor-1016 | .50 | U |
| 11104-28-2 | Aroclor-1221 | .50 | U |
| 11141-16-5 | Aroclor-1232 | .50 | U |
| 53469-21-9 | Aroclor-1242 | .50 | U |
| 12672-29-6 | Aroclor-1248 | .50 | U |
| 11097-69-1 | Aroclor-1254 | 1.0 | U |
| 11096-82-5 | Aroclor-1260 | 1.0 | U |

1D
# PESTICIDE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

BZ952

Lab Name: PEI  Contract: 68-D9-0037

Lab Code: PEI  Case No.: 11834  SAS No.:  SDG No.: BZ949

Matrix: (soil/water) WATER  Lab Sample ID: T9-04-199-04A

Sample wt/vol: 1000. (g/mL)ML  Lab File ID: BZP952

Level: (low/med) LOW  Date Received: 4/26/89

% Moisture: not dec.100. dec. 0.  Date Extracted: 4/26/89

Extraction: (SepF/Cont/Sonc) CONT  Date Analyzed: 5/ 6/89

GPC Cleanup: (Y/N) N  pH: 7.0  Dilution Factor: 1.00

| CAS NO. | COMPOUND | CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L | Q |
|---|---|---|---|
| 319-84-6 | alpha-BHC | .050 | U |
| 319-85-7 | beta-BHC | .050 | U |
| 319-86-8 | delta-BHC | .050 | U |
| 58-89-9 | gamma-BHC | .050 | U |
| 76-44-8 | Heptachlor | .050 | U |
| 309-00-2 | Aldrin | .050 | U |
| 1024-57-3 | Heptachlor epoxide | .050 | U |
| 959-98-8 | Endosulfan I | .050 | U |
| 60-57-1 | Dieldrin | .050 | U |
| 72-55-9 | 4,4'-DDE | .10 | U |
| 72-20-8 | Endrin | .10 | U |
| 33213-65-9 | Endosulfan II | .10 | U |
| 72-54-8 | 4,4'-DDD | .10 | U |
| 1031-07-8 | Endosulfan sulfate | .10 | U |
| 50-29-3 | 4,4'-DDT | .10 | U |
| 72-43-5 | Methoxychlor | .10 | U |
| 53494-70-5 | Endrin ketone | .50 | U |
| 5103-71-9 | alpha-Chlordane | .10 | U |
| 5103-74-2 | gamma-Chlordane | .50 | U |
| 8001-35-2 | Toxaphene | .50 | U |
| 12674-11-2 | Aroclor-1016 | 1.0 | U |
| 11104-28-2 | Aroclor-1221 | .50 | U |
| 11141-16-5 | Aroclor-1232 | .50 | U |
| 53469-21-9 | Aroclor-1242 | .50 | U |
| 12672-29-6 | Aroclor-1248 | .50 | U |
| 11097-69-1 | Aroclor-1254 | .50 | U |
| 11096-82-5 | Aroclor-1260 | 1.0 | U |
| | | 1.0 | U |

1D
PESTICIDE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

BZ953

Lab Name: PEI Contract: 68-D9-0037

Lab Code: PEI Case No.: 11834 SAS No.: SDG No.: BZ949

Matrix: (soil/water) WATER Lab Sample ID: T9-04-199-05A

Sample wt/vol: 1000. (g/mL)ML Lab File ID: BZP953

Level: (low/med) LOW Date Received: 4/26/89

% Moisture: not dec.100. dec. 0. Date Extracted: 4/26/89

Extraction: (SepF/Cont/Sonc) CONT Date Analyzed: 5/ 6/89

GPC Cleanup: (Y/N) N pH: 7.0 Dilution Factor: 1.00

| CAS NO. | COMPOUND | CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L | Q |
|---|---|---|---|
| 319-84-6 | alpha-BHC | .050 | IU |
| 319-85-7 | beta-BHC | .050 | IU |
| 319-86-8 | delta-BHC | .050 | IU |
| 58-89-9 | gamma-BHC | .050 | IU |
| 76-44-8 | Heptachlor | .050 | IU |
| 309-00-2 | Aldrin | .050 | IU |
| 1024-57-3 | Heptachlor epoxide | .050 | IU |
| 959-98-8 | Endosulfan I | .050 | IU |
| 60-57-1 | Dieldrin | .050 | IU |
| 72-55-9 | 4,4'-DDE | .10 | IU |
| 72-20-8 | Endrin | .10 | IU |
| 33213-65-9 | Endosulfan II | .10 | IU |
| 72-54-8 | 4,4'-DDD | .10 | IU |
| 1031-07-8 | Endosulfan sulfate | .10 | IU |
| 50-29-3 | 4,4'-DDT | .10 | IU |
| 72-43-5 | Methoxychlor | .10 | IU |
| 53494-70-5 | Endrin ketone | .50 | IU |
| 5103-71-9 | alpha-Chlordane | .10 | IU |
| 5103-74-2 | gamma-Chlordane | .50 | IU |
| 8001-35-2 | Toxaphene | .50 | IU |
| 12674-11-2 | Aroclor-1016 | 1.0 | IU |
| 11104-28-2 | Aroclor-1221 | .50 | IU |
| 11141-16-5 | Aroclor-1232 | .50 | IU |
| 53469-21-9 | Aroclor-1242 | .50 | IU |
| 12672-29-6 | Aroclor-1248 | .50 | IU |
| 11097-69-1 | Aroclor-1254 | .50 | IU |
| 11096-82-5 | Aroclor-1260 | 1.0 | IU |
| | | 1.0 | IU |

1D
PESTICIDE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

BZ954

Lab Name: PEI Contract: 68-D9-0037

Lab Code: PEI Case No.: 11834 SAS No.: SDG No.: BZ949

Matrix: (soil/water) WATER Lab Sample ID: T9-04-199-06A

Sample wt/vol: 1000. (g/mL)ML Lab File ID: BZP954

Level: (low/med) LOW Date Received: 4/26/89

% Moisture: not dec.100. dec. 0. Date Extracted: 4/26/89

Extraction: (SepF/Cont/Sonc) CONT Date Analyzed: 5/ 6/89

GPC Cleanup: (Y/N) N pH: 7.0 Dilution Factor: 1.00

| CAS NO. | COMPOUND | CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L | Q |
|---|---|---|---|
| 319-84-6 | alpha-BHC | .050 | U |
| 319-85-7 | beta-BHC | .050 | U |
| 319-86-8 | delta-BHC | .050 | U |
| 58-89-9 | gamma-BHC | .050 | U |
| 76-44-8 | Heptachlor | .050 | U |
| 309-00-2 | Aldrin | .050 | U |
| 1024-57-3 | Heptachlor epoxide | .050 | U |
| 959-98-8 | Endosulfan I | .050 | U |
| 60-57-1 | Dieldrin | .10 | U |
| 72-55-9 | 4,4'-DDE | .10 | U |
| 72-20-8 | Endrin | .10 | U |
| 33213-65-9 | Endosulfan II | .10 | U |
| 72-54-8 | 4,4'-DDD | .10 | U |
| 1031-07-8 | Endosulfan sulfate | .10 | U |
| 50-29-3 | 4,4'-DDT | .10 | U |
| 72-43-5 | Methoxychlor | .50 | U |
| 53494-70-5 | Endrin ketone | .10 | U |
| 5103-71-9 | alpha-Chlordane | .50 | U |
| 5103-74-2 | gamma-Chlordane | .50 | U |
| 8001-35-2 | Toxaphene | 1.0 | U |
| 12674-11-2 | Aroclor-1016 | .50 | U |
| 11104-28-2 | Aroclor-1221 | .50 | U |
| 11141-16-5 | Aroclor-1232 | .50 | U |
| 53469-21-9 | Aroclor-1242 | .50 | U |
| 12672-29-6 | Aroclor-1248 | .50 | U |
| 11097-69-1 | Aroclor-1254 | 1.0 | U |
| 11096-82-5 | Aroclor-1260 | 1.0 | U |

1D
# PESTICIDE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

BZ964

Lab Name: PEI  Contract: 68-D9-0037

Lab Code: PEI  Case No.: 11834  SAS No.:  SDG No.: BZ949

Matrix: (soil/water) WATER  Lab Sample ID: T9-114-199-16A

Sample wt/vol: 1000. (g/mL) ML  Lab File ID: BZP964

Level: (low/med) LOW  Date Received: 4/26/89

% Moisture: not dec. 100.  dec. 0.  Date Extracted: 4/26/89

Extraction: (SepF/Cont/Sonc) CONT  Date Analyzed: 5/ 6/89

GPC Cleanup: (Y/N) N  pH: 7.0  Dilution Factor: 1.00

| CAS NO. | COMPOUND | CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L | Q |
|---|---|---|---|
| 319-84-6 | alpha-BHC | .050 | U |
| 319-85-7 | beta-BHC | .050 | U |
| 319-86-8 | delta-BHC | .050 | U |
| 58-89-9 | gamma-BHC | .050 | U |
| 76-44-8 | Heptachlor | .050 | U |
| 309-00-2 | Aldrin | .050 | U |
| 1024-57-3 | Heptachlor epoxide | .050 | U |
| 959-98-8 | Endosulfan I | .050 | U |
| 60-57-1 | Dieldrin | .050 | U |
| 72-55-9 | 4,4'-DDE | .10 | U |
| 72-20-8 | Endrin | .10 | U |
| 33213-65-9 | Endosulfan II | .10 | U |
| 72-54-8 | 4,4'-DDD | .10 | U |
| 1031-07-8 | Endosulfan sulfate | .10 | U |
| 50-29-3 | 4,4'-DDT | .10 | U |
| 72-43-5 | Methoxychlor | .10 | U |
| 53494-70-5 | Endrin ketone | .50 | U |
| 5103-71-9 | alpha-Chlordane | .10 | U |
| 5103-74-2 | gamma-Chlordane | .50 | U |
| 8001-35-2 | Toxaphene | .50 | U |
| 12674-11-2 | Aroclor-1016 | 1.0 | U |
| 11104-28-2 | Aroclor-1221 | .50 | U |
| 11141-16-5 | Aroclor-1232 | .50 | U |
| 53469-21-9 | Aroclor-1242 | .50 | U |
| 12672-29-6 | Aroclor-1248 | .50 | U |
| 11097-69-1 | Aroclor-1254 | .50 | U |
| 11096-82-5 | Aroclor-1260 | 1.0 | U |
| | | 1.0 | U |

1D
PESTICIDE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.
BZ955

Lab Name: PEI
Contract: 68-D9-0037
Lab Code: PEI
Case No.: 11834
SAS No.:
SDG No.: BZ949
Matrix: (soil/water) SOIL
Lab Sample ID: T9-04-199-07A
Sample wt/vol: 30. (g/mL) G
Lab File ID: BZP955
Level: (low/med) LOW
Date Received: 4/26/89
% Moisture: not dec. 50. dec. 0.
Date Extracted: 4/28/89
Extraction: (SepF/Cont/Sonc) SONC
Date Analyzed: 5/ 6/89
GPC Cleanup: (Y/N) Y
pH: 7.0
Dilution Factor: 1.00

| CAS NO. | COMPOUND | CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG | Q |
|---|---|---|---|
| 319-84-6 | alpha-BHC | 32. | IU |
| 319-85-7 | beta-BHC | 32. | IU |
| 319-86-8 | delta-BHC | 32. | IU |
| 58-89-9 | gamma-BHC | 32. | IU |
| 76-44-8 | Heptachlor | 32. | IU |
| 309-00-2 | Aldrin | 32. | IU |
| 1024-57-3 | Heptachlor epoxide | 32. | IU |
| 959-98-8 | Endosulfan I | 32. | IU |
| 60-57-1 | Dieldrin | 63. | IU |
| 72-55-9 | 4,4'-DDE | 63. | IU |
| 72-20-8 | Endrin | 63. | IU |
| 33213-65-9 | Endosulfan II | 63. | IU |
| 72-54-8 | 4,4'-DDD | 63. | IU |
| 1031-07-8 | Endosulfan sulfate | 63. | IU |
| 50-29-3 | 4,4'-DDT | 63. | IU |
| 72-43-5 | Methoxychlor | 320. | IU |
| 53494-70-5 | Endrin ketone | 63. | IU |
| 5103-71-9 | alpha-Chlordane | 320. | IU |
| 5103-74-2 | gamma-Chlordane | 320. | IU |
| 8001-35-2 | Toxaphene | 630. | IU |
| 12674-11-2 | Aroclor-1016 | 320. | IU |
| 11104-28-2 | Aroclor-1221 | 320. | IU |
| 11141-16-5 | Aroclor-1232 | 320. | IU |
| 53469-21-9 | Aroclor-1242 | 320. | IU |
| 12672-29-6 | Aroclor-1248 | 320. | IU |
| 11097-69-1 | Aroclor-1254 | 2600. | IJ |
| 11096-82-5 | Aroclor-1260 | 2400. | IJ |

1D
PESTICIDE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

BZ956

Lab Name: PEI Contract: 68-D9-0037

Lab Code: PEI Case No.: 11834 SAS No.: SDG No.: BZ949

Matrix: (soil/water) SOIL Lab Sample ID: T9-04-199-08A

Sample wt/vol: 30. (g/mL) G Lab File ID: BZP956

Level: (low/med) LOW Date Received: 4/26/89

% Moisture: not dec. 22. dec. 0. Date Extracted: 4/28/89

Extraction: (SepF/Cont/Sonc) SONC Date Analyzed: 5/ 6/89

GPC Cleanup: (Y/N) Y pH: 7.0 Dilution Factor: 1.00

| CAS NO. | COMPOUND | CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG | Q |
|---|---|---|---|
| 319-84-6 | alpha-BHC | 21. | U |
| 319-85-7 | beta-BHC | 21. | U |
| 319-86-8 | delta-BHC | 21. | U |
| 58-89-9 | gamma-BHC | 21. | U |
| 76-44-8 | Heptachlor | 21. | U |
| 309-00-2 | Aldrin | 21. | U |
| 1024-57-3 | Heptachlor epoxide | 21. | U |
| 959-98-8 | Endosulfan I | 21. | U |
| 60-57-1 | Dieldrin | 41. | U |
| 72-55-9 | 4,4'-DDE | 41. | U |
| 72-20-8 | Endrin | 41. | U |
| 33213-65-9 | Endosulfan II | 41. | U |
| 72-54-8 | 4,4'-DDD | 41. | U |
| 1031-07-8 | Endosulfan sulfate | 41. | U |
| 50-29-3 | 4,4'-DDT | 41. | U |
| 72-43-5 | Methoxychlor | 210. | U |
| 53494-70-5 | Endrin ketone | 41. | U |
| 5103-71-9 | alpha-Chlordane | 210. | U |
| 5103-74-2 | gamma-Chlordane | 210. | U |
| 8001-35-2 | Toxaphene | 410. | U |
| 12674-11-2 | Aroclor-1016 | 210. | U |
| 11104-28-2 | Aroclor-1221 | 210. | U |
| 11141-16-5 | Aroclor-1232 | 210. | U |
| 53469-21-9 | Aroclor-1242 | 210. | U |
| 12672-29-6 | Aroclor-1248 | 210. | U |
| 11097-69-1 | Aroclor-1254 | 410. | U |
| 11096-82-5 | Aroclor-1260 | 410. | U |

