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EPA WORK ASSIGNMENT NUMBER : 041-2Z00
EPA CONTRACT NUMBER : 68-W8-0110
EBASCO SERVICES INCORPORATED

ARCS II PROGRAM

FINAL DRAFT
ENVIRONMENTAL PRIORITIES INITIATIVE/ PRELIMINARY ASSESSMENT (EPI-PA)
CONTINENTAL CAN COMPANY
CITY OF PATERSON
PASSAIC COUNTY, NEW JERSEY
CERCLIS NO.: NJD002521425

SEPTEMBER 1992

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W0141.LYN

SITE SUMMARY AND RECOMMENDATION

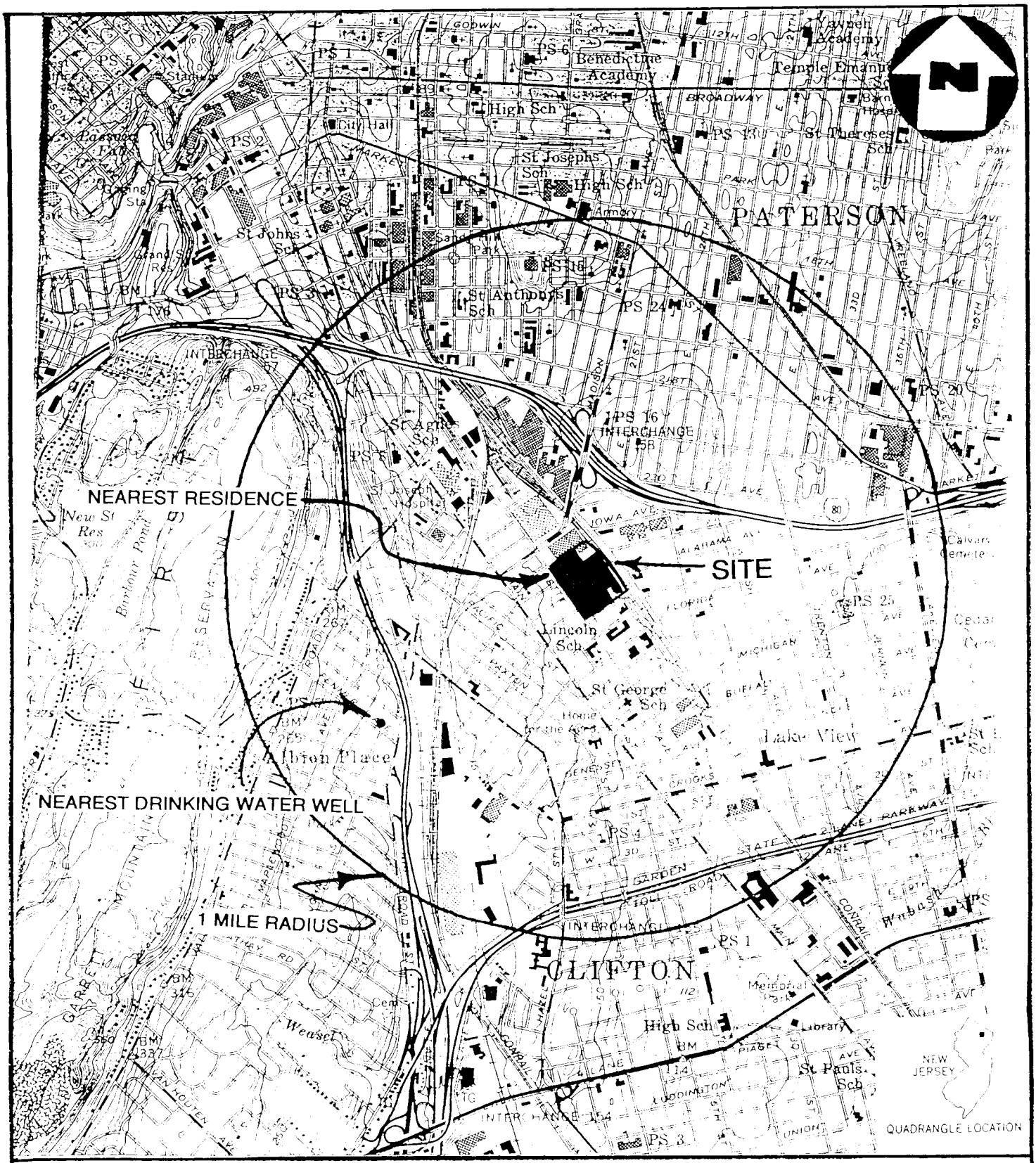
The Continental Can Company site (Continental Can, CERCLIS No. NJD002521425) is located in the City of Paterson, Passaic County, New Jersey, in an area of mixed residential, commercial, and light industrial development. It comprises a total of approximately 15 acres. Most of the facility is fenced, except along the southeast corner, where a railroad siding enters the property. Figure 1 depicts the regional location of the site and Figure 2 provides a site sketch.

The site first operated in 1923, when the boiler house was built. In 1943 the shell of the present production plant was constructed by the French government, and was used in the production of aircraft engines. During the period 1945-1950 it was used in the manufacture of railroad cars. From 1955-1981 it was used by Continental Can to produce aluminum cans. Continental Can Company ceased operations at the site in 1982. The site was purchased by the current owner, 297 Getty Associates (a holding/investment firm) in 1983. Currently, the site is leased to five different tenants: 1) Kaysam, engaged in rubber product distribution, occupying approximetely 75,000 square feet; 2) OPS Distribution, engaged in high priced clothing distribution, occupying approximately 180,000 square feet; 3) Cashman, engaged in forklift repair; occupying 15,000 square feet; 4) Textile Transprint, engaged in wall paper production, occupying 68,000 square feet ; and 5) General Floorcraft, engaged in manufacturing floor polishing machines and vacuum cleaners, occupying approximately 65,000 square feet. No hazardous wastes are generated by these tenants.

Prior land use has included aircraft engine, railroad car, and aluminum can manufacture. The entire site is either paved or is occupied by buildings, except for small areas of healthy vegetation along the western side of the site, bordering Getty Avenue, and the southern side, bordering Thomas Street. Stormwater runoff generated on site flows into storm drains either on site (in the boiler house courtyard) or along Thomas Street.

Wastes generated at Continental Can include paint wastes, which were stored on site in a 30 by 30 foot paved drum storage area in the boiler house courtyard and in a 2,500 gallon aboveground "slop" tank on the southern portion of the facility. Waste solvents were also produced, including waste naptha, which was stored in a 10,000-gallon underground storage tank (UST) on the southern side of the property. These Solid Waste Management Units (SWMUs) were formally closed by Continental Can in March 1982. There is no evidence that wastes were ever disposed of on site. One additional area of environmental concern exists in the northern portion of the boiler house courtyard, where five petroleum underground storage tanks (USTs) were determined to be leaking. Soil and groundwater contamination with benzene, toluene, ethylbenzene, and xylene (BTEX) is present in the immediate vicinity of these tanks.

The facility filed a RCRA Part A Hazardous Waste Permit with the United States Environmental Protection Agency (USEPA) Region II in October 31, 1980 and a Notification of Hazardous Waste Activity in June 11, 1982. The facility ceased operations in 1982 and in June 1987 the facility officially requested the New Jersey Department of Environmental Protection and Energy (NJDEPE) to delist the facility as a treatment, storage and disposal (TSD) facility. In August 1988, NJDEPE officially delisted the facility since the SWMUs had been formally closed and



SCALE 1:24,000

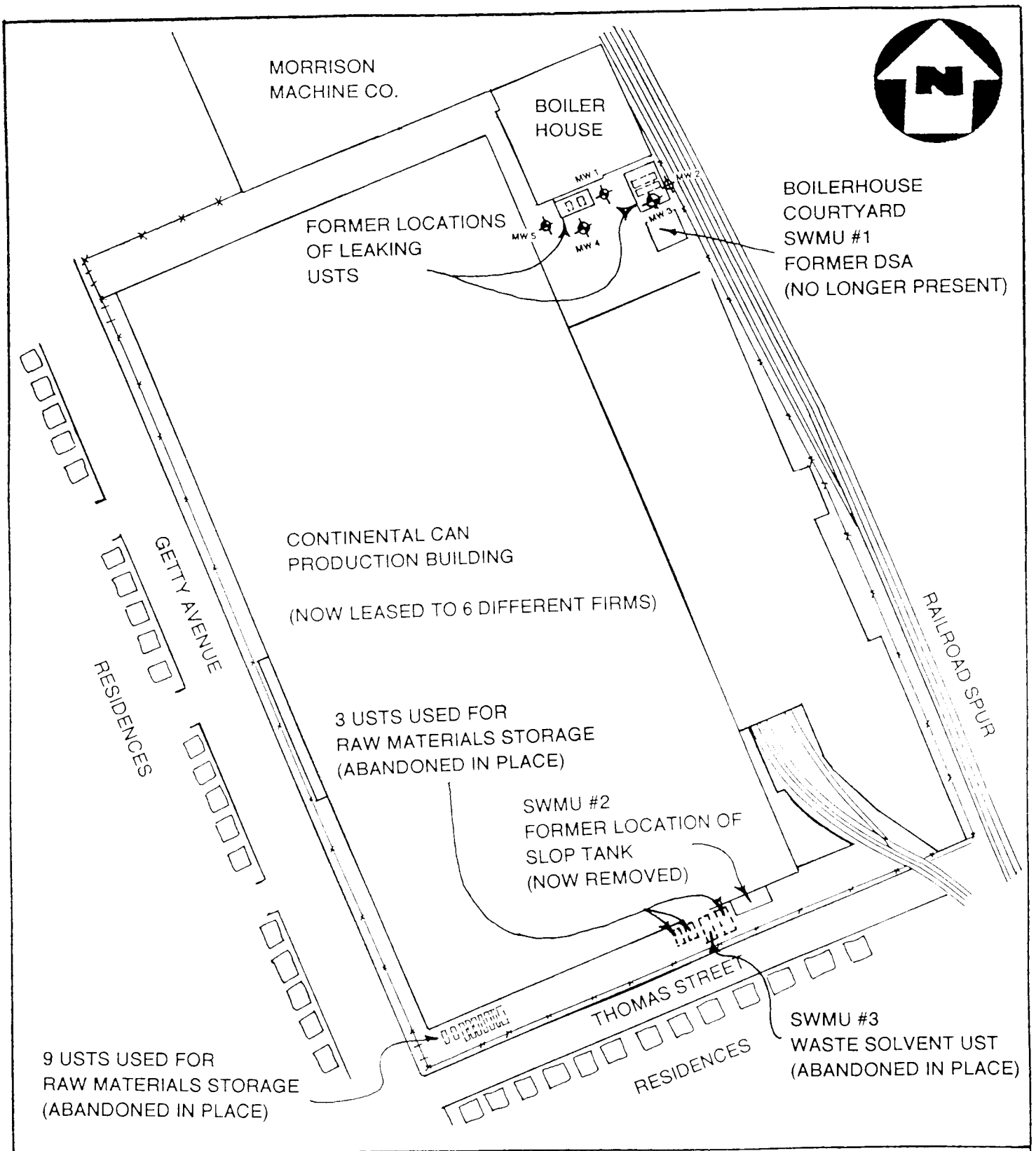
EBASCO ENVIRONMENTAL

TOPOGRAPHY TAKEN FROM:
1955 PATERSON, N.J.
U.S.G.S. QUADRANGLE 7.5 MIN. SERIES

FIGURE 1

REGIONAL LOCATION MAP

CONTINENTAL CAN CO.
PATERSON, NEW JERSEY



SITE SKETCH

CONTINENTAL CAN COMPANY
PATERSON, NEW JERSEY

NOT TO SCALE

FIGURE 2

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ENVIRONMENTAL

there were no hazardous wastes being generated or store at the site. A RCRA inspection was attempted by the NJDEPE in 1989; however, the agency could not locate the current owner and the inspection apparently never occurred.. The facility has 17 USTs registered with the NJDEPE under permit No. 0097176; however, all of these USTs have been either removed or abandoned in place.

No known contamination of off-site or neighboring properties exists. No citizen complaints or air releases have been reported. There are no known National Priorities List (NPL) or Resource Conservation and Recovery Act (RCRA) sites within one mile of the facility.

Two investigations have been performed at the Continental Can facility, both associated with petroleum UST removals. Two 20,000-gallon fuel oil USTs and approximately 240 tons of petroleum contaminated soils were removed from the boiler house courtyard area in July 1990. Soils were disposed of at the Browning Ferris Industries (BFI) Landfill in Lowellville, Ohio.

An investigation completed in July 1991 included the installation and sampling of three bedrock groundwater monitoring wells for volatile organic compounds (VOCs) and base neutral compounds (BNs). VOCs, almost exclusively BTEX, comprised the majority of groundwater contamination, with total VOC levels of over 11,500 parts-per-billion (ppb) present. Benzene, toluene, and xylene exceeded the Federal Maximum Contaminant Levels (MCLs) of 5 ppb, 700 ppb, and 1,000 ppb, respectively. The upgradient well (MW-1) showed the highest levels (primarily BTEX, components found in gasoline) suggesting a source other than the fuel oil USTs. MW-1 is located upgradient of the former location of the fuel oil USTs and downgradient of the former gasoline USTs. The three gasoline USTs located upgradient of the fuel oil USTs were removed in July, 1991, with approximately 192 tons of contaminated soils. Soils were disposed of at Grand Central Sanitation, in Penn Argyl, Pennsylvania.

In September, 1991, two additional bedrock monitoring wells, one upgradient (MW-5) and one downgradient (MW-4), were installed nearby the former locations of the gasoline USTs. Sampling for VOCs also indicated the presence of BTEX in groundwater, also exceeding the MCLs for benzene, toluene, and xylene. Downgradient VOC concentrations exceeded upgradient by over three times. Post-excavation soil sampling for VOCs was also performed, and indicated that soil contamination with BTEX was also present in the vicinity of the removed gasoline USTs at up to 110,000 ppb total VOCs. No background soil data was available. These investigations also determined that a floating product layer of up to 7.9 inches thick was present in the vicinity of the fuel oil USTs. Remediation of this floating layer includes the weekly removal and off site disposal of the product layer from affected wells. This action is being performed under the auspices of the NJDEPE, and the NJDEPE expects the groundwater contamination to attenuate within two years.

The aquifer of concern is the Brunswick Formation, found at 8 to 12 feet below the ground surface. Groundwater flow direction is easterly. The nearest well that is used for drinking purposes is located on Fenner Avenue in the City of Clifton, an estimated 3/4 mile southwest of the site. An estimated 57,067 people obtain drinking water from wells located within four miles of the site. The depth from the lowest point of waste disposal or storage to the highest seasonal level of the saturated zone of the aquifer of concern is 5 feet.

Runoff from the site enters storm drains; as a result the storm water runoff pathway is poorly defined. The nearest surface water is the Passaic River, 1.2 miles east of the facility (measured in a straight line), which makes up the entire 15-mile surface water target distance limit. The northern portion of the Passaic (the portion from the probable point of entry {PPE} to the confluence with the Second River) is designated by NJDEPE as classification "FW2/SE2," which has the following uses: Maintenance, migration, and propagation of the natural and established biota; primary and secondary contact recreation; industrial and agricultural water supply; public potable water supply after treatment; migration of diadromous fish; maintenance of wildlife; and any other reasonable uses. The southern portion of the Passaic from the confluence with the Second River south is designated by NJDEPE as classification "SE," which has the following uses: secondary contact recreation; maintenance and migration of fish populations; migration of diadromous fish; maintenance of wildlife; and any other reasonable uses. No public or private drinking water intakes exist along the surface water target distance limit; drinking water comes from municipal wells and reservoirs located north of the facility. The site is not located within a floodplain. Sensitive environments within 15 miles downstream of the PPE include the Passaic River (a State-designated area for the maintenance of aquatic life). Approximately 70 acres of wetlands exist within 15 miles downstream of the PPE.

The nearest residences are on Getty Avenue and Thomas Street, approximately 100 feet from the site. An estimated 180 people work on site, and an estimated 90 people live within 200 feet of the site. There are no schools or daycare facilities within 200 feet of the site. An estimated 40,716 people live within one mile radius of the site. There are no terrestrial sensitive environments within 200 feet of the site.

An estimated 407,450 people live within four miles of the site. There are no sensitive environments within one half mile radius of the facility, nor are there any adjacent recreational areas.

There has been a release of petroleum products from leaking USTs on site; however, releases of petroleum products are not covered under the Comprehensive Environmental Responsibility Compensation and Liability Act (CERCLA). In addition, the facility is under the Discharge Investigation and Corrective Action (DICA) procedures with NJDEPE oversight, which includes removal of contaminated soils and remediation of contaminated groundwater. The NJDEPE expected groundwater contamination to attenuate within two years. No other releases to groundwater or other releases to surface water, soil, or air are suspected or documented to have occurred from either of the SWMUs on site. No drinking water wells are present within 1/2 mile of the site. No surface water intakes are present within 15 miles downstream of the facility. Most of the site is fenced, thus limiting access. The site is located in a densely populated area, however, no air releases have been documented.

Although groundwater contamination with petroleum products has occurred, the facility is performing a remedial action under State oversight. Results of the current remedial activities being conducted at the site should be evaluated prior to recommending any additional action.

SITE ASSESSMENT REPORT: ENVIRONMENTAL PRIORITIES INITIATIVE/ PRELIMINARY ASSESSMENT (EPI-PA)

PART I: SITE INFORMATION

1. Site Name/Alias Continental Can Company/297 Getty Avenue Associates, Inc.

   Street 297 Getty Avenue

   City Paterson State New Jersey Zip 07503

2. County Passaic County Code 031 Cong. Dist. 08

3. EPA ID No. NJD002521425

4. Block No. K-1225 Lot No. 2

5. Latitude 40°52'30" Longitude 74°07'30"

   USGS Quad. Paterson, New Jersey

6. Owner Feist & Feist Associates Tel. No. (201) 226-5000

   Street 101 Eisenhower Parkway

   City Roseland State New Jersey Zip 07068

7. Operator 297 Getty Avenue Associates Tel. No. (201) 278-3023

   Street 297 Getty Avenue

   City Paterson State New Jersey Zip 07503

8. Type of Ownership

X	Private	O	Federal	O	State
O	County	O	Municipal	O	Unknown

9. Owner/Operator Notification on File

X	RCRA 3001	Date: 06/11/82	O	CERCLA103C	Date:_____
O	None		O	Unknown	

10. Permit Information

Permit	Permit No.	Date Issued	Expir. Date	Comments
BUST	0097176	10/06/86	02/28/89	Tanks removed or abandoned in place

11. Site Status

X Active O Inactive O Unknown

12. Years of Operation: 1923 to Present

13. Identify the types of waste sources (eg., landfill, surface impoundment, piles, stained soil, above or below-ground 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.	Containers	Boiler house Courtyard Parking Lot
2.	Above Ground Tank	Slop Tank
3.	Underground Tank	Waste Solvent Tank

(b) Other Areas of Concern

Identify any miscellaneous spills, dumping, etc. on site; describe the materials and identify their locations on site.

Eleven 10,000-gallon and two 2,500-gallon USTs are present on the south side of the site, between the plant building and Thomas Street. These were used before 1982 for raw material storage, and contained paint, enamel, varnish, "clear," and ethyl ketone. In 1982, Continental Can implemented a facility closure plan, and formally closed these USTs. Closure procedures included draining the USTs of any material still contained in them and scraping any bottom solids or sludge and transferring the material to drums for off site disposal. The tanks were then cleaned with a spray of 5 to 15% caustic solution to all interior surfaces, followed by water rinses until the washwater showed a neutral pH. They were then filled with sand. All wastes and wastewaters were disposed of at Delaware Container Corp. of Coatesville, Pennsylvania.

A small area of apparently oil stained soil was noted along the facility boundary with Thomas Street. Dimensions of the oil stained area were approximately 20 feet by 1 foot.
Convenience dumping of household trash and litter is occurring in some remote areas of the facility, including along the southeast end of Thomas Street, and on the railroad spur.

Two, 20,000-gallon fuel oil USTs and three 2,000-gallon gasoline USTs were removed from the boiler house courtyard area in 1991. Contamination of soil and groundwater with petroleum derivatives, primarily benzene, toluene, ethylbenzene, and xylene occurred, and the NJDEPE required that the facility implement DICAR procedures. Since petroleum products are exempt from CERCLA/SARA regulations, these USTs will not be evaluated in this report.

14. Information available from

Contact: Luz Martinez Agency: USEPA Tel.No.: (212) 264-4561

Preparer: Polly Armour Agency: Wehran Engineering Date: July 28, 1992

PART II: WASTE SOURCE INFORMATION (For RCRA Solid Waste Management Units (SWMUs)

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

Waste Unit 1 Boiler house Courtyard Containers

1. **Identify the RCRA status and permit history, if applicable, and the age of the SWMU.**

The boiler house courtyard drum storage area (DSA) was first identified in Continental Can Company's Hazardous Waste Permit Application submitted to the USEPA on October 31, 1980. The age of this SWMU is unknown; the October 1980 Part A Hazardous Waste Permit Application indicated that Continental Can facility had been operating since March, 1949. A January 28, 1987 letter from the NJDEP to Continental Can Company indicated that a closure plan submitted for the facility was approved. An August 10, 1988 letter from the NJDEP to Continental Can Company indicated that the facility had been delisted as a TSDF, since the SWMUs has been closed and the facility was no longer generating or storing hazardous waste at the site. The PRP (297 Getty Avenue Associates) indicated during the site reconnaissance that the DSA had not been used as a SWMU since before they took ownership of the facility in 1983.

2. **Describe the SWMU and clearly identify its location on a site map.**

According to the Hazardous Waste Permit Application submitted to the USEPA on October 31, 1980, this SWMU is located on the east side of the boiler house courtyard. It is approximately 30 ft. by 30 ft. During the site reconnaissance, the entire boiler house courtyard area, including the area identified as the DSA, was paved with either asphalt or concrete. No stained pavement was noted, nor were any drums noted in the DSA. Two drums were noted in another area of the boiler house courtyard area; these were at the north side of the area, near where underground storage tanks had been removed, and were being used for containment of recovered petroleum from the leaking USTs (currently removed).

3. **Identify the size or quantity of the waste (e.g., area or volume of a landfill or surface impoundment, number and capacity of drums, or tanks). Specify the quantity of hazardous substances in the waste unit.**

The Hazardous Waste Permit Application submitted in October 1980 indicated that the facility had a total container storage process design capacity of 1,120 gallons. During the July 1992 site reconnaissance no drums were noted in the DSA.

4. **Identify the physical state(s) of the waste(s) as disposed of in the SWMU. The physical state(s) should be categorized as follows: solid, powder or fines, sludge, slurry, liquid or gas.**

No known waste disposal has occurred in this SWMU. The wastes stored in this SWMU were indicated as Waste Code F017, paint wastes. These were present as liquids and sludges.

5. **Identify specific hazardous substance(s) known or suspected to be present in the SWMU.**

Hazardous substances stored at this SWMU include paint waste. The facility implemented an unofficial closure plan in the early 1980's, during which all hazardous wastes from this SWMU were removed and disposed of off site. The July 1992 site reconnaissance did not reveal any current waste storage or disposal practices at this SWMU, nor did it find any historical evidence of releases. Therefore, no hazardous substances are known or suspected to be present in this SWMU.

6. **Describe the containment of the SWMU unit as it relates to releases to groundwater, surface water, soil and air.**

The entire boiler house courtyard area, including the DSA, is paved with either concrete or asphalt, thus minimizing potential releases to soil and groundwater. The courtyard area slopes slightly to the south, where it is drained by storm drains which flow under the facility to connect with mains on Thomas Street. Past air releases may have occurred; however, no OVM or O2/LEL readings above background were obtained.

SWMU-specific Conclusion:

No release of hazardous substances is known, alleged, or suspected to have occurred from this SWMU. The entire SWMU is paved, and no staining, OVM or O2/LEL readings, or other evidence of a release of hazardous substances was observed during the July 1992 site reconnaissance.

Ref. No. 1, 2, 3, 5, 8, and 22.

PART II: WASTE SOURCE INFORMATION (For RCRA Solid Waste Management Units (SWMUs)

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

Waste Unit 2 Slop Tank Above Ground Storage Tank

1. **Identify the RCRA status and permit history, if applicable, and the age of the SWMU.**

   The "Slop Tank" above ground storage tank (AGST) was first identified in Continental Can Company's Hazardous Waste Permit Application submitted to the USEPA on October 31, 1980. The age of this SWMU is unknown; the October 1980 Part A Hazardous Waste Permit Application indicated that Continental Can facility had been operating since March, 1949. An August 10, 1988 letter from the New Jersey Department of Environmental Protection (NJDEP) to Continental Can Company indicated that the facility had been delisted as a TSDF, since the SWMUs has been closed and the facility was no longer generating or storing hazardous waste at the site. The AGST was not present during the July 1992 site reconnaissance. The PRP did not know when the tank had been removed.

2. **Describe the SWMU and clearly identify its location on a site map.**

   According to the Hazardous Waste Permit Application submitted to the USEPA on October 31, 1980, this SWMU, a vertical 2,500 gallon steel tank, was located on the south side of the facility adjacent to Thomas Street. It was not present during the site reconnaissance.

3. **Identify the size or quantity of the waste (e.g., area or volume of a landfill or surface impoundment, number and capacity of drums, or tanks,). Specify the quantity of hazardous substances in the waste unit.**

   The Hazardous Waste Permit Application submitted in October 1980 indicated that the facility had a total tank process design capacity of 1,119 gallons. A February 1982 closure plan for the underground and above ground tanks indicated that the tank was a 2,500 gallon tank.

4. **Identify the physical state(s) of the waste(s) as disposed of in the SWMU. The physical state(s) should be categorized as follows: solid, powder or fines, sludge, slurry, liquid or gas.**

   The wastes stored in this SWMU were indicated as Waste Code F017, paint waste. These were present as liquids and sludges.

5. **Identify specific hazardous substance(s) known or suspected to be present in the SWMU.**

Hazardous substances stored at this SWMU include paint wastes. The facility implemented a closure plan in 1982, during which all hazardous wastes from this SWMU were removed, and the tank was cleaned and dismantled. The tank was not present during the July 1992 site reconnaissance. Therefore, no hazardous substances are known or suspected to be present in this SWMU.

6. **Describe the containment of the SWMU unit as it relates to releases to groundwater, surface water, soil and air.**

This area of the site is paved with either concrete or asphalt, thus minimizing potential releases to soil and groundwater. The area slopes slightly to the south and east, where it is drained by storm drain mains on Thomas Street. Past air releases may have occurred; however, no OVM or O2/LEL readings above background were obtained.

SWMU-specific Conclusion:

No release of hazardous substances is known, alleged, or suspected to have occurred from this SWMU. The entire SWMU is paved, and no staining, OVM or O2/LEL readings, or other evidence of a release of hazardous substances was observed during the July 1992 site reconnaissance.

Ref. No. 1, 2, 3, 4, 5, 6, 8, 12, and 22.

PART II: WASTE SOURCE INFORMATION (For RCRA Solid Waste Management Units (SWMUs)

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

Waste Unit 3 Waste Solvent Tank Underground Storage Tank

1. **Identify the RCRA status and permit history, if applicable, and the age of the SWMU.**

   This UST was not identified in Continental Can Company's Hazardous Waste Permit Application submitted to the USEPA on October 31, 1980. Continental Can's UST registration submitted to the NJDEPE in 1986 indicates that the tank was 35 years old at that time. An August 10, 1988 letter from the New Jersey Department of Environmental Protection (NJDEP) to Continental Can Company indicated that the facility had been delisted as a TSDF, since the SWMUs has been closed and the facility was no longer generating or storing hazardous waste at the site. Correspondence in the NJDEPE files indicates that this tank was abandoned in place in 1982, when the facility implemented a closure plan. During the July 1992 site reconnaissance, a loading dock was seen occupying the area where this tank was located.

2. **Describe the SWMU and clearly identify its location on a site map.**

   According to a site map, this SWMU was located on the south side of the facility adjacent to Thomas Street. The area where it was located is now occupied by a loading dock.

3. **Identify the size or quantity of the waste (e.g., area or volume of a landfill or surface impoundment, number and capacity of drums, or tanks,). Specify the quantity of hazardous substances in the waste unit.**

   The Hazardous Waste Permit Application submitted in October 1980 indicated that the facility had a total tank process design capacity of 1,119 gallons. A February 1982 closure plan for the underground and above ground tanks indicated that the tank was a 10,000 gallon tank. According to Continental Can 's 1986 UST registration with the NJDEPE, there was 0 gallons of material present in the tank at that time.

4. **Identify the physical state(s) of the waste(s) as disposed of in the SWMU. The physical state(s) should be categorized as follows: solid, powder or fines, sludge, slurry, liquid or gas.**

   The wastes stored in this SWMU were indicated as waste solvent (naptha), which was present in the liquid state.

5. **Identify specific hazardous substance(s) known or suspected to be present in the SWMU.**

Hazardous substances stored in this SWMU waste solvent. The facility implemented a closure plan in 1982, during which all hazardous wastes from this SWMU were removed, and the tank was cleaned and filled with sand. The area where this tank was located is now occupied by a loading dock. Therefore, no hazardous substances are known or suspected to be present in this SWMU.

6. **Describe the containment of the SWMU unit as it relates to releases to groundwater, surface water, soil and air.**

The SWMU was a steel UST with no secondary containment, cathodic protection, or leak detection. Soil or groundwater contamination may have occurred from this tank during when the facility was operational prior to 1982; however, the SWMU was closed in accordance with NJDEPE procedures, and no hazardous substances are now present in the tank. The area slopes slightly to the south and east, where it is drained by storm drain mains on Thomas Street. Past air releases may have occurred; however, no OVM or O2/LEL readings above background were obtained.

SWMU-specific Conclusion:

No release of hazardous substances is known, alleged, or suspected to have occurred from this SWMU. Hazardous substances are no longer present in this SWMU.

Ref. No. 1, 2, 3, 4, 6, 7, 8, 17, and 22.

PART III: PREVIOUS INVESTIGATIONS

EXISTING ANALYTICAL DATA

Soil and groundwater sampling was performed in 1991 as part of a Discharge Investigation and Corrective Action Report required (DICAR) submitted to the NJDEPE as a result of leaking fuel oil and gasoline USTs.

Ref. 8, 9

GROUNDWATER

Dan Raviv Associates, Inc. (DRAI) installed and sampled three groundwater monitoring wells in March and April 1991, as part of a DICAR by the NJDEPE. The wells surrounded the locations of former fuel oil USTs, and were installed to determine if the excavated USTs had impacted the underlying groundwater. Accutest Laboratories of Dayton, New Jersey, performed analysis for VOCs and BNs, which included field and trip blanks.

VOCs detected in groundwater (Table 1) consisted entirely of benzene, toluene, ethylbenzene, and xylene (BTEX). Concentrations of up to 11,580 ppb total VOC were detected, and were highest in the upgradient monitoring well. BNs, consisting almost entirely of Naphthalene, were also detected in the monitoring wells, at up to 143 ppb total BNs. Again, the upgradient monitoring well showed the highest concentrations. A floating product layer was encountered in two wells, at up to 7.9 inches thick.

Both the compounds detected in the April 1991 sampling and the extent of contamination suggested a source other than the fuel oil USTs. In September, 1991, two additional groundwater monitoring wells were installed and sampled adjoining the gasoline USTs. Accutest Laboratories of Dayton, New Jersey, performed analysis for VOCs, which included field and trip blanks.

VOCs detected in these additional groundwater monitoring wells (Table 2) consisted entirely of BTEX. Concentrations of up to 22,400 ppb total VOC were detected, and were significantly higher in the downgradient monitoring well than in the upgradient well (334 ppb total VOCs).

Ref. 8,9

SOIL

Ten grab soil samples were collected following excavation of the two gasoline USTs in the boiler house courtyard area. All samples were collected at a depth interval of 5.5 to 6.0 feet below ground surface. Accutest Laboratories of Dayton, New Jersey, performed analysis for VOCs and lead, which included field and trip blanks.

VOCs were detected in almost all sample locations (Table 3), and consisted entirely of BTEX and methylene chloride (the methylene chloride was also detected in the blanks). Concentrations

of up to 110,000 ppb total VOCs were noted. Since all samples were located adjacent to the former gasoline USTs, no comparison of upgradient versus downgradient can be made.

Ref. 8,9

SITE RECONNAISSANCE RESULTS

A site reconnaissance was performed July 27, 1992, by Ebasco/Wehran Engineering Corporation (Wehran).

The Continental Can Company site is located on Getty Avenue in the City of Paterson, Passaic County, New Jersey, in an area of mixed residential, commercial, and light industrial/manufacturing uses. The site itself was formerly used by a variety of industries, including manufacture of aircraft engines, railroad cars, and aluminum cans. Most of the site is occupied by a production building constructed of brick and block, and a brick building formerly housing the facility's boiler. The remainder of the site is paved, and most of the facility is surrounded by a chain-link fence. The site comprises a total of approximately 15 acres.

The site was first developed in 1923, when the boiler house was built. In 1943 the shell of the present production plant was constructed by the French government, and was used in the production of aircraft engines. During the period 1945-1950 it was used in the manufacture of railroad cars. From 1955-1981 it was used by Continental Can Company to produce aluminum cans. The site was purchased by the current owner, 297 Getty Associates (a holding/investment firm) in 1983. It is currently active, and is used for warehouse/storage and light manufacturing/assembly. Five tenants currently occupy parts of the property: (1) Kaysam (75,000 sq. ft.), rubber product distribution; (2) OPS Distribution (180,000 sq. ft.), high priced clothing distribution; (3) Cashman (15,000 sq. ft.), forklift repair; (4) Textile Transprint (68,000 sq. ft.), wallpaper production; and (5) General Floorcraft (65,000 sq. ft.), manufacture of floor polishing machines and vacuums.

The site is currently in a State-mandated remedial action due to the presence of leaking underground storage tanks (USTs) in the courtyard adjacent to the boiler house (the area reported in the 1980 Continental Can Company RCRA Part A permit submission to the USEPA as a Drum Storage Area). This action has resulted in the removal of two 20,000 gallon USTs containing #6 fuel oil and three 2,000 gallon USTs containing gasoline. In addition, over 800 tons of contaminated soil were removed and disposed of off site. Five bedrock groundwater monitoring wells were installed, three of which contain free product. These actions were performed under New Jersey Department of Environmental Protection and Energy (NJDEPE) Bureau of Underground Storage Tanks (BUST) oversight. The PRP has submitted a Discharge Investigation and Corrective Action Report (DICAR) to the NJDEPE. The PRP stated during the site reconnaissance that he bails the three wells containing free product twice each week to recover the product.

In addition to the five USTs removed under NJDEPE oversight, nine USTs are present on the south side of the facility adjacent to Thomas Street. The PRP stated that they examined these tanks in 1991 and found that they had been filled with sand. This information is in accordance

TABLE 1: ORGANIC COMPOUNDS DETECTED IN GROUNDWATER APRIL 1991

Compound	MW-1	MW-2	MW-3
VOCs			
Benzene	5,000	38	560
Ethylbenzene	880	100	510
Toluene	1,900		470
m-Xylene	2,000		1,600
p-, o-Xylene	1,800		1,700
Total VOCs	11,580	138	4,840
BNs			
Acenaphthene	1.7	1.5	3.8
Fluorene	1.7		4.8
Naphthalene	140		110
Anthracene			2.2
Fluoanthrene			3.1
Phenanthrene			7.4
Pyrene			3.3
Total BNs	143.4	1.5	134.6

Note: All data in ppb
A blank space indicates not detected

TABLE 2: ORGANIC COMPOUNDS DETECTED IN GROUNDWATER SEPTEMBER 1991

Compound	MW-4	MW-5
VOCs		
Benzene	7,800	59
Ethylbenzene	1,800	79
Toluene	4,300	15
m-Xylene	4,500	100
p-, o-Xylene	4,000	81
Total VOCs	22,400	334

Note: All data in ppb
A blank space indicates not detected

TABLE 3: VOLATILE ORGANIC COMPOUNDS DETECTED IN SOIL
JULY 1991

Compound	Locations Where Compound Detected	Highest Concentration	Location Where Highest Conc. Detected
Benzene	GS-10	51	GS-10
Ethylbenzene	GS-1, GS-3, GS-4, GS-5, GS-6, GS-7, GS-9, GS-10	11,000	GS-4
Methylene chloride	GS-9, GS-10	57 JB	GS-9
Toluene	GS-5, GS-10	120 J	GS-5
m-Xylene	GS-1, GS-3, GS-4, GS-5, GS-6, GS-7, GS-8, GS-9, GS-10	52,000	GS-4
p-, o-Xylene	GS-1, GS-3, GS-4, GS-5, GS-6, GS-7, GS-8, GS-9, GS-10	47,000	GS-4

Notes: All data in ppb
A blank space indicates not detected
J - Concentration estimated
B - Compound also found in blanks

of up to 110,000 ppb total VOCs were noted. Since all samples were located adjacent to the former gasoline USTs, no comparison of upgradient versus downgradient can be made.

Ref. 8,9

SITE RECONNAISSANCE RESULTS

A site reconnaissance was performed July 27, 1992, by Ebasco/Wehran Engineering Corporation (Wehran).

The Continental Can Company site is located on Getty Avenue in the City of Paterson, Passaic County, New Jersey, in an area of mixed residential, commercial, and light industrial/manufacturing uses. The site itself was formerly used by a variety of industries, including manufacture of aircraft engines, railroad cars, and aluminum cans. Most of the site is occupied by a production building constructed of brick and block, and a brick building formerly housing the facility's boiler. The remainder of the site is paved, and most of the facility is surrounded by a chain-link fence. The site comprises a total of approximately 15 acres.

The site was first developed in 1923, when the boiler house was built. In 1943 the shell of the present production plant was constructed by the French government, and was used in the production of aircraft engines. During the period 1945-1950 it was used in the manufacture of railroad cars. From 1955-1981 it was used by Continental Can Company to produce aluminum cans. The site was purchased by the current owner, 297 Getty Associates (a holding/investment firm) in 1983. It is currently active, and is used for warehouse/storage and light manufacturing/assembly. Five tenants currently occupy parts of the property: (1) Kaysam (75,000 sq. ft.), rubber product distribution; (2) OPS Distribution (180,000 sq. ft.), high priced clothing distribution; (3) Cashman (15,000 sq. ft.), forklift repair; (4) Textile Transprint (68,000 sq. ft.), wallpaper production; and (5) General Floorcraft (65,000 sq. ft.), manufacture of floor polishing machines and vacuums.

The site is currently in a State-mandated remedial action due to the presence of leaking underground storage tanks (USTs) in the courtyard adjacent to the boiler house (the area reported in the 1980 Continental Can Company RCRA Part A permit submission to the USEPA as a Drum Storage Area). This action has resulted in the removal of two 20,000 gallon USTs containing #6 fuel oil and three 2,000 gallon USTs containing gasoline. In addition, over 800 tons of contaminated soil were removed and disposed of off site. Five bedrock groundwater monitoring wells were installed, three of which contain free product. These actions were performed under New Jersey Department of Environmental Protection and Energy (NJDEPE) Bureau of Underground Storage Tanks (BUST) oversight. The PRP has submitted a Discharge Investigation and Corrective Action Report (DICAR) to the NJDEPE. The PRP stated during the site reconnaissance that he bails the three wells containing free product twice each week to recover the product.

In addition to the five USTs removed under NJDEPE oversight, nine USTs are present on the south side of the facility adjacent to Thomas Street. The PRP stated that they examined these tanks in 1991 and found that they had been filled with sand. This information is in accordance

with the results of the file search, which indicated that the tanks were cleaned and filled with sand in 1982. The area of the facility where these tanks are present is fenced with a chain-link fence. During the site reconnaissance, a black, oily material was noted along the boundary of this area with Thomas Street. This material did not appear to have originated on site, and may have been spilled there by "do-it-yourselfers" changing their automobile oil.

Two Solid Waste Management Units (SWMUs) were reported in the 1980 Continental Can Company RCRA Part A permit submission to the USEPA: a drum storage area and a bulk storage tank. The drum storage area was located in the boiler house courtyard where the tank excavation was performed. This area is entirely paved, and the facility fence limits access. Two drums were noted in this area during the site reconnaissance: one empty, and one containing free product recovered from the monitoring wells. The PRP had no information regarding the drum storage area period of use, except that it has not been used as a drum storage area since they took ownership in 1983. No OVM, O2/LEL, or dust readings were detected above background in this area. The bulk storage tank formerly located on the south side of the facility is no longer present. The area is now occupied by a truck loading dock. The entire area is paved. The PRP had no information as to when the bulk storage tank was removed or when the loading dock was constructed. This portion of the facility building is not fenced.

One 55 gallon steel drum was noted in the railroad siding area. It was approximately 3/4 full with an unknown liquid. Since the bung was open and the drum was located next to the building where roof runoff would strike the drum, this liquid may be rainwater. No OVM or O2/LEL readings above background were obtained from inside or in the vicinity of this drum.

Convenience dumping of household trash, appliances, and tires is occurring in several concealed portions of the site.

Continuous air monitoring with an OVM photoionizer, an 02/LEL explosimeter, and a dust monitor was performed throughout the site reconnaissance. No readings were obtained above background from any of the meters.

Ref. 1

PART IV: HAZARDOUS WASTE ASSESSMENT

GROUNDWATER ROUTE

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

There has been an observed release of contaminants to groundwater. Groundwater sampling has indicated the presence of benzene, toluene, ethylbenzene, and xylene in monitoring wells adjacent and downgradient of USTs formerly used for gasoline storage (now removed).

Ref. No. 8, 9, 24

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.

Surface soils at the site consist of unconsolidated sediments, primarily clayey silts. Brunswick Formation bedrock (the aquifer of concern) underlies these surface deposits, 8 to 12 feet below the ground surface. Groundwater is present in the Brunswick Formation on site at 15-17 feet below ground surface. Groundwater flow in the Brunswick Formation on site is towards the east.

The Brunswick Formation is the youngest member of the Triassic-age Newark Group, which consists of sedimentary rocks, primarily shales, interbedded with siltstone and sandstone. These were formed from consolidated sediments originally deposited in layers that have been subsequently uplifted and eroded. The Brunswick Formation has a total thickness of 6,000 to 8,000 feet, and dips to the northwest at an angle of between 5 and 15 degrees. The fine grained sedimentary rocks of the Brunswick Formation generally exhibit very low porosity and permeability, both of which limit water storage and groundwater movement. However, fractures and joints are common in this formation, and water supply wells tapping these secondary openings are capable of producing significant quantities of water.

Ref. No. 3, 8, 9, 10, 11, 15, 20

3. Is a designated well head protection area within four miles of the site?

No. There are no designated well head protection areas within four miles of the site.

Ref. No. 12, 13

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

The lowest point of waste storage was a 10,000-gallon UST on the south side of the facility. This tank is estimated to have been at 10 feet below the surface and was used to store naphta waste. Groundwater in the Brunswick Formation occurs in this area at 15 feet below the ground surface. Therefore, the depth from the lowest point of waste disposal or storage to the highest seasonal level of the saturated zone of the aquifer of concern is 5 feet.

Ref. No. 6, ; 7, 8,

5. What is the permeability value of the least permeable intervening stratum between the ground surface and the aquifer of concern?

The least permeable intervening stratum between the ground surface and the aquifer of concern is the overburden deposits consisting of clayey silt. They have an associated permeability of 10^{-6} cm/sec.

Ref. No. 14,

6. What is the net precipitation for the area?

The mean annual precipitation for the area is 48 inches. The mean annual lake evaporation for the area is 32 inches. Therefore, the net precipitation for the area is 16 inches.

Ref. No. 15, 16

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

The nearest well that is used for drinking purposes is located on Fenner Avenue in the City of Clifton, an estimated 3/4 mile southwest of the site. Its depth is unknown.

Ref. No. 12

8. 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 located within the contaminated boundary of release.

The nearest well used for drinking water purposes is located 3/4 mile southwest of the site. Groundwater flow direction is towards the east. As a result, there are no wells documented or suspected of being within the contamination boundary of release.

Ref. No. 8, 12

9. Identify the population served by wells located within four miles of the site that draw

from the aquifer of concern.

Distance	Population
0-1/4 mi	0
>1/4-1/2 mi	0
>1/2-1 mi	14
>1-2 mi	159
>2-3 mi	34,002
>3-4 mi	22,891

Ref. No. 12 13

10. Identify uses of groundwater within four miles of the site (i.e., private drinking source, municipal source, commercial, irrigation, unusable).

Groundwater uses within four miles of the site include both private and municipal drinking water wells, industrial supply, lawn care, equipment cool down, and car washes.

Ref. No. 12; 13

SURFACE WATER ROUTE

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

There is neither an observed nor a suspected release of contaminants to surface water. Areas of the site not occupied by building are paved and the stormwater runoff is directed towards storm drains, which discharge to the Passaic River, 1.2 miles east of the site. As a result, the runoff pathway is not well defined. Historical records nor the July 1992 site reconnaissance indicated any evidence of releases to surface water.

Ref. No. 1 5, 6

12. Identify the nearest downslope surface water if possible, include a description of possible surface drainage patterns from the site.

The nearest surface water is the Passaic River, 1.2 miles east of the facility. Storm water drainage from the boiler house courtyard enters catchbasins which flow under the facility building and discharge to stormwater mains along Thomas Street. The southern side of the facility drains directly into stormwater drains along Thomas Street.
Ref. No. 1, 17

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

Runoff from the site enters storm drains; as a result the storm water runoff pathway is poorly defined. The nearest surface water is the Passaic River, 1.2 miles east of the facility (measured in a straight line).

Ref. No. 1, 17,

14. Define the floodplain that the site is located within.

The site is not located within the 100-year or 500-year floodplain.

Ref. No. 18

15. What is the 2-year 24-hour rainfall

The 2-year 24-hour rainfall is 3.0 inches.

Ref. No. 19

16. Identify drinking water intakes in surface waters within 15 miles downstream of the site. For each intake identify: the distance 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

There are no drinking water intakes within 15 miles downstream of the site.

Ref. No. 20

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

Fishery	Water Body Type	Flow (cfs)
Passaic River	Tidal River	1,200

Ref. No. 21.

18. Identify sensitive environments that exist within 15 miles of the point of surface water entry. For each sensitive environment specify the following:

Environment	Water Body Type	Flow (cfs)
Passaic River (Upper)	Tidal River	1,200
Passaic River (Lower)	Tidal River	1,200
Wetlands	Tidal River	1,200

Two miles of wetlands frontage border the Passaic River.

Ref. No. 21 22, 23, 24, 25

19. If release to surface water is observed or suspected, identify any intakes, fisheries, and sensitive environments from question Nos. 16-18 that are or may be located within the contamination boundary of the release.

Intake	Fishery	Environment
None	None	None

No releases to surface water have been documented or reported

Ref. No. 1, 21, p. 4, 7-8 of 9; 22 23, 24, 25

SOIL EXPOSURE PATHWAY

20. Determine the number of people that occupy residence or attend school or day care on or within 200 feet of the site property.

There are 33 residences along Getty Avenue and Thomas Street that are within 200 feet of the site, with an estimated 89 people residing therein. In addition, one man was observed during the site reconnaissance living in a shack along the railroad spur; therefore, the total number of people living within 200 feet of the site is 90.

Ref. No. 1, 26.

21. Determine the number of people that work on or within 200 feet of the site property.

Approximately 180 people work on or within 200 feet of the property.

Ref. No. 1

22. Identify terrestrially sensitive environments on or within 200 feet of the site property.

There are no terrestrially sensitive environments on or within 200 feet of the site property.

Ref. No. 1

AIR ROUTE

23. Describe the likelihood of release of contaminants to air as follows: observed release, suspected release, or none. Identify contaminants detected or suspected and provided a rationale for attributing them to the site. For observed release define the supporting analytical evidence.

There is neither an observed nor a suspected release of contaminants to the air. No odors nor OVM or O2/LEL readings were observed during the site reconnaissance, nor is any historical contamination present which might emit contaminants to the air.

Ref. No. 1

24. Determine populations that reside within four miles of the site

Distance	Population
0-1/4 mi	1,559
>1/4-1/2 mi	9,237
>1/2-1 mi	30,100
>1-2 mi	98,857
>2-3 mi	143,703
>3-4 mi	123,994

The 0-1/4 mile radius includes the on-site worker population of 180.

Ref. No. 1, 27

25. Identify sensitive environments and wetlands acreage within 1/2 mile of the site.

Sensitive Environment	Type	Distance

No sensitive environments are present within 1/2 mile of the site.

Ref. No. 1, 21, 22, 23, 24, 25

26. 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 the air contamination from the release.

Neither an observed nor a suspected release of contaminants to the air has occurred.

Ref. No. 1

27. If a release to air is observed or suspected, identify any sensitive environments, listed in question No. 25, that are or may be located within the area of air contamination from the release.

Neither an observed nor a suspected release of contaminants to the air has occurred.

Ref. No. 1

REFERENCE LIST

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ATTACHMENT A

PHOTODOCUMENTATION LOG

Continental Can Company, Paterson, NJ Polly Armour, Wehran Engineering 7/27/92

Photo #1 - View of north side of building. From boilerhouse building.

Photo #2 - Boilerhouse courtyard. From west corner of courtyard looking south.

Photo #3 - Boilerhouse courtyard. From west corner looking southeast.

Photo #4 - Boilerhouse courtyard. From west corner looking east. Former Drum Storage Area is located approximately where people are standing near mini-van.

Photo #5 - Area where underground fuel storage tanks were removed. Drum visible in upper right corner is for recovered product.

Photo #6 - Another view of the area where the underground tanks were removed.

Photo #7 - South propery line. Chain-link fence surrounds old underground storage tanks. Adjacent to chain-link fence is soil stained with an oily material (possibly used crankcase oil).

Photo #8 - Former underground storage tank area (tanks now abandoned in place). Looking south.

Photo #9 - Former underground storage tank area (tanks now abandoned in place). Looking south.

Photo #10 - Vent pipes and fill ports of former underground storage tank area. Looking south.

Photo #11 - Truck loading dock off Thomas Street. Former location of aboveground waste storage tank ("slop tank") is in extreme upper right of photo, where trees and brush grow.

Photo #12 - Former location of aboveground storage tank.

Photo #13 - Railroad siding area. Looking north from Thomas Street.

Photo #14 - Debris along railroad spur. Looking north.

Photo #15 - Debris along railroad spur.

Photo #16 - Debris along railroad spur.

Photo #17 - Transformer along rear property line adjacent to railroad spur.

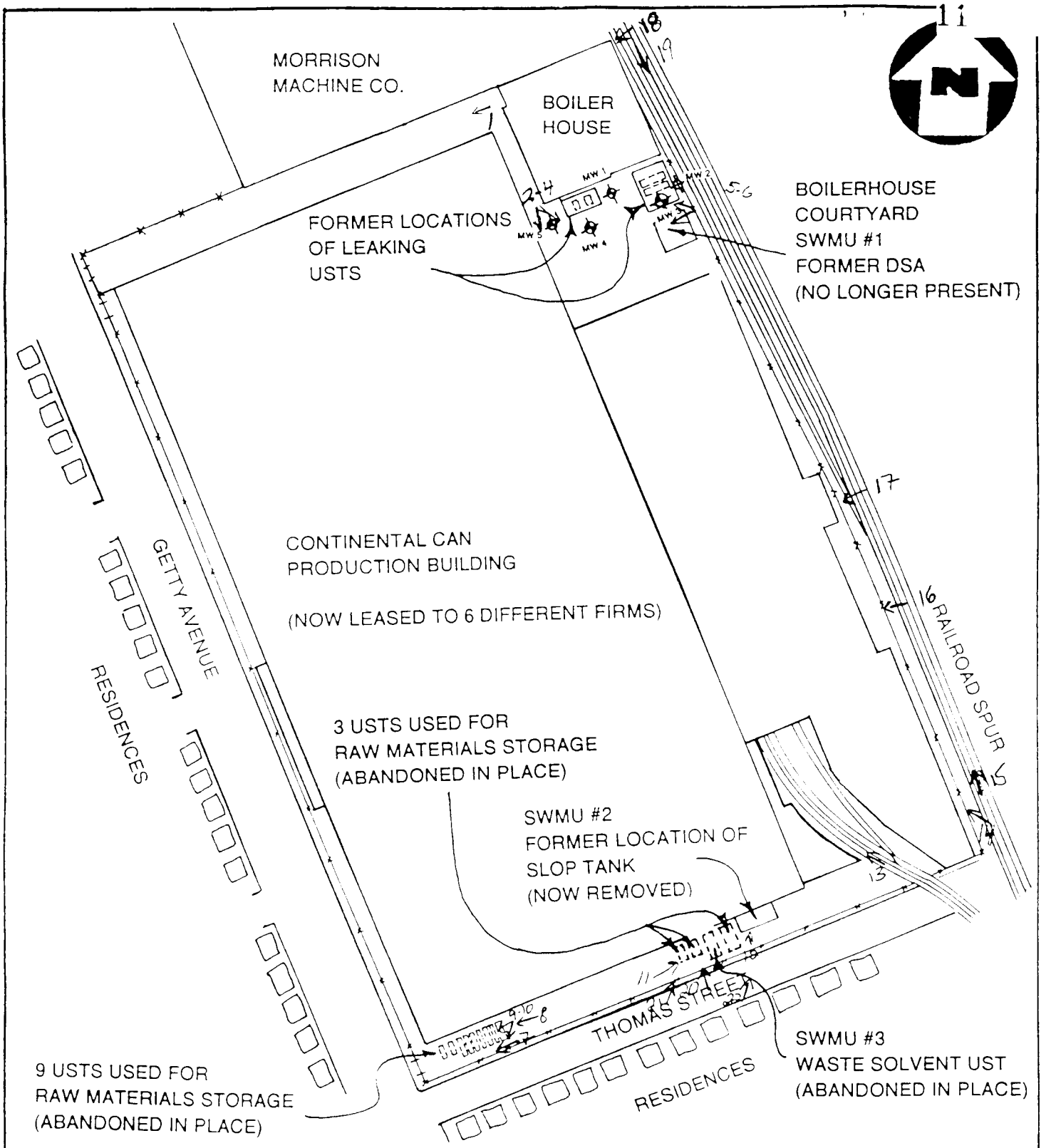
Photo #18 - Rear of boilerhouse. From railroad spur.

Photo #19 - Railroad spur behind plant. Looking south.

Photo #20 - Loading dock area on side of plant.

Photo #21 - Former location of aboveground storage tank. Looking north from across Thomas Street.

Photo #22 - Former location of aboveground storage tank. Looking north from across Thomas Street.



PHOTODOCUMENTATION LOG

CONTINENTAL CAN COMPANY
PATERSON, NEW JERSEY

NOT TO SCALE

FIGURE A

EBASCO
ENVIRONMENTAL

1

2

3

4

5 (5)

4 (6)

9 (7)

E (8)

9 ~~8~~

10 ~~9~~

11 11

12

13

14

15

16

17

18 18

19

20

21

22

REFERENCE 1

Continental Can Co.

BLANK

Field Book

E 64 8x4

7-27-92 (1)

Projects (continued)

N

A

Pl

Th
sp
wa

DT

Continental Can Co Site Recon
Arrive on site 08:55

Ptly cloudy, humid, 80's
P. Armour
M. Colantuono } Wehran

MAC Calibrates meters
09:00 Meter calib & readings in separate log.
09:10 Meter w/PRP in office:
Jason Quick Plant Mgr
Terry Munson Attorney
Pete Grogan - Dan Rovin Assoc (consultant)

Plant History

1923 - Boilerhouse section built
1943 Shell - 750,000 by french govt.
produced aircraft engine
1945-50 - Produced RR cars

REFERENCE 1
2

(2) Conti Can 7-27-92
1955 - Continental - produced
- 1981 alum cans.

297 Getty Assoc current
owner - owns entire prop.

Used currently as warehouse

4 tenants:
(1) Kay Sam Rubber product
distribution
75,000
(2) OPS distribution -
high priced clothing dist
180,000

250,000 ft vacant -
Conti Can still leaves it
vacant since Jan 81

(3) Cashman Forklift Repair

(4) Textile trans print -
- make wallpaper out
of normal paper
using 68,000

Continental Can 7/27/92 (3)

(5) ~~Gerald~~ - produce industrial
General & Loorgrast (PJA)
floor polishing machines &
vacuums. 65000

Boilerhouse - app 15,000 ft.

at one time - 2 - 20,000 #6 oil
tanks - pulled July 1990

~~550 tons~~ soils removed. 500 yd³/
DEP oversite 640 tons

soils went to Grand Central LF
in Pen - Argyl.

3 - 2,000 gasoline tanks -
192 tons soil removed
July 91 under ~~by~~ DEP oversite
also ~~too~~ Paterson Heath Dept
present.

9 - tanks ~~below~~ - July 90 Fiet
removed lids - tanks were

REFERENCE 1
3

(4) Continental Can 7-27-92

filled with sand.

AG tanks shown in 1980 plan are no longer there.

USTs (3+/-) referred to in closure plan are no longer there - doesn't know how removed

When tanks yanked - holes in tanks. Also evidence of overfilling

5 MW's installed
3 initially - 3/91 fuel oil
2 add - 9/91 gasoline

3 have free product - see plan provided by DRP.

Wells are set in bedrock - 8-12 feet down.

Brunswick formation
GW flow direction is East.

Continental Can 7-27-92 (5)

DSA no longer present. Now is parking lot. No idea as to when used - 1983 or before.

Plant is now gas heat.

130 people work here during day shift.

180 total

Entire property is fenced w/ automated gate - no guard on duty

0940 start site walk
Pic 1 09:38 Kay Sam property
Pic 2-4 09:42 Former DSA
Area paved w/ mix of concrete & asphalt. Sloping slightly

Area repaved 87-88 in center
92 in corners when tanks pulled

REFERENCE 1

(6) Continental Can Co 7-27-92

Catchbasin in DSA runs to 36" main which goes under plant. Runs to main on Thomas St.

5 MWs in former DSA 4" PVC Flush Mt. Good condition.

Pictures 5 & 6 09:48 Area where tanks ripped out.

Entire DSA paved.

15' drop off side of DSA to RR line. Fence between. Prop line @ fence. 09:55

Proceeded along Betty Avenue & Thomas St. Between chain link fence & sidewalk small 30' x 1' area of oily spillage. Pic 6 & 7 (8)

Continental Can 7-27-92 (7)

possibly crankcase oil by do-it-yourself mechanics.

Pic 8 - old UST area - Tanks now filled w/ sand as per PRP

Area paved w/ concrete & some asphalt. ~~to~~ Concrete cracked in some areas (some veg growing up).

9 fill holes Pic 8 & 9 (PJA)

Pic 10 10:07 ~~fill~~ tank vents for 9 USTs

Fill ports labelled from East to West:

1. unreadable
2. unreadable
3. 137 Enamel
4. 99 CLS
5. 516 Solvent
6. 199 Clear
7. 99 CLS
8. 2263 varn
9. 57 Gold.

(8) Continental Can 7-27-92

pump ~~pr~~ machinery for each tank located adj to bldg.

No wells ~~no~~ at this portion of site

Pic 11 Loading dock area
trees, convenience dumping

Pic 12 Former Bulk Storage area No AG tanks present.

No stressed veg or other extend of spills

Pic 13 RR Siding
No odors or stained soil.
Some convenience dumping

1 drum 55 gal steel noted in RR Siding Area. 3/4 full, bung open.
Clarkson & Ford Co
Ban Ner, Clifton NJ
Heat Transfer.

Continental Can 7-27-92 (9)

Pic 14-16 RR easement area of rear of plant showing dumping.

Pic 17 Transformer along rear of bldg.
labelled "PCB Contaminated"
owned by PSE&G

Pic 18 boiler plant @ RR Loads. Large stack last used circ 1980.

Boilerhouse used to be part of Morrison Machine Co.

Pic 19 10:33 Boilerhouse/ Morrison Machinery Co bld from off site.

(C) Continental Can 7-27-92
PRP requests copies of pictures
& report

PRP will supply copy of submissions
to NJDEP Sect. 9A QC data

Depart Site 11-30

[illegible]
7-27-92

GENERAL INFORMATION

Date: 7/22/92
Name: MARC Colantuono
Project Number:
Project Name: Continental CAN
Background Level: 0ppm
Background Location: Guard Shack on Getty Ave.
Weather Conditions: Overcast / 80's
Estimated Wind Direction and Speed: Calm
(i.e. calm, moderate, strong, etc.)

FIELD ACTIVITIES

Field Activity	Start Time	Stop Time	Comments
1. Site investigation	9:30	10:50	Calib. before 60 ppm
2.			Calib at Tes 60 ppm BATTI OK
3.			
4.			

EQUIPMENT USED

HNu OVM		O_2/LEL		Chemical Specific Monitor		Colormetric Detector Tubes	
Range: 0-2000 Span: 60ppm		Alarm-LEL: ___ O_2: 19.5		Chemical:		Chemical:	
Instrument #: 5805		Instrument #: 261 ~~[illegible]~~		Instrument #:		Pump Strokes:	
Time	Reading	Time	Reading	Time	Reading	Time	Reading
Dist 3.51 9:35	0 ppm	295 10:15	0ppm				
3.53 9:40	0ppm	2.44 10:20	0				
3.48 9:45	0ppm	2.44 10:25	0				
3.23 9:50	0ppm	2.43 10:30	0				
3.21 9:55	0ppm	2.41 10:35	0				
3.21 10:00	0 ppm	2.51 10:40	0				
3.03 10:05	0ppm	3.03 10:45	0				
3.71 10:10	0ppm	3.11 10:50	0				

COMMENTS

1 Drum Free product near oil tank area

21 1/91 47000 05

REFERENCE 1

8

LC

1945-1950 RR car product.
~1955 LC enters Al cans → 1981

Currently Active warehouse

2.50 (250,000) LC
~~180~~,000 OPS
~~75~~,000 KA
~~68,000~~ Tex
(45,)000 GFC
~15,000 Boilerhouse

2-20,000 No 6 F.O.
DEP over saw

~~640~~ ~~750~~ ~500 ~~tons~~ ~~tons~~ of soil was removed

Sent to Grand Central ID 37 testing

3-2,000 gal gasoline tank
142 tons July 1989

Gw flow E

~130 people day
(180 Total) all day

No Fires

Tennants

297 Getty Ave Ass.
Own entire facility

Kaysam - rubber boot Dist.
Ops Dist. upper end clothing to Macys
~240,000 Vacant since 1991
Cashman Forklift Repair (in boiler house)
Textile Transprint (back RR side) heat fabric onto paper
Gen. Floorcraft - floor polish machines

Paved parking lots
Fenced in

SMW

3 installed 3/91 - 1 upgrade
2 (Rear gas) 9/91
8-12' each (to bedrock)
Brunswick form.

9

REFERENCE 1

PHOTODOCUMENTATION LOG

Continental Can Company, Paterson, NJ Polly Armour, Wehran Engineering 7/27/92

Photo #1 - View of north side of building. From boilerhouse building.

Photo #2 - Boilerhouse courtyard. From west corner of courtyard looking south.

Photo #3 - Boilerhouse courtyard. From west corner looking southeast.

Photo #4 - Boilerhouse courtyard. From west corner looking east. Former Drum Storage Area is located approximately where people are standing near mini-van.

Photo #5 - Area where underground fuel storage tanks were removed. Drum visible in upper right corner is for recovered product.

Photo #6 - Another view of the area where the underground tanks were removed.

Photo #7 - South propery line. Chain-link fence surrounds old underground storage tanks. Adjacent to chain-link fence is soil stained with an oily material (possibly used crankcase oil).

Photo #8 - Former underground storage tank area (tanks now abandoned in place). Looking south.

Photo #9 - Former underground storage tank area (tanks now abandoned in place). Looking south.

Photo #10 - Vent pipes and fill ports of former underground storage tank area. Looking south.

Photo #11 - Truck loading dock off Thomas Street. Former location of aboveground waste storage tank ("slop tank") is in extreme upper right of photo, where trees and brush grow.

Photo #12 - Former location of aboveground storage tank.

Photo #13 - Railroad siding area. Looking north from Thomas Street.

Photo #14 - Debris along railroad spur. Looking north.

Photo #15 - Debris along railroad spur.

Photo #16 - Debris along railroad spur.

Photo #17 - Transformer along rear property line adjacent to railroad spur.

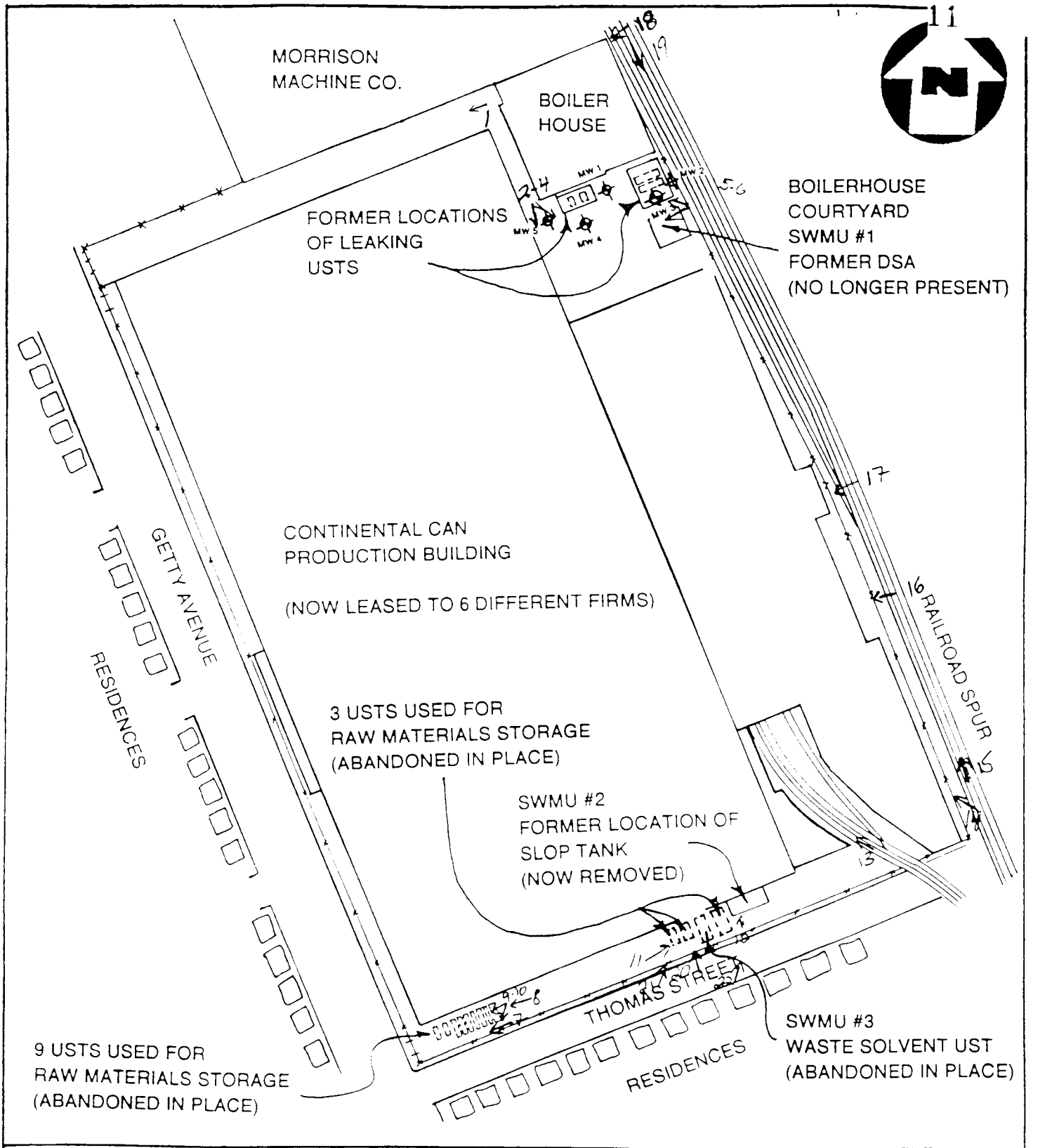
Photo #18 - Rear of boilerhouse. From railroad spur.

Photo #19 - Railroad spur behind plant. Looking south.

Photo #20 - Loading dock area on side of plant.

Photo #21 - Former location of aboveground storage tank. Looking north from across Thomas Street.

Photo #22 - Former location of aboveground storage tank. Looking north from across Thomas Street.



PHOTODOCUMENTATION LOG

CONTINENTAL CAN COMPANY
PATERSON, NEW JERSEY

NOT TO SCALE

FIGURE A

EBASCO
ENVIRONMENTAL

1

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4

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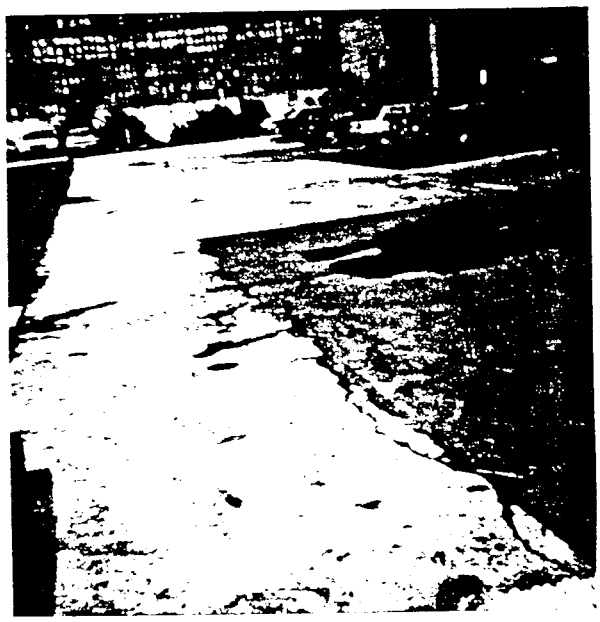

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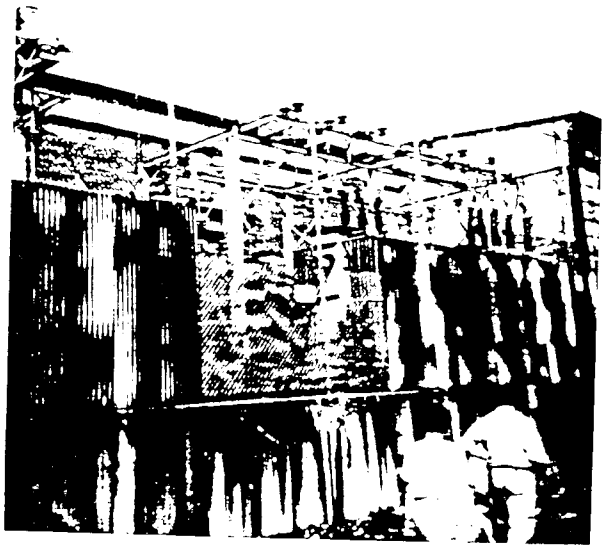

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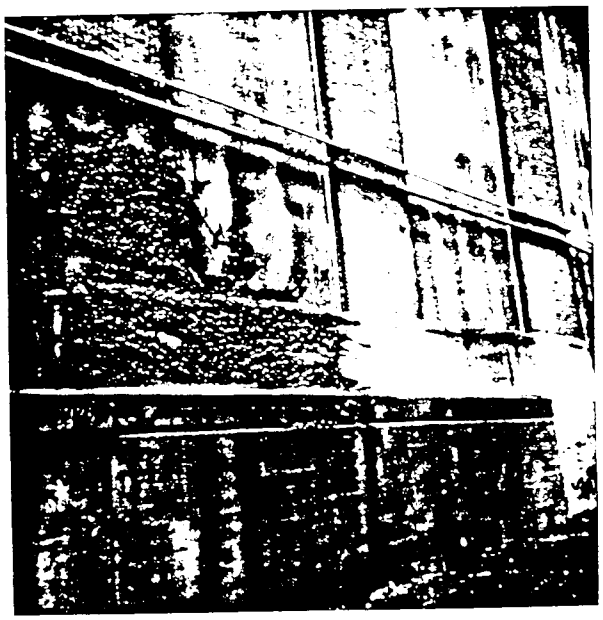

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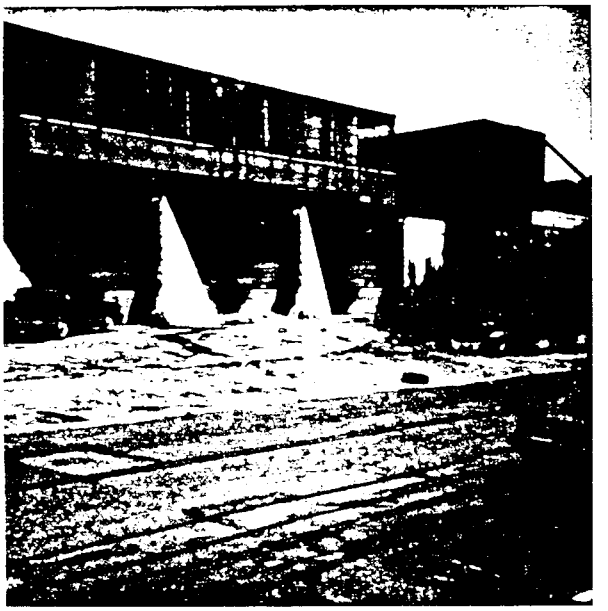

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RECORD US

TRIP REPORT

SITE NAME: Continental Can Company

SITE RECONNAISSANCE DATE: July 27, 1992

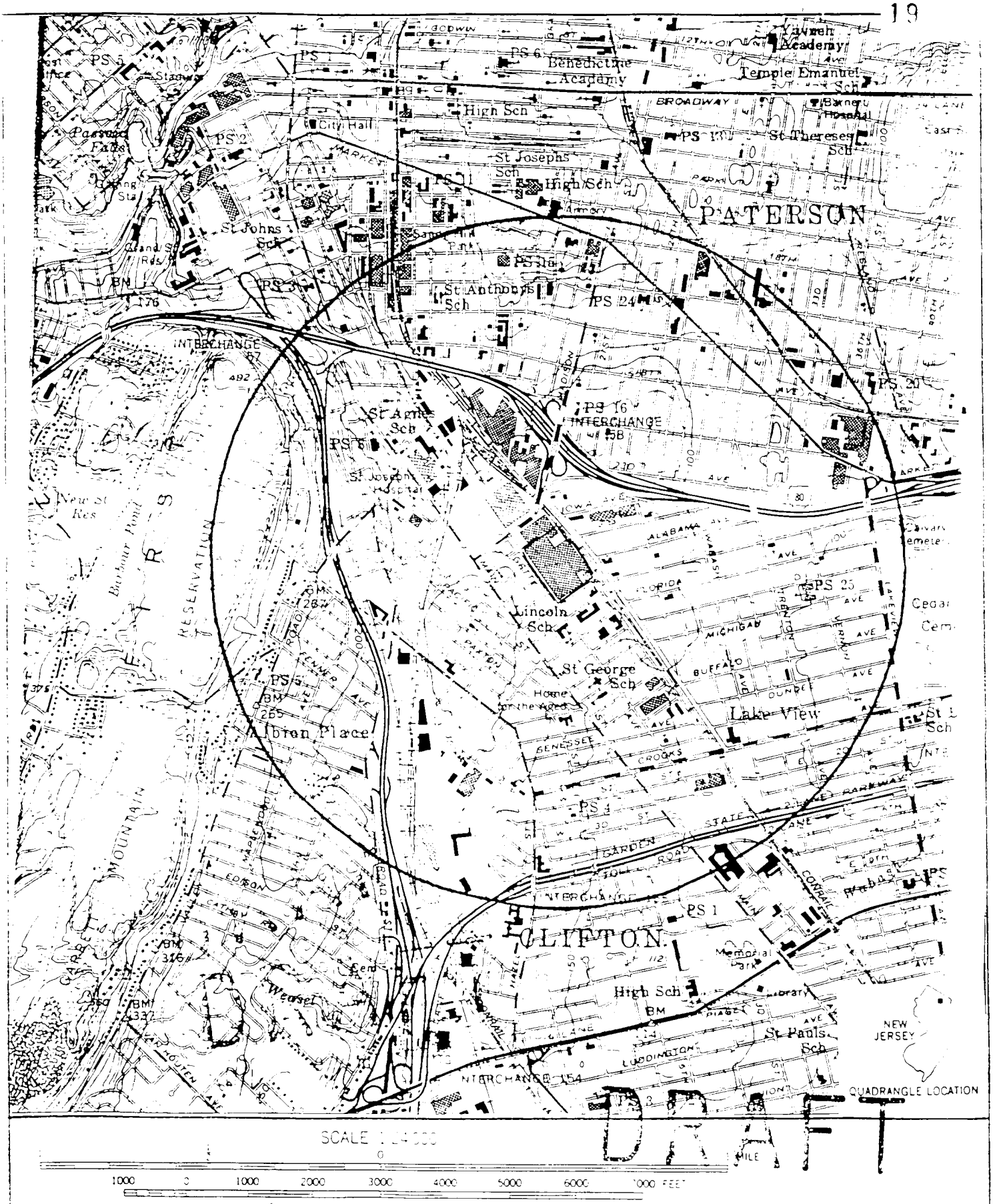
1. Site Location:

The Continental Can Company site is located on Getty Avenue in the City of Paterson, Passaic County, New Jersey (Figure 1), in an area of mixed residential, commercial, and light industrial/manufacturing uses. The site itself was formerly used by a variety of industries, including manufacture of aircraft engines, railroad cars, and aluminum cans. Most of the site is occupied by a production building constructed of brick and block, and a brick building formerly housing the facility's boiler. The remainder of the site is paved, and most of the facility is surrounded by a chain-link fence. The site comprises a total of approximately 15 acres.

2. Site Reconnaissance Results

According to PRP representatives, the site was first developed in 1923, when the boilerhouse was built (Figure 2). In 1943 the shell of the present production plant was constructed by the French government, and was used in the production of aircraft engines. During the period 1945-1950 it was used in the manufacture of railroad cars. From 1955-1981 it was used by Continental Can Company to produce aluminum cans. The site was purchased by the current owner, 297 Getty Associates (a holding/investment firm) in 1983. It is currently active, and is used for warehouse/storage and light manufacturing/assembly. Five tenants currently occupy parts of the property: (1) Kaysam (75,000 sq. ft.), rubber product distribution; (2) OPS Distribution (180,000 sq. ft.), high priced clothing distribution; (3) Cashman (15,000 sq. ft.), forklift repair; (4) Textile Transprint (68,000 sq. ft.), wallpaper production; and (5) General Floorcraft (65,000 sq. ft.), manufacture of floor polishing machines and vacuums.

The site is currently in a State-mandated remedial action due to the presence of leaking underground storage tanks (USTs) in the courtyard adjacent to the boilerhouse (the area reported in the 1980 Continental Can Company RCRA Part A permit submission to the USEPA as a Drum Storage Area). This action has resulted in the removal of two 20,000 gallon USTs containing #6 fuel oil and three 2,000 gallon USTs containing gasoline. In addition, over 800 tons of contaminated soil were removed and disposed of off site. Five bedrock groundwater monitoring wells were installed, three of which contain free product.

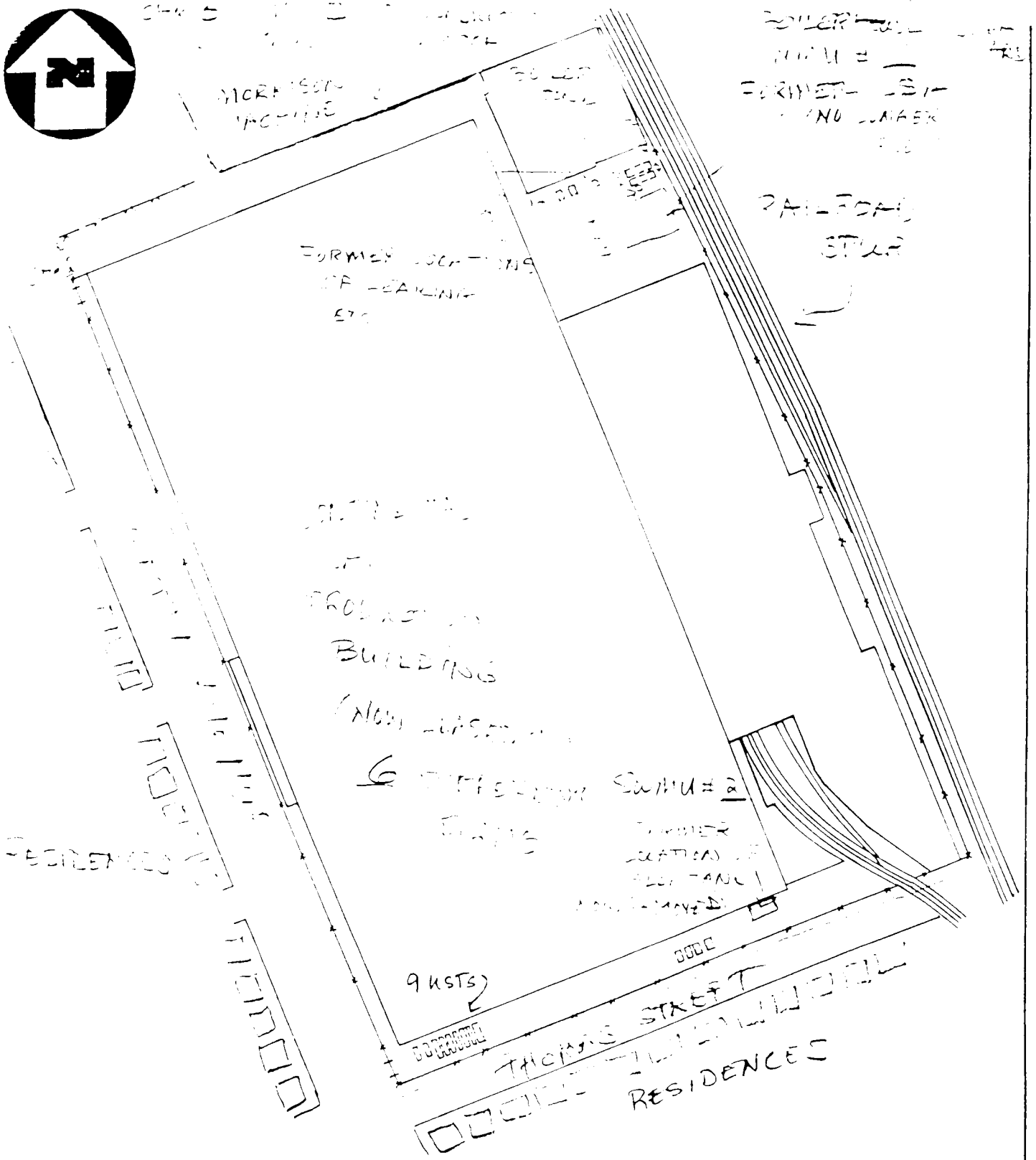


TOPOGRAPHY TAKEN FROM:
1955 PATERSON, N.J.
U.S.G.S. QUADRANGLE 7.5 MIN. SERIES

FIGURE 1

REGIONAL LOCATION MAP

CONTINENTAL CAN CO.
PATERSON, NEW JERSEY



SITE SKETCH

CONTINENTAL CAN COMPANY
PATERSON, NEW JERSEY

DRAFT

FIGURE 2

EBASCO
ENVIRONMENTAL

These actions were performed under New Jersey Department of Environmental Protection and Energy (NJDEPE) Bureau of Underground Storage Tanks (BUST) oversite. The PRP has submitted a Discharge Investigation and Corrective Action Report (DICAR) to the NJDEPE. The PRP stated during the site reconnaissance that he bails the three wells containing free product twice each week to recover the product.

In addition to the five USTs removed under NJDEPE oversite, nine USTs are present on the south side of the facility adjacent to Thomas Street. The PRP stated that they examined these tanks in 1991 and found that they had been filled with sand. This information is in accordance with the results of the file search, which indicated that the tanks were cleaned and filled with sand in 1982. The area of the facility where these tanks are present is fenced with a chain-link fence. During the site reconnaissance, a black, oily material was noted along the boundary of this area with Thomas Street. This material did not appear to have originated on site, and may have been spilled there by "do-it-yourselfers" changing their automobile oil.

Two Solid Waste Management Units (SWMUs) were reported in the 1980 Continental Can Company RCRA Part A permit submission to the USEPA: a drum storage area and a bulk storage tank. The drum storage area was located in the boilerhouse courtyard where the tank excavation was performed. This area is entirely paved, and the facility fence limits access. Two drums were noted in this area during the site recon: one empty, and one containing free product recovered from the monitoring wells. The PRP had no information regarding the drum storage area period of use, except that it has not been used as a drum storage area since they took ownership in 1983. No OVM, O2/LEL, or dust readings were detected above background in this area. The bulk storage tank formerly located on the south side of the facility is no longer present. The area is now occupied by a truck loading dock. The entire area is paved. The PRP had no information as to when the bulk storage tank was removed or when the loading dock was constructed. This portion of the facility building is not fenced.

One 55 gallon steel drum was noted in the railroad siding area. It was approximately 3/4 full with an unknown liquid. Since the bung was open and the drum was located next to the building where roof runoff would strike the drum, this liquid may be rainwater. No OVM or O@/LEL readings above background were obtained from inside or in the vicinity of this drum.