1D
PESTICIDE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

BZ957

Lab Name: PEI Contract: 68-D9-0037

Lab Code: PEI Case No.: 11834 SAS No.: SDG No.: BZ949

Matrix: (soil/water) SOIL Lab Sample ID: T9-04-199-09A

Sample wt/vol: 30. (g/mL) G Lab File ID: BZP957

Level: (low/med) LOW Date Received: 4/26/89

% Moisture: not dec. 22. dec. 0. Date Extracted: 4/28/89

Extraction: (SepF/Cont/Sonc) SONC Date Analyzed: 5/ 6/89

GPC Cleanup: (Y/N) Y pH: 7.0 Dilution Factor: 1.00

| CAS NO. | COMPOUND | CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG | Q |
|---|---|---|---|
| 319-84-6 | alpha-BHC | 20. | U |
| 319-85-7 | beta-BHC | 20. | U |
| 319-86-8 | delta-BHC | 20. | U |
| 58-89-9 | gamma-BHC | 20. | U |
| 76-44-8 | Heptachlor | 20. | U |
| 309-00-2 | Aldrin | 20. | U |
| 1024-57-3 | Heptachlor epoxide | 20. | U |
| 959-98-8 | Endosulfan I | 20. | U |
| 60-57-1 | Dieldrin | 41. | U |
| 72-55-9 | 4,4'-DDE | 41. | U |
| 72-20-8 | Endrin | 41. | U |
| 33213-65-9 | Endosulfan II | 41. | U |
| 72-54-8 | 4,4'-DDD | 41. | U |
| 1031-07-8 | Endosulfan sulfate | 41. | U |
| 50-29-3 | 4,4'-DDT | 41. | U |
| 72-43-5 | Methoxychlor | 200. | U |
| 53494-70-5 | Endrin ketone | 41. | U |
| 5103-71-9 | alpha-Chlordane | 200. | U |
| 5103-74-2 | gamma-Chlordane | 200. | U |
| 8001-35-2 | Toxaphene | 410. | U |
| 12674-11-2 | Aroclor-1016 | 200. | U |
| 11104-28-2 | Aroclor-1221 | 200. | U |
| 11141-16-5 | Aroclor-1232 | 200. | U |
| 53469-21-9 | Aroclor-1242 | 200. | U |
| 12672-29-6 | Aroclor-1248 | 200. | U |
| 11097-69-1 | Aroclor-1254 | 410. | U |
| 11096-82-5 | Aroclor-1260 | 410. | U |

1D
PESTICIDE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

BZ958

Lab Name: PEI Contract: 68-D9-0037

Lab Code: PEI Case No.: 11834 SAS No.: SDG No.: BZ949

Matrix: (soil/water) SOIL Lab Sample ID: T9-04-199-10A

Sample wt/vol: 1. (g/mL) G Lab File ID: BZR958

Level: (low/med) MED Date Received: 4/26/89

% Moisture: not dec. 54. dec. 0. Date Extracted: 5/ 2/89

Extraction: (SepF/Cont/Sonc) SONC Date Analyzed: 5/ 7/89

GPC Cleanup: (Y/N) N pH: 7.0 Dilution Factor: 1.00

| CAS NO. | COMPOUND | CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG | Q |
|---|---|---|---|
| 319-84-6 | alpha-BHC | 250. | U |
| 319-85-7 | beta-BHC | 250. | U |
| 319-86-8 | delta-BHC | 250. | U |
| 58-89-9 | gamma-BHC | 250. | U |
| 76-44-8 | Heptachlor | 250. | U |
| 309-00-2 | Aldrin | 250. | U |
| 1024-57-3 | Heptachlor epoxide | 250. | U |
| 959-98-8 | Endosulfan I | 250. | U |
| 60-57-1 | Dieldrin | 500. | U |
| 72-55-9 | 4,4'-DDE | 500. | U |
| 72-20-8 | Endrin | 500. | U |
| 33213-65-9 | Endosulfan II | 500. | U |
| 72-54-8 | 4,4'-DDD | 500. | U |
| 1031-07-8 | Endosulfan sulfate | 500. | U |
| 50-29-3 | 4,4'-DDT | 500. | U |
| 72-43-5 | Methoxychlor | 2500. | U |
| 53494-70-5 | Endrin ketone | 500. | U |
| 5103-71-9 | alpha-Chlordane | 2500. | U |
| 5103-74-2 | gamma-Chlordane | 2500. | U |
| 8001-35-2 | Toxaphene | 5000. | U |
| 12674-11-2 | Aroclor-1016 | 2500. | U |
| 11104-28-2 | Aroclor-1221 | 2500. | U |
| 11141-16-5 | Aroclor-1232 | 2500. | U |
| 53469-21-9 | Aroclor-1242 | 2500. | U |
| 12672-29-6 | Aroclor-1248 | 2500. | U |
| 11097-69-1 | Aroclor-1254 | [illegible]000. | U |
| 11096-82-5 | Aroclor-1260 | [illegible]000. | U |

1D
PESTICIDE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.
B7959

Lab Name: PEI  Contract: 68-D9-0037

Lab Code: PEI  Case No.: 11834  SAS No.:  SDG No.: B7949

Matrix: (soil/water) SOIL  Lab Sample ID: T9-114-199-11A

Sample wt/vol: 30. (g/mL) G  Lab File ID: BZP959

Level: (low/med) LOW  Date Received: 4/26/89

% Moisture: not dec. 59.  dec. 0.  Date Extracted: 4/28/89

Extraction: (SepF/Cont/Sonc) SONC  Date Analyzed: 5/ 6/89

GPC Cleanup: (Y/N) Y  pH: 7.0  Dilution Factor: 1.00

| CAS NO. | COMPOUND | CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG | Q |
|---|---|---|---|
| 319-84-6 | alpha-BHC | 39. | U |
| 319-85-7 | beta-BHC | 39. | U |
| 319-86-8 | delta-BHC | 39. | U |
| 58-89-9 | gamma-BHC | 39. | U |
| 76-44-8 | Heptachlor | 39. | U |
| 309-00-2 | Aldrin | 39. | U |
| 1024-57-3 | Heptachlor epoxide | 39. | U |
| 959-98-8 | Endosulfan I | 39. | U |
| 60-57-1 | Dieldrin | 78. | U |
| 72-55-9 | 4,4'-DDE | 78. | U |
| 72-20-8 | Endrin | 78. | U |
| 33213-65-9 | Endosulfan II | 78. | U |
| 72-54-8 | 4,4'-DDD | 78. | U |
| 1031-07-8 | Endosulfan sulfate | 78. | U |
| 50-29-3 | 4,4'-DDT | 78. | U |
| 72-43-5 | Methoxychlor | 390. | U |
| 53494-70-5 | Endrin ketone | 78. | U |
| 5103-71-9 | alpha-Chlordane | 390. | U |
| 5103-74-2 | gamma-Chlordane | 390. | U |
| 8001-35-2 | Toxaphene | 780. | U |
| 12674-11-2 | Aroclor-1016 | 390. | U |
| 11104-28-2 | Aroclor-1221 | 390. | U |
| 11141-16-5 | Aroclor-1232 | 390. | U |
| 53469-21-9 | Aroclor-1242 | 390. | U |
| 12672-29-6 | Aroclor-1248 | 390. | U |
| 11097-69-1 | Aroclor-1254 | 1400. | J |
| 11096-82-5 | Aroclor-1260 | 1600. | J |

1D
PESTICIDE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.
B7960

Lab Name: PEI Contract: 68-D9-0037

Lab Code: PEI Case No.: 11834 SAS No.: SDG No.: B7949

Matrix: (soil/water) SOIL Lab Sample ID: T9-114-199-12A

Sample wt/vol: 30. (g/mL) G Lab File ID: B7P960

Level: (low/med) LOW Date Received: 4/26/89

% Moisture: not dec. 41. dec. 0. Date Extracted: 4/28/89

Extraction: (SepF/Cont/Sonc) SONC Date Analyzed: 5/ 6/89

GPC Cleanup: (Y/N) Y pH: 7.0 Dilution Factor: 1.000

| CAS NO. | COMPOUND | CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG | Q |
|---|---|---|---|
| 319-84-6 | alpha-BHC | 27. | U |
| 319-85-7 | beta-BHC | 27. | U |
| 319-86-8 | delta-BHC | 27. | U |
| 58-89-9 | gamma-BHC | 27. | U |
| 76-44-8 | Heptachlor | 27. | U |
| 309-00-2 | Aldrin | 27. | U |
| 1024-57-3 | Heptachlor epoxide | 27. | U |
| 959-98-8 | Endosulfan I | 27. | U |
| 60-57-1 | Dieldrin | 54. | U |
| 72-55-9 | 4,4'-DDE | 54. | U |
| 72-20-8 | Endrin | 54. | U |
| 33213-65-9 | Endosulfan II | 54. | U |
| 72-54-8 | 4,4'-DDD | 54. | U |
| 1031-07-8 | Endosulfan sulfate | 54. | U |
| 50-29-3 | 4,4'-DDT | 54. | U |
| 72-43-5 | Methoxychlor | 270. | U |
| 53494-70-5 | Endrin ketone | 54. | U |
| 5103-71-9 | alpha-Chlordane | 270. | U |
| 5103-74-2 | gamma-Chlordane | 270. | U |
| 8001-35-2 | Toxaphene | 540. | U |
| 12674-11-2 | Aroclor-1016 | 270. | U |
| 11104-28-2 | Aroclor-1221 | 270. | U |
| 11141-16-5 | Aroclor-1232 | 270. | U |
| 53469-21-9 | Aroclor-1242 | 270. | U |
| 12672-29-6 | Aroclor-1248 | 270. | U |
| 11097-69-1 | Aroclor-1254 | 4200. | U |
| 11096-82-5 | Aroclor-1260 | 540. | U |

1D

# PESTICIDE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

B7961

Lab Name: PEI  Contract: 68-D9-0037

Lab Code: PEI  Case No.: 11834  SAS No.:  SDG No.: B7949

Matrix: (soil/water) WATER  Lab Sample ID: T9-04-199-13A

Sample wt/vol: 1000. (g/mL) ML  Lab File ID: B7P961

Level: (low/med) LOW  Date Received: 4/26/89

% Moisture: not dec. 100.  dec. 0.  Date Extracted: 4/26/89

Extraction: (SepF/Cont/Sonc) CONT  Date Analyzed: 5/ 6/89

GPC Cleanup: (Y/N) N  pH: 7.0  Dilution Factor: 1.00

| CAS NO. | COMPOUND | CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L | Q |
|---|---|---|---|
| 319-84-6 | alpha-BHC | .050 | U |
| 319-85-7 | beta-BHC | .050 | U |
| 319-86-8 | delta-BHC | .050 | U |
| 58-89-9 | gamma-BHC | .050 | U |
| 76-44-8 | Heptachlor | .050 | U |
| 309-00-2 | Aldrin | .050 | U |
| 1024-57-3 | Heptachlor epoxide | .050 | U |
| 959-98-8 | Endosulfan I | .050 | U |
| 60-57-1 | Dieldrin | .10 | U |
| 72-55-9 | 4,4'-DDE | .10 | U |
| 72-20-8 | Endrin | .10 | U |
| 33213-65-9 | Endosulfan II | .10 | U |
| 72-54-8 | 4,4'-DDD | .10 | U |
| 1031-07-8 | Endosulfan sulfate | .10 | U |
| 50-29-3 | 4,4'-DDT | .10 | U |
| 72-43-5 | Methoxychlor | .50 | U |
| 53494-70-5 | Endrin ketone | .10 | U |
| 5103-71-9 | alpha-Chlordane | .50 | U |
| 5103-74-2 | gamma-Chlordane | .50 | U |
| 8001-35-2 | Toxaphene | 1.0 | U |
| 12674-11-2 | Aroclor-1016 | .50 | U |
| 11104-28-2 | Aroclor-1221 | .50 | U |
| 11141-16-5 | Aroclor-1232 | .50 | U |
| 53469-21-9 | Aroclor-1242 | .50 | U |
| 12672-29-6 | Aroclor-1248 | .50 | U |
| 11097-69-1 | Aroclor-1254 | 1.0 | U |
| 11096-82-5 | Aroclor-1260 | 1.0 | U |

1D
PESTICIDE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

BZ9A2

Lab Name: PEI Contract: 68-D9-0037

Lab Code: PEI Case No.: 11834 SAS No.: SDG No.: BZ949

Matrix: (soil/water) WATER Lab Sample ID: T9-04-199-14A

Sample wt/vol: 1000. (g/ml) ML Lab File ID: BZP9A2

Level: (low/med) LOW Date Received: 4/26/89

% Moisture: not dec. 100. dec. 0. Date Extracted: 4/26/89

Extraction: (SepF/Cont/Sonc) CONT Date Analyzed: 5/ 6/89

GPC Cleanup: (Y/N) N pH: 7.0 Dilution Factor: 1.00

| CAS NO. | COMPOUND | CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L | Q |
|---|---|---|---|
| 319-84-6 | alpha-BHC | .050 | U |
| 319-85-7 | beta-BHC | .050 | U |
| 319-86-8 | delta-BHC | .050 | U |
| 58-89-9 | gamma-BHC | .050 | U |
| 76-44-8 | Heptachlor | .050 | U |
| 309-00-2 | Aldrin | .050 | U |
| 1024-57-3 | Heptachlor epoxide | .050 | U |
| 959-98-8 | Endosulfan I | .050 | U |
| 60-57-1 | Dieldrin | .10 | U |
| 72-55-9 | 4,4'-DDE | .10 | U |
| 72-20-8 | Endrin | .10 | U |
| 33213-65-9 | Endosulfan II | .10 | U |
| 72-54-8 | 4,4'-DDD | .10 | U |
| 1031-07-8 | Endosulfan sulfate | .10 | U |
| 50-29-3 | 4,4'-DDT | .10 | U |
| 72-43-5 | Methoxychlor | .50 | U |
| 53494-70-5 | Endrin ketone | .10 | U |
| 5103-71-9 | alpha-Chlordane | .50 | U |
| 5103-74-2 | gamma-Chlordane | .50 | U |
| 8001-35-2 | Toxaphene | 1.0 | U |
| 12674-11-2 | Aroclor-1016 | .50 | U |
| 11104-28-2 | Aroclor-1221 | .50 | U |
| 11141-16-5 | Aroclor-1232 | .50 | U |
| 53469-21-9 | Aroclor-1242 | .50 | U |
| 12672-29-6 | Aroclor-1248 | .50 | U |
| 11097-69-1 | Aroclor-1254 | 1.0 | U |
| 11096-82-5 | Aroclor-1260 | 1.0 | U |

**REFERENCE NO. 23**

Part II & III

# NEW JERSEY AND NATIONAL REGISTERS OF HISTORIC PLACES

p. 352

## HUDSON

OLD BERGEN CHURCH 1842
Bergen and Highland Avenues
SR 06/13/73 NR 08/14/73

PIER G
SHPO Opinion: 07/27/78

PIER 19
Determination of Eligibility: 10/20/78

STATEN ISLAND FERRY ROUTE AND TERMINAL SITES 18-19th C.
SR 05/08/75

STATUE OF LIBERTY NATIONAL MONUMENT
Hudson River
National Historic Landmark NR 10/15/66

TIMBER CRIBBING/STRATIFIED FILL
SHPO Opinion: 07/09/79

VAN VORST HISTORIC DISTRICT 19-20th C.
Area includes Jersey Avenue, Varick, Barrow, Grove, Wayne, Mercer, Montgomery, York, Bright and Grand Streets
SR 08/02/78 NR 03/05/80

VESSEL #99
SHPO Opinion: 08/30/76

## KEARNY TOWN

PENNSYLVANIA TUNNEL AND TERMINAL RAILROAD COMPANY PORTAL BRIDGE
Determination of Eligibility: 01/18/78

## WEEHAWKEN

HACKENSACK WATER COMPANY COMPLEX 1883
4100 Park Avenue
SR 08/24/79 NR 01/03/80

NORTH HUDSON HOSPITAL
Determination of Eligibility: 04/15/80

**REFERENCE NO. 24**

# APPRAISAL OF WATER RESOURCES IN THE HACKENSACK RIVER BASIN, NEW JERSEY

By L. D. Carswell

U.S. GEOLOGICAL SURVEY
Water-Resources Investigations 76–74

Prepared in cooperation with
NEW JERSEY DEPARTMENT OF ENVIRONMENTAL
PROTECTION, DIVISION OF WATER RESOURCES

June 1976

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## GEOLOGY

### General Features

During the Late Triassic Epoch downfaulting produced a series of northeastward-trending basins in the Piedmont Plateau from North Carolina to Nova Scotia. Sedimentary and associated igneous rocks of Triassic age occupy the downfaulted basins and are known as the Newark Group. In New Jersey the Newark Group crops out in a band 16 to 30 miles wide trending southwestward from the Hudson River to the Delaware River (fig. 1). In the vicinity of the Delaware River the Newark Group is about 12,000 feet thick (Johnson and McLaughlin, 1957, p. 32). The bedrock in the Hackensack River basin is a part of the Newark Group of Late Triassic age.

The sedimentary rocks of the Newark Group in New Jersey are composed of reddish brown arkosic sandstone, mudstone, siltstone, and conglomerate, and dark-gray argillite. The sediments were derived largely from rocks of Paleozoic and Precambrian age to the southeast and were deposited in a nonmarine intermontane basin (Van Houten, 1965). In Triassic time the sedimentary rocks were intruded by diabase sills (intrusions which parallel the enclosing beds) and dikes (intrusions which cut across the bedding). The diabase is more resistant to erosion than other rocks of the Newark Group and generally forms ridges such as the Palisades.

The Newark Group has been divided into three formations on the basis of distinctive lithology: a lower unit, the Stockton Formation; a middle unit, the Lockatong Formation; and an upper unit, the Brunswick Formation. The Lockatong interfingers with both the underlying Stockton and overlying Brunswick; its presence has been reported at only one locality in the Hackensack River basin (Van Houten, 1964, p. 500). The distribution of the units of the Newark Group in the Hackensack River basin is shown in figure 3.

The beds of the Newark Group generally strike north to northeast in the Hackensack River basin and dip west to northwest at approximately 10 degrees. A prominent set of steeply dipping joints parallels the strike of the beds. A less prominent set of nearly-vertical joints parallels approximately the direction of dip of the beds. In the cliffs along the Hudson River the diabase has well developed columnar jointing which inspired the name "Palisades" for the vertical columns of rock. The faults that cut and displace the Triassic rocks typically strike northeastward and are parallel to or intersect the strike of the beds at a low angle.

Surficial deposits cover most of the bedrock in the Hackensack River basin and are largely a result of several major advances of the continental glaciers across the area during the Pleistocene Epoch. Younger deposits of Holocene age, consisting largely of alluvium deposited by present-day streams, overlie the glacial deposits. The alluvium is restricted to the flood plains of the streams.

During Pleistocene time glaciers which advanced across the basin probably removed an unknown thickness of weathered or easily eroded rock and soil. Part of this material was ground to clay size and the mixture later redeposited on the bedrock. Deposits of the latest (Wisconsin) ice advances now are exposed at the land surface. They consist of unsorted deposits of boulders, pebbles, sand, and rock flour which cover the hills and partly fill the valleys. A few miles south of the Hackensack River basin, frontal deposits from the melting ice sheet accumulated as a terminal moraine.

Streams of melt water issuing from the stagnating and retreating glacier formed stratified deposits of gravel, sand, silt, and clay. As the glacier retreated, crustal downwarping beneath the glacier, as a result of its weight, combined with blockage of drainage by the terminal moraine to the south ponded the melt water forming a lake known as Lake Hackensack in the area of the present Newark Bay and Hackensack Meadows and extending northward into Rockland County, N. Y. Subsequently, this lake was partly filled with deposits of varved silts, and clay prior to the establishment of outlets which drained the lake. The lake beds were eventually veneered with alluvium and a mat of decayed plant material.

## Pre-Quaternary Rock Units

### Stockton Formation

The Stockton Formation in the Hackensack River basin occurs in a narrow belt, as much as two miles wide, on the western slope of the Palisades from West New York, N. J., northward into Rockland County, New York. The Stockton underlies the Lockatong Formation in the southern part of the basin and intertongues with the Lockatong in the northern part of the basin. The Stockton is locally cut by the Palisades sill.

The Stockton is composed of light-colored arkosic sandstone and some thin beds of red sandstone and shale. The arkosic sandstone contains 50 to 70 percent quartz and 15 to 40 percent feldspar and is atypical in that the content of sodium feldspar exceeds that of potassium feldspar according to Van Houten (1965, p. 832-833). Silica cement is common. Also present are minor amounts of calcite and rarely dolomite cement as well as authigenic feldspar overgrowths and void fillings. In the past some arkosic sandstone has been quarried locally for building stone.

The exact thickness of the Stockton in northeastern New Jersey is unknown (Merrill and others, 1902, p. 6), but it is much less than the 5,000 feet along the Delaware River reported by Johnson and McLaughlin (1957, p. 40).

## Lockatong Formation

The Lockatong Formation has been identified at only one location, North Bergen, in the Hackensack River basin. Here it consists of argillite that has been altered to hornsfels during the emplacement of the adjacent diabase sill (Van Houten, 1964, p. 500).

The Lockatong overlies the Stockton Formation and is overlain by the Brunswick Formation. Laterally it intertongues with both the Brunswick and the Stockton Formations.

The Lockatong Formation is composed of cyclic units of chemical and detrital origin that average 15 feet in thickness. The detrital deposits are mudstones composed of abundant sodium feldspar, calcite, illite, and chlorite with very little quartz and potassium feldspar. In the chemical deposits the mudstone contains abundant analcime, albite, dolomite, calcite, illite, and chlorite. Dolomite and analcime casts of skeletal glauberite (and possibly anhydrite) crystals are common in some of the chemical deposits (Van Houten, 1965).

The formation is 90 feet thick at North Bergen. It thins northward and is entirely missing at the New York-New Jersey State line. It presumably thickens south of North Bergen and is 3,750 feet thick in western New Jersey and adjacent Pennsylvania.

## Brunswick Formation

The Brunswick Formation overlies the Stockton Formation and forms the bedrock throughout most of the Hackensack River basin. It is reddish-brown and composed of mudstone, siltstone, sandstone, and conglomerate. In the southern part of the basin mudstone is the dominant lithology. The deposits gradually become coarser grained northward (Kümmel 1898, p. 43 and Savage, 1968) so that in the northern part of the basin in New York the Brunswick consists largely of sandstone and commonly contains beds of conglomerate.

Gypsum and glauberite are reported to occur in the Brunswick Formation. Herpers and Barksdale (1951, p. 37) have reported the presence of gypsum from well borings in the Newark area just south of the Hackensack River basin. Glauberite has long been known to be present locally in the Brunswick Formation. Van Houten (1965, p. 834) reports that some beds enclose large complete molds of glauberite, as well as rosettes of elongate calcite casts. The coarser deposits are fledspathic and are commonly cemented by calcite (Van Houten, 1965, p. 834).

The thickness of the Brunswick Formation in the Hackensack River basin is unknown. Herpers and Barksdale (1951, p. 23) estimated the Brunswick to be about 6,000 to 7,000 feet thick in the Newark area just south of the Hackensack River basin.

## Diabase

Sills and dikes of diabase (commonly called traprock) intruded the strata of the Newark Group. They are relatively resistant to erosion and form the Palisades ridge, Laurel Hill, and Little Snake Hill. Minor intrusive bodies of diabase are found at North Arlington and Bogota. The diabase dikes at Laurel Hill, Little Snake Hill, and Bogota cut the Brunswick Formation at high angles. The diabase at North Arlington is a sill, and that which forms the Palisades is a semiconcordant sill. The latter sill was fed by dikes and the upper and lower contacts of the sill locally cut across the bedding of the Stockton Formation. The Palisades diabase is 1,200 feet thick north of Englewood and thins southward to Jersey City (Darton, in Merrill and others, 1902, p. 9).

Diabase is a black, hard, dense rock composed of about equal amounts of plagioclase fledspar and augite. The texture ranges from finely crystalline in small dikes or chilled border zones of large intrusions to coarsely crystalline in the center of large intrusions where the rock solidified slowly thus giving the crystals a longer time to grow. Diabase is extensively quarried for road metal, particularly the dike at Laurel Hill and along the west flank of the ridge formed by the Palisades sill.

# Quaternary Deposits

## Pleistocene Deposits

Unconsolidated deposits overlying the Newark Group consist of sand, gravel, silt, and clay, that were deposited largely during the last (Wisconsin) glaciation of the Pleistocene Epoch. These deposits are generally thickest in the valleys and are thin or absent on hill crests. The deposits can be broadly subdivided into till and stratified drift. Till is an unsorted mixture of sand, gravel, silt, and clay deposited directly from the ice. It covers almost all the bedrock in the Hackensack River basin. The thickness of the till is variable; it averages 25 feet and is known to exceed 165 feet locally in the meadows area. Stratified drift consists of sand, gravel, silt, and clay which has been transported by water; it is poorly to well sorted. The stratified drift was deposited in contact with the ice or as outwash in flood plains, deltas, and as fine sediment in lakes during and after the retreat of the ice.

Stratified drift deposits of varved silt and clay, as much as 300 feet thick in the meadows, occur in two troughs (fig. 4) which roughly parallel the sides of the basin and probably connect a few miles south of the New York State line. Perlmutter (1959, p. 25) has reported similar deposits of laminated clay continuous with those of New Jersey in southern Rockland County, New York. Because of their varved character and lack of marine fossils, the silt and clay are presumed

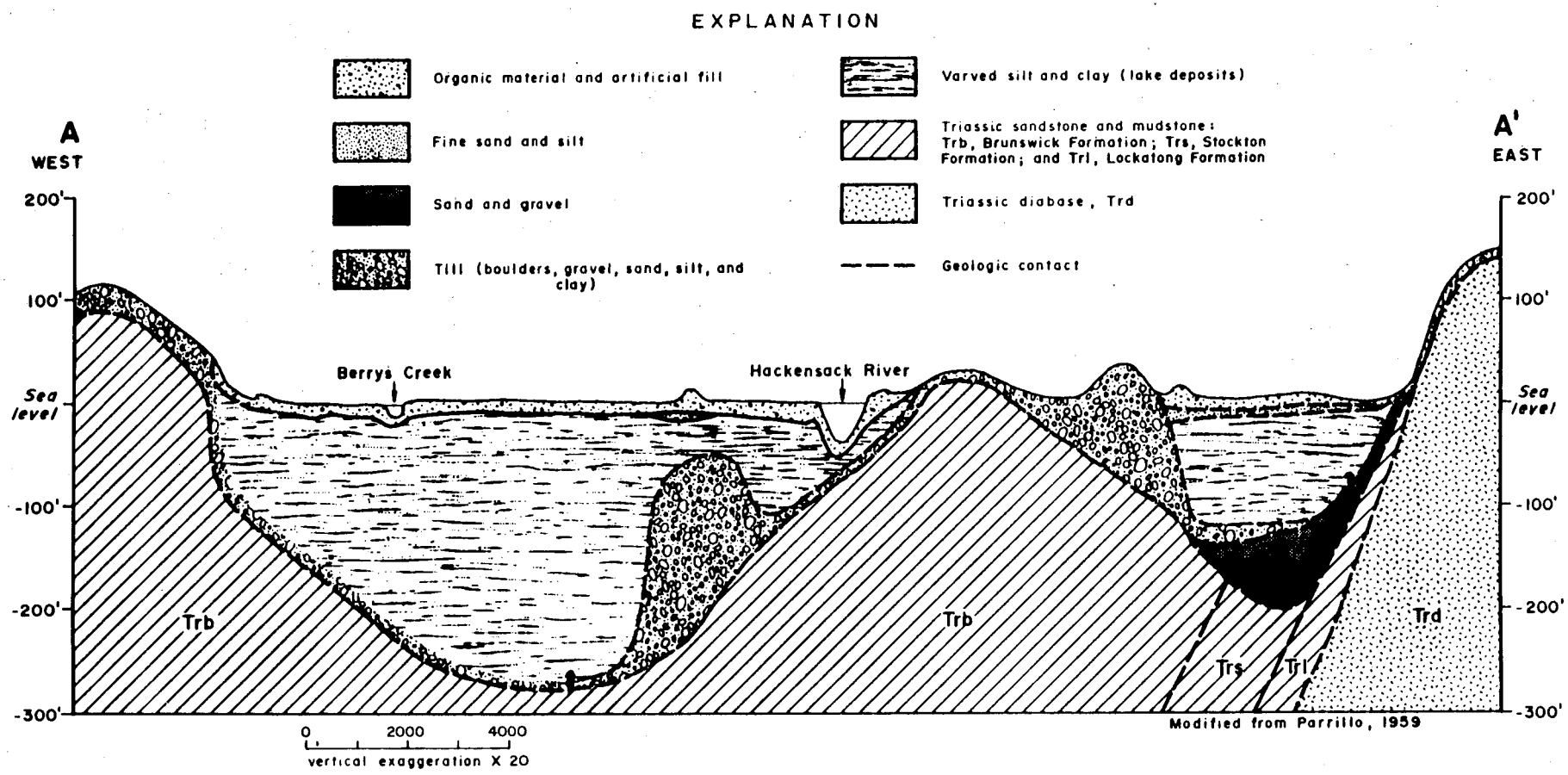


Figure 4.--Geologic section across the Hackensack Meadows area.

to have been deposited in fresh-water lakes (Lake Hackensack) which formed as the ice retreated. The varved silt and clay overlie till or bedrock and underlie Holocene deposits. In the eastern trough, from Jersey City northward to Ridgefield Park, however, the varved silt and clay overlies coarse sand and gravel also.