Convenience dumping of household trash, appliances, and tires is occurring in several concealed portions of the site. A homeless man is living near the railroad tracks adjacent to the east boundary of the site.

Continuous air monitoring with an OVM photoionizer, an 02/LEL explosimeter, and a dust monitor was performed throughout the site reconnaissance. No readings were obtained above background from any of the meters.

3. Field Personnel:

The following people were present during the site reconnaissance:

Name	Organization	Duties on Site
Polly Armour	Wehran EnviroTech	Task Leader
Marc Colantuono	Wehran EnviroTech	Health and Safety Officer
Jason Quick	297 Getty Associates	Plant Manager
Theresa Munson	Brach, Eichler, P.C.	Attorney to PRP
Pete Grogan	Dan Raviv Associates	Consultant to PRP

4. Weather Conditions:

During the site reconnaissance it was sunny, slightly hazy and humid, with little wind. Temperatures were in the 80s.

5. Additional Comments:

The PRP will provide Wehran EnviroTech with a copy of the report submitted to NJDEPE as part of the DICAR investigation. This report contains analytical results from soil and groundwater sampling performed as part of the investigation.

6. Report Prepared By: Polly Armour

Date: July 27, 1992

7. Approved By:_____

Date:_____

REFERENCE 2

Please print or type with ELITE type (12 characters/inch) in the unshaded areas only.

Form Approved OMB No. 158-S79016
GSA No. 0246-EPA-OT Ret 2

EPA

U.S. ENVIRONMENTAL PROTECTION AGENCY

NOTIFICATION OF HAZARDOUS WASTE ACTIVITY

INSTALLATION'S EPA I.D. NO.

I. NAME OF INSTALLATION

II. INSTALLATION MAILING ADDRESS

III. LOCATION OF INSTALLATION

PLEASE PLACE LABEL IN THIS SPACE

Microfiche

INSTRUCTIONS: If you received a preprinted label, affix it in the space at left. If any of the information on the label is incorrect, draw a line through it and supply the correct information in the appropriate section below. If the label is complete and correct, leave Items I, II, and III below blank. If you did not receive a preprinted label, complete all items. "Installation" means a single site where hazardous waste is generated, treated, stored and/or disposed of, or a transporter's principal place of business. Please refer to the INSTRUCTIONS FOR FILING NOTIFICATION before completing this form. The information requested herein is required by law *(Section 3010 of the Resource Conservation and Recovery Act).*

FOR OFFICIAL USE ONLY

COMMENTS

C NO CODES

INSTALLATION'S EPA I.D. NUMBER	APPROVED	DATE RECEIVED (yr., mo., & day)
F NJD002521425 T/A C 1	A	820611

I. NAME OF INSTALLATION

CONTINENTAL CAN CO PLANT 67

II. INSTALLATION MAILING ADDRESS

STREET OR P.O. BOX

3 297 GETTY AVE

CITY OR TOWN	ST.	ZIP CODE
4 PATERSON	NJ	07503

III. LOCATION OF INSTALLATION

STREET OR ROUTE NUMBER

5 297 GETTY AVE

CITY OR TOWN	ST.	ZIP CODE
6 PATERSON	NJ	07503

ENVIRONMENTAL PROTECTION AGENCY NEW YORK CITY 10007 JUN 11 08 PM '82

Passaic

IV. INSTALLATION CONTACT

NAME AND TITLE (last, first, & job title)	PHONE NO. (area code & no.)
2 COE, ROBERT PLANT MANAGER	201-881-6616

V. OWNERSHIP

A. NAME OF INSTALLATION'S LEGAL OWNER

8 CONTINENTAL CAN CO USA

B. TYPE OF OWNERSHIP (enter the appropriate letter into box)

F = FEDERAL
M = NON-FEDERAL

M

VI. TYPE OF HAZARDOUS WASTE ACTIVITY (enter "X" in the appropriate box(es))

- [X] A. GENERATION
- [ ] B. TRANSPORTATION (complete item VII)
- [ ] C. TREAT/STORE/DISPOSE
- [ ] D. UNDERGROUND INJECTION

VII. MODE OF TRANSPORTATION (transporters only – enter "X" in the appropriate box(es))

- [ ] A. AIR
- [ ] B. RAIL
- [X] C. HIGHWAY
- [ ] D. WATER
- [ ] E. OTHER (specify):

VIII. FIRST OR SUBSEQUENT NOTIFICATION

Mark "X" in the appropriate box to indicate whether this is your installation's first notification of hazardous waste activity or a subsequent notification. If this is not your first notification, enter your Installation's EPA I.D. Number in the space provided below.

- [X] A. FIRST NOTIFICATION
- [ ] B. SUBSEQUENT NOTIFICATION (complete item C)

C. INSTALLATION'S EPA I.D. NO.

IX. DESCRIPTION OF HAZARDOUS WASTES

Please go to the reverse of this form and provide the requested information.

EPA Form 8700-12 (6-80)

CONTINUE ON REVERSE

I.D. – FOR OFFICIAL USE ONLY

W

IX. DESCRIPTION OF HAZARDOUS WASTES *(continued from front)*

A. HAZARDOUS WASTES FROM NON–SPECIFIC SOURCES. Enter the four–digit number from 40 CFR Part 261.31 for each listed hazardous waste from non–specific sources your installation handles. Use additional sheets if necessary.

1	2	3	4	5	6
7	8	9	10	11	12

B. HAZARDOUS WASTES FROM SPECIFIC SOURCES. Enter the four–digit number from 40 CFR Part 261.32 for each listed hazardous waste from specific industrial sources your installation handles. Use additional sheets if necessary.

13	14	15	16	17	18
19	20	21	22	23	24
25	26	27	28	29	30

C. COMMERCIAL CHEMICAL PRODUCT HAZARDOUS WASTES. Enter the four–digit number from 40 CFR Part 261.33 for each chemical substance your installation handles which may be a hazardous waste. Use additional sheets if necessary.

31	32	33	34	35	36
37	38	39	40	41	42
43	44	45	46	47	48

D. LISTED INFECTIOUS WASTES. Enter the four–digit number from 40 CFR Part 261.34 for each listed hazardous waste from hospitals, veterinary hospitals, medical and research laboratories your installation handles. Use additional sheets if necessary.

49	50	51	52	53	54

E. CHARACTERISTICS OF NON–LISTED HAZARDOUS WASTES. Mark "X" in the boxes corresponding to the characteristics of non–listed hazardous wastes your installation handles. *(See 40 CFR Parts 261.21 – 261.24.)*

☐ 1. IGNITABLE (D001) ☒ 2. CORROSIVE (D002) ☐ 3. REACTIVE (D003) ☐ 4. TOXIC (D000)

X. CERTIFICATION

I certify under penalty of law that I have personally examined and am familiar with the information submitted in this and all attached documents, and that based on my inquiry of those individuals immediately responsible for obtaining the information, I believe that the submitted information is true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment.

SIGNATURE	NAME & OFFICIAL TITLE *(type or print)*	DATE SIGNED
T. J. Riker	T. J. RIKER, DIVISION MANAGER	6/7/82

DETACH

REFERENCE 3

DATE RETURNED _____
REASON _____

[ ] ACKNOWLEDGEMENT SENT

complete

INTERNAL CHECKLIST ID # NJD002521942

1. Interim Regulatory Requirements

A. (1) FORM 1 MISSING [ ]

(2) FORM 3 MISSING [ ]

B. POSTMARK after NOVEMBER 19, 1980 [ ] Valid [ ]

C. (1) DATE of OPERATION MISSING [ ]

(2) DATE of OPERATION after NOVEMBER 19, 1980 [ ]

D. (1) NON-ACDFER [ ]
(2) NOTIFIED after AUGUST 18, 1980 [ ] Valid [ ]

E. (1) FORM 1, ~~X~~III B SIGNATURE MISSING [ ]

(2) FORM 3, IX B SIGNATURE MISSING [ ]

2. A. HANDLER [ ]

B. NONREGULATED [ ]

C. UNSURE [ ]

D. UNKNOWN FACILITY [ ]
(missing name and address on Form 3)

E. NEW FACILITY > NOV. 19, 1980 [ ]

F. CORE ITEM(S) MISSING [ ]

G. NON-CORE ITEM(S) MISSING [ ]

H. OTHER [ ]

MISSING:
MAP [ ]
DRAWING [ ]
PHOTO [ ]

ACK

Spaced for ease of use

U.S. ENVIRONMENTAL PROTECTION AGENCY

EPA GENERAL INFORMATION

Consolidated Permits Program

(Read the "General Instructions" before starting.)

I. EPA I.D. NUMBER: F NJD 002521425 S D

I. ITEMS
D. NUMBER
A. FACILITY NAME
B. FACILITY MAILING ADDRESS
VI. FACILITY LOCATION

PLEASE PLACE LABEL IN THIS SPACE

GENERAL INSTRUCTIONS

If a preprinted label has been provided, affix it in the designated space. Review the information carefully; if any of it is incorrect, cross through it and enter the correct data in the appropriate fill-in area below. Also, if any of the preprinted data is absent *(the area to the left of the label space lists the information that should appear)*, please provide it in the proper fill-in area(s) below. If the label is complete and correct, you need not complete Items I, III, V, and VI *(except VI-B which must be completed regardless)*. Complete all items if no label has been provided. Refer to the instructions for detailed item descriptions and for the legal authorizations under which this data is collected.

II. POLLUTANT CHARACTERISTICS

INSTRUCTIONS: Complete A through J to determine whether you need to submit any permit application forms to the EPA. If you answer "yes" to any questions, you must submit this form and the supplemental form listed in the parenthesis following the question. Mark "X" in the box in the third column if the supplemental form is attached. If you answer "no" to each question, you need not submit any of these forms. You may answer "no" if your activity is excluded from permit requirements; see Section C of the instructions. See also, Section D of the instructions for definitions of **bold-faced terms**.

SPECIFIC QUESTIONS	MARK "X" YES	NO	FORM ATTACHED
A. Is this facility a **publicly owned treatment works** which results in a **discharge** to **waters of the U.S.**? (FORM 2A)		X	
B. Does or will this facility *(either existing or proposed)* include a **concentrated animal feeding operation** or **aquatic animal production facility** which results in a **discharge to waters of the U.S.**? (FORM 2B)		X	
C. Is this a facility which currently results in **discharges to waters of the U.S.** other than those described in A or B above? (FORM 2C)		X	
D. Is this a proposed facility *(other than those described in A or B above)* which will result in a **discharge to waters of the U.S.**? (FORM 2D)		X	
E. Does or will this facility treat, store, or dispose of **hazardous wastes**? (FORM 3)	X		X
F. Do you or will you inject at this facility industrial or municipal effluent below the lowermost stratum containing, within one quarter mile of the well bore, underground sources of drinking water? (FORM 4)		X	
G. Do you or will you inject at this facility any produced water or other fluids which are brought to the surface in connection with conventional oil or natural gas production, inject fluids used for enhanced recovery of oil or natural gas, or inject fluids for storage of liquid hydrocarbons? (FORM 4)		X	
H. Do you or will you inject at this facility fluids for special processes such as mining of sulfur by the Frasch process, solution mining of minerals, in situ combustion of fossil fuel, or recovery of geothermal energy? (FORM 4)		X	
I. Is this facility a proposed stationary source which is one of the 28 industrial categories listed in the instructions and which will potentially emit 100 tons per year of any air pollutant regulated under the Clean Air Act and may affect or be located in an attainment area? (FORM 5)		X	
J. Is this facility a proposed stationary source which is NOT one of the 28 industrial categories listed in the instructions and which will potentially emit 250 tons per year of any air pollutant regulated under the Clean Air Act and may affect or be located in an attainment area? (FORM 5)		X	

III. NAME OF FACILITY

1 SKIP CONTINENTAL CAN CO U.S.A. #048

IV. FACILITY CONTACT

A. NAME & TITLE (first & last) — B. PHONE (area code & no.)

2 GAYLE ROBERT PLANT MANAGER 201 684 2700

V. FACILITY MAILING ADDRESS

A. STREET OR P.O. BOX

3 297 GETTY AVE

B. CITY OR TOWN — C. STATE — D. ZIP CODE

4 PATERSON NJ 07503

VI. FACILITY LOCATION

A. STREET, ROUTE NO. OR OTHER SPECIFIC IDENTIFIER

5 297 GETTY AVE

B. COUNTY NAME

PASSAIC

C. CITY OR TOWN — D. STATE — E. ZIP CODE — F. COUNTY CODE (if known)

6 PATERSON NJ 07503

CONTINUE ON REVERSE

CONTINUED FROM THE FRONT

VII. SIC CODES (4-digit, in order of priority)

A. FIRST	B. SECOND
3411 (specify) METAL CANS	(specify) Ky 3 p 3
C. THIRD	**D. FOURTH**
(specify)	(specify)

VIII. OPERATOR INFORMATION

A. NAME: CONTINENTAL CAN CO USA. #048

B. Is the name listed in Item VIII-A also the owner? [X] YES [ ] NO

C. STATUS OF OPERATOR (Enter the appropriate letter into the answer box; if "Other", specify.)
F = FEDERAL
S = STATE
P = PRIVATE
M = PUBLIC (other than federal or state)
O = OTHER (specify)
Answer: P (specify)

D. PHONE (area code & no.): A 201 684 2700

E. STREET OR P.O. BOX: 297 GETTY AVE

F. CITY OR TOWN: PATERSON

G. STATE: NJ

H. ZIP CODE: 07503

IX. INDIAN LAND

Is the facility located on Indian lands? [ ] YES [X] NO

X. EXISTING ENVIRONMENTAL PERMITS

A. NPDES (Discharges to Surface Water)	D. PSD (Air Emissions from Proposed Sources)
N N/A	P N/A
B. UIC (Underground Injection of Fluids)	**E. OTHER (specify)**
U N/A	P N/A (specify)
C. RCRA (Hazardous Wastes)	**F. OTHER (specify)**
R N/A	N/A (specify)

XI. MAP

Attach to this application a topographic map of the area extending to at least one mile beyond property boundaries. The map must show the outline of the facility, the location of each of its existing and proposed intake and discharge structures, each of its hazardous waste treatment, storage, or disposal facilities, and each well where it injects fluids underground. Include all springs, rivers and other surface water bodies in the map area. See instructions for precise requirements.

XII. NATURE OF BUSINESS (provide a brief description)

METAL CANS

FQ: N/51

XIII. CERTIFICATION (see instructions)

I certify under penalty of law that I have personally examined and am familiar with the information submitted in this application and all attachments and, that, based on my inquiry of those persons immediately responsible for obtaining the information contained in the application, I believe that the information is true, accurate and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment.

A. NAME & OFFICIAL TITLE (type or print)	B. SIGNATURE	C. DATE SIGNED
E.L. Polite Division General Manager	E. L. Polite	10/31/80

COMMENTS FOR OFFICIAL USE ONLY

spaced for elite type, i.e., 12 characters/inch).

U.S. ENVIRONMENTAL PROTECTION AGENCY

HAZARDOUS WASTE PERMIT APPLICATION

Consolidated Permits Program

(This information is required under Section 3005 of RCRA.)

I. EPA I.D. NUMBER

F N J D 0 0 2 5 2 4 4 2 0 3 1

OFFICIAL USE ONLY

APPLICATION APPROVED	DATE RECEIVED (yr., mo., & day)	COMMENTS
		R43 p4

II. FIRST OR REVISED APPLICATION

Place an "X" in the appropriate box in A or B below *(mark one box only)* to indicate whether this is the first application you are submitting for your facility or a revised application. If this is your first application and you already know your facility's EPA I.D. Number, or if this is a revised application, enter your facility's EPA I.D. Number in Item I above.

A. FIRST APPLICATION *(place an "X" below and provide the appropriate date)*

[X] 1. EXISTING FACILITY *(See instructions for definition of "existing" facility. Complete item below.)*

FOR EXISTING FACILITIES, PROVIDE THE DATE *(yr., mo., & day)* OPERATION BEGAN OR THE DATE CONSTRUCTION COMMENCED *(use the boxes to the left)*

YR.	MO.	DAY
49	03	17

[ ] 2. NEW FACILITY *(Complete item below.)*

FOR NEW FACILITIES, PROVIDE THE DATE *(yr., mo., & day)* OPERATION BEGAN OR IS EXPECTED TO BEGIN

YR.	MO.	DAY

B. REVISED APPLICATION *(place an "X" below and complete Item I above)*

[ ] 1. FACILITY HAS INTERIM STATUS

[ ] 2. FACILITY HAS A RCRA PERMIT

III. PROCESSES – CODES AND DESIGN CAPACITIES

A. **PROCESS CODE** – Enter the code from the list of process codes below that best describes each process to be used at the facility. Ten lines are provided for entering codes. If more lines are needed, enter the code*(s)* in the space provided. If a process will be used that is not included in the list of codes below, then describe the process *(including its design capacity)* in the space provided on the form *(Item III-C)*.

B. **PROCESS DESIGN CAPACITY** – For each code entered in column A enter the capacity of the process.
1. AMOUNT – Enter the amount.
2. UNIT OF MEASURE – For each amount entered in column B(1), enter the code from the list of unit measure codes below that describes the unit of measure used. Only the units of measure that are listed below should be used.

PROCESS	PROCESS CODE	APPROPRIATE UNITS OF MEASURE FOR PROCESS DESIGN CAPACITY
Storage:		
CONTAINER *(barrel, drum, etc.)*	S01	GALLONS OR LITERS
TANK	S02	GALLONS OR LITERS
WASTE PILE	S03	CUBIC YARDS OR CUBIC METERS
SURFACE IMPOUNDMENT	S04	GALLONS OR LITERS
Disposal:		
INJECTION WELL	D79	GALLONS OR LITERS
LANDFILL	D80	ACRE-FEET *(the volume that would cover one acre to a depth of one foot)* OR HECTARE-METER
LAND APPLICATION	D81	ACRES OR HECTARES
OCEAN DISPOSAL	D82	GALLONS PER DAY OR LITERS PER DAY
SURFACE IMPOUNDMENT	D83	GALLONS OR LITERS

PROCESS	PROCESS CODE	APPROPRIATE UNITS OF MEASURE FOR PROCESS DESIGN CAPACITY
Treatment:		
TANK	T01	GALLONS PER DAY OR LITERS PER DAY
SURFACE IMPOUNDMENT	T02	GALLONS PER DAY OR LITERS PER DAY
INCINERATOR	T03	TONS PER HOUR OR METRIC TONS PER HOUR; GALLONS PER HOUR OR LITERS PER HOUR
OTHER *(Use for physical, chemical, thermal or biological treatment processes not occurring in tanks, surface impoundments or incinerators. Describe the processes in the space provided; Item III-C.)*	T04	GALLONS PER DAY OR LITERS PER DAY

UNIT OF MEASURE	UNIT OF MEASURE CODE	UNIT OF MEASURE	UNIT OF MEASURE CODE	UNIT OF MEASURE	UNIT OF MEASURE CODE
GALLONS	G	LITERS PER DAY	V	ACRE-FEET	A
LITERS	L	TONS PER HOUR	D	HECTARE-METER	F
CUBIC YARDS	Y	METRIC TONS PER HOUR	W	ACRES	B
CUBIC METERS	C	GALLONS PER HOUR	E	HECTARES	Q
GALLONS PER DAY	U	LITERS PER HOUR	H		

EXAMPLE FOR COMPLETING ITEM III *(shown in line numbers X-1 and X-2 below)*: A facility has two storage tanks, one tank can hold 200 gallons and the other can hold 400 gallons. The facility also has an incinerator that can burn up to 20 gallons per hour.

C DUP 1

LINE NUMBER	A. PROCESS CODE (from list above)	B. PROCESS DESIGN CAPACITY 1. AMOUNT (specify)	B. 2. UNIT OF MEASURE (enter code)	FOR OFFICIAL USE ONLY	LINE NUMBER	A. PROCESS CODE (from list above)	B. PROCESS DESIGN CAPACITY 1. AMOUNT	B. 2. UNIT OF MEASURE (enter code)	FOR OFFICIAL USE ONLY
X-1	S02	600	G		5				
X-2	T03	20	E		6				
1	S01	1120000	G		7				
2	S02	1119000	G		8				
3					9				
4					10				

Continued from the front.

III. PROCESSES *(continued)*

C. SPACE FOR ADDITIONAL PROCESS CODES OR FOR DESCRIBING OTHER PROCESSES *(code "T04")*. FOR EACH PROCESS ENTERED H INCLUDE DESIGN CAPACITY.

IV. DESCRIPTION OF HAZARDOUS WASTES

A. **EPA HAZARDOUS WASTE NUMBER** — Enter the four—digit number from 40 CFR, Subpart D for each listed hazardous waste you will handle. If you handle hazardous wastes which are not listed in 40 CFR, Subpart D, enter the four—digit number*(s)* from 40 CFR, Subpart C that describes the characteristics and/or the toxic contaminants of those hazardous wastes.

B. **ESTIMATED ANNUAL QUANTITY** — For each **listed waste** entered in column A estimate the quantity of that waste that will be handled on an annual basis. For each **characteristic** or **toxic contaminant** entered in column A estimate the total annual quantity of all the non—listed waste*(s)* that will be handled which possess that characteristic or contaminant.

C. **UNIT OF MEASURE** — For each quantity entered in column B enter the unit of measure code. Units of measure which must be used and the appropriate codes are:

ENGLISH UNIT OF MEASURE	CODE	METRIC UNIT OF MEASURE	CODE
POUNDS	P	KILOGRAMS	K
TONS	T	METRIC TONS	M

If facility records use any other unit of measure for quantity, the units of measure must be converted into one of the required units of measure taking into account the appropriate density or specific gravity of the waste.

D. **PROCESSES**

1. PROCESS CODES:

For listed hazardous waste: For each **listed** hazardous waste entered in column A select the code*(s)* from the list of process codes contained in Item III to indicate how the waste will be stored, treated, and/or disposed of at the facility.

For non—listed hazardous wastes: For each characteristic or toxic contaminant entered in column A, select the code*(s)* from the list of process codes contained in Item III to indicate **all** the processes that will be used to store, treat, and/or dispose of all the non—listed hazardous wastes that possess that characteristic or toxic contaminant.

Note: Four spaces are provided for entering process codes. If more are needed: (1) Enter the first three as described above; (2) Enter "000" in the extreme right box of Item IV-D(1); and (3) Enter in the space provided on page 4, the line number and the additional code*(s)*.

2. PROCESS DESCRIPTION: If a code is not listed for a process that will be used, describe the process in the space provided on the form.

NOTE: HAZARDOUS WASTES DESCRIBED BY MORE THAN ONE EPA HAZARDOUS WASTE NUMBER — Hazardous wastes that can be described by more than one EPA Hazardous Waste Number shall be described on the form as follows:

1. Select one of the EPA Hazardous Waste Numbers and enter it in column A. On the same line complete columns B,C, and D by estimating the total annual quantity of the waste and describing all the processes to be used to treat, store, and/or dispose of the waste.
2. In column A of the next line enter the other EPA Hazardous Waste Number that can be used to describe the waste. In column D(2) on that line enter "included with above" and make no other entries on that line.
3. Repeat step 2 for each other EPA Hazardous Waste Number that can be used to describe the hazardous waste.

EXAMPLE FOR COMPLETING ITEM IV *(shown in line numbers X-1, X-2, X-3, and X-4 below)* — A facility will treat and dispose of an estimated 900 pounds per year of chrome shavings from leather tanning and finishing operation. In addition, the facility will treat and dispose of three non—listed wastes. Two wastes are corrosive only and there will be an estimated 200 pounds per year of each waste. The other waste is corrosive and ignitable and there will be an estimated 100 pounds per year of that waste. Treatment will be in an incinerator and disposal will be in a landfill.

LINE NO.	A. EPA HAZARD. WASTE NO. (enter code)	B. ESTIMATED ANNUAL QUANTITY OF WASTE	C. UNIT OF MEASURE (enter code)	D. PROCESSES 1. PROCESS CODES (enter)	D. PROCESSES 2. PROCESS DESCRIPTION (if a code is not entered in D(1))
X-1	K054	900	P	T03 D80	[illegible]
X-2	D002	400	P	T03 D80	[illegible]
X-3	D001	100	P	T03 D80	
X-4	D002				included with above

 CONTINUE ON PAGE 3

n page 2.
copy this page before completing if you have more than 26 wastes to list.

Form Approved OMB No. 158-S80004

LD. NUMBER (enter from page 1): D 0 0 2 5 2 1 4 2 5 | T/A 3 | C 1

FOR OFFICIAL USE ONLY: S W | DUP | T/A 3 | C 2 | DUP

DESCRIPTION OF HAZARDOUS WASTES (continued)

LINE NO.	A. EPA HAZARD. WASTE NO. (enter code)	B. ESTIMATED ANNUAL QUANTITY OF WASTE	C. UNIT OF MEASURE (enter code)	D. PROCESSES 1. PROCESS CODES (enter)	D. PROCESSES 2. PROCESS DESCRIPTION (if a code is not entered in D(1))
1	F017	10747500	K	S01 S02	
2					
3					
4					
5					
6					
7					
8					
9					
10					
11					
12					
13					
14					
15					
16					
17					
18					
19					
20					
21					
22					
23					

n 3510-3 (6-80)

CONTINUE ON REVERSE

(enter "A", "B", "C", etc. behind the "3" to identify photocopied pages)

ontinued from the front.

V. DESCRIPTION OF HAZARDOUS WASTES *(continued)*

E. USE THIS SPACE TO LIST ADDITIONAL PROCESS CODES FROM ITEM D(1) ON PAGE 3.

F6: A/55 F6: A/56

EPA I.D. NO. *(enter from page 1)*

F N J D 0 0 2 5 2 1 4 2 5 T/A 3 C 6

V. FACILITY DRAWING

All existing facilities must include in the space provided on page 5 a scale drawing of the facility *(see instructions for more detail).*

VI. PHOTOGRAPHS

All existing facilities must include photographs *(aerial or ground—level)* that clearly delineate all existing structures; existing storage, treatment and disposal areas; and sites of future storage, treatment or disposal areas *(see instructions for more detail).*

VII. FACILITY GEOGRAPHIC LOCATION

LATITUDE *(degrees, minutes, & seconds)*	LONGITUDE *(degrees, minutes, & seconds)*
40 53 450	074 09 150

VIII. FACILITY OWNER

☒ A. If the facility owner is also the facility operator as listed in Section VIII on Form 1, "General Information", place an "X" in the box to the left and skip to Section IX below.

B. If the facility owner is not the facility operator as listed in Section VIII on Form 1, complete the following items:

1. NAME OF FACILITY'S LEGAL OWNER	2. PHONE NO. *(area code & no.)*
E	

3. STREET OR P.O. BOX	4. CITY OR TOWN	5. ST.	6. ZIP CODE
F	G		

IX. OWNER CERTIFICATION

I certify under penalty of law that I have personally examined and am familiar with the information submitted in this and all attached documents, and that based on my inquiry of those individuals immediately responsible for obtaining the information, I believe that the submitted information is true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment.

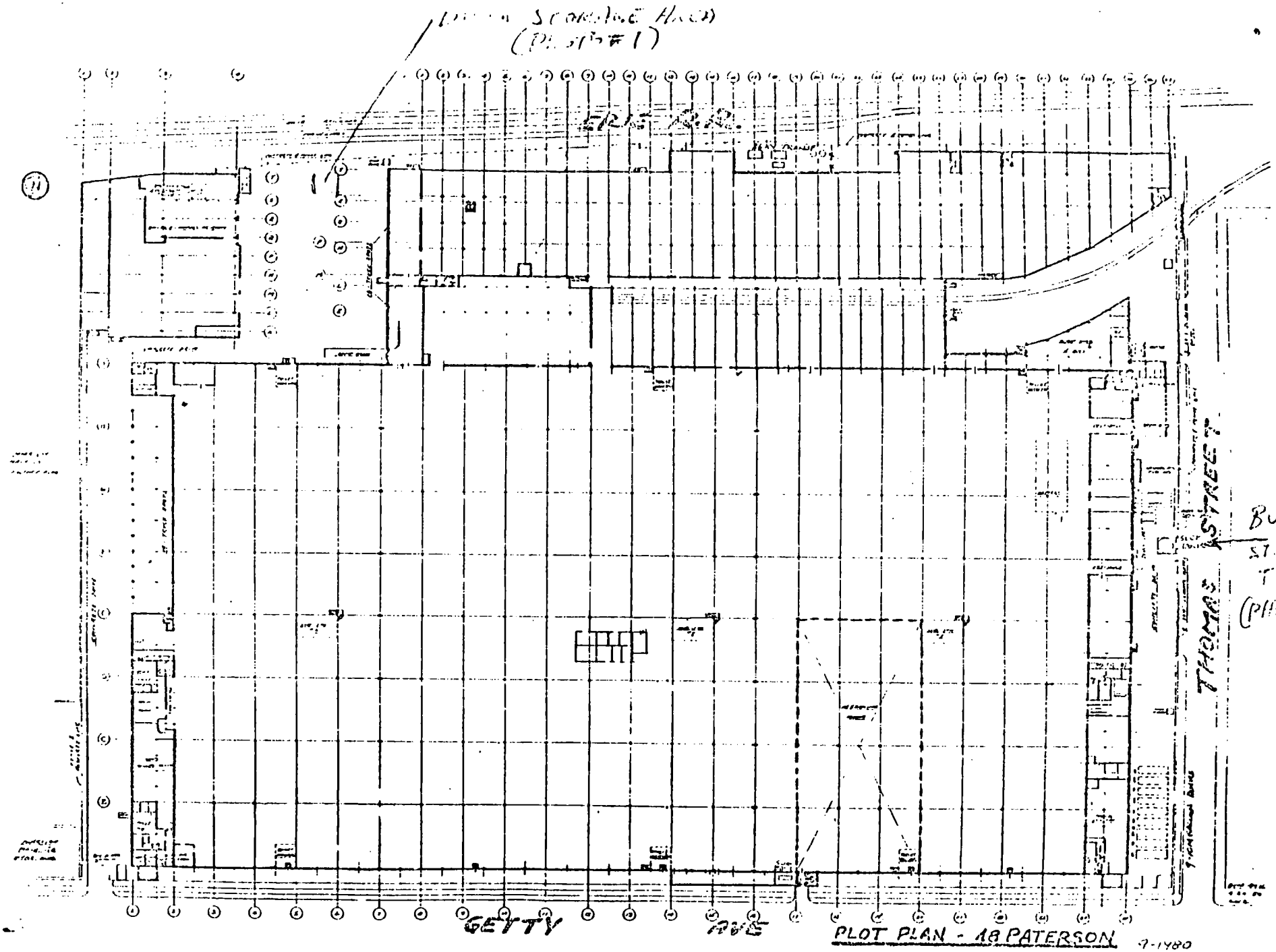
A. NAME *(print or type)*	B. SIGNATURE	C. DATE SIGNED
E.L. Polite Division General Manager	E. L. Polite	10/31/80

X. OPERATOR CERTIFICATION

I certify under penalty of law that I have personally examined and am familiar with the information submitted in this and all at documents, and that based on my inquiry of those individuals immediately responsible for obtaining the information, I believe submitted information is true, accurate, and complete. I am aware that there are significant penalties for submitting false inf including the possibility of fine and imprisonment.

A. NAME *(print or type)*	B. SIGNATURE	C. DATE SIGNE
N/A		

Ref 3 P.7



PLOT PLAN - 18 PATERSON 9-1980

REFERENCE 4

Reference 4
p 1 of 3

CN 028
Trenton, N.J. 08625-0028

Let's protect our earth

ENVIRONMENTAL PROTECTION AGENCY
REGION II
(609)633-1408
88 AUG 15 PM 1:53

HAZARDOUS WASTE FACILITIES BRANCH

State of New Jersey

DEPARTMENT OF ENVIRONMENTAL PROTECTION
DIVISION OF HAZARDOUS WASTE MANAGEMENT

Michele M. Putnam
Deputy Director
Hazardous Waste Operations

John J. Trela, Ph.D., Director

Lance R. Miller
Deputy Director
Responsible Party Remedial Action

RECEIVED
MAY
E. AGUADO

AUG 10 1988

Ms. Michelle K. Armstrong
Continental Can Company
800 Connecticut Avenue
Post Office Box 5410
Norwalk, CT 06856

delistment

Dear Ms. Armstrong:

RE: REGULATORY STATUS OF CONTINENTAL CAN COMPANY, INC.
PATERSON, NEW JERSEY PLANT
EPA ID No. NJD 002 521 425

The New Jersey Department of Environmental Protection (the Department) is in receipt of Continental Can Company's submittal dated June 26, 1987 requesting to be delisted as a treatment, storage, or disposal (TSD) facility.

Continental Can Company has been listed as a TSD facility because they had originally filed a Part A Hazardous Waste Facility Permit Application dated November 19, 1980 with the USEPA indicating that the following hazardous waste activities had taken place on-site:

S01-container storage-1,120 gallons
S02-tank storage-1,119 gallons

As a result of your submittal and additional file review, the Department has reached the following conclusions regarding present hazardous waste activities at the above referenced facility.

1. The storage tanks were officially closed as of March 17, 1982 according to a certification letter from a registered Professional Engineer, Foster C. Franks.

2. During approximately the same time as the tank closure the subject company implemented an unofficial closure plan regarding the drum storage area.

3. There is presently no hazardous waste being generated or stored at the above mentioned site.

Ref 4 P2 of 3

AUG 10 1988

If the aforementioned conclusion are incorrect or incomplete, please contact the Department immediately.

Assuming the aforementioned conclusion are correct Continental Can Company's facility identified by the following USEPA identification number:

NJD 002 521 425

is excluded from applicable hazardous waste treatment, storage or disposal regulations under N.J.A.C. 7:26-1 et. seq. provided that all hazardous waste generated on-site is accumulated in containers in accordance with N.J.A.C. 7:26-9.3 which include but are not limited to the following:

1. All such waste is, within 90 days or less, shipped off-site to an authorized facility or placed in an on-site authorized facility, as defined at N.J.A.C. 7:26-1.4.

2. The waste is placed in containers which meet the standards of N.J.A.C. 7:26-7.2 and are managed in accordance with N.J.A.C. 7:26-9.4(d).

3. The date upon which each period of accumulation begins is clearly marked and visible for inspection on each container. While being accumulated on-site, each container shall be clearly labeled or marked with the words "Hazardous Waste" and labeled in accordance with 49 CFR 172.304.

4. The generator complies with the requirements for owners and operators of N.J.A.C. 7:26-9.6 and 9.7 concerning preparedness and prevention, contingency plans and emergency procedures as well as N.J.A.C. 7:26-9.4(g) concerning personnel training.

In order to be removed from the list of generators and have your EPA ID No. rescinded you must contact Nancy Power at (609) 292-7081.

Your company's hazardous waste facility above is no longer included in DEP's list of "existing facilities" (see N.J.A.C. 7:26-1.4 and 12.3) and therefore does not need to conform with the interim operating requirements of N.J.A.C. 7:26-1 et seq. for "existing facilities". It is the company's responsibility to operate within conditions listed above. To operate a hazardous waste facility without prior approval from the DEP is a violation of the Solid Waste Management Act N.J.S.A. 13:1E-1 et seq.

This written acknowledgement of the exclusion of the subject company from the hazardous waste facility requirements under N.J.A.C. 7:26-1 et seq. is based expressly on the review of the aforementioned correspondence. This letter makes no claim as to the extend and physical condition of the actual hazardous waste activities occurring at the site mentioned above.

The issuance of this delisting letter by the Department does not indicate, or imply, and should not be construed as a waiver of any requirements pursuant to the New Jersey Water Pollution Control Act, N.J.S.A. 58:10A-1 et seq. and regulations promulgated thereunder concerning the New Jersey Pollutant Discharge Elimination System, N.J.A.C. 7:14-1 et seq. If your facility is in any of the regulated categories identified in the above cited

Ref 4 p 3 of 3

AUG 10 1988

regulations, you are hereby directed to apply for any and all permits necessary within ninety (or 180 days - at the option of DWR) to the Bureau of Ground Water Discharge Permits, CN 029, Trenton, New Jersey, 08625. Applications may be obtained by calling (609) 292-0424.

If you have any questions concerning this matter, contact Craig McNally of my staff at (609)292-9880.

Very truly yours,

Ernest J. Kuhlwein, Jr., Chief
Bureau of Hazardous Waste Engineering

EP49/lm

cc: ~~Barry Tornick,~~ USEPA
Dave Shotwell, NFO
Nancy Power, BMIS

REFERENCE 5

11 of 1
16-08-08
28 JAN 1987 Reference 5
P. 1

Let's protect our earth

State of New Jersey
DEPARTMENT OF ENVIRONMENTAL PROTECTION
DIVISION OF HAZARDOUS WASTE MANAGEMENT

John J. Trela, Ph.D., Acting Director
401 East State St.
CN 028
Trenton, N.J. 08625
609 - 633 - 1408

Richard Torrito, Director
Governmental Affairs
Continental Can Company, Inc.
800 Connecticut Avenue
Post Office Box 5410
Norwalk, Conn. 06856

Dear Mr. Torrito:

RE: Closure Plan Approval for Continental Can Company, Inc., Wayne, EPA ID No. NJD 060 803 889

The Bureau of Hazardous Waste Engineering (the Bureau) has completed a review of the revised closure plans for the above referenced facility dated May 20, 1986. The New Jersey Department of Environmental Protection (NJDEP) finds the plans in compliance with the criteria set forth by N.J.A.C. 7:26-9.8 et seq. facility closure requirements. Continental Can Company, Inc. is hereby authorized to implement closure in accordance with N.J.A.C. 7:26-9.8, the approved closure plan and the following conditions:

1. Continental Can Company, Inc. shall remove all hazardous waste stored in containers and the tank and manifest off-site to an authorized commercial hazardous waste facility.

2. The storage pads shall be decontaminated with a detergent wash using a biodegradable non-solvent base detergent, followed by a separate rinse. Both the wash and rinse operations will be performed using an industrial floor washer equipped with rotating nylon brushes and suction pick-up of wash/rinse water.

3. All the waste wash detergent from the above operations shall be collected and manifested off-site to an authorized commercial hazardous waste facility.

4. Accumulated sludge in the tank shall be liquified by a clear jet stream. The inlet and outlet pipes to the underground tank shall be first flushed with detergent and water. The tank shall then be washed with detergent and water then rinsed with clean water.

5. The inside of the tank shall be washed with a rotating-head power washer three times and rinsed with clean water each time.

REFERENCE 6

CLOSURE PLAN

SCOPE

The work to be done under this closure plan is the cleaning of 15 tanks at the Continental Can Co. located at 297 Getty Ave., Paterson, N.J. 07503.

The tanks shall be appropriately and sufficiently cleaned and in a condition whereas they may be put to immediate use to store materials other than the material therein contained.

If tanks are not to be used within a reasonable length of time, the Paterson Fire Prevention Code, Appendex B, abandonment of underground tanks, Section 1, 2 and 3 requires tanks be filled with sand.

GENERAL PROCEDURE

A written log shall be maintained of the work completed. After the contractor has certified the document of completed work, the documented information shall be submitted to the Engineer or his assistant who shall verify the accuracy of the certified records in the field and certify thereon that the subject work is completed as noted.

The Engineer or his assistant shall submit to the owner or his assistant a reproduced copy of the record in time to be used for the final inspection for acceptance of the work covered under his closure plan.

An estimate of the maximum inventory of waste in storage shall be taken and recorded during the closure period.

WORK DESCRIPTION

Nine of the 10,000 gallon underground tanks located at the south side of the plant in the westerly direction adjacent to Thomas Street shall be completely drained of any material contained therein. Subsequently, the tanks shall be scraped of any bottom solids or sludge and the material transferred to open head drums for disposal. The final cleaning shall be administered with a steam driven rotary spray head that shall simultaneously heat and spray a 5 to 15% caustic cleaning solution to all interior surfaces of the tank. After the tank is considered to be rid of any undesireable material, the caustic solution addition shall be terminated and immediately followed by a water rinse. The rinse shall continue and be considered completed when the PH of the effluent rinse water shows a neutral PH, indicating that all caustic solution has been removed from the tank. All solutions and rinse water shall be bulk loaded and transported legally to an EPA approved site.

If there is no intention for these tanks to be put in operation immediately, all inlet and outlet ports or openings other than vents shall be capped or blanked by the Owner of the facility.

The clean-up treatment of the four (4) underground tanks, located on the southside of the Plant in the easterly direction adjacent to Thomas St. consisting of two (2) 10,000 gallons and two (2) 2,500 gallon tanks, shall be similar to the nine underground tanks.

If any or all of the underground tanks are not intended to be put into operation after a 90 day period, they may be required to be filled completely with sand, as covered under Scope. All connections to tanks other than vents must be disconnected and capped or blanked at the tank. All lines are to be removed after flushing and cleaning.

At the south side of the plant location exists a 2500 gallon vertical above-ground tank located adjacent to Thomas Street and adjacent to the 4 underground tanks. In the same area, but located inside of the building is a 4,500 gallon aboveground tank used for storage of compounds. These tanks shall be cleaned in the same manner as the underground tanks, but must be prepared for dismounting and removal from the property. Therefore, any tank aboveground which is scheduled for removal from the premises shall not be capped or blanked nor filled with water. A check for cleanliness and any residual explosive atmosphere must be checked with an approved explosion meter, before any welding or burning is performed on the tanks.

HEAT EXCHANGER

Located inside the building on the mezzanine and used for heating materials stored in the underground tanks during cold weather prior to use shall, be completely drained of material and cleaned out with a 5 to 15% caustic cleaning solution to rid interior surfaces of all undesireable material, then rinsed immediately with water. The rinse shall continue and be considered completed when the PH of the effluent rinse water shows a neutral PH,

indicating all caustic solution has been removed. All solutions and rinse water shall be collected and disposed of in an EPA approved site.

BULKY WASTES

All vehicles used for collection and/or haulage of such wastes shall be designed in a manner as to preclude any spillage onto the highways of the State. All collectors and haulers of such waste shall obtain a Bill of Lading and/or a Hazardous Waste Manifest listing the material (s) to be hauled. All collectors and haulers of such wastes must be so licensed and are responsible for operating within existing laws governing the transportation of such materials.

DRUMS

Collectors and haulers of such wastes shall not transport drummed hazardous wastes whereby said drum or containers are damaged, rusted, leaking or without proper tight fitting covers or lids.

All drums and containers of hazardous or chemical wastes in transport to a disposal facility shall be properly labeled in accordance with existing statute and regulations of the State of New Jersey.

AGENCIES CONTACTED

Fire Dept. Chief Shortway (201) 881-6715

His main requirement and concern was the plant sprinkler system. It must be kept operational at all times.

Township Engineer Mr. Maletesta (201) 881-3440

Does not have any special recommendations other than what is covered in the Closure Plan.

State Hazardous Waste Management Mr. M. Marotta

stated that since Continental Can is not a hazardous waste facility, this particular department is not involved.

STATE HAZARDOUS MATERIAL MANAGEMENT MR. Furman Stoop

(609) 292-5560. This department does not get involved in tank preparations of a plant closing. Their main concern is in the hauling of waste to an EPA site.

INSURANCE

1. Protective Public Liability Insurance
2. Property Damage Liability Insurance

Prepared by Foster C. Franks, P.E.

New Jersey Number 16504

Foster C. Franks
2/16/82

APPENDIX B

ABANDONMENT OR REMOVAL OF UNDERGROUND TANKS

1. Methods.

a. Underground tanks taken out of service shall be safeguarded or disposed of by any one of the three following means:

(1) Placed in a "temporarily out of service" condition. Tanks shall be rendered "temporarily out of service" only when it is planned that they will be returned to active service within a reasonable period or pending removal or abandonment within 90 days.

(2) Abandoned in place, with proper safeguarding.

(3) Removed.

2. Records.

a. In cases where tanks are either rendered "temporarily out of service" or permanently abandoned, records shall be kept of tank size, location, date of abandonment, and method used for placing the abandoned tank in a safe condition. With any of the methods described in section 1, no cutting torch or other flame or spark producing equipment shall be used until the tank has been completely purged or otherwise rendered safe. In each case, the steps given shall be carried out successively.

3. Tanks Rendered Temporarily Out of Service.

a. With tanks rendered "temporarily out of service",

(1) The fill line, gage opening, and pump suction shall be capped and secured against tampering.

(2) The vent line shall be left open.

4. Tanks Abandoned in Place.

a. With underground tanks abandoned in place.

(1) All flammable or combustible liquid shall be removed from the tank and from all connecting lines.

(2) The suction, inlet, gage, and vent lines shall be disconnected.

(3) The tank shall be filled completely with an inert solid material.

(4) The remaining underground piping shall be capped.

THOMAS ASSOCIATES INC
Design • Engineering • Construction

P.O. Box 550
Westfield, NJ 07091

Telephone • (201) 654-7400
Cable • THOMASGAS

April 6, 1982
S-28G-82

The Continental Group, Inc.
297 Getty Avenue
Paterson, New Jersey 07503

Attention: Mr. L. L. Vannice

Re: Your P.O. 48-2803

Gentlemen:

We hereby certify that the two (2) 30,000 gallon propane tanks and 4" propane vapor line from the propane vaporizer to the gas-air mixing equipment at your Paterson, New Jersey plant, have been completely purged of all propane vapor.

We trust the above meets with your approval.

Very truly yours,

THOMAS ASSOCIATES, INC.

Frank Stoll
Vice President

FS/js

5. Tanks Removed.

a. When underground tanks are removed,

(1) All flammable or combustible liquids in the tank and connecting lines shall be removed.

(2) The suction, inlet, gage and vent lines shall be disconnected. Sections of connecting lines which are not to be used shall be removed. Inlets, outlets, and leaks, if any, shall be capped or plugged.

(3) After removal, the tank shall be gas freed; on the premises if it can be done safely at that location, or transported to an area not accessible to the public and the tank gas freed at that location.

6. Tanks That Are Junked.

a. If a tank is to be disposed of as junk, it shall be rendered for flammable vapors, and, if necessary, rendered gas free. After junking and before releasing to junk dealer, a sufficient number of holes or openings shall be made in it to render it unfit for further use.

7. Tanks That Are Reused.

a. Used tanks which are to be reused for flammable or combustible liquid service shall meet all the provisions of article . for the installation of underground tanks.

B E P Chemical Company, Inc

TELEPHONE
(201) 445-5866

579 Goffle Rd.
Ridgewood, N.J. 07451

April 14, 1982

Continental Can Corp.
297 Getty Ave.
Paterson, N.J.

Attn: Mr. L. L. Vannice

Dear Mr. Vannice:

This is to confirm that the underground storage tanks have been filled with sand as per our letter of March 19, 1982. On or about the 16th of April Olson & Hassold will come in to recheck the tanks for settling. We will give you a call the day before so you can arrange to have the area clear of automobiles.

If you have any questions, please do not hesitate to give me a call.

Very truly yours,

Robert A. Robinson

RAR/rb

B & P Chemical Company, Inc.

TELEPHONE
(201) 445-5866

579 Goffle Rd.
Ridgewood, N.J. 07451

March 17, 1982

Continental Can Co.
297 Getty Ave.
Paterson, N.J. 07503

Attn: Mr. L. L. Vannice

Re: Closure of Paterson Plant

Dear Mr. Vannice:

This is the final report on work completed by us on the above matter.

1. The closure plan has been delivered to you.

2. Cleaning of all underground and aboveground storage tanks by Olsen and Hassold, Inc., 62-64 East 26th St., Paterson, N.J. 07514 is complete. Hatches have been replaced on the underground tanks and they are ready for use, or final closure as per the closure plan. The above ground tanks are ready for removal as per the closure plan.

3. Fourteen (14) drums of sludge and solids removed from the storage tanks and 14,600 gallons of aqueous waste generated from the tank cleaning and heat exchanger cleaning has been disposed of by Delaware Container Corp., West 11th Ave. and Valley Road, Coatesville, Pa. 19320 in accordance with all applicable Federal and State regulations.

4. Enclosed is a self explanatory letter to us from Olsen and Hassold describing the procedure used in cleaning the tanks, along with meter readings taken with a J & W Sniffer - Model G, prior to start of tank cleaning and when tank cleaning was complete.

Also, enclosed are the recommendations as per our letter of February 25, 1982.

If you have any questions, please do not hesitate to give us a call.

Very truly yours,

Foster C. Franks, P.E.
New Jersey Number 16504

FCF/rb

encl

cc: George Dreher

Olsen & Hassold, Inc.
62-64 East 26th Street Paterson, N.J. 07514
(201) 345-4000

February 26, 1982

Mr. Robert A. Robinson
B & P Chemical Co.
579 Goffle Road
Ridgewood, NJ 07451

Dear Bob:

As per your request for the flammability of the fifteen tanks located at Continental Can Co., Getty Avenue, Paterson, I can tell you the following:

At the start of the job, all the tanks had sludge in the bottom, and all showed high flammability. We removed all the sludge and squeegeed all interior tank surfaces; then each tank was caustic-washed with hot solutions, and then squeegeed clean.

Listed below are the meter readings taken from a J & W Sniffer - Model G. The meter scale showed .0-.2 Safe and +.2-.9 Dangerous; +.9 and above, Explosive. Readings were taken before and after cleaning. Each tank is listed with Continental Can's code.

	Code	Flammable Before	Safe After
1.	10,000 gal. Wash Up Solvent	+.6	-.1
2.	10,000 gal. 107	.4	-.05
3.	10,000 gal. 137 Enamel	+.5	.0
4.	10,000 gal. 99 CLS	.4	-.1
5.	10,000 gal. 516 Solvent	off meter	.0
6.	10,000 gal. 199 Clear	.4	-.1
7.	10,000 gal. 99 CLS	.4	.0
8.	10,000 gal. 2262 DL	+.5	.05
9.	10,000 gal. 87 Gold	+.6	.0
10.	2500 gal. 379 CLS Lacq.	.4	.0
11.	2500 gal. 379 CLS Lacq.	.4	-.05
12.	10,000 gal. Waste Solvent	+.6	-.1
13.	10,000 gal. 196	.4	-.1
14.	Cone tank- removed sludge and washed	.4	.0
15.	4400 gal.- Hydroblasted to remove coating from interior surfaces. Tank was very flammable when started; now safe with a meter reading of .05.		

REFERENCE 7

Let's protect our earth

State of New Jersey
DEPARTMENT OF ENVIRONMENTAL PROTECTION
Division of Water Resources
CN-029
Trenton, New Jersey 08625

FOR STATE USE ONLY		
UST #		
	YES	NO
CK. IN.	☐	☐
AMT.	☐	☐
AUTH.	☐	☐
SP. ROUTE	☐	☐
SITE PLN.	☐	☐
SIGN	☐	☐
COMCODE		

UNDERGROUND STORAGE TANK REGISTRATION QUESTIONNAIRE

Bureau of Ground Water Quality Management
Underground Storage Tank Section
(609)984-9736

COMPLIANCE WITH THIS REGISTRATION WILL MEET ALL REGISTRATION REQUIREMENTS OF THE FEDERAL LAW, P.L. 93-616, THE HAZARDOUS AND SOLID WASTE AMENDMENTS OF 1984, SUBTITLE 1, SECTIONS 9001-9010.

General Facility Information

1. Facility name:
2. Facility location: 297 GETTY AVE (NUMBER AND STREET)
   PATERSON (CITY OR MUNICIPALITY)
   COUNTY: | STATE: NJ | ZIP CODE: 07503
3. Owner's mailing address: 8000 CONNECTICUT AVE PO BOX 5410 (NUMBER AND STREET)
   NORWALK (CITY OR MUNICIPALITY)
   COUNTY: | STATE: CT | ZIP CODE: 06856
4. Owner's name: CONTINENTAL CAN CO USA INC
5. Contact person (Facility Operator) (PERSON OR TITLE)
6. Contact telephone number: AREA CODE | EXCHANGE | NUMBER
7. Total number of facility underground storage tanks: 0017 (Complete Questions 12 thru 33) for each tank
8. Total facility underground storage tank capacity (gallons): 159000
9. Type and status of owner (mark all that apply).

A. ☐ CURRENT B. ☒ FORMER C. ☐ STATE OR LOCAL GOVERNMENT D. ☐ PRIVATE OR CORPORATE E. ☐ OWNERSHIP UNCERTAIN F. ☐ FEDERAL GOVT. (GSA FACILITY I.D. NUMBER)

10. Two copies of a site plan are submitted with this registration. A. ☒ YES B. ☐ NO

Submit two (2) copies of SITE PLAN showing facility or property boundary, buildings and the location of ALL underground storage tanks. EITHER, an existing engineering site plan, if available, OR a neat and legible hand-drawn sketch of the site may be submitted. In either case the site plan or sketch MUST show the location and distances that tanks, buildings, and dispensers are from the facility's property boundary. Include all tanks that are operating or existing, (E); abandoned, (A); or closed, (C). Each underground tank on the site plan or sketch shall be numbered in accordance with the instructions for question 12. The number assigned to a tank on the site plan or sketch MUST match and be identical to the tank identification number assigned to that tank on this form.

INCLUDE FACILITY NAME, OWNER'S NAME, FACILITY ADDRESS AND TELEPHONE NUMBER ON ALL SITE PLANS.

UST NO.

11. All underground tanks used after January 1, 1974 including those taken out of operation, **(UNLESS THE TANK WAS REMOVED FROM THE GROUND)** must be included in this registration. All in-ground tanks shall be reported as underground tanks on this questionnaire regardless of their current status; Existing, E; Abandoned, A; or Closed C.

SPECIFIC TANK INFORMATION

	TANK NO.		TANK NO.		TANK NO.		TANK NO.		TANK NO.	
12. Tank Identification Number	A1		A2		A3		A4		A5	
13. CASRN Number (Hazardous Substances Only)										
14. Tank Age (Years)	35		35		35		35		55	
15. Tank Size (gallons)	10000		10000		10000		10000		10000	
16. Tank Contents (MARK ONE X)										
A. Leaded gasoline	☐		☐		☐		☐		☐	
B. Unleaded gasoline	☐		☐		☐		☐		☐	
C. Alcohol enriched gasoline	☐		☐		☐		☐		☐	
D. Light diesel fuel (No. 1-D)	☐		☐		☐		☐		☐	
E. Medium diesel fuel (No. 2-D)	☐		☐		☐		☐		☐	
F. Waste oil	☐		☐		☐		☐		☐	
G. Kerosene (No. 1)	☐		☐		☐		☐		☐	
H. Home heating oil (No. 2)	☐		☐		☐		☐		☐	
J. Heating oil (No. 4)	☐		☐		☐		☐		☐	
K. Heavy heating oil (No. 6)	☐		☐		☐		☐		☐	
L. Aviation fuel	☐		☐		☐		☐		☐	
M. Hazardous substances (per Fact Sheet)	☐		☐		☐		☐		☐	
N. Other: Please Specify	NONE		NONE		NONE		NONE		NONE	
17. Tank and Piping Construction (MARK ALL THAT APPLY X)	Tank	Piping	Tank	Piping	Tank	Piping	Tank	Piping	Tank	Piping
A. Bare steel	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
B. Carbon steel	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
C. Stainless steel	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
D. Aluminum	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
E. Polyvinyl chloride	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
F. Concrete	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
G. Bronze	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
H. Earthen walls	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
J. Fiberglass reinforced plastic	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
K. Fiberglas-clad steel	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
L. Painted/asphalt steel	☒	☒	☒	☒	☒	☒	☒	☒	☒	☒
M. Vaulted	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
N. Composite	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
P. Iron (cast or ductile)	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
R. Non-metallic	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
S. Other: Please Specify										
18. Tank and Piping Structure (MARK ALL THAT APPLY X)	Tank	Piping	Tank	Piping	Tank	Piping	Tank	Piping	Tank	Piping
A. Single wall	☒	☒	☒	☒	☒	☒	☒	☒	☒	☒
B. Double wall	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
C. Manway in tank	☐		☐		☐		☐		☐	
19. Internal Tank and Piping Lining (MARK ONE X)	Tank	Piping	Tank	Piping	Tank	Piping	Tank	Piping	Tank	Piping
A. Rubber	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
B. Epoxy	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
C. Alklyd	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
D. Phenolic	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
E. Glass	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
F. Clay	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
G. None	☒	☒	☒	☒	☒	☒	☒	☒	☒	☒
H. Other, Please Specify										

UST NO.

11. All underground tanks used after January 1, 1974 including those taken out of operation, **(UNLESS THE TANK WAS REMOVED FROM THE GROUND)** must be included in this registration. All in-ground tanks shall be reported as underground tanks on this questionnaire regardless of their current status; Existing, E; Abandoned, A; or Closed C.

SPECIFIC TANK INFORMATION

	TANK NO.		TANK NO.		TANK NO.		TANK NO.		TANK NO.	
12. Tank Identification Number	A6		A7		A8		A9		A10	
13. CASRN Number (Hazardous Substances Only)										
14. Tank Age (Years)	35		35		35		35		35	
15. Tank Size (gallons)	10000		10000		10000		10000		8500	
16. Tank Contents (MARK ONE X)										
A. Leaded gasoline	☐		☐		☐		☐		☐	
B. Unleaded gasoline	☐		☐		☐		☐		☐	
C. Alcohol enriched gasoline	☐		☐		☐		☐		☐	
D. Light diesel fuel (No. 1-D)	☐		☐		☐		☐		☐	
E. Medium diesel fuel (No. 2-D)	☐		☐		☐		☐		☐	
F. Waste oil	☐		☐		☐		☐		☐	
G. Kerosene (No. 1)	☐		☐		☐		☐		☐	
H. Home heating oil (No. 2)	☐		☐		☐		☐		☐	
J. Heating oil (No. 4)	☐		☐		☐		☐		☐	
K. Heavy heating oil (No. 6)	☐		☐		☐		☐		☐	
L. Aviation fuel	☐		☐		☐		☐		☐	
M. Hazardous substances (per Fact Sheet)	☐		☐		☐		☐		☐	
N. Other; Please Specify	NONE		NONE		NONE		NONE		NONE	
17. Tank and Piping Construction (MARK ALL THAT APPLY X)	Tank	Piping	Tank	Piping	Tank	Piping	Tank	Piping	Tank	Piping
A. Bare steel	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
B. Carbon steel	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
C. Stainless steel	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
D. Aluminum	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
E. Polyvinyl chloride	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
F. Concrete	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
G. Bronze	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
H. Earthen walls	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
J. Fiberglass reinforced plastic	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
K. Fiberglas-clad steel	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
L. Painted/asphalt steel	☒	☒	☒	☒	☒	☒	☒	☒	☒	☒
M. Vaulted	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
N. Composite	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
P. Iron (cast or ductile)	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
R. Non-metallic	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
S. Other; Please Specify										
18. Tank and Piping Structure (MARK ALL THAT APPLY X)	Tank	Piping	Tank	Piping	Tank	Piping	Tank	Piping	Tank	Piping
A. Single wall	☒	☒	☒	☒	☒	☒	☒	☒	☒	☒
B. Double wall	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
C. Manway in tank	☐		☐		☐		☐		☐	
19. Internal Tank and Piping Lining (MARK ONE X)	Tank	Piping	Tank	Piping	Tank	Piping	Tank	Piping	Tank	Piping
A. Rubber	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
B. Epoxy	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
C. Alklyd	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
D. Phenolic	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
E. Glass	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
F. Clay	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
G. None	☒	☒	☒	☒	☒	☒	☒	☒	☒	☒
H. Other, Please Specify										

 UST NO._____

11. All underground tanks used after January 1, 1974 including those taken out of operation, **(UNLESS THE TANK WAS REMOVED FROM THE GROUND)** must be included in this registration. All in-ground tanks shall be reported as underground tanks on this questionnaire regardless of their current status; Existing, E; Abandoned, A; or Closed C.

SPECIFIC TANK INFORMATION

	TANK NO.		TANK NO.		TANK NO.		TANK NO.		TANK NO.	
12. Tank Identification Number	A11		A12		A13		E14		E15	
13. CASRN Number (Hazardous Substances Only)										
14. Tank Age (Years)	35		35		35		45		45	
15. Tank Size (gallons)	2500		10000		10000		2500		2000	
16. Tank Contents (MARK ONE X)										
A. Leaded gasoline	☐		☐		☐		☐		☐	
B. Unleaded gasoline	☐		☐		☐		☐		☐	
C. Alcohol enriched gasoline	☐		☐		☐		☐		☐	
D. Light diesel fuel (No. 1-D)	☐		☐		☐		☐		☐	
E. Medium diesel fuel (No. 2-D)	☐		☐		☐		☐		☐	
F. Waste oil	☐		☐		☐		☐		☐	
G. Kerosene (No. 1)	☐		☐		☐		☐		☐	
H. Home heating oil (No. 2)	☐		☐		☐		☐		☐	
J. Heating oil (No. 4)	☐		☐		☐		☐		☐	
K. Heavy heating oil (No. 6)	☐		☐		☐		☐		☐	
L. Aviation fuel	☐		☐		☐		☐		☐	
M. Hazardous substances (per Fact Sheet)	☐		☐		☐		☐		☐	
N. Other; Please Specify	NONE		NONE		NONE					
17. Tank and Piping Construction (MARK ALL THAT APPLY X)	Tank	Piping	Tank	Piping	Tank	Piping	Tank	Piping	Tank	Piping
A. Bare steel	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
B. Carbon steel	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
C. Stainless steel	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
D. Aluminum	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
E. Polyvinyl chloride	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
F. Concrete	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
G. Bronze	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
H. Earthen walls	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
J. Fiberglass reinforced plastic	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
K. Fiberglas-clad steel	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
L. Painted/asphalt steel	☒	☒	☒	☒	☒	☒	☒	☒	☒	☒
M. Vaulted	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
N. Composite	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
P. Iron (cast or ductile)	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
R. Non-metallic	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
S. Other Please Specify										
18. Tank and Piping Structure (MARK ALL THAT APPLY X)	Tank	Piping	Tank	Piping	Tank	Piping	Tank	Piping	Tank	Piping
A. Single wall	☒	☒	☒	☒	☒	☒	☒	☒	☒	☒
B. Double wall	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
C. Manway in tank	☐		☐		☐		☐		☐	
19. Internal Tank and Piping Lining (MARK ONE X)	Tank	Piping	Tank	Piping	Tank	Piping	Tank	Piping	Tank	Piping
A. Rubber	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
B. Epoxy	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
C. Alkiyd	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
D. Phenolic	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
E. Glass	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
F. Clay	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
G. None	☒	☒	☒	☒	☒	☒	☒	☒	☒	☒
H. Other, Please Specify										

 UST NO.

11. All underground tanks used after January 1, 1974 including those taken out of operation, **(UNLESS THE TANK WAS REMOVED FROM THE GROUND)** must be included in this registration. All in-ground tanks shall be reported as underground tanks on this questionnaire regardless of their current status; Existing, E; Abandoned, A; or Closed C.

SPECIFIC TANK INFORMATION

	TANK NO.	TANK NO.	TANK NO.	TANK NO.	TANK NO.
12. Tank Identification Number	E16	E17			
13. CASRN Number (Hazardous Substances Only)					
14. Tank Age (Years)	45	45			
15. Tank Size (gallons)	20000	20000			
16. Tank Contents (MARK ONE X)					
A. Leaded gasoline	☐	☐	☐	☐	☐
B. Unleaded gasoline	☐	☐	☐	☐	☐
C. Alcohol enriched gasoline	☐	☐	☐	☐	☐
D. Light diesel fuel (No. 1-D)	☐	☐	☐	☐	☐
E. Medium diesel fuel (No. 2-D)	☐	☐	☐	☐	☐
F. Waste oil	☐	☐	☐	☐	☐
G. Kerosene (No. 1)	☐	☐	☐	☐	☐
H. Home heating oil (No. 2)	☐	☐	☐	☐	☐
J. Heating oil (No. 4)	☒	☒	☐	☐	☐
K. Heavy heating oil (No. 6)	☐	☐	☐	☐	☐
L. Aviation fuel	☐	☐	☐	☐	☐
M. Hazardous substances (per Fact Sheet)	☐	☐	☐	☐	☐
N. Other; Please Specify					

17. Tank and Piping Construction (MARK ALL THAT APPLY X)	Tank	Piping	Tank	Piping	Tank	Piping	Tank	Piping	Tank	Piping
A. Bare steel	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
B. Carbon steel	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
C. Stainless steel	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
D. Aluminum	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
E. Polyvinyl chloride	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
F. Concrete	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
G. Bronze	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
H. Earthen walls	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
J. Fiberglass reinforced plastic	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
K. Fiberglas-clad steel	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
L. Painted/asphalt steel	☒	☒	☒	☒	☐	☐	☐	☐	☐	☐
M. Vaulted	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
N. Composite	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
P. Iron (cast or ductile)	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
R. Non-metallic	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
S. Other; Please Specify										

18. Tank and Piping Structure (MARK ALL THAT APPLY X)	Tank	Piping	Tank	Piping	Tank	Piping	Tank	Piping	Tank	Piping
A. Single wall	☒	☒	☒	☒	☐	☐	☐	☐	☐	☐
B. Double wall	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
C. Manway in tank	☐		☐		☐		☐		☐	

19. Internal Tank and Piping Lining (MARK ONE X)	Tank	Piping	Tank	Piping	Tank	Piping	Tank	Piping	Tank	Piping
A. Rubber	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
B. Epoxy	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
C. Alklyd	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
D. Phenolic	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
E. Glass	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
F. Clay	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
G. None	☒	☒	☒	☒	☐	☐	☐	☐	☐	☐
H. Other, Please Specify										

Page 3.

UST NO.

Tank I.D. No.	TANK NO. A1		TANK NO. A2		TANK NO. A3		TANK NO. A4		TANK NO. A5	
20. Tank and Piping Lining installed (MARK ONE X)	Tank	Piping	Tank	Piping	Tank	Piping	Tank	Piping	Tank	Piping
A. At purchase of tank	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
B. Retrofitted	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
21. Secondary containment (MARK ALL THAT APPLY X)	Tank	Piping	Tank	Piping	Tank	Piping	Tank	Piping	Tank	Piping
A. Liner	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
B. Vault	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
C. Double wall	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
D. None	☒	☒	☒	☒	☒	☒	☒	☒	☒	☒
E. Other, Please Specify										
22. External Type/Application of Cathodic Protection (MARK ALL THAT APPLY X)	Tank	Piping	Tank	Piping	Tank	Piping	Tank	Piping	Tank	Piping
A. Wrapped	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
B. Sprayed	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
C. Sacrificial anode	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
D. Impressed current	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
E. None	☒	☒	☒	☒	☒	☒	☒	☒	☒	☒
F. Other, Please Specify										
23. Monitoring/detection method (MARK ALL THAT APPLY X)	Tank	Piping	Tank	Piping	Tank	Piping	Tank	Piping	Tank	Piping
A. Automatic sampling	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
B. Manual sampling	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
C. Ground water monitoring	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
D. System in secondary containment	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
E. System outside backfill	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
F. System within piping (piping leak detector)	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
G. None	☒	☒	☒	☒	☒	☒	☒	☒	☒	☒
24. Type of monitoring/detection system (MARK ALL THAT APPLY X)	Tank	Piping	Tank	Piping	Tank	Piping	Tank	Piping	Tank	Piping
A. Continuous	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
B. Event activated	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
C. Audio	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
D. Visual	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
E. Electric sensor	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
F. Stock/inventory control (manual)	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
G. Stock/inventory control (electronic)	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
H. Tile drain	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
J. Vapor sniff wells	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
K. Internal inspection	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
L. Other, Please Specify										
M. None	☒	☒	☒	☒	☒	☒	☒	☒	☒	☒
25. Testing history recorded (MARK ALL THAT APPLY X)										
A. Yes	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
B. No	☒	☒	☒	☒	☒	☒	☒	☒	☒	☒
C. Test Result (MARK IF LEAKING NOW)	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
26. Leak/spill occurrence (MARK ALL THAT APPLY X)										
A. Within the past 1 year	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
B. Within the past 1 to 5 years	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
C. More than 5 years ago	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
D. No Records	☒	☒	☒	☒	☒	☒	☒	☒	☒	☒

Page 3.

UST NO.

Tank I.D. No.	TANK NO. A6		TANK NO. A7		TANK NO. A8		TANK NO. A9		TANK NO. A10	
20. Tank and Piping Lining installed (MARK ONE X)	Tank	Piping	Tank	Piping	Tank	Piping	Tank	Piping	Tank	Piping
A. At purchase of tank	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
B. Retrofitted	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
21. Secondary containment (MARK ALL THAT APPLY X)	Tank	Piping	Tank	Piping	Tank	Piping	Tank	Piping	Tank	Piping
A. Liner	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
B. Vault	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
C. Double wall	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
D. None	☒	☒	☒	☒	☒	☒	☒	☒	☒	☒
E. Other, Please Specify										
22. External Type/Application of Cathodic Protection (MARK ALL THAT APPLY X)	Tank	Piping	Tank	Piping	Tank	Piping	Tank	Piping	Tank	Piping
A. Wrapped	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
B. Sprayed	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
C. Sacrificial anode	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
D. Impressed current	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
E. None	☒	☒	☒	☒	☒	☒	☒	☒	☒	☒
F. Other, Please Specify										
23. Monitoring/detection method (MARK ALL THAT APPLY X)	Tank	Piping	Tank	Piping	Tank	Piping	Tank	Piping	Tank	Piping
A. Automatic sampling	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
B. Manual sampling	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
C. Ground water monitoring	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
D. System in secondary containment	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
E. System outside backfill	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
F. System within piping (piping leak detector)	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
G. None	☒	☒	☒	☒	☒	☒	☒	☒	☒	☒
24. Type of monitoring/detection system (MARK ALL THAT APPLY X)	Tank	Piping	Tank	Piping	Tank	Piping	Tank	Piping	Tank	Piping
A. Continuous	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
B. Event activated	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
C. Audio	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
D. Visual	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
E. Electric sensor	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
F. Stock/inventory control (manual)	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
G. Stock/inventory control (electronic)	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
H. Tile drain	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
J. Vapor sniff wells	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
K. Internal inspection	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
L. Other, Please Specify										
M. None	☒	☒	☒	☒	☒	☒	☒	☒	☒	☒
25. Testing history recorded (MARK ALL THAT APPLY X)										
A. Yes	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
B. No	☒	☒	☒	☒	☒	☒	☒	☒	☒	☒
C. Test Result (MARK IF LEAKING NOW)	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
26. Leak/spill occurrence (MARK ALL THAT APPLY X)										
A. Within the past 1 year	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
B. Within the past 1 to 5 years	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
C. More than 5 years ago	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
D. No Records	☒	☒	☒	☒	☒	☒	☒	☒	☒	☒

Page 3.

UST NO.

Tank I.D. No.	TANK NO. A11		TANK NO. A12		TANK NO. A13		TANK NO. B14		TANK NO. B15	
20. Tank and Piping Lining installed (MARK ONE X)	Tank	Piping	Tank	Piping	Tank	Piping	Tank	Piping	Tank	Piping
A. At purchase of tank	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
B. Retrofitted	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
21. Secondary containment (MARK ALL THAT APPLY X)	Tank	Piping	Tank	Piping	Tank	Piping	Tank	Piping	Tank	Piping
A. Liner	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
B. Vault	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
C. Double wall	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
D. None	☒	☒	☒	☒	☒	☒	☒	☒	☒	☒
E. Other, Please Specify										
22. External Type/Application of Cathodic Protection (MARK ALL THAT APPLY X)	Tank	Piping	Tank	Piping	Tank	Piping	Tank	Piping	Tank	Piping
A. Wrapped	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
B. Sprayed	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
C. Sacrificial anode	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
D. Impressed current	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
E. None	☒	☒	☒	☒	☒	☒	☒	☒	☒	☒
F. Other, Please Specify										
23. Monitoring/detection method (MARK ALL THAT APPLY X)	Tank	Piping	Tank	Piping	Tank	Piping	Tank	Piping	Tank	Piping
A. Automatic sampling	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
B. Manual sampling	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
C. Ground water monitoring	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
D. System in secondary containment	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
E. System outside backfill	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
F. System within piping (piping leak detector)	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
G. None	☒	☒	☒	☒	☒	☒	☒	☒	☒	☒
24. Type of monitoring/detection system (MARK ALL THAT APPLY X)	Tank	Piping	Tank	Piping	Tank	Piping	Tank	Piping	Tank	Piping
A. Continuous	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
B. Event activated	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
C. Audio	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
D. Visual	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
E. Electric sensor	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
F. Stock/inventory control (manual)	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
G. Stock/inventory control (electronic)	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
H. Tile drain	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
J. Vapor sniff wells	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
K. Internal inspection	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
L. Other, Please Specify										
M. None	☒	☒	☒	☒	☒	☒	☒	☒	☒	☒
25. Testing history recorded (MARK ALL THAT APPLY X)										
A. Yes	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
B. No	☒	☒	☒	☒	☒	☒	☒	☒	☒	☒
C. Test Result (MARK IF LEAKING NOW)	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
26 Leak/spill occurrence (MARK ALL THAT APPLY X)										
A. Within the past 1 year	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
B. Within the past 1 to 5 years	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
C. More than 5 years ago	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
D. No Records	☒	☒	☒	☒	☒	☒	☒	☒	☒	☒

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UST NO.

Tank I.D. No.	TANK NO. 016		TANK NO. 017		TANK NO.		TANK NO.		TANK NO.	
20. Tank and Piping Lining installed (MARK ONE X)	Tank	Piping	Tank	Piping	Tank	Piping	Tank	Piping	Tank	Piping
A. At purchase of tank	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
B. Retrofitted	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
21. Secondary containment (MARK ALL THAT APPLY X)	Tank	Piping	Tank	Piping	Tank	Piping	Tank	Piping	Tank	Piping
A. Liner	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
B. Vault	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
C. Double wall	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
D. None	☒	☒	☒	☒	☐	☐	☐	☐	☐	☐
E. Other, Please Specify										
22. External Type/Application of Cathodic Protection (MARK ALL THAT APPLY X)	Tank	Piping	Tank	Piping	Tank	Piping	Tank	Piping	Tank	Piping
A. Wrapped	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
B. Sprayed	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
C. Sacrificial anode	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
D. Impressed current	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
E. None	☒	☒	☒	☒	☐	☐	☐	☐	☐	☐
F. Other, Please Specify										
23. Monitoring/detection method (MARK ALL THAT APPLY X)	Tank	Piping	Tank	Piping	Tank	Piping	Tank	Piping	Tank	Piping
A. Automatic sampling	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
B. Manual sampling	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
C. Ground water monitoring	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
D. System in secondary containment	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
E. System outside backfill	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
F. System within piping (piping leak detector)	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
G. None	☒	☒	☒	☒	☐	☐	☐	☐	☐	☐
24. Type of monitoring/detection system (MARK ALL THAT APPLY X)	Tank	Piping	Tank	Piping	Tank	Piping	Tank	Piping	Tank	Piping
A. Continuous	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
B. Event activated	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
C. Audio	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
D. Visual	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
E. Electric sensor	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
F. Stock/inventory control (manual)	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
G. Stock/inventory control (electronic)	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
H. Tile drain	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
J. Vapor sniff wells	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
K. Internal inspection	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
L. Other, Please Specify										
M. None	☒	☒	☒	☒	☐	☐	☐	☐	☐	☐
25. Testing history recorded (MARK ALL THAT APPLY X)										
A. Yes	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
B. No	☒	☒	☒	☒	☐	☐	☐	☐	☐	☐
C. Test Result (MARK IF LEAKING NOW)	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
26. Leak/spill occurrence (MARK ALL THAT APPLY X)										
A. Within the past 1 year	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
B. Within the past 1 to 5 years	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
C. More than 5 years ago	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
D. No Records	☒	☒	☒	☒	☐	☐	☐	☐	☐	☐

Page 4.

UST NO.

Tank I.D. No.	TANK NO. A1	TANK NO. A2	TANK NO. A3	TANK NO. A4	TANK NO. A5
27. Tank Status (MARK ONE X) A. Active (operational)	☐	☐	☐	☐	☐
B. Inactive (non-operational)	☐	☐	☐	☐	☐
C. Closed (temporarily out-of-service)	☐	☐	☐	☐	☐
D. Closed (permanently out-of-service)	☐	☐	☐	☐	☐
* SEE BELOW E. Abandoned, in place	☐	☐	☐	☐	☐
F. Abandoned, in place, filled only	☐	☐	☐	☐	☐
G. Abandoned, in place, sealed only	☐	☐	☐	☐	☐
H. Abandoned in place, filled and sealed	☒	☒	☒	☒	☒
J. Seasonal	☐	☐	☐	☐	☐
K. Prior retrofitting work. Please Specify					
L. Other, Please Specify					
28. Spill recovery system on-site (MARK ONE X) A. Yes	☐	☐	☐	☐	☐
B. No	☒	☒	☒	☒	☒
29. Overfill protection (tank only) (MARK ONE X) A. Yes	☐	☐	☐	☐	☐
B. No	☒	☒	☒	☒	☒
30. Emergency shut-off mechanisms (dispensers) (MARK ONE X) A. Yes	☐	☐	☐	☐	☐
B. No	☒	☒	☒	☒	☒

* If boxes 27 E, F, G or H above have been answered - answer questions 31, 32 and 33 below.

31. Substance last used in tank (MARK ONE X) A. Leaded gasoline	☐	☐	☐	☐	☐
B. Unleaded gasoline	☐	☐	☐	☐	☐
C. Alcohol enriched gasoline	☐	☐	☐	☐	☐
D. Light diesel fuel (No. 1-D)	☐	☐	☐	☐	☐
E. Medium diesel fuel (No. 2-D)	☐	☐	☐	☐	☐
F. Waste oil	☐	☐	☐	☐	☐
G. Kerosene (No. 1)	☐	☐	☐	☐	☐
H. Home heating oil (No. 2)	☐	☐	☐	☐	☐
J. Heating oil (No. 4)	☐	☐	☐	☐	☐
J. Heavy heating oil (No. 6)	☐	☐	☐	☐	☐
K. Aviation fuel	☐	☐	☐	☐	☐
L. Hazardous substances (per Fact Sheet)	☐	☐	☐	☐	☐
M. Other, Please Specify	PAINT/VARNISH	PAINT/VARN	PAINT/VARN	PAINT/VARN	☒ *
32. Estimated date last used (month/year)	1232 Mo. Yr.	1252 Mo. Yr.	1212 Mo. Yr.	1232 Mo. Yr.	1212 Mo. Yr.
33. Estimated quantity (gallons) left in tank	0	0	0	0	0

* M.E.K. CASRN 78933

OWNER OR OWNER'S AGENT CERTIFICATION

I certify under penalty of law that I have personally examined and am familiar with the information submitted in this and all attached documents, and that based on my inquiry of those individuals immediately responsible for obtaining the information, I believe that the submitted information is true, accurate, and complete.

Joseph A. Tarlo
(SIGNATURE)

JOSEPH A. TARLO
(PRINT OR TYPE NAME)

MANAGER PRODUCTION ENGINEERING
(TITLE)

Page 4.

UST NO._____

Tank I.D. No.	TANK NO. A6	TANK NO. A7	TANK NO. A8	TANK NO. A9	TANK NO. A10
27. Tank Status (MARK ONE X) A. Active (operational)	☐	☐	☐	☐	☐
B. Inactive (non-operational)	☐	☐	☐	☐	☐
C. Closed (temporarily out-of-service)	☐	☐	☐	☐	☐
D. Closed (permanently out-of-service)	☐	☐	☐	☐	☐
* SEE BELOW E. Abandoned, in place	☐	☐	☐	☐	☐
F. Abandoned, in place, filled only	☐	☐	☐	☐	☐
G. Abandoned, in place, sealed only	☐	☐	☐	☐	☐
H. Abandoned, in place, filled and sealed	☒	☒	☒	☒	☒
J. Seasonal	☐	☐	☐	☐	☐
K. Prior retrofitting work. Please Specify					
L. Other, Please Specify					
28. Spill recovery system on-site (MARK ONE X) A. Yes	☐	☐	☐	☐	☐
B. No	☒	☒	☒	☒	☒
29. Overfill protection (tank only) (MARK ONE X) A. Yes	☐	☐	☐	☐	☐
B. No	☒	☒	☒	☒	☒
30. Emergency shut-off mechanisms (dispensers) (MARK ONE X) A. Yes	☐	☐	☐	☐	☐
B. No	☒	☒	☒	☒	☒

* If boxes 27 E, F, G or H above have been answered - answer questions 31, 32 and 33 below.

31. Substance last used in tank (MARK ONE X) A. Leaded gasoline	☐	☐	☐	☐	☐
B. Unleaded gasoline	☐	☐	☐	☐	☐
C. Alcohol enriched gasoline	☐	☐	☐	☐	☐
D. Light diesel fuel (No. 1-D)	☐	☐	☐	☐	☐
E. Medium diesel fuel (No. 2-D)	☐	☐	☐	☐	☐
F. Waste oil	☐	☐	☐	☐	☐
G. Kerosene (No. 1)	☐	☐	☐	☐	☐
H. Home heating oil (No. 2)	☐	☐	☐	☐	☐
J. Heating oil (No. 4)	☐	☐	☐	☐	☐
J. Heavy heating oil (No. 6)	☐	☐	☐	☐	☐
K. Aviation fuel	☐	☐	☐	☐	☐
L. Hazardous substances (per Fact Sheet)	☐	☐	☐	☐	☐
M. Other, Please Specify	PAINT/VARNISH	PAINT/VARN	PAINT/VARN	PAINT/VARN	PAINT/VARN
32. Estimated date last used (month/year)	1 2 8 2 Mo. Yr.	1 2 8 2 Mo. Yr.	1 2 8 2 Mo. Yr.	1 2 8 2 Mo. Yr.	1 2 8 2 Mo. Yr.
33. Estimated quantity (gallons) left in tank	0	0	0	0	0

OWNER OR OWNER'S AGENT CERTIFICATION

I certify under penalty of law that I have personally examined and am familiar with the information submitted in this and all attached documents, and that based on my inquiry of those individuals immediately responsible for obtaining the information, I believe that the submitted information is true, accurate, and complete.

Joseph R. Tarlo
(SIGNATURE)

(PRINT OR TYPE NAME)

(TITLE)

Page 4. UST NO.

Tank I.D. No.	TANK NO. A/1	TANK NO. A/2	TANK NO. A/3	TANK NO. E/4	TANK NO. E/5
27. Tank Status (MARK ONE X) A. Active (operational)	☐	☐	☐	☒	☒
B. Inactive (non-operational)	☐	☐	☐	☐	☐
C. Closed (temporarily out-of-service)	☐	☐	☐	☐	☐
D. Closed (permanently out-of-service)	☐	☐	☐	☐	☐
* SEE BELOW E. Abandoned, in place	☐	☐	☐	☐	☐
F. Abandoned, in place, filled only	☐	☐	☐	☐	☐
G. Abandoned, in place, sealed only	☐	☐	☐	☐	☐
H. Abandoned, in place, filled and sealed	☒	☒	☒	☐	☐
J. Seasonal	☐	☐	☐	☐	☐
K. Prior retrofitting work, Please Specify					
L. Other, Please Specify					
28. Spill recovery system on-site (MARK ONE X) A. Yes	☐	☐	☐	☐	☐
B. No	☒	☒	☒	☐	☐
29. Overfill protection (tank only) (MARK ONE X) A. Yes	☐	☐	☐	☐	☐
B. No	☒	☒	☒	☐	☐
30. Emergency shut-off mechanisms (dispensers) (MARK ONE X) A. Yes	☐	☐	☐	☐	☐
B. No	☒	☒	☒	☐	☐

* If boxes 27 E, F, G or H above have been answered - answer questions 31, 32 and 33 below.

31. Substance last used in tank (MARK ONE X) A. Leaded gasoline	☐	☐	☐	☐	☐
B. Unleaded gasoline	☐	☐	☐	☐	☐
C. Alcohol enriched gasoline	☐	☐	☐	☐	☐
D. Light diesel fuel (No. 1-D)	☐	☐	☐	☐	☐
E. Medium diesel fuel (No. 2-D)	☐	☐	☐	☐	☐
F. Waste oil	☐	☐	☐	☐	☐
G. Kerosene (No. 1)	☐	☐	☐	☐	☐
H. Home heating oil (No. 2)	☐	☐	☐	☐	☐
J. Heating oil (No. 4)	☐	☐	☐	☐	☐
J. Heavy heating oil (No. 6)	☐	☐	☐	☐	☐
K. Aviation fuel	☐	☐	☐	☐	☐
L. Hazardous substances (per Fact Sheet)	☒ *	☒ **	☒ **	☐	☐
M. Other, Please Specify					
32. Estimated date last used (month/year)	1/2/8/2 Mo. Yr.	1/2/8/2 Mo. Yr.	1/2/8/2 Mo. Yr.	1/2/8/2 Mo. Yr.	1/2/8/2 Mo. Yr.
33. Estimated quantity (gallons) left in tank	0	0	0	100	100

* VARNISH THINNER CASRN - NONE
** NAPTHA CASRN - 8030306

OWNER OR OWNER'S AGENT CERTIFICATION

I certify under penalty of law that I have personally examined and am familiar with the information submitted in this and all attached documents, and that based on my inquiry of those individuals immediately responsible for obtaining the information, I believe that the submitted information is true, accurate, and complete.