Coarse sand and gravel in the eastern trough underlie both till and lakebeds and are as much as 50 feet thick. They are fluvial deposits formed prior to the last glacial advance across the area. They were probably more extensive in the eastern trough and were deposited also in the western trough, but most of the materials have been removed by glacial scour. Thin deposits of stratified coarse sand and gravel underlie terraces along the sides of the valleys north of the Hackensack Meadows. Also several small hills of coarse sand and gravel, called kames, were formed in contact with the retreating ice north of the meadows.

In seven small areas (shown on figure 5), a part of the interval normally containing lakebeds is composed of beds of sand and gravel deposited as small deltas. The streams that built these deltas flowed eastward either in contact with the ice as the glaciers retreated or in Lake Hackensack. The valleys formed by these streams probably represent successively more southerly routes of the Passaic and Saddle River prior to the establishment of their present course.

### Holocene Deposits

In the upper part of the basin, Holocene deposits are thin and of small areal extent. In the lower part of the basin, deposits of sand, gravel, silt, clay, peat, and root mat (decayed vegetation) of Holocene age directly underlie the Hackensack Meadows. Here fine-grained sand and silt overlie till and varved silt and clay of Pleistocene age. The sand deposits are lenticular and thicken to 50 feet downstream. Root mat overlies the sand and silt in most of the meadowland and is about 10 feet thick, but locally is 50 feet thick. Artificial fill consisting largely of trash and rubbish overlies the natural deposits in parts of the Hackensack Meadows.

## HYDROLOGY

### Surface Water

The Hackensack River basin can be divided into two areas which differ markedly in their hydrologic characteristics. The division arbitrarily set at the north edge of New Milford, New Jersey, separates the basin into an upper (northern) 113-square mile area and a lower (southern) 84-square mile area.

In the interval between 1927 and 1963 the average yearly total dissolved solids content of the Hackensack River in the upper area increased from 104 mg/l to 184 mg/l and the hardness calculated as calcium carbonate increased from 37 mg/l to 77 mg/l (analyses by the Hackensack Water Company). Some of the increased dissolved solids content resulted from cycling water through municipal and domestic sewage systems.

The Hackensack Meadows in the lower area of the basin are utilized for the disposal of 57 mgd of treated municipal sewage effluent and industrial waste, rich in nitrates and phosphates. During summer months, particularly when precipitation is deficient, brackish water from Newark Bay flows up the Hackensack River. The chloride concentration in Newark Bay is approximately 10,000 mg/l. In the late summer of 1961 concentrations as high as 4,000 mg/l were found in the Hackensack River as far north as Hackensack and concentrations of several hundred milligrams per liter occurred near the northern part of the area below New Milford. This high concentration of chloride makes the water in the lower Hackensack unsuitable for municipal and industrial processes although it is usable for cooling purposes.

## Ground Water in Consolidated Rock

### Stockton and Lockatong Formations

The Stockton Formation underlies a small area on the west side of the Palisades in the Hackensack River basin. Because of its limited areal extent in the basin and because it has hydrologic properties similar to those of coarser parts of the Brunswick Formation, the hydrology of the Stockton Formation is not discussed separately in this section.

The Lockatong Formation is thin and is known from only one exposure in the basin. No wells are known to penetrate it within the basin. Based on studies made elsewhere in New Jersey, the Lockatong can be expected to yield considerably smaller quantities of water than the finer-grained parts of the Brunswick Formation.

### Brunswick Formation

#### Occurrence and Movement of Ground Water

Ground water in the Brunswick Formation occurs in a network of interconnected openings formed along joints, fractures, and solution channels. The intervening unfractured rock has negligible capacity to store and transmit ground water. The openings which contain ground water decrease in size and number with increasing depth below land surface. As some beds within the formation contain more openings than others, the ground-water system consists of a series of alternating tabular aquifers and aquicludes several tens of feet thick and dipping

to the northwest at approximately 10 degrees. The water-bearing fractures in each tabular aquifer are more or less continuous, but hydraulic connection between individual tabular aquifers is poor. These tabular aquifers generally extend downdip for a few hundred feet and are continuous along strike for thousands of feet.

In an areally extensive, homogeneous, and isotropic aquifer, drawdown caused by pumping a well is equal at all points equidistant from the pumped well. This is not true, however, in a consolidated rock aquifer, such as the Brunswick Formation, where water is stored in and transmitted through secondary openings, which generally have some preferential alinement and are better developed in some beds than they are in others. In the Newark area, Herpers and Barksdale (1951, p. 29) observed a drawdown in an observation well located 2,400 feet from a pumped well in a direction parallel to the strike of the beds, whereas no distinct drawdown was evident in observation wells 600 feet from a pumped well in a direction transverse to the strike. They also observed that as a consequence of heavy pumping, high-chloride water from Newark Bay intruded the aquifer farthest along the strike of the beds. Similar observations on the anisotropism of the Brunswick Formation have been documented by Vecchioli (1967) and Vecchioli and others (1969). Their pumping-test data indicate that the direction of highest permeability and of the movement of water in response to pumping characteristically parallels the strike of the beds. Therefore, well fields, wherever possible, should be designed with wells alined transverse to the strike of the beds in order to minimize interference.

## Thickness and Distribution of Water-Producing Zones

Estimates of the thickness of the ground water producing zone in the Brunswick Formation have been based typically on review of drilling records and on the observation that when a well has not successfully tapped a water-yielding zone in the first 400 feet of drilling, water-yielding zones are not likely to be penetrated by drilling deeper.

The zone in the Brunswick Formation containing joints and fractures that are capable of storing and transmitting fresh water has been variously estimated to be between 200 and 600 feet thick (Herpers and Barksdale, 1951, p. 27; Greenman, 1955; Rima, 1955; Perlmutter, 1959; and Parker and others, 1964). The depth and distribution of water-producing zones in the Brunswick Formation were determined at Lansdale, Pennsylvania, by Rima (1955) who injected water into several wells and traced the flow of the injected water by means of a flow meter. Rima concluded that the Brunswick in the Lansdale area contains an upper water-table aquifer of low permeability occurring at depths of less than 250 feet below land surface; below this depth there are one or more artesian or semiartesian aquifers of high permeability, generally less than 20 feet thick each, and occurring at depths as great as 600 feet.

The zone of fresh ground water in the Hackensack River basin locally appears to be thinner than 200 feet. Injected slugs of salt water were traced with an electric logger in seven wells, 400 to 500 feet deep, in the main valleys of the Hackensack River and Pascack Brook. When the wells were pumped at 25 to 35 gpm with a drawdown of about 5 feet, about 60 percent of the water entered the wells from above a 100-foot depth; about 90 percent entered from above a 200-foot depth. Below a depth of 200 feet, the maximum yield was 2 gallons for 5 feet of drawdown for the entire lower part of the well (fig. 10). Although none of these wells penetrated high-yielding zones below a depth of 200 feet, other wells in the main valleys reportedly have penetrated high-yielding zones below a depth of 200 feet. The relatively small thickness of the zone containing water-bearing openings in the seven wells shown on figure 10 may be a result of the removal by glacial scour of a considerable thickness of rock containing water-bearing openings.

Where there are differences in hydraulic head between water-bearing openings internal flow occurs under nonpumping conditions within the well from the zone of higher head to the zone of lower head. In upland areas where recharge is dominant, hydraulic heads generally decrease with increasing depth and internal flow is downward in the wells. In lowland areas where discharge is dominant, heads increase with increasing depth and flow is upward in wells. In some wells the water may flow at the surface.

To confirm this flow pattern borehole-velocity measurements were made under nonpumping conditions in seven wells in the valleys of the Hackensack River and Pascack Brook. In four of the wells no internal movement of injected brine slugs could be measured during a half hour or more of observation. Two wells (Emerson 3 and Hillsdale 6) flowed at the surface and upward internal flow occurred also in the third well (Harrington Park 6) although the well did not flow at the surface (fig. 11).

Borehole-velocity measurements were made under nonpumping conditions in six wells located in the upland valleys near minor tributaries of Pascack Brook and in one well on the divide between the Hackensack and Saddle River drainages. Figure 12 shows borehole flow from water-yielding zones in the upper 175 to 200 feet downward to "thieving" zones extending to within 50 feet of the bottom of the wells. These wells range in depth from 270 to 350 feet. This downward flow is a consequence of penetrating water-bearing beds having successively lower hydraulic heads with increasing depth.

Two of the six wells in upland valleys, which showed downward internal flow at depth, simultaneously flowed at the surface at 10 to 15 gpm. Three of the six wells were subsequently pumped at rates from 35 to 100 gpm and additional borehole velocity measurements were made while pumping. In each case the water pumped from the well

came from a zone 50 to 100 feet below land surface. Below this depth the internal flow was downward but at a lower rate than under nonpumping conditions. Figure 13 shows the downward internal flow of water in Park Ridge well No. 16 under nonpumping conditions and the simultaneous upward and downward internal flow when the well was pumped at 100 gpm.

When the water level in a pumping well declines below the top of a water-producing zone the rate of drawdown can increase because that part of the producing zone which is above the water level in the well no longer contributes as much water to the well. Figure 14 shows the time-drawdown relation during a pumping test on Emerson well No. 3. When the well was pumped at 250 gpm the water level in the well declined at a constant rate until the water level dropped below the base of the casing and into the zone which was transmitting water to the well. When this occurred the rate of drawdown increased markedly.

Wells having downward internal flow under nonpumping conditions may not have penetrated to the maximum depth of the fresh-water circulation system. In the seven wells in which measurements were made (fig. 12), no measurable flow was found near the bottom of the well regardless of the depth of the wells. This lower zone of no flow may result from either plugging of fractures during drilling or lack of adequate development near the bottom of the borehole. The maximum velocity of the water moving down the borehole of most of the wells was near a depth of 200 feet below land surface. The lower or "thieving" zone in the deepest wells appear to be as thick or thicker than the producing zones (fig. 12). The zone which thieves under nonpumping conditions may become a producing zone while pumping, provided that there is sufficient drawdown in the well. Therefore, the potential yielding zone in the uplands or in small valleys in the uplands is probably more than 300 feet thick and may be as great as 400 to 500 feet thick. The difference in head between the top producing zone and the base of the lowest thieving zone is not known, but a suggestion of its magnitude is provided by data from a well in Park Ridge. Deepening the well from 200 to 500 feet caused a drop of 30 feet in the water level. This new water level in the well represents a composite of all heads at the well and is presumably higher than the head in the lowest water-bearing zone.

The internal flow in wells under nonpumping conditions results from the penetration of a hydrologic system having hydraulic gradients that have vertical components. Flow through the borehole therefore is a short-circuiting of natural flow. One effect of this short-circuiting is to accelerate the movement of water from areas of recharge to areas of discharge. The effects of short-circuiting can be put in perspective when related to recharge. For example, precipitation at a rate of 45 inches per year averages about 3,340 gallons per day per acre. If one half of the precipitation is

evaporated or transpired, 1,670 gallons remain to run off directly to streams and to enter the ground-water system. A well having downward internal outflow of only 1 gallon a minute, or 1,440 gpd, is accelerating the movement of all the recharge available from about one to two acres of land. A number of such wells in an area with downward flow can result in a substantial water-table decline.

Another consequence of downward internal flow in wells is that the cleaning and development of the lower part of a well is made difficult or impossible unless the head relations in the well are artificially reversed because any surging action will tend to move drilling mud out into fractures in the "thieving zone" in the well. However, the downward flow assists in the cleaning and development of the upper part of the hole where there is a gradient toward the borehole. Well development generally increases the yield of a consolidated rock well; but which zones are actually developed is rarely known.

## Yields and Specific Capacities of Wells

In most of the Hackensack River basin and Bergen County, the Brunswick Formation yields only small to moderate supplies of ground water to wells. A few wells outside the study area in Ridgewood, N. J., have yields of 500 to 1,000 gpm.

The frequency of occurrence of yields, specific capacities, and depths from available data on wells tapping the Brunswick Formation in Bergen County are shown on figures 15, 16, and 17. In general for the same frequency of occurrence, industrial and municipal-supply well yields are 10 times as great as domestic well yields. Industrial and municipal-supply wells are at least twice as deep and have twice the specific capacity of domestic wells. The median industrial or municipal-supply well is 260 feet deep, yields 100 gpm, and has a specific capacity of 1.5 gpm per foot of drawdown; the median domestic well is 120 feet deep, yields about 10 gpm, and has a specific capacity of about 0.7 gpm per foot of drawdown.

The difference between yields of industrial and municipal-supply wells and those of domestic wells result from the vastly different requirements of the owner, and the economics of well construction and development. For most domestic purposes small-diameter (6-inch) wells are drilled and the well is typically located for convenience and low costs. A well yield of a few gallons a minute is adequate and when such a yield is obtained drilling is stopped. Little effort is expended in developing the maximum potential yield of the well. In contrast, a maximum supply of ground water is sought for industrial or municipal-supply wells. Such wells are of large diameter (8 to 12 inches) and may be located utilizing the advice of a ground-water consultant. The consultant may specify and supervise drilling techniques and the extensive development and testing of the completed well.