Joseph C. Tarlo
(SIGNATURE)

(PRINT OR TYPE NAME)

(TITLE)

Page 4. UST NO.

Tank I.D. No.	TANK NO. E16	TANK NO. E17	TANK NO.	TANK NO.	TANK NO.
27. Tank Status (MARK ONE X) A. Active (operational)	☒	☒	☐	☐	☐
B. Inactive (non-operational)	☐	☐	☐	☐	☐
C. Closed (temporarily out-of-service)	☐	☐	☐	☐	☐
D. Closed (permanently out-of-service)	☐	☐	☐	☐	☐
* SEE BELOW E. Abandoned, in place	☐	☐	☐	☐	☐
F. Abandoned, in place, filled only	☐	☐	☐	☐	☐
G. Abandoned, in place, sealed only	☐	☐	☐	☐	☐
H. Abandoned, in place, filled and sealed	☐	☐	☐	☐	☐
J. Seasonal	☐	☐	☐	☐	☐
K. Prior retrofitting work, Please Specify					
L. Other, Please Specify					
28. Spill recovery system on-site (MARK ONE X) A. Yes	☐	☐	☐	☐	☐
B. No	☐	☐	☐	☐	☐
29. Overfill protection (tank only) (MARK ONE X) A. Yes	☐	☐	☐	☐	☐
B. No	☐	☐	☐	☐	☐
30. Emergency shut-off mechanisms (dispensers) (MARK ONE X) A. Yes	☐	☐	☐	☐	☐
B. No	☐	☐	☐	☐	☐

* If boxes 27 E, F, G or H above have been answered - answer questions 31, 32 and 33 below.

31. Substance last used in tank (MARK ONE X) A. Leaded gasoline	☐	☐	☐	☐	☐
B. Unleaded gasoline	☐	☐	☐	☐	☐
C. Alcohol enriched gasoline	☐	☐	☐	☐	☐
D. Light diesel fuel (No. 1-D)	☐	☐	☐	☐	☐
E. Medium diesel fuel (No. 2-D)	☐	☐	☐	☐	☐
F. Waste oil	☐	☐	☐	☐	☐
G. Kerosene (No. 1)	☐	☐	☐	☐	☐
H. Home heating oil (No. 2)	☐	☐	☐	☐	☐
J. Heating oil (No. 4)	☐	☐	☐	☐	☐
J. Heavy heating oil (No. 6)	☐	☐	☐	☐	☐
K. Aviation fuel	☐	☐	☐	☐	☐
L. Hazardous substances (per Fact Sheet)	☐	☐	☐	☐	☐
M. Other, Please Specify					
32. Estimated date last used (month/year)	0383 Mo. Yr.	0383 Mo. Yr.	Mo. Yr.	Mo. Yr.	Mo. Yr.
33. Estimated quantity (gallons) left in tank	500	500			

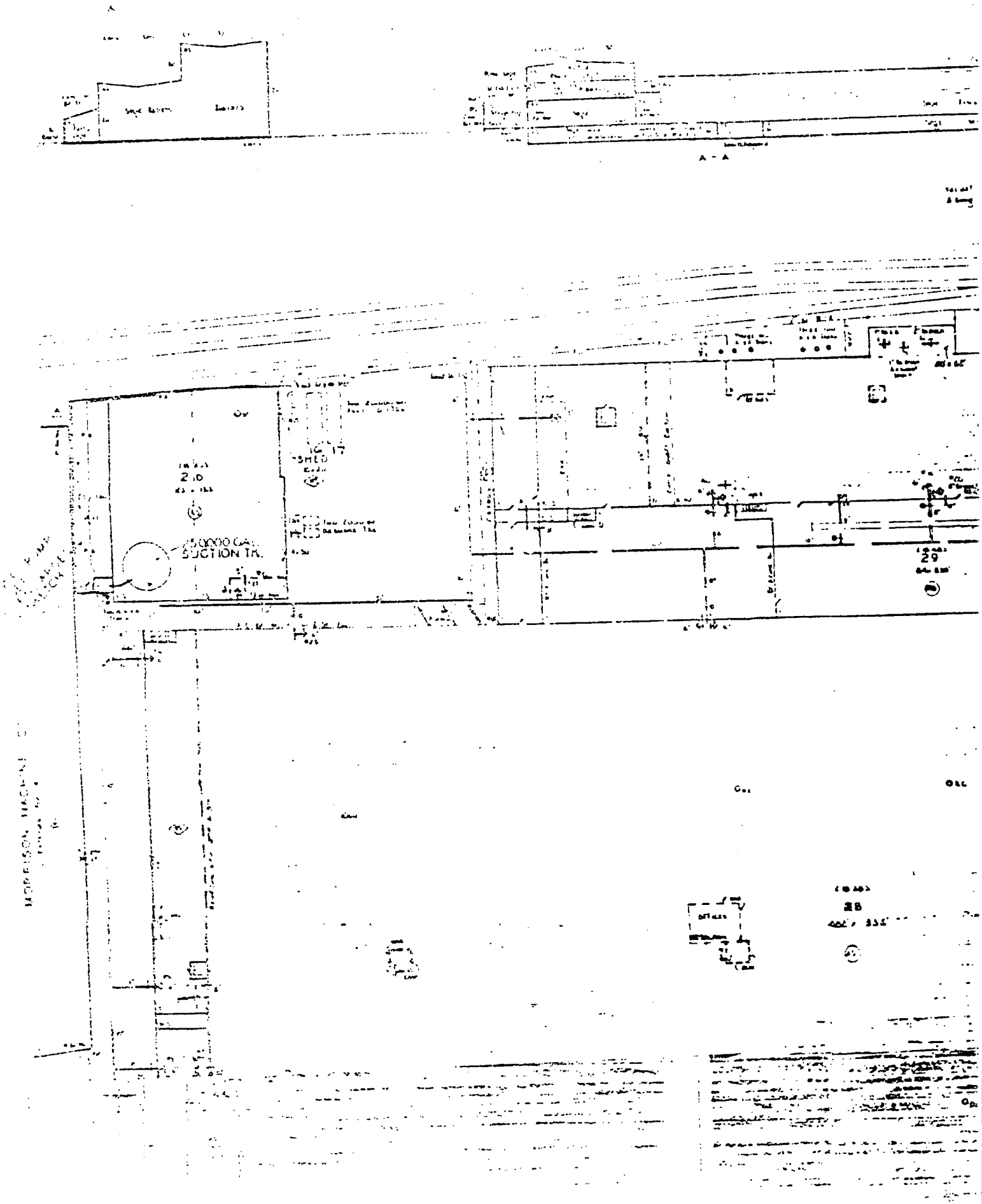
OWNER OR OWNER'S AGENT CERTIFICATION

I certify under penalty of law that I have personally examined and am familiar with the information submitted in this and all attached documents, and that based on my inquiry of those individuals immediately responsible for obtaining the information, I believe that the submitted information is true, accurate, and complete.

Joseph C. Tarlo
(SIGNATURE)

(PRINT OR TYPE NAME)

(TITLE)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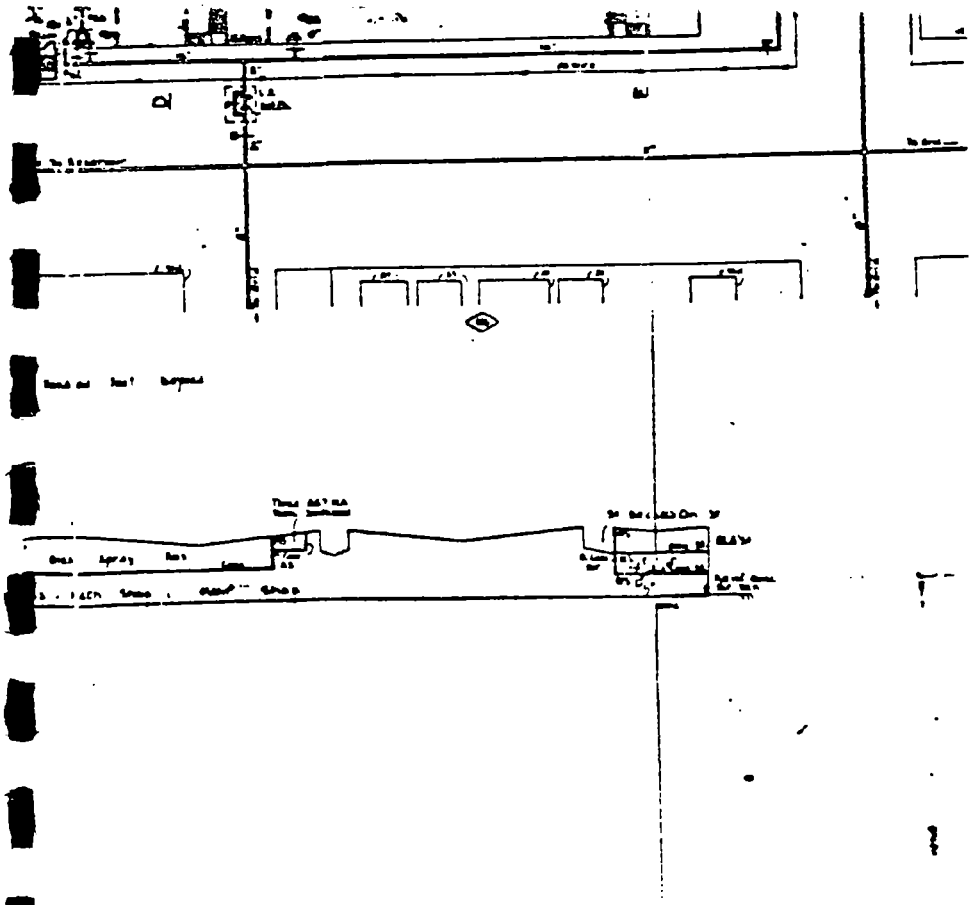

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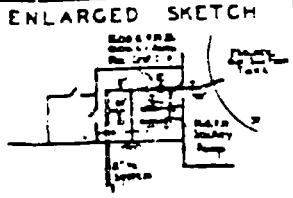


PRINCIPAL MAP SYMBOLS

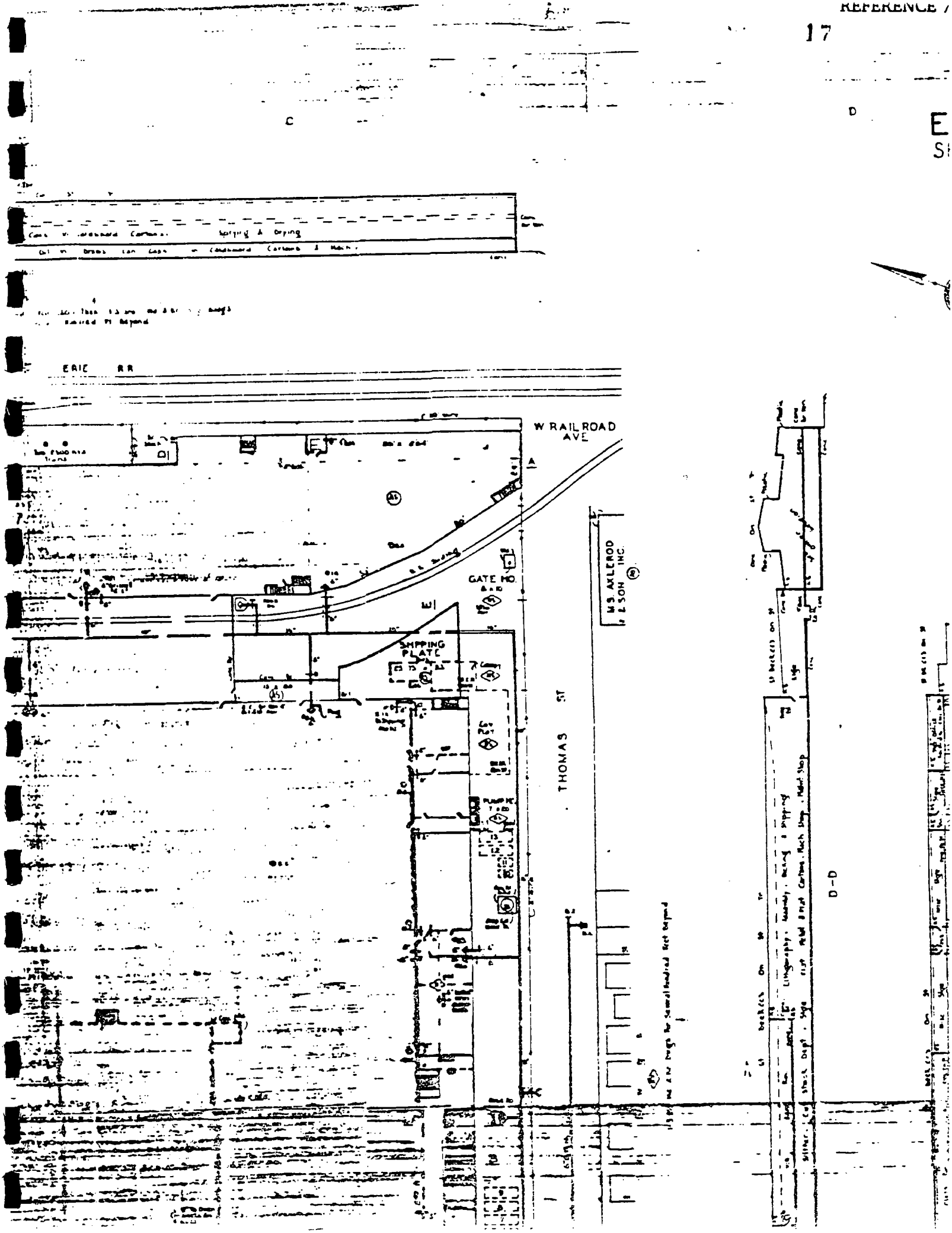
CONFIDENTIAL
THIS PLAN SHOULD BE MADE AVAILABLE ONLY TO AUTHORI

CONTINENTAL CAN COMPANY
PLANTS NOS. 48 & 67
PATERSON, N.J.

FACTORY INSURANCE ASSOC
HARTFORD CHICAGO SA

DRAWN BY F.Z. FEBRUARY 1974 E-30

REFERENCE 8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W RAILROAD AVE
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GATE NO.
M.S. AXLEROD & SON INC.
SHIPPING PLATE
THOMAS ST
D-D

Dan Raviv Associates, Inc.

Consultants in hydrogeology, water quality, landfill hydrology and ECRA compliance

June 21, 1991

State of New Jersey
Department of Environmental Protection
Division of Water Resources
Bureau of Underground Storage Tanks
401 East State Street
CN-029
Trenton, New Jersey 08625-0029

Attention: Mr. Joseph A. Miller, Section Chief
Mr. Joseph Eaker, Case Manager

Re: Submittal of Discharge Investigation
and Corrective Action Report
297 Getty Avenue Associates
Paterson, New Jersey
BUST Case No. 90-07-17-1203
DRAI Job No. 90C830

Dear Sirs:

On behalf of 297 Getty Avenue Associates (Getty), Dan Raviv Associates, Inc. (DRAI), submits the following report for your review and comment. The purpose of this report is to comply with the New Jersey Department of Environmental Protection (NJDEP), Bureau of Underground Storage Tanks (BUST), Scope of Work, Case No. 90-07-17-1203, issued to Getty on November 7, 1990.

The subsurface investigation at Getty included: monitoring well installation and survey; ground water elevation measurement; calculation of ground water flow direction; and, ground water sampling and analysis.

The results of monitoring well installation and ground water sampling and analysis at Getty indicate that ground water beneath the site has been impacted by a discharge of petroleum-type products. Elevated levels of benzene, toluene, ethylbenzene, xylene and naphthalene have been detected in the monitoring wells.

57 East Willow Street, Millburn, New Jersey 07041 (201) 564-6006/FAX (201) 564-6442

Mr. Joseph A. Miller
Mr. Joseph Eaker
NJDEP/BUST
June 21, 1991
Page 2

Based on these results, DRAI recommends that a supplementary hydrogeologic investigation be performed at Getty. Additionally, DRAI has applied for the removal of three upgradient gasoline UGSTs and the installation of two additional monitoring wells. Following well installation, and one round of ground water sampling and analysis from the two proposed wells will be performed.

If you have any questions or need additional information, please call.

Very truly yours,

DAN RAVIV ASSOCIATES, INC.

Peter Grogan

Peter Grogan
Hydrogeologist

Reviewed By: _____
Kenneth Siet
Regulatory Compliance

PLG/KS/pk

Enc.
(2 copies sent)

cc: Mr. Jacob Quick (Getty)

Dan Raviv Associates, Inc.
Consultants in hydrogeology, water quality, landfill hydrology and ECRA compliance

DISCHARGE INVESTIGATION AND CORRECTIVE ACTION REPORT 297 GETTY AVENUE ASSOCIATES PATERSON, NEW JERSEY BUST CASE NO. 90-07-17-1203 DRAI JOB NO. 90C830

prepared for:

Mr. Jacob Quick
297 Getty Avenue Associates
101 Eisenhower Parkway
Roseland, New Jersey 07068

prepared by:

Dan Raviv Associates, Inc.
57 East Willow Street
Millburn, New Jersey 07041

June 1991

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2	Well Search of NJDEP Permitted Wells
3	Results of VOC and B/N Analyses in Ground Water April 11, 1991
4	Location of Proposed Monitoring Wells

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II	Monitoring Well Completion Data
III	Ground Water Elevation Measurement Data
IV	Summary of Volatile Organic Compounds in Ground Water - April 1991
V	Summary of Base Neutral Compounds in Ground Water - April 1991

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Appendix No.	Title
A	DICAR Summary Sheet
B	Well Search Records
C	Monitoring Well Logs
D	Laboratory Data Report Accutest Laboratories, April 1991

DISCHARGE INVESTIGATION AND CORRECTIVE ACTION REPORT 297 GETTY AVENUE ASSOCIATES PATERSON, NEW JERSEY BUST CASE NO. 90-07-17-1203

1.0 INTRODUCTION

On behalf of 297 Getty Avenue Associates (Getty), Dan Raviv Associates, Inc. (DRAI) has prepared this report entitled "Discharge Investigation and Corrective Action Report, 297 Getty Avenue Associates, Paterson, New Jersey". The purpose of the investigation was to evaluate the ground water conditions and quality underlying Getty near the former locations of two excavated and removed heating oil underground storage tanks (UGSTs).

Based on Getty's records, Getty immediately converted the property from oil heat to gas heat upon taking title of the property in 1983. Since the UGSTs were no longer utilized, they were subsequently excavated and removed from the site during July 1990. **Both tanks had a capacity of 20,000 gallons and contained No. 6 fuel oil. Removal of the UGSTs was performed by Active Oil Service, Inc., of Newark, New Jersey. During removal, visual petroleum contamination was observed beneath the excavated UGSTs. Approximately 640 tons of non hazardous petroleum contaminated soil was removed; an excavation with approximate dimensions of 32 feet wide by 45 feet long by 21 feet deep was created. The contaminated soil was disposed at the Browning Ferris Industries (BFI) Landfill in Lowellville, Ohio in February 1991.**

Based on these findings, the NJDEP was notified on July 17, 1990 of a discharge of petroleum substances from the former tanks. Subsequent post-excavation soil samples obtained from the bottom of the excavation confirmed the presence of elevated levels of petroleum hydrocarbons (PHCs) in several of the samples. The NJDEP subsequently issued a Scope of Work, dated November 7, 1990, to investigate and initiate corrective actions at Getty.

The Scope of Work issued to Getty included the installation and ground water sampling of three monitoring wells at the site. The purpose of the monitoring wells was to determine if the excavated and removed UGSTs had adversely impacted the underlying ground water. A summary of all pertinent data is presented in the DICAR Summary Sheet in Appendix A.

2.0 REGIONAL LAND USE

2.1 General

The site is located in the city of Paterson, Passaic County, in northern New Jersey. The area consists primarily of small businesses, warehousing, light industry and residential housing (Figure 1). The Erie Lackawanna Railroad borders the site to the northeast.

2.2 Well Search

At the request of DRAI, a well search was performed through the NJDEP, Bureau of Water Allocation computerized data base. The available well records confirm that no domestic wells exist within 1/2-mile of the site. 31 industrial wells and 2 irrigation wells are located within 1-mile of Getty in addition to 19 monitoring wells within 1/2-mile of the site. The identified locations of the industrial, irrigation, and monitoring wells are presented on Figure 2. Table I summarizes the pertinent data for each identified well. Appendix B includes the records of the above-referenced wells.

3.0 GROUND WATER INVESTIGATION

3.1 Monitoring Well Locations

Three monitoring wells were installed adjacent to the UGST excavation in March 1991 to evaluate ground water quality in the vicinity of the former UGSTs. The wells were installed by Environmental Drilling, Inc., of West Creek, New Jersey, a New Jersey-licensed well driller, under the observation of a DRAI geologist.

The well locations were selected by the on-site DRAI geologist, based on the former UGST location and interpretation of local topography. MW-1 was installed in the anticipated upgradient location of the former UGST positions (Figure 3). Due to site constraints, MW-2 was situated downgradient within the backfilled excavation. MW-3 was also installed downgradient, within 10 feet of the former UGST location.

3.2 Monitoring Well Construction

The wells were constructed of 4-inch diameter, 0.020 slot, PVC screen set above and below the encountered ground water surface to a maximum depth of 30 feet below the ground surface (Table II, Appendix C). A 4-inch diameter PVC riser was installed from the top of the screen to the ground surface. The top of each PVC casing was covered with a flushmount protective steel cover and locking cap. All the wells were completed in accordance with NJDEP protocols. The wells were subsequently surveyed by Aqua Firma Surveys, of North Arlington, New Jersey, and plotted on a site map (Figure 3). Elevations of the PVC casings and the ground surface were measured to the nearest 0.01 foot. Depth to ground water within each well was measured on April 11, 1991, May 9, 1991, and May 30, 1991 (Table III).

3.3 Ground Water Sampling

Ground water samples were obtained from the three monitoring wells on April 11, 1991. All sampling was done in accordance with NJDEP-approved protocols. The wells were purged of the standing water prior to sampling. Within two hours of evacuation, samples were collected with a dedicated teflon bailer, poured into laboratory-supplied bottles, and stored on ice. The samples were then transported, under chain of custody, to Accutest Laboratories, of Dayton, New Jersey, a NJDEP-certified laboratory.

4.0 HYDROGEOLOGY

Information on geologic conditions at the Getty site was obtained during the drilling of the three monitoring wells and from published hydrogeologic studies of the area (Kummel, 1940; Vecchioli, 1967; Carswell and Rooney, 1976, Spayd, 1985 and Michalski, 1990). These hydrogeologic data, along with water and product-level data, provided an understanding of hydrogeologic conditions at the site.

4.1 Geology

The lithology beneath the vicinity of Getty consists of 8 to 12 feet of unconsolidated sediments derived largely from the underlying rocks and deposition by Pleistocene glaciation. The unconsolidated sediments consist primarily of clayey silts.

The Brunswick Formation of Triassic age immediately underlies the unconsolidated sediments at the site and is several thousand feet thick (Kummel, 1940). In the study area, the Brunswick Formation consists mainly of fractured reddish-brown shale with some interbedded sandstone. The uppermost 3 to 5 feet of the Brunswick Formation is weathered and becomes more competent with depth. The strike of the shale is approximately N30°E, with individual beds dipping at a shallow angle (10-15°) to the northwest.

As previously discussed, MW-2 was located in the backfill material of the excavated UGSTs. This material consisted of sand and gravel to a depth of 17 feet below ground surface (BGS).

4.2 Ground Water Conditions

Ground water underlying the site exists **approximately 15-17 feet BGS and** flows within the Brunswick Formation. Systematic fractures, both near-vertical joints and partings along the bedding, are generally believed to provide the principal passages for ground water flow through the Brunswick Formation (Michalski, 1990).

Water levels measured from MW-2 indicate a mounding of ground water associated with the highly permeable backfill material. Prior to being paved over in April 1991, the excavation represented a recharge area for precipitation for approximately 10 months and was the only unpaved area in reference to this ground water investigation. Since the excavation was paved over, water levels in MW-2 have begun to stabilize in relation to the other two wells, MW-1 and MW-3.

Due to the inaccuracy of the water levels observed in MW-2, a ground water contour map cannot be properly prepared. Based on both water levels from MW-1 and MW-3 and the local topography, however, a ground water flow direction is implied to be in an east-northeast direction.

5.0 GROUNDWATER QUALITY

Ground water samples were collected on April 11, 1991 and submitted to Accutest Laboratories for analyses of volatile organic compounds plus fifteen non-targeted compounds (VOCs+15) and base neutral compounds plus fifteen non-targeted compounds (B/Ns+15). The analytical parameters were selected, based on the above-referenced BUST, Scope of Work. Laboratory data sheets are presented in Appendix D. The results of the analysis are summarized on Tables IV and V, and on Figure 3.

During sampling, no free product was observed in any of the three wells. However, a free floating layer of product approximately 0.50-inches thick, was observed in MW-3 during the collection of water-level measurements on May 9, 1991. Water levels on May 30, 1991 indicated that the thickness of free product in MW-3 increased to approximately 2 inches, and approximately 0.25 inches of free product was observed in MW-1.

Analysis of ground water samples collected on April 11, 1991 indicated that MW-1 and MW-3 contain elevated levels of petroleum type compounds. The major contaminants detected were benzene, toluene, ethylbenzene, xylenes (BTEX) and naphthalene. Total targeted VOC concentrations were 11,580 parts per billion (ppb) for MW-1 and 4,840 ppb for MW-3. MW-2 contained lesser concentrations of benzene and ethylbenzene at a total VOC concentration of 138 ppb. Total targeted B/N concentrations were detected at lesser concentrations than VOCs, with values from MW-1 at 143 ppb, MW-2 at 1.5 ppb and MW-3 at 135 ppb.

6.0 CONCLUSIONS

Based on the ground water investigation performed by DRAI at Getty, the following conclusions are presented:

(1) The site is underlain by unconsolidated reddish-brown clayey silt, overlying bedrock, identified as the Brunswick Formation.

(2) The ground water surface exists approximately 15-17 feet BGS and flows within shale of the Brunswick Formation.

(3) Ground water flow beneath the site is implied to be flowing in an east-northeastern direction.

(4) No off-site wells were identified immediately hydraulically-downgradient of the site.

(5) Analytical results from the three wells on site confirm that ground water beneath Getty has been impacted by a discharge of petroleum-type products. Ground water measurements collected at the end of May 1991 indicated that approximately 2 inches of free product exists in MW-3 and 1/4 inch in MW-1.

7.0 RECOMMENDATIONS

The concentrations of BTEX detected indicates that a discharge of gasoline may have taken place. There are three 2,000-gallon gasoline UGSTs located approximately 40 feet west (and upgradient) of the former fuel oil UGSTs (Figure 4).

DRAI has recommended proper closure of these gasoline UGSTs. DRAI has proposed that after the gasoline UGSTs are removed and post excavation soil samples are obtained, two additional monitoring wells be installed to evaluate ground water conditions. The two proposed wells MW-4 and MW-5 are shown on Figure 4. MW-4 is located in the implied downgradient direction of the existing gasoline UGSTs and MW-5 is located upgradient of the UGSTs for background quality. Ground water samples will be obtained from the two proposed wells and will be analyzed for VOCs+15, methyl tertiary butyl ether (MTBE) and tertiary butyl alcohol (TBA).

Upon the completion of additional monitoring well installation and ground water sampling and analyses, DRAI will prepare and submit to the NJDEP a supplementary hydrogeologic investigation report for review and comment. The report will include the results of the above-outlined Scope of Work and appropriate recommendations by DRAI.

8.0 REFERENCES

Carswell, L.D. and J.G. Rooney, 1976. Summary of Geology and Ground-Water Resources of Passaic County, New Jersey, U.S. Geological Survey No. 76-75, 47 pp.

Kummel, H.B. 1940. The Geology of New Jersey. New Jersey Department of Conservation and Development, Division of Geology and Topography Bulletin No. 50, 102 pp.

Michalski, A., 1990. Hydrogeology of the Brunswick (Passaic) Formation and Implications for Ground Water Monitoring Practice, Ground Water Monitoring Review. Volume X, No. 4, 9 pp.

Spayd, S., 1985. Movement of Volatile Organics Through a Fractured Rock Aquifer. Ground Water, Vol. 23, No. 4, pp 496-502.

Vecchioli, J. 1967. Directional Behavior of a Fractured Shale Aquifer in New Jersey. From the Proceedings of the Dubruonik Symposium, Hydrology of Fractured Rocks. Vol. 1 Int. Ass. Sci. Hydrology, 73 pp.

FIGURES

PATERSON QUADRANGLE
7.5 MINUTE SERIES

0 2,000 FT.
APPROXIMATE SCALE

N

Dan Raviv Associates, Inc.
57 E. Willow Street Millburn, NJ 07041

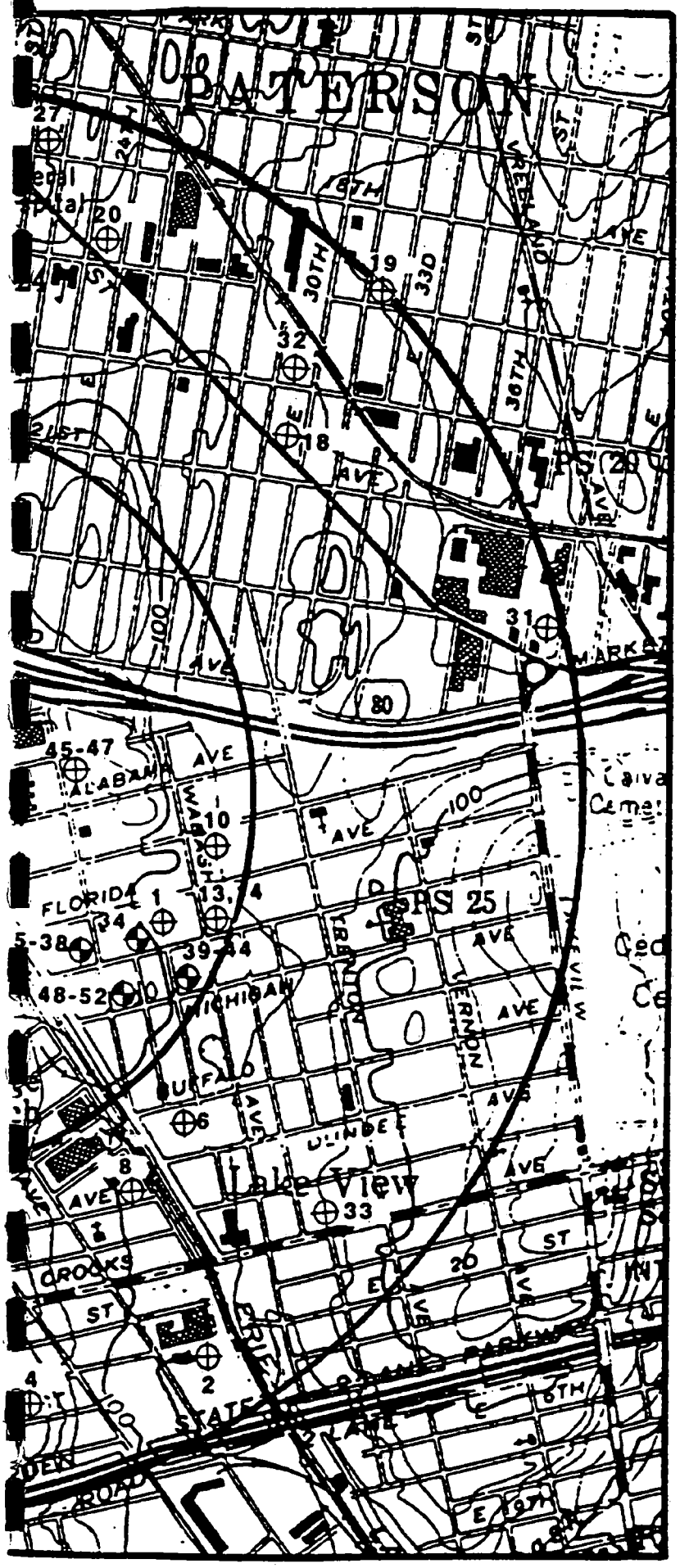
SITE LOCATION

297 GETTY AVENUE ASSOCIATES - PATERSON, NJ

PREPARED BY: PG/MV	DATE: MARCH 1991
JOB NO.: 90P830	FIGURE: 1

PATERSON QUADRANGLE
7.5 MINUTE SERIES

KNAPP CO.



EXPLANATION

30 — EXISTING INDUSTRIAL WELL

34 — EXISTING MONITORING WELL

NOTES : 1) ONLY THOSE WELLS LOCATED BY W
SEARCH SUPPLIED BY NJDEP, BURE
WATER ALLOCATION HAVE BEEN PLC

2) WELL NUMBERS ARE IN REFERENCE
TO TABLE I

0 — 2,000 FT.

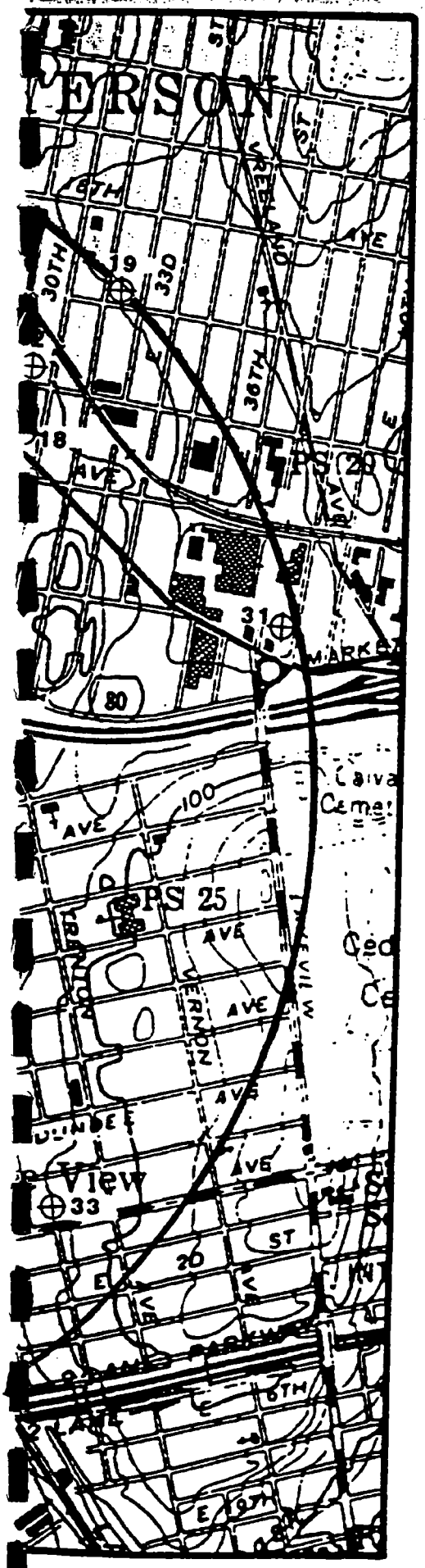
APPROXIMATE SCALE

Dan Raviv Associates, I
57 E. Willow Street Millburn, NJ 07

WELL SEARCH OF NJDEP
PERMITTED WELLS

297 GETTY AVENUE ASSOCIATES - PATERS

PREPARED BY: PG/MV	DATE: MAY 1991
JOB NO.: 90C830	FIGURE: 2



EXPLANATION

30 — EXISTING INDUSTRIAL WELL

34 — EXISTING MONITORING WELL

NOTES : 1) ONLY THOSE WELLS LOCATED BY WELL SEARCH SUPPLIED BY NJDEP, BUREAU OF WATER ALLOCATION HAVE BEEN PLOTTED.

2) WELL NUMBERS ARE IN REFERENCE TO TABLE I.

0 — 2,000 FT.

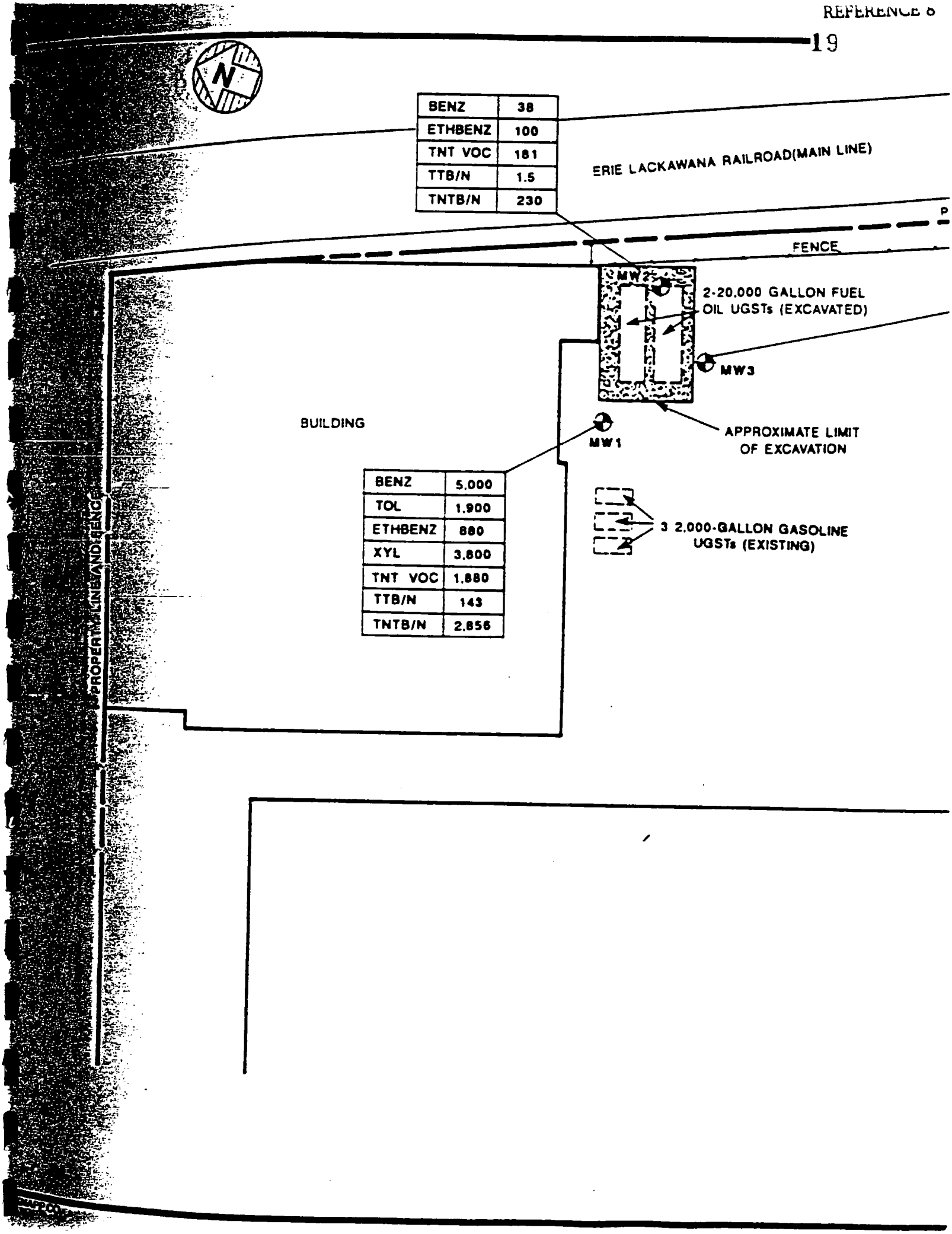
APPROXIMATE SCALE

Dan Raviv Associates, Inc.
57 E. Willow Street Millburn, NJ 07041

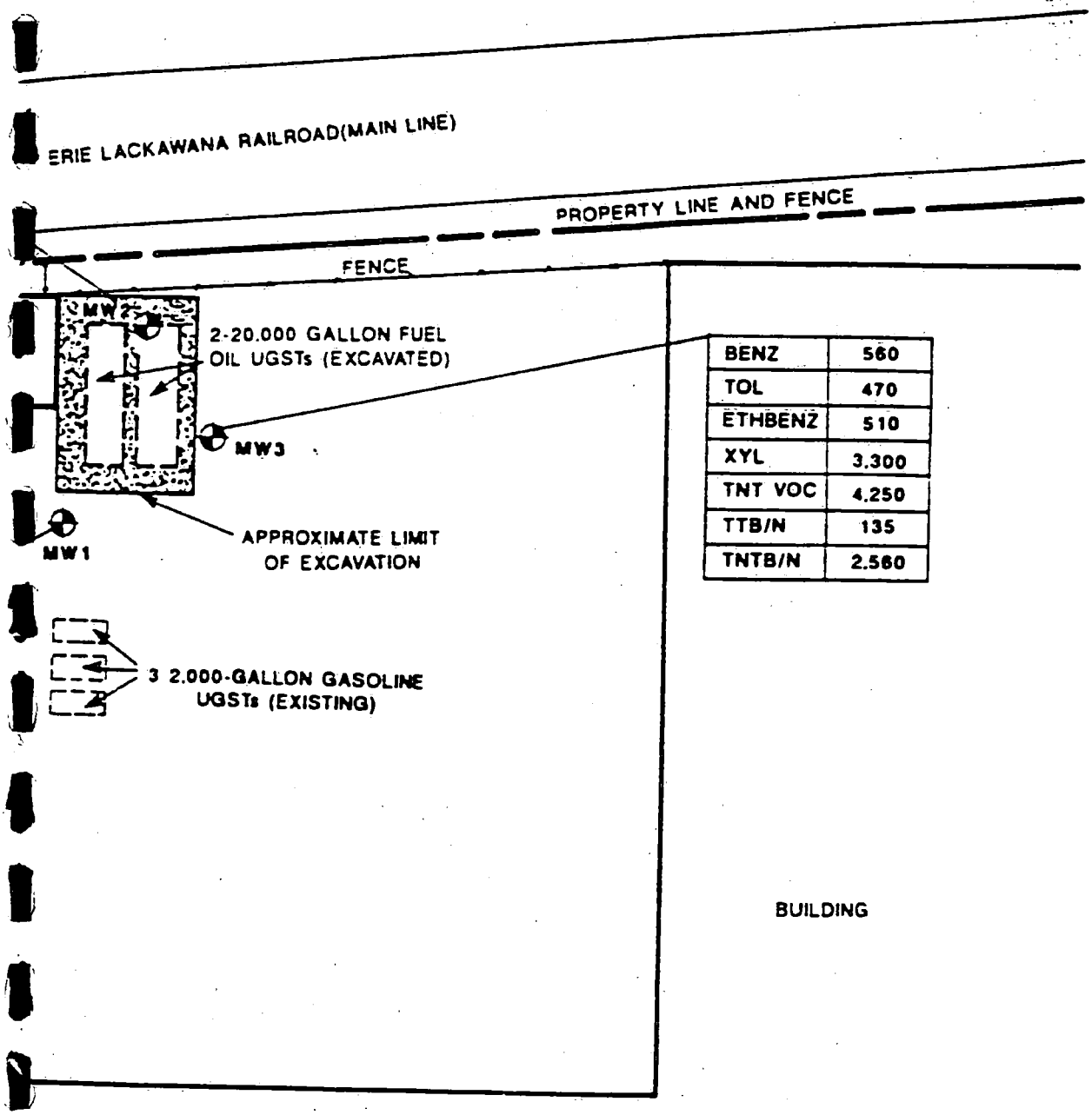
WELL SEARCH OF NJDEP PERMITTED WELLS

297 GETTY AVENUE ASSOCIATES - PATERSON, NJ

PREPARED BY: PG/MV	DATE: MAY 1991
JOB NO.: 90C830	FIGURE: 2


N
BENZ 38
ETHBENZ 100
TNT VOC 181
TTB/N 1.5
TNTB/N 230
ERIE LACKAWANA RAILROAD(MAIN LINE)
FENCE
MW2
2-20,000 GALLON FUEL OIL UGSTs (EXCAVATED)
MW3
BUILDING
MW1
APPROXIMATE LIMIT OF EXCAVATION
BENZ 5,000
TOL 1,900
ETHBENZ 880
XYL 3,800
TNT VOC 1,880
TTB/N 143
TNTB/N 2,856
3 2,000-GALLON GASOLINE UGSTs (EXISTING)
PROPERTY LINE AND FENCE

EX



BENZ	560
TOL	470
ETHBENZ	510
XYL	3,300
TNT VOC	4,250
TTB/N	135
TNTB/N	2,560

MW1 LO
MO

BENZ	5,000
TOL	1,900
ETHBENZ	880
XYL	3,800
TNT VOC	1,880
TTB/N	143
TNTB/N	2,856

PAF

CO
BIL

BENZ = BEN
TOL = TOL
ETHBENZ = ETH
XYL = TOT
TNT VOC = TOT ORG
TTB/N = TOT
TNTB/N = TOT

D
57 E. Willo

RESULTS

GETTY AVEN

PREPARED BY: P

JOB NO.: 90C83

EXPLANATION

MW1 LOCATION AND DESIGNATION OF MONITORING WELL

PARAMETERS	CONCENTRATIONS IN PARTS PER BILLION (ppb)
BENZ	5,000
TOL	1,900
ETHBENZ	880
XYL	3,800
TNT VOC	1,880
TTB/N	143
TNTB/N	2,856

BENZ = BENZENE

TOL = TOLUENE

ETHBENZ = ETHYLBENZENE

XYL = TOTAL XYLENES

TNT VOC = TOTAL NON-TARGETED VOLATILE ORGANIC COMPOUNDS

TTB/N = TOTAL TARGETED BASE NEUTRALS

TNTB/N = TOTAL NON-TARGETED BASE NEUTRALS

0 40 FT.

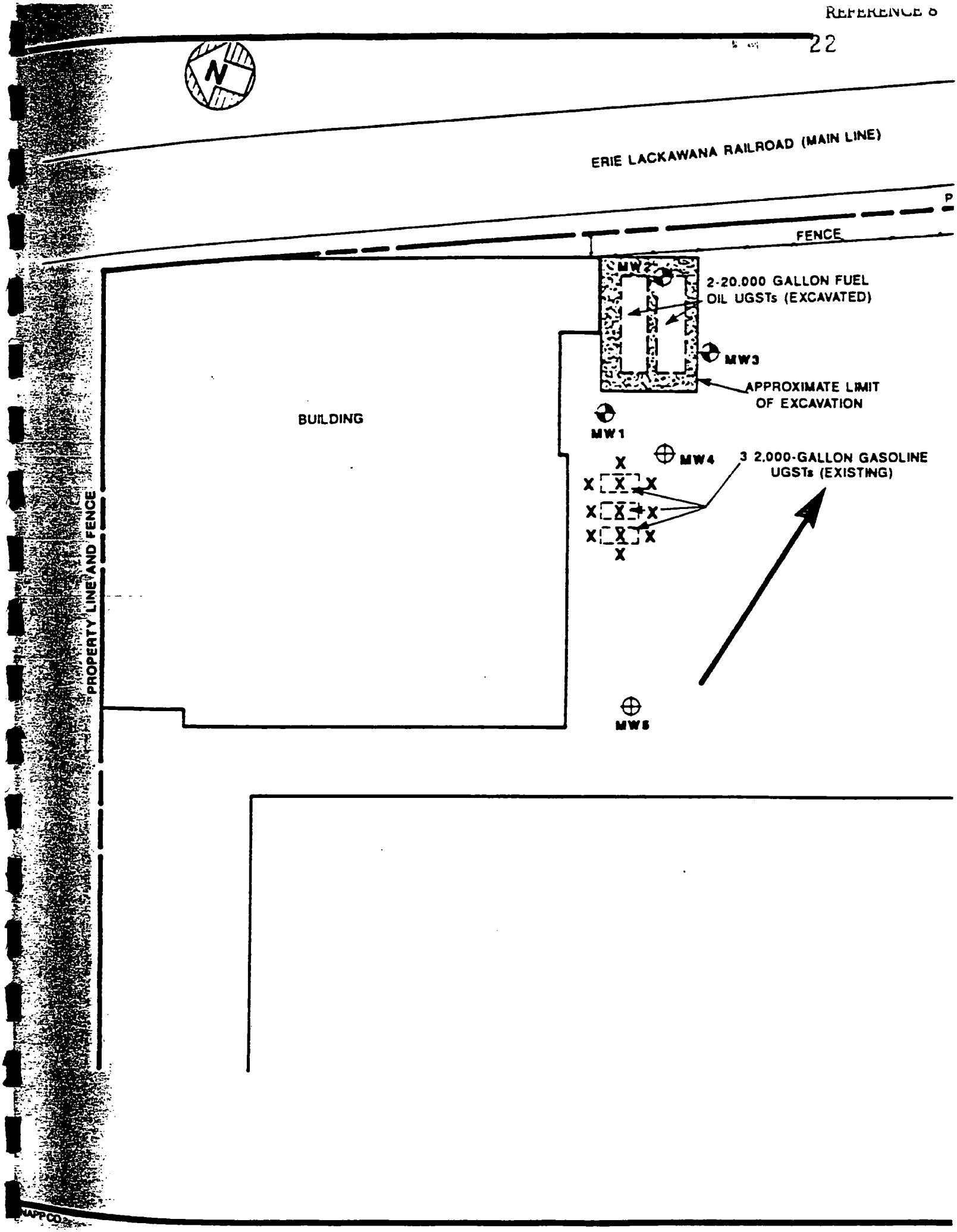
APPROXIMATE SCALE

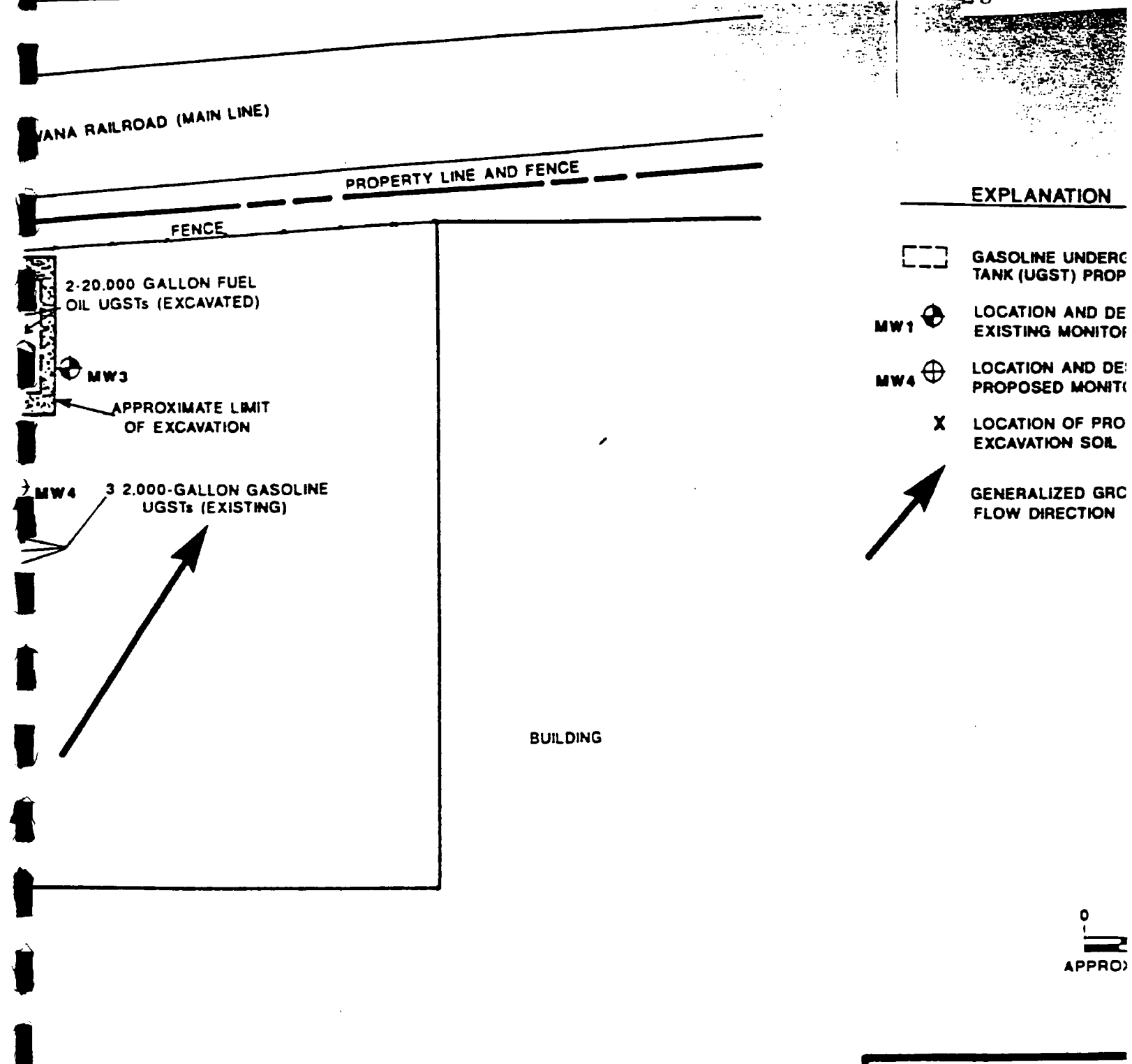
Dan Raviv Associates, Inc.
57 E. Willow Street Millburn, NJ 07041

RESULTS OF VOC AND B/N ANALYSES IN GROUND WATER
APRIL 11, 1991

GETTY AVENUE ASSOCIATES - PATERSON, NJ

PREPARED BY: PG/MV	DATE: MAY 1991
JOB NO.: 90C830	FIGURE: 3


N
ERIE LACKAWANA RAILROAD (MAIN LINE)
FENCE
MW2
2-20,000 GALLON FUEL OIL UGSTs (EXCAVATED)
MW3
APPROXIMATE LIMIT OF EXCAVATION
BUILDING
MW1
MW4
3 2,000-GALLON GASOLINE UGSTs (EXISTING)
MW5
PROPERTY LINE AND FENCE



Dan Raviv
57 E. Willow Street

LOCATION OF UGSTs PR
AND PROPOSED SITE
SAMPLE AND MONITOR

297 GETTY AVE. ASSO

PREPARED BY: MRF/ODL

JOB NO.: 90C830

E

LDING

EXPLANATION

GASOLINE UNDERGROUND STORAGE TANK (UGST) PROPOSED FOR CLOSURE

MW1 LOCATION AND DESIGNATION OF EXISTING MONITORING WELL

MW4 LOCATION AND DESIGNATION OF PROPOSED MONITORING WELL

X LOCATION OF PROPOSED POST-EXCAVATION SOIL SAMPLE

GENERALIZED GROUND WATER FLOW DIRECTION

0 40 FT

APPROXIMATE SCALE

Dan Raviv Associates, Inc.
57 E. Willow Street Millburn, NJ 07041

LOCATION OF UGSTs PROPOSED FOR CLOSURE AND PROPOSED SITE ASSESSMENT SOIL SAMPLE AND MONITORING WELL LOCATIONS

297 GETTY AVE. ASSOCIATES - PATERSON, NJ

PREPARED BY: MRF/ODL	DATE: JUNE 1991
JOB NO.: 90C830	FIGURE: 4

TABLES

Table I

Summary of Well Search
of NJDEP Permitted Wells (1)
297 Getty Avenue Associates
Paterson, New Jersey

Well No. (2)	Owner	Distance from Site (3)	Well Depth (3)	Interval (4) Screened	Use	Pump Rate (5)
1	M & M Lumber Co.	2,400	125	30-125	Industrial	30
2	Donald Maley	5,000	105	22-105	Industrial	20
3	F.E.R. Realty Co., Inc.	5,000	307	32-307	Industrial	300
4	Fritzsche Brothers	4,800	600	21-600	Industrial	210
5	Scientific Electro Corp.	4,900	250	21-250	Industrial	55
6	Sea Breeze Products Co.	1,400	180	34-180	Industrial	65
7	Colorite Plastic of N.J. Inc.	800	200	20-200	Industrial	254
8	Manhattan Casting Co.	1,600	220	20-220	Industrial	150
9	A.G.L. Welding Supply Co.	5,200	215	50-215	Industrial	65
10	Peter Garafano & Son Inc.	2,700	140	24-140	Industrial	201
11	Augsburger Tool & Die Co.	5,000	200	24-200	Industrial	100
12	Augsburger Tool & Die Co.	5,000	200	24-200	Industrial	100
13	Robert Waitts Crown Roll Leaf Inc.	2,700	200	31-200	Industrial	80
14	Robert Waitts Crown Roll Leaf Inc.	2,700	200	31-200	Industrial	75
15	Farmland Dairy	5,000	505	25-505	Industrial	255
16	Passaic County Park Commission	4,200	425	50-425	Industrial	25
17	First National Bank and Trust Company	2,800	200	12-200	Industrial	125
18	Art-Son Realty Co.	4,200	200	27-200	Industrial	100
19	Gurnsey Crest Ice Cream Co.	5,200	100	25-100	Industrial	20
20	Paterson Board of Education	4,400	312	63-312	Irrigation	30
21	United States Package Corp.	700	101	23-101	Industrial	18
22	Heller Candy Co., Inc.	1,700	315	25-315	Industrial	157
23	River Pulp Co.	3,000	400	39-400	Industrial	350
24	Minsbrenner Prints Inc.	3,600	300	50-300	Industrial	(?)
25	Madison Avenue Baptist Church	4,000	250	38-250	Industrial	276
26	Madison Avenue Baptist Church	4,000	270	50-270	Irrigation	200+
27	Richardson Funeral Home	5,000	190	22-190	Industrial	45
28	Lakeview Savings	3,000	130	36-130	Industrial	18
29	Wrights Diner	1,800	220	18-220	Industrial	70
30	Mountainside Inn	3,200	132	20-132	Industrial	36
31	Food Fairstores Inc.	5,000	211	21.5-211	Industrial	150
32	Carrol Plaza Hotel	4,600	140	37-140	Industrial	30
33	Separate Sanitary Laundry	4,700	120	20-120	Industrial	75
34	S. Malatesta & Son	2,200	19	9-19	Monitoring	10
35	Krystinel Corp.	2,100	13.5	3.5-13.5	Monitoring	NA(6)
36	Krystinel Corp.	2,100	13	3-13	Monitoring	NA
37	Kyrstinel Corp.	2,100	10	3-10	Monitoring	NA
38	Krystinel	2,100	14.5	4.5-14.5	Monitoring	NA

Dan Raviv Associates, Inc.
Job No. 90C830

REFERENCE 0

Table 1 (cont'd)

Summary of Well Search
of NJDEP Permitted Wells (1)
297 Getty Avenue Associates
Paterson, New Jersey

Well No. (2)	Owner	Distance from Site (3)	Well Depth (3)	Interval Screened (4)	Use	Pump Rate (5)
39	Samuel Toscano	2,600	19	14-19	Monitoring	NA (6)
40	Samuel Toscano	2,600	19	14-19	Monitoring	NA
41	Samuel Toscano	2,600	19	14-19	Monitoring	NA
42	Samuel Toscano	2,600	15	5-15	Monitoring	NA
43	Samuel Toscano	2,600	25	15-25	Monitoring	NA
44	Samuel Toscano	2,600	24	14-24	Monitoring	NA
45	Bogue Electric Manufacturing Co.	1,600	20	10-20	Monitoring	2+
46	Bogue Electric Manufacturing Co.	1,600	20	10-20	Monitoring	2+
47	Bogue Electric Manufacturing Co.	1,600	20	10-20	Monitoring	2+
48	M & S Realty	2,400	16	3-16	Monitoring	NA
49	M & S Realty	2,400	16	6-16	Monitoring	NA
50	M & S Realty	2,400	16.5	6.5-16.5	Monitoring	NA
51	M & S Realty	2,400	16	6-16	Monitoring	NA
52	M & S Realty	2,400	17	7-17	Monitoring	NA

Dan Raviv Associates, Inc.
Job No. 90C830

Notes: (1) Industrial wells within 1 mile of site and monitoring wells within 1/2 mile of site are identified.

(2) Well number refers to wells identified on Figure 2

(3) Distance from site and well depth are in feet.

(4) Interval screened is feet below ground surface.

(5) Pump rate is in gallons per minute

(6) NA - Not Available.

REFERENCE 8

Table II

Monitoring Well Completion Data
297 Getty Avenue Associates
Paterson, New Jersey

Monitoring Well No.	Date of Completion	Well Permit No.	Total Depth from Ground Surface (ft)	Screened Interval Below Ground Surface (ft)
MW-1	3/20/91	26-24123-4	25	10-25
MW-2	3/20/91	26-24124-2	20	5-20
MW-3	3/20/91	26-24125-1	30	10-30

Dan Raviv Associates, Inc.
Job No. 90-810

REFERENCE 8

Table III

Ground Water Elevation Data
297 Getty Avenue Associates
Paterson, New Jersey

Date Measured:	4/11/91		05/09/91		05/30/91	
Monitoring Well No.	Depth to Water (1)	Ground Water Elevation (ft., MSL)(2)	Depth to Water (1)	Ground Water Elevation (ft., MSL)	Depth to Water (1)	Ground Water Elevation (ft., MSL)
MW1 (3)	16.37	104.98	15.45	105.90	16.51	104.85 (4)
MW2 (3)	9.15	112.01	8.99	112.17	9.46	111.70
MW3 (3)	17.44	101.15	16.69	104.93 (4)	19.68	104.03 (4)

Notes:

(1) Measured from top of PVC casing.
(2) ft., MSL = feet, Mean Sea Level.
(3) Measuring point elevations (ft., MSL):
MW1 = 121.35
MW2 = 121.16
MW3 = 121.59
(4) Free product gasoline was observed in MW-3 on May 9, 1991 and MW-1 and MW-3 on May 30, 1991. To determine correct ground water elevation, a conversion factor is required. Corrected depth to ground water (DTW) = DTW - (Product Thickness, feet) (Product Density, 0.75 g/ml). Value of Product Density provided by The Soil Chemistry of Hazardous Materials, Hazardous Materials Control Research Institute, 1988.

Dan Raviv Associates, Inc.
Job No. 90C830

REFERENCE 6

T4W#:191

Table IV

Summary of Volatile Organic Compounds in Ground Water
297 Getty Avenue Associates
Paterson, New Jersey
April 1991

DRAI Sample No.	MW-1	MW-2	MW-3	FB	TB
Date Sampled	4/11/91	4/11/91	4/11/91	4/11/91	4/10/91
Lab Sample No. (1)	E110182	E110183	E110184	E110185	E110186
Targetted VOCs(2) (ppb)(3)					
Benzene	5,000	38	560	ND	ND
Ethylbenzene	880	100	510	:	:
Toluene	1,900	ND	470	:	:
m-Xylene	2,000	:	1,600	:	:
p,o-Xylene	1,800	ND	1,700	ND	ND
Total Targetted (VOCs) (ppb):	11,580	138	4,840	ND	ND
Non-Targetted VOCs (ppb)					
Butane, 2-methyl-	1,200	ND	710	ND	ND
1-Butene, 2-methyl-	370	:	100	:	:
Pentane	310	ND	ND	:	:
1-Pentene, 2-methyl-	ND	17	:	:	:
1H-Tetrazole, 5-methyl-	:	36	:	:	:
Benzene, propyl-	:	17	ND	:	:
Benzene, (1-methylethyl)	:	45	510	:	:
Cyclopropane, 1,2-dimethyl-, cis-	:	ND	270	:	:
Cyclopentane, methyl-	:	:	270	:	:
1-Propene, 2-methyl-	:	:	180	:	:
Hexane	:	:	120	:	:
Benzene, 1,2-dimethyl-(m-Xylene)	:	:	1,100 (5)	:	:
Benzene, 1-ethyl-2-methyl-	:	ND	930	:	:
Unknown	ND	66	60	ND	ND
Total Non-Targetted VOCs (ppb):	1,880	181	4,250	ND	ND
Total Targetted and Non-Targetted VOCs (ppb):	13,460	319	9,090	ND	ND

Notes: (1) Samples analyzed by Accutest Laboratories of Dayton, New Jersey using EPA Method 624. Only those compounds detected are reported.
(2) VOCs - Volatile Organic Compounds.
(3) ppb - Parts per billion.
(4) ND - Not Detected.
(5) This compound already identified and reported as target compound.

Dan Raviv Associates, Inc.
Job No. 90830

REFERENCE 6

T5-BN491

Table V

Summary of Base Neutral Compounds in Ground Water
297 Getty Avenue Associates
Paterson, New Jersey
April 1991

DRAI Sample No.	MW-1	MW-2	MW-3	FB
Date Sampled	4/11/91	4/11/91	4/11/91	4/11/91
Lab Sample No. (1)	E110182	E110183	E110184	E110185
Targetted B/Ns(2) (ppb)(3)				
Acenaphthene	1.7	1.5	3.8	ND
Fluorene	1.7	ND	4.8	;
Naphthalene	140	;	110	;
Anthracene	ND	;	2.2	;
Fluoranthene	;	;	3.1	;
Phenanthrene	;	;	7.4	;
Pyrene	ND	ND	3.3	ND
Total Targetted B/Ns (ppb):	143.4	1.5	134.6	ND
Non Targetted B/Ns (ppb)				
Benzene, methyl- (Toluene)	150 (5)	ND	160 (5)	ND
Benzene, ethyl-	270 (5)	46 (5)	88 (5)	;
Benzene, 1,2-dimethyl- (Xylenes)	790 (5)	ND	710 (5)	;
Benzene, 1-ethyl-2-methyl-	320	11	110	;
Benzene, 1,2,3-trimethyl-	520	ND	470	;
Benzene, (1-methylethyl)	140	;	150	;
1H-Indene, 2,3-dihydro-	150	12	120	;
Benzene, 1-ethynyl-4-methyl-	73	ND	ND	;
Benzene, 1-ethyl-2,3-dimethyl	67	;	ND	;
Benzene, 1-methyl-3-(1-methylethyl)	59	ND	220	;
1H-Indene, 2,3-dihydro-4-methyl	17	26	21	;
Benzene, propyl-	ND	6	ND	;
Benzene, 1,2-diethyl-	;	16	;	;
Benzene, 1-methyl-4-propyl-	;	6	;	;
Benzene, 2-ethyl-1,4-dimethyl	;	5	;	;
Benzene, 1,2,3,4-tetramethyl-	;	16	;	;
1H-Indene, 2,3-dihydro-1-methyl-	;	10	;	;
1H-Indene, 2,3-dihydro-4,7-dimethyl	ND	4	ND	ND
(CONT'D)				

Notes: (1) Samples analyzed by Accutest Laboratories of Dayton, New Jersey using EPA method 625. Only those compounds detected are reported.
(2) B/Ns - Base Neutral Compounds.
(3) ppb - Parts per billion.
(4) ND - Not Detected.
(5) This compound already identified and reported as target compound (on volatile fraction).

Dan Raviv Associates, Inc.
Job No. 90C830

T5-BN491

Table V (cont'd)

Summary of Base Neutral Compounds in Ground Water
297 Getty Avenue Associates
Paterson, New Jersey
April 1991

DRAI Sample No.	MW-1	MW-2	MW-3	FB
Date Sampled	4/11/91	4/11/91	4/11/91	4/11/91
Lab Sample No. (1)	E110182	E110183	E110184	E110185
Non-Targetted B/Ns (ppb)				
(CONT'D)				
Naphthalene, 2-methyl-	ND	7	ND	ND
Benzene, 1-ethyl-3-methyl	!	ND	320	!
Benzene, 1-methyl-3-propyl	!	!	110	!
1H-Indene, 2,3-dihydro-4-methyl	!	ND	21	!
Unknown	ND	5	ND	ND
Total Non-Targetted B/Ns (ppb):	2,856	230	2,560	ND
Total Targetted and Non-Targetted B/Ns (ppb):	2,999.4	231.5	2,694.6	ND

Notes: (1) Samples analyzed by Accutest Laboratories of Dayton, New Jersey using EPA method 625. Only those compounds detected are reported.
(2) B/Ns - Base Neutral Compounds.
(3) ppb - Parts per billion.
(4) ND - Not Detected.
(5) This compound already identified and reported as target compound (on volatile fraction).

Dan Raviv Associates, Inc.
Job No. 900830

REFERENCE 0

APPENDIX A

DEPARTMENT OF ENVIRONMENTAL PROTECTION
BUREAU OF UNDERGROUND STORAGE TANKS
DICAR SUMMARY SHEET

ase # 90-07-17-1203

ill in "Yes" "No" "N/A" (non-applicable) or "U" (unknown) after ach completed statement and the appropriate response after each ncompleted statement. Explain any "No" "U" or "N/A" responses.

.) The substance(s) discharged was (were) fuel oil

.) The highest ground water contamination at any 1 sampling ocation and at any 1 sampling event to date has been determined o be:

.) 11,580 ppb total BTEX, 4,250 ppb total non-targeted VOC
.) 144 ppb total B/N, 2,999 ppb total non-targeted B/N
.) N/A ppb MTBE, N/A ppb TBA
.) N/A ppb N/A (for non-petroleum substance)
.) greatest thickness of separate phase product found 0.16'
.) separate phase product has been delineated No

a.) A well search (including a review of manual well records) ndicates that private, municipal or commercial wells do exist ithin the distances specified in the Scope of Work. Yes
.) The number of these wells identified is 33 . (Industrial and Irrigation)

a.) The shallowest depth of any well noted in the well search hich may be in the horizontal or vertical potential path (s) of he contaminant plume(s) is 101 feet below grade consideration has been given for the effects of pumping, ubsurface structures, etc. on the direction(s) of contaminant igration). This well is 700 feet from the source and its creening begins at a depth of 23 feet.
.) The shallowest depth to the top of the well screen for any ell in the potential path of the plume(s) (as described in #4a bove) is 20 feet below grade. This well is located 900 eet from the source.
c.) The closest horizontal distance of a private, commercial or unicipal well in the potential path of the plume (as determined n #4a) is 700 feet from the source. This well is 101 eet deep and screening begins at a depth of 23 feet.

5.) A plan for separate phase product recovery has been ncluded. No

6.) A ground water contour map has been submitted which includes he ground water elevations for each well. No (See Explanation Section 4.2)

7.) Any vapor hazards which the consultant or the client have ecome aware of have been mitigated. N/A

8a.) The ground water contaminants have been delineated to MCLs r lower values at the property boundaries. No
b.) The plume is suspected to continue off the property at concentrations greater than MCLs. U
c.) Off property access: is being sought/ has been approved/ N/A has been denied (circle one).

(OVER)

) Boring logs have been included. Yes

0.) The scaled site map includes the following:
.) north arrow and scale Yes
.) locations of above ground structures Yes
.) locations, depths & function of sub-surface structures N/A
.) locations, depths and contents of the removed tank(s) Yes
.) locations of wells and the well permit #s Yes
.) analytical results of all ground water samples Yes
.) locations of surface water bodies N/A

11a.) All free product contaminated soil on the property boundaries and above the water table are believed to have been removed from the subsurface. Yes

b.) free product contaminated soils are suspected to exist below the water table. No

c.) free product contaminated soils are suspected to exist off the property boundaries. No

12.) The registration number(s) for the investigated tanks have been provided in this report. Yes

****

This form must be signed by the qualified ground water consultant responsible for reviewing or preparing the contents of the report AND by the owner/operator who is submitting this report.

"I certify under penalty of law that the information provided in this document is true, accurate and complete and was obtained by procedures in compliance with N.J.A.C. 7:14B-8. I am aware that there are significant civil and criminal penalties for submitting false, inaccurate or incomplete information, including fines and/or imprisonment."

Consulting Firm: Dan Raviv Associates, Inc.

Name of Consultant: Kenneth Siat Peter Grogan

Signature: [signature] Peter Grogan Date: 6-21-91

Phone #: (201) 564-6006

"I certify under penalty of law that I have personally examined and am familiar with the information submitted in this transmittal and all attached documents, and that based on my inquiry of those individuals immediately responsible for obtaining the information, I believe that the submitted information is true, accurate and complete. I am aware that there are significant civil and criminal penalties for submitting false, inaccurate or incomplete information, including the possibility of fines and/or imprisonment."

Owner/Operator's Company Name: 297 Getty Avenue Associates

Owner/Operator's Name: Jacob Quick

Signature: [signature] Date: 6-21-91

Phone #: 201-226-5000

APPENDIX B

State of New Jersey
DEPARTMENT OF ENVIRONMENTAL PROTECTION
DIVISION OF WATER RESOURCES
CN 029
Trenton, N.J. 08625-0029

(609) 292-1637
Fax # (609) 984-7938

The enclosed well search which you had requested includes the wells that are currently contained in the Well Record Files of the Bureau of Water Allocation for the area in question. Recognizing the fact that not all well records have been submitted, wells installed before 1947 are not included, and that there can be errors in location, it is advisable to use this resource as a guide. The Bureau recommends that a field survey of the area in question be performed in order to verify all data. The Bureau tries to maintain accurate well records; however, well locations are only as accurate as the information supplied by the drilling company. Therefore, the Bureau cannot guarantee their reliability. Local Health Departments should also be contacted concerning the location of wells within their jurisdiction. Please write to us in reference to "Well Surveys" at:

NJDEP
Division of Water Resources
Bureau of Water Allocation
CN-029
Trenton, New Jersey 08625

Calls regarding "Well Surveys" can be made between 4:30 pm and 5:00 pm to (609) 292-2957.

Thank you.

New Jersey is an Equal Opportunity Employer
Recycled Paper

REFERENCE 6

38

Dan Raviv Associates, Inc.
Consultants in hydrogeology, water quality, landfill hydrology and ECRA/NJPDES compliance

Dan D. Raviv
Roberta N. Hoy

William F. Althoff
David J. Morrow
Kenneth B. Siet
Raymond E. Simonds
Edwin D. Tichenor

March 26, 1991

State of New Jersey
Department of Environmental Protection
Division of Water Allocation
401 East State Street
Trenton, New Jersey 08625

Attention: Mr. Jan Gheen
Well Radius Program Operator

Re: Request for Well Search
297 Getty Avenue Associates
Paterson, New Jersey
Case No. 90-07-17-1203
DRAI Job No. 90P830

Dear Mr. Gheen:

Dan Raviv Associates, Inc. (DRAI) is requesting a well search to be conducted in a 1-mile radius for the following site:

297 Getty Avenue Associates
297 Getty Avenue
Paterson, New Jersey
Latitude: 40°53'58"
Longitude: 74°09'32"
Paterson Quadrangle

A figure showing the site location and a check for $230 are enclosed.

If you have any questions or need additional information, please call.

Very truly yours,

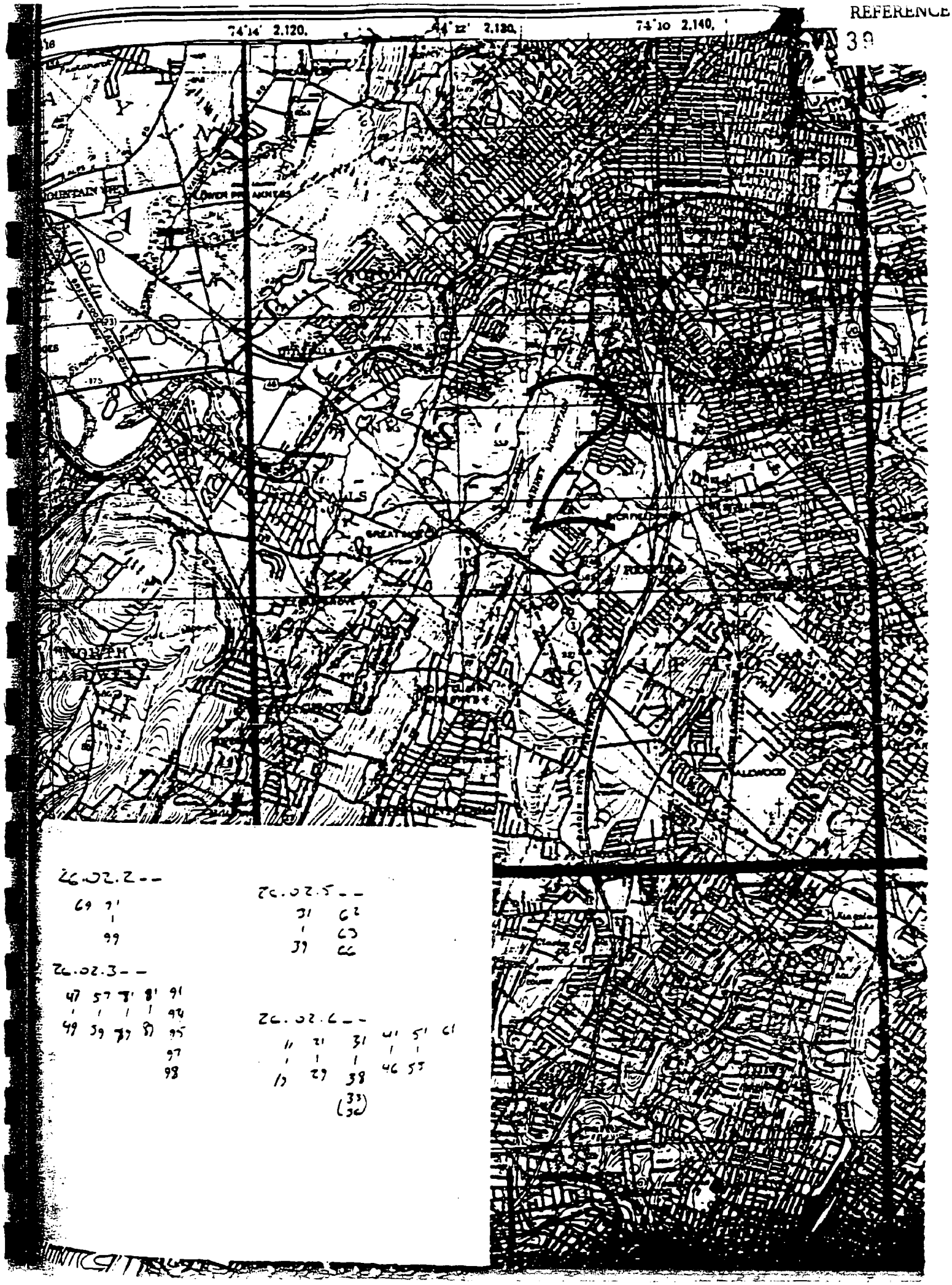
DAN RAVIV ASSOCIATES, INC.

Peter Grogan

Peter Grogan
Hydrogeologist

PG/nl
Enc.

57 East Willow Street Millburn, New Jersey 07041 (201) 564-6006/FAX (201) 564-6442



26.02.2--
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1
99

26.02.3--
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49 59 79 87 95
97
98

26.02.5--
31 62
1 63
39 66

26.02.6--
11 21 31 41 51 61
1 1 1 1 1
13 29 38 46 55
(33
36)

REFERENCE 9

Dan Raviv Associates, Inc.

Consultants in hydrogeology, water quality, landfill hydrology and ECRA compliance

December 27, 1991

State of New Jersey
Department of Environmental Protection and Energy
Division of Responsible Party Site Remediation
Bureau of Underground Storage Tanks
CN-029
Trenton, New Jersey 08625-0029

Attention: Mr. Joseph Eaker, Case Manager

Re: Submittal of Supplemental Hydrogeological Investigation Report
297 Getty Avenue Associates
Paterson, New Jersey
BUST Case No. 90-07-17-1203
DRAI Job No. 90C830

Dear Mr. Eaker:

On behalf of 297 Getty Avenue Associates (Getty), Dan Raviv Associates, Inc. (DRAI) submits the following report for your review and comment. The purpose of the investigation was to evaluate soil and ground water conditions associated with the closure of three gasoline underground storage tanks (UGSTs) at the Getty site in Paterson, New Jersey. This report is submitted in accordance with the requirements stated in the New Jersey Department of Environmental Protection and Energy (NJDEPE) letter of September 10, 1991.

Field tasks and the subsurface investigation at Getty included: UGST removal; excavation and disposal of petroleum contaminated soil; monitoring well installation and survey; ground water elevation measurement; calculation of ground water flow direction; and, ground water sampling and analysis.

The results of the tank removal work and the supplemental hydrogeologic investigation indicate that discharges from the former UGSTs have contaminated both soils and ground water at the site. Several monitoring wells revealed measurable quantities of floating product.

Recovery of floating product from two on-site monitoring wells commenced during October 1991. Product thicknesses have been reduced by this interim remedial measure. Upon the successful completion of floating product recovery, DRAI recommends that ground water monitoring be performed quarterly for one year to investigate the dissolved constituents of gasoline-type compounds.

57 East Willow Street, Millburn, New Jersey 07041 (201) 564-6006/FAX (201) 564-6442

If you have any questions or need additional information, please call.

Very truly yours,

DAN RAVIV ASSOCIATES, INC.

Peter Grogan

Peter Grogan
Hydrogeologist

Reviewed by:

Kenneth Siet
Regulatory Compliance

cc: Mr. Jason Quick, 297 Getty Avenue Assoc.
Mr. William Friedman, Brach, Eichler, et. al.

Dan Raviv Associates, Inc.
Consultants in hydrogeology, water quality, landfill hydrology and ECRA compliance

SUPPLEMENTAL HYDROGEOLOGICAL INVESTIGATION REPORT
297 GETTY AVENUE ASSOCIATES
PATERSON, NEW JERSEY
BUST CASE NO. 90-07-17-1203
DRAI JOB NO. 90C830

prepared for:

Mr. Jason Quick
297 Getty Avenue Associates
101 Eisenhower Parkway
Roseland, New Jersey 07068

prepared by:

Dan Raviv Associates, Inc.
57 East Willow Street
Millburn, New Jersey 07041

December 1991

57 East Willow Street, Millburn, New Jersey 07041 (201) 564-6006/FAX (201) 564-6442

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1.0 INTRODUCTION

On behalf of 297 Getty Avenue Associates (Getty), Dan Raviv Associates, Inc. (DRAI) has prepared this report entitled "Supplemental Hydrogeologic Investigation Report, 297 Getty Avenue Associates, Paterson, New Jersey". The purpose of the investigation was to evaluate soil and ground water conditions associated with the closure of three gasoline underground storage tanks (UGSTs) at the Getty site at 297 Getty Avenue, Paterson, New Jersey. This report is being submitted in accordance with the requirements stated in the New Jersey Department of Environmental Protection and Energy (NJDEPE)-Bureau of Underground Storage Tanks (BUST) letter of September 10, 1991 (Appendix A). An implementation summary regarding the closure of three UGSTs is included in Appendix B.

In June 1991, DRAI submitted to NJDEPE a Discharge Investigation and Corrective Action Report (DICAR) summarizing the results of an investigation concerning the reported discharge from two 10,000-gallon heating oil UGSTs. As discussed in that report, three monitoring wells were installed at the site. The three wells (MW1, MW2 and MW3, as shown on Figure 1) were installed to monitor the impact of the two former heating oil UGSTs on ground water quality.

The results of the analyses indicated elevated concentrations of volatile organic compounds (VOCs) and base neutral compounds (B/Ns) in ground water. Additionally, floating product was observed in two of the monitoring wells (MW1 and MW3). The direction of ground water flow was not definitively determined as part of the investigation but was predicted to be towards the east.

As discussed in the DRAI June 1991 report, the ground water sample from the upgradient well, MW1, contained elevated concentrations of benzene, toluene, ethylbenzene and xylene. These compounds are typical of gasoline type products. Additionally, MW1 revealed the presence of a layer of floating product. Based upon ground water results and the location (upgradient) of three existing gasoline UGSTs, DRAI recommended that the gasoline tanks be properly closed and that soil and ground water quality be investigated. To fufill NJDEPE site assessment requirements, post excavation soil sampling and the installation and sampling of two additional monitoring wells was proposed. The NJDEPE approved DRAI's closure plan on July 9, 1991.

In addition to tank closure, the NJDEPE required floating product recovery, investigation of the neighborhood for unpermitted wells and installation of a monitoring well downgradient of existing wells to define the extent of ground water contamination.

2.0 FIELD INVESTIGATION

2.1 UGST Excavation and Removal

Getty retained the services of Inland Pollution Services, Inc. (IPSI), of Elizabeth, New Jersey to excavate and remove three 2,000-gallon gasoline UGSTs (Figure 1). Removal of the gasoline UGSTs commenced on July 17, 1991. Representatives of the Paterson Health Department were present during removal of the tanks.

Prior to removing the UGSTs, IPSI excavated to the top of the UGSTs and purged the tanks with compressed air to remove explosive vapors. The Lower Explosive Limit (LEL) and oxygen concentrations were continuously monitored prior to cutting open and entering the tanks. Perched water within the backfill material was observed to be flowing into Tanks #1 and #2 (Figure 2). Gasoline and water inside the tanks was removed by vacuum truck for proper disposal. Additionally, residual liquid from the tanks was cleaned and vacuumed. Numerous holes were observed on the top and inside Tanks #1 and #2 prior to removal from the ground. The holes were apparently the result of corrosion. Based on Getty's records, at least two of the tanks were already in the ground in 1957. Piping associated to the tanks was cut, pumped of residual product and capped.