## Ground Water in Unconsolidated Deposits

Ground water occurs in the interstices, or pores, between grains in unconsolidated deposits. Unconsolidated deposits in the Hackensack River basin consist of till, varved silt and clay, alluvium, sand and gravel. Small quantities of ground water are stored in till which overlies the bedrock throughout most of the basin. Till characteristically has low permeability because of its poorly sorted nature and does not yield water to wells in sufficient quantities for other than domestic use. Deposits of varved silt and clay such as the lake beds that overlie bedrock and till in most of the meadows, are poorly permeable and impede the movement, discharge, and recharge of water. Alluvium is thin, not widely distributed, and has little value as a source of ground water.

Sand and gravel may store and transmit large quantities of ground water where they are coarse, saturated, and near a source of recharge. However, areas in the Hackensack River basin where large supplies of ground water may be developed from coarse sand and gravel are limited. In the upper area of the basin only small quantities of ground water have been developed from unconsolidated deposits with the exception of a few wells at Park Ridge where recharge is induced from Pascack Brook. Furthermore, large-scale ground-water development in the limited areas along stream valleys would reduce streamflow which is currently utilized for water supply at Oradell Reservoir.

Coarse sand and gravel deposited in deltas at the mouths of streams that entered Lake Hackensack (fig. 5), yield large supplies of ground water at Hackensack, Rutherford, and Newark. Deltaic deposits at Westwood, Ridge Edge, Lyndhurst, and in the southern part of Hackensack have not been outlined by drilling and may be small and thus have little potential as sources of ground-water.

In a narrow area between the eastern buried valley and the Palisades Ridge is a poorly defined but probably continuous sequence of coarse sand and gravel that extends at least as far north as Englewood and possibly as far north as Closter (fig. 5). Near North Bergen, wells yielding more than 300 gpm derive water from the sand and gravel where they are in hydraulic connection with the Hackensack River.

The chemical quality of ground water in the unconsolidated deposits in the Hackensack Meadows is highly influenced by the quality of water in the Hackensack River and waters that flood the meadows as a result of tides. Pumping has reversed the natural gradients and induced recharge from these generally highly mineralized sources. For example, heavy pumping at Hackensack and near North Bergen has induced recharge of poor chemical quality from the Hackensack River into the sand and gravel aquifers.

As the upper area of the basin has become more urbanized and water demands have increased, progressively smaller quantities of fresh water have been permitted to enter the meadows from upstream sources of the Hackensack River. During the drought from 1960 to 1965 practically no fresh water flowed into the meadows. Furthermore, the lower area is used for disposal of 57 mgd of sewage and industrial wastes, an amount equivalent to about one third the average precipitation that falls on the area. The preceding combination of factors makes surface water of poor quality available for induced recharge to the unconsolidated deposits in the meadows. This water is suitable for cooling if precautions are taken to prevent corrosion by water that may have a chloride content of several thousand milligrams per liter.

## SUMMARY AND CONCLUSIONS

Bedrock in the Hackensack River basin is composed of sedimentary and igneous rocks of the Newark Group of Triassic age. The Brunswick Formation of the Newark Group is composed of mudstone, siltstone, and sandstone and is the most important bedrock aquifer in the basin. Water occurs in this formation in a network of interconnected openings formed along joints, fractures, and solution openings. Because of preferential alinement of these openings the formation is anisotropic: greatest permeability and the major component of water movement in response to pumping is parallel to the strike of the beds. Consequently, well fields designed with wells alined transverse to the strike would have minimum interference between wells.

The zone in the Brunswick Formation that contains fresh-water-bearing openings is generally less than 200 feet thick in the main valleys of the Hackensack River and Pascack Brook. In upland areas the zone is greater than 300 feet thick and may be as much as 400 to 500 feet thick.

The median reported yield of industrial and public supply wells tapping the Brunswick Formation in Bergen County, which includes most of the Hackensack River basin is 100 gpm. The median specific capacity of wells tapping the Brunswick is 1.5 gpm per ft drawdown. The most productive wells (300 to 600 gpm) are located in narrow belts on the east and west flanks of the Hackensack Meadows where the Brunswick Formation is hydraulically connected to coarse-grained, highly permeable, unconsolidated deposits.

The Stockton and Lockatong Formations of the Newark Group have very limited areal extent and are not important aquifers in the basin. Diabase, an igneous rock, yields small quantities of water to wells; generally less than 35 gpm to industrial wells.

Overlying the Newark Group throughout the basin are unconsolidated deposits consisting of alluvium of Holocene age and till, varved silt and clay, and sand and gravel of Pleistocene age. The sand and gravel have value as a source of ground water, yielding large supplies (greater than 300 gpm) of ground water locally.

Ground water from the Brunswick Formation in the upper area of the basin is relatively low in mineral content and of moderate hardness. Water from the Brunswick in the lower area is hard to very hard and highly mineralized. Here the water quality in both the Brunswick and unconsolidated deposits is influenced by water quality of the Hackensack River and Newark Bay. Heavy pumpage has induced recharge of poor quality water, high in chloride, from these sources. Both surface and ground-water quality in the lower area is influenced by the disposal of large quantities of sewage and industrial wastes in the Hackensack Meadows.

Utilization of surface water in the Hackensack River basin above Oradell Reservoir is approaching its maximum limit. Consequently, development of additional water supplies from the ground water reservoir is limited, because it would decrease surface-water supplies. Ground-water development is limited also by the small amount of ground water stored in the basin and by the intrusion of surface water of poor quality into the ground-water reservoir in the lower area of the basin.

## TABLES

Table 1 indicates the construction and yield characteristics of selected wells in the Hackensack River basin. Aquifer designations are: Trb Brunswick Formation, Trdb diabase, Q Quaternary deposits. The use of the well is indicated by letter symbols which are: A abandoned, C commercial, D domestic, I industrial, and T test well. In the remarks column the current status and use of the well and quality of produced water is further defined where known. The letters BT indicate that borehole velocity measurements were made in the well during the course of this investigation. The location of the wells is shown on figure 2. The wells are numbered serially in each political subdivision. Table 2 is a compilation of chemical data on water from wells in the New Jersey part of the basin.

Table 1.--RECORDS OF SELECTED WELLS IN THE HACKENSACK RIVER BASIN

| Well | Owner or Tenant | New Jersey Grid No. | Driller | Year Drilled | Altitude above msl (ft) | Total depth drilled below lsd (ft) | Depth to bedrock below lsd (ft) | Diameter of well (in) | Depth to which well is cased (ft) | Screen setting (ft) | Aquifer | Static level below lsd (ft) | Yield (gpm) | Drawdown (ft) | Specific Capacity (gpm/ft) | Use | Remarks |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | BERGEN COUNTY-WOODCLIFF LK-Cont. | | | | | | | | | | | | | | | | |
| 9 | Hackensack W C | 23.33.9.6.4 | Artesian | 4-65 | 105 | 400 | 112 | 8 | 113 | -- | Trb | 21 | 55 | 179 | .3 | T | BT |
| 10 | Boro of Park Ridge | 23.33.5.6.7 | Rinbrand | 1965 | 450 | 300 | -- | 8 | 60 | -- | Trb | 26 | 30 | -- | -- | T | |
| | HUDSON COUNTY-HARRISON | | | | | | | | | | | | | | | | |
| 1 | Worthington Pump & M Co. | 26.12.9.5.9 | ---- | -- | 15 | 400 | 295 | 9 | -- | -- | Trb | 80 | 250 | 40 | 6.3 | I | |
| 2 | Harmon Color Wks. Inc. | 26.12.9.5.9 | ---- | 1910 | 10 | 362 | -- | 8 | -- | -- | Trb | 100 | 200 | 100 | 2.0 | I | Cl 1,800 in 1950 |
| 3 | T. Schriver Co | 26.12.9.5.5 | ---- | -- | 15 | 40 | -- | 8 | -- | 2 | Q | 29 | 46 | -- | -- | I | |
| 4 | do. | do. | ---- | -- | 15 | 40 | -- | 6 | -- | ? | Q | 29 | 30 | -- | -- | I | |
| 5 | Liquid Carbonic Corp. | 26.12.9.8.1 | ---- | 1938 | 20 | 489 | 307 | 8 | -- | -- | Trb | 67 | 225 | 87 | 2.6 | I | |
| 6 | do. | do. | ---- | 1934 | 20 | 465 | 320 | 8-6 | -- | -- | Trb | 67 | 90 | 90 | 1.0 | I | |
| 7 | Hyatt Roller Bearing Co. | 26.12.9.8.4 | ---- | 1918 | 9 | 950 | 277 | 8-6 | 395 | -- | Trb | 79 | 336 | -- | -- | I | |
| 8 | do. | do. | ---- | 1918 | 9 | 987 | 282 | 8 | -- | -- | Trb | -- | 347 | -- | -- | I | |
| 9 | do. | do. | ---- | 1914 | 8 | 241 | -- | 8 | -- | -- | Trb | -- | -- | -- | -- | I | |

Table 1.--RECORDS OF SELECTED WELLS IN THE HACKENSACK RIVER BASIN

| Well | Owner or Tenant | New Jersey Grid No. | Driller | Year Drilled | Altitude above msl (ft) | Total depth drilled below lsd (ft) | Depth to bedrock below lsd (ft) | Diameter of well (in) | Depth to which well is cased (ft) | Screen setting (ft) | Aquifer | Static level below lsd (ft) | Yield (gpm) | Drawdown (ft) | Specific Capacity (gpm/ft) | Use | Remarks |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | HUDSON COUNTY-HARRISON-Cont | | | | | | | | | | | | | | | | |
| 10 | Hyatt Roller Bearing Co. | 26.12.9.8.4 | ---- | -- | 8 | 90 | -- | 8 | -- | -- | Q(?) | 11.5 | 150 | -- | -- | I | |
| 11 | Driver Harris Co. | 26.12.9.7.6 | ---- | -- | 9 | 337 | 292 | 12 | -- | -- | Trb | 76 | 600 | -- | -- | I | Cl 1.680 1948 |
| 12 | do. | do. | ---- | 1946 | 9 | 300 | 279 | 8 | -- | -- | Trb | 38 | 469 | 41 | 11.4 | I | |
| 13 | Pub. Serv. & Gas Co. | 26.12.9.7.9 | ---- | 1932 | 11 | 699 | 218 | 12 | -- | -- | Trb | 37 | 406 | 139 | 2.9 | I | |
| 14 | Crucible Steel Co. of America | 26.12.9.8.4 | ---- | 1943 | 10 | 600 | 160 | 16-10 | -- | -- | Trb | 134 | 600 | 66 | 9.1 | I | |
| 15 | Delaware & Western RR | 26.12.9.8.3 | H. W. Smith | 8-27-52 | 20 | 225 | -- | 6 | 115 | -- | Trb | 96 | 18 | -- | -- | I | |
| | JERSEY CITY | | | | | | | | | | | | | | | | |
| 1 | Dodge & Bliss | 26.13.8.9.5 | ---- | 1920 | 20 | 80 | -- | -- | -- | -- | Q | -- | 50 | -- | -- | I | |
| 2 | Spalding & Jennings | 26.23.2.5.7 | ---- | -- | 20 | 422 | 57 | -- | -- | -- | Trs | -- | 75 | -- | -- | I | |
| 3 | Crucible Steel Co. of America | 26.23.1.9.3 | ---- | 1925 | 12 | 210 | -- | -- | -- | -- | Trb | -- | 100 | -- | -- | I | |
| | KEARNY | | | | | | | | | | | | | | | | |
| 1 | Wilpet Tool Mfg. Co. | 26.12.9.6.4 | Rinbrand | 4-26-61 | 10 | 700 | -- | 10 | 290 | -- | Trb | 40 | 520 | 135 | 3.8 | I | |
| 2 | Pfaft Tool & Mfg. Co. | 26.12.6.9.9 | Frank Bott | 2-16-60 | 8 | 590 | 46 | 8 | 54 | -- | Trb | 67 | 185 | 113 | 1.6 | I | |

Table 1.--RECORDS OF SELECTED WELLS IN THE HACKENSACK RIVER BASIN

| Well | Owner or Tenant | New Jersey Grid No. | Driller | Year Drilled | Altitude above msl (ft) | Total depth drilled below lsd (ft) | Depth to bedrock below lsd (ft) | Diameter of well (in) | Depth to which well is cased (ft) | Screen setting (ft) | Aquifer | Static level below lsd (ft) | Yield (gpm) | Drawdown (ft) | Specific Capacity (gpm/ft) | Use | Remarks |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | HUDSON COUNTY-KEARNY-Cont. | | | | | | | | | | | | | | | | |
| 3 | Pfaft Tool & Mfg. Co. | 26.12.6.9.9 | Frank Bott | 1963 | 8 | 740 | 60 | 8 | -- | -- | Trb | 80 | 145 | 120 | 1.2 | I | |
| 4 | E. I. DuPont | 26.12.6.8.9 | Stothoff | 10-9-20 | 20 | 401 | 166 | 10-4 | 175 | -- | Trb | 29 | 148 | 156 | 1.0 | I | |
| 5 | do. | 26.12.9.3.3 | do. | 10-30-20 | 5 | 202 | 124 | 10 | 130 | -- | Trb | -- | 174 | -- | -- | I | |
| 6 | do. | 26.13.4.7.7 | do. | 2-15-21 | 5 | 504 | 185 | 10 | 221 | -- | Trb | 28 | 124 | 40 | 3.1 | I | |
| 7 | E. I. DuPont | 26.12.6.9.8 | do. | 9-1-16 | 70 | 802 | 47 | 10 | 49 | -- | Trb | 25 | 90 | -- | -- | I | |
| 8 | Joe Davis Plastics Co. | 26.12.9.5.3 | ---- | 1930 | 10 | 350 | 17 | 8 | -- | -- | Trb | 17 | 168 | 54 | 3.1 | I | |
| 9 | do. | 26.12.9.5.3 | ---- | 1958 | 10 | 400 | 26 | -- | -- | -- | Trb | -- | 20 | -- | -- | I | |
| 10 | Lawter Chem. | 26.13.7.8.9 | ---- | 1939 | 8 | 200 | 112 | 8 | -- | -- | Trb | -- | -- | -- | -- | I | Abandoned |
| 11 | American Stores | 26.13.7.9.8 | ---- | 1941 | 8 | 1041 | 82 | 8 | -- | -- | Trb | 28 | 60 | 322 | .2 | I | |
| 12 | Koppers Gas & Coke Co., Inc. | 26.13.8.8.2 | ---- | 1915 | 5 | -- | -- | -- | -- | -- | Trb | -- | 53 | -- | -- | -- | |
| 13 | N. Verzalero | 26.12.9.6.1 | Burrows | -- | 5 | 235 | 145 | 6 | 146 | -- | Trb | 100 | 150 | 15 | 10 | I | |
| | N. BERGEN | | | | | | | | | | | | | | | | |
| 1 | Meer Corp. | 26.14.1.5.6 | Burrows | 6-6-50 | 4 | 153 | 32 | 8 | 32 | -- | Trdb | 2 | 100 | 22 | 4.5 | I | |
| 2 | do. | 26.14.1.5.3 | do. | 9-56 | 5 | 200 | -- | 8 | 33 | -- | Trdb | -- | 60 | -- | -- | I | |

Table 1.--RECORDS OF SELECTED WELLS IN THE HACKENSACK RIVER BASIN

| Well | Owner or Tenant | New Jersey Grid No. | Driller | Year Drilled | Altitude above msl (ft) | Total depth drilled below lsd (ft) | Depth to bedrock below lsd (ft) | Diameter of well (in) | Depth to which well is cased (ft) | Screen setting (ft) | Aquifer | Static level below lsd (ft) | Yield (gpm) | Drawdown (ft) | Specific Capacity (gpm/ft) | Use | Remarks |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | HUDSON COUNTY-N. BERGEN-Cont. | | | | | | | | | | | | | | | | |
| 3 | Meer Corp. | 26.14.1.5.5 | Rinbrand | 9-14-60 | 15 | 303 | 14 | 8 | 21 | -- | Trdb | 30 | 35 | 270 | .1 | I | |
| 4 | Consolidated Bleaching Co. | 26.14.1.8.3 | Stothoff | 7-31-50 | 10 | 528 | 93 | 10-8 | 93 | -- | Trdb | Flows | 44 | 155 | .3 | I | |
| 5 | Gibralter Paper Co. | 26.14.1.4.6 | Burrows | 11-10-51 | 5 | 228 | 120 | 8 | 120 | ? | Q-Trdb | 12 | 10 | 82 | .12 | T | Abandoned |
| 6 | do. | do. | do. | 1-23-52 | 1 | 170 | 118 | 6 | 136 | -- | -- | -- | -- | -- | -- | T | |
| 7 | Grand City Cont. Corp | 26.13.6.8.9 | Artesian | 3-5-53 | 5 | 34 | 225 | 6 | -- | -- | -- | -- | -- | -- | -- | -- | |
| 8 | Armour & Co. | 26.14.1.7.3 | ---- | -- | 5 | 101 | -- | -- | -- | -- | Trb | -- | 98 | -- | -- | I | |
| 9 | do. | do. | ---- | -- | 5 | 350 | 40 | 8 | -- | -- | Trb | -- | 15 | -- | -- | I | |
| 10 | do. | do. | ---- | 1930 | 5 | 108 | -- | 12 | -- | -- | Q | -- | 250 | -- | -- | I | 33 ppm cl 1933<br>230 " cl 1937<br>440 " cl 1938 |
| 11 | do. | do. | ---- | 1933 | 5 | 113 | 113 | 24-12 | -- | -- | Q | -- | 325 | -- | -- | I | |
| 12 | do. | do. | ---- | 1937 | 5 | 108 | -- | 12 | -- | -- | Q | -- | -- | -- | -- | I | |
| 13 | do. | do. | ---- | 1937 | 5 | 113 | 113 | 24-12 | -- | -- | Q | -- | -- | -- | -- | I | |
| 14 | do. | do. | ---- | 1937 | 5 | 106 | 106 | 18-12 | -- | -- | Q | 32.5 | 300 | 63.5 | 4.7 | I | |

Table 1.--RECORDS OF SELECTED WELLS IN THE HACKENSACK RIVER BASIN

| Well | Owner or Tenant | New Jersey Grid No. | Driller | Year Drilled | Altitude above msl (ft) | Total depth drilled below lsd (ft) | Depth to bedrock below lsd (ft) | Diameter of well (in) | Depth to which well is cased (ft) | Screen setting (ft) | Aquifer | Static level below lsd (ft) | Yield (gpm) | Drawdown (ft) | Specific Capacity (gpm/ft) | Use | Remarks |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | HUDSON COUNTY-N. BERGEN-Cont. | | | | | | | | | | | | | | | | |
| 15 | Nat. Cylinder Gas Co. | 26.14.1.8.2 | ---- | 1935 | 5 | -- | 70 | -- | -- | -- | Trb | -- | 75 | -- | -- | I | 685 ppm cl 1938 430 ppm cl 1960 |
| 16 | Mondet Cork | 26.14.1.8.7 | ---- | 1954 | 40 | 65.5 | -- | 12 | -- | -- | Q | 13 | 305 | 15 | 20.3 | I | |
| 17 | W. Bergen Realty Co. | 26.13.6.6.6 | ---- | 1962 | 8 | 72 | -- | 16-12 | -- | -- | Q | 20 | 90 | 50 | 1.8 | C | Brackish |
| 18 | DeAngelis Packing Co. | 26.13.9.2.4 | ---- | 1947 | 10 | 60 | 60 | 10 | -- | -- | Q | 5 | 15 | 23 | .7 | I | |
| 19 | Chas. Miller & Co. | 26.13.9.2.4 | ---- | 1934 | 5 | 35 | -- | 12 | -- | -- | Q | .5 | 700 | 14.9 | 48.3 | I | |
| | SECAUCUS | | | | | | | | | | | | | | | | |
| 1 | L. Vander Wall | 26.13.3.7.6 | Rinbrand | 12-26-51 | 5 | 200 | 37 | 6 | 37 | -- | Trb | 5 | 20 | 5 | 4.0 | I | |
| 2 | Keystone Metal | 26.13.6.4.2 | do. | 3-3-50 | 10 | 200 | 18 | 8 | 18 | -- | Trb | flows | 76 | 101 | .8 | I | |
| 3 | do. | do. | do. | 8-30-60 | 10 | 150 | -- | 8 | 21 | -- | Trb | 35 | 150 | 110 | 1.4 | I | |
| 4 | Erie Railroad | 26.13.8.3.1 | ---- | 1933 | 15 | 184 | 15 | 10 | -- | -- | Trb | 6 | 200 | 38 | 5.3 | A | Water unsuitable for boiler use |
| 5 | do. | do. | ---- | 1933 | 15 | 182 | 16 | 10 | -- | -- | Trb | -- | 5 | -- | -- | A | |
| 6 | Charles Haag, Inc. | 26.13.6.7.6 | ---- | 1934 | 10 | 465 | -- | -- | -- | -- | Trb | -- | 36 | -- | -- | A | |

Table 1.--RECORDS OF SELECTED WELLS IN THE HACKENSACK RIVER BASIN

| Well | Owner or Tenant | New Jersey Grid No. | Driller | Year Drilled | Altitude above msl (ft) | Total depth drilled below lsd (ft) | Depth to bedrock below lsd (ft) | Diameter of well (in) | Depth to which well is cased (ft) | Screen setting (ft) | Aquifer | Static level below lsd (ft) | Yield (gpm) | Drawdown (ft) | Specific Capacity (gpm/ft) | Use | Remarks |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | HUDSON COUNTY-N. BERGEN-Cont. | | | | | | | | | | | | | | | | |
| 7 | Charles Haag, Inc. | 26.13.6.7.6 | Stothoff Co | 5-1-53 | 10 | 294 | 20 | 10 | 31.6 | -- | Trb | 12 | 65 | 138 | .5 | A | |
| 8 | Gateway Motor Inn. | 26.13.6.5.1 | ---- | 1962 | 8 | 160 | -- | 6 | -- | -- | Trb | 8 | 55 | 7 | 7.[illegible] | C | |

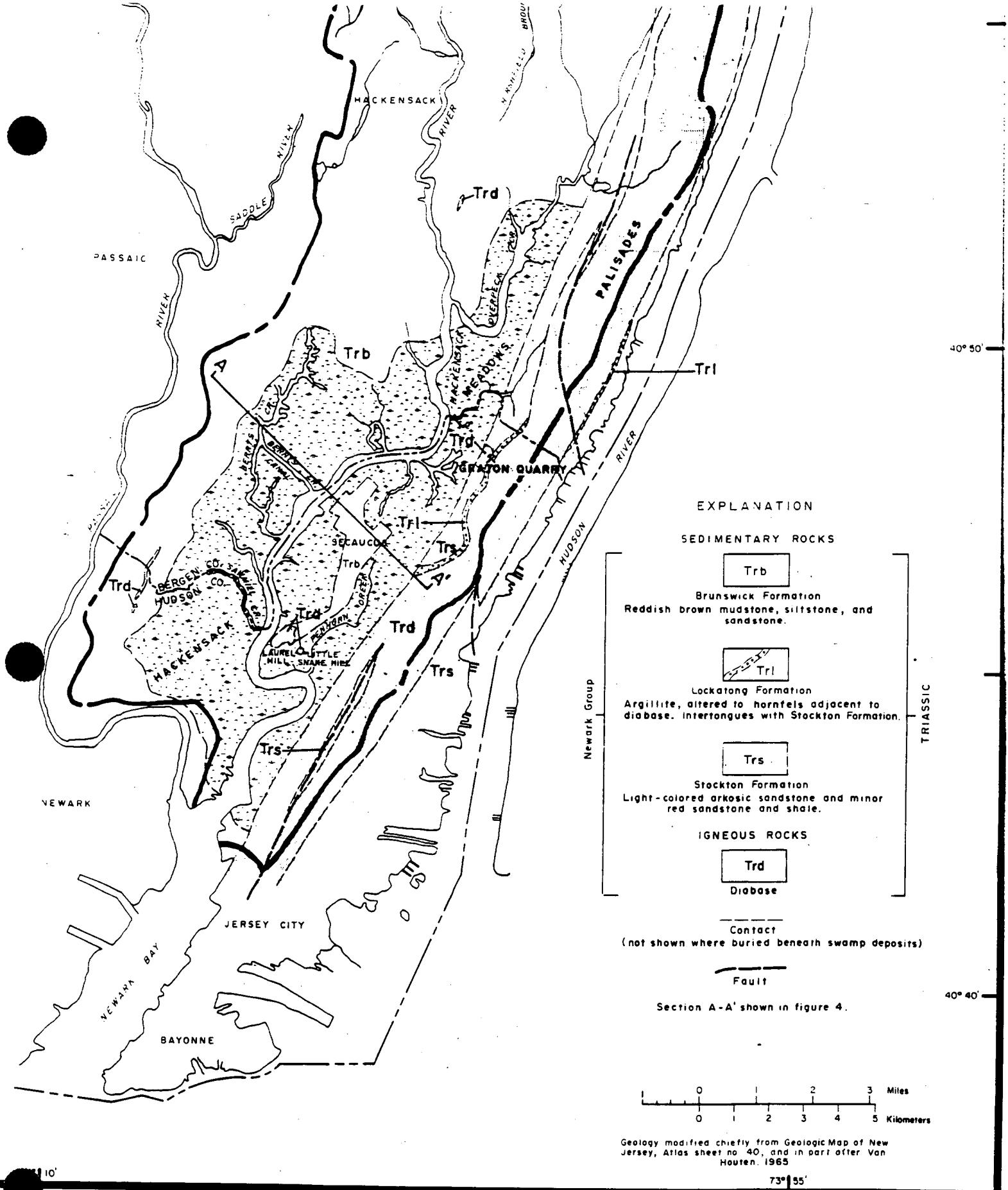


Figure 3.-- Geologic map of consolidated rock units in the Hackensack River basin

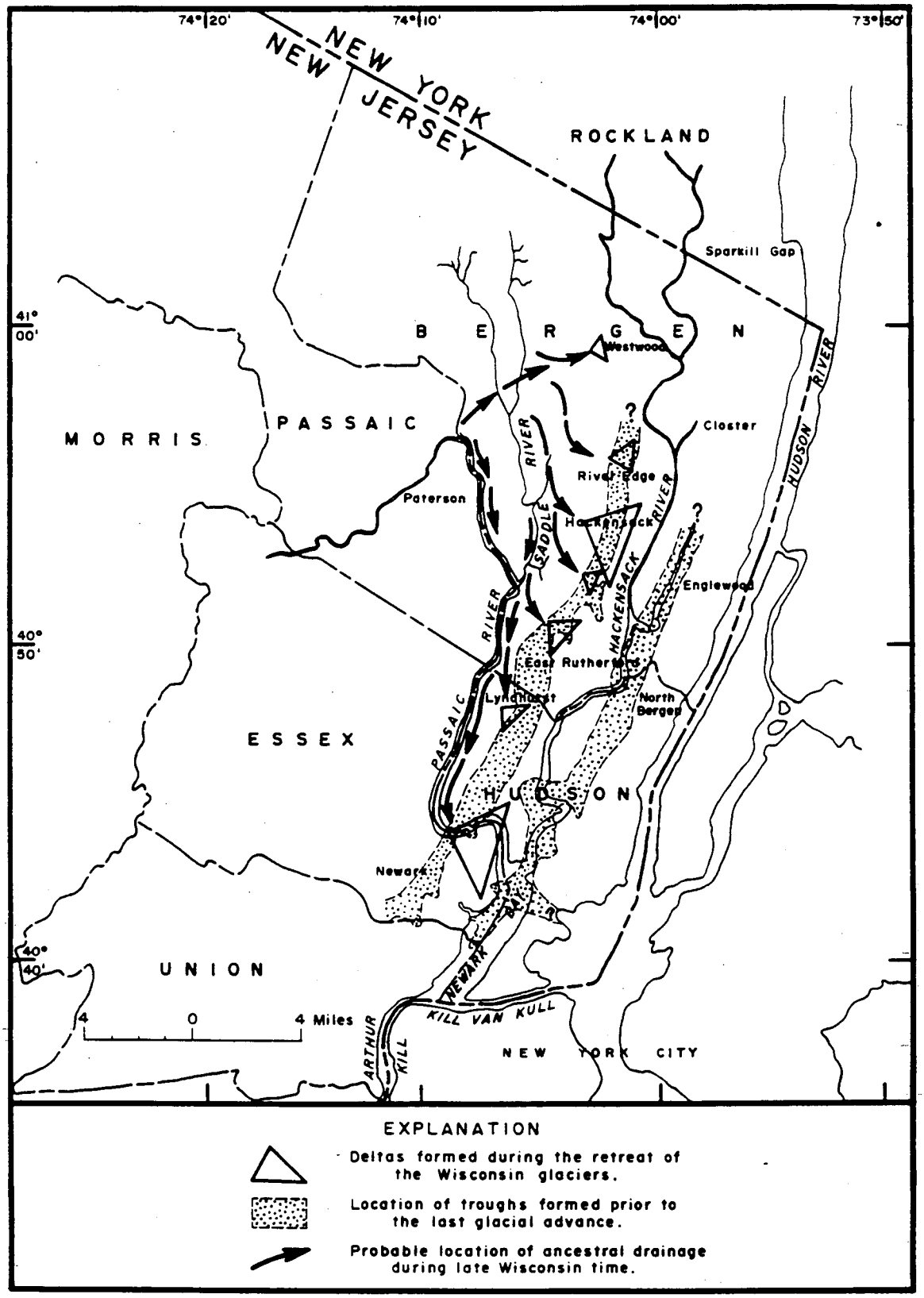


Figure 5.--Map showing the location of drainage and deltas formed during the retreat of the Wisconsin Glaciation.