Tank removal activities proceeded by removing each of the UGSTs prior to excavating contaminated soil. One excavation was completed, encompassing all three UGSTs. Inspection of the tanks was performed by the DRAI geologist and Health Department personnel. Numerous holes and corrosion were observed on all three tanks. Contaminated soils were observed adjacent to the UGST. Contaminated soils were screened by the DRAI geologist utilizing a photoionization detector (HNu) and then excavated. HNu readings observed from the contaminated soil indicated elevated concentrations up to 20 parts per million (ppm). Weathered bedrock was encountered at approximately 6.0 feet below the ground surface (bgs), as shown on Figure 3). Excavation of contaminated soils was restricted to prevent undermining of a building and pipeline (Figure 2). Approximately 192 tons of non-DOT, non-RCRA regulated petroleum contaminated soil was excavated and disposed at Grand Central Sanitation, in Penn Argyl, Pennsylvania.

2.2 Collection of Post-Excavation Soil Samples

As required by the NJDEPE, ten post-excavation soil samples (GS-1 through GS-10) were obtained from the tank excavation at an interval of 5.5-6.0 feet bgs. The ten soil samples collected were submitted to Accutest Laboratories, Dayton, New Jersey for analyses of VOC+15, included targeted calibrations for methyl tertiary butyl ether (MTBE), tertiary butyl alcohol (TBA) and lead.

2.3 Monitoring Well Installation

Two additional monitoring wells (MW4 and MW5, Figure 1) were installed adjacent to the excavated gasoline UGSTs to evaluate ground water quality in the vicinity of the former UGSTs. The wells were installed on September 10-11, 1991 by Environmental Drilling, Inc., of West Creek, New Jersey, a

New Jersey licensed well driller, under the observation of a DRAI geologist. MW4 is located in the predicted downgradient direction within ten feet of the UGST excavation. MW5 is located upgradient of the excavated UGSTs.

The monitoring wells are constructed of 4-inch diameter PVC casing with 15 feet of 0.020 slot, PVC screen. Both wells were screened across the water table, which was observed during well installation to be approximately 16 feet bgs (MW4) and 9 feet bgs (MW5, Table I, Appendix C). Because the water table is within bedrock, a modified unconsolidated well specification was used. A 4-inch diameter PVC riser was installed from the top of the screen to the ground surface. The top of each PVC casing was covered with a flushmount protective steel cover and locking cap. All the wells were completed in accordance with NJDEPE protocols.

The wells were subsequently surveyed by Aqua Firma Surveys, of North Arlington, New Jersey, and plotted on a site map. Elevations of the PVC casings and the ground surface were measured to the nearest 0.01 foot.

Depth to ground water within each well was measured on September 26, October 11, November 8 and November 18, 1991 (Table II). Floating product was observed in MW1 and MW3 on all four dates. A thin layer (0.1-0.2 inch) of floating product was observed in MW4 on November 8 and 18, 1991. An oil/water interface probe was used to measure product thickness.

2.4 Ground Water Sampling

Ground water samples were obtained from the two monitoring wells on September 26, 1991. All sampling was done in accordance with NJDEPE-approved protocols. The wells were purged of standing water prior to sampling. Within two hours of evacuation, samples were collected with a dedicated teflon bailer, poured into laboratory-supplied bottles, and stored on ice. The samples were then transported, under chain of custody, to Accutest Laboratories for analyses of VOC+15, including MTBE and TBA.

2.5 Investigation of Non-Permitted Wells

A review of all well records available at the Paterson Health Department was performed. Records of eleven industrial wells not included in DRAI's original well search were located. A review of records provided by the NJDEPE and Paterson Health Department indicate than no domestic wells exist within 1/2 mile of the site. Copies of the eleven industrial well records are provided in Appendix D.

2.6 Floating Product Recovery

Recovery of floating product from MW1 and MW3 was initiated on October 11, 1991. Product is bailed weekly, with records maintained of product thickness and total gallons removed. As of the end of November 1991, a total of approximately 40 gallons of product/water mixture have been removed. Product thicknesses in MW3 have been reduced from approximately 3.5 inches (9/26/91) to 1.2 inches (11/18/91) and from about 7.9 inches (9/26/91) to 2.6 inches (11/18/91) in MW1. Product recovery will continue on a regular basis.

Since MW4 is located upgradient of MW3, the thin layer (0.1-0.2 inch) of floating product will not be bailed at this time. It is anticipated that floating product recovery from wells MW1 and MW3 will remediate the floating product in MW4. Monitoring of product thickness will be performed to determine the necessity of implementing recovery in the future.

Table I

Monitoring Well Completion Data
297 Getty Avenue Associates
Paterson, New Jersey

Monitoring Well No.	Date of Completion	Well Permit No.	Total Depth from Ground Surface (ft)	Screened Interval Below Ground Surface (ft)
MW4	9/11/91	2626586	25.5	10.5-25.5
MW5	9/11/91	2626587	22.5	7.5-22.5

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REFERENCE 5

Table II

Ground Water Elevation Data
297 Getty Avenue Associates
Paterson, New Jersey

Date Measured:	9/26/91		10/11/91		11/8/91	
Monitoring Well No.	Depth to Water (1)	Ground Water Elevation (ft., MSL)(2)	Depth to Water (1)	Ground Water Elevation (ft., MSL)	Depth to Water (1)	Ground Water Elevation (ft., MSL)
MW1 (3)	13.78	108.07 (4)	16.31	105.27 (4)	17.33	103.84 (4)
MW2 (3)	6.86	114.30	8.52	112.64	9.52	111.64
MW3 (3)	17.15	104.66 (4)	17.78	104.00 (4)	18.75	102.93 (4)
MW4 (3)	14.09	107.22	15.51	105.80	17.05	104.26 (4)
MW5 (3)	6.33	115.82	8.55	113.60	10.94	111.21

Notes:

(1) Measured from top of PVC casing.

(2) ft., MSL – feet, Mean Sea Level.

(3) Measuring point elevations (ft., MSL):

MW1 = 121.35
MW2 = 121.16
MW3 = 121.59
MW4 = 121.31
MW5 = 122.15

(4) Free product gasoline was observed in MW1 and MW3 on 9/26/91, 10/11/91, 11/8/91 and 11/18/91 and in MW4 on 11/8/91 and 11/18/91. To determine correct ground water elevation, a conversion factor is required. Corrected depth to ground water (DTW) = DTW – (Product Thickness, feet) (Product Density, 0.75 g/ml). Value of Product Density provided by The Soil Chemistry of Hazardous Materials, Hazardous Materials Control Research Institute, 1988.

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Table II (cont'd)

Ground Water Elevation Data
297 Getty Avenue Associates
Paterson, New Jersey

Date Measured: 11/18/91

Monitoring Well No.	Depth to Water (1)	Ground Water Elevation (ft., MSL)(2)
MW1 (3)	17.94	103.57 (4)
MW2 (3)	9.63	111.53
MW3 (3)	18.99	102.67 (4)
MW4 (3)	17.35	103.97 (4)
MW5 (3)	11.18	110.97

Notes:

(1) Measured from top of PVC casing.

(2) ft., MSL – feet, Mean Sea Level.

(3) Measuring point elevations (ft., MSL):

MW1 = 121.35
MW2 = 121.16
MW3 = 121.59
MW4 = 121.31
MW5 = 122.15

(4) Free product gasoline was observed in MW1 and MW3 on 9/26/91, 10/11/91, 11/8/91 and 11/18/91 and in MW4 on 11/8/91 and 11/18/91. To determine correct ground water elevation, a conversion factor is required. Corrected depth to ground water (DTW) = DTW – (Product Thickness, feet) (Product Density, 0.75 g/ml). Value of Product Density provided by The Soil Chemistry of Hazardous Materials, Hazardous Materials Control Research Institute, 1988.

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Table III

Summary of Volatile Organic Compounds in Soil

DRAI Sample No.:	GS-1	GS-2	GS-3	GS-4	GS-5	GS-6	GS-7	GS-8	GS-9	GS-10	FB	TB
Depth (ft below surface):	5.5-6.0	5.5-6.0	5.5-6.0	5.5-6.0	5.5-6.0	5.5-6.0	5.5-6.0	5.5-6.0	5.5-6.0	5.5-6.0		
Lab Sample No.:	E122265	E122266	E122267	E122268	E122269	E122270	E122271	E122273	E122274	E122275	E122276	E122277
Date Sampled:	7/19/91	7/19/91	7/19/91	7/19/91	7/19/91	7/19/91	7/19/91	7/19/91	7/19/91	7/19/91	7/19/91	7/16/91
Laboratory:	Accutest	Accutest	Accutest	Accutest	Accutest	Accutest	Accutest	Accutest	Accutest	Accutest	Accutest	Accutest
Targeted VOCs (ppb)												
Acrolein	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Acrylonitrile	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Benzene	ND	ND	ND	ND	ND	ND	ND	ND	ND	51	ND	ND
Bromoform	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Bromodichloromethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Bromomethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Carbon Tetrachloride	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Chlorobenzene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Chloroethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2-Chloroethyl Vinyl Ether	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Chloroform	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Chloromethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
cis-1,3-Dichloropropene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Dibromochloromethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dichlorobenzene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,3-Dichlorobenzene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,4-Dichlorobenzene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1-Dichloroethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dichloroethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1-Dichloroethylene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
trans-1,2-Dichloroethylene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
trans-1,3-Dichloropropene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dichloropropane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Ethylbenzene	600	ND	700	11,000	380 J	250 J	400	ND	110	480	ND	ND
Methylene Chloride	ND	ND	ND	ND	ND	ND	ND	ND	57 JB	19 JB	ND	ND
1,1,2,2-Tetrachloroethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Tetrachloroethylene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Toluene	ND	ND	ND	ND	120 J	ND	ND	ND	ND	90	ND	ND
1,1,1-Trichloroethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1,2-Trichloroethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Trichloroethylene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Trichlorofluoromethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Vinyl Chloride	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
m-Xylene	180 J	ND	69	52,000	800	350 J	4,100	23	150	500	ND	ND
p,o-Xylene	150 J	ND	1,100	47,000	310 J	600	3,800	16	30 J	370	ND	ND
TOTAL TARGETED VOCs (ppb):	930	ND	1,869	110,000	1,610	1,200	8,300	39	290	1,491	ND	ND
TOTAL NON-TARGETED VOCs (pp	8,430	44	7,748	186,400	39,570	68,500	42,700	548	870	1,151	ND	ND
TOTAL TARGETED AND NON-TARGETED VOCs (ppb)	9,360	44	9,617	296,400	41,180	69,700	51,000	587	1,160	2,642	ND	ND

ND = not detected.

J = estimated concentration detected below the Method Detection Limit.

B = compound detected in method blank and excluded from total.

Dan Raviv Associates, Inc.

Job No. 90C830

REFERENCE 9

Table IV

Summary of Volatile Organic Compounds in Ground Water

DRAI Sample No.:	MW-4	MW-5	FB	TB
Lab Sample No.:	E130440	E130441	E130442	E130443
Date Sampled:	9/26/91	9/26/91	9/26/91	9/25/91
Laboratory:	Accutest	Accutest	Accutest	Accutest
Targeted VOCs (ppb)				
Acrolein	ND	ND	ND	ND
Acrylonitrile	ND	ND	ND	ND
Benzene	7,800	59	ND	ND
Bromoform	ND	ND	ND	ND
Bromodichloromethane	ND	ND	ND	ND
Bromomethane	ND	ND	ND	ND
Carbon Tetrachloride	ND	ND	ND	ND
Chlorobenzene	ND	ND	ND	ND
Chloroethane	ND	ND	ND	ND
2-Chloroethyl Vinyl Ether	ND	ND	ND	ND
Chloroform	ND	ND	ND	ND
Chloromethane	ND	ND	ND	ND
cis-1,3-Dichloropropene	ND	ND	ND	ND
Dibromochloromethane	ND	ND	ND	ND
1,2-Dichlorobenzene	ND	ND	ND	ND
1,3-Dichlorobenzene	ND	ND	ND	ND
1,4-Dichlorobenzene	ND	ND	ND	ND
1,1-Dichloroethane	ND	ND	ND	ND
1,2-Dichloroethane	ND	ND	ND	ND
1,1-Dichloroethylene	ND	ND	ND	ND
trans-1,2-Dichloroethylene	ND	ND	ND	ND
trans-1,3-Dichloropropene	ND	ND	ND	ND
1,2-Dichloropropane	ND	ND	ND	ND
Ethylbenzene	1,800	79	ND	ND
Methylene Chloride	ND	ND	ND	ND
1,1,2,2-Tetrachloroethane	ND	ND	ND	ND
Tetrachloroethylene	ND	ND	ND	ND
Toluene	4,300	15	ND	ND
1,1,1-Trichloroethane	ND	ND	ND	ND
1,1,2-Trichloroethane	ND	ND	ND	ND
Trichloroethylene	ND	ND	ND	ND
Trichlorofluoromethane	ND	ND	ND	ND
Vinyl Chloride	ND	ND	ND	ND
m-Xylene	4,500	100	ND	ND
p,o-Xylene	4,000	81	ND	ND
TOTAL TARGETED VOCs (ppb):	22,400	334	ND	ND
Non-Targeted VOCs (ppb)				
Methyl Tert. Butyl Ether	ND	ND	ND	ND
Tertiary Butyl Alcohol	ND	ND	ND	ND
Others	2,850	845	31	22
TOTAL NON-TARGETED VOCs(ppb):	2,850	845	31	22
TOTAL TARGETED AND NON-TARGETED VOCs (ppb):	25,250	1,179	31	22

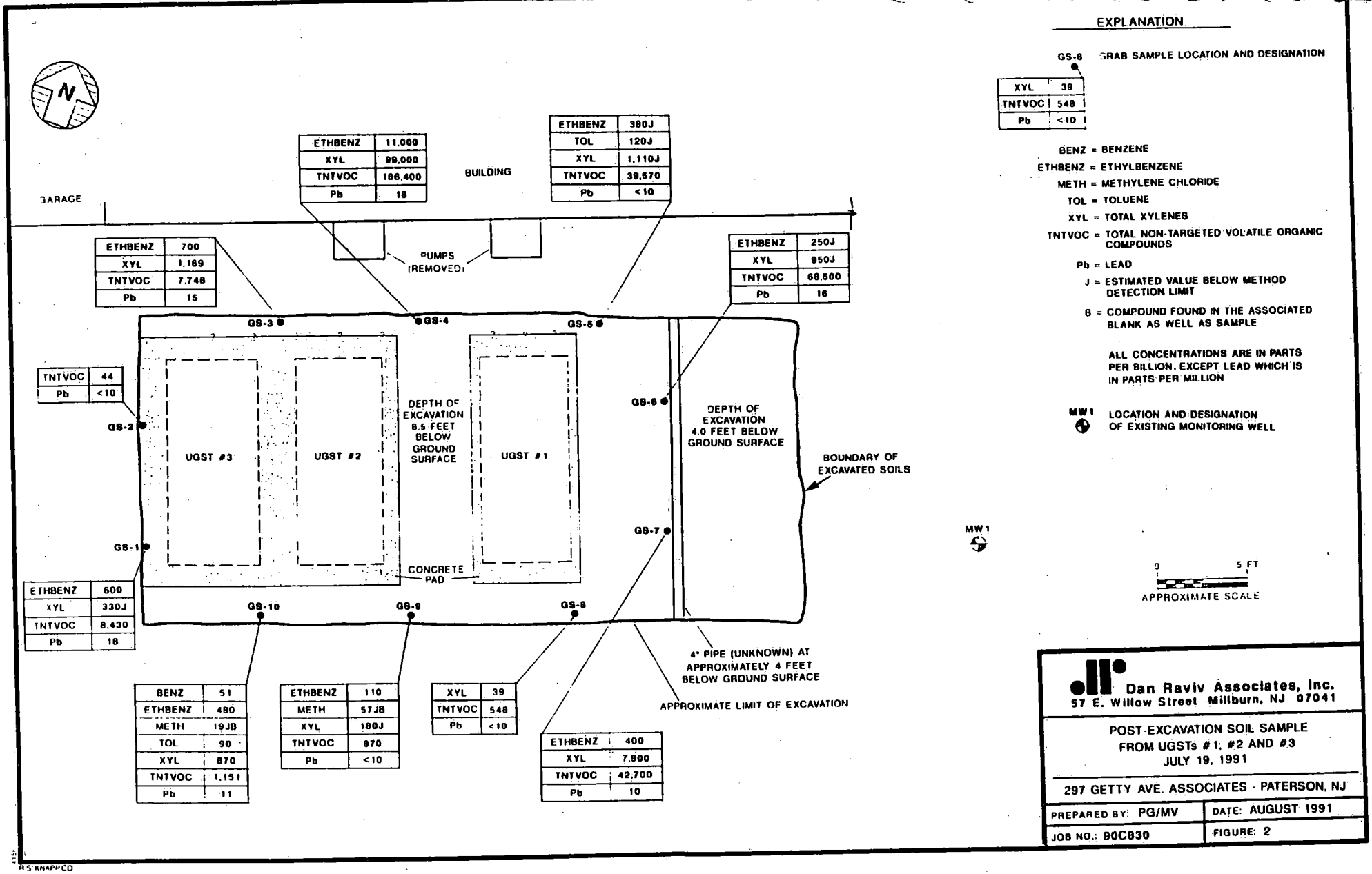
ND = not detected.

J = estimated concentration detected below the Method Detection Limit

B = compound detected in method blank and excluded from total.

Dan Raviv Associates, Inc.

Job No. 90C830



EXPLANATION

GS-8 GRAB SAMPLE LOCATION AND DESIGNATION

XYL	39
TNTVOC	548
Pb	<10

BENZ = BENZENE
ETHBENZ = ETHYLBENZENE
METH = METHYLENE CHLORIDE
TOL = TOLUENE
XYL = TOTAL XYLENES
TNTVOC = TOTAL NON-TARGETED VOLATILE ORGANIC COMPOUNDS
Pb = LEAD
J = ESTIMATED VALUE BELOW METHOD DETECTION LIMIT
B = COMPOUND FOUND IN THE ASSOCIATED BLANK AS WELL AS SAMPLE

ALL CONCENTRATIONS ARE IN PARTS PER BILLION, EXCEPT LEAD WHICH IS IN PARTS PER MILLION

MW1 LOCATION AND DESIGNATION OF EXISTING MONITORING WELL

Dan Raviv Associates, Inc.
57 E. Willow Street Millburn, NJ 07041

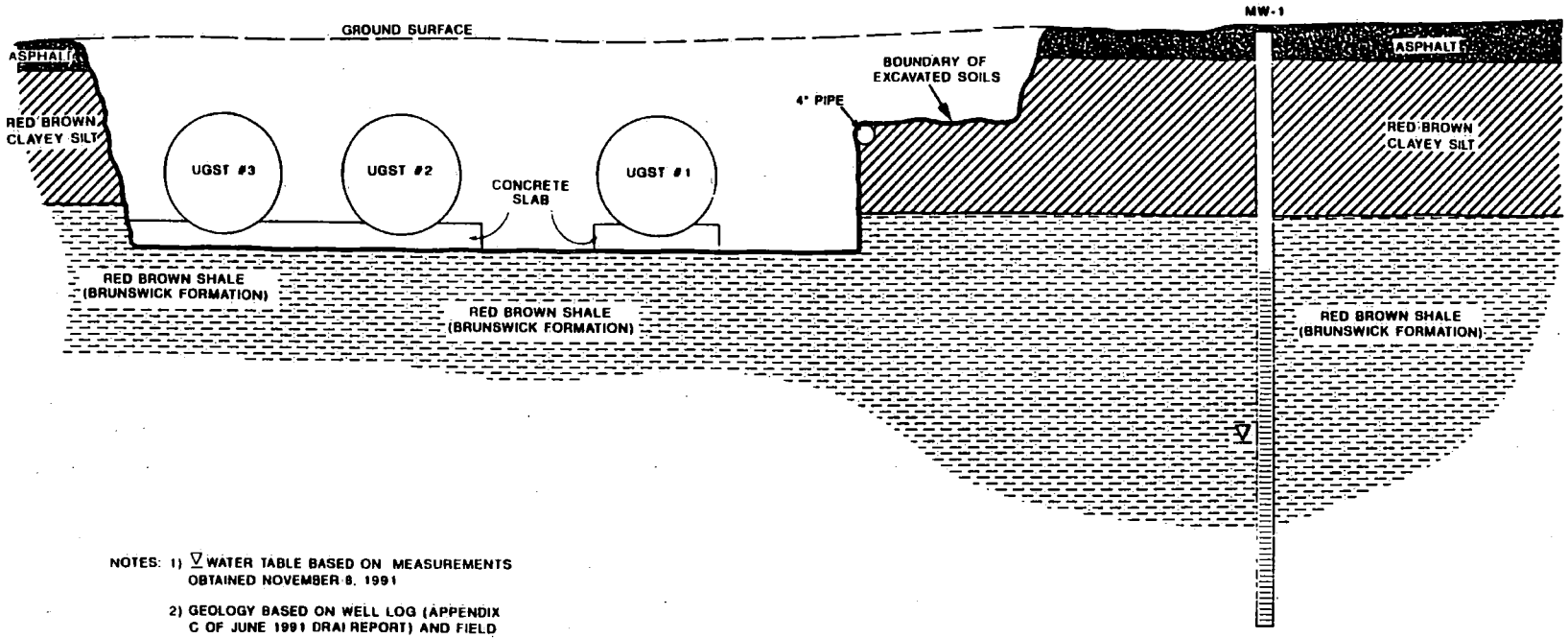
POST-EXCAVATION SOIL SAMPLE
FROM UGSTs #1, #2 AND #3
JULY 19, 1991

297 GETTY AVE. ASSOCIATES - PATERSON, NJ

PREPARED BY: PG/MV	DATE: AUGUST 1991
JOB NO.: 90C830	FIGURE: 2

R S KNAPPCO

15



NOTES: 1) ∇ WATER TABLE BASED ON MEASUREMENTS OBTAINED NOVEMBER 8, 1991

2) GEOLOGY BASED ON WELL LOG (APPENDIX C OF JUNE 1991 DRAI REPORT) AND FIELD OBSERVATIONS.

0 5 FT.
APPROXIMATE SCALE

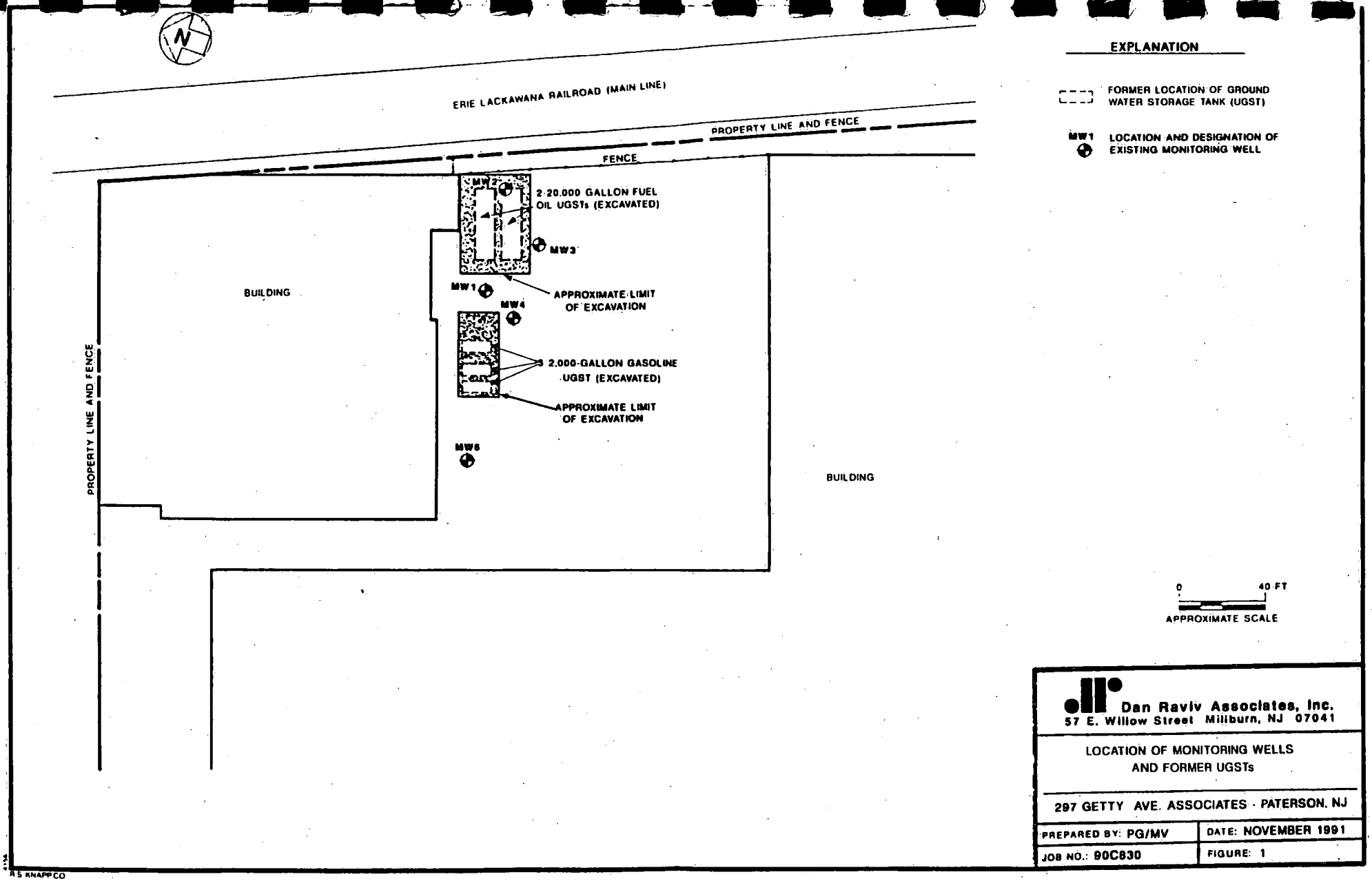
Dan Raviv Associates, Inc.
57 E. Willow Street Millburn, NJ 07041

CROSS SECTION VIEW
OF UGSTs #1 #2 AND #3

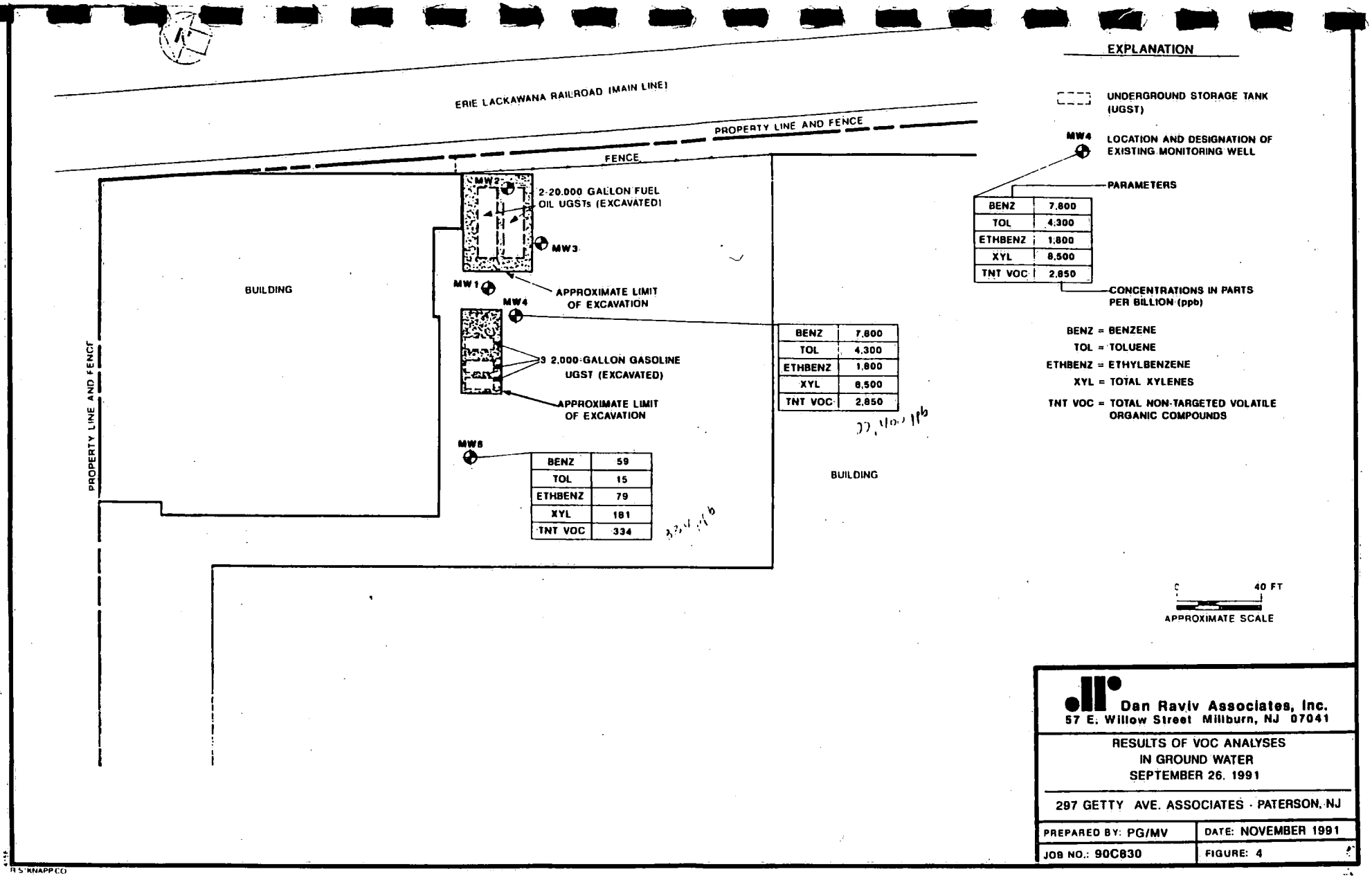
297 GETTY AVENUE ASSOCIATES - PATERSON, NJ

PREPARED BY: PLG/ODL	DATE: AUGUST 1991
JOB NO.: 90C830	FIGURE: 3

S. KNAPP CO


N
ERIE LACKAWANA RAILROAD (MAIN LINE)
PROPERTY LINE AND FENCE
FENCE
MW2
2-20,000 GALLON FUEL OIL UGSTs (EXCAVATED)
MW3
MW1
APPROXIMATE LIMIT OF EXCAVATION
MW4
2,000-GALLON GASOLINE UGST (EXCAVATED)
APPROXIMATE LIMIT OF EXCAVATION
MW6
BUILDING
BUILDING
PROPERTY LINE AND FENCE
EXPLANATION
FORMER LOCATION OF GROUND WATER STORAGE TANK (UGST)
MW1 LOCATION AND DESIGNATION OF EXISTING MONITORING WELL
0
40 FT
APPROXIMATE SCALE
Dan Raviv Associates, Inc.
57 E. Willow Street Millburn, NJ 07041
LOCATION OF MONITORING WELLS AND FORMER UGSTs
297 GETTY AVE. ASSOCIATES - PATERSON, NJ
PREPARED BY: PG/MV
DATE: NOVEMBER 1991
JOB NO.: 90C830
FIGURE: 1
R S KNAPP CO

REFERENCE 7



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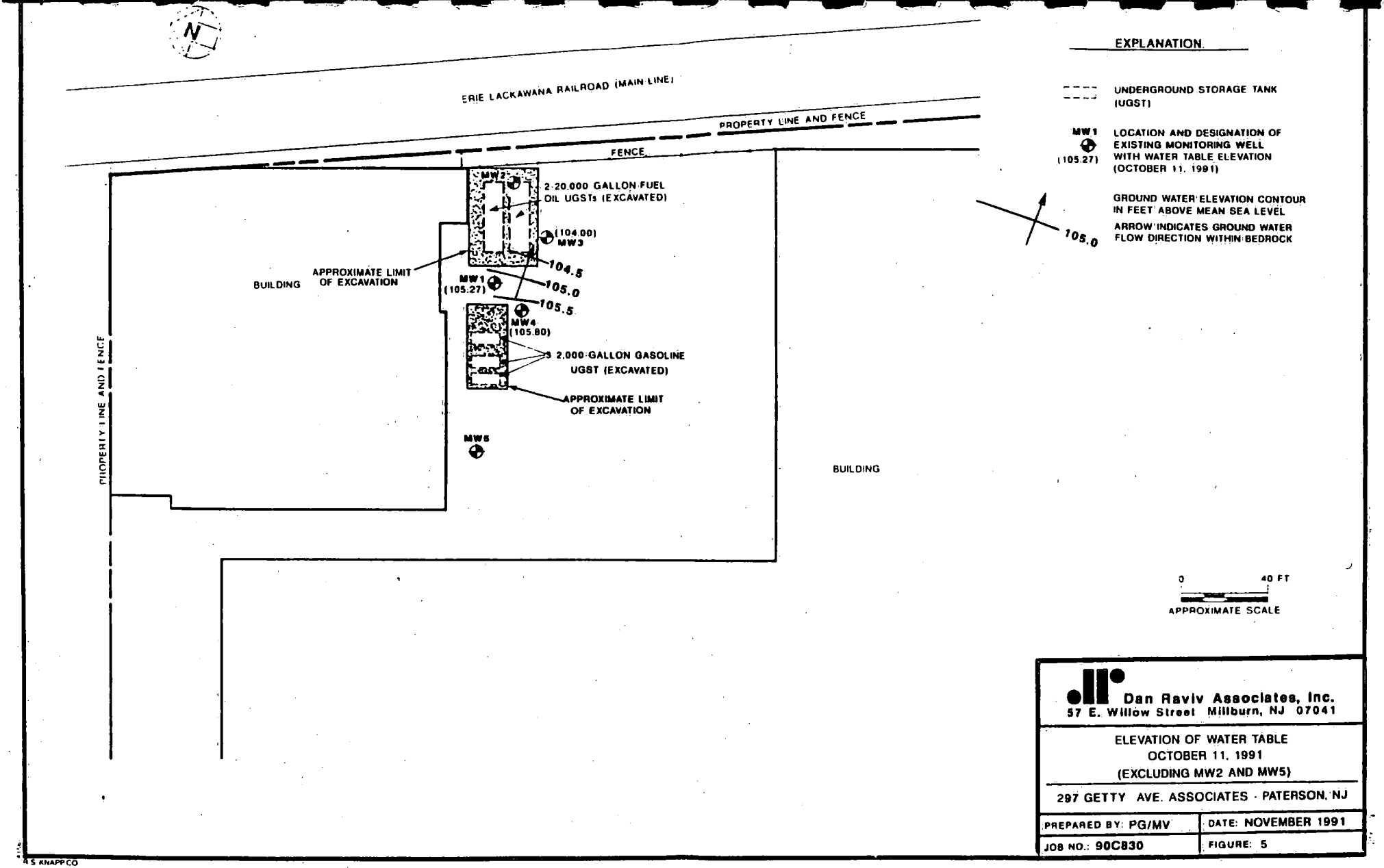
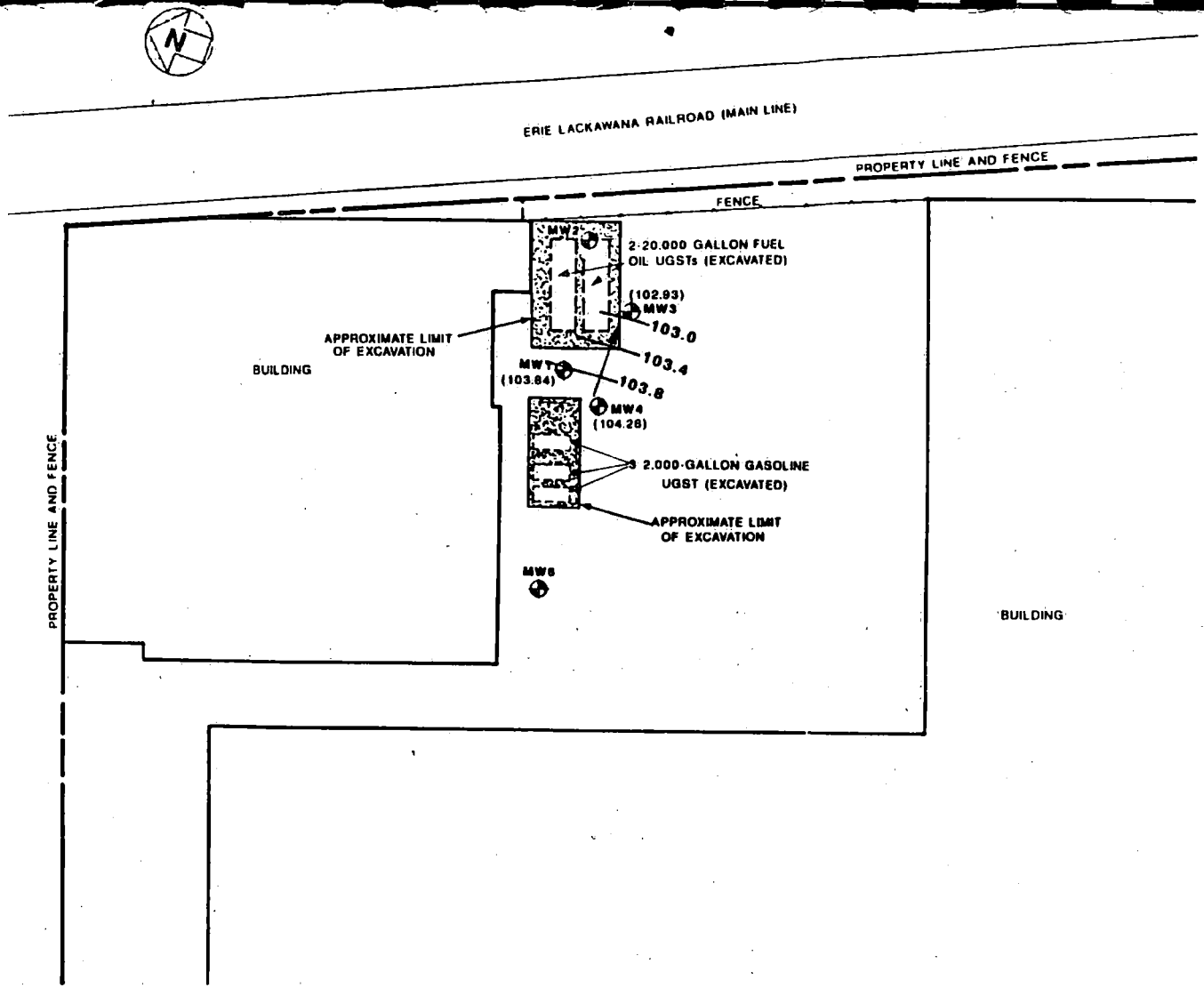

N
ERIE LACKAWANA RAILROAD (MAIN LINE)
PROPERTY LINE AND FENCE
FENCE
MW2
2-20,000 GALLON FUEL OIL UGSTs (EXCAVATED)
(104.00)
MW3
104.5
105.0
105.5
APPROXIMATE LIMIT OF EXCAVATION
BUILDING
MW1
(105.27)
MW4
(105.80)
2,000 GALLON GASOLINE UGST (EXCAVATED)
APPROXIMATE LIMIT OF EXCAVATION
MW5
PROPERTY LINE AND FENCE
BUILDING
EXPLANATION
UNDERGROUND STORAGE TANK (UGST)
MW1
(105.27)
LOCATION AND DESIGNATION OF EXISTING MONITORING WELL WITH WATER TABLE ELEVATION (OCTOBER 11, 1991)
GROUND WATER ELEVATION CONTOUR IN FEET ABOVE MEAN SEA LEVEL
ARROW INDICATES GROUND WATER FLOW DIRECTION WITHIN BEDROCK
105.0
0
40 FT
APPROXIMATE SCALE
Dan Raviv Associates, Inc.
57 E. Willow Street Millburn, NJ 07041
ELEVATION OF WATER TABLE
OCTOBER 11, 1991
(EXCLUDING MW2 AND MW5)
297 GETTY AVE. ASSOCIATES - PATERSON, NJ
PREPARED BY: PG/MV
DATE: NOVEMBER 1991
JOB NO.: 90C830
FIGURE: 5
A S KNAPP CO



EXPLANATION

UNDERGROUND STORAGE TANK (UGST)

MW1 (103.84) — LOCATION AND DESIGNATION OF EXISTING MONITORING WELL WITH WATER TABLE ELEVATION (NOVEMBER 8, 1991)

103.4 — GROUND WATER ELEVATION IN FEET ABOVE MEAN SEA LEVEL

ARROW INDICATES GROUND WATER FLOW DIRECTION WITHIN BEDROCK

0 — 40 FT
APPROXIMATE SCALE

Dan Raviv Associates, Inc.
57 E. Willow Street Millburn, NJ 07041

ELEVATION OF WATER TABLE
NOVEMBER 8, 1991
(EXCLUDING MW2 AND MW5)

297 GETTY AVE. ASSOCIATES - PATERSON, NJ

PREPARED BY: PG/MV	DATE: NOVEMBER 1991
JOB NO.: 90C830	FIGURE: 6

R S KNAPP CO

Table II

Ground Water Elevation Data
297 Getty Avenue Associates
Paterson, New Jersey

Date Measured:	9/26/91		10/11/91		11/8/91	
Monitoring Well No.	Depth to Water (1)	Ground Water Elevation (ft., MSL)(2)	Depth to Water (1)	Ground Water Elevation (ft., MSL)	Depth to Water (1)	Ground Water Elevation (ft., MSL)
MW1 (3)	13.78	108.07 (4)	16.31	105.27 (4)	17.33	103.84 (4)
MW2 (3)	6.86	114.30	8.52	112.64	9.52	111.64
MW3 (3)	17.15	104.66 (4)	17.78	104.00 (4)	18.75	102.93 (4)
MW4 (3)	14.09	107.22	15.51	105.80	17.05	104.26 (4)
MW5 (3)	6.33	115.82	8.55	113.60	10.94	111.21

Notes:

(1) Measured from top of PVC casing.

(2) ft., MSL – feet, Mean Sea Level.

(3) Measuring point elevations (ft., MSL):

MW1 = 121.35
MW2 = 121.16
MW3 = 121.59
MW4 = 121.31
MW5 = 122.15

(4) Free product gasoline was observed in MW1 and MW3 on 9/26/91, 10/11/91, 11/8/91 and 11/18/91 and in MW4 on 11/8/91 and 11/18/91. To determine correct ground water elevation, a conversion factor is required. Corrected depth to ground water (DTW) = DTW – (Product Thickness, feet) (Product Density, 0.75 g/ml). Value of Product Density provided by The Soil Chemistry of Hazardous Materials, Hazardous Materials Control Research Institute, 1988.

Dan Raviv Associates, Inc.
Job No. 90C830

Table II (cont'd)

Ground Water Elevation Data
297 Getty Avenue Associates
Paterson, New Jersey

Date Measured: 11/18/91

Monitoring Well No.	Depth to Water (1)	Ground Water Elevation (ft., MSL)(2)
MW1 (3)	17.94	103.57 (4)
MW2 (3)	9.63	111.53
MW3 (3)	18.99	102.67 (4)
MW4 (3)	17.35	103.97 (4)
MW5 (3)	11.18	110.97

Notes:

(1) Measured from top of PVC casing.

(2) ft., MSL – feet, Mean Sea Level.

(3) Measuring point elevations (ft., MSL):

MW1 = 121.35
MW2 = 121.16
MW3 = 121.59
MW4 = 121.31
MW5 = 122.15

(4) Free product gasoline was observed in MW1 and MW3 on 9/26/91, 10/11/91, 11/8/91 and 11/18/91 and in MW4 on 11/8/91 and 11/18/91. To determine correct ground water elevation, a conversion factor is required. Corrected depth to ground water (DTW) = DTW – (Product Thickness, feet) (Product Density, 0.75 g/ml). Value of Product Density provided by The Soil Chemistry of Hazardous Materials, Hazardous Materials Control Research Institute, 1988.

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Job No. 90C830

Table III

Summary of Volatile Organic Compounds in Soil

DRAI Sample No.:	GS-1	GS-2	GS-3	GS-4	GS-5	GS-6	GS-7	GS-8	GS-9	GS-10	TB	TB
Depth (ft below surface):	5.5-6.0	5.5-6.0	5.5-6.0	5.5-6.0	5.5-6.0	5.5-6.0	5.5-6.0	5.5-6.0	5.5-6.0	5.5-6.0		
Lab Sample No.:	E122265	E122266	E122267	E122268	E122269	E122270	E122271	E122273	E122274	E122275	E122276	E122277
Date Sampled:	7/19/91	7/19/91	7/19/91	7/19/91	7/19/91	7/19/91	7/19/91	7/19/91	7/19/91	7/19/91	7/19/91	7/16/91
Laboratory:	Accutest	Accutest	Accutest	Accutest	Accutest	Accutest	Accutest	Accutest	Accutest	Accutest	Accutest	Accutest
Targeted VOCs (ppb)												
Acrolein	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Acrylonitrile	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Benzene	ND	ND	ND	ND	ND	ND	ND	ND	ND	51	ND	ND
Bromoform	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Bromodichloromethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Bromomethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Carbon Tetrachloride	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Chlorobenzene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Chloroethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2-Chloroethyl Vinyl Ether	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Chloroform	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Chloromethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
cis-1,3-Dichloropropene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Dibromochloromethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dichlorobenzene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,3-Dichlorobenzene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,4-Dichlorobenzene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1-Dichloroethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dichloroethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1-Dichloroethylene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
trans-1,2-Dichloroethylene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
trans-1,3-Dichloropropene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dichloropropane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Ethylbenzene	600	ND	700	11,000	380 J	250 J	400	ND	110	480	ND	ND
Methylene Chloride	ND	ND	ND	ND	ND	ND	ND	ND	57 JB	19 JB	ND	ND
1,1,2,2-Tetrachloroethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Tetrachloroethylene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Toluene	ND	ND	ND	ND	120 J	ND	ND	ND	ND	90	ND	ND
1,1,1-Trichloroethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1,2-Trichloroethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Trichloroethylene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Trichlorofluoromethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Vinyl Chloride	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
m-Xylene	180 J	ND	69	52,000	800	350 J	4,100	23	150	500	ND	ND
p,o-Xylene	150 J	ND	1,100	47,000	310 J	600	3,800	16	30 J	370	ND	ND
TOTAL TARGETED VOCs (ppb):	930	ND	1,889	110,000	1,610	1,200	8,300	39	290	1,491	ND	ND
TOTAL NON-TARGETED VOCs (pp	8,430	44	7,748	186,400	39,570	68,500	42,700	548	870	1,151	ND	ND
TOTAL TARGETED AND NON-TARGETED VOCs (ppb)	9,360	44	9,617	296,400	41,180	69,700	51,000	587	1,160	2,642	ND	ND

ND = not detected.

J = estimated concentration detected below the Method Detection Limit.

B = compound detected in method blank and excluded from total.

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Job No. 90C830

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REFERENCE 7

Table IV

Summary of Volatile Organic Compounds in Ground Water

DRAI Sample No.:	MW-4	MW-5	FB	TB
Lab Sample No.:	E130440	E130441	E130442	E130443
Date Sampled:	9/26/91	9/26/91	9/26/91	9/25/91
Laboratory:	Accutest	Accutest	Accutest	Accutest
Targeted VOCs (ppb)				
Acrolein	ND	ND	ND	ND
Acrylonitrile	ND	ND	ND	ND
Benzene	7,800	59	ND	ND
Bromoform	ND	ND	ND	ND
Bromodichloromethane	ND	ND	ND	ND
Bromomethane	ND	ND	ND	ND
Carbon Tetrachloride	ND	ND	ND	ND
Chlorobenzene	ND	ND	ND	ND
Chloroethane	ND	ND	ND	ND
2-Chloroethyl Vinyl Ether	ND	ND	ND	ND
Chloroform	ND	ND	ND	ND
Chloromethane	ND	ND	ND	ND
cis-1,3-Dichloropropene	ND	ND	ND	ND
Dibromochloromethane	ND	ND	ND	ND
1,2-Dichlorobenzene	ND	ND	ND	ND
1,3-Dichlorobenzene	ND	ND	ND	ND
1,4-Dichlorobenzene	ND	ND	ND	ND
1,1-Dichloroethane	ND	ND	ND	ND
1,2-Dichloroethane	ND	ND	ND	ND
1,1-Dichloroethylene	ND	ND	ND	ND
trans-1,2-Dichloroethylene	ND	ND	ND	ND
trans-1,3-Dichloropropene	ND	ND	ND	ND
1,2-Dichloropropane	ND	ND	ND	ND
Ethylbenzene	1,800	79	ND	ND
Methylene Chloride	ND	ND	ND	ND
1,1,2,2-Tetrachloroethane	ND	ND	ND	ND
Tetrachloroethylene	ND	ND	ND	ND
Toluene	4,300	15	ND	ND
1,1,1-Trichloroethane	ND	ND	ND	ND
1,1,2-Trichloroethane	ND	ND	ND	ND
Trichloroethylene	ND	ND	ND	ND
Trichlorofluoromethane	ND	ND	ND	ND
Vinyl Chloride	ND	ND	ND	ND
m-Xylene	4,500	100	ND	ND
p,o-Xylene	4,000	81	ND	ND
TOTAL TARGETED VOCs (ppb):	22,400	334	ND	ND
Non-Targeted VOCs (ppb)				
Methyl Tert. Butyl Ether	ND	ND	ND	ND
Tertiary Butyl Alcohol	ND	ND	ND	ND
Others	2,850	845	31	22
TOTAL NON-TARGETED VOCs(ppb):	2,850	845	31	22
TOTAL TARGETED AND NON-TARGETED VOCs (ppb):	25,250	1,179	31	22

ND = not detected.
J = estimated concentration detected below the Method Detection Limit
B = compound detected in method blank and excluded from total.

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Job No. 90C830

REFERENCE 10

REFERENCE 10
1

SUMMARY OF GEOLOGY AND GROUND-WATER RESOURCES OF PASSAIC COUNTY, NEW JERSEY

By L. D. Carswell and J. G. Rooney

U.S. GEOLOGICAL SURVEY
Water-Resources Investigations 76–75

Prepared in cooperation with
NEW JERSEY DEPARTMENT OF ENVIRONMENTAL
PROTECTION, DIVISION OF WATER RESOURCES

June 1976

SUMMARY OF GEOLOGY AND GROUND-WATER RESOURCES OF PASSAIC COUNTY, NEW JERSEY

By
L. D. Carswell and J. G. Rooney

ABSTRACT

Ground water in Passaic County occurs in intergranular openings of unconsolidated stratified deposits of Quaternary age and in joints and fractures in consolidated rocks of Precambrian, Paleozoic, and Triassic age.

The Brunswick Formation of Triassic age is the most important aquifer in the southeastern one-third of Passaic County. Reported yields of public supply and industrial wells range from 50 to 510 gallons per minute (3 to 32 litres per second) and the median yield is 130 gallons per minute (8 litres per second). Most of these wells are 200 to 400 feet (61 to 122 metres) deep. The median yield of all public supply and industrial wells over 300 feet (91 metres) deep and 8 inches (203 millimetres) or larger in diameter is 230 gallons per minute (15 litres per second). Crystalline rocks of Precambrian age are the major source of ground water for domestic use in the northwestern two-thirds of Passaic County. Reported well yields range from 1 to 200 gallons per minute (.06 to 13 litres per second). The median reported yield of domestic wells is 5 gallons per minute (.31 litres per second) and that of public supply wells is 30 gallons per minute (2 litres per second).

Other consolidated rocks--rocks of Paleozoic age and the Watchung Basalt of Traissic age--are utilized primarily for domestic water supplies in Passaic County. Reported yields of wells tapping the Paleozoic rocks range from less than 1 to 35 gallons per minute (.06 to 2 litres per second) and the median yield is 10 gallons per minute (.63 litres per second). Reported yields of domestic wells tapping the Watchung Basalt range from less than 1 to 40 gallons per minute (.06 to 3 litres per second) and the median yield is 12 gallons per minute (.76 litres per second). However, reported yields of nine industrial and commercial wells range from 50 to 180 gallons per minute (3 to 11 litres per second).

Unconsolidated stratified deposits of Quaternary age are locally an important source of ground water for public supply and industrial use in parts of Passaic County. These deposits have not been extensively explored but are potentially an important source of ground water for future development. Reported yields of wells tapping the stratified deposits range from 4 to 920 gallons per minute (.25 to 58 litres per second). The median reported yield of domestic wells is 16 gallons per minute (1 litre per second) and that of public supply and industrial wells is 130 gallons per minute (8 litres per

second. Depths of wells depend upon the thickness of the deposits. Reported depths range from 22 to 170 feet (7 to 52 metres).

The quality of ground water in Passaic County varies from one aquifer to another. Water from the Precambrian rocks is soft to moderately hard (34 to 104 milligrams per litre) and is low in dissolved solids (66 to 159 milligrams per litre). Water from the Brunswick Formation is moderately hard to very hard (89 to 540 milligrams per litre). The dissolved solids content ranges from 129 to 563 milligrams per litre). The occurrence of more highly mineralized water at depth in the Brunswick Formation is indicated by an analysis, made in 1885, of 16,000 milligrams per litre of dissolved solids at a depth of 2,050 feet (625 metres) in a well in Paterson. Water from two wells tapping the Quaternary deposits is moderately hard (65 and 83 milligrams per litre) and has dissolved solids contents of 122 and 133 milligrams per litre).

Water use from both surface and ground-water supplies in Passaic County averaged about 106 million gallons per day (4.6 cubic metres per second) in 1965. Ground water probably accounts for 5 to 10 percent of this total. Ground-water pumpage by the major public supply companies in the county has increased from 2.1 million gallons per day (.09 cubic metres per second) in 1951 to 4.39 million gallons per day (.19 cubic metres per second) in 1968. About 80 percent of the 4.39 million gallons per day (.19 cubic metres per second) was from wells tapping the Brunswick Formation in the southern part of the county.

INTRODUCTION

Purpose and Scope

This is one of a series of County ground-water reports authorized by the Water Supply Act of 1958 and its companion Water Bond Act. These reports present assembled data and interpretation on the availability, occurrence, movement, and chemical quality of ground water in New Jersey. This investigation was made by the U.S. Geological Survey in cooperation with the New Jersey State Department of Environmental Protection, Division of Water Resources. The report was prepared under the supervision of John E. McCall and Harold Meisler, consecutive District Chiefs.

Location and Extent of Area

Passaic County is located in northcentral New Jersey (fig. 1). It is bounded on the north by the State of New York and Bergen County, on the east by Bergen County, on the south by Essex and Morris Counties, and on the west by Sussex County. The county is shaped roughly like an hour glass with the top to the northwest, and the bottom to the southeast. It lies between longitudes 74°06'W and 74°30'W and latitudes 40°48'N and 41°12'N and contains 194 mi^2 (square miles) [502 km^2 (square kilometres)] of land area and 8 mi^2

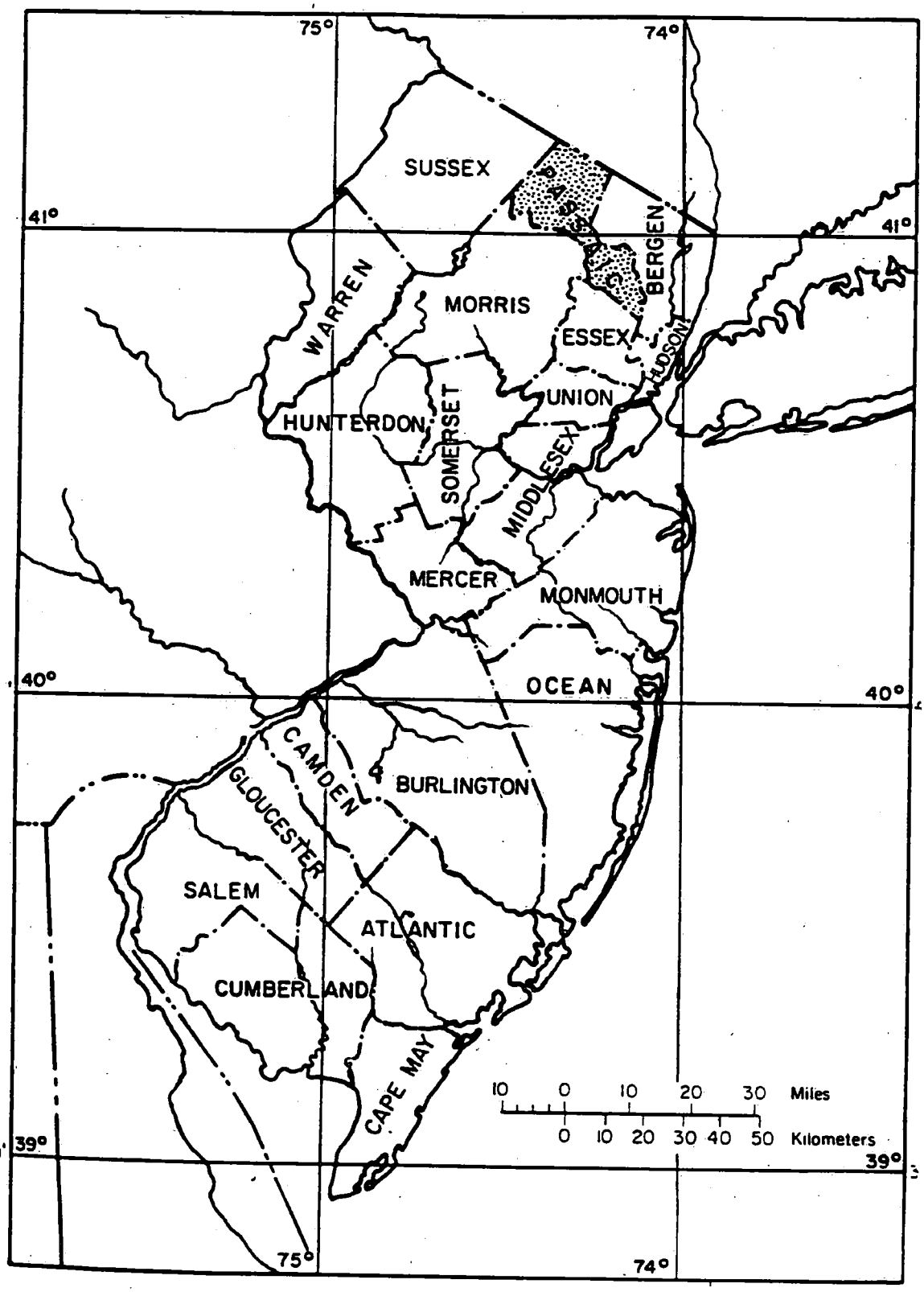


Figure 1.--Map of New Jersey showing location of Passaic County.

(21 km^2) of water. Paterson is the county seat; other major communities include Passaic and Clifton.

Previous Investigations

The geology of the southeastern third of Passaic County is described in the Passaic Folio (Darton and others, 1908). A northeast-trending 30-square mile (78 km^2) outlier of Paleozoic rocks in the northwestern part of the county is described by Kümmel and Weller (1901). Hotz (1953) described the Precambrian igneous and metasedimentary rocks in a 15-square mile area (39 km^2) in the vicinity of Hewitt and Ringwood as a part of his study of magnetite deposits. The bedrock geology of the area immediately north of Passaic County in New York has recently been described by Offield (1967) who presents an excellent review of the rock types of the highlands and the stratigraphic terminology. Salisbury (1902) described the Quaternary deposits in his report on the glacial geology of New Jersey. The availability of ground water in Passaic County is summarized by Widmer and others (1966) in Water Resources Resumé State Atlas Sheet No. 23 and its companion volumes for Atlas Sheets No. 22 and No. 26. The availability of ground water in Morris and Essex Counties is described, respectively, by Gill and Vecchioli (1965) and Nichols (1968). A report on the water resources of the Ramapo River basin, New Jersey, by Vecchioli and Miller (1973) covers a part of Pompton Lakes Boro and Wayne Township in Passaic County and an elongate area just to the northeast of the county.

Methods Used in this Investigation

During this investigation records of more than 1,500 wells were collected and analyzed for information on well yields and depths, static water levels, and the thickness and lithology of Pleistocene deposits. Field work included the location of most of the public-supply wells and many of the industrial wells and reconnaissance of the geology of the county. Many of the wells for which records were available, particularly in the northwestern two-thirds of the County, were drilled for domestic use. The locations of most of the domestic wells used for this report are from applications for permit to drill submitted to the New Jersey Bureau of Geology by the prospective owner or driller.

Records of selected wells are given in table 2; their locations are shown in figure 2. Each well is identified by a well number which is prefixed with an abbreviation of the name of each township, city, or borough in which the well is located. Municipal abbreviations are as follows:

Municipality	Abbreviation	Municipality	Abbreviation
Bloomingdale	Bl	Pompton Lakes	PL
Clifton	Cl	Prospect Park	PP
Haledon	Hl	Ringwood	Ri
Hawthorne	Hw	Totowa	To
Little Falls	LF	Wanaque	Wn
North Haledon	NH	Wayne	Wy
Passaic	Ps	West Milford	WM
Paterson	Pt	West Paterson	WP

The wells within each municipality are numbered serially, generally starting from the northern margins of each municipality. Thus, well Ri-2 is located in the northern part of Ringwood and well Ri-30 is in the southern part.

Acknowledgments

The cooperation of Dr. Kemble Widmer, the State Geologist of New Jersey, is gratefully acknowledged for providing access not only to the well-organized and voluminous file of well records maintained by the New Jersey Bureau of Geology, but in addition, to the manuscript copies of Water Resources Resumés of State Atlas Sheets No. 22 and 26 which are being prepared for publication by the State Survey. Other members of the New Jersey Geological Survey, including Joseph Miller, provided assistance during the data gathering phase of this investigation.

GEOGRAPHY

Topography and Drainage

The northwestern two-thirds of Passaic County is in the New Jersey Highlands, a subdivision of the Reading Prong of the New England physiographic province. The southeastern one-third of the county is the Lowland section of the Piedmont physiographic province.

The Highlands are an area of moderate topographic relief largely underlain by gneiss of Precambrian age but also including an outlier of folded sedimentary rocks of Paleozoic age which form a series of parallel ridges and valleys in the western third of the Highlands area. The ridges and valleys formed on the rocks of Paleozoic and Precambrian age have a prominent northeast-southwest alignment reflecting the dominant structural orientation of the rocks as well as the direction of movement of the ice which overrode the area during the Wisconsin Glaciation. Hotz (1953, p. 159) reports that the topographic expression of major cross faults are well defined trench-like structures apparent on aerial photographs. These faults strike east-west, interrupt minor drainage lines, and offset small valleys and ridges.

Altitudes in the Highlands range from 1,491 ft (feet) [454 m (metres)] on Bearfort Mountain to 200 ft (61 m) on the Wanaque River at Pompton Lakes. The maximum local relief is 850 ft (259 m) between the crest of Bearfort Mountain and the valley immediately to the east. Northwest of the outlier of Paleozoic rocks, valleys partially filled with glacial deposits are at an altitude of about 1,200 ft (366 m). Immediately to the east of the outlier the valleys are at an altitude of 600 to 800 ft (183 to 244 m), and the valley of the Wanaque on the eastern side of the Highlands is at an altitude of 300 ft (91 m).

The Highlands in Passaic County are drained by the Pequannock, Wanaque, and Ramapo Rivers which join to form the Pompton River, a tributary of the Passaic River. A small area in the northwest corner of the County is drained by the northeastward-flowing Long House Creek, a tributary of the northward-flowing Wallkill River.

In the Highlands area, eastward-flowing streams generally have steeper gradients than streams parallel to the regional structure of the Precambrian and Paleozoic rocks. The eastward-flowing streams are presumably controlled by erosion along transverse joints and shear zones associated with cross faults; whereas, the valleys and local topographic lows containing Upper Greenwood Lake, Greenwood Lake, and the lower Wanaque River are all apparently developed along major longitudinal or oblique faults.

The Highlands area in Passaic County is largely developed as a watershed for surface-water supply; approximately one quarter of the land area used for this purpose is municipally owned. This area contains or partially contains Oak Ridge, Clinton, and Charlotteburg Reservoirs, and Echo Lake, which are regulated bodies of surface water in the Pequannock River drainage and are utilized for water supply by the City of Newark. Upper and Lower Greenwood Lakes and Wanaque Reservoir in the Wanaque River drainage are used for surface-water supply by the North Jersey District Water Supply Commission.

The Piedmont Lowland in Passaic County is underlain by igneous and sedimentary rocks of Traissic age. The sedimentary rocks throughout most of the area underlie gently rolling topography one to three hundred feet in altitude. This gently rolling topography is broken by the abrupt arcuate ridges of the First and Second Watchung Mountains and Packanack Mountain which are underlain by three successive sheets of basalt. The highest altitude in the Piedmont area is 885 ft (270 m) on High Mountain, a knob of the Second Watchung Mountain. The lowest altitude is sea level along the tidal portion of the Passaic River on the southeastern boundary of the County. Drainage is to the Passaic River which flows in an irregular but dominantly eastward direction across the Piedmont Lowlands traversing the Watchung Mountains through gaps at Little Falls and Paterson. The Pompton River flows southward from the Highlands across the Piedmont Lowlands joining the Passaic River near Mountain View after passing through a gap in Packanack Mountain. Smaller streams, in general, parallel the ridges of the Watchung Mountains.

Passaic County is entirely within the part of northern New Jersey that has been subject to Wisconsin Stage glaciations. Consequently, the topography shows the effects of both glacial erosion and deposition. In general, the ridges have been scraped clean and contain abundant bedrock outcrops; whereas, the valleys are filled with a variety of unconsolidated deposits which extend part way up the flanks of the adjacent high areas.

Climate

The climate of Passaic County is continental in character being controlled largely by storms which move from west to east across the county. These storms are generally dominated by polar continental air masses in winter and tropical air masses in summer. Although part of the precipitation in Passaic County results from the storms which move from west to east across the county, the heaviest rains are produced when coastal storms of tropical origin move inland.

Precipitation throughout the county averages 48 in (inches) [122 mm (millimetres)] annually and is normally well distributed throughout the year. Because the Highlands area is generally higher in altitude than the Piedmont Lowlands, the temperature in the Highlands averages several degrees cooler than in the Piedmont Lowlands in both summer and winter. Although both areas receive equal precipitation, the cooler Highlands receive more than 6 in (152 mm) more snowfall than the Lowlands.

At Paterson the frost-free periods average 192 days from April 16 to October 25. The frost-free period at Charlotteburg in Passaic County averages only 128 days, from May 20 to September 25. In the northwestern portion of the county the growing season is even shorter. The average July temperature is 75.9°F (24°C) at Paterson and 71.2°F (22°C) at Charlotteburg In January the average temperature is 31.9°F (0°C) at Paterson and 29°F (2°C) at Charlotteburg (U.S. Weather Bureau, 1959).

Population and Economic Development

In 1960 the population of Passaic County was 406,518, a 20 percent increase over 1950. This increase has been predominately in the suburban areas such as North Haledon, Pompton Lakes, Totowa, and Wayne which over the 10-year period had population increases of 69.7, 102.9, 80.3, and 148.3 percent, respectively. Municipalities having the largest population are Clifton (32,084), Paterson (143,663), and Passaic (153,963). The population increased 27.2 percent in Clifton and 3.1 percent in Paterson and decreased 6.5 percent in Passaic.

The northwestern part of the county comprises 124 mi^2 (321 km^2) or 65 percent of the total area of the county, but contains only 6 percent of the total population. This area of the county is used predominantly for recreation and water supply. The reservoirs and watersheds owned by Newark and the North Jersey District Water Supply Commission cover approximately one quarter of the area. The southern part of the county is highly industrialized. Manufacturing includes textile, apparel, leather products, metal products, and electrical and nonelectrical machinery. Only 3 percent of the land area in the county is devoted to agriculture.

GEOLOGY

General Considerations

The bedrock underlying the Highlands is composed of crystalline rocks of Precambrian age, an outlier of sedimentary rocks of Paleozoic age, and a small fault-bounded wedge of black shale of Paleozoic age near Pompton Lakes. The bedrock geology of Passaic County is shown in figure 3. The crystalline rocks include the Franklin Limestone and metasedimentary and igneous gneisses. The outlier of Paleozoic age is bounded on the northwest by a fault which closely parallels the strike of the beds. On the east side of the outlier the sedimentary rocks lie unconformably on the Precambrian gneiss. The southeastern third of Passaic County, the Lowlands, is underlain by mudstone, sandstone, conglomerate, and basalt of Triassic age.

Unconsolidated deposits overlie the bedrock in both the Highlands and the Lowlands and are largely related to the last advance and retreat of the continental glacier across the area in Wisconsin time. These unconsolidated deposits are generally thick and continuous in valleys and on lower hill slopes and thin to absent on hilltops. The deposits on the upper slopes of the hills and hilltops were deposited directly by the glacier and are largely till consisting of an unstratified mixture of clay, silt, sand, gravel, and boulders. The deposits in the valleys and lower slopes of the hills locally contain till in addition to well-sorted stratified clays, sands, and gravels deposited by streams or in lakes.

Precambrian Rocks

The Precambrian igneous and metasedimentary rocks in northwestern Passaic County have been referred to as Pochuck, Losee, and Byram in reports on the geology of the area (Johnson, 1950). These older map units have subsequently been found inadequate for the purposes of detailed mapping and have been discarded by recent workers (Sims, 1958; Hotz, 1953; Offield, 1967; and Smith, 1969). Recent practice has been to assign descriptive mineralogic terms to a much greater number of lithologic units mapped in the field. These units include; hypersthene-quartz andesine gneiss, pyroxene quartz feldspar gneiss, quartz feldspar biotite gneiss, amphibolite, granite and granitic gneiss, and Franklin Limestone. Distribution of these units is shown in figure 3. Because the occurrence and movement of ground water appears to be similar in all these lithologic units they are not described in detail in this report.

The Precambrian rocks are characteristically gneissic, granitoid, foliated, and structurally complex. The gneisses are cut by northeast-trending faults which parallel the regional strike of the rock units and by transverse (east-west) trending faults.

The regolith and soil that had developed on top of the Precambrian rocks during Tertiary time was almost entirely removed by Pleistocene glaciation.

Few drillers' logs indicate the presence of weathered and decomposed gneiss. The gneiss presents a fresh, unweathered appearance in outcrop. Salisbury (1894, p. 17) reported that the surface of the gneiss beneath the till was smooth and polished and that it was the exception to find it weathered.

Paleozoic Rocks

Rocks of Cambrian, Ordovician, Silurian, and Devonian age in western Passaic County underlie a 2- to 3.5-mile (3 to 6 km) wide belt trending northeasterly from the Pequannock River to the New York State line. This belt is part of a synclinal outlier of Paleozoic rocks, approximately 60 mi (97 km) in length. The main outcrop area occurs 25 mi (40 km) to the northwest. The syncline is truncated on the northwest by a fault which places strata of Devonian age in contact with Precambrian gneiss. On the southeast side of the syncline quartzite of Cambrian age and conglomerate of Silurian age lie unconformably upon the gneiss. Kümmel and Weller (1901) have mapped a small syncline within the belt of Paleozoic rocks on the west side of Greenwood Lake. The small syncline contains strata of Silurian and Devonian age and is truncated on the northwest by a fault that extends from the New York State line southeastward to the vicinity of West Milford.

Near Pompton Lakes an area of less than 1 mi^2 (3 km^2) is underlain by black shale of Ordovician age. According to Darton and others (1908) the shale is bounded by faults.

The Paleozoic sedimentary rocks of the outlier in western Passaic County are the Hardyston Quartzite of Cambrian age, the Kittatinny Limestone of Cambrian and Ordovician age, a black shale unit of Ordovician age, the Green Pond Conglomerate, Longwood Shale, and Decker Limestone of Silurian age, and the Kanouse Sandstone, Cornwell Shale, Bellvale Sandstone of Darton (1894), and Skunnemunk Conglomerate of Devonian age. The following brief descriptions of Paleozoic sedimentary rocks of Passaic County are based largely on the descriptions of Kümmel and Weller (1902).

Hardyston Quartzite--The Hardyston Quartzite of Early Cambrian age is the oldest unmetamorphosed sedimentary formation in Passaic County and underlies a narrow belt on the eastern side of the Paleozoic rock outlier. The Hardyston is about 30 ft (9 m) thick and is composed of vitreous blue quartzite which grades upward into calcareous sandstone which is white and very friable where weathered.

Kittatinny Limestone--The Kittatinny Limestone is a massively bedded, silicious, bluish gray limestone of Cambrian and Ordovician age. The contact between the Kittatinny and the underlying Hardyston is gradational. Erosion, prior to the deposition of the overlying Green Pond Conglomerate, has removed all but about 130 ft (40 m) of this unit which is 2,500 to 3,000 ft (762 to 914 m) thick in western New Jersey. The limestone occasionally contains pockets of conglomerate which were considered by Kümmel and Weller (1902, p. 8) to be masses of the overlying Green Pond Conglomerate that filled the fractures and crevices in the deeply weathered and eroded surface developed on top of the Kittatinny.

Black Shale.--This black shale of Ordovician age underlies Pompton Lakes. Although it shows only a moderate degree of metamorphism, it was mapped as Hudson Schist* by Darton and others (1908) because of its presumed equivalence to the schists of Ordovician age which crop out 20 mi (32 km) to the east along the Hudson River. Two small areas (not shown in figure 3) of similar nonfossiliferous black shale are found in the outlier of Paleozoic rocks near Oak Ridge Reservoir in western Passaic County and were referred to as Hudson River Shale* by Kümmel and Weller (1902, p. 8). The black shale is probably equivalent to the Martinsburg Formation in western New Jersey. A few miles north of Passaic County in New York presumed Martinsburg equivalents have been subdivided into a number of distinct formations. Inasmuch as the correlation of the nonfossiliferous shale with either the section in New York or that of the type Martinsburg is uncertain, no formal stratigraphic name is applied to the unit here. As the area underlain by the shale is small, the shale is considered hydrologically unimportant for purposes of this report.

Green Pond Conglomerate.--The Green Pond Conglomerate of Silurian age lies unconformably upon an erosional surface which cuts across rocks of Precambrian, Cambrian, and Ordovician age. The Green Pond characteristically has a pinkish color, is 1,200 to 1,500 ft (366 to 457 m) thick, and is a coarse silicious conglomerate which is interbedded with and grades into quartzite and sandstone. The Green Pond is very resistant to erosion thus forming the comparatively high steep slopes of Kanouse Mountain, a linear ridge extending from Charlotteburg north to West Milford. Locally, the basal beds are friable where they contain significant amounts of reworked Kittatinny Limestone but more typically the Green Pond contains silicious cement and is very hard.

Longwood Shale.--The Longwood Shale of Silurian age crops out intermittently in a narrow belt to the west of Kanouse Mountain. It consists of about 200 ft (61 m) of red shale and conformably overlies the Green Pond Conglomerate. The cleavage in the shale generally obscures bedding.

Decker Limestone.--The Decker Limestone is a dark gray, impure, shaley, and silicious limestone. It is 40 to 50 ft (12 to 15 m) thick and is the youngest Silurian formation in the area.

Kanouse Sandstone.--The Kanouse Sandstone of Devonian age is 215 ft (65 m) thick. It consists of a lower white, thick bedded, fine grained quartzose conglomerate that is about 100 ft (30 m) thick and an upper greenish, hard thin-bedded quartzose sandstone. The conglomerate is usually friable but, locally, cementation with silica has formed a hard quartzite.

Cornwell Shale.--The Cornwell Shale is a black to dark gray slaty shale having gradational contacts between both the overlying Bellvale Sandstone of Darton (1894) and the underlying Kanouse Sandstone. It is about 1,000 ft (305 m) thick.

*The names Hudson Schist and Hudson River Shale have not been adopted by the U.S. Geological Survey.

Bellvale Sandstone of Darton (1894).--The Bellvale Sandstone is a dark-gray, hard, flaggy to thick bedded, fine- to medium-grained sandstone. The formation contains alternating beds of red and green shale, sandstone, and conglomerate near the top. Kümmel and Weller (1902, p. 23) report a thickness of 1,600 to 2,000 ft (488 to 610 m) for the Bellvale Sandstone.

Skunnemunk Conglomerate.--The Skunnemunk Conglomerate is a purple and maroon, massively bedded conglomerate containing beds of reddish sandstone and shale. The formation is 2,500 ft (762 m) thick, very hard, and resistant to erosion. It underlies the comparatively high rugged terrain of Bearfort Mountain.

Triassic Rocks

The rocks of Triassic age that underlie the southern one-third of Passaic County are the Brunswick Formation and the Watchung Basalt. See figure 3. The Brunswick and the Watchung are a part of the Newark Group which elsewhere in New Jersey includes two units (Stockton and Lockatong Formations), not present in Passaic County. The rocks generally have a monoclinal dip of 10° to 15° W., but they contain some gentle open folds such as those expressed by the arcuate form of the Watchung Mountains. The Newark Group is bounded on the northwest by a fault which places it in contact with Precambrian gneiss and Ordovician shale. The rocks are cut by a number of north- to northeast-trending high angle faults which are evident (see figure 3) where they offset the contact between the Watchung Basalt and the Brunswick Formation.

Brunswick Formation

The Brunswick Formation forms broad valleys between the Watchung Mountains and gently rolling lowlands east of First Watchung Mountain. The Brunswick consists of alternating beds of reddish-brown sandstone and mudstone. The texture of the rocks is generally coarser in the northern part of the area than in the southern part. Conglomerates occur a little below the base of the basalt flow underlying First Watchung Mountain and locally along the northwestern border of the outcrop area. These "border conglomerates" are composed of pebble derived from Precambrian gneiss and Paleozoic rocks that cropped out in the Highlands during Triassic time.

Watchung Basalt

Intercalated between the beds of the Brunswick Formation are three sheets of basalt which form the crest of the First and Second Watchung Mountains and Packanack Mountain. Each basalt sheet is made up of a series of lava flows which outpoured during the deposition of the Brunswick Formation. Individual flows usually have vesicular zones at their tops and bases. The basalt sheets that form First and Second Watchung Mountains, and Packanack Mountain are approximately 600, 850, and 300 ft (183, 259, 91 m) thick, respectively (Darton and others, 1908, p. 10).

Quaternary Deposits

Bedrock in Passaic County is largely concealed beneath unconsolidated deposits genetically related to the continental ice sheets that overran the entire county during the Wisconsin Stage of the Pleistocene Epoch. As the glacier advanced across the county existing drainage systems were blocked by ice and modified by glacial erosion and deposition. Stream gradients were temporarily altered by warping of the earth's crust as a result of the weight of the ice. This combination of factors resulted in constant readjustment of drainage in front of the ice sheet as it advanced and withdrew from the area. Many lakes were formed; the largest of these, known as Lake Passaic, covered the area which lies between the Second Watchung Mountain and the Highlands in Passaic, Essex, Morris, Union, and Somerset Counties. The development and subsequent drainage of Lake Passaic is described by Salisbury (1902) and Salisbury in Darton and others (1908).

Glacial deposits consist of boulders, gravel, sand, silt, and clay largely derived from the local bedrock. The deposits are broadly subdivided on the basis of whether they are stratified or unstratified. The unstratified deposits (till) are not sorted, contain rock fragments from clay size to boulders, and were deposited directly from the glacier. The stratified deposits are not only layered but moderately to well sorted as a consequence of their having been transported in meltwater and deposited in streams or lakes.

The stratified deposits of Passaic County are, in this report, grouped into three categories; (1) deposits formed prior to the last advance of the glacier, (2) deposits resulting from the last advance of the glacier, and (3) deposits formed after the retreat of the glacier and associated with present day drainage.

Stratified deposits formed prior to the last advance of the glacier in the county are thin [2 to 50 ft (.61 to 15 m) thick] sands and gravels which overlie bedrock and are overlain by till or lake beds. These deposits occur characteristically in or near the base of buried pre-glacial or inter-glacial stream valleys.

Stratified deposits resulting from the last advance of the ice sheet include kames, which were formed in contact with the ice, coarse outwash deposits, and lake deposits. The kames in general are on the flanks of the Watchung Mountains and between Second Watchung and Packanack Mountains in central Wayne Township. The coarse outwash deposits formed deltas in the highlands. Available well logs do not always permit a clear distinction to be made between coarse outwash deposits and sands and gravels deposited prior to the last advance of the glacier. Both deposits intertongue with and are overlain by finer grained sediments. Lake deposits consist largely of laminated silt and clay which are up to 100 ft (30 m) thick in the valleys between Second Watchung Mountain and the Highlands.

The lake deposits are overlain by deposits associated with present day drainage. These include swamp deposits of organic muck and alluvium on the flood plains of the major streams. Alluvium is composed of silt and fine sand and is generally not more than 20 ft (6 m) thick.

The areal distribution of the surficial deposits of roughly the southern one third of Passaic County is shown in the Passaic Folio (Darton and others, 1908). Surficial geology of the northern two thirds of the county is shown in Salisbury (1902). An indication of the distribution of Quaternary deposits is given by Rogers and others (1951) in an engineering soil survey of Passaic County.

The thickness of the Quaternary deposits and the distribution of known subsurface lithologies in Passaic County are indicated in figure 4. This map is a first approximation as it is based on drillers' logs of variable quality and the locations and altitudes of wells have not been checked in the field. The deposits are thin to absent on the hills and are thickest in the present day valleys, particularly where they fill pre glacial or inter glacial valleys. Maximum known thickness is about 220 ft (67 m) in the valley of the Pequannock River near Pompton Lakes.

Structure

The structural grain in Passaic County is formed by the northeast strike of the layers and foliations of the sedimentary, igneous, and metamorphic rocks, and the parallel trends of fold axis and major faults. The major northeast-trending faults bound large blocks and commonly have vertical displacements of thousands of feet. The northwest part of each structural block is depressed in relation to the adjoining block bringing rocks of Paleozoic and Triassic age adjacent to the much older Precambrian gneisses.

The Precambrian rocks trend northeast, dip southeast, and contain both isoclinal and open folds. They are cut by minor longitudinal and oblique reverse faults and transverse normal faults. Sims (1958, p. 54) reports that faults within the Precambrian rocks of the Dover district in Morris County have small displacements in contrast to the great faults that bound individual structural blocks. Several sets of vertical or steeply dipping joints occur in the Precambrian rocks. One set is parallel to the regional structure. A second set is transverse to it, and a third set is oblique to the regional structure. The transverse joints are the most abundant and the most prominent set (Sims, 1958, p. 47). Another set of joints is nearly horizontal or may dip gently in any direction and presumably is a result of sheeting due to the release of load by erosion.

The outlier of Paleozoic rocks contains a large syncline which is truncated on the west by a major northeast-trending normal fault which places rocks of Devonian age adjacent to rocks of Precambrian age. The Paleozoic rocks are cut by smaller northeast-trending reverse faults at both Newfoundland and Greenwood Lake. Joint sets in the Paleozoic rocks are parallel, transverse, and oblique to the regional strike of the beds and according to Sims (1958,

p. 48) "probably reflects prominent joint sets in the Precambrian rocks." The transverse joints appear to be the most prominent and apparently control the location of streams that transect Bearfort Mountain.

The Triassic rocks are bounded on the northwest by a major northeast-trending normal fault. In general the Triassic rocks have a monoclinal dip of 10° to 15° NW and contain shallow open folds such as those expressed in the arcuate trend of the outcrop of the Watchung Basalt. Minor north-trending normal faults cut the Triassic rocks and are apparent where they offset the contact between the basalt flows and the Brunswick shale. The Brunswick contains vertical joints. The major joint sets are parallel and transverse to the strike of the beds. Many of the flows of the Watchung Basalt contain prominent columnar structure.

A thorough discussion of the origin of vertical or steeply dipping joints is beyond the scope of this report. In a study of jointing, Hodgson (1961, p. 37) concluded that "systematic joints are produced by tidal forces through a fatigue mechanism and the direction of the joints is considered to be inherited by upward reflection of the joint pattern in pre-existing jointed rocks." The systematic joints in Triassic and Paleozoic rocks in Passaic County have the same basic trends as do the joints in the Precambrian rocks.

GROUND WATER HYDROLOGY

Principles

Water is continually being exchanged in a circulatory pattern between the earth and the atmosphere. In general, the amount of precipitation ultimately determines the amount of water available for man's use. Some of the precipitation that falls on land evaporates where it falls, some is absorbed by plants that later transpire the water back to the atmosphere, some flows overland to streams, and some infiltrates into the ground to become ground water. The ground water is discharged to streams, and streams flow to the oceans where the water can be evaporated back to the atmosphere.

Ground water is the subsurface water in the zone of saturation--the zone in which all the rock voids are filled with water under pressure equal to or greater than atmospheric. The water table is the upper surface of this zone and in Passaic County occurs at depths of 20 to 40 ft (6 to 12 m) below land surface on hilltops and intersects the land surface in valleys where it is contiguous with the upper surface of streams, lakes, swamps, and reservoirs.

In unconsolidated deposits, and in friable consolidated rocks, ground water is stored in and moves through the intergranular openings. Ground water in the consolidated rocks of Precambrian, Paleozoic, and Triassic age occurs in and moves through cleavage planes, joints, fractures, and faults. These openings become fewer and tighter with increasing depth below the land surface but tend to be distributed in an orderly geometric attitude within rock units of homogeneous composition. The openings are better developed and enlarged in some rocks than others; however, the openings form a comparatively small volume in comparison to the volume of the rock as a whole.