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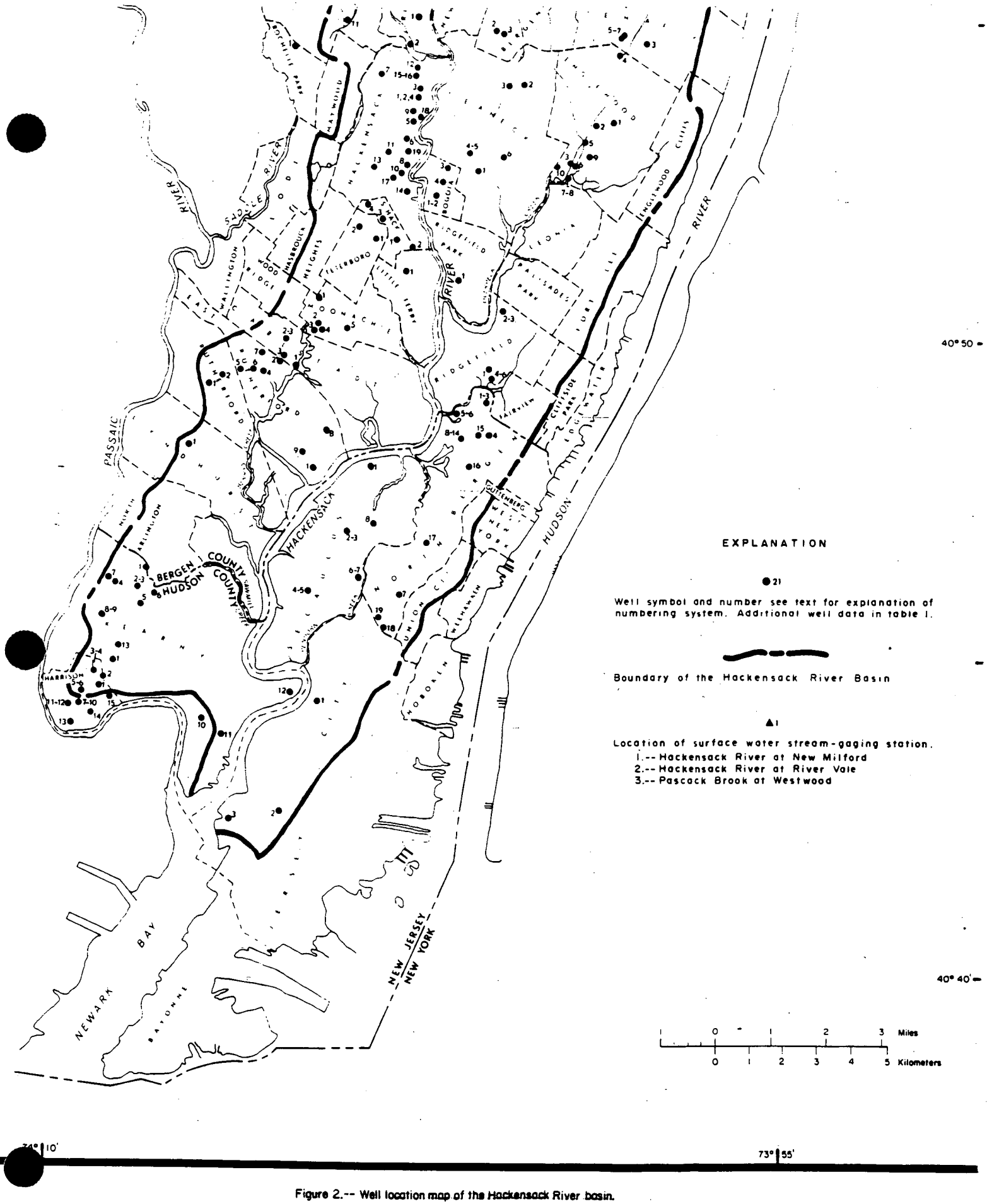



Figure 2.-- Well location map of the Hackensack River basin.

**REFERENCE NO. 25**

C2-8810-75

**NUS CORPORATION**

**TELECON NOTE**

| CONTROL NO: | DATE: 4-20-89 | TIME: 1430 |
|---|---|---|

DISTRIBUTION: Keegan Landfill
02-8810-75

| BETWEEN: Michael Beard | OF: Kearny Health Dept. | PHONE: (201) 997-0600 |
|---|---|---|

AND: Gerald Gilliland (NUS)

DISCUSSION:

We are planning to collect samples at Keegan LF on 4/25/89 (Tuesday). The SI, originally scheduled on 4/11/89 was postponed because surface waters were frozen solid. M. Beard said OK to sampling on 4/25/89, but he wouldn't be there in the morning. He would send someone else or catch up with us later in the day. We may proceed without him.

M. Beard mentioned that Lt. Ronald Johnstone of the Kearny Police Dept. was an eyewitness to several tons of "chromate" being deposited at the Keegan site. Drums were crushed and dumped there, very likely near the perimeter near water. His phone # is 998-1313.

Tom McKee of NJDEP is the coordinator of chromate projects in Kearny. I should contact him about the site. 609-633-1478

ACTION ITEMS:

"chromate" mentioned here allegedly originated somewhere in Newark



N.S 067 REVISED 0581

**REFERENCE NO. 26**

02-8810-7

**NUS CORPORATION** — **TELECON NOTE**

| CONTROL NO: | DATE: 4/25/89 | TIME: 0800 |
|---|---|---|

DISTRIBUTION: Keegan Landfill correspondence file
02-8810-75 SI

| BETWEEN: | OF: | PHONE: |
|---|---|---|
| Lt. Ronald Johnstone | Kearny PD | (201) 998-1313 |

AND: Gerald Gilliland (NUS)

DISCUSSION:

Johnstone worked as a truck driver for Dupont Chemical in Newark for approximately 7 years in the 1960s. Every morning while he worked there at least 1 truck w/ approx. 40 30-gallon drums went to the Keegan tract.

Waste: chromate + bichromate slurry ~15% water
pigment wastes
organic wastes
plating wastes

Drums were left behind ~~and~~ GG 4/25/89 at the landfill, filled with waste, or the waste was dumped from them. Disposal took place all over the site; "drive up to the shack and the man would direct us to where they were working that day."

Dupont Chemical in Newark closed in 1975 or 1976.

ACTION ITEMS:



NUS 067 REVISED 0581

REFERENCE NO. 27

Shown in BROWN: species with special status shown in RED-(F) or (S) indicates species protected by Federal or State Legislation (see text)

SYMBOL SPECIES

PLANTS (301-350)

301 Eastern hemlock
302 Spleenwort (S)
303 Spider lily (S)
304 Pond bush (S)
305 Watermilfoil (S)
306 Hooded pitcher plant (S)
307 Tree
308 Prickly pear cactus (S)
309 Trailing arbutus (S)
310 Eastern bumelia
311 Pitcher plant
312 Baldcypress
313 Redbay
314 Seaside alder
315 Box huckleberry
316 Purple fringeless orchid
317 Pink lady's slipper
318 Ebony spleenwort (S)
319 Orchids (S)
320 Golden club (S)
321 Florida beargrass
322 East-coast coontie
323 Fall-flowering ixia
324 Jackson-vine
325 Spoon-flower
326 Curtiss milkweed
327 Sea lavender
328 Hand fern
329 Needle palm
330 Yellow squirrel-banana
331 Beach creeper
332 Florida coontie
333 Four-petal pawpaw
334 Bird's nest spleenwort
335 Burrowing four-o'clock
336 Beach star
337 Silver palm
338 Dancing lady orchid
339 Tamarindillo
340 Fuch's bromeliad
341 Everglades peperomia
342 Buccaneer palm
343 Slender spleenwort
344 Pineland jacquemontia
345 Mahogany mistletoe
346 Florida thatch
347 Twisted air plant
348 Long's bittercress
349 Venus's flytrap

INVERTEBRATES (351-400)

351 Monarch butterfly
352 Zebra butterfly

BIRDS (401-600)

SHOREBIRDS (401-430)

401 Shorebirds
402 Terns
403 Gulls
404 Forster's tern
405 Arctic tern
406 Least tern (S)
407 Roseate tern (S)
408 Common tern
409 Great black-backed gull
410 Herring gull
411 Laughing gull
412 Black skimmer (S)
413 Turnstones
414 Plovers
415 Piping plover
416 American oystercatcher (S)

WADING BIRDS (431-460)

431 Wading birds
432 Herons
433 Egrets
434 Rails
435 Ibises
436 Bitterns
437 Great blue heron (S)
438 Wood ibis (S)
439 Anhinga
440 Little blue heron (S)
441 Yellow-crowned night heron (S)
442 Black-crowned night heron
443 Florida sandhill crane (S)
444 Louisiana heron (S)
445 Limpkin (S)
446 Roseate spoonbill (S)
447 Snowy egret (S)
448 Magnificent frigate-bird (S)
449 Reddish egret (S)
450 Clapper rail
451 King rail
452 Virginia rail
453 Sora rail

WATERFOWL (461-500)

461 Waterfowl
462 Swans
463 Geese
464 Dabbling ducks
465 Diving ducks
466 Common eider
467 Harlequin duck
468 Wood duck
469 Fulvous tree duck
470 Loons
471 Grebes
472 Brant geese
473 Snow goose

p. 385

# Newark

## N. J.—N. Y.—PA.

69-815-
GEOSTAT
MAP & TRAVEL CENTERS
11 $ 4.95

1:250 000-scale map of

# Atlantic Coast Ecological Inventory

Produced by
U. S. FISH AND WILDLIFE SERVICE
1980

AQUATIC ORGANISMS

Shown in BLUE: species with special status shown in RED-(F) or (S) indicates species protected by Federal or State Legislation (see text)

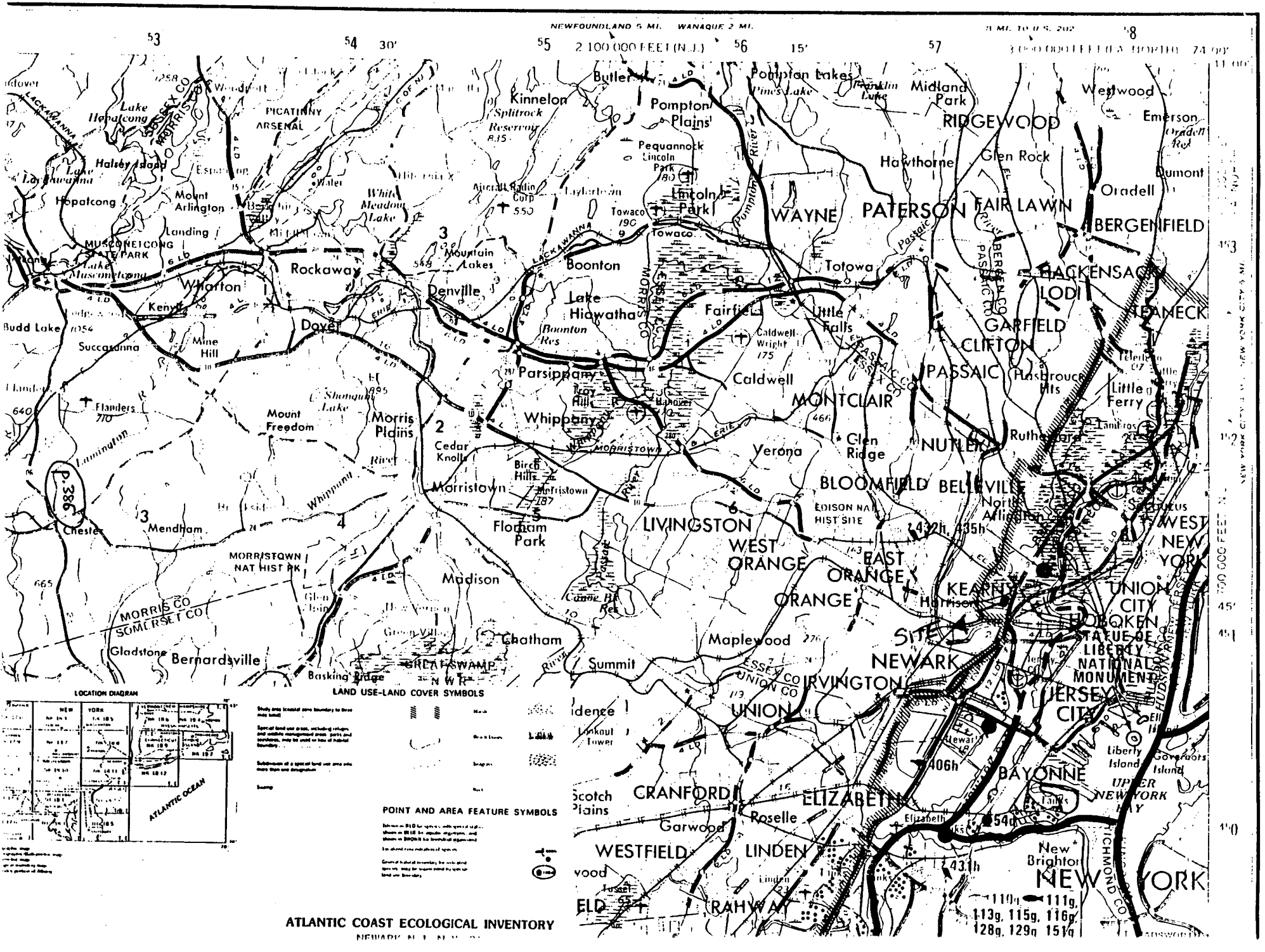
SYMBOL SPECIES

PLANTS (1-50)

1 Irish moss
2 Rockweed

INVERTEBRATES (51-100)

51 Crabs
52 Mussels
53 Oysters
54 Scallops
55 Clams
56 Worms
57 Shrimp
58 American lobster
59 Blue crab
60 Eastern oyster
61 European oyster
62 Bay scallop
63 Deep-sea scallop
64 Calico scallop
65 Surf clam
66 Hard clam
67 Soft shell clam
68 Brackish-water clam
69 Bloodworm
70 Sandworm
71 [illegible]