The movement of ground-water in the Precambrian igneous and metamorphic ks and the Paleozoic sedimentary rocks is probably largely in a direction nsverse to the regional structure of the beds. Openings along the joint transverse to the regional structure have probably been selectively arged by weathering more than those openings along joints parallel and iique to the regional structure. The greater weathering of transverse nts is indicated by their greater abundance and prominence and by the inant east-west alignment (parallel to the direction of dominant jointing) streams cutting the Precambrian and Paleozoic rocks. A further suggestion t the movement of ground water in the Precambrian and Paleozoic rocks is trolled largely by the transverse joints comes from an analysis of eamflow data of West Brook and Ringwood Creek. West Brook, which traverses regional structure, has higher flow per square mile than Ringwood Creek ch parallels the regional structure. The mean flow for West Brook near aque is 1.94 $(ft^3/s)/mi^2$ (cubic feet per second per square mile) [.0212 /s)/km^2 (cubic metres per second per square kilometre)] and for Ringwood ek it is 1.65 $(ft^3/s)/mi^2$ [0.180 $(m^3/s)/km^2$]. Differences in low flow, ch are composed almost entirely of ground-water discharge, between the streams are shown in the table below. There is no known variation in ckness, composition, or distribution of the Pleistocene deposits, or ference in precipitation that would account for the higher flow of West ok.

Stream	Average of the minimum mean discharge for designated number of days $[(ft^3/s)/mi^2]$					
	3	7	14	30	60	90
t Brook r Wanaque	0.123	0.138	0.167	0.215	0.332	0.454
gwood Creek r Wanaque	.095	.112	.137	.185	.283	.372

Water-bearing openings in the Brunswick Formation in New Jersey occur liscrete zones controlled by bedding. These tabular aquifers extend dip for several hundred feet and are continuous along strike for thousands feet. Hydraulic connection between the aquifers is generally poor. The ment of water in these aquifers under pumping and presumably under ral conditions is preferentially along strike (Vecchioli, 1967, and hioli and others, 1969). Thus, discrete water bearing and nonwater ing zones in the Brunswick form a series of tabular aquifers and aquitards ing up to tens of feet thick and dipping to the west at approximately 10 5 degrees. The basalt flows that are intercalated with the Brunswick rally act as aquitards.

In Passaic County the ground-water reservoir is a few hundred feet k and can be visualized as composed of a number of small basins separated ivides which at land surface coincide with surface-water drainage divides.

In the subsurface these ground-water divides do not necessarily descend vertically through the zone of fresh water circulation but may in places become essentially horizontal where they form divides between shallow local flow systems and deeper and larger flow systems. Ground-water flow systems in the county are generally small, the largest underlying probably only a few square miles. No regional ground-water flow system underlies the entire area.

Areal variations occur in the thickness, porosity, and permeability of the rock within the zone of fresh-water flow. These variations are partly the result of changes in the chemistry of the water and its ability to weather and dissolve mineral matter as the water moves through the rocks. In the upland areas, water entering the water table contains dissolved oxygen, carbon dioxide, and humic acids which greatly aid in the weathering of rock. In contrast the water moving along the longest flow paths is alkaline and may be much closer to being in chemical equilibrium with the rock. Variations in thickness, porosity, and permeability may also be the result of areal variations in the rates of movement and volume of water transmitted through the rocks. On hilltops or divides a comparatively small volume of water enters and moves through the secondary openings, thus limiting the amount of weathering. On the other hand comparatively large volumes of water move beneath the flanks of major valleys. Movement of ground water in the valleys is generally upward to discharge. Because it is a discharge area, precipitation that falls on the area cannot enter the system and, therefore; certain forms of the weathering and particularly the oxidation of minerals is precluded.

Water-bearing fractures at different depths below land surface contain water under different hydraulic heads. On stream-drainage divides, hydraulic heads decrease with increasing depth and in major valleys they increase with increasing depth below land surface. In intermediate areas, including minor valleys, there may be reversals in the direction of head change with increasing depth below land surface. Most wells in the consolidated rock penetrate more than one producing fracture or zone of fractures which have different hydraulic heads. As a result, the observed water level in a well is characteristically a composite head and does not indicate the hydraulic head of any single water-producing zone. When a well penetrates separate fracture zones having different hydraulic heads some of the natural flow is short circuited through the well from the fracture having a higher hydraulic head to that having the lower head. A consequence of the internal flow in wells under nonpumping conditions may be the cleaning of openings which were partially sealed during drilling. Some of the variation in well yields noted in Passaic County may in part depend upon which part of the flow system the well penetrates and the consequent effect of internal borehole flow upon the cleaning of water-bearing openings.

In a study of the availability of water in igneous and metamorphic rocks in the southern Piedmont province Legrand and Mundorff (1952) found a relationship between well yields and the topographic location of the well. They found that wells located in draws have the highest yields and progressively smaller yields are found from wells in the following topographic locations: valleys, slopes, flats, and hills. Studies in similar terrains throughout the

New England and Piedmont provinces have in general confirmed the relationship between yields and topographic location of the wells. James (1967) in a study of the availability of water in the Precambrian crystalline rocks of the New Jersey Highlands found the same relationship between well yield and topographic location. Yields of wells penetrating the Precambrian rocks in Passaic County probably bear a similar relationship.

Water-Bearing Properties of the Rocks

The rocks of Passaic County differ greatly in their ability to yield water to wells. Figure 5 shows the frequency distribution of reported yields of wells tapping the major rock units in Passaic County. Difference in well yields between rock units and variations in well yield within a rock unit depend in part upon the hydraulic characteristics--permeability, thickness, and storage coefficient--of the aquifer. For consolidated rocks, these characteristics depend upon the number, size and degree of interconnection of secondary openings which occur along structural features such as joints, faults, cleavage, and bedding. Other factors affecting well yields include; well diameter and depth, degree of well cleaning and development, and the hydraulic continuity of the aquifer with a source of induced recharge from a surface-water body.

Precambrian Rocks

The Precambrian rocks are the major source of ground water for domestic use in the northwestern two-thirds of Passaic County. These rocks generally yield smaller quantities of water to individual wells than do the other major geologic units in Passaic County. Reported yields of wells tapping the Precambrian rocks in Passaic County range from less than 1 to 200 gal/min (gallons per minute) [.06 to 13 l/s (litres per second)]. The highest reported yields are obtained from wells that are located in the larger valleys near streams or large surface-water bodies such as Lake Erskine and Greenwood Lake.

The frequency distributions of reported yields of 415 domestic wells and of 21 public-supply wells are shown in figure 5. The median yield of the domestic wells is 5 gal/min (.32 l/s) and that of the public-supply wells is 30 gal/min (2 l/s).

Depths of wells drilled in Precambrian rocks vary considerably in Passaic County. They depend in part on the cost of well construction and on the quantity of water required for a particular use. Maximum reported depths are about 400 ft (122 m) and minimum depths are about 50 ft (15 m). The average reported depth is 160 ft (49 m). The deepest wells were drilled to obtain large public and industrial supplies; whereas, most of the shallower wells were drilled to obtain only small domestic supplies.

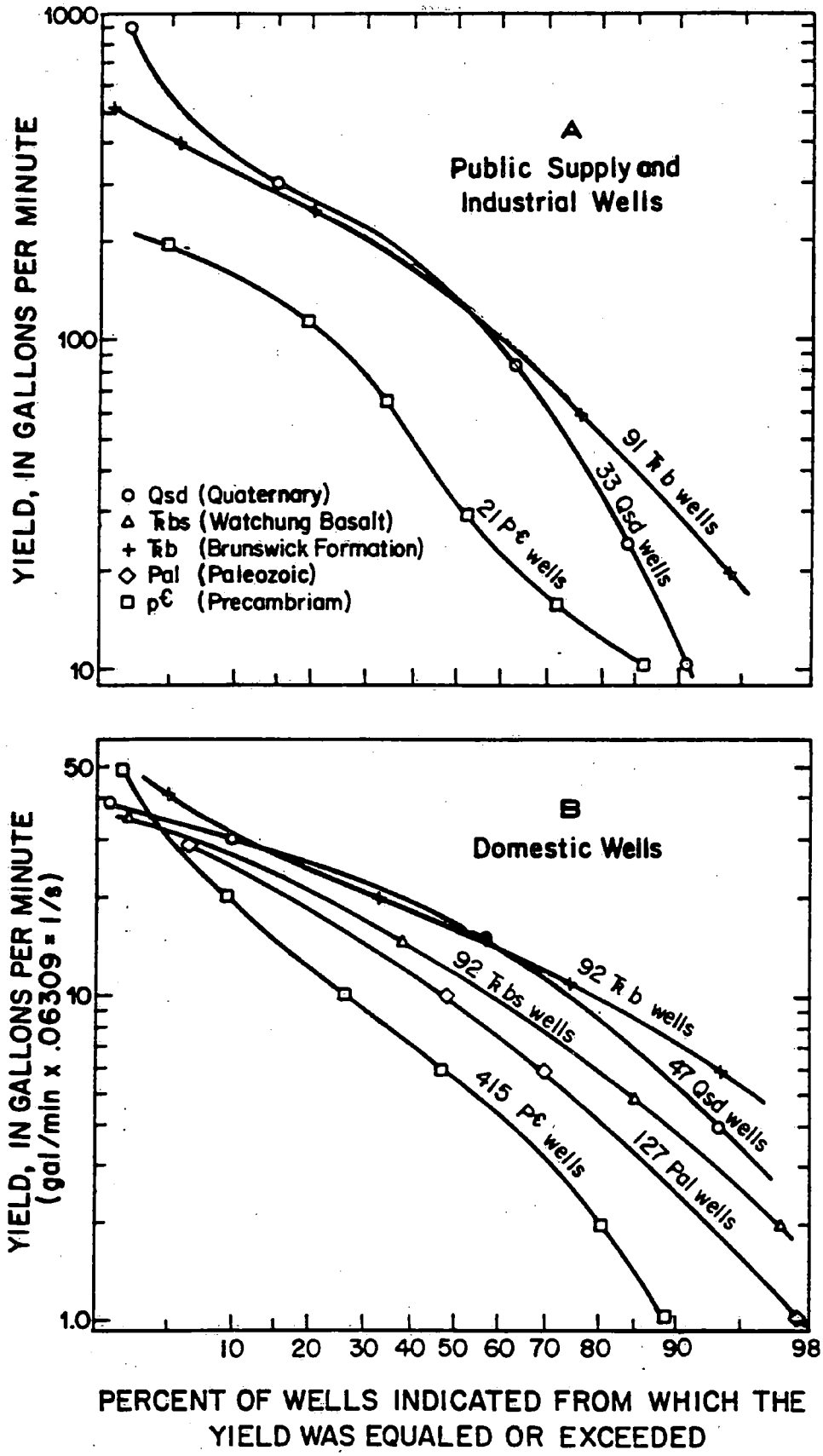


Figure 5.--Graph showing frequency distribution of well yields grouped according to geologic unit.

Paleozoic Rocks

The Paleozoic rocks are utilized primarily for domestic water supplies in Passaic County. Some of the Paleozoic units such as the Kanouse Sandstone, Green Pond Conglomerate, and Hardyston Quartzite (see figure 3) are locally friable and potentially may yield significant quantities of water to properly located wells. Reported yields of wells tapping the Paleozoic rocks in Passaic County range from less than 1 gal/min to 35 gal/min (.06 to 2 l/s). The median reported yield of 127 wells, almost all of which are domestic wells, is 10 gal/min (.63 l/s). The frequency distribution of these well yields is shown in figure 5.

Depths of wells drilled in the Paleozoic rocks in Passaic County range from about 50 ft (15 m) to 400 ft (122 m). The average depth of 32 selected wells listed in table 2 is 150 ft (46 m).

Triassic Rocks

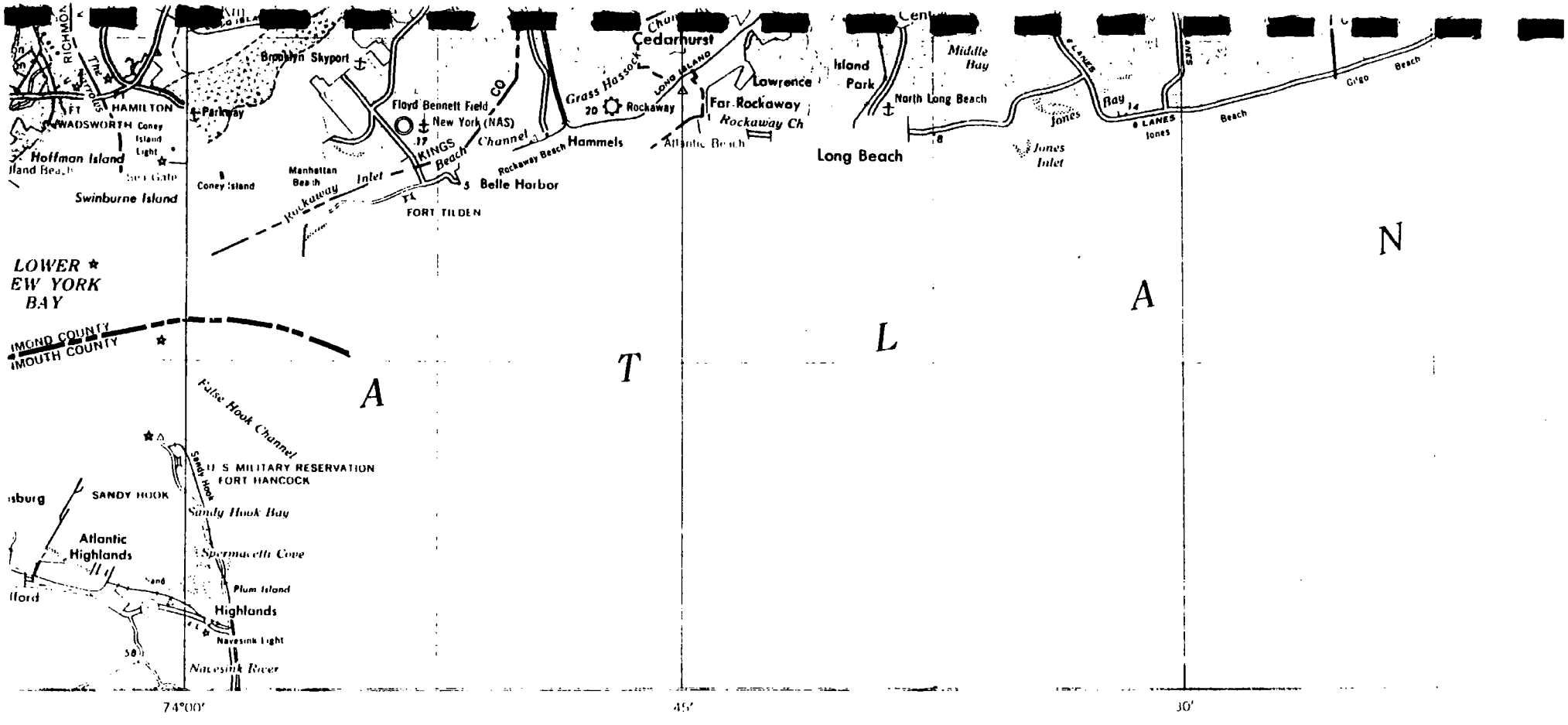
Brunswick Formation

The Brunswick Formation is the most important aquifer in Passaic County. It is the major source of ground water for public supply and industrial use in the county. Reported yields of 91 public supply and industrial wells range from 20 to 510 gal/min (1 to 32 l/s). The median yield is 130 gal/min 8 (l/s) (see figure 5). The median yield of all public supply and industrial wells over 300 ft (91 m) deep is 190 gal/min (12 l/s), and the yield of the deep wells that are 8 in (203 mm) or larger in diameter is 230 gal/min (15 l/s). The higher yields of the larger diameter wells are in part a result of decreased entrance losses to the well and may in part result from better cleaning and development of the well. Most of the high yielding wells are located in valleys in the more industrial areas, in Hawthorne, Paterson, Clifton and Passaic and are in or on the flanks of preglacial valleys containing comparatively thicker unconsolidated deposits. They are thus located in an environment where recharge to the aquifer may be induced. Smaller yields are generally obtained from domestic wells. The median reported yield of 92 domestic wells is 16 gal/min (1 l/s) (see figure 5). These wells have smaller diameters and are shallower and less developed than the public supply and industrial wells. Most domestic wells are between 150 and 250 ft (46 and 76 m) deep; whereas, most public-supply and industrial wells are between 200 and 400 ft (61 and 122 m) deep.

Watchung Basalt

The Watchung Basalt is utilized primarily for domestic water supplies in Passaic County. Reported yields of 92 domestic wells range from less than 1 gal/min (.06 l/s) to 40 gal/min (3 l/s). The median yield is 12 gal/min (.76 l/s). Figure 5 shows the frequency distribution of yields of these domestic wells. Reported yields of nine industrial and commercial wells in Passaic County range from 50 to 180 gal/min (3 to 11 l/s). A few wells in adjacent Essex County have reported yields as high as 400 gal/min (25 l/s) (Nichols, 1968).

REFERENCE 11



GEOLOGIC MAP OF NEW YORK

1970

Lower Hudson Sheet

Scale 1:250,000

5 0 5 10 15 Statute Miles 20

5 0 5 10 15 20 25 Kilometers 30

CONTOUR INTERVAL 100 FEET

Reg 11 p1

Ref 11 p 2

MESOZOIC

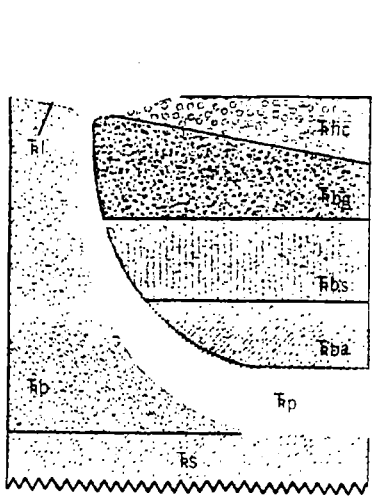
Jurassic-Lower Cretaceous

?MESOZOIC INTRUSIVES

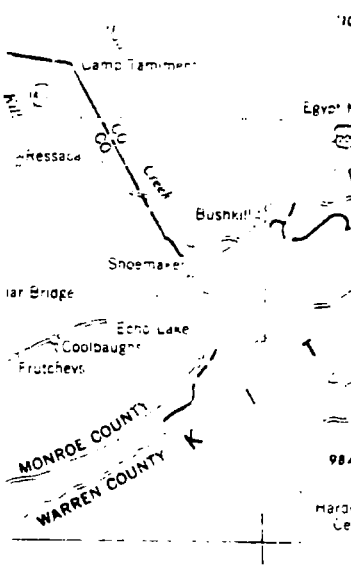
Lamprophyre dikes near Harriman and Mts. Adam and Eve: not shown in Proterozoic terrane.

Upper Triassic

NEWARK GROUP
0-7,000 ft. (0-2100 m.)



Hammer Creek Formation—conglomerate.
Brunswick Formation, undivided — sandstone and conglomerate; sandstone, siltstone, and mudstone; mudstone, sandstone, and arkose.
Stockton Formation — arkose, conglomerate, and mudstone.
Ladentown diabase and basaltic lava.
Palisade Diabase.



41°00′

PALEOZOIC

Upper Devonian

DEVONIAN INTRUSIVES

Dpgr — Muscovite-biotite granite of Peekskill Pluton.

Dpgd — Muscovite-biotite granodiorite of Peekskill Pluton.

?Dbg — Muscovite-biotite granite gneiss.

WEST FALLS GROUP
1,800 ft. (550 m.)

Dwh — Honesdale Formation—sandstone, shale.
Dws — Slide Mountain Formation—sandstone, shale, conglomerate.
Dww — upper Walton Formation—shale, sandstone, conglomerate.

SONYEA GROUP
900 ft. (270 m.)

Dsw — lower Walton Formation—shale, sandstone, conglomerate.

GENESEE GROUP
1,500-3,200 ft. (400-980 m.)

Dgo — Oneonta Formation—shale, sandstone.

Middle Devonian

HAMILTON GROUP
2,600-2,800 ft. (790-850 m.)

Dhmo — Moscow Formation—shale, sandstone.
Dhpl — Plattekill Formation—shale, sandstone; Ashokan Formation—shale, sandstone.
Dh — Undifferentiated lower Hamilton Group—shale, sandstone.
Dhm — Undifferentiated Hamilton Group—shale, siltstone. In eastern Orange County: Skunnemunk Formation—sandstone, conglomerate; Bellvale Formation—shale, sandstone; Cornwall Shale.

ONONDAGA LIMESTONE AND ULSTER GROUP
450-1,000 ft. (140-300 m.)

Dou — Onondaga Limestone—Seneca, Morehouse (cherty), and Nedrow Limestone Members, Edgecliff cherty Limestone Member, local bioherms, Buttermilk Falls Limestone Member, Schoharie Formation—shale

45′

PALEOZOIC

Upper Silurian

Srp

Sbs

Upper Ordovician

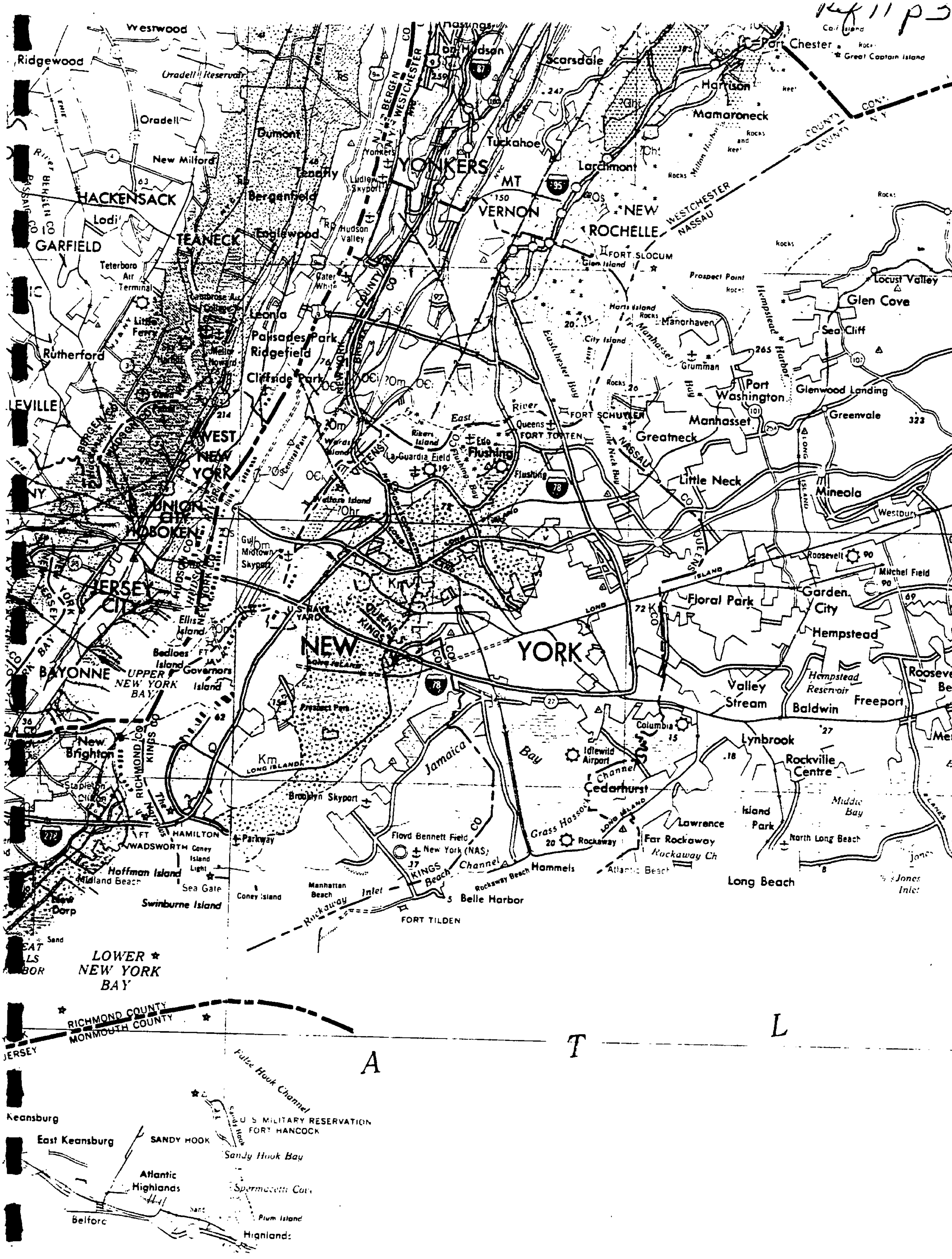
Oban Od

Oqu

Oag

On

Owi


Westwood
Ridgewood
Oradell Reservoir
Oradell
New Milford
HACKENSACK
Lodi
GARFIELD
TEANECK
Teterboro Air Terminal
Little Ferry
Rutherford
Dumont
Tenafly
Bergenfield
Englewood
Leonia
Palisades Park
Ridgefield
Cliffside Park
WEST NEW YORK
UNION CITY
HOBOKEN
JERSEY CITY
BAYONNE
UPPER NEW YORK BAY
Ellis Island
Bedloes Island
Governors Island
New Brighton
Stapleton
Clifton
FT WADSWORTH
HAMILTON
Hoffman Island
Midland Beach
Sea Gate
Swinburne Island
LOWER NEW YORK BAY
RICHMOND COUNTY
MONMOUTH COUNTY
JERSEY
Keansburg
East Keansburg
SANDY HOOK
U S MILITARY RESERVATION FORT HANCOCK
False Hook Channel
Sandy Hook Bay
Atlantic Highlands
Belford
Plum Island
Highlands
Hastings on Hudson
YONKERS
Scarsdale
Tuckahoe
MT VERNON
Harrison
Port Chester
Great Captain Island
Mamaroneck
Larchmont
NEW ROCHELLE
WESTCHESTER
NASSAU
FORT SLOCUM
Glen Island
Prospect Point
Hart Island
City Island
Manorhaven
Manhasset
Hempstead Harbor
Grumman
Port Washington
Locust Valley
Glen Cove
Sea Cliff
Glenwood Landing
Greenvale
East River
Rikers Island
La Guardia Field
Flushing
FORT TOTTEN
FORT SCHUYLER
Little Neck Bay
Greatneck
Little Neck
Mineola
Westbury
Roosevelt
Mitchel Field
Garden City
Floral Park
Hempstead
NEW YORK
QUEENS
KINGS
Welfare Island
Gulf Midtown Skyport
Prospect Park
Brooklyn Skyport
Jamaica Bay
Idlewild Airport
Cedarhurst
Valley Stream
Lynbrook
Baldwin
Freeport
Hempstead Reservoir
Rockville Centre
Island Park
Lawrence
Far Rockaway
Rockaway Channel
Atlantic Beach
Long Beach
Floyd Bennett Field
New York (NAS)
Coney Island
Manhattan Beach
Rockaway Inlet
Hammels
Belle Harbor
FORT TILDEN
North Long Beach
Middle Bay
Jones Inlet
A T L

REFERENCE 12

Continental Can – GW use calcs

Distance	Population
0 - 1/4 mile	0
> 1/4 - 1/2 mile	0
> 1/2 - 1 mile	(5 PW × 2.7) = 13.5
> 1 - 2 mile	(59 PW × 2.7) = 159.3
> 2 - 3 mile	(420 PW × 2.7) + 22000 + 7440 + 3428 = 34002
> 3 - 4 mile	(44 PW × 2.7) + 100 + 9920 + 5040 + 7713 = 22,891.8

NOTE: Household population derived from the County + City Data Book - 1988, U.S. Dept of Commerce, 1988 (1985 data).

Bergen Co = 2.68
Passaic Co = 2.74
} rounded to 2.7

Continental Can Co., Paterson

Towns within 4 miles

1 Paterson City - All pipe water 201-881-3400
2 Clifton City - All PW - 201-470-5800
3 Hawthorn Boro - All PW - 201-427-1167
4 Haledon Boro - All PW - 201-595-7766
5 North Haledon Boro - [redacted] South PW - 201-427-7793
6 Wayne Twp - All PW - 201-694-1800
7 Totowa Boro - All PW - 201-956-1000
✓ 8 West Paterson Boro - All PW - 201-345-8100
✓ 9 Little Falls TWP - All PW - 201-256-0170
✓ 10 Cedar Grove TWP - All PW - 201-239-1410
✓ 11 Montclair Twp - All PW - 201 744-1400
✓ 12 Bloomfield Twp - All PW 201-680-40[redacted] 15
✓ 13 Passaic City - All on pipe water 201-365-5584
✓ 14 E Rutherford Boro - All PW - 201-933-34[redacted]
✓ 15 Wallington Boro - All PW - 201-777-0318
✓ 16 Garfield City - All PW - 201-340-2001
✓ 17 Elmwood Park Boro - All PW - 201-796-1457
✓ 18 Fairlawn Boro - All PW - 201-796-1700

GW Use

TELEPHONE CONVERSATION MEMORANDUM

CLIENT EBASCO

PROJ. No. 02443-8.2A

PROJECT ARCS (WATER SUPPLIES)

DATE 7/23/92

TIME 09:15

CALL (TO) FROM BILL O'BRIEN

REPRESENTING PASSAIC VAL WTR CO ENGINEERING

PHONE No. (201) 340-4308

SUMMARY OF CONVERSATION: LOCATION: PATERSON/CLIFTON/PASSAIC

The P.V.W.C. supplies water to the Cities of Paterson, Clifton, + Passaic. Sources of the water supply are:

- Passaic River
- Revine Reservoir (Paterson)
- Great Notch Reservoir (W. Paterson)
- New Street Reservoir (W. Paterson)
- Point View Reservoir (Wayne)
  (not a working reservoir; raw water, not filtered)

The P.V.W.C. also sells water to other cities.

COPIES TO: FILE

BY: Th

WEHRAN ENGINEERING
CONSULTING ENGINEERS

TELEPHONE CONVERSATION MEMORANDUM

CLIENT EBASCO
PROJECT ARCS (WATER SUPPLIES)
PROJ. No. 02443-8.2A
DATE 7/24/92
TIME 13:10

CALL TO/FROM GAIL DEGRAW, ENG REPRESENTING NORTH JERSEY DISTR WTR SUPPLY COMM
PHONE No. (201) 835-3600

SUMMARY OF CONVERSATION: LOCATION: MISCELLANEOUS

Source of supply is the Wanaque Reservoir.
Backup/emergency supply is the Monksville Reservoir in Ringwood

The NJDWSC supplies the PVWC.

The NJDWSC supplies the following:

Newark	Montclair
Paterson	Glen Ridge
Kearny	Cedar Grove
Passaic	Wayne
Clifton	Nutley

COPIES TO: FILE

BY: Jh

WEHRAN ENGINEERING
CONSULTING ENGINEERS

TELEPHONE CONVERSATION MEMORANDUM

CLIENT EBASCO

PROJ. No. 02443-8.2A

PROJECT ARCS (WATER SUPPLIES)

DATE 6/29/92

TIME 13:15

CALL TO/FROM MR DeLaurigo

REPRESENTING Paterson Dept of Engineering

PHONE No. (201) 881-3400

SUMMARY OF CONVERSATION: LOCATION: Paterson

A few wells were being used recently.

a) Dixon Ave at Nagle
b) Dixon Ave at Ramsey
c) Chamberlain Ave between Berkshire & Linwood

Continental Can Co was originally Wright Aeronautical

No industrial wells known in city.

Water comes from Passaic Valley Water Commission
Serves Passaic, Clifton, & Paterson

COPIES TO: FILE

BY: P. ARMAN

WEHRAN ENGINEERING
CONSULTING ENGINEERS

TELEPHONE CONVERSATION MEMORANDUM

CLIENT EBASCO
PROJ. No. 02443-8.2A
PROJECT ARCS (WATER SUPPLIES)
DATE 7/23/92
TIME 09:15

CALL TO/FROM BILL O'BRIEN
REPRESENTING PASSAIC VAL WTR CO ENGINEERING
PHONE No. (201) 340-4308

SUMMARY OF CONVERSATION: LOCATION: PATERSON/CLIFTON/PASSAIC

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  (not a working reservoir; raw water, not filtered)

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BY: th

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CONSULTING ENGINEERS

TELEPHONE CONVERSATION MEMORANDUM

CLIENT EBASCO

PROJ. No. 02443-8.2A

PROJECT ARCS (WATER SUPPLIES)

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BY: th

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CONSULTING ENGINEERS

TELEPHONE CONVERSATION MEMORANDUM

CLIENT EBASCO

PROJ. No. 02443-8.2A

PROJECT ARCS (WATER SUPPLIES)

DATE 6/29/92

TIME 13:30

CALL TO/FROM Steve Ditzig

REPRESENTING Clifton Health Dept

PHONE No. 201-470-5800

SUMMARY OF CONVERSATION: LOCATION: Clifton

He has a 3-4 year old list of private wells within the City of Clifton left over from when the City used to take water samples.

He'll send it to me.

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BY: P. Arnoux

WEHRAN ENGINEERING
CONSULTING ENGINEERS

* Wells are questionable —

CLIFTON WELLS

Street	St#	Lname
✓ ALLWOOD PLACE?	32	Micheal Glita
✓ Allwood Avenue PLACE?	935	Edward Cassatly
✓ Allwood Road	826	Mason
	955	Casey's Restaurant NO LONGER USED
Arlington Avenue	193	Miles Laboratories Industry
Bloomfield Avenue	955	Brookdale Beverage co. Industry
	1155	Delux Check Printing Industry
✓ Bogert Road PLACE?	14	Julian Noonon
✓ Broadale Road	27	Henry Mol
✓ Churchill Road DRIVE?	36	Boswell
Clifton Avenue	900	City Well
Clifton Blvd.	1	Swepco Tube Co. - Industry
Colfax Avenue	280	Industrial Well
Corlue Avenue CAN'T LOCATE	70	Corrir
Couken Drive CAN'T LOCATE	18	F. Schwighhort
Delawanna Avenue	125	Givaudan Corporation - Industry
	206	Terre Co., The Bill Toury Industry
Fatin Road	200	Sandy Alexander - Industry
✓ Fenner Avenue	90	Cozouo
✓	96	Hillmon
Getty Avneue	600	Bright Star Industries - Industry
✓ Grove Street	89	Steven Dcutsch
✓	309	Omoy
✓	425	Dr. Siliano
✓	589	Douglas
✓	695	Glottly Grove
✓ Helen Street	11	Boy
✓ Hepburn Road	177	Upper Montclair Country Club SERVES 10
✓ Highland Avenue	521	E.G Kuszecki
✓		Lue Cruszecki
✓ Jay Street	57	Stuart Palfreyman
✓ Jones Court	59	Magnifico
Kingsland Avenue	180	Wiggins Plastics Inc. - Industry
Kingsland Street	340	Hoffmann- LaRouche Industry
✓ Lakeview Avenue	175	Jouir Brody Industry
Lisbon Street	1	Cardinal Glove Co. Industry
✓ MacArthur Drive	77	Oxelrod Industry
Main Avenue	1240	Union Photo Co. Industry
✓ McCosh Road	32	Martin Grosso
Mount Prospect Avenue	211	Missbrenner Prints Inc Industry
EARL ✓ ~~Peerl~~brook Drive	1	Atkend
Piaget Avenue	200	Liberty Provisions Inc. Industry
River Road	417	Rutt's Hutt Industry
	492	ITT Avionics Div. Industry
✓ Rolling Hills Road	515	A.L.M. Corp Industry
Rouge Hill Drive CAN'T LOCATE	16	Grilli
✓ Rt.46 & East First Street	64	Micheal Bychcn
Sargot Avenue CAN'T LOCATE		BP Service Station
Speer Avenue	174	John Devion
Styertown Road	49	St. John Kanty Chruch NO LONGER USED
	25	Yeast Products - Industry

1990/04/02
Page 1

RECEIVED
JUL 3

NOTE: WELLS PLOTTED ON LISTED STREETS AT LOCATION NEAREST TO SITE.

th

CLIFTON WELLS

Street	St#	Lname
Tamboer Avneue	27	Titncy
Third Street	85	Fritzsche Dodge & Olcott - Industry
U.S Hgwy # 46 East	613	Parkway Scrap - Industry
Valley Road	500	Kzomer
	528	Kozopchovr
Van Houten Avenue		Morris Froudly Tolcru
	710	Mario's Friendly Restaurant NO LONG USE
Warren St	133	Bodnorchun
Warren Street	117	Unknown
Washington Avenue	390	ITT Avionics - Industry
	500	ITT Avionics Division Industry
Wellington Street	5	Alfred Heller Heat Treating co. Industry
West of Hazel Street		A.G.L. Welding Sup. Co. Industry
		Count: 64

MILES River Rd — 495 Canteen Co

REFERENCE

TELEPHONE CONVERSATION MEMORANDUM

CLIENT EBASCO

PROJECT ARCS (WATER SUPPLIES)

PROJ. No. 02443-8.2A

DATE 8/11/92 + 8/12/92

TIME

CALL TO/FROM SEE BELOW

REPRESENTING SEE BELOW

PHONE No. SEE BELOW

SUMMARY OF CONVERSATION: LOCATION: CLIFTON
(FOLLOW-UPS TO LIST OF PRIVATE WELLS IN CLIFTON)

1. Called Carolyn at Casey's Restaurant (201) 773-2110
   Well no longer used for drinking.
2. Called Ret Dickison, Green Supervisor at the Upper Montclair Country Club (201) 779-7505
   During the busy season, well serves ~100 staff.
3. No listing for BP Service Station; assume household count.
4. Called Agnes of St. John Cantry Church (201) 779-4102
   On City water.
5. Called Aurora of Mario's Friendly Restaurant (201) 777-0559
   Well no longer used for drinking.

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BY: Th

WEHRAN ENGINEERING
CONSULTING ENGINEERS

TELEPHONE CONVERSATION MEMORANDUM

CLIENT EBASCO

PROJECT ARCS (WATER SUPPLIES)

PROJ. No. 02443-8.2A

DATE 8/14/92

TIME 10:20

CALL TO/FROM Barbara

REPRESENTING CLIFTON HEALTH DEPT

PHONE No. (201) 470-5800

SUMMARY OF CONVERSATION: LOCATION: CLIFTON

(FOLLOW-UP TO LIST OF PRIVATE WELLS).

Called to establish house number of "Morris Friendly Foliers" on Van Houten Avenue. Barbara checked the Health Dept's records, the phone book, & information and could not locate a house number or phone number.

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CONSULTING ENGINEERS

TELEPHONE CONVERSATION MEMORANDUM

CLIENT EBASCO

PROJECT ARCS (WATER SUPPLIES)

PROJ. No. 02443-8.2A

DATE 8/21/92

TIME 10:40

CALL TO/FROM SEE BELOW

REPRESENTING HAWTHORNE WTR DEPT

PHONE No.

SUMMARY OF CONVERSATION: LOCATION: HAWTHORNE + OTHERS

SPOKE W/ VIRGINIA DONAHUE (201) 427-2378
CHARLES BLUMELINO DIRECTOR (201) 427-4760
RONALD TATHAN, PUMP' HOUSE (201) 427-2501

there are 22 municipal wells in Hawthorne which serve Hawthorne plus small portions of Ridgewood, Glen Rock, Fair Lawn, + North Haledon (total of ~60-70 services out of town). Different wells are used at different times, depending on requirement + functionability. Wells serve a total of ~18,000 residents. There are a few private wells in town but their locations are unknown. Sending a map of municipal well locations.

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BY: th

WEHRAN ENGINEERING
CONSULTING ENGINEERS

BORO OF HAWTHORNE

21 WELLS SERVE 18,000

$\frac{18000}{21} = 857$

WELLS W/IN:

>2 - 3 MILES = 4 x 857 = 3428

>3 - 4 MILES = 9 x 857 = 7713

>4 MILES = 8 x 857 = 6856

↑ Population Served

WehranEnviroTech

Wehran Engineering Corporation
666 East Main Street
P.O. Box 2006
Middletown, New York 10940
Tel: 914-343-0660
Fax: 914-343-1946

August 24, 1992

Mr. Ronald Tathan
Hawthorne Water Department
445 Lafayette Avenue
Hawthorne, New Jersey 07506

Re: ARCS II
WE Project No. 02443-8.2A

Dear Mr. Tathan:

Wehran Engineering has been retained by the United States Environmental Protection Agency (USEPA) under contract No. 68-W8-0010 to perform investigations of several potential hazardous waste sites in New Jersey. In this regard, we need to identify the water supplies which serve the study areas.

We understand that the source of Hawthorne's water supply consists of 22 municipal wells which serve approximately 18,000 people. If possible, we would like to obtain a map showing the location of these wells, and any privately-owned wells, within Hawthorne. Are the municipal wells located in well head protection areas?

Thank you in advance for your assistance and cooperation.

Very truly yours,

WEHRAN ENGINEERING CORPORATION

Tricia Haelen

Tricia Haelen
Environmental Scientist

TAH/lyc-m

10.8/92.02443-8.2A

TELEPHONE CONVERSATION MEMORANDUM

CLIENT EBASCO

PROJ. No. 02443-8.2A

PROJECT ARCS (WATER SUPPLIES)

DATE 6/29/92

TIME 13:40

CALL (TO)/FROM Henry Van Rye

REPRESENTING Water Dept.

PHONE No. 201 427 2378

SUMMARY OF CONVERSATION: LOCATION: Haworth Boro

He doesnt know any wells within the boro

COPIES TO: FILE

BY:

WEHRAN ENGINEERING
CONSULTING ENGINEERS

REFERENCE

TELEPHONE CONVERSATION MEMORANDUM

CLIENT EBASCO

PROJ. No. 02443-8.2A

PROJECT ARCS (WATER SUPPLIES)

DATE 6/29/92

TIME 13:45

CALL TO/FROM Holly Foster

REPRESENTING Haledon Boro Health Dept

PHONE No. 201-595-5024

SUMMARY OF CONVERSATION: LOCATION: Haledon

Only one well w/in town:

* 5 Valley View Terrace between Central Ave and Hill Street (Valley View is just above Central Ave).

COPIES TO: FILE

BY: P. Armour

WEHRAN ENGINEERING
CONSULTING ENGINEERS

TELEPHONE CONVERSATION MEMORANDUM

CLIENT EBASCO

PROJ. No. 02443-8.2A

PROJECT ARCS (WATER SUPPLIES)

DATE 6/29/92

TIME 13:50

CALL TO/FROM

REPRESENTING North Haledon Water Dept.

PHONE No. 201-427-7793

SUMMARY OF CONVERSATION: LOCATION: North Haledon

All Residences are served by N. Haledon Water Department.

COPIES TO: FILE

BY: P. Amons

WEHRAN ENGINEERING
CONSULTING ENGINEERS

TELEPHONE CONVERSATION MEMORANDUM

CLIENT EBASCO
PROJ. No. 02443-8.2A
PROJECT ARCS (WATER SUPPLIES)
DATE 7/24/92
TIME 13:10

CALL TO/FROM GAIL DEGRAW, ENG REPRESENTING NORTH JERSEY DISTR WTR SUPPLY COMM
PHONE No. (201) 835-3600

SUMMARY OF CONVERSATION: LOCATION: MISCELLANEOUS

Source of supply is the Wanaque Reservoir.
Backup/emergency supply is the Monksville Reservoir in Ringwood

The NJDWSC supplies the PVWC.

The NJDWSC supplies the following:

Newark	Montclair
Paterson	Glen Ridge
Kearny	Cedar Grove
Passaic	Wayne
Clifton	Nutley

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BY: Th

WEHRAN ENGINEERING
CONSULTING ENGINEERS

WehranEnviroTech

REFERENCE

20

Wehran Engineering Corporation
666 East Main Street
P.O. Box 2006
Middletown, New York 10940
Tel: 914-343-0660
Fax: 914-343-1946

August 4, 1992

Ms. Maria Moerck
Tax Collector
Wayne Township
475 Valley Road
Wayne, New Jersey 07470

Re: ARCSII
WE Project No. 02443-8.2A

Dear Ms. Moerck:

Wehran Engineering has been retained by the United States Environmental Protection Agency (USEPA) under Contract No. 68-W8-001 to perform investigations of several potential hazardous waste sites in New Jersey. In this regard, we need to identify the water supplies which serve the study area.

During our phone conversation you informed me that it may be possible to obtain a lost of private wells in Wayne Township. This list will be most valuable to our research.

If it is convenient, you may Federal Express this information to us. Our Federal Express account number is 0125-0027-2.

Thank you in advance for your assistance and cooperation.

Sincerely,

WEHRAN ENGINEERING CORPORATION

Christopher E. Morgans
Environmental Technician

CEM/lac

WehranEnviroTech

REFERENCE

21

Wehran Engineering Corporation
666 East Main Street
P.O. Box 2006
Middletown, New York 10940
Tel: 914-343-0660
Fax: 914-343-1946

August 4, 1992

to Eng. from MJM. 8/10/92

Ms. Maria Moerck
Tax Collector
Wayne Township
475 Valley Road
Wayne, New Jersey 07470

Re: ARCSII
WE Project No. 02443-8.2A

Dear Ms. Moerck:

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Thank you in advance for your assistance and cooperation.

Sincerely,

WEHRAN ENGINEERING CORPORATION

Christopher E. Morgans
Environmental Technician

CEM/lac

8/10/92
* Note: No List available, MJM.

RECEIVED
AUG 14 1992

TELEPHONE CONVERSATION MEMORANDUM

CLIENT EBASCO

PROJ. No. 02443-8.2A

PROJECT ARCS (WATER SUPPLIES)

DATE 6/29/92

TIME 14:10

CALL TO/FROM Pat Sherron

REPRESENTING Totowa Board of Health

PHONE No. 201-956-1008

SUMMARY OF CONVERSATION: LOCATION: Totowa

Approximately 250-300 residences in Borough have private wells. She did not know locations of any of them.

NOTE: ASSUMED WORST CASE: 300 WELLS W/IN >2-3 MILE RADIUS

th

COPIES TO: FILE

BY: P. Armon

WEHRAN ENGINEERING
CONSULTING ENGINEERS

TELEPHONE CONVERSATION MEMORANDUM

CLIENT EBASCO

PROJ. No. 02443-8.2A

PROJECT ARCS (WATER SUPPLIES)

DATE 7/27/92

TIME 09:15

CALL (TO) FROM CHUCK METHVEN REPRESENTING DPW

PHONE No. (201) 256-1264

SUMMARY OF CONVERSATION: LOCATION: BOROUGH OF W. PATERSON

Obtain water from the Passaic Valley Water Commission. *Some residents use on private wells. Contact:

- Felix Esposito, Code Enforcement (201) 345-8100 (Per 7/27/92-09:30 telecon w/ secretary, Felix not call back; call George Galbraith, Supervisor of DPW, at (201) 256-1264)
- George Galbraith cont 7/27/92

COPIES TO: FILE

BY: Th

WEHRAN ENGINEERING
CONSULTING ENGINEERS

TELEPHONE CONVERSATION MEMORANDUM

CLIENT EBASCO

PROJ. No. 02443-8.2A

PROJECT ARCS (WATER SUPPLIES)

DATE 7/31/92

TIME 15:10

CALL (TO)/FROM GEORGE GALBRAITH REPRESENTING SUPERVISOR, DPW

PHONE No. (201) 256-1264

SUMMARY OF CONVERSATION: LOCATION: BOROUGH OF W. PATERSON

Obtain water from the PVWC, American Wtr Co., and W. Paterson Water Commission. Some residents use on private wells. Send ltr + Hagstrom Map + he'll identify location of wells to:

#1 Browertown Road
W. Paterson NJ 07424
(201) 345-8194 (fax)

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BY: th

WEHRAN ENGINEERING
CONSULTING ENGINEERS

Borough of West Paterson

Department of Public Works

GEORGE GALBRAITH, Superintendent

One Browertown Road
Post Office Box 506
West Paterson, New Jersey 07424

PATERSON, NJ
P.M.
4 AUG

29 USA

WEHRAN ENVIRO. TECH
666 E. MAIN ST
MIDDLETOWN N.Y. 10940

ATT. TRICIA HAELEN

REFERENCE : 25

WehranEnviroTech

REFERENCE 1

26

Wehran Engineering Corporation
666 East Main Street
P.O. Box 2006
Middletown, New York 10940
Tel: 914-343-0660
Fax: 914-343-1946

August 3, 1992

Mr. George Galbraith
Department of Public Works
#1 Browertown Road
West Paterson, New Jersey 07424

Re: ARCS II
WE Project No. 02443-8.2A

Dear Mr. Galbraith:

Wehran Engineering has been retained by the United States Environmental Protection Agency (USEPA) under contract No. 68-W8-0010 to perform investigations of several potential hazardous waste sites in New Jersey. In this regard, we need to identify the water supplies which serve the study areas.

We understand that several residents in West Paterson rely on private wells for their drinking water. As requested on July 31, 1992, I have enclosed an enlarged Hagstrom Map for West Paterson on which the locations of these wells can be delineated.

If it is convenient, you may Federal Express this information to us. Our Federal Express account number is 0125-0027-0.

Thank you in advance for your assistance and cooperation.

Very truly yours,

WEHRAN ENGINEERING CORPORATION

Tricia Haelen/Lac

Tricia Haelen
Environmental Scientist

TAH/lac
Enclosure

RECEIVED
AUG 7 1992

☐ - PRIVATE WELLS

ANY QUESTIONS
PLEASE CALL

G. Galbraith

10.8/92.02443-8.2A

WehranEnviroTech

REFERENCE 1

27

Wehran Engineering Corporation
666 East Main Street
P.O. Box 2006
Middletown, New York 10940
Tel: 914-343-0660
Fax: 914-343-1946

August 11, 1992

Mr. George Galbraith, Superintendent
Department of Public Works
One Browertown Road
PO Box 506
West Paterson, New Jersey 07424

Re: ARCS II
WE Project No. 02443-8.2A

Dear Mr. Galbraith:

As you know, Wehran Engineering has been retained by the United States Environmental Protection Agency (USEPA) under contract No. 68-W8-0010 to perform investigations of several potential hazardous waste sites in New Jersey. In this regard, we need to identify the water supplies which serve the study areas.

We appreciate the information you provided recently regarding the locations of the private wells in West Paterson; however, some additional data would be very helpful. Approximately how many private wells are located in each of the areas delineated?

- Northwest of Mountain Avenue ____
- Intersection of Kelsey and Leighton Avenue ____
- South of Weaseldrift Road ____
- Large Area East and West of Rifle Camp Road ____
- Intersection of Lower Notch Road and Lackawanna Avenue ____
- North of Reservoir Road ____

If it is convenient, you may fax [(914) 692-7376] or Federal Express this information to us. Our Federal Express account number is 0125-0027-0.

Thank you again for your assistance and cooperation.

Very truly yours,

WEHRAN ENGINEERING CORPORATION

Tricia Haelen /lyc

Tricia Haelen
Environmental Scientist

TAH/lyc-m
Enclosure

TELEPHONE CONVERSATION MEMORANDUM

CLIENT EBASCO

PROJ. No. 02443-8.2A

PROJECT ARCS (WATER SUPPLIES)

DATE 8/13/92

TIME 11:30

CALL TO/FROM GEORGE GALBRAITH REPRESENTING SUPERINTENDENT, L

PHONE No. (201) 256-1264

SUMMARY OF CONVERSATION: LOCATION: BORD OF W. PATERSON

Rec'd ltr of 8/11/92 requesting info on # of private wells in W. Paterson. Will fax response next week. However, total wells is ~ 100-150.

(Therefore, assumed 50 wells in > 1-2 mile radius and 100 wells in > 2-3 mile radius.

th

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WEHRAN ENGINEERING
CONSULTING ENGINEERS

TELEPHONE CONVERSATION MEMORANDUM

CLIENT EBASCO

PROJ. No. 02443-8.2A

PROJECT ARCS (WATER SUPPLIES)

DATE 7/22/92

TIME 14:20

CALL (TO)/FROM ANN KYPERS

REPRESENTING CLERK

PHONE No. (201) 256-0170

SUMMARY OF CONVERSATION: LOCATION: LITTLE FALLS TOWNSHIP

There are private wells - call Health Office Michael Fiesta at (201) 239-4010.

Water supply is thru NJ American Water Company (800) 233-6680.

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BY: Jh

WEHRAN ENGINEERING
CONSULTING ENGINEERS

TELEPHONE CONVERSATION MEMORANDUM

CLIENT EBASCO

PROJ. No. 02443-8.2A

PROJECT ARCS (WATER SUPPLIES)

DATE 7/22/92

TIME 14:35

CALL TO/FROM SCOTT BAXTER-GREEN

REPRESENTING NJ AMER WTR CO WTR QUAL

PHONE No. (201) 376-8800

SUMMARY OF CONVERSATION: LOCATION: LITTLE FALLS TOWNSHIP

Purchase water from the Passaic Valley Water Commission. Source is the Passaic River.

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CONSULTING ENGINEERS

TELEPHONE CONVERSATION MEMORANDUM

CLIENT EBASCO

PROJ. No. 02443-8.2A

PROJECT ARCS (WATER SUPPLIES)

DATE 7/22/92

TIME 15:00

CALL TO/FROM TONY SANCHEZ

REPRESENTING HEALTH DEPT, SANITARY INSP

PHONE No. (201) 239-4010

SUMMARY OF CONVERSATION: LOCATION: LITTLE FALLS TOWNSHIP

Does not have location of private wells.

Call NJDEPE.

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CONSULTING ENGINEERS

REFERENCE

33

TELEPHONE CONVERSATION MEMORANDUM

CLIENT EBASCO

PROJ. No. 02443-8.2A

PROJECT ARCS (WATER SUPPLIES)

DATE 7/23/92

TIME 13:20

CALL TO/FROM MANNY BARONE

REPRESENTING WTR DEPT - FOREMA

PHONE No. (201) 239-1410

SUMMARY OF CONVERSATION: LOCATION: CEDAR GROVE TOWNSHIP

Two water suppliers:

North Jersey District Wtr Supply Comm

Passaic Valley Wtr Comm

Private wells are used for "sprinkling", not allowed for drinking.

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CONSULTING ENGINEERS

TELEPHONE CONVERSATION MEMORANDUM

CLIENT EBASCO
PROJECT ARCS (WATER SUPPLIES)
PROJ. No. 02443-8.2A
DATE 7/24/92
TIME 13:10

CALL (TO)/FROM GAIL DEBRAW, ENG REPRESENTING NORTH JERSEY DIST WTR SUPPLY COMM
PHONE No. (201) 955-3600

SUMMARY OF CONVERSATION: LOCATION: MISCELLANEOUS

Source of supply is the Wanaque Reservoir.
Backup/emergency supply is the Monksville Reservoir in Ringwood

The NJDWSC supplies the PVWC.

The NJDWSC supplies the following:

Newark	Montclair
Patterson	Glen Ridge
Kearny	Cedar Grove
Passaic	Wayne
Clifton	Nutley

COPIES TO: FILE

BY: th

WEHRAN ENGINEERING
CONSULTING ENGINEERS

TELEPHONE CONVERSATION MEMORANDUM

CLIENT EBASCO
PROJ. No. 02443-8.2A
PROJECT ARCS (WATER SUPPLIES)
DATE 7/23/92
TIME 11:20
CALL TO/FROM TOM SAUCHELLI
REPRESENTING DPW - SUPER OF WTR OPERATIONS
PHONE No. (201) 744-4600

SUMMARY OF CONVERSATION: LOCATION: MONTCLAIR TOWNSHIP

~75% of Supply - North Jersey District Water Supply Commission; source is Wanaque Reservoir (4.7 million gpd)

~25% of Supply - 3 Municipal Wells:

"Glenfield Well" - Maple Ave + Bloomfield Ave (800,000 gpd)

"Rand Well" - Chestnut St + North Fullerton Ave (350,000 gpd)

"Lorraine Well" - Lorraine Ave + North Mountain Ave (325,000 gpd)

Population of Montclair - 38,000

NOTE: All municipal wells located >4 miles from s

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WEHRAN ENGINEERING
CONSULTING ENGINEERS

TELEPHONE CONVERSATION MEMORANDUM

CLIENT EBASCO

PROJ. No. 02443-8.2A

PROJECT ARCS (WATER SUPPLIES)

DATE 7/23/92

TIME 14:40

CALL TO/FROM TOM SAUCHELLI

REPRESENTING DPW - SUPER OF WTR OPERATIONS

PHONE No. (201) 744-4600

SUMMARY OF CONVERSATION: LOCATION: MONTCLAIR TOWNSHIP

Three municipal wells are used strictly for drinking (no industrial). They are contained in well head protection areas.

There are private wells in Montclair. Most are abandoned; however, some used for drinking purposes. Locations of wells are not readily available. Will call us if they come up w/ anything.

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BY: th

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CONSULTING ENGINEERS

TELEPHONE CONVERSATION MEMORANDUM

CLIENT EBASCO

PROJ. No. 02443-8.2A

PROJECT ARCS (WATER SUPPLIES)

DATE 7/24/92

TIME 13:10

CALL TO/FROM GAIL DEGRAW, ENG REPRESENTING NORTH JERSEY DISTR WTR SUPPLY COMM

PHONE No. (201) 835-3600

SUMMARY OF CONVERSATION: LOCATION: MISCELLANEOUS

Source of supply is the Wanaque Reservoir.
Backup/emergency supply is the Monksville Reservoir in Ringwood

The NJDWSC supplies the PVWC

The NJDWSC supplies the following:

Newark	Montclair
Paterson	Glen Ridge
Kearny	Cedar Grove
Passaic	Wayne
Clifton	Nutley

COPIES TO: FILE

BY: th

WEHRAN ENGINEERING
CONSULTING ENGINEERS

TELEPHONE CONVERSATION MEMORANDUM

CLIENT EBASCO

PROJ. No. 02443-8.2A

PROJECT ARCS (WATER SUPPLIES)

DATE 7/27/92

TIME 08:40

CALL TO/FROM MR. COPPOLA

REPRESENTING ENGINEERING

PHONE No. (201) 680-4015

SUMMARY OF CONVERSATION: LOCATION: TOWN OF BLOOMFIELD

Obtain water from the Newark Water System, the source of which is the Pequannock Reservoir (Morris County).

No private wells are used for drinking.

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BY: th

WEHRAN ENGINEERING
CONSULTING ENGINEERS

TELEPHONE CONVERSATION MEMORANDUM

CLIENT EBASCO

PROJ. No. 02443-8.2A

PROJECT ARCS (WATER SUPPLIES)

DATE 7/24/92

TIME 15:10

CALL TO/FROM TONY MARTONE

REPRESENTING HEALTH DEPT CHIEF SANIT INSP

PHONE No. (201) 365-5609

SUMMARY OF CONVERSATION: LOCATION: PASSAIC

Supplied by the PVWC. There are 10-11 private wells; however, they're used for equipment cool down + car washes only. Code Enforcement has a list of the wells, if necessary.

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BY: th

WEHRAN ENGINEERING
CONSULTING ENGINEERS

TELEPHONE CONVERSATION MEMORANDUM

CLIENT EBASCO
PROJ. No. 02443-8.2A
PROJECT ARCS (WATER SUPPLIES)
DATE 7/23/92
TIME 09:15

CALL TO/FROM BILL O'BRIEN
REPRESENTING PASSAIC VAL WTR C ENGINEERING
PHONE No. (201) 340-4308

SUMMARY OF CONVERSATION: LOCATION: PATERSON/CLIFTON/PASSAI

The P.V.W.C. supplies water to the Cities of Paterson, Clifton, + Passaic. Sources of the water supply are:

- Passaic River
- Revine Reservoir (Paterson)
- Great Notch Reservoir (W. Paterson)
- New Street Reservoir (W. Paterson)
- Point View Reservoir (Wayne)
  (not a working reservoir; raw water, not filtered)

The P.V.W.C. also sells water to other cities.

COPIES TO: FILE
BY: Th

WEHRAN ENGINEERING
CONSULTING ENGINEERS

TELEPHONE CONVERSATION MEMORANDUM

CLIENT EBASCO

PROJ. No. 02443-8.2A

PROJECT ARCS (WATER SUPPLIES)

DATE 7/24/92

TIME 13:10

CALL TO/FROM GAIL DEGRAW, ENG REPRESENTING NORTH JERSEY DIS. WTR SUPPLY COMM

PHONE No. (201) 835-3600

SUMMARY OF CONVERSATION: LOCATION: MISCELLANEOUS

Source of supply is the Wanaque Reservoir.
Backup/emergency supply is the Monksville Reservoir in Ringwood

The NJDWSC supplies the PVWC.

The NJDWSC supplies the following:

Newark	Montclair
Patterson	Glen Ridge
Kearny	Cedar Grove
Passaic	Wayne
Clifton	Nutley

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BY: Jh

WEHRAN ENGINEERING
CONSULTING ENGINEERS

TELEPHONE CONVERSATION MEMORANDUM

CLIENT EBASCO

PROJ. No. 02443-8.2A

PROJECT ARCS (WATER SUPPLIES)

DATE 7/24/92

TIME 15:10

CALL TO/FROM ANN PSZTUR

REPRESENTING CLERK'S OFFICE

PHONE No. (201) 933-3444

SUMMARY OF CONVERSATION: LOCATION: EAST RUTHERFORD

Water supplied by Hackensack Water Company.
There are no private or municipal wells
in use.

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BY: th

WEHRAN ENGINEERING
CONSULTING ENGINEERS

TELEPHONE CONVERSATION MEMORANDUM

CLIENT EBASCO
PROJ. No. 02443-8.2A
PROJECT ARCS (WATER SUPPLIES)
DATE 7/24/92
TIME 15:30

CALL TO/FROM ED LYNCH, ENG
REPRESENTING HACKENSACK WTR
PHONE No. (201) 767-9300

SUMMARY OF CONVERSATION: LOCATION: EAST RUTHERFORD

Sources of supply:
(All are surface impounding lakes + dam
Oradell Reservoir (Oradell, New Milford,
Emerson + Haworth, NJ)
Woodcliff Lake (Woodcliff Lake, NJ)
Lake Tappan (Tappan, NY)
De Forest Lake (Congers, NY)
Wanaque Reservoir (Wanaque, NJ)
Trading the communities served (attached).
Also supplied by wells; need to write +
request locations, etc., to:

COPIES TO: FILE

BY: th

Eduardo Vega
HWC
200 Old Hook Rd
Harrington Pk, NJ
07640
Fax # (201) 767-289

WEHRAN ENGINEERING
CONSULTING ENGINEERS

REFERENCE 1

FAX TRANSMITTAL SHEET 44

TO: Tricia Haelen COMPANY: Wehran ENG.

FROM: Ed Lynch COMPANY: H.W.C.

FAX NUMBER:

(201)767-2892

NUMBER OF PAGES TO FOLLOW: 1

IF YOU ARE HAVING DIFFICULTIES RECEIVING THIS FAX, PLEASE CALL:

(201)767-9300 X3012

Between 8 a.m. and 4:30 p.m.

SPECIAL INSTRUCTIONS:

rec'd 7/24/92
15:45

APPENDIX 4

REFERENCE 1

HWC MCD	MUNICIPALITY	1980 CENSUS	1990 CENSUS
1	ALPINE	1,549	1,716
2	BERGENFIELD	25,568	24,458
3	CLOSTER	8,164	8,094
4	CRESSKILL	7,609	7,558
5	DEMAREST	4,963	4,800
6	DUMONT	18,334	17,187
7	ENGLEWOOD	23,701	24,850
8	ENGLEWOOD CLIFFS	5,698	5,634
9	FORT LEE	32,449	31,997
10	HARRINGTON PARK	4,532	4,623
11	HAWORTH	3,509	3,384
12	LEONIA	8,027	8,365
13	NORTHVALE	5,046	4,563
14	NORWOOD	4,413	4,858
15	OLD TAPPAN	4,168	4,254
16	PALISADES PARK	13,732	14,536
17	RIDGFIELD	10,294	9,996
18	ROCKLEIGH *	192	270
19	TENAFLY	13,552	13,326
30	CLIFFSIDE PARK	21,464	20,393
31	EDGEWATER	4,628	5,001
32	FAIRVIEW	10,519	10,733
33	GUTTENBERG	7,340	7,463
34	NORTH BERGEN	47,019	47,690
35	SECAUCUS	13,719	16,382
36	UNION CITY	55,593	56,427
37	WEEHAWKEN	13,168	13,106
38	WEST NEW YORK	39,194	40,955
50	BOGOTA	8,344	7,824
51	EMERSON	7,793	6,930
53	HACKENSACK	36,039	37,049
54	HILLSDALE	10,495	9,750
55	LITTLE FERRY	9,399	9,889
56	MAYWOOD	9,895	9,473
57	MONTVALE	7,318	6,946
58	NEW MILFORD	16,876	15,990
59	ORADELL	8,658	8,024
60	PARAMUS	26,474	25,067
60	RIDGEFIELD PARK	12,738	12,454
62	RIVER EDGE	11,111	10,603
63	RIVER VALE	9,489	9,410
64	ROCHELLE PARK	5,603	5,587
65	SOUTH HACKENSACK	2,118	2,001
66	TEANECK	39,007	37,825
67	WASHINGTON TOWNSHIP	9,550	9,245
68	WESTWOOD	10,714	10,446
71	WOODCLIFF LAKE *	56	53
72	UPPER SADDLE RIVER *	80	72
79	FRANKLIN LAKES *	3,508	3,949
80	CARLSTADT	6,166	5,510
81	EAST RUTHERFORD	7,849	7,902
82	HASBROUCK HEIGHTS	12,166	11,488
83	MOONACHIE	2,706	2,817
84	RUTHERFORD	19,068	17,790
85	TETERBORO	19	22
86	WOOD-RIDGE	7,929	7,506
87	LODI *	479	447
88	SOUTH HACKENSACK	111	105
89	WALLINGTON *	300	300
	TOTAL	709,902	704,793

* Partially served MCDs, population served estimated

#4

TELEPHONE CONVERSATION MEMORANDUM

CLIENT EBASCO

PROJ. No. 02443-8.2A

PROJECT ARCS (WATER SUPPLIES)

DATE 7/22/92

TIME 16:20

CALL TO/FROM WALTER WARGACKI REPRESENTING MAYOR

PHONE No. (201) 777-0318

SUMMARY OF CONVERSATION: LOCATION: BORO OF WALLINGTON

Public supply thru Passaic Valley Water Commission.

No private wells; all were "eliminated" due to contamination ~7 years ago (PRP = Curtis-Wright?).

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BY: th

WEHRAN ENGINEERING
CONSULTING ENGINEERS

TELEPHONE CONVERSATION MEMORANDUM

CLIENT EBASCO

PROJ. No. 02443-8.2A

PROJECT ARCS (WATER SUPPLIES)

DATE 8/3/92

TIME 8:35

CALL TO/FROM MR. SFERRUCZO

REPRESENTING ASST SUP - WTR

PHONE No. (201) 546-2200 or 478-9081

SUMMARY OF CONVERSATION: LOCATION: CITY OF GARFIELD

USAGE
1/3 PASSIC VALLEY WATER
2/3 - WELLS - CHLORINATION & FILTRATION

ELMWOOD PARK
7 - WELL WORKING
4 TOTAL WELLS, REMAIN 2 MAY SOON BE USED

GILBERT AVE & BULIVARD
LINCOLN or WASHING
SPINAL AVE - EAST TO RAILRAIL

POP. OF GARFIELD SERVED
34,000 - 32000 - DPW ESTIMATE *
26,000 - US CENSUS ESTIMATE

11333 - 10666 PEOPLE USE PASSAIC VALLEY WATER
22667 - 21333 PEOPLE USE WELL WATER
* AVG = 22,000 PEOPLE

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BY: Yh

WEHRAN ENGINEERING
CONSULTING ENGINEERS

ROAD CLASSIFICATION

Light-duty

Unimproved dirt

Mapped, edited, and published by the Geological Survey

Control by USGS, NOS/NOAA, and New Jersey Geodetic Survey

Topography by planetable surveys 1934. Revised 1955

Hydrography compiled from NOS chart 287 (1954)

HACKENSACK & PATERSON

TELEPHONE CONVERSATION MEMORANDUM

CLIENT EBASCO

PROJ. No. 02443-8.2A

PROJECT ARCS (WATER SUPPLIES)

DATE 7/27/92

TIME 10:40

CALL TO/FROM NANCY JANITZ REPRESENTING WTR DEPT / TAX COLLE

PHONE No. (201) 796-2614

SUMMARY OF CONVERSATION: LOCATION: BOROUGH OF ELMWOOD PARK

Water obtained from the PVWC.

Several residents do use private wells for drinking. No specific records; however, she's aware of residents on: Church St., Oak St., Martha Ave., + Kipp Ave.

There are artesian wells located on a piece of property in Elmwood Park. The property was sold to Garfield, + the wells supplement Garfield's supply. The wells were shut down in the late 70's/early 80's due to contamination. One or two wells were recently "reopened".

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GARFIELD

BY: Jh

WEHRAN ENGINEERING
CONSULTING ENGINEERS

TELEPHONE CONVERSATION MEMORANDUM

CLIENT EBASCO

PROJ. No. 02443-8.2A

PROJECT ARCS (WATER SUPPLIES)

DATE 7/27/92

TIME 10:40

CALL TO/FROM NANCY JANITZ

REPRESENTING WTR DEPT / TAX COLL

PHONE No. (201) 796-2614

SUMMARY OF CONVERSATION: LOCATION: BOROUGH OF ELMWOOD PARK

Water obtained from the PVWC.

Several residents do use private wells for drinking. No specific records; however, she's aware of residents on: Church St, Oak St, Martha Ave, + Upp Ave.

* There are artesian wells located on a piece of property in Elmwood Park. The property was sold to Garfield, + the wells supplement Garfield's supply. The wells were shut down in the late 70's/early 80's due to contamination. One of two wells were recently "reopened".

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GARFIELD

BY: Jh

WEHRAN ENGINEERING
CONSULTING ENGINEERS

TELEPHONE CONVERSATION MEMORANDUM

CLIENT EBASCO PROJ. No. 02443-8.2A

PROJECT ARCS (WATER SUPPLIES) DATE 7/27/92

TIME 10:05

CALL (TO) FROM FRED BLECHINGER REPRESENTING ENGINEERING

PHONE No. (201) 796-1700

SUMMARY OF CONVERSATION: LOCATION: BOROUGH OF FAIRLAWN

Population = ~31,000. (~18,600 persons).

~60% supplied by 15 MWL. All but 3 of the wells are contaminated (industrial facilities, USTs); supply goes thru air stripping process at central treatment facility. Not located in well head protection areas. Sending map of well locations.

~40% supplied by PVWC + HWC.

~20 residents have private wells used for drinking. Sending list.

COPIES TO: FILE

BY: th

WEHRAN ENGINEERING
CONSULTING ENGINEERS

BORO OF FAIRLAWN

15 WELLS SERVE 18,600

$\frac{18600}{15} = 1240$

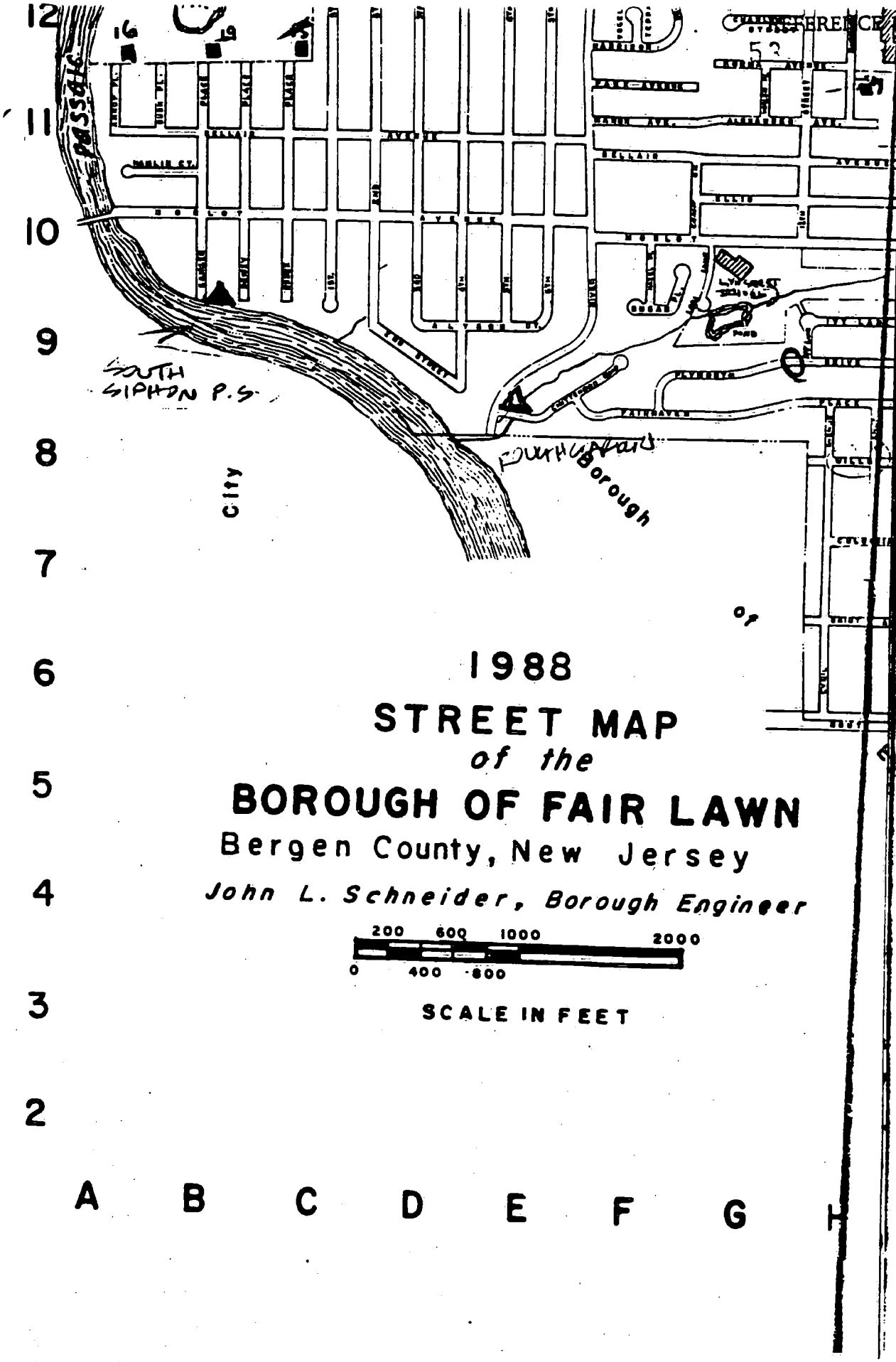
WELLS W/IN:

> 2-3 MILES = 6 x 1240 = 7440

> 3-4 MILES = 8 x 1240 = 9920

> 4 MILES = 1 x 1240 = 1240

Population Served


REFERENCE
53
PASSAIC
SOUTH SIPHON P.S.
City
Borough
of
1988
STREET MAP
of the
BOROUGH OF FAIR LAWN
Bergen County, New Jersey
John L. Schneider, Borough Engineer
200 600 1000 2000
0 400 800
SCALE IN FEET
12
11
10
9
8
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6
5
4
3
2
A B C D E F G H

From: Lydia Kramarchuk

FAIR LAWN HEALTH DEPARTMENT

NON-MUNICIPAL WELLS IN FAIR LAWN
July 1992

(This is an incomplete list, compiled by Lydia Kramarchuk since 1991 from various well searches, and does not include environmental monitoring wells.)

WELLS PRESENT AND NO WATER BILLS - ASSUMED POTABLE WELLS

36-07 Berdan Ave
27-02 Berkshire Rd
28-09 Fair Lawn Ave
31-15 Garfield Pl
17 Gurney Terr > 4 MILES
8 Lafayette Pl
14-01 Lucena Dr > 4 MILES
24-18 Maple Ave -Budget Rent-A-Car WELL USED FOR CAR WASHING ONLY
15-10 Morlot Ave
34-15 Morlot Ave
8-49 Oak Street
381 Plaza Rd N
385 Plaza Rd N
389 Plaza Rd N
398 Plaza Rd N
17-14 Radburn Rd > 4 MILES
0-09 Saddle River Rd
0-40 Saddle River Rd
21-11 Saddle River Rd
21-17 Saddle River Rd.
15-17 Saddle River Rd * have water service connection, unused
13-31 Saddle River Rd
1-24 17 th St
Plaza Rd & 208 South (Block 3517 Lot 8)
? Rt 4 & 208 ?

RECEIVED
JUL - 7 1992
ENGINEERING DEPARTMENT
BOROUGH OF FAIR LAWN

AT ADDRESSES BELOW WELLS ASSUMED TO BE USED FOR NON-POTABLE PURSPOSES, SINCE GET BOROUGH WATER and WATER BILLS

34-04 Barbara Pl.
8-15 Bellair Ave
27-02 Berkshire Rd.
17-15 Broadway- Rumpernook- cross connection permit
37-14 Broadway- Auto Car Wash - cross connection permit
37-16 Broadway
16 Chittenden Rd
18 Chittenden Rd
23 Chittenden Rd

RECEIVED
JUL 30 1992

(SEE MAP)

TELEPHONE CONVERSATION MEMORANDUM

CLIENT EBASCO

PROJ. No. 02443-8.2A

PROJECT ARCS (WATER SUPPLIES)

DATE 8/20/92

TIME 15:40

CALL TO/FROM LOU VETERE

REPRESENTING BUDGET RENT-A-CAR

PHONE No. (201) 440-7660

SUMMARY OF CONVERSATION: LOCATION: FAIRLAWN

WELL listed on Fairlawn Health Dept listing is used for car washing only.

COPIES TO: FILE

BY: th

WEHRAN ENGINEERING
CONSULTING ENGINEERS

TELEPHONE CONVERSATION MEMORANDUM

CLIENT EBASCO

PROJ. No. 02443-8.2A

PROJECT ARCS (WATER SUPPLIES)

DATE 7/27/92

TIME 16:30

CALL TO/FROM MRS. KAMPER

REPRESENTING SADDLE BROOK WATER DEPT

PHONE No. (201) 843-7100

SUMMARY OF CONVERSATION: LOCATION: HACKENSACK WATER SUPPLY
— PRIVATE WELLS
- KNEW THERE WERE SOME PRIVATE WELLS BUT WAS NOT SURE HOW MANY
* ~ 20 WELLS
SADDLEBROOK MUNICIPAL BUILDING
93 MARKET ST.
SADDLEBROOK, NJ ~~07076~~ 07662
ATT MRS. KAMPER

WRITE FOR A LIST OF LOCATIONS OF WELLS

8/12/92 - Per Mrs. Kamper she forwarded ltr to her consultant, Harry Gerecke.

8/13/92 - Per Harry Gerecke, (914) 357-4411 don't have list of private wells in Saddle Brook - call DEPE.

* Therefore, assumed 20 private wells within the ½-mile radius.

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BY: CM

WEHRAN ENGINEERING
CONSULTING ENGINEERS

WehranEnviroTech

REFERENCE 12

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Wehran Engineering Corporation
666 East Main Street
P.O. Box 2006
Middletown, New York 10940
Tel: 914-343-0660
Fax: 914-343-1946

July 30, 1992

Mrs. Kamper
Saddle Brook Water Department
Saddle Brook Municipal Building
93 Market Street
Saddle Brook, New Jersey 07662

Re: ARCS II
WE Project No. 02443-8.2A

Dear Mrs. Kamper:

Wehran Engineering has been retained by the United State Environmental Protection Agency (USEPA) under Contract No. 68-W8-0010 to perform investigations of several potential hazardous waste sites in New Jersey. In this regard, we need to identify the water supplies which serve the study area.

During our conversation on July 27, 1992, you informed me that Saddle Brook receives its water from the Hackensack Water Company and that approximately 20 private wells exist within the area. If possible, we would like to obtain a list of these private wells, their locations, and their uses of these wells (i.e., potable water, industrial, etc.).

If it is convenient, you may Federal Express this information to us. Our Federal Express account number is 0125-0027-0.

Thank you in advance for your assistance and cooperation.

Sincerely,

WEHRAN ENGINEERING CORPORATION

Christopher E Morgans

Christopher E. Morgans
Environmental Technician

CEM:lyc-m

10.7/92.02443-8.2A

REFERENCE

TELEPHONE CONVERSATION MEMORANDUM

CLIENT EBASCO

PROJ. No. 02443-8.2A

PROJECT ARCS (WATER SUPPLIES)

DATE 7/29/92

TIME 9:35

CALL TO/FROM JIM GASPARRI

REPRESENTING DPW LODI

PHONE No. (201) 365-4068

SUMMARY OF CONVERSATION: LOCATION: PASSAIC VALLEY WATER COM
- 8 MUNICIPAL WELLS - NOT BEING USED
- NO PRIVATE WELLS

COPIES TO: FILE

BY: [illegible]

WEHRAN ENGINEERING
CONSULTING ENGINEERS

TELEPHONE CONVERSATION MEMORANDUM

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CLIENT EBASCO

PROJ. No. 02443-8.2A

PROJECT ARCS (WATER SUPPLIES)

DATE 8/13/92

TIME 10:15

CALL TO/FROM JEFF INFANTE

REPRESENTING PARK RD ASSOC SADDLE BROOK

PHONE No. (201) 843-3922

SUMMARY OF CONVERSATION: ~~LOCATION:~~

Wells # 2172P listed on NJDEPE printout were previously used as cooling water for the air conditioning. They are not used for drinking.

Telecon applicable to NJDEPE printout

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BY: Th

WEHRAN ENGINEERING
CONSULTING ENGINEERS

TELEPHONE CONVERSATION MEMORANDUM

CLIENT EBASCO

PROJ. No. 02443-8.2A

PROJECT ARCS (WATER SUPPLIES)

DATE 8/20/92

TIME 16:05

CALL TO/FROM MARY

REPRESENTING WATER DEPT RIDGEWOOD

PHONE No. (201) 670-5510

SUMMARY OF CONVERSATION: LOCATION: RIDGEWOOD + GLEN ROCK

Ridgewood has 60 municipal wells which serve, and are located throughout, Ridgewood, Glen Rock, Midland Park, + 90% of Wyckoff. Possible contacts re: the "Main" well listed on NJDEPE printout are:

- Mr. Moritz, Director
- Mr. Cunningham, Office Mgr 670-5523
- Steven Florence, Pump Station 670-5526

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CONSULTING ENGINEERS

REFERENCE

TELEPHONE CONVERSATION MEMORANDUM

CLIENT EBASCO

PROJ. No. 02443-8.2A

PROJECT ARCS (WATER SUPPLIES)

DATE 8/21/92

TIME 11:35

CALL TO/FROM ELMER HOPPER

REPRESENTING RIDGEWOOD WTR DEPT PUMP HOUSE

PHONE No. (201) 670-5526

SUMMARY OF CONVERSATION: LOCATION: GLEN ROCK

Unsure of population served by "Main" well in Glen Rock (listed on NJDEPE printout). They estimate water usage at 100 gpd/person; capacity of the well is ~ 300-350 gpm. Therefore,

60 min/hr x 24 hr/day = 1440 min/day

1440 min/day x 350 gal/min ÷ 100 gal/person

= 5040 persons served

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BY: th

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CONSULTING ENGINEERS

REFERENCE
62

TELEPHONE CONVERSATION MEMORANDUM

CLIENT EBASCO

PROJ. No. 02443-8.2A

PROJECT ARCS (WATER SUPPLIES)

DATE 8/17/92

TIME 13:30

CALL TO/FROM TOM ELGERT, ENG REPRESENTING HACKENSACK WTR

PHONE No. (201) 767-9300

SUMMARY OF CONVERSATION: LOCATION: PARAMUS (?)

The "Dunderhook" well (#5107-2305450) in Paramus is a raw water well, i.e., water doesn't enter the HWC system. It is possibly discharged to a stream which eventually drains to a reservoir.

He has no info on capacity, current usage, population served.

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BY: th

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CONSULTING ENGINEERS

TELEPHONE CONVERSATION MEMORANDUM

CLIENT EBASCO

PROJ. No. 02443-8.2A

PROJECT ARCS (WATER SUPPLIES)

DATE 8/13/92

TIME 11:10

CALL TO/FROM Mary

REPRESENTING DPW, GARFIELD

PHONE No. (201) 546-2200

SUMMARY OF CONVERSATION: LOCATION:

Returned call for Michael Sferruzzo, Asst Superintendent at DPW. Of the wells listed on the NJDEPE printout (#5282 - Garfield Wtr Dept), most are included in the "Elmwood Pk Wellfield". Others are no longer used

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BY: th

WEHRAN ENGINEERING
CONSULTING ENGINEERS

REFERENCE 13

SUBJECT TO REVISION

100,000 GPD WATER WITHDRAWAL POINTS ONLY AND NJGS CASE INDEX SITES WITHIN 5.0 MILES OF:

LATITUDE 405353
LONGITUDE 740933

DRAFT

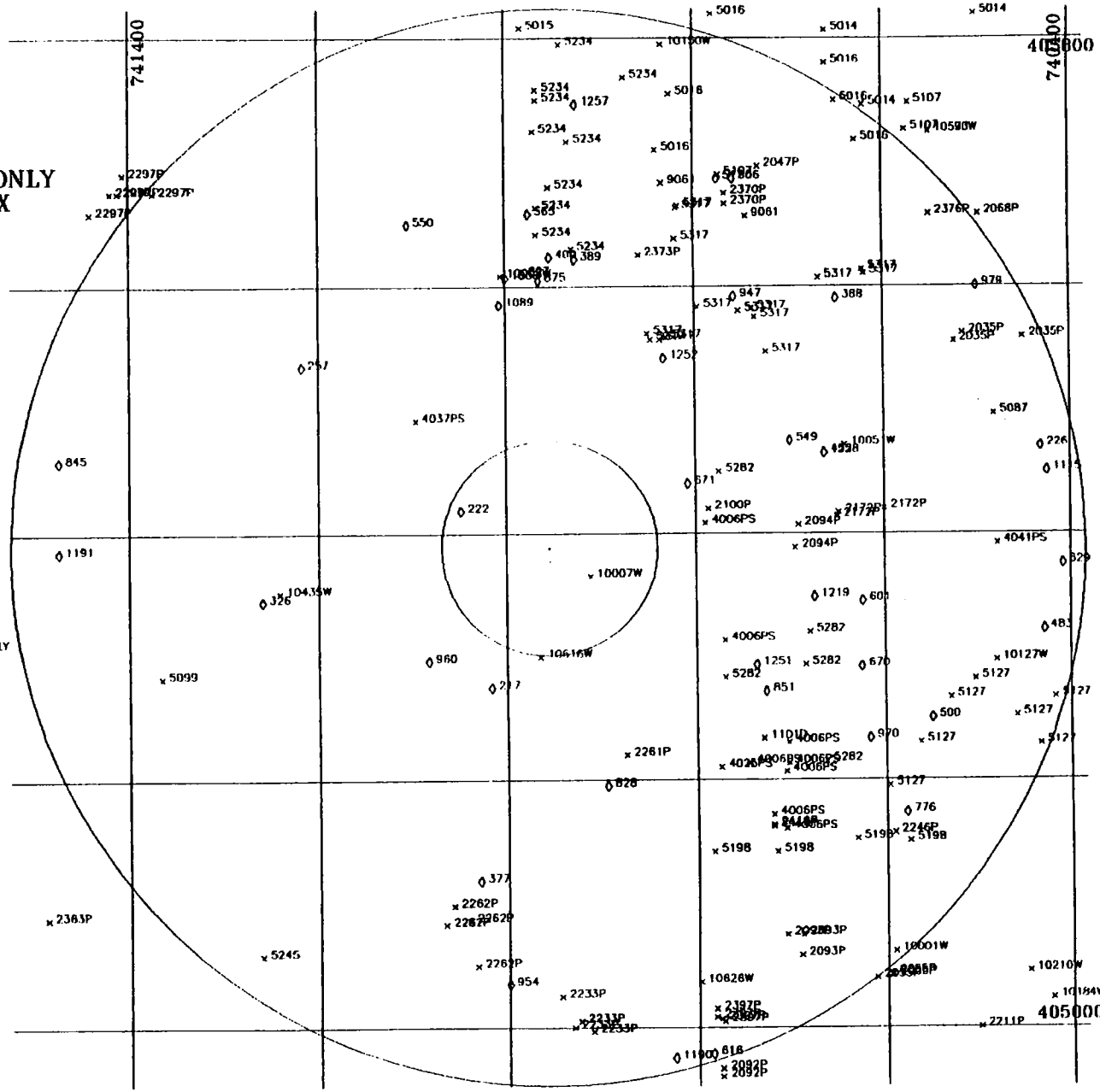
SCALE: 1:63,360
(1 Inch = 1 Mile)

× 100,000 GPD WATER WITHDRAWAL POINTS ONLY
◊ 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:
NJDEPE
WATER TECHNICAL PROGRAMS
BUREAU OF WATER ALLOCATION
CN-029
TRENTON, NJ 08625

DATE: 07/08/92



SUBJECT TO REVISION

Reference

[illegible] LIST OF SANITARY SURVEY OF WATER WITHDRAWAL FOR USE WITHIN 5.0 MILES OF [illegible] LAT. [illegible] LONG. (SORTED BY LEMILE NUMBER) - [illegible]

NUMBER	NAME	SOURCE-ID	LOCID	LA	LOL	LEVEL	DISTANCE	COUNTY	PUT	DEPTH	GEO1	GEO2	CAPACITY
[illegible]	SUN CHEMICAL CORP.	[illegible]	WELL #1	405037	740[illegible]	M	4.9	03	05	150	GTRB		150
	SUN CHEMICAL CORP.	2603934	WELL #2	405037	740[illegible]	M	4.9	03	05	280	GTRB		200
10007W	WESTWOOD INDUSTRIES, INC.	2603057	1	405339	740907		0.5	31	08	220	GTRB		125
10008W	TILCON NEW JERSEY, INC.	4300102	WELL #1	405665	741003	I	2.6	31	10	600	GTRB		95.5
	TILCON NEW JERSEY, INC.	4300103	WELL #2	405665	741003	I	2.6	31	10	250	GTRB		100
	TILCON NEW JERSEY, INC.	4300104	WELL #3	405665	741003	I	2.6	31	10	250	GTRB		95.5
10[illegible]W	GRANT CHEMICAL COMPANY	2604140	#1	405[illegible]	74[illegible]	I	2.9	03	11	300			300
10[illegible]W	INTERPLAST UNIVERSAL IND., INC	2601790	#[illegible]	405[illegible]	74[illegible]	I	1.3	03	31	310			150
10[illegible]W	FAIR LAWN MEMORIAL CEMETERY	3305707	#1	405757	74[illegible]	I	4.8	03	17	300			150
10[illegible]W	WORLD PLASTIC EXTRUDERS INC.	2602991	#1	405014	74[illegible]	I	6.[illegible]	03	37	200	GTRB		100
[illegible]W	TILLMANN INC.	2604187	#1	405037	74[illegible]	I	[illegible]	03	05	300	GTRB		150
[illegible]	PARK WEST MEADOWS CONDO ASSOC.	2606860	WELL 2	405831	741[illegible]	I	[illegible].5	31	16	70			[illegible]
[illegible]	BERGEN CO. COMMUNITY COLLEGE	1700101		405215	74[illegible]	I	[illegible]	03	46	200	GTRB		180
[illegible]	BERGEN CO. DIV. OF PARKS	4300169		[illegible]	74[illegible]	I	[illegible]	03	46	210	GTRB		175
[illegible]	INTERNATIONAL MELLING CORP.	[illegible]02		405[illegible]	740[illegible]	I	1.0	[illegible]	03	307			120
[illegible]	FALSTAFF COMPANY, INC.	2604194	1	[illegible]	[illegible]	I	4.[illegible]	[illegible]	0	700	GTRB		140
[illegible]	FOSTER WHEELER DYNAMIC, INC.			[illegible]	[illegible]		[illegible]	31	0	45	GD		1.5
[illegible]	ARCOLA COUNTRY CLUB	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	46	[illegible]	GTRB		[illegible]
	ARCOLA COUNTRY CLUB	2603072	[illegible]	[illegible]	740[illegible]	U	1.3	03	46	208	GTRB		1.5
	ARCOLA COUNTRY CLUB	FUND	1	[illegible]	740[illegible]	U	1.8	03	46	5	GTRB		200
	ARCOLA COUNTRY CLUB	FUND	[illegible]	[illegible]	740[illegible]	U	1.8	03	46	15	GTRB		200
2047P	NABISCO BRANDS, INC.	3303369	[illegible]	[illegible]	740[illegible]	S	1.0	03	17	39[illegible]	GTRB		350
2[illegible]5P	GAMES CHEMICAL, INC.	4600080	[illegible]	[illegible]	740[illegible]	I	5.1	03	05	490	GTRB		[illegible]
	GAMES CHEMICAL, INC.	2600005	1	[illegible]	740[illegible]	I	5.0	03	05	526	GTRB		80
	GAMES CHEMICAL, INC.	2604277	[illegible]	[illegible]	740[illegible]	I	5.1	03	05	430	GTRB		70
2[illegible]6P	RIDGEWOOD COUNTRY CLUB	4300032	1	[illegible]	740[illegible]	U	5.1	03	46	306	GTRB		120
	RIDGEWOOD COUNTRY CLUB	4300033	[illegible]	[illegible]	740[illegible]	U	[illegible].1	03	46	275	GTRB		275
	RIDGEWOOD COUNTRY CLUB	2302832	[illegible]	[illegible]	740[illegible]	S	5.1	03	46	500	GTRB		250
	RIDGEWOOD COUNTRY CLUB	FUND		[illegible]	740[illegible]	U	5.1	03	46	8	GTRB		500
2[illegible]2P	GIVAUDAN-ROURE CORPORATION	4600006		[illegible]	740[illegible]	F	5.2	31	02	297	GTRB		225
	GIVAUDAN-ROURE CORPORATION	4600007		[illegible]	740[illegible]	F	5.1	31	02	250	GTRB		110
2[illegible]3P	OSVAL KENT FOOD COMPANY, INC.	2604317	1	[illegible]	740[illegible]	F	4.2	03	12	580	GTRB		150
	OSVAL KENT FOOD COMPANY, INC.	2604341	[illegible]	[illegible]	740[illegible]	S	4.3	03	12	300	GTRB		150
	OSVAL KENT FOOD COMPANY, INC.	2604342	[illegible]	[illegible]	740[illegible]	I	4.4	03	12	470	GTRB		430
2[illegible]4P	D.A.K. MANUFACTURING CORP.	2600466	1	[illegible]	740[illegible]	F	[illegible].3	03	11		GTRB		
	D.A.K. MANUFACTURING CORP.	4600210	2	[illegible]	740[illegible]	U	[illegible].3	03	11		GTRB		
	D.A.K. MANUFACTURING CORP.	4600211	3	[illegible]	740[illegible]	U	[illegible].3	03	11		GTRB		
	D.A.K. MANUFACTURING CORP.	2602037	4	[illegible]	740[illegible]	F	[illegible].3	03	11	250	GTRB		60
2100P	MARCAL PAPER MILLS, INC.	4600008	1	[illegible]	740[illegible]	F	1.5	03	11	308	GTRB		150
	MARCAL PAPER MILLS, INC.	4600009	2	[illegible]	740[illegible]	F	1.5	03	11	330	GTRB		280
	MARCAL PAPER MILLS, INC.	4600010	3	[illegible]	740[illegible]	F	1.5	03	11	325	GTRB		250
	MARCAL PAPER MILLS, INC.	4600011	4	[illegible]	740[illegible]	F	1.5	03	11	282	GTRB		90
	MARCAL PAPER MILLS, INC.	4600012	5	[illegible]	740[illegible]	F	1.5	03	11		GTRB		125
	MARCAL PAPER MILLS, INC.	4600013	6	[illegible]	740[illegible]	F	1.5	03	11		GTRB		300
21[illegible]P	PARK 80 ASSOCIATES	2604234	1	[illegible]	740[illegible]	S	2.7	03	57	400	GTRB		300
	PARK 80 ASSOCIATES	2604235	2	[illegible]	740[illegible]	S	2.7	03	57	400	GTRB		300
	PARK 80 ASSOCIATES	2605701	3	[illegible]	740[illegible]	S	2.7	03	57	300	GTRB		0
	PARK 80 ASSOCIATES	2604104	1	[illegible]	740[illegible]	S	2.1	03	57	300	GTRB		
2211P	HENKEL PROCESS CHEMICALS, INC.	4600125	1	[illegible]	740[illegible]		6.0	03	05	170	GOSD		600
2333P	HOFFMANN-LAROCHE INC.	4600155	20	[illegible]	740[illegible]	F	1.5	13	16	402	GTRB		100
	HOFFMANN-LAROCHE INC.	4600156	22	[illegible]	740[illegible]	F	4.2	31	02	650	GTRB		260
	HOFFMANN-LAROCHE INC.	4600157	33	[illegible]	740[illegible]	F	4.4	31	02		GTRB		165
	HOFFMANN-LAROCHE INC.	4600158	37	[illegible]	740[illegible]	F	4.5	31	02	720	GTRB		300
2[illegible]6P	FARMLAND DAIRIES INC.	2604169	1	[illegible]	740[illegible]	U	4.1	03	65	600	GTRB		200
	FARMLAND DAIRIES INC.	2604150	2	[illegible]	740[illegible]	U	4.1	03	65	500	GTRB		185

Fig. 15

2

Page 3 of PRELIMINARY SURVEY OF WATER WITHDRAWAL POINTS WITHIN 5.0 MILES OF 405333 LAT. 740933 LON. (IN ORDER BY PERMIT NUMBER) - 07/08/92

NUMBER	NAME	SOURCEID	LOCID	LAT	LON	U/GW	DISTANCE	COUNTY	MUN	DEPTH	GEO1	GEO2	CAPACITY
2261P	GIVAUDAN-ROURE CORPORATION	2603812	2	405212	740845	U	2.1	31	02	600	GTRB		218
2263P	UPPER MONTCLAIR COUNTRY CLUB	2601199	1	405052	741025		3.5	31	02	490	GTRB		90
	UPPER MONTCLAIR COUNTRY CLUB	2604390	2	405059	741035		3.4	13	02	335	GTRB		132
	UPPER MONTCLAIR COUNTRY CLUB	2604825	3	405030	741020	I	3.9	31	02	300	GTRB		60
	UPPER MONTCLAIR COUNTRY CLUB	POND	SW	405050	741040	T	3.6	13	02	12	GOSD		1100
2297P	FREEHOLD HILL COUNTRY CLUB	4300047	1	405654	741404	T	5.3	31	14	350	GTRB		105
	FREEHOLD HILL COUNTRY CLUB	4300049	2	405645	741407	T	5.2	31	14	561	GTRB		100
	FREEHOLD HILL COUNTRY CLUB	2304756	3	405645	741345	T	4.9	31	14	342	GTRB		200
	FREEHOLD HILL COUNTRY CLUB	4300050	4	405635	741425	T	5.3	31	14	135	GTRB		10
	FREEHOLD HILL COUNTRY CLUB	POND	1	405645	741412	T	5.2	31	14	6	GOSD		1000
	FREEHOLD HILL COUNTRY CLUB	POND	2	405645	741412	T	5.2	31	14		GOSD		200
2367P	ESSEX COUNTY HOSPITAL CENTER	2604891	10	405053	741453		5.8	13	04	524	GTRB		250
	ESSEX COUNTY HOSPITAL CENTER	2604849	9	405053	741453		5.9	13	04	524	GTRB		200
	ESSEX COUNTY HOSPITAL CENTER	4600213	8	405053	741453		5.8	13	04	200	GTRB		200
	ESSEX COUNTY HOSPITAL CENTER	4600212	7	405053	741453		5.8	13	04	200	GTRB		200
2370P	FISHER SCIENTIFIC CO. CHEM DIV	2605028	PW2	405645	740740	I	3.7	03	17	335	GTRB		60
	FISHER SCIENTIFIC CO. CHEM DIV	TRENCHES	TT-1,TT-2	405646	740740	I	3.7	03	17	25	GRS		60
	FISHER SCIENTIFIC CO. CHEM DIV	2304701	MW-4	405646	740740	I	3.6	03	17	400	GTRB		60
	FISHER SCIENTIFIC CO. CHEM DIV	2300700	MW-3	405646	740740	I	3.6	03	17	350	GTRB		60
2373P	PAPERBOARD SPECIALTIES	4300098	1	405615	740835	I	2.8	31	08	800	GTRB		70
	PAPERBOARD SPECIALTIES	4300099	2	405615	740835	I	2.8	31	08	800	GTRB		203
	PAPERBOARD SPECIALTIES	2300369	3	405615	740835	I	2.8	31	08	625	GTRB		119
	PAPERBOARD SPECIALTIES	2302336	4	405615	740835	I	2.8	31	08	400	GTRB		189
2376P	PARAMUS GOLF AND COUNTRY CLUB	4300095	2	405625	740530	F	4.7	03	46	200	GTRB		200
	PARAMUS GOLF AND COUNTRY CLUB	STORAGE POND		405625	740530	F	4.7	03	46		GTRB		350
2397P	SANDY ALEXANDER INC	2607737	1	405009	740749	S	4.6	31	02	400	GTRB		150
	SANDY ALEXANDER INC	2608396	4	405009	740749	S	4.5	31	02	400	GTRB		50
	SANDY ALEXANDER INC	2608398	2	405003	740744	S	4.7	31	02		GTRB		
	SANDY ALEXANDER INC	2608397	3	405004	740746	S	4.7	31	02		GTRB		
2416P	DYE-TEX CORP.	4600217	WELL NO 1	405127	740712	F	3.3	31	07	220	GTRB		350
	DYE-TEX CORP.	4600218	WELL NO 2	405128	740712	F	3.3	31	07	300	GTRB		350
4006FS	DUNDEE WATER POWER & LAND CO.	DUNDEE LK/G.S.	G.S. PAPER	405263	740742	I	1.8	03	21		SPPAS		
	DUNDEE WATER POWER & LAND CO.	DUNDEE CAN	WHITFANY	405206	740727	I	2.7	31	02		SP		
	DUNDEE WATER POWER & LAND CO.	DUNDEE CAN	CHELTON CO	405208	740702	I	3.0	31	02		SP		
	DUNDEE WATER POWER & LAND CO.	DUNDEE CAN	UCONITE CO	405143	740712	I	3.2	31	07		SP		
	DUNDEE WATER POWER & LAND CO.	DUNDEE LK/MARC	MARCAL CO.	405405	740754	I	1.5	03	11		SPPAS		
	DUNDEE WATER POWER & LAND CO.	DUNDEE CAN	PASSAIC IN	405219	740702	I	2.9	31	02		SP		
	DUNDEE WATER POWER & LAND CO.	DUNDEE CAN	TUCK IND.	405136	740704	I	3.4	31	07		SP		
	DUNDEE WATER POWER & LAND CO.	DUNDEE CAN	FANTASOTE	405204	740704	I	3.0	31	02		SP		
4025FS	KALAMA CHEMICAL, INC.	PASSAIC RIVER		405206	740745	I	2.6	03	21		SPPAS		
4037FS	GREAT FALLS HYDROELECTRIC CO	PASSAIC RIVER		405455	741058		1.7	31	08		SPPAS		
4041FS	STEPAN CHEMICAL COMPANY	SADDLE RIVER		405335	740447		4.2	03	54		SPSAD		2000
5014	RIDGEWOOD VILLAGE	4300013	BRUME ST.	405804	740636		5.5	03	51	298	GTRB		200
	RIDGEWOOD VILLAGE	2303902	SALEM	405812	740500		6.4	03	51	320	GTRB		225
	RIDGEWOOD VILLAGE	2304170	STEVENS	405729	740612		5.1	03	51	300	GTRB		225
5015	RIDGEWOOD VILLAGE	2305158	WEIGH	405805	740750	F	4.8	03	70	300	GTRB		450
5016	RIDGEWOOD VILLAGE	2301443	MAIN	405706	740824		3.8	03	22	300	GTRB		350
	RIDGEWOOD VILLAGE	2301770	PROSPECT	405748	740636		5.2	03	22	300	GTRB		400
	RIDGEWOOD VILLAGE	2302327	FARNAN	405730	740630		4.9	03	22	303	GTRB		250
	RIDGEWOOD VILLAGE	2301835	GLEN ROCK	405812	740748		5.2	03	22	300	GTRB		150
	RIDGEWOOD VILLAGE	2304171	LEIGH	405711	740617		4.7	03	22	300	GTRB		125
	RIDGEWOOD VILLAGE	2304172	HOOK	405733	740815		4.4	03	22	300	GTRB		125
5087	HACKENSACK WATER COMPANY	2603017	ROCHELLE P	405458	740449		4.3	03	54	473	GTRB		200
5099	PASSAIC VALLEY WATER COMM.	LITTLE FALLS		405259	741310		3.8	31	05		SPPAS		
5107	HACKENSACK WATER COMPANY	2304260	PARAMUS 1	405716	740545		5.1	03	46	28	GOSD		200
	HACKENSACK WATER COMPANY	2305502	PARAMUS 2	405716	740545		5.1	03	46	388	GTRB		150

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Page [illegible] of PRELIMINARY SURVEY OF WELLS WITHDRAWING FROM WITHIN 500 FEET OF [illegible] FOR CHLORIDE BY PERMIT NUMBER [illegible]

PERMIT	NAME	SERIAL NO	WELL NO	LAT	LON	[illegible]	[illegible]	COUNTY	MUN	DEPTH	[illegible]	[illegible]	CONCENTR
	HACKENSACK WATER COMPANY	[illegible]	[illegible]	405[illegible]	[illegible]		5.8	03	16	353	GTRB		
	HACKENSACK WATER COMPANY	ADDLE RIVER		405[illegible]	[illegible]		5.3	03	46		SPSAD		
5127	LODI BOROUGH	4600048	ARMOUR ST.	405249	740618		4.0	03	31	300	GTRB		160
	LODI BOROUGH	4600069	4	405249	740502		4.1	03	31	307	GTRB		295
	LODI BOROUGH	4600070	5	405249	740502		4.1	03	31	300	GTRB		355
	LODI BOROUGH	4600071	7	405249	740502		4.1	03	31	332	GTRB		355
	LODI BOROUGH	4600072	LAWRENCE	405217	740420	U	4.9	03	31	373	GTRB		500
	LODI BOROUGH	4600073	COLUMBIA	405240	740410	U	4.9	03	31	409	GTRB		375
	LODI BOROUGH	3601017	JEFFERSON	405157	740338		4.8	03	31	607	GTRB		190
	LODI BOROUGH	2601010	GARFIELD	405218	740634		4.9	03	31	459	GTRB		150
	LODI BOROUGH	2603183	CLIFFORD	405231	740425		4.6	03	31	470	GTRB		200
5198	WALLINGTON BOROUGH	2603[illegible]	DOE	405131	740619		2.9	03	65	400	GTRB		140
	WALLINGTON BOROUGH	2603934	MAIN AVE	405130	740545	I	4.3	03	65	400	GTRB		150
	WALLINGTON BOROUGH	2603027	LESTER ST	405135	740710		1.5	03	65	400	GTRB		130
	WALLINGTON BOROUGH	4600075	2	405135	740550		1.2	03	65	503	GTRB		80
	WALLINGTON BOROUGH	4600074	3	405134	740550		1.2	03	65	506	GTRB		150
5234	HAWTHORNE BOROUGH	4300056	1	405257	740625	I	1.7	31	04	293	GTRB		175
	HAWTHORNE BOROUGH	4300057	[illegible]	405[illegible]	[illegible]	I	1.7	31	04	300	GTRB		150
	HAWTHORNE BOROUGH	4300058	1	405[illegible]	[illegible]	I	1.7	31	04	315	GTRB		150
	HAWTHORNE BOROUGH	4300059	5	405[illegible]	[illegible]	I	1.7	31	04	300	GTRB		180
	HAWTHORNE BOROUGH	4300060	6	405757	740625	I	1.7	31	04	486	GTRB		250
	HAWTHORNE BOROUGH	4300061	3	405635	740940	I	2.9	31	04	300	GTRB		100
	HAWTHORNE BOROUGH	4300062	4	405635	740940	I	2.9	31	04	300	GTRB		75
	HAWTHORNE BOROUGH	4300063	5	405635	740940	I	2.9	31	04	385	GTRB		210
	HAWTHORNE BOROUGH	4300064	-	405635	740940	I	2.9	31	04	358	GTRB		150
	HAWTHORNE BOROUGH	4300065		405635	740940	I	2.9	31	04	369	GTRB		140
	HAWTHORNE BOROUGH	4300066	9	405635	740940	I	2.9	31	04	416	GTRB		210
	HAWTHORNE BOROUGH	4300067	10	405633	740918	I	2.8	31	04	300	GTRB		200
	HAWTHORNE BOROUGH	4600068	11	405633	740918	I	2.8	31	04	300	GTRB		400
	HAWTHORNE BOROUGH	4300069	12	405633	740918	I	2.8	31	04	300	GTRB		400
	HAWTHORNE BOROUGH	2303100	UTTER AVE	405741	740844		4.4	31	04	300	GTRB		175
	HAWTHORNE BOROUGH	2303099	GRAND AVE	405710	740920	F	3.8	31	04	300	GTRB		125
	HAWTHORNE BOROUGH	2303101	WAFFORD AV	405715	740942	F	2.9	31	04	300	GTRB		300
	HAWTHORNE BOROUGH	2304139	CEDAR AVE	405648	740932	I	2.2	31	04	400	GTRB		300
	HAWTHORNE BOROUGH	2304691	FIRST ST.	405735	740940	F	4.2	31	04	400	GTRB		200
	HAWTHORNE BOROUGH	2305139	MAPLELAND	405638	740940	F	2.2	31	04	400	GTRB		200
	HAWTHORNE BOROUGH	4300086	SEA AVE.	405730	740940		4.2	31	04	400	GTRB		200
5245	MONTCLAIR TOWN	2604527	LORRAINE 3	405035	741237	F	4.6	13	13	300	GTRB		400
5332	GARFIELD WATER DEPARTMENT	4600113	1	405430	740745	I	1.7	03	11	404	GTRB		100
	GARFIELD WATER DEPARTMENT	4600114	2	405430	740745	I	1.7	03	11	358	GTRB		125
	GARFIELD WATER DEPARTMENT	4600118	10	405430	740745	I	1.7	03	11	350	GTRB		150
	GARFIELD WATER DEPARTMENT	4600119	11	405430	740745	I	1.7	03	11	353	GTRB		190
	GARFIELD WATER DEPARTMENT	4600120	12	405430	740745	I	1.7	03	11	350	GTRB		140
	GARFIELD WATER DEPARTMENT	4600121	14	405430	740745	I	1.7	03	11	485	GTRB		140
	GARFIELD WATER DEPARTMENT	4600122	16	405430	740745	I	1.7	03	11	400	GTRB		60
	GARFIELD WATER DEPARTMENT	4600123	17	405430	740745	I	1.7	03	11	353	GTRB		110
	GARFIELD WATER DEPARTMENT	4600124	1	405430	740745	I	1.7	03	11	300	GTRB		150
	GARFIELD WATER DEPARTMENT	2604016	10	405256	740651		2.6	03	21	400	GTRB		300
	GARFIELD WATER DEPARTMENT	2604063	2	405312	740648	U	2.5	03	21	475	GTRB		150
	GARFIELD WATER DEPARTMENT	2604010	5	405207	740638		2.2	03	21	276	GTRB		150
	GARFIELD WATER DEPARTMENT	2604064	BC	405250	740742		2.0	03	21	405	GTRB		400
	GARFIELD WATER DEPARTMENT	4600115	4	405430	740745	I	1.7	03	11	353	GTRB		90
	GARFIELD WATER DEPARTMENT	4600116	5	405430	740745	I	1.7	03	11	353	GTRB		275
	GARFIELD WATER DEPARTMENT	4600117	9	405430	740745	I	1.7	03	11	354	GTRB		165
5417	FAIR LAWN BOROUGH	4600147	1	405549	740724	F	2.9	03	17	300	GTRB		80
	FAIR LAWN BOROUGH	4600151	7	405549	740732	F	2.8	03	17	458	GTRB		200

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Page 4 of PRELIMINARY SURVEY OF WATER WITHDRAWAL POINTS WITHIN 5.0 MILES OF 405[illegible] LAT. [illegible] LON. (IN ORDER BY PERMIT NUMBER) - 07/08/[illegible]

PERMIT	NAME	SOURCE ID	CODE	LAT	LON	[illegible]	[illegible]	DISTANCE	COUNTY	MUN	DEPTH	GEO1	GEO2	CAPACITY
	FAIR LAWN BOROUGH	4600[illegible]	[illegible]	405[illegible]	740715	F		2.7	03	17	430	GTRB		[illegible]
	FAIR LAWN BOROUGH	4600153	[illegible]	405550	740758	F		2.6	03	17	404	GTRB		115
	FAIR LAWN BOROUGH	2600465	16	405534	740838	F		2.2	03	17	413	GTRB		250
	FAIR LAWN BOROUGH	2601032	17	405527	740870	F		2.2	03	17	350	GTRB		200
	FAIR LAWN BOROUGH	2601197	19	405534	740822	F		2.2	03	17	400	GTRB		400
	FAIR LAWN BOROUGH	2300380	14	405623	740812	F		3.1	03	17	400	GTRB		100
	FAIR LAWN BOROUGH	2600393	15	405525	740819	F		2.2	03	17	402	GTRB		200
	FAIR LAWN BOROUGH	2300249	10	405639	740810	F		3.4	03	17	300	GTRB		75
	FAIR LAWN BOROUGH	2300250	11	405639	740811	F		3.4	03	17	400	GTRB		75
	FAIR LAWN BOROUGH	[illegible]	[illegible]	405606	740612	F		[illegible]	03	17	370	GTRB		200
	FAIR LAWN BOROUGH	[illegible]	[illegible]	405678	740613	F		3.9	03	17	400	GTRB		100
	FAIR LAWN BOROUGH	2307541	[illegible]	405604	740641	F		3.5	03	17	355	GTRB		250
	FAIR LAWN BOROUGH	4600219	5	405545	740722	F		2.9	03	17	300	GTRB		150

Number of Observations: 180

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[illegible]	NAME	[illegible]	[illegible]	LAT	LONG	[illegible]	DISTANCE	COUNTY	MUN	DEPTH	GEOL	DEQ	CAPACITY
[illegible]	ESSEX COUNTY HOSPITAL CENTER	[illegible]	[illegible]	[illegible]	[illegible]		[illegible]	13	04	524	GIRB		250
2363P	ESSEX COUNTY HOSPITAL CENTER	[illegible]	9	[illegible]	[illegible]		5.8	13	04	524	GIRB		200
2363P	ESSEX COUNTY HOSPITAL CENTER	[illegible]	8	[illegible]	[illegible]		5.8	13	04	200	GIRB		200
2363P	ESSEX COUNTY HOSPITAL CENTER	[illegible]	7	[illegible]	[illegible]		5.8	13	04	200	GIRB		200
2297P	FREAKNESS HILL COUNTRY CLUB	[illegible]	4	405675	741425	I	5.3	31	14	135	GIRB		10
2297P	FREAKNESS HILL COUNTRY CLUB	POND	1	405645	741412	I	5.2	31	14	6	GOSD		1000
2297P	FREAKNESS HILL COUNTRY CLUB	POND	2	405645	741412	I	5.2	31	14		GOSD		200
2297P	FREAKNESS HILL COUNTRY CLUB	[illegible]	3	405645	741412	I	5.2	31	14	561	GIRB		100
2297P	FREAKNESS HILL COUNTRY CLUB	[illegible]	1	[illegible]	[illegible]	I	[illegible]	31	14	350	GIRB		105
2297P	FREAKNESS HILL COUNTRY CLUB	[illegible]	[illegible]	[illegible]	[illegible]	I	1.9	31	14	347	GIRB		[illegible]
5099	PASSAIC VALLEY WATER COMM.	LITTLE FALLS		[illegible]	[illegible]		[illegible]	31	05		SPRWS		
5285	MONTCLAIR TOWN	[illegible]	LOCKWOOD	[illegible]	[illegible]	F	4.6	13	13	300	GIRB		400
[illegible]	PARK WEST MEADOWS CONDO ASSOC.	[illegible]	[illegible]	[illegible]	[illegible]	I	[illegible]	31	16	70			50
[illegible]	GREAT FALLS HYDROELECTRIC CO	PASSAIC RIVER		[illegible]	[illegible]		[illegible]	31	03		SPRWS		
[illegible]	UPPER MONTCLAIR COUNTRY CLUB	POND	[illegible]	[illegible]	[illegible]	I	[illegible]	13	02	12	GOSD		1100
[illegible]	UPPER MONTCLAIR COUNTRY CLUB	[illegible]	[illegible]	[illegible]	[illegible]		[illegible]	13	02	125	GIRB		1[illegible]
[illegible]	UPPER MONTCLAIR COUNTRY CLUB	[illegible]	1	[illegible]	[illegible]		[illegible]	31	02	170	GIRB		30
[illegible]	UPPER MONTCLAIR COUNTRY CLUB	[illegible]		[illegible]	[illegible]	I	[illegible]	31	02	[illegible]	GIRB		50
[illegible]	TILCON NEW JERSEY, INC.	[illegible]	[illegible]	[illegible]	[illegible]	I	[illegible]	31	10	[illegible]	GIRB		[illegible]
[illegible]	TILCON NEW JERSEY, INC.	[illegible]	[illegible]	[illegible]	[illegible]	I	[illegible]	31	10	[illegible]	GIRB		[illegible]
[illegible]	TILCON NEW JERSEY, INC.	[illegible]	[illegible]	[illegible]	[illegible]	I	[illegible]	31	10	[illegible]	GIRB		[illegible]
5015	RIDGEWOOD VILLAGE	[illegible]	[illegible]	[illegible]	[illegible]	F	[illegible]	03	07	[illegible]	GIRB		[illegible]
5234	HAWTHORNE BOROUGH	[illegible]	[illegible]	[illegible]	[illegible]	F	[illegible]	31	04	[illegible]	GIRB		[illegible]
5234	HAWTHORNE BOROUGH	[illegible]		[illegible]	[illegible]	I	[illegible]	31	04	[illegible]	GIRB		[illegible]
5234	HAWTHORNE BOROUGH	[illegible]	1	[illegible]	[illegible]	I	[illegible]	31	04	[illegible]	GIRB		[illegible]
5234	HAWTHORNE BOROUGH	[illegible]	[illegible]	[illegible]	[illegible]	I	[illegible]	31	04	[illegible]	GIRB		[illegible]
5234	HAWTHORNE BOROUGH	[illegible]	[illegible]	[illegible]	[illegible]	I	[illegible]	31	04	380	GIRB		150
5234	HAWTHORNE BOROUGH	[illegible]		[illegible]	[illegible]	I	[illegible]	31	04	329	GIRB		140
5234	HAWTHORNE BOROUGH	[illegible]	[illegible]	[illegible]	[illegible]	I	[illegible]	31	04	415	GIRB		[illegible]
5234	HAWTHORNE BOROUGH	[illegible]	FIRST ST.	[illegible]	[illegible]	I	[illegible]	31	04	400	GIRB		200
5234	HAWTHORNE BOROUGH	[illegible]	[illegible]	[illegible]	[illegible]	I	[illegible]	31	04	400	GIRB		200
5234	HAWTHORNE BOROUGH	[illegible]	[illegible] AVE.	[illegible]	[illegible]		[illegible]	31	04	400	GIRB		200
[illegible]	INTERNATIONAL METALS CORP.	[illegible]		[illegible]	[illegible]	I	[illegible]	31	03	307			120
5234	HAWTHORNE BOROUGH	[illegible]	[illegible] AVE	[illegible]	[illegible]	I	[illegible]	31	04	400	GIRB		300
[illegible]	HOFFMANN-LAROCHE INC.	[illegible]		[illegible]	[illegible]	I	[illegible]	31	03	420	GIRB		200
5234	HAWTHORNE BOROUGH	[illegible]	1	[illegible]	[illegible]	I	[illegible]	31	04	293	GIRB		175
5234	HAWTHORNE BOROUGH	[illegible]	2	[illegible]	[illegible]	I	[illegible]	31	04	300	GIRB		150
5234	HAWTHORNE BOROUGH	[illegible]	4	[illegible]	[illegible]	I	[illegible]	31	04	315	GIRB		250
5234	HAWTHORNE BOROUGH	[illegible]	[illegible]	[illegible]	[illegible]	I	[illegible]	31	04	200	GIRB		100
5234	HAWTHORNE BOROUGH	[illegible]	5	[illegible]	[illegible]	I	[illegible]	31	04	485	GIRB		250
5234	HAWTHORNE BOROUGH	[illegible]	BRAND AVE	[illegible]	[illegible]	F	.8	31	04	300	GIRB		125
[illegible]	HOFFMANN-LAROCHE INC.	[illegible]	[illegible]	[illegible]	[illegible]	F	[illegible]	13	16	402	GIRB		100
5234	HAWTHORNE BOROUGH	[illegible]	10	[illegible]	[illegible]	I	[illegible]	31	04	300	GIRB		200
5234	HAWTHORNE BOROUGH	[illegible]	11	[illegible]	[illegible]	I	[illegible]	31	04	300	GIRB		400
5234	HAWTHORNE BOROUGH	[illegible]	12	[illegible]	[illegible]	I	[illegible]	31	04	300	GIRB		400
[illegible]	HOFFMANN-LAROCHE INC.	[illegible]	[illegible]	[illegible]	[illegible]	F	[illegible]	31	02		GIRB		185
[illegible]	WESTWOOD INDUSTRIES, INC.	[illegible]	1	[illegible]	[illegible]		[illegible]	31	08	[illegible]	GIRB		[illegible]
[illegible]	HOFFMANN-LAROCHE INC.	[illegible]	[illegible]	[illegible]	[illegible]	F	[illegible]	31	02	720	GIRB		300
[illegible]	GIVAUDAN-HOLDS CORPORATION	[illegible]	[illegible]	[illegible]	[illegible]	U	[illegible]	31	02	600	GIRB		218
5234	HAWTHORNE BOROUGH	[illegible]	UTTER AVE	[illegible]	[illegible]		[illegible]	31	04	300	GIRB		125
[illegible]	PAPERBOARD SPECIALTIES	[illegible]	1	[illegible]	[illegible]	I	[illegible]	31	08	900	GIRB		70
[illegible]	PAPERBOARD SPECIALTIES	[illegible]	[illegible]	[illegible]	[illegible]	I	[illegible]	31	08	900	GIRB		[illegible]
[illegible]	PAPERBOARD SPECIALTIES	[illegible]	[illegible]	[illegible]	[illegible]	I	[illegible]	31	08	615	GIRB		119
[illegible]	PAPERBOARD SPECIALTIES	[illegible]	[illegible]	[illegible]	[illegible]	I	[illegible]	31	08	400	GIRB		100
5317	FAIR LAWN BOROUGH	[illegible]	17	[illegible]	[illegible]	F	[illegible]	03	17	350	GIRB		[illegible]
5317	FAIR LAWN BOROUGH	[illegible]	16	[illegible]	[illegible]	F	[illegible]	03	17	413	GIRB		250

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Page 2 of [illegible] PAGES WITHIN 5.0 MILES OF [illegible] LAT. 740933 LON. (DILUTION BY DECREASING LONGITUDE) [illegible]

NUMBER	NAME	[illegible]	[illegible]	LAT	LON	[illegible]	OPERATOR	COUNTY	MUN	DEPTH	[illegible]	[illegible]	CAPACITY
5016	RIDGEWOOD VILLAGE	[illegible]	[illegible]	[illegible]	[illegible]		5.8	03	22	300	GIRB		320
5317	FAIR LAWN BOROUGH	2601197	19	[illegible]	740832	F	2.2	03	17	400	GIRB		400
1015009	FAIR LAWN MEMORIAL CEMETERY	[illegible]	11	[illegible]	740830	[illegible]	4.8	03	17	300			150
5317	FAIR LAWN BOROUGH	2600793	15	405535	740818	F	2.2	03	17	402	GIRB		200
5016	RIDGEWOOD VILLAGE	2304172	[illegible]	[illegible]	740815		4.4	03	22	300	GIRB		125
5317	FAIR LAWN BOROUGH	2300380	14	405623	740812	F	3.1	03	17	400	GIRB		100
5317	FAIR LAWN BOROUGH	2300250	11	405638	740811	F	3.4	03	17	400	GIRB		75
5317	FAIR LAWN BOROUGH	2300249	10	405639	740810	F	3.4	03	17	300	GIRB		75
1052640	FALSTROM COMPANY, INC.	2601494	1	[illegible]	740759	I	4.3	31	07	300	GIRB		145
5317	FAIR LAWN BOROUGH	4600153	9	405370	740750	F	2.6	03	17	404	GIRB		115
4006FS	DUNDEE WATER POWER & LAND CO.	DUNDEE CANAL	PUMPING CO.	405405	740754	I	1.5	03	11		SFPAS		
2100P	MYSTAL PAPER MILLS, INC.	4600008	1	[illegible]	740752	F	1.5	03	11	308	GIRB		150
2100P	MYSTAL PAPER MILLS, INC.	4600009	[illegible]	[illegible]	740752	F	1.5	03	11	320	GIRB		390
2100P	MYSTAL PAPER MILLS, INC.	4600010		[illegible]	740752	F	1.5	03	11	325	GIRB		350
2100P	MYSTAL PAPER MILLS, INC.	4600011	4	[illegible]	740752	F	1.5	03	11	392	GIRB		80
2100P	MYSTAL PAPER MILLS, INC.	4600012	5	[illegible]	740752	F	1.5	03	11		GIRB		125
2100P	MYSTAL PAPER MILLS, INC.	4600013	[illegible]	[illegible]	740752	F	1.5	03	11		GIRB		200
5198	WELLINGTON BOROUGH	4600073	9	[illegible]	[illegible]		[illegible]	[illegible]	[illegible]	503	GIRB		90
5198	WELLINGTON BOROUGH	4600074	[illegible]	[illegible]	[illegible]		[illegible]	[illegible]	[illegible]	[illegible]	GIRB		[illegible]
2397P	SANDY ALEXANDER INC	2608396	1	[illegible]	740749	[illegible]	4.5	31	02	400	GIRB		160
2397P	SANDY ALEXANDER INC	2608396	4	[illegible]	740749	2	4.5	31	02	400	GIRB		50
5016	RIDGEWOOD VILLAGE	2301835	[illegible]	[illegible]	740749		5.2	03	22	300	GIRB		150
2397P	SANDY ALEXANDER INC	2608397		405024	740746	S	4.7	31	02		GIRB		
2092P	GIVAUDAN-ROURE CORPORATION	4600006	5	[illegible]	740745	F	3.2	31	02	297	GIRB		235
2092P	GIVAUDAN-ROURE CORPORATION	4600007		[illegible]	740745	F	3.1	31	02	290	GIRB		110
4025FS	KALAMA CHEMICAL, INC.	PASSAIC RIVER		405206	740745	I	2.6	03	21		SFPAS		
5282	BARFIELD WATER DEPARTMENT	4600113	1	[illegible]	740745	I	1.7	03	11	404	GIRB		100
5282	BARFIELD WATER DEPARTMENT	4600114	2	[illegible]	740745	I	1.7	03	11	358	GIRB		135
5282	BARFIELD WATER DEPARTMENT	4600118	10	[illegible]	740745	I	1.7	03	11	350	GIRB		150
5282	BARFIELD WATER DEPARTMENT	4600119	11	[illegible]	740745	I	1.7	03	11	353	GIRB		170
5282	BARFIELD WATER DEPARTMENT	4600120	12	[illegible]	740745	I	1.7	03	11	370	GIRB		140
5282	BARFIELD WATER DEPARTMENT	4600121	13	[illegible]	740745	I	1.7	03	11	485	GIRB		140
5282	BARFIELD WATER DEPARTMENT	4600122	14	[illegible]	[illegible]	I	1.7	03	11	400	GIRB		60
5282	BARFIELD WATER DEPARTMENT	4600123	1	[illegible]	740745	I	1.7	03	11	353	GIRB		110
5282	BARFIELD WATER DEPARTMENT	4600124	1	[illegible]	740745	I	1.7	03	11	400	GIRB		150
5282	BARFIELD WATER DEPARTMENT	4600115	4	[illegible]	740745	I	1.7	03	11	352	GIRB		90
5282	BARFIELD WATER DEPARTMENT	4600116	5	[illegible]	740745	I	1.7	03	11	352	GIRB		275
5282	BARFIELD WATER DEPARTMENT	4600117	8	[illegible]	740745	T	1.7	03	11	354	GIRB		165
2397P	SANDY ALEXANDER INC	2608398	2	[illegible]	740744	S	4.7	31	02		GIRB		
5107	HACKENSACK WATER COMPANY	2705450	DIMESBROOK	405654	740744		1.3	03	46	353	GIRB		
4006FS	DUNDEE WATER POWER & LAND CO.	DUNDEE CANAL	U.S. PAPER	405204	740742	I	1.8	03	21		SFPAS		
5282	BARFIELD WATER DEPARTMENT	2600054	10	[illegible]	740742		2.0	03	11	405	GIRB		400
2370P	FISHER SCIENTIFIC CO. CHEM DIV	2605038	TWO	[illegible]	740740	I	1.7	03	17	335	GIRB		60
2370P	FISHER SCIENTIFIC CO. CHEM DIV	TRENCHES	TT-1,TT-2	[illegible]	740740	I	1.7	03	17	25	GRS		60
2370P	FISHER SCIENTIFIC CO. CHEM DIV	2308701	TW-4	[illegible]	740740	I	1.6	03	17	400	GIRB		60
2370P	FISHER SCIENTIFIC CO. CHEM DIV	2308700	TW-5	[illegible]	740740	I	1.6	03	17	350	GIRB		60
5317	FAIR LAWN BOROUGH	4600151	7	405548	740732	F	2.8	03	17	438	GIRB		200
4006FS	DUNDEE WATER POWER & LAND CO.	DUNDEE CAN	COMPANY	405208	740727	I	2.7	31	02		SF		
5317	FAIR LAWN BOROUGH	4600147	2	405547	740724	F	2.9	03	17	300	GIRB		80
5317	FAIR LAWN BOROUGH	4600219		405545	740722	F	2.9	03	17	300	GIRB		150
2047P	NAVISTO BONDS, INC.	2707269	2	[illegible]	740719	S	4.0	03	17	393	GIRB		250
1101D	FOSTER WHEELER PASSAIC, INC.			405220	740719		2.7	31	07	46	GD		175
5317	FAIR LAWN BOROUGH	4600152	8	[illegible]	740715	F	2.7	03	17	430	GIRB		300
2416P	DYE-TEX CORP.	4600217	WELL NO 1	405127	740712	F	3.3	31	07	220	GIRB		250
2416P	DYE-TEX CORP.	4600218	WELL NO 2	405128	740712	F	3.3	31	07	300	GIRB		250
4006FS	DUNDEE WATER POWER & LAND CO.	DUNDEE CAN	DUNDEE CO	405[illegible]	740712	I	3.2	31	07		SF		

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NUMBER	NAME	SCHEDULE	LOCID	LAT	LON	LL/LC	DISTANCE	COUNTY	MUN	DEPTH	GEO1	GEO2	CAPACITY
5198	WALLINGTON BOROUGH	2603027	LESTER ST	405135	740710		3.5	03	65	400	GIRB		130
2973P	ORVAL KENT FOOD COMPANY, INC.	2604317	1	405045	740704	I	4.2	03	12	580	GIRB		150
4006FS	DUNDEE WATER POWER & LAND CO.	DUNDEE CAN	BUCK IND.	405126	740704	I	3.4	31	07		SP		
4006FS	DUNDEE WATER POWER & LAND CO.	DUNDEE CAN	PANTASOTE	405204	740704	I	3.0	31	02		SP		
4006FS	DUNDEE WATER POWER & LAND CO.	DUNDEE CAN	CHELTON CO	405208	740702	I	3.0	31	02		SP		
4006FS	DUNDEE WATER POWER & LAND CO.	DUNDEE CAN	PASSAIC IN	405219	740702	I	2.9	31	02		SP		
2994P	D.A.K. MANUFACTURING CORP.	2605037	4	405353	740657	F	2.3	03	11	250	GIRB		60
2973P	ORVAL KENT FOOD COMPANY, INC.	2604382	3	405035	740655	I	4.4	03	12	470	GIRB		470
2994P	D.A.K. MANUFACTURING CORP.	2605466	1	405404	740655	F	2.3	03	11		GIRB		
2994P	D.A.K. MANUFACTURING CORP.	4600210	2	405404	740655	U	2.3	03	11		GIRB		
2994P	D.A.K. MANUFACTURING CORP.	4600211	3	405404	740655	U	2.3	03	11		GIRB		
2973P	ORVAL KENT FOOD COMPANY, INC.	2604341	2	405045	740654	S	4.3	03	12	300	GIRB		150
5332	GARFIELD WATER DEPARTMENT	2604016	16	405256	740651		2.6	03	31	400	GIRB		300
5.92	GARFIELD WATER DEPARTMENT	2604062	7	405312	740648	U	2.5	03	31	475	GIRB		150
5317	FAIR LAWN BOROUGH	2607341	28	405404	740641	F	2.5	03	17	355	GIRB		250
5.92	GARFIELD WATER DEPARTMENT	2604010	5	405337	740639		3.2	03	31	276	GIRB		150
5014	RIDGEWOOD VILLAGE	4600013	MAPLE ST.	405[illegible]	740636		5.5	03	51	298	GIRB		200
5016	RIDGEWOOD VILLAGE	2604170	[illegible]	[illegible]	740635		5.2	03	52	300	GIRB		400
[illegible]	PARK 80 ASSOCIATES	[illegible]	1	[illegible]	740632	S	2.7	03	57	400	GIRB		300
5016	RIDGEWOOD VILLAGE	2607337	ARTESIAN	405420	740630		1.9	03	52	300	GIRB		250
5173P	PARK 80 ASSOCIATES	2604335	2	405410	740627	S	2.7	03	57	400	GIRB		300
5173P	PARK 80 ASSOCIATES	2605301	2	405410	740627	S	2.7	03	57	300	GIRB		0
10051W	GRANT CHEMICAL COMPANY	2604140	11	405445	740625	I	3.9	03	11	300			300
5198	WALLINGTON BOROUGH	2603932	1SL	405131	740619		3.9	03	65	400	GIRB		140
5016	RIDGEWOOD VILLAGE	2604171	[illegible]	405411	740617		4.7	03	52	300	GIRB		150
5317	FAIR LAWN BOROUGH	2607539	2[illegible]	405[illegible]	740617	F	2.9	03	17	400	GIRB		100
5014	RIDGEWOOD VILLAGE	2604170	SHERMAN	405[illegible]	740612		5.1	03	51	300	GIRB		225
5317	FAIR LAWN BOROUGH	2607538	2[illegible]	405[illegible]	740612	F	3.9	03	17	370	GIRB		300
2.63P	BYNES CHEMICAL, INC.	2603905	4	405[illegible]	740607	F	5.0	03	05	526	GIRB		80
5173P	PARK 80 ASSOCIATES	2604104	1	405410	740600	F	3.1	03	57	300	GIRB		
5127	LODI BOROUGH	2601037	BURGOLF	405157	740553		3.8	03	31	607	GIRB		190
2.63P	BYNES CHEMICAL, INC.	4600060	2	405076	740557	F	5.1	03	05	470	GIRB		200
2.63P	BYNES CHEMICAL, INC.	2604277	5	405077	740557	F	5.1	03	05	430	GIRB		30
10001W	SUN CHEMICAL CORP.	2602784	MILL #1	405037	740555	H	4.9	03	05	150	GIRB		150
10001W	SUN CHEMICAL CORP.	2602784	MILL #2	405036	740555	H	4.9	03	05	200	GIRB		200
2246P	FAIRLAWN DAIRIES INC.	2604169	1	405134	740532	U	4.1	03	65	600	GIRB		200
2246P	FAIRLAWN DAIRIES INC.	2604250	2	405134	740532	U	4.1	03	65	500	GIRB		185
5107	HACKENSACK WATER COMPANY	2604260	PARAMUS 1	405716	740515		5.1	03	46	38	DUGD		200
5107	HACKENSACK WATER COMPANY	2605502	PARAMUS 2	405716	740515		5.1	03	46	308	GIRB		150
5198	WALLINGTON BOROUGH	2603934	MAIN AVE	405130	740515	I	4.3	03	65	400	GIRB		150
5107	HACKENSACK WATER COMPANY	SADDLE RIVER		405729	740542		5.2	03	46		SPSAD		
5127	LODI BOROUGH	2601010	GARFIELD	405219	740538		3.9	03	31	459	GIRB		150
10573W	BERGEN CO. COMMUNITY COLLEGE	4600101		405715	740530	F	5.2	03	46	200	GIRB		180
10590W	BERGEN CO. DIV. OF PARKS	4600100		405715	740530	F	5.2	03	46	210	GIRB		275
2376P	PARAMUS GOLF AND COUNTRY CLUB	4600095	2	405635	740530	F	4.7	03	46	200	GIRB		200
2376P	PARAMUS GOLF AND COUNTRY CLUB	STORMWATER POND		405635	740530	F	4.7	03	46		GIRB		250
5127	LODI BOROUGH	4600068	ARNDT ST.	405240	740518		1.0	03	31	300	GIRB		160
2.63P	ARCOLA COUNTRY CLUB	4600126	2	405533	740515	S	1.2	03	46	200	GIRB		160
2.63P	ARCOLA COUNTRY CLUB	2602972	4	405537	740509	S	4.3	03	46	208	GIRB		125
5127	LODI BOROUGH	4600069	4	405249	740502		4.1	03	31	307	GIRB		295
5127	LODI BOROUGH	4600070	5	405249	740502		4.1	03	31	300	GIRB		255
5127	LODI BOROUGH	4600071	7	405249	740502		4.1	03	31	332	GIRB		355
2411P	HENKEL PROCESS CHEMICALS, INC.	4600125	1	405000	740500		6.0	03	05	170	DUGD		600
5014	RIDGEWOOD VILLAGE	2603902	SALEM	405812	740500		6.4	03	51	320	GIRB		225
2.68P	RIDGEWOOD COUNTRY CLUB	4600032	1	405635	740458	U	5.1	03	46	306	GIRB		120
2.68P	RIDGEWOOD COUNTRY CLUB	4600033	2	405635	740458	U	5.1	03	46	275	GIRB		275

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SITENUM	NAME	LAT	LON	DISTANCE	CONTAM	PRODUCT1	PRODUCT2	STATUS1	STATUS2
245	UNIVERSAL MFG CORP., TOTOWA, PASSAIC CO.	405435	741445	4.6	00	0130	3070	1	B
1191	AMOCO OIL CO. SERVICE STA. 0576, RIVERVIEW RD. TOTOWA, PASSAI	405351	741445	4.6	51			7	
326	WEST PATERSON, MEMORIAL DRIVE LOT, PASSAIC CO.	405327	741236	2.7	70	130	3023	0	
257	SEGRETO RESIDENCE, PATERSON, PASSAIC CO.	405521	741211	2.9	51	110	3022	1	B
550	MOBAY CHEM. CORP., HALEDAN, PASSAIC CO.	405630	741103	3.3	1	130	3070	9	
960	STEVES AUTO CENTER, CLIFTON, PASSAIC CO.	405358	741050	1.5	0	0	0	3	
222	SUNOCO, PATERSON, PASSAIC CO.	405411	741029	0.9	51	120	3023	8	H
377	SUPERO TUBE, CLIFTON, PASSAIC CO.	405111	741018	3.2	57	3070	0	0	
217	GARDEN STATE PARKWAY & RT. 46, CLIFTON, PASSAIC CO.	405245	741010	1.4	53	130	120	0	
1087	SYBRON CHEMICAL, N. HALEDON, PASSAIC CO.	405551	741004	2.3	63	0103	0	1	B
954	PUCK RICHARD'S FURNITURE, MONTCLAIR, ESSEX CO.	405021	741000	4.1	0	0140	3070	1	C
1000	PUREX CORP., PATERSON, PASSAIC CO.	405604	740900	2.5	00	0102	3070	1	B
827	POUGHKEEPSIE FINISHING CORP. PATERSON	405606	740949	2.6	00	0103	3070	1	B
565	INMONT, HAWTHORNE, PASSAIC CO.	405625	740945	3.1	00	130	3070	1	A
875	UNIVERSAL MANUFACTURING, PATERSON, PASSAIC CO.	405615	740939	2.5	00	0130	3070	1	B
400	CALGON CORP., HAWTHORNE, PASSAIC CO.	405614	740932	2.7	00	130	3070	1	F
389	HAWTHORNE MUNICIPAL WELLS, HAWTHORNE, PASSAIC CO.	405615	740916	2.7	00	130	3070	1	G
1357	PRECISION SCREEN, HAWTHORNE, PASSAIC CO.	[illegible]	[illegible]	4.1	00		3070	1	E
681	POUGHKEEPSIE FINISHING CORP CORPORATE, CLIFTON	405657	[illegible]	2.7	00	0103	3070	1	B
1352	MEMORIAL WELL FIELD, FAIRLAWN	405535	740900	2.1	00	3070		1	C
1190	ITT AVIONICS, 100 KINGSLAND RD., CLIFTON, PASSAIC CO.	404945	740815	4.9	04			3	
671	MORTON THIOKOL, INC., PATERSON, PASSAIC CO.	405424	740906	1.4	13	130	3070	2	H
616	GIVAUDAN CORP, CLIFTON, PASSAIC CO.	404947	740851	4.9	00	130	3070	1	E
517	SANDVIK, INC., FAIRLAWN, BERGEN CO.	405652	740815	3.8	0	3070	0100	2	B
606	FISHER SCIENTIFIC, FAIRLAWN, BERGEN CO.	405657	740735	3.8	0	3070	0120	1	B
947	CADMUS WELL FIELD, FAIR LAWN, BERGEN CO.	405856	740725	2.9	00	3070		1	C
1251	GARFIELD WATER DEPARTMENT, GARFIELD, BERGEN CO.	405356	740732	2.2	01	0120	3070	1	
861	WHITTANY PAPER BOARD CO. INC	405343	740716	2.4	00	0103	3070	1	D
349	GARFIELD MUNICIPAL WELLS, ELMWOOD PARK, BERGEN CO.	405345	740700	2.4	00	120	3070	1	E
1219	EMPIRE OLEFVILL, ELMWOOD PARK, BERGEN CO.	405329	740645	2.5	00	0110	3070	1	C
452	LAPLACE AND GRANT CHEMICALS, ELMWOOD PARK, BERGEN CO.	405437	740638	2.7	00	130	3070	1	E
1258	STOR DYNAMICS, ELMWOOD PARK, BERGEN CO.	405437	740638	2.7	00	0130	3070	1	E
388	WESTMORELAND/KODAK WELLFIELDS, FAIRLAWN, BERGEN CO.	405354	740627	3.3	0	120	3070	2	I
670	SKETCHLEY SERVICES, BERGEN CO.	405503	740615	3.1	00	0110	3070	1	G
601	CURCIO SCRAP METALS, GARFIELD, BERGEN CO.	[illegible]	740614	2.7	50	130	3070	1	
970	E.C. ELECTROPLATING, GARFIELD, BERGEN CO.	405520	740610	3.5	0	0	0	3	
776	CURTISS-WRIGHT CORP	405144	740547	4.1	00	3070	0	1	A
500	LODI MUNICIPAL WELL V.O. CONTAM, LODI, BERGEN CO.(SEE ALSO 629)	405330	740520	3.9	0	120	3070	1	E
979	HEWLETT-PACKARD, PARAMUS, BERGEN CO.	405600	740500	4.7	53	0110		1	
236	MOBIL, (SHOTMEYER) PARAMUS, BERGEN CO.	405412	740419	4.7	51	130	3070	1	
483	INMONT CHEMICAL, LODI, BERGEN CO.	405313	740417	4.7	00	100	3070	1	B
1115	SHOTMEYER BROS. MOBIL, PARAMUS	405130	740415	4.7	51			1	B
629	LODI/MAYWOOD RADIOLOGICAL CONTAM., BERGEN CO.(SEE ALSO 500)	405345	740405	4.9	67	120	3070	1	E

Number of Observations: 43

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Page 4 of PRELIMINARY SURVEY OF WATER WITHDRAWAL POINTS WITHIN 5.0 MILES OF 40[illegible] LAT. 740[illegible] LON. (IN ORDER BY DECREASING LONGITUDE) - [illegible]

NUMBER	NAME	SOURCEID	LOCID	LAT	LON	PLACE	DISTANCE	COUNTY	MUN	DEPTH	GEO1	GEO2	CAPACITY
[illegible]	RIDGEWOOD COUNTRY CLUB	[illegible]	[illegible]	[illegible]	[illegible]	S	5.1	03	46	500	GTRB		[illegible]
2068P	RIDGEWOOD COUNTRY CLUB	POND		405[illegible]	740438	U	5.1	03	46	8	GTRB		500
5087	HACKENSACK WATER COMPANY	2[illegible]017	BUCHELLE P	405458	740449		4.3	03	54	473	GTRB		200
10127W	INTERPLAST UNIVERSAL IND., INC	2601990	#2	405258	740448	T	4.3	03	31	310			150
4041PS	STEPAN CHEMICAL COMPANY	SADDLE RIVER		405355	740447		4.2	03	54		SPSAD		2000
5127	LODI BOROUGH	2603183	CORABELLE	405231	740435		4.6	03	31	470	GTRB		200
2035P	ARCOLA COUNTRY CLUB	POND	1	405[illegible]	740430	U	4.8	03	46	5	GTRB		200
2035P	ARCOLA COUNTRY CLUB	POND	2	405[illegible]	740430	U	4.8	03	46	15	GTRB		200
10210W	THUMANN INC.	2604997	#1	405[illegible]	740438	T	5.9	03	65	300	GTRB		250
5127	LODI BOROUGH	4600072	[illegible]	405[illegible]	740420	U	4.9	03	31	373	GTRB		500
10184W	WORLD PLASTIC EXTRUDERS INC.	2603991	#1	405[illegible]	740412	T	5.3	03	37	200	GTRB		100
5127	LODI BOROUGH	4600073	COLUMBIA	405[illegible]	740410	U	4.9	03	31	409	GTRB		275

Number of Observations: 19

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Page [illegible] LIST BUFFS LOVE INDEX SITE METHODOLOGIES [illegible] LIST, [illegible] ORDERED BY SITE NUMBER - [illegible]

SITENUM	NAME	LAT	LON	DISTANCE	CONTAM	FMCODE1	FMCODE2	STATUS1	STATUS2
217	GARDEN STATE PARKWAY & RT. 46, CLIFTON, PASSAIC CO.	[illegible]	741010	1.4	53	130	120	0	
222	SUNOCO, PATERSON, PASSAIC CO.	405411	741[illegible]9	0.9	51	120	3022	8	H
226	MOBIL, (SHOTMEYER) PARAMUS, BERGEN CO.	[illegible]	740119	4.7	51	130	3070	1	
257	SEGRETO RESIDENCE, PATERSON, PASSAIC CO.	[illegible]	741211	2.9	51	110	3022	1	D
326	WEST PATERSON, MEMORIAL DRIVE LOT, PASSAIC CO.	[illegible]	741[illegible]6	2.7	70	130	3023	0	
377	SWEFLO TUBE, CLIFTON, PASSAIC CO.	[illegible]	741[illegible]19	3.2	57	3070	0	0	
388	WESTMORELAND/FOLKS HELLFIELDS, FAIRLAWN, BERGEN CO.	[illegible]	740[illegible]0	3.5	0	120	3070	2	I
389	HAWTHORNE MUNICIPAL WELLS, HAWTHORNE, PASSAIC CO.	[illegible]	740[illegible]6	2.7	00	170	3070	1	G
400	VALSICOL CORP., HAWTHORNE, PASSAIC CO.	[illegible]	740[illegible]2	2.7	00	130	3070	1	I
452	LAFLAME AND GRANT CHEMICALS, LODI, BERGEN CO.	[illegible]	740[illegible]39	2.7	00	130	3070	1	E
483	INDUSTRIAL CHEMICAL, LODI, BERGEN CO.	[illegible]	[illegible]	4.7	[illegible]	100	3070	1	B
500	LODI MUNICIPAL WELL V.O. LOWTON, LODI, BERGEN CO.	[illegible]	740[illegible]	3.5	0	120	3070	1	L
517	[illegible], INC., FAIRLAWN, BERGEN CO.	[illegible]	[illegible]	[illegible]	0	[illegible]	0100	[illegible]	B
542	GARFIELD MUNICIPAL WELLS, GARFIELD, BERGEN CO.	[illegible]	[illegible]	[illegible]	[illegible]	130	3070	1	I
570	MURRAY CHEM. CORP., RAMSEY, BERGEN CO.	[illegible]	[illegible]	[illegible]	1	120	3070	[illegible]	
585	INDECO, HAWTHORNE, PASSAIC CO.	[illegible]	[illegible]	3.1	00	130	3070	1	D
601	CURCIO STATE HIGHWAY, GARFIELD, BERGEN CO.	[illegible]	[illegible]	[illegible]	[illegible]	130	3070	1	
605	FLEMER SCHENCK, FAIRLAWN, BERGEN CO.	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	0100	1	G
616	GRAFTON CORP., CLIFTON, PASSAIC CO.	[illegible]	[illegible]	4.9	00	130	3070	1	E
629	LODI/MAYWOOD RADIOLOGICAL CONTROL, BERGEN CO., N. J. [illegible]	[illegible]	[illegible]	4.8	67	120	3070	1	E
630	SHEFFIELD SERVICES, BERGEN CO.	[illegible]	[illegible]	3.1	00	[illegible]	[illegible]	1	G
671	MORTON THIOKOL, INC., PATERSON, PASSAIC CO.	[illegible]	[illegible]	1.4	17	130	3070	2	H
776	CURTISS-WRIGHT CORP.	[illegible]	[illegible]	4.1	00	[illegible]	[illegible]	1	A
807	POUGHKEEPSIE FINISHING CORP., PATERSON	[illegible]	[illegible]	2.6	00	0100	[illegible]	1	B
838	POUGHKEEPSIE FINISHING CORP. (LID DYEING), CLIFTON	[illegible]	[illegible]	2.7	[illegible]	0100	[illegible]	1	B
845	UNIVERSAL PAN CORP., HOHOKUS, PASSAIC CO.	[illegible]	[illegible]	1.6	00	0120	[illegible]	1	B
851	WHITFORD PAINT BOARD CO., INC.	[illegible]	[illegible]	2.4	00	[illegible]	[illegible]	1	B
875	UNIVERSAL NYLON/CLIFTON, PATERSON, PASSAIC CO.	[illegible]	[illegible]	2.5	00	0170	[illegible]	1	D
947	CAMMUS WELL FIELD, FAIR LAWN, BERGEN CO.	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]		1	C
954	POOR RICHARD'S FURNITURE, MANTOLOKING, ESSEX CO.	[illegible]	[illegible]	4.1	0	[illegible]	[illegible]	1	C
960	STEVES AUTO CENTER, CLIFTON, PASSAIC CO.	[illegible]	[illegible]	1.5	[illegible]	[illegible]	[illegible]	3	
970	E.C. ELECTROPLATING, FAIRFIELD, BERGEN CO.	[illegible]	[illegible]	3.5	0	[illegible]	[illegible]	3	
979	HEWLETT-PACKARD, PARAMUS, BERGEN CO.	[illegible]	[illegible]	4.2	57	0110		1	
1000	PUREX CORP., PATERSON, PASSAIC CO.	[illegible]	[illegible]	2.5	00	0102	3070	1	B
1009	SYBRON CHEMICAL, N. PATERSON, PASSAIC CO.	[illegible]	[illegible]	2.2	63	0107	[illegible]	1	B
1115	SHOTMEYER PROS. MOBIL, PARAMUS	[illegible]	[illegible]	4.7	51			1	B
1170	ITT AVIONICS, 100 KINGSLAND RD., CLIFTON, PASSAIC CO.	[illegible]	[illegible]	4.9	00			3	
1191	AMOCO OIL CO. SERVICE STA. #[illegible], RIVERVIEW RD. HOHOKUS, PASSAIC	[illegible]	[illegible]	4.6	51			3	
1219	EMPIRE OVERALL, ELMWOOD PARK, BERGEN CO.	[illegible]	[illegible]	2.8	00	0110	3070	1	C
1251	GARFIELD WATER DEPARTMENT, GARFIELD, BERGEN CO.	[illegible]	[illegible]	2.0	01	0120	3070	1	
1252	MEMORIAL WELL FIELD, FAIRLAWN	[illegible]	[illegible]	2.1	00	3070		1	C
1257	PRECISION SCREEN, HAWTHORNE, PASSAIC CO.	[illegible]	[illegible]	4.1	00		3070	1	E
1258	STOR DYNAMICS, ELMWOOD PARK, BERGEN CO.	[illegible]	[illegible]	2.7	00	0130	3070	1	E

Number of Observations: 43

Ref 14
p1 of 2

federal register

Friday
December 14, 1990

Part II

Environmental Protection Agency

40 CFR Part 300

Hazard Ranking System; Final Rule

Ref 14 p 29

TABLE 3-6.—HYDRAULIC CONDUCTIVITY OF GEOLOGIC MATERIALS

Type of material	Assigned hydraulic conductivity [a] (cm/sec)
Clay; low permeability till (compact unfractured till); shale; unfractured metamorphic and igneous rocks	10^{-8}
Silt; loesses; silty clays; sediments that are predominantly silts; moderately permeable till (fine-grained, unconsolidated till, or compact till with some fractures); low permeability limestones and dolomites (no karst); low permeability sandstone; low permeability fractured igneous and metamorphic rocks	10^{-6}
Sands, sandy silts; sediments that are predominantly sand; highly permeable till (coarse-grained, unconsolidated or compact and highly fractured); peat; moderately permeable limestones and dolomites (no karst); moderately permeable sandstone; moderately permeable fractured igneous and metamorphic rocks	10^{-4}
Gravel; clean sand; highly permeable fractured igneous and metamorphic rocks; permeable basalt; karst limestones and dolomites	10^{-2}

[a] Do not round to nearest integer.

TABLE 3-7.—TRAVEL TIME FACTOR VALUES [a]

Hydraulic conductivity (cm/sec)	Thickness of lowest hydraulic conductivity layer(s) [b] (feet)			
	Greater than 3 to 5	Greater than 5 to 100	Greater than 100 to 500	Greater than 500
Greater than or equal to 10^{-3}	35	35	35	25
Less than 10^{-3} to 10^{-5}	35	25	15	15
Less than 10^{-5} to 10^{-7}	15	15	5	5
Less than 10^{-7}	5	5	1	1

[a] If depth to aquifer is 10 feet or less or if, for the interval being evaluated, all layers that underlie a portion of the sources at the site are karst, assign a value of 35.

[b] Consider only layers at least 3 feet thick. Do not consider layers or portions of layers within the first 10 feet of the depth to the aquifer.

Determine travel time only at locations within 2 miles of the sources at the site, except: if observed ground water contamination attributable to sources at the site extends more than 2 miles beyond these sources, use any location within the limits of this observed ground water contamination when evaluating the travel time factor for any aquifer that does not have an observed release. If the necessary subsurface geologic information is available at multiple locations, evaluate the travel time factor at each location. Use the location having the highest travel time factor value to assign the factor value for the aquifer. Enter this value in Table 3-1.

3.1.2.5 *Calculation of potential to release factor value.* Sum the factor values for net precipitation, depth to aquifer, and travel time, and multiply this sum by the factor value for containment. Assign this product as the potential to release factor value for the aquifer. Enter this value in Table 3-1.

3.1.3 *Calculation of likelihood of release factor category value.* If an observed release is established for an aquifer, assign the observed release factor value of 550 as the likelihood of release factor category value for that aquifer. Otherwise, assign the potential to release factor value for that aquifer as the likelihood of release value. Enter the value assigned in Table 3-1.

3.2 *Waste characteristics.* Evaluate the waste characteristics factor category for an aquifer based on two factors: toxicity/mobility and hazardous waste quantity. Evaluate only those hazardous substances available to migrate from the sources at the site to ground water. Such hazardous substances include:

- Hazardous substances that meet the criteria for an observed release to ground water.
- All hazardous substances associated with a source that has a ground water containment factor value greater than 0 (see sections 3.2.2, 2.2.3, and 3.1.2.1)

3.2.1 *Toxicity/mobility.* For each hazardous substance, assign a toxicity factor value, a mobility factor value, and a combined toxicity/mobility factor value as specified in the following sections. Select the toxicity/mobility factor value for the aquifer being evaluated as specified in section 3.2.1.3.

3.2.1.1 *Toxicity.* Assign a toxicity factor value to each hazardous substance as specified in Section 2.4.1.1.

3.2.1.2 *Mobility.* Assign a mobility factor value to each hazardous substance for the aquifer being evaluated as follows:

- For any hazardous substance that meets the criteria for an observed release by chemical analysis to one or more aquifers underlying the sources at the site, regardless of the aquifer being evaluated, assign a mobility factor value of 1.
- For any hazardous substance that does not meet the criteria for an observed release by chemical analysis to at least one of the aquifers, assign that hazardous substance a mobility factor value from Table 3-8 for the aquifer being evaluated, based on its water solubility and distribution coefficient (K_d).
- If the hazardous substance cannot be assigned a mobility factor value because data on its water solubility or distribution coefficient are not available, use other hazardous substances for which information is available in evaluating the pathway.

TABLE 3-8.—GROUND WATER MOBILITY FACTOR VALUES [a]

Water solubility (mg/l)	Distribution coefficient (K_d) (ml/g)			
	Karst [c]	< 10	> 10 to 1,000	> 1,000
Present as liquid [b]	1	1	0.01	0.0001
Greater than 100	1	1	0.01	0.0001
Greater than 1 to 100	0.2	0.2	0.002	2x10
Greater than 0.01 to 1	0.002	0.002	2x10	2x10
Less than or equal to 0.01	2x10	2x10	2x10	2x10

[a] Do not round to nearest integer.

[b] Use if the hazardous substance is present or deposited as a liquid.

[c] Use if the entire interval from the source to the aquifer being evaluated is karst.

REFERENCE 15

Ref 15
P1

CLIMATES OF THE STATES

National Oceanic and Atmospheric Administration
Narrative Summaries, Tables, and Maps
for Each State

with

Current Tables of Normals, 1941-1970
Means and Extremes to 1975
Overview of State Climatologist Programs

New Material by
James A. Ruffner

Volume 2

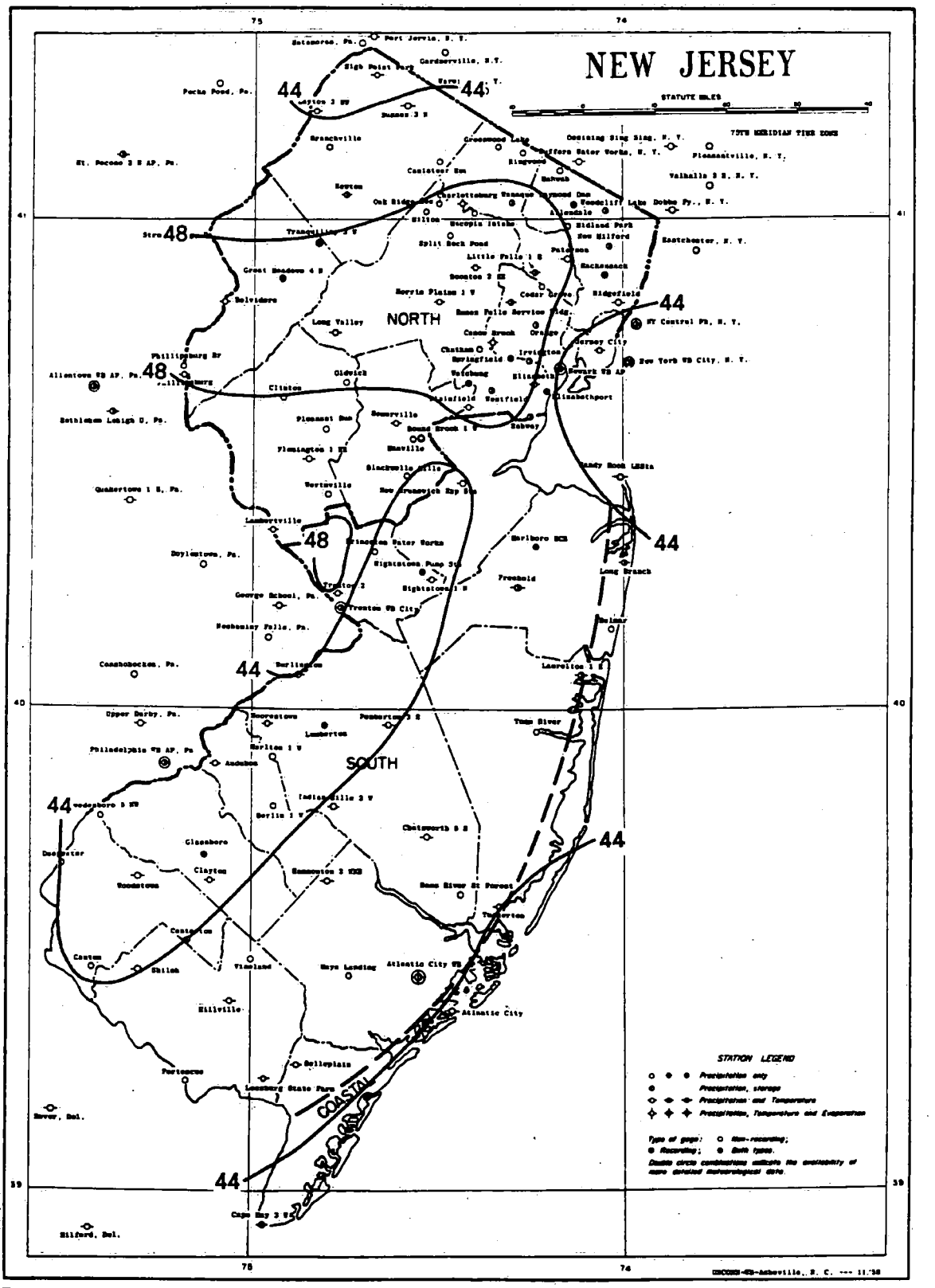
Nebraska-Wyoming
Puerto Rico and U.S. Virgin Islands
Hurricane Data
The State Climatologist Program 1954-1973
Appendixes

Gale Research Company
BOOK TOWER • DETROIT, MICHIGAN 48226

PEARL RIVER PUBLIC LIBRARY
80 FRANKLIN AVENUE
PEARL RIVER, NEW YORK 10965

Key 15 p2

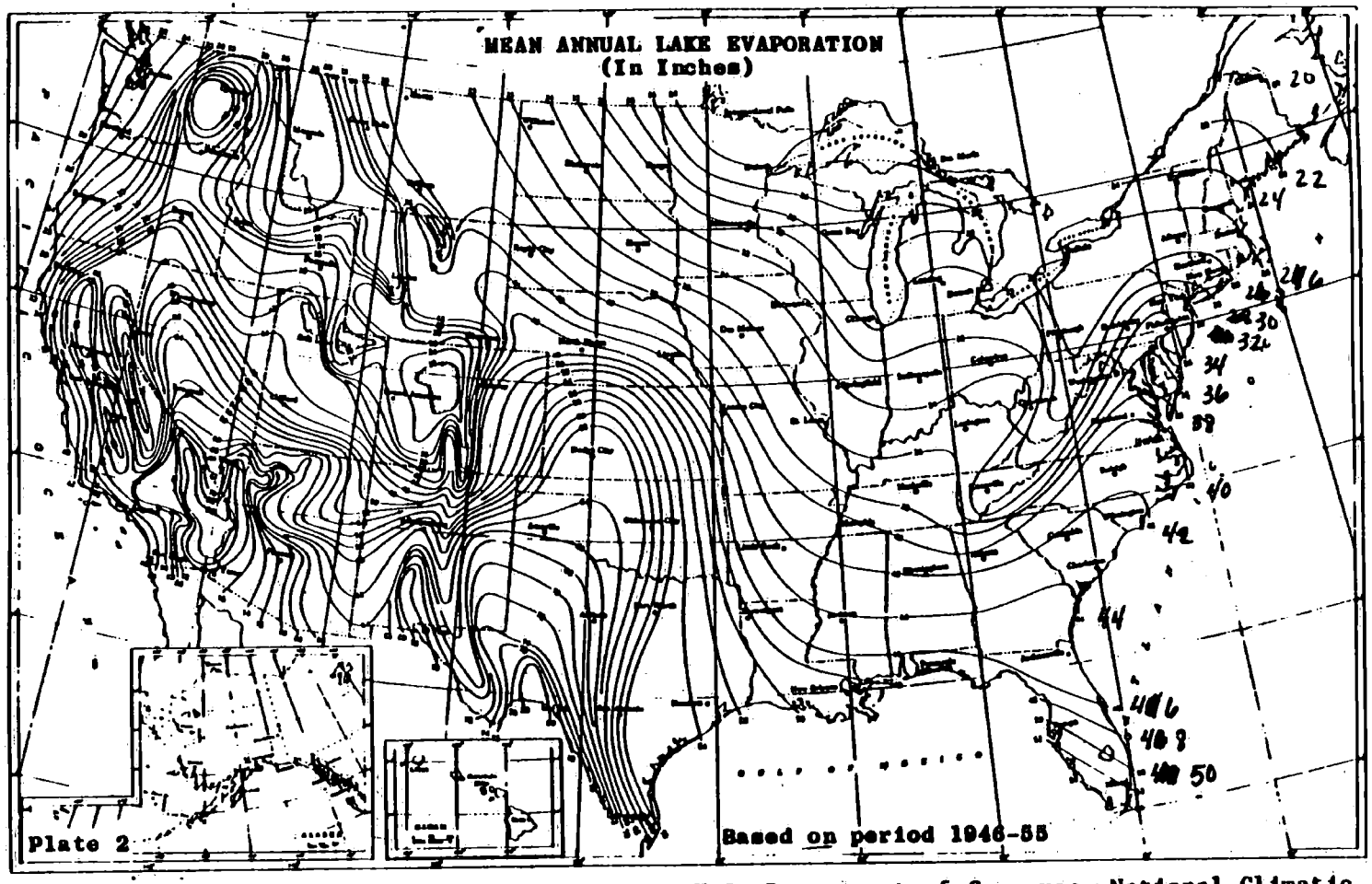
Mean Annual Precipitation, Inches



Based on period 1931-55

Isolines are drawn through points of approximately equal value. Caution should be used in interpolating on these maps.

REFERENCE 16



Source: Climatic Atlas of the United States, U.S. Department of Commerce, National Climatic Center, Ashville, N.C., 1979.

FIGURE 4
MEAN ANNUAL LAKE EVAPORATION
(IN INCHES)

REFERENCE 17

UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY

HACKENSACK QUADRANGLE
NEW JERSEY
7.5 MINUTE SERIES (TOPOGRAPHIC)

Mapped, edited, and published by the Geological Survey

Control by USGS, NOS/NOAA, and New Jersey Geodetic Survey

Topography by planetable surveys 1934. Revised 1955

Hydrography compiled from NOS chart 287 (1954)
This information is not intended for navigational purposes

Polyconic projection. 10,000-foot grid ticks based on New Jersey coordinate system. 1000-meter Universal Transverse Mercator grid ticks, zone 18, shown in blue. 1927 North American Datum
To place on the predicted North American Datum 1983 move the projection lines 6 meters south and 35 meters west as shown by dashed corner ticks

Red tint indicates areas in which only landmark buildings are shown

SCALE 1:24000

CONTOUR INTERVAL 10 FEET
NATIONAL GEODETIC VERTICAL DATUM OF 1929
SOUNDINGS IN FEET—DATUM IS MEAN LOW WATER
SHORELINE SHOWN REPRESENTS THE APPROXIMATE LINE OF MEAN HIGH WATER

THIS MAP COMPLIES WITH NATIONAL MAP ACCURACY STANDARDS
FOR SALE BY U.S. GEOLOGICAL SURVEY, RESTON, VIRGINIA 22092
A FOLDER DESCRIBING TOPOGRAPHIC MAPS AND SYMBOLS IS AVAILABLE ON REQUEST

QUADRANGLE LOCATION

Revisions shown in purple compiled from aerial photographs taken 1976 and other sources. This information not field checked. Map edited 1981

Purple tint indicates extension of urban areas

ROAD CLASSIFICATION

HACKENSACK, N. J.
40074-H1-TF-024

1955
PHOTOREVISED 1981

UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY

WEEHAWKEN QUADRANGLE
NEW JERSEY – NEW YORK
7.5 MINUTE SERIES (TOPOGRAPHIC)

Mapped, edited, and published by the Geological Survey
Revised in cooperation with New York Department of Transportation

Control by USGS, NOS/NOAA, USCE, and New Jersey Geodetic Survey

Topography by planetable surveys 1935. Revised from aerial photographs taken 1966. Field checked 1967.

Selected hydrographic data compiled from NOS charts 287, 345, and 745 (1966). This information is not intended for navigational purposes.

Polyconic projection. 10,000-foot grid ticks based on New Jersey coordinate system and New York coordinate system, Long Island zone. 2000-meter Universal Transverse Mercator grid ticks, zone 18.

Shoreline from 1927 North American Datum.

Transverse Mercator projection North American Datum 1983.

Vertical datum is mean low water in tidal areas, south and 3½ meters above mean low water in Hudson corner ticks.

Bench marks indicated shown in chiseled, geodetic bronze tablets are shown.

CONTOUR INTERVAL 10 FEET
NATIONAL GEODETIC VERTICAL DATUM OF 1929

DEPTH CURVES AND SOUNDINGS IN FEET—DATUM IS MEAN LOW WATER

THE RELATIONSHIP BETWEEN THE TWO DATUMS VARIES FROM PLACE TO PLACE. INCREASING SHOWN SUBSTANTIALLY THE SAME RESULTS. THE MEAN RANGE OF TIDE IS APPROXIMATELY [illegible] FEET IN THE VICINITY OF THE MOUTH OF THE HUDSON RIVER.