NEWFOUNDLAND 5 MI.
WANAQUE 2 MI.
2 100 000 FEET (N.J.)
Butler
Pompton Lakes
Midland Park
Westwood
Emerson
Oradell Res
Kinnelon
Splitrock Reservoir
Pompton Plains
Pequannock
Lincoln Park
Towaco
RIDGEWOOD
Hawthorne
Glen Rock
Dumont
Oradell
WAYNE
PATERSON
FAIR LAWN
BERGENFIELD
Totowa
HACKENSACK
LODI
TEANECK
GARFIELD
CLIFTON
PASSAIC
Little Falls
Fairfield
Caldwell
MONTCLAIR
Little Ferry
Lake Hopatcong
Halsey Island
Mount Arlington
PICATINNY ARSENAL
White Meadow Lake
Aircraft Radio Corp
Mountain Lakes
Boonton
Rockaway
Wharton
Denville
Lake Hiawatha
Boonton Res
Dover
Mine Hill
Succasunna
Budd Lake
Parsippany
Troy Hill
Whippany
Morris Plains
Mount Freedom
Morristown
Cedar Knolls
Birch Hills
Florham Park
Verona
Glen Ridge
NUTLEY
BLOOMFIELD
BELLEVILLE
EDISON NAT HIST SITE
LIVINGSTON
WEST ORANGE
EAST ORANGE
ORANGE
KEARNY
WEST NEW YORK
UNION CITY
HOBOKEN
STATUE OF LIBERTY NATIONAL MONUMENT
JERSEY CITY
NEWARK
IRVINGTON
UNION
Maplewood
Summit
Madison
Chatham
Bernardsville
Gladstone
Basking Ridge
GREAT SWAMP N.W.R.
MORRISTOWN NAT HIST PK
Mendham
Chester
Flanders
Budd Lake
MUSCONETCONG STATE PARK
Lake Musconetcong
MORRIS CO
SOMERSET CO
ESSEX CO
UNION CO
BERGEN CO
PASSAIC CO
HUDSON CO
RICHMOND CO
Liberty Island
Governors Island
UPPER NEW YORK BAY
BAYONNE
ELIZABETH
CRANFORD
Scotch Plains
Garwood
Roselle
WESTFIELD
LINDEN
RAHWAY
New Brighton
NEW YORK
NEW YORK CITY 5 MI.
LOCATION DIAGRAM
ATLANTIC OCEAN
LAND USE-LAND COVER SYMBOLS
POINT AND AREA FEATURE SYMBOLS
ATLANTIC COAST ECOLOGICAL INVENTORY
NEWARK, N.J.

## TERRESTRIAL ORGANISMS

Shown in BROWN, species with special status shown in RED(F) or (S) indicates species protected by Federal or State Legislation (see text)

SYMBOL SPECIES

PLANTS (301-350)

301 Eastern hemlock
302 Spleenwort (S)
303 Spider lily (S)
304 Pond bush (S)
305 Watermilfoil (S)
306 Hooded pitcher plant (S)
307 Tree
308 Prickly pear cactus (S)
309 Trailing arbutus (S)
310 Eastern bumelia
311 Pitcher plant
312 Baldcypress
313 Redbay
314 Seaside alder
315 Box huckleberry
316 Purple fringeless orchid
317 Pink lady's slipper
318 Ebony spleenwort (S)
319 Orchids (S)
320 Golden club (S)
321 Florida beargrass
322 East-coast coontie
323 Fall-flowering ixia
324 Jackson-vine
325 Spoon-flower
326 Curtiss milkweed
327 Sea lavender
328 Hand fern
329 Needle palm
330 Yellow squirrel-banana
331 Beach creeper
332 Florida coontie
333 Four-petal pawpaw
334 Bird's nest spleenwort
335 Burrowing four-o'clock
336 Beach star
337 Silver palm
338 Dancing lady orchid
339 Tamarindillo
340 Fuch's bromeliad
341 Everglades peperomia
342 Buccaneer palm
343 Slender spleenwort
344 Pineland jacquemontia
345 Mahogany mistletoe
346 Florida thatch
347 Twisted air plant
348 Long's bittercress
349 Venus's flytrap

INVERTEBRATES (351-400)

351 Monarch butterfly
352 Zebra butterfly

BIRDS (401-600)

SHOREBIRDS (401-430)

401 Shorebirds
402 Terns
403 Gulls
404 Forster's tern
405 Arctic tern
406 Least tern (S)
407 Roseate tern (S)
408 Common tern
409 Great black-backed gull
410 Herring gull
411 Laughing gull
412 Black skimmer (S)
413 Turnstones
414 Plovers
415 Piping plover
416 American oystercatcher (S)

WADING BIRDS (431-460)

431 Wading birds
432 Herons
433 Egrets
434 Rails
435 Ibises
436 Bitterns
437 Great blue heron (S)
438 Wood ibis (S)
439 Anhinga
440 Little blue heron (S)
441 Yellow-crowned night heron (S)
442 Black-crowned night heron
443 Florida sandhill crane (S)
444 Louisiana heron (S)
445 Limpkin (S)
446 Roseate spoonbill (S)
447 Snowy egret (S)
448 Magnificent frigate-bird (S)
449 Reddish egret (S)
450 Clapper rail
451 King rail
452 Virginia rail
453 Sora rail

WATERFOWL (461-500)

461 Waterfowl
462 Swans
463 Geese
464 Dabbling ducks
465 Diving ducks
466 Common eider
467 Harlequin duck
468 Wood duck
469 Fulvous tree duck
470 Loons
471 Grebes
472 Brant geese
473 Snow goose
474 Gadwall
475 Black duck

RAPTORS (501-530)

501 Raptors
502 Owls
503 Kites
504 Hawks
505 Bald eagle (F)
506 Osprey (S)
507 Peregrine falcon (F)
508 Cooper's hawk (S)
509 Swallow-tailed kite
510 Marsh hawk (S)
511 Southeastern American kestrel (S)
512 Florida burrowing owl (S)

SEABIRDS (531-550)

531 Seabirds
532 Petrels, shearwaters, and albatrosses
533 Pelican and allies
534 Alcids
535 Brown pelican (F)
536 Black guillemot
537 Leach's petrel
538 Razorbill
539 Common puffin
540 Double-crested cormorant
541 Gannet
542 Wilson's petrel
543 Northern phalarope
544 Audubon's shearwater
545 Greater shearwater
546 Shearwaters
547 Petrels
548 Jaegers
549 White pelican

SONGBIRDS AND OTHERS (551-600)

551 Songbirds and others
552 Red-cockaded woodpecker (F)
553 Chachalaca
554 Bachman's warbler (F)
555 Wild turkey
556 American woodcock
557 Pileated woodpecker
558 Swainson's warbler
559 Ruffed grouse
560 Bobwhite
561 Mourning dove
562 Warblers
563 Ring-necked pheasant
564 Bank swallow
565 Dusky seaside sparrow (F)
566 White-crowned pigeon (S)

REPTILES AND AMPHIBIANS (601-700)

601 Eastern narrow-mouthed toad (S)
602 Eastern indigo snake (F)
603 American alligator (F)
604 Northern diamondback terrapin
605 Amphibians
606 Greater siren
607 Bog turtle (S)
608 Gopher tortoise (S)
609 Eastern tiger salamander (S)
610 Northern fence lizard
611 Five-lined skink
612 Map turtle
613 Plymouth red-bellied turtle (F)
614 Eastern diamondback rattlesnake
615 Carolina gopher frog
616 Florida gopher frog (S)
617 Atlantic salt marsh watersnake (F)
618 American crocodile (F)
619 Florida Keys mole skink (S)
620 Florida black-headed snake (S)
621 Pine barrens tree frog (S)
622 Northern pine snake (S)
623 Corn snake (S)
624 Timber rattlesnake (S)
625 Southern gray tree frog (S)

MAMMALS (701-800)

701 Beaver
702 Whitetail deer
703 European fallow deer
704 Blackbeard Island deer
705 Opossum
706 Marsh rabbit
707 Rice rat
708 Raccoon
709 St. Simon Island raccoon
710 Mink
711 River otter (F)
712 Feral hog
713 Feral cow
714 Cumberland Island pocket gopher
715 Anastasia Island cotton mouse
716 Aquatic furbearers
717 Black bear (S)
718 Bobcat
719 Eastern gray squirrel
720 Eastern fox squirrel
721 Eastern cottontail
722 Delmarva fox squirrel (F)
723 Muskrat
724 Red fox
725 Bats
726 Gray fox
727 Striped skunk
728 Nutria
729 Longtail weasel
730 Colonial pocket gopher (S)
731 Wild pigs
732 Sika deer
733 Beach meadow vole
734 Block Island meadow vole
735 Pallid beach mouse (S)
736 Sherman's fox squirrel (S)
737 Florida mouse (S)
738 Florida panther (F)
739 Griff's pocket gopher (S)
740 Key Largo wood rat (S)
741 Lower Keys cotton rat (S)
742 Key Largo cotton mouse (S)

## AQUATIC ORGANISMS

Shown in BLUE, species with special status shown in RED(F) or (S) indicates species protected by Federal or State Legislation (see text)

SYMBOL SPECIES

PLANTS (1-50)

1 Irish moss
2 Rockweed

INVERTEBRATES (51-100)

51 Crabs
52 Mussels
53 Oysters
54 Scallops
55 Clams
56 Worms
57 Shrimp
58 American lobster
59 Blue crab
60 Eastern oyster
61 European oyster
62 Bay scallop
63 Deep-sea scallop
64 Calico scallop
65 Surf clam
66 Hard clam
67 Soft shell clam
68 Blackish water clam
69 Bloodworm
70 Sandworm
71 White shrimp
72 Brown shrimp
73 Northern shrimp
74 Rock crab
75 Jonah crab
76 Whelk
77 Ocean quahog
78 Pink shrimp
79 Stone crab
80 Spiny lobster

FISH (101-200)

101 Sharks, skates, rays
102 Herring
103 Salmon and trout
104 Catfish
105 Cod
106 Sunfish and bass
107 Drum
108 Flatfish
109 Longnose gar
110 Shortnose sturgeon (F)
111 Atlantic sturgeon (S)
112 American eel
113 Blueback herring
114 Hickory shad
115 Alewife
116 American shad (S)
117 Atlantic menhaden
118 Atlantic herring
119 Gizzard shad
120 Tarpon
121 Atlantic salmon
122 White catfish
123 Channel catfish
124 Yellow bullhead
125 Brown bullhead
126 Flat bullhead
127 Sea catfish
128 White perch
129 Striped bass
130 Black sea bass
131 Redbreast sunfish
132 Warmouth
133 Bluegill
134 Largemouth bass
135 Black crappie
136 Sheepshead
137 Spotted seatrout
138 Weakfish
139 Spot
140 Atlantic croaker
141 Southern kingfish
142 Northern kingfish
143 Gulf kingfish
144 Red drum
145 Star drum
146 Black drum
147 Summer flounder
148 Southern flounder
149 Winter flounder
150 Rainbow smelt
151 Atlantic tomcod
152 Threadfin shad
153 Carp
154 Atlantic mackerel
155 Chain pickerel
156 White bass
157 Northern puffer
158 Silver perch
159 Florida pompano
160 Bluefish
161 Spanish mackerel
162 Cobia
163 Mullet
164 White crappie
165 Redear sunfish
166 Smallmouth bass
167 Yellow perch
168 Pumpkinseed
169 Atlantic halibut
170 Atlantic cod
171 Pollock
172 Haddock
173 Hake
174 Bluefin tuna
175 Walleye
176 Northern pike
177 Scup
178 Tautog
179 Atlantic spadefish
180 Bay anchovy
181 Butterfish
182 Little tunny
183 Atlantic bonito
184 Brown trout
185 Cunner
186 Yellowtail flounder
187 Gulf flounder
188 Pinfish
189 King mackerel
190 Puffish
191 White grunt
192 Tripletail
193 Ladyfish
194 Snook
195 Jack
196 Snapper
197 Grouper
198 Sailfish
199 Great barracuda
200 Maryland darter (F)

REPTILES AND AMPHIBIANS (201-250)

201 Green sea turtle (F)
202 Loggerhead sea turtle (F)
203 Hawksbill turtle (F)
204 Atlantic ridley turtle (F)
205 Leatherback turtle (F)

MAMMALS (251-300)

251 Manatee (F)
252 Atlantic bottlenose dolphin
253 Pygmy sperm whale
254 Short finned pilot whale
255 Harbor seal
256 Gray seal
257 Right whale (F)
258 Atlantic spotted dolphin

High salinity estuarine habitat (generally 16.5 to 10 parts per thousand), brown used for wide estuaries.

Mid salinity estuarine habitat (generally 5 to 16.5 parts per thousand).

Low salinity estuarine habitat (generally 0.5 to 5 parts per thousand) and tidal freshwater.

Non-tidal freshwater riverine and creek habitat.

## HABITAT USE

Shown in RED for species with special status, BLUE for aquatic organisms and BROWN for terrestrial organisms

a Spawning ground
b Nursery
c Commercial harvesting area
d Adult concentration
e Overwintering area
f Sport fishing/hunting area
g Migratory area
h Nesting area
i Unusual distribution or specimen

REFERENCE NO. 4

MONTCLAIR
NUTLEY
RUTHERFORD
BELLEVILLE
NORTH ARLINGTON
EAST ORANGE
NEWARK
KEARNY
SITE LOCATION
NEWARK INTERNATIONAL AIRPORT
Port Newark
LIBERTY STATE PARK
HACKENSACK RIVER
PASSAIC RIVER
NEWARK BAY
SCALE 1:24000
CONTOUR INTERVAL 20 FEET
NOTES: Well locations are approximate. Well No. designations are provided in Reference No. 8, Tables 1-01 and 1-03 of this report. The use of Well No. 313 is discussed in Reference No. 11.
WESTON
Roy F. Weston, Inc.
FEDERAL PROGRAMS DIVISION
IN ASSOCIATION WITH RESOURCE APPLICATION, INC.
G.E. JOHNSON & SALAMOTA, P.C., R.E. SANDERS ASSOCIATES,
PNI ENVIRONMENTAL MANAGEMENT, AND GHS ENVIRONMENTAL SERVICES, INC.
CHART: ORANGE, NJ
TITLE: FOUR MILE RADIUS MAP
SITE NAME: KEEGAN LANDFILL KEARNY, NJ
SCALE: 1": 2,000'
TDM#: 02-96-11-0044
DATE: 04/08/97