FOR SALE BY U.S. GEOLOGICAL SURVEY, RESTON, VIRGINIA 22092

WEEHAWKEN, N.J.–N.Y.
1967
PHOTOREVISED 1981

DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY

PATERSON QUADRANGLE
NEW JERSEY
7.5 MINUTE SERIES (TOPOGR

Mapped, edited, and published by the Geological Survey

Control by USGS, NOS/NOAA, and New Jersey Geodetic Survey

Topography by planetable surveys 1937-1938
Culture revised 1955

Polyconic projection. 10,000-foot grid ticks based on New Jersey coordinate system. 1000-meter Universal Transverse Mercator grid ticks, zone 18, shown in blue. 1927 North American Datum. To place on the predicted North American Datum 1983 move the projection lines 6 meters south and 35 meters west as shown by dashed corner ticks

Red tint indicates areas in which only landmark buildings are shown

Revisions shown in purple compiled from aerial photographs taken 1976 and other sources. This information not field checked. Map edited 1981

Purple tint indicates extension of urban areas

CONTOUR INTERVAL 10 FEET
NATIONAL GEODETIC VERTICAL DATUM OF 1929

THIS MAP COMPLIES WITH NATIONAL MAP ACCURACY STANDARDS
FOR SALE BY U S GEOLOGICAL SURVEY, RESTON, VIRGINIA 22092
A FOLDER DESCRIBING TOPOGRAPHIC MAPS AND SYMBOLS IS AVAILABLE ON REQUEST

ROAD CLASSIFICATION

PATERSON,

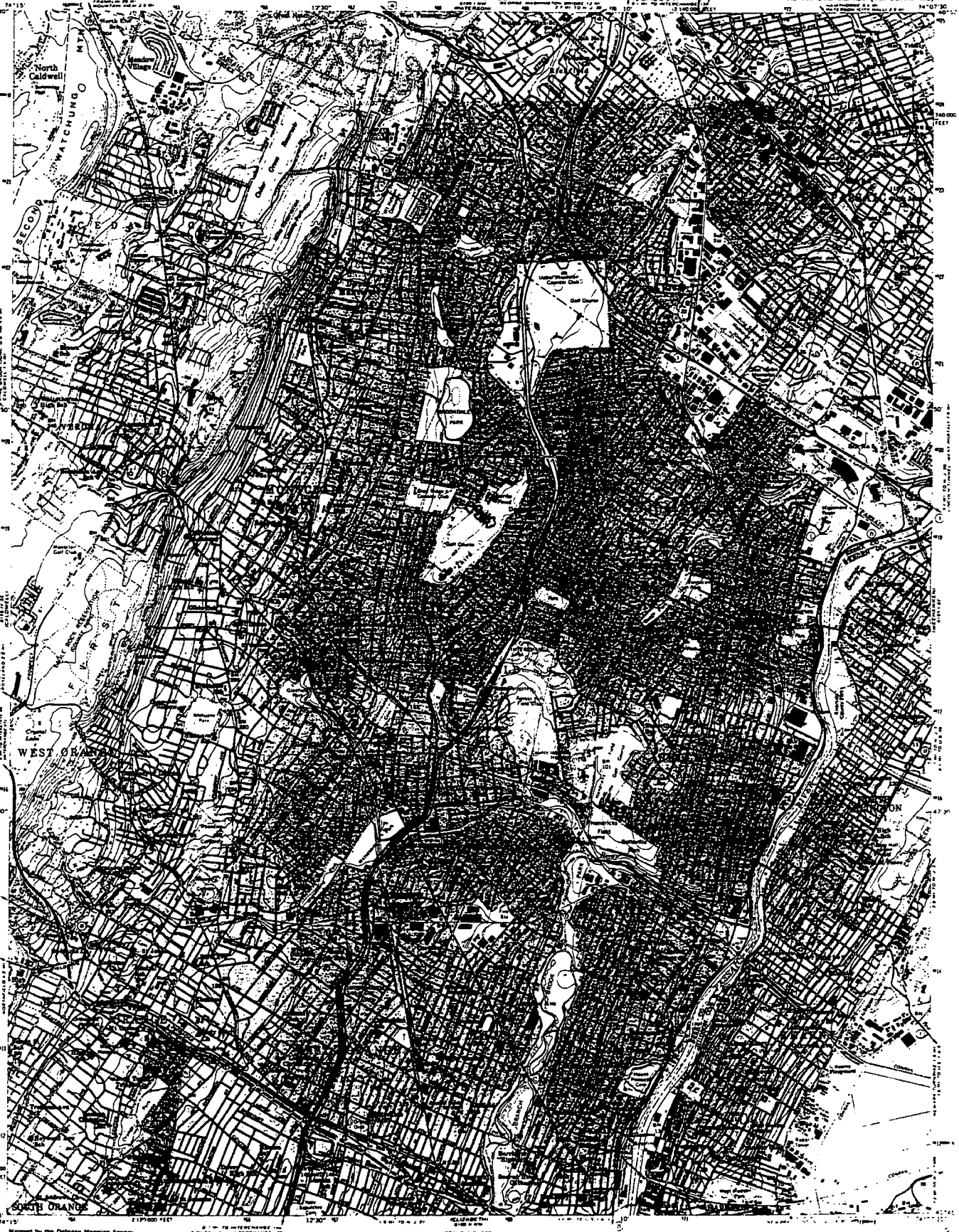
1955
PHOTOREVISED

UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY

UNITED STATES
DEPARTMENT OF THE ARMY
CORPS OF ENGINEERS

K of 17

ORANGE QUADRANGLE
NEW JERSEY
7.5 MINUTE SERIES (TOPOGRAPHIC)



Mapped by the Defense Mapping Agency
Edited and published by the Geological Survey

Control by USCS, NOS/NOAA, USCS, and New Jersey Geodetic Survey

Topography by photogrammetric methods from aerial photographs taken 1962 and 1963. Field checked 1963.
Culture revised by USGS by planetable surveys 1992

Hydrography compiled from NOS chart 287 (1994)
This information is not intended for navigational purposes

Projection: 10 000-foot grid ticks based on New Jersey coordinate system, 1000 meter Universal Transverse Mercator grid ticks, zone 18, shown in blue. 1927 North American Datum
To place on the predecent North American Datum 1983 move the projection lines 8 meters south and 75 meters west as shown by dashed corner ticks

Red tint indicates areas in which only landmark buildings are shown

There may be private inholdings within the boundaries of the National or State reservations shown on this map

SCALE 1:24 000

CONTOUR INTERVAL 20 FEET
NATIONAL GEODETIC VERTICAL DATUM OF 1929
SHORELINE SHOWN REPRESENTS THE APPROXIMATE LINE OF MEAN HIGH WATER
THE MEAN RANGE OF TIDE IS APPROXIMATELY 4 FEET

THIS MAP COMPLIES WITH NATIONAL MAP ACCURACY STANDARDS
FOR SALE BY U.S. GEOLOGICAL SURVEY, RESTON, VIRGINIA 22092
A FULL DESCRIPTIVE TOPOGRAPHIC MAP CATALOG IS AVAILABLE ON REQUEST

ROAD CLASSIFICATION

Primary
Secondary
Light duty
Unimproved dirt
U.S. Route
State Route

Revisions shown in purple are based on aerial photographs taken 1977. Information not field checked. Map edited 1981

Purple tint indicates extension of urban areas

ORANGE, N.J.

1992
PHOTOREVISED 1981

UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY

JERSEY CITY QUADRANGLE
NEW JERSEY–NEW YORK
7.5 MINUTE SERIES (TOPOGRAPHIC)

Mapped, edited, and published by the Geological Survey
Revised in cooperation with New York Department of Transportation

Control by USCS, NOS/NOAA, USCE, New Jersey Geodetic Survey, and City of New York Board of Estimate and Apportionment

Photogrammetric compilation, estimated and from NOS charts T 5111, T 5277, T 5137, T 5450, T 5453, T 5454, T 5460, T 5461, T 5468, T 5468, T 5469 and T 5470

Topography by photogrammetric methods from aerial photographs taken 1984 and photoelectric survey 1985. Revised from aerial photographs taken 1986. Field checked 1987

Land use topographic data compiled from NOS charts 285, 287, 541, and 245 (1984). Tick information is not intended for navigational purposes

Projection: projection: 10,000 yard grid ticks based on New Jersey Coordinate System, and New York Coordinate System. Long Island zone. 1991 metric conversion. Transverse Mercator. New zone grid ticks, zone 18, shown on base. 1927 North American Datum. To place on the grids last North America on Datum 1927 ... [illegible]

SCALE 1:24 000

CONTOUR INTERVAL 10 FEET
NATIONAL GEODETIC VERTICAL DATUM OF 1929
DEPTH CURVES AND SOUNDINGS IN FEET—DATUM IS MEAN LOW WATER
THE RELATIONSHIP BETWEEN THE TWO DATUMS IS VARIED.
SHORELINE SHOWN REPRESENTS THE APPROXIMATE LINE OF MEAN HIGH WATER
THE MEAN RANGE OF TIDE IS APPROXIMATELY 4.4 FEET.
(APPROX 1991 AND 4.4 FEET IN NEWARK BAY)

THE MAGNETIC DECLINATION WAS APPROXIMATELY [illegible] DEGREES WEST OF TRUE NORTH AT THE CENTER OF THE MAP IN 1987
FOR SALE BY U.S. GEOLOGICAL SURVEY, RESTON, VIRGINIA 22092
A FOLDER DESCRIBING TOPOGRAPHIC MAPS AND OTHER INFORMATION AVAILABLE ON REQUEST

Pressures shown in purple compiled from aerial photographs taken 1976 and other sources. This information not field checked. Map revised 1981

Purple tint indicates extension of urban areas

ROAD CLASSIFICATION
Primary highway, hard surface
Secondary highway, hard surface
Light duty road, hard surface
Unimproved road
U.S. Route
State Route

JERSEY CITY, N.J.–N.Y.

UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY

ELIZABETH QUADR
NEW JERSEY – NEW YORK
7.5 MINUTE SERIES (TOPOGRA

Mapped, edited, and published by the Geological Survey
Revised in cooperation with New York Department
of Transportation

Control by USGS, USC&GS, USGS, and New Jersey Geodetic Survey

Hydrography by photogrammetric methods from aerial
photographs taken 1953 and planetable surveys 1955
Topography by photogrammetric methods from aerial
photographs taken 1966. Field checked 1967

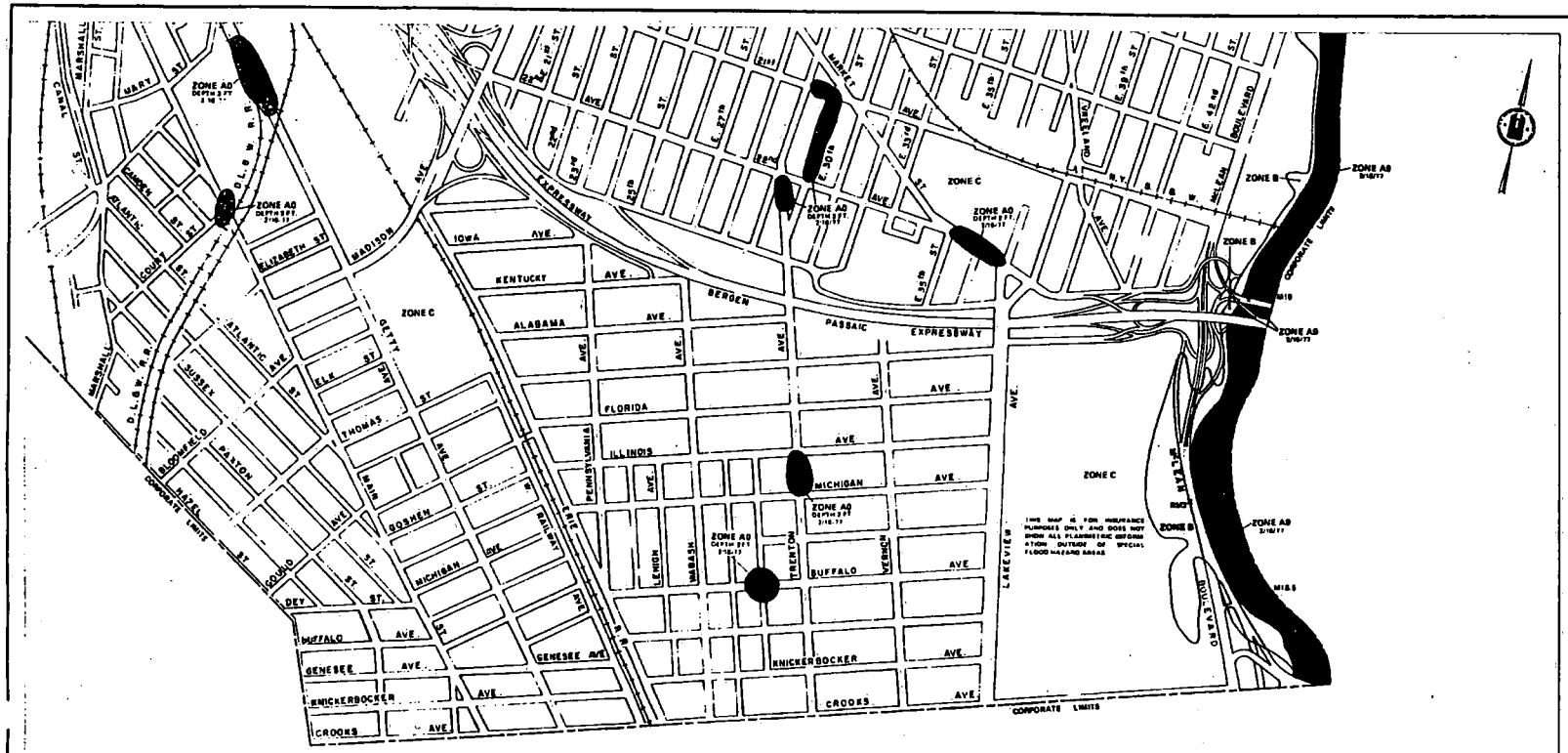
SCALE 1:24 000

CONTOUR INTERVAL 10 FEET
DATUM IS MEAN SEA LEVEL
DEPTH CURVES AND SOUNDINGS IN FEET—DATUM IS MEAN LOW WATER

FOR SALE BY U. S. GEOLOGICAL SURVEY, WASHINGTON, D. C. 20242
A FOLDER DESCRIBING TOPOGRAPHIC MAPS AND SYMBOLS AVAILABLE ON REQUEST

ELIZABETH, N. J.–

REFERENCE 18



KEY TO SYMBOLS

ZONE B

ZONE D

ZONE DESIGNATIONS WITH DATE OF IDENTIFICATION

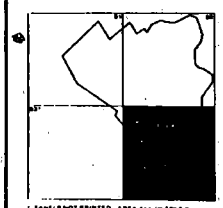
EXPLANATION OF ZONE DESIGNATIONS

CONSULT UPIA SERVICING COMPANY OR LOCAL INSURANCE AGENT OR BROKER TO DETERMINE IF PROPERTIES IN THIS COMMUNITY ARE ELIGIBLE FOR FLOOD INSURANCE.

INITIAL IDENTIFICATION DATE JUNE 1 1975

CONVERSION TO REGULAR PROGRAM FEBRUARY 15 1977

MAP LOCATOR DIAGRAM



PANELS NOT PRINTED - AREA ALL IN ZONE C

FOR DESCRIPTION OF ELEVATION REFERENCE MARKS SEE SEPARATELY PRINTED FLOOD INSURANCE STUDY REPORT

FLOOD HAZARD BOUNDARY MAP H-01-04
FLOOD INSURANCE RATE MAP I-01-04

CITY OF PATERSON, NEW JERSEY
PASSAIC COUNTY

PANEL H&I-04

PAGE 3 OF 3 PRINTED

EFFECTIVE DATE:
FEBRUARY 15, 1977

Pg 18
pl

REFERENCE 19

S. DEPARTMENT OF COMMERCE
THER H. HODGES, Secretary

WEAT
F. W. REI

TECHNICAL PAPER NO. 40

RAINFALL FREQUENCY ATLAS OF THE UNITED STATES

for Durations from 30 Minutes to 24 Hours and Return Periods from 1 to 100 Years

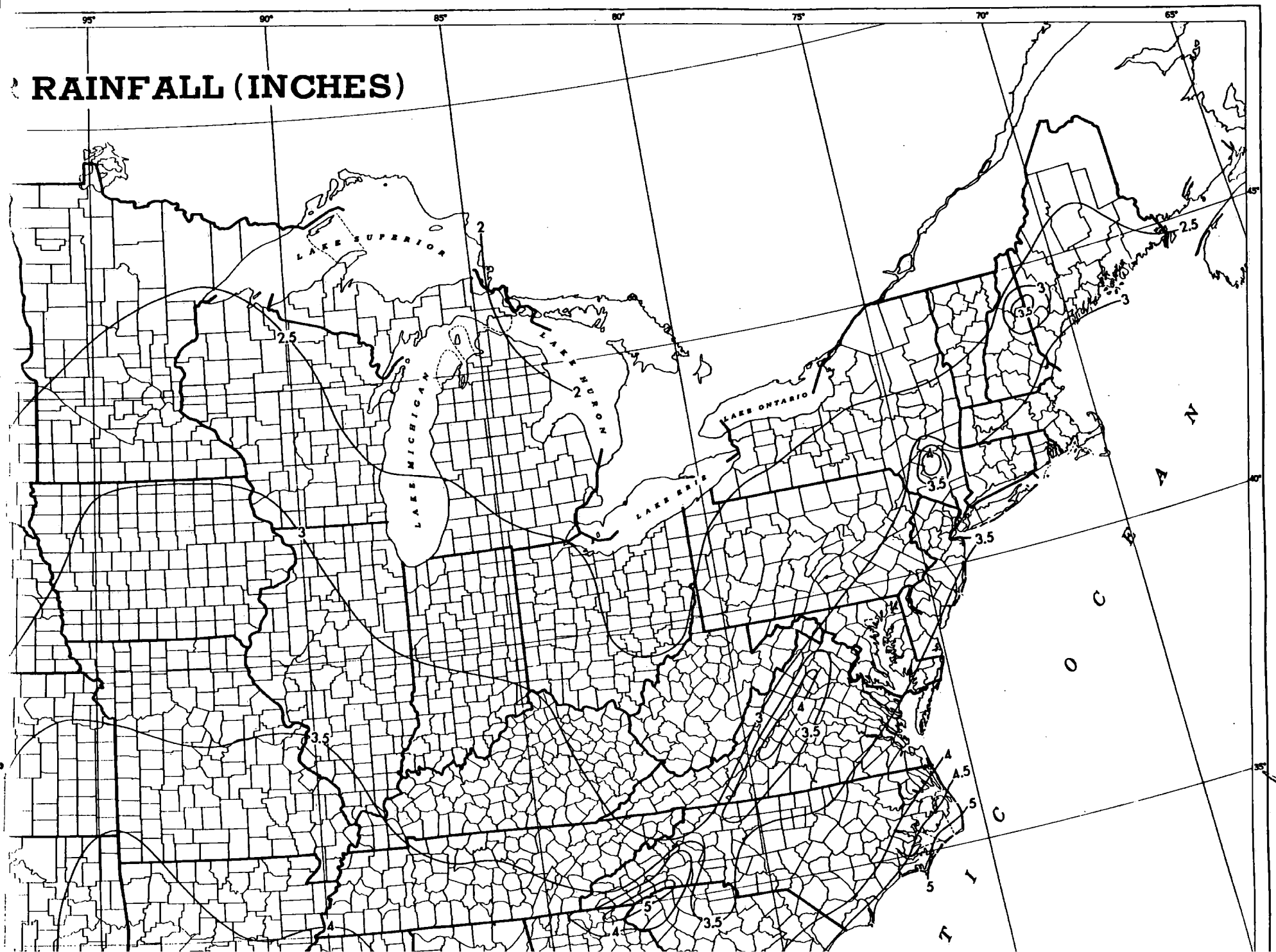
Prepared by
DAVID M. HERSHFIELD
Cooperative Studies Section, Hydrologic Services Division
for
Engineering Division, Soil Conservation Service
U.S. Department of Agriculture

WASHINGTON, D.C.
May 1961
Repaginated and Reprinted January 1963

For sale by the Superintendent of Documents, U.S. Government Printing Office, Washington 25, D.C. Price $1.25

Kg 19
p 1

RAINFALL (INCHES)



Page 17

REFERENCE 20

Ref 20 p1

SURFACE WATER INTAKE LOCATIONS
BUREAU OF SAFE DRINKING WATER
With Longitude & Latitudes

Prepared by: Michael Mariano

Ref 20 p2

STATE OF NEW JERSEY DEPARTMENT OF ENVIRONMENTAL PROTECTION
BUREAU OF SAFE DRINKING WATER
MARCH 1992

PWSID#	PURVEYOR NAME	PHONE NUMBER	INTAKE MUNICIPALITY	INTAKE LOCATION	LONGITUDE	LATITUDE
0102001	ATLANTIC CITY WATER DEPARTMENT	609-345-3315	ABSECON	DOUGHTY POND - South tip Hays Landing Rd. & Mill Rd.	74 31 21.6	39 25 48.75
0238001	HACKENSACK WATER DEPARTMENT	201-767-9300	PARAMUS	SADDLE RIVER - South of intersection of Paramus Rd. & Midland Ave.		
			ORADELL	HACKENSACK RIVER - At Martin Ave.	74 01 36.64	40 56 47.63
			NORTHVALE	SPARK HILL CREEK - Northwest of intersection of Pegasus Ave. & Hill Terr.		
			ORADELL	LONG SWAMP BROOK - At Martin Ave.		
0305001	BURLINGTON CITY WATER DEPARTMENT	609-386-0307	EAST BURLINGTON	DELAWARE RIVER - 1/4 mile north of Assiscunk Creek	74 50 21.82	40 05 19.78
			BURLINGTON ISLAND	BURLINGTON ISLAND LAKE		
0325001	FORT DIX	609-542-5040		RANCOCAS CREEK	74 37 47.10	39 57 36.08
1613001	NJDWSC	201-575-0225	POMPTON LAKES	RAMAPO RIVER - At Pompton Lake (pump to Wanaque Res.)		
			WANAQUE	WANAQUE RESERVOIR - Ringwood Ave & Oricchio Ave	74 17 39.4	41 02 47.67
0717001	CITY OF ORANGE	201-762-6800	SOUTH ORANGE	ORANGE RESERVOIR - On West branch of Rahway River 40 ft upstream from dam	74 17 19.48	40 45 33.65

Ref 20 pg

STATE OF NEW JERSEY DEPARTMENT OF ENVIRONMENTAL PROTECTION
BUREAU OF SAFE DRINKING WATER
MARCH 1992

PWSID#	PURVEYOR NAME	PHONE NUMBER	INTAKE MUNICIPALITY	INTAKE LOCATION	LONGITUDE	LATITUDE
0712001	NJ AMERICAN NORTHERN DISTRICT	201-376-8800	MILLBURN	PASSAIC RIVER - At Kennedy Parkway	74 21 56.16	40 44 42.88
			SHORT HILLS	CANOE BROOK - North of Route 24	74 21 13.31	40 44 40.77
			CALDWELL	POMPTON RIVER - At Bridges Rd.		
0714001	NEWARK WATER DEPT	201-256-4965		PEQUANNOCK WATER SHED	74 25 27.07	41 01 32.44
0906001	JERSEY CITY WATER DEPARTMENT	201-547-4390	BOONTON	BOONTON RESERVOIR - 200 yds northwest of Washington St Bridge	74 23 51.41	40 53 33.80
			ROCKAWAY	SPLIT ROCK RESERVOIR - Empties into Boonton Res. via Rockaway River		
1017001	LAMBERTVILLE WATER DEPARTMENT	609-397-0526	LAMBERTVILLE	SWAN CREEK RESERVOIR EAST	74 55 28.18	40 21 40.52
			LAMBERTVILLE	SWAN CREEK RESERVOIR WEST	74 55 43.90	40 21 46.63
			LAMBERTVILLE	DELAWARE-RARITAN CANAL - At Swan St. (Emergency)	74 56 46.94	40 21 55.90
1111001	CITY OF TRENTON	609-989-3208	TRENTON	DELAWARE RIVER - At Rt 29 north of Calhoun St. Bridge	74 46 45.57	40 13 19.06
1216001	PERTH AMBOY	908-826-0290	OLD BRIDGE	TENNENTS POND - At Waterworks Rd.	74 20 12.23	40 25 33.99
1225001	MIDDLESEX WATER CO	908-634-1500	EDISON	DELAWARE-RARITAN CANAL & MILLSTONE RIVER - At Rt 18	74 27 34.00	40 30 25.66

Ref 20 p 4

STATE OF NEW JERSEY DEPARTMENT OF ENVIRONMENTAL PROTECTION
BUREAU OF SAFE DRINKING WATER
MARCH 1992

PWSID#	PURVEYOR NAME	PHONE NUMBER	INTAKE MUNICIPALITY	INTAKE LOCATION	LONGITUDE	LATITUDE
1214001	NEW BRUNSWICK WATER DEPARTMENT	908-745-5060	NEW BRUNSWICK	LAWRENCE BROOK - At Burnet St St.	74 24 49.97	40 28 58.48
			NEW BRUNSWICK	DELAWARE-RARITAN CANAL - At George St & College Ave		
1214001	NORTH BRUNSWICK	908-247-0922	FRANKLIN TWP	DELAWARE-RARITAN CANAL - At Suydam Ave.	74 34 59.03	40 27 38.49
1219001	SAYERVILLE	908-390-7000	OLD BRIDGE	SOUTH RIVER - At Main St North of Rt 18	74 21 41.75	40 24 58.99
1352005	NEW JERSEY WATER SUPPLY AUTH.		WALL TWP	MANASQUAN RIVER - Hospital Rd. North of Garden State Parkway (Pump to Manasquan Reservior)	74 11 27.43	40 10 31.82
1345001	NJ AMERICAN - MONMOUTH		WALL TWP	MANASQUAN RIVER - Hospital Rd. North of GSP (Pump to Glendola Reservoir)	74 04 45.13	40 11 42.47
			NEPTUNE TWP	SHARK RIVER - Off Corlies Ave. 2000' North of GSP	74 04 16.51	40 11 53.69
			NEPTUNE TWP	JUMPING BROOK - At Greensgrove & Corlies Aves	74 03 57.82	40 12 11.83
			LINCROFT	SWIMMING RIVER RESERVOIR - 1000' West of Swimming Riv.	74 07 13.35	40 19 06.70
1326004	MATCHAPONIX		MANALAPAN	MATCHAPONIX BROOK - At Wilson Ave.	74 21 50.42	40 18 33.20
1401001	TOWN OF BOONTON	201-299-7740	MONTVILLE	TAYLORTOWN RESERVOIR - At Taylortown Rd.	74 23 00.06	40 57 13.06

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STATE OF NEW JERSEY DEPARTMENT OF ENVIRONMENTAL PROTECTION
BUREAU OF SAFE DRINKING WATER
MARCH 1992

PWSID#	PURVEYOR NAME	PHONE NUMBER	INTAKE MUNICIPALITY	INTAKE LOCATION	LONGITUDE	LATITUDE
1403001	BUTLER WATER DEPT	201-838-7200	BUTLER	KIKEOUT RESERVOIR - At Resevior Rd.	74 21 58.63	40 59 24.13
1424001	SOUTH EAST MORRIS COUNTY	201-538-5600	MENDHAM	CLYDE POTTS RESERVOIR - Cold Hill Rd & Woodland Rd	74 34 51.90	40 48 21.61
1506001	BRICK TWP	908-458-7000		METEBECONK RIVER	74 08 36.45	40 04 28.07
1603001	HALEDON WATER DEPT		HALEDON	HALEDON RESERVOIR - Lower Basin pump station at Belmont Ave.		
1605002	PASSAIC VALLEY WATER COMMISSION	201-256-1566	WAYNE	POMPTON RIVER - At Confluence of Ramapo & Pequannock Rivers		
			TOTOWA	PASSAIC RIVER - At Union Blvd.	74 13 51.49	40 52 58.46
1708300	E.I. DUPONT PENNSVILLE	609-299-5000		SALEM CANAL	75 30 19.63	39 41 08.91
1712001	SALEM WATER DEPT	609-935-0350	CLINTON TWP	LAUREL LAKE - At Waterworks Rd & Lake Ave.	75 24 28.33	39 32 52.62
			ALLOWAY TWP	ELKINTON HILL POND - Waterworks Rd. 3 miles east of Laurel Lake (Seasonal)		
1903001	BRANCHVILLE WATER DEPARTMENT	201-948-6463	FRANKFORD TWP	BRANCHVILLE RESERVOIR - 7300' northeast of Hattison Ave & Hattison School Rd.		
1906002	FRANKLIN WATER DEPT	201-827-7060	FRANKLIN BOROUGH	FRANKLIN POND - Franklin Ave. Across from plant		
1915001	NEWTON WATER DEPT	201-383-3521	SPARTA TWP	MORRIS LAKE	74 34 17.07	41 08 14.40

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STATE OF NEW JERSEY DEPARTMENT OF ENVIRONMENTAL PROTECTION
BUREAU OF SAFE DRINKING WATER
MARCH 1992

PWSID#	PURVEYOR NAME	PHONE NUMBER	INTAKE MUNICIPALITY	INTAKE LOCATION	LONGITUDE	LATITUDE
1921001	SUSSEX WATER DEPT	201-967-5622	WANTAGE TWP	COLESVILLE RESERVOIR - At Brink Rd. 400' west of Rt. 23		
2013001	RAHWAY WATER DEPT	201-388-0086	RAHWAY	RAHWAY RIVER - At pump station off Valley Rd & Lambert St.	74 17 26.57	40 37 06.41
2004002	ELIZABETHTOWN WATER COMPANY	201-345-4444	BRIDGEWATER TWP	RARITAN & HILLSTONE RIVERS - At confluence	74 34 01.82	40 32 33.33
2108001	HACKETTSTOWN MUA	201-852-3622	DRAKESTOWN	NINE HILL RESERVOIR - Off Nine Hill Rd.	74 47 41.62	40 51 23.77
			DRAKESTOWN	BURD RESERVOIR - Off Reservoir Rd. Southeast of	74 48 01.64	40 50 27.91

REFERENCE 21

REFERENCE 21
1

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THE JOURNAL OF STATE AGENCY RULEMAKING

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See the Register Index for Subsequent Rulemaking Activity.

NEXT UPDATE: SUPPLEMENT JUNE 17, 1989

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TAR HILL BROOK	
(Lake Lenape)—Source to, but not including, Lake Lenape	FW2-TM
(Lake Lenape)—Lake Lenape to Andover Junction Brook	FW2-NT
THREE MOUTHS (Egg Island)	FW2-NT/SE1(C1)
THUNDERGUST BROOK	
(Deerfield)—Entire length, except segment described below	FW2-NT
(Deerfield)—That segment within the boundaries of Parvin State Park	FW2-NT(C1)
THUNDERGUST LAKE (Parvin State Park)	FW2-NT(C1)
TILLMAN BROOK	
(Walpack)—Entire length	FW2-TP(C1)
TROUT BROOK	
(Hackettstown)—Entire length	FW2-TM(C1)
TROUT BROOK	
(Tranquility)—Entire length	FW2-TP(C1)
TROUT BROOK (Hope)—Entire length	FW2-TM
TROUT BROOK	
(Allamuchy)—Entire length	FW2-NT
TROUT BROOK	
(Middleville)—Source to confluence with Pond Brook	FW2-TP(C1)
(Middleville)—Confluence with Pond Brook to Paulins Kill	FW2-NT
TURKEY HILL BROOK	
(Bethlehem)—Entire length	FW2-TM
TURNERS FORK—See MAD HORSE CREEK	*[FW2-TM]*
TUTTLES CORNER BROOK	
(Tuttles Corner)—Entire length	FW2-TP(C1)
UPPER BROTHERS CREEK (Egg Island)—Entire length	SE1(C1)
UPPER DEEP CREEK (Mad Horse Creek)—Entire length	SE1(C1)
VANCAMPENS BROOK	
(Millbrook)—Entire length	FW2-TP(C1)
WAPALANNE LAKE (Stokes State Forest)	FW2-NT(C1)
WELDON BROOK (Jefferson Township), from source to, but not including, Lake Shawnee	FW2-TM
WEST CREEK	
(Halberton)—Source to the boundary of the Pinelands Protection and Preservation Areas, except those portions described separately below	PL
(Belleplain)—The portion of the tributary that originates about 0.9 miles southeast of Hoffman's Mill and is located entirely within the boundaries of Belleplain State Forest	FW1
(Belleplain)—Those tributaries that originate about 0.5 miles upstream of Hoffman's Mill and are located entirely within the boundaries of Belleplain State Forest	FW1
(Belleplain)—Eastern branch of the easterly tributary to Pickle Factory Pond from its origin to its confluence with the western branch	FW1
(Delmont)—Boundary of the Pinelands Protection and Preservation Area to the boundary of the Fish and Game lands	FW2-NT/SE1(C1)
(Delmont)—Boundary of the Fish and Game lands to Delaware Bay	SE1
WEST PORTAL CREEK (West Portal)—Entire length	FW2-TP(C1)
WHITE BROOK (Montague)—Entire length	FW2-TP(C1)
WHITE LAKE (Hardwick)	FW2-TM
WICKECHEOKE CREEK	
(Locktown)—Source to confluence with Plum Brook	FW2-NT
(Stockton)—Confluence with Plum Brook to Delaware River	FW2-TM
WIDGEON PONDS (Egg Island)	FW2-NT/SE1(C1)
WILLS BROOK (Mt. Olive)—Entire length	FW2-TM
YARDS CREEK (Blairstown)—Entire length	FW2-TP(C1)

(e) The surface water classifications in Table 3 are for waters of the Passaic, Hackensack and New York Harbor Complex Basin*[:]**:*

TABLE 3

WATER BODY	CLASSIFICATION
ARTHUR KILL	
(Perth Amboy)—The Kill and its saline New Jersey tributaries between the Outerbridge Crossing and a line connecting Ferry Pt., Perth Amboy to Wards Pt., Staten Island, New York	SE2
(Elizabeth)—From an east-west line connecting Elizabethport with Bergen Pt., Bayonne to the Outerbridge Crossing	SE3
(Woodbridge)—All freshwater tributaries	FW2-NT
BEAR SWAMP BROOK	
(Mahwah)—Entire length	FW2-TP(C1)
BEAR SWAMP LAKE (Ringwood)	FW2-NT(C1)
BEAVER BROOK	
(Meriden)—from Splitrock Reservoir Dam downstream to Meriden Road Bridge	FW2-TM
(Denville)—Meriden Road Bridge to Rockaway River	FW2-NT
BEECH BROOK	
(West Milford)—from State line downstream to Wanaque River	FW2-TM
BELCHER CREEK (W. Milford)—Entire length	FW2-NT
BERRYS CREEK (Secaucus)—Entire length	FW2-NT/SE2
BLACK BROOK	
(Meyersville)—Entire length, except segment described below	FW2-NT
(Great Swamp)—Segment and tributaries within the Great Swamp National Wildlife Refuge	FW2-NT(C1)
BLUE MINE BROOK	
(Wanaque)—Entire length, except segment described below	FW2-TM
(Norvin Green State Forest)—That portion of the stream and any tributaries within Norvin Green State Forest	FW2-TM(C1)
BRUSHWOOD POND (Ringwood)	FW2-TM(C1)
BUCKABEAR POND	
(Newfoundland)—Pond, its tributaries and connecting stream to Clinton Reservoir	FW2-NT(C1)
BURNT MEADOW BROOK	
(Stonetown)—Entire length	FW2-TP(C1)

CANISTEAR RESERVOIR (Vernon)	FW2-TM
CANISTEAR RESERVOIR TRIBUTARY (Vernon)—The southern branch of the eastern tributary to the Reservoir	FW1
CANOE BROOK (Chatham)—Entire length	FW2-NT
CEDAR POND (Clinton)—Pond and all tributaries	FW1
CHARLOTTEBURG RESERVOIR (Charlotteburg)	FW2-TM
CHERRY RIDGE BROOK	
(Vernon)—Entire length, except segments described below	FW2-NT
(Canistear)—Brook and tributaries upstream of Canistear Reservoir located entirely within the boundaries of Wawayanda State Park and the Newark Watershed lands	*FW1*
CLINTON BROOK	*[FW1]*
(Mossmans Brook) (W. Milford)—Source to, but not including, Clinton Reservoir	FW2-NT(C1)
(Newfoundland)—Clinton Reservoir dam to Pequannock River	FW2-TP(C1)
CLINTON RESERVOIR (W. Milford)	FW2-TM (C1)
CLOVE BROOK—See STAG BROOK	
COOLEY BROOK	
(W. Milford)—Entire length, except segments described below	FW2-TP(C1)
(Hewitt)—Segments of the brook and all tributaries located entirely within Hewitt State Forest	FW1(tp)
CORYS BROOK (Warren)—Entire length	FW2-NT
CRESSKILL BROOK	
(Alpine)—Source to Duck Pond Rd. bridge, Demarest	FW2-TP(C1)
(Demarest)—Duck Pond Rd. bridge to Tenakill Brook	FW2-NT
CUPSAW BROOK	
(Skylands)—Source to Wanaque Reservoir, except segment described below	FW2-NT
(Skylands)—That segment of Cupsaw Brook within the boundaries of Ringwood State Park	FW2-NT(C1)
DEAD RIVER (Liberty Corners)—Entire length	FW2-NT
DEN BROOK (Denville)—Entire length	FW2-NT
DUCK POND (Ringwood)	FW2-NT(C1)
ELIZABETH RIVER	
(Elizabeth)—Source to Broad St. bridge, Elizabeth and all freshwater tributaries	FW2-NT
(Elizabeth)—Broad St. bridge to mouth	SE3
FOX BROOK (Mahwah)—Entire length	FW2-NT
GLASMERE PONDS (Ringwood)	FW2-NT(C1)
GOFFLE BROOK (Hawthorne)—Entire length	FW2-NT
GRANNIS BROOK (Morris Plains)—Entire length	FW2-NT
GREAT BROOK	
(Chatham)—Entire length, except segment described below	FW2-NT
(Great Swamp)—Segment within the boundaries of the Great Swamp National Wildlife Refuge	FW2-NT(C1)
GREEN BROOK	
(W. Milford)—Entire length, except those segments described below	FW2-TP(C1)
(Hewitt)—Those segments located entirely within the Hewitt State Forest boundaries	FW1(tp)
GREEN POND (Rockaway)	FW2-TM
GREEN POND BROOK (Picatinny Arsenal)—Green Pond outlet to Rockaway River	FW2-NT
GREENWOOD LAKE (W. Milford)	FW2-TM
HACKENSACK RIVER	
(Oradell)—Source to Oradell dam	FW2-NT
(Oradell)—Main stem and saline tributaries from Oradell dam to the confluence with Overpeck Creek	SE1
(Little Ferry)—Main stem and saline tributaries from Overpeck Creek to Route 1 and 9 crossing	SE2
(Kearny Point)—Main stem downstream from Route 1 and 9 crossing	SE3
TRIBUTARIES	
(Oradell)—Tributaries joining the main stem between Oradell dam and the confluence with Overpeck Creek	FW2-NT/SE1
(Little Ferry)—Tributaries joining the main stem downstream of Overpeck Creek	FW2-NT/SE2
HANKS POND (Clinton)—Pond and all tributaries	FW1
HARMONY BROOK	
(Brookside)—Entire length	FW2-TP(C1)
HARRISONS BROOK	
(Bernards)—Entire length	FW2-NT
HAVEMEYER BROOK	
(Mahwah)—Entire length	FW2-TP(C1)
HEWITT BROOK (W. Milford)—Entire length	FW2-TP(C1)
HIBERNIA BROOK	
(Hibernia)—Entire length, except tributary described separately below	FW2-TM
(Rockaway)—Entire length of tributary at Rockaway	FW2-TP(C1)
HIGH MOUNTAIN BROOK	
(Ringwood)—Source to, but not including, Skyline Lake	FW2-TP(C1)
HOHOKUS BROOK (Hohokus)—Entire length	FW2-NT/SE2
HUDSON RIVER	
(Rockleigh)—River and saline portions New Jersey tributaries from the New Jersey-New York boundary line in the north to its confluence with the Harlem River, New York	SE1
(Englewood Cliffs)—River and saline portions of New Jersey tributaries from the confluence with the Harlem River, New York to a north-south line connecting Constable Hook (Bayonne) to St. George (Staten Island, New York)	SE2
TRIBUTARIES	
(Rockleigh)—Freshwater portions of tributaries to the Hudson River in New Jersey	FW2-NT
INDIAN GROVE BROOK	
(Somersetin)—Entire length	FW2-TM
JACKSON BROOK	
(Mine Hill)—Source to the boundary of Hurd Park, Dover	FW2-TP(C1)
(Dover)—Hurd Park to Rockaway River	FW2-NT

JENNINGS CREEK (W. Milford)—State line to Wanaque River	FW2-TP(C1)
JERSEY CITY RESERVOIR (Boonton)	FW2-TM
KANOUSE BROOK (Newfoundland)—Entire length	FW2-TP(C1)
KIKEOUT BROOK (Butler)—Entire length	FW2-NT
KILL VAN KULL (Bayonne)—Westerly from a north-south line connecting Constable Hook (Bayonne) to St. George (Staten Island, New York)	SE3
LAKE RICKONDA OUTLET STREAM (Monks)—That segment of the outlet stream from Lake Rickonda within Ringwood State Park	FW2-TM(C1)
LAKE STOCKHOLM BROOK (Stockholm)—Entire length, except tributaries described separately below	FW2-TP(C1)
(Stockholm)—Westerly tributary located entirely within the boundaries of the Newark Watershed	FW1(tp)
(Stockholm)—Brook between Hamburg Turnpike and Williamsville-Stockholm Rd. to its confluence with Lake Stockholm Brook, north of Rt. 23	FW1(tp)
LITTLE POND BROOK (Oakland)—Entire length	FW2-TP(C1)
LOANTAKA BROOK (Green Village)—Entire length, except segment described below	FW2-NT
(Great Swamp)—Brook and all tributaries within the boundaries of Great Swamp National Wildlife Refuge	FW2-NT(C1)
LUD-DAY BROOK (Camp Garfield)—Source to confluence with a tributary from Camp Garfield	FW1
MACOPIN RIVER (Newfoundland)—Source to Echo Lake dam	FW2-NT
(Newfoundland)—Echo Lake dam to Pequannock River	FW2-TM
MEADOW BROOK (Wanaque)—Skyline Lake to Wanaque River	FW2-NT
MILL BROOK (Randolph)—Source to Rt. 10 bridge	FW2-TP(C1)
(Randolph)—Rt. 10 bridge to Rockaway River	FW2-NT
MORSES CREEK—Entire length	FW2-NT/SE3
MOSSMAN'S BROOK—See CLINTON BROOK	
MT. TABOR BROOK (Morris Plains)—Entire length	FW2-NT
NEWARK BAY (Newark)—North of an east-west line connecting Elizabethport with Bergen Pt., Bayonne up to the mouths of the Passaic and Hackensack Rivers	SE3
NOSENZO POND (Upper Macopin)	FW2-NT(C1)
OAK RIDGE RESERVOIR (Oak Ridge)	FW2-TM
OAK RIDGE RESERVOIR (Oak Ridge)—Northwestern tributary to Reservoir	FW1(tm)
OVERPECK CREEK (Palisades Park)—Entire length	FW2-NT/SE2
PACACK BROOK (Stockholm)—Source to Pequannock River, excluding Canistear Reservoir, except segments described separately below	FW2-NT
(Canistear)—Brook and tributaries upstream of Canistear Reservoir located entirely within the boundaries of the Newark Watershed	FW1
PASSAIC RIVER (Mendham)—Source to Rt. 202 bridge (Van Doren's Mill), except tributaries described separately below	FW2-TM
(Paterson)—Rt. 202 bridge to Dundee Lake dam	FW2-NT
(Little Falls)—Dundee Lake dam to confluence with Second River	FW2-NT/SE2
(Newark)—Confluence with Second River to mouth	SE3
TRIBUTARIES (Fairfield)—Tributaries within Great Piece Meadows	FW2-NT(C1)
PECKMAN RIVER (Verona)—Entire length	FW2-NT
PEQUANNOCK RIVER MAIN STEM (Vernon)—Source to confluence with Pacack Brook	FW1(tp)
(Newfoundland)—Pacack Brook to Hamburg Turnpike, (Bench Mark 257) in Bloomingdale except tributaries described separately below	FW2-TM
(Riverdale)—Hamburg Turnpike bridge to Pompton River	FW2-NT
TRIBUTARIES (Copperas Mtn.)—Entire length	FW2-TP(C1)
(Smoke Rise)—Entire length	FW2-TP(C1)
(Green Pond Junction)—Tributary at Green Pond Junction	FW1(tm)
(Jefferson)—Tributary joining the Main Stem about 3500± feet southeast of the Sussex-Passaic County line, near Jefferson	FW1(tm)
(Lake Kampfe)—Source to, but not including, Lake Kampfe	FW2-TM
(Lake Kampfe)—Lake Kampfe to Pequannock River, except tributary described separately below	FW2-NT
(Lake Kampfe)—Tributary within the boundaries of Norvin Green State Forest, originating west of Torne Mtn.	FW2-NT(C1)
PILES CREEK—Entire length	SE3
POMPTON LAKE (Pompton Lakes)	FW2-NT
POMPTON RIVER (Wayne)—Entire length	FW2-NT
POND BROOK (Oakland)—Entire length	FW2-NT
POSTS BROOK (Bloomingdale)—Source to Wanaque Reservoir, except segment described below	FW2-TM
(Norvin Green State Forest)—That segment of the stream and all tributaries within the boundaries of Norvin Green State Forest	FW2-TM(C1)
(Haskell)—Wanaque Reservoir dam to Wanaque River	FW2-NT
PREAKNESS [SINGAC] BROOK (Wayne)—Source to, but not including, Barbours Pond	FW2-TP(C1)
(Barbours Pond)—Pond to Passaic River	FW2-NT
PRIMROSE BROOK (Harding)—Source to Lees Hill Road bridge	FW2-TP(C1)

(Harding)—Lees Hill Road bridge to Great Swamp National Wildlife Refuge boundary	FW2-NT
(Great Swamp)—Wildlife Refuge boundary to Great Brook	FW2-NT(C1)
RAHWAY RIVER	
SOUTH BRANCH	
(Rahway)—Source to Hazelwood Ave., Rahway	FW2-NT
(Rahway)—Hazelwood Ave. to mouth	SE2
MAIN STEM	
(Rahway)—Upstream of Pennsylvania Railroad bridge	FW2-NT
(Linden)—Penn. Railroad bridge to Route 1&9 crossing	SE2
(Carteret)—Route 1-9 crossing to mouth	SE3
RAMAPO LAKE (Ramapo)—Lake and all outlet streams and tributaries within the boundaries of Ramapo Mtn. State Forest	FW2-NT(C1)
RAMAPO RIVER (Mahwah)—State line to Pompton River	FW2-NT
TRIBUTARY (Oakland)—Entire length	FW2-TP(C1)
RINGWOOD CREEK	
(Ringwood)—Entire length, except segment described below	FW2-TM
(Sloatsburg)—Creek within Ringwood State Park	FW2-TM(C1)
RINGWOOD MILL POND (Ringwood)	FW2-NT(C1)
ROCKAWAY RIVER	
(Dover)—Source to Passaic River, excluding the Jersey City Reservoir and the segment described below	FW2-NT
(Berkshire Valley)—That segment within the boundaries of the Berkshire Valley Wildlife Management Area	FW2-NT(C1)
RUSSIA BROOK	
(Sparta)—Source to Lake Hartung dam	FW2-NT
(Milton)—Lake Hartung dam to, but not including, Lake Swannanoa	FW2-TM
SADDLE RIVER	
(Upper Saddle River)—State line to Bergen County Rt. 2 bridge	FW2-TP(C1)
(Saddle River)—Bergen County Rt. 2 bridge to Allendale Rd. bridge	FW2-TM
(Lodi)—Allendale Rd. bridge to Passaic River	FW2-NT/SE3
SAWMILL CREEK (Pompton Plains)—Entire length	FW2-NT
SHEPPARD LAKE (Ringwood)	FW2-TM(C1)
SINGAC BROOK—See PREAKNESS BROOK	
SLOUGH BROOK (Livingston)—Entire length	FW2-NT
SMITH CREEK—Entire length	FW2-NT/SE*[3]**2*
SPLIT ROCK RESERVOIR (Rockaway)	FW2-TM
SPLIT ROCK RESERVOIR TRIBUTARIES (Farny State Park)—Three tributaries within Farny State Park	FW2-NT(C1)
SPRING GARDEN BROOK (Florham)—Entire length	FW2-NT
STAG [CLOVE] BROOK (Mahwah)—Entire length	FW2-TP(C1)
STEPHENS BROOK	
(Roxbury)—Entire length, except segment described separately, below	FW2-NT
(Berkshire Valley)—That segment north of the boundaries of the Berkshire Valley Tract	FW1
STONE HOUSE BROOK (Kinnelon)—Entire length	FW2-NT
STONY BROOK (Boonton)—Entire length	FW2-NT
SURPRISE LAKE (Hewitt)	FW1
SWAN POND (Ringwood)	FW2-NT(C1)
TENAKILL BROOK (Demarest)—Entire length	FW2-NT
TERRACE POND (Wawayanda)	FW2-NT(C1)
TIMBER BROOK (Kitchell)—Entire length, except tributary described separately below	FW2-NT
TIMBER BROOK (Farny State Park)—Headwater segment of tributary to Timber Brook within Farny State Park	FW2-NT(C1)
TROY BROOK (Troy Hills)—Entire length	FW2-NT
WANAQUE RESERVOIR	FW2-TM
WANAQUE RIVER	
MAIN STEM	
(Hewitt)—Greenwood Lake outlet, through Wanaque Wildlife Management Area to the boundary of the State Park and Forest land at Monks, except tributary described separately below	FW2-TM(C1)
(Hewitt)—Entire length of tributary south of Jennings Creek	FW2-TP(C1)
(Monks)—Parkland boundary to Wanaque Reservoir	FW2-TM
(Pompton Lakes)—Wanaque Reservoir dam to Pompton River	FW2-NT
WEST BROOK (W. Milford)—Entire length	FW2-TP(C1)
WEST POND (Hewitt)	FW1
WEYBLE POND (Ringwood)	FW2-NT(C1)
WHIPPANY RIVER	
(Brookside)—Source to Whitehead Rd. bridge	FW2-TP(C1)
(Morristown)—Whitehead Rd. bridge to Passaic River	FW2-NT
TRIBUTARIES	
(Brookside)—Entire length	FW2-TP(C1)
(E. of Brookside)—Entire length	FW2-TM
(E. of Washington Valley)—Entire length	FW2-TM
(Gillespie Hill)—Entire length	FW2-TP(C1)
(Shongum Mtn.)—Entire length	FW2-NT
WONDER LAKE (West Milford)	FW2-NT(C1)
WOODBRIDGE RIVER—Entire length	FW2-NT/SE3

(f) The surface water classifications in Table 4 are for waters of the Raritan River and Raritan Bay Basin*[:]**:*

TABLE 4

WATER BODY	CLASSIFICATION
ALLERTON CREEK (Allerton)—Entire length	FW2-NT
AMBROSE BROOK (Piscataway)—Entire length	FW2-NT
AMWELL LAKE (Snydertown)	FW2-NT(C1)
ASSISCONG CREEK (Flemington)—Entire length	FW2-NT
BACK BROOK (Vanliew's Corners)—Entire length	FW2-NT
BALDWINS CREEK (Pennington)—Entire length, except segment described separately below	FW2-NT

STATE OF NEW JERSEY
NEW JERSEY ADMINISTRATIVE CODE

Title 7. Department of Environmental Protection

Office of the Commissioner
Division of Parks and Forestry
Division of Marine Services
Division of Water Resources
Division of Fish, Game and Wildlife
Division of Waste Management
Division of Environmental Quality
Office of Green Acres and Outdoor Recreation
Delaware and Raritan Canal Commission
Pinelands Commission

Published and Distributed By
OFFICE OF ADMINISTRATIVE LAW
CN 301
Trenton, New Jersey 08625

Supp. 5-20-91

(d) The Department shall issue public notice to all interested parties (including affected municipalities and dischargers) and shall hold public hearing(s) as part of any reclassification proceeding.

(e) A reclassification for more restrictive uses shall be made whenever:

1. It is demonstrated to the satisfaction of the Department that there are existing uses of the specific segment that are not included in the designated uses; or

2. Where a reclassification for less restrictive uses has been granted pursuant to N.J.A.C. 7:9-4.10, the bases for that reclassification no longer exist; or

3. It is demonstrated to the satisfaction of the Department that any uses in Section 101(a)(2) of the Federal Clean Water Act, protection and propagation of fish, shellfish, and wildlife, and recreation in and on the water, which are not included in the designated uses listed in this subchapter are attainable.

(f) A reclassification for more restrictive uses may be made when:

1. It is demonstrated to the satisfaction of the Department that the waters should be set aside to represent the natural aquatic environment and its associated biota; or

2. It is demonstrated to the satisfaction of the Department that a more restrictive use is necessary to protect a unique ecological system or threatened/endangered species.

(g) In those cases in which a thermal discharge is involved, the procedures for reclassifying segments for more restrictive uses shall be consistent with section 316 of the Federal Clean Water Act.

7:9-4.12 Designated uses of FW1, PL, FW2, SE1, SE2, SE3, and SC waters

(a) In all FW1 waters the designated uses are:

1. Set aside for posterity to represent the natural aquatic environment and its associated biota;

2. Primary and secondary contact recreation;

3. Maintenance, migration and propagation of the natural and established aquatic biota; and

4. Any other reasonable uses.

(b) In all PL waters the designated uses are:

1. Cranberry bog water supply and other agricultural uses;

2. Maintenance, migration and propagation of the natural and established biota indigenous to this unique ecological system;

3. Public potable water supply after such treatment as required by law or regulations;

4. Primary and secondary contact recreation; and

5. Any other reasonable uses.

(c) In all FW2 waters the designated uses are:

1. Maintenance, migration and propagation of the natural and established biota;

2. Primary and secondary contact recreation;

3. Industrial and agricultural water supply;

4. Public potable water supply after such treatment as required by law or regulation; and

5. Any other reasonable uses.

(d) In all SE1 waters the designated uses are:

1. Shellfish harvesting in accordance with N.J.A.C. 7:12;

2. Maintenance, migration and propagation of the natural and established biota;

3. Primary and secondary contact recreation; and

4. Any other reasonable uses.

(e) In all SE2 waters the designated uses are:

1. Maintenance, migration and propagation of the natural and established biota;

2. Migration of diadromous fish;

3. Maintenance of wildlife;

4. Secondary contact recreation; and

5. Any other reasonable uses.

(f) In all SE3 waters the designated uses are:

1. Secondary contact recreation;

2. Maintenance and migration of fish populations;

3. Migration of diadromous fish;

4. Maintenance of wildlife; and

5. Any other reasonable uses.

(g) In all SC waters the designated uses are:

1. Shellfish harvesting in accordance with N.J.A.C. 7:12;

2. Primary and secondary contact recreation;

3. Maintenance, migration and propagation of the natural and established biota; and

4. Any other reasonable uses.

Petition for Rulemaking: Exxon petitioning for reclassification to less restrictive uses of portion of Morses Creek.
21 N.J.R. 3791(c).

7:9-4.13 Designated uses of mainstem Delaware River and Delaware Bay (Summarized From the DRBC "Administrative Manual; Part III: Basin Regulations, Water Quality; Including Amendments Through June 29, 1983")

(a) The designated uses for Zone 1C, 1D, and 1E are:

1. Agricultural, industrial and public water supply after reasonable treatment;

2. Wildlife:
3. Maintenance and propagation of resident gamefish and other aquatic biota:
4. Spawning and nursery habitat for anadromous fish:
5. Passage of anadromous fish:
6. Primary and secondary contact recreation.

(b) The designated uses for Zone 2 are:
1. Agricultural, industrial and public water supply after reasonable treatment:
2. Wildlife:
3. Maintenance and propagation of resident gamefish and other aquatic biota:
4. Passage of anadromous fish:
5. Primary contact recreation from R.M. 133.4 to R.M. 117.81:
6. Secondary contact recreation from R.M. 133.4 to R.M. 108.4: and
7. Navigation

(c) The designated uses for Zone 3 are:
1. Agricultural, industrial and public water supply after reasonable treatment:
2. Wildlife:
3. Maintenance of resident fish and other aquatic biota:
4. Migration of anadromous fish:
5. Secondary contact recreation: and
6. Navigation.

(d) The designated uses for Zone 4 are:
1. Industrial water supply after reasonable treatment:
2. Wildlife:
3. Maintenance of resident fish and other aquatic biota:
4. Migration of anadromous fish:
5. Secondary contact recreation: and
6. Navigation.

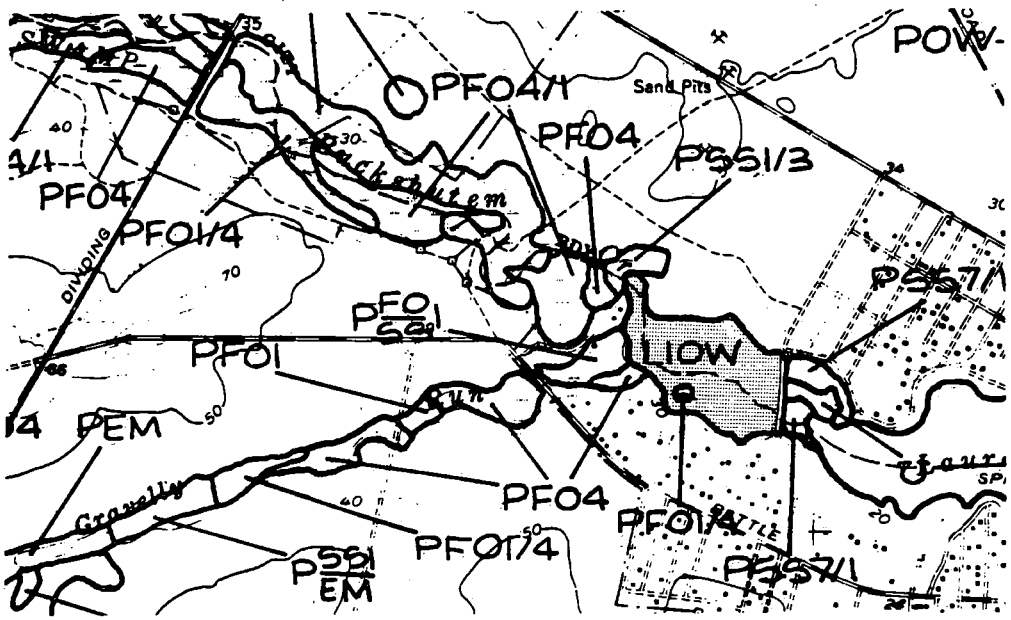
(e) The designated uses for Zone 5 are:
1. Industrial water supply after reasonable treatment:
2. Wildlife
3. Migration of anadromous fish:
4. Maintenance of resident fish and other aquatic biota:
5. Propagation of resident fish from R.M. 70.0 to R.M. 48.2:
6. Secondary contact recreation:
7. Primary contact recreation from R.M. 59.5 to R.M. 48.2: and
8. Navigation.

(f) The designated uses for Zone 6 are:
1. Industrial water supply after reasonable treatment:
2. Wildlife:

REFERENCE 22

Ref Lyons 22 p-

ATLAS OF NATIONAL WETLANDS INVENTORY MAPS FOR NEW JERSEY



PORTION OF DIVIDING CREEK MAP

SCALE: 1:24,000

McCarthy Map Co., Inc.
1003 Main Street
Boonton, N.J. 07005
Phone 201-316-5494

UNITED STATES
DEPARTMENT OF THE INTERIOR
Fish and Wildlife Service
Region Five
Habitat Resources
One Gateway Center, Suite 700
Newton Corner, Massachusetts

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WEHRAN ENGINEERING
666 East Main Street
Middletown, New York 10940

1984

Ref 22 p2

NATIONAL WETLANDS INVENTORY

UNITED STATES DEPARTMENT OF THE INTERIOR

NEWARK NE
NEWARK

40°37'30"
74°00'

JERSEY CITY NJ

Ref 22 p3

NATIONAL WETLANDS INVENTORY

UNITED STATES DEPARTMENT OF THE INTERIOR

NEWARK NE
NEWARK

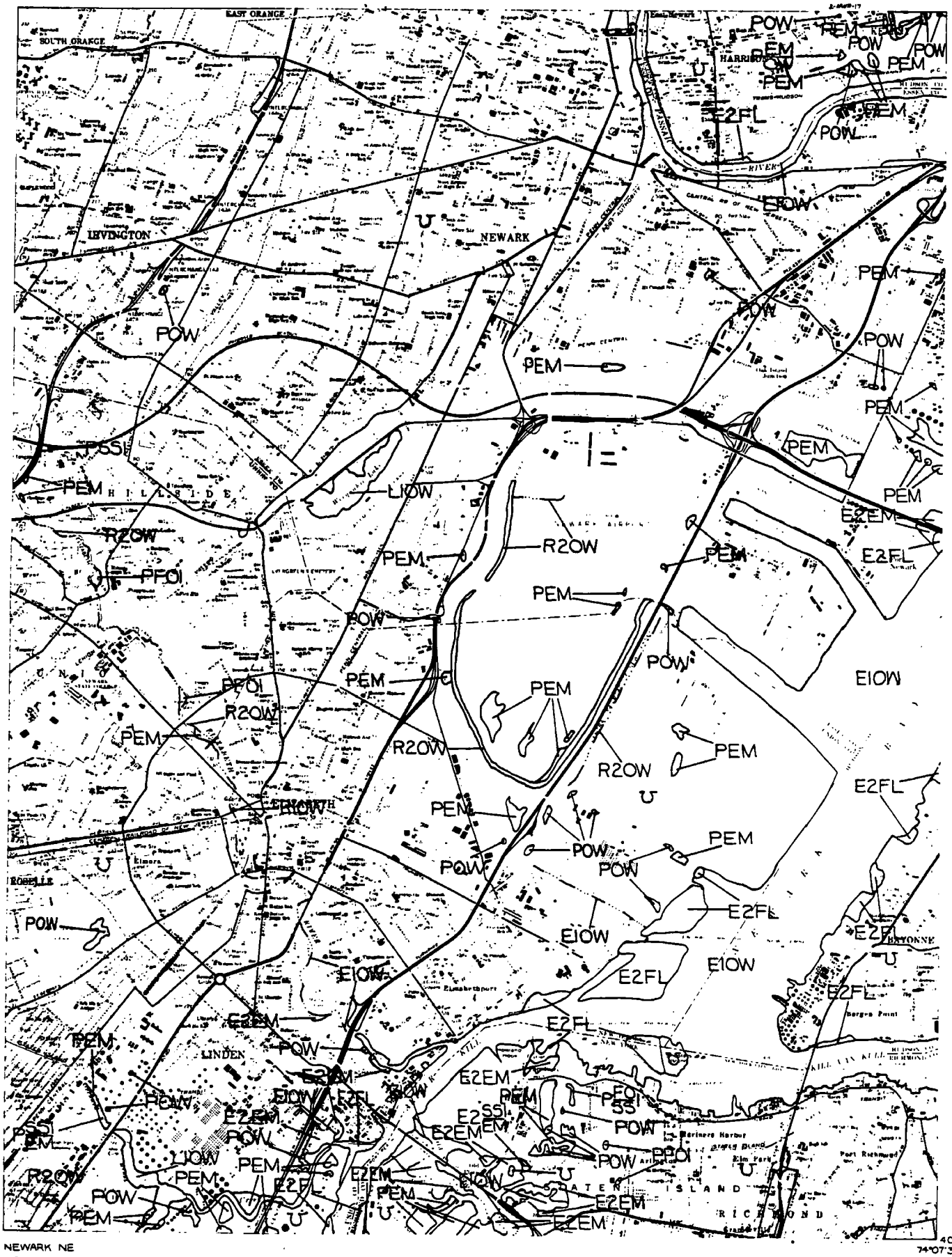
40°52'30"
74°00'

HACKENSACK, N.J.

Ref 22 p4

NATIONAL WETLANDS INVENTORY

UNITED STATES DEPARTMENT OF THE INTERIOR



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NATIONAL WETLANDS INVENTORY

UNITED STATES DEPARTMENT OF THE INTERIOR

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NATIONAL WETLANDS INVENTORY

UNITED STATES DEPARTMENT OF THE INTERIOR

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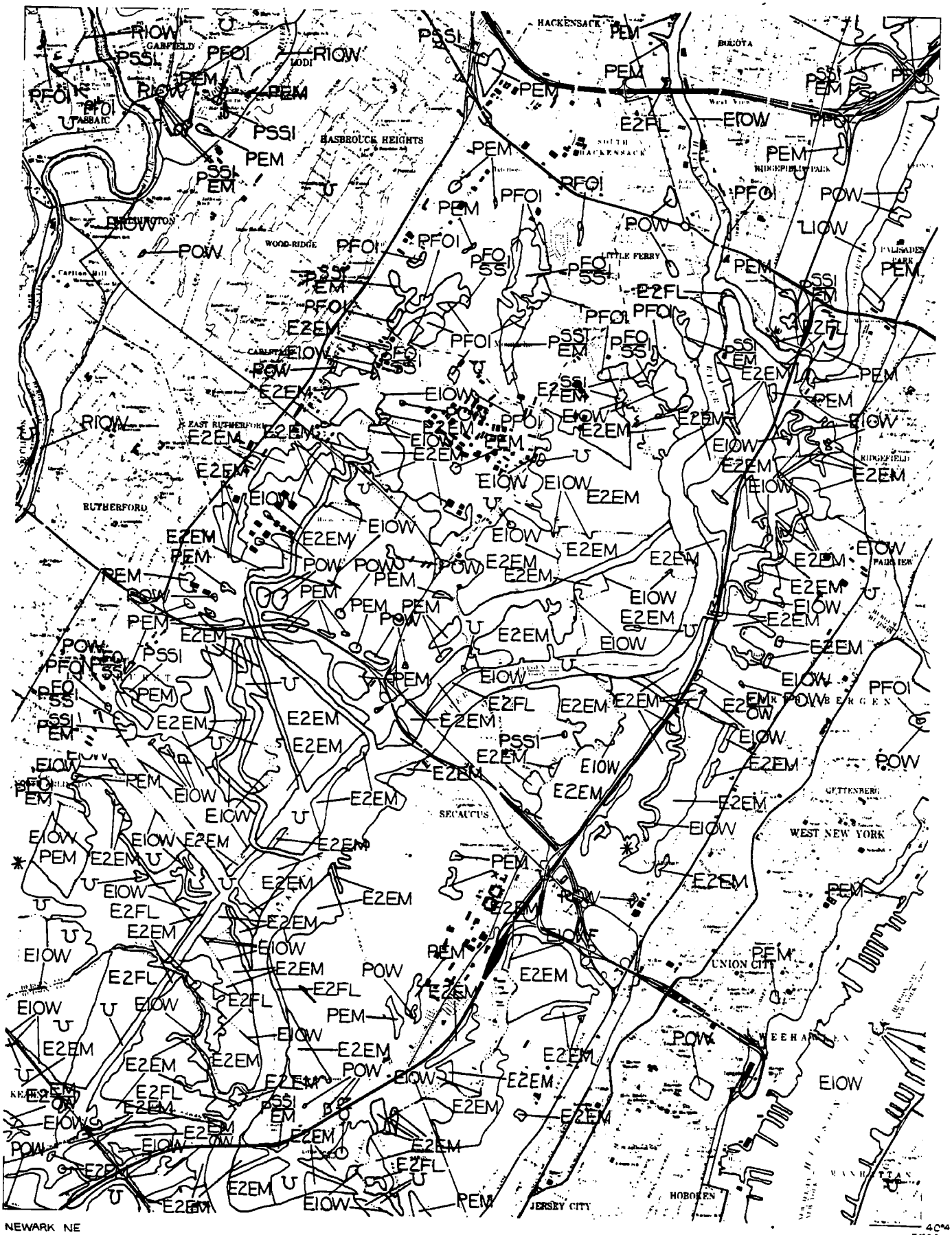
ORANGE, N.J.

Ref 22 p 7

NATIONAL WETLANDS INVENTORY

UNITED STATES DEPARTMENT OF THE INTERIOR



NEWARK NE
NEWARK

WEEHAWKEN, NJ-NY

REFERENCE 23

State of New Jersey
Department of Environmental Protection and Energy
Division of Parks and Forestry
Office of Natural Lands Management
CN 404 Trenton New Jersey 08625-0404
(609) 984-1339
FAX (609) 984-1427

Scott A. Weiner
Commissioner

Thomas F. Hampton
Administrator

July 22, 1992

RECEIVED
JUL 1 1992

Polly Armour
Wehran Engineering Corporation
666 East Main Street
P.O. Box 2006
Middletown, New York 10940

Re: Continental Can Co. and Associated Waterways

Dear Ms. Armour:

Thank you for your data request regarding rare species information for the above referenced project site in Bergen, Essex, Hudson and Passaic Counties.

The Natural Heritage Data Base does not have any records for rare plants, animals or natural communities on the Continental Can Company site. However, there is a record for an occurrence of *Lemna perpusilla* which may be on, or in the immediate vicinity of the waterways that you have associated with this site. The attached list provides additional information about this occurrence.

Also attached are lists of rare vertebrates of Bergen, Essex, Hudson and Passaic Counties together with descriptions of their habitats. If suitable habitat is present at the project site, these species would have potential to be present. If you have questions concerning the wildlife records or wildlife species mentioned in this response, we recommend you contact the Division of Fish, Game and Wildlife Endangered and Nongame Species Program.

In order to red flag the general locations of documented occurrences of rare and endangered species and natural communities, in 1988 we prepared computer generated Natural Heritage Index Maps. Enclosed please find these maps for the Elizabeth, Hackensack, Orange, Paterson and Weehawken USGS quadrangles.

PLEASE SEE THE ATTACHED 'CAUTIONS AND RESTRICTIONS ON NHP DATA'.

Thank you for consulting the Natural Heritage Program. The fee to cover the cost of processing this data request is $30.00. Payment should be made payable to Treasurer, State of New Jersey and mailed to Office of Natural Lands Management, DEPE Div. of Parks and Forestry, CN404, Trenton, NJ 08625-0404. To ensure that your payment is properly credited, please provide a copy of this

Printed on recycled paper

letter with your remittance. Feel free to contact us again regarding any future data requests.

Sincerely,

Thomas F. Breden
Coordinator/Ecologist
Natural Heritage Program

cc: JoAnn Frier-Murza
Thomas Hampton

NATURAL LANDS MANAGEMENT

CAUTIONS AND RESTRICTIONS ON NATURAL HERITAGE DATA

The quantity and quality of data collected by the Natural Heritage Program is dependent on the research and observations of many individuals and organizations. Not all of this information is the result of comprehensive or site-specific field surveys. Some natural areas in New Jersey have never been thoroughly surveyed. As a result, new locations for plant and animal species are continuously added to the data base. Since data acquisition is a dynamic, ongoing process, the Natural Heritage Program cannot provide a definitive statement on the presence, absence, or condition of biological elements in any part of New Jersey. Information supplied by the Natural Heritage Program summarizes existing data known to the program at the time of the request regarding the biological elements or locations in question. They should never be regarded as final statements on the elements or areas being considered, nor should they be substituted for on-site surveys required for environmental assessments. The attached data is provided as one source of information to assist others in the preservation of natural diversity.

This office cannot provide a letter of interpretation or a statement addressing the classification of wetlands as defined by the Freshwater Wetlands Act. Requests for such determination should be sent to the DEP Division of Coastal Resources, Bureau of Freshwater Wetlands, CN 402, Trenton, NJ 08625.

This cautions and restrictions notice must be included whenever information provided by the Natural Heritage Database is published.

ON OR IN THE IMMEDIATE VICINITY OF ASSOCIATED WATERWAYS
RARE SPECIES AND NATURAL COMMUNITIES PRESENTLY RECORDED IN
THE NEW JERSEY NATURAL HERITAGE DATABASE

NAME	COMMON NAME	FEDERAL STATUS	STATE STATUS	REGIONAL STATUS	GRANK	SRANK	DATE OBSERVED	IDENT.
*** Vascular plants								
LEMNA PERPUSILLA	MINUTE DUCKWEED				G5	SH	1935-07-14	Y

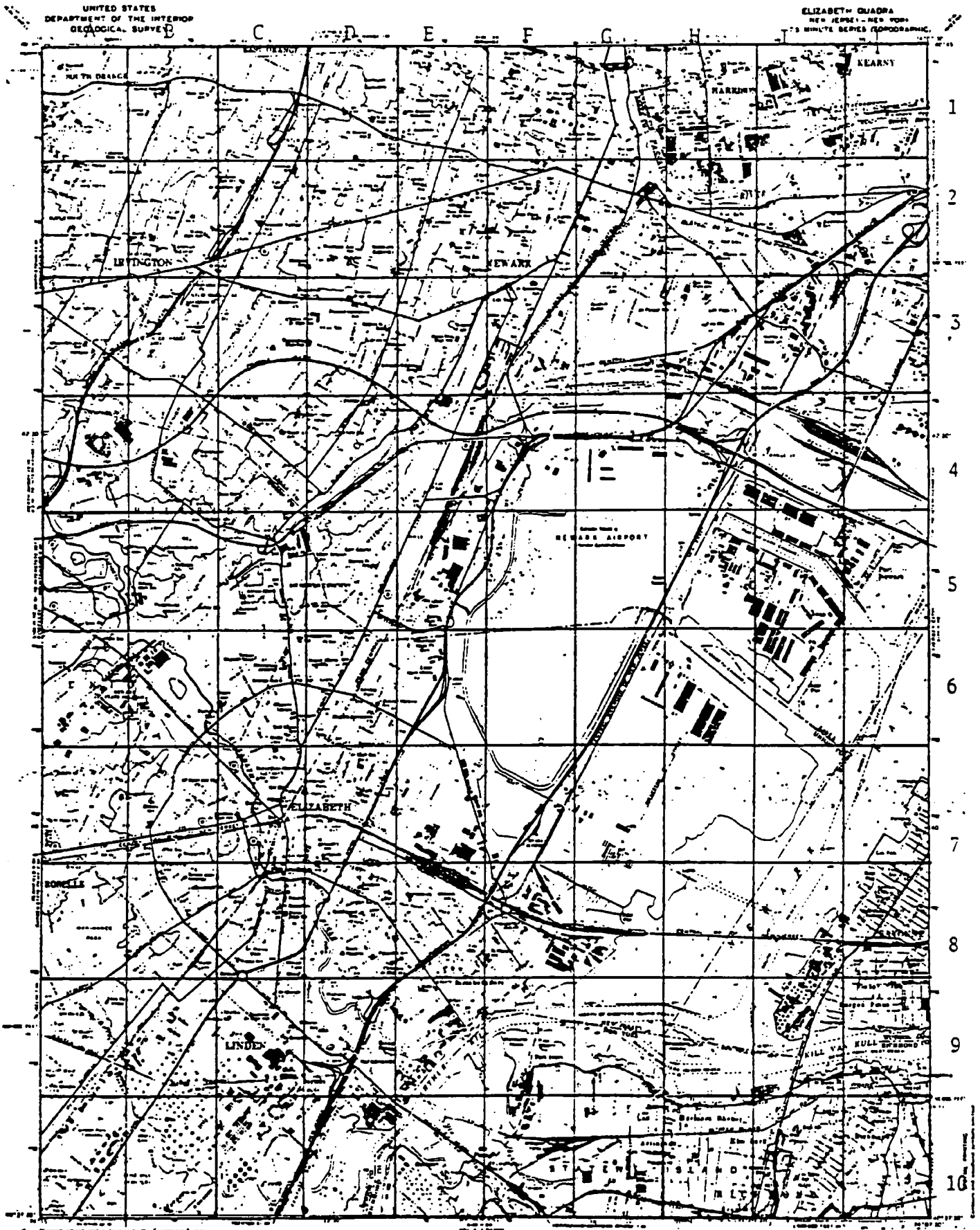
1 Records Processed

NATURAL LANDS MANAGEMENT

NATURAL HERITAGE INDEX MAPS

The Natural Heritage Database contains several thousand records of individual occurrences of endangered and threatened species and ecosystems. Many of these occurrences either have not been documented in recent years or have not had habitat boundaries delineated. Because much work remains to be done to delineate habitat boundaries and determine current status for these occurrences, Natural Heritage Index Maps were devised to red flag general areas in which the occurrences are located. The index maps are meant to be used as a tool to point to areas which may be of significance for endangered biological diversity. These maps do not depict all endangered species habitat in the State, but merely general areas which contain documented occurrences. Many additional areas may contain unidentified or poorly documented occurrences.

The maps have been produced using a computer generated grid which shades a grid cell approximately 330 acres in size if an endangered or threatened species or ecosystem has been documented anywhere within the cell. To use these maps, we suggest that you first find the location to be checked on the quad maps and then refer to the same grid location of the Natural Heritage Index Maps. The Natural Heritage Program can be contacted for additional information as specific projects are planned.


UNITED STATES
DEPARTMENT OF THE INTERIOR
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7.5 MINUTE SERIES (TOPOGRAPHIC)
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NATURAL HERITAGE DATA

GENERALIZED LOCATIONS FOR RARE & ENDANGERED ELEMENTS OF NATURAL DI' 7

DOCUMENTED LOCATION KNOWN PRECISELY

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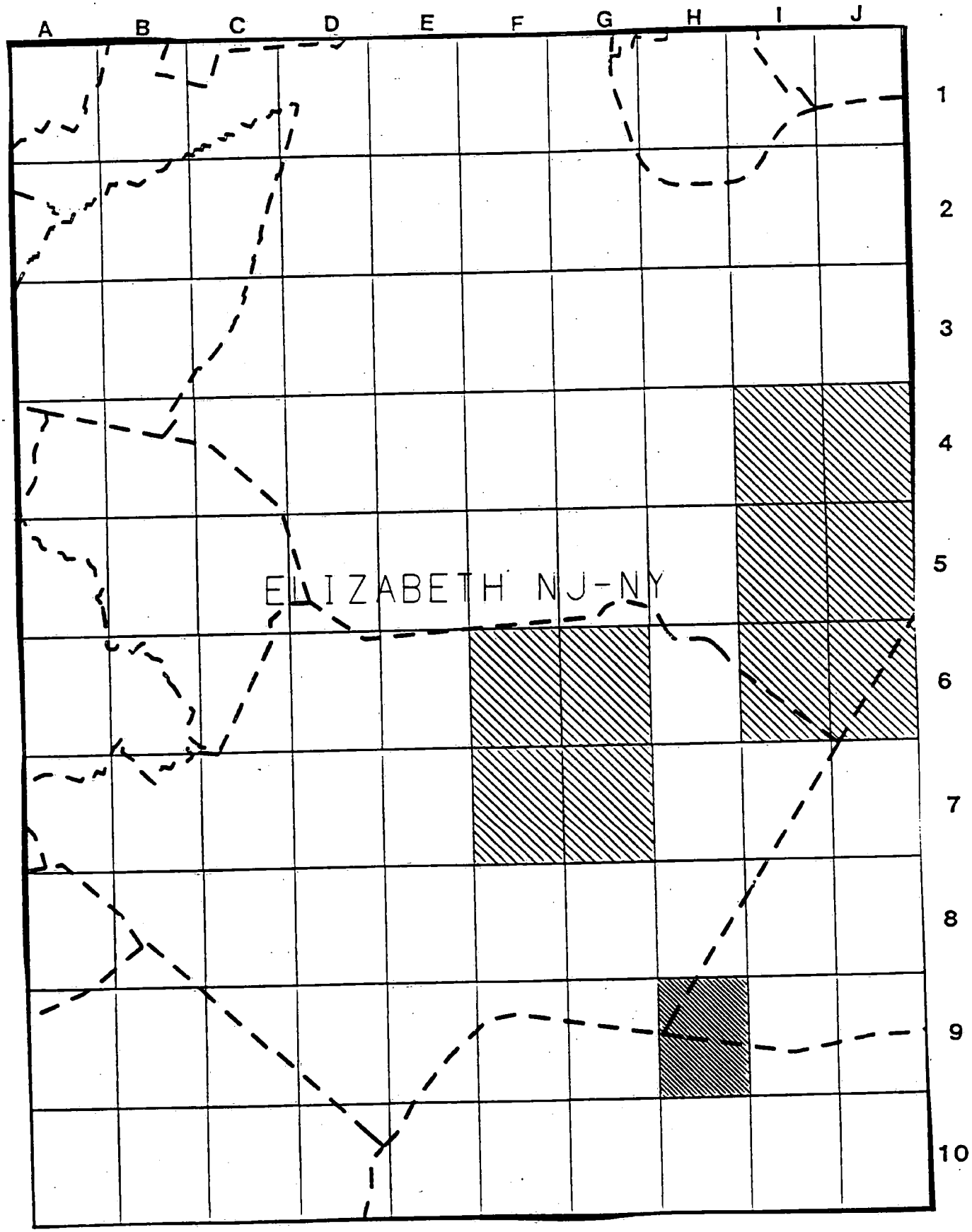

NOTE: THIS IS NOT A COMPLETE MAP OF RARE AND ENDANGERED SPECIES HABITAT FOR THIS AREA. IT REFLECTS DATA ON KNOWN OCCURRENCES COMPILED AS OF THE ABOVE DATE. IT INCLUDES BOTH HISTORICALLY AND RECENTLY DOCUMENTED OCCURRENCES. ADDITIONAL OCCURRENCES MAY BE FOUND ON UNSURVEYED HABITAT. FOR MORE INFORMATION, CONTACT THE OFFICE OF NATURAL LANDS MANAGEMENT, CN404, TRENTON NJ 08625.

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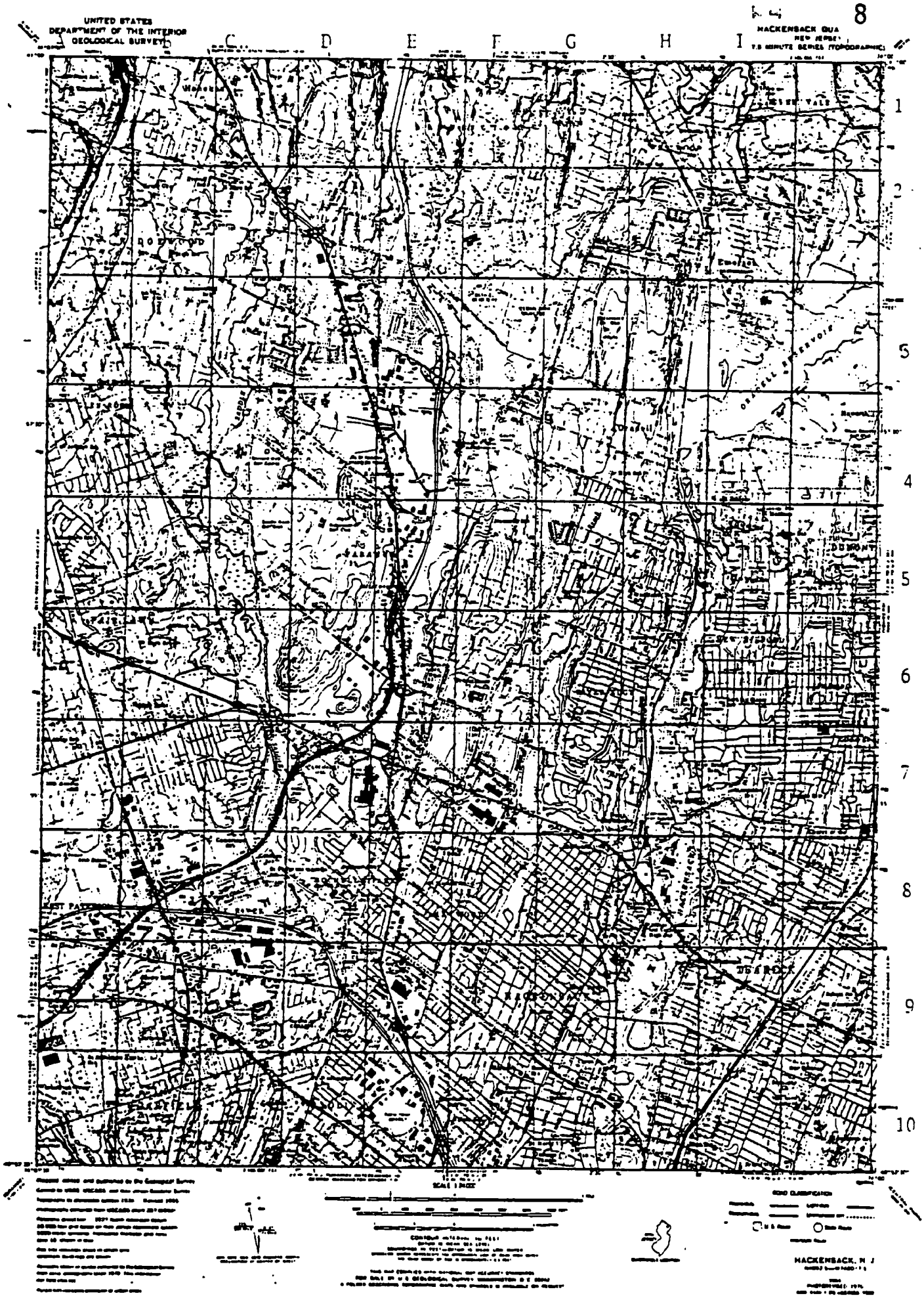
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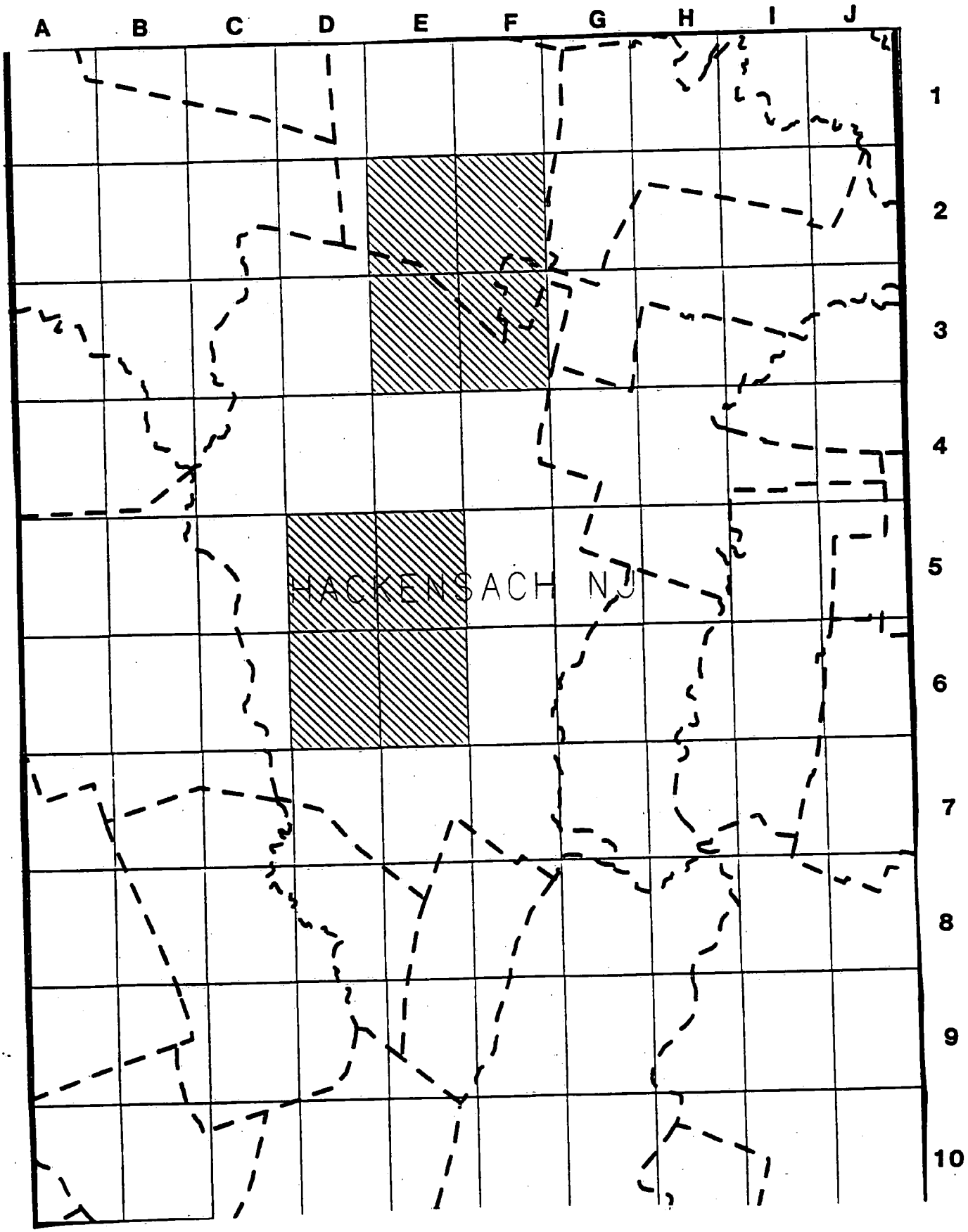

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NATURAL HERITAGE DATA

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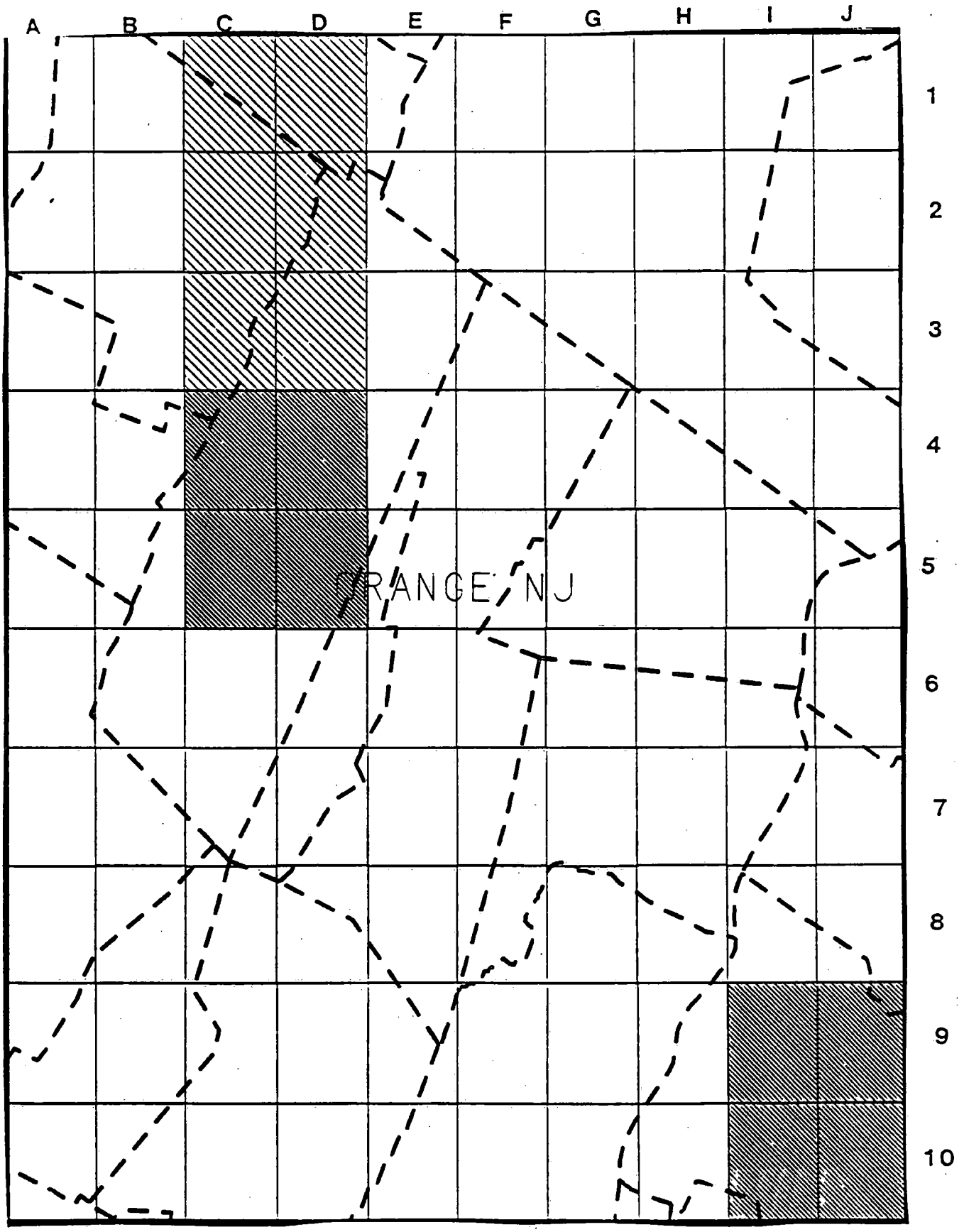

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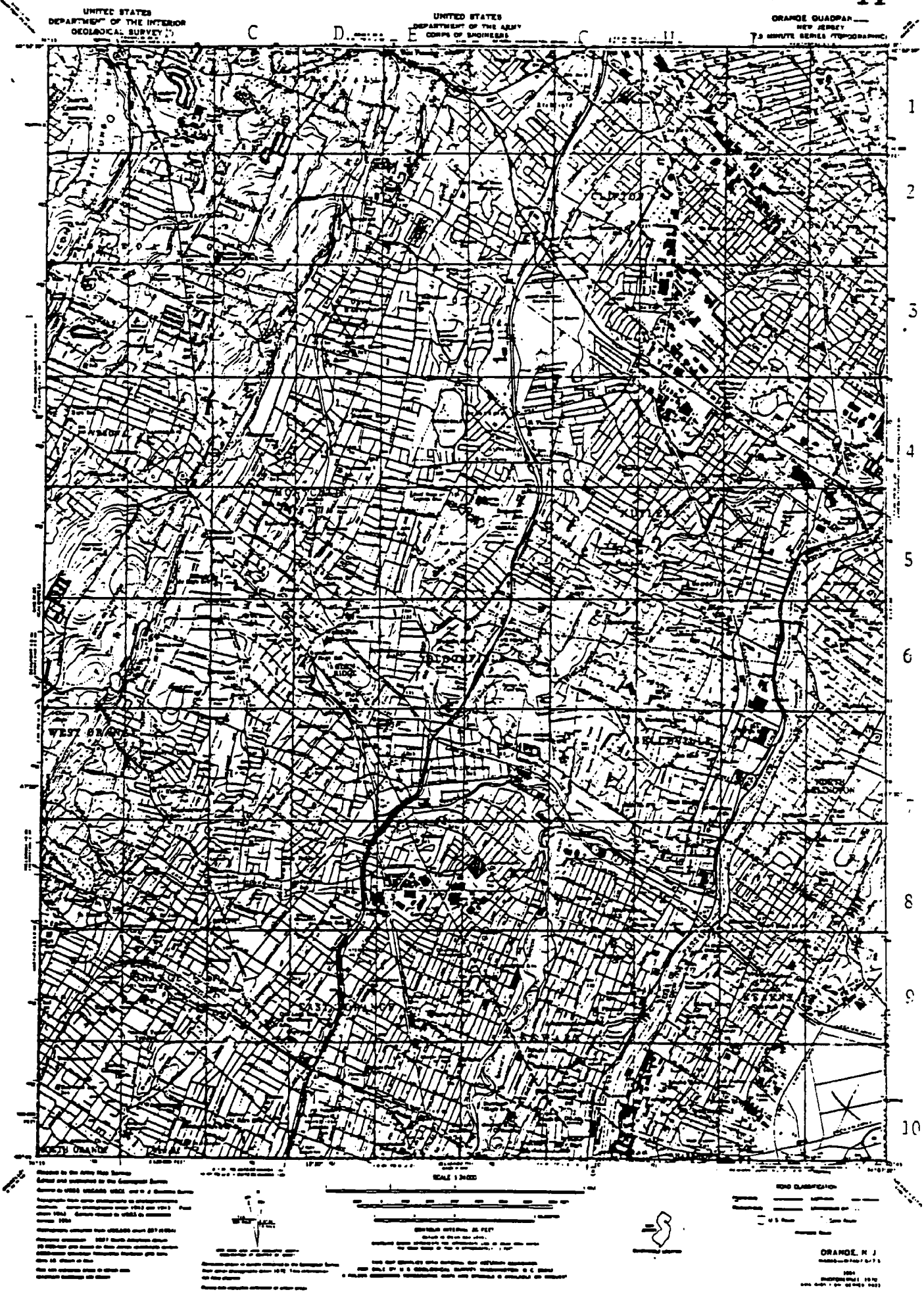
UNITED STATES
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NATURAL HERITAGE DATA

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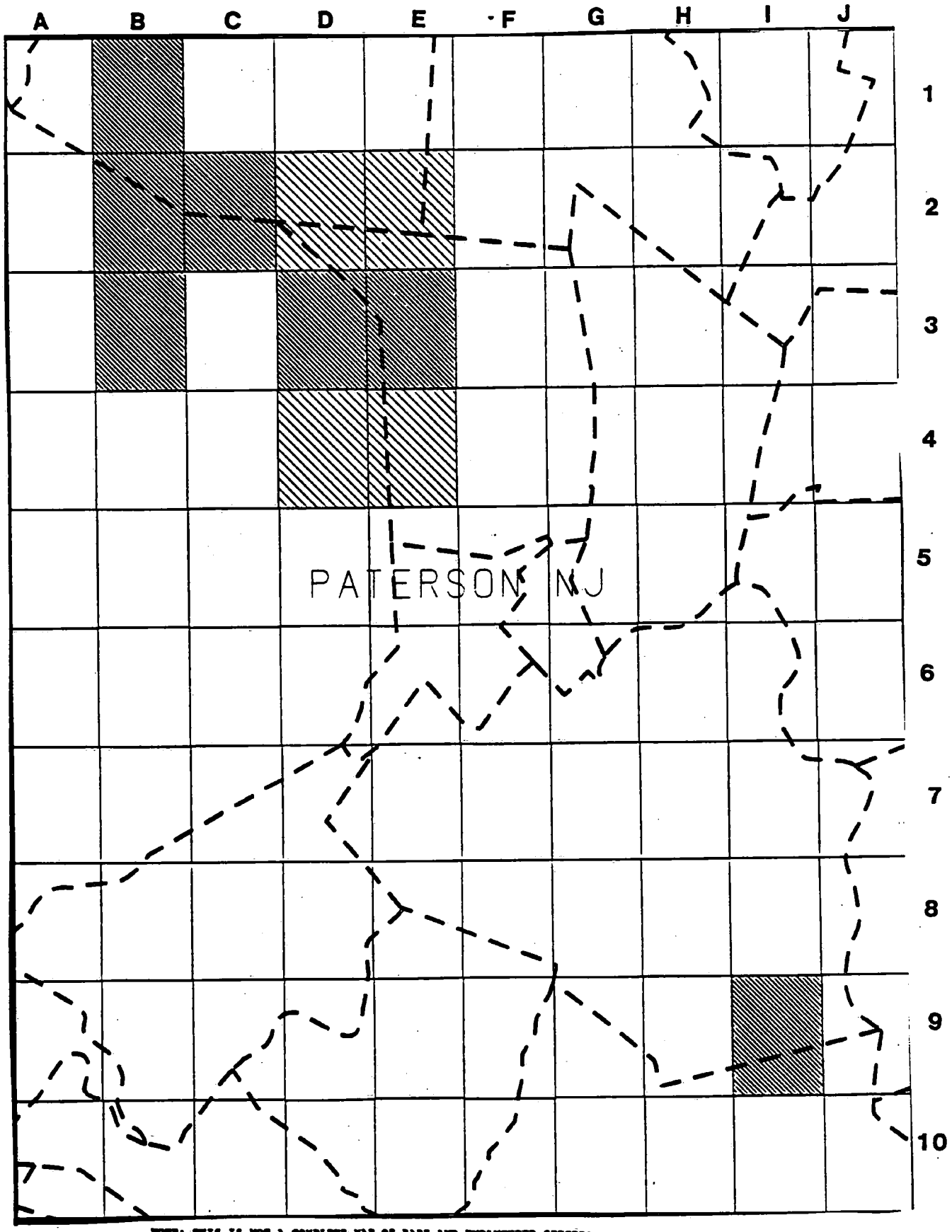

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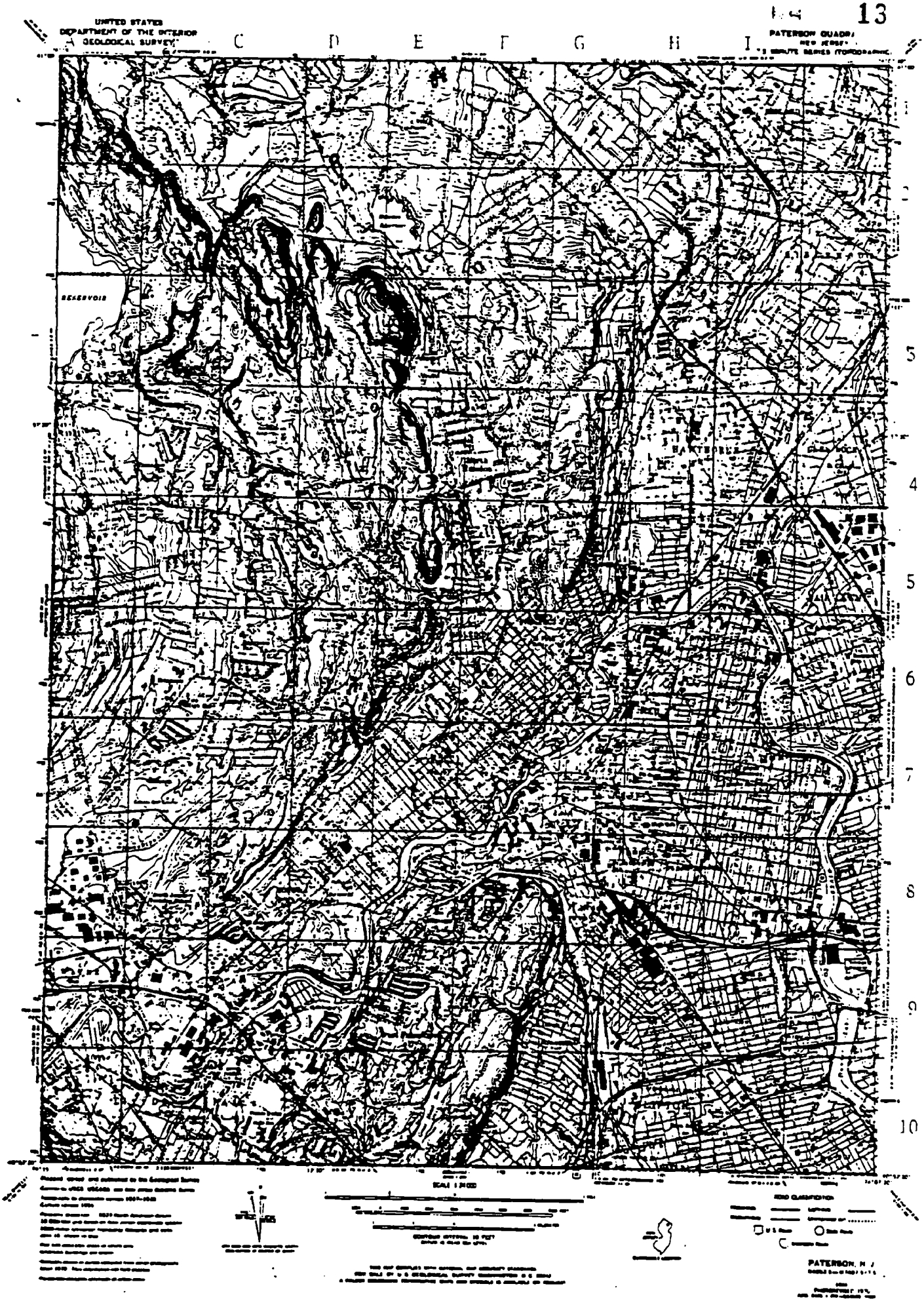
MAY 1988

UPDATED SEMIANNUALLY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NATURAL HERITAGE DATA

GENERALIZED LOCATIONS FOR RARE & ENDANGERED ELEMENTS OF NATURAL DIV 14

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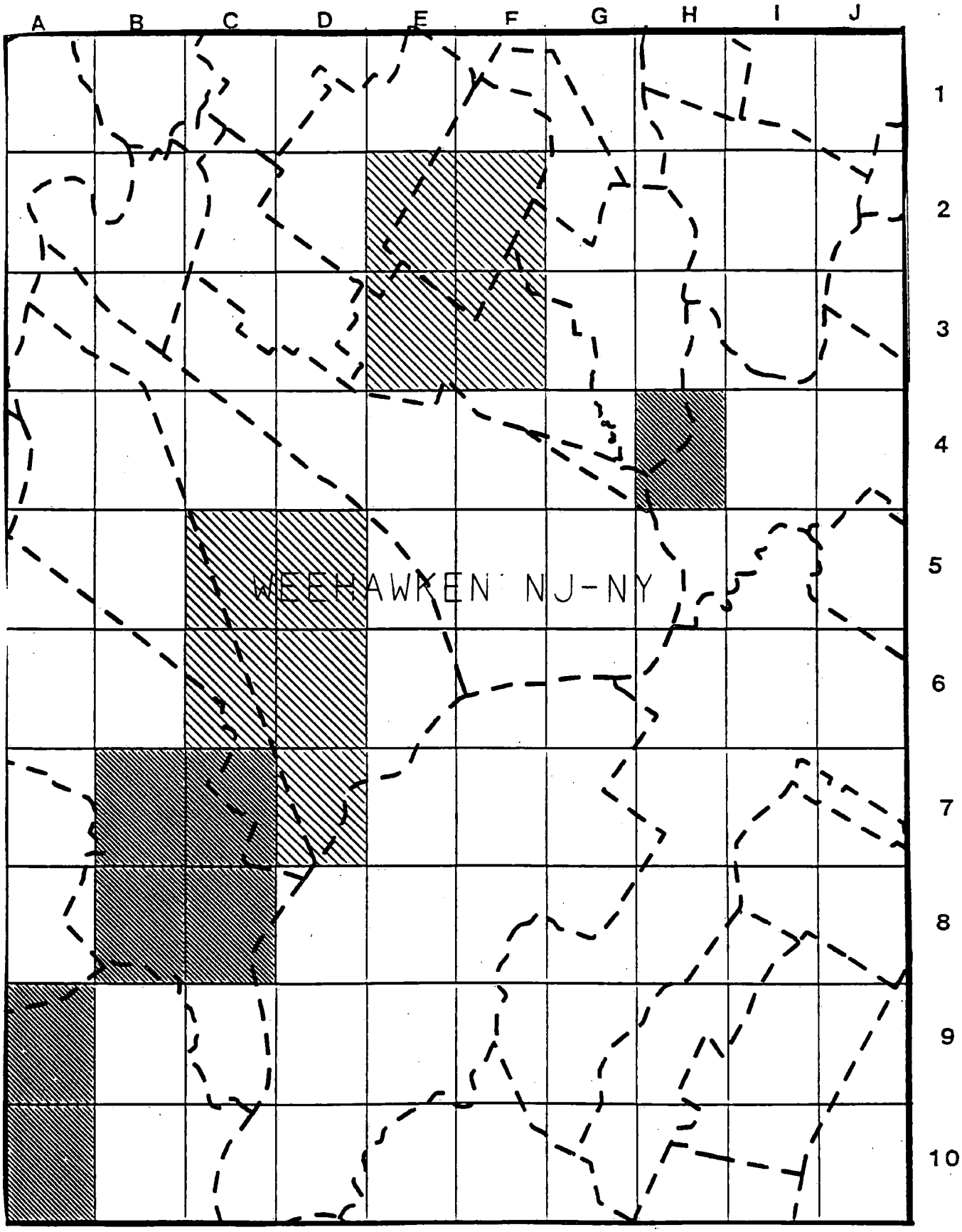

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MAY 1988

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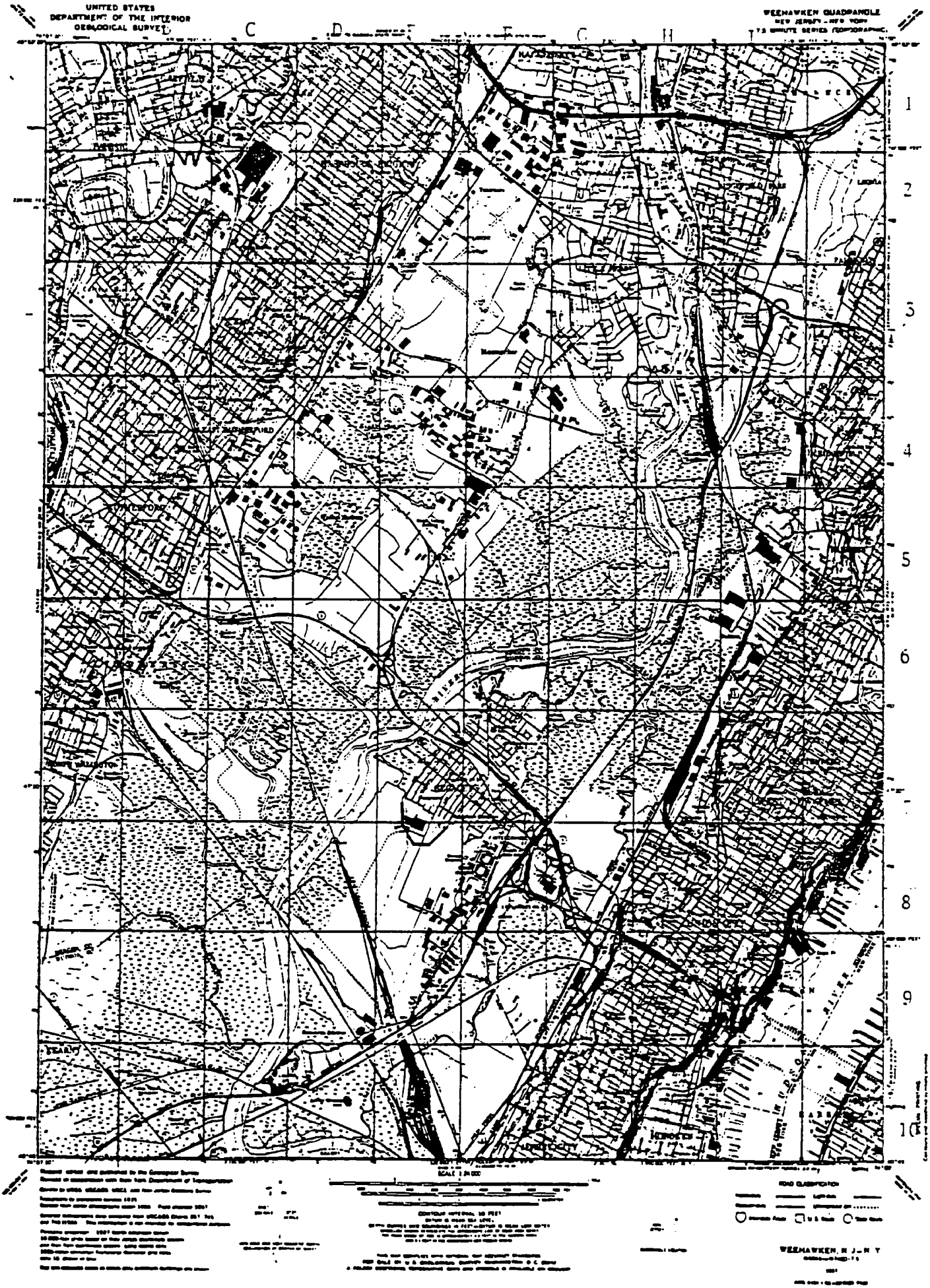
UNITED STATES
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EXPLANATIONS OF CODES USED IN NATURAL HERITAGE REPORTS

FEDERAL STATUS CODES

The following U.S. Fish and Wildlife Service categories and their definitions of endangered and threatened plants and animals have been modified from the U.S. Fish and Wildlife Service (F.R. Vol. 50 No. 188; Vol. 55, No. 35; F.R. 50 CFR 17.11 and 17.12). Federal Status codes reported for species follow the most recent listing.

LE Taxa formally listed as endangered.

LT Taxa formally listed as threatened.

PE Taxa already proposed to be formally listed as endangered.

PT Taxa already proposed to be formally listed as threatened.

C1 Taxa for which the Service currently has on file substantial information on biological vulnerability and threat(s) to support the appropriateness of proposing to list them as endangered or threatened species.

C1* Taxa which may be possibly extinct (although persuasive documentation of extinction has not been made--compare to 3A status).

C2 Taxa for which information now in possession of the Service indicates that proposing to list them as endangered or threatened species is possibly appropriate, but for which substantial data on biological vulnerability and threat(s) are not currently known or on file to support the immediate preparation of rules.

C3 Taxa that are no longer being considered for listing as threatened or endangered species. Such taxa are further coded to indicate three subcategories, depending on the reason(s) for removal from consideration.

3A Taxa for which the Service has persuasive evidence of extinction.

3B Names that, on the basis of current taxonomic understanding, do not represent taxa meeting the Act's definition of "species".

3C Taxa that have proven to be more abundant or widespread than was previously believed

and/or those that are not subject to any identifiable threat.

S/A Similarity of appearance species.

STATE STATUS CODES

Two animal lists provide state status codes after the Endangered and Nongame Species Conservation Act of 1973 (NSSA 23:2A-13 et. seq.): the list of endangered species (N.J.A.C. 7:25-4.13) and the list defining status of indigenous, nongame wildlife species of New Jersey (N.J.A.C. 7:25-4.17(a)). The status of animal species is determined by the Nongame and Endangered Species Program (ENSP). The state status codes and definitions provided reflect the most recent lists that were revised in the New Jersey Register, Monday, June 3, 1991.

D Declining species-a species which has exhibited a continued decline in population numbers over the years.

E Endangered species-an endangered species is one whose prospects for survival within the state are in immediate danger due to one or many factors - a loss of habitat, over exploitation, predation, competition, disease. An endangered species requires immediate assistance or extinction will probably follow.

EX Extirpated species-a species that formerly occurred in New Jersey, but is not now known to exist within the state.

I Introduced species-a species not native to New Jersey that could not have established itself here without the assistance of man.

INC Increasing species-a species whose population has exhibited a significant increase, beyond the normal range of its life cycle, over a long term period.

T Threatened species-a species that may become endangered if conditions surrounding the species begin to or continue to deteriorate.

P Peripheral species-a species whose occurrence in New Jersey is at the extreme edge of its present natural range.

S Stable species-a species whose population is not undergoing any long-term increase/decrease within its natural cycle.

U Undetermined species-a species about which there is not enough information available to determine the status.

Status for animals separated by a slash(/) indicate a duel status. First status refers to the state breeding population, and the second status refers to the migratory or winter population.

Plant taxa listed as endangered are from New Jersey's official Endangered Plant Species List N.J.S.A. 131B-15.151 et seq.

E Native New Jersey plant species whose survival in the State or nation is in jeopardy.

REGIONAL STATUS CODES FOR PLANTS

LP Indicates taxa listed by the Pinelands Commission as endangered or threatened within their legal jurisdiction. Not all species currently tracked by the Pinelands Commission are tracked by the Natural Heritage Program. A complete list of endangered and threatened Pineland species is included in the New Jersey Pinelands Comprehensive Management Plan.

EXPLANATION OF GLOBAL AND STATE ELEMENT RANKS

The Nature Conservancy has developed a ranking system for use in identifying elements (rare species and natural communities) of natural diversity most endangered with extinction. Each element is ranked according to its global, national, and state (or subnational in other countries) rarity. These ranks are used to prioritize conservation work so that the most endangered elements receive attention first. Definitions for element ranks are after The Nature Conservancy (1982: Chapter 4, 4.1-1 through 4.4.1.3-3).

GLOBAL ELEMENT RANKS

G1 Critically imperiled globally because of extreme rarity (5 or fewer occurrences or very few remaining individuals or acres) or because of some factor(s) making it especially vulnerable to extinction.

G2 Imperiled globally because of rarity (6 to 20 occurrences or few remaining individuals or acres) or because of some factor(s) making it very vulnerable to extinction throughout its range.

G3 Either very rare and local throughout its range or found locally (even abundantly at some of its locations) in a restricted range (e.g., a single western state, a physiographic region in the East) or because of other factors making it vulnerable to extinction throughout it's range; with the number of occurrences in the range of 21 to 100.

G4 Apparently secure globally; although it may be quite rare in parts of its range, especially at the periphery.

G5 Demonstrably secure globally; although it may be quite rare in parts of its range, especially at the periphery.

GH Of historical occurrence throughout its range i.e., formerly part of the established biota, with the expectation that it may be rediscovered.

GU Possibly in peril range-wide but status uncertain; more information needed.

GX Believed to be extinct throughout range (e.g., passenger pigeon) with virtually no likelihood that it will be rediscovered.

G? Species has not yet been ranked.

STATE ELEMENT RANKS

S1 Critically imperiled in New Jersey because of extreme rarity (5 or fewer occurrences or very few remaining individuals or acres). Elements so ranked are often restricted to very specialized conditions or habitats and/or restricted to an extremely small geographical

area of the state. Also included are elements which were formerly more abundant, but because of habitat destruction or some other critical factor of its biology, they have been demonstrably reduced in abundance. In essence, these are elements for which, even with intensive searching, sizable additional occurrences are unlikely to be discovered.

S2 Imperiled in New Jersey because of rarity (6 to 20 occurrences). Historically many of these elements may have been more frequent but are now known from very few extant occurrences, primarily because of habitat destruction. Diligent searching may yield additional occurrences.

S3 Rare in state with 21 to 100 occurrences (plant species in this category have only 21 to 50 occurrences). Includes elements which are widely distributed in the state but with small populations/acreage or elements with restricted distribution, but locally abundant. Not yet imperiled in state but may soon be if current trends continue. Searching often yields additional occurrences.

S4 Apparently secure in state, with many occurrences.

S5 Demonstrably secure in state and essentially ineradicable under present conditions.

SA Accidental in state, including species (usually birds or butterflies) recorded once or twice or only at very great intervals, hundreds or even thousands of miles outside their usual range; a few of these species may even have bred on the one or two occasions they were recorded; examples include european strays or western birds on the East Coast and visa-versa.

SE Elements that are clearly exotic in New Jersey including those taxa not native to North America (introduced taxa) or taxa deliberately or accidentally introduced into the State from other parts of North America (adventive taxa). Taxa ranked SE are not a conservation priority (viable introduced occurrences of G1 or G2 elements may be exceptions).

SH Elements of historical occurrence in New Jersey. Despite some searching of historical occurrences and/or potential habitat, no extant occurrences are known. Since not all of the historical occurrences have been field surveyed, and unsearched potential habitat remains, historically ranked taxa are considered possibly extant, and remain a conservation priority for continued field work.

SN Regularly occurring, usually migratory and typically nonbreeding species for which no significant or effective habitat conservation measures can be taken in the state; this category includes migratory birds, bats, sea turtles, and cetaceans which do not breed in the state but pass through twice a year or may remain in the winter (or, in a few cases, the summer); included also are certain lepidoptera which regularly migrate to a state where they reproduce, but then completely die out every year with no return migration. Species in this category are so widely and unreliably distributed during migration or in winter that no small set of sites could be set aside with the hope of significantly furthering their conservation. Other nonbreeding, high globally-ranked species (such as the bald eagle, whooping crane or some seal species) which regularly spend some portion of the year at definite localities (and therefore have a valid conservation need in the state) are not ranked SN but rather S1, S2, etc.

SR Elements reported from New Jersey, but without persuasive documentation which would provide a basis for either accepting or rejecting the report. In some instances documentation may exist, but as of yet, its source or location has not been determined.

SRF Elements erroneously reported from New Jersey, but this error persists in the literature.

SU Elements believed to be in peril but the degree of rarity uncertain. Also included are rare taxa of uncertain taxonomical standing. More information is needed to resolve rank.

SX Elements that have been determined or are presumed to be extirpated from New Jersey. All historical occurrences have been searched and a reasonable search of potential habitat has been completed. Extirpated taxa are not a current conservation priority.

SXC Elements presumed extirpated from New Jersey, but native populations collected from the wild exist in cultivation.

T Element ranks containing a "T" indicate that the infraspecific taxon is being ranked differently than the full species. For example *Stachys palustris* var. *homotricha* is ranked "G5T? SH" meaning the full species is globally secure but the global rarity of the var. *homotricha* has not been determined; in New Jersey the variety is ranked historic.

Q Elements containing a "Q" in the global portion of its rank indicates that the taxon is of questionable, or uncertain taxonomical standing, e.g., some authors regard it as a full species, while others treat it at the subspecific level.

.1 Elements documented from a single location.

Note: To express uncertainty, the most likely rank is assigned and a question mark added (e.g., G2?). A range is indicated by combining two ranks (e.g., G1G2, S1S3).

IDENTIFICATION CODES

These codes refer to whether the identification of the species or community has been checked by a reliable individual and is indicative of significant habitat.

Y	Identification has been verified and is indicative of significant habitat.
BLANK	Identification has not been verified but there is no reason to believe it is not indicative of significant habitat.
?	Either it has not been determined if the record is indicative of significant habitat or the identification of the species or community may be confusing or disputed.

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NEW JERSEY NATURAL HERITAGE PROGRAM
POTENTIAL THREATENED AND ENDANGERED VERTEBRATE SPECIES
IN BERGEN COUNTY

AMERICAN BITTERN — FEDERAL STATUS: — COUNTY
BOTAURUS LENTIGINOSUS — STATE STATUS: LT — OCCURRENCE: ?

HABITAT COMMENTS
Fresh water bogs, swamps, wet fields, cattail and bulrush marshes, brackish and saltwater marshes and meadows.

BALD EAGLE — FEDERAL STATUS: LELT — COUNTY
HALIAEETUS LEUCOCEPHALUS — STATE STATUS: LE — OCCURRENCE: T*

HABITAT COMMENTS
Primarily near seacoasts, rivers, and large lakes.

BARRED OWL — FEDERAL STATUS: — COUNTY
STRIX VARIA — STATE STATUS: LT — OCCURRENCE: W

HABITAT COMMENTS
Dense woodland and forest (conif. or hardwood), swamps, wooded river valleys, cabbage palm-live oak hammocks, especially where bordering streams, marshes, and meadows.

BOG TURTLE — FEDERAL STATUS: C2 — COUNTY
CLEMMYS MUHLENBERGII — STATE STATUS: LE — OCCURRENCE: Y

HABITAT COMMENTS
Slow, shallow rivulets of sphagnum bogs, swamps, and marshy meadows; sea level to 1200 m in Appalachians. Commonly basks on tussocks in morning in spring and early summer. Hibernates in subterreanean rivulet or seepage area.

BROOK TROUT — FEDERAL STATUS: — COUNTY
SALVELINUS FONTINALIS — STATE STATUS: LT — OCCURRENCE: Y

HABITAT COMMENTS
Clear cool well-oxygenated streams and lakes. May move from streams into lakes or sea to avoid high temps. in summer.

COOPER'S HAWK — FEDERAL STATUS: — COUNTY
ACCIPITER COOPERII — STATE STATUS: LE — OCCURRENCE: Y

HABITAT COMMENTS
Primarily mature forest, either broadleaf or coniferous, mostly the former; also open woodland and forest edge.

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GRASSHOPPER SPARROW
AMMODRAMUS SAVANNARUM
FEDERAL STATUS:
STATE STATUS: LT
COUNTY OCCURRENCE: B

HABITAT COMMENTS
Prairie, old fields, open grasslands, cultivated fields, savanna.

GREAT BLUE HERON
ARDEA HERODIAS
FEDERAL STATUS:
STATE STATUS: LT
COUNTY OCCURRENCE: N*

HABITAT COMMENTS
Freshwater and brackish marshes, along lakes, rivers, bays, lagoons, ocean beaches, mangroves, fields, and meadows.

LONGTAIL SALAMANDER
EURYCEA LONGICAUDA
FEDERAL STATUS:
STATE STATUS: LT
COUNTY OCCURRENCE: ?

HABITAT COMMENTS
Streamsides, spring runs, cave mouths, forested floodplains in South. May disperse into wooded terrestrial habitats in wet weather. Hides under rocks, logs, and other debris.

NORTHERN GOSHAWK
ACCIPITER GENTILIS
FEDERAL STATUS:
STATE STATUS: LT
COUNTY OCCURRENCE: W*

HABITAT COMMENTS
Deciduous and coniferous forest, forest edge and open woodland, foraging also in cultivated regions; primarily in mountains towards the south.

NORTHERN HARRIER
CIRCUS CYANEUS
FEDERAL STATUS:
STATE STATUS: LE
COUNTY OCCURRENCE: Y

HABITAT COMMENTS
Marshes, meadows, grasslands, and cultivated fields. Perches on ground or on stumps or posts.

OSPREY
PANDION HALIAETUS
FEDERAL STATUS:
STATE STATUS: LT
COUNTY OCCURRENCE: T*

HABITAT COMMENTS
Primarily along rivers, lakes, and seacoasts, occurring widely in migration, often crossing land between bodies of water.

PIED-BILLED GREBE
PODILYMBUS PODICEPS
FEDERAL STATUS:
STATE STATUS: LE
COUNTY OCCURRENCE: Y

HABITAT COMMENTS
Lakes, ponds, sluggish streams, and marshes; in migration and in winter also in brackish bays and estuaries.

5/18/87

RED-HEADED WOODPECKER
MELANERPES ERYTHROCEPHALUS
FEDERAL STATUS:
STATE STATUS: LT
COUNTY OCCURRENCE: ?

HABITAT COMMENTS
Open woodland, especially with beech or oak, open situations with scattered trees, parks, cultivated areas and gardens.

RED-SHOULDERED HAWK
BUTEO LINEATUS
FEDERAL STATUS:
STATE STATUS: LT
COUNTY OCCURRENCE: Y

HABITAT COMMENTS
Moist and riverine forest, and in e. N. Am. in wooded swamps, foraging in forest edge and open woodland.

SAVANNAH SPARROW
PASSERCULUS SANDWICHENSIS
FEDERAL STATUS:
STATE STATUS: LT
COUNTY OCCURRENCE: Y

HABITAT COMMENTS
"Open areas, especially grasslands, tundra, meadows, bogs, farmlands, grassy areas with scattered bushes, and marshes, including salt marshes in the BELDINGI and ROSTRATUS groups (Subtropical and Temperate zones)".

SEDGE WREN
CISTOTHORUS PLATENSIS
FEDERAL STATUS:
STATE STATUS: LE
COUNTY OCCURRENCE: ?

HABITAT COMMENTS
Grasslands and savanna, especially where wet or boggy, sedge marshes, locally in dry cultivated grainfields. In migration and winter also in brushy grasslands.

SHORT-EARED OWL
ASIO FLAMMEUS
FEDERAL STATUS:
STATE STATUS: LE/S
COUNTY OCCURRENCE: W*

HABITAT COMMENTS
Open country, including prairie, meadows, tundra, moorlands, marshes, savanna, dunes, fields, and open woodland. Roosts by day on ground or on low open perches.

TIMBER RATTLESNAKE
CROTALUS HORRIDUS
FEDERAL STATUS:
STATE STATUS: LE
COUNTY OCCURRENCE: Y

HABITAT COMMENTS
Wooded rocky hillsides in north; swampy areas, canebrake thickets, and floodplains in south. Near streams in late summer in some areas. Often hibernates in burrows and crevices of rock outcroppings.

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UPLAND SANDPIPER
BARTRAMIA LONGICAUDA

FEDERAL STATUS:
STATE STATUS: LE

COUNTY
OCCURRENCE: B

HABITAT COMMENTS
Grasslands, especially prairies, dry meadows, pastures, and (in Alaska) scattered woodlands at timberline; very rarely in migration along shores and mudflats.

VESPER SPARROW
POOECETES GRAMINEUS

FEDERAL STATUS:
STATE STATUS: LE

COUNTY
OCCURRENCE: Y

HABITAT COMMENTS
"Plains, prairie, dry shrublands, savanna, weedy pastures, fields, sagebrush, arid scrub and woodland clearings."

WOOD TURTLE
CLEMMYS INSCULPTA

FEDERAL STATUS:
STATE STATUS: LT

COUNTY
OCCURRENCE: Y

HABITAT COMMENTS
Vicinity of streams and rivers. In streams and in wooded areas and fields adjacent to streams in summer. In streams in spring and fall. Hibernates in banks or bottoms of streams in winter.

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NEW JERSEY NATURAL HERITAGE PROGRAM
POTENTIAL THREATENED AND ENDANGERED VERTEBRATE SPECIES
IN ESSEX COUNTY

AMERICAN BITTERN
BOTAURUS LENTIGINOSUS

FEDERAL STATUS:
STATE STATUS: LT

COUNTY
OCCURRENCE: ?

HABITAT COMMENTS
Fresh water bogs, swamps, wet fields, cattail and bulrush marshes, brackish and saltwater marshes and meadows.

BARRED OWL
STRIX VARIA

FEDERAL STATUS:
STATE STATUS: LT

COUNTY
OCCURRENCE: ?

HABITAT COMMENTS
Dense woodland and forest (conif. or hardwood), swamps, wooded river valleys, cabbage palm-live oak hammocks, especially where bordering streams, marshes, and meadows.

BLUE-SPOTTED SALAMANDER
AMBYSTOMA LATERALE

FEDERAL STATUS:
STATE STATUS: LE

COUNTY
OCCURRENCE: Y

HABITAT COMMENTS
Sometimes in overgrown pastures. Sometimes hibernates under rocks or logs near breeding pools. Often found in areas with sandy soil. Adults usually under objects or underground.

BOG TURTLE
CLEMMYS MUHLENBERGII

FEDERAL STATUS: C2
STATE STATUS: LE

COUNTY
OCCURRENCE: ?

HABITAT COMMENTS
Slow, shallow rivulets of sphagnum bogs, swamps, and marshy meadows; sea level to 1200 m in Appalachians. Commonly basks on tussocks in morning in spring and early summer. Hibernates in subterreanean rivulet or seepage area.

COOPER'S HAWK
ACCIPITER COOPERII

FEDERAL STATUS:
STATE STATUS: LE

COUNTY
OCCURRENCE: Y

HABITAT COMMENTS
Primarily mature forest, either broadleaf or coniferous, mostly the former; also open woodland and forest edge.

GREAT BLUE HERON
ARDEA HERODIAS

FEDERAL STATUS:
STATE STATUS: LT

COUNTY
OCCURRENCE: N*

HABITAT COMMENTS
Freshwater and brackish marshes, along lakes, rivers, bays, lagoons, ocean beaches, mangroves, fields, and meadows.

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LEAST TERN
STERNA ANTILLARUM

FEDERAL STATUS:
STATE STATUS: LE

COUNTY
OCCURRENCE: B

HABITAT COMMENTS
Seacoasts, beaches, bays, estuaries, lagoons, lakes, and rivers.

LONGTAIL SALAMANDER
EURYCEA LONGICAUDA

FEDERAL STATUS:
STATE STATUS: LT

COUNTY
OCCURRENCE: ?

HABITAT COMMENTS
Streamsides, spring runs, cave mouths, forested floodplains in South. May disperse into wooded terrestrial habitats in wet weather. Hides under rocks, logs, and other debris.

NORTHERN HARRIER
CIRCUS CYANEUS

FEDERAL STATUS:
STATE STATUS: LE

COUNTY
OCCURRENCE: W*

HABITAT COMMENTS
Marshes, meadows, grasslands, and cultivated fields. Perches on ground or on stumps or posts.

PIED-BILLED GREBE
PODILYMBUS PODICEPS

FEDERAL STATUS:
STATE STATUS: LE

COUNTY
OCCURRENCE: ?

HABITAT COMMENTS
Lakes, ponds, sluggish streams, and marshes; in migration and in winter also in brackish bays and estuaries.

RED-SHOULDERED HAWK
BUTEO LINEATUS

FEDERAL STATUS:
STATE STATUS: LT

COUNTY
OCCURRENCE: Y

HABITAT COMMENTS
Moist and riverine forest, and in e. N. Am. in wooded swamps, foraging in forest edge and open woodland.

SAVANNAH SPARROW
PASSERCULUS SANDWICHENSIS

FEDERAL STATUS:
STATE STATUS: LT

COUNTY
OCCURRENCE: Y

HABITAT COMMENTS
"Open areas, especially grasslands, tundra, meadows, bogs, farmlands, grassy areas with scattered bushes, and marshes, including salt marshes in the BELDINGI and ROSTRATUS groups."

SHORT-EARED OWL
ASIO FLAMMEUS

FEDERAL STATUS:
STATE STATUS: LE/S

COUNTY
OCCURRENCE: ?

HABITAT COMMENTS
Open country, including prairie, meadows, tundra, moorlands, marshes, savanna, dunes, fields, and open woodland. Roosts by day on ground or on low open perches.

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TREMBLAY'S SALAMANDER
AMBYSTOMA TREMBLAYI

FEDERAL STATUS:
STATE STATUS: LE

COUNTY
OCCURRENCE: ?

HABITAT COMMENTS
Habitat requirements similar to those exhibited by the blue-spotted salamander (AMBYSTOMA LATERALE)

UPLAND SANDPIPER
BARTRAMIA LONGICAUDA

FEDERAL STATUS:
STATE STATUS: LE

COUNTY
OCCURRENCE: B

HABITAT COMMENTS
Grasslands, especially prairies, dry meadows, pastures, and (in Alaska) scattered woodlands at timberline; very rarely in migration along shores and mudflats.

WOOD TURTLE
CLEMMYS INSCULPTA

FEDERAL STATUS:
STATE STATUS: LT

COUNTY
OCCURRENCE: Y

HABITAT COMMENTS
Vicinity of streams and rivers. In streams and in wooded areas and fields adjacent to streams in summer. In streams in spring and fall. Hibernates in banks or bottoms of streams in winter.

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NEW JERSEY NATURAL HERITAGE PROGRAM
POTENTIAL THREATENED AND ENDANGERED VERTEBRATE SPECIES
IN HUDSON COUNTY

AMERICAN BITTERN — FEDERAL STATUS: — COUNTY
BOTAURUS LENTIGINOSUS — STATE STATUS: LT — OCCURRENCE: Y

HABITAT COMMENTS
Fresh water bogs, swamps, wet fields, cattail and bulrush marshes, brackish and saltwater marshes and meadows.

BARRED OWL — FEDERAL STATUS: — COUNTY
STRIX VARIA — STATE STATUS: LT — OCCURRENCE: ?

HABITAT COMMENTS
Dense woodland and forest (conif. or hardwood), swamps, wooded river valleys, cabbage palm-live oak hammocks, especially where bordering streams, marshes, and meadows.

COOPER'S HAWK — FEDERAL STATUS: — COUNTY
ACCIPITER COOPERII — STATE STATUS: LE — OCCURRENCE: ?

HABITAT COMMENTS
Primarily mature forest, either broadleaf or coniferous, mostly the former; also open woodland and forest edge.

GREAT BLUE HERON — FEDERAL STATUS: — COUNTY
ARDEA HERODIAS — STATE STATUS: LT — OCCURRENCE: N*

HABITAT COMMENTS
Freshwater and brackish marshes, along lakes, rivers, bays, lagoons, ocean beaches, mangroves, fields, and meadows.

LEAST TERN — FEDERAL STATUS: — COUNTY
STERNA ANTILLARUM — STATE STATUS: LE — OCCURRENCE: B

HABITAT COMMENTS
Seacoasts, beaches, bays, estuaries, lagoons, lakes, and rivers.

NORTHERN HARRIER — FEDERAL STATUS: — COUNTY
CIRCUS CYANEUS — STATE STATUS: LE — OCCURRENCE: W*

HABITAT COMMENTS
Marshes, meadows, grasslands, and cultivated fields. Perches on ground or on stumps or posts.

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PIED-BILLED GREBE
PODILYMBUS PODICEPS

FEDERAL STATUS:
STATE STATUS: LE

COUNTY
OCCURRENCE: Y

HABITAT COMMENTS
Lakes, ponds, sluggish streams, and marshes; in migration and in winter also in brackish bays and estuaries.

RED-SHOULDERED HAWK
BUTEO LINEATUS

FEDERAL STATUS:
STATE STATUS: LT

COUNTY
OCCURRENCE: ?

HABITAT COMMENTS
Moist and riverine forest, and in e. N. Am. in wooded swamps, foraging in forest edge and open woodland.

SAVANNAH SPARROW
PASSERCULUS SANDWICHENSIS

FEDERAL STATUS:
STATE STATUS: LT

COUNTY
OCCURRENCE: W*

HABITAT COMMENTS
"Open areas, especially grasslands, tundra, meadows, bogs, farmlands, grassy areas with scattered bushes, and marshes, including salt marshes in the BELDINGI and ROSTRATUS groups (Subtropical and Temperate zones)".

SHORT-EARED OWL
ASIO FLAMMEUS

FEDERAL STATUS:
STATE STATUS: LE/S

COUNTY
OCCURRENCE: ?

HABITAT COMMENTS
Open country, including prairie, meadows, tundra, moorlands, marshes, savanna, dunes, fields, and open woodland. Roosts by day on ground or on low open perches.

YELLOW-CROWNED NIGHT-HERON
NYCTICORAX VIOLACEUS

FEDERAL STATUS:
STATE STATUS: LT

COUNTY
OCCURRENCE: ?

HABITAT COMMENTS
Marshes, swamps, lakes, lagoons, and mangroves.

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NEW JERSEY NATURAL HERITAGE PROGRAM
POTENTIAL THREATENED AND ENDANGERED VERTEBRATE SPECIES
IN PASSIAC COUNTY

AMERICAN BITTERN — FEDERAL STATUS: — COUNTY
BOTAURUS LENTIGINOSUS — STATE STATUS: LT — OCCURRENCE: ?

HABITAT COMMENTS
Fresh water bogs, swamps, wet fields, cattail and bulrush marshes, brackish and saltwater marshes and meadows.

BALD EAGLE — FEDERAL STATUS: LELT — COUNTY
HALIAEETUS LEUCOCEPHALUS — STATE STATUS: LE — OCCURRENCE: T*

HABITAT COMMENTS
Primarily near seacoasts, rivers, and large lakes.

BARRED OWL — FEDERAL STATUS: — COUNTY
STRIX VARIA — STATE STATUS: LT — OCCURRENCE: Y

HABITAT COMMENTS
Dense woodland and forest (conif. or hardwood), swamps, wooded river valleys, cabbage palm-live oak hammocks, especially where bordering streams, marshes, and meadows.

BOBOLINK — FEDERAL STATUS: — COUNTY
DOLICHONYX ORYZIVORUS — STATE STATUS: LT — OCCURRENCE: ?

HABITAT COMMENTS
Tall grass areas, flooded meadows, prairie, deep cultivated grains, alfalfa and clover fields. In migration and winter also in rice fields, marshes, and open woody areas.

BOG TURTLE — FEDERAL STATUS: C2 — COUNTY
CLEMMYS MUHLENBERGII — STATE STATUS: LE — OCCURRENCE: Y

HABITAT COMMENTS
Slow, shallow rivulets of sphagnum bogs, swamps, and marshy meadows; sea level to 1200 m in Appalachians. Commonly basks on tussocks in morning in spring and early summer. Hibernates in subterreanean rivulet or seepage area.

BROOK TROUT — FEDERAL STATUS: — COUNTY
SALVELINUS FONTINALIS — STATE STATUS: LT — OCCURRENCE: Y

HABITAT COMMENTS
Clear cool well-oxygenated streams and lakes. May move from streams into lakes or sea to avoid high temps. in summer.

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COOPER'S HAWK
ACCIPITER COOPERII
FEDERAL STATUS:
STATE STATUS: LE
COUNTY OCCURRENCE: Y

HABITAT COMMENTS
Primarily mature forest, either broadleaf or coniferous, mostly the former; also open woodland and forest edge.

GREAT BLUE HERON
ARDEA HERODIAS
FEDERAL STATUS:
STATE STATUS: LT
COUNTY OCCURRENCE: N*

HABITAT COMMENTS
Freshwater and brackish marshes, along lakes, rivers, bays, lagoons, ocean beaches, mangroves, fields, and meadows.

LONGTAIL SALAMANDER
EURYCEA LONGICAUDA
FEDERAL STATUS:
STATE STATUS: LT
COUNTY OCCURRENCE: Y

HABITAT COMMENTS
Streamsides, spring runs, cave mouths, forested floodplains in South. May disperse into wooded terrestrial habitats in wet weather. Hides under rocks, logs, and other debris.

NORTHERN GOSHAWK
ACCIPITER GENTILIS
FEDERAL STATUS:
STATE STATUS: LT
COUNTY OCCURRENCE: Y

HABITAT COMMENTS
Deciduous and coniferous forest, forest edge and open woodland, foraging also in cultivated regions; primarily in mountains towards the south.

OSPREY
PANDION HALIAETUS
FEDERAL STATUS:
STATE STATUS: LT
COUNTY OCCURRENCE: T*

HABITAT COMMENTS
Primarily along rivers, lakes, and seacoasts, occurring widely in migration, often crossing land between bodies of water.

PIED-BILLED GREBE
PODILYMBUS PODICEPS
FEDERAL STATUS:
STATE STATUS: LE
COUNTY OCCURRENCE: ?

HABITAT COMMENTS
Lakes, ponds, sluggish streams, and marshes; in migration and in winter also in brackish bays and estuaries.

RED-HEADED WOODPECKER
MELANERPES ERYTHROCEPHALUS
FEDERAL STATUS:
STATE STATUS: LT
COUNTY OCCURRENCE: ?

HABITAT COMMENTS
Open woodland, especially with beech or oak, open situations with scattered trees, parks, cultivated areas and gardens.

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RED-SHOULDERED HAWK
BUTEO LINEATUS

FEDERAL STATUS:
STATE STATUS: LT

COUNTY
OCCURRENCE: Y

HABITAT COMMENTS
Moist and riverine forest, and in e. N. Am. in wooded swamps, foraging in forest edge and open woodland.

TIMBER RATTLESNAKE
CROTALUS HORRIDUS

FEDERAL STATUS:
STATE STATUS: LE

COUNTY
OCCURRENCE: Y

HABITAT COMMENTS
Wooded rocky hillsides in north; swampy areas, canebrake thickets, and floodplains in south. Near streams in late summer in some areas. Often hibernates in burrows and crevices of rock outcroppings.

WOOD TURTLE
CLEMMYS INSCULPTA

FEDERAL STATUS:
STATE STATUS: LT

COUNTY
OCCURRENCE: Y

HABITAT COMMENTS
Vicinity of streams and rivers. In streams and in wooded areas and fields adjacent to streams in summer. In streams in spring and fall. Hibernates in banks or bottoms of streams in winter.

DEFINITION OF ACRONYMS

FEDERAL STATUS

LE=listed endangered.
LT=listed threatened.
PE=proposed endangered.
PT=proposed threatened.
C2=candidate for listing.

STATE STATUS

LE=listed as endangered. (short-eared owl winter pop. listed as stable:S)
LT=listed as threatened.

COUNTY OCCURRENCE

Y=present year-round, breeds.
N=present year-round, not recorded breeding.
B=present during the summer, breeds.
W=present during the winter.
T=present as a transient.
?=present status undetermined.
*=indicates that the county is within the species known breeding range.

REFERENCE 24

1

United States Department of the Interior

FISH AND WILDLIFE SERVICE

Fish and Wildlife Enhancement
927 North Main Street (Bldg. D1)
Pleasantville, New Jersey 08232

Tel: 609-646-9310
FAX: 609-646-0352

IN REPLY REFER TO:
ES-92/271

RECEIVED JUL 20 1992

July 7, 1992

Polly J. Armour
Wehran Engineering Corporation
666 East Main Street
P.O. Box 2006
Middletown, New York 10940

Dear Ms. Armour:

This responds to your June 10, 1992, request to the U.S. Fish and Wildlife Service (Service) for information on endangered and threatened species, and other natural resources, for five potential hazardous waste sites located in Passaic County, New Jersey (Sites A-E). The sites you identified are as follows: Site A is the Howe-Richardson Scale Company site in Clifton; Site B is the Ridge Printing Company Site in Ridgefield; Site C is the Union Ink Company / Standard Coating Corporation Site in Ridgefield; Site D is the Onieda Packaging Products Company Site in Clifton; and, Site E is the Continental Can Company Site in Paterson. The study area for each site includes a 15-mile-long route downstream of the site. The Service can provide you with information concerning federally listed and proposed threatened and endangered species, and wetlands within the project areas. Other federal and State agencies must be contacted for the information that you requested on other natural resources.

This response is provided pursuant to the Endangered Species Act of 1973 (87 Stat. 884, as amended; 16 U.S.C. 1531 et seq.) to ensure the protection of endangered and threatened species and is intended to assist your assessments, investigations, and planning being conducted pursuant to Section 104(a) of the Comprehensive Environmental Response, Compensation and Liability Act (P.L. 96-510 94 Stat. 2767) as amended by the Superfund Amendments and Reauthorization Act (42 U.S.C. 9601 et seq.). These comments do not represent any position the U.S. Department of the Interior may adopt concerning possible injury to natural resources under the Department's trusteeship.

<u>Listed Species</u>

Enclosed are current summaries of federally listed and candidate species in New Jersey for your information. The Hackensack Meadowlands is adjacent to sites B and C. This large wetland complex provides feeding habitat for the

endangered peregrine falcon (*Falco peregrinus*), which nests on bridge structures in the New York / New Jersey metropolitan area. Peregrines may travel extensive distances in search of food, and tend to utilize marshes and riparian habitats for hunting, as these areas attract shorebird and passerine prey. If project activities directly or indirectly affect the Hackensack Meadowlands, please contact this office for further consultation pursuant to Section 7 of the Endangered Species Act. In addition to the peregrine falcon, transient appearances of the endangered bald eagle (*Haliaeetus leucocephalus*) may be expected at all of the project sites. No other federally listed or proposed threatened or endangered flora or fauna are expected to occur within the study areas.

Candidate Species

Candidate species are species under consideration by the Service for possible inclusion on the List of Endangered and Threatened Wildlife and Plants. Although candidate species receive no substantive or procedural protection under the Endangered Species Act, the Service encourages federal agencies and other planners to consider candidate species in the project planning process. More information on candidate species may be obtained from The New Jersey Natural Heritage Program (NHP). The NHP provides the most up-to-date information on candidate species in the State, as well as maintaining information on State listed species, and may be contacted at the following address:

Mr. Thomas Breden
Natural Heritage Program
Division of Parks and Forestry
CN 404
Trenton, New Jersey 08625
(609/984-0097)

Should the NHP data search reveal the presence of any candidate species in the project areas, the Service must be contacted to ensure that these species are not adversely affected by project activities.

Further information on State listed wildlife species may be obtained from the following office:

Ms. JoAnn Frier-Murza
Endangered and Nongame Species Program
Division of Fish, Game and Wildlife
CN 400
Trenton, New Jersey 08625
(609/292-9101)

Wetlands

According to the Service's National Wetlands Inventory map (Weehawkin quadrangle), there are wetlands contiguous to the downstream receiving streams of sites B and C. Wetlands provide habitat for a variety of migratory and resident species of fish and wildlife. Thus, the Service discourages activities in and affecting the Nation's wetlands that would unnecessarily damage, degrade, or destroy the values associated with them.

Information contained in this letter and additional information obtained from the aforementioned sources represents the public interest for fish and wildlife resources and should warrant full consideration in the project planning process. The Service requests that no part of this letter be taken out of context and if reproduced, the letter should appear in its entirety.

Please contact Dana Peters of my staff if you have any questions or require further assistance regarding threatened or endangered species.

Sincerely,

for Clifford G. Day
Supervisor

Enclosures

Revised 5/92

FEDERALLY LISTED ENDANGERED AND THREATENED SPECIES IN NEW JERSEY

An **ENDANGERED SPECIES** is any species that is in danger of extinction throughout all or a significant portion of its range.

A **THREATENED SPECIES** is any species that is likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range.

FISHES

Sturgeon, shortnose*	Acipenser brevirostrum	E

REPTILES

Turtle, Atl. Ridley*	Lepidochelys kempii	E
Turtle, green*	Chelonia mydas	T
Turtle, hawksbill*	Eretmochelys imbricata	E
Turtle, leatherback*	Dermochelys coriacea	E
Turtle, loggerhead*	Caretta caretta	T

BIRDS

Eagle, bald	Haliaeetus leucocephalus	E
Falcon, Am. peregrine	Falco peregrinus anatum	E
Falcon, Arctic peregrine	Falco peregrinus tundrius	T
Plover, piping	Charadrius melodus	T
Tern, roseate	Sterna dougallii dougallii	E

MAMMALS

Bat, Indiana	Myotis sodalis	E+
Cougar, eastern	Felis concolor couguar	E+
Whale, blue*	Balaenoptera musculus	E
Whale, finback*	Balaenoptera physalus	E
Whale, humpback*	Megaptera novaeangliae	E
Whale, right*	Balaena glacialis	E
Whale, sei*	Balaenoptera borealis	E
Whale, sperm*	Physeter catodon	E

INVERTEBRATES

Dwarf wedge mussel	Alasmidonta heterodon	E+
Beetle, northeastern beach tiger	Cicindela dorsalis dorsalis	T+
Butterfly, Mitchell satyr	Neonympha m. mitchellii	E+
American burying beetle	Nicrophorus americanus	E+

PLANTS

Pogonia, small whorled	Isotria medeoloides	E
Swamp pink	Helonias bullata	T
Orchid, eastern prairie fringed	Platanthera leucophaea	T+
Knieskern's beaked rush	Rhynchospora knieskernii	T
American chaffseed	Schwalbea americana	PE
Joint-vetch, sensitive	Aeschynomene virginica	PT

STATUS:

E: endangered species
T: threatened species
+: presumed extirpated
PE: proposed endangered
PT: proposed threatened

* Except for sea turtle nesting habitat, principal responsibility for these species is vested with the National Marine Fisheries Service.

Note: for a complete listing of Endangered and Threatened Wildlife and Plants refer to 50 CFR 17.11 and 17.12, July 15, 1991)

revised 5/92

CANDIDATE SPECIES IN NEW JERSEY

CANDIDATE SPECIES in categories 1 and 2 are species that appear to warrant consideration for addition to the List of Endangered and Threatened Wildlife and Plants. Although these species receive no substantive or procedural protection under the Endangered Species Act, the Service encourages federal agencies and other planners to give consideration to these species in the environmental planning process.

VERTEBRATES

		Category
Turtle, bog	Clemmys muhlenbergii	2
Terrapin, northern diamondback	Malaclemys terrapin terrapin	2
Snake, northern pine	Pituophis melanoleucus melanoleucus	2
Duck, harlequin	Histrionicus histrionicus	2
Rail, Black	Laterallus jamaicensis	2
Shrike, migrant loggerhead	Lanius ludovicianus migrans	2
Warbler, cerulean	Dendroica cerulea	2
Bat, eastern small-footed	Myotis subulatus leibii	2
Rabbit, New England cottontail	Sylvilagus transitionalis	2
Shrew, long-tailed	Sorex dispar	3C
Shrew, Tuckahoe masked	Sorex cinereus nigriculus	2
Woodrat, eastern	Neotoma floridana magister	2

INVERTEBRATES

Beetle, cobblestone tiger	Cicindela marginipennis	2
Butterfly, regal fritillary	Speyeria idalia	2*
Butterfly, tawny crescent	Phyciodes batesi	2
Dragonfly, banded bog skimmer	Williamsonia lintneri	2
Dragonfly, extra-striped snaketail	Ophiogomphus anomalus	2*
Moth, Albarufan dagger	Acronicta albarufa	2
Moth, Bucholz' dart	Agrotis bucholzi	2
Moth, Daecke's pyralid	Crambus daeckeellus	2
Moth, Hebard's noctuid	Erythroecia hebardi	2
Moth, Lemmer's pinnion	Lithophane lemmeri	3C
Moth, precious underwing	Catocala pretiosa	2
Moth, Carter's noctuid	Spartiniphaga carterae	2
Moth, annointed sallow noctuid	Pyreferra ceromatica	2*
Skipper, Eastern beardgrass	Atrytone arogos arogos	2
Skipper, grizzled	Pyrgus wyandot	2*
Mussel, brook floater	Alasmidonta varicosa	2
Mussel, green floater	Lasmigona subviridis	2
Mussel, yellow lamp	Lampsilis cariosa	2

PLANTS

Blazingstar	Liatris borealis	2
Bog asphodel	Narthecium americanum	1
Boneset, Pine Barrens	Eupatorium resinosum	2
Bulrush, Long's	Scirpus longii	2
Butternut	Juglans cinerea	2
Chaffseed	Schwalbea americana	PE
Joint-vetch, sensitive	Aeschynomene virginica	PT
Lobelia, Boykin's	Lobelia boykinii	2
Meadowbeauty, awned	Rhexia aristosa	2
Micranthemum, Nuttall's	Micranthemum micranthemoides	1*
Morning-glory, Pickering's	Stylisma pickeringii var. pickeringii	2
Panic grass, Hirst's	Panicum hirstii	2
Pigweed, sea-beach	Amaranthus pumilus	2
Pondweed	Potamogeton confervoides	2
Rush, New Jersey	Juncus caesariensis	2
Sedge, variable	Carex polymorpha	2
Spring beauty	Claytonia sp.	2
Spurge, Darlington's	Euphorbia purpurea	2
Tick-trefoil, ground-spreading	Desmodium humifusum	2
Verbena	Verbena riparia	2?

STATUS:

1: Taxa for which the Service currently has substantial information to support the appropriateness of proposing to list the species as threatened or endangered. Development and publication of proposed rules on these species is anticipated.

2: Taxa for which information now in possession of the Service indicates that proposing to list the species as threatened or endangered is possibly appropriate, but for which conclusive data are not available to support proposed rules at this time.

3C: Taxa that have proven to be more abundant than previously believed and/or those that are not subject to any identifialbe threat. If further research or changes in habitat indicate a signficant decline in any of these taza, they may be reevaluated for possible inclusion in categories 1 or 2.

PE: Proposed Endangered species

PT: Proposed Threatened species

* indicates those species for which there have been no authenticated records in New Jersey since 1963; some of these are possibly extinct, but further research is needed to determine their status with any confidence.

? indicates those species for which occurrence in New Jersey is questionable.

Note: for complete listings of taxa under review, refer to Federal Register Vol. 56, No. 225, Nov. 21, 1991 (Animal) and Vol. 55., No. 35, February 21, 1990 (Plants).

REFERENCE 25

Ref 25 p1

TELEPHONE CONVERSATION MEMORANDUM

CLIENT Ebasco/USEPA

PROJ. No.

PROJECT ARCS II EPI/PFS

DATE 8/13/92

TIME 08:50

CALL TO/FROM Bob Reiser

REPRESENTING USGS

PHONE No. 609-771-3900

SUMMARY OF CONVERSATION:

Mean Annual flows of NJ Rivers/streams:

Passaic River at Garfield 1200 cfs (est)

Weasel Brook 5.9 cfs

Bellman's Creek 3.2 cfs (est)

Wolf Creek 1.6 cfs

Hackensack River at vicinity of Bellman's Cr
140 cfs (est).

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Union Inc

BY: P. Armour

WEHRAN ENGINEERING
CONSULTING ENGINEERS

REFERENCE 26

A Statistical Abstract Supplement

Ref 26 p1

County and City Data Book

1988

States

Counties

Cities of 25,000 or More

Places of 2,500 or More

U.S. Department of Commerce

C. William Verity, Secretary
Donna C. Tuttle, Deputy Secretary
Robert Ortner, Under Secretary for Economic Affairs

BUREAU OF THE CENSUS
John G. Keane, Director

Ref 26 pR

BUREAU OF THE CENSUS

John G. Keane, Director
C.L. Kincannon, Deputy Director
Roland H. Moore, Associate Director for Field Operations

DATA USER SERVICES DIVISION
Gerard C. Iannelli, Chief

ACKNOWLEDGMENTS

This volume was prepared under the general direction of **Marie Argana**, Assistant Division Chief, and under the general supervision of **Glenn W. King**, Chief, Statistical Compendia Staff. **David C. Shaw** was responsible for coordination of procedures, compilation, computer systems design, and technical supervision, assisted by **Wanda K. Cevis**. Subject development and analytical review was provided by **Lars B. Johanson**, **Edward C. Jagers**, and **Rosemary E. Clark**. **Kathleen A. Siemer** was responsible for computer operations, assisted by **Mary Grace Lynch**. **Ellen M. Ewell** provided publications planning and layout. **Deloris W. Byers** was responsible for text preparation. Statistical assistance was provided by **Cheryl L. Slacum** and clerical support was provided by **Elsie F. Kesterson** and **Mary K. Cator**.

The staff of Publications Services Division, **Walter C. Odom**, Chief, performed publication planning, design, composition, editorial review, and printing planning and procurement. **Nelsa Brown** provided publication coordination and editing. **Ernest A. Schwartz** provided design and graphics services.

May 1988

Library of Congress Card No. 52-4576

SUGGESTED CITATION

U.S. Bureau of the Census, *County and City Data Book, 1988*
U.S.Government Printing Office: 1988

For sale by the Superintendent of Documents, U.S. Government Printing Office, Washington, DC 20402, Tel. (202) 783-3238, or any U.S. Department of Commerce district office.

Ref 26 R3

County	Population characteristics—Con.												Households					
	1984—Con.									1980			1985			1980		
	Percent—									Percent—							Percent—	
	Under 5 years	5 to 14 years	15 to 24 years	25 to 34 years	35 to 44 years	45 to 54 years	55 to 64 years	65 to 74 years	75 years and over	American Indian, Eskimo, and Aleut	Asian and Pacific Islander	Hispanic[1]	Number	Percent change, 1980-1985	Persons per household	Number	Female family householder[2]	One-person[3]
	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
NEVADA—Con.																		
Lincoln	S	S	S	S	S	S	S	S	S	1.74	.64	7.53	1 200	-8.2	2.91	1 270	6.3	24.9
Lyon	S	S	S	S	S	S	S	S	S	3.87	.51	4.91	6 400	27.3	2.57	5 039	6.6	19.9
Mineral	S	S	S	S	S	S	S	S	S	10.37	.92	8.09	2 300	2.8	2.52	2 271	10.5	26.3
Nye	S	S	S	S	S	S	S	S	S	3.91	.63	5.61	5 700	66.0	2.54	3 434	5.5	26.6
Pershing	S	S	S	S	S	S	S	S	S	5.58	.41	11.30	1 300	6.0	2.74	1 256	4.5	22.2
Storey	S	S	S	S	S	S	S	S	S	2.48	1.06	2.86	700	21.3	2.43	593	5.7	26.0
Washoe	6.3	11.5	18.2	20.3	15.0	10.1	9.1	6.4	3.1	1.76	1.96	4.83	89 600	16.0	2.41	77 204	8.6	26.0
White Pine	S	S	S	S	S	S	S	S	S	2.78	.60	9.35	2 900	-3.4	2.66	3 003	7.2	24.8
Independent City																		
Carson City city	5.0	12.7	14.4	18.0	15.0	10.9	11.3	8.8	3.9	4.62	.90	3.98	13 700	13.9	2.39	12 074	8.8	24.3
NEW HAMPSHIRE	7.0	14.3	16.6	18.4	13.8	9.3	9.1	6.7	4.8	.15	.32	.61	366 000	13.2	2.64	323 493	8.4	21.2
Belknap	6.7	14.5	14.2	17.0	14.1	9.3	10.2	8.2	5.8	.24	.29	.44	17 300	11.4	2.57	15 573	8.3	22.4
Carroll	6.2	13.0	11.6	16.4	12.8	11.0	11.8	10.3	6.8	.11	.08	.38	12 400	11.7	2.46	11 074	7.5	24.8
Cheshire	6.7	13.4	18.2	17.2	13.2	9.2	9.1	7.7	5.4	.16	.16	.42	24 000	10.1	2.59	21 832	8.2	21.2
Coos	6.9	13.9	14.0	15.2	11.0	11.1	12.0	9.1	6.9	.10	.14	.28	13 000	.8	2.56	12 938	8.5	23.1
Grafton	6.6	12.3	21.4	17.1	12.0	8.9	8.9	7.4	5.3	.21	.42	.55	25 000	7.5	2.50	23 221	7.8	24.4
Hillsborough	7.4	15.1	16.1	18.4	14.6	9.3	8.6	6.1	4.3	.13	.36	.80	110 800	15.6	2.71	95 820	9.1	20.7
Merrimack	7.0	14.0	15.4	19.2	13.6	9.3	8.9	7.0	5.6	.14	.21	.47	39 300	13.3	2.60	34 674	8.6	22.1
Rockingham	7.3	14.7	15.2	20.8	14.9	9.1	8.3	5.8	3.8	.15	.41	.64	78 100	18.5	2.68	65 951	7.7	19.0
Strafford	6.5	13.3	23.5	16.5	11.8	8.9	9.0	6.2	4.3	.13	.37	.62	32 400	11.2	2.63	29 104	9.0	21.1
Sullivan	7.4	15.3	13.7	17.0	13.1	9.1	9.9	8.5	6.0	.14	.17	.36	14 000	5.1	2.65	13 306	8.0	22.9
NEW JERSEY	6.8	13.9	15.5	16.7	13.7	10.5	10.8	7.5	4.8	.11	1.41	6.68	2 737 000	7.4	2.71	2 548 594	12.0	21.1
Atlantic	6.0	13.7	16.1	16.8	11.9	9.2	11.2	8.6	6.4	.14	.49	3.91	79 200	10.2	2.53	71 806	13.7	25.8
Bergen	5.5	12.1	13.8	15.8	14.8	11.9	12.5	8.3	5.3	.08	2.33	3.37	310 800	3.4	2.68	300 410	8.8	20.1
Burlington	7.3	15.2	16.6	17.9	14.7	10.3	9.2	5.5	3.4	.14	1.24	2.39	126 600	10.2	2.66	114 890	9.8	16.5
Camden	7.7	15.2	15.7	17.3	13.2	9.5	10.1	7.0	4.2	.12	1.07	4.37	175 300	7.9	2.76	162 508	13.6	21.0
Cape May	6.2	12.2	13.7	13.7	11.6	8.9	13.6	12.1	7.9	.12	.35	1.45	37 100	14.6	2.37	32 347	9.6	27.2
Cumberland	7.5	16.2	15.8	14.9	12.8	10.2	10.3	7.5	4.7	.56	.64	9.43	47 400	7.1	2.75	44 287	14.3	20.5
Essex	7.4	14.7	16.7	15.9	12.8	10.6	10.2	7.0	4.7	.12	1.29	9.00	307 300	2.3	2.71	300 303	18.9	25.1
Gloucester	8.2	15.5	17.2	18.0	13.2	9.1	9.1	6.2	3.6	.15	.53	1.20	71 200	9.4	2.69	65 129	9.7	16.7
Hudson	7.2	12.9	17.3	16.3	12.3	10.6	11.0	7.7	4.9	.10	2.73	26.06	215 500	3.7	2.56	207 857	16.4	27.9
Hunterdon	6.7	15.9	12.9	17.0	16.7	11.0	8.3	5.6	3.8	.07	.57	1.04	31 700	11.0	2.87	28 515	6.5	16.9
Mercer	6.2	12.9	17.2	17.4	13.1	10.3	10.7	7.4	4.8	.09	1.23	3.44	115 000	8.7	2.62	105 819	13.4	22.4
Middlesex	6.4	12.6	18.1	18.5	13.3	10.3	10.7	6.7	3.5	.09	2.06	5.73	218 500	11.1	2.77	196 708	9.7	18.1
Monmouth	6.9	15.1	13.6	16.5	15.0	10.6	10.0	7.3	5.2	.10	1.06	2.57	189 800	11.6	2.75	170 130	10.2	20.5
Morris	6.3	14.8	14.2	18.0	16.8	11.5	9.0	5.5	3.9	.05	1.66	2.69	142 700	8.3	2.66	131 820	7.6	18.1
Ocean	6.5	13.2	12.0	14.7	11.5	7.9	11.7	13.6	8.9	.11	.49	2.44	149 900	16.8	2.52	128 304	8.4	21.1
Passaic	7.2	13.8	17.1	16.5	12.7	10.3	10.4	7.2	4.9	.15	1.04	13.88	164 600	7.3	2.74	153 463	14.4	21.0
Salem	7.6	16.5	15.0	15.3	13.0	9.5	10.4	8.0	4.7	.20	.30	1.55	23 200	4.0	2.78	22 330	11.3	19.4
Somerset	5.9	13.8	14.0	17.8	15.6	12.5	10.3	6.2	3.9	.07	1.39	2.01	73 200	8.7	2.81	67 388	8.3	16.8
Sussex	8.4	16.9	11.6	21.3	16.9	8.6	7.0	5.6	3.9	.09	.46	1.52	41 400	11.2	2.88	37 221	6.8	14.6
Union	6.3	12.4	14.6	15.8	13.4	11.2	12.5	8.4	5.2	.09	1.24	8.09	184 900	3.9	2.71	177 873	11.4	20.8
Warren	6.6	14.6	15.0	16.3	14.8	9.7	9.9	8.0	5.3	.07	.44	1.14	31 300	6.4	2.70	29 406	8.8	19.8
NEW MEXICO	9.1	16.5	17.3	17.7	12.7	9.1	8.3	5.8	3.5	8.14	.52	36.83	510 000	15.4	2.80	441 466	10.1	21.0
Bernalillo	7.9	14.5	18.6	19.3	13.2	9.0	8.5	5.6	3.3	2.69	.85	36.84	174 400	15.4	2.63	151 037	11.1	22.7
Catron	S	S	S	S	S	S	S	S	S	1.47	.11	28.68	1 000	-.5	2.77	980	6.4	21.5
Chaves	9.3	15.4	14.7	15.8	11.1	9.9	10.6	8.1	5.2	.64	.32	30.57	20 700	13.9	2.85	18 194	9.1	22.1
Cibola	(4)	(4)	(4)	(4)	(4)	(4)	(4)	(4)	(4)	(4)	(4)	(4)	7 100	-21.0	3.30	(4)	(4)	(4)
Colfax	S	S	S	S	S	S	S	S	S	.53	.15	47.42	5 200	5.4	2.68	4 901	8.6	25.4
Curry	8.7	17.2	17.8	16.6	12.8	8.6	8.4	5.9	4.1	.41	.85	19.52	15 600	9.2	2.65	14 419	8.9	20.7
De Baca	S	S	S	S	S	S	S	S	S	.08	.04	30.93	1 000	.7	2.39	969	7.6	27.3
Dona Ana	9.9	17.3	20.5	16.3	11.6	9.2	7.7	4.7	2.8	.79	.62	52.11	38 300	25.9	3.00	30 402	10.1	18.9
Eddy	9.8	16.5	15.1	15.7	11.4	8.8	9.9	7.8	5.0	.35	.19	30.73	18 300	9.8	2.81	16 669	8.1	19.1
Grant	9.2	17.6	14.6	13.9	13.1	10.0	9.9	7.2	4.4	.47	.17	51.34	9 200	6.9	2.88	8 586	6.9	18.7
Guadalupe	S	S	S	S	S	S	S	S	S	.24	.40	82.85	1 500	-1.1	3.00	1 498	13.8	21.8
Harding	S	S	S	S	S	S	S	S	S	.09	-	44.31	400	-12.1	2.69	412	5.6	26.6
Hidalgo	S	S	S	S	S	S	S	S	S	.10	.64	47.10	2 100	10.4	2.96	1 905	8.8	18.8
Lea	12.5	17.6	17.0	17.2	10.9	9.1	7.9	5.0	2.8	.54	.19	21.25	21 800	15.3	2.95	18 947	7.3	17.8
Lincoln	S	S	S	S	S	S	S	S	S	.60	.12	26.62	5 500	33.1	2.48	4 108	8.5	23.1
Los Alamos	S	S	S	S	S	S	S	S	S	.56	1.09	11.49	6 800	8.8	2.63	6 283	4.3	18.0
Luna	S	S	S	S	S	S	S	S	S	.50	.20	39.45	6 700	20.5	2.60	5 557	9.5	20.9
McKinley	11.7	22.1	19.9	17.6	10.9	7.8	4.9	3.2	2.0	65.72	.37	13.53	17 900	19.0	3.57	15 078	15.6	17.2
Mora	S	S	S	S	S	S	S	S	S	.17	.05	66.56	1 700	19.8	2.76	1 390	12.4	21.8
Otero	8.3	17.1	19.0	17.7	13.2	9.5	8.0	4.7	2.6	4.83	1.12	21.75	17 200	17.8	2.80	14 608	8.3	17.0
Quay	S	S	S	S	S	S	S	S	S	.37	.25	35.48	4 400	12.1	2.65	3 936	8.6	24.6
Rio Arriba	9.7	19.0	18.7	15.3	13.0	8.7	7.3	4.9	3.4	11.38	.05	74.40	10 600	16.3	3.09	9 078	12.0	19.0
Roosevelt	S	S	S	S	S	S	S	S	S	.69	.53	21.52	6 200	10.7	2.45	5 645	7.9	25.8
Sandoval	10.0	17.9	14.1	16.3	12.5	8.9	9.0	7.7	3.6	27.30	.19	27.53	14 600	39.8	3.20	10 464	10.3	14.0

[1]Hispanic persons may be of any race. [2]No spouse present. [3]Householder living alone. [4]Cibola County included with Valencia County; data not available separately.

REFERENCE 27

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LATITUDE 40:53:53 LONGITUDE 74: 9:32 1980 POPULATION

KM	0.00- 0.4	0.4- 0.8	0.8- 1.6	1.6- 3.2	3.2- 4.8	4.8- 6.4	SECTOR TOTALS
S 1	1379	9237	30100	98857	143703	123994	407270
RING TOTALS	1379	9237	30100	98857	143703	123994	407270

CONTINENTAL CAN COMPANY
PATERSON, NEW JERSEY

Graphical Exposure Modeling System
by General Science Corporation
April 1